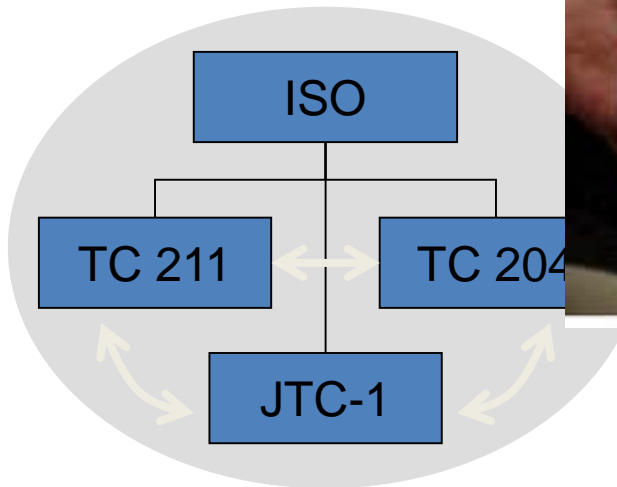


Aspetos Normativos da GeoInformação



- Características das Normas (Standards)
- Classificação das normas
- A ISO
- Procedimento de Normalização
- ISO/TC211
- Roadmap das Normas
- EPSG
- INSPIRE

Standards are the Foundation of Data Ecosystems

By Dr. Nadine Alameh

Location counts. There is no dearth of articles and talks around the ‘new spatial revolution’ or how ‘location is at the heart of Industry 4.0.’ The fact is that geospatial has finally moved up the value chain and is now being acknowledged as both an enabler *and* a differentiator in more domains than can fit in this article.

More Prime Read



Geo4SDGs:
Relevance to
the Digital Age

The growing recognition of ‘geospatial’ is largely due to location’s unparalleled ability to function as the organizing principle that unites heterogeneous data. But while location allows us to *contextualize* diverse data, the ability to *seamlessly integrate* it for analysis requires standards.

Seamless data integration

Over time our community has evolved from being seen as geospatial pioneers to GIS technologists, and now, to experts at using location to integrate diverse data and create new value. One current example of this location-based value is how the geospatial industry mobilized to support responses to the COVID pandemic. Every dashboard, every quarantine/de-quarantine plan, and every contact-tracing app relies on location for data integration and contextualization, and every one of these applications is creating tremendous value for communities the world over.

htt

Data integration sits at the heart of the decision-making, analysis, and prediction processes that help us make sense of, and exist in, our world. Because of humanity's newfound appetite for — even reliance on — data, we continue to invent new technologies that generate data about nearly every aspect of human activity

Standards and interoperability

The only way to create such a data ecosystem is for data providers and software developers to agree upon a set of standards that guarantee interoperability. Consensus-based open standards, when created by an engaged user community, ensure interoperability, enhance collaboration, and create a diverse, interoperable, decentralized software and data ecosystem that benefits all participants. Simultaneously, this means that the only requirement for participation in the ecosystem is compliance with its standards, making it as accessible for the small players as it does the large.

While it's impossible to create universal, perpetual standards, it *is* possible to design them to easily evolve in-step with technological progress, so that we don't have to start from scratch every few years. This is why the new OGC API family of standards are being developed in a fully modular and extensible fashion, and with

As Normas (standard)

O que é uma norma?

“regra de procedimento; princípio; modelo; lei.”



As boas normas são simples e únicas

Por exemplo as letras romanas são usadas há mais de 2000 anos e são capazes de se adaptar à maioria das línguas do mundo.

Por contraste os números romanos não tiveram tanto sucesso como norma e acabaram por desaparecer.

Todos os dias contactamos com normas e quase não nos apercebemos do quanto estas contribuem para a simplificação ou facilitação de tarefas.

São exemplos:

Folha de papel A4, A3, etc

Formatos de ficheiros

- *.DOC (Microsoft Word),
- *.TIF, (Tagged Interchange Format, Adobe)
- *.DXF (AutoCad), *.shp (Shape ESRI)

Perspectiva Linguística

(Em inglês o termo correspondente a **norma** é “**standard**”, em Francês “**la norme**” e alemão “**die Norm**”). (стандартен)

Uma organização internacional como a ISO (International Organization for Standardization) publica normas formais que têm algum nível de relevância no domínio das aplicações.

Estas normas são referidas por “**de-jure**” (“*pela lei*”)

As empresas desenvolvem normas com o objectivo de melhor operar com os seus produtos.

Se o “standard” for bem aceite pela comunidade torna-se uma norma “**de-facto**” (“*na prática*”)

O motivo para a indústria investir na normalização é o retorno financeiro. Um estudo provou que os ganhos de normalização na indústria alemã eram de 15 mil milhões de euros anuais (em 2000).

As razões para este ganhos são:

1. Normalização evita a opção de interfaces para um variado número de aplicações
2. Participação no processo de normalização coloca as empresas em vantagem relativamente às outras que não participam
3. As normas permitem as empresas terem vários fornecedores
4. As normas suportam o processo legislativo. Cerca de 20% das normas alemãs (DIN) são referenciadas por leis. Neste sentido as normas simplificam o processo legislativo

Perspectiva Nacional

Os princípios de normalização são:

Faz uma vez,

faz certo,

faz internacional


No domínio das Tecnologias da Informação qualquer abordagem de âmbito nacional só poderá ser vista como referência de uma solução internacional.

De qualquer modo, as normas internacionais têm de ser adaptadas a cada país (linguística) e devem obter o contributo dos vários Estados.


Em Portugal a instituição participante é o

IPQ (Instituto Português de Qualidade)

O Instituto Português de Qualidade



“No quadro do Sistema Português da Qualidade (SPQ) - Decreto-Lei nº 142/2007, de 27 de Abril - o IPQ, como Organismo Nacional de Normalização (ONN), coordena a actividade normativa nacional, a qual está definida nas “Regras e Procedimentos para a Normalização Portuguesa, aprovadas por Despacho IPQ nº 26/2010 de 28 de Setembro.”



“No que concerne à participação ao nível internacional, o IPQ assegura a representação de Portugal em inúmeras estruturas europeias e internacionais relevantes para a sua missão, designadamente,

European Committee for Standardization (CEN),

European Committee for Electrotechnical Standardization (CENELEC),

International Electrotechnical Commission (IEC),

Conference General des Poids et Mesures (CGPM),

International Organization for Legal Metrology (OIML), e

International Organization for Standardization (ISO).”



NORMALIZAÇÃO

O CONHECIMENTO AO SERVIÇO DA ECONOMIA E DA SOCIEDADE

SAIBA MAIS ▶



Instituto Português da Qualidade

O Instituto Português da Qualidade é o Organismo Nacional de Normalização e a Instituição Nacional de Metrologia. Coordena o Sistema Português da Qualidade (SPQ) e de outros sistemas de qualificação regulamentar que lhe forem conferidos por lei.

Serviços do Instituto Português da Qualidade

VER TODOS OS SERVIÇOS



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Serviços do Instituto Português da Qualidade

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Agendar **Visitas ao Museu de Metrologia e/ou Laboratórios**

Aprovação de modelos de **Instrumentos de Medição**

Calibração de **Padrões e Instrumentos de Medição**

Candidatura a **Organismo Notificado ou Entidade Terceira Reconhecida**

Consulta do **Catálogo de Normas**

Consultar o **estado de um Instrumento de Medição**

Inscrição em **Formações**

Licenciamento de **Cisternas**

Licenciamento de **RSPS e ESP**

Questionar – Pedido de Informações

Reconhecimento de acordo com os **princípios das Boas Práticas de Laboratório (BPL)**

Subscrição de **Correspondentes**

METROLOGIA

NORMALIZAÇÃO

Um outro tipo de normas são as normas da série ISO9000 para gestão de qualidade.



É definido um conjunto de regras para investigar a eficiência na gestão da qualidade numa organização

Estes exemplos ilustram a natureza heterogénea da normalização.

As normas podem ser:

- Orientadas para a gestão ou técnicas
- Detalhadas ou abstractas
- Resultado do consenso internacional ou o resultado do desenvolvimento de uma empresa

As várias organizações internacionais de normalização podem ser divididas em dois grupos:

Organizações Internacionais

A sua decisão é baseada no consenso

O seu funcionamento é baseado no financiamento de cada estado membro em função do seu potencial económico permitindo funcionar de forma independente dos estados ou empresas.

Exemplos:

ISO – International Organisation for Standardization

IEC - International Electrotechnical Organization

ITU – International Telecommunication Union

Consórcios Internacionais

São liderados pela indústria com participação de agências governamentais.

O objectivo principal é defender os interesses dos seus membros.

Um dos interesses será desenvolver normas comuns de modo a potenciar outros desenvolvimentos (as normas “de-facto”)

Exemplos:

OGC – Open Geospatial Consortium

(o maior e mais importante consorcio da comunidade da IG)

W3C – World Wide Web Consortium



Leading the Future of Geospatial Innovation

At OGC, we unite a global network of leaders across government, business, research institutions, startups, and the geospatial community. For over 30 years, we've been the trusted hub for collaboration, empowering diverse voices to come together and drive solutions to the world's most pressing challenges — from climate change to urban planning and food security. As a U.S.-registered non-profit with offices in Belgium and the UK, we are committed to shaping a future where geospatial data and technology improve lives, connect communities, and protect our planet.

Our Program Areas

OGC is the home of open geospatial standards, but we're far more than that. We run an agile research and development lab that evaluates geospatial technology to identify future standardization needs, we certify solutions as OGC compliant and backed by our collective expertise, and we provide advisory services.

Standards

OGC Standards are collective, expert thinking on interoperability to maximize the value of geospatial.

Standards provide a fundamental description of the geospatial information being collected at pace, and scale, in the world around us. By implementing OGC Standards, you can describe the way to do something, from telling someone what a data resource is, to who created it, how it can be rendered on a map, and analyzed. Recognizing that things can be done better, our members work on making it easier to share and use geospatial information. And our next-gen OGC API Standards take advantage of modern web development practices to extend their reach.

OGC APIs

Standards that build upon the legacy of the OGC Web Service Standards but define resource-centric APIs that take advantage of modern web development practices.

- GeoAPI Implementation Specification
- OGC API – Features
- OGC API – Processes
- OGC SensorThings API
- OGC API – Common
- OGC API – Maps
- OGC API – Records
- OGC API – Connected Systems
- OGC API – Environmental Data Retrieval
- OGC API – Moving Features
- OGC API – Tiles

Services

Standards that implement XML Remote Procedure Calls using the Hypertext Transfer Protocol (HTTP).

- 3D Portrayal Service
- Table Joining Service
- Web Feature Service
- Web Map Tile Service
- Web Services Security
- Coordinate Transformation Service
- Web Coverage Processing Service (WCPS)
- Web Map Context
- Web Processing Service
- Location Service (OpenLS)
- Web Coverage Service
- Web Map Service
- Web Service Common

Data Models and Encodings — General

Standards that provide general rules to organize geospatial information, typically sent by a service provider or produced by an application.

- 3D Tiles
- EO Dataset Metadata GeoJSON(-LD)
- Geography Markup Language (GML)
- GeoXACML
- KML
- OGC GeoTIFF
- OGC Two Dimensional Tile Matrix Set
- Simple Feature Access – Part 2: SQL Option
- Styled Layer Descriptor
- Time Ontology in OWL
- Common Query Language (CQL2)
- Filter Encoding
- GeoPose
- GML in JPEG 2000 for Geographic Imagery
- Observations, Measurements, and Samples
- OGC Moving Features
- Open GeoSMS – Core
- Simple Features for CORBA
- Symbology Conceptual Core Model
- Training Data Markup Language for Artificial Intelligence
- CoverageJSON
- Geodetic data Grid eXchange Format (GGXF)
- Geospatial User Feedback (GUF)
- Indexed 3D Scene Layers (I3S)
- OGC Cloud Optimized GeoTIFF
- OGC Open Modelling Interface (OpenMI)
- Simple Feature Access – Part 1: Common Architecture
- Simple Features for OLE/COM
- Symbology Encoding
- Well-known text representation of coordinate reference system

Data Models and Encodings — Domain Specific

Standards that provide domain specific rules to organize geospatial information.

- CityGML
- LAS Specification
- OGC Geoscience Markup Language (GeoSciML)
- OGC WaterML
- CityJSON
- MUDDI
- OGC IndoorGML
- OGC WaterML 2: Part 4 – GroundWaterML 2 (GWML2)
- Indoor Mapping Data Format (IMDF)
- OGC Augmented Reality Markup Language 2.0 (ARML 2.0)
- OGC LandInfra / InfraGML
- PipelineML Conceptual and Encoding Model



CityGML

This standard defines a conceptual model and exchange format for the representation, storage and exchange of virtual 3D city models.

Downloads

(Hover over Type for full description)

| DOCUMENT TITLE | VERSION | OGC DOC NO. | TYPE |
|--|---------|-------------|------|
| OGC City Geography Markup Language (CityGML) Part 2: GML Encoding Standard | 3.0 | 21-006r2 | IS |
| OGC City Geography Markup Language (CityGML) Part 1: Conceptual Model Standard | 3.0 | 20-010 | IS |
| OGC City Geography Markup Language (CityGML) 3.0 Conceptual Model Users Guide | 3.0 | 20-066 | UG |
| OGC City Geography Markup Language (CityGML) Encoding Standard | 2.0 | 12-019 | IS |
| OpenGIS® City Geography Markup Language (CityGML) Encoding Standard | 1.0 | 08-007r1 | IS |

Three core areas of focus:

The Future of Geospatial

What's next is already here. AI, automation, and commercial space exploration are reshaping how we move, plan, and respond—from smart cities and self-driving cars to lunar landings and global logistics.

OGC Research is where new ideas are tested, challenged, and proven—so the next generation of geospatial innovation is built on solid ground.

Integrity, Provenance, and Trust (IPT)

Because decisions are only as strong as the data behind them.

In an age of synthetic imagery, black-box AI, and information overload, trust in geospatial systems is non-negotiable. We're building the frameworks that make integrity, traceability, and reliability part of the foundation—**so trust isn't an afterthought, it's a feature.**

Purpose-Driven Domains & Standardization 3.0

Real-world problems need more than generic solutions.

From wildfire response to underground infrastructure, digital twins to planetary mapping—**location challenges are specific, high-stakes, and evolving.** That's why we're rethinking how standards work.

Standardization 3.0 delivers modular tools, test environments, and reusable building blocks that accelerate innovation where it matters most.

OGC Standards

Below is a list of OGC Implementation Standards.

Implementation Standards are different from the Abstract Specification. They are written for a more technical audience and detail the interface structure between software components. An interface specification is considered to be at the implementation level of detail if, when implemented by two different software engineers in ignorance of each other, the resulting components plug and play with each other at that interface.

Any Schemas (xsd, xslt, etc) that support an approved Implementation Standard can be found in the official [OGC Schema Repository](#).

OGC Standards

- [3D Tiles](#)
- [3dP](#)
- [ARML2.0](#)
- [Cat: ebRIM App Profile: Earth Observation Products](#)
- [Catalogue Service](#)
- [CDB](#)
- [CityGML](#)
- [CityJSON](#)
- [Coordinate Transformation](#)
- [EO-GeoJSON](#)
- [Filter Encoding](#)
- [GML in JPEG 2000](#)
- [GeoAPI](#)
- [GeoPackage](#)
- [GeoSciML](#)
- [GeoSPARQL](#)
- [Geography Markup Language](#)
- [GeoRSS](#)
- [Geospatial eXtensible Access Control Markup Language \(GeoXACML\)](#)
- [Geospatial User Feedback \(GUF\)](#)
- [GeoTiff](#)
- [GroundwaterML](#)
- [HDF5](#)
- [I3S](#)
- [Indoor Mapping Data Format \(IMDF\)](#)
- [IndoorGML](#)
- [KML](#)
- [LandInfra/InfraGML](#)
- [LAS](#)

Standards List

Standards Architecture Diagram

Standards Listing

A list of the OGC standards

| Document Title (click to view/download) | Version | OGC Doc.# | Editor | Publication Date |
|--|---------|-----------|---------------------------------|------------------|
| CDB Multi-Spectral Imagery Extension CDB: Multispectral The "Multi-Spectral Imagery" extension defines how to encode and store reflected electromagnetic radiation from the infrared wavelengths into a CDB. The portion of the spectrum targeted is between the visible spectrum (current imagery and texture in CDB), and longer wavelength infrared that is See more... | 1.0 | 17-080r2 | Ryan Franz | 2018 |
| CF-netCDF3 Data Model Extension standard netcdf-data-model-ex The OGC netCDF encoding supports electronic encoding of geospatial data, that is, digital geospatial information representing space and time-varying phenomena. This standard specifies the CF-netCDF data model extension. This standard specifies the CF-netCDF data model mapping onto the ISO 19123 c See more... | 3.1 | 11-165r2 | Ben Domenico and Stefano Nativi | 2013 |
| Corrigendum 1 for OGC Web Services Common | | 11-157 | Jim Greenwood | 2011 |

A ISO (International Organization for Standardization)

+3

A ISA (International Federation of the National Standardizing Associations) foi fundada em 1926 e estava focada na engenharia mecânica. A sua actividade terminou em 1942.

Em 1947 sucedeu-lhe a ISO (International Organization for Standardization) como organização não governamental. A sua sede é em Genebra, Suíça.

O trabalho na ISO é baseado em três princípios:

Consensus

As diferentes visões dos diferentes parceiros são tomados em consideração. A aprovação de uma norma é feita com 75% dos votantes

Industry-wide

As normas deverão sempre conduzir a soluções globais que satisfaçam as necessidades da indústria e dos consumidores

Volunteering

É baseado no envolvimento voluntário de todas as partes interessadas

A ISO (International Organization for Standardization)

O trabalho na ISO é descentralizado

O trabalho de normalização é realizado pelas

Comissões Técnicas (TC) e **Sub-Comissões (SC)**

Cada TC e SC tem o seu próprio secretariado numa instituição competente num qualquer lugar do mundo. Neste momento a ISO tem 186 TC e 50 SC.

No caso da TC-211 (IG/Geomatics) o secretariado é na Suécia,

O número de membros de um TC pode variar entre os 10 e 1000. No caso da TC211 são cerca de 60 que se encontram 2 vezes por ano.

As primeiras normas na área da IG surgiram na década de 1990.

(Embora já existissem na Europa há muitos anos normas para a execução de trabalhos nas áreas da Geodesia, Cadastro e Cartografia)

1991: O primeiro projecto para normalizar a informação geográfica, liderado pela AFNOR, a agência francesa, a Organização Europeia de Normalização CEN (Comité Européen de Normalisation) criou o Comité Técnico 287 (Geographic Information). O trabalho dessa comissão resultou em 8 pré-normas europeias.

1994: ISO/TC211 é criada e a congénere europeia foi extinta.

A Comunidade Europeia implementou recentemente (2007) uma iniciativa chamada INSPIRE que pretende desenvolver uma SDI a nível europeu. Este projeto é suportado nas normas ISO.

A principal força impulsionadora da ISO/TC211 foi a Defence Geospatial Information Working Group (DGIWG) dos EUA e os esforços de normalização nos EUA e Canadá.

As outras duas organizações que contribuíram para o aparecimento da ISO/TC211 foram a IHO (International Hydrographic Organization) e a CEN/TC278 (Geographic Data Files, GDF)

Âmbito:

A Informação Geográfica / Geomática

As normas deverão especificar uma infra-estrutura e os necessários serviços para o manuseamento de dados geográficos incluindo a sua **gestão, aquisição, processamento, análise, acesso, representação e transferência.**

Quando possível a norma deverá estabelecer a ligação com outras normas das Tecnologias da Informação.

ISO/TC 211

Geographic information/Geomatics

- About ▾
- Plenary meeting ▾
- Resolutions ▾
- Projects ▾
- Standards in action ▾
- Resources
- Good practices

- P- and O-Members
- External liaisons
- Internal liaisons
- Working groups
- Advisory groups
- Structure
- Contact

News from ISO/TC 211 Geographic information/Geomatics

ISO/TC 211 Standards in support of Spatial Data Infrastructures



THEME:
SHAPING THE FUTURE OF OUR NATIONAL GEOSPATIAL ECOSYSTEM
 Together Through Partnership, Efficiency, Innovation, and Impact

September 8-10, 2025
 Hyatt Regency Dulles, USA

<https://committee.iso.org/home/tc211>

Scope

Standardization in the field of digital geographic information.

This work aims to establish a structured set of standards for information concerning objects or phenomena that are directly or indirectly associated with a location relative to the Earth.

Within the scope of geographic information, these standards may specify methods, tools, and services for data management. Data management includes acquiring, processing, analyzing, accessing, presenting, and publishing geographic data for users and systems.

The work shall link to appropriate standards for information technology and data where possible, and provide a framework for the development of sector-specific applications using geographic data.

Vision:

ISO/TC 211 wants to support a

SUSTAINABLE DEVELOPMENT GOALS

This committee contributes with 21 standards to the following Sustainable Development Goals:



TC

STANDARDS BY ISO/TC 211

Geographic information/Geomatics

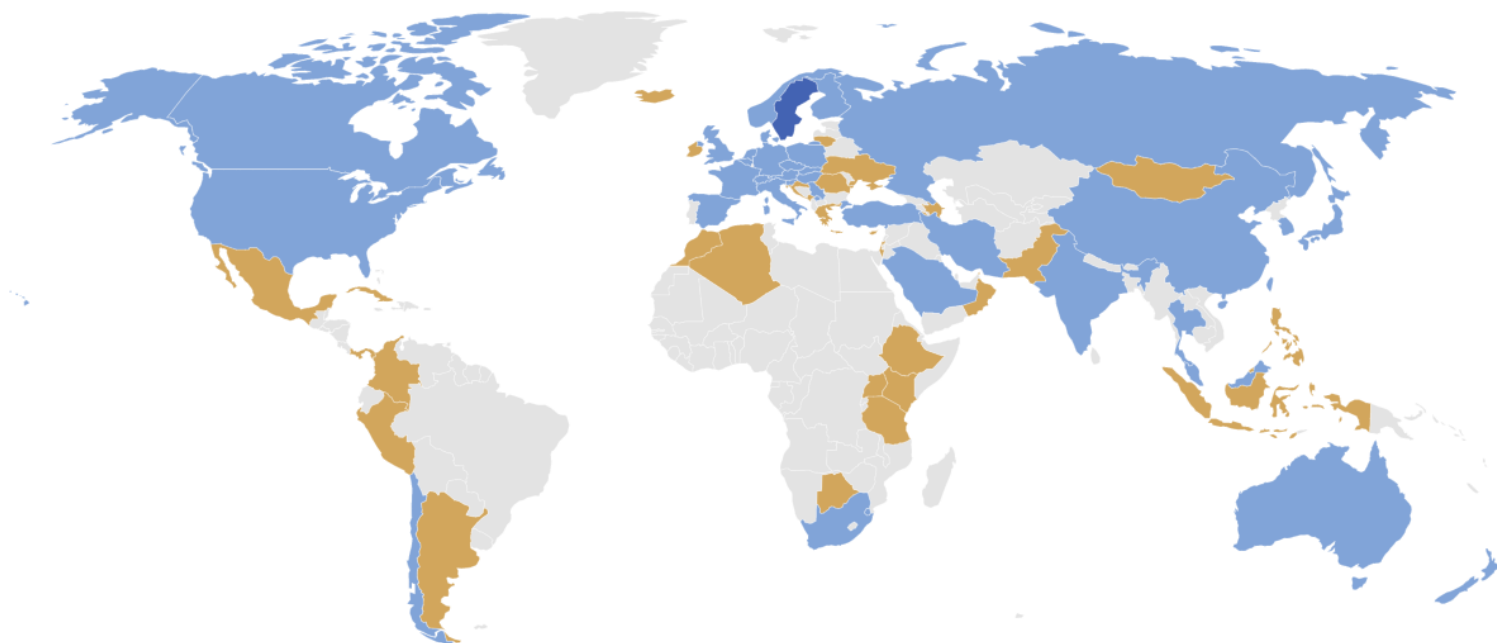
Filter: Published standards Standards under development Withdrawn standards Projects deleted

STANDARD AND/OR PROJECT UNDER THE DIRECT RESPONSIBILITY OF ISO/TC 211 SECRETARIAT (75) 

| | STAGE | ICS |
|---|-------|------------------------|
| ISO 6709:2008 Standard representation of geographic point location by coordinates | 90.92 | 35.240.70 |
| ISO 6709:2008/COR 1:2009 Standard representation of geographic point location by coordinates — Technical Corrigendum 1 | 60.60 | 35.240.70 |
| ISO 19101-1:2014 Geographic information — Reference model — Part 1: Fundamentals | 60.60 | 35.240.70 |
| ISO 19101-2:2018 Geographic information — Reference model — Part 2: Imagery | 60.60 | 35.240.70 |
| ISO 19103:2015 Geographic information — Conceptual schema language | 60.60 | 35.240.70 |
| ISO 19104:2016 Geographic information — Terminology | 60.60 | 01.040.35 35.240.70 |
| ISO 19105:2000 Geographic information — Conformance and testing | 90.92 | 35.240.70 |
| ISO 19106:2004 Geographic information — Profiles | 90.93 | 35.240.70 |
| ISO 19107:2003 Geographic information — Spatial schema | 90.92 | 35.240.70 |
| ISO 19108:2002 Geographic information — Temporal schema | 90.93 | 35.240.70 |
| ISO 19108:2002/COR 1:2006 Geographic information — Temporal schema — Technical Corrigendum 1 | 60.60 | 35.240.70 |

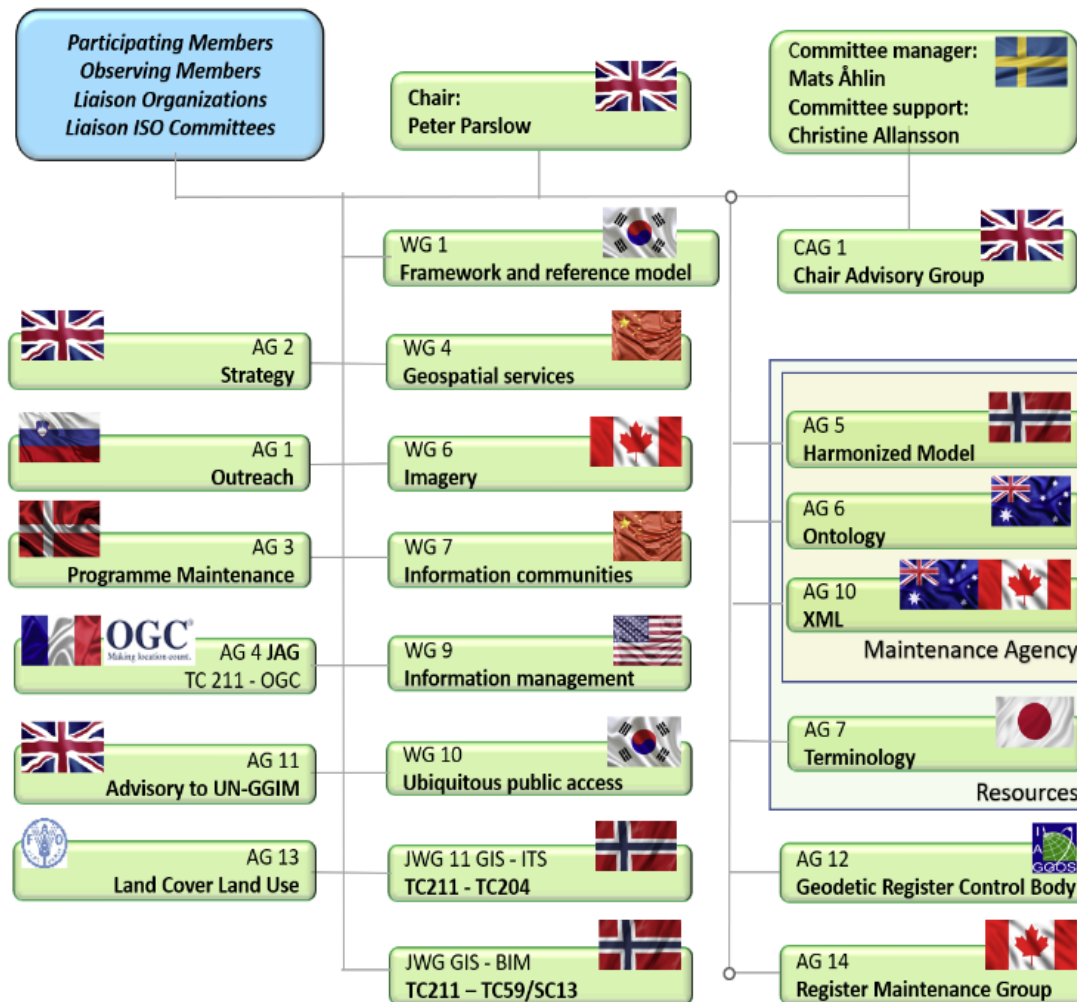
← ISO/TC 211

Participation



This map is designed to visually demonstrate the geographic distribution of our Members. The boundaries shown do not imply an official endorsement or acceptance by ISO.

ISO/TC211 - Estrutura



Active working groups

| | Number on livelink |
|---|--------------------|
| Working group 1 Framework and reference model Convenor: Mr. Andrew Jones, Australi (2013-11 - Reappointed 2016-12) | ISO/TC 211/WG 01 |
| Working group 4 Geospatial services Convenor: Mr. Morten Borrebæk, Norway (1995-08 - Reappointed 2017-06) | ISO/TC 211/WG 04 |
| Working group 6 Imagery Convenor: Mr. Doug O'Brien, Canada (2002-05 - Reappointed 2017-06) | ISO/TC 211/WG 06 |
| Working group 7 Information communities Convenor: tdb | ISO/TC 211/WG 07 |
| Working group 9 Information management Convenor: Mr. John Herring, USA (2011-05 - Reappointed 2017-06) | ISO/TC 211/WG 09 |
| Working group 10 Ubiquitous public access Convenor: Professor Sang-Ki Hong, Korea (2008-01 - Reappointed 2017-06) | ISO/TC 211/WG 10 |

Next ISO/TC 211 meeting

Nov 27th - Dec 1st 2017 in Wellington, New Zealand

[Register here](#)

[Practical information](#)

[Draft Agenda](#)

May 28th - June 1st 2018 in Copenhagen, Denmark

Registration not open yet

ISO/TC 211 Publications (1)

Working Group 1 - Framework and reference model

Published standards/specifications

ISO 19101-1:2014 Geographic information - **Reference model** - Part 1: Fundamentals

ISO/TS 19103:2005 Geographic information - **Conceptual schema language** - Under revision in WG 4

ISO/TS 19104:2008 Geographic information - **Terminology** -

ISO 19105:2000 Geographic information - **Conformance and testing**

ISO/TR 19121:2000 Geographic information - Imagery and gridded data

WI 19124 Geographic information - Imagery and gridded data components - Completed with review summary, N 1017

ISO/TS 19129:2009 Geographic information - Imagery, gridded and coverage data framework - Moved to new WG 6

WI 19130 Geographic information - Sensor and data models for imagery and gridded data - Moved to new WG 6

Working Group 4 - Geospatial services

ISO 19116:2004 Geographic information - Positioning services

ISO 19117:2012 Geographic information - Portrayal

ISO 19118:2011 Geographic information - Encoding

ISO 19119:2005 Geographic information - Services (*under revision*)

ISO 19119:2005 Amd 1:2008 Geographic information - Services - Amendment 1

ISO 19125-1:2004 Geographic information - Simple feature access - Part 1: Common architecture

ISO 19125-2:2004 Geographic information - Simple feature access - Part 2: SQL options (*under revision*)

ISO 19128:2005 Geographic information - **Web Map server interface**

ISO 19136:2007 Geographic information - **Geography Markup Language (GML)**

ISO 19136-2:2016 Geographic information - **Geography Markup Language (GML) - Part 2: Extended schemas and encoding rules**

ISO 19142:2010 Geographic information - **Web Feature Service**

ISO 19143:2010 Geographic information - Filter encoding (*under revision*)

ISO 19149:2010 Geographic information - Rights expression language for geographic information - GeoREL

Working group 6 - Imagery

Published standards/specifications

ISO/TR 19120:2001 Geographic information - Functional standards

ISO 19101-2:2008 Geographic information - Preference model - Part 2: Imagery

ISO 19115-2:2009 Geographic information - Metadata - Part 2: Extensions for imagery and gridded data (*under revision*)

ISO/TS 19129:2009 Geographic information - Imagery, gridded and coverage data framework

ISO/TS 19130:2010 Geographic information - Imagery sensor models for geopositioning (*under revision*)

ISO/TS 19130-2 Geographic information - Imagery sensor models for geopositioning - Part 2: SAR, InSAR, lidar and sonar

ISO/TS 19139-2:2012 Geographic information - Metadata - XML Schema Implementation - Part 2 : Extensions for imagery and gridded data

ISO/TS 19159-1 Geographic information - Calibration and validation of remote sensing imagery sensors - Part 1: Optical sensor

Working group 7 - Information communities

Published standards/specifications

ISO 19110:2005 Geographic information - Methodology for feature cataloguing

ISO 19110:2005 Amd. 1:2011

ISO 19115-1:2014 Geographic information - Metadata – Part 1: Fundamentals

ISO/TR 19122:2004 Geographic information/Geomatics - Qualification and certification of personnel

ISO 19126:2009 Geographic information - Feature concept dictionaries and registers

ISO 19137:2007 Geographic information - Core profile of the spatial schema

ISO/TS 19139:2007 Geographic information - Metadata - Implementation specifications (*under revision*)

ISO 19144-1:2009 Geographic information - Classification Systems – Part 1: Classification system structure

ISO 19144-1:2009 Corrigendum 1:2012

ISO 19144-2:2012 Geographic information - Classification systems - Part 2: Land Cover Meta Language (LCML)

ISO 19150 Geographic information - Ontology - Review summary N 2705

ISO/TS 19150-1 Geographic information - Ontology - Part 1: Framework

ISO 19150-2:2016 Geographic information - Ontology - Part 2: Rules for developing ontologies in the Web

Ontology Language (OWL)

ISO 19152:2012 Geographic information - Land Administration Domain Model (LADM)

Working group 9 - Information management

Published standards/specifications

ISO 6709:2008 Standard representation of geographic point location by coordinates

ISO 19111-2:2009 Geographic information - Spatial referencing by coordinates - Part 2: Extension for parametric values

ISO/TS 19127:2005 Geographic information -- Geodetic codes and parameters (*under revision*)

ISO 19131:2007 Geographic information - Data product specifications

ISO 19131:2007/Amd 1:2011

ISO 19135-1 Geographic information - Procedures for item registration - Part 1: Fundamentals (*Revision of ISO 19135:2005*)

ISO 19135-2 Geographic information - Procedures for item registration - Part 2: XML Schema Implementation

ISO 19138:2006 Geographic information - Data quality measures (Withdrawn, replaced by ISO 19157:2013)

ISO 19145:2013 Geographic information - Registry of representations of geographic point location

ISO 19146:2010 Geographic information - Cross-domain vocabularies

ISO 19153:2014 Geospatial Digital Rights Management Reference Model (GeoDRM RM)

ISO 19156:2011 Geographic information - Observations and measurements

ISO 19157:2013 Geographic information - Data quality

ISO/TS 19158:2012 Geographic information - Quality assurance of data supply

ISO/TS 19162:2016 Geographic information - Well-known text representation of coordinate reference systems

Review summary: Geographic information - Amendment to ISO 19113:2002 Geographic information - Quality principles and ISO 19115:2003 Geographic information - Metadata

ISO/TC 211 Publications (6)

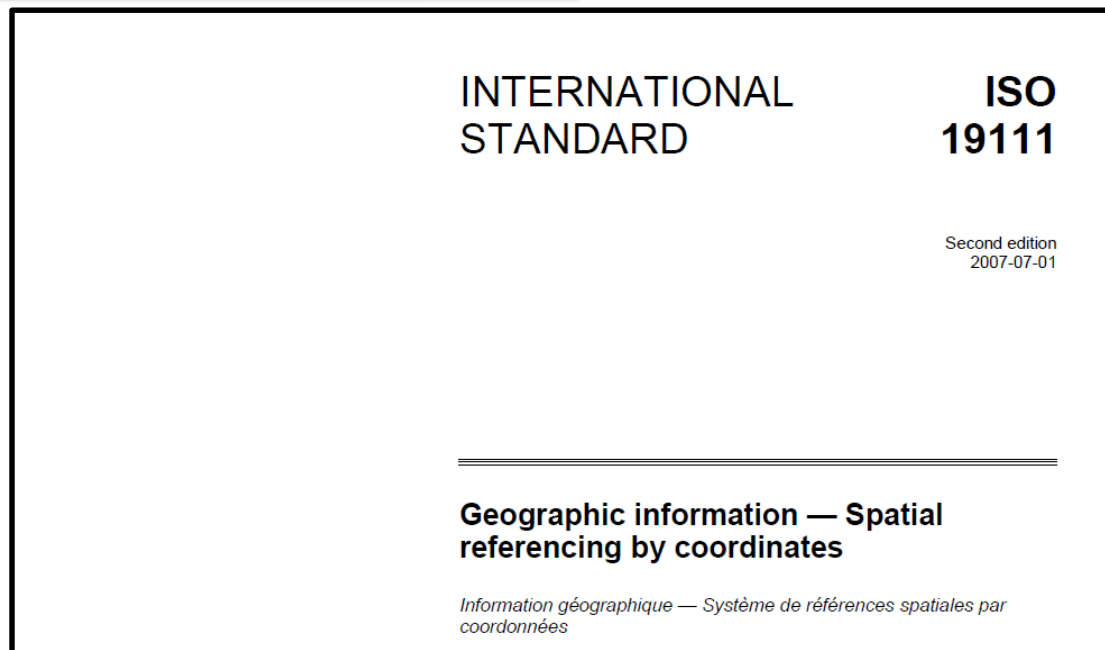
| | | |
|---|-------|-----------|
| ISO/TS 19130:2010 Geographic information - Imagery sensor models for ge positioning | 90.92 | 35.240.70 |
| ISO/TS 19130-2:2014 Geographic information -- Imagery sensor models for ge positioning -- Part 2: SAR, InSAR, lidar and sonar | 90.60 | 35.240.70 |
| ISO 19131:2007 Geographic information -- Data product specifications | 90.92 | 35.240.70 |
| ISO 19131:2007/Amd 1:2011 Requirements relating to the inclusion of an application schema and feature catalogue and the treatment of coverages in an application schema. | 60.60 | 35.240.70 |
| ISO 19132:2007 Geographic information -- Location-based services -- Reference model | 90.93 | 35.240.70 |
| ISO 19133:2005 Geographic information -- Location-based services -- Tracking and navigation | 90.93 | 35.240.70 |
| ISO 19134:2007 Geographic information -- Location-based services -- Multimodal routing and navigation | 90.93 | 35.240.70 |
| ISO 19135-1:2015 Geographic information -- Procedures for item registration -- Part 1: Fundamentals | 60.60 | 35.240.70 |
| ISO/TS 19135-2:2012 Geographic information - Procedures for item registration -- Part 2: XML schema implementation | 90.93 | 35.240.70 |
| ISO 19136:2007 Geographic information -- Geography Markup Language (GML) | 90.92 | 35.240.70 |
| ISO 19136-2:2015 Geographic information -- Geography Markup Language (GML) -- Part 2: Extended schemas and encoding rules | 60.60 | 35.240.70 |
| ISO 19137:2007 Geographic information -- Core profile of the spatial schema | 90.93 | 35.240.70 |
| ISO/TS 19139:2007 Geographic information -- Metadata -- XML schema implementation | 90.92 | 35.240.70 |
| ISO/TS 19139-2:2012 Geographic information -- Metadata -- XML schema implementation -- Part 2: Extensions for imagery and gridded data | 90.93 | 35.240.70 |

Formato de uma Norma ISO

Todos as normas têm o mesmo aspecto.

As normas ISO são documentos com uma estrutura rígida com páginas informativas e normativas

Têm uma página de rosto



Escopo

INTERNATIONAL STANDARD

ISO 19111:2007(E)

Geographic information — Spatial referencing by coordinates

1 Scope

This International Standard defines the conceptual schema for the description of spatial referencing by coordinates, optionally extended to spatio-temporal referencing. It describes the minimum data required to define one-, two- and three-dimensional spatial coordinate reference systems with an extension to merged spatial-temporal reference systems. It allows additional descriptive information to be provided. It also describes the information required to change coordinates from one coordinate reference system to another.

In this International Standard, a coordinate reference system does not change with time. For coordinate reference systems defined on moving platforms such as cars, ships, aircraft and spacecraft, the transformation to an Earth-fixed coordinate reference system can include a time element.

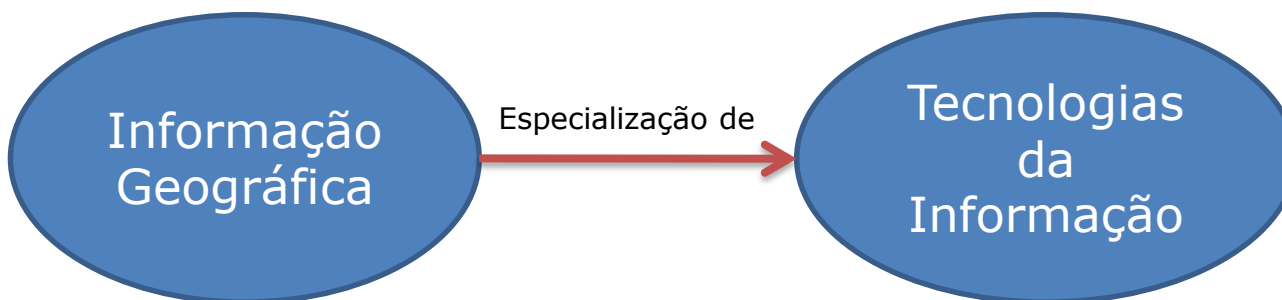
This International Standard is applicable to producers and users of geographic information. Although it is applicable to digital geographic data, its principles can be extended to many other forms of geographic data such as maps, charts and text documents.

Define sem ambiguidade o assunto do documento e os aspectos abordados indicando os limites de aplicabilidade.

O âmbito deverá ser sucinto de modo a ser usado como sumário para efeitos bibliográficos

Modelo de Referência (19101)

É assumido na família de normas ISO19100 que :

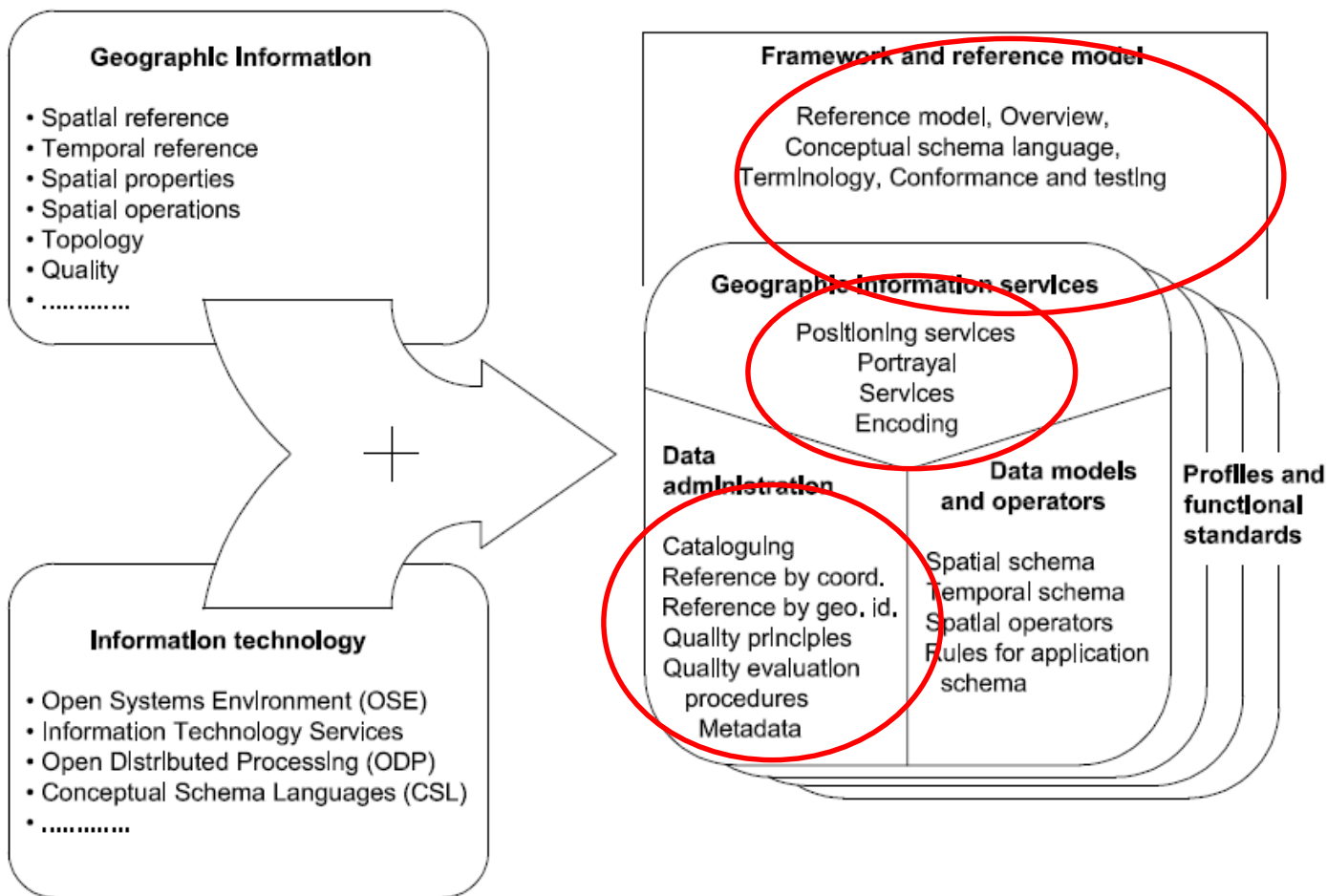


Por essa razão, a normalização da informação geográfica na série **ISO19100** é baseada na integração de conceitos de IG com conceitos de TI

A ISO19101 (Reference Model) define um modelo de referência hierárquico estruturado para a família ISO19100.

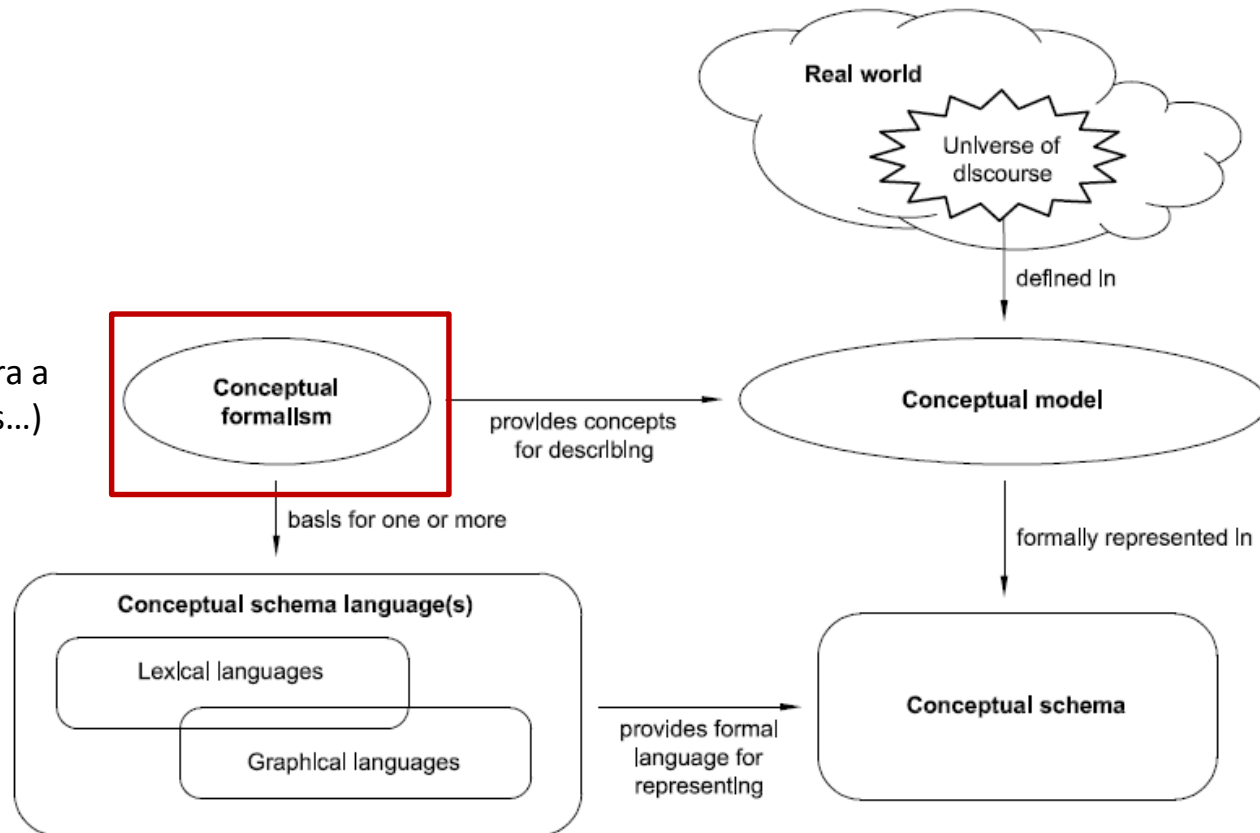
O modelo de referência é uma aplicação especial do “ponto de vista da informação” (semântica da informação e processamento da informação) que é identificado como o mais importante para a normalização da Geomática. Uma componente do modelo de referencia é baseado na abordagem computacional que se reporta aos serviços.

Modelo de Referência (19101)



Modelo de Referência

Fornecer os conceitos para a descrição (pontos, linhas...)



Um modelo é uma abstracção e representa apenas uma parte do mundo real. A parte que nós seleccionámos do mundo real que pretendemos descrever num modelo é designado como universo do discurso.

Linguagem do esquema conceptual

A ISO19103 define um perfil **UML (Unified Modelling language)** para a Informação Geográfica.

A UML é uma norma ISO/IEC 19501-1

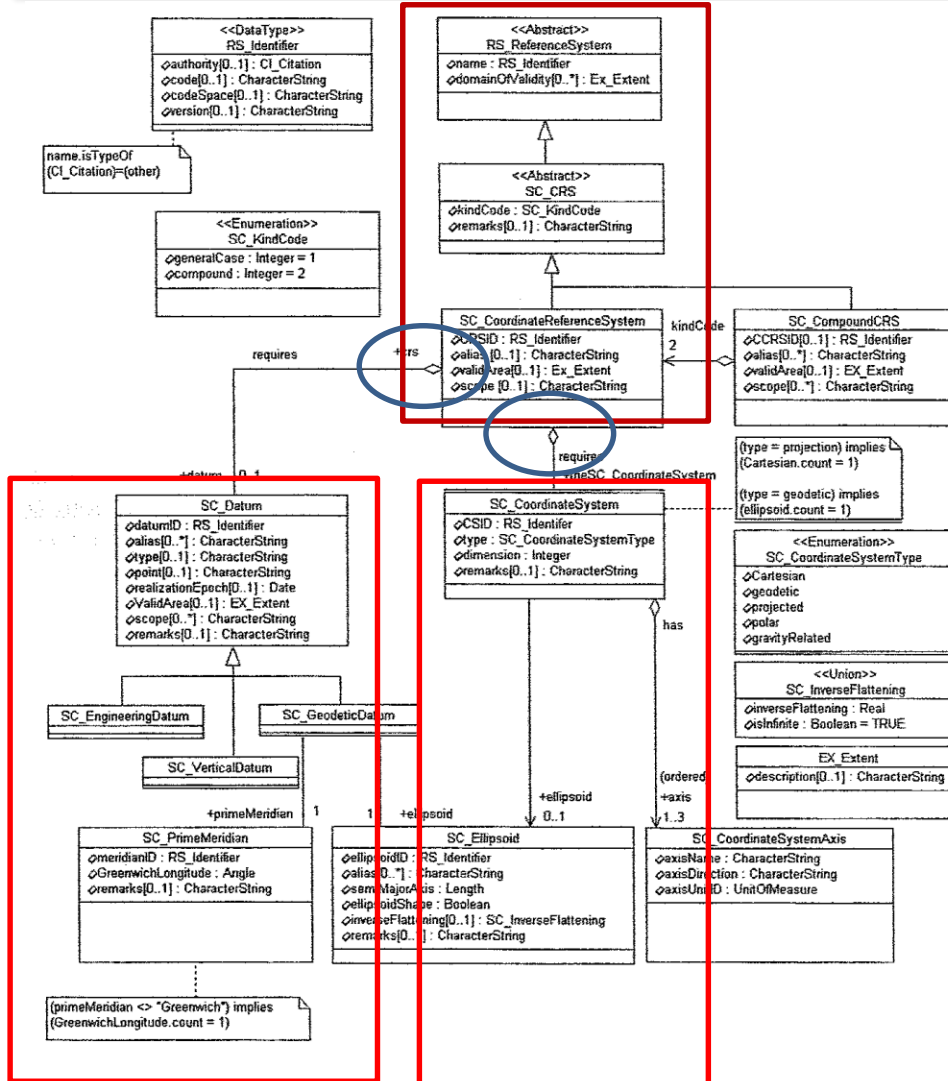
EXPRESS é uma linguagem conceptual usada no campo da engenharia mecânica e foi normalizada pela ISO/TC184

Os esquemas conceptuais em UML são baseados em elementos gráficos e léxicos enquanto que os esquemas em EXPRESS contêm apenas texto.

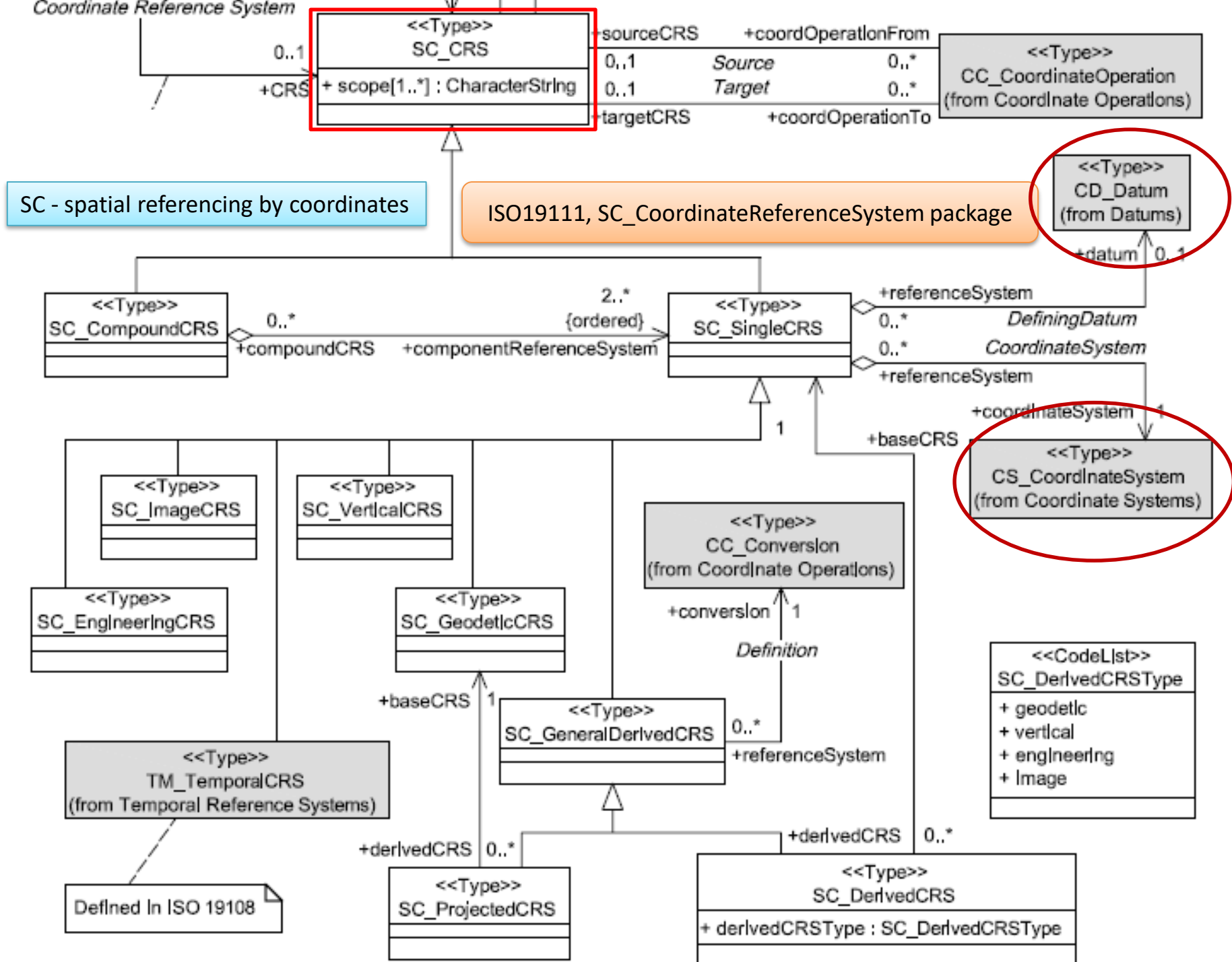
De acordo com as normas ISO 19100 ambas as linguagens são válidas para modelação de IG. Contudo UML é preferível.

Exemplo de Esquema UML

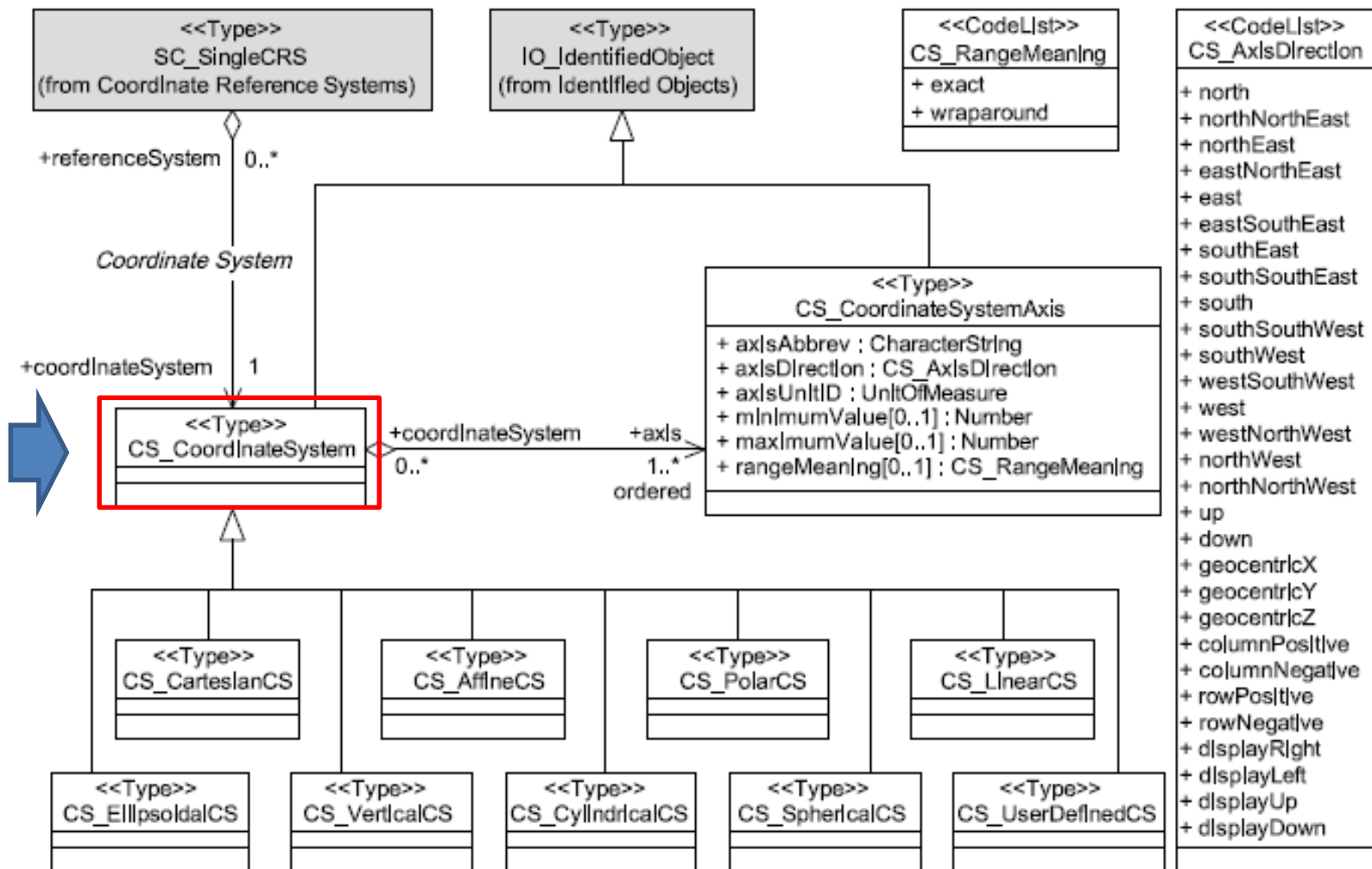
19111 - Spatial Referencing by Coordinates



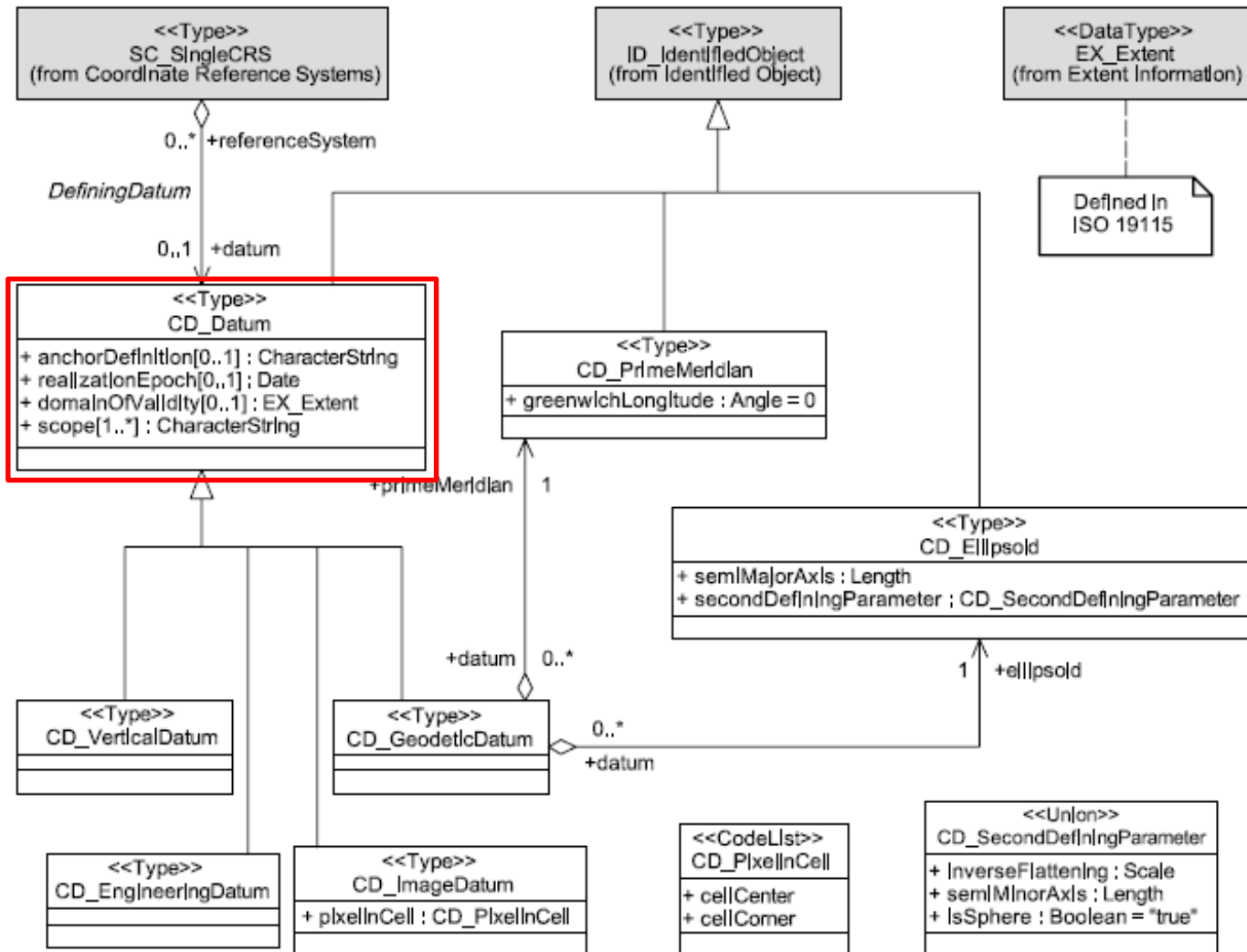
Basicamente, consiste em duas árvores de generalização uma com a classe mãe RS_ReferenceSystem e outra com a classe SC_Datum. O Diagrama de classes é normativo



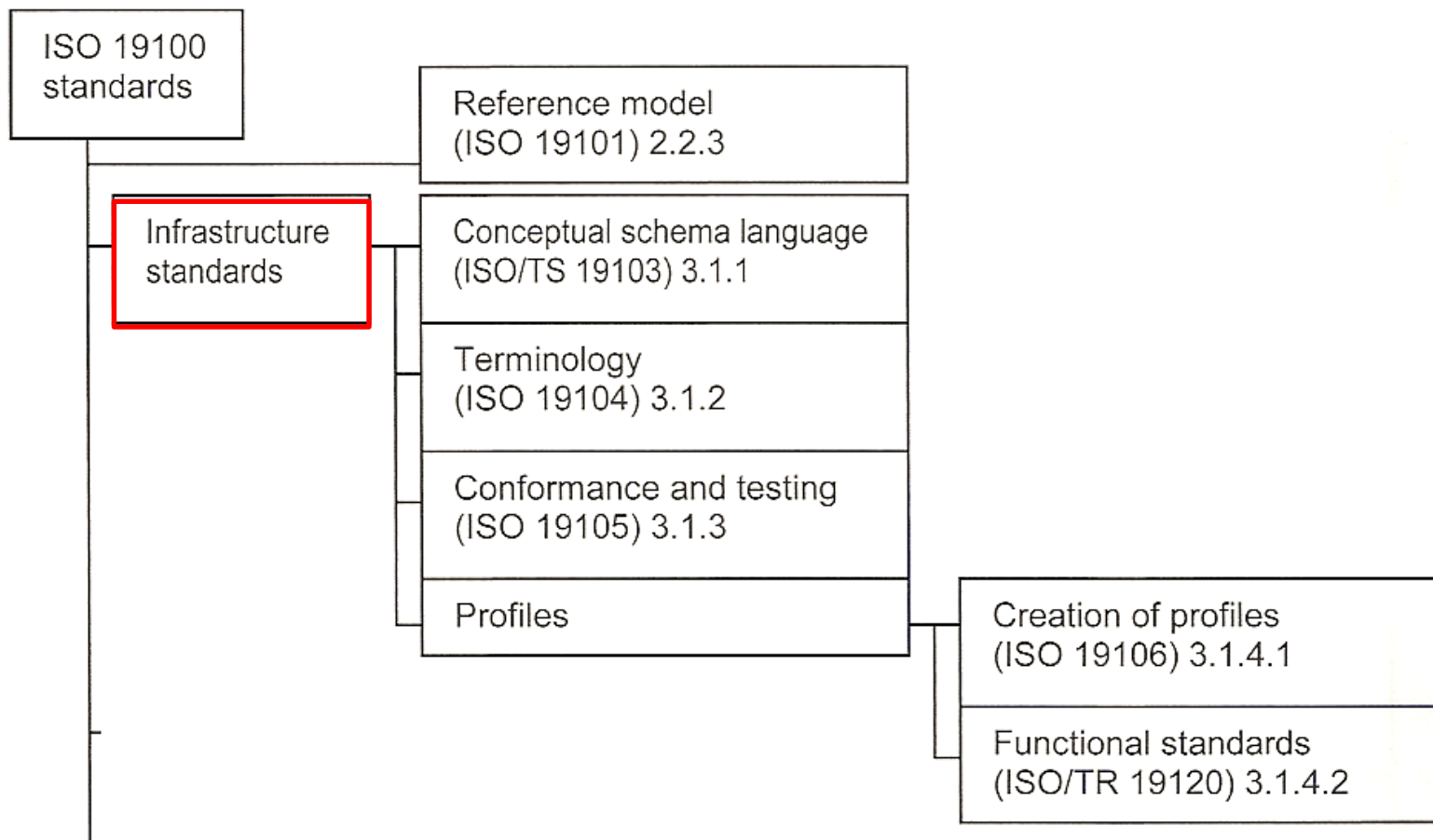
CS_CoordinateSystem package



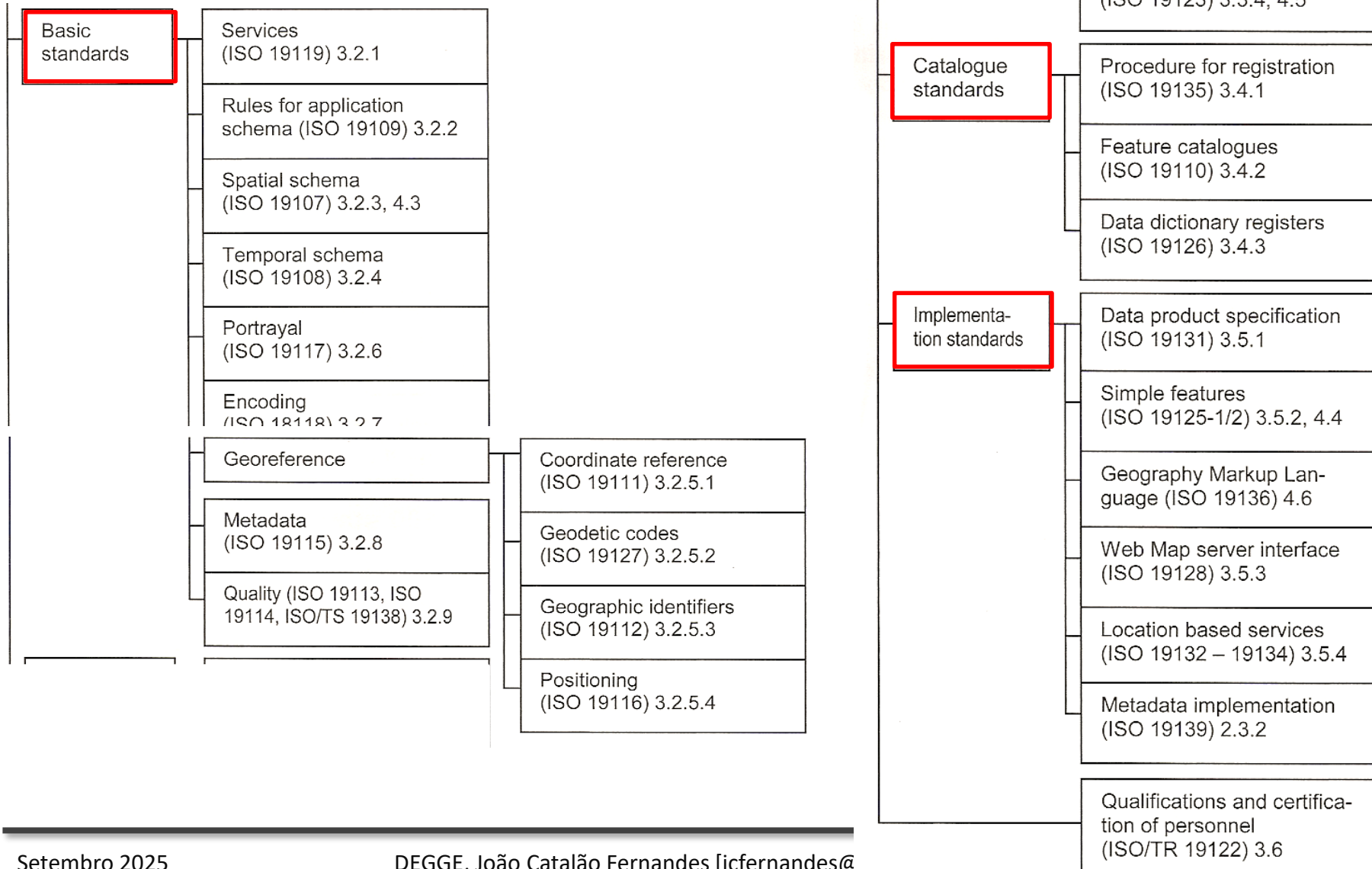
CD_Datum package



Road-Map das ISO 19100



Road-Map das ISO 19100



B.179 **feature**

abstraction of real world phenomena

NOTE A feature may occur as a **type** (B.503) or an **instance** (B.253). Feature type or feature instance shall be used when only one is meant.

[ISO 19101:2002]

B.180 **feature association**

relationship (B.395) that links **instances** (B.253) of one **feature** (B.179) **type** (B.503) with instances of the same or a different feature type

[ISO 19110:2005]

B.181 **feature attribute**

characteristic of a **feature** (B.179)

EXAMPLE 1 A feature attribute named “colour” may have an **attribute** (B.18) **value** (B.515) “green” which belongs to the **data type** (B.121) “text”.

EXAMPLE 2 A feature attribute named “length” may have an attribute value “82.4” which belongs to the data type “real”.

ISO 19104 Terminology

B.201

geodetic coordinate system

ellipsoidal coordinate system

coordinate system (B.90) in which position (B.365) is specified by **geodetic latitude** (B.204), **geodetic longitude** (B.205) and (in the three-dimensional case) **ellipsoidal height** (B.156)

[ISO 19111:2007]

B.202

geodetic datum

datum (B.124) describing the relationship (B.395) of a two- or three-dimensional coordinate system (B.90) to the Earth

[ISO 19111:2007]

B.203

geodetic height

ellipsoidal height

h

distance of a point (B.352) from the ellipsoid (B.154), measured along the perpendicular from the ellipsoid to this point, positive if upwards or outside of the ellipsoid

NOTE Only used as part of a three-dimensional **ellipsoidal coordinate system** (B.155) and never on its own.

[ISO 19111:2007]

B.204

geodetic latitude

ellipsoidal latitude

φ

angle from the equatorial plane to the perpendicular to the ellipsoid (B.154) through a given point (B.352), northwards treated as positive

[ISO 19111:2007]

A ISO não normaliza os procedimentos de aquisição de dados para um SIG.

As normas ISO 19100 apenas fornecem linhas de orientação e elementos de metadados para descrever a **origem** e **qualidade dos dados**

As normas relevantes são:

- ISO 19113 – Quality principles
- ISO 19114 – Quality Evaluation Procedures *
- ISO 19115** – Metadata
- ISO 19115:2 – Metadata for imagery

* Aconselha sobre os diferentes níveis de detalhe para o controlo de qualidade

** Abordada em detalhe na UC - IDE

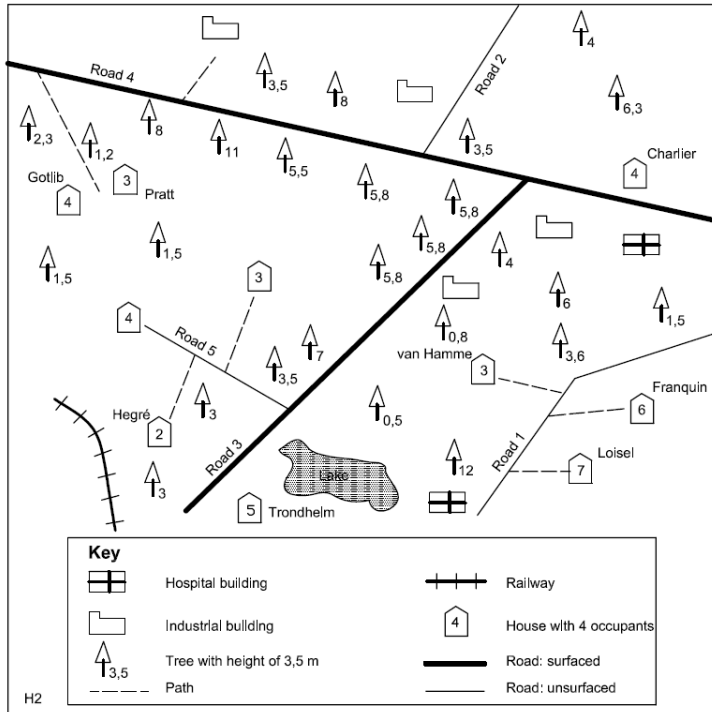
Aquisição de Dados

Supondo que temos de escrever um relatório do controlo de qualidade do nosso SIG. Este relatório deverá ser normalizado de acordo com a norma ISO 19114.

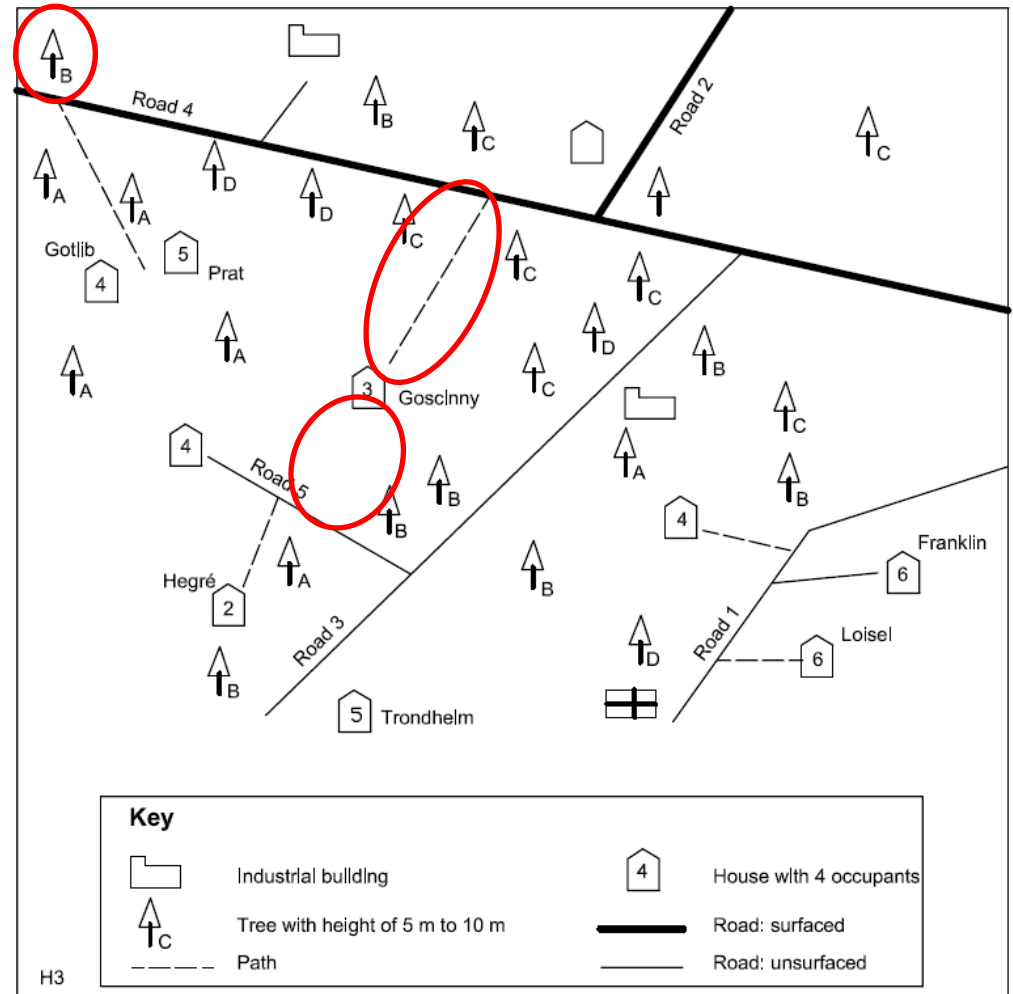
Deverá incluir os valores dos "elementos de qualidade dos dados" ("data quality elements") da seguinte forma:

| | |
|--|---|
| Completude (Completeness) | : 100% |
| Consistência Lógica (Logical Consistency) | : sem erros |
| Exactidão posicional (Positional accuracy) | : ± 5 m |
| Exactidão temporal (temporal accuracy) | : a última revisão foi há três anos, a informação da Câmara Municipal foi fornecida na última Primavera. |
| Exactidão Temática (Thematic accuracy) | : a carta topográfica não tem indicação das paragens de autocarro ou outros elementos similares para efeitos de turismo |

Universo do Discurso



Base de dados



G.3.2 Completeness

ISO 19113 defines completeness as the presence and absence of features, their attributes and their relationships. Completeness in this example is classified by feature class. The types of measures tested for are commission and omission. Table G.1 depicts a way to classify completeness.

Table G.1 — Completeness by feature class

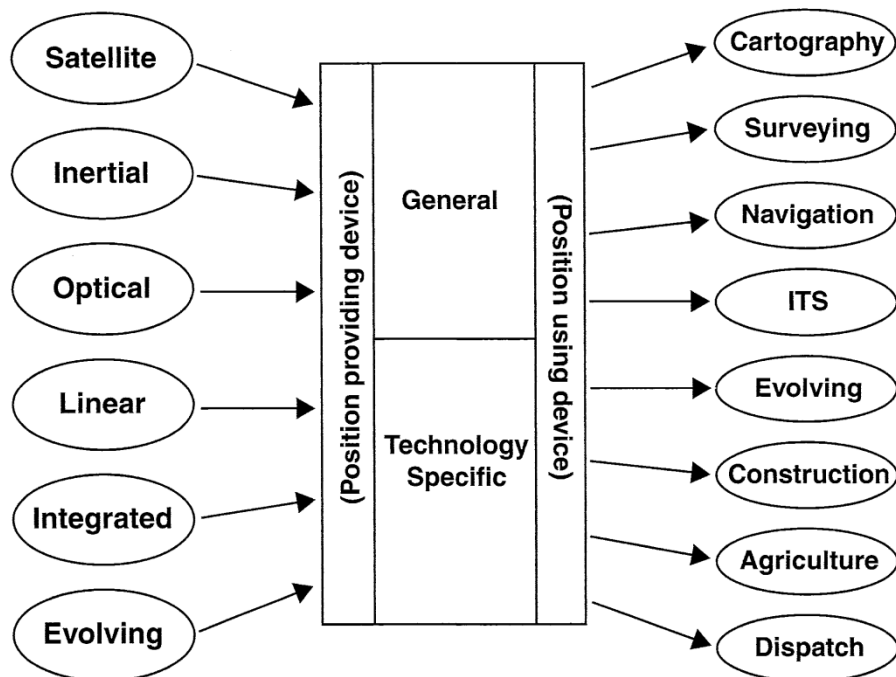
| Feature class | Number of instances in the universe of discourse | Commission count | Commission percentage ^a | Omission count | Omission percentage ^b |
|---|--|------------------|------------------------------------|----------------|----------------------------------|
| Path | 7 | 0 | 0 | 2 | 29 |
| Road | 5 | 2 | 40 | 0 | 0 |
| Tree | 25 | 3 | 12 | 2 | 7 |
| Industrial building | 4 | 0 | 0 | 2 | 50 |
| House | 10 | 1 | 10 | 1 | 10 |
| Hospital | 0 | 1 | 100 | 0 | 0 |
| ^a Commission percentage = number of included items/number of items in the universe of discourse × 100 ^b Omission percentage = number of omitted items/number of items in the universe of discourse × 100 | | | | | |

Serviços Posicionamento (ISO19116)

Serviços de posicionamento empregam uma grande variedade de tecnologias que fornecem a posição e informação relacionada com uma grande variedade de aplicações.

Positioning Technologies

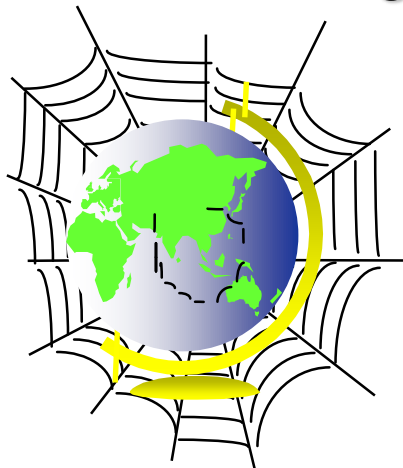
Geographic Information



A ISO19116 normaliza o modelo de dados para a informação de base independentemente do tipo de sistema e um conjunto de operações para manipular esses dados

<https://www.iso.org/committee/54904.html>

Contém :



- Secretariat
- Organization
- Calendar
- About...
- Resolutions
- Document list
- Scope and work programme
- Mail to secretariat
- News and information
- Presentations (slides)



EPSG Dataset : v10.002

Text Search 

Please login or register to include deprecated (invalid) items, search remarks and export results.



EPSG Geodetic Parameter Dataset

About the EPSG Dataset

The IOGP's EPSG Geodetic Parameter Dataset is a collection of definitions of coordinate reference systems and coordinate transformations which may be global, regional, national or local in application. The EPSG Geodetic Parameter Dataset is maintained by the Geodesy Subcommittee of the IOGP Geomatics Committee.

Recent changes to the EPSG Dataset can be viewed in [Release Information History Table](#).

About this site

The EPSG Registry has migrated from a previous platform. The data model on this new site has been upgraded to follow the ISO 19111:2019 revisions for dynamic datums, datum ensembles and derived projected coordinate reference systems. EPSG Dataset v10.001 in the new model is consistent with the v9.9.1 data but has some modifications due to the data model changes. For an overview of the model changes see [here](#).

At this time the master EPSG Dataset is EPSG v9.9.1 (2020-08-31) available from [Archives](#).

The functionality of this new site is still being improved and from time to time small changes may be made.

GeoRepository API

Software developers can find the RESTful GeoRepository API [here](#) (swagger).

About registration

To gain access to the EPSG data through these web pages, you must agree to the [Terms of Use](#) by registering on this site. Once logged in, you will have access to additional functionality and may also manage your account including your subscription to EPSG updates.

To register, you must enter your email address (visible to IOGP) and password (not visible). This information is not used outside this site, nor is it passed on to any third party.

Click [here](#) to register.





EPSG

GEODETTIC PARAMETER DATASET

Managed by IOGP's Geomatics Committee

EPSG Dataset : v10.002

Please [login](#) or [register](#) to include deprecated (invalid) items, search remarks and export results.

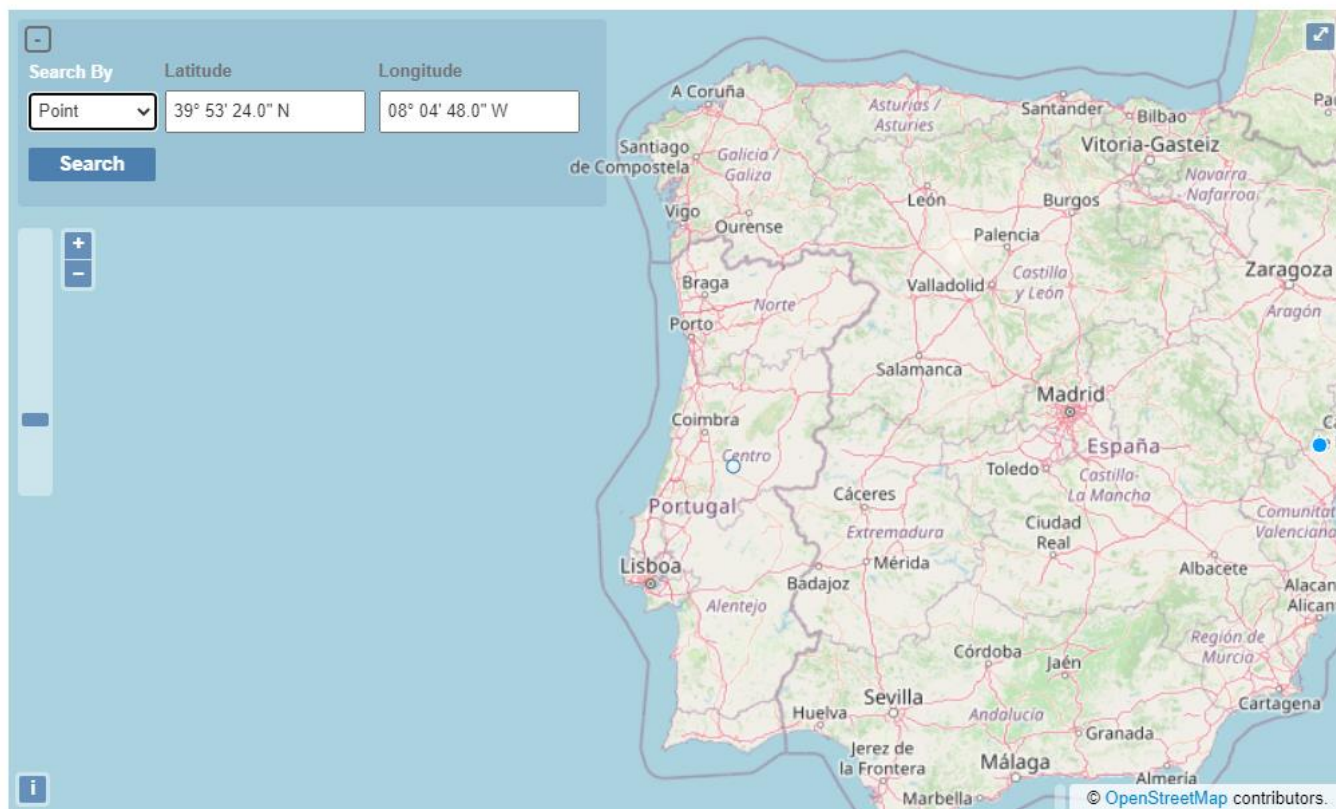


Geodetic Parameters

Search Database by Location

Click on the map to select coordinates or use the [GeoLocation](#) service

Search By Latitude Longitude



© OpenStreetMap contributors.



EPSG Dataset : v10.002



Geodetic Parameters

Search Database

Text Search

Search Results (456 Objects Found)

Search results only display valid entries. Please [login](#) or [register](#) to include deprecated and invalid objects.

CRSs (197) Transformations (146) Point Motion Operations (0) Concatenated Operations (3) Conversions (34) Datums (76) More...

| REPORT | NAME | CODE | TYPE | EXTENT | DATA SOURCE | REMARKS | REVISION DATE |
|--------------------------|---|-------|---------------|-----------------------------------|-------------|-----------------------------------|----------------|
| <input type="checkbox"/> | ↑ Cascals height | 5780 | vertical | Portugal - mainland - onshore | EPSG | | 14 March 2008 |
| <input type="checkbox"/> | Datum 73 | 4274 | geographic 2D | Portugal - mainland - onshore | EPSG | | 6 January 2004 |
| <input type="checkbox"/> | Datum 73 / Modified Portuguese Grid | 27493 | projected | Portugal - mainland - onshore | EPSG | The projection parameters have... | 14 March 2008 |
| <input type="checkbox"/> | Datum 73 / UTM zone 29N | 27429 | projected | Portugal - mainland - onshore | EPSG | | 2 June 1995 |
| <input type="checkbox"/> | ED79 | 4668 | geographic 2D | Europe - west | EPSG | | 27 May 2005 |
| <input type="checkbox"/> | ED87 | 4231 | geographic 2D | Europe - west | EPSG | | 6 January 2004 |
| <input type="checkbox"/> | ↑ EGM2008 height | 3855 | vertical | World | EPSG | Zero-height surface resulting... | 17 July 2019 |
| <input type="checkbox"/> | ↑ EGM84 height | 5798 | vertical | World | EPSG | Zero-height surface resulting... | 17 July 2019 |
| <input type="checkbox"/> | ↑ EGM96 height | 5773 | vertical | World | EPSG | Zero-height surface resulting... | 17 July 2019 |
| <input type="checkbox"/> | ETRS89 | 4258 | geographic 2D | Europe - ETRF by country | EPSG | Has been realized through ETRF... | 14 March 2020 |
| <input type="checkbox"/> | ETRS89 / Portugal TM06 | 3763 | projected | Portugal - mainland - onshore | EPSG | | 30 March 2020 |
| <input type="checkbox"/> | ETRS89 / UTM zone 29N | 25829 | projected | Europe - 12°W to 6°W and ETRS8... | EPSG | The distinction in usage betwe... | 30 March 2020 |
| <input type="checkbox"/> | ETRS89 / UTM zone 29N (N-E) | 3041 | projected | Europe - 12°W to 6°W and ETRS8... | EPSG | ETRS89-LCC (CRS code 3034) use... | 30 March 2020 |
| <input type="checkbox"/> | ETRS89 + EVRF2000 height | 7409 | compound | Europe - EVRF2000 | EPSG | Replaced by ETRS89 + EVRF2007... | 30 March 2020 |
| <input type="checkbox"/> | ETRS89 + EVRF2007 height | 7423 | compound | Europe - EVRF2007 | EPSG | Replaces ETRS89 + EVRF2000 hei... | 30 March 2020 |

First < Previous **1** 2 3 4 Next > Last

Items per page:

Search Database



Search Results (456 Objects Found)

Search results only display valid entries. Please [login](#) or [register](#) to include deprecated and invalid objects.

| REPORT | NAME | CODE | TYPE | EXTENT |
|--------------------------|---|------|----------------|-------------------------------|
| <input type="checkbox"/> | Cascais height to EVRF2000 height (1) | 5427 | transformation | Portugal - mainland - onshore |
| <input type="checkbox"/> | Cascais height to EVRF2019 height (1) | 9439 | transformation | Portugal - mainland - onshore |
| <input type="checkbox"/> | Cascais height to EVRF2019 mean-tide height (1) | 9440 | transformation | Portugal - mainland - onshore |
| <input type="checkbox"/> | Datum 73 to ETRS89 (1) | 1657 | transformation | Portugal - mainland - onshore |
| <input type="checkbox"/> | Datum 73 to ETRS89 (3) | 1992 | transformation | Portugal - mainland - onshore |
| <input type="checkbox"/> | Datum 73 to ETRS89 (4) | 5036 | transformation | Portugal - mainland - onshore |
| <input type="checkbox"/> | Datum 73 to ETRS89 (5) | 5037 | transformation | Portugal - mainland - onshore |
| <input type="checkbox"/> | Datum 73 to ETRS89 (6) | 6189 | transformation | Portugal - mainland - onshore |
| <input type="checkbox"/> | Datum 73 to WGS 84 (1) | 1658 | transformation | Portugal - mainland - onshore |
| <input type="checkbox"/> | Datum 73 to WGS 84 (3) | 1983 | transformation | Portugal - mainland - onshore |
| <input type="checkbox"/> | Datum 73 to WGS 84 (4) | 1987 | transformation | Portugal - mainland - onshore |
| <input type="checkbox"/> | ED50 to ETRS89 (13) | 5040 | transformation | Portugal - mainland - onshore |



Coordinate Transformation: Cascais height to EVRF2000 height (1)

Transformation Details [VALID]

NAME: Cascais height to EVRF2000 height (1)
CODE: 5427
VERSION: EuG-Prt
VARIANT: 1
ACCURACY (M): 0.1
USAGE:

Usage Details

SCOPE: Change of height to a different vertical reference surface.
EXTENT: [Portugal - mainland - onshore](#)

SOURCE CRS: [Cascais height](#)
TARGET CRS: [EVRF2000 height](#)

TRANSFORMATION PARAMETERS:

| Parameter | Value | Reversible | Unit |
|-----------------|--------|------------|-----------------------|
| Vertical Offset | -0.315 | YES | metre |

TRANSFORMATION METHOD: [Vertical Offset](#)

META DATA

REMARKS: Determined at 5 points. RMS residual 0.013m, maximum residual 0.021m. The Cascais vertical reference surface is below the EVRF2000 vertical reference surface.
INFORMATION SOURCE: EuroGeographics, <http://crs.bkg.bund.de/crs-eu/>
DATA SOURCE: EPSG
REVISION DATE: 16 de outubro de 2017
CHANGE ID: [\[2008.01\]](#) [\[2014.027\]](#)

| ALIAS: | Alias | Naming System | Remarks |
|--------|--------------------------|----------------------------|---------|
| | PT_CASC / OH to EVRF2000 | EuroGeographics Identifier | |

Changes to Access to EPSG definitions from the OGC Definitions Server

Post date: 3 August 2020



Any software implementors that access EPSG Coordinate Reference System (CRS) definitions through the OGC Definitions Server should read this blog post.

Publishing of EPSG CRS definitions through the OGC Definitions Server is enabled by the IOGP Geodetic Registry API (epsg.org). The IOGP Geodetic Registry API is undergoing an upgrade that will require some changes to both the data model and the interface through which EPSG definitions are retrieved from the OGC Definitions Server.

IOGP will take the legacy IOGP Geodetic Registry API offline in September, 2020. A related announcement is at <https://epsg.org>

Therefore, OGC is planning to reconfigure the OGC Definitions Server to support the upgraded IOGP Geodetic Registry API by then or soon after.

A proposed mapping from the current OGC URIs to the current EPSG URNs and new EPSG URIs is shown below.

| OGC Syntax | Current EPSG URN Syntax | Future EPSG URI Syntax | Notes |
|---|---|---|------------------|
| http://www.opengis.net/def/... | http://www.epsg-registry.org/export.htm?gml=urn:ogc:def:... | http://apps.epsg.org/def/... | 1, 2, 11, 12, 13 |
| ...area/EPSPG/0/[code] | ...area:EPSPG::[code] | ...extent/EPSPG/0/[code]/gml | 3 |
| ...axis/EPSPG/0/[code] | | | 4 |
| ...axis-name/EPSPG/0/[code] | ...axis-name:EPSPG::[code] | ...axis-name/EPSPG/0/[code]/gml | |

<https://www.ogc.org/blog/3260>

OGC TECHNOLOGY TRENDS

Technology that has transformative effects on businesses and society



OGC, as a consortium of over 500 of the most influential geospatial organizations, is *the* global forum for innovation and standards in location technology. As such, we are uniquely positioned to track the latest tech innovations and forecast their impact on geospatial - something we undertake quarterly as part of our Tech Trends process.

“ Technological change is as inevitable as it is beneficial. However, it’s those organizations that anticipate technological change that benefit the most from it.

~George Percivall (OGC Chief Technology Officer and Chief Engineer)

In order to help the 80% of businesses that need to “get smart” about new technologies, we’ve recently made our Tech Trends insights available for any organization to use in their business planning

Subscribe to Tech Trends

A subscription includes **Tech Trends Reports** twice every year, enabling you to:

- **Inform** your organization's strategy using trusted technology forecasting
- **Identify** new areas of investment and potential strategic partnerships
- **Plan** your technology direction using a proven OGC process

EMERGENT TRENDS

Clusters of emerging trends that score high on the criteria, assessments and roadmaps are developed and provided in the complete OGC Technology Forecast. For example, COVID-19 has triggered the convergences of multiple geospatial trends in order to respond to the pandemic. Assessments of key trends are conducted to better

characterize the most impactful trends. In a typical report, 6 clusters will be evaluated in-depth. The table below lists the current set of 12 emergent clusters. A full version of the OGC Tech Trends Report provides an in-depth evaluation and development roadmap of several of these clusters.

EMERGENT TRENDS CLUSTERS:



Responding to COVID-19



Spatial Data on the Web



AI & Machine Learning



Connected Autonomous Vehicles



New Space Exploration



Geo IT Ethics



Cloud Native & Edge Computing



Geospatial Data Science



Immersive Geo: AR XR



Urban Digital Twin

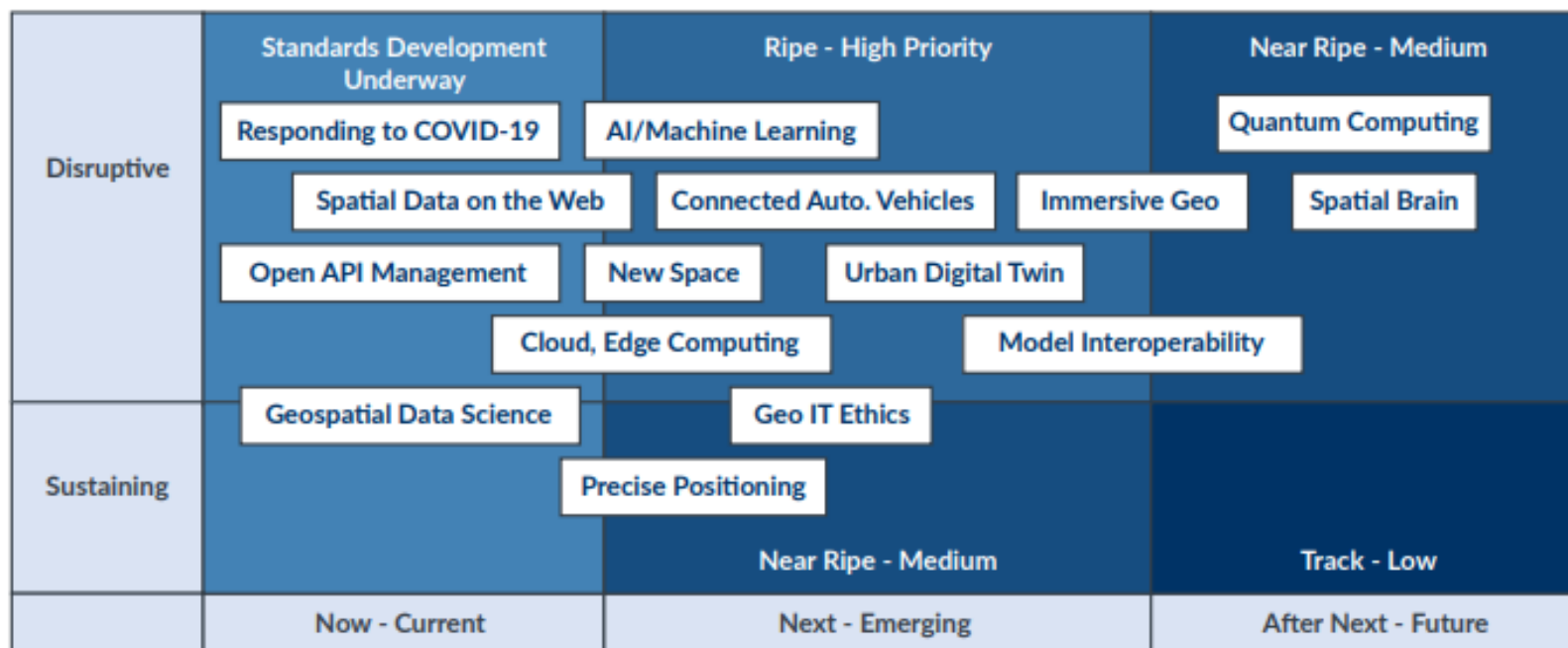


Open API Management



Model Interoperability

TRENDS THAT ARE ASSESSED TO BE BOTH DISRUPTIVE AND NEXT ARE DEEMED TO BE OF THE HIGHEST PRIORITY.



2020-05-23

OGC Takes action based on the OGC Technology Forecast. As a hub for thought leadership and innovation on geospatial standards and innovation for all things related to location - OGC activities in the Standards Program and Innovation Program are developing the next generation geospatial technology ecosystem.

Top 5 Geospatial Trends in 2023



© Richa Tyagi 📅 July 7, 2023

Over the past decade, geospatial technology has undergone a lot of transformation that has changed the way businesses operate and fulfill their commitments toward their customers. Geospatial technologies include different types of tools and techniques to leverage spatial information.

With the advancement in technologies, it is unfolding new possibilities in the area of urban planning, space exploration, retail, transportation, and so on. By implementing these emerging

Top 5 Geospatial Trends in 2023

Artificial Intelligence & Machine Learning

Artificial intelligence (AI) and machine learning (ML) both are playing an important role in spatial analysis and mapping. Uses of AI have been evolving from the past few years and has found its usage in geospatial solutions as well. In geospatial, data processing is a time-consuming task. However, with AI, it gets easier as it can handle multiple tasks, identify patterns and assist with training. One significant example of GeoAI is in urban planning, where it can easily track and monitor the changes in an area over a period of time.

3D Mapping

3D mapping refers to adding the three dimensions to map the objects in the environment, which creates a virtual infrastructure to build the vision. It is generally used in smart city planning, regional analysis, global information, and building information to simulate development projects on the surrounding environment. With growing technology like drone technologies and LiDAR scanning, 3D mapping has become more accessible and has the potential to change the way, geospatial data is analyzed.

IoT and AR/VR

IoT or Internet of Things describes physical objects embedded with sensors and connected to technologies that allowed them to collect and store data. In geospatial, that data can be used in a variety of ways such as in improving the accuracy of location-based services and enhancing customer experience.

Indoor Mapping

Indoor mapping helps visitors/consumers to navigate inside the malls, airports, railway stations, and all types of places. From the past few years, indoor mapping has evolved to become more user-friendly and flexible, from the traditional indoor maps, which were complex. Indoor mapping platforms take the building floor plans and convert them into a 3D digital map, which also helps in public safety emergency response system by providing accurate location even inside of buildings.

Digital Twin

Digital twin refers to a virtual 3D representation of physical environment, whether it is a river, ocean, highway, building or earth. 3D model of physical objects acts like a base twin using real-time information, like sensor data (IoT), weather data or up-to-date information from the public transport or electricity system. Businesses around the world are deploying digital twin in various applications from designing of complex equipment and 3D environments to bringing precision in complex medical procedures as well as in studying digital agriculture.

GIS-based technologies will continue to make considerable advancements in the coming years as technologies improve.

<https://www.geospatialworld.net/prime/top-5-geospatial-trends-2023/>

Top 10 Trends in GIS Technology for 2025

February 4, 2025 ⌚ 4 mins

<https://www.lightboxre.com/insight/top-10-trends-in-gis-technology-for-2025/>

GIS technology is evolving beyond traditional mapping, becoming a critical tool for decision-making across industries. From AI-powered geospatial analysis to real-time The Internet of Things (IoT) data integration, organizations are leveraging GIS in new ways to tackle complex challenges. Whether it's optimizing supply chains, monitoring environmental changes, or enhancing urban planning, here are the top trends shaping GIS in 2025.

1. AI-Driven Geospatial Analysis

Artificial Intelligence (AI) and machine learning are revolutionizing GIS by automating complex analyses and uncovering patterns in large datasets. For example, AI-powered tools can analyze satellite imagery to detect urban sprawl, predict wildfire risks, or monitor illegal deforestation. Governments and NGOs are leveraging these capabilities to enhance disaster response and conservation efforts. In urban planning, predictive modeling helps cities optimize resource allocation and infrastructure development.

“AI is fundamentally reshaping how we analyze geospatial data,” noted **Skip Cody**, product manager at LightBox. “The ability to process vast datasets in real time and extract meaningful insights is transforming industries that rely on location intelligence.”

2. Integration of IoT with GIS



INSPIRE

Infrastructure for Spatial Information in the European Community

European Commission > INSPIRE >

About

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INSPIRE DIRECTIVE

In Europe a major recent development has been the entering in force of the INSPIRE Directive in May 2007, establishing an infrastructure for spatial information in Europe to support Community environmental policies, and policies or activities which may have an impact on the environment.

INSPIRE is based on the infrastructures for spatial information established and operated by the 27 Member States of the European Union. The Directive addresses 34 spatial data themes needed for environmental applications, with key components specified through technical implementing rules. This makes INSPIRE a unique example of a legislative "regional" approach.

Legislation

Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) was published in the official Journal on the 25th April 2007. The INSPIRE Directive entered into force on the 15th May 2007

To ensure that the spatial data infrastructures of the Member States are compatible and usable in a Community and transboundary context, the Directive requires that common Implementing Rules (IR) are adopted in a number of specific areas (Metadata, Data Specifications, Network Services, Data and Service Sharing and Monitoring and Reporting). These IRs are adopted as Commission Decisions or Regulations, and are binding in their entirety. The Commission is assisted in the process of adopting such rules by a regulatory committee composed of representatives of the Member States and chaired by a representative of the Commission (this is known as the Comitology procedure).

- [Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community \(INSPIRE\) 14.03.2007](#)
- [INSPIRE Metadata Regulation 03.12.2008](#)
- [Commission Decision regarding INSPIRE monitoring and reporting 05.06.2009](#)
- [Commission Regulation \(EC\) No 976/2009 of 19 October 2009 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards the Network Services 19.10.2009](#)
- [Corrigendum to INSPIRE Metadata Regulation 15.12.2009](#)

INSPIRE – DIRECTIVE 2007/2/EC

DIRECTIVES

DIRECTIVAS

DIRECTIVAS

DIRETTIVE

DIRETTIVA 2007/2/CE DEL PARLAMENTO EUROPEO E DEL CONSIGLIO

;))

del 14 marzo 2007

che istituisce un'Infrastruttura per l'informazione territoriale nella Comunità europea (Inspire)

Será que é irrelevante esta questão? (da designação)

Infraestrutura para (de)

Informação Espacial

Informação Geográfica

Informação Cartográfica

Art. 4 - The Infrastructure for Spatial Information in the European Community (Inspire) should assist policy-making in relation to policies and activities that may have a direct or indirect impact on the **Environment**.

Termos:

‘spatial data’ means any data with a direct or indirect reference to a specific location or geographical area; (ISO : geographic feature)



In the spotlight



News announcement | 16 June 2025

[The Green Deal Data Space for AI](#)

This workshop is the first in a three-part online stakeholder consultation series supporting the upcoming European Commission Communication on a Digitally Powered Green Transition and its accompanying Action Plan.

🕒 1 min read



News announcement | 7 May 2025

[ISO-TC211/EC-JRC/EuroGeographics webinar on Data Spaces](#)

You are cordially invited to join us for our webinar on Data Spaces jointly organised by the International Standardization Organisation, ISO/TC211, European Commission/Joint Research Center and EuroGeographics.

🕒 1 min read



News announcement | 6 March 2025

[BDVA Workshop Proposal - Registration forms](#)

Get ready to unlock the true potential of Large Language Models! On 10/04, the SEMIC team and the Big Data Value Association (BDVA) organise a workshop on the transformative power of LLMs in enhancing semantic interoperability.

🕒 1 min read

Learn

- About INSPIRE
- INSPIRE Policy Background
- INSPIRE Principles
- INSPIRE Legislation
- Implementing Rules
- INSPIRE Technical Guidance
- Who's who?
- Training

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- Community
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- INSPIRE
- INSPIRE in your Country
- Learn
- Maintenance and Implementation
- Metadata
- MIG Workprogramme
- Monitoring and Reporting
- Network Services
- Spatial Data Services
- Use

Página antiga mas mais esclarecedora dos objetivos do INSPIRE

About INSPIRE

The INSPIRE Directive aims to create a European Union spatial data infrastructure for the purposes of EU environmental policies and policies or activities which may have an impact on the environment. This European Spatial Data Infrastructure will enable the sharing of environmental spatial information among public sector organisations, facilitate public access to spatial information across Europe and assist in policy-making across boundaries.



INSPIRE is based on the infrastructures for spatial information established and operated by the Member States of the European Union. The Directive addresses 34 spatial data themes needed for environmental applications.

The Directive came into force on 15 May 2007 and will be implemented in various stages, with full implementation required by 2021.

This video provides an overview of why INSPIRE is needed and what types of spatial are covered by INSPIRE.



Implement

Guide for implementers
Roadmap
Data Specifications
Monitoring & Reporting
Metadata
Network Services
Data and Service Sharing
Spatial Data Services
Maintenance and Implementation Framework

Data Specifications

Overview
Technical Guidelines
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Data Specifications

The [INSPIRE Implementing Rules on interoperability of spatial data sets and services](#) (IRs) and [Technical Guidelines](#) (Data Specifications) specify common data models, code lists, map layers and additional metadata on the interoperability to be used when exchanging spatial datasets.



Datasets in scope of INSPIRE are ones which come under one or more of the 34 spatial data themes (below) set out in the [INSPIRE Directive](#). Interoperability in INSPIRE means the possibility to combine spatial data and services from different sources across the European Community in a consistent way without involving specific efforts of humans or machines. Interoperability may be achieved by either changing (harmonising) and storing existing data sets or transforming them via services for publication in the INSPIRE infrastructure.

While the Implementing Rules specify what must be implemented at an abstract and generic level, the non-binding [Technical Guidelines](#) specify how legal obligations could be implemented, making reference to existing geospatial standards where appropriate. Implementing these Technical Guidelines will maximise the cross-border and cross-thematic interoperability of INSPIRE spatial data sets and services as well as guaranteeing interoperability with other sectors.

Each Annex has a set of milestones for when metadata, data, and network services for datasets are to be available, set out in this [roadmap](#).

ANNEX: 1



[Addresses](#)



[Administrative units](#)



[Cadastral parcels](#)



[Coordinate reference systems](#)



[Geographical grid systems](#)



[Geographical names](#)



[Hydrography](#)



[Protected sites](#)



[Transport networks](#)

INSPIRE Data Sets - EU & EFTA Country overview



INSPIRE Geoportal Data Set Statistics

172876
Metadata records

28521
Downloadable Data Sets

32357
Viewable Data Sets

Spatial scope coverage: National Regional

Select a COUNTRY

| | | | | | | | |
|----------------|-----------------|---------|-----------------------|---------------|-----------------|----------|-----------------|
| Austria | 503 427 439 | Finland | 625 97 111 | Latvia | 138 42 69 | Portugal | 631 268 277 |
| Belgium | 602 460 497 | France | 43371 2399 3039 | Liechtenstein | 49 9 11 | Romania | 116 28 32 |
| Bulgaria | 134 23 23 | Germany | 44692 22029 23627 | Lithuania | 125 99 31 | Slovakia | 266 36 45 |
| Croatia | 114 10 22 | Greece | 58 58 58 | Luxembourg | 306 213 248 | Slovenia | 93 12 12 |
| Cyprus | 42 32 34 | Hungary | 121 23 20 | Malta | 157 136 152 | Spain | 219 153 47 |
| Czech Republic | 143 54 68 | Iceland | 147 7 0 | Netherlands | 196 120 132 | Sweden | 251 172 202 |

A Directiva INSPIRE

A presente directiva abrange os conjuntos de dados espaciais que satisfaçam as seguintes condições:

Estarem relacionados com uma zona sobre a qual um Estado-Membro tenha e/ou exerça jurisdição;

Estarem disponíveis em formato digital;

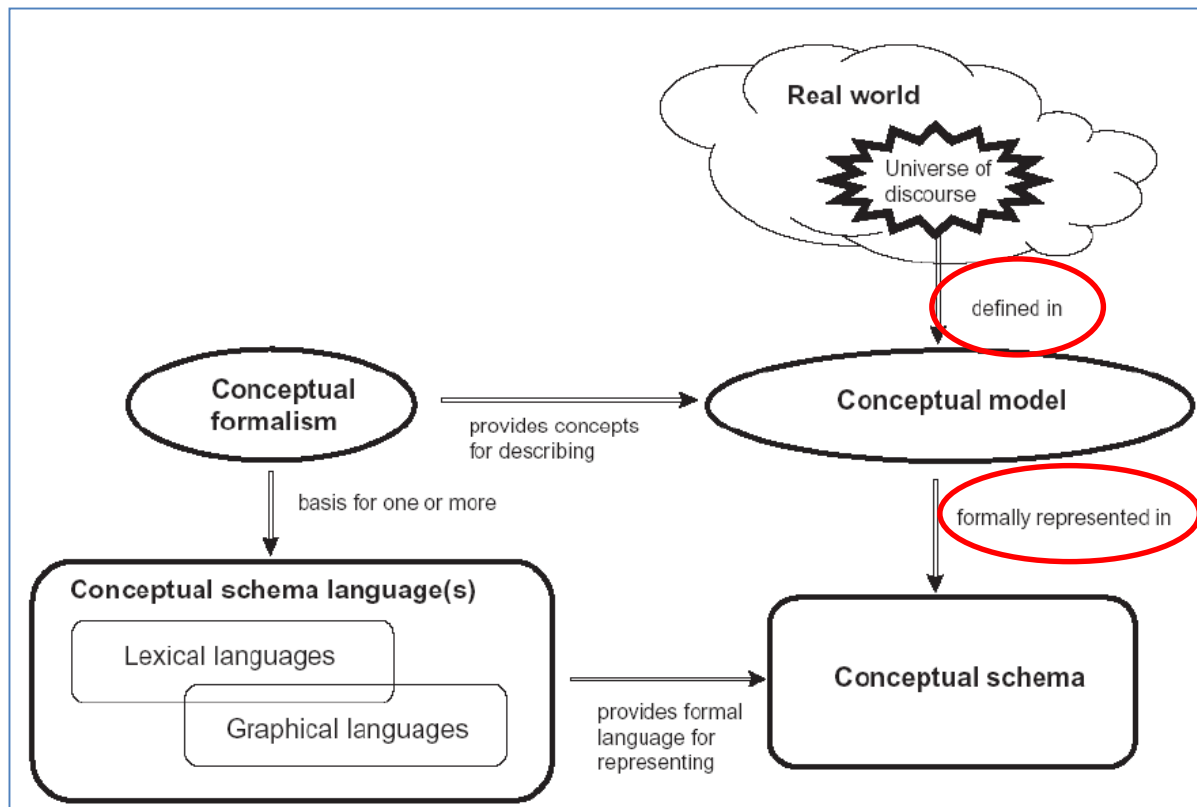
Serem mantidos por entidades públicas (ou terceiras) por conta da mesma;

Dizerem respeito a um ou mais dos temas enumerados nos anexos I, II ou III.

A presente diretiva **NÃO** exige a recolha de novos dados espaciais.

Generic Conceptual Model

Requirement 4 The reference model specified in ISO 19101 shall be used as the reference model of the INSPIRE data specifications.



Conceptual schema language

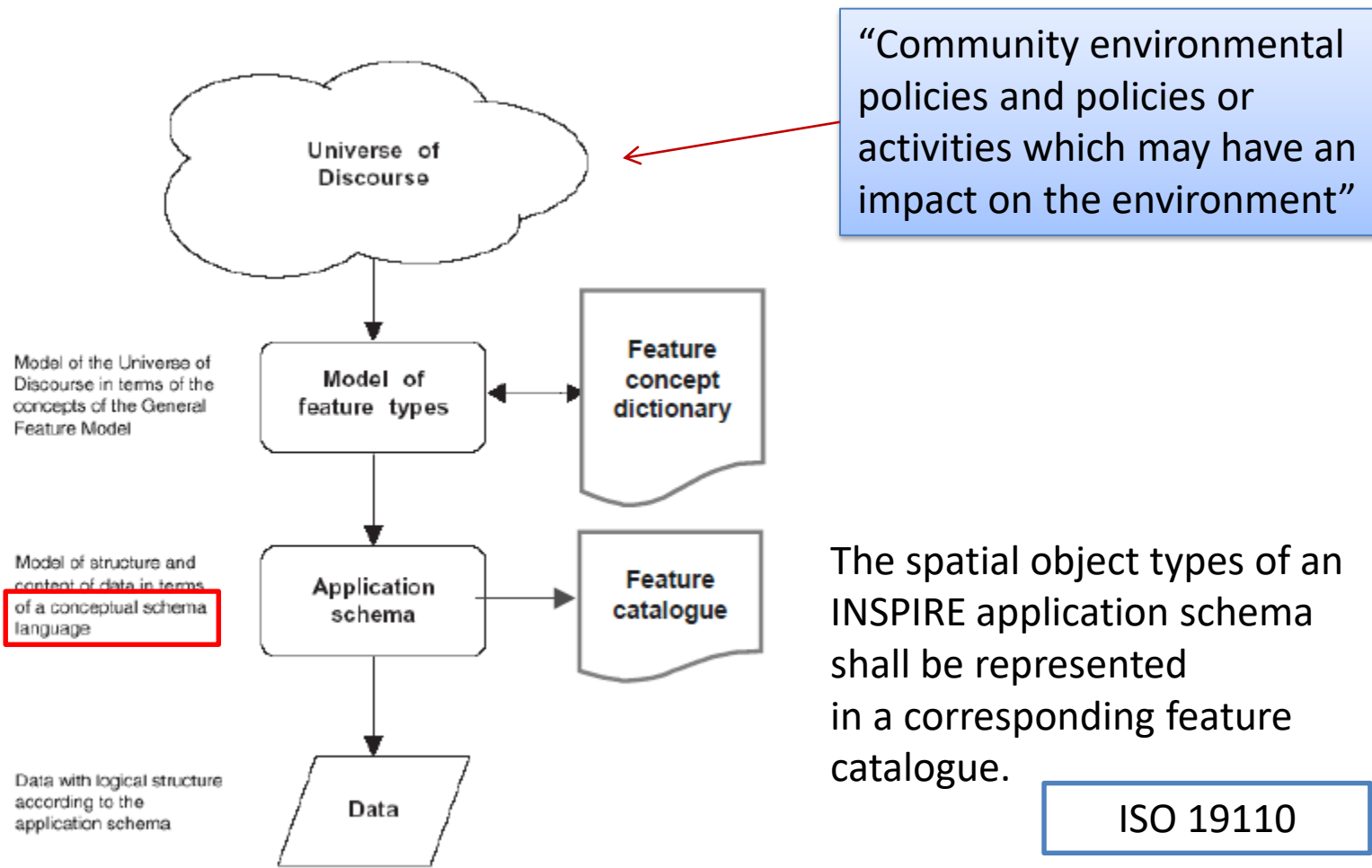
Requirement 20 Every INSPIRE application schema shall be specified in UML, version 2.1.

The use of a common conceptual schema language (i.e. UML) allows for an automated processing of application schemas and the encoding, querying and updating of data based on the application schema – across different themes and different levels of detail.

Requirement 21 Every spatial object type and its properties shall be shown in class diagrams in the UML package describing the application schema (or packages contained by that package).

Requirement 22 The use of UML shall conform to ISO 19109 8.3 and ISO/TS 19103 with the exception that UML 2.1 instead of ISO/IEC 19501 shall be used.

General Feature Model



2 Normative references

EN ISO 19101:2005, Geographic information — Reference model

ISO/TS 19103:2005, Geographic Information — Conceptual schema language

NOTE A revision of the standard is a current work item of ISO/TC 211. To the extent possible, alignment of this document with the future version has been taken into consideration.

EN ISO 19107:2005, Geographic information — Spatial schema

EN ISO 19108:2005, Geographic information — Temporal schema

EN ISO 19109:2006, Geographic Information — Rules for application schemas

EN ISO 19110:2006, Geographic information — Methodology for feature cataloguing

EN ISO 19135:2007, Geographic information — Procedures for item registration

EN ISO 19136:2009, Geographic Information – Geography Markup Language

ISO/TS 19139:2007, Geographic Information – Metadata – XML Schema implementation

ISO 19156:2011, Geographic Information – Observation and Measurements

UML 2.1.2, Unified Modelling Language (UML) Superstructure and Infrastructure, Version 2.1.2

A Directiva INSPIRE



Methodology for the development of data specifications (D2.6_v3.0.pdf)

Apart from logical consistency (see the Generic Conceptual Model clause 20), the INSPIRE Directive **does not** spell out requirements for **data quality**.

(D2.6) 7.5 Data quality

ISO 19131 requires a data specification to cover the data quality elements and data quality subelements defined in ISO 19113. Those quality elements are:

- Completeness
- Logical Consistency
- Positional Accuracy
- Temporal Accuracy
- Thematic Accuracy

Methodology for the development of data specifications (D2.6_v3.0.pdf)

However, as INSPIRE is based on existing data, it won't be possible that all data sets will be compliant with the quality required (or at least desirable).

Recommendation 25

Specify the positional accuracy desirable in the common data specification; accept deviations and ask data providers to register them in metadata, at data set level.

In the INSPIRE **administrative unit** data specification, there are no mandatory quality requirements. However it is recommended that Member States provide the data at the source accuracy where possible targeting a minimal positional accuracy of **50 meters**. The actual values of data quality elements (omission, topological and conceptual consistency, positional, thematic, and temporal accuracy) have to be published as metadata, when they are available.

Methodology for the development of data specifications (D2.6_v3.0.pdf)

Recommendation 26

The main point to ensure consistency across national boundaries is to combine data sets at similar levels of detail.

Recommendation 27

The possible levels of detail to be considered for INSPIRE data specifications are:

- European
- National
- Regional
- Local

Example 1 (geology):

- european level (continent) : from 1 : 5 000 000 to 1 : 1 500 000.
- national level (nation) : 1 : 250 000 to 1 : 1 000 000
- regional level : from 1 : 250 000 to 1 : 25 0000
- local level : scale > 1 : 25 000.

Definition of Annex Themes and Scope

Estrutura dos dados Espaciais

Dados referência
(reference data)



Dados temáticos

Reference data is a series of dataset that everybody involved with geographic information uses to reference his/her own data as part of their work.

It is used as a common base to which **thematic data** may be referenced.

Os dados de referência deve cumprir três requisitos funcionais:

- fornecer uma localização inequívoca para a informação do utilizador
- permitir a fusão de dados de diversas fontes
- Fornecer o contexto que permita aos outros a melhor compreensão do que está a ser apresentado

Reference Data

1. Geodetic reference data
2. Units of administration
3. Units of property rights (parcels, buildings)
4. Addresses
5. Selected topographic themes (hydrography, transport, height)
6. Orthoimagery
7. Geographical names

É expectável que os Dados de Referência sejam produzidos ou organizados pelas Agências Nacionais de Cartografia e Agências Cadastrais.

The data themes of INSPIRE are divided in modular blocks. “Annexes I and II focus on reference data, while Annex III focuses on data for environmental analysis and impact assessment.

Annex I

1. Coordinate reference systems
2. Geographical grid systems
3. Geographical names
4. Administrative units
5. Addresses
6. Cadastral parcels
7. Transport networks
8. Hydrography
9. Protected sites

Annex II

10. Elevation
11. Land cover
12. Ortho-imagery
13. Geology

Annex III

14. Statistical units
15. Buildings
16. Soil
17. Land use
18. Human health and safety
19. Utility and governmental services
20. Environmental monitoring facilities
21. Production and industrial facilities
22. Agricultural and aquaculture facilities
23. Population distribution – demography
24. Area management/restriction/regulation zones & reporting units
25. Natural risk zones
26. Atmospheric conditions
27. Meteorological geographical features
28. Oceanographic geographical features
29. Sea regions
30. Bio-geographical regions
31. Habitats and biotopes
32. Species distribution
33. Energy Resources
34. Mineral resources

Coordinate Reference Systems (CRS)

O âmbito do tema *Coordinate reference systems* abrange os *Sistemas de Referencia de Coordenadas Geodésicas (Geodetic Coordinate Reference Systems (CRS))* necessários para referenciar de forma inequívoca a informação espacial como um conjunto de coordenadas (X, Y, Z) e /ou latitude, longitude e altitude .

As coordenadas latitude, longitude e altitude elipsoidal podem ser calculadas a partir das coordenadas (X,Y,Z) usando um elipsóide de referencia.

As **coordenadas planas** (cartográficas) são calculadas a partir da latitude e longitude usando uma projeção cartográfica apropriada. São adoptadas e recomendadas diferentes projeções para diferentes objectivos.

Coordinate Reference Systems (CRS)

Requirement 1 For the three-dimensional and two-dimensional (horizontal component) coordinate reference systems, the European Terrestrial Reference System 1989 (ETRS89) shall be used for the areas within the geographical scope of ETRS89.

Requirement 2 The International Terrestrial Reference System (ITRS) or other geodetic coordinate reference systems compliant with ITRS shall be used in areas that are outside the geographical scope of ETRS89.

Requirement 3 For the computation of latitude, longitude and ellipsoidal height, and for the computation of plane coordinates using a suitable mapping projection, the parameters of the GRS80 ellipsoid shall be used.

Requirement 4 For representation with plane coordinates one of the Lambert Azimuthal Equal Area (ETRS89-LAEA), the Lambert Conformal Conic (ETRS89-LCC) or the Transverse Mercator (ETRS89-TMzn) projection shall be used.

Coordinate Reference Systems (CRS)

Requirement 8 For the vertical component on land, the European Vertical Reference System (EVRS) shall be used to express gravity-related heights for the areas within the geographical scope of EVRS.

Requirement 9 Other vertical reference systems related to the Earth gravity field shall be used to express gravity-related heights in areas that are outside the geographical scope of EVRS.

Recommendation 6 For referring the coordinate reference systems adopted by INSPIRE, identifiers presented in the table 1 are recommended.

Recommendation 7 For referring a compound CRS, one 2D and one 1D system combined together, the respective identifier shall be created by appending the identifiers of the 2D and 1D CRS with a slash between both.

EXAMPLE When both ETRS89-GRS80 and EVRS the CRS used the identifier shall be ETRS89-GRS80/EVRS.

Geographical grid systems

Definition:

'grid' means a network composed of two or more sets of curves in which the members of each set intersect the members of the other sets in an algorithmic way,

Geographical Grids



Quadricula Geográfica

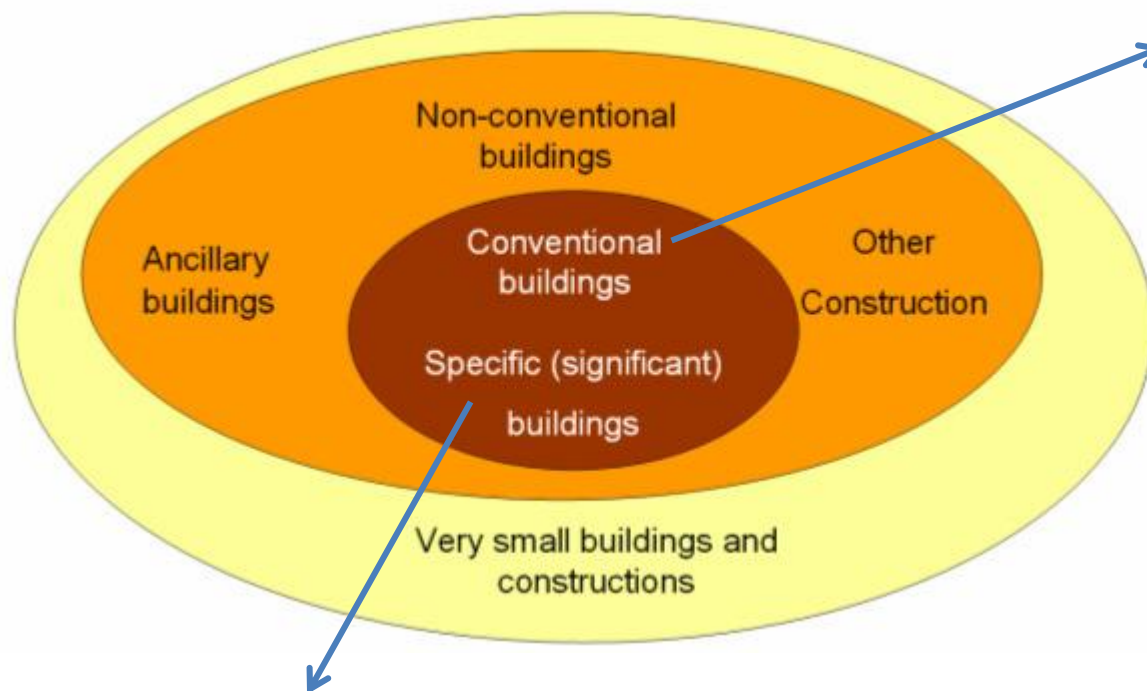
Requirement 1 The Grid_ETRS89-LAEA as defined in this document shall be used as a geo-referencing framework for the themes where grids with fixed and unambiguously defined locations of equal-area grid cells are needed.

The grid – proposed as the multipurpose Pan-European standard – is based on the ETRS89 Lambert Azimuthal Equal Area coordinate reference system with the centre of the projection at the point 52° N, 10° E and false northing: $Y_0 = 3210000$ m, false easting: $X_0 = 4321000$ m (CRS identifier in INSPIRE: ETRS89-LAEA).

The grid is designated as Grid_ETRS89-LAEA. For identification of an individual resolution level the cell size in metres is appended to the name.

EXAMPLE The grid at a resolution level of 100km is designated as Grid_ETRS89-LAEA_100K.

Buildings



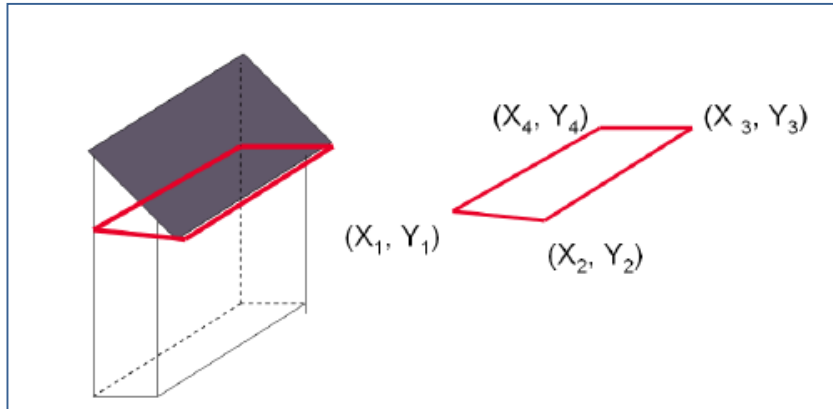
Actividades humanas
 (residencial,
 industrial, comércio
 e serviços)

Com uma área
 superior a 15-20m²

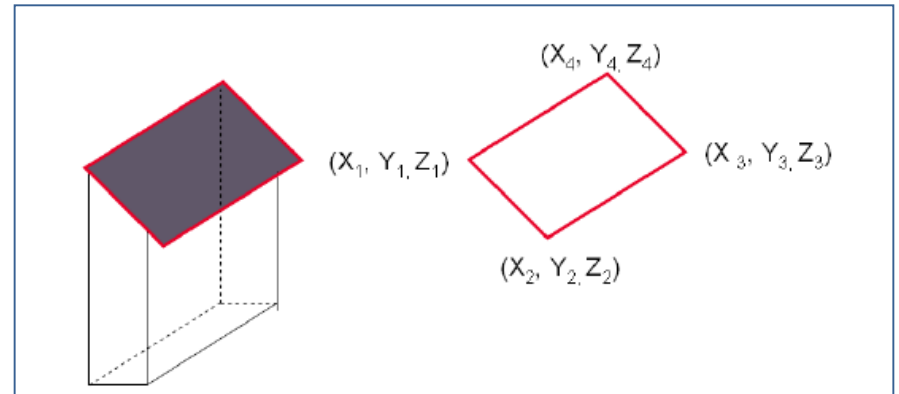
Edifícios com área ou altura
 significativos para serem
 usados como referencias
 (Igrejas, torres, estádios, ..)

- What shall be in INSPIRE
- What should be in INSPIRE
- What maybe in INSPIRE

Buildings

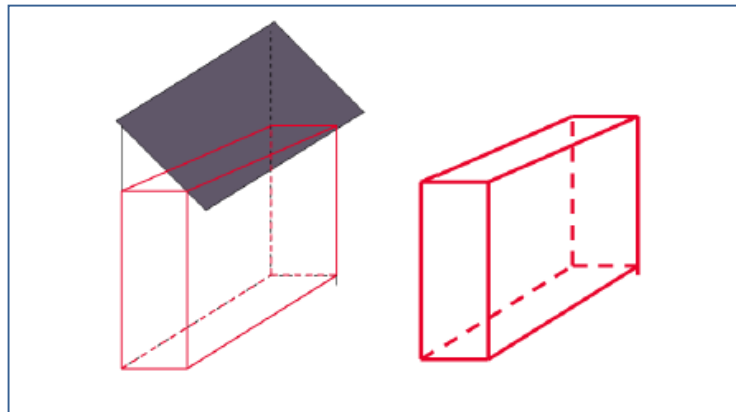


Edifício representado por dados a 2D



Edifício representado por dados a 2.5D

A cada para (X,Y) corresponde apenas um valor de Z (exemplo dos modelos digitais do terreno)

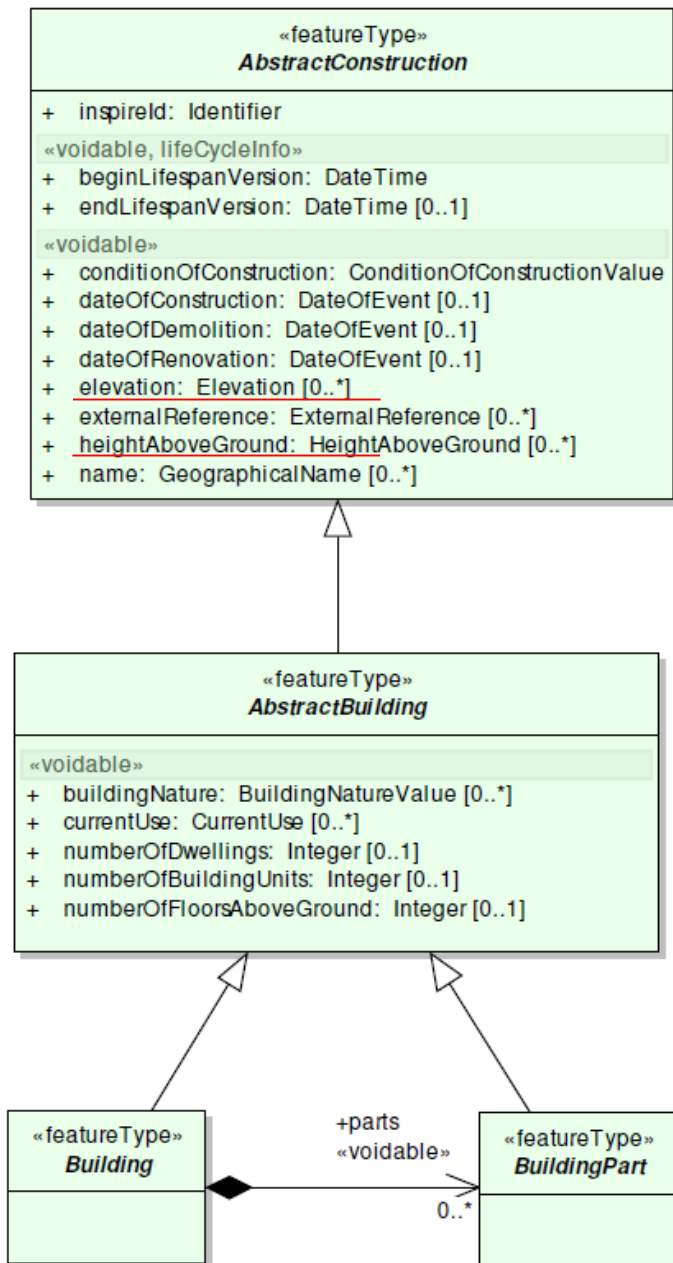


Edifício representado por dados a 3D

Tipos de elementos do esquema de aplicação "Buildings Base"

AbstractBuilding is an abstract feature type grouping the common properties of instanciable feature types Building and BuildingPart

AbstractConstruction is an abstract feature type grouping the semantic properties of buildings, building parts and of some optional feature types that may be added to core profiles, in order to provide more information about theme Buildings.



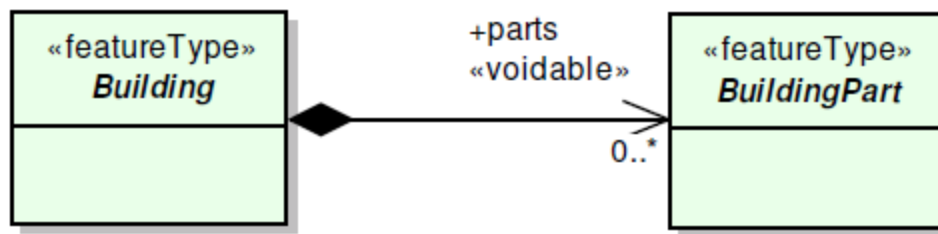
BuildingsBase Aplicação Schema

Edifício composto por duas partes



From City GML

De acordo com o conceito do CityGML, um edifício complexo é considerado como uma agregação de “BuildingParts”



Instanciável feature types

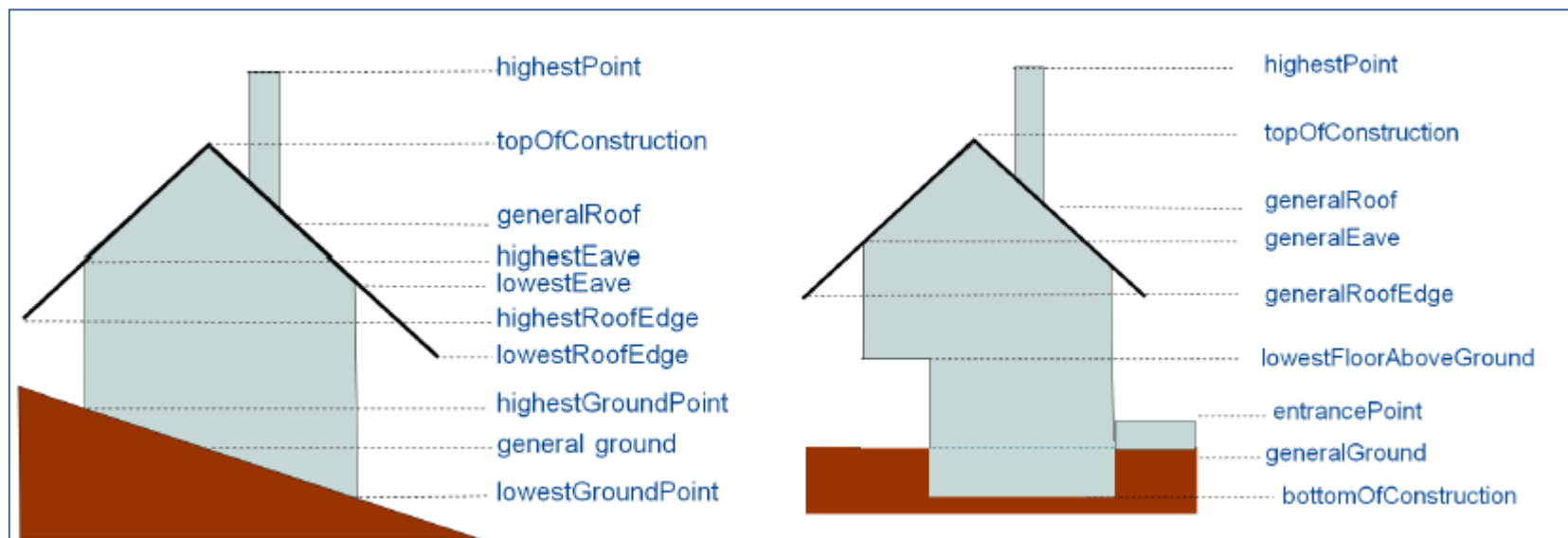
Buildings Attributes

Elevation

| |
|---|
| «dataType» Elevation |
| + elevationReference: ElevationReferenceValue |
| + elevationValue: DirectPosition |

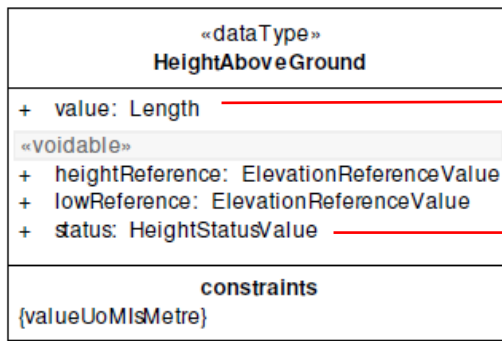
above ground envelope, bottom of construction, entrance point, general eave, general ground, general roof, general roof edge, highest eave, highest ground point, highest point, highest roof edge, lowest eave, lowest floor above ground, lowest ground point, lowest roof edge, top of construction.

Recommendation 7 For territories that are in the scope of EVRS, the use EVRS as elevation datum is recommended.



Buildings Attributes

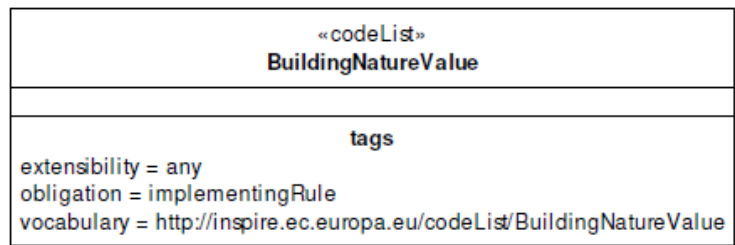
HeightAboveGround



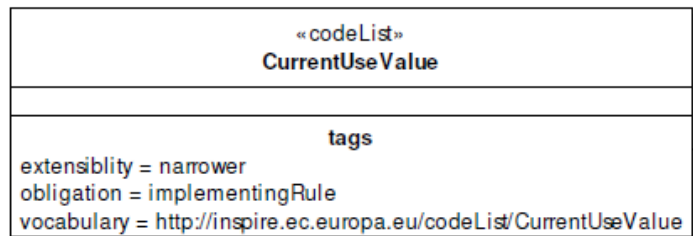
Diferença de altitude entre *heightreference* e *lowreference*

Estimado ou medido

BuildingNature



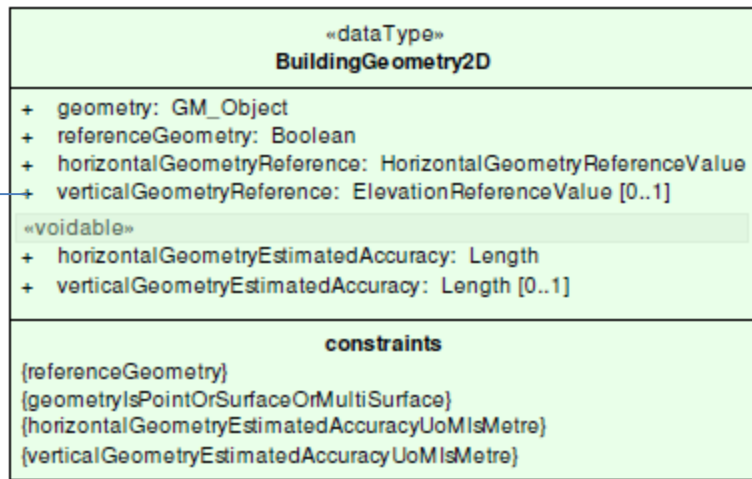
arch, bunker, canopy, castle, cave building, chapel, church, dam, greenhouse, lighthouse, mosque, shed, silo, stadium, storage tank, synagogue, temple, tower, windmill, wind turbine.



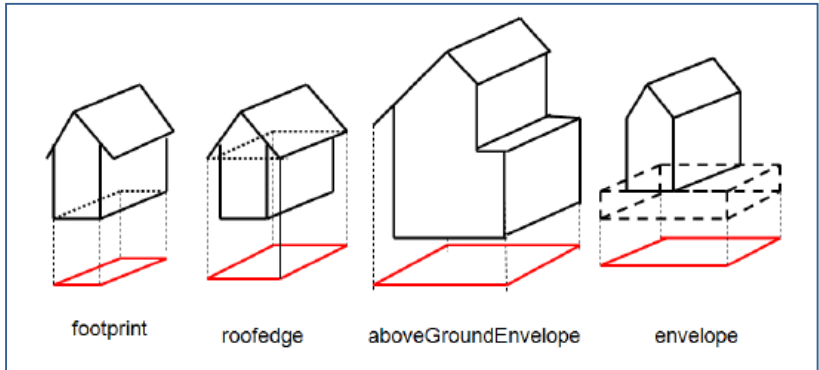
residential
 individualResidence
 collectiveResidence
 twoDwellings
 moreThanTwoDwellings
 residenceForCommunities
 agriculture
 industrial
 commerceAndServices
 office
 trade
 publicServices
 ancillary

CurrentUse

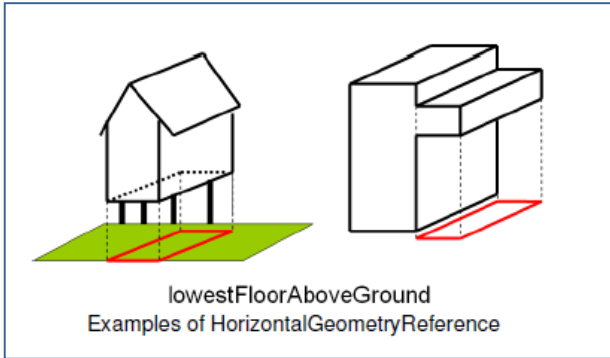
Building Geometry data type



above ground envelope, combined, entrance point, envelope, footprint, lower floor above ground, point inside building, point inside cadastral parcel, roof edge.

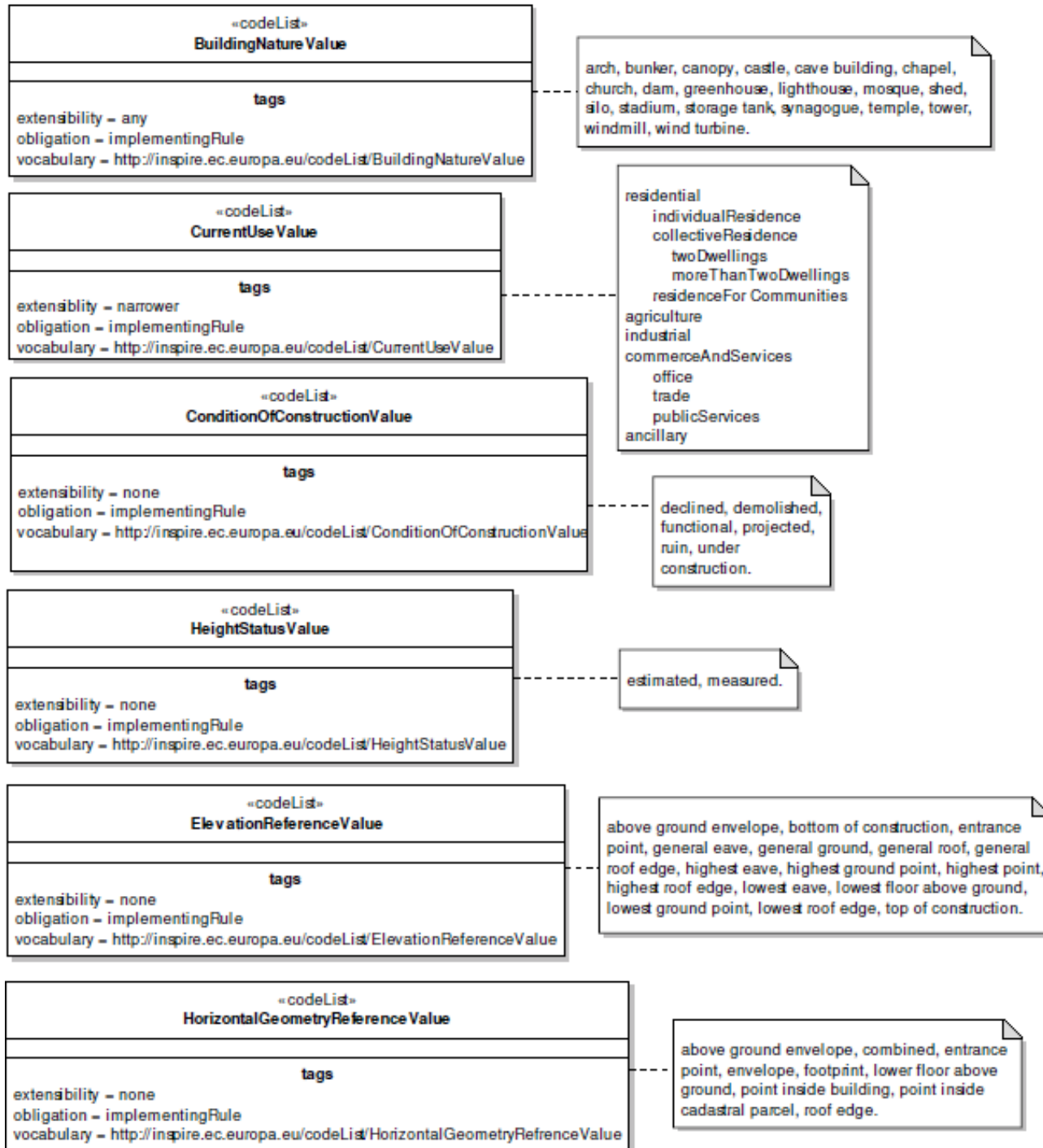


above ground envelope, bottom of construction, entrance point, general eave, general ground, general roof, general roof edge, highest eave, highest ground point, highest point, highest roof edge, lowest eave, lowest floor above ground, lowest ground point, lowest roof edge, top of construction.

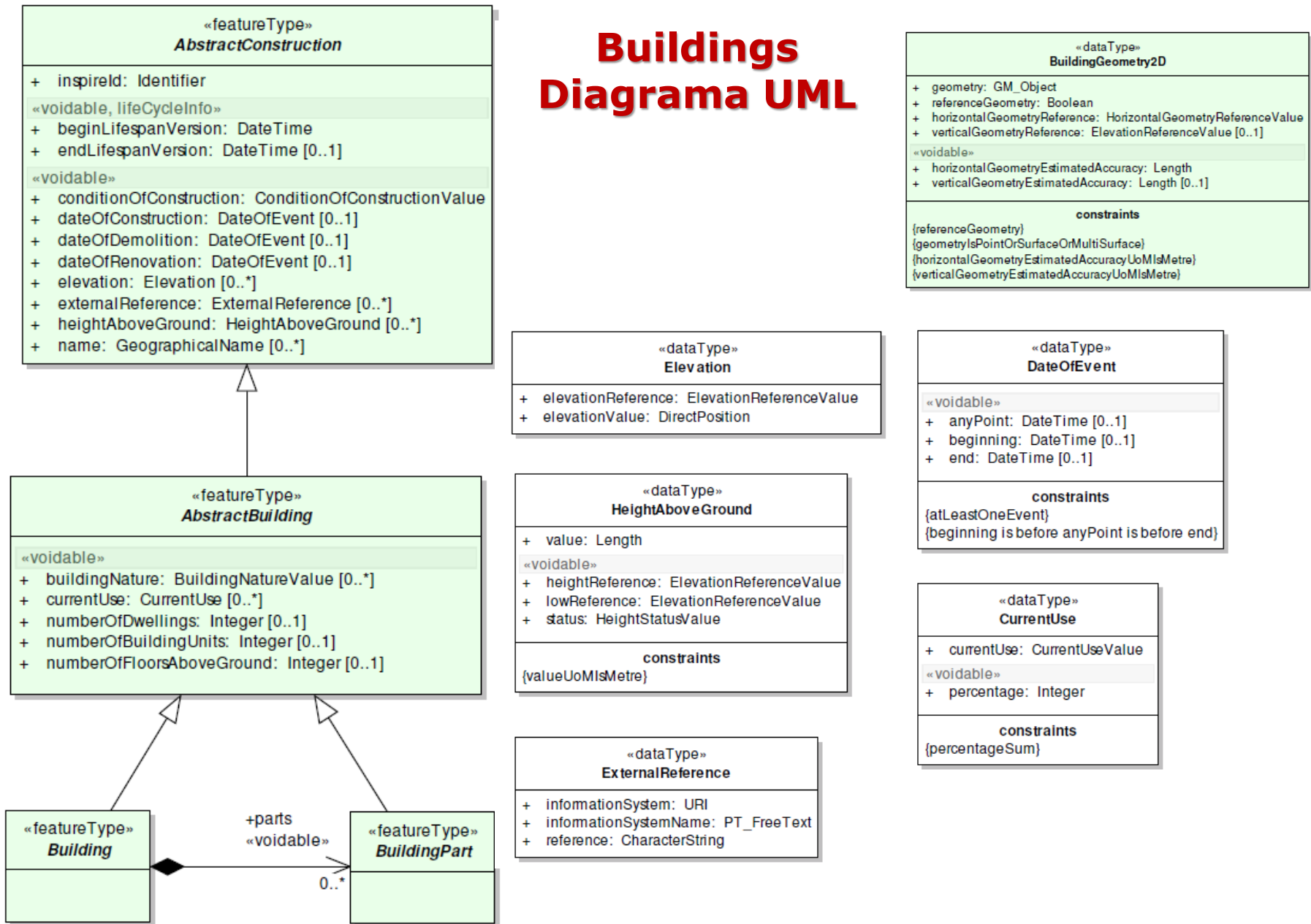


Buildings Diagrama UML

Code List



Buildings Diagrama UML



Buildings - Feature Catalogue

| Feature catalogue metadata | | |
|--|--|-------------------|
| Application Schema | INSPIRE Application Schema BuildingsBase | buildingsBase.xsd |
| Version number | 3.0rc3 | |
| Types defined in the feature catalogue | | |
| Type | Package | Stereotypes |
| <i>AbstractBuilding</i> | BuildingsBase | «featureType» |
| <i>AbstractConstruction</i> | BuildingsBase | «featureType» |
| <i>Building</i> | BuildingsBase | «featureType» |
| <i>BuildingGeometry2D</i> | BuildingsBase | «dataType» |
| <i>BuildingPart</i> | BuildingsBase | «featureType» |
| <i>CurrentUse</i> | BuildingsBase | «dataType» |
| <i>DateOfEvent</i> | BuildingsBase | «dataType» |
| <i>Elevation</i> | BuildingsBase | «dataType» |
| <i>ExternalReference</i> | BuildingsBase | «dataType» |
| <i>HeightAboveGround</i> | BuildingsBase | «dataType» |
| 5.3.2.1. Spatial object types | | |
| 5.3.2.1.1. AbstractConstruction | | |
| AbstractConstruction (abstract) | | |
| Name: | Abstract construction | |
| Definition: | Abstract spatial object type grouping the semantic properties of buildings, building parts and of some optional spatial object types that may be added in order to provide more information about the theme Buildings. | |
| Description: | The optional spatial object types that may be added to core profiles are | |

HUMBOLDT

Towards the Harmonisation of Spatial Information in Europe

HUMBOLDT contributes to the implementation of a European Spatial Data Infrastructure (ESDI) that integrates the diversity of spatial data available for a multitude of European organisations. It is the aim to manage and advance important parts of the implementation process of this ESDI.

The main goal of the HUMBOLDT project is to enable organisations to document, publish and harmonise their spatial information. The software tools and processes created will demonstrate the feasibility and benefits of an Infrastructure for Spatial Information in Europe as planned by the INSPIRE initiative ([INSPIRE](#)), meeting the goals of Global Monitoring for Environment and Security ([GMES](#)).

The technical goal of HUMBOLDT is to support Spatial Data Infrastructure (SDI) enablement by providing the functionalities for covering the data harmonisation process as a whole. The HUMBOLDT Tools and Services are built on current state of the art and standards, designed to provide solutions to all types of users, data custodians as well as private end-users. HUMBOLDT enables the use of single functionalities as part of your own infrastructure.

Learn more about HUMBOLDT

[At a Glance](#) provides a concise overview on the project's benefits.

[Scenarios](#) present example use cases explaining the application areas of HUMBOLDT.

[Get Involved!](#) Find out about possibilities to participate in and benefit from HUMBOLDT.

Please also visit our [Community Website](#) and the [HUMBOLDT Training Platform](#).



HUMBOLDT Video

Download the HUMBOLDT Video: [\[MP4\]](#) [\[OGV\]](#)
[\[WEBM\]](#)

Recent blog posts:



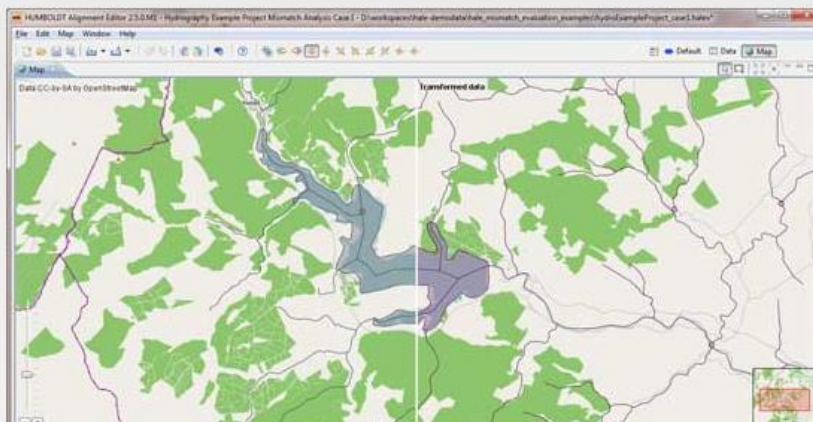
Test drive HALE 2.8.0

HALE – The HUMBOLDT Alignment Editor

Status: Stable, active development

The mapping of elements such as Feature Types and Attributes of one conceptual schema (e.g. GML Application Schemas, Database Schemas or UML models) to another is a cornerstone of data harmonisation. The **HUMBOLDT Alignment Editor (HALE)** is a tool for defining and evaluating conceptual schema mappings. HALE allows domain experts to create logically and semantically consistent mappings and to transform geodata based on these mappings. Furthermore, a major focus is put on the documentation of the schema transformation process and its impacts, e.g. in the form of lineage information attached to the resultant transformed data.

[Watch the HALE Tutorial for getting started!](#)



HALE uses a high-level language for expressing the mappings. They can later be used by the Conceptual Schema Transformer processing component to execute a data transformation, e.g. from a non-harmonised data source to a INSPIRE-compliant data set.

To make this complex process

News

[GeoServer App-Schema Integration: HALE 2.9.4 is out](#)

2015-11-02: HALE has been supported well by the community in the past months with contributions, through support subscriptions and projects. ...

[» more](#)

[AGILE 2015 workshop on Data Harmonisation](#)

Members of the data harmonisation panel and the wider community will host the «Data Complexity Challenge – New Approaches to Data Harmonisation» preconference workshop at AGILE 2013, 14th of May, Leuven, Belgium.

[» more \(blog post\)](#)

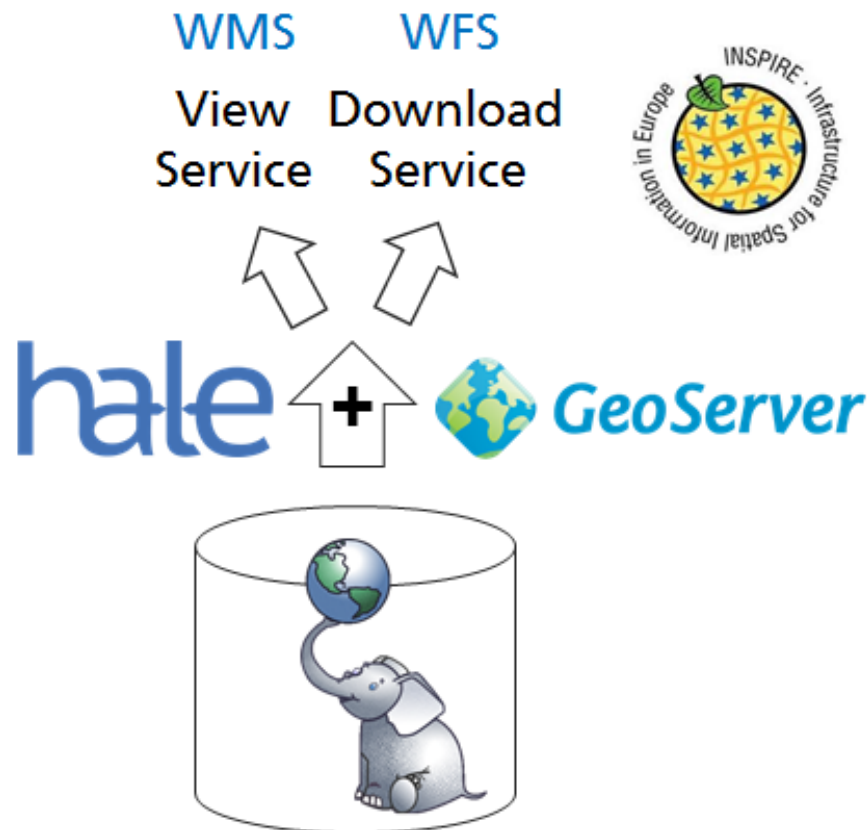
[» more \(AGILE WS paper\)](#)

[HALE Evaluation](#)

2012-04-20: The HUMBOLDT Alignment Editor Usage Evaluation and Comparison Questionnaire is online now. If you are a HALE user, please consider participating

GeoServer App-Schema configuration

Publishing OGC services based on GML Application Schemas and Complex Features with [GeoServer](#) is now easier than ever. Use [HALE](#) to define the mapping from your data store to an application schema, such as INSPIRE or NAS. Then, upload the resulting configuration for the GeoServer [App-Schema plugin](#) directly to your GeoServer instance. This feature was developed together with [GeoSolutions S.R.L., Italy](#). More information on the new feature including future plans is available at the [GeoSolutions Blog](#).



d.gTerritório
Direção-Geral do Território

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A DGT | ORDENAMENTO E CIDADES | CARTOGRAFIA E GEODESIA | CADASTRO | **SISTEMAS DE INFORMAÇÃO** | PRODUTOS E SERVIÇOS

Sistema Nacional de Informação Territorial **SNIT**

Clique Aqui →

VOCÊ ESTÁ EM: Página inicial > Sistemas de Informação > SNIT

◀ | **O que é o SNIT?** | SNIT (IGT em vigor) | SSAIGT (IGT em publicação) | PCGT/PEC (IGT em curso) | CRUS | CUP | ▶

- Apresentação SNIT**
Ver vídeo
- Ver Vídeo**
Acesso Simples
- Ver Vídeo**
Acesso Avançado - Infraestrutura de Dados Espaciais (IDE)
- Enquadramento e evolução**
Enquadramento e evolução do Sistema Nacional de Informação Territorial.
- Objetivos e destinatários**
Principais objetivos e destinatários do Sistema Nacional de Informação Territorial.
- Vantagens**
Benefícios do Sistema Nacional de Informação Territorial para o cidadão e para a eficiência e eficácia dos serviços.
- Serviços WEB**
O SNIT inclui um sistema de acesso à informação através da Web, o que permite aos seus utilizadores frequentes a utilização da informação gráfica nos respetivos ambientes de trabalho.

VOCÊ ESTÁ EM: Página inicial > Sistemas de Informação > SNIT > IGT em vigor (SNIT) > Acesso Simples

Acesso Simples

O acesso simples permite consultar os instrumentos de gestão territorial (IGT) em vigor de uma forma simples e direta, bastando para isso indicar a região, o concelho e o tipo de plano pretendido. Inicia-se a consulta com a seleção de uma Região, seguidamente deverá escolher um concelho e, posteriormente, o tipo de IGT que se pretende visualizar. Se pretender visualizar a listagem de todos os IGT em vigor selecionar "todos". É possível consultar as peças escritas (regulamento), bem como as peças gráficas dos IGT (plantas), no caso da sua existência.

Região



Total de 5 regiões

Concelho

- TODOS
- ABRANTES
- ÁGUEDA
- AGUIAR DA BEIRA
- ALANDROAL
- ALBERGARIA-A-VELHA
- ALBUFEIRA
- ALCÁCER DO SAL
- ALCANENA

Total de 278 concelhos
1 concelho(s) selecionado(s)

Tipo de plano

- TODOS
- Programa Nacional da Política de Ordenamento do Território
- Plano de Ordenamento de Área Protegida
- Plano de Ordenamento de Albufeira de Águas Públicas
- Plano de Ordenamento da Orla Costeira
- Plano Regional de Ordenamento do Território
- Plano Diretor Municipal
- Plano de Pormenor
- Plano de Urbanização

Total de 14 tipos de plano
1 tipo(s) de plano(s) selecionado(s)

Procurar

Barómetro:

| | | |
|------------|--|-----|
| Facilidade | | 4,1 |
| Utilidade | | 4,1 |
| Imagem | | 4,2 |

nº de pesquisas:

>> [avaliação e sugestões](#)

http://www.dgterritorio.pt/sistemas_de_informacao/snit/igt_em_vigor_snit/acesso_simples/

Página Inspire (ver vídeo)

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

Data Specifications

<http://inspire.jrc.ec.europa.eu/index.cfm/pageid/2>

Ver datamodels
Descarregar XML

Projecto Humboldt

<http://www.esdi-humboldt.eu/home.html>

Importar BuildingsBase no HALE