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### **Closing Plenary**

114th OGC Technical Committee

Ottawa, Canada

Scott Simmons and Technical Committee Working Group Chairs

5 March 2020



# Agenda

- Thanks
- Quorum confirmation
- Early presentations
  - EO Collection Metadata GeoJSON(-LD) Encoding Standard: Yves Coen
  - 2020 Montreal TC Meeting: David Graham
- TC Member presentations
  - MobilityDB project: Mahmoud Sakr
- TC Motions
  - OWL Time corrigendum: Simon Cox
  - Tiling Abstract Spec: Carl Reed
  - CityJSON Community standard proposed work item: Linda van den Brink
  - MLS DWG and Routing API Charter: Jeff Harrison
  - IDBE Discussion Paper: Carsten Rönsdorf
  - IndoorGML 1.1: Ki-Joune Li
- Upcoming TC Meetings
- TC Chair announcements and motions
- Working Group reports with motions: 3 to Z
- "Important Things" discussion

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**Closing Plenary** 





### Welcome to Ottawa!



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### **Opening Presentations**

- Keynote Jina MacEachern and Cameron Wilson
- ESRI Canada Gord Plunkett
- Natural Resource Canada Testbed Activities Ryan Ahola
- MapML and June W3C Workshop Peter Rushforth
- Canadian Energy End-Use Map Project Jessica Webster
- Maritime Limits and Boundaries Serge Levesque
- Forestry Applications Brian Low
- Arctic Spatial Data Infrastructure Cameron Wilson
- Canada Forum Presentations
  - Canadian Groundwater Information Network Boyan Brodaric

### **Canada Forum Presentations**

- Welcome, Introduction and Overview of the Innovation Day Opportunity during the Montreal June 2020, Trevor Taylor, Director Member Services, OGC
- Canadian Energy End-Use Map Project, Jessica Webster, Energy Planning Analyst, CanmetENERGY-Ottawa, Natural Resources Canada
- Federal Geospatial Platform Cumulative Effects Concept Development Study, Joshua Lieberman, Director, Innovation Program, OGC
- Maps For HTML, Peter Rushforth, Technical Advisor, GeoConnections, Natural Resources Canada
- OGC Implementation at the Meteorological Service of Canada, Tom Kralidis, Senior Systems Scientist, Environment
   and Climate Change Canada
- Flood Mapping Activities and Standards Development, Laura Salisbury, Geospatial Standards Advisor, Canada Centre for Mapping and Earth Observation Water Program, Natural Resources Canada
- OGC Marine Limits and Boundaries (MLB) pilot project: Operationalizing IHO S-121 standard for MLBs for future use in MSDI, Serge Levesque, Technical Advisor - Geomatics, Canadian Hydrographic Service, Fisheries and Oceans Canada
- Canada's User Needs Assessment and Knowledge Products for CGDI, Graham Wilkes, Geography Activity Leader, GeoConnections, Natural Resources Canada.
- Arctic SDI Governance and Multi-Jurisdictional Data Sharing, Simon Riopel, Geospatial Advisor, GeoConnections, Natural Resources Canada

### **OGC Enables Spatial Data Infrastructures**



### Awards









### The Scott Award (Ottawa edition)

17: 7

< EXIT

PARTY AT THE BRIER PATCH

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### The George Award (aka what happens in Ottawa, stays in Ottawa)



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### Let's also acknowledge those others who investigated hosting

- Ordnance Survey
- Singapore Land Authority
- European Space Agency

### Thanks to OGC staff

- Greg Buehler
- Gobe Hobona
- Trevor Taylor
- Nadine Alameh
- George Percivall
- Ingo Simonis
- Josh Lieberman

# **Early Presentations**





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# OGC17-084: EO Collection Metadata GeoJSON(-LD) Encoding

114th OGC Technical Committee Ottawa, Canada Yves Coene (Spacebel s.a.) 5 March 2020



## Outline

- Introduction
- Collection Metadata overview
- Conclusion

### Introduction

- OGC EO Product Metadata & OpenSearch (EOPMOS) SWG
  - OGC 13-026r9, OGC 17-047, OGC 17-003 approved by OGC mid 2019.
    - Cover EO OpenSearch and EO Product metadata (GeoJSON)
    - Benefited from inputs and review by OGC SWG and CEOS WGISS SLT members.



### Introduction

WGISS SLT review process of OGC 17-003 (Granule metadata) raised comments related to Collection metadata.	Next steps – Open Comments			
	<ul> <li>MM-05 (NASA) – Collection metadata encoding</li> </ul>			
EOPMOS SWG at OGC TC Portsmouth 09/2017 agreed to prepare dedicated document for EO Collection metadata a.k.a. OGC 17-084.	Image: products of products of products of products of granules) (page 10, line 1): Consider adding a fully defined Collection (Product) GeolSON example.       Image: products of pro			
Prepared by EOPMOS SWG as background task as priority given to OGC 17-047 and 13-026r9.	MM-06 (NASA) – Collection metadata     encoding     The GeoJSON format seems to be suitable for defining UMM-6 (Granule) required     metadata (see UMM-6 Required Fields table) but not for UMM-C (Collection) required			
Presented to Metadata and Catalog DWG (TC Toulouse, Nov. 2019)	metadata (see UMM-C Required Fields table):			
EOPMOS SWG vote proposing as Best Practice (Febr. 2020)	Veryon Exercit         Magners/Santham         Mathematical Annual			
For a Best Practice, the document needs to be presented to the TC and then an electronic vote is scheduled.	EO Product and OpenSearch SWG   13/09/2017   OGC 17-003 Page 15 European Space Agency			

The following organisations will submit the original document or its revisions to the Open Geospatial Consortium (OGC):

• CGI

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- Con terra GmbH
- ESA European Space Agency
- EUMETSAT
- Spacebel s.a.

The editors would like to acknowledge that this work is the result of collaboration and review of many organisations and would like to thank for the comments and contributions from:

- CEOS/WGISS
- DLR
- NASA
- VITO

4 EO Collection Metadata | Ottawa | 5 March 2020

### OGC 17-084 - Overview

- Encoding for conceptual models:
  - NASA UMM-C
  - OGC 11-035r1 chapter 6
  - ISO19139(-2), INSPIRE
- Standards-based:
  - GeoJSON (RFC 7946) Feature
  - OWS Context (OGC 14-055r2)
  - JSON Schema
  - GeoDCAT-AP
  - W3C DCAT (V2)
- Encoding:
  - GeoJSON
  - JSON-LD (@context)

#### **Open Geospatial Consortium**

Date: 2020-01-30 External identifier of this OGC<sup>®</sup> document: <<u>http://www.opengis.net/doc/IS/eoc-geojson/1.0></u> Internal reference number of this OGC<sup>®</sup> document: 17-084r0 Version: 1.0.0D9 Category: OGC<sup>®</sup> Best Practice Editors: Y. Coene, U. Voges, O. Barois

> EO Collection GeoJSON(-LD) Encoding Standard

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Warning

This document defines an OGC Best Practices on a particular technology or approach related to an OGC standard. This document is <u>not</u> an OGC Standard and may not be referred to as an OGC Standard. It is subject to change without notice. However, this document is an <u>official</u> position of the OGC membership on this particular technology topic.



Document type: OGC® Best Practice Document subtype: Encoding Document stage: Draft Document language: English

# OGC 17-084 – Conceptual models

$\leq$						
Traceabilit	ty to:		Collection Metadata Status VI.3	i Model (UMM-C)	Baynes, Reiter September 2015	
	ified Metadata Model for Collections (L	JMM-C)	Unified Coll	ection Metadata Model		
– OGC 11-035r1 Chapter 6 (ISO19115, INSPIRE)			Status of This Document This document provides information to the National Aeronautics and Space Administration (NASA) Eart Science community. Distribution is unlimited. Change Explanation			
			V1.0 Provisi	ional Release anization for Standardization (ISO) 19115-2	June 2014 November 2014	
				rds Office Review, Adding UMM-Common	May 2015	
		Open G	eospatial Consortium Posted Date: 2012-11-16 Approval Date: 2012-12-21 Publication date: 2013-03-26	e 2015Earth Science Data and Information tandarde Office (ESO) review comments meets Search tagts Dearch APL ta standard a Dates to Metadata Date - Changed the tit uses UMM-Common Metadata Dateelement fame element	August 2015	
		External identifier of thi: OGC® document: http://www.ope	engis.net/doc/bp/eo-product-collection	) 3.		
		Reference num	nber of this document: OGC 11-035r1	es to DataDate. ; mapping of type from Organization		
			Version: 1.0			
			Category: OGC® Best Practice			
		Edito	ors: Frédéric Houbie, Steven Smolders	atended to be backward compatible with existing impact providers from NASA Distributed Active . MR) client developers (both private and commerc	Archive Centers (DAAC),	
6 METADATA MODELS		EO Product Collection, Service and Sensor Discovery using the CS-W ebRIM Catalogue		not protected by copyright in the United States.		
	6.1 EO Product Collection minimal information model					
		Copyright © 2013 Open Geospatial	l Consortium	ied Metadata Model for Collections (UMM-C) to be used by the NASA Earth kes into account standards and specifications (Directory Interchange		
		To obtain additional rights of use, visit http://www	dditional rights of use, visit http://www.opengeospatial.org/legal		stem (EOS)Clearing House (ECHO)10,ISO 19115-2, and ISO 19115-1 )in ters of Earth Science Data and Information System's (ESDIS)CMR, its	
	6.1.2 Non ISO 19115 elements for eo product collection discovery	This document defines an OGC Best Practices on a particular technology or approach related to an OGC standard. This document is not an OGC Standard and may not be referred to as an OGC Standard. This document is subject to change without notice. This document is an official position of the OGC membership on this particular technology topic				
	6.2 EO Services minimal information model					
	6.2.1 EO Services information model	Document type: OGC® Best Practice Paper Document subtype: NA Document stage: Approved for publication Document language: English				
R C C B	6.2.2 INSPIRE mapping notes					
JGL						

### OGC 17-084 - Overview

• Similar approach and presentation as OGC 17-003 (Product Metadata)



### OGC 17-084 – Table of Content



## **Chapter 7: GeoJSON Encoding**

### Top-down presentation

- JSON schema (draft 4) graphical representation
- JSON schema incl. as Annex E
- Property tables

Example 1: GeoJSON encoding example

- GeoJSON examples

{	
	"type": "Feature",
	"id": "
	tp://fedeo.esa.int/opensearch/request/?httpAccept=application/geo%2Bjson&parentIdent
if	ier=EOP%3AESA%3AFEDEO&uid=LANDSAT.ETM.GTC",
	"bbox": [
	-180,
	-90,
	180,
	90
	1,
	"geometry": {},
	"properties": {}
}	

(1) GeoJSON example

Properties @context Type Any \_\_\_ type String Enum (String) Feature {**D**} id String onstraints format: uri Def Feature aeometry Type Object ype Any GeoJSON Feature properties Properties Type Object bbox onstraints 4 <= items <= -{\*} Wildcard Type Any

JSON Property	Definition	Data type and values	Multiplicity and use	
<b>type</b> S.type	Type of the element. This property is a string with fixed value "Feature".	Mandatory Property in [RD2].	One (mandatory)	
		Range: String		
		Fixed values: "Feature"		
id Ş.id	Unique identifier for the Feature (IRI).	Mandatory Property in [RD5].	One (mandatory)	
		Range: String		
bbox Ş.bbox	Information on the coordinate range of the geometry object representing the footprint (See [NR2]). The value is an array of length 2*n where n is the number of dimensions represented in geometry. Typically south-west point and north-east point. The value defines a shape with edges that have constant lonzitude and latitude.	Optional Property in [NR2]. Domain: Feature	Zero or one (optional)	
		Range: Array		
geometry	Contains the description of the geometry of the feature. The value shall be either a Geometry object or a JSON null value.	Property [NR2]. Domain: Feature Range: Geometry or null value.	One (mandatory)	

(2) JSON Schema

(3) Property table

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### **GeoJSON Encoding - Feature**



(\*) Visualised with http://jsonviewer.stack.hu/

### Annex A: Abstract test suite

• Conformance tested via set of JSON Schema definitions



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### Annex B: Normative JSON-LD @context



### ESA CCI / GeoJSON Example

Viewer Text
Inost {}
■ type : "Feature"
id : "http://geo.spacebel.be/opensearch/request/?httpAccept=application/geo%2Bjson&parentIdentifier=EOP:ESA:FEDEO:COLLECTIONS&uid=e0659b01259145c8bfb0de6eb12c2690"
Beometry
□ { } properties
title : "ESA Sea Surface Temperature Climate Change Initiative (ESA SST CCI): GHRSST Multi-Product ensemble (GMPE)"
identifier : "e0659b01259145c8bfb0de6eb12c2690"
abstract : "The ESA Sea Surface Temperature Climate Change Initiative (ESA SST CCI) dataset accurately maps the surface temperature of the global oceans over the period 1991 to 2010 using
bibliographicCitation : "Fiedler, E.K.; McLaren, A.; Merchant, C.J.; Donlon, C. (2015): ESA Sea Surface Temperature Climate Change Initiative (ESA SST CCI): GHRSST Multi-Product ensemble
doi: "10.5285/7BAF7407-2F15-406C-8F09-CB9DC10392AA"
date : "1991-09-01T00:00:00.000Z/2010-12-31T00:00:00.000Z"
updated : "1991-09-01T00:00:00.000Z"
Image: Separate Separation of the second sec
🕀 🚺 categories
🕀 🚺 keyword
🕀 🚺 license
🕀 🚺 contactPoint
🕀 🚼 author
publisher : "NERC - Earth Observation Data Centre"
□ qualifiedAttribution     □
Identities
describedby
Closing Plenary LOGC 17-084 EO Collection Metadata LOttawa L5 March 2020

# ESA CCI / JSON-LD Example

Viewer	Text
i 🖻 { } JSO	N
	Dcontext
	- @id : "http://geo.spacebel.be/opensearch/request/?httpAccept=application/geo%2Bjson&parentIdentifier=EOP:ESA:FEDEO:COLLECTIONS&uid=e0659b01259145c8bfb0de6eb12c2690"
	Dtype : "dcat:Dataset"
	ct:accessRights
	ct:bibliographicCitation : "Fiedler, E.K.; McLaren, A.; Merchant, C.J.; Donlon, C. (2015): ESA Sea Surface Temperature Climate Change Initiative (ESA SST CCI): GHRSST Multi-Product ensemble
··· 🔳 🕻	ct:date : "1991-09-01T00:00:00.000Z/2010-12-31T00:00:00.000Z"
··· 🔳 🕻	ct:description : "The ESA Sea Surface Temperature Climate Change Initiative (ESA SST CCI) dataset accurately maps the surface temperature of the global oceans over the period 1991 to 2010 us
··· 🔳 🕻	ct:identifier : "e0659b01259145c8bfb0de6eb12c2690"
∎{}¢	ct:license
	@type : "dct:LicenseDocument"
	rdfs:label : "Use of these data is covered by the following licence: http://licences.ceda.ac.uk/image/data_access_condition/esacci_sst_terms_and_conditions.pdf . When using these data you mus
- <b>=</b> (	ct:modified : "1991-09-01T00:00:00.000Z"
{}∝	ct:provenance
··· 🔳 🕻	ct:title : "ESA Sea Surface Temperature Climate Change Initiative (ESA SST CCI): GHRSST Multi-Product ensemble (GMPE)"
	wc:links
	iana:alternate
	] iana:describedby
	} iana:search
	dms:identifier
	@id : "https://doi.org/10.5285/7BAF7407-2F15-406C-8F09-CB9DC10392AA"
	cat:contactPoint
	cat:keyword
	cat:theme
	rov:qualifiedAttribution
1 1 77	paf:isPrimaryTopicOf
	dct:modified : "2019-07-26T00:08:02.000Z"
€ <b>}</b> ⊆	j:geometry
R	
-	
$\sim$	Closing Plenary   OGC 17-084 EO Collection Metadata   Ottawa   5 March 2020

### Annex C: EO Vocabulary Mapping

• Annex with mappings, GeoJSON as entry-point

JSON Property	Vocabulary Property	JSON Property Reference	Vocabular y Reference	OGC 11-035r1, ISO19139, ISO19139-2	UMM-C [OR2], [OR1]	Comments
ings[*].contents						
<pre>coordinates \$.geometry.coordin ates</pre>	gj∶coordinates	[NR2]	[OR18]	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_Data Identification /gmd:extent/gmd:EX_Extent/gmd:geographicElement/ gmd:EX_GeographicBoundingBox	Spatial Information   Spatial Extent [R] (§2.6.2)	
<pre>created \$.properties.isPri maryTopicOf.create d</pre>	dct:created			N/A.	Metadata Information / Metadata Date (§2.1.2) (CREATE)	Table 6: MetadataInformation object properties
created \$.properties.creat ed	dct:created			gmd:citation/gmd:CI_Citation/gmd:date/gmd:CI_Date/gm d:date /gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_Data Identification/gmd:citation/gmd:CI_Citation/gmd:date/gm d:CI_Date/gmd:dateType/gmd:CI_DateTypeCode codeListValue : creation (See [OR33] §2.3.4).	Data Identification   Data Dates (§2.2.7)	Table 8: DataDates object properties
data \$.properties.links .data	iana:enclosure	[NR5]	[NR11]		Related URL   ( §2.4, §2.8)	Table 24: Links object properties
date \$.properties.date	dct:date	[NR5]	[OR3]	/gmi:MI_Metadata/gmd:identificationInfo/gmd:MD_Data Identification/gmd:citation/gmd:CI_Citation/gmd:date/gm d:CI_Date/gmd:date/gco:DateTime	Data Identification   Data Dates (§2.2.7) Data Identification   Collection Progress (§2.2.13)	Table 7: DataIdentification object properties
degree \$.properties.wasUs edBy[*].generated. degree	dct:type		[OR15]	//dataQualityInfo/*/report/*/result/*/pass		Table 14: Entity object properties



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### Conclusion

- Data model defined as
  - GeoJSON
  - JSON(-LD), thus applicable for linked data (RDF) applications
  - JSON schema (OpenAPI compatible)
- Maximum reuse of existing specifications and vocabularies
  - OGC 14-055r2 (OWS Context)
  - DCAT (V2), DCAT-AP, GeoDCAT-AP
  - OGC 17-003 (EO Vocabulary)
- Collection data model applicable outside EO context (GeoDCAT-AP, DCAT)
- Consistent with related GeoJSON(-LD) encodings for:
  - OpenSearch GeoJSON(-LD) Responses (OGC 17-047)
  - EO Product Metadata (OGC 17-003)
  - Application and Service Metadata (OGC 19-020r1)

## Conclusion

### • Traceability covers main elements from

- UMM-C (Unified Metadata Model for Collections)
- ISO19139(-2)
- Implementations:
  - ESA FedEO: https://geo.spacebel.be/opensearch/readme.html
  - <u>https://databio.spacebel.be/eo-catalog/readme.html</u>
  - OGC Testbed-15 EOPAD Catalog
  - VITO PDF-FO OpenSearch
- Next steps:
  - Electronic vote proposed as OGC Best Practice
- Future work:
  - Alignment OGC 14-055r2 with OGC API Features (i.e. Feature properties).



### Conclusion



- Questions ?
- Contact info:
  - <u>Yves.Coene@spacebel.be</u>
  - Andrea.Della.Vecchia@esa.int



### June 2020 OGC TC/PC Montreal Briefing

100th 115<sup>th</sup> OGC Technical Committee Orlando, FL USA St. Laurent, QC Canada David Graham <xx> September 2016 June 2020



### From here to there...



# OGC <sup>®</sup>

# Île de Montréal



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R

### Arriving at CAE from YUL



# OGC <sup>®</sup>
# **Rideshare from the Montreal Airport**

<u>https://blog.mtl.org/en/transportation-options-to-and-montreal-airport</u>

### ORDER A RIDE FROM YOUR PHONE

 Montréal's ride-sharing application Eva was launched in 2019 by a group of enterprising University students looking to create a cooperative model – where the drivers are also owners – to get folks where they need to be in a snap. The Mozio airport transport system is also offered at YUL, and like other rideshare programs like Lyft (soon to launch in Montréal) and Uber, all meet their passengers at the official pick-up area at Gate 6 of the departure level on the second floor.



# CAE HQ is a BIG Factory



# Stationnement de CAE



# How Big is CAE?

#### • CAE FY2019:

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- \$3.3B (Cdn) Annual Revenue
- \$9.5B (Cdn) Backlog
- New record 78 FFS sold



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# What to do in Montreal in June?



#### JUNE 12 TO 14, 2020

Formula 1 Grand Prix du Canada

The best Formula 1 drivers meet at the demanding Gilles-Villeneuve Circuit.







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June 15th, 2020 - June 19th, 2020

#### JUNE 25 TO JULY 4, 2020

#### Festival International de Jazz de Montréal

A meeting place for enthusiasts of all jazz-related music.



June 2020 OGC Technical and Planning Committee Meetings - Montreal

# Here's a good idea:

 David Graham's short clips from the 2016 Quebec
 Enbridge Ride to Conquer
 Cancer

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# **TC Member Presentations**





# MobilityDB: A Database System for Moving Features

Contacts: Esteban Zimanyi (ezimanyi@ulb.ac.be) Mahmoud SAKR (mahmoud.sakr@ulb.ac.be)

# **MobilityDB**



- A moving object database MOD
- Builds on PostgreSQL and PostGIS
- Developed by a team in Université libre de Bruxelles
- OPEN SOURCE extension
- Compliant with OGC standards on Moving Features, and in particular the OGC Moving Features Access



### MobilityDB: Architecture







# MobilityDB Ecosystem

MobilityDB MapMatch		MobilityDB Exchange		MobilityDB View		MobilityDB ETL	
MobilityDB Distributed	MobilityDB Network		MobilityDB Stream	QCIS	python- mobilitydb		MobilityDB JDBC
© cītusdata	pgRouting		PIPELINEDB	psycopg	asyncpg		PostgreSQL JDBC
docker		MobilityDB	PostgreSQL	PostGIS	python"		Java
ubuntu							

#### Loading Data: CSV Example

```
CREATE TABLE TripsInput (
   CarId integer REFERENCES Cars,
   TripId integer,
   Lon float,
   Lat float,
   T timestamptz,
   PRIMARY KEY (CarId, TripId, T) );
```

CREATE TABLE Trips ( CarId integer NOT NULL, TripId integer NOT NULL, Trip tgeompoint, PRIMARY KEY (CarId, TripId), FOREIGN KEY (CarId) REFERENCES Cars (CarId) );

```
INSERT INTO Trips
SELECT CarId, TripId,
    tgeompointseq(array_agg(tgeompointinst(
        ST_Transform(ST_SetSRID(ST_MakePoint(Lon,Lat), 4326), 5676), T) ORDER BY T))
FROM TripsInput
GROUP BY CarId, TripId;
```

## Loading Data: GTFS Example

Source: STIB, Brussels

Duration: 28 days

7 Oct- 3 Nov 2019

**#Trips:** 445,187

DB size: 9 GB



#### https://docs.mobilitydb.com/nightly/workshop/ch02.html

## Loading Data: Google Location Data

**Source:** Personal Google data

**Duration:** 6 years with time gaps

JSON size: 144 MB

**CSV size**: 8 MB converted with jq

**#Trips**: One per day



#### https://docs.mobilitydb.com/nightly/workshop/ch03.html

## Loading Data: Maritime Data (AIS)

**Source:** Danish Maritime Authority

Duration: one day

April 1st 2018

**#Rows:** 10M

**#Trips:** 2,995

DB size: 1 GB



#### https://docs.mobilitydb.com/nightly/workshop/ch01.html

## **Visualization - Cesium MF-JSON**

Cesium extension for MF-JSON visualization.

Kyoung-Sook KIM et al., Artificial Intelligence Research Center (AIRC) of AIST in Japan.



#### https://www.opengeospatial.org/pressroom/pressreleases/3083

#### Visualization - Cesium MF-JSON



# Data analysis - velocity maps

#### Moscow bus lanes





https://pgconf.ru/en/2020/265266

7

### **Quick Example: Spatial Projection**

TABLE Ships(mmsi integer, trip tgeompoint, sog tfloat, cog tfloat, traj geometry, tripETRS tgeompoint ) List the ships that commute between the ports Rødby and Puttgarden.

CREATE INDEX Ships\_tripETRS\_idx ON Ships USING GiST(tripETRS);

```
SELECT *
FROM Ships
WHERE intersects( tripETRS, ST_MakeEnvelope(...) ) AND
intersects( tripETRS, ST_MakeEnvelope(...) )
```

The intersects function is index supported, i.e.,



## **Quick Example: Temporal Operations**

TABLE Ships(mmsi integer, trip tgeompoint, sog tfloat, cog tfloat, traj geometry, tripETRS tgeompoint )

Find all the trips that report SOG very different from the speed calculated from their trajectories (noise, broken sensor, ...).

```
SELECT *
FROM Ships
WHERE twavg ( ( speed( tripETRS ) * 3.6 ) - ( sog * 1.852 ) ) > 10
```

#### Quick Example: Temporal Operations

SELECT \*

**FROM Ships** 

WHERE twavg ( ( speed( tripETRS ) \* 3.6 ) - ( sog \* 1.852 ) ) > 10





### Quick Example: Temporal Operations



# More queries (temporal aggregation, collision risk) can be found in the full presentation in:

https://portal.ogc.org/files/?artifact\_id=92291

#### **Distributed MobilityDB Using Citus**



# Python Support

- python-mobilitydb: database adapter to access MobilityDB from Python
- Open source, developed by MobilityDB Team
- Available on Github
- Supports both psycopg2 and asyncpg for PostgreSQL
- Uses postgis adapter for PostGIS
- An adapter for SQLAIchemy has been independently developed
- Also available on Github

# UML Diagram: compliant with MF\_TemporalTrajectory ISO\_19141



**Template Classes** 



# MobilityDB on Github



# Thanks for listening !

Questions ?



# **TC Motions**



# **OWL-Time updates/errata**

Simon J D Cox, CSIRO

# **Time Ontology in OWL**

W3C Recommendation 19 October 2017



#### This version:

https://www.w3.org/TR/2017/REC-owl-time-20171019/

#### Latest published version:

https://www.w3.org/TR/owl-time/

#### Latest editor's draft:

https://w3c.github.io/sdw/time/

#### Implementation report:

https://www.w3.org/2015/spatial/wiki/OWL\_Time\_Ontology\_adoption

#### Previous version:

https://www.w3.org/TR/2017/PR-owl-time-20170907/

#### Editors:

Simon Cox, <u>CSIRO</u> Chris Little, Met Office

#### Contributors:

Jerry R. Hobbs

Feng Pan

#### Repository:

GitHub

Issues

#### OGC Document Number:

OGC 16-071r2

#### Temporal topology in OWL-Time



Figure 2 Thirteen elementary possible relations between time periods [af-97].
### IANA link registry

### Link Relations



#### Registry included below

Link Relation Types

#### Link Relation Types

#### **Registration Procedure(s)**

Specification Required

#### Expert(s)

Mark Nottingham, Julian Reschke, Jan Algermissen

#### Reference

[<u>RFC8288]</u>

#### Note

New link relations, along with changes to existing relations, can be requested using the [registry interface] or the mailing list defined in [RFC8288].

#### **Available Formats**



Relation Name 🔳	Description 🔟	Reference 🔟 Notes 🔟
about	Refers to a resource that is the subject of the link's context.	[ <u>RFC6903],</u> section 2
alternate	Refers to a substitute for this context	[HTML]
amphtml	Used to reference alternative content that uses the AMP profile of the HTML format.	[AMP HTML]

### Interval relations

Added 2019-09

intervalAfter	refers to a resource associated with a time interval that ends before the beginning of the time interval associated with the context resource	[ <u>Time</u> <u>Ontology in</u> <u>OWL</u> ] section 4.2.21
intervalBefore	refers to a resource associated with a time interval that begins after the end of the time interval associated with the context resource	[ <u>Time</u> <u>Ontology in</u> <u>OWL</u> ] section 4.2.22
intervalContains	refers to a resource associated with a time interval that begins after the beginning of the time interval associated with the context resource, and ends before the end of the time interval associated with the context resource	[ <u>Time</u> <u>Ontology in</u> <u>OWL</u> ] section 4.2.23
intervalDisjoint	refers to a resource associated with a time interval that begins after the end of the time interval associated with the context resource, or ends before the beginning of the time interval associated with the context resource	[ <u>Time</u> <u>Ontology in</u> <u>OWL</u> ] section 4.2.24
intervalDuring	refers to a resource associated with a time interval that begins before the beginning of the time interval associated with the context resource, and ends after the end of the time interval associated with the context resource	[ <u>Time</u> <u>Ontology in</u> <u>OWL</u> ] section 4.2.25
intervalEquals	refers to a resource associated with a time interval whose beginning coincides with the beginning of the time interval associated with the context resource, and whose end coincides with the end of the time interval associated with the context resource	[ <u>Time</u> <u>Ontology in</u> <u>OWL</u> ] section 4.2.26
intervalFinishedBy	refers to a resource associated with a time interval that begins after the beginning of the time interval associated with the context resource, and whose end coincides with the end of the time interval associated with the context resource	[ <u>Time</u> <u>Ontology in</u> <u>OWL</u> ] section 4.2.27
intervalFinishes	refers to a resource associated with a time interval that begins before the beginning of the time interval associated with the context resource, and whose end coincides with the end of the time interval associated with the context resource	[ <u>Time</u> <u>Ontology in</u> <u>OWL</u> ] section 4.2.28
intervalln	refers to a resource associated with a time interval that begins before or is coincident with the beginning of the time interval associated with the context resource, and ends after or is coincident with the end of the time interval associated with the context resource	[ <u>Time</u> <u>Ontology in</u> <u>OWL</u> ] section 4.2.29
intervalMeets	refers to a resource associated with a time interval	Time

#### 6. IANA Considerations 6.1 intervalAfter Link Relation Type 6.2 intervalBefore Link Relation Type 6.3 intervalContains Link Relation Type 6.4 intervalDisjoint Link Relation Type 6.5 intervalDuring Link Relation Type 6.6 intervalEquals Link Relation Type 6.7 intervalFinishedBy Link Relation Type 6.8 intervalFinishes Link Relation Type 6.9 intervalln Link Relation Type 6.10 intervalMeets Link Relation Type 6.11 intervalMetBy Link Relation Type 6.12 intervalOverlappedBy Link Relation Type 6.13 intervalOverlaps Link Relation Type 6.14 intervalStartedBy Link Relation Type 6.15 intervalStarts Link Relation Type

τ

Add an 'IANA Considerations' clause to the spec document N.B. no change to semantics, just an IANAformat presentation

https://w3c.github.io/sdw/time/#iana-links

Normative references

G.1

#### § 6. IANA Considerations

The link relation types below have been registered by IANA per Section 6.2.1 of [RFC8288]:

#### § 6.1 intervalAfter Link Relation Type

#### Relation name

intervalAfter

#### Description

refers to a resource associated with a time interval that ends before the beginning of the time interval associated with the context resource

#### Reference

W3C OWL-Time recommendation, section 4.2.21

#### § 6.2 intervalBefore Link Relation Type

#### Relation name

intervalBefore

#### Description

refers to a resource associated with a time interval that begins after the end of the time interval associated with the context resource

#### Reference

W3C OWL-Time recommendation, section 4.2.22

#### § 6.3 intervalContains Link Relation Type

#### Relation name

intervalContains

#### Description

refers to a resource associated with a time interval that begins after the beginning of the time interval associated with the context resource, and ends before the end of the time interval associated with the context resource

#### Reference

W3C OWL-Time recommendation, section 4.2.23

### + Minor errata

- Missing attribute in (non-normative) figure
- Incorrect capitalization of german nouns in RDF

### Process – next steps

- Call for consensus within SDWIG to release this document ends 5<sup>th</sup> of March ( = today)
- Next:
  - It will be published as Candidate Rec at W3C (public review)
  - AND draft will be uploaded to Pending docs at OGC followed by vote to accept the corrigendum



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### Tiling Conceptual Model and Logical Model for 2-D Planar Space – Abstract Specification

114th OGC Technical Committee

Ottawa, Canada

**Carl Reed** 

5 March 2020



# Agenda



- The draft conceptual model and logical model for 2d planar space contains:
  - Requirements
  - Terminology
  - Mandatory elements
  - Recommended elements
- At
  - <u>https://portal.ogc.org/files/?artifact\_id=92185&version=1</u>



# Timeline

- September 2018: First discussed in well attended open session in Stuttgart.
- June 2019: First draft of document posted to pending.
- June 2019: Leuven Meeting Presentation in Architecture DWG
- November 2019: Toulouse Meeting Presentation in Architecture DWG on final draft for public comment.
- December 2019 OAB Review and approval for public comment. Adjudicated OAB comments – Thanks Chris <sup>©</sup>
- January 2020: R1 posted to pending for public comment
- February 2020: Comment period ended. One set of comments.
- February 2020: Comments adjudicated and r2 posted to pending.
  - Comments: Use correct template for terms and definitions, complete normative reference list, make T&Ds consistent throughout the document, complete list of abbreviations.

### • Not new 🙂

- Some form of (ceramic) tile has been in existence for more than 25,000 years. "Tile" and "tiling" as we know it dates from c4,700 B.C. in Egypt while glass tiles were popular in 2,500 B.C
- What is relatively new is the concept and use of "tiles" and "tiling" in digital geospatial technology
  - Earliest known use of a tiled data store is in CGIS circa 1965.



alamy stock photo

- There are numerous OGC standards and engineering reports that discuss and provide requirements for tiled approaches for vector and/or raster data.
- There have been and continue to be numerous ongoing activities and discussions related to tiles in OGC standards.
  - Testbed 15, Vector Tiles Pilot 2, 3D Containers Pilot
- Yet, there is no consistent OGC model to which all the current and envisioned tiling approaches can reference.
- But current OGC documents and work do have common and consistent tile related concepts and elements.

# An OGC Abstract Specification provides a conceptual foundation for:

- Consensus Agreement on:
  - Common Terms and Definitions
  - Concepts
  - Relationships
  - A lingua-franca
- Otherwise
  - The Tower of Babel, oil painting by Pieter Bruegel the Elder, 1563





### There is a discussion of conceptual and logical models

• Conceptual Model should be "simple" and easy to understand. Logical models flush out the details



Cycladic sculpture circa 2700 BC



### Da Vinci's Vitruvian Man

# **Top Level Requirements**

- Be consistent as possible with existing OGC standards baseline. These include:
  - CDB, DGGS, GeoPackage, WMTS, and the Tile Matrix Set (TMS) standards.
  - 19123:2005 Coverages Abstract Spec and GPKG Tiled Gridded Coverages
  - Also considered ongoing Innovation program initiatives such as TB 13, Vector Tiling Pilot, and TB15 activities.
  - And various commercial approaches such as MapBox Vector Tiles and Ecere GNOSIS tile structure.
  - And historical commercial products GenaMap 1986.
- Any implementation approach should be able to use the logical model as the framework and define a profile in the ISO sense (with extensions?) that meets specific application, domain, or end user requirements.

- Must be content neutral (type of data makes no difference to the core model)
- Must be end use case neutral (application and domain requirements are irrelevant) – Although Storage and Visualization use cases are presented in various OGC documents.
- Must be consistent with current best practice so that existing standards and implementations are not impacted or impacted as little as possible.
- Does not consider symbology, layers, or other requirements that are domain specific and are viewed as extensions to the core model



### Why clear terminology?

#### About 219,000,000 results (0.60 seconds)

#### See 3d tiles





Mountain 8" x ...

Free shipping

Cubes A

\$76.49

Wayfair



Exagoni Dimension ... **\$94.75** TileBar Sponsored 🕕



Art3d Textures 3D Wall Panels **\$64.99** Amazon.com Free shipping



### **3D Tiles**



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### **Tiling Conceptual Model**





# **Terminology – Conceptual Model**

### tessellation (aka Tiling)

 partitioning of a space into a set of conterminous subspaces having the same dimension as the space being partitioned.

### • tile

a geometric shape with known properties that is the result of the tiling (tessellation) of a plane. A tile consists of a single connected "piece" without "holes" or "lines" (topological disc).

### tile set

- set collection of tiles with common properties that meets the definition of a tessellation. In short, a collection of subsets of the plane. The common properties of a tile set are specified in the tile schema.
- Homogeneous vs. heterogeneous tile sets depending on source tiling(s)





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# Logical Model – Tessellation of 2D Euclidean Space



### Logical Model for partitioning based on tiles in the 2D Euclidean case.



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### **Tile Set Mandatory Elements**

### Defined in Tile Set Schema

### • Foundation Requirement:

– Any tiling scheme used to create a tile set SHALL be a regular tessellation of a flat surface and is the tiling of a plane using one or more geometric shapes, called tiles, with no overlaps and no gaps. The tiling scheme is periodic (tiling that repeats itself at regular intervals) and symmetric.

### • Other Tile Set requirements

- Tile Set Identifier
- Tile Set CRS
- Tile Set UoM
- Tile Set Extent
- Tile Set Origin
- Tile Set Tessellation Rules (How the tiles were generated)

### **Tile Mandatory Requirements**

- The following are tile mandatory requirements:
  - Tile Address/ID (Each tile shall be uniquely identified)
  - Tile Origin is specified (Lower left, upper right, etc.)
  - Tile Reference (from DGGS)
  - Tile extent (bounding box)

### **Recommended Metadata Requirement**

- Recommended Tile Set Metadata Class (Based on TMS Standard) and consistent with current OGC API work.
  - Title
    - Title of the tile set, normally used for display to a human
  - Abstract
    - Brief narrative description of the tile set, normally available for display to a human
  - Keywords
    - Unordered list of one or more commonly used or formalized word(s) or phrase(s) used to describe this tile set.

### So, simple example: ID = Parcels, tessellation = square



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### **CityJSON submission as community standard**

114th OGC Technical Committee Ottawa, Canada Linda van den Brink 5 March 2020



# What is CityJSON?

- CityJSON is a JSON-based encoding for a subset of the OGC CityGML 2.0 conceptual data model
- Aims of CityJSON
  - Alternative to the GML encoding of CityGML, which tends to be verbose and complex to work with
  - Easy-to-use for reading/writing datasets and for building software
  - Friendly for web and mobile development
  - Designed with programmers in mind
  - Compact datasets (~ 6x compression compared to GML equivalent)



# CityJSON as OGC Community Standard

- Submission of CityJSON as OGC Community Standard
- Submission team of 7
  - Geonovum (leading organization)
  - Delft University of Technology
  - Kadaster International
  - virtualcitySYSTEMS GmbH
  - National University of Singapore
  - Forum Virium Helsinki Oy
  - Ordnance Survey
- Submission based on CityJSON version 1.0 and already existing implementations
- To be done: Investigation of relation between CityJSON 1.0 and draft version of CityGML 3.0
  - Successful conversion CityGML 3.0 <-> CityJSON 1.0 using development versions of citygml4j and citygmltools
  - Hypothesis: CityJSON also encodes a profile of CityGML 3.0

### OGC considering CityJSON as community standard; seeks public comment for new Work Item

#### Contact:

info@opengeospatial.org

### Comments are due by 5th March, 2020

#### **Release Date:**

Thursday, 13 February 2020 UTC

CityJSON provides a simplified alternative to the GML encoding of CityGML that is also lightweight and suitable for use on the web and mobile.



OG

The Open Geospatial Consortium (OGC) is considering CityJSON for adoption as an official OGC Community Standard. A new Work Item

### Next steps

- Respond to comments & amend the justification document
- Post to pending
- Electronic vote on the proposed candidate Community standard as an official OGC work item.



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### **Mobile Location Services DWG**

114th OGC Technical Committee Ottawa, Canada Jeff Harrison 5 March 2020



The MLS DWG recommends that the OGC Technical Committee approve a public call for comments on the "Routing SWG Charter".

Discussed the development of Route encodings, conceptual model, and maybe an ontology - as well as a Route API.

Discussed coordination with WPS, API Processing and other groups, and whether Routes and other processing outcomes should be top-level resource of functional API or follow common API Processing pattern, or both...



# **Activity Summary**

<ul> <li>Discussion topics</li> <li>Route encodings, conceptual model, and maybe an ontology</li> <li>Routing API</li> <li>Coordination with WPS and API Processing</li> <li>Core (single mode) and extensions (including Multimodal)</li> </ul>	<ul> <li>Upcoming deliverables         <ul> <li>Incorporate comments from public review</li> <li>Request TC vote to approve Routing SWG</li> </ul> </li> </ul>
<ul> <li>Coordination (ongoing and planned)         <ul> <li>Key API SWGS: Common, Processing, Features, etc</li> <li>W3C</li> </ul> </li> </ul>	<ul> <li>Future meetings         <ul> <li>Tentative Routing SWG initial meeting at Montrea TC (pending SWG approval)</li> </ul> </li> </ul>



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### **Routing SWG Charter**

114th OGC Technical Committee Ottawa, Canada Jeff Harrison 5 March 2020



# **Routing SWG Purpose**

- The purpose of this Standards Working Group is to:
- Develop and maintain a routing conceptual model, a routing ontology, and a route exchange model.
- Develop and maintain an OGC API Open Routing core standard.
- Develop and maintain extensions of the OGC API Open Routing standard as identified in section 4 (Scope).

The formal proposed name of the new standard is "OGC API – Open Routing - Part 1: Core". The short name "Routing API" may also be used to refer to this effort in the charter and work products

# **Routing SWG Business Value**

- The Routing SWG will define and document a common exchange model for routing information and create an OGC API- Routing specification.
  - The route exchange model provides a common means for route consumers and routing services to exchange information to enable interoperability and expand the ability of routing services to incorporate diverse data, routing algorithms, and planning parameters in a standardized way. This will allow a variety of users and systems to request and receive routing solutions using a networked routing analytic workflow.
  - The OGC API defines a baseline suite of Routing API functions, capabilities, and encodings to address a common standard interface for network routing functionality, develop guidance for extending Routing APIs to account for various routing data models, and provide guidance for network routing engine configuration for the Routing API. The proposed API provides the methods and apparatus to support:
    - Discovery of route resources and metadata;
    - Execute basic commands to GET, PUT, PATCH, POST, and DELETE route resources, requests, and response; and
    - Interface with other web resources using OGC API capabilities and OGC web services.
- For providers of routing engines and solvers, the exchange model and API provide a uniform means to publish and offer those routing resources and capabilities for use by other systems.
- Users of routing engines and solvers are provided with a common exchange model and API that will allow them to access multiple capabilities and routing datasets to provide efficient access and application of multiple route resources offered through the API.

# **Existing and Related Routing Efforts**

- The starting point for the work will be:
  - OGC 19-041r3: Routing Pilot Engineering Report and
  - OGC 19-040 WPS Routing API (draft specification) Engineering Report
- The work shall also be informed by the following specifications and by recommendations found in:
  - OGC/W3C Spatial Data Working Group on the Web Best Practices (<u>https://www.w3.org/TR/sdw- bp/</u>);
  - OGC Geospatial API White Paper [OGC 16-019r4]; and
  - OGC API Features Part 1: Core standard, [OGC 17-069r3].
- The following standards work may be applicable to the work of the proposed SWG:
  - 16-120r3, OGC Moving Feature Access
  - 16-140, OGC Moving Feature Encoding Extension JSON (Best Practice document includes API, being updated in 19-045r2, OGC Moving Features Encoding Extension – JSON (candidate standard)
- Additionally, the proposed SWG will monitor other OGC API work ongoing in various Standards and Innovation Program activities (e.g., OGC API - Common and API work on Processing, Coverages, Tiles, Moving Features SWG, etc.).
- Each of these documents recommends an emphasis on resource-oriented APIs in future OGC standards development including use of tools such as OpenAPI.

# **Routing SWG Scope**

- Route Exchange Model and Routing API were demonstrated in the OGC Open Routing API Pilot
  - OpenAPI frameworks have helped make describing and sharing API definitions more suitable for interoperability standardization.
- The Routing SWG will build on those preliminary efforts
  - More fully develop and document a Route Exchange Model and Routing API candidate standard that will provide a modernized, common, and consistent interface to services
  - Work will align with the current architecture of the Web and the Spatial Data on the Web Best Practices and be done in coordination with Joint W3C/OGC SDWIG
- Routing API candidate standard informed by emerging OGC API best practices and prior API standards examples (e.g., OGC API Features)
  - Define core API functions of GET, PUT, PATCH, POST, DELETE applied to routes as resources.
  - Document metadata requirements for routes to enhance discovery and exchange of routing resources.
- Implementer and standards development interaction
  - Developers encouraged to implement the draft API specification early and provide feedback.
  - Public access to draft versions of the standard using GitHub
  - Before finalizing versions of the "OGC API Routing", completion of goals should be verified:
    - Working implementations of all capabilities must be available and tested; and
    - Implementation feedback must be taken into account.
### **Routing SWG Scope: Modularization**

#### • OGC API - Open Routing - Part 1: Core will define a basic capabilities in multiple conformance classes

- The minimal conformance class will specify a simple interface to access metadata from routing resources that is sufficient for interfaces to exchange and perform basic web functions with the routing resources.
- Additional conformance classes will define additional capabilities based on the requirements and requirements classes defined in the core to meet the needs of use cases that require such capabilities.
- The Open Routing API Pilot identified two approaches for a routing API; one aligned more specially to the current draft OGC API -Processes specification and another aligned more generally to OGC API - Common.
  - The OGC API Routing Part 1: Core will initially focus on the routing/common approach and will incorporate the processing approach as it matures.
- The Route Exchange Model, containing a conceptual model and route ontology, will be developed independent of the API specification.
  - Provides a more general specification for routing approaches that could be developed independent of an API but provide a shared basis to ensure interoperability of information exchange.
- The Open Routing API Pilot identified work items that will be refined and assigned to the API Core, API Extensions, or the Route Exchange Model.
  - Supporting additional routing constraints (e.g. elevation, restricted maneuvers, speed limits, street hierarchies)
  - Incorporating additional transportation methods as parameters (e.g. pedestrians, cycling, motor vehicles)
  - Addressing alternative routing output (e.g. catchment and distance area and traveling salesman problem (multi-node optimization)
- Other extensions may be proposed and addressed in revisions to this charter.

### **Routing SWG Deliverables**

- The following deliverables will result from the work of this SWG:
  - A final version of the Route Exchange Model document for submission to the TC.
  - A final version of the OGC API Open Routing Part 1: Core document for submission to the TC;
  - Identification of at least three prototype implementations of the core based on the standard although more would be preferred; and
  - Zero or more additional parts as time and community interest permits.
- Part 1 will cover basic capabilities to GET, PUT, PATCH, POST, and DELETE routes and define route metadata.
  - Capabilities for richer routing interfaces or extension for unique geospatial resource considerations will be specified in additional parts.
- The targeted start date is in June 2020 once this charter is approved.
- Initial candidate route exchange model and API specifications are anticipated by the end of calendar year 2020 with demonstrated implementations and formal approval of the core Open Routing API in 2021.

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#### **IDBE discussion paper**

114th OGC Technical Committee Ottawa, Canada Carsten Rönsdorf 5 March 2020



# IDBE joint working group

- IDBE = Integrated Digital Built Environment
- Collaboration between bSI and OGC
- Finally, the first tangible work output

Built environment data standards and their integration: an analysis of IFC, CityGML and LandInfra





Open Geospatial Consortium & huilding SMADT Internet

IDBE v1.0, March 2020

### Comparison of three standards



# $OGC^{\circ}$

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## Approach

#### **IDBE WORKSHOP, MUNICH, APRIL 2018**

- IFC, CityGML and LandInfra: compare & contrast
- Panel of standards experts
- Questions and discussions

#### PURPOSE OF DOCUMENT

- Establish commonality and consensus •
- Communication to broaden participation
- **Propose some possible next steps**

#### THE PROCESS

- Summarise the differences between the standards
- Articulate the challenges to integration and interoperability ٠
- **Propose action points to address these challenges** ٠



Page 6 of 14

#### **IDBE – publishing our findings**



#### Comparison of three standards



### Modularity



 $OGC^{\circ}$ 

#### One possible building representation compared in UML



#### **Challenges and actions**

#### **CHALLENGES TO INTEGRATION**

- Identifying equivalence between different conceptualisation of the same real-world object.
- Inconsistency in the accuracy and method of geolocation.
- Different geometric representations, including parametric techniques.
- Contrasting scope and format of real-world object identification.
- Predominance of dissimilar encodings.

#### **PROPOSED ACTIONS**

- Articulate in plain writing a set of illustrative use cases.
- Derive and make publicly available a shared vocabulary or definition dictionary.
- Author a best practice document on the use of three-dimensional georeferencing.
- Devise a system of common unique identifiers for real-world, physical objects.
- Agree a collaborative mechanism for opportunistic harmonisation of conceptual representations.

#### **Document Approval Motion**

• The IDBE SC recommends that the OGC Technical Committee approve release of [OGC 19-091r1] "Built environment data standards and their integration: an assessment of IFC, CityGML and LandInfra" as an OGC Discussion Paper.

- There was no objection to unanimous consent



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#### IndoorGML 1.1

114th OGC Technical Committee Ottawa, Canada Ki-Joune Li, Pusan National University 5 March 2020



#### Difference from IndoorGML 1.0.3: Level

- Level (Storey) Information is very demanded by applications.
- Level data in many industrial indoor map formats
  - Apple IMDF
  - Indoor OSM
- No information in IndoorGML 1.0.3 (current version)
- Solution
  - Include it as a property of CellSpace
  - xs:string (rather than xs:integer): "M", "RC", "G", "B1", etc..
  - Cardinality
    - From 0: level may not be clear in some cases (e.g. Guggenheim Museum)
    - To many(\*): since a cell may be on several levels (e.g. atrium)

# Why String and 0..\*?

https://www.amazon.com/Being-John-Malkovich-Cusack/dp/B001O34NMI

BEING

JOHN MALKOVICH

13

12

11

10

9

8

- Why String (not integer)?
  - Ground Floor: GF (US, UK), RC (France), 0, 1(China, Japan, Korea)
  - M(Mezzanine) Floor
  - 7.5<sup>th</sup> floor (in Being John Malkovich)
  - Sometimes No 4<sup>th</sup> floor in China and Korea: 4(死) sounds death likewise no 13<sup>th</sup> floor
- Why 0..\*
  - To ensure the backward compatibility (0)
  - Some cells lies in multiple floors (e.g. atrium)

#### OGC

#### IndoorGML 1.1 for including level



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#### IndoorGML 1.1 for including level



#### 8.3 <CellSpace>

CellSpace is a base class for representing the indoor space. The class CellSpace contains properties for space attributes and purely geometric representations of space. CellSpace also has references to thematic objects in external data sources; the geometrical representation in primal Euclidean space is referenced by xlink. The attribute externalReference is used for the reference of an object to its corresponding object in an external data set. Each CellSpace is associated with a geometry object, which can be represented as several geometry primitive types such as 2D and 3D. *CellSpace has also information of level. Each CellSpace has normally one level but can have no level information when it cannot be clearly identified. Multiple stories can be also included to a single instance of CellSpace. The value of level is given as a xs:string rather than a xs:integer because it is sometime given as "M" for mezzanine floor and "RC" for ground floor.* 

#### IndoorGML 1.1: Public Comments

#### • Public Comments

- http://lists.opengeospatial.org/pipermail/requests/2019-November/000401.html
- 1. Requirement: [General, #]

Mentioning of related OGC standard

2. Implementation Specification Section number: [General, #]

Annex E (Informative)

3. Criticality: [Major, Minor, Editorial, etc.]

Editorial: OGC® Land and Infrastructure Conceptual Model Standard (LandInfra) 15-111r1 in section 7.11.5 BuildingPartType specifies four values, including

jointAccessFacility: The parts of the common portions used for access. Identification of these parts may be used for indoor navigation or security management.

4. Comments/justifications for changes: [Comments]

The OGC LandInfra standard acknowledges the need for indoor navigation and refers to it.

#### IndoorGML 1.1: Public Comments

- Reflection of the public comments
  - Add an informative annex (E.4)

#### ∎E.4 LandInfra and IndoorGML+

LandInfra defines CondominiumBuilding as a composite of BuildingParts in section 7.11.5 of OGC LandInfra core module (OGC 15-111r1), where a type of BuildingPart is jointAccessFacility such as staircase or lift. It is the parts of the common portions of CondominiumBuilding used for access. Identification of these parts may be used for indoor navigation or security management.

# **Upcoming TC Meetings**



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### **Technical / Planning Committee Meetings**

Date	Location	Host/Sponsor
2-6 March 2020	Ottawa, Canada	NRCan, Esri Canada
15-19 June 2020	Montreal, Canada	CAE
14-18 Sept 2020	Munich, Germany	TUM
7-11 Dec 2020	Atlanta, GA USA	GTRI
Feb or March 2021 (or 2022)	Offer from India (TBC)	NRSC, DST, SOI
June 2021	Madrid, Spain (TBC)	
October 2021	Americas	

# **TC Chair Announcements and Motions**



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#### **TC Policies and Procedures update**

- A revised document is almost ready for review
- A few outstanding items/directives from Banff/Toulouse meetings were settled this week
- Expect availability for review in April, vote in June

# <sup>3-Z</sup> WG Reports with TC Motions



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#### **3DIM DWG – closing plenary report**

114th OGC Technical Committee Ottawa, Canada Jantien Stoter, David Graham, Carsten Rönsdorf 5 March 2020



#### The most important thing for this WG is...

#### Few 3D related papers produced and put forward to TC vote.

Finally going underground with MUDDI.



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- Discussion paper "An Experiment to Link Geo-Referenced Multimedia and CityGML Features", Ki-Joune Li or or Sung-Hwan (DWG vote for submission to TC)
- CityGML Urban Planning ADE for i-Urban Revitalization, Nobuhiro Ishimaru
- 3D-IoT ER, Josh Lieberman
- Status and next steps on the National Building Layer Initiative, Jean-Samuel Proulx-Bourque
- MUDDI SWG vote, Carsten
- Future 3DIM topics to focus on, Carsten



# **Activity Summary**

<ul> <li>Discussion topics</li> <li>Multi-media</li> <li>Urban Planning</li> <li>3D IoT</li> <li>Underground data integration</li> </ul>	Upcoming deliverables
<ul> <li>Coordination (ongoing and planned)         <ul> <li>New MUDDI SWG</li> <li>Various (IndoorGML, LandInfra, SensorThings, Smart Cities,)</li> </ul> </li> </ul>	<ul> <li>Future meetings         <ul> <li>next TC Meeting</li> <li>'Insurance, underwriting and re-insurance based on 3D models' event in Montreal under 3DIM umbrella</li> </ul> </li> </ul>

#### An Experiment to Link Geo-Referenced Multimedia and CityGML Features

- The 3DIM DWG recommends that the OGC Technical Committee approve release of 19-090 An Experiment to Link Geo-referenced Multimedia with CityGML Objects as an OGC Discussion Paper.
  - There was no objection to unanimous consent
- Abstract: How to link geo-referenced images and videos with CityGML features. Investigated the data modeling, building procedure of geo-referenced images and videos and query processing.

### CityGML Urban Planning ADE for i-Urban Revitalization

- The 3DIM DWG recommends that the OGC Technical Committee approve release of 20-000r1 CityGML Urban Planning ADE for i-Urban Revitalization as an OGC Discussion Paper.
  - There was no objection to unanimous consent
- Abstract: Urban planning extension for CityGML as a data infrastructure for integration of urban planning data as a replacement of OGC KML.

#### **3D-IoT ER vote**

- The 3DIM DWG recommends that the OGC Technical Committee approve release of 19-073 3D-IoT Pilot Engineering Report as a public OGC Engineering Report.
  - There was no objection to unanimous consent
- Abstract: Advance the use of open standards for integrating environmental, building, and internet of things (IoT) data in Smart Cities. Scenarios:
  - Real-time monitoring on indoor occupancy (IndoorGML + SensorThings)
  - Real-time monitoring on micro-dust (CityGML + SensorThings)



# MUDDI

- Model for Underground Data Definition and Integration
- Underground CDS and pilot
- Persistent SWG to develop
  - MUDDI conceptual model
  - Roadmap
  - Implementation specifications
- Ad-hoc meeting held on 3/3/2020
- Charter members to include:
  - » Transport Scotland
  - » Danish Agency for Data Supply & Efficiency (SDFE)
  - » Geoff Zeiss
  - » Leica Geosystems
  - » ETH Zurich
  - » TU Munich
  - » Ordnance Survey



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#### **CITE Subcommittee**

114th OGC Technical Committee Ottawa, Canada Chuck Heazel 5 March 2020



#### The most important thing for this WG is...

# The GMLJP2 v2.0\* and OGC API - Features: Part 1 - Core executable test suites are ready to be moved to Production status.

\* GMLJP2 v2.0 ETS will be ready once there are one or more implementations that can pass the test

# Agenda

- OGC Validation Tools Status Report Dirk Stenger (lat/lon)
- GMLJP2 v2.0 executable test suite Gobe Hobona (OGC)
- OGC API Features: Part 1 Core executable test suite Dirk Stenger (lat/lon)
- GeoTIFF ETS Status Report Chuck Heazel
- Compliance Testing Policy Gobe Hobona (OGC)

#### Motion to approve the OGC API – Features – Part 1:Core Executable Test Suite as Official

- The CITE SubCommittee recommends that the Technical Committee approves the Executable Test Suite (ETS) of the OGC API – Features – Part 1:Core standard as an official OGC Compliance Test Package. Upon passing of this motion, the ETS will be moved from the Beta instance of TEAM Engine to the Production instance.
- At the time of this motion, there are three early implementors that have been certified compliant.
- Result: NOTUC


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# **EDM DWG Closing Plenary Report**

114th OGC Technical Committee Ottawa, Canada Don Sullivan 5 March 2020



# The most important thing for this WG is...

# Lessons learned from Smart City Interoperability Reference Architecture (SCIRA) exercise



- Sara Saeedi (University of Calgary): SCIRA Pilot ER Brief
- Pending Document(s) for Consideration: <u>20-011 SCIRA Pilot Engineering</u> <u>Report</u>
- Luis Bermudez (GeoSolutions USA): Use of Open Standards in the Decatastrophize European project <u>https://decatastrophize.eu/project/</u>
- He refers us to their blog:
- <u>https://www.geosolutionsgroup.com/blog/decat-platform-with-geonode/</u>

# **Activity Summary**

<ul> <li>Discussion topics         <ul> <li>SCIRA Report</li> </ul> </li> </ul>	<ul> <li>Upcoming deliverables         <ul> <li>[20-011] "OGC SCIRA Pilot ER"</li> </ul> </li> </ul>
<ul> <li>Coordination (ongoing and planned)         <ul> <li>Brief SCIRA Report to NASA Disaster Response Program</li> </ul> </li> </ul>	<ul> <li>Future meetings         <ul> <li>Next TC Meeting – see you in Montreal</li> </ul> </li> </ul>



# **Document Approval Motion**

# •The EDM DWG recommends that the OGC Technical Committee approve release of [20-011] "OGC SCIRA Pilot ER" as an OGC Engineering Report.

#### -Pending any final edits and review by OGC staff

**Editorial Review** 

#### -There was no objection to unanimous consent.

This engineering report (ER) captures Smart City Interoperability Reference Architecture (SCIRA) Pilot implementation outcomes and findings to demonstrate the risk mitigation and safety capability of the SCIRA interoperable and standard-based architecture. SCIRA pilot is an OGC (Open Geospatial Consortium) Innovation Program project sponsored by the US Department of Homeland Security (DHS) Science & Technology (S&T). The purpose of this project is to advance standards for smart and safe cities and develop open, interoperable design patterns for incorporating Internet of Things (IoT) sensors into city services.

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# **GeoSemantics DWG closing plenary report**

114th OGC Technical Committee Ottawa, Canada Linda van den Brink, Joseph Abhayaratna 5 March 2020



# The most important thing for this WG is...

### Publication of a white paper on the OGC Benefits of Representing Spatial Data Using Semantic and Graph Technologies ...In support of gathering interest for and chartering of a SWG to work on GeoSPARQL 2.0

# Joseph Abhayaratna (PSMA Australia Ltd) Whitepaper on the benefits of graph technology + discussion (45 min)

2. Camille Bernard, Marlène Villanova-Oliver and Jérôme Gensel (UNIV. GRENOBLE ALPES)

Immersing evolving geographic divisions in the semantic Web (20 min)

3. Timothy Nyerges, WenWen Li, Sean Gordon (OKN-SDS) Open Knowledge Network for Spatial Decision Support (20 min)



# **Activity Summary**

<ul> <li>Discussion topics         <ul> <li>White paper on benefits of graph technologies</li> <li>Possible value of standardizing ontologies for geographic/administrative units and their changes over time</li> <li>Value in liaison between OKN-SDS and OGC: the topic being Open Knowledge Network for Spatial Decision Support. Is GeoSemantics DWG the right forum?</li> </ul> </li> </ul>	<ul> <li>Upcoming deliverables         <ul> <li>White paper: now 4 week review within GeoSemantics DWG, then will go to Pending</li> </ul> </li> </ul>
<ul> <li>Coordination (ongoing and planned)</li> <li>SDWIG / W3C</li> <li>ISO group working on GQL</li> <li>W3C Linked Building Data Community Group</li> </ul>	<ul> <li>Future meetings</li> <li>Web meetings as necessary</li> <li>next TC Meeting: Montreal</li> </ul>

# Status of whitepaper

- Presented hardly edited at last meeting
- Draft complete: <u>https://portal.ogc.org/files/?artifact\_id=92270</u>
  - All sections have been reviewed and edited by authors
  - Seeking feedback from Geosemantics DWG (until four weeks from today)
    - Accepting comments and recommended edits (best done via GitHub comments => Issues, edits => Pull Requests)
    - Accepting additional use cases (Pull Requests)
    - As always, more GeoSPARQL Change Requests via Standards Tracker
  - Additional use cases being added from W3C Linked Building Data
  - Benefits being shared with ISO Graph Query Language (GQL) WG (discussed later)
- After finalization of feedback period
  - Motion to TC to accept as OGC White Paper
  - Socialization with audiences

# Next step: Chartering GeoSPARQL 2.0 SWG

- The Whitepaper contains a clause listing proposed extensions to GeoSPARQL
- There is interest in updating GeoSPARQL
- The GeoSemantics DWG is starting work on a charter for a GeoSPARQL 2.0 SWG
- Want to have an open SWG
- Call for further interest from OGC members:
  - Those interested: Contact the GeoSemantics DWG chairs!



# Spatial Data on the Web Interest Group update

- We are currently re-chartering (as W3C charters always have an end date, and ours is coming up)
- See <a href="https://w3c.github.io/sdw/roadmap/charter-2020.html">https://w3c.github.io/sdw/roadmap/charter-2020.html</a>
- Group review ended this week
- A few comments via email list and issue tracker
- Charter will be updated and sent for vote to W3C Advisory Committee
- (and to OGC TC members?)





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# Recommendations from Location Powers: Data Science for OGC WGs

114th OGC Technical Committee

Ottawa, Canada

George Percivall

5 March 2020

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Location Powers

CONVERSATION

AGENDA SPEAKERS TEAM REGISTRATION CONTACT ALL EVENTS



# DATA SCIENCE

13th & 14th November 2019

Google Building Cl5, 1500 Crittenden Ln Mountain View, CA 94043

The Location Powers workshop presentations and panel sessions were recorded. The discussion groups were not recorded.

Nov 13th Day 1 Video 1 - https://youtu.be/dZALrQ2MK4M Transcript Day 1 video 1 Day 1 Video 2 - https://youtu.be/0LqUhikBKYc Transcript Day 1 video 2 Day 1 Video 3 - https://youtu.be/3Iw-O6py8SIJ

# **Geospatial Data Science**

- Location Powers Summit, Nov 2019
  - <u>http://www.locationpowers.net/events/1911california/</u>
  - Posted: Presentations, YouTube video, YouTube Transcripts
- Geospatial Data Science White Paper, OGC 20-001
  - <u>https://portal.ogc.org/files/?artifact\_id=92196&version=1</u>
  - <u>https://github.com/opengeospatial/GeoDataSciWhitePaper</u>
- Seminar with initial Recommendations on Monday, March 3rd
  - Draft white paper lists recommendations for OGC Working Groups
  - How does your WG view the recommendations?

# **Geospatial Data Science**

"The art and craft of people leveraging technology to create value out of data"



# **Location Powers Recommendations**

### **GeoAl DWG**

- OGC Community Practices for geospatial machine learning.
- Promote development of training sets and benchmarks, e.g., with Radiant Earth Foundation.

### **EO Exploitation Platform DWG**

- OGC Community Practice for EO Exploitation Platform.
- Testbed 16 results on notebooks and python-oriented APIs

### **Big Data DWG**

- Big Data Stack for
  - Spatial temporal analytics
  - Streaming analytics
- ApacheCon Geospatial Track
- Frameworks for geospatial cyberinfrastructure, e.g., CyberGIS
- Testbed 16 results on notebooks and Python-oriented APIs

# **Location Powers Recommendations**

### **University DWG**

- Coordinate with institutes on geospatial data science, e.g., NSF Geo SW Institute, City of LA
- Frameworks for geospatial cyberinfrastructure, e.g., CyberGIS

#### **Moving Features SWG**

• Community Practices for spatial-temporal analytics.

### **OGC Statistical DWG**

- Community Practices for geospatial data science based on Statistical Geography
- Impact of big data platforms on statistical geography

#### GeoSemantics DWG

 GQL development, e.g., geospatial use cases and sample queries

# **Location Powers Recommendations**

#### No Clear WG Connection

- Community Practices for Geospatial Data Science.
- Knowledge Powered Data Science to additional types of models, e.g., models for the built environment, models for training, simulation and gaming.
- Community Practices for using Data Sharing agreements
- Geospatial Data Science Code of Ethics



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# **OGC Naming Authority SC**

114th OGC Technical Committee Ottawa, Canada Gobe Hobona, Erik Stubkjær 5 March 2020



# The most important thing for this WG is...

# The OGC Glossary of Terms should be deprecated and rebuilt from the terms and definitions, as well as normative sections, of published standards



# Agenda

- Register for Well Known Scale Sets (WKSS) Joan Maso
- Register for OGC <u>Media Types</u> Chuck Heazel
- Register for <u>Link Relations</u> Chuck Heazel
- Definitions and the OGC <u>Glossary of Terms</u> Gobe Hobona
- Definitions Server Update Rob Atkinson
- Motion to remove Beta label from OGC Definitions Server Gobe Hobona
- Any Other Business

# **Activity Summary**

#### • Discussion topics

- There's a need for a register for Well Known Scale Sets (WKSS). The 2D Tile Matrix Set standard provides a number of WKSS.
- There's a need for registers for OGC Media Types and Link Relations that are submitted to IANA.
- The OGC Glossary of Terms needs to be rebuilt.
- The Definitions Server could support Content Negotiation by Profile. Contact Rob Atkinson to get involved!
- Coordination (ongoing and planned)
  - OAB
  - IANA

#### • Upcoming deliverables

- Revision to Datum for geologic time

#### • Future meetings

- Next TC Meeting



- Binary Array Linked Data
- Development of registers for OGC Media Types, Link Relation Types, and Well Known Scale Sets
- Publishing minimal ontologies for GWML2, GeoSciML, and HY\_Features

# Internal Motion to establish a register for Well Known Scale Sets

- The OGC-NA approves the creation of a register for publishing of the Well Known Scale Sets published by the OGC Two Dimensional Tile Matrix Set standard (17-083r2) through the OGC Definitions Server.
- To also include the common tile matrix set examples in Annex D.

• Result: There was no objection to unanimous consent



# Motion to establish a register for OGC Media Types

- The OGC-NA approves the creation of a register for publishing of OGC media types through the OGC Definitions Server. The media types would then be submitted to IANA for registration.
- Result: There was no objection to unanimous consent

# Motion to establish a register for Link relations

- The OGC-NA approves the creation of a register for publishing of Link Relations through the OGC Definitions Server.
- Result: There was no objection to unanimous consent

# Motion to establish a process and convention for Link relations

- The OGC-NA recommends the establishment of the following guidelines and rules for the governance of link relations.
  - Reuse existing link relation types registered with IANA wherever appropriate.
  - If an OGC specific relation type is needed, it will be prefixed with an "ogc-"
  - The OGC-NA will work with IANA to find a way to register these link relation types in the IANA register.
- Result: There was no objection to unanimous consent

# Motion on the Glossary of Terms

- OGC-NA agrees to deprecate the existing glossary of terms and to rebuild it from the terms and definitions, as well as normative sections, of published standards.
- Result: There was no objection to unanimous consent

# Internal Motion to remove BETA label from the User Interface of the Definitions Server

- OGC-NA approves the removal of the BETA label from the User Interface of the Definitions Server.
- Result: There was no objection to unanimous consent



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# **Temporal Domain Working Group Report**

114th OGC Technical Committee Ottawa, Canada Chris Little 5 March 2020



# The most important thing for Temporal DWG is...

#### agreeing an Abstract Model for both OGC and ISO



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# **Temporal Domain WG Agenda**

- 1. Welcome, technology struggles, announcements
- 2. Recent enhancements by Simon Cox to W3C OWL-Time ontology, Chris Little
- 3. Overview of ISO/TC 154/WG 5 work, Ron Tse
  - Code table for calendars and timescales
  - ISO proposals to revamp standards to be consistent
  - ISO 8601 part 2
- 4. Defining Calendars, Mark Hedley
- 5. Proposed OGC Abstract Model
- 6. Any Other Business

# **Activity Summary**

Discussion topics:	<ul> <li>Upcoming deliverables</li> </ul>
<ul> <li>ISO/TC 154/WG 5 time standards, Ron Tse: <ul> <li>34000 concepts &amp; vocabulary</li> <li>34100,34300 Code tables: calendars &amp; timescales</li> <li>34200 Time zones</li> <li>34500 Conceptual model</li> <li>ISO proposals to revamp standards to be consistent</li> <li>ISO 8601 parts 2 &amp; 3</li> </ul> </li> <li>W3C/OGC Time Ontology &amp; Extensions could be refactored for vertical reasoning (R Gibbs)</li> </ul>	<ul> <li>Review of OGC docs using ISO19108</li> <li>Start developing Temporal Abstract Model based on ISO34500 early draft on GitHub</li> </ul>
<ul> <li>Coordination (ongoing and planned)         <ul> <li>ISO TC154 WG5 via JAG</li> <li>W3C SDWIG for OWL-Time ontology extensions</li> </ul> </li> </ul>	<ul> <li>Future meetings         <ul> <li>Montréal TC</li> <li>Telcos and via OGC GitHub repo</li> </ul> </li> </ul>

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- Review OGC standards for ISO19108 references
- Ask ISO JAG to review ISO19108 bearing in mind ISO 34500 work
- Decide future of ISO19108 (Inconsistent with ISO19111):
  - Deprecate
  - Review and continue
  - Replace by ISO 34500

# **Action/Motion**

- The Temporal DWG requests TC SWGs to identify their past, present and planned usage of ISO 19108
- To inform ISO/OGC joint work
### Next Quarter WG Communications Plan

• Work in OGC GitHub repo for public visibility



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# **University DWG**

114th OGC Technical Committee Ottawa, Canada Gobe Hobona 5 March 2020



# How do organizations commission geospatial research (at Doctoral level) at universities across the Globe?



# Agenda

- Commission Geospatial Research
  - Stefano Cavazzi / Danny Vandenbroucke (Ordnance Survey / KU Leuven)
- A BoK on GI/EO as part of a multi-vocabulary approach for Digital Transformation of Governments
  - Danny Vandenbroucke (KU Leuven)
- OGC Body of Knowledge Discussion Paper
  - Gobe Hobona (OGC)



# **Activity Summary**

Discussion topics	Upcoming deliverables
<ul> <li>How organizations commission PhD geospatial research at universities across the Globe</li> </ul>	<ul> <li>Commissioning Geospatial Research questionnaire</li> </ul>
<ul> <li>Coordination (ongoing and planned)</li> <li>– OGC Naming Authority</li> </ul>	<ul> <li>Future meetings         <ul> <li>Next TC Meeting</li> </ul> </li> </ul>

# Key activities

Commissioning of Geospatial Research study

# Informative Motion for the TC to approve an electronic vote for a questionnaire on Commissioning Geospatial Research

- The University DWG recommends to the Technical Committee that it approves an electronic vote to approve the publication of a questionnaire on Commissioning Geospatial Research. The questionnaire is part of a study initiated by Ordnance Survey. The questionnaire will be reviewed by the TC for a period of at least 3 weeks before the electronic vote.
- Discussion: GDPR should be considered. Hosting location should also be considered.
- Result: There was no objection to unanimous consent.
- Abstract: The "Commissioning Geospatial Research" initiative aims to survey via a questionnaire how organizations commission geospatial research (at Doctoral level) at academic institutions.

## Motion to approve public release of the OGC Body of Knowledge v0.1 Discussion Paper

The University DWG recommends that the OGC Technical Committee approves release of OGC 19-077 "OGC Body of Knowledge – Version 0.1 - Discussion Paper " as an OGC Discussion Paper. Discussion: DP needs to be clear that delegation to WGs is for review functions. There's a need to reconcile what is on the website and what is on the draft BoK DP.

Gobe explains why the title has a version – reflects the immaturity of the effort

Results: There was [no] objection to unanimous consent.

Abstract: The OGC Body of Knowledge is a structured collection of concepts and related resources that can be found in the OGC library. The Discussion Paper provides a human-readable presentation of a snapshot of the OGC Body of Knowledge.



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### **Closing Plenary – no motions**

114th OGC Technical Committee Ottawa, Canada Technical Committee Working Group Chairs 5 March 2020





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### **Architecture DWG**

114th OGC Technical Committee Ottawa, Canada Joan Maso, Gobe Hobona 5 March 2020



# In light of the UGAS 2020 work on JSON, what should happen to the draft OGC JSON Best Practices?



- Future results from the UGAS-2020 pilot related to JSON / JSON Schema Clemens Portele, Johannes Echterhoff (Interactive Instruments)
- OGC Vector Tiles Pilot 2: Vector Tiles Filter Language Engineering Report -Andrea Aime, Stefano Bovio (GeoSolutions)
- OGC Vector Tiles Pilot 2: Summary Engineering Report Gobe Hobona (OGC), Jeff Yutzler (Image Matters)
- OGC Vector Tiles Pilot 2: Vector Tiles and Tile Metadata Engineering Report -Sergio Taleisnik, Antonio Correas (Skymantics)

# **Activity Summary**

- Discussion topics
  - UML to JSON and JSON Schema conversion tool development
  - UGAS 2020 addressing the need to identify core profile of key schemas that are used in the NAS and consider their use in JSON
  - In light of the UGAS work on JSON, what should happen to the draft JSON Best Practices?
  - Application of CQL to Features, Tiles and Records APIs
  - Filtering multi layer vector tiles does not fit the current protocol approach
  - Vector Tiles Metadata development
- Coordination (ongoing and planned)
  - OWS Common SWG

#### • Upcoming deliverables

 OGC Vector Tiles Pilot 2 Engineering Reports are under development and will be reviewed by the DWG when ready.

- Future meetings
  - Next TC Meeting in Montreal

# Key activities

• Development of the OGC JSON Best Practice



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### **Citizen Science DWG**

114th OGC Technical Committee Ottawa, Canada Joan Maso 5 March 2020



### Citizens are a core component in Citizen Science but no description of the "citizen" in the SensorThings API.

There is a need to cover this part. The DWG will study how to cover this use case.



# Agenda

- Outcomes of LandSense and starting architecture for COS4Cloud
  - Speaker: Andreas Matheus (Secure Dimensions)
- Report on the Citizen Science IE second phase
  - Speaker: Joan Maso (CREAF)
- Where is the Citizen in the SensorThings API?
  - Speaker: Joan Masó (CREAF)
- Discussion

# **Activity Summary**

<ul> <li>Discussion topics</li> <li>Relevance and dificulties in identifying users</li> <li>Need to describe the user in SensorThings API</li> <li>Second phase of the interoperability Experiment</li> </ul>	<ul> <li>Upcoming deliverables         <ul> <li>First study of the Citizen description complementary with the SensorThings API</li> <li>Second ER of the IE</li> </ul> </li> </ul>
<ul> <li>Coordination (ongoing and planned)</li> <li>WeObserve CoPs</li> <li>Earth Challenge 2020</li> <li>GEOSS CitSci Community Activity</li> </ul>	<ul> <li>Future meetings         <ul> <li>Next TC</li> <li>Next CoP meeting the 24-26 of March. Done by teleconference.</li> </ul> </li> </ul>

### **Next Quarter WG Communications Plan**

- We could promote the participation in the second phase of the IE
- We could promote the Enginering Report that is now published in the OGC website.



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# **Data Quality DWG**

114th OGC Technical Committee Ottawa, Canada Joan Masó, Matt Beare, Ivana Ivánová 5 March 2020



Engagement with the ISO 19157-1 Revision Process Supporting adoption of OGC Geospatial User Feedback within ISO 19157 Further consideration of vocabulary for expressing knowledge of usability



# Agenda

- Standardizing a Framework for Spatial and Spectral Error Propagation
  - Kumar Navulur (Maxar Technologies)
  - Mark Abrams (Exquisite Geolocation Systems)
- Update on ISO 19157-1 revision
  - Ivana Ivánová (Curtin University)

# **Activity Summary**

<ul> <li>Discussion topics</li> </ul>	<ul> <li>Upcoming deliverables</li> </ul>
<ul> <li>Need statement presented for unified framework to increase location data reliability as actionable information (from multiple platforms, sensors, and modalities)</li> <li>Pros/cons of simplifying ISO Quality Model, didn't conclude during meeting, so will aim to continue via mailing list and/or G2M</li> </ul>	<ul> <li>Discussion paper on "Standardizing a Framework for Spatial and Spectral Error Propagation" (and presented at this meeting) circulated for comment with aspiration to agree it for OGC publication at next TC meeting.</li> </ul>
<ul> <li>Coordination (ongoing and planned)         <ul> <li>ISO 19157-1 revision with Committee Draft anticipated in June 2020</li> </ul> </li> </ul>	<ul> <li>Future meetings</li> <li>G2M to be arranged as interim to next TC</li> <li>DQ DWG will meet again at next TC (Jun'20)</li> </ul>



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### **Defence & Intelligence DWG**

114th OGC Technical Committee Ottawa, Canada Gobe Hobona, Lucio Colaiacomo 5 March 2020



### Testebed 15 results presented to D&I community



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# Agenda

- Testbed 15 Outcomes and Discussion , Gobe Hobona, OGC
- The spectral NITF implementation profile (SNIP) Jason Smith, L3Harris

# Key activities

- Some discussion about the Federated Cloud experiment
- Questions about possible adoption in other domains of the SNIP format



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## DGGS DWG

114th OGC Technical Committee Ottawa, Canada Matthew Purss 5 March 2020



One thing that is most important for this WG is fostering a vibrant DGGS Standards Community who are actively engaged in developing and standardising DGGS technologies in a way that maximises interoperability across all relevant geospatial standards without duplicating effort.



# Agenda

- Presentation: "DGGS Research Update: From Computer Graphics to DGGS" Faramarz Samavati, University of Calgary (25 min)
- Presentation: "The Disdyakis Triacontahedron DGGS" John Hall, University of Calgary (25 min)
- Discussion Topic: "Opportunities and Pathways/Barriers to the integration of DGGS Cell IDs with other OGC Standards" – DWG Chair to lead (30 min)
- Other Business (10 min)

# **Activity Summary**

Discussion topics	<ul> <li>Upcoming deliverables</li> </ul>
<ul> <li>The exploration of Catalan Solids by John Hall, in particular the Disdyakis Triacontahedron, as a base polyhedron to more closely represent a sphere and further minimize shape distortions of DGGS cells led to some interesting discussion.</li> <li>The R&amp;D work into DGGS visualization technologies and techniques is very important to support the demonstration of the value of DGGS technologies.</li> </ul>	<ul> <li>There will be a special session during the next TO focusing on Volumetric/3D DGGS technologies.</li> </ul>
<ul> <li>Coordination (ongoing and planned)         <ul> <li>Coverages DWG, OWS Common, CRS SWG/DWG, Simple Features, Big Data/Datacubes DWG, CDB DWG, Interoperability and Model Simulation DWG, JAG, NA, OAB, CITE</li> <li>ISO/TC 211</li> </ul> </li> </ul>	<ul> <li>Future meetings         <ul> <li>Next face-to-face DWG meeting will be at the Montreal TC.</li> </ul> </li> </ul>

# Key activities

- DGGS APIs
- DGGS Registry
- Engagement with UN-GGIM through the Global Statistical Geospatial Framework initiative
- Engagement with the Marine community on DGGS applications through the GEBCO 2030 Project

### Next Quarter WG Communications Plan

 We are planning to have a session during the next TC meeting focusing on volumentric/3D DGGS technologies aimed at aligning R&D activities with the DGGS Standards development roadmap.



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## LandInfra DWG

114th OGC Technical Committee Ottawa, Canada Leif Granholm 5 March 2020



# Most important thing at the moment is getting proper production quality implementations of InfraGML.



- Presentation of PipeLine SWG
- Discussion of "adopting" PipeLineML SWG
- LADM LandInfra collaboration, Codelists
- ISO TC 127 situation
- Actions to promote implementations
- Next steps/version

John Tisdale All Peter van Oosterom HC/Leif Leif/HC Leif/HC
<ul> <li>Discussion topics</li> </ul>	<ul> <li>Upcoming deliverables</li> </ul>
<ul> <li>Discussion on "adopting" Pipeline SWG</li> <li>LandInfra relation to LADM</li> <li>DWG restructuring for Built Environment</li> <li>How to deal with using/referencing standards external to OGC (IFC, ISO LADM, ISO 15926 etc) (Muddi/federated/multikernel approach)</li> </ul>	– none
<ul> <li>Coordination (ongoing and planned)</li> <li>BuildingSMART (IFC for infra, IDBE)</li> <li>ISO TC/211 LADM</li> </ul>	<ul> <li>Future meetings         <ul> <li>next TC Meeting</li> <li>Ad hoc to develop new DWG structure for Built Environment at next TC (Scott promised to add to agenda). Who will chair, Carsten?</li> </ul> </li> </ul>



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#### **Met Ocean Domain Working Group Report**

114th OGC Technical Committee Ottawa, Canada Chris Little 5 March 2020



#### The most important thing for Met Ocean DWG is...

EDR API as a global standard



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#### Met Ocean Domain WG Agenda

- 1. Welcome, technology struggles, announcements
- 2. Discuss progress of: EDR API SWG,
  - Quick demo of pilot implementation, Chris Little, Mark Burgoyne
- 3. Discuss EDR API Sprint/Hackathon, Washington 18-20 Mar 2020
- 4. Progress on WotW Best Practices for use of EDR API
- 5. Any Other Business



<ul> <li>Discussion topics</li> <li>CoverageJSON needs standardising</li> <li>EDR API demo seems not to know about leap days!</li> <li>Add conformance testing of payloads to hackathon themes</li> </ul>	<ul> <li>Upcoming deliverables</li> <li>EDR API Hackathon/Sprint Mar 2020</li> <li>WotW Engineering Report</li> <li>EDR API drafts</li> </ul>
<ul> <li>Coordination (ongoing and planned)         <ul> <li>EDR API SWG</li> <li>WCS SWG</li> <li>EGOWS annual conference interested in Hackathon for timeseries</li> <li>WMO to be kept informed of progress</li> </ul> </li> </ul>	<ul> <li>Future meetings         <ul> <li>Regular weekly web meetings</li> <li>Montreal TC<web meeting=""></web></li> <li>Future EDR API Hackathon/Sprint</li> </ul> </li> </ul>

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#### Key activities

- Supporting EDR API by organizing Hackathon/Sprint
- Closing out WotW Engineering Report
- Orgnaizing follow-on EDR API Hackathon/Sprint

# Working pilot of EDR API: retrieving temperature timeseries from 3 datastores (point cloud, & 2 gridded datasets)



Time

#### Next Quarter WG Communications Plan

- Advertise EDR API Hackathon/Sprint 18-20 Mar 2020, Washington DC
- Advertise follow-on Hackathon/Sprint



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#### **Point Cloud DWG Report to TC**

114th OGC Technical Committee Ottawa, Canada Stan Tillman, Hexagon 5 March 2020



#### The most important thing for this WG is...

## Update the LAS 1.4 Community Standard to the latest version – this should be simply a revision as opposed to a new version.



- Constructing IndoorGML data from indoor point cloud
  - Sung-Hwan KIM and Ki-Joune Li, Pusan National University
- Updates to LAS 1.4 since becoming a Community Standard
  - Evon Silvia, ASPRS LAS Working Group Chair
- Standardizing Point Cloud Data Transfers
  - Stan Tillman, Hexagon



Discussion topics	<ul> <li>Upcoming deliverables</li> </ul>
<ul> <li>Creating IndoorGML from point cloud scans</li> <li>Changes to LAS 1.4 since the build we took as a snapshot – plan is to update the Community Standard to the latest version soon.</li> <li>Discussion whether we want to standardize point cloud exchange. The answer was overwhelmingly no, but do not take it off the agenda.</li> </ul>	<ul> <li>The latest version of the LAS 1.4 standard for review and consideration.</li> </ul>
<ul> <li>Coordination (ongoing and planned)</li> <li>– N/A</li> </ul>	<ul> <li>Future meetings         <ul> <li>Next face-to-face meeting in Montreal</li> </ul> </li> </ul>

#### Next Quarter WG Communications Plan

• Coming soon: A proposal to update the LAS 1.4 Community Standard



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#### **Portrayal DWG**

114th OGC Technical Committee Ottawa, Canada Matt Sorenson 5 March 2020



#### The most important thing for the Portrayal DWG is...

## Held detailed discussion on developing portrayal abstract specification and identified key tasks and near term schedule.





OGC Symbology Conceptual Model; Core Part (SymCore)

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<ul> <li>Discussion topics <ul> <li>Existing and prior work</li> <li>Definition of terms</li> <li>Portrayal use cases</li> <li>Breadth of abstract specification <ul> <li>(3D, nD, coverages, audio, etc.)</li> </ul> </li> </ul></li></ul>	<ul> <li>Upcoming deliverables         <ul> <li>Capture DWG activities and abstract specification efforts on portal and wiki</li> <li>Review OGC documents for portrayal terminology and definitions and solicit member inputs</li> <li>Draft portrayal use case</li> <li>Develop outline for abstract specification</li> </ul> </li> </ul>
<ul> <li>Coordination (ongoing and planned)</li> <li>SLD/SE SWG</li> <li>3DPS SWG</li> <li>Vector Tile Pilot</li> <li>Prior testbed and pilot work</li> </ul>	<ul> <li>Future meetings</li> <li>1-2 web meetings in Apr/May 2020</li> <li>Montreal TC physical meeting June 2020</li> </ul>



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#### **Security DWG**

114th OGC Technical Committee Ottawa, Canada Andreas Matheus 5 March 2020



#### The most important thing for this WG is...

#### SQLite vulnerabilities with implication to GeoPackage

**OGC API Security** 

Transport Layer vs. Application Layer security



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### Agenda

- SQLite security vulnerabilities: nothing new, but how to deal with them? Frank Terpstra (Geonovum) 20 min
- Discussion on security aspects for OGC APIs All
- AOB

<ul> <li>Discussion topics</li> <li>– SQLite vulnerabilities</li> <li>– OGC API security</li> </ul>	<ul> <li>Upcoming deliverables         <ul> <li>none</li> </ul> </li> </ul>
<ul> <li>Coordination (ongoing and planned)</li> <li>– GeoPackage SWG</li> </ul>	Future meetings     – next TC Meeting