



INSPIRE

Infrastructure for Spatial Information in Europe

News from Standardisation Bodies

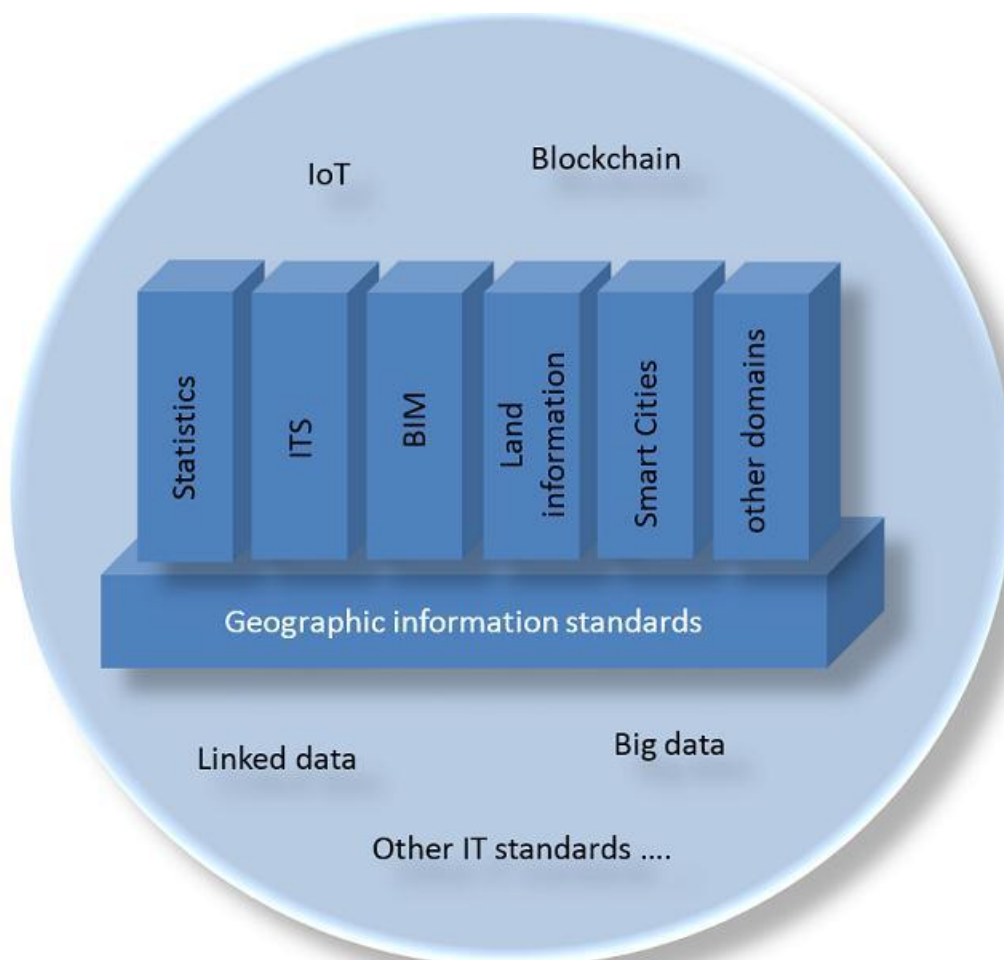
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Identifier	MIG/9/2018/DOC12
Description	<p>This documents summarises new developments and activities relevant to INSPIRE maintenance and implementation from the following standardisation bodies:</p> <ul style="list-style-type: none">• ISO/TC 211• Open Geospatial Consortium (OGC)• World Wide Web Consortium (W3C)
actions:	<p>MIG to:</p> <ul style="list-style-type: none">• Take note of the document• Discuss possible coordinated actions related to the presented standardisation activities

ISO Technical Committee (TC) 211 on Geographic Information

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The primary focus of ISO/TC 211 is geographic information and geomatics as an enabling technology within Information and communications technology (ICT). However, in the revised business plan the current and future scope, besides the important work to maintain the already published 19100 series of standards, is to work more closely with liaison organizations and other ISO committees to support specific application domains. Since most subjects are directly or indirectly associated with a location, geographic information and geomatics are linked to many other areas. It is natural for ISO/TC 211 to have a coordinating role for all standards in the scope of geographic information.



The vertical integration of geomatics standard with ICT in general implies a specific focus on eGovernment and semantic web. All (or most) ISO standards that contains a XML schema do also have an OWL/RDF representation. Advocating these schemas is of specific interest,

Regarding the horizontal integration, ISO/TC 211 has established a joint working group with ISO/TC 59 SC h13 for the interoperability between GIS (Geospatial) and BIM (Building Information models). The first deliverable will be a technical report describing interoperability barriers between the two platforms.

ISO/TC 211 is also working on establishing a joint working group with ISO/TC 204, ensuring interoperability between GIS and the ITS domain.

Several of the ISO/TC 211 standard are now revised and available as the second generation of standards.

The following is a list of standards that are under revision (The standards in bold may be of specific interest to INSPIRE). Several of the standards are joint projects with OGC.

- ISO 19112 Spatial referencing by geographic identifiers
- **ISO 19105 Conformance and testing (Just started)**
- **ISO 19136-1 Geography Markup Language (GML) -- Part 1: Fundamentals**
- **ISO 19126 Feature concept dictionaries and registers**
- ISO 19107 Spatial schema
- **ISO 19111 Referencing by coordinates**
- **ISO 19131 Data product specifications**
- **ISO 19156 Observations and measurements**
- **ISO 19123-1 Geographic information -- Schema for coverage geometry and functions -- Part 1:**
- **ISO 19139-1 Geographic information -- XML schema implementation -- Part 1: Encoding rules Revision of ISO 19139 with a new title.**
- ISO 19150-2 Geographic information -- Ontology -- Part 2: Rules for developing ontologies in the Web Ontology Language (OWL) -- Amendment 1
- **ISO 19127 Geodetic register**

In addition, there are several new standardization projects going on, some early in the process, others just waiting for publication by ISO central secretary (The standards in bold may be of specific interest to INSPIRE). Several of the standards are joint projects with OGC.

- ISO 19161-1 Geodetic references -- Part 1: The international terrestrial reference system (ITRS)
- **ISO 19168-1 Web feature services -- Part 1: Core¹**
- ISO 19115-2 Metadata -- Part 2: Extensions for acquisition and processing
- ISO 19130-3 Imagery sensor models for geopositioning -- Part 3: Implementation Schema
- **ISO 19163-2 Content components and encoding rules for imagery and gridded data -- Part 2: Implementation schema**
- ISO 19150-4 Ontology -- Part 4: Service ontology
- ISO 19160-3 Addressing -- Part 3: Address data quality
- ISO 19160-6 Addressing -- Part 6: Digital interchange models
- ISO 19165-2 Preservation of digital data and metadata -- Part 2: Content specifications for earth observation data and derived digital products
- ISO 19162 Well-known text representation of coordinate reference systems
- **ISO 19170 Discrete Global Grid Systems**

¹ This is not a revision of ISO 19142 WFS, but part 1 in a new multipart standard, jointly developed with OGC – see https://github.com/opengeospatial/WFS_FES/blob/master/background.md. ISO 19142 will remain.

- **ISO 19148 Linear referencing**
- ISO 19166 BIM to GIS conceptual mapping (B2GM)
- ISO 19167 The Application of ubiquitous public access for air quality information

Geospatial, or location, technology has been going mainstream for some years now. Maps, geographic information and related content are becoming more pervasive and embedded in everyday life. Continued major investments from large players like Google, Microsoft, Apple and Amazon are making consumer-based mapping, location-based service applications and image based maps truly ubiquitous. As the consumerization of technology increases, the focus will be more on providing value and Return on Investment (ROI) to the users. The standardisation results that already are achieved will only create new needs for interoperability and new kinds of geodata.

More information can be found at the web site <https://committee.iso.org/home/tc211>

Open Geospatial Consortium (OGC)

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News in summary

- 8 Standards approved
- 1 Best Practice approved
- 5 Engineering Reports approved
- 5 Discussion or White Papers approved
- 1 new Domain Working Group (DWG)

Standards approved

- OGC GML in JPEG 2000 (GMLJP2) Encoding Standard v.2.1
- OGC TimeseriesML 1.2 – XML Encoding of the Timeseries Profile of Observations and Measurements
- OGC Web Services Security

Engineering Reports published

- GeoPackage Related Tables Extension Interoperability Experiment
- SCIRA (Smart City Interoperability Reference Architecture) Architectural Landscape Assessment
- Portrayal Concept Development Study
- MUDDI Conceptual Model (Model for Underground Data Definition and Interchange)
- OGC Earth Observation Exploitation Platform Hackathon 2018

Discussion/White Papers published

- GeoDCAT Discussion Paper
- GeoPackage / OWS Context Harmonization Discussion Paper
- OGC SensorThings API Tasking Core - Tasking Capabilities Examples Discussion Paper
- Geospatial Standardization of Distributed Ledger Technologies Discussion Paper
- OGC CDB and Geopackage Discussion Paper

Recently initiated Domain Working Groups

- OGC Interoperable Simulation and Gaming Domain Working Group (ISG DWG)

2018 Standards forecast

Green = approved

Red = in vote

Italic Bold = Community standard

- GeoPackage Tiled/Gridded Extension (approved)
- SensorThings API – Part 2, Tasking
- Web Coverage Service (WCS) 2.1
- CDB² Multi-Spec Extension
- TimeseriesML 1.2
- GML in JPEG 2000 (GMLJP2) v2
- Web Services Security
- CDB 1.1
- **3D Tiles (Q3)**
- **Abstract Specification Topic 2 – Spatial Ref (Q3)**
- MetOcean Profile for WCS 2.1 (Q4)
- GeoTIFF (Q4)
- PipelineML (Q4)
- Web Coverage Service (WCS) 2.0 REST Extension (Q4)
- Web Processing Service (WPS) 2.0 REST/JSON Binding Extension (Q4)
- Semantic Sensor Network Ontology (with W3C) (Q4)
- Time Ontology in OWL (with W3C) (Q4)
- Abstract Specification Topic 1 – Feature Geometry (Q4)
- HDF (Hierarchical Data Format) Abstract Data Model (Q4)
- **OpenFlight (Q4)**
- **Geo-DCAT (Q4)**
- IndoorGML 1.1 (Q4)
- Web Map Service (WMS) 1.4 (2019)
- CityGML 3.0 (2019)
- SoilML (2019)
- QB4ST - RDF Data Cube extensions for spatio-temporal components (with W3C) (2019)
- Web Feature Service (WFS) 3.0 (with ISO) (2019)

Upcoming TC Meetings

- December 2018: Charlotte, NC USA
- March 2019: Singapore
- June 2019: Leuven, Belgium (ideas from the MIG community are welcome!)
- September 2019: Banff, Canada
- December 2019: Toulouse, France (to be confirmed)

² Formerly known as Common Database the OGC Members determined that going forward that this standard shall be known as “CDB”.

Technology Trends watch - Highlighted topics – near term actions

Why does OGC Track Geo Technology? OGC's position on Innovation (2014): "develop standards to support evolving and potentially disruptive technologies, community needs and market trends."

Formal Technology Strategy - OGC CTO leads a Technology Strategy process to track and promote technology evolution

Overwhelming member interest to understand and address implications

Table 1. Example assessment summary

Meta Trend	Software Development and Patterns
Title	Edge and Fog Computing
Description	Fog computing is a system-level horizontal architecture that distributes resources and services of computing, storage, control and networking anywhere along the continuum from Cloud to Things (OpenFog Consortium).
What is new or emerging?	IEC White paper on Edge Intelligence[1]: "Driven by the internet of things (IoT), a new computing model – edge-cloud computing – is currently evolving, which involves extending data processing to the edge of a network in addition to computing in a cloud or a central data centre.
Why might it matter?	Cloud players continue to set record revenues and profits while the telcos grapple with stalled revenues. The telcos have lost the 'Cloud 1.0' battle to the OTTs. But, is there a way for the telcos to be more competitive? More specifically: can edge computing provide the telcos a competitive advantage over the cloud players? - Frank Royal, Xona Partners
Horizon	After Next: Proprietary offerings are available. Conceptual architectures are being developed [2], but have not advanced to interoperability based on open standards.
Impact	Disruptive: Similar to the emergence of cloud computing, edge and fog computing will shift the economics of the "computing on demand" marketplace.
Gartner Hype Curve phase	
Technology Readiness Level	Currently no OGC implementation activities.

The following topics are currently part of the Technology Trends watch:

- Power of Location
 - People who communicate digitally tend to meet in person
- Spatial/Temporal Models

- 3D Geo Model creation
- Indoor positioning
- Autonomous vehicles
- Big Data & Data Science
 - Machine Learning
 - Modeling, Simulation and Prediction
 - Uncertainty and Veracity
- Spatial Data on the Web
 - APIs for the Web
 - Linked data
- New Geo Sources
 - IoT and Sensor Webs
 - Remote sensing on demand
 - UAVs and drones
 - Smallsats
- User platforms & Networks
 - Immersive Geo
 - Ambient Services
- Software development
 - Federation, Pub-Sub

World Wide Web Consortium (W3C)

Points of contact: Dave Raggett, team contact of the Dataset Exchange Working Group, dsr@w3.org; Francois Daoust, team contact of the Spatial Data on the Web Interest Group, fd@w3.org

- The Dataset Exchange Working Group recently published a second Public Working Draft of its revised edition of the Data Catalog Vocabulary (DCAT)³ and is poised to publish several First Public Working Drafts on related specifications.
- The Spatial Data on the Web Interest Group⁴ is discussing maintenance and update of the vocabularies and Spatial Data on the Web Best Practices document that were published last year. In addition, the group is also identifying areas where standards should be developed *jointly* by both W3C and OGC, using the overall W3C Strategy Funnel⁵, which triages topics into the following stages: Exploration, Investigation, Incubation, Evaluation and Standardisation (this last step is out-of-scope for the Interest Group). It has also started to work on best practices for Statistical Data (no document published yet).
- W3C has chartered a Working Group on updating the popular JSON-LD specification⁶.
- The Web of Things Working Group⁷ is progressing work on standards for exposing physical and abstract entities (things) as objects with properties, actions and events, independently of the communication protocols. The approach uses Linked Data with URIs for naming things and linking to their descriptions, and provides the basis for semantic interoperability across open markets of services. We expect the specifications to reach W3C Recommendation status in mid-2019.
- A W3C standardisation workshop⁸ is planned for March 2019 on bridging communities (RDBMS, Property Graphs, RDF/Linked Data, AI/ML) on identifying opportunities for further standardisation work, e.g. extending RDF to embrace Property Graphs, alignment on graph data query languages, and context sensitive mappings between vocabularies with overlapping semantics. A follow on workshop on time-series and spatial data is now at an early stage of planning.
- A W3C study of Web data standardisation⁹ has been produced with support from the Open Data Institute and InnovateUK, with a view to making W3C a more effective, more welcoming and sustainable venue for communities seeking to develop Web data standards and exploit them to create value added services.

³ <https://www.w3.org/TR/2018/WD-vocab-dcat-2-20180508/>

⁴ <https://www.w3.org/2017/sdwig/>

⁵ <https://github.com/w3c/strategy/projects/2> (overall strategy funnel),
https://github.com/w3c/strategy/projects/2?card_filter_query=label%3Ageospatial (only geospatial proposals)

⁶ <https://www.w3.org/2018/03/jsonld-wg-charter.html>

⁷ <https://www.w3.org/WoT/WG/>

⁸ <https://www.w3.org/Data/events/data-ws-2019/cfp.html>

⁹ <https://www.w3.org/2017/12/odi-study/>