

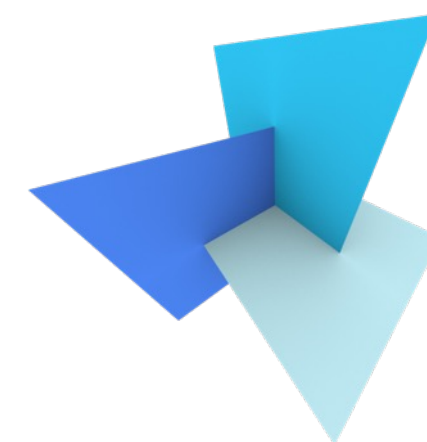


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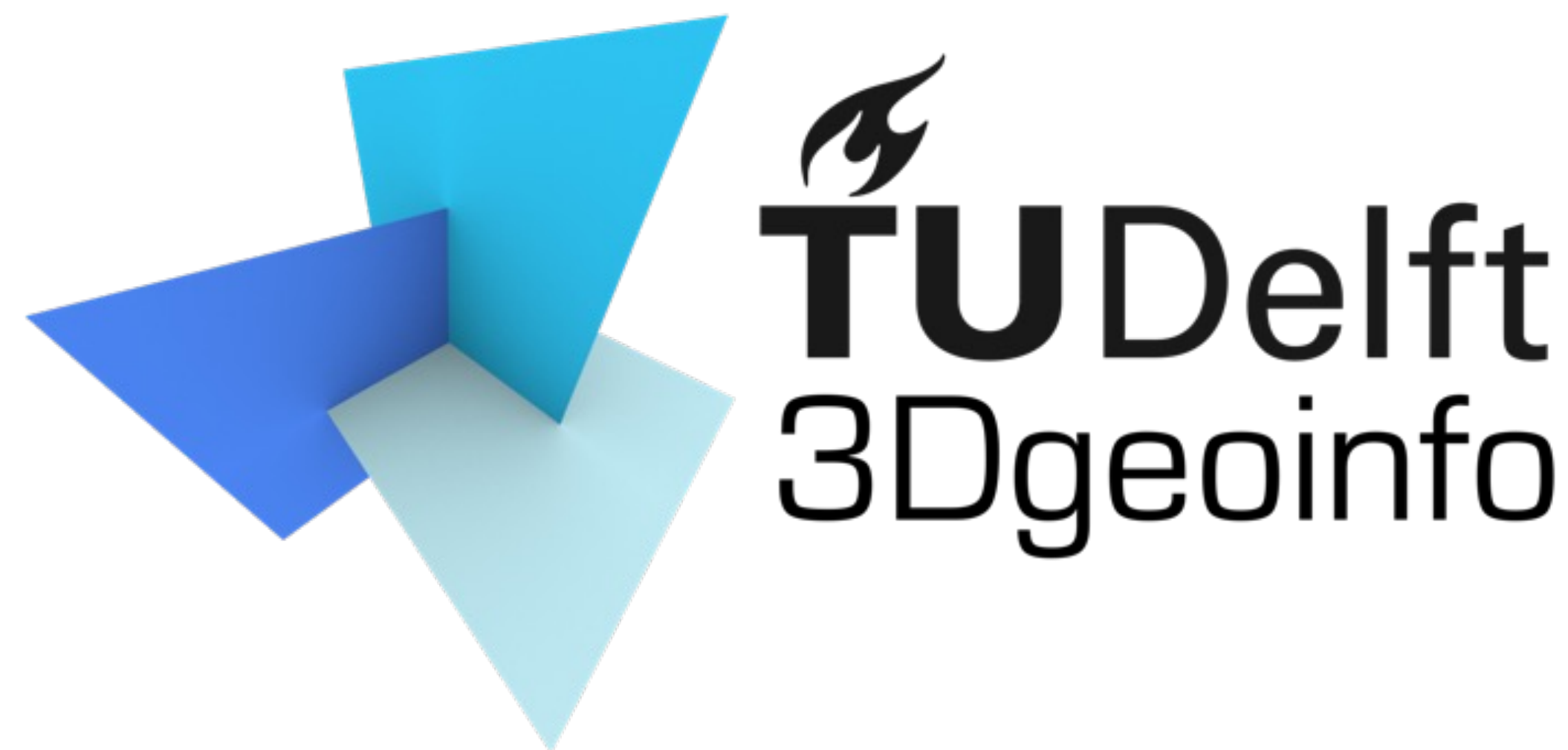
Closing Plenary consolidated slides

The 128th OGC Member Meeting

Meeting Sponsors



Scott Simmons, OGC
28 March 2024



Agenda

- Thank you!
- The Member Meeting in 10 minutes
- Quorum confirmation
- TC Presentations and Motions
 - openEO Community Standard work item – Matthias Mohr
 - LADM SWG – Eva-Maria Unger and Peter van Oosterom
 - HDMapML SWG – Peng Yue
 - Abstract Conceptual Model for Time – Chris Little
 - OGC API – EDR – Part 2: PubSub – Chris Little
 - OGC API – Moving Features – Moving Features SWG
 - BAG Community Standard work item – Steve Olson
 - MUDDI – Carsten Rönsdorf
 - OGC API – Features – Part 3: Filtering and Common Query Language – Clemens Portele
 - Abstract Specification Topic 1: Spatial Schema update – Scott Simmons
 - Geographic Data Files SWG – Jon or Trond
 - OGC API – Maps – Part 1: Core – Joan Masó
 - Abstract Specification Topic 6: Coverages parts – Peter Baumann
 - Geospatial Reporting Indicators SWG – Nils Hempelmann
- TC Chair announcements and motions
 - Member Survey
 - Upcoming OGC Events
 - Montreal Member Meeting
 - Calls for OAB and TC rep to EPC nominations
 - Discussion topics in upcoming EPC meeting
- Working Group reports with motions: 3 to Z

TC Presentations and Motions





openEO

Interoperable geoprocessing in the cloud

128th OGC member meeting
Delft, March 2024

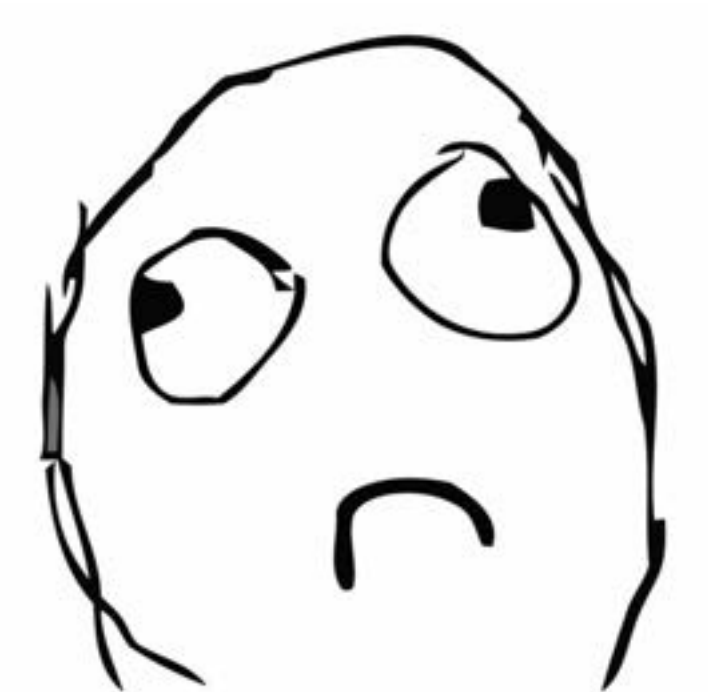
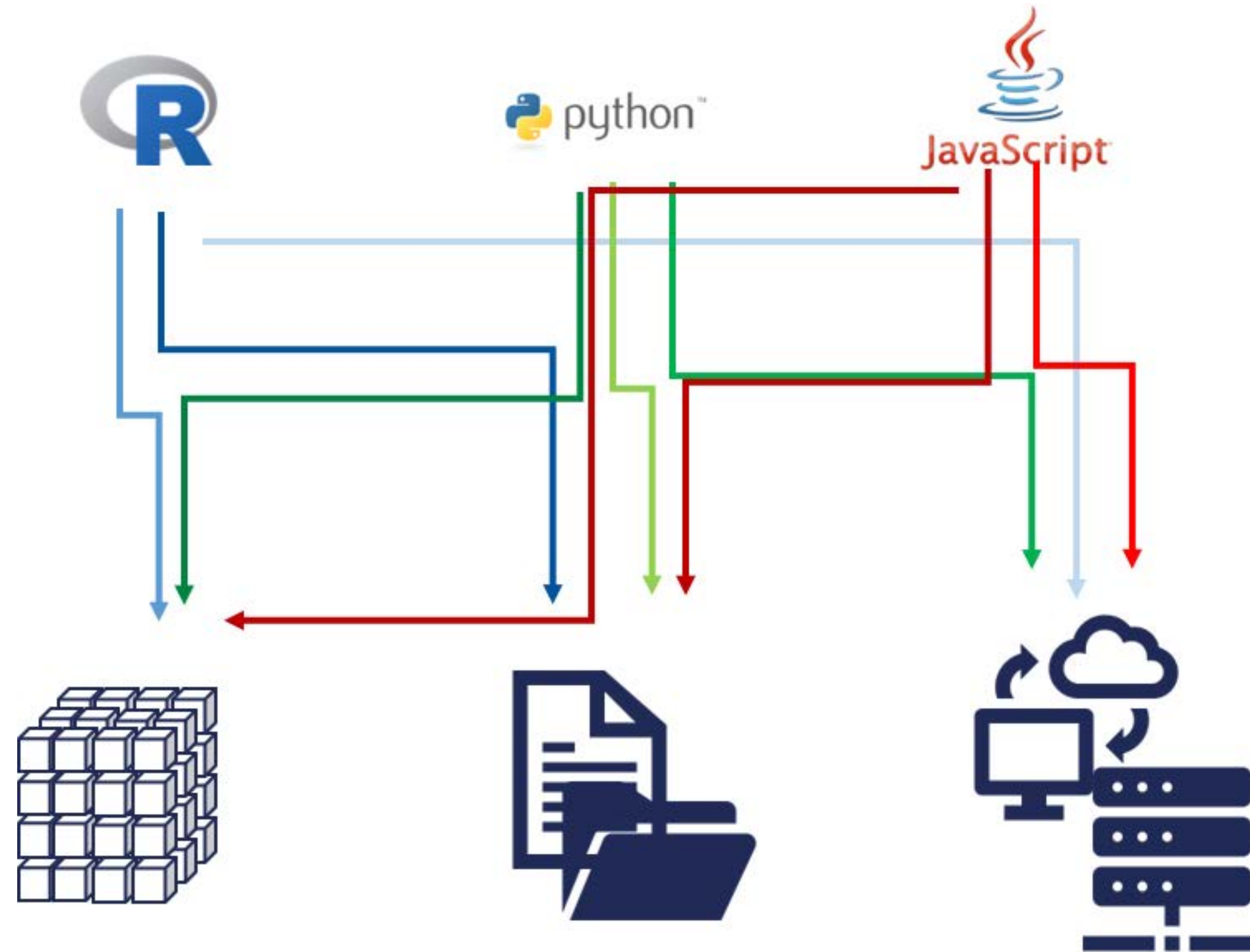
Matthias Mohr
openEO PSC chair

openeo.org

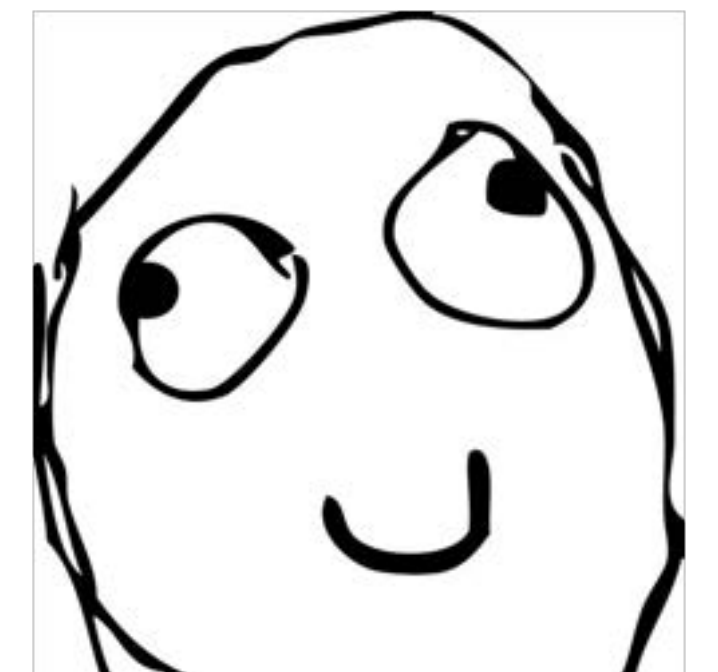
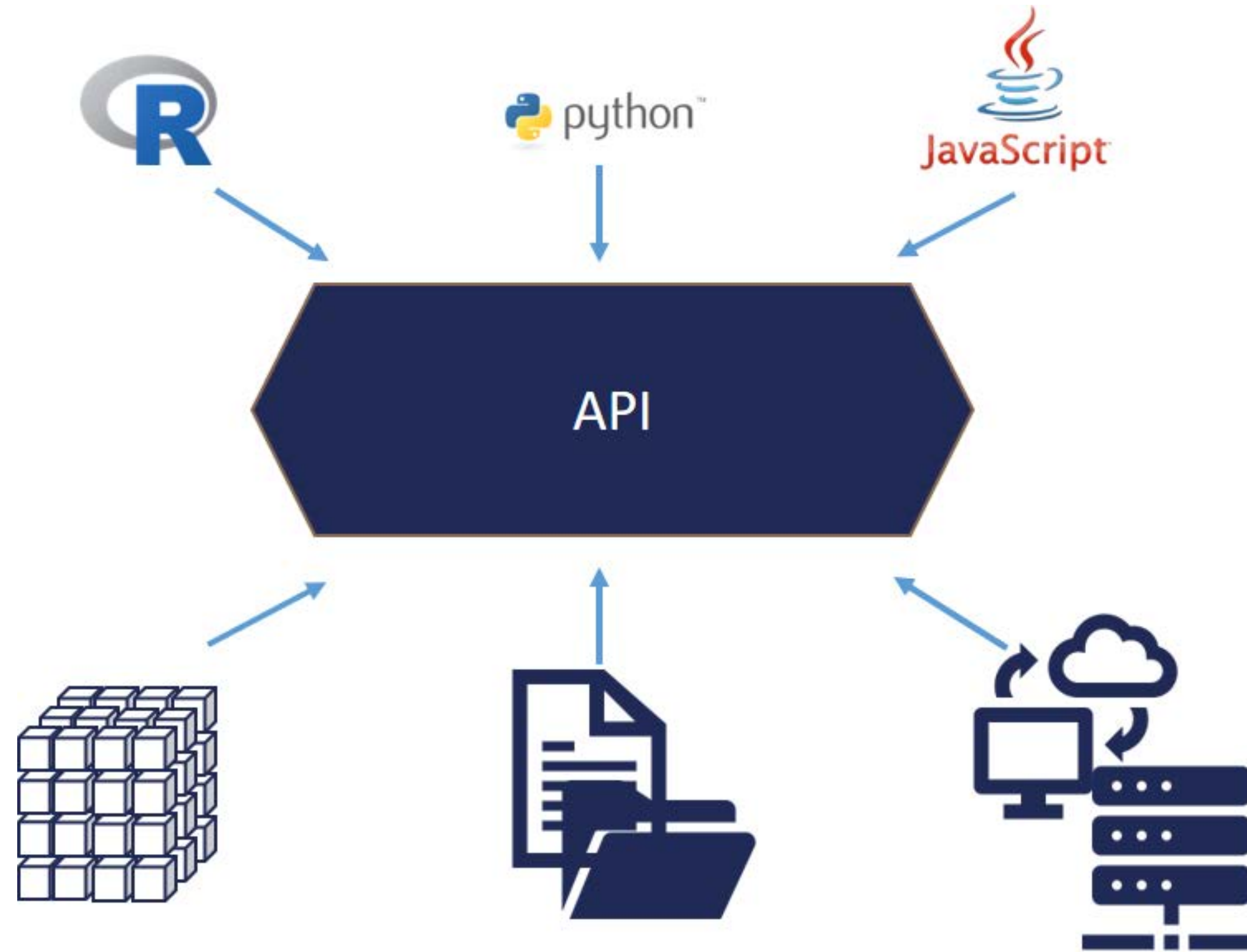


Why openEO?

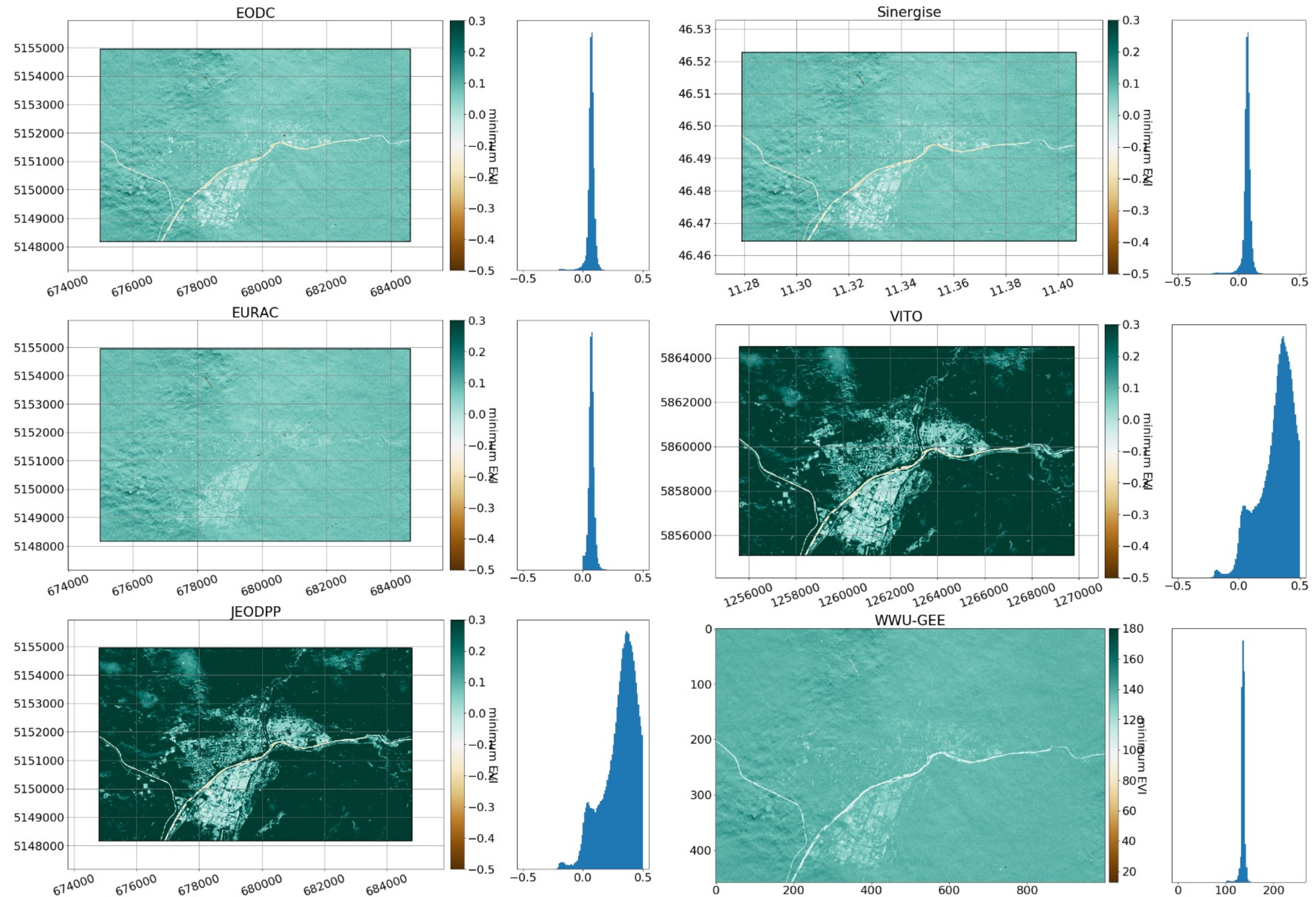
Why openEO?



Why openEO?



Why openEO?



What is openEO?



- Language for geospatial processing
 - API + Processes
- Data Cubes
- Cloud Native
- Open Specification **and** Software
- Community-driven project
 - governed by the openEO PSC
 - monthly calls

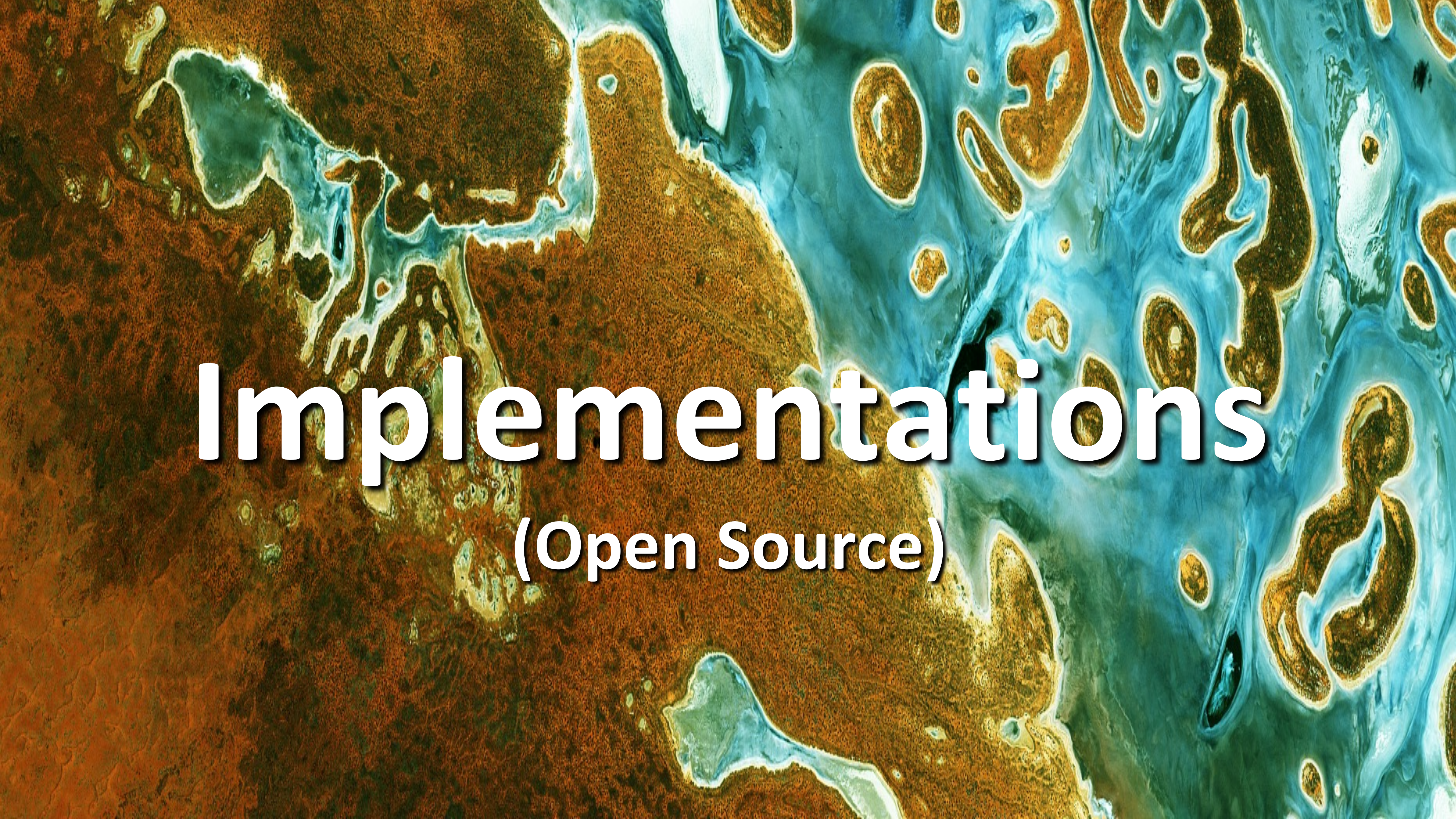


API and Processes

(the submission to OGC)

- Defined in OpenAPI
 - api.openeo.org
- HTTPS & JSON
- Functionality
 - Capabilities (OGC API – Common)
 - Data Discovery (STAC)
 - Authentication (openID Connect, HTTP Basic)
 - File management
 - Data Processing / Workflow management
 - Data Export / Web Services (STAC, OGC W*S, OGC APIs, ...)
 - Extensions

- Pre-defined processes
 - processes.openeo.org (150+)
 - Can be customized (e.g. remove a parameter)
 - Data cubes
- User-defined processes (UDP)
 - Combine processes to a new process (like functions in programming) with parameters, metadata, ...
- User-defined functions (UDF)



Implementations

(Open Source)

- GeoPyspark / Geotrellis (VITO, CDSE)
- Xarray / Dask (EODC, EURAC, RI.SE, IBM, local processing, ...)
- Google Earth Engine
- WCPS (EURAC, rasdaman)
- GRASSGIS / actinia (mundialis)
- Sentinel Hub (Sinergise)
- some proprietary implementations

Clients



- [Python](#)
- [R](#)
- [JavaScript \(TypeScript\)](#)
- [Julia](#)
- [Web Editor](#)



OGC

Relation to OGC standards



- Alignment whenever possible
 - API Basics -> OGC API Common ✓
 - Data Discovery -> STAC (✓)
 - Processing / Workflows -> openEO ✗
 - Visualization / Web Services -> e.g. W*S, OGC APIs, ... ✓
 - Result Access -> STAC (✓)
- Non-OGC
 - Auth -> OpenID Connect, HTTP Basic
 - Files -> openEO, S3 soon

Relation to OGC API - Processes?



- has a different target audience
- OGC API – Processes
 - application packages, custom processes and existing code
 - very flexible, less interoperable
 - building block in the suite of OGC API
- openEO
 - fine-grained language for data cubes, describes algorithms in an abstract way
 - less flexible, more interoperability
 - ready-to-use combination of building blocks, e.g. describes authentication



Discussion / Vote

Request of an electronic vote

- The openEO submitters recommend that the OGC Technical Committee approve an electronic vote to approve a Community Standard Work Item based on [OGC 24-002r1] “openEO Community Standard Work Item justification.”
 - There was no objection to unanimous consent



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Charter OGC SWG LADM

Standards Working Group

The 128th OGC Member Meeting

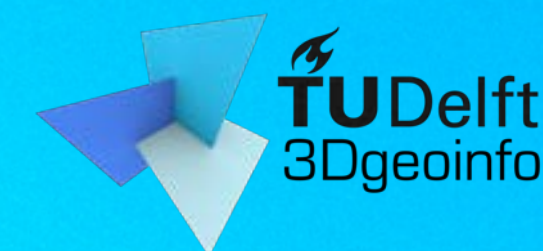
Land Admin DWG Co-Chairs:

Peter van Oosterroom, TU Delft

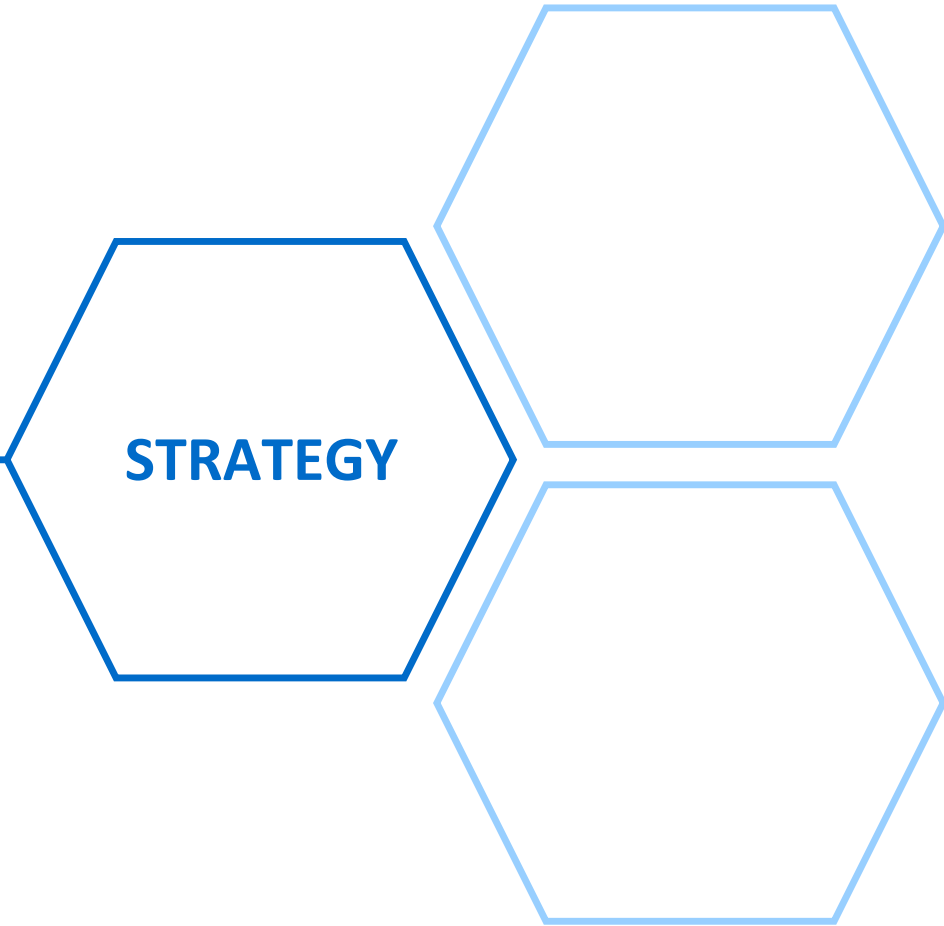
Eva-Maria Unger, Kadaster

28 March 2024

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DWG Land Admin



STRATEGY

DWG land admin identifies needs for implementation standards (in the wider domain of land administration)

Land administration has different functions (FIG LADM, ISO 19152):

- Land Registry
- Marine Georegulation
- Valuation Information
- Spatial Plan Information



DWG proposed recently the establishment of **SWG LADM** (vote on charter, which has been distributed for comments, and comments are processed)

**Mark your calendar!!
Call for papers**

Joint International Conference

- FIG Commission 7 Annual Meeting,
- FIG Land Administration Domain Model (LADM) and 3D Land Administration (LA),
- UN-Habitat Social Tenure Domain Model (STDM),
- Geoinformation Week 2024, and
- Pre-conference Tutorial (23rd Sept) & Exhibition



Assoc. Prof Dr. Rohan
Bennett,
Chair FIG Commission 7



Prof Dr. Peter van
Oosterom,
Chair FIG LADM & 3D LA



John Gitau,
Chair UN-Habitat STDM



Prof Dr. Alias
Abdul Rahman,
Chair Geoinformation Week



Date : 24th – 26th September 2024

**Venue : Riverside Majestic Hotel,
Jalan Tunku Abdul Rahman, 93756, Kuching, Malaysia**

**Conference website:
<https://www.geoinfo.utm.my/geoweeek/>**

LADM v2 is a multi part

- Part 1 – Generic Conceptual Model
- Part 2 – Land Registration
- Part 3 – Marine Georegulation (IHO S-121)
- Part 4 – Valuation Information
- Part 5 – Spatial Plan Information
- Part 6 – Implementation Aspects

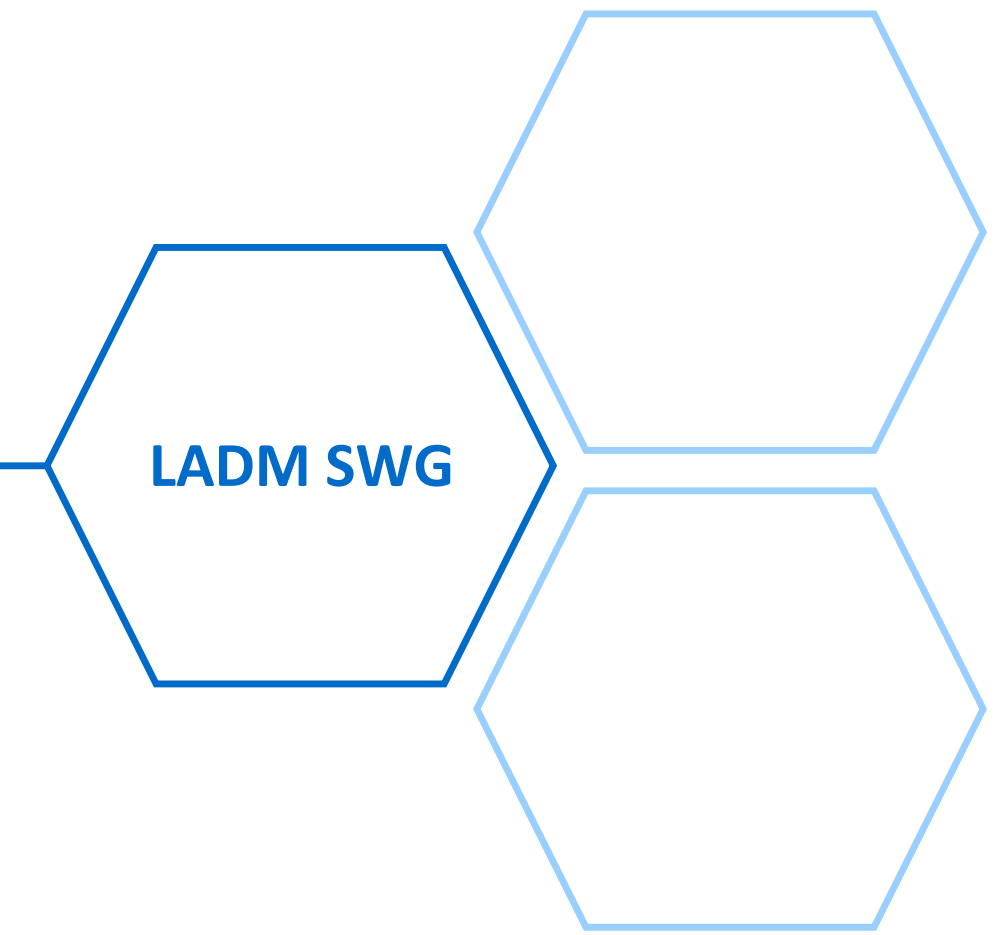
Scope current
version LADM 2012

Work in
progress
ISO
TC211

→ OGC first, sync with ISO TC211

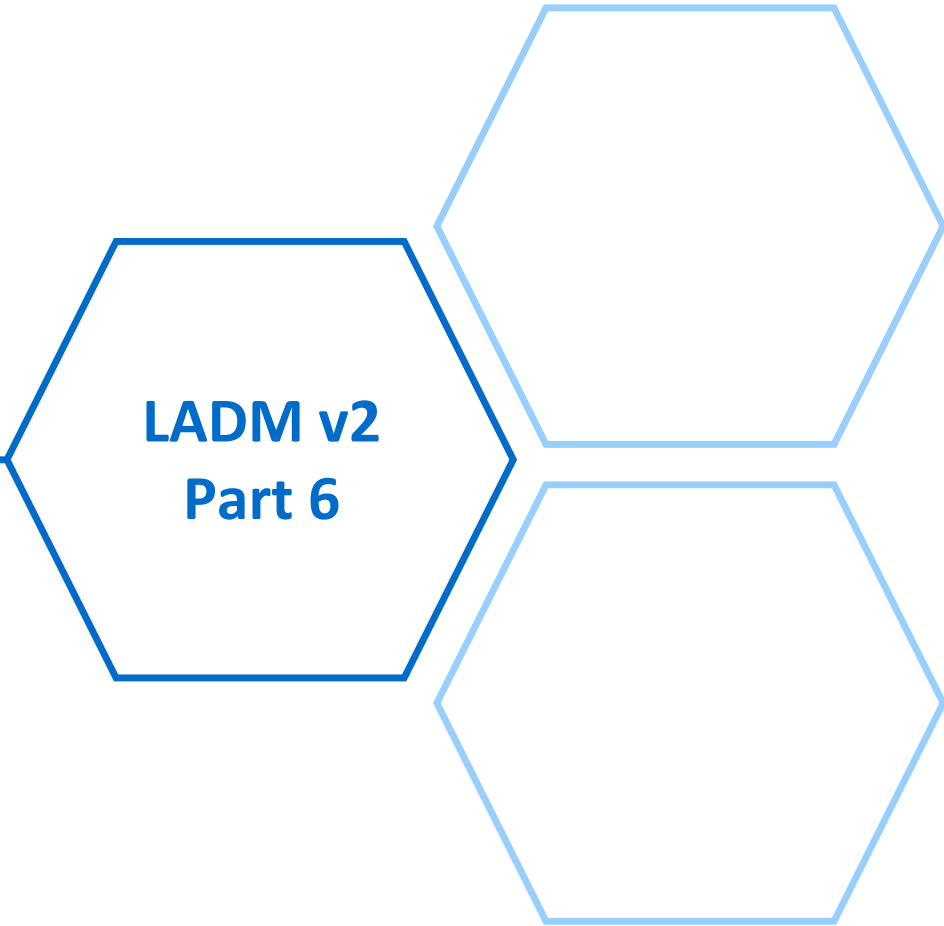
ISO TC211 standards become CEN TC287 standards by parallel voting (Vienna agreement)

General purpose SWG LADM



- Assist LADM implementing community
- Improve actual/technical interoperability
- Decrease implementation cost

LADM v2 Part 6: Implementation Aspects

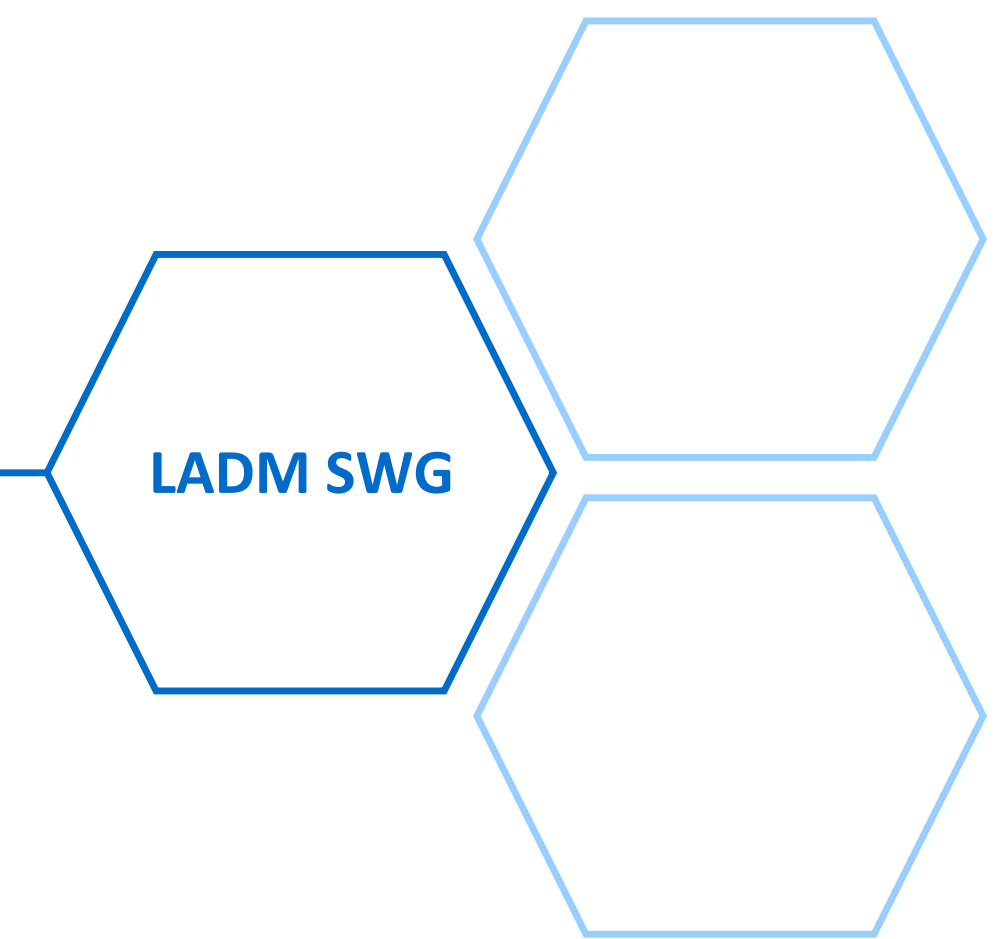


LADM v2
Part 6

OGC SWG LADM components:

- 1. Methodology for developing a country profile**
2. Technical model / encodings (LD, JSON, GML, INTERLIS, IFC, ..)
3. Management and maintenance of semantically rich code list values (possible SKOS)
4. Procedures / workflows (land registry, marine georegulation, valuation information, spatial plan information)

Relationship with current OGC standards



Geographically-referenced land administration units are often encoded using OGC Standards

OGC CityGML is relevant as topographic context of the legal spaces

OGC IndoorGML is relevant for indoor legal spaces (e.g. apartment rights)

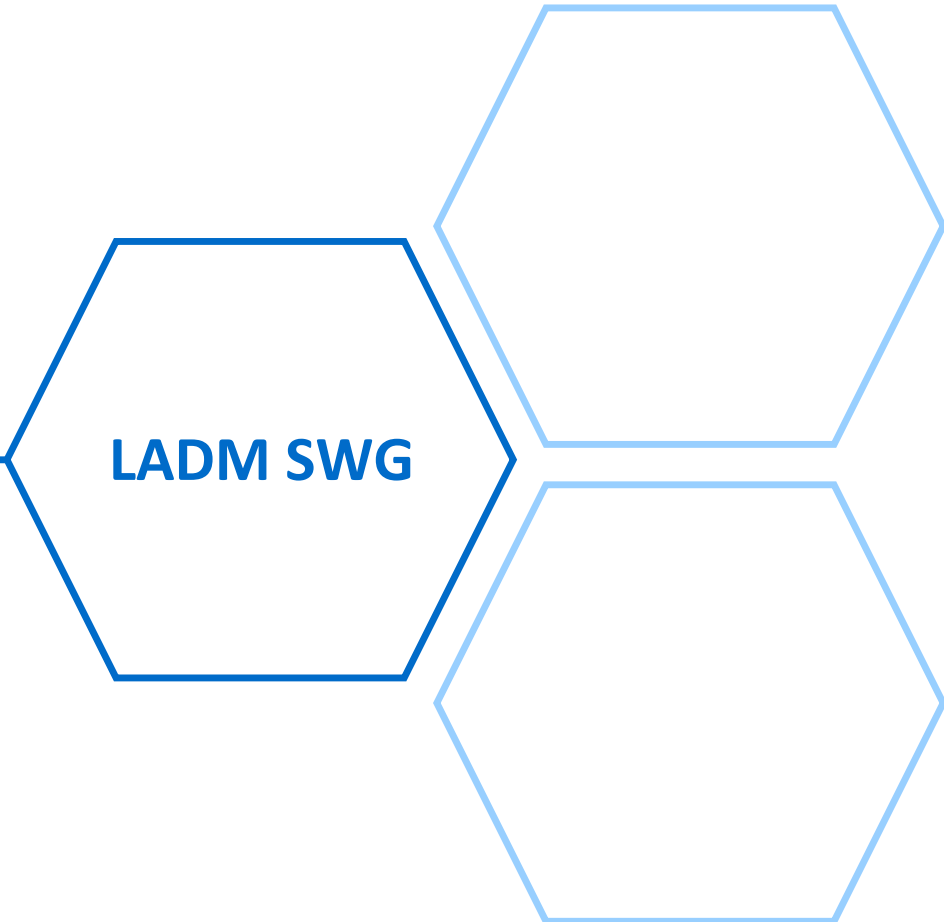
OGC LandInfra Conceptual Model Standard (e.g. survey model)

Early Members



- Javier Morales (Univ. Twente)
 - Anthony Beck (ISO/TC 211)
 - Amir Bar-Maor (Esri)
-
- **More members very welcome: industry, government, academia**

Finally



LADM SWG

What is out of scope

- LADM SWG will not develop further conceptual model parts

Specific contribution of existing work

- ISO LADM (ISO19152-1 to 5),
OGC and other int. standard encoding formats will be considered

When can SWG be inactivated

- When the four SWG LADM components are realized

Request of an electronic vote

- The Land Administration DWG recommends that the OGC Technical Committee approve an electronic vote to approve charter of the Land Administration Domain Model (LADM) Standards Working Group per the Charter document [OGC 23-060r1].
 - There was no objection to unanimous consent

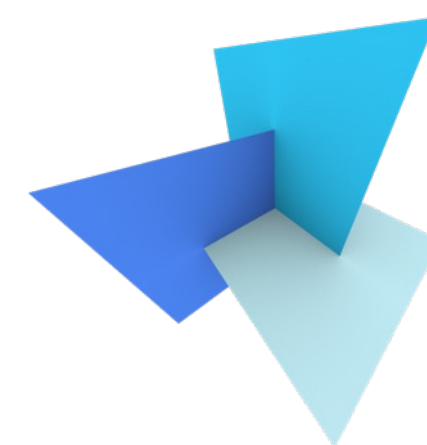


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HDML SWG Charter Proposal

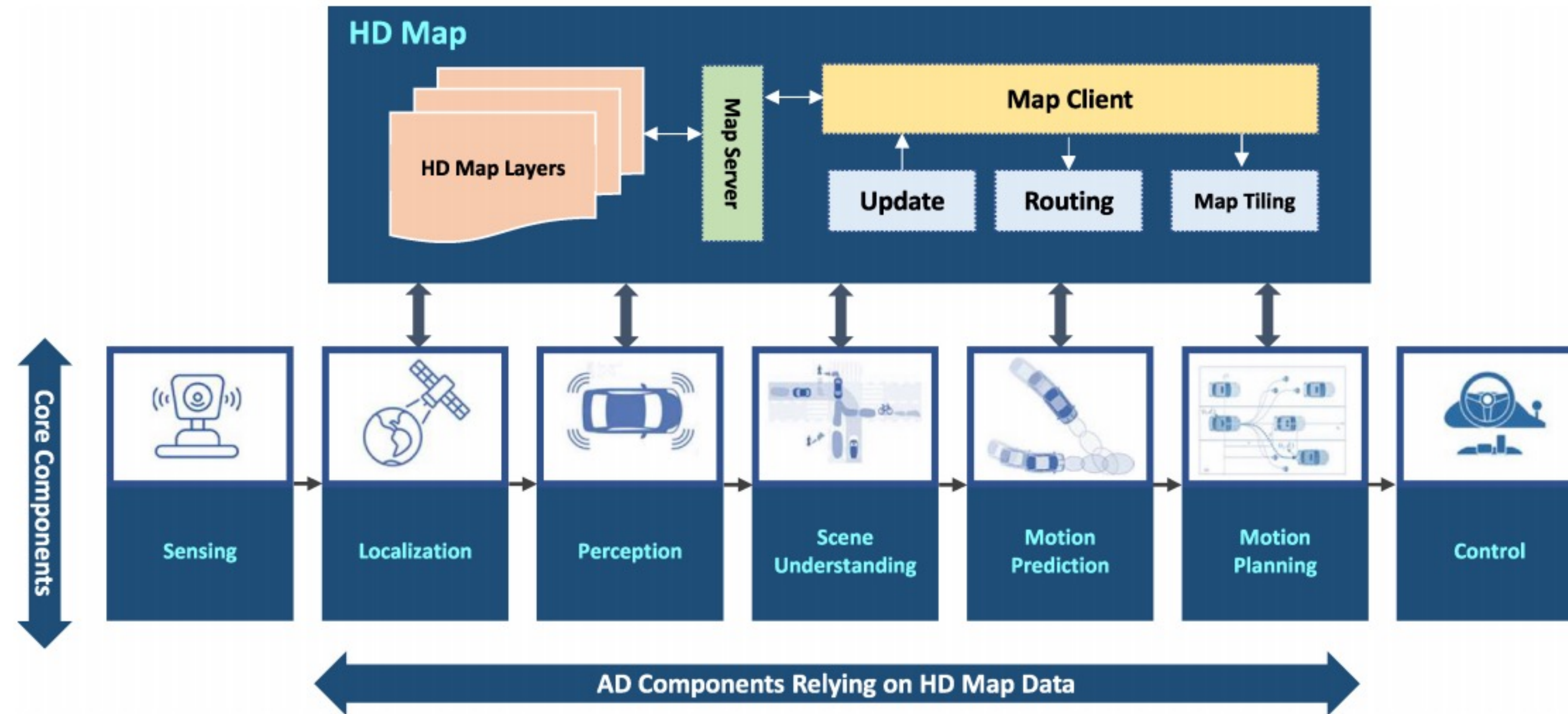
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Peng Yue, Wuhan University
28 March 2024

Background: High-Definition Map Markup Language (HDML)



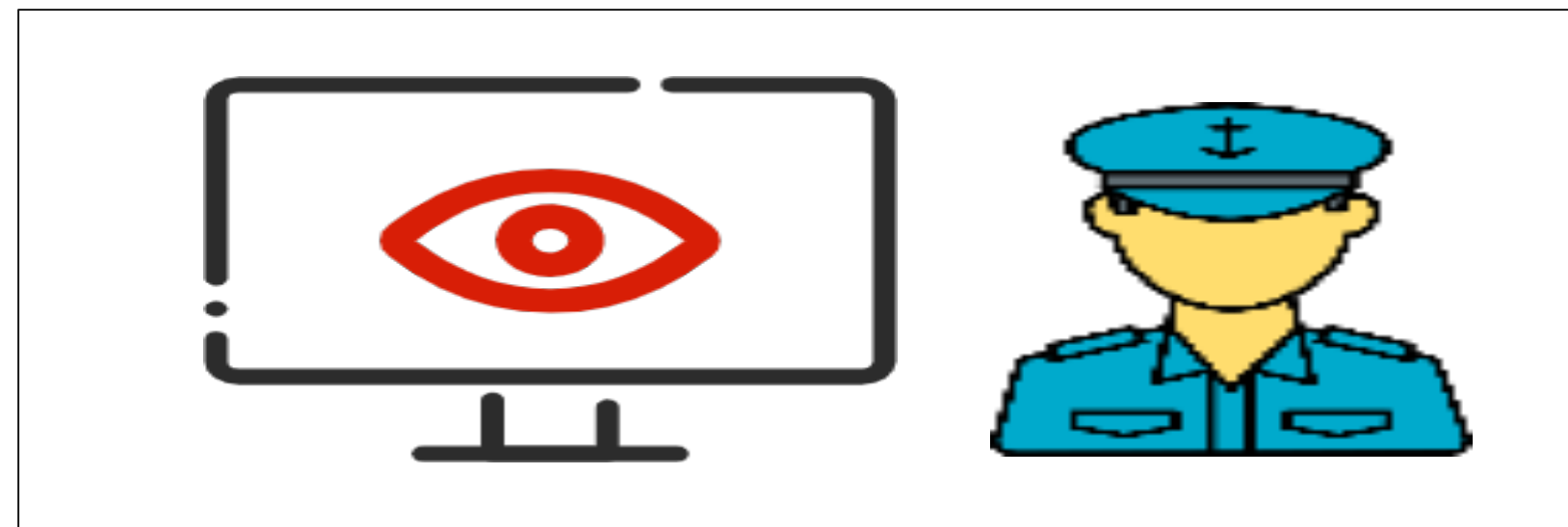
(Elghazaly et al. 2023)

High-Definition map (HD map) were born out of the needs for **automated driving (AD)**. As a foundational knowledge repository and spatial reference for automated vehicles, HD map support data services characterized by **accuracy, richness, dynamism, and reliability**.

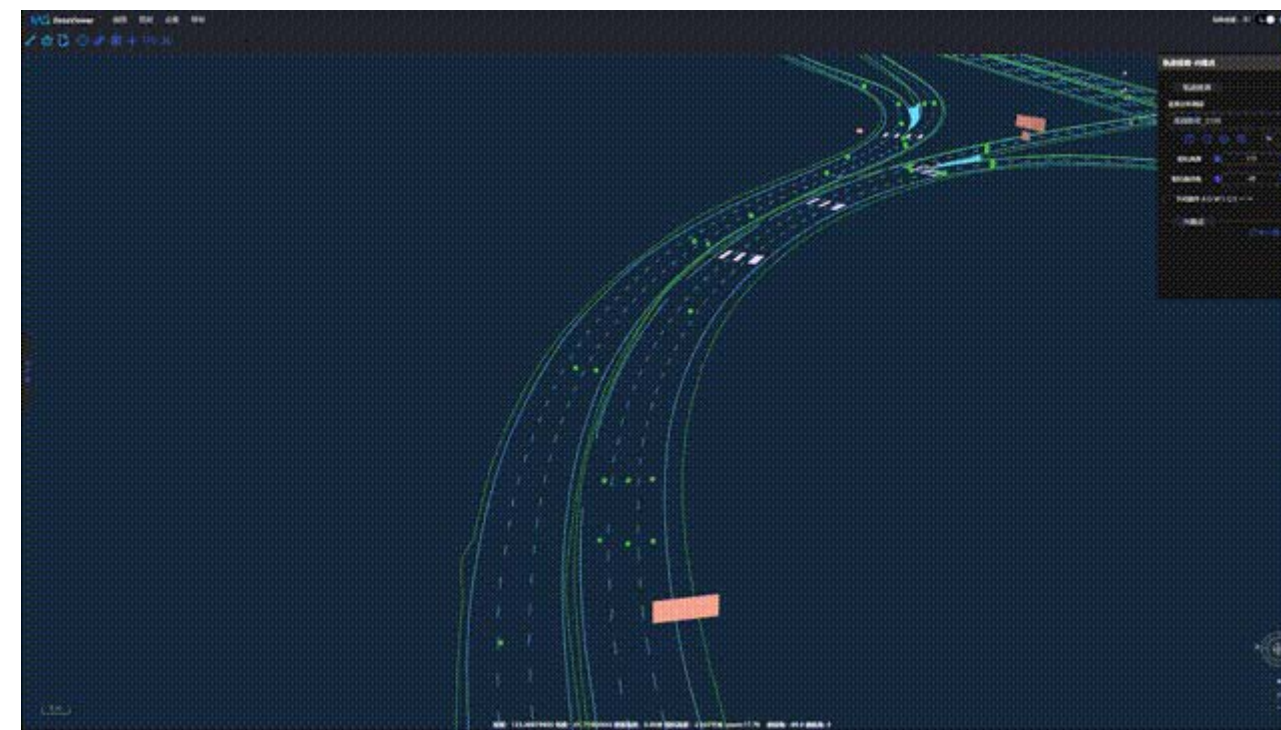
Background



Map Manufacturers



Regulatory Authorities



HD map



Car Companies

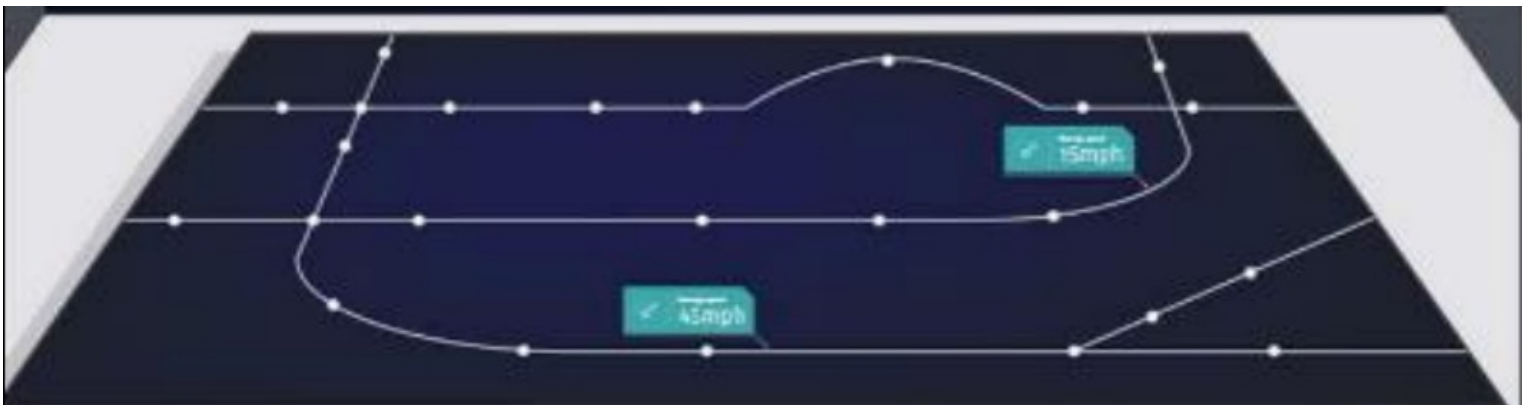


Organizations and Individual Users

A unified HD map model is imperative to be established as a standard for the sharing and exchange of HD map products among relevant stakeholders.

Rich Data Elements in the HD Map Model

Road Network

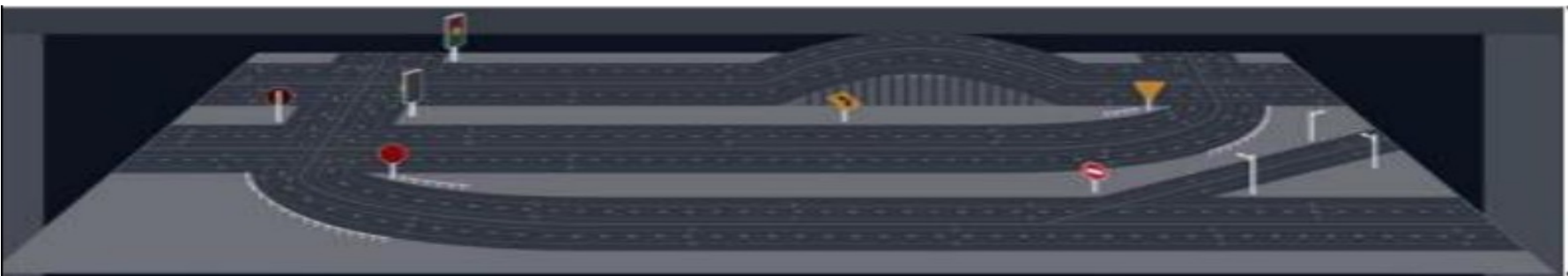


Roads

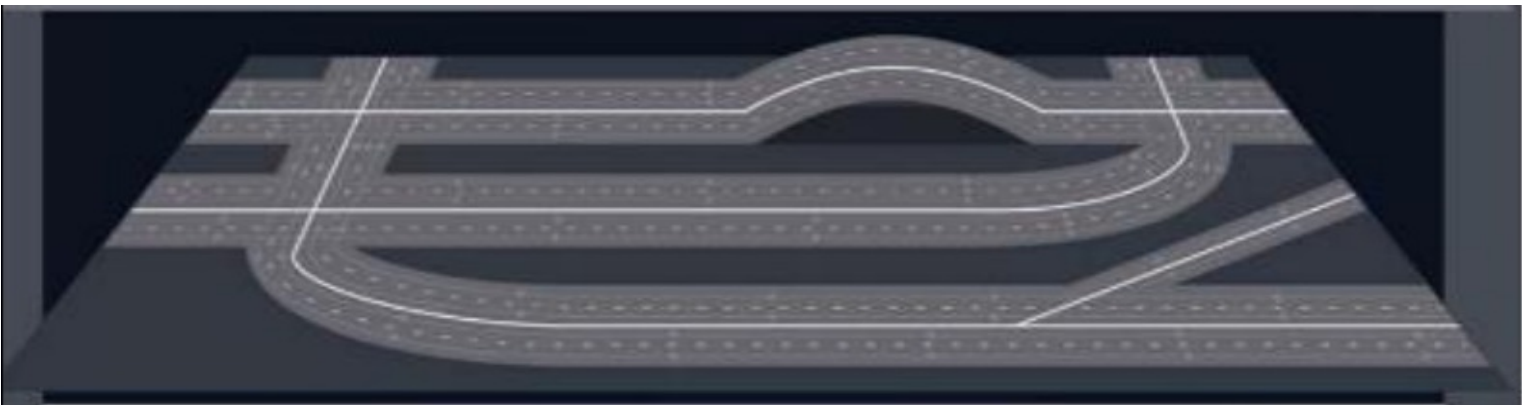
Road-level Intersection

Road-level Topology

Localization Feature



Lane Network



Lanes

Lane-level Intersection

Lane-level Topology

Surface

Gradient Curvature Elevation Width ...

Furniture



Traffic Signs

Speed Bump

Parking Lot

Curb

...

POI



Dynamic Traffic Data



Traffic Flow



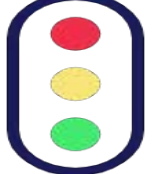
Traffic Participants



Traffic Incident



Weather



Traffic Light

HD map model will **contain rich road and traffic data** to meet the needs of automated driving system.

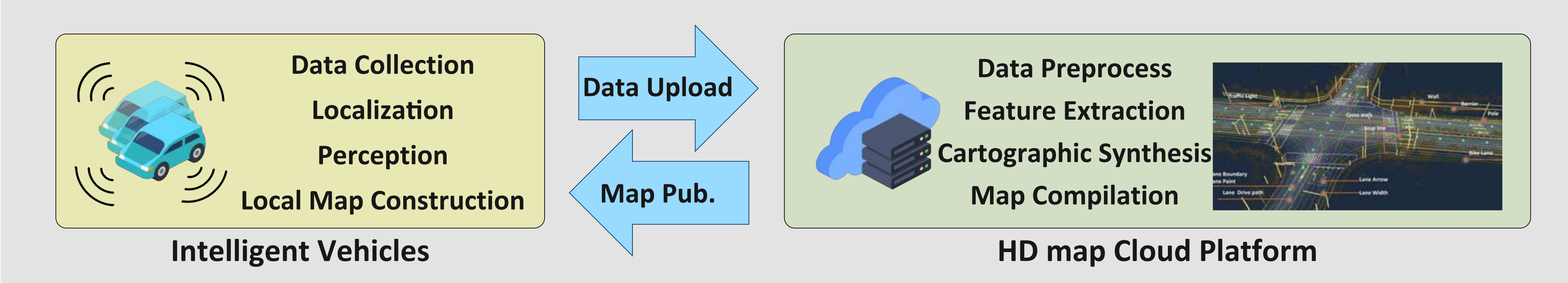
AD Levels VS. Need of HD Map Model

Level 0 – No Driving Automation	Level 1 – Driver Assistance	Level 2 – Partial Driving Automation	Level 3 – Conditional Driving Automation	Level 4 – High Driving Automation	Level 5 – Full Driving Automation
Short intervention from vehicle control for emergency avoidance	Either the lateral or longitudinal vehicle motion control	Both the lateral and longitudinal vehicle motion control	Dynamic driving task with the expectation of user intervention	Dynamic driving task without user intervention but under specific operational design	Driverless

SD Map → ADAS Map → HD Map →		
Standard Definition (SD) Map	Advanced Driver Assistance System (ADAS) Map	High-Definition (HD) Map
L0~L1	L1~L2	L1~L5
Road, POI	+ Road Gradient, Curvature, Heading	+ Lane-level Data, Localization Features, Furniture, Dynamic Data
Precision: 10m	Precision: 0.5~1m	Precision: 0.2~0.5m

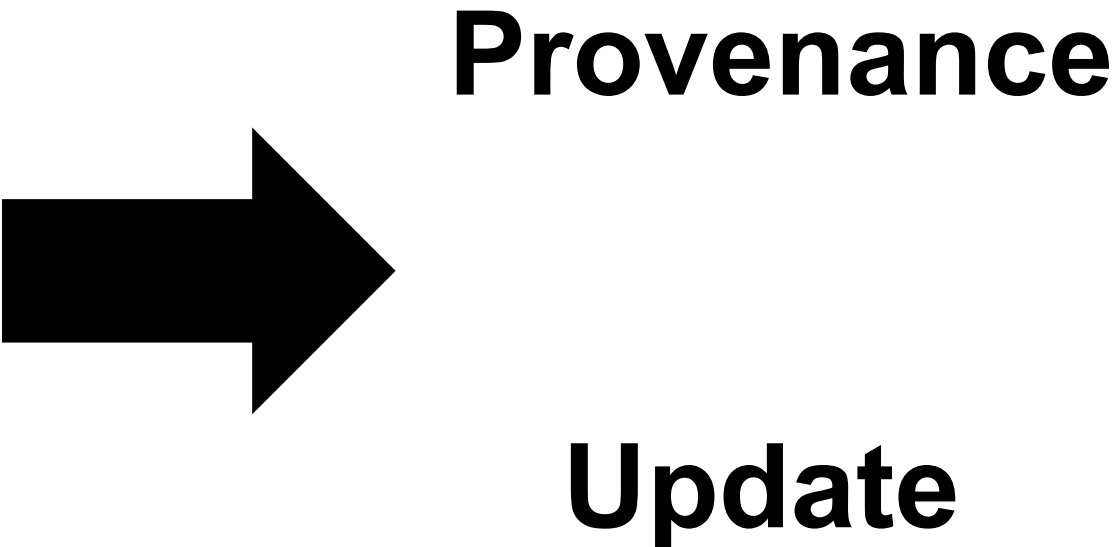
HD map model will **organize map data at different levels** to meet the different AD levels of automated driving system.

Data Reliability Need of HD map Model



Quality

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



Data Collection Information				
(Volunteers, GNSS, IMU, Point Clouds, Time, Vehicle Type, Surrounding Images...)				
Data Processing Information		Company	...	
Changeset	Version	Add / Modify / Delete	Date	...

HD map model should **consider data quality management** to meet the data reliability needs of automated driving system.

Purpose of the HDML:

- The HDML is chartered to develop the UML model and JSON/XML encoding for high-definition map data.
- The HDML will investigate the feasibility and interoperability of OGC standards to use and share high-definition map data in transportation applications and describe gaps and issues that can lead to a new geospatial standard.
- The HDML will include, but not be restricted to, data content, metadata, data quality, and provenance, etc.
- The UML model and encodings of HDML will consistent with the OGC standards baseline to exchange and retrieve the high-definition map data in the Web environment.

Scope of Work for HDML SWG:

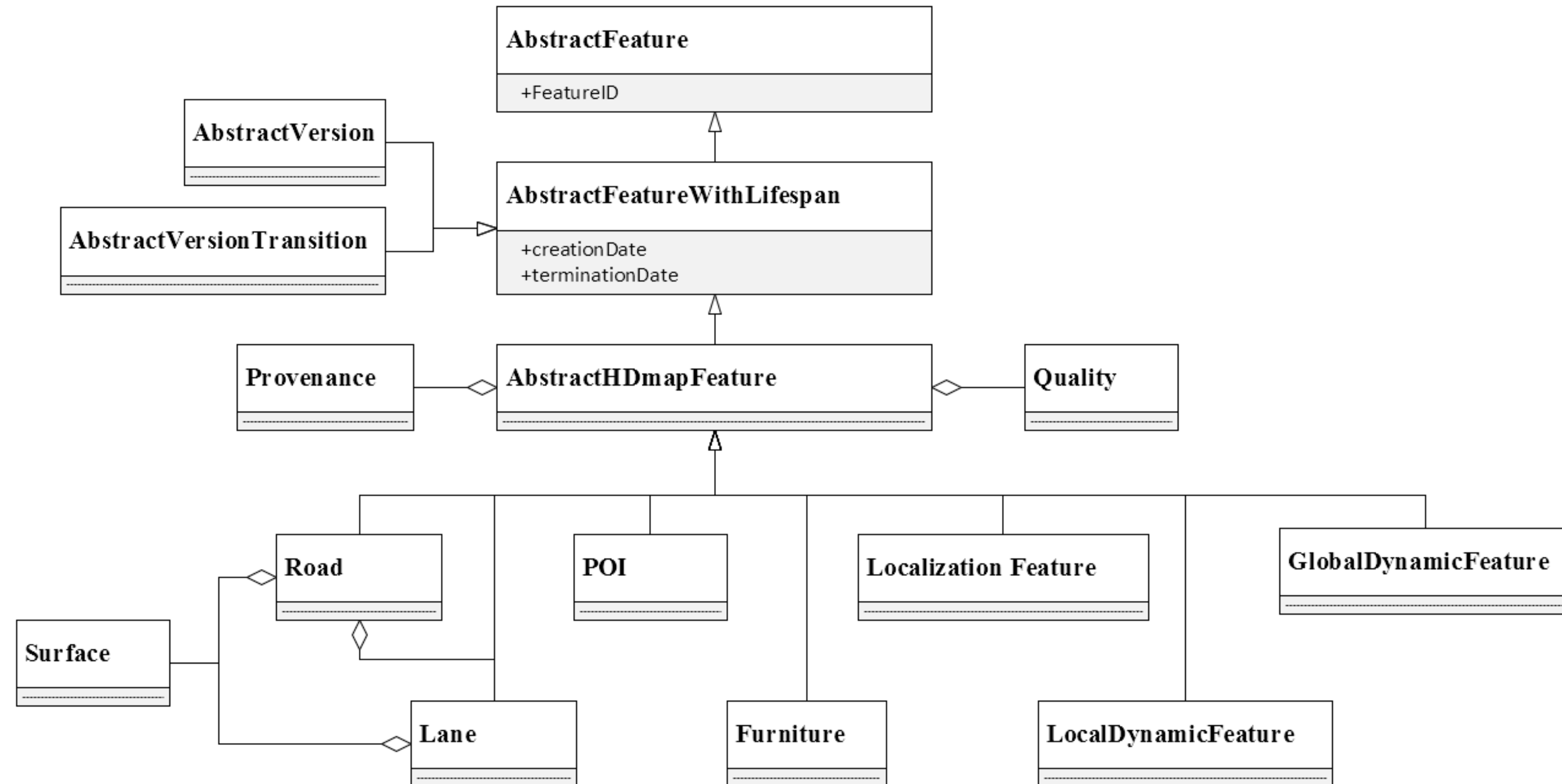
- Design the UML model and JSON / XML encoding of HD map to maximize the interoperability and usability of HD map data;
- Define the static map used to depict the static driving environment. The static map primarily includes the road network, lane network, traffic facilities, and positioning features;
- Define the dynamic data used to depict the real-time traffic information with high update frequencies, mainly including nearby vehicles, pedestrians, traffic lights, weather, traffic flow, etc.;
- Define the description of quality evaluation (e.g., HD map data completeness, HD map data positional accuracy) and the provenance (e.g., all intermediate data and processes, the evolution of map data over time);
- Define the model's scalability to accommodate practical applications, where objects in a specific model may contain attributes not explicitly modeled in HDML;
- Support data updates by defining version control and historical records for features.

HDML (draft)

- The HDML UML Model

Key considerations:

- Core features for HD map
- Updates/version
- Quality
- Provenance
- Level of details
- Extensibility for applications
- Alignment with existing OGC standards



Comments from Carl Reed

Are you aware of the MapML technology?
<https://github.com/Maps4HTML/MapML> Widely
implemented in various Open Source projects.

The two languages **serve different purposes**. MapML is designed for embedding map data in HTML, while HDML is a specification for a new kind of map data. To avoid the confusion, we will adopt **HDML** instead of HDMaPML as the short name.

TITLE: <High-Definition Map Markup Language (HD**Map**ML)> Standards
Working Group Charter↵
Author Name (s): Peng Yue↵
Email: pyue@whu.edu.cn↵
DATE: 2023.11.30↵
CATEGORY: SWG Charter Draft↵

Comments from Carl Reed

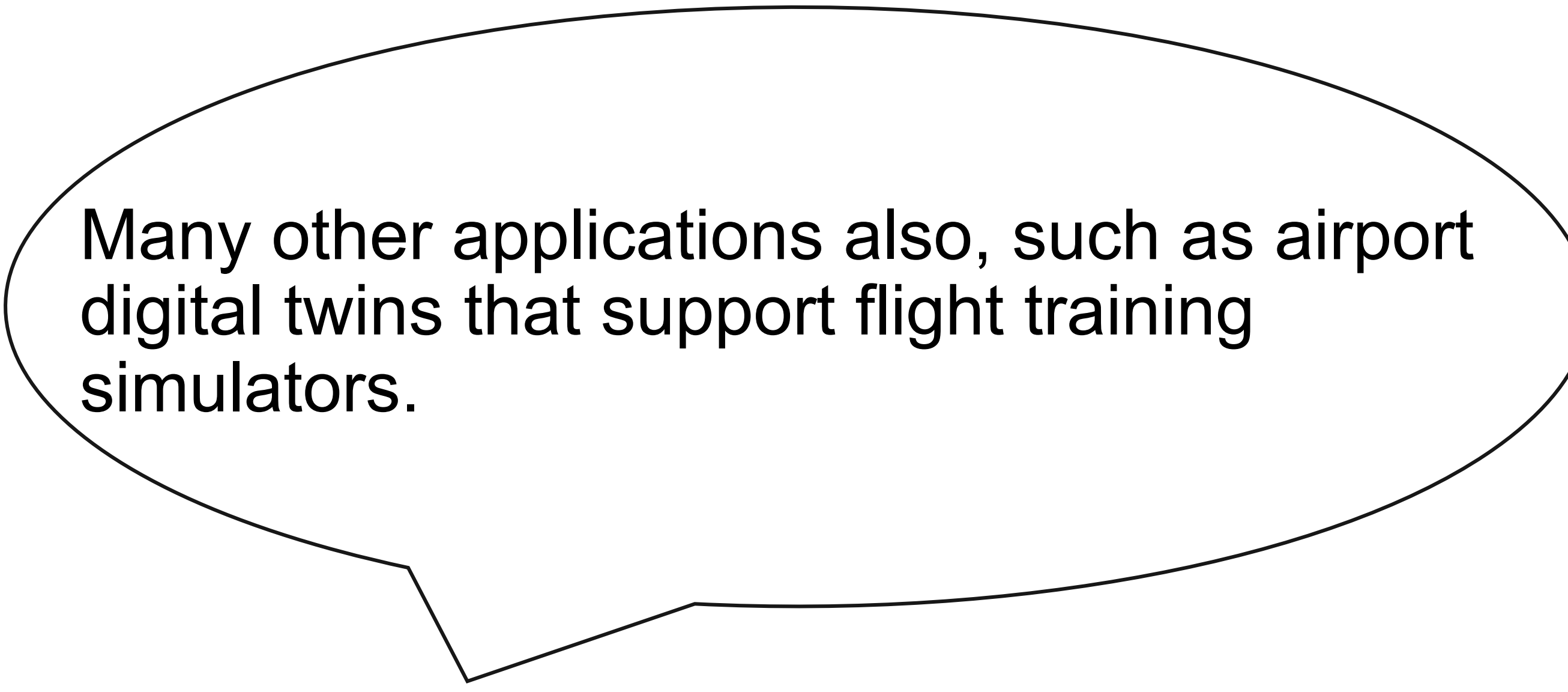
Accurate? In the fields of engineering, industry and statistics, accuracy is the degree of closeness of a measured or calculated quantity to its actual (true) value. Precision, also called reproducibility or repeatability, the degree to which further measurements or calculations show the same or similar results. (Esri, 2011)

Revised as suggested. In the rest of the document, we will use the **precision** in the context of **position measurement**.

1. Purpose of the Standards Working Group←

A ~~“High-Definition High-Definition (HD) mMap” (HDMaP)~~ is a highly **precise** ~~aaccurate~~ and informative map, ~~which that~~ contains **all both** static geometries (for examples: roads, lanes, traffic lights, and landmarks) and dynamic moving participants (for examples: cars, pedestrians, and cyclists) of the road/environment necessary for autonomous driving. The High-Definition Map Markup Language (~~HDMaPML~~ **HDML**) SWG

Comments from Carl Reed



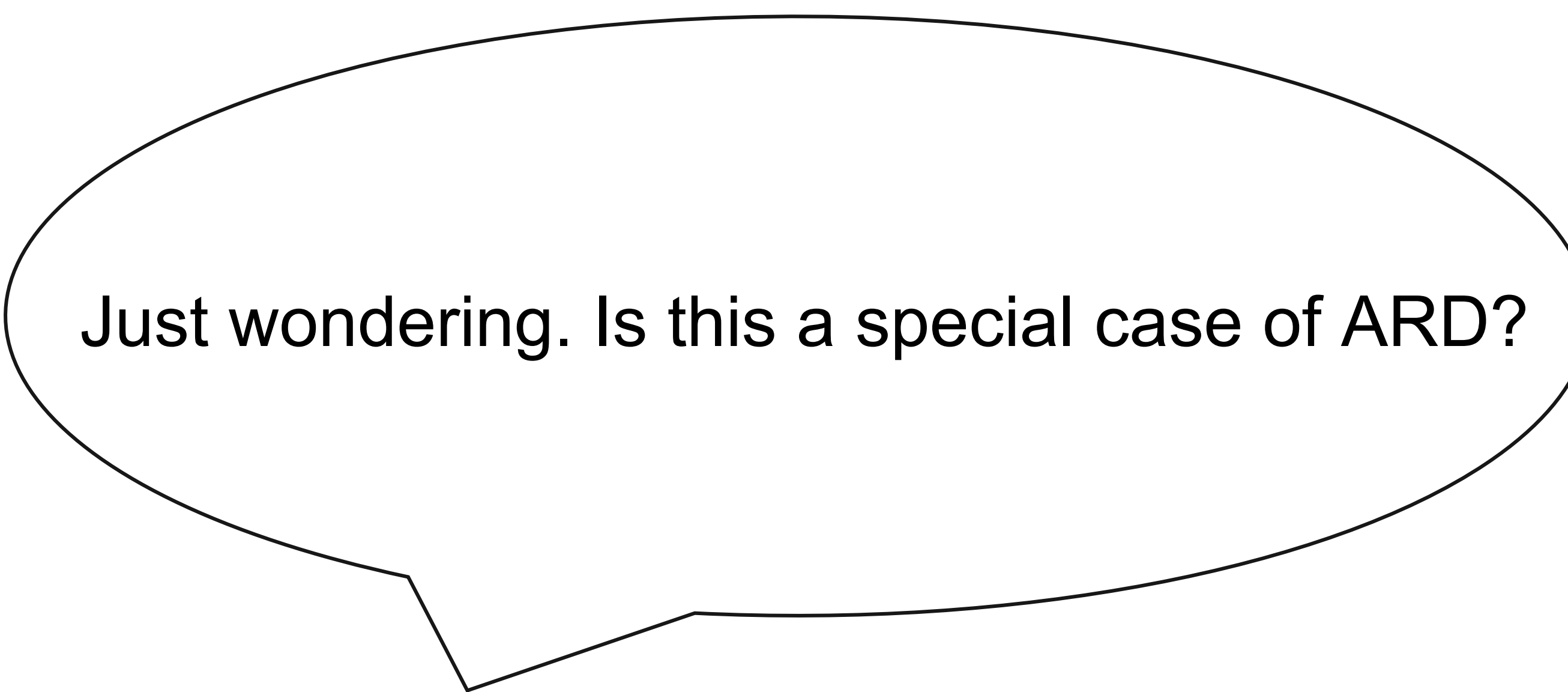
Many other applications also, such as airport digital twins that support flight training simulators.

Currently we limit the scope to **the primary use case, i.e. autonomous vehicles**. We will see if there is a need to broaden the scope in the future.

2. Business Value Proposition←

As a foundational knowledge repository and spatial reference for autonomous vehicles, high-definition maps **provide support** data services characterized by accuracy, richness, dynamism, and reliability, constituting a vital component in the current landscape of autonomous driving and intelligent connected vehicles. However, the lack of unified standards and specifications has resulted in significant disparities in

Comments from Carl Reed

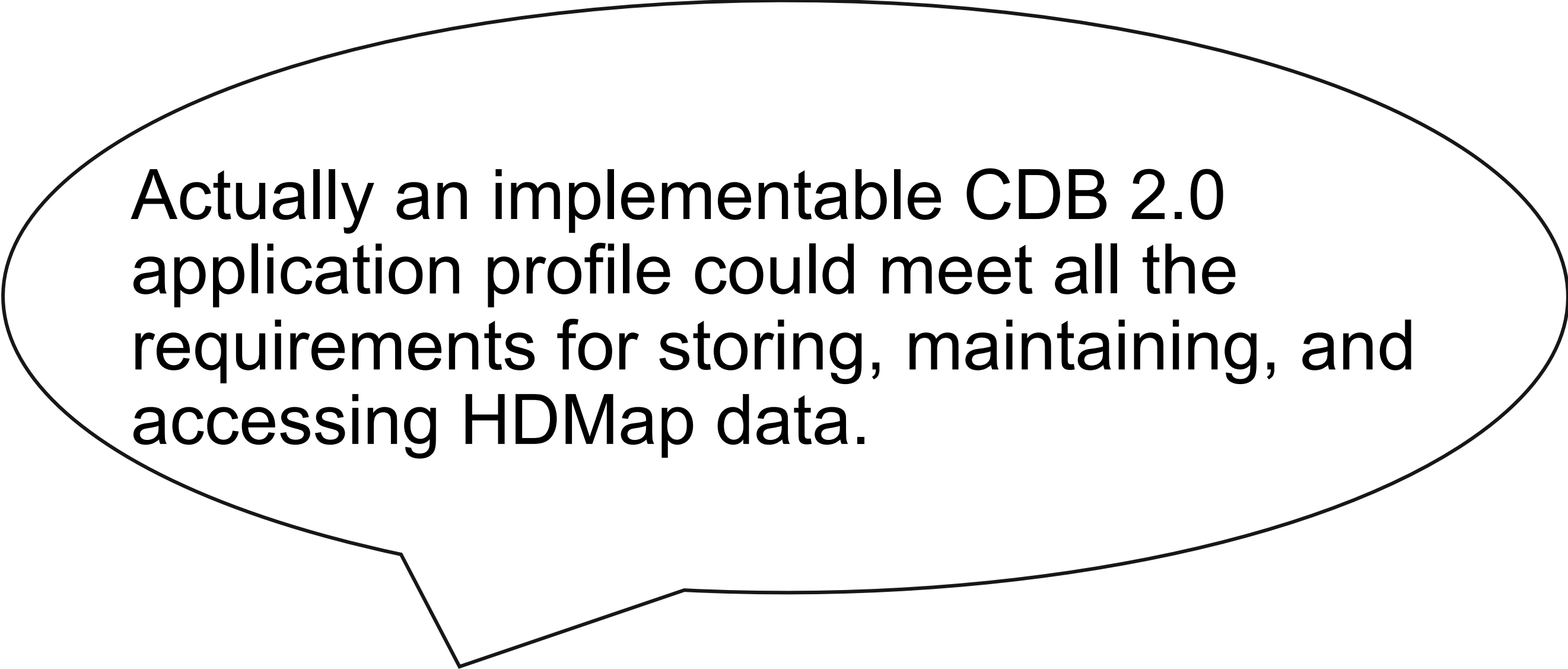


Just wondering. Is this a special case of ARD?

ARD is about the EO data products. Currently ISO/OGC is defining the specification of ARD products in terms of degrees of radiometric correction, geometric correction, and metadata. **The concept of HDML is different from ARD.** It can be regarded as a kind of high-level data products, derived from sensing data in vehicles.

To encourage the widespread adoption of the language for high-definition maps by researchers and practitioners, several challenges must be addressed. A key challenge is the lack of an industry-recognized or standardized model for high-definition maps, resulting in a diverse array of data representations. This diversity creates complications in achieving interoperability between disparate map datasets, leading to substantial costs associated with the conversion and adaptation of high-definition map data from various sources. While recent research has focused on refining elements, geometry, attributes, and representations

Comments from Carl Reed



Actually an implementable CDB 2.0 application profile could meet all the requirements for storing, maintaining, and accessing HDMap data.

Added as suggested.

b. Similar or Applicable Standards Work (OGC and Elsewhere). ↓

↓

The following standards and projects may be relevant to the SWG's planned work, although none currently provide the functionality anticipated by this committee's deliverables:↵

- [OGC CDB Version 2: Core Standard](#)↵
- OGC CityGML Encoding Standard↵
- OGC Moving Features Encoding Part I: XML Core↵
- ISO 20524-2:2020 Intelligent transport systems — Geographic Data Files (GDF) GDF5.1↵

Question?

A report on the proposal of the OGC HDML SWG
Peng Yue, Wuhan University
Email: pyue@whu.edu.cn
28 March 2024



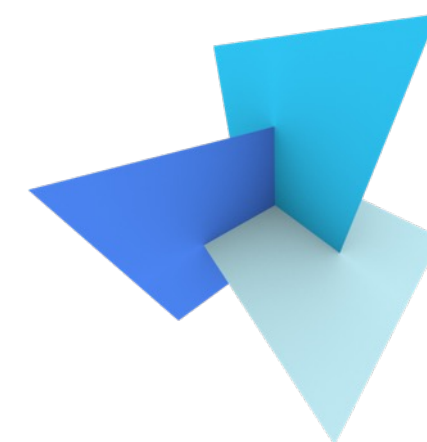
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Temporal DWG Plenary Report

The 128th OGC Member Meeting

Meeting Sponsors

Chris Little, UK Met Office
Chuck Heazel, HeazelTech
28 March 2024



The most important thing for Temporal DWG is...

Publication of the Abstract Conceptual Model for Time, OGC23-049r2

What Temporal DWG talked about this week

- ISO activities in TC211 and TC154
- Enhancing or changing ISO19111 to support spatiotemporal CRSs
- Enhancing or changing ISO19111 for relativistic Minkowski block space-time
- Need to support accountancy and other periods, such as weeks and quarters, or repetitions of specific days or months and how to represent them
- The need to widely socialize the best practice of only using UTC ('Z') timestamps for persistent resources, and that any timezones and calendar adjustments be done in user facing software or resources.
- As requirements for increasing precision and accuracy grow, the need for Temporal CRSs to be synchronized or coordinated with a best practice also increases
- Who should own authoritative temporal registers? OGC perhaps temporarily

Where Temporal DWG are headed in coming year

- Coordinate with ISO TC211 and TC154 on temporal standards
- Propose OGC 23-049r2 as a basis for an ISO 34500 conceptual model for time
- A Best Practices document should be resuscitated

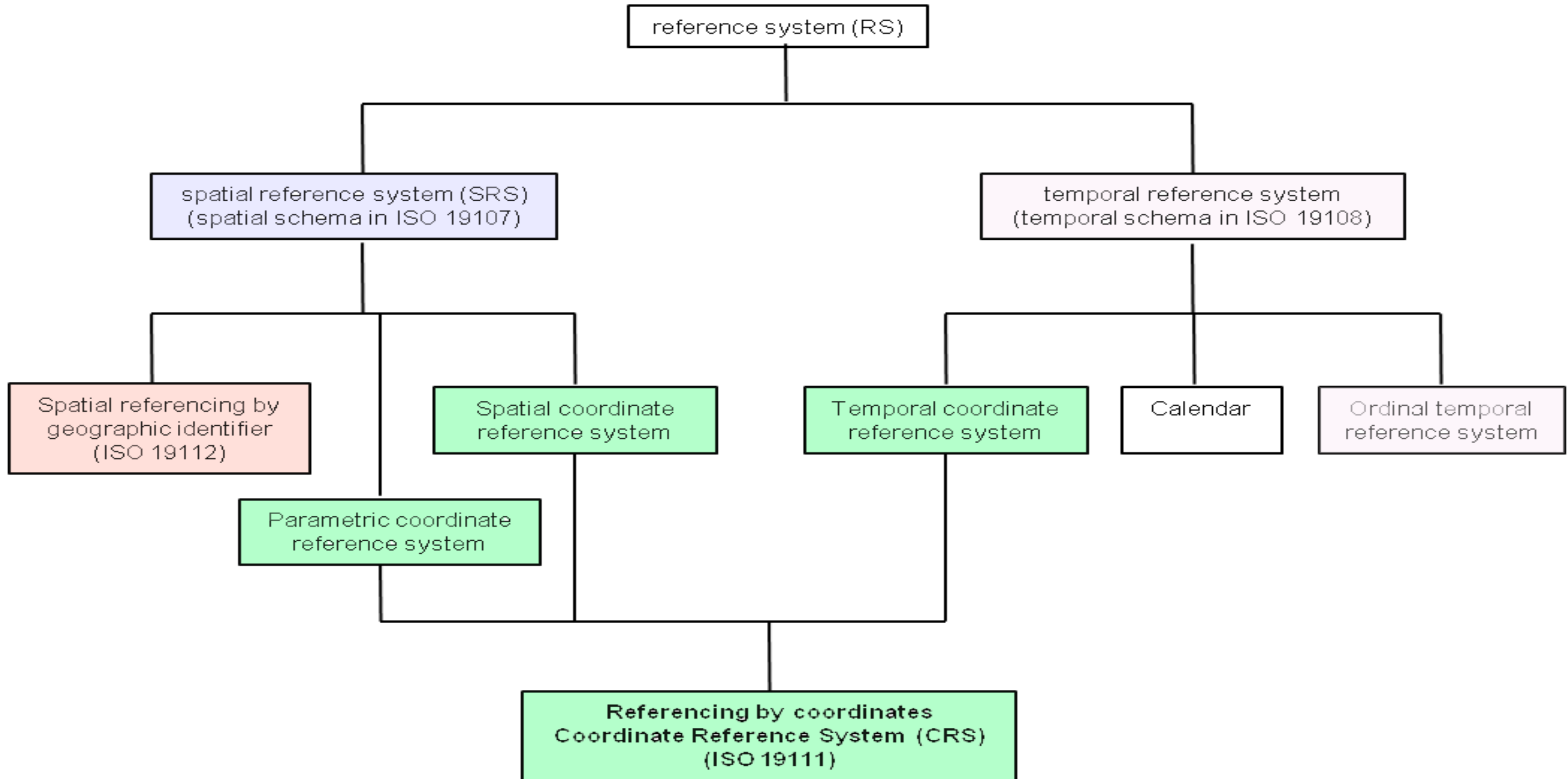
Next Quarter Temporal DWG Comms Plan

- < Are there any upcoming events (e.g., conference papers) related to your WG that you would like OGC to promote? > TC211/TC154
- <Is there a new project or outcome that you think is worthy of an article or blog post? Please add a short description.> Yes!
- <Have there been any articles published online/in magazines that reference the work your WG is doing?> No.

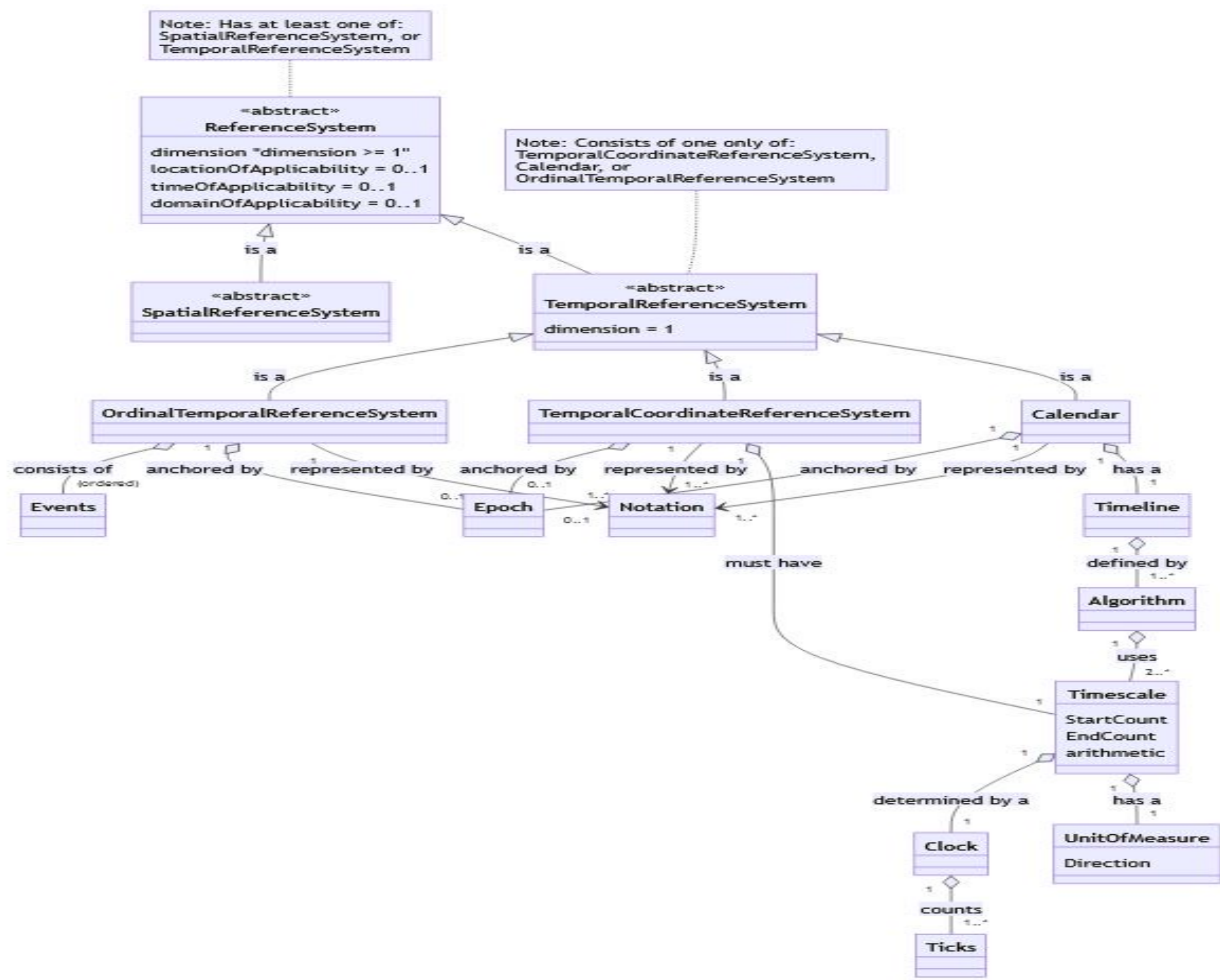
Temporal Domain WG Agenda

- Welcome, Introductions and technology struggles
- Request Approval vote for Abstract Conceptual Model for Time.
- OGC Naming Authority: registrations of Temporal CRSs & Calendars
- Overview of Temporal activities outside of OGC: Liaison with:
 - ISO TC211 and TC154
 - NGA/MISB
 - IETF
 - W3C
 - Others: WMO, BIPM, IERS, IEEE, etc
- Discuss and agree future work:
 - Tidy the GitHub repo
 - Supporting spatiotemporal coordinate reference systems
 - Best Practices
 - Any implementation standards required (and SWGs)
- Any Other Business

ISO19111:2019 UML diagram



Abstract Conceptual Model for Time (OGC23-049r2)



Comment Adjudication

- The Abstract Conceptual Model for Time specification was released for public comment on November 23, 2023
- A total of 65 Comments were received.
- 57 comments were accepted and resulted in changes to the document.
 - Only one not editorial
- 8 comments were not accepted.
- The resolutions are in the [Closed Issues of the Repo.](#)

Request for a TC electronic vote

- The TemporalDWG recommends that the OGC Technical Committee approve an electronic vote to approve release of OGC 23-049r2 “Abstract Conceptual Model for Time” as an OGC Abstract Topic Specification.
 - There was no objection to unanimous consent



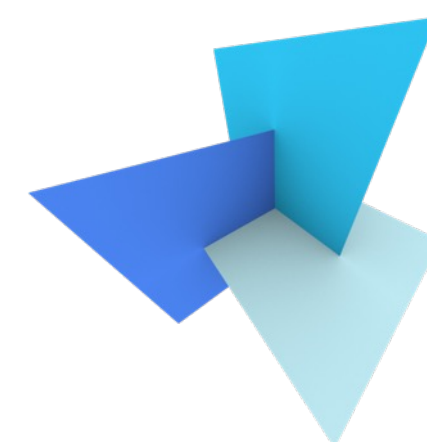
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EDR API SWG Plenary Report

The 128th OGC Member Meeting

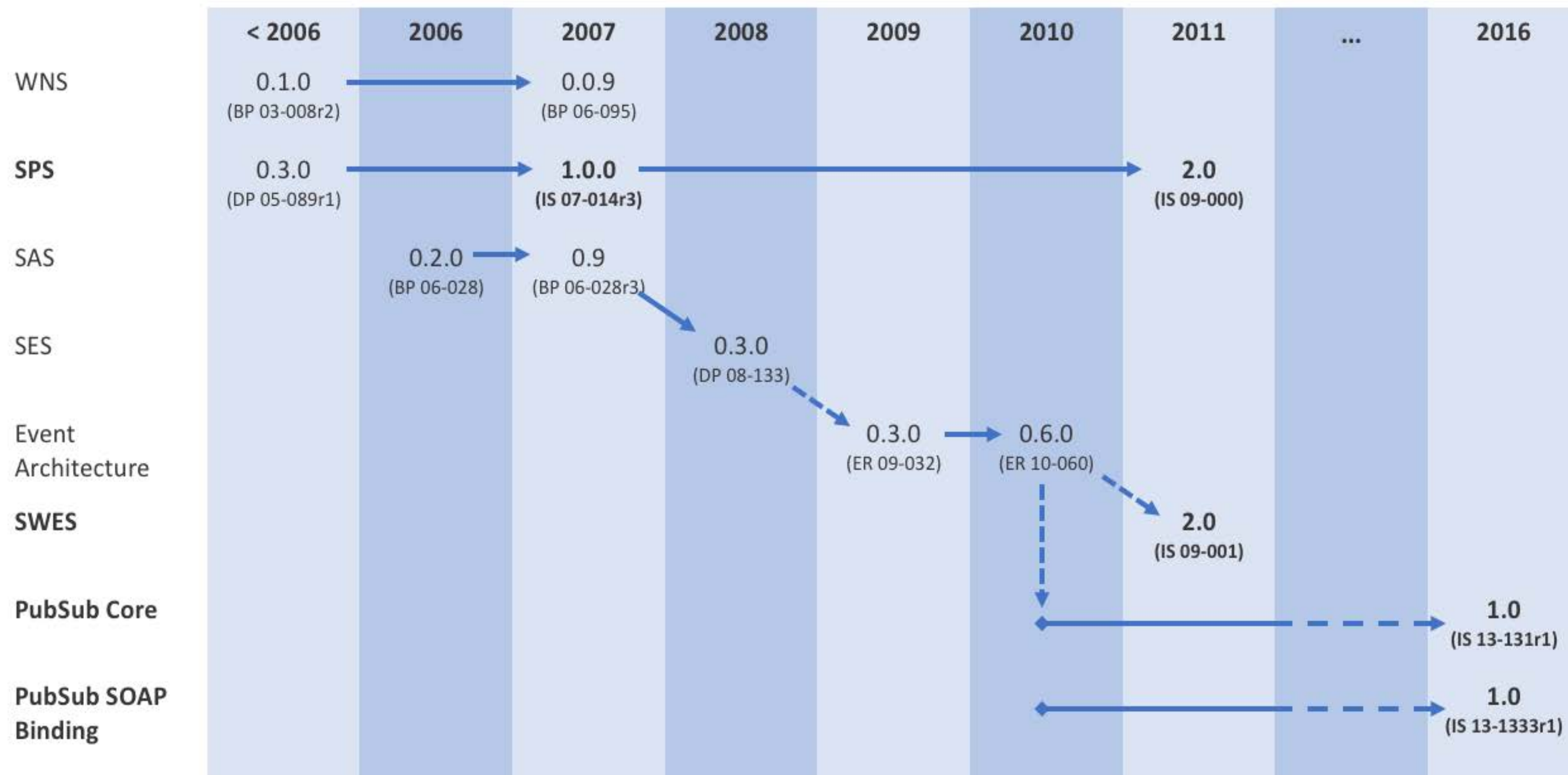
Chris Little, UK Met Office
28 March 2024

Meeting Sponsors



OGC Pub Sub Historical Background - 1

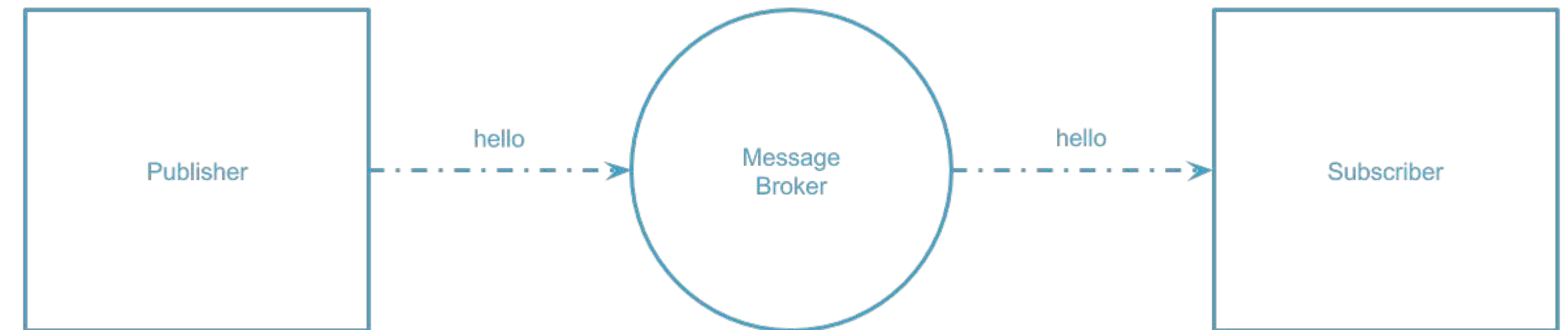
[1] M. Rieke, L. Bigagli, S. Herle, S. Jirka, A. Kotsev, T. Liebig, C. Malewski, T. Paschke, C. Stasch. Geospatial IoT—The Need for Spatial Data Infrastructures. ISPRS International Journal of Geo-Information (IJGI), ISSN 2220-9964, Volume 7, Issue 10, article 38 Switzerland, 25 September 2018.



OGC PubSub Historical Background - 2

- **2016:** OGC [Pub/Sub Version 1](#)
- **2020:** OGC Publish-Subscribe [Whitepaper](#) (Saeedi et. al., 20-046 / 20-081)
- **2022:** MetOcean DWG began revisiting Pub/Sub due to FAA SWIM requirement and WMO Information System 2.0
- **2023:** MetOcean DWG presented generic approach for Pub/Sub within EDR API: Part 2 at Frascati, Italy Members Meeting (**February**) based on use of [AsyncAPI](#)
 - 3 implementations (NWS, UKMet Office, MSC) using AMQP and MQTT
- **2023:** Began process to restart dormant PubSub SWG at Huntsville Members Meeting (**June**)
- **2023:** OGC Developers API Sprint with Pub/Sub focal area (**October**)
- **2024:** Public Comment (**March**)

OGC API-EDR Pub/Sub Approach - Leveraging AsyncAPI



- **Link in Landing page**

```
{  
  "rel": "service-desc",  
  "type": "application/json",  
  "title": "AsyncAPI document",  
  "href": "https://example.org/asyn capi"  
}
```

- **AsyncAPI is an event orientated equivalent of OpenAPI**
- **Agnostic description of protocols, channels, and message payloads**
 - MQTT, Kafka, AMQP, STOMP, WebSockets, JMS

API-EDR Pub/Sub Approach - OGC API Endpoints as Channels

OGC API Endpoint	Channel	Description
/	/#	All notifications
/collections	/collections	Notifications of new collections
/collections/{collectionId}	/collections/foo	Notifications of new granules (items, etc.) from a collection
/collections/{collectionId}	/collections/+	Notifications of new granules (items, etc.) from all collections

- **Subscription wildcard patterns are specific to the protocol**
 - Note that the above channel examples are based on MQTT syntax

Request of an electronic vote

- The EDR API SWG recommends that the OGC Technical Committee approve an electronic vote to approve release of OGC 23-057r1 “OGC API – Environmental Data Retrieval – Part 2: Publish-Subscribe Workflows” as an OGC Standard.
- There was no objection to unanimous consent



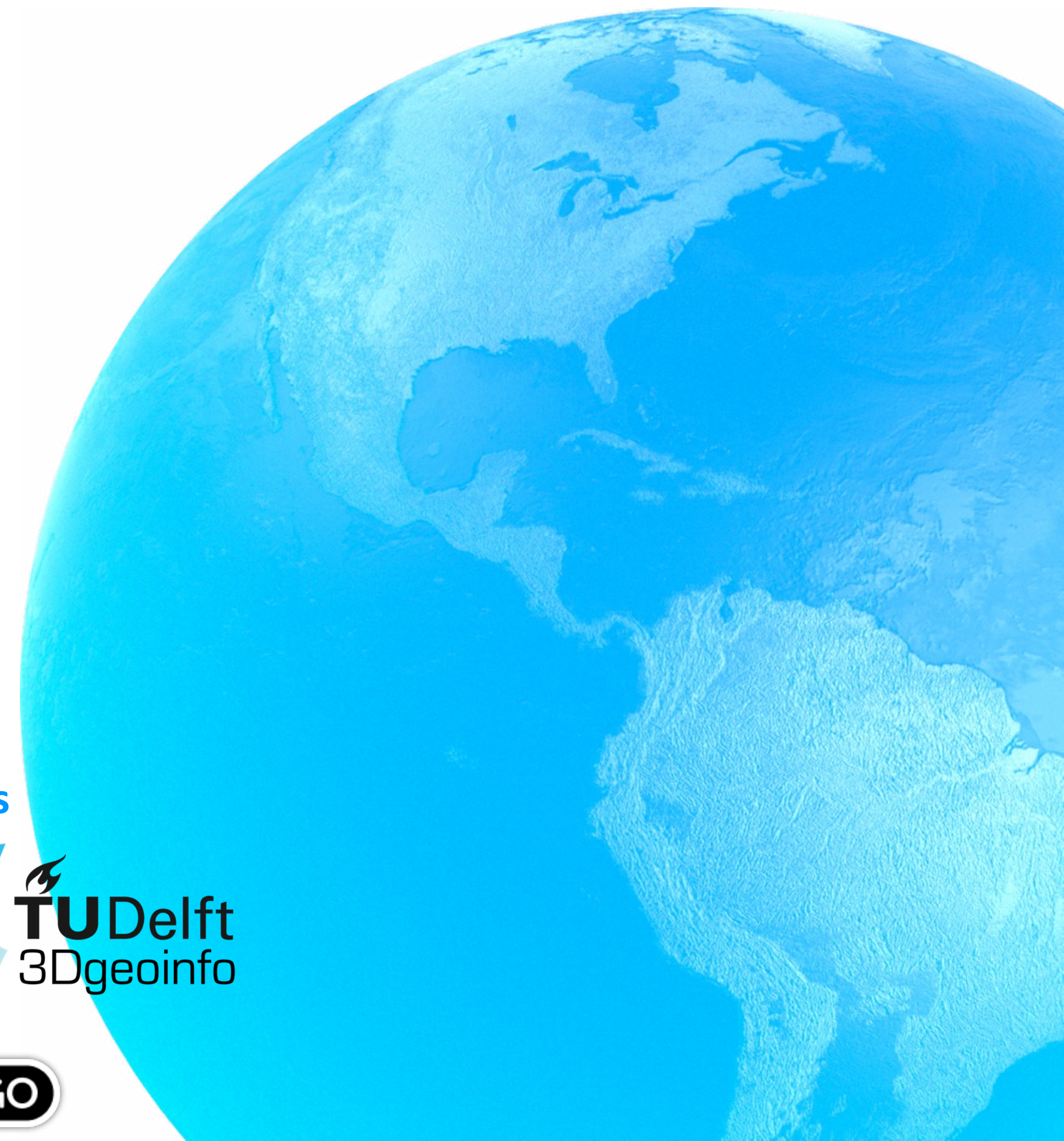
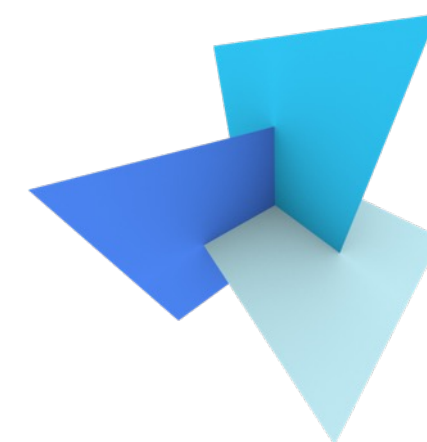
Open
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Moving Features SWG

The 128th OGC Member Meeting

Kyoung-Sook Kim,
Mahmoud Sakr,
Nobuhiro Ishimaru
28 March 2024

Meeting Sponsors

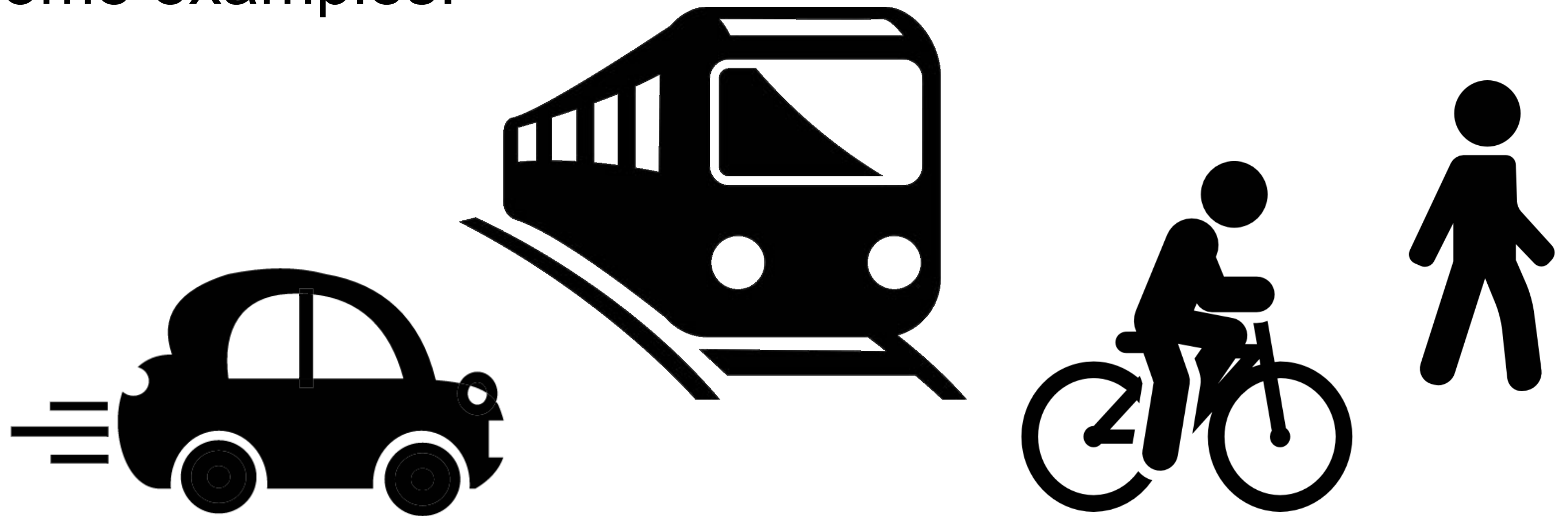


Various types of moving features in the real world

- **Moving Feature:** feature whose **location changes over time**

- We can easily imagine some examples:

- Cars,
- Trains,
- Bicycles,
- Pedestrians,
- ...

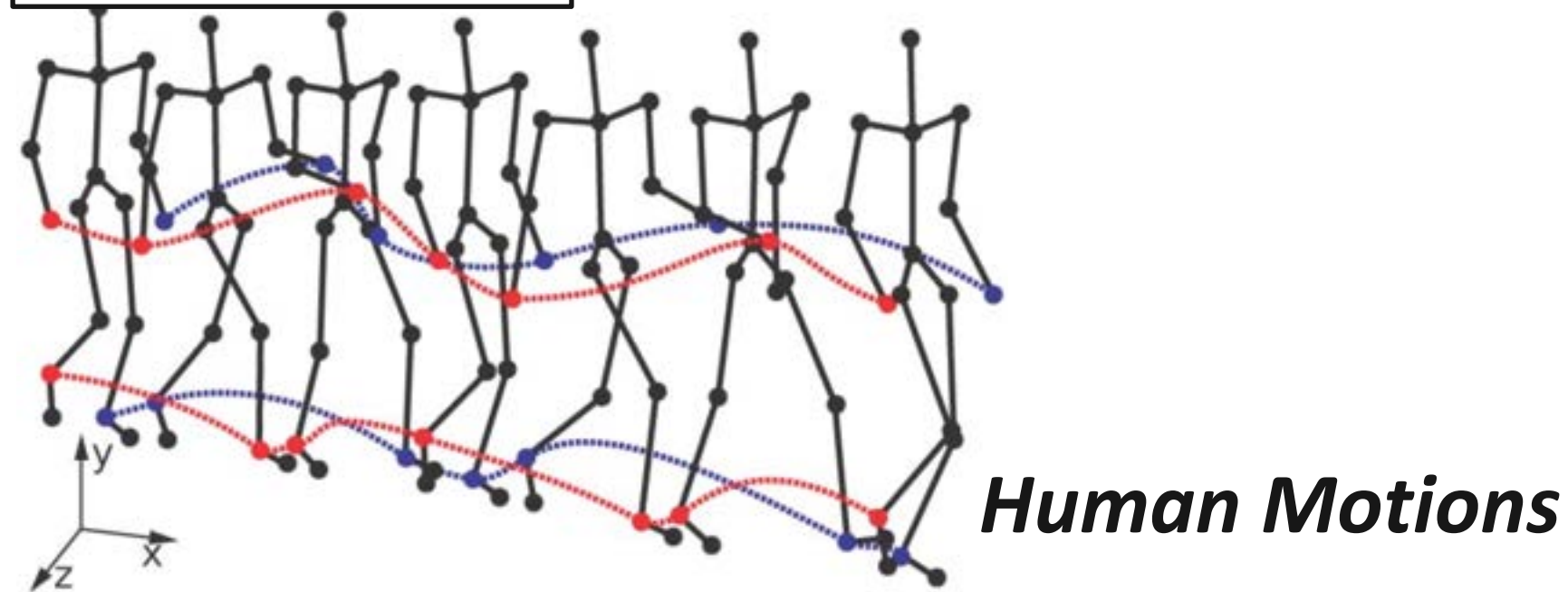


- Their **positions** changed over time, and they are usually represented by **Points**
 - How about its **shape**? With other representations, such as Curve, Surface, ...
 - How about its **properties**? Such as speeds, directions, capacities, ...

Various geometry representations with moving features

- **Moving Feature:** feature whose **location changes over time**

Curve type



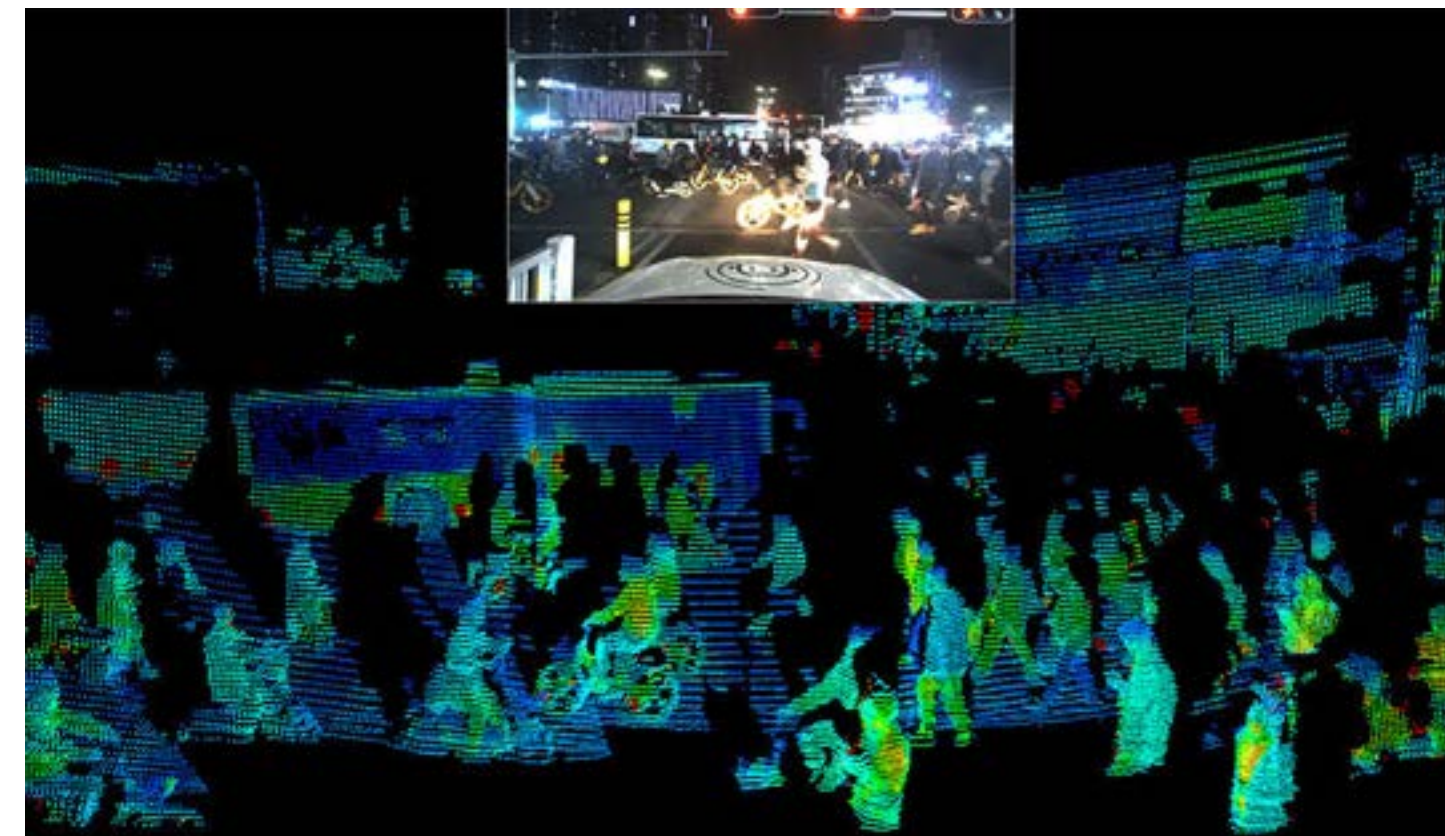
Trains

Surface type



Typhoon

Point Clouds type

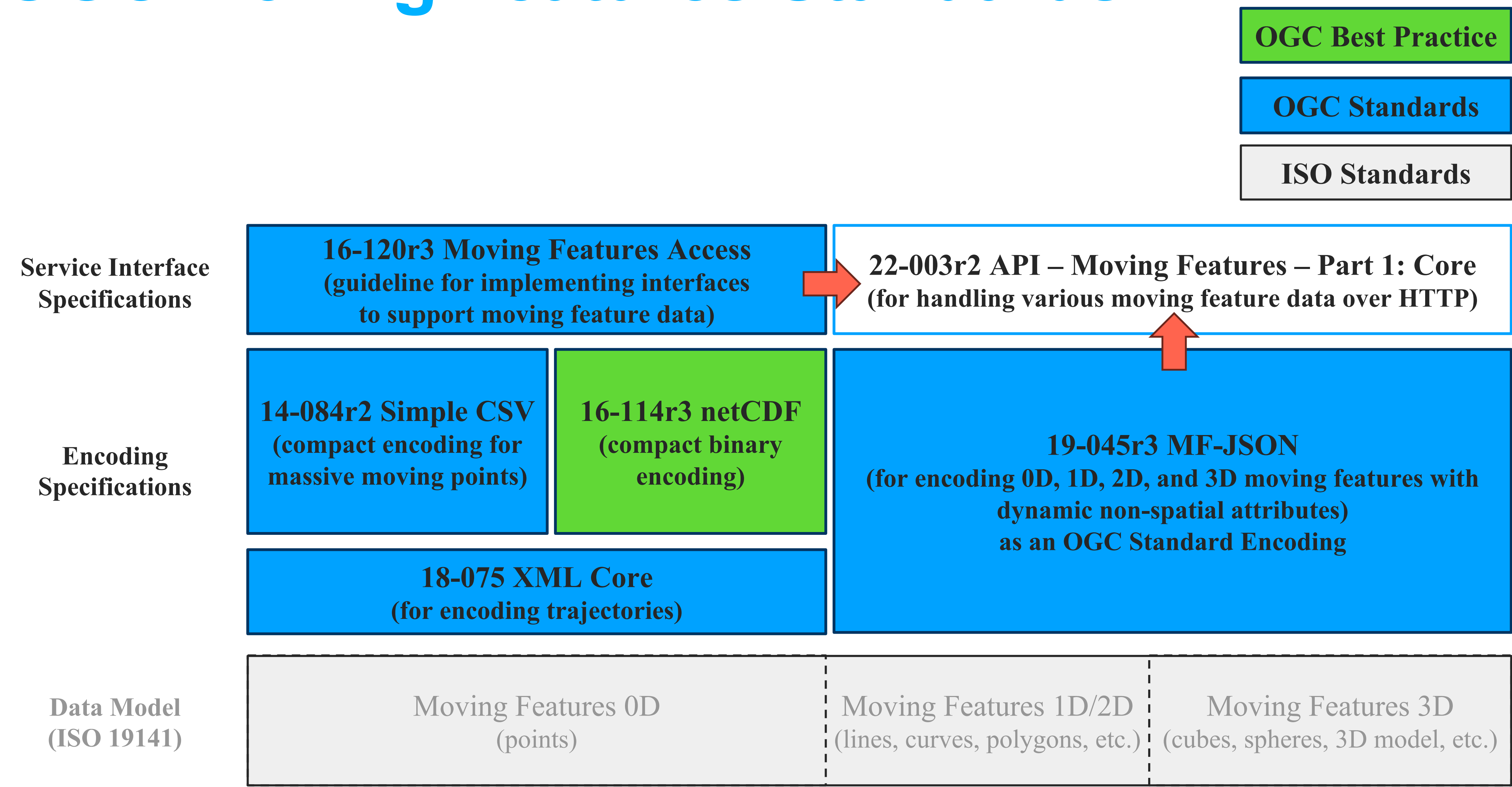


Pedestrians

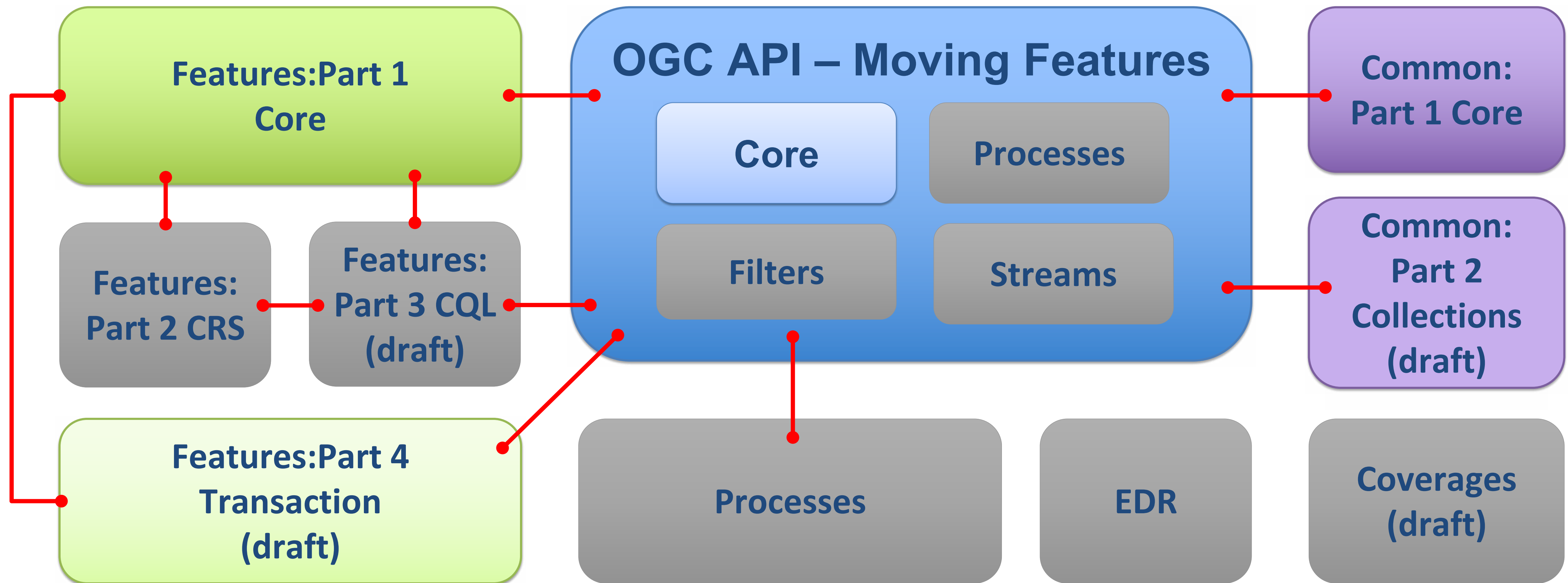
Image source:

1. <https://matcha-jp.com/en/4409>
2. <https://github.com/aistairc/mf-cesium/wiki/Stinuum-Web-Manual>
3. <https://www.robosense.ai/en/tech-show-55>
4. <https://www.sama.com/3d-lidar-radar-point-cloud-annotation/>
5. Balazia, Michal, and Petr Sojka. "Learning robust features for gait recognition by maximum margin criterion." *2016 23rd International Conference on Pattern Recognition (ICPR)*. IEEE, 2016.

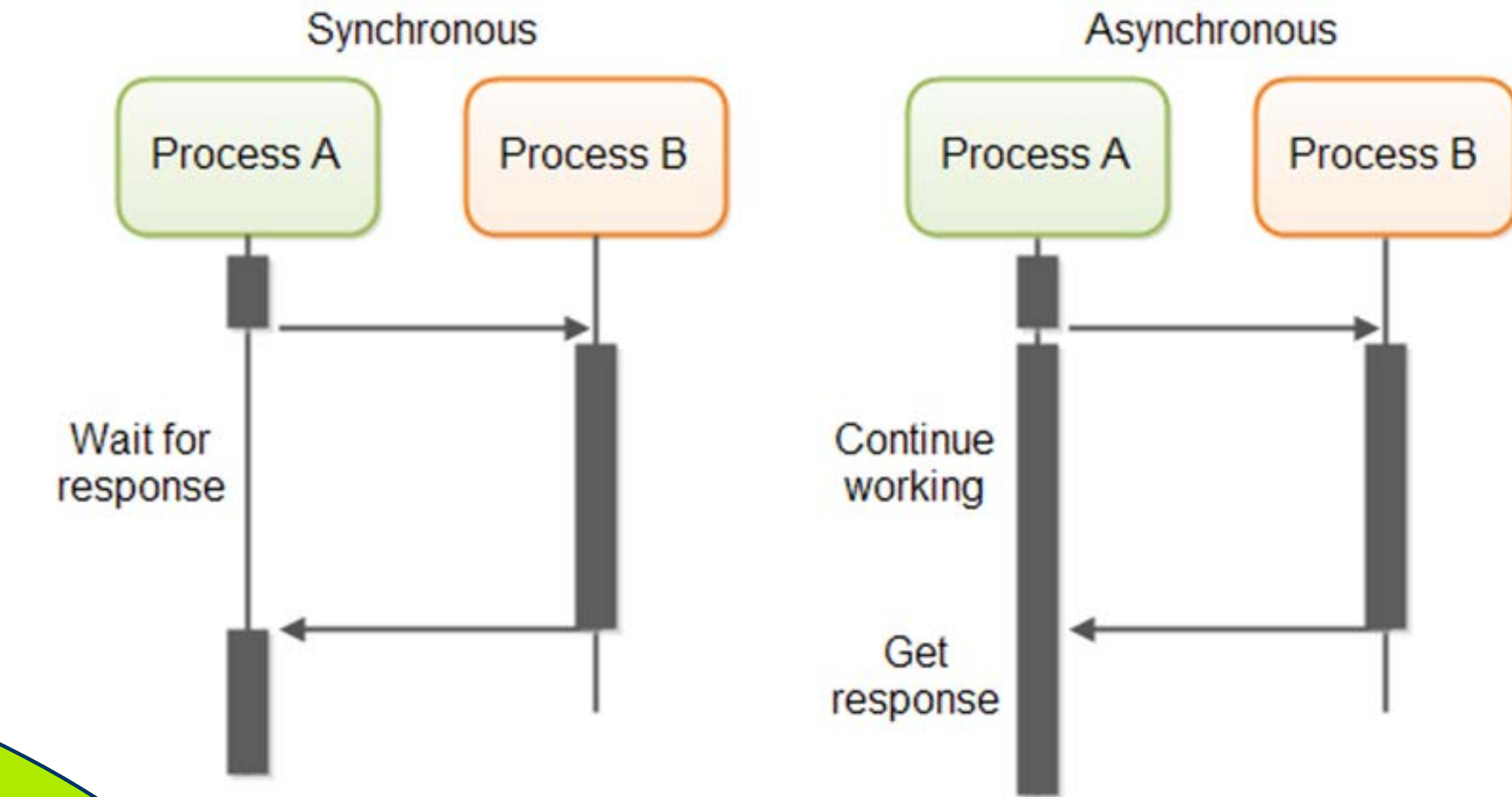
OGC Moving Features Standards



Design Four Parts of OGC API – Moving Features (OGC API – MF)



Positions of Four Parts



OGC API – MF Part 3: **Processes** (Asynchronous)

OGC API – MF Part 2: **Filters**
(Synchronous)

OGC API – MF Part 1: **Core** (Synchronous)

OGC MF-JSON encoding

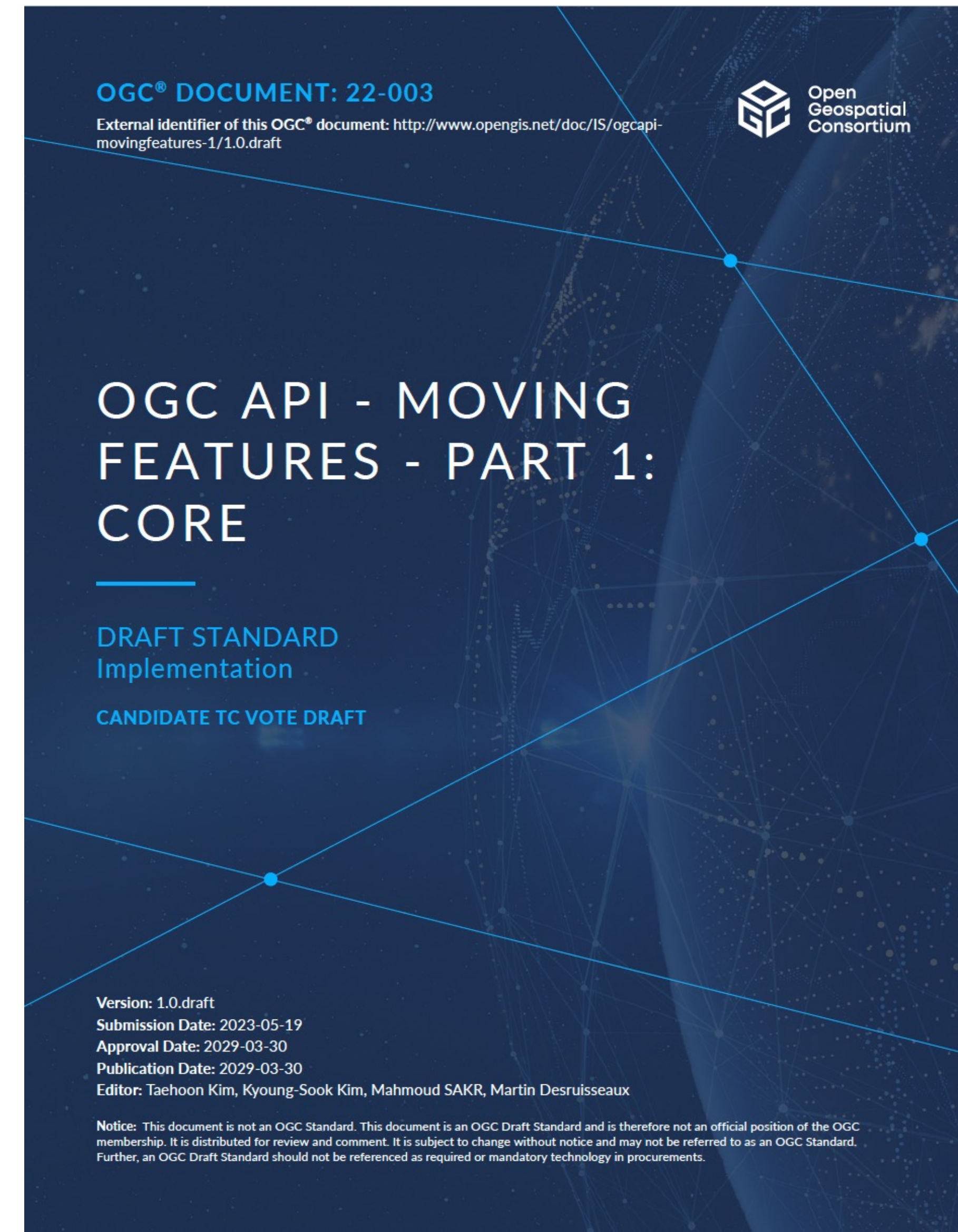
OGC API – MF Part 4:
Streams (Sub/Pub)

OGC API – Moving Features – Part 1: Core (OGC 22-003)

- **Part 1: Core**
 - Moving feature is a type of feature.
 - Inherit the necessary APIs (and Resources) from OGC API-Features (& Common)
 - Consider **CRUD** operations for ***MF-JSON*** objects
 - CRUD: Create, Read, Update, and Delete
 - Support fundamental operations
 - Based on **Type A** operations of OGC Moving Features Access Standard

Documentation of OGC API – Moving Features – Part 1

- **The draft version for OGC API – MF – Part 1 is finalized!**
 - **Pending document:** <https://portal.ogc.org/files/107154>
 - **Overview:**
 - <https://ogcapi.ogc.org/movingfeatures/>
 - <https://github.com/opengeospatial/ogcapi-movingfeatures>
 - **Draft document:**
 - <https://opengeospatial.github.io/ogcna-auto-review/22-003.html>
 - <https://opengeospatial.github.io/ogcna-auto-review/22-003.pdf>
 - **OpenAPI:**
 - <https://opengeospatial.github.io/ogcapi-movingfeatures/openapi/openapi-movingfeatures-1.html>
- The goal of **OGC API – Moving Features – Part 1: Core**
 - Provide an interface for **Creating, Retrieving, Updating, and Deleting *Moving Features***, which conformance to the **OGC MF-JSON Encoding Standard**.

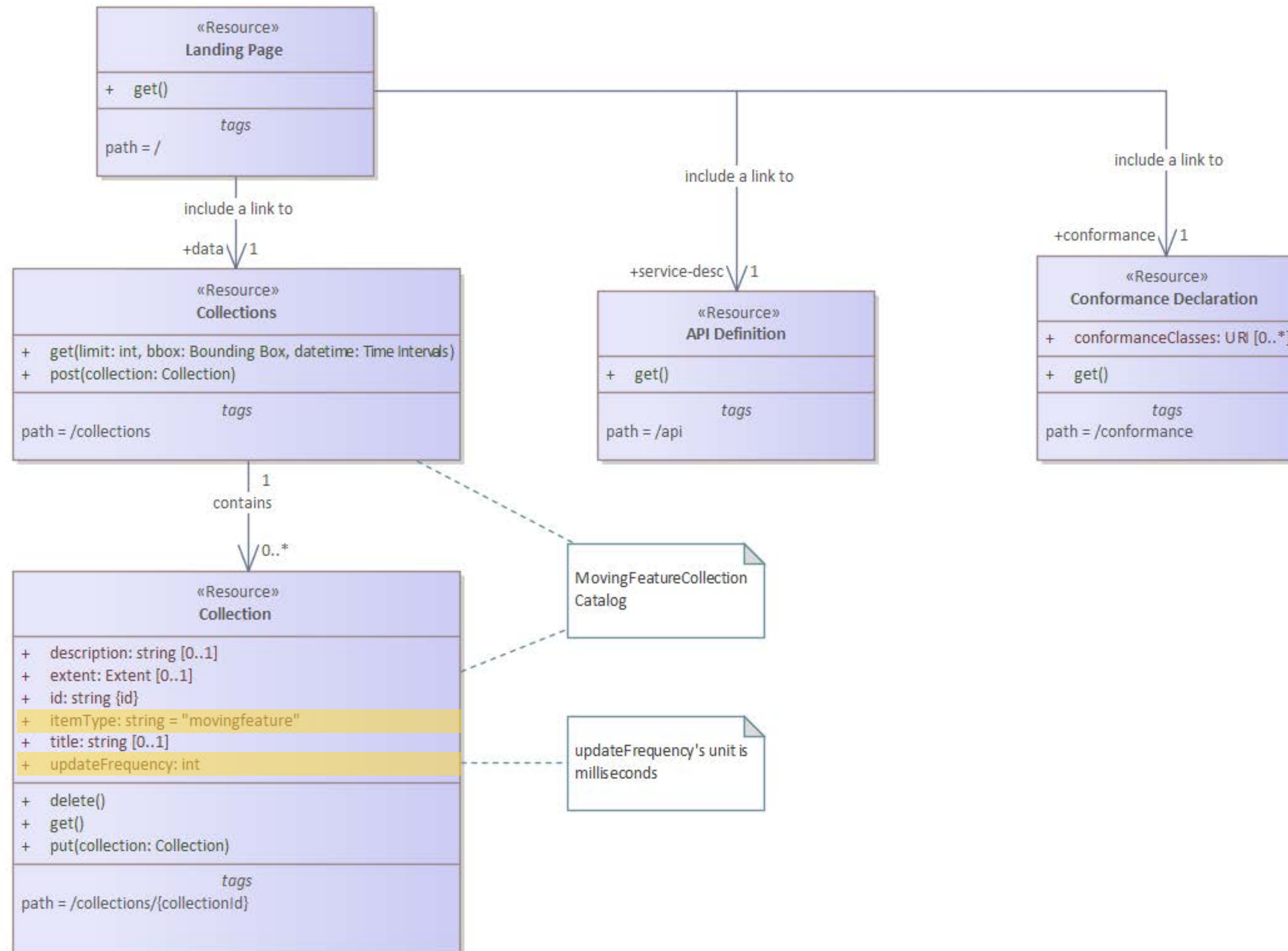


Overview of OGC API — Moving Features — Part 1: Core

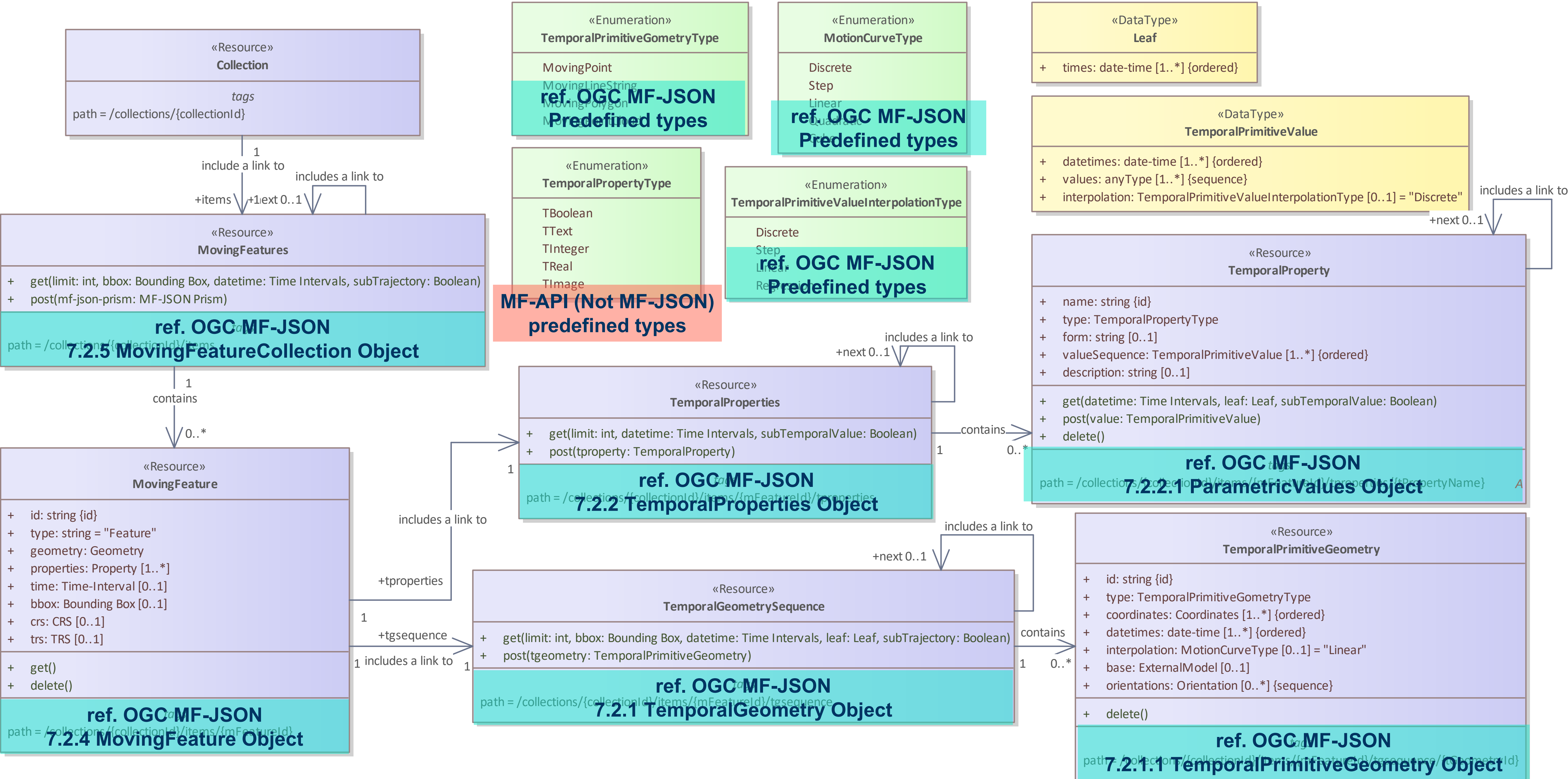
		Resource	Path	HTTP Method	Document Reference
Inherited from OGC API-Features		Landing page	/	GET	No modification
		API definition	/api	GET	
		Conformance classes	/conformance	GET	
		Collections metadata	/collections	GET, POST	7.3
		Collection instance metadata	/collections/{collectionId}	GET, DELETE, PUT	7.4
Resources from OGC MF-JSON		Moving feature collection	/collections/{collectionId}/items	GET, POST	8.3
		Moving feature instance	/collections/{collectionId}/items/{mFeatureId}	GET, DELETE	8.4
		Temporal geometry sequence	/collections/{collectionId}/items/{mFeatureId}/tgsequence	GET, POST	8.5
		Temporal primitive geometry	/collections/{collectionId}/items/{mFeatureId}/tgsequence/{tGeometryId}	DELETE	8.6
		Temporal properties	/collections/{collectionId}/items/{mFeatureId}/tproperties	GET, POST	8.8
Resources from OGC MF-Access		Temporal property instance	/collections/{collectionId}/items/{mFeatureId}/tproperties/{tPropertyName}	GET, POST, DELETE	8.9
		Velocity query	/collections/{collectionId}/items/{mFeatureId}/tgsequence/{tGeometryId}/velocity	GET	8.7
		Acceleration query	/collections/{collectionId}/items/{mFeatureId}/tgsequence/{tGeometryId}/acceleration	GET	8.7
		Distance query	/collections/{collectionId}/items/{mFeatureId}/tgsequence/{tGeometryId}/distance	GET	8.7

Inherited OGC API – Features and Common

- There is **no modification** for supporting moving features.
- But there are two constraints:
 - The ***itemType*** of Collection should be "**movingfeature**"
 - The new property (***updateFrequency***) is required to determine the continuous of temporal geometry
 - Update frequency: a time interval of sampling location



Resource diagram of OGC API – MF



Relationship of Between Web Resources

- *TemporalGeometry* is a special type of *TemporalProperty*
- *TemporalPrimitiveGeometry* is a special type of *TemporalPrimitiveValue*

MovingFeatures (~MovingFeatureCollection)

MovingFeature A

TemporalGeometry

TemporalPrimitiveGeometry 1



TemporalPrimitiveGeometry N

TemporalProperties

TemporalProperty A

TemporalPrimitiveValue 1



TemporalPrimitiveValue M

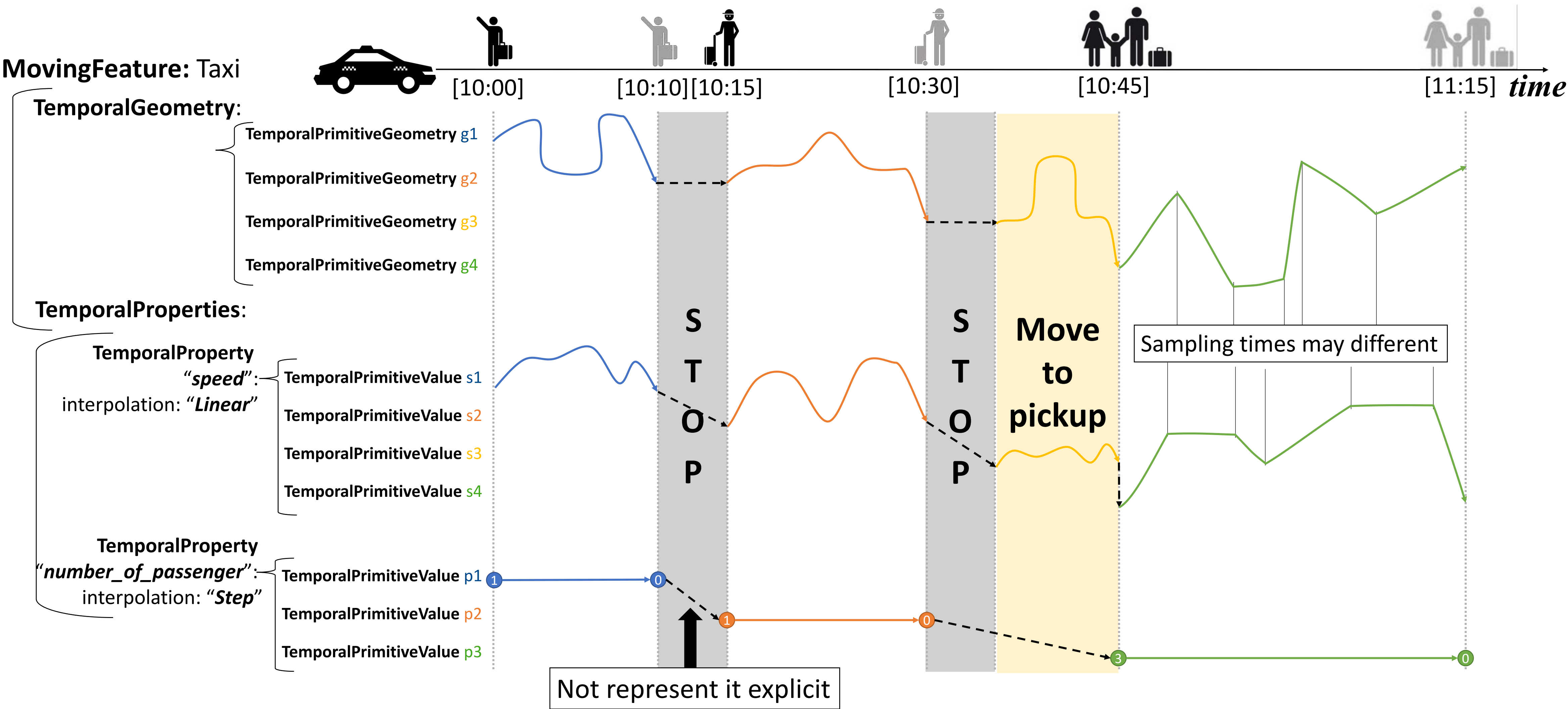


TemporalProperty B

Moving
Feature B

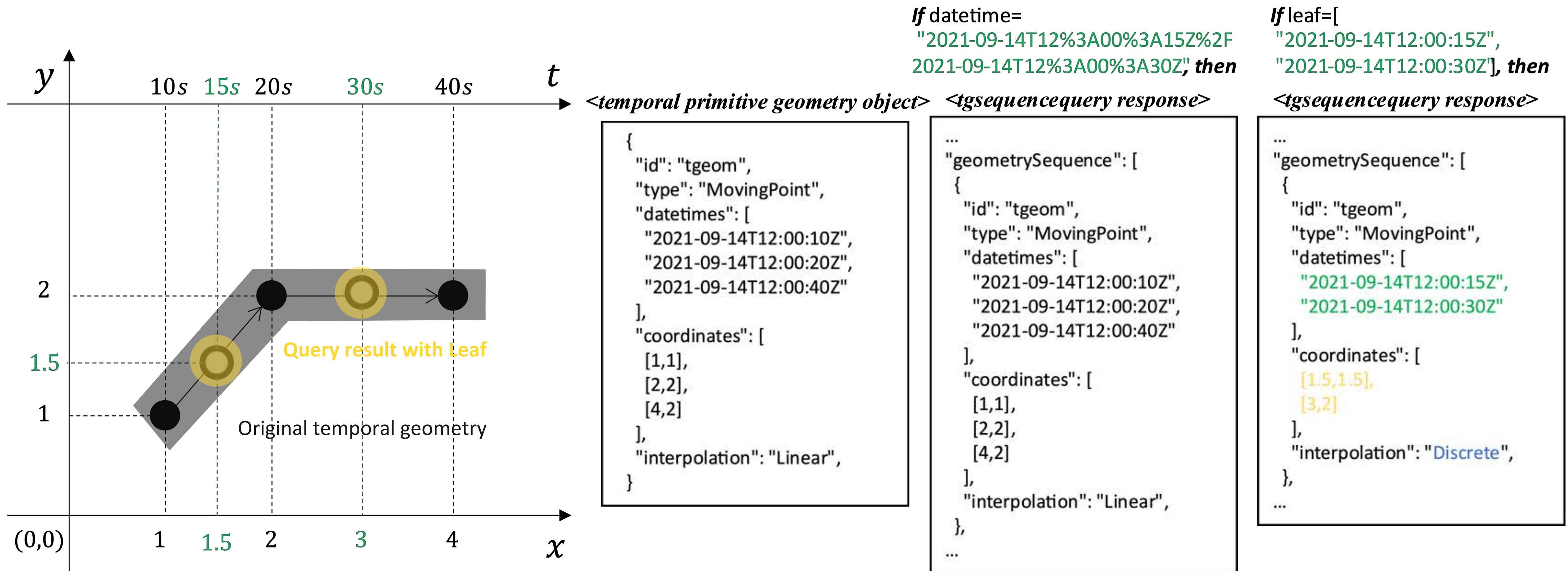


Example of Moving Feature



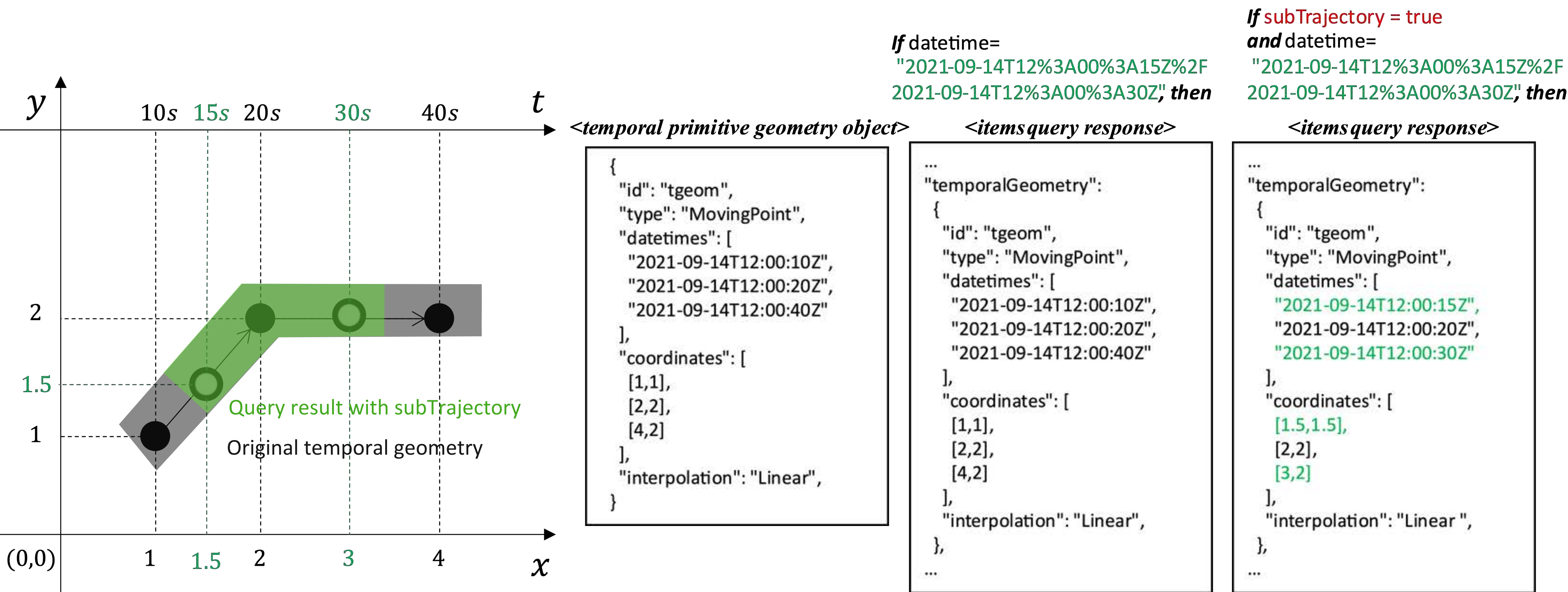
leaf Parameter

- The parameter leaf can be used in the HTTP GET operation of **TemporalGeometrySequence** and **TemporalProperty**
 - leaf is a sequence of date-time strings (i.e., an array of date-time strings).
 - Implements **pointAtTime** operation in the [OGC Moving Feature Access standard](#)



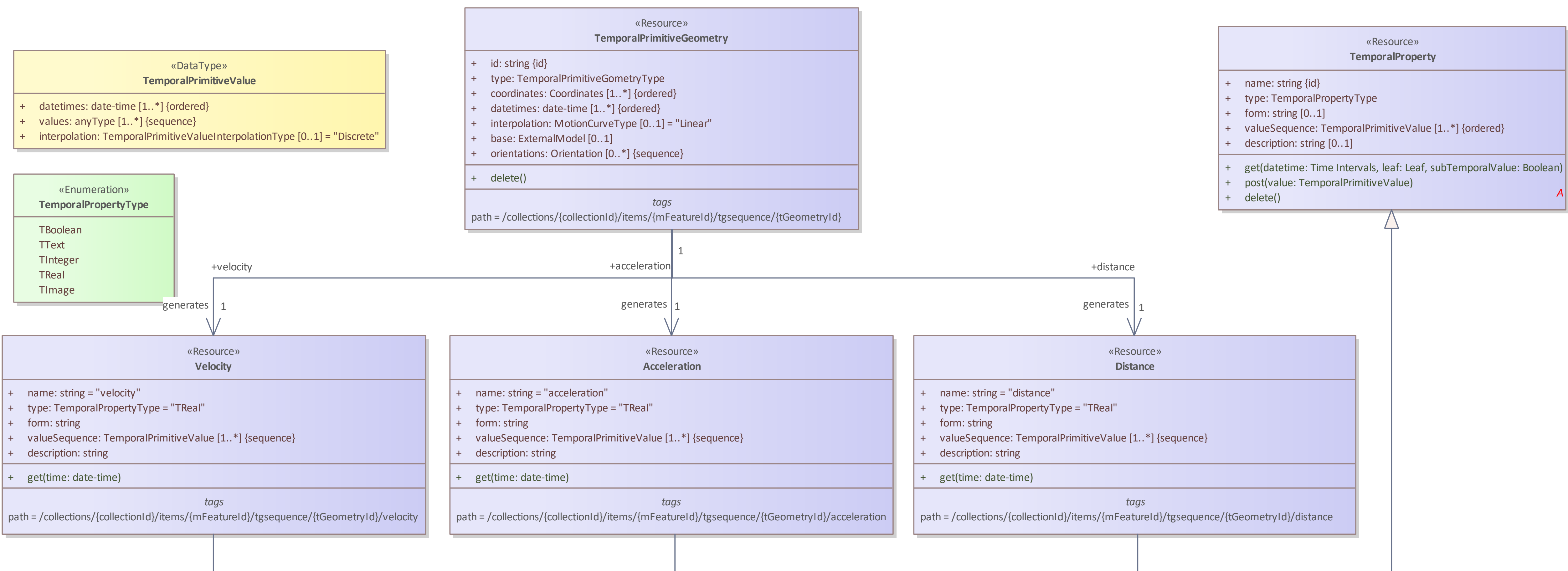
subTrajectory (and subTemporalValue) Parameter

- The parameter 'subTrajectory' can be used in the HTTP GET operation of **MovingFeatures** and **TemporalGeometrySequence**
 - 'subTrajectory' is a Boolean. A specified time interval is derived from the 'datetime' parameter.
 - Implements *subTrajectory* operation in the [OGC Moving Feature Access standard](#).
 - Similarly, for **TemporalProperties**, there is a 'subTemporalValue' parameter.



Resources for Temporal Geometry Query

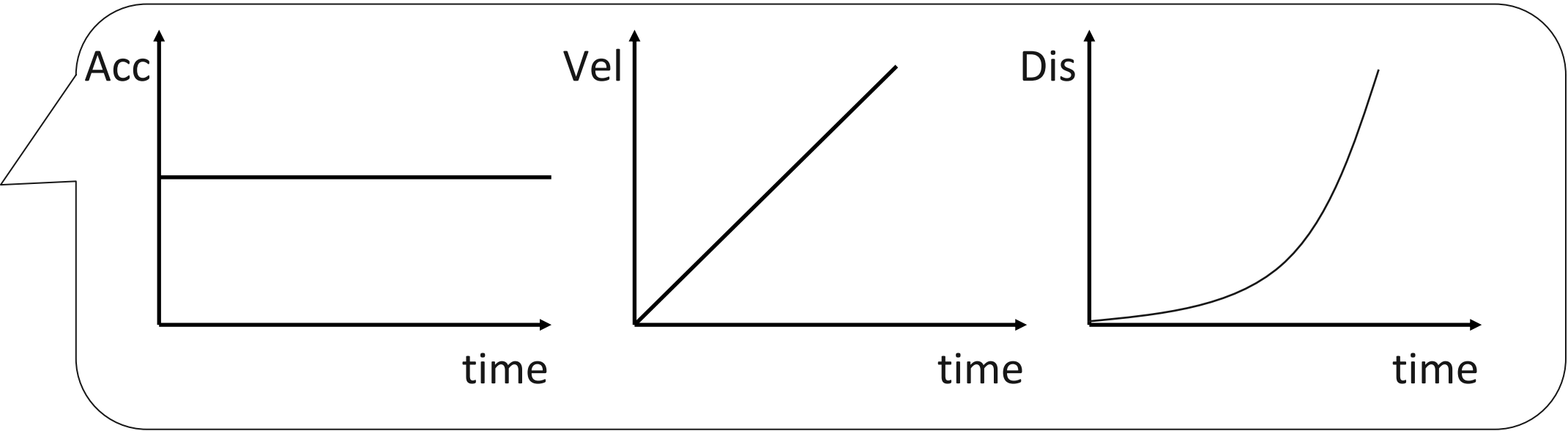
- Distance, Velocity, and Acceleration resources support only HTTP GET operation
 - A type of TemporalProperty with a specified type of value
 - The response schema is TemporalProperties in MF-JSON



Examples with Queries

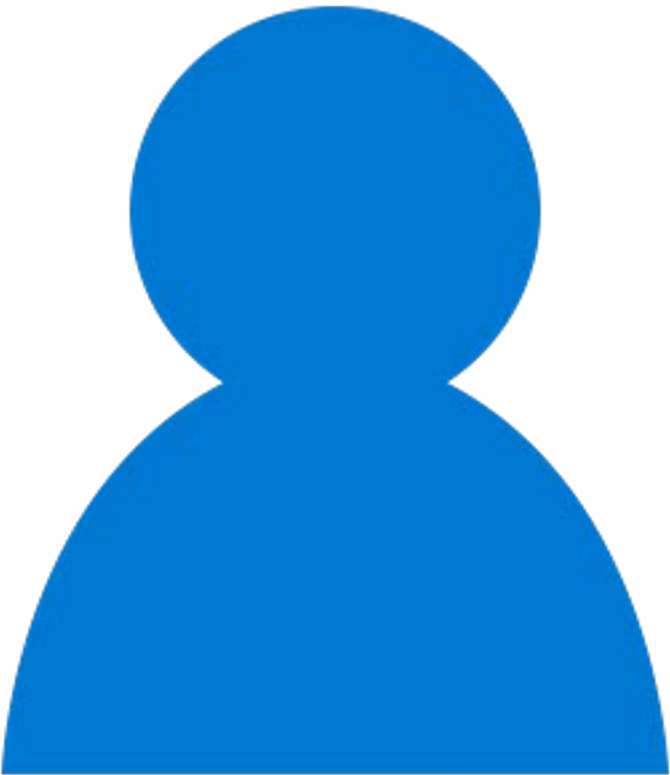
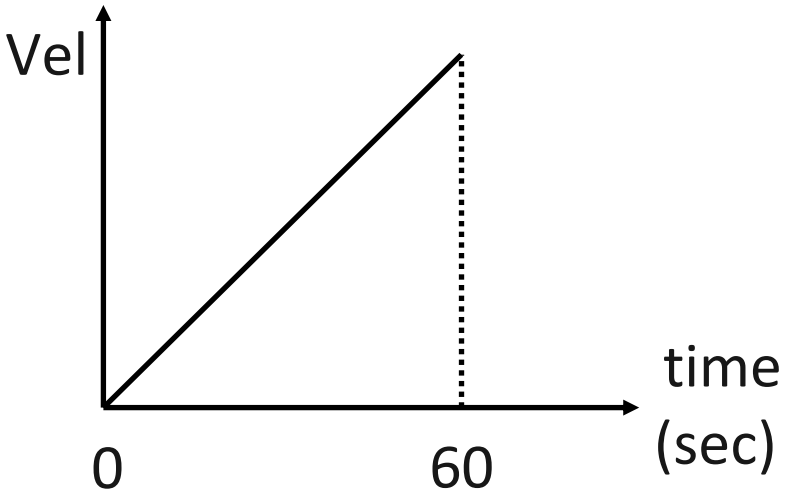


collectionId: col-1
mFeatureId: mf-1
tGeometryId: tg-1



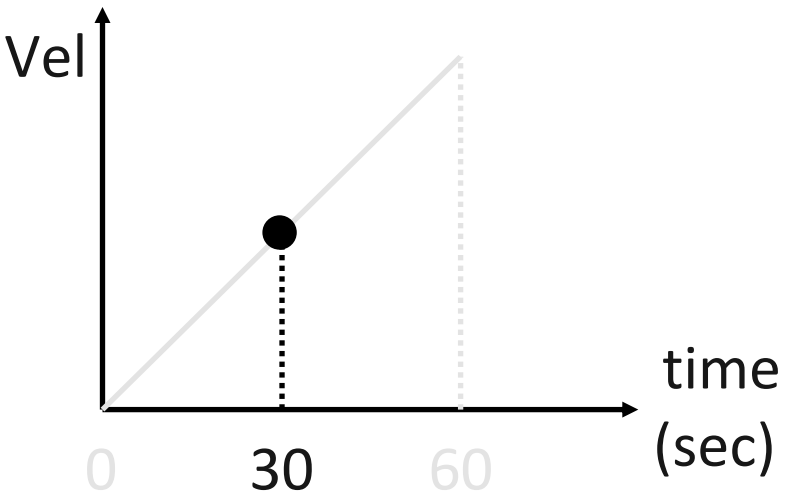
GET
/collections/col-1/items/mf-1
/tgsequence/tg-1/velocity

```
{  
  "temporalproperties": [  
    {  
      "datetimes": [  
        "2022-11-01T10:00:00Z",  
        "2022-11-01T10:01:00Z"],  
      "velocity": {  
        "type": "Measure",  
        "form": "KMH",  
        "values": [0.0, 100.0],  
        "interpolation": "Linear"  
      }  
    }  
  ]  
}
```



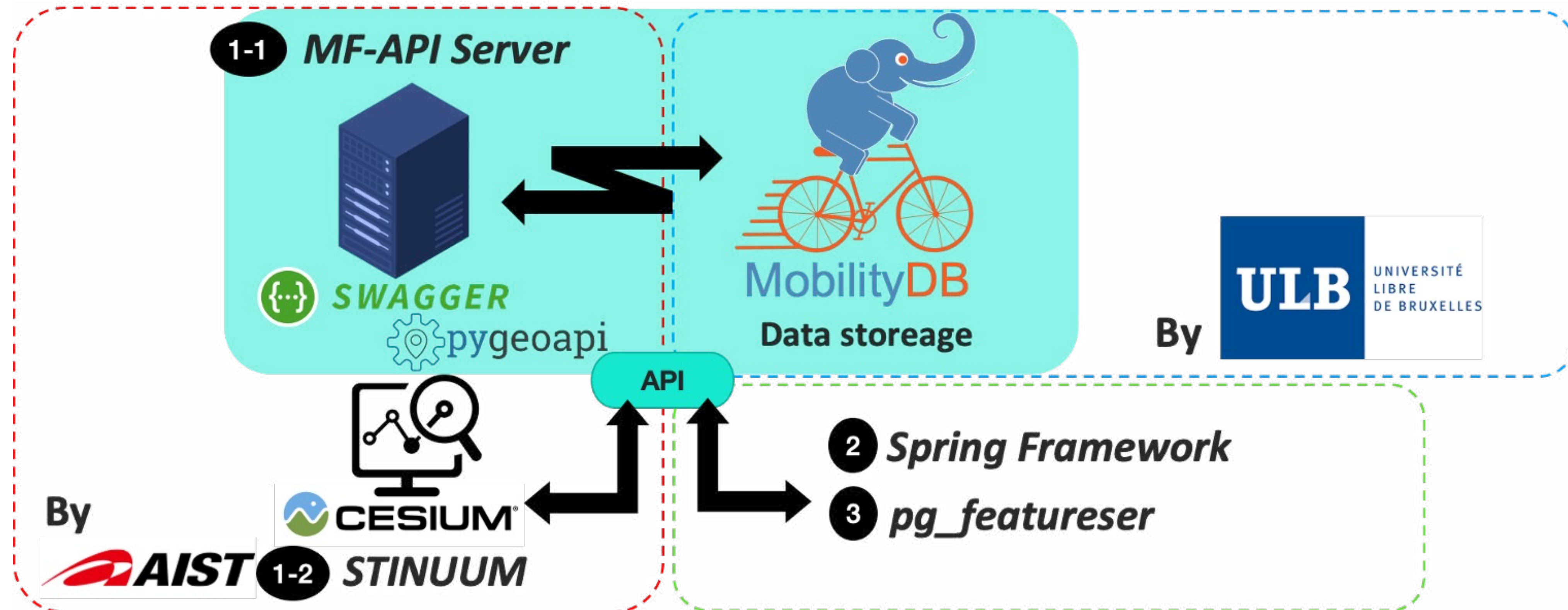
GET
/collections/col-1/items/mf-1
/tgsequence/tg-1/velocity
?datetime="2022-11-01T10:00:30"

```
{  
  "temporalproperties": [  
    {  
      "datetimes": [  
        "2022-11-01T10:00:30Z"],  
      "velocity": {  
        "type": "Measure",  
        "form": "KMH",  
        "values": [50.0],  
        "interpolation": "Discrete"  
      }  
    }  
  ]  
}
```



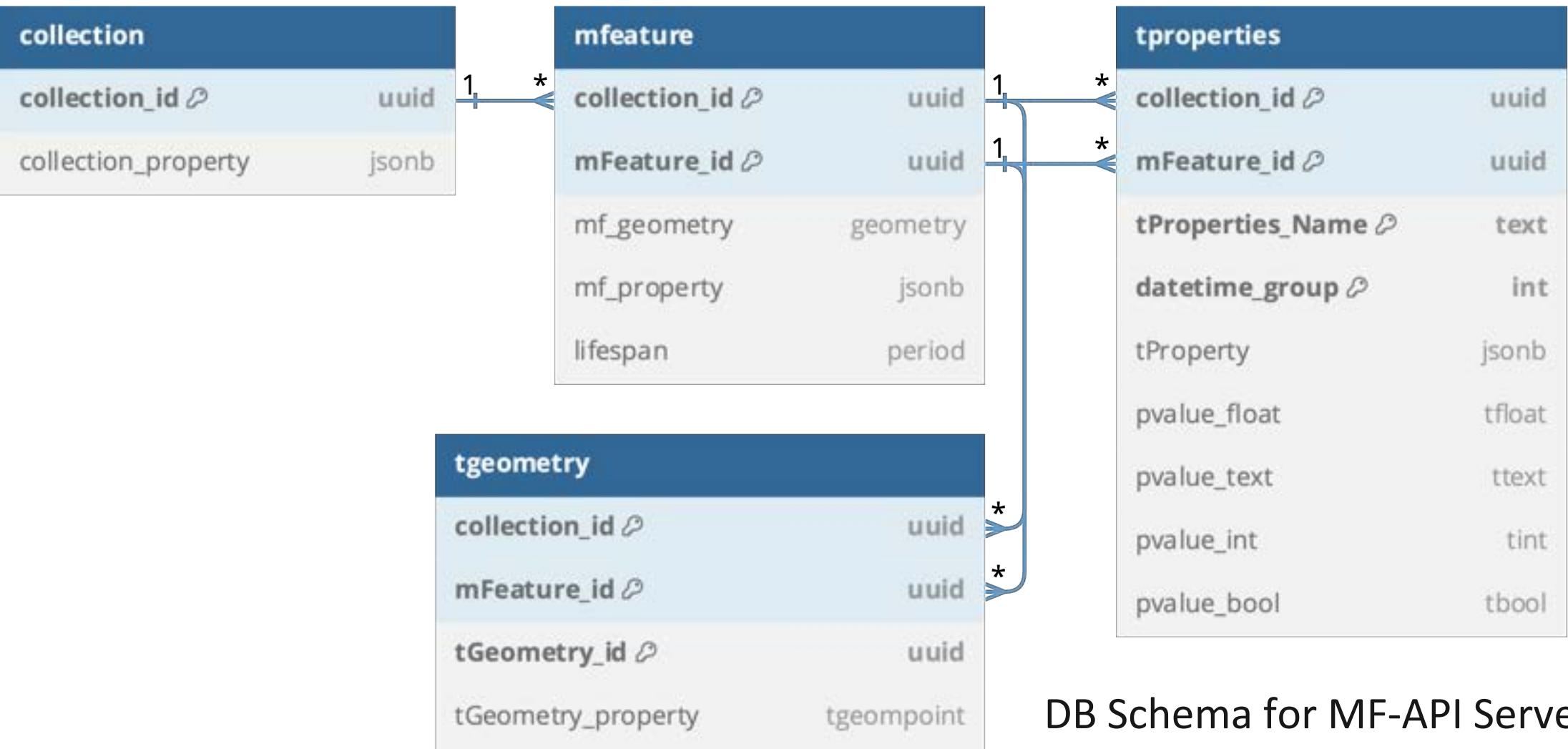
Implementations for OGC API-MF

- MF API-Server (Opensource): implement using **Swagger** and **pygeoapi**
 - <https://github.com/aistairc/mf-api>
 - Using **MobilityDB** (and **PyMEOS**) for data storage (in MF-JSON format).



MF-API Server

- <https://github.com/aistairc/mf-api>
- Implement mandatory functionality for OGC API-MF
- Easily test OGC API-MF with Swagger



DB Schema for MF-API Server

The image shows the Swagger UI for the "Building Blocks specified in OGC API - Moving Features - Part 1: Core" API. The interface includes the Swagger logo, the API title, a version indicator (0.1.0 OAS 3.0), and a URL (http://localhost:8085/openapi?f=json). It provides a description of the API and links to the OGC Moving Features SWG and OGC License.

Capabilities Essential characteristics of the information available from the API.

- GET** / Landing page
- GET** /conformance Information about specifications that this API conforms to
- GET** /api API definition
- GET** /collections Retrieve catalogs of moving features collection

MovingFeatureCollection Collections of moving features to be logically managed by a user.

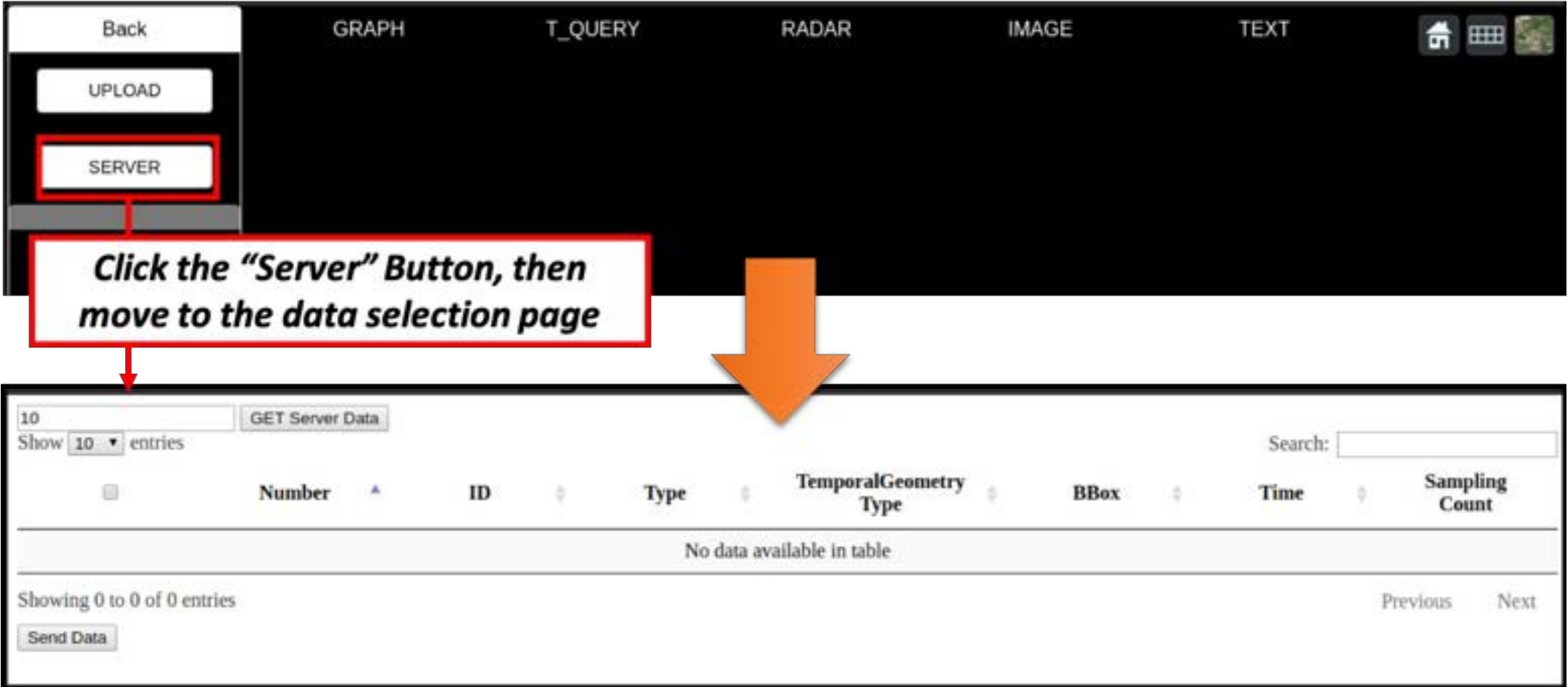
- POST** /collections Register metadata about a collection of moving features
- GET** /collections/{collectionId} Access metadata about the collection
- DELETE** /collections/{collectionId} Delete the collection
- PUT** /collections/{collectionId} Replace metadata about the collection

MovingFeatures Moving feature data, including the temporal geometry, temporal properties, etc.

- GET** /collections/{collectionId}/items Retrieve moving feature collection
- POST** /collections/{collectionId}/items Insert moving features
- GET** /collections/{collectionId}/items/{mFeatureId} Access the static data of the moving feature
- DELETE** /collections/{collectionId}/items/{mFeatureId} Delete a single moving feature

STINUUM with MF-API Server

- We modified STINUUM for using MF-API server
(Visualization tool for MF-JSON encoding)
- https://github.com/aistairc/mf-cesium/tree/mf-cesium_api



Number	ID	Type	TemporalGeometry Type	BBox	Time	Sampling Count
0	20191206	Feature	Point	[139.77967514, 35.619145201, 139.77967514, 35.619145201]	2019-12-06T00:00:00+09:00/2019-12-06T00:00:00+09:00	10
1	T0005	Feature	Point	[138.35, 1.138, 35.1]	2020-01-01T00:00:00+09:00/2020-01-01T00:00:00+09:00	10
2	T0017	Feature	Point	[138.35, 1.138, 35.1]	2020-01-01T00:00:00+09:00/2020-01-01T00:00:00+09:00	10
3	T0005	Feature	Point	[138.35, 1.138, 35.1]	2020-01-01T00:00:00+09:00/2020-01-01T00:00:00+09:00	10
4	T0041	Feature	Point	[138.35, 1.138, 35.1]	2020-01-01T00:00:00+09:00/2020-01-01T00:00:00+09:00	10
5	d-vn4	Feature	Point	[138.35, 1.138, 35.1]	2020-01-01T00:00:00+09:00/2020-01-01T00:00:00+09:00	10
6	20200106	Feature	Point	[139.77967514, 35.619145201, 139.77967514, 35.619145201]	2020-01-06T00:00:00+09:00/2020-01-06T00:00:00+09:00	10
7	20191125	Feature	Point	[140.00632322, 35.64540000, 140.00632322, 35.64540000]	2019-11-25T00:00:00+09:00/2019-11-25T00:00:00+09:00	10
8	T00002	Feature	Point	[138.35, 1.138, 35.1]	2020-01-01T00:00:00+09:00/2020-01-01T00:00:00+09:00	10
9	T0002	Feature	Point	[138.35, 1.138, 35.1]	2020-01-01T00:00:00+09:00/2020-01-01T00:00:00+09:00	10

Showing 1 to 10 of 10 entries
Send Data
Previous Next

Result of getting MF-Collection



New OGC API-Moving Features implementation!

- **iCity 3D Urban Data Platform:** a local government project in Munakata city in Fukuoka Japan, with HFT Stuttgart Prof. Volker Coors and Joe
- For the OGC API – Moving Features service:
 - The service is available at: http://ogcapi.hft-stuttgart.de/ogc_api_moving_features
 - All collections (currently only 1 sample route):
 - http://ogcapi.hft-stuttgart.de/ogc_api_moving_features/collections
 - The Sample Bus Route Collection:
 - http://ogcapi.hft-Stuttgart.de/ogc_api_moving_features/collections/bus_1
 - The Sample Bus Route Moving Feature item:
 - http://ogcapi.hft-stuttgart.de/ogc_api_moving_features/collections/bus_1/items
- The current implementation of OGC API Moving Features only supports GET operation. The POST PUT or DELETE operations will be added to the service later.

More Detailed Information

- Please check our GitHub projects and other resources
 - <https://github.com/opengeospatial/ogcapi-movingfeatures>
 - <https://github.com/opengeospatial/mf-swg>
 - https://github.com/opengeospatial/mf-swg/tree/main/workshop/FOSS4G_Asia_2023
 - https://opengeospatial.github.io/mf-swg/codesprint/2024_joint_ogc_osgeo_asf_code_sprint/
- If you have any questions or suggestions:
 - Make a new issue on our GitHub project!

OGC API - MovingFeatures Server (MF-API Server)

MF-API Server is an open-source Python server implementation of the [OGC API – MovingFeatures](#) with [pygeoapi](#) and [MobilityDB](#).

[OGC API – MovingFeatures](#) (OGC API – MF) provides a uniform way to access, communicate, and manage data about moving features across different applications, data providers, and data consumers. It includes operations for filtering, sorting, and aggregating moving feature data based on location, time, and other properties. MF-API Server implements a standard interface which is defined in the OGC API – MovingFeatures – Part 1:Core. The summary of the supported API is described in the below table.

2024 Joint OGC – OSGeo – ASF Code Sprint, OGC API – Moving Features Activity

Public repository of the OGC Moving Feature Standard Working Group (Moving Features SWG).

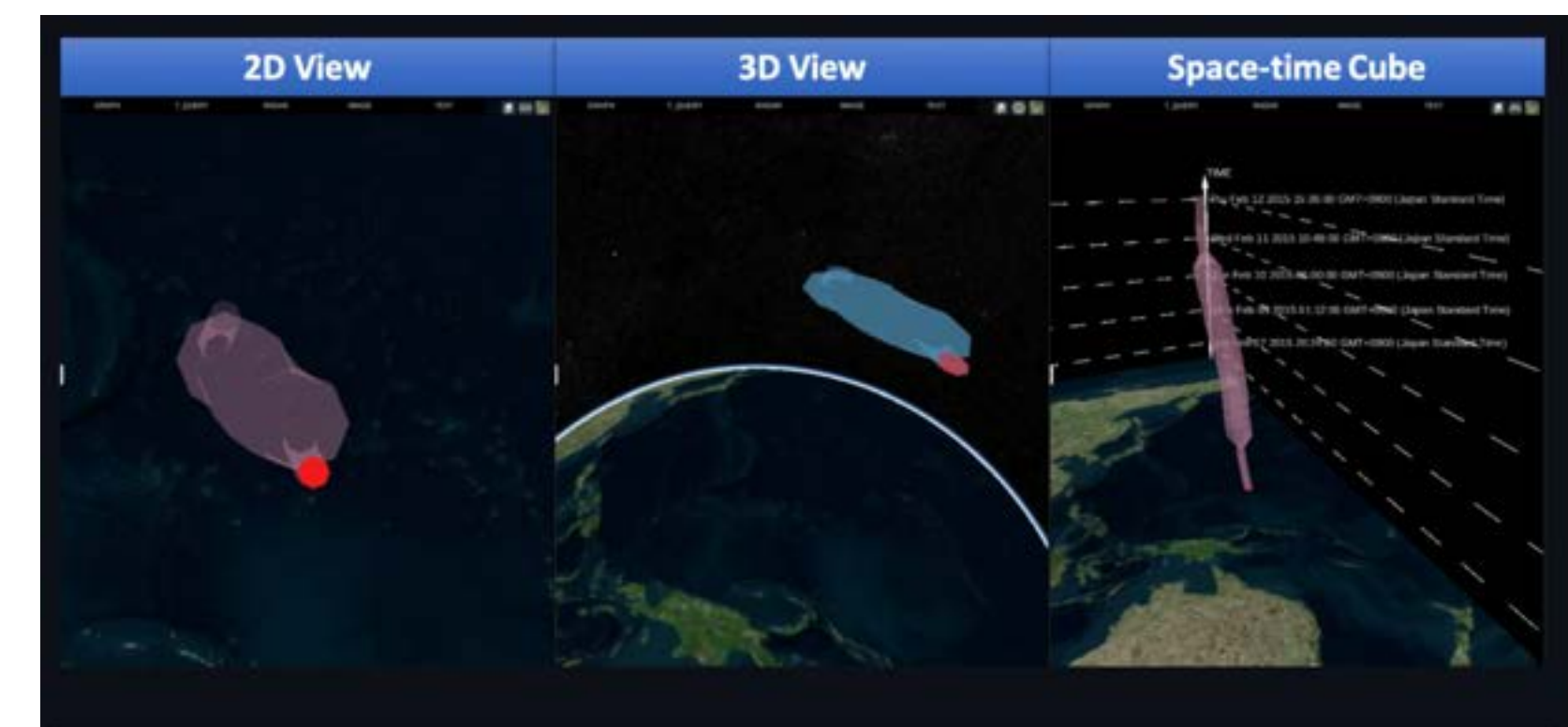
[View on GitHub](#)

2024 Joint OGC – OSGeo – ASF Code Sprint, OGC API – Moving Features Activity

Overview

The OGC Moving Features SWG will participate in the 2024 Joint OGC – OSGeo – ASF Code Sprint (2024 Feb. 26 - 29)

Screenshot



Request of an electronic vote

- The Moving Features SWG recommends that the OGC Technical Committee approve an electronic vote to approve release of 22-003r3 “OGC API - Moving Features - Part 1: Core” as an OGC Standard.
- There was no objection to unanimous consent



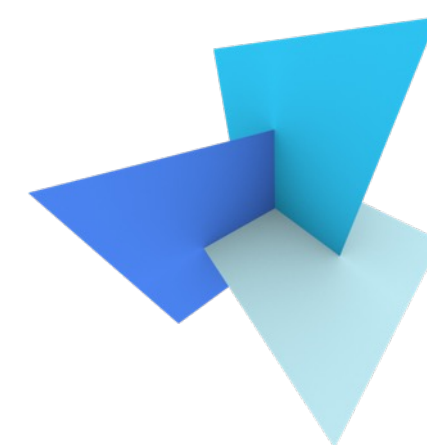
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MetOcean DWG

The 128th OGC Member Meeting

Steve Olson, NOAA
28 March 2024

Meeting Sponsors

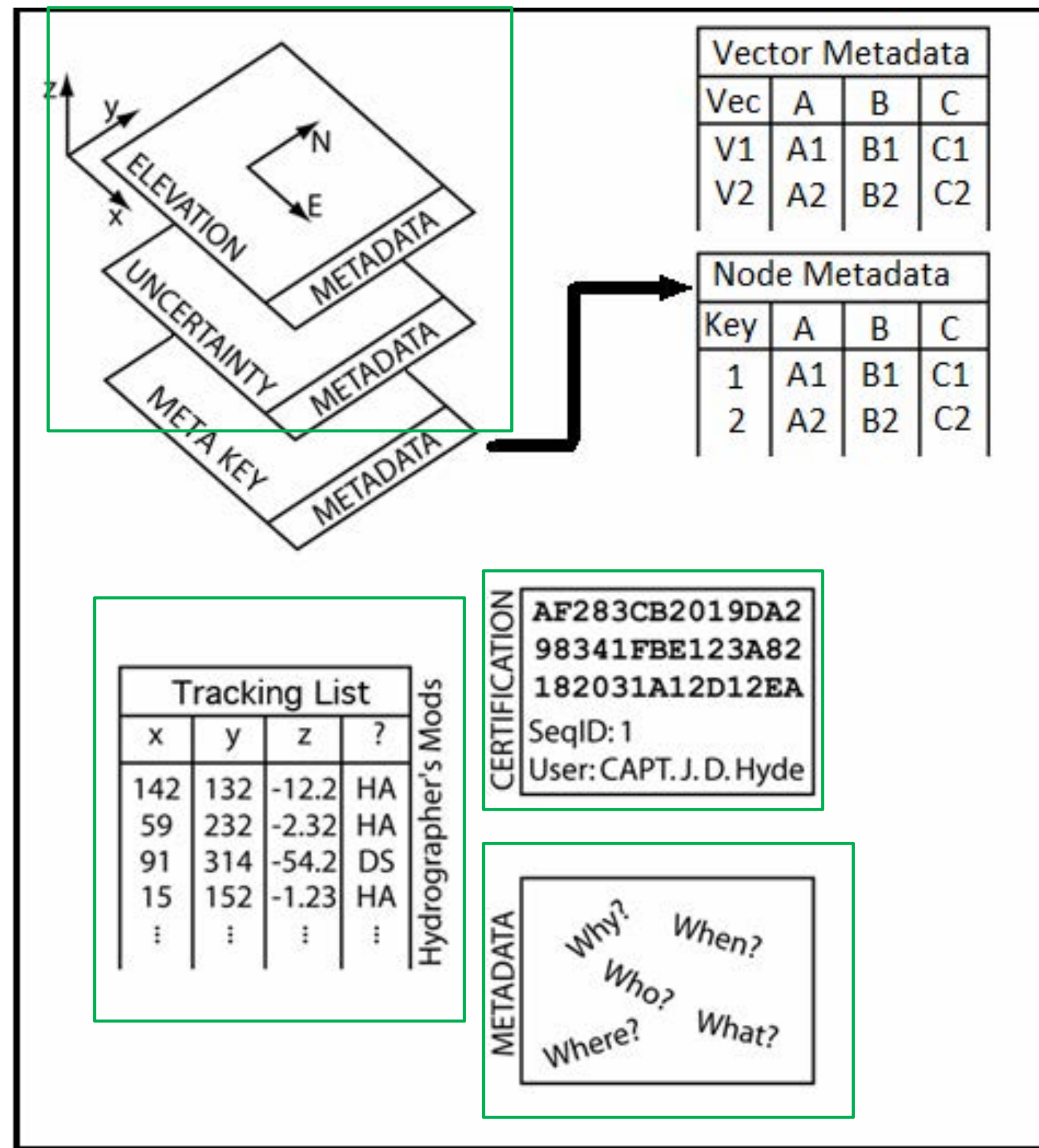


The most important thing for this WG is...

Adoption of Bathymetric Attributed Grid (BAG) as an OGC Community Standard

The BAG specification has been in use for conveying and archiving bathymetry, uncertainty, and metadata by a number of Hydrographic Offices for close to 20 years, including by U.S. National Oceanic and Atmospheric Administration (NOAA) Office of Coast Survey, the US Naval Oceanographic Office, the UK Hydrographic Office, and many others. The format is also used by academic partners around the world.

BAG Specification (<https://bag.readthedocs.io/>)



Important Navigational Contexts:

- Depth
- Uncertainty
- Lineage of information

BAG format:

- HDF5 structure
- Reference library on GitHub
- Read and limited write capability in GDAL





BAG value

... to the Hydrographic Community

- An open raster format for communicating Bathymetry and its associated quality metrics
- The Open Navigation Surface community's tool for finding new and better ways to communicate bathymetry.

... to NOAA

- An open format for sharing data with the public
- An open format for archiving past surveys
- BAG 1.6 added variable resolution, which is a collection of smaller rasters that nest together

BAG as an OGC Community Standard

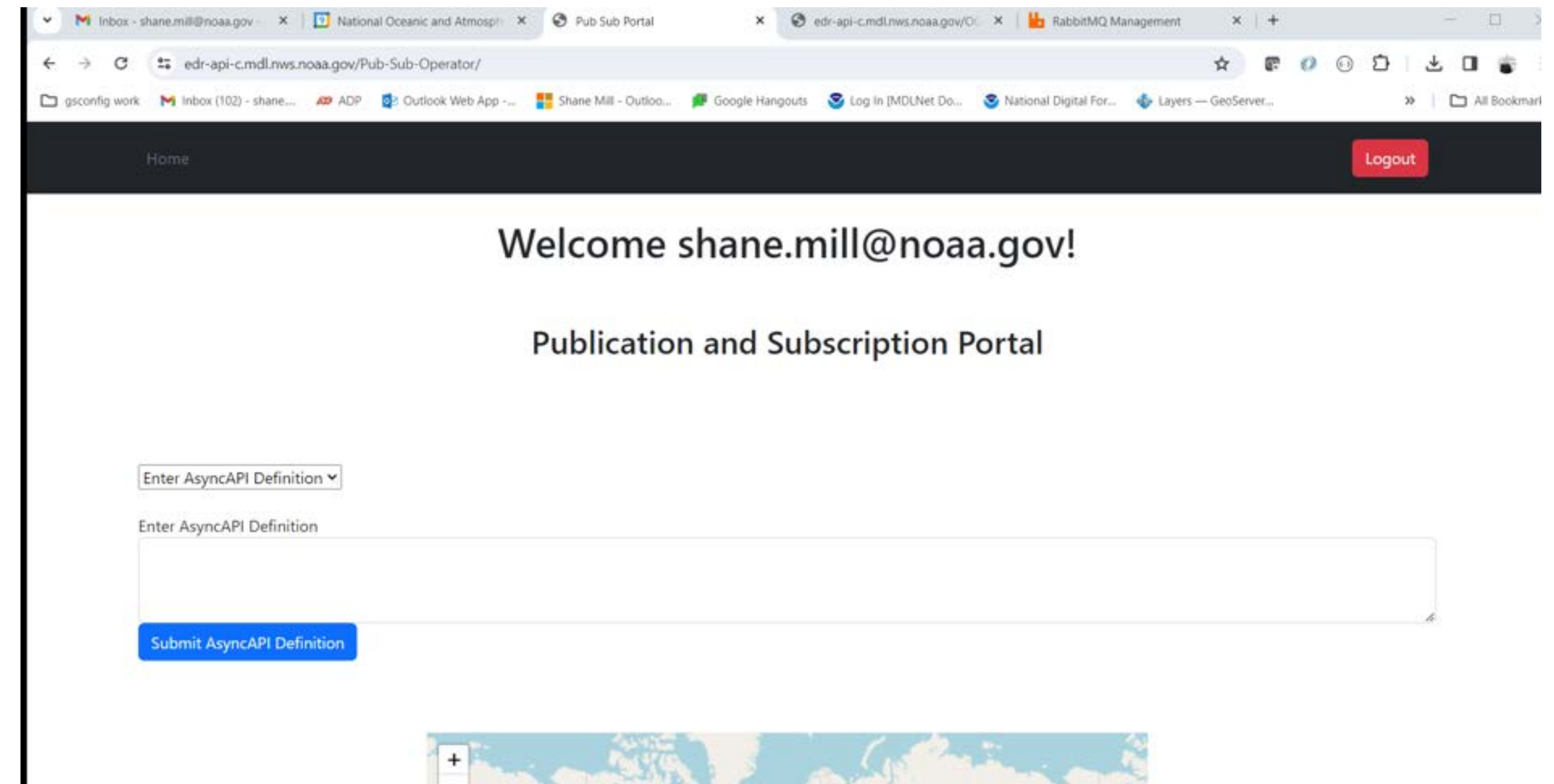
Public Access:

- BAG data is not as Findable, **Accessible**, **Interoperable**, or **Reusable** (FAIR) as it could be for the public.
- BAG as an OGC community standard raises the FAIR quality of the BAG format and data, as well as the efforts of the Open Navigation Surface Working Group to support the bathymetry community.



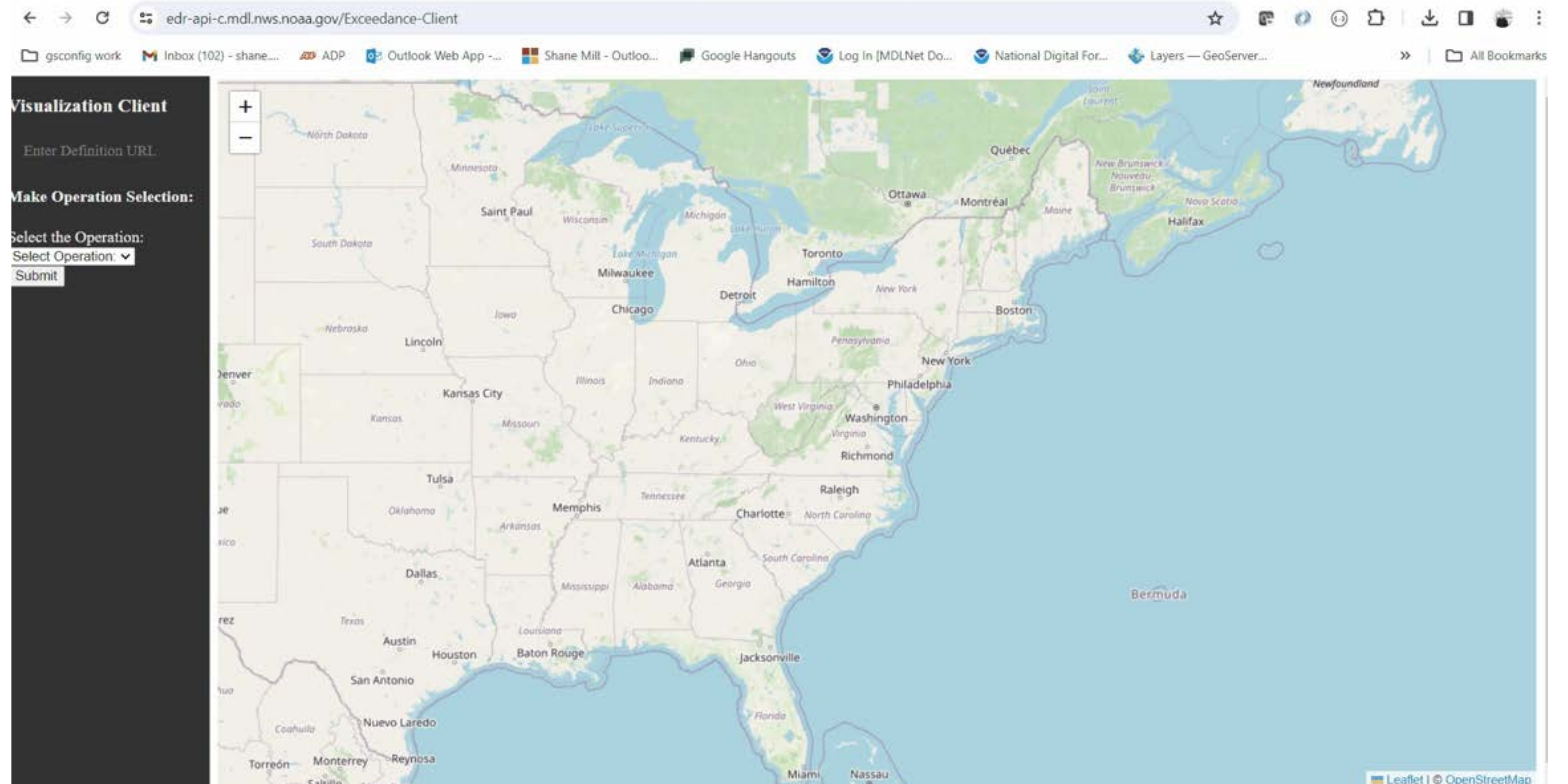
What we talked about this week

- OGC API-EDR: Part 2- Publication/Subscription
- Future work with CoverageJSON
- Future OGC API-EDR work (querying multiple locations, Add capability to advertise the EDR profile supported by a service)
- Presentations on BAG, Rodeo, Do we need a new standard for visualizing the invisible?



What we talked about this week (cont'd)

- OGC API-EDR: Part 2- Publication/Subscription
- Future work with CoverageJSON
- Future OGC API-EDR work (querying multiple locations, Add capability to advertise the EDR profile supported by a service)
- Presentations on BAG, Rodeo, Do we need a new standard for visualizing the invisible?



Where we are headed in the coming year

- Greater coordination with global Met Centers with FAA SWIM requirement for publication/subscription service within the Aviation Community
- Support for EDR profiles
- Synergy/Linkage with OGC API-Records (metadata) and TimeSeriesML v2.0 with JSON encoding
- Greater linkage and connection with the oceans community

Next Quarter WG Communications Plan

- Coordination with API-Records and TimeSeriesML WGs
- Coordination with Pub/Sub SWG
- Montreal Members Meeting

Session Agenda

1. Welcome and Introductions - Chris Little and Steve Olson (5 mins)
2. Project Updates (15 mins)
 - a. OGC API-EDR (Chris Little) (5 mins)
 - b. CoverageJSON (Chris Little) (5 mins)
 - c. BAG as community standard (Glen Rice/Steve Olson) (5 mins)
3. Demonstrations (30 mins)
 - a. EDR API 1.2 Functionality (Mark B.) (10 mins)
 - b. QGIS Demo (Guy C.) (10 mins)
 - c. Product API Definition Demo (Steve O./Shane M.) (10 mins)
4. Presentations (30 mins)
 - a. Rodeo presentation by Mikko V. (FMI) (10 mins)
 - b. BAG presentation by Glen Rice (NOAA) (10 mins)
 - b. "Do we need a new standard for visualizing the invisible?" by Sanghee SHIN and Hakjoon KIM (Gaia3D) (10 mins)
5. Future Plans, Motions and AOB (10 mins)

Request of an electronic vote

- The MetOcean DWG recommends that the OGC Technical Committee approve an electronic vote to approve release of OGC document 24-000 [Bathymetric Attributed Grid Community Standard Work Item Justification](#) as an OGC Community Standard work item.
- There was no objection to unanimous consent



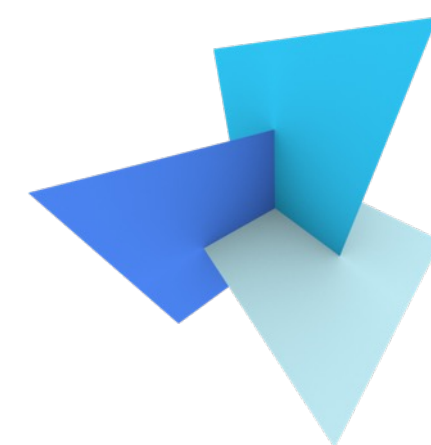
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MUDDI

The 128th OGC Member Meeting

Carsten Roensdorf, OS
28 March 2024

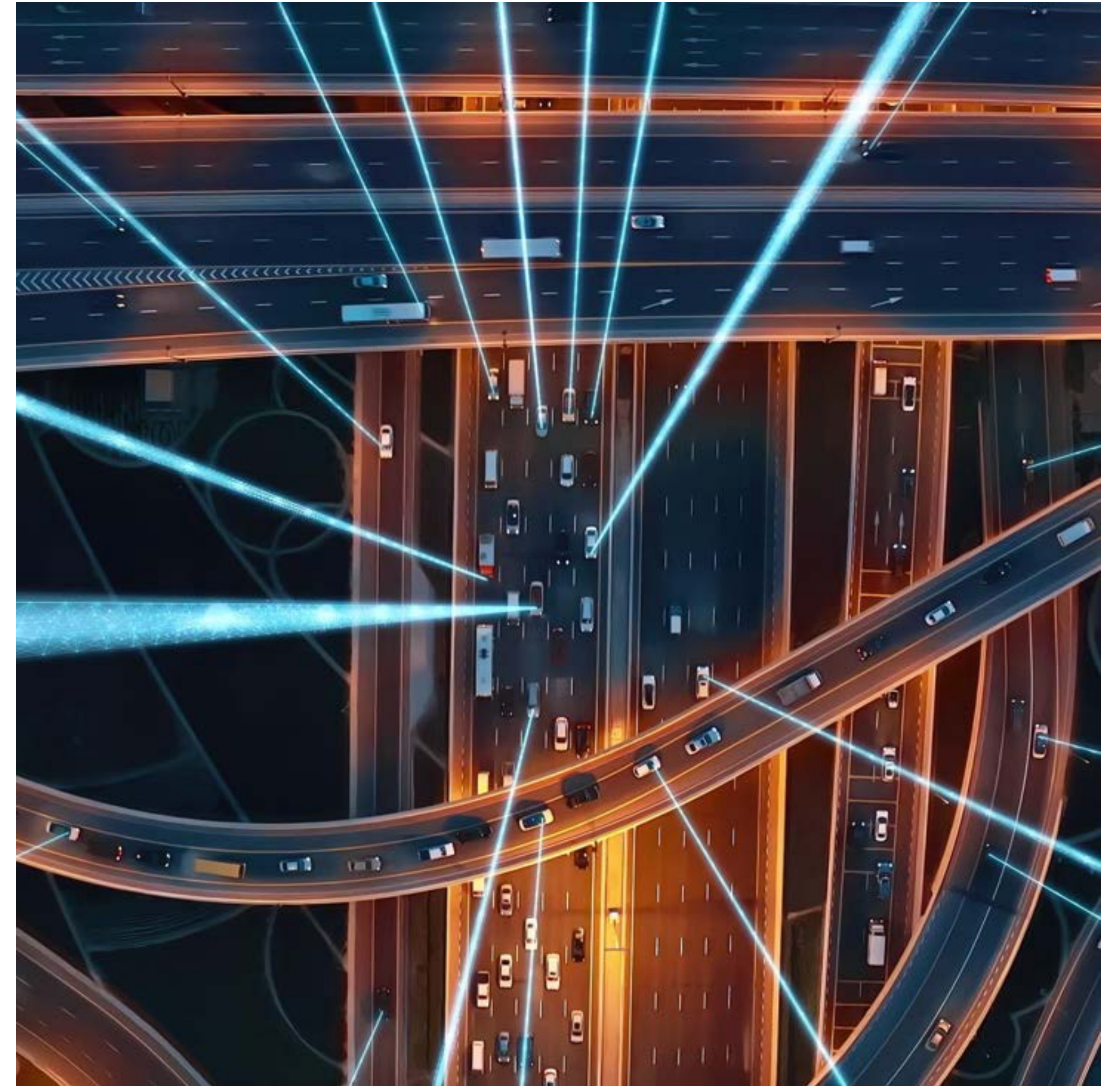
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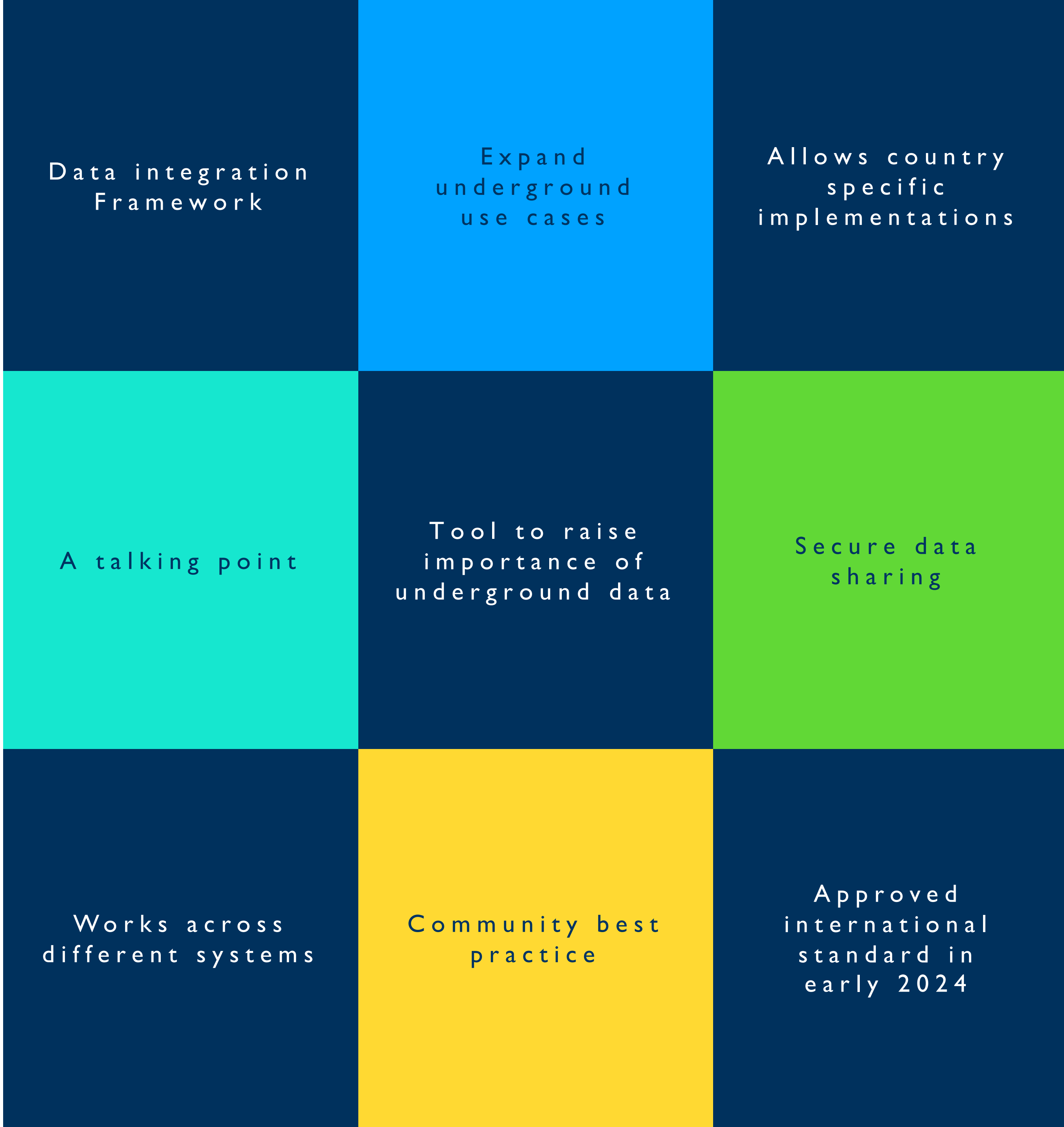


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Model For Underground Data Definition and Integration (MUDDI)



What is
MUDDI?



UK case study

Is there an issue with
underground infrastructure ?



Would it be better like this?

Layers

- ✓ Underground assets

-  Draw Polygon

- ☒ Observation

-  Draw Circle

- ☒ Water

- ☒ Sewer

- ☒ Electricity

- ☒ Gas

- ☒
- Rail

- ☒ Furniture (above ground)

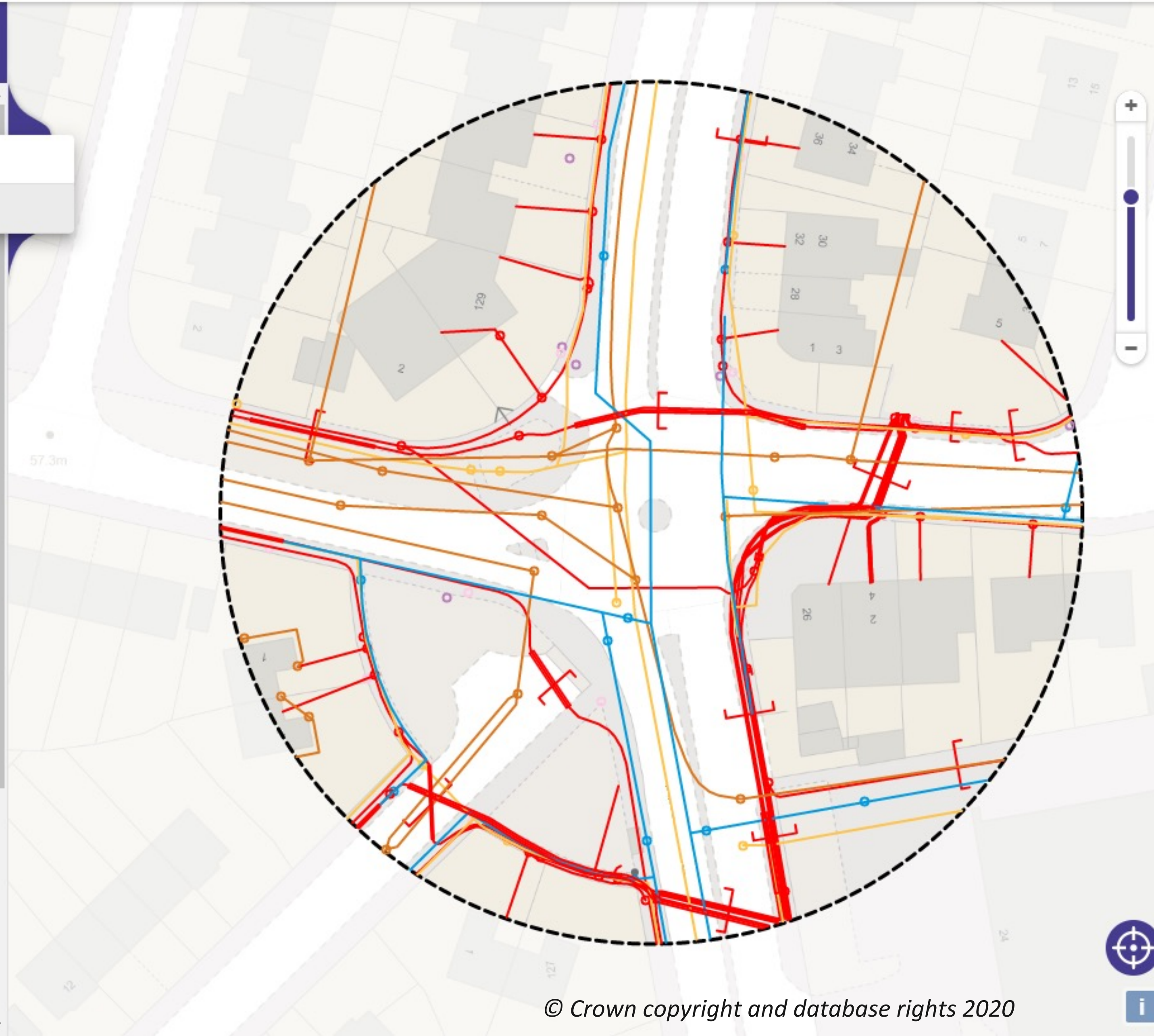
- ☒ Street Lighting

- ☒ Traffic Signal

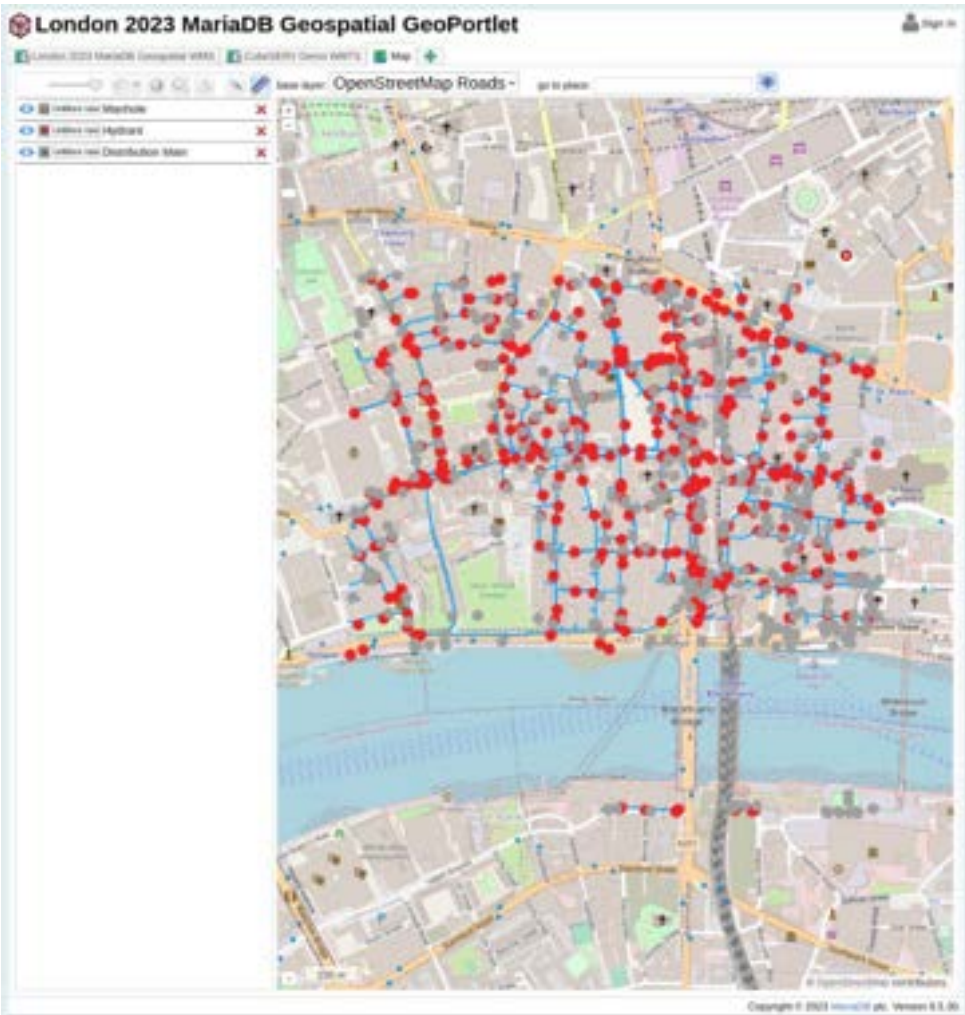
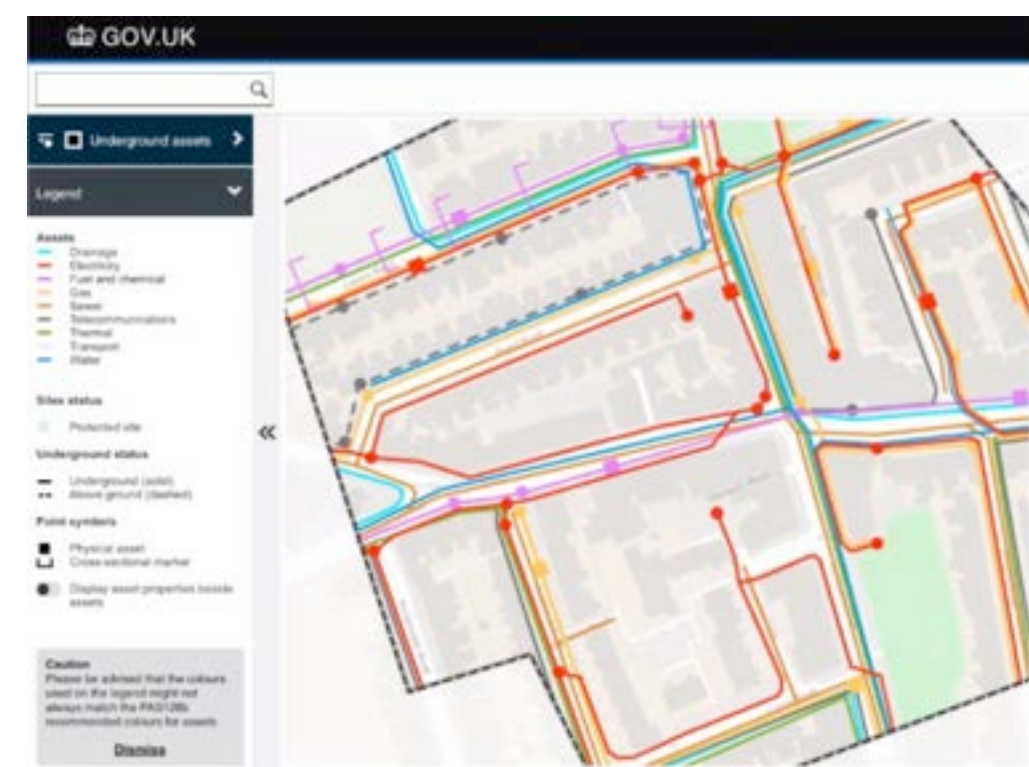
- ☒
- Illuminated Sign

- ☒ Furniture (in ground)

- ☒ **Manhole Cover**



MUDDI reference implementations



National Underground Asset Register

UK

Unification for Underground Resilience Measures

UNILIM

New York, US

OGC open standards
Code sprint
Oct 2023

Request of an electronic vote

- The MUDDI SWG recommends that the OGC Technical Committee approve an electronic vote to approve release of [OGC 23-024] “OGC Model for Underground Data Definition and Integration (MUDDI) Part 1: Conceptual Model” as an OGC Standard.
- There was no objection to unanimous consent



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Features API SWG

The 128th OGC Member Meeting

Clemens Portele,
interactive instruments
Panagiotis (Peter) Vretanos,
CubeWerx
28 March 2024

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What happened of Part 3 and CQL2?

- Public Review of Part 3 (including CQL2) from February to April 2021 (informally extended to June 2021 on request of some implementers)
- Common Query Language (CQL2) was moved to its own candidate standard after the Public Review
 - This was already anticipated in the Charter of the Features API SWG
- In March 2022 the SWG thought all comments had been resolved and presented both standards in the (last virtual) Closing Plenary → [Slides](#)
 - Then and over time new issues were raised mainly related to CQL2 from various new implementations that we thought should be discussed and resolved
 - ... and somehow that took two years
- There was no fundamental change in the two standards since March 2022
 - See the next slides for the main changes beside fixing bugs identified by implementers
 - We also had a discussion about extending CQL2 for non-boolean expressions → moved to future work

The main changes to Part 3

- The Queryables resource was moved to their own requirements class
- The Queryables requirements were updated based on the cross-SWG discussion with respect to schemas over the last year (see Part 5: Schemas)
- A new requirements class “Queryables as Query Parameters” was added to provide a link between the Queryables and the option in Part 1 to provide additional query parameters to filter on property values

The main changes to CQL2 (1/2)

- Updated CQL2 grammar to avoid left recursion
- Other improvements in the CQL2 BNF grammar, often without impact on the language
- Redesign of the CQL2 JSON encoding
- CQL2 Text and JSON requirements classes were reorganized
- Changed ENVELOPE to BBOX
- Added GEOMETRYCOLLECTION as a spatial literal
- Restricted “Basic Spatial Functions” to BBOX and POINT
- Added “Basic Spatial Functions with additional Spatial Literals” requirements class that adds support for the other Simple Feature spatial data types (LINESTRING, POLYGON, etc.)

The main changes to CQL2 (2/2)

- The rules for characters, CASEI() and ACCENTI() were clarified as good as we could
 - Unicode is very complex and not well documented...
- Spatial, temporal and array “operators” are now called “functions” and use the same syntax as custom functions, also in CQL2 JSON
- Clarifications and terminology improvements based on implementer feedback and questions
- Array literals are now written with parentheses as delimiters instead of square brackets
- Updated Abstract Test Suite with a significant number of test cases against a test dataset to support automated tests by implementations

New document versions since the 3-week-rule

- New documents were uploaded to pending this week as a result of last-minute comments. Changes to the documents are:
- Part 3
 - Changed requirement for a Link HTTP header to a recommendation (to align with the related recommendation in Part 1)
- CQL2
 - Updates to BNF grammar and JSON Schema to fix issues in these artefacts (no impact on existing implementations)
 - Fix AsciiDoc issues
 - Updated the title of a requirements class
 - Fixes in the Abstract Test Suite

Request of an electronic vote

- The Features API SWG recommends that the OGC Technical Committee approve an electronic vote to approve release of OGC 19-079r2 “OGC API - Features - Part 3: Filtering” and OGC 21-065r1 “Common Query Language (CQL2)” as OGC Adopted Standards.
- There was no objection to unanimous consent

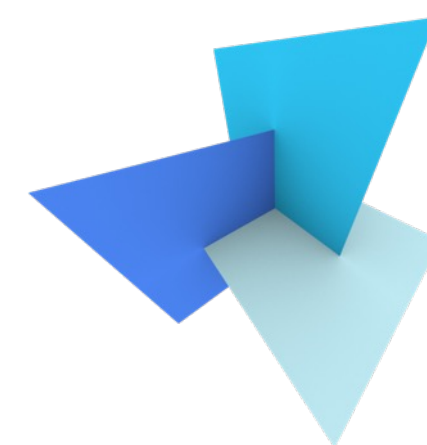


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Abstract Specification Topic 1: Spatial Schema

The 128th OGC Member Meeting

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Scott Simmons, OGC
28 March 2024

A little history

- Abstract Spec Topic 1 has historically been ISO 19107 Geographic Information - Spatial Schema
- At last (ISO equivalent) approval, this Topic was ISO 19107:2003
- Under the work of the Simple Features SWG, a new, harmonizing effort began to build a multipart Standard that covered spatial schema, the general feature model, and Simple Features
 - Part 1 of this work, [OGC 17-087r13] *“Features and geometry – Part 1: Feature Models”* was approved by OGC in 2019 to be the first portion of this rework and thus a part of Topic 1... in the process, we dropped 19107
 - But Part 1 does not supersede ISO 19107, it supplements
 - And ISO 19107 has since been updated

The proposal

- We still need ISO 19107 as we need the foundational spatial schema concepts
- There is value in [OGC 17-087r13] *“Features and geometry – Part 1: Feature Models”*
- Thus, the OAB has suggested that we bring back ISO 19107, but while we are at it, use the most recent version, ISO 19107:2019
- And retain OGC 17-087r13 as a Part of this Topic
- Note: no comments on this proposal were received during the public comment period

Request of an electronic vote

- The OGC Architecture Board recommends that the OGC Technical Committee approve an electronic vote to approve release of ISO 19107:2019 “Geographic Information - Spatial Schema” as OGC Abstract Specification Topic 1, Part 0.
- There was no objection to unanimous consent

ISO GDF and OGC

Formation of an OGC SWG for GDF

28th March 2024

About GDF...

Geographic Data Files (GDF) is the ISO standard for the exchange of data between geographic databases providing the basic map data (road networks and features) used for navigation

- The latest edition (20524) provides support (Part 2) automated driving systems, Cooperative ITS, and multi-modal transport
- Up to 2011 there was very strong participation from commercial actors in earlier versions
- Developed in the Intelligent Transport Systems Technical Committees of ISO (TC204) and CEN (TC278)
- Data model of concepts, and relationships, features library, (and encoding formats)

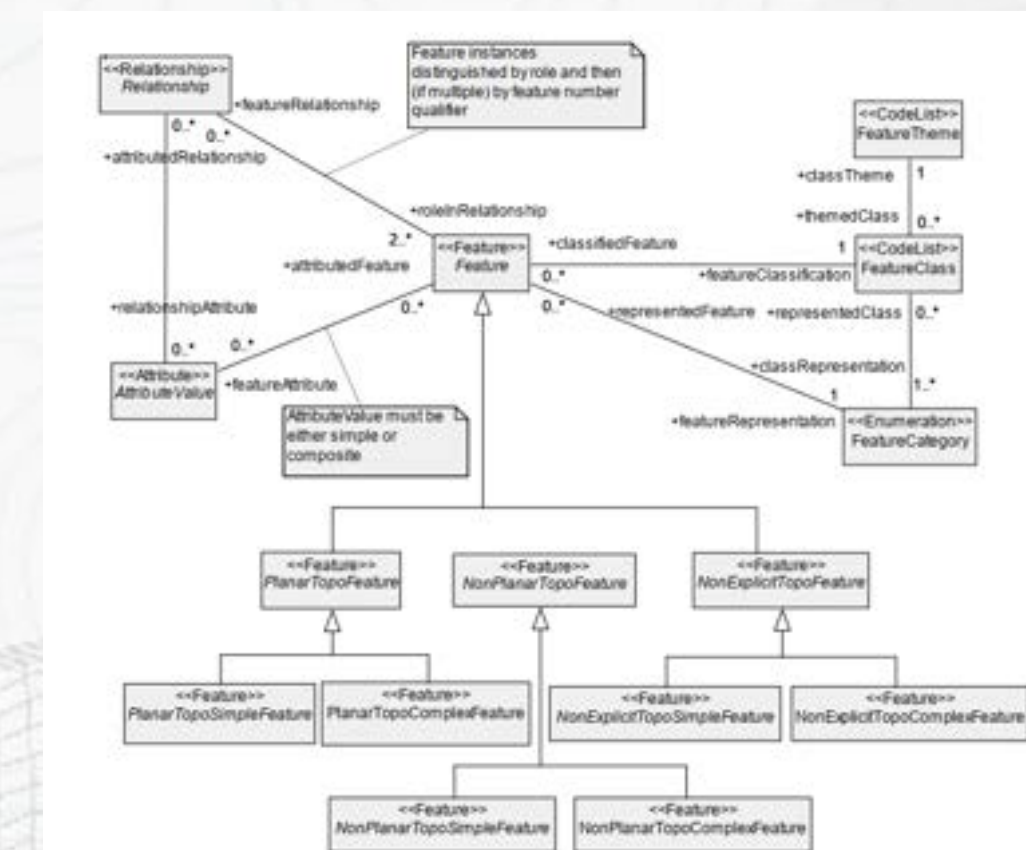
Initially developed in Europe/CEN

CEN and ISO
ENV ISO 14825: 1996

EN ISO 14825: 2004

EN ISO 14825: 2011

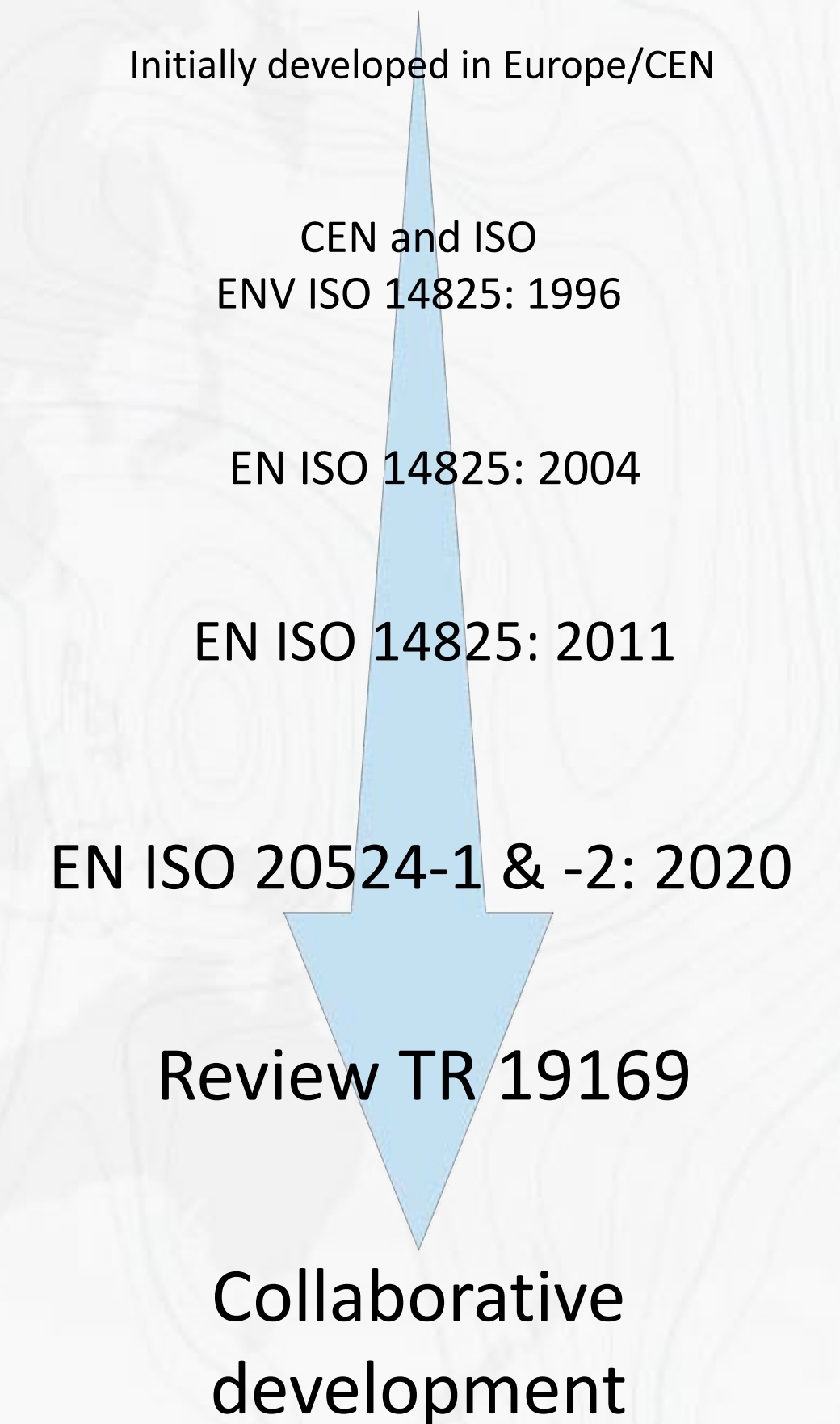
EN ISO 20524-1 & -2: 2020



More recent developments

Collaborative work with the ISO TC for Geographic Information Systems/Geomatics (TC 211) generated a Technical Report (ISO TR 19169) on bringing GDF more in line with mainstream GIS standards, concepts and modelling

- Strong desire to evolve GDF to meet industry needsOutreaching to industry to ensure GDF remains relevant to needs
 - Hence active collaboration with OGC
 - Formation of an OGC SWG for GDF
 - As part of a broader stakeholder community engagement



Why OGC?

- This latest revision has been recommended for work first in OGC to take advantage of the OGC diversity of members and modern aspects of the OGC Standards Baseline for encoding options
- The GDF Standard provides a standardised basis for the preparation and exchange of conformant data between various interested parties, which include road operators and administrations, entities working on their behalf, private and public sector survey and mapping companies, and companies providing or supporting the road network navigation services.
- Further detailed guidance for modelling road networks from real-world road constructs may be added. Extension of concepts to support modelling of non-road surface transport networks and interconnection with network models for other modes of transport may also be included.
- It is expected that the work to revise GDF would be of broad interest, to organisations preparing road network datasets, service providers supporting (vehicle) navigation services, governmental mapping agencies, and representative road administrations and operators.
- Public comment, for TN-ITS: there is no common map basis for a description of a Detailed Lane Model (DLM) which reflects road infrastructure: lane centerline geometries, lane divider types/geometries, road/lane guards geometries/types, curb geometries/properties, road/lane pavement, road/lane surface geometry ... it would be good if GDF addressed this

Request of an electronic vote

- The Transportation ad hoc recommends that the OGC Technical Committee approve an electronic vote to approve charter of the Geographic Data Files (GDF) Standards Working Group per the Charter document [OGC 24-004] “Geographic Data Files Standards Working Group Charter.”
- Pending any final edits and review by OGC staff
- Motion: **TABLED until Transportation and Mobility DWG is established and has discussed various transportation data Standards**
- Second:
- Discussion:
- There was [no] objection to unanimous consent



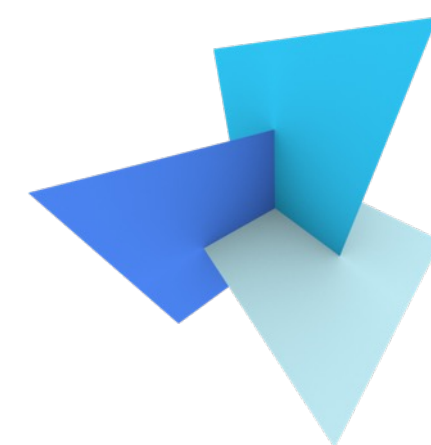
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OGC API Maps

The 128th OGC Member Meeting

Meeting Sponsors

Joan Maso, UAB-CREAF, Editor
Jerome St. Louis, ECERE, Presenter
28 March 2024



OGC API – Maps – Part 1: Core

Access visual representation of geospatial data



GET

link relation:
<http://www.opengis.net/def/rel/ogc/1.0/map>

.../map



Server Response:
Visual representation



200



OGC API – Maps

Developing the standard

2019-2023: Development on GitHub
(<https://github.com/opengeospatial/ogcapi-maps>)

Irregular weekly meetings since 2019 on
Thursday mornings 11am EST/EDT

69 issues addressed and closed
4 open issues for extensions, 1 for WMS

Request for public comments:
February 5, 2024 9:00 am — March 6, 2024 11:59 pm

Fast reaction to the comments on GitHub
(mostly editorial)

Final version uploaded to the OGC portal
2024-03-07 12:44

Table 2. SEDAN GPWv4 Population Density, 2015 and Forecast NDFD, Surface (10m AGL) Wind Velocity (Barb, Knots)

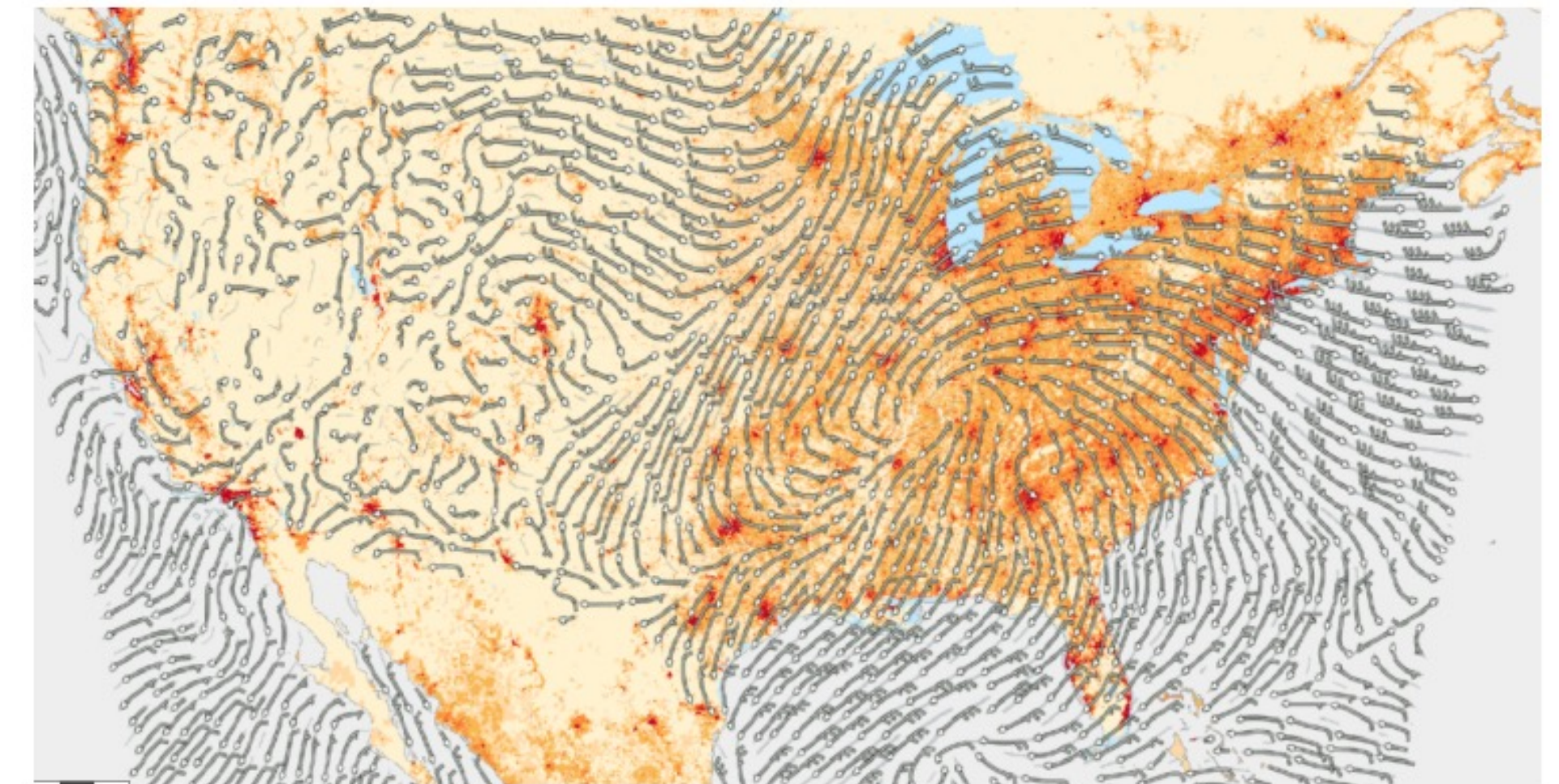
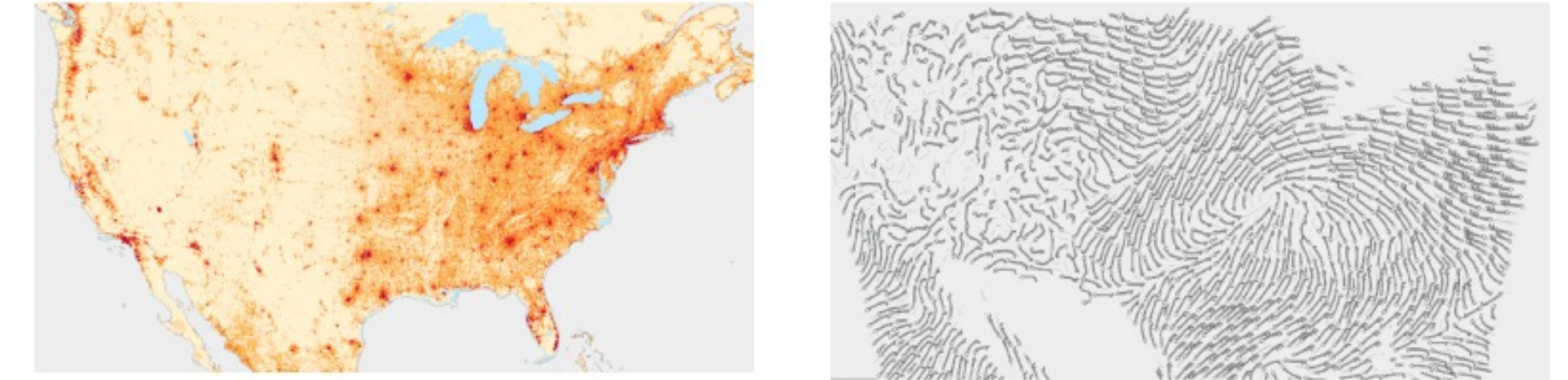


Figure 1. Forecast NDFD wind speed on top of SEDAN Population density



OGC API – Maps

Designed and tested in several hackathons and sprints.

April – December 2019: *Testbed 15 [Maps and Tiles API ER](#)* (Joan Masó, 19-069)

Since Maps and Tiles ER: simplified core requirements class (.../map, no parameter)

June 20 – 21, 2019: *OGC API Hackathon* in London

July 28 – 29, 2020: *OGC API – Maps Code Sprint* ([ER](#))

June 2020 – March 2021: *Modular OGC API Workflows* GeoConnections project

February 17 – 19, 2021: *Joint OGC, OSGeo, ASF Code Sprint* ([ER](#))

May 26 – 28, 2021: *OGC API – Maps, Tiles and Styles Code Sprint* ([blog post](#))

March 8 – 10, 2022: *Joint OGC, OSGeo, ASF Code Sprint*

November 29 – December 1, 2022: *Web Mapping Code Sprint* in Brussels

February 24, 2023: *Editing session* in Rome on sideline of 125th OGC meeting in Frascati

October 2023: *Another Code Sprint* (testing more formats)

OGC API – Maps – Part 1: Core

Requirements Classes

Resources

Core

Retrieve a Map (.../map)

Map Tilesets

Retrieve map tiles (.../map/tiles)

NEW: A map with no parameters: Give me a nice map representing this API or this coverage

OLD: pre-rendered tiles or dynamic map tiles

Origins

Collection Maps

Retrieve map from a collection (/collections/{collectionId}/map)

Dataset Maps

Retrieve map form a dataset (/map)

Styled Maps

Retrieve map from a style (/styles/{styleId}/map)

NEW: A map of the whole API

NEW: Integrated style for a combination of layers (instead of a list of styles, one for each layer)

OGC API – Maps – Part 1: Core

Requirements Classes

Query Parameters

Background (transparent=, bgcolor=)

Control transparency or background color

NEW: Two reasons for having bgcolor.

Scaling (width=, height=, scale-denominator=)

Specify width, height or scale denominator

NEW: scale-denominator parameter is another way to rescale

Display Resolution (mm-per-pixel=)

Override default 0.28mm/pixel (for computing scale)

NEW: Long demanded: features sizes can be adapted to the device resolution (screen, printer...)

OGC API – Maps – Part 1: Core

Requirements Classes

Query Parameters (continued)

NEW: Syntax harmonized with OGC API Coverages

Spatial Subsetting (subset=Lat(...),Lon(...); bbox=; center=)

Retrieve spatial subset of a map

NEW: A map centered in a location

Date & Time (datetime=, subset=time(...))

Retrieve a temporal subset of a map

NEW: Syntax harmonized with OGC API Coverages

General Subsetting (e.g., subset=pressure(...))

Retrieve subset of a map in other dimensions

NEW: Syntax harmonized with OGC API Coverages

OGC API – Maps – Part 1: Core

Requirements Classes

Query Parameters (continued)

Coordinate Reference System (crs=)
Output CRS by reference

NEW: crs= and bbox-crs=
can have different values

Rotation (orientation=)
Rotate map around output center

NEW: maps not oriented to
the north

Custom Projection CRS
(crs-proj-method=, crs-proj-params=, crs-proj-center=, crs-datum=)
Support for custom projections
listed at **/projectionsAndDatums**

NEW: powerful replacement
for AUTO CRSs

OGC API – Maps – Part 1: Core

Requirements Classes

Formats

PNG

JPEG

JPEG-XL

(Geo)TIFF

SVG (styled vectors)

HTML (interactive)

(additional formats always allowed)

OpenAPI Definition

Defines *operationID* suffixes to recognize

map and map tiles resources

NEW: revisited common formats

NEW: Section on security considerations

NEW: Section on comparing OGC API maps with WMS and how to combine with other APIs for extra capabilities

OGC API – Maps

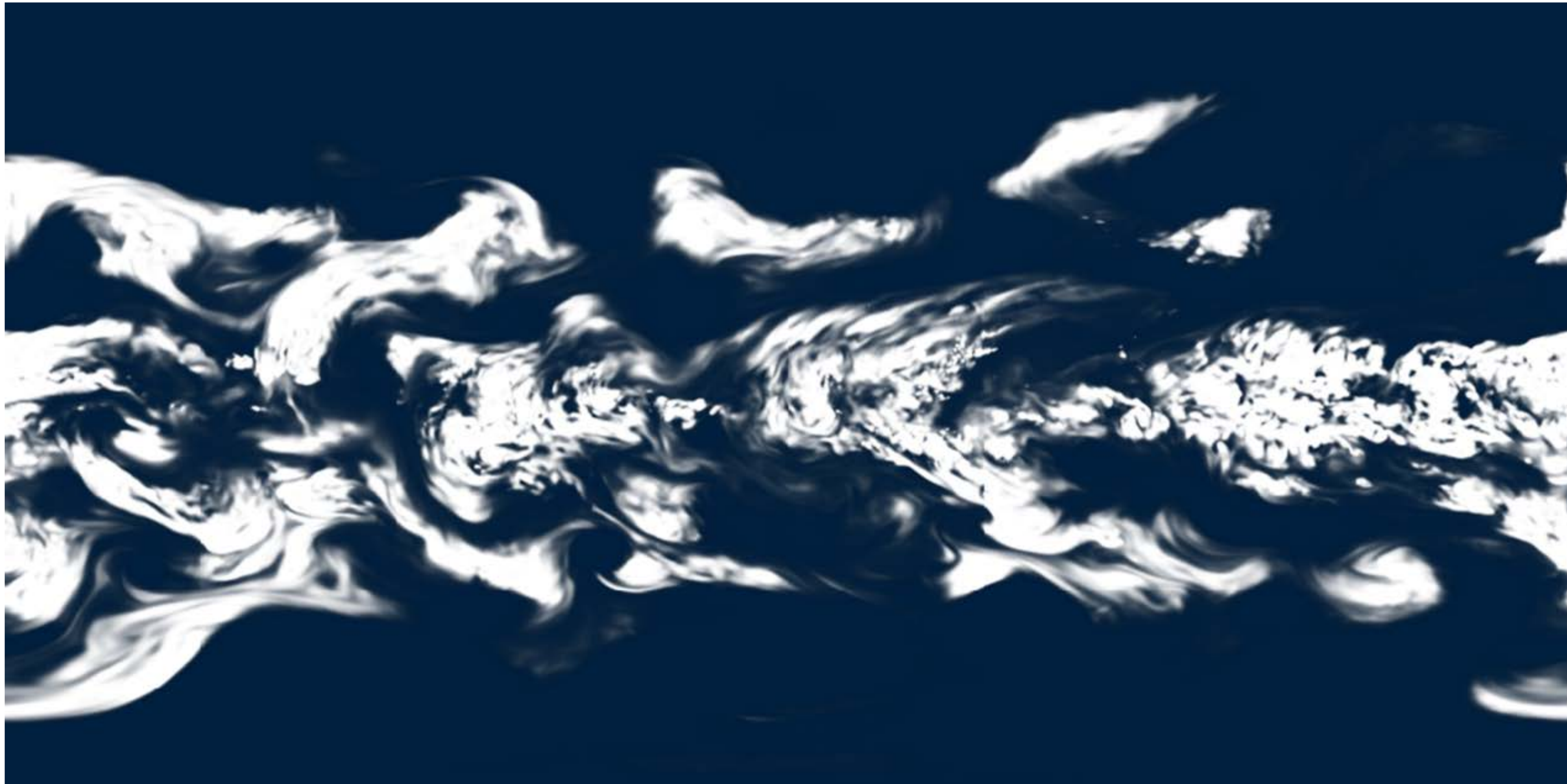
***Temperature at 500 hPa on July 3, 2023
from Copernicus Climate Data Store***



[https://maps.gnosis.earth/ogcapi/collections/climate:cmips5:ta_day_GFDL_CM3_rcp85_r1i1p1_20210101_20251231/map?
subset=pressure\(500\)&datetime=2023-07-03](https://maps.gnosis.earth/ogcapi/collections/climate:cmips5:ta_day_GFDL_CM3_rcp85_r1i1p1_20210101_20251231/map?subset=pressure(500)&datetime=2023-07-03)

OGC API – Maps

*Relative humidity at 200 hPa at 1PM on April 1, 2023
from Copernicus Climate Data Store*



[https://maps.gnosis.earth/ogcapi/collections/climate:relativeHumidityApril1_6_2023/map?subset=pressure\(200\)&datetime=2023-04-01T13:00:00&bgcolor=0x002040](https://maps.gnosis.earth/ogcapi/collections/climate:relativeHumidityApril1_6_2023/map?subset=pressure(200)&datetime=2023-04-01T13:00:00&bgcolor=0x002040)

OGC API – Maps. Beyond part 1

Planned Extensions

Cartographic Layout

NEW: maps for illustrations

Legend, Scale, Compass, Attribution, Title, Grid, Situation...

Map Queries

"GetFeatureInfo" for point, Queryables, filter=

OLD: clic on a point

Maps of custom styles supplied by clients

Possibly private "temporary" styles with *OGC API – Styles*

Possibly well-known Process and *OGC API – Processes – Part 2*

Better integration with other standards

Motion: Request of an electronic vote

- The OGC API – Maps SWG recommends that the OGC Technical Committee approve an electronic vote to approve release of OGC 20-058 “OGC API – Maps – Part 1: Core” as an OGC Standard.
- There was no objection to unanimous consent
- Document available on "pending" here: https://portal.ogc.org/files/?artifact_id=107199&version=1



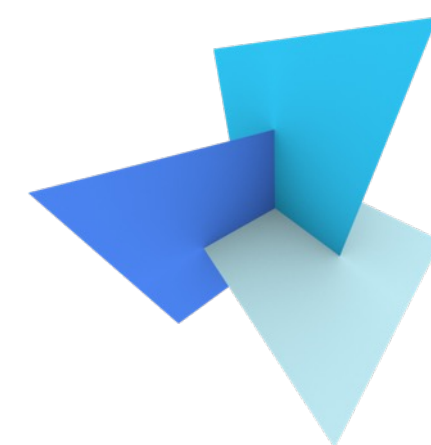
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Adoption of ISO 19123-1/-3 as New OGC Abstract Topic 6

The 128th OGC Member Meeting

Peter Baumann,
Constructor U | rasdaman
27 March 2024

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Coverage Standards Syncing: OGC - ISO

- ISO 19123 = OGC AT6 ...written ~2000
 - „*raster: usually rectangular pattern of parallel scanning lines forming or corresponding to the display on a cathode ray tube*”
 - ISO decided revision: modernization, split
- Fast forward:
 - April 2023: 19123-1 + 19123-3 **adopted**, 100% YES votes
 - September 2023: Coverages.SWG **adopted** motion for OGC AT6 Part 1 + 3
 - ...OGC formatting work...
 - **Delft: presentation to TC in closing plenary**

ISO 19123-x Family

- Separation of concerns: ISO 19123 = OGC AT6 split
 - concepts & terminology in 19123-1, concrete coverage structure in 19123-1

	Geometry/data model	Function/processing model
abstract	19123-1 Covg. Fundamentals	19123-3 Covg. Processing Fundamentals
concrete	19123-2 Covg. Impl. Schema	19123-4 ~~Covg. Services~~

concepts, terminology

Covg. Tiling

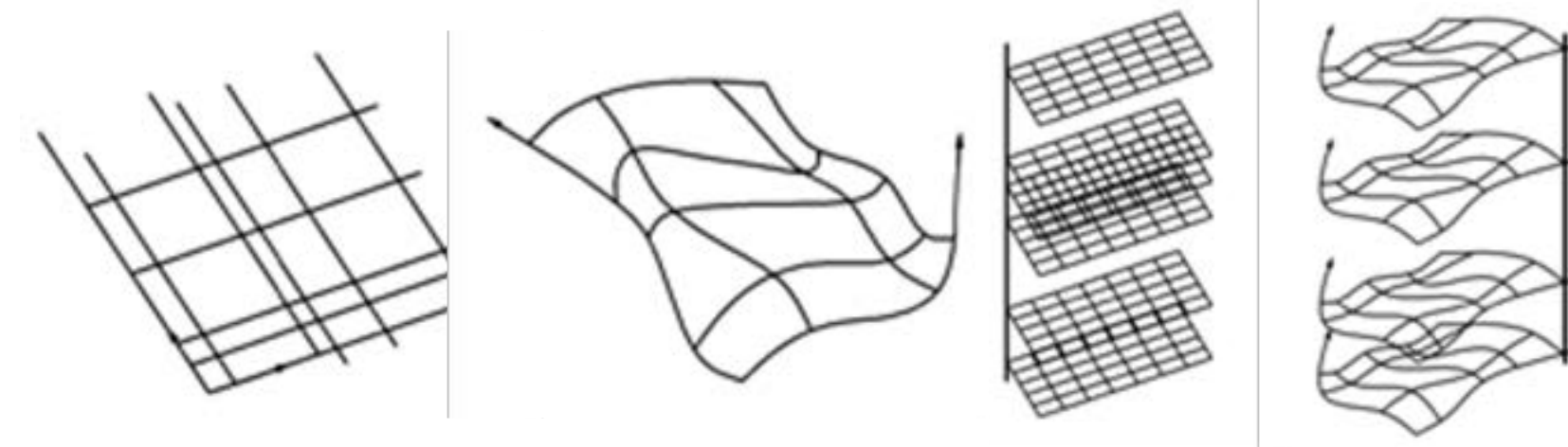
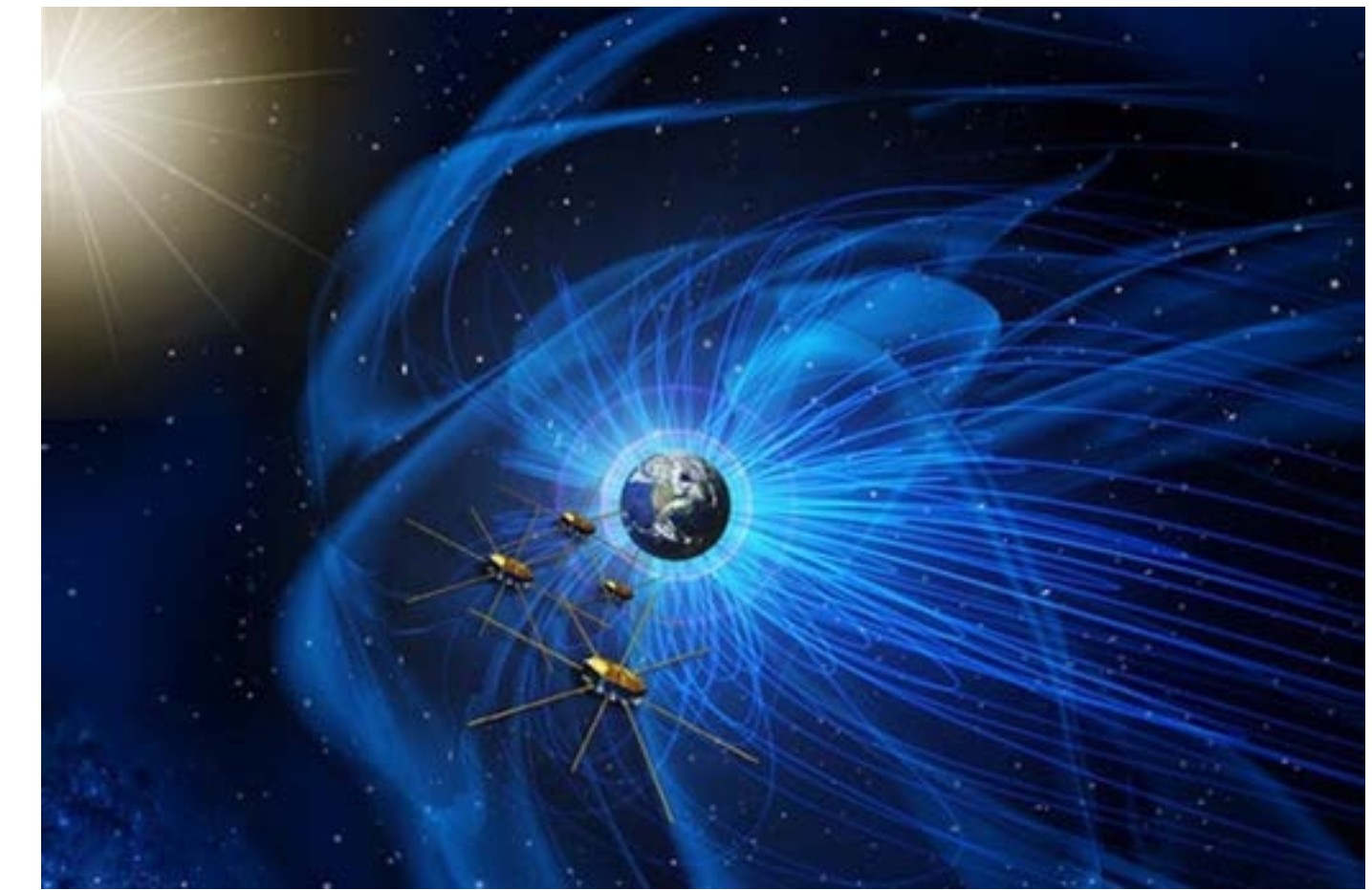
- Major updates 19123 → 19123-1:
 - Modernization (19123 is 25y old!)
 - Some flaws corrected
 - Reorganization: sorted along dimensions
- Note: In parallel: ISO 19123-2 (aka OGC CIS 1.0) under update from OGC CIS 1.1

AT6 Update: Submitting Organizations

- Peter Baumann Constructor University
- Lucio Colaiacono European Union Satellite Center
- Dimitar Misev rasdaman GmbH
- Joan Maso CREAf
- Jimmy Zhou Feng Chia University
- Peter Strobl EU JRC

19123-1 Coverage Data Model

- ISO/FDIS 19123-1 Geographic information — Schema for coverage geometry and functions — Part 1: Fundamentals
 - Modernization of (outdated) 19123:2005
 - Concepts & terminology, not implementation → „abstract“
- Coverage = digital representation of space-time varying geographic phenomenon
 - corresponding to *field* in physics
- Key features:
 - cartesian grids, regular & irregular axes
 - interpolation
 - discrete or continuous
 - Proper coordinate & CRS handling, as per ISO 19111



19123-3 Coverage Processing Model

- Concepts & terminology, not implementation → „abstract“
 - Compact description of core coverage operations: Extraction, analytics, fusion, ...
 - 2 basic ops:
 - *coverage constructor*: builds a coverage from scratch or by deriving it
 - *coverage condenser*: summary information from a coverage
 - expression language → unlimited complexity
 - No new data definitions, strictly 19123-1
- **not a service, but foundation** for defining service standards functionality, independent from any particular protocol

Request of an electronic vote

- The Coverages SWG recommends that the OGC Technical Committee approve an electronic vote to approve release of OGC 23-054 and OGC 23-055 “Coverage Fundamentals” and “Coverage Processing Fundamentals,” respectively, as an OGC Abstract Specification Topic parts.
- There was no objection to unanimous consent

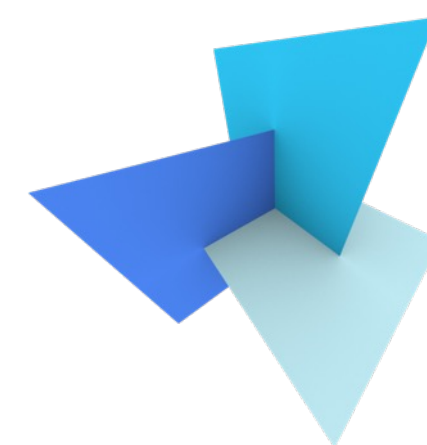


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Geospatial Reporting Indicators SWG

The 128th OGC Member Meeting

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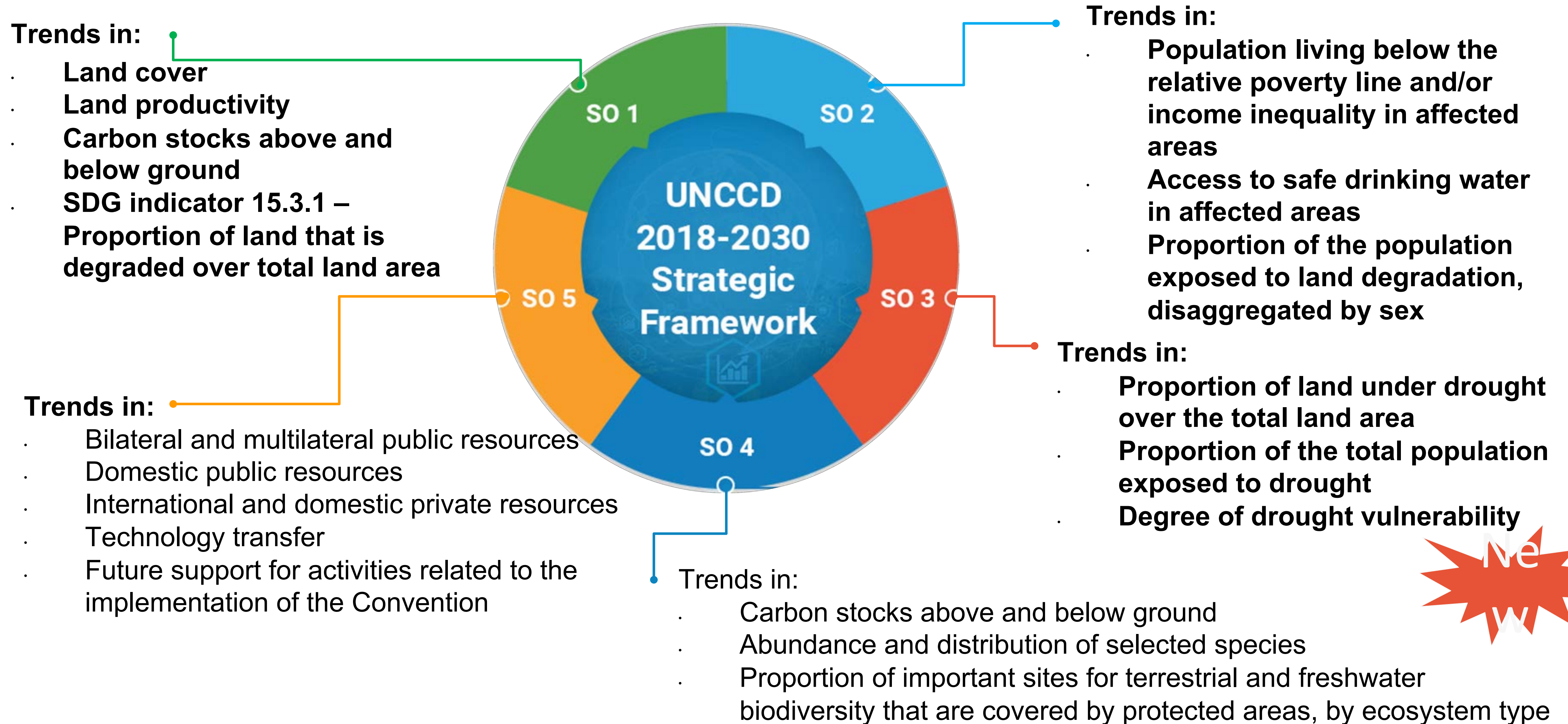
Nils Hempelmann, OGC
28 March 2024

Agenda AdHoc Session, Monday 25th March

- . **Welcome**
- . **Brian O'Connor**
United Nations Convention Combat Desertification:
Necessity of documented approved Standards for the UNCCD national reporting process
- . **Jean-Michel Lord, BEng., PSM I**
Developer and Scrum Master
GEO BON, Department of Biology, McGill University
GEO BON's collaborative approach to biodiversity indicator calculation
- . Motion for SWG - Charter

The most important thing for this WG is...

UNCCD Indicator Framework

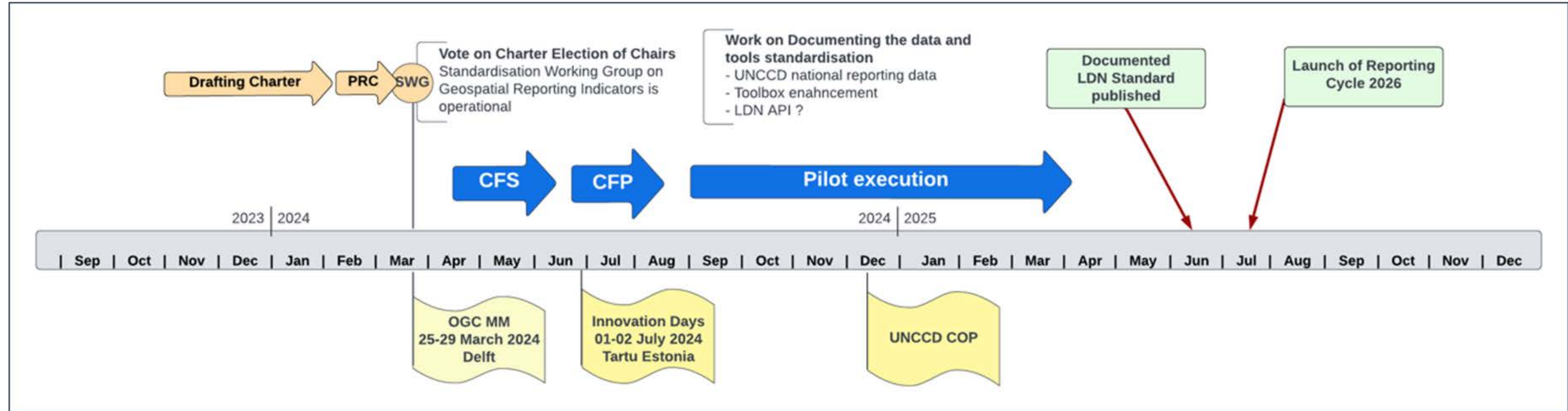


What we talked about this week

- Early discussions with the OGC indicate there may be at least two opportunities for UNCCD led standards:
 - The reporting data structure (in JSON format) as an **encoding standard**
 - The SDG Indicator 15.3.1 methodology as a **Geospatial Reporting Indicator – this may qualify as a ‘profile’** of the GRI standard addressing the specific needs of the Land degradation Neutrality community
- The encoding standard appears to be the low hanging fruit but the SDG 15.3.1 may be a practical use case for the first exercise of the GRI-SWG

Next Quarter WG Communications Plan

OGC vision for Land Degradation Neutrality (LDN)



Request of an electronic vote

- The Geospatial Reporting Indicators ad hoc recommends that the OGC Technical Committee approve an electronic vote to approve charter of the Geospatial Reporting Indicators Standards Working Group per the Charter document [OGC 24-003] “Standards Working Group on Geospatial Reporting Indicators.”
- There was no objection to unanimous consent

TC Chair Announcements and Motions



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Member Survey Results

From survey administered September
2023

Micah Brachman
Rosie Chen
Harsha Madiraju

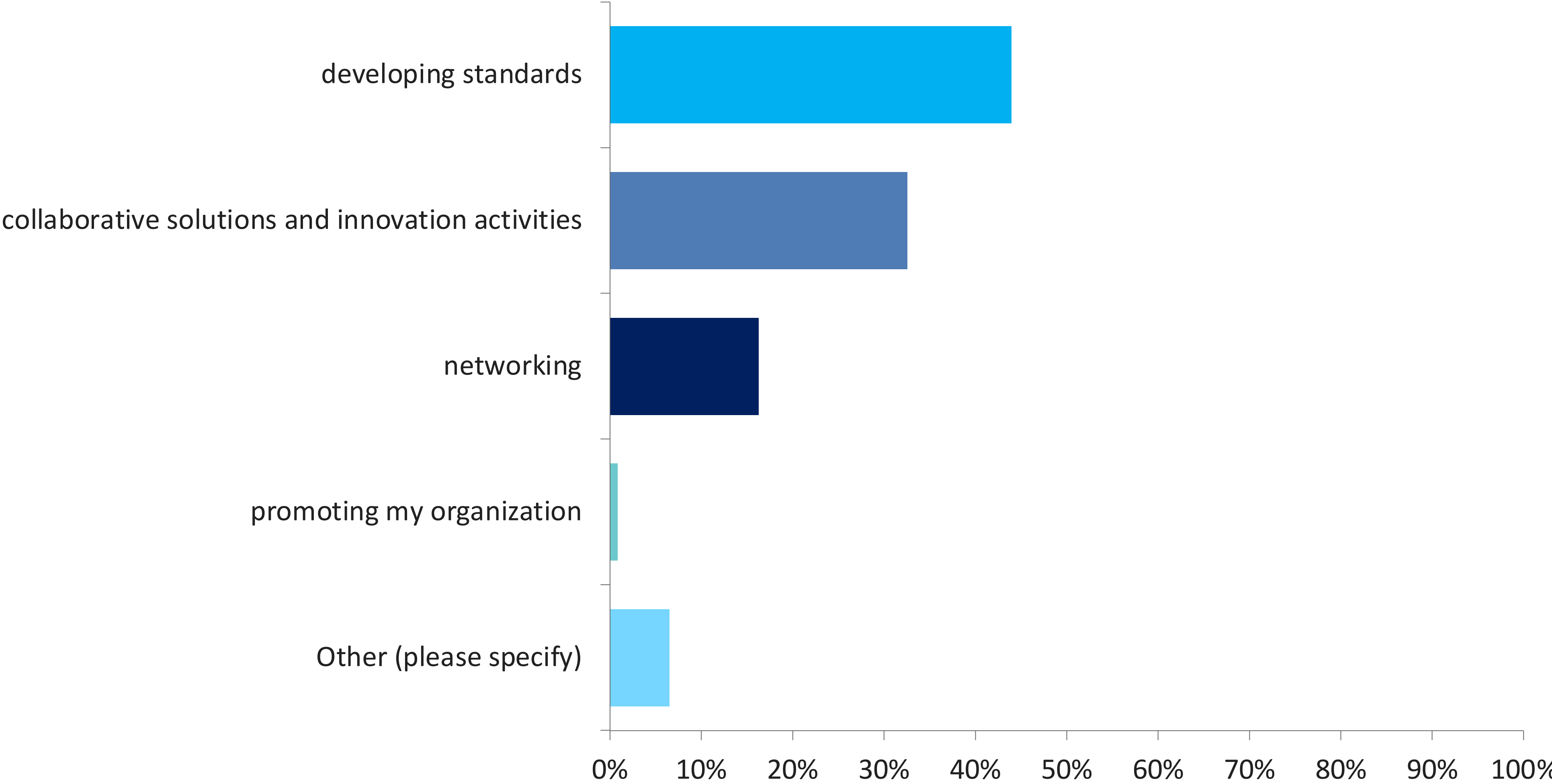
March 28, 2024



Goal

Conduct a scientific survey of our membership
to **drive continuous improvement**

What is the most valuable aspect of your OGC membership?



How likely is it that you would recommend OGC membership to a friend or colleague?

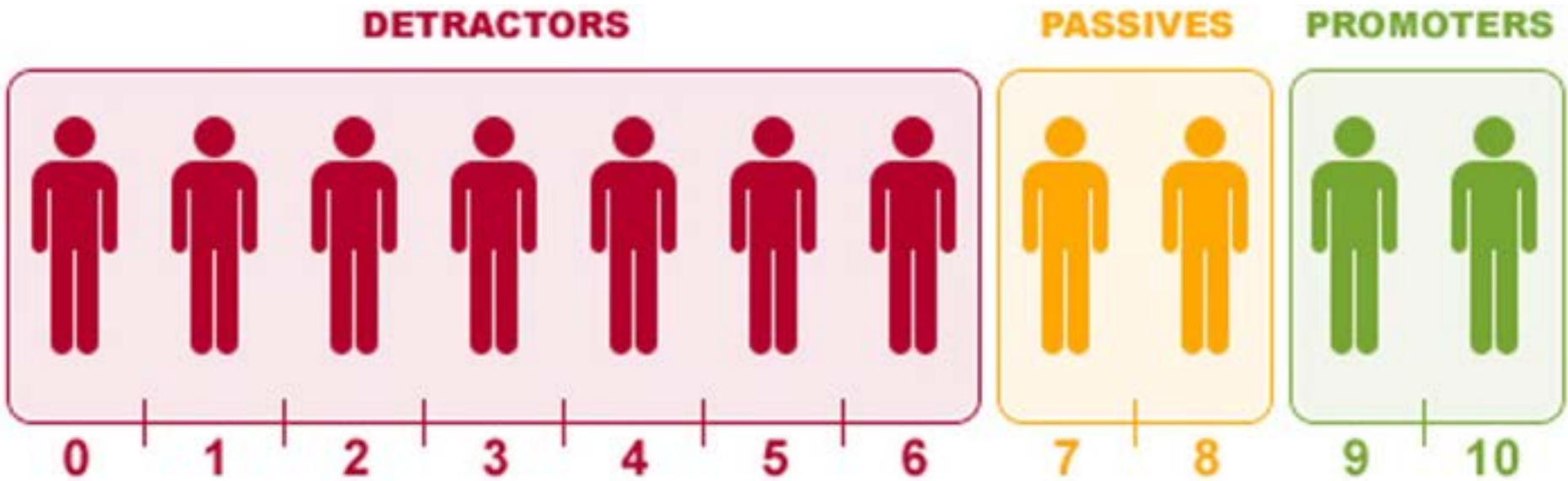


Very Unlikely

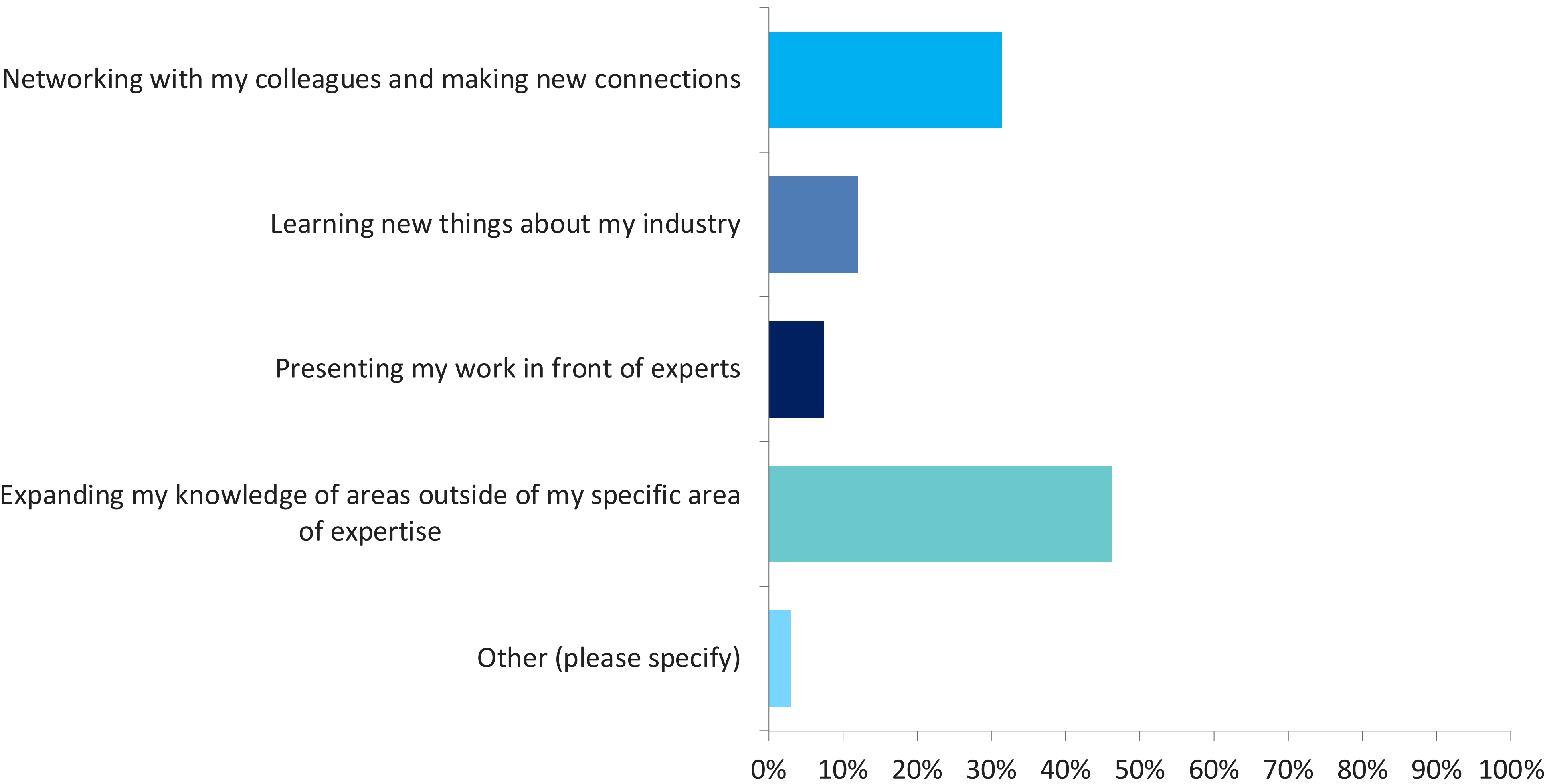
Very Likely



We want to be here!



What was the best thing about the Member Meeting?

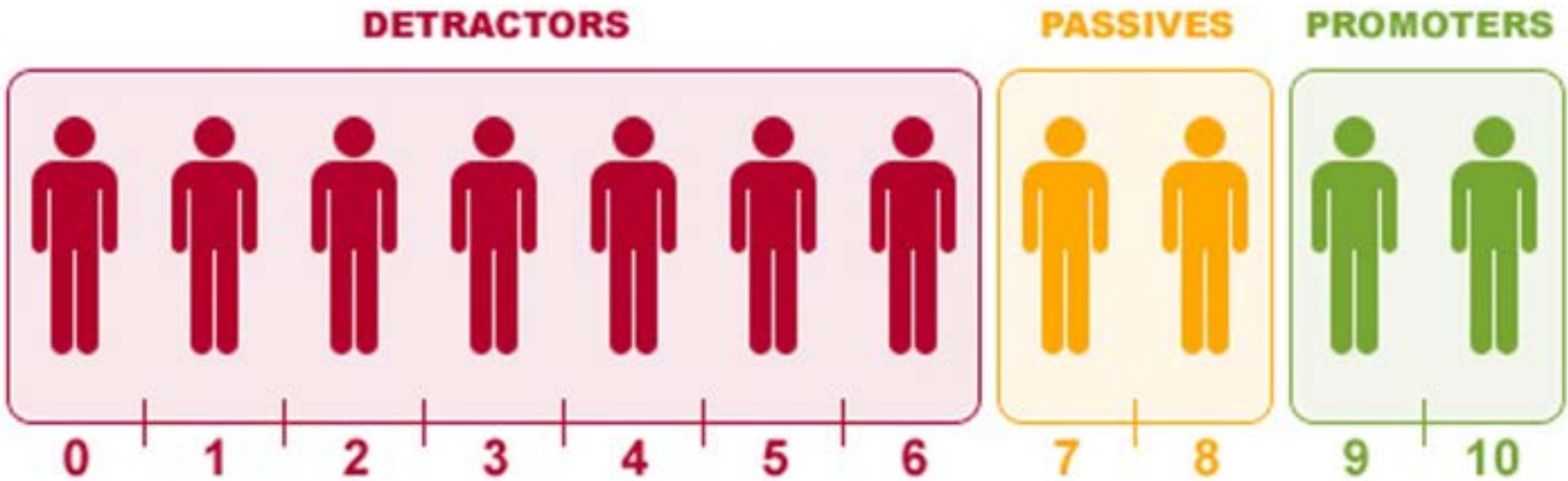


How likely is it that you would recommend attending an OGC member meeting to a friend or colleague?



Very Unlikely

Very Likely



Member Success Stories

OGC is looking for member success stories that highlight the benefits your organization has realized through OGC COSI Initiatives and Standards.

Please contact info@ogc.org (or scan the QR Code below) if your organization is interested in sharing your successes with the OGC Community.



What are the Forum Members Working On?



3D Interoperability

glTF/USD 3D Asset Interoperability

Cooperation between USD and glTF to increase synergy and reduce duplication of effort, gaps, fragmentation

Interoperable Avatars

Cross-platform avatars and characters for film, gaming, fashion and social platforms

Digital Fashion/Wearables

Clothing (including layering), shoes, hats, accessories

Volumetric Media Interoperability

Capture, transport and display

Technology Stack

Network Requirements and Capabilities

Industry requirements for seamlessly transitioning traffic on multiple wireline and wireless technologies for deploying metaverse applications at scale

3D Web Interoperability

Enable the broadest possible interoperability of Metaverse Content using the Web

Digital Twins and Geospatial

Real/Virtual World Integration (Digital twins, IOT)

Constructs to describe and integrate the physical world and created representations

Use Case Verticals

Metaverse Use in the Real Estate Industry

How the Metaverse can be used in the real estate industry

Industrial Metaverse

Enabling collaboration between geographically dispersed teams through virtual environments, expert avatars, digital twins, data visualization, AR/VR and the emerging concept of Shared Reality

Ecosystem Navigation and Discovery

Metaverse Standards Register
Publicly available database mapping the landscape of metaverse-relevant standardization activities, organizations, standards & specifications, use cases, and terms

Legal

Asset Management

Digital rights, protection, portability, access, availability

Privacy, Cybersecurity & Identity

Recommendations for responsible innovation that mitigates human and societal harm from objective and subjective privacy risks – including cybersecurity and identity risk management

Ethical principles for the metaverse and its implementation

Define a set of ethical principles and implementation methodology for metaverse development, use, procurement and commercialization

Ownership and Identity

Decentralized identify and ownership

Engagement and Education

End-User Technical Troubleshooting

Enabling end-users to ensure reliable metaverse experiences

Educational Research

Using the metaverse for education

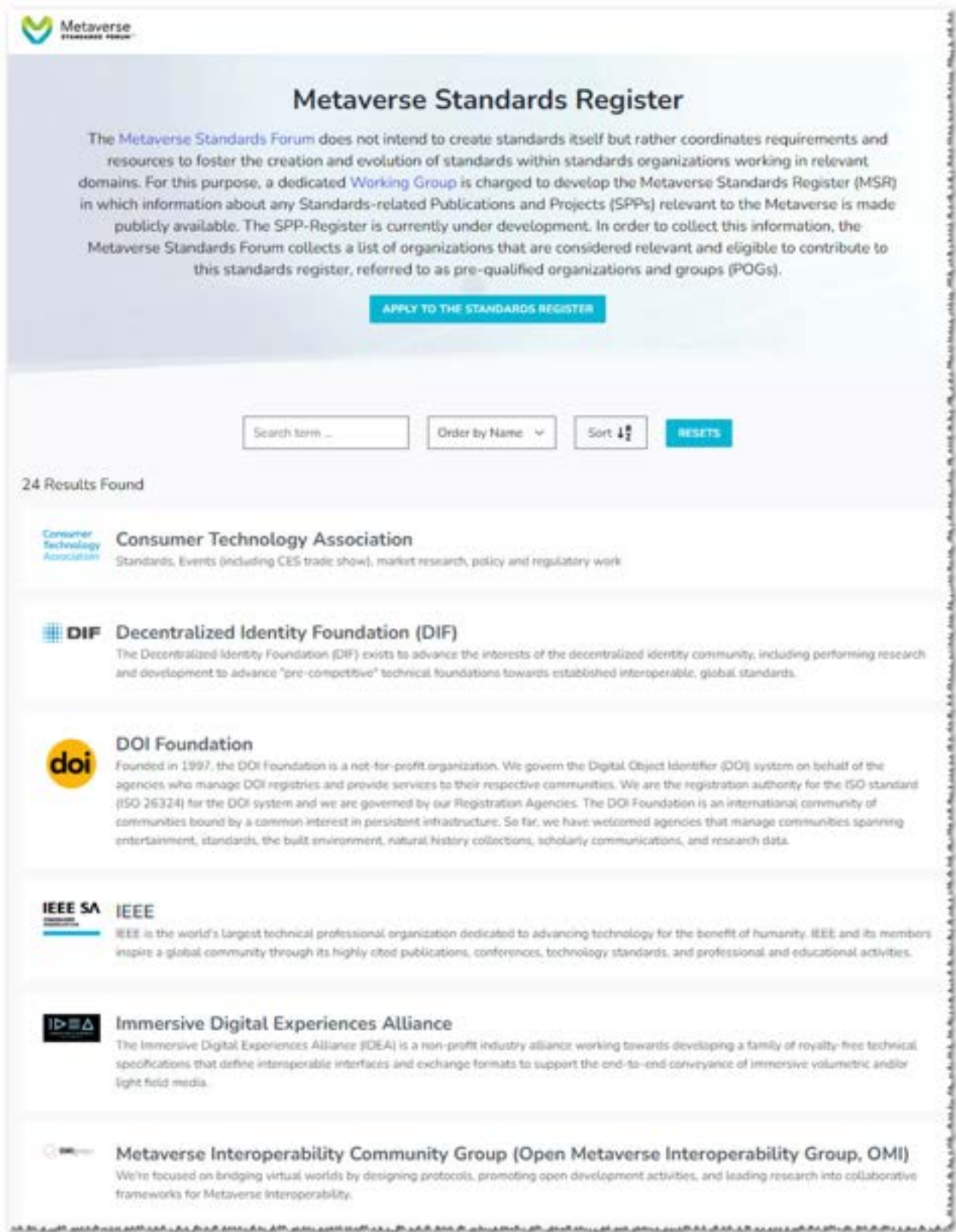
Accessibility

Ensuring the metaverse is accessible to all



OGC Standards Need to be Added to the Register

<https://register.metaverse-standards.org/>



The [Metaverse Standards Register](#) is created and maintained by a Forum working group

In order to *accelerate the development of metaverse interoperability*, the Forum encourages the adoption of **EXISTING** standards, where available.

Many (most?) OGC Standards, Best Practices and Implementation standards are applicable

The Standards Register Working Group highly encourages all OGC chairs to communicate information below to Scott Simmons

Title of SPP	Type of SPP	IPR policy additional information
Resource identifier of SPP	Normative references	Implementations
Source URL	Metaverse domains	Additional publisher(s) of SPP
Pre-qualified organization or group	Keywords	Comments
Justification	IPR policy URL	
Maturity		
Abstract		



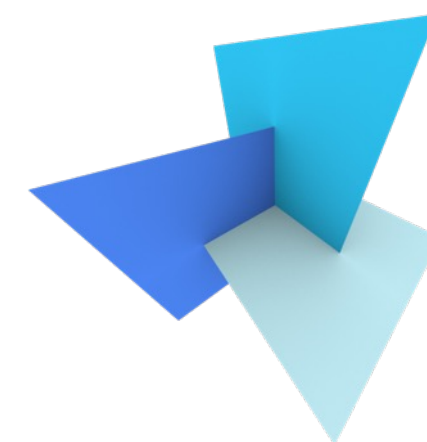


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Welcome to Montreal!

The 128th OGC Member Meeting

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Ryan Ahola
Natural Resources Canada
28 March 2024



Thank you supporters!



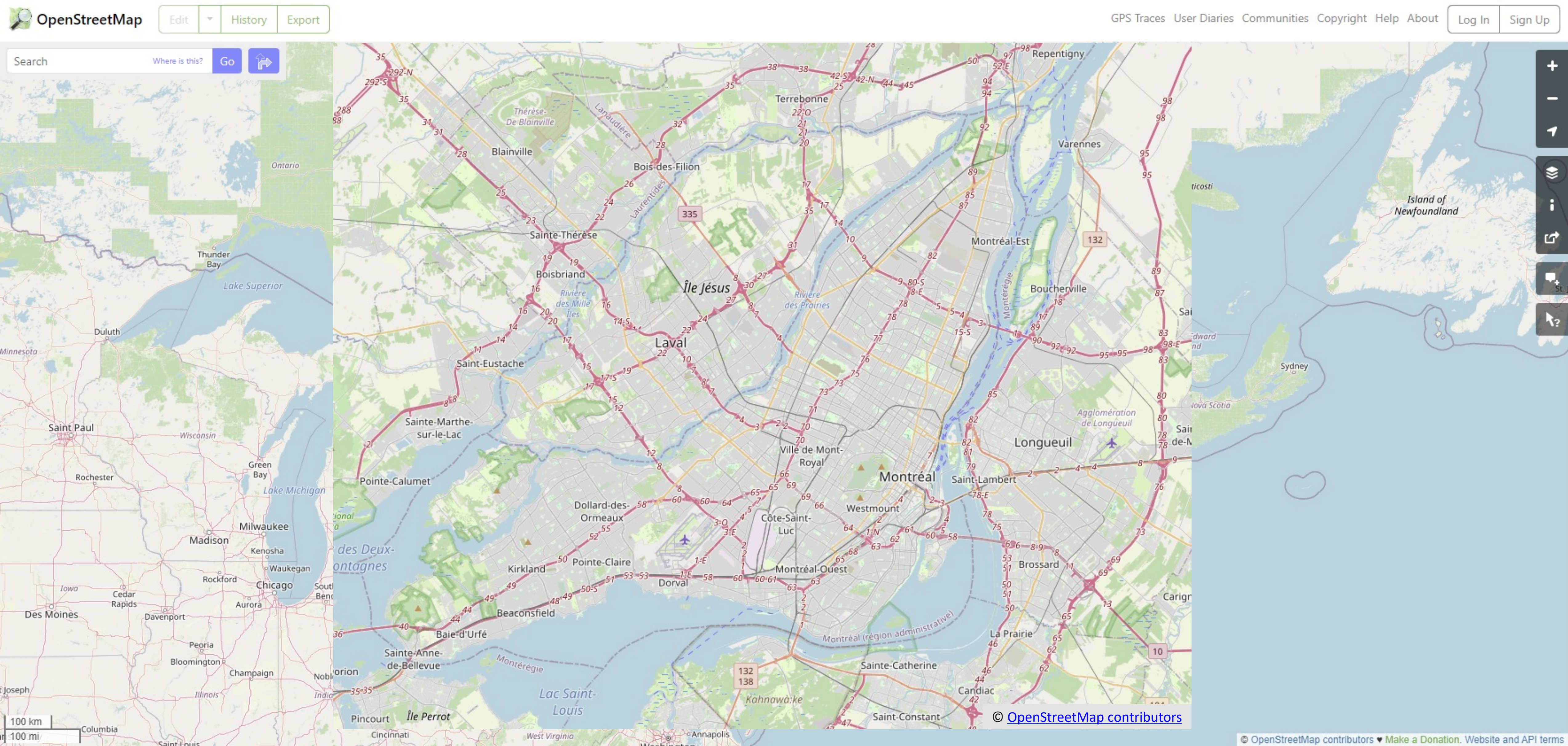
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Where is Montreal?



About Montreal



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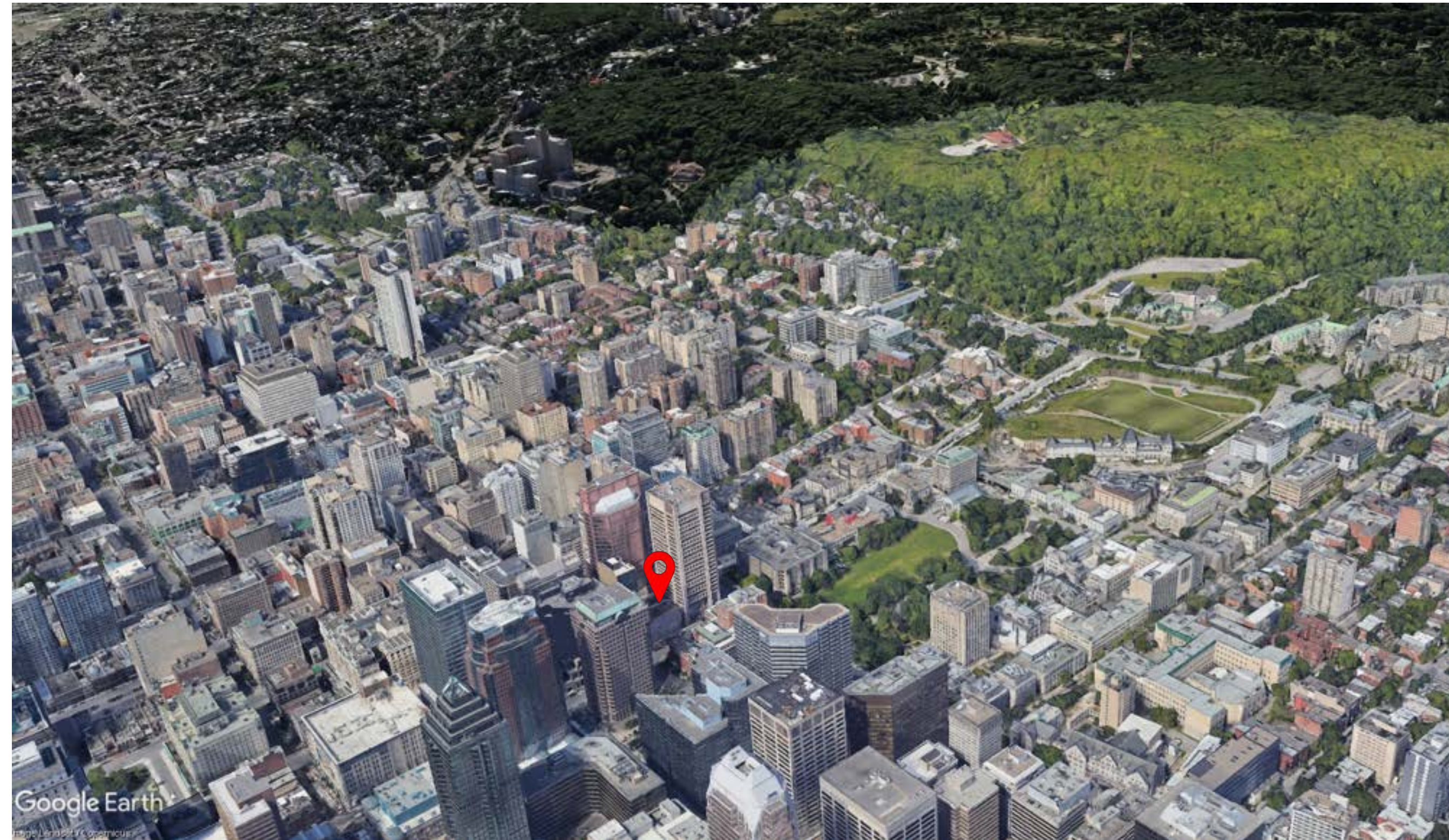
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The Meeting

- **When:** June 17-21, 2024
- **Where:** Centre Mont-Royal, downtown Montreal
- **What:**
 - 30th anniversary of OGC!!
 - Kickoff presentation from Eric Loubier, Director General of NRCan's Canada Centre for Mapping and Earth Observation (CCMEO)
 - Canada Forum restart. SDI Modernization focus





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See you in Montreal

129th Member Meeting

JUNE 17-21, 2024

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Upcoming OGC Events

Date	Location	Host/Sponsor
30 Oct – 1 Nov 2023 Open Standards Code Sprint	London, UK	Geovation, OS, SatCen, NGA, Dstl
5 – 7 December 2023 Innovation Days	Washington D.C, USA	American Red Cross
26 – 28 February 2024 Joint OGC ASF OSGeo Code Sprint	Évora, Portugal	Universidade de Évora, Centro Tecnológico Gil Eanes, Natural GIS, Geobeyond
25 – 29 March 2024 Member Meeting	Delft, Netherlands	Geonovum
17 – 21 June 2024 Member Meeting	Montreal, Canada	NRCan
1 – 2 July 2024 Innovation Days Europe	Tartu, Estonia	GEOSA, Saudi Arabia and FOSS4G-Europe
4 – 8 November 2024 Member Meeting	Seoul, Republic of Korea	MOLIT, LX, LH

This year marks the 30th anniversary of OGC

We are looking for sponsors for future meetings

An aerial photograph of a vast, snow-covered mountain range. The terrain is rugged with deep valleys and ridges, all blanketed in white snow. Puffy white clouds are scattered across the landscape, particularly in the lower right and middle sections. The sky above is a clear, deep blue. The overall scene is majestic and serene.

WG Reports not to be briefed

Not being briefed today, saving you 171 slides

- 3DIM DWG
- Architecture DWG
- Big Data DWG
- Blockchain & DLT DWG
- Citizen Science DWG
- CityGML SWG
- CRS DWG and SWG
- Coverages SWG
- Data Quality DWG
- Defense & Intelligence DWG
- DGGS DWG
- DGGS SWG
- EO Exploitation Platform DWG
- Features and Geometries SWG
- GeoAI DWG
- Geospatial Data Requirements ad hoc
- Geospatial User Feedback SWG
- GeoTIFF SWG
- IndoorGML SWG
- Interoperable Simulation and Gaming DWG
- Observational Data Special Session
- Observations, Measurements, and Samples SWG
- OGC API – Common SWG
- OGC API – Processes SWG
- Point Cloud DWG
- Points of Interest SWG
- Security DWG
- Space Standards DWG
- TimeSeriesML SWG
- TrainingDML-AI SWG
- Uninhabited Systems DWG
- Urban Digital Twins sessions

WG Reports with TC Motions

3 to Z

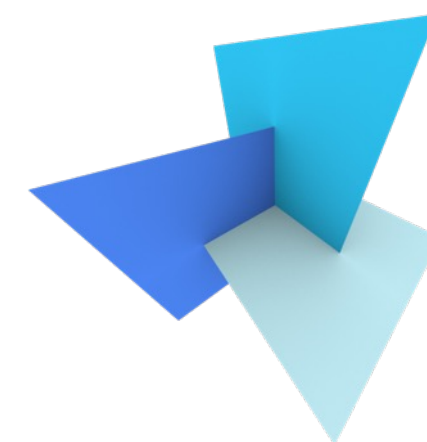


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ARD SWG

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Liping Di, George Mason University
28 March 2024

Document Approval Motion

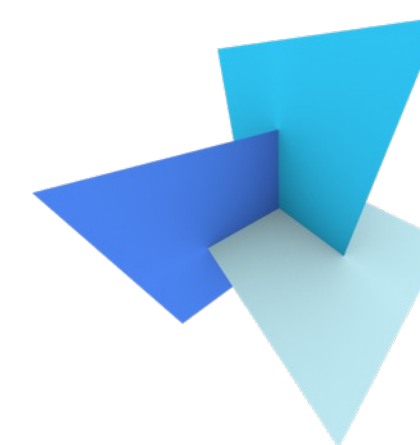
- The ARD SWG recommends that the OGC Technical Committee approves the release of 23-043 “OGC Testbed 19 Analysis Ready Data Engineering Report” as an OGC Public Engineering Report.
 - Pending any final edits and review by OGC staff
 - The motion is unanimously passed
- The goal of this ER was to summarize the lessons-learned from using ARD products in multiple use cases in OGC Testbed 19 and make recommendations on creating, developing, identifying, and implementing ARD definitions and capabilities based on the lessons-learned. Specifically, this ER aims to increase the ease of use of ARD through improved backend standardization and varied application scenarios. Four distinct scenarios – gentrification, synthetic data, coverage analysis, and coastal studies – were explored in the Testbed 19 to reveal both the strengths and limitations of the current ARD framework. The ARD products used in the four use cases were compliant with CEOS ARD PFS. This ER identified several key areas for improvement: Encompassing non-EO data such as building footprints, socio-economic statistics, synthetic data, and in-situ measurements. Establishing guidelines and quality controls for incorporating diverse data types. Tailoring data specifications to accommodate different analytical needs, including temporal emphasis and non-GIS applications. Implementing structured metadata with defined extensions for enhanced data discovery, understanding, and provenance tracking.



Compliance Interoperability & Testing Evaluation (CITE) SC

The 128th OGC Member Meeting

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Gobe Hobona (OGC)
28 March 2024

The most important thing for this WG is...

TEAM Engine 6.0.0 release candidate is now available for testing

Session Agenda - Telecon held 14 March 2024

- EO-GeoJSON Executable Test Suite - Gobe Hobona (OGC)
- OGC API - Tiles - Part 1:Core Executable Test Suite - Gobe Hobona (OGC)
- TEAM Engine update - Micah Brachman (OGC), Dirk Stenger (lat/lon)
- Discussion

Where we are headed in the coming year

- TEAM Engine 6.0.0 will include:
 - Major updates of technologies
 - Migration Java 17 (currently Java 8)
 - Migration to Tomcat 10.1 (currently Tomcat 7)
 - Updates of Maven dependencies
 - Updates of Maven plugins

Motion: EO-GeoJSON v1.0 Executable Test Suite as Official

- The CITE Subcommittee recommends that the Technical Committee approves the Executable Test Suite (ETS) of version 1.0 of the OGC EO Dataset Metadata GeoJSON(-LD) Encoding 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, after more than 6 months at Beta stage, there was 1 early implementer that had been certified compliant.
- Result: NOTUC

Motion: OGC API - Tiles v1.0 Executable Test Suite as Official

- The CITE Subcommittee recommends that the Technical Committee approves the Executable Test Suite (ETS) of version 1.0 of the [OGC API – Tiles – 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.
- Result: NOTUC



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Joint EDM and Climate Resilience DWGs Closing Plenary Report

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Don Sullivan, NASA
28 March 2024



Agenda

1. Speaker: Paul Churchyard (HSR.Health) Presentation: Update for the OGC Climate Disaster Resilience Pilot 2024 (11 min)
2. Speaker: Tien-Yin Chou (Jimmy) (GiS.FCU) Presentation: Landslides in Taiwan (11 min)
3. Speaker: Allan Jamieson (United Kingdom Ordnance Survey) Presentation: Climate Resilience Updates from Ordnance Survey (11 min)
4. Speaker: Guy Schumann & Paul Churchyard (RSS-Hydro & HSR.Health) Presentation: FireSENS – Smart Sensing of Fires using Sentinel-3 Data and the health impacts of Wildland Fires (11 min)
5. Speaker: Antonio Correias (Skymantics) Presentation: Use of Generative AI / synthetic data for augmenting vulnerability assessments of populations affected by disasters and climate change (11 min)
6. Speaker: Chairs (OGC) Presentation: Consideration of Disaster Pilot 2023 documents (5 min)

Four Recommendations One Motion



EDM DWG Recommendation 0

- The EDM DWG recommends that the OGC Technical Committee approve release of OGC Document Number 21-074r2 “OGC Disaster Pilot Provider Readiness Guide” as an OGC Engineering Report.
- **Abstract:** As part of DP23, a trilogy of Guides were developed to improve knowledge and understanding of how geospatial data and tools and could support disaster and emergency communities. Alongside the User Guide is a Provider Guide giving all the detail technical details behind the work, and a companion Operational Capacity Guide describing the steps needed to develop geospatial readiness.

EDM DWG Recommendation 1

- The EDM DWG recommends that the OGC Technical Committee approve release of OGC Document Number 21-075r2 “OGC Disaster Pilot User Readiness Guide” as an OGC Engineering Report.
- **Abstract:** Disasters are geographic events and therefore, geospatial information, tools and applications have the potential to support the management of, and response to, disaster scenarios. However, the use of geospatial data varies significantly across disaster and emergency communities. This can often make it difficult to share information between different organizations, and sometimes even within the same organization, involved in disaster response. This could mean that not everyone involved will have the same situational awareness information.

EDM DWG Recommendation 2

- The EDM DWG recommends that the OGC Technical Committee approve release of OGC Document Number 23-026 “Engineering Report For OGC Disaster Pilot 2023” as an OGC Engineering Report.
- **Abstract:** This OGC Disaster Pilot '23 (DP23) Engineering Report summarizes technical work done in the Pilot to increase drought and wildfires awareness among various disaster management stakeholders. Pilot participants implemented components of a data flow ecosystem to leverage analysis-ready earth observations and other datasets (ARD) and produce decision-ready indicators (DRI) according to collaboratively developed workflow recipes. DP23 focused on the hazards of drought, wildfires, and floods, the interactions and complications among them, as well as climate change scenario effects on hydropower production, in regions of Canada, United States, and Italy. The Pilot also prototyped providing information to field practitioners in secure package formats and leveraging linked data and structured web page information to optimize public web searches for disaster information.

EDM DWG Recommendation 3

- The EDM DWG recommends that the OGC Technical Committee approve release of OGC Document Number 23-030 “OGC Disaster Pilot Decision Ready Operational Capacity Guide” as an OGC Engineering Report.
- **Abstract:** As part of DP23, a trilogy of Guides were developed to improve knowledge and understanding of how geospatial data and tools and could support disaster and emergency communities. The Operational Capacity Guide aims to provide disaster and emergency management communities with a set of incremental strategic actions to help them develop, and enhance, the infrastructure, training, support, and operational processes needed to deliver an effective and efficient geospatial response to disaster events.

EDM DWG Motion

- The EDM DWG hereby motions the previous recommendations:
 - Pending any final edits and review by OGC staff
 - There was no objection to unanimous consent



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GeoScienceDWG

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Author, Affiliation
28 March 2024

The most important thing for this WG is...

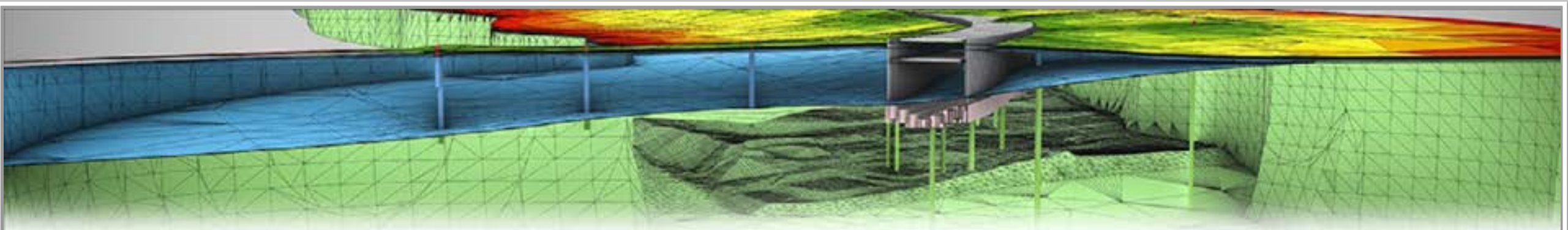
We (hopefully) achieved a 2nd Interoperability Experiment!

Session Agenda

- Presentation of Geotech IE report by Mickaël Beaufils, Neil Chadwick, Dan Ponti, Kathi Schleidt and Hylke van Der Schaaf
- Discussion

Next Quarter WG Communications Plan

- Upcoming event: find it and share it on LinkedIn with #ISSMGE TC222



**ISSMGE TC222 Geotechnical BIM and Digital Twins
Online Workshop**

Digital standards for geotechnical data

Thursday April 4th | 14:00 (Paris) | 8:00 (New York) | 20:00 (Hong-Kong)
Duration : 2 hours

with talks from:

Neil Chadwick (AGS Data Management WG), Dan Ponti (DIGGS Steering Committee),
Jonas Weil (bSI IFC Tunnel GeoSubgroup) and Mickaël Beaufils (OGC GeoScience DWG)

- Plan to write a paper about GeotechIE outcomes. Journal candidates include Computer & Geoscience, Geotechnics.

Document Approval Motion

- The GeoScienceDWG recommends that the OGC Technical Committee approve release of [OGC 24-008] “Geotechnical Interoperability Experiment Engineering Report” as an OGC Engineering Report.
 - There was no objection to unanimous consent
- An IE that aimed at federating around the topic of geotech digital data. Participation of AGS, DIGGS, buildingSmart International and OGC WGs. Activities included: - Identify/define geotech concepts + mapping, - Propose OGC standards extensions accordingly, - Extend SensorThingsAPI to provide geotech investigations and test / mapping with real data from AGS, DIGGS.



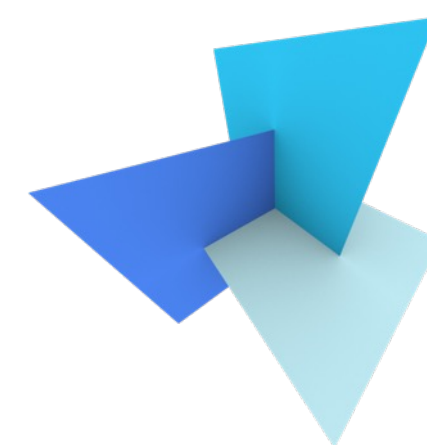
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GeoDataCubes SWG

The 128th OGC Member Meeting

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Alexander Jacob, Eurac Research
Ryan Ahola, NRCan
Michael Schick, EUMETSAT
28 March 2024



Testbed-19 GeoDataCubes ER Motion

- The GDC SWG recommends that the OGC Technical Committee approve release of 23-047 “OGC TESTBED-19 GEODATACUBES ENGINEERING REPORT” as an OGC Engineering Report.
- There was no objection to unanimous consent
- This document describes the work and outcome of Testbed-19 with respect to the development and implementation of a draft GDC API specification. It reflects on existing specs that went into that definitions and describes all client and server implementations and discusses usability of those.

Testbed-19 Draft GeoDataCubes API Specification Motion

- The GDC SWG recommends that the OGC Technical Committee approve release of 23-048 “OGC TESTBED19 DRAFT API – GEODATACUBES SPECIFICATION” as an OGC Engineering Report.
- There was no objection to unanimous consent
- This document describes the OGC draft API GeoDataCubes specification as developed in OGC Testbed-19.

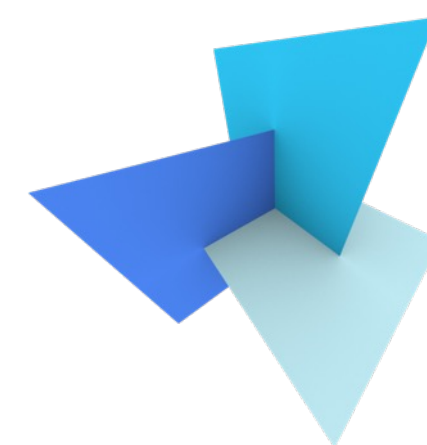


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GeoPose SWG

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Christine Perey
28 March 2024

Vote on Testbed-19 Engineering Report

- The GeoPose SWG recommends that the OGC Technical Committee approve release of OGC 23-042 “Engineering Report: OGC Testbed 19 Non-Terrestrial GeoSpatial Engineering Report” as an OGC Public Engineering Report.
- There was no objection to unanimous consent.

“The report documents methods for application of OGC GeoPose 1.0 and experimental extensions to GeoPose to addressing issues and comments from TB-18 and other implementations since the adoption of the standard by OGC.”



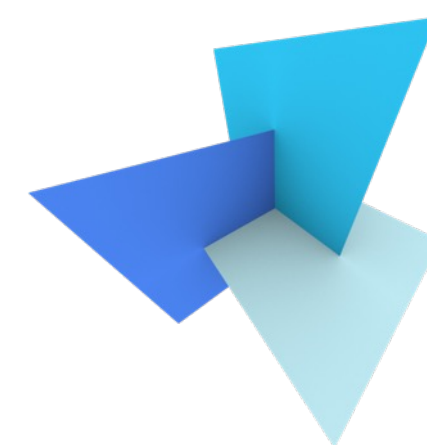
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GeoSemantics DWG

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Linda van den Brink, Geonovum
28 March 2024



The most important thing for this WG is...

We need to set up a joint WG between W3C and OGC to publish the expected new version of SSN Ontology, aligned with OMS SWG
([draft charter](#))

What we talked about this week

- Progress of SSN update
- New GeoSPARQL version
 - Need for a geohash register
 - Need input on 3D use cases
- The Kadaster Knowledge Graph
- Tooling to help work with geospatial linked data

Where we are headed in the coming year

- Full 3D support in GeoSPARQL
 - Special session will be organized to assemble use cases for 3D in GeoSPARQL
- Handing off SSN to joint W3C/OGC OMS SWG

Session agenda

W3C/OGC standard developments

- 09:00 Simon Cox (OGC), SOSA/SSN update (15 minutes)
- 09:15 Nick Car (Kurrawong AI), GeoSPARQL 1.2 and 1.3 plans (15 minutes)

Dutch experiences with geospatial linked data and semantic web

- 09:30 Redmer Kronemeijer (CROW), generating RDF from GeoPackage (15 minutes)
- 09:45 Wouter Beek (Triply), GeoSPARQL and WKT/CRS implementation experiences (15 minutes)
- 10:00 Lexi Rowland (Kadaster), Kadaster Knowledge graph (15 minutes)
- 10:15 Wouter Beek (PLDN), GeoData Wizard (15 minutes)
- 10:30 End

Motion

- Update of the SSN Ontology be pursued in collaboration with W3C, through a joint working group managed through the OGC OMS SWG
 - Proposed: Simon Cox
 - Seconded:
 - Discussion: RobA: add GeoSemantics DWG as coordination group in the charter
 - Vote: notuc
- Chair(s) of OMS SWG to work with W3C to prepare a new charter for the joint W3C/OGC working group
- Draft: <https://raw.githubusercontent.com/w3c/sdw-sosa-ssn/new-charter/charter/index.html>



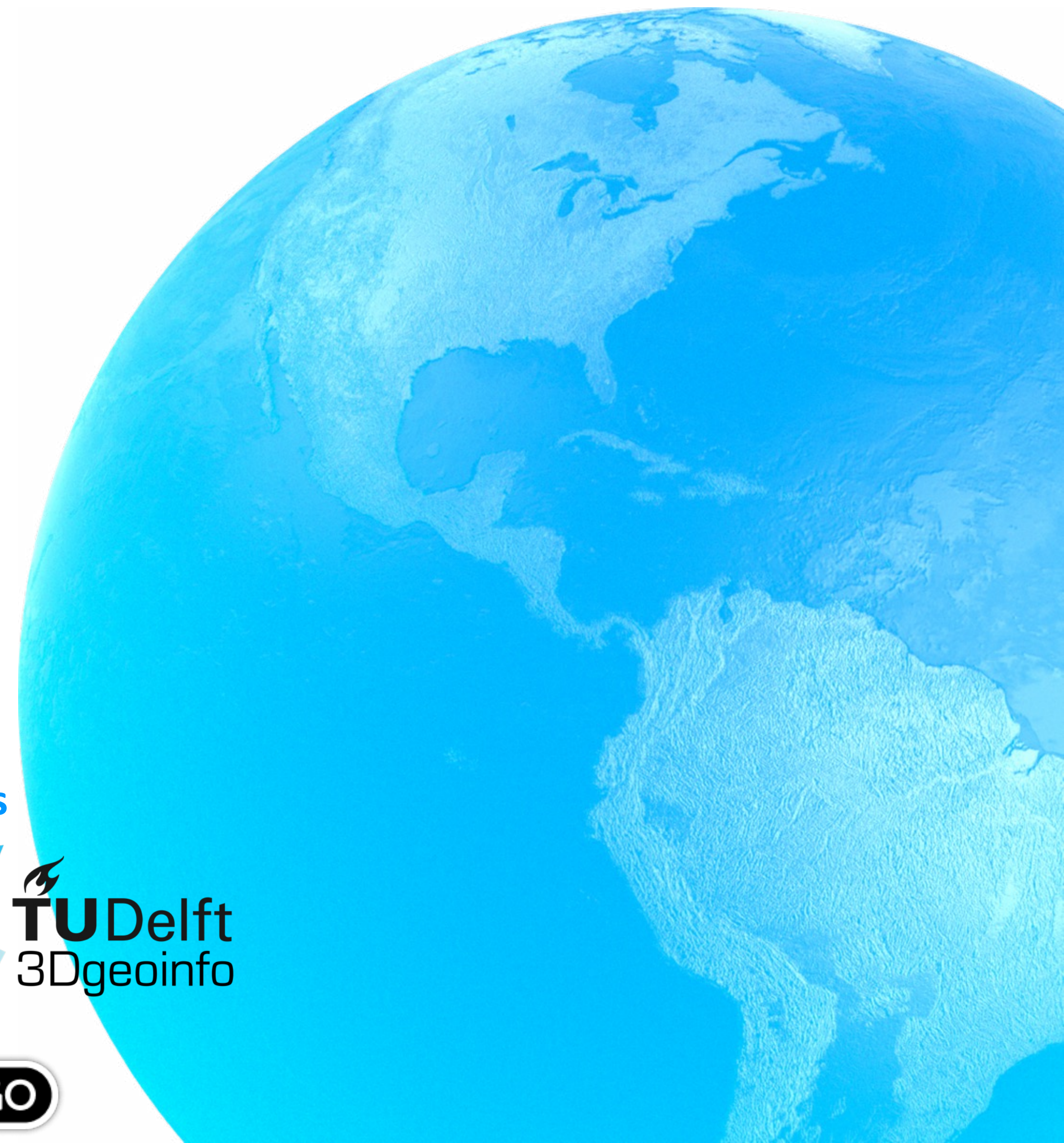
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Closing Plenary – no motions

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WG Chairs
28 March 2024

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3DIM DWG agenda

The 128th OGC Member Meeting

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Carsten Rönsdorf, OS
26 March 2024

The most important thing for this WG is...

The return of Bart de Lathouwer to 3DIM!

What we talked about this week

- Please put your name forward if you would consider becoming a 3DIM co-chair.
- We will do a chair election over email in the coming weeks.
- 3D context document idea: passing on scene definition and the web service it uses from one viewer to another. Simple principle to define your vantage point (camera pose) and what you are looking at (list of web services), like OWS context with a camera view.
- Spatial ID as a 3D DGGS implementation, including indoor navigation and underground use cases.
- Update on IMDF use in first responder scenarios (Muscatatuck campus, Indiana Uni).

Next Quarter WG Communications Plan

- Chair election
- Next meeting at Montreal Member meeting in June 2024

Session Agenda

- Welcome, call for new co-chair nominations
- 3D viewer context documents, Bart de Lathouwer
- Spatial ID and Spatial Voxel (3D Grid), Kakeru Suzuki
- FRST Challenge (First Responder Smart Tracking), David Coggeshall



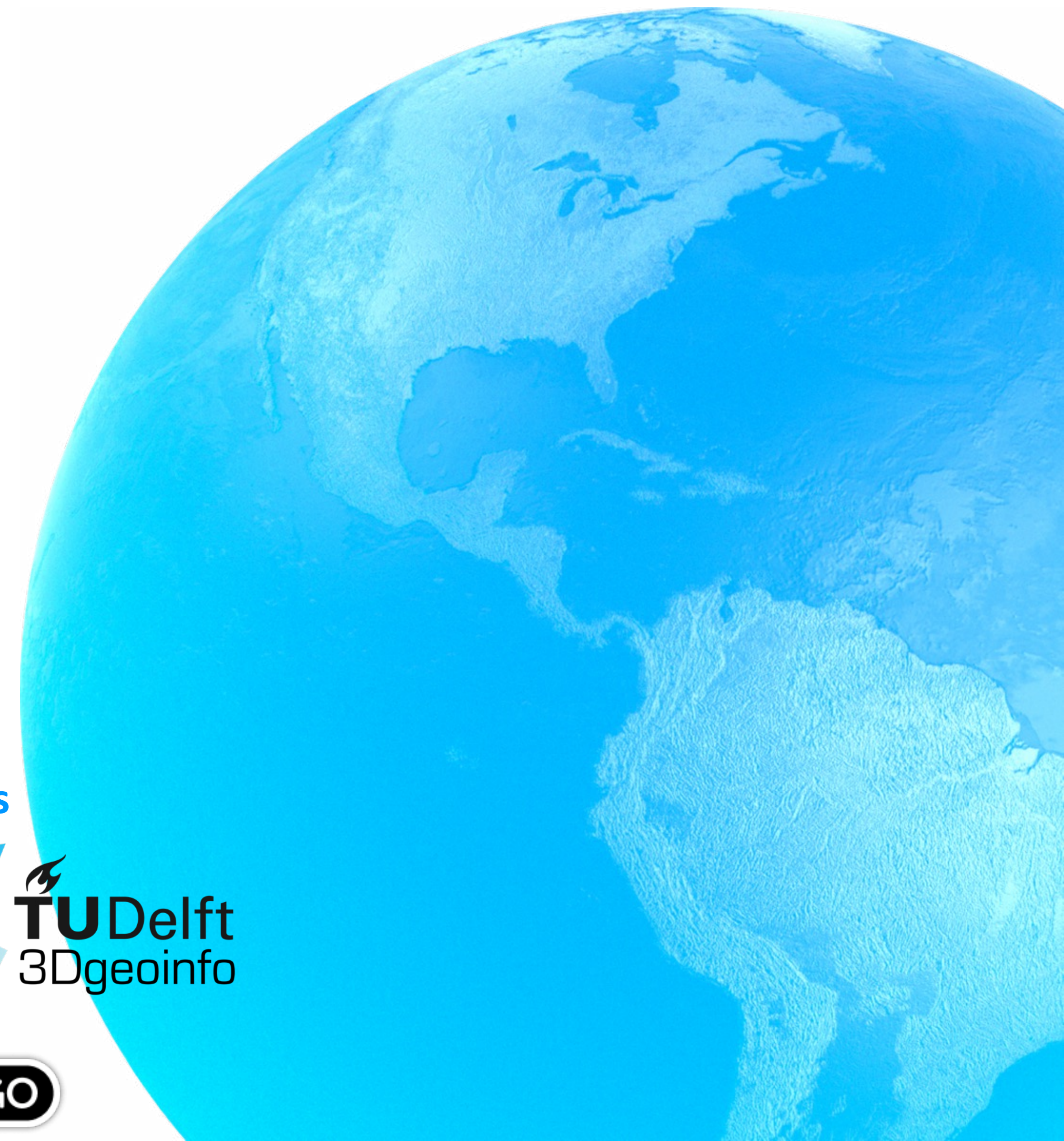
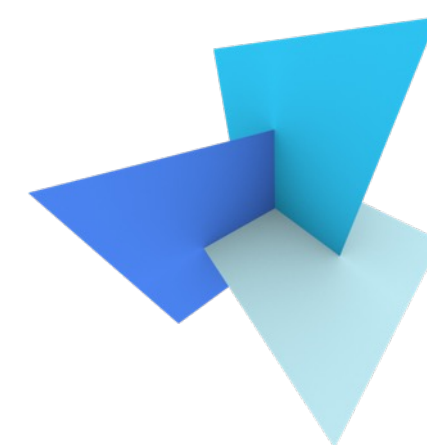
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Architecture DWG

The 128th OGC Member Meeting

Gobe Hobona (OGC),
Joan Maso (UAB-CREAF)
28 March 2024

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The most important thing for this WG is...

Are encodings the same as formats?

Session Agenda

- Carl Reed (Carl Reed and Associates) - Issues of the dependency of OGC API Standards on JSON (15 min)
- Linda van den Brink (Geonovum) - IMX-Geo: cross domain model geospatial data (15 min)
- Chris Little (Met Office) - What do we need from Time and the Temporal DWG once the Abstract Conceptual Model is agreed? (15 min)
- Chris Little (Met Office) - PubSub (15 min)
- Lucio Colaiacomo (EU Satellite Centre) - Agile Reference Architecture: Discussion on the Outcomes of Testbed-19 (15 min)
- Joan Maso, Gobe Hobona (UAB-CREAF / OGC) - Session wrap-up (15 min)

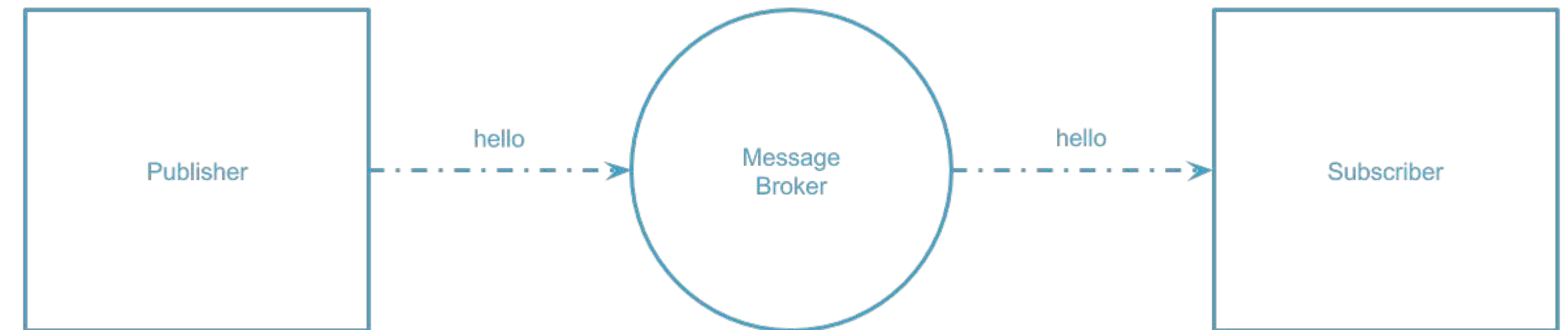
What we talked about this week

- The justification for adding conformance classes addressing each encoding should be added to OGC Standards
- Lessons from the Geonovum's IMX-Geo project, regarding orchestration engines, are relevant to OGC API – Processes – Part 2: Workflows and Chaining candidate Standard
- The PubSub extension of OGC API – EDR is intended to be adopted by other OGC API Standards, therefore detailed discussions are needed on how this could be achieved
- There is urgency in establishing an Agile Reference Architecture because it could address some of the fast-emerging requirements regarding Integrity Provenance and Trust (IPT)

Terminology conflation: Format/Encoding

- These two words (terms) are often used interchangeably in the OGC.
- Encoding is the process of *converting the data or a given sequence of characters, symbols, alphabets* etc., into a specified format.
- Format/formatting:
 - the organization of information according to preset specifications (schema)
 - the definition of the structure of data that gives the information its meaning
 -
- Encoding
 - process involving changing data into a specified format using a scheme
 - the process of putting a sequence of characters (letters, numbers, punctuation, and certain symbols) into a specialized format for efficient transmission or storage

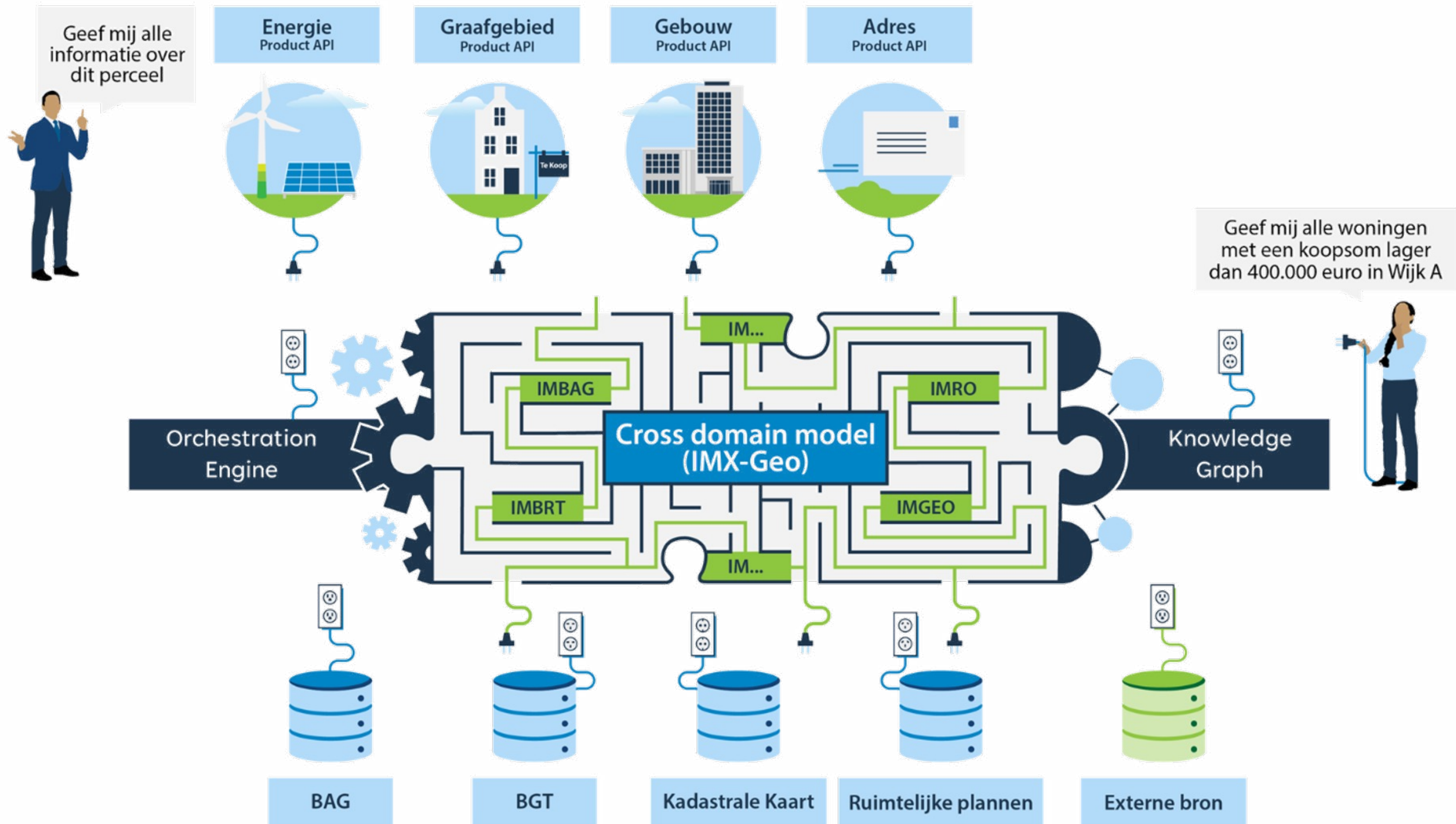
OGC API-EDR Pub/Sub Approach - Leveraging AsyncAPI



- **Link in Landing page**

```
{  
  "rel": "service-desc",  
  "type": "application/json",  
  "title": "AsyncAPI document",  
  "href": "https://example.org/asynccapi"  
}
```

- **Agnostic description of protocols, channels, and message payloads**
 - **MQTT, Kafka, AMQP, STOMP, WebSockets, JMS**



Where we are headed in the coming year

- PubSub extension of OGC API – Common (pulled in from OGC API – EDR)
- Agile Reference Architecture and building blocks
- Integrity, Provenance and Trust (IPT)



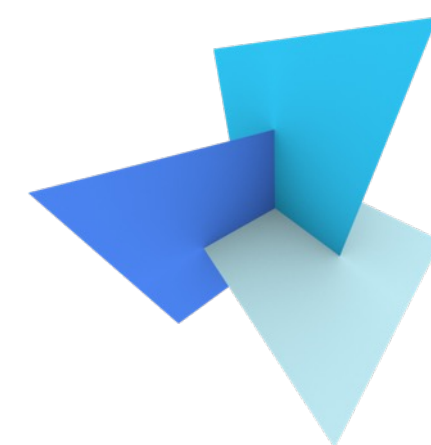
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BigData.DWG

The 128th OGC Member Meeting

Peter Baumann,
Constructor U | rasdaman
27 March 2024

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The most important thing for this WG is...

The BigData.DWG
is a discussion forum addressing Big Data challenges
(such as Volume, Velocity, Variety, and Veracity):
Recent trends & projects, challenges



What we talked about this week

- After being dormant for a while, shall we revive it?
- No fixed agenda - a vivid discussion emerged about a variety of topics, many of them cross-SWG
- Next TC meeting: will address those & more – join us!



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Blockchain and DLT DWG

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Andreas Matheus, Secure Dimensions
28 March 2024



The most important thing for this WG is...

Easily adoptable decentralized protocols for the geospatial web.

What we talked about this week

- Introduction to Blockchain and NFT
- Concept from Testbed 19 (F.A.C.T.S.) towards establishing trust and provenance in geospatial data processing

Where we are headed in the coming year

- Unclear but hopefully towards the adoption of Blockchain and DLT with solutions based on OGC Standards

Session Agenda

- DWG Co-chairs (periodic affirmation confirmed by email on 27th Feb. 2024)
 - Andreas Matheus / Secure Dimensions GmbH / Germany
 - Marcus Alzona / State of Maryland / USA
 - Taylor Oshan / University of Maryland / USA
- Unlocking the power of geospatial data and DLT/smart-contract Infrastructure to enhance the reliability of impact measurements
 - Louis Schwab (Axon Protocol)
- F.A.C.T.S.
 - Lucio Colaiacomo (EU SatCen)
- Discussion
 - All



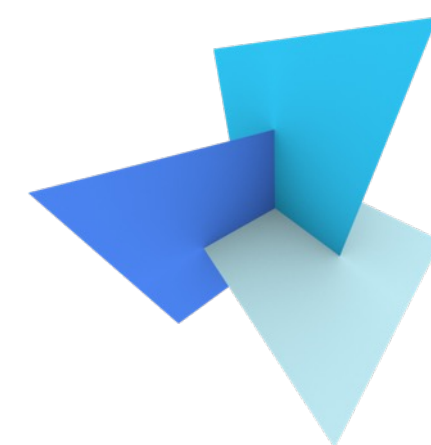
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CitSci DWG

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Joan Maso, UAB-CREAF
28 March 2024

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The most important thing for this WG is...

The SensorThings API is the standard that is driving some project to the interoperability path. The European Union funded projects CitiObs, more4nature and AD4GD are a demonstration of that.

What we talked about this week

- Organizational level interoperability aims to meet the requirements of the user community by making services available, easily identifiable, accessible and user-focused. Citizen Science in its various forms presents innovative ways of joint data and knowledge production and may even empower citizens in sustainable natural resource management.
- SensorThings API is helping to improve interoperability of several projects in Ferrara (Italy). Some examples were presented and questions were proposed.
- How to deal with an existing platform stack but wanting to share the data in a standard way with SensorThings API? How to deal with variables and units vocabularies? How do we respect ownership? How to create a tool that can be used to interoperate with several platforms using MQTT in a non standards way?.
- How to introduce authentication to low-cost sensors and capture that ownership in STAplus? How to use Self-sovereign identity (SSI) is an approach to digital identity that gives individuals control over the information they use to prove who they are to websites, services, and applications across the web.

Where we are headed in the coming year

- We will continue presenting approaches and tools to make data interoperable in the field of Citizen Science to scale up.
 - The TAPIS presentations was pending and will be done in the next meeting.
- We will explore links with other groups working on observations and the new SWG on indicators.

Session Agenda

- Social dimensions and OGC standards
 - Uta Wehn (IHE Delft)
- STA experiences from EDIAQI and USAGE projects (Ferrara)
 - Piergiorgio Cipriano (Dedagroup)
- Smart Citizen sensors and data gathering
 - Oscar Gonzalez (Fablab)
- Trust and Privacy in Citizen Science data
 - Andreas Matheus (Secure Dimensions)
- Understanding STAplus with tapis (for EU citizen science projects)
 - Joan Maso (CREAF)

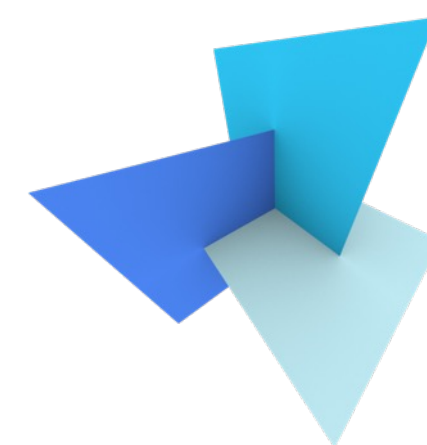


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CRS SWG/DWG

The 128th OGC Member Meeting

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Keith Ryden, esri
28 March 2024

The most important thing for this WG is...

Completion of the adoption vote for:

22-010r4 Topic 24 Functional Model for Crustal Deformation

22-051r7 GGXF geodetic data grid exchange format v1.0

What we talked about this week

- Status update on Dynamic Datum work.
 - 22-010r4 Topic 24 Functional Model for Crustal Deformation
(https://portal.ogc.org/files/?artifact_id=106827&version=1 [portal.ogc.org])
 - 22-051r7 GGXF geodetic data grid exchange format v1.0
(https://portal.ogc.org/files/?artifact_id=106828&version=1 [portal.ogc.org])
- Requirements for support of non-terrestrial spatial references and temporal data
- Coordinate Reference system requests for DGGS and how to expose those through the OGC Naming Authority
- JSON representation of CRS – moving forward with detailed review of PROJ JSON

Where we are headed in the coming year

- Discuss with the OGC Naming Authority how to expose CRS descriptions as CRS WKT2 and JSON representations – currently limited to GML.
- Actively work a JSON encoding for CRS descriptions – to be informed by the PROJ JSON implementation
- Complete of the adoption vote and start working pushing implementations for:
 - 22-010r4 Topic 24 Functional Model for Crustal Deformation
(https://portal.ogc.org/files/?artifact_id=106827&version=1 [portal.ogc.org])
 - 22-051r7 GGXF geodetic data grid exchange format v1.0
(https://portal.ogc.org/files/?artifact_id=106828&version=1 [portal.ogc.org])

Next Quarter WG Communications Plan

- Adoption of these documents are worth of blog/paper postings:
 - 22-010r4 Topic 24 Functional Model for Crustal Deformation
(https://portal.ogc.org/files/?artifact_id=106827&version=1 [portal.ogc.org])
 - 22-051r7 GGXF geodetic data grid exchange format v1.0
(https://portal.ogc.org/files/?artifact_id=106828&version=1 [portal.ogc.org])
- There have been several good presentations in OGC meetings that could provide high level overview material.
- Geodetic Agency participation in the document preparation is worth citing and may be a source of supporting comments/examples in postings.

Session Agenda

- Status update on Dynamic Datum work.
 - 22-010r4 Topic 24 Functional Model for Crustal Deformation
(https://portal.ogc.org/files/?artifact_id=106827&version=1 [portal.ogc.org])
 - 22-051r7 GGXF geodetic data grid exchange format v1.0
(https://portal.ogc.org/files/?artifact_id=106828&version=1 [portal.ogc.org])
- Any updates required for alignment with ISO documents?
- Overview on any pending Engineering Reports?
- Working Group requests for CRS definitions to be added?
- JSON representation of CRS – moving forward with detailed review of PROJ JSON
- Any other business?



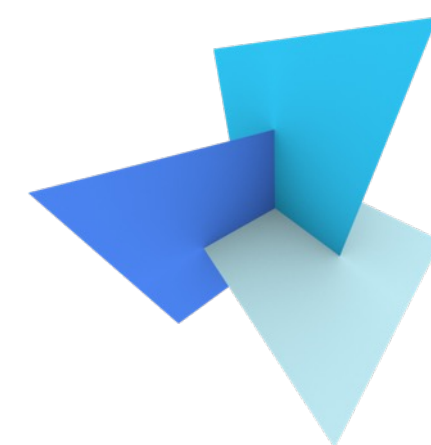
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Coverages.SWG

The 128th OGC Member Meeting

Peter Baumann,
Constructor U | rasdaman
27 March 2024

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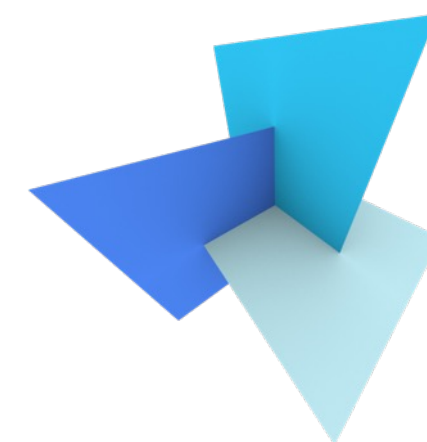


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Data Quality DWG

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Author, Affiliation
28 March 2024

The most important thing for this WG is...

Understanding how the requirements of data quality is related to data with a temporal element that does not conform to ISO's consideration of a dataset.

What we talked about this week

- We talked about:
 - Temporal Data Quality
 - Managing ISO metadata
 - Updates on ISO 19157

Where we are headed in the coming year

- The longer term goals are:
 - Ensuring the ISO 19157 update is fit-for-purpose.
 - Working with SensorThings SWG to ensure the quality extensions and models are harmonized.

Session Agenda

- Ivana Ivánová - Update on ISO 19157-3 Data quality measures register (10 minutes)
- Joan Masó & Núria Julià - QualityML in Gem+ (15 minutes)
- David Schäfer - Data Quality in STA from the Perspective of Automated Quality Control for Time Series Data (15 minutes)
- Andreas Matheus & Joan Masó - DataQuality in STA and STApplus (15 minutes)
- Karsten Peters-von Gehlen - What does it take to create high-quality climate model simulation output?(15 minutes)
- Discussion (15 mins)

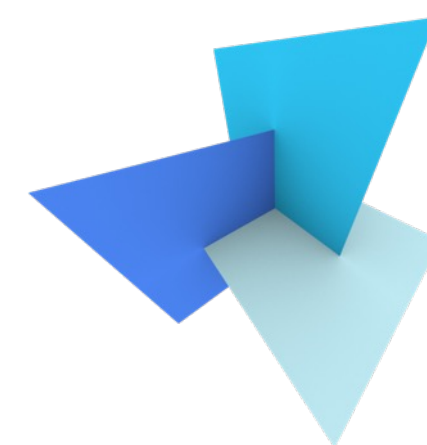


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Defence & Intelligence DWG

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Amanda K. Morgan, NGA
Lucio Colaiacono, EU SatCEn
28 March 2024

The most important thing for this WG is...

Following the experience of the Testbed 19 ER Agile Rerefence Architecture, and considering the development just presented, I would strongly recommend OGC taking the lead to harmonize all the efforts in enabling DCS (IPT) and TRUST in OGC standards and their implementations

Where we are headed in the coming year

- Data centric Security (Identity Integrity Provenance Trust)
- Data Streaming
- Persistent Monitoring Capability

Session Agenda

- Detecting and Analyzing Open Geodata Reconnaissance Targeting Critical Infrastructure, Oskari Häkkinen, Spatineo
- FACTS at SatCen , Lucio Colaiacomo, EU SatCen
- NATO SPS Cube4EnvSec Datacube Federation: Status, Findings, and Way Forward, Peter Baumann , Constructor University Bremen GmbH
- Next Generation ISR Imagery Standard (NGIIS), Jackie Carr, NGA

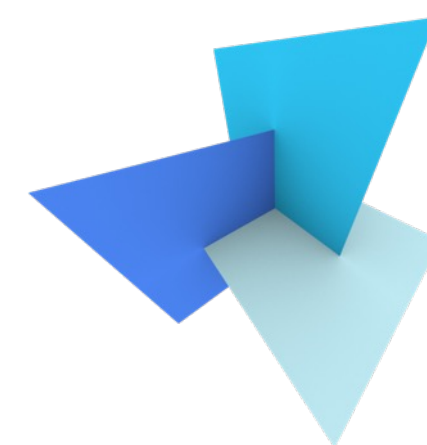


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DGGS DWG

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Peter Strobl
28 March 2024

The most important thing for this WG is...

DGGS is increasingly attracting interest and seeing new implementations

What we talked about this week

- Building a bridge between the Pangeo suite of tools and DGGS technologies
- Testing and evaluating what it means to store large raster data sets in a DGGS
- New ways of combining a quadrilateral DGGS (ISEA9R) and hexagonal (ISEA3H) for smart indexing
- A hierarchical discrete 3D spatial identifier system based on WGS84

With XDSSG package, no need to chose area of interest in 'cell' number but now you can chose that in lat and lon!!

```
[4]: ds_idx.dggs.sel_latlon([37., 37.5], [299.3, 299.5])
```

```
[4]: xarray.Dataset
```

Dimensions: (time: 2920, cell: 2)

Coordinates:

name	type	dtype	range
time	(time)	datetime64[ns]	2013-01-01 ... 2014-12-31T18:00:00
cell	(cell)	int64	590733031707246591 5907334440241...

Data variables:

name	type	dtype	range
air	(time, cell)	float64	...

Indexes:

name	index
time	PandasIndex
cell	H3Index(resolution=3)

Attributes: (5)

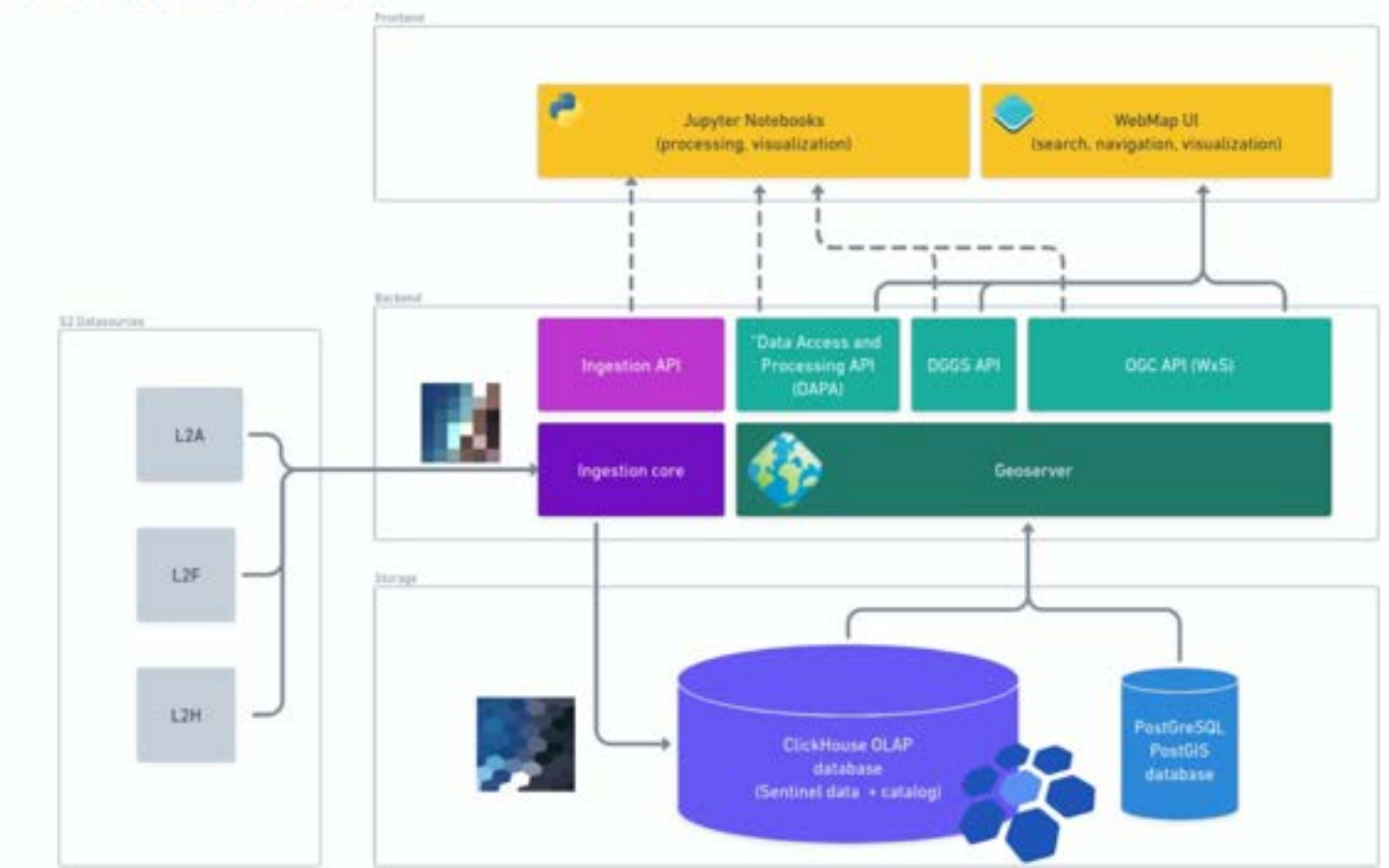
How ?

Development of a DGGS demonstrator software Possible Implementation

Development of a pilot demonstrator at country scale

Demonstrate efficiency in terms of product storage, search, visualization, and analysis

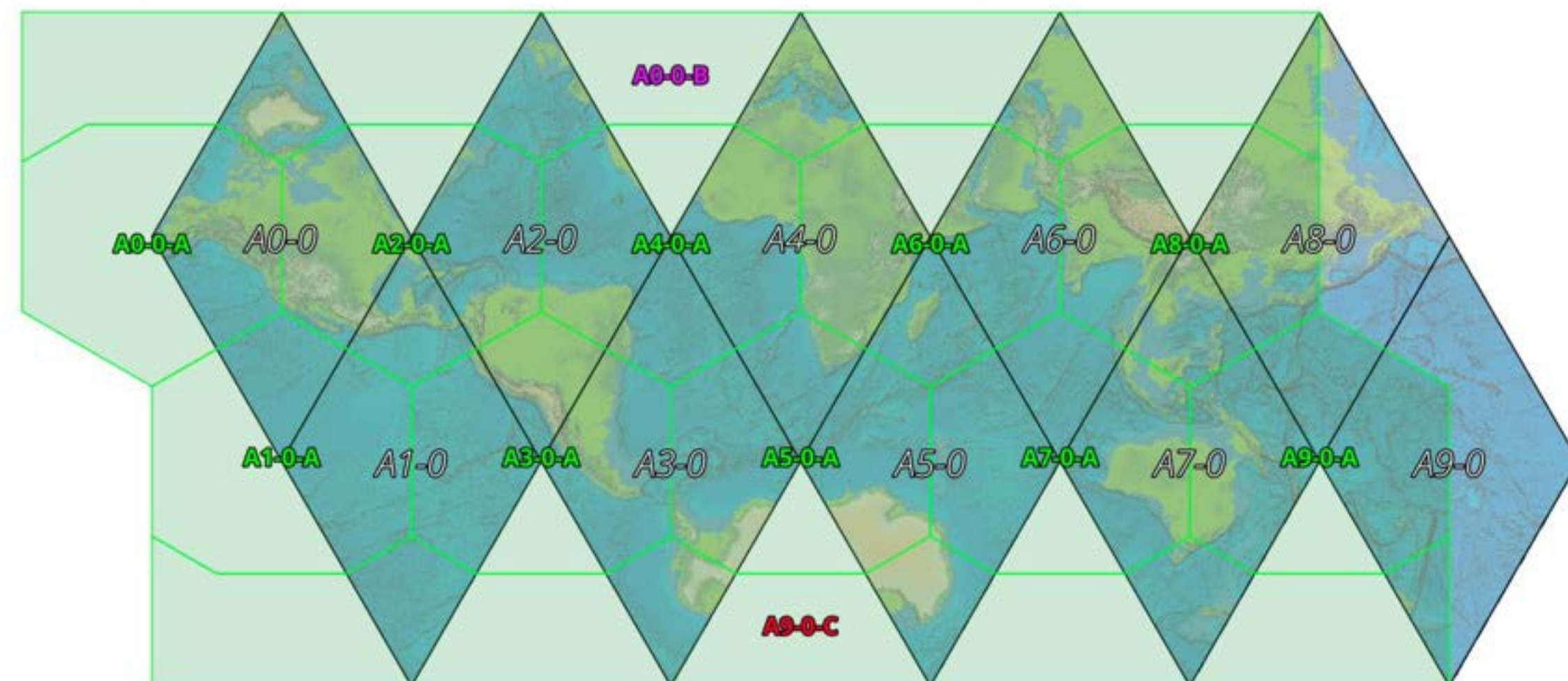
Support of native S2 (L2A) and Sen2Like products (L2F, L2H), L8, S3 (optical)



Indexing ISEA3H Even Levels

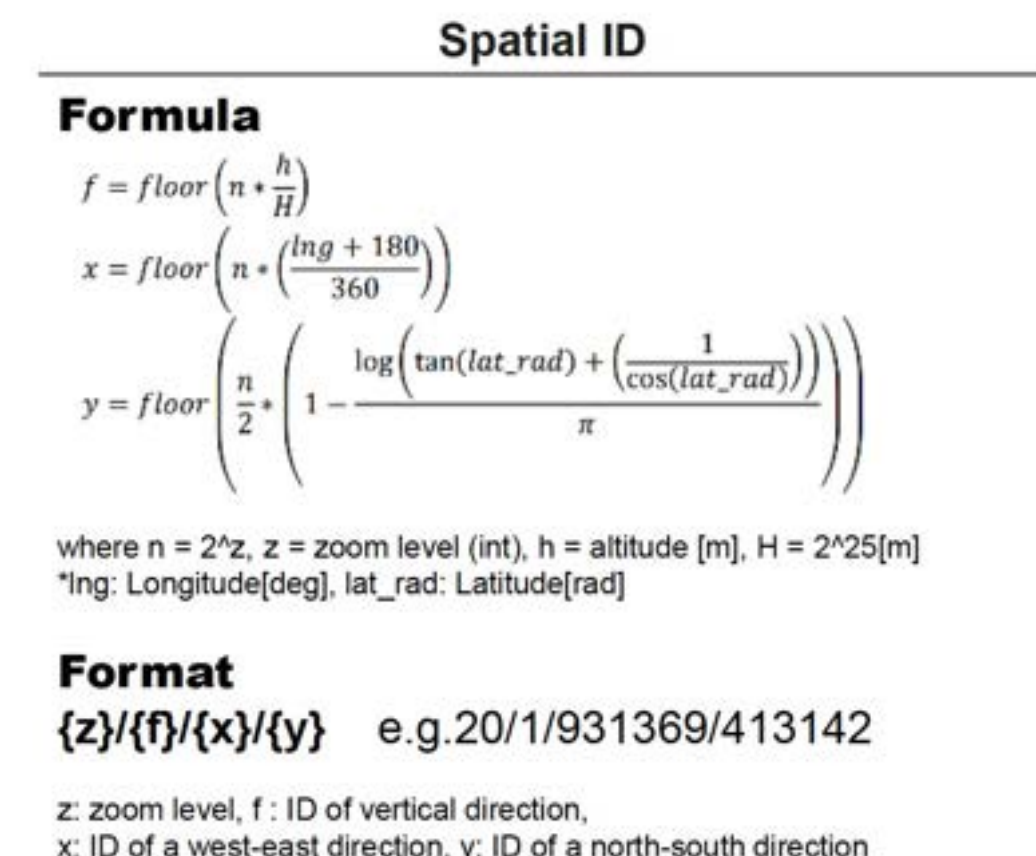
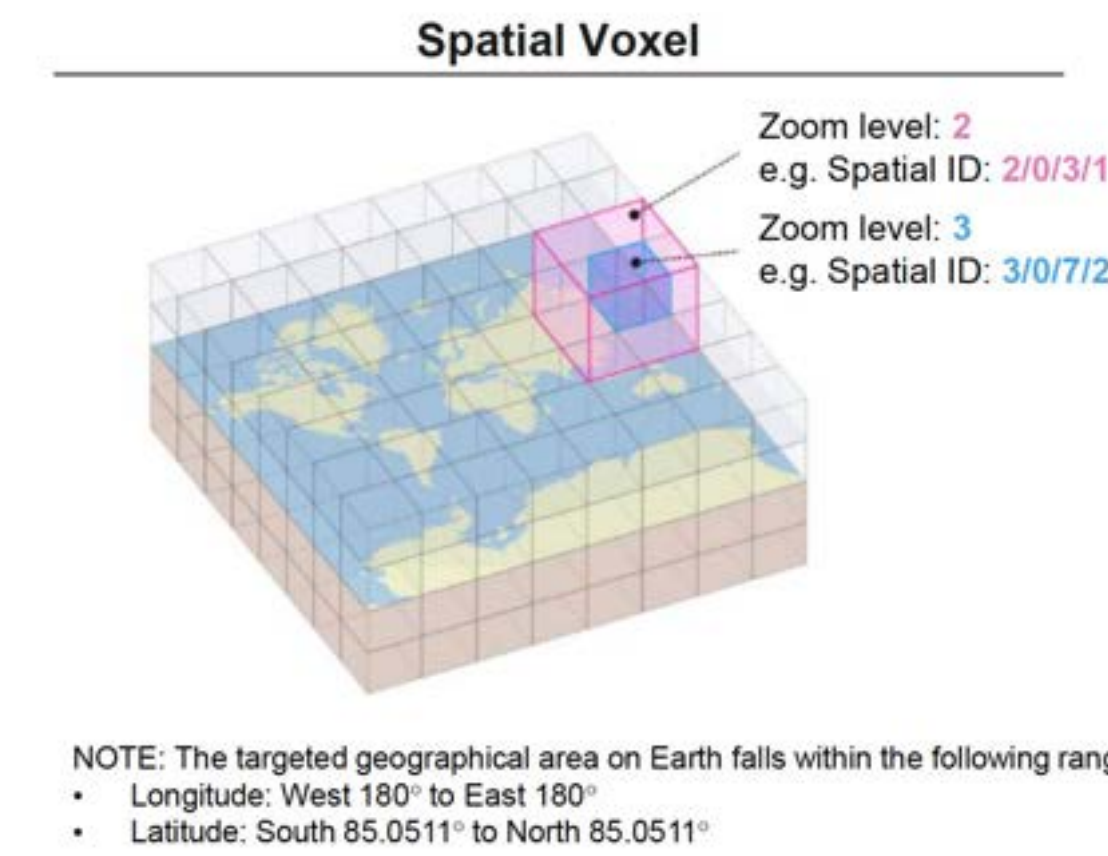
Re-using ISEA9R indices, adding one more - {sub-hexagon} differentiator based on rhombus left vertex on which hexagon is centered:

A - Regular case B - "North" pole case C - "South" pole case Level 0:



Identifier Assignment

- Divide all spaces on the Earth into a three-dimensional grid of rectangular prisms.
- Spatial Voxel** : Each of these individual spatial regions
- Spatial ID** : Unique position identification, assigned to each spatial voxel



Where we are headed in the coming year

- Bring OSGeo-software implementers and data producers together for novel use cases for DGGS implementation and proof of concept
- Explore role of DGGS in data-cubing and ARD

Next Quarter WG Communications Plan

- Planned Pangeo-DGGS presentation at EGU in Vienna, April 2024

Session Agenda

- **DGGS DWG Chair(s)**
 - Introduction and logistics - 5 min - In-Person
- ~~**Jean-Christophe Malapert & Flav Gouillon [CNES]**~~
 - ~~oceanographic DGGS and Digital Twin applications/research - 12 min - Virtual~~
- **Alexander Kmoch [University of Tartu]**
 - Pangeo update on DGGS activities - 10 min - Virtual
- **Georgia Doxani [ESA]**
 - ESA update on DGGS for Sentinel-2 - 12 min - In-Person
- **Jerome St-Louis [Ecere Corp]**
 - ISEA3H indexing - 12 min - In-Person

Session Agenda

- **Michitaka Tsuda** [*Japan METI (Ministry of Economy, Trade and Industry)*]
 - Spatial ID and Spatial Voxel (3D Grid) - 12 min - In-Person/Virtual? (There will be METI people attending in person - but I'm not sure about the presenter)
- **DGGS DWG Chair(s)**
 - General Discussion - 25 min - In-Person

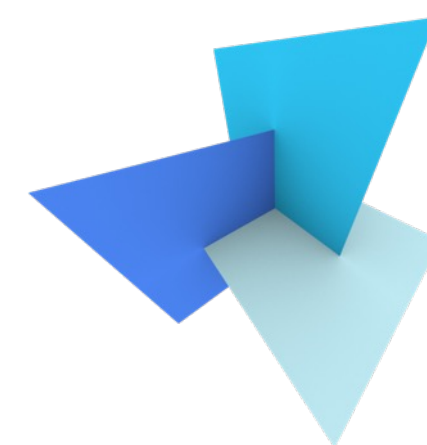


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Discrete Global Grid Systems Standards Working Group

The 128th OGC Member Meeting

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Dr Matthew Purss,
Pangaea Innovations Pty Ltd
28 March 2024



Earth Observation Exploitation Platform DWG

The 128th OGC Member Meeting

Ryan Ahola, NRCAN
Claudio Iacopino, ESA
Pedro Gonçalves, Terradue
28 March 2024

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The most important thing for this WG is...

Continuing to advance the use of OGC approaches for all aspects of working
with Earth Observation data

What we talked about this week

- Applications of the OGC TrainingDML-AI standard to cloud-native training data storage
- Approaches for integrating open and commercial EO datasets for continuous and consistent monitoring of change on Earth's surface
- Datacube federations to connect distributed datacubes from different providers and AI approaches for interacting with datacubes

Where we are headed in the coming year

- Upcoming improvements to the Earth Observation Exploitation Platform Common Architecture (EOEPCA). Potential for DWG to inform any improvements required for OGC standards to realize new EOEPCA goals
- Better understanding the increasing role of AI approaches for working with and gaining insight from EO data. Understanding what role the DWG has in helping OGC manage this change

Next Quarter WG Communications Plan

- DWG plans to meet during 129th Member Meeting in Montreal. Communications will be released to promote that session
- No other communication activities are anticipated at this time

Session Agenda

- Samantha Lavender, “Application of the OGC TrainingDML-AI standard to cloud-native training data storage”
- Adithya Kothandhapani, “EarthSights v2.0: Bridging Open and Commercial EO Data” (Virtual)
- Peter Baumann, “The EarthServer datacube federation: recent growth and new features” (Virtual)

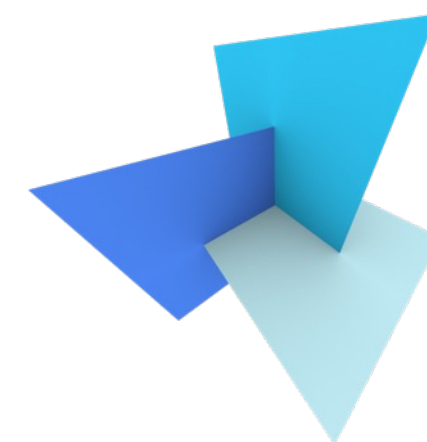


Features and Geometries JSON (JSON-FG) SWG

The 128th OGC Member Meeting

Clemens Portele,
interactive instruments
28 March 2024

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GeoAI DWG

The 128th OGC Member Meeting

Kim, Kyoung-Sook, AIST

Chauhan, Lokendra, Qen Labs Inc.

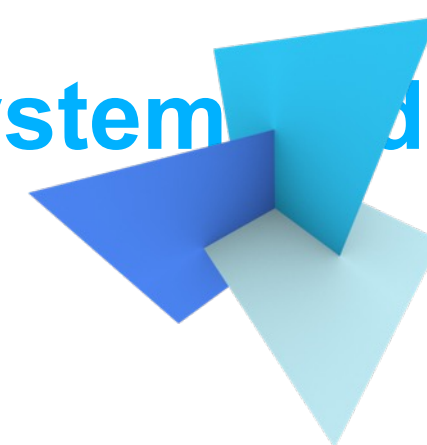
Hadland, Anneley, HELYX secure information system

Chou, Tien-Yin, Feng Chia University

Kotzinos, Dimitris, OSGeo

28 March 2024

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The most important thing for this WG is...

Online GeoAI Speaker Series

Format

- Online Speaker Series
 - 45-Minute Sessions
 - 5-Minute Introduction
 - 25-30 Minute Speaker Presentation
 - Moderated Q&A -- Chat Only for Attendees
 - Open to the public – speakers and attendees do not need to be OGC members

Roles and Responsibilities

- Lokendra will recruit and schedule speakers
- OGC
 - infrastructure, scheduling, logistics, and facilitation
- GeoAI DWG
 - Helps promote the speaker series
 - Holds internal discussions of speaker topics to generate innovation and/or standards ideas



What we talked about this week

Executive Summary

- Lokendra and I plan to organize an online GeoAI Speaker Series
- Objectives:
 - broaden participation and awareness of the GeoAI DWG
 - generate innovation and/or standards ideas
- First session tentatively scheduled for April 17, 1800 - 1900 UTC

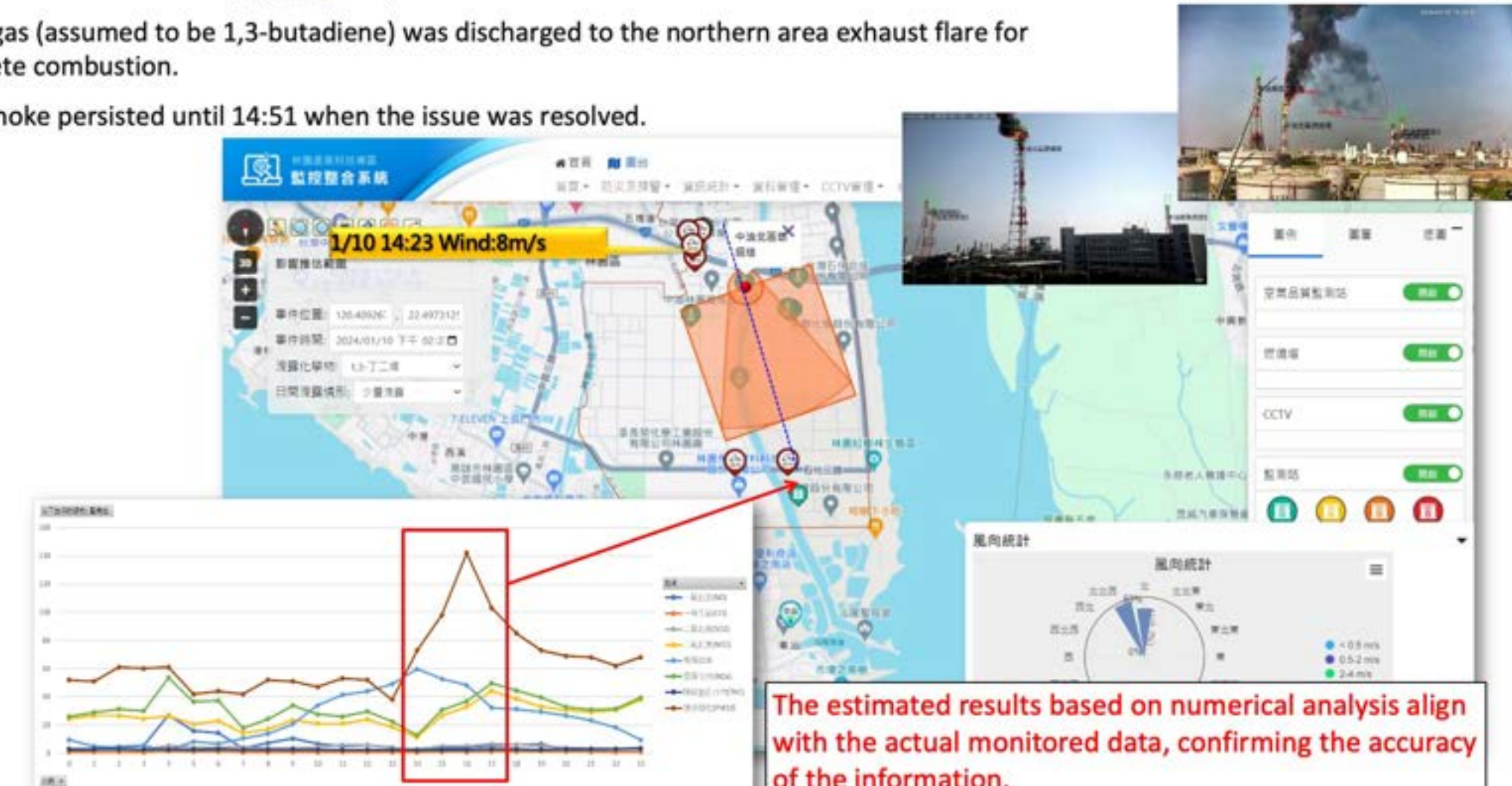
Roles and Responsibilities

- GeoAI DWG members
 - Choose a Curator of the GeoAI Speaker Series for a 1 year term
 - attend and/or help promote each session
 - Discuss of speaker topics to generate GeoAI use cases and/or requirements
- Curator
 - Evaluate, select and schedule speakers
- OGC Staff
 - Infrastructure, scheduling, logistics, and facilitation
 - Micah will lead



Real Event At 14:23 on January 10th:

- The safety interlock mechanism of compression compressor C-1501 in the ethylene cracking unit (M33) at the Formosa Plastics Group (Nanya Site) was activated.
- Process gas (assumed to be 1,3-butadiene) was discharged to the northern area exhaust flare for incomplete combustion.
- Dense smoke persisted until 14:51 when the issue was resolved.



Where we are headed in the coming year

Online GeoAI Speaker Series

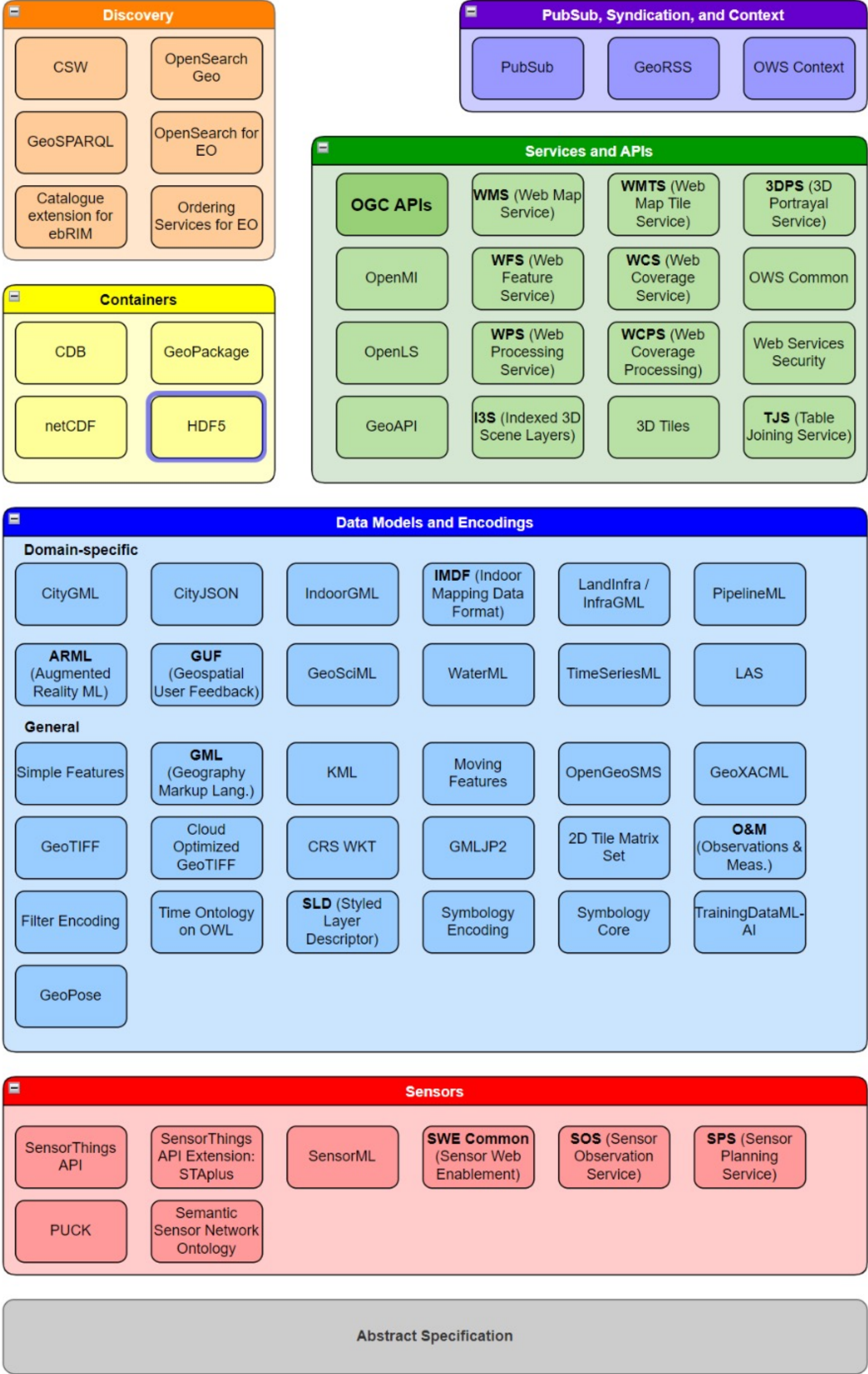
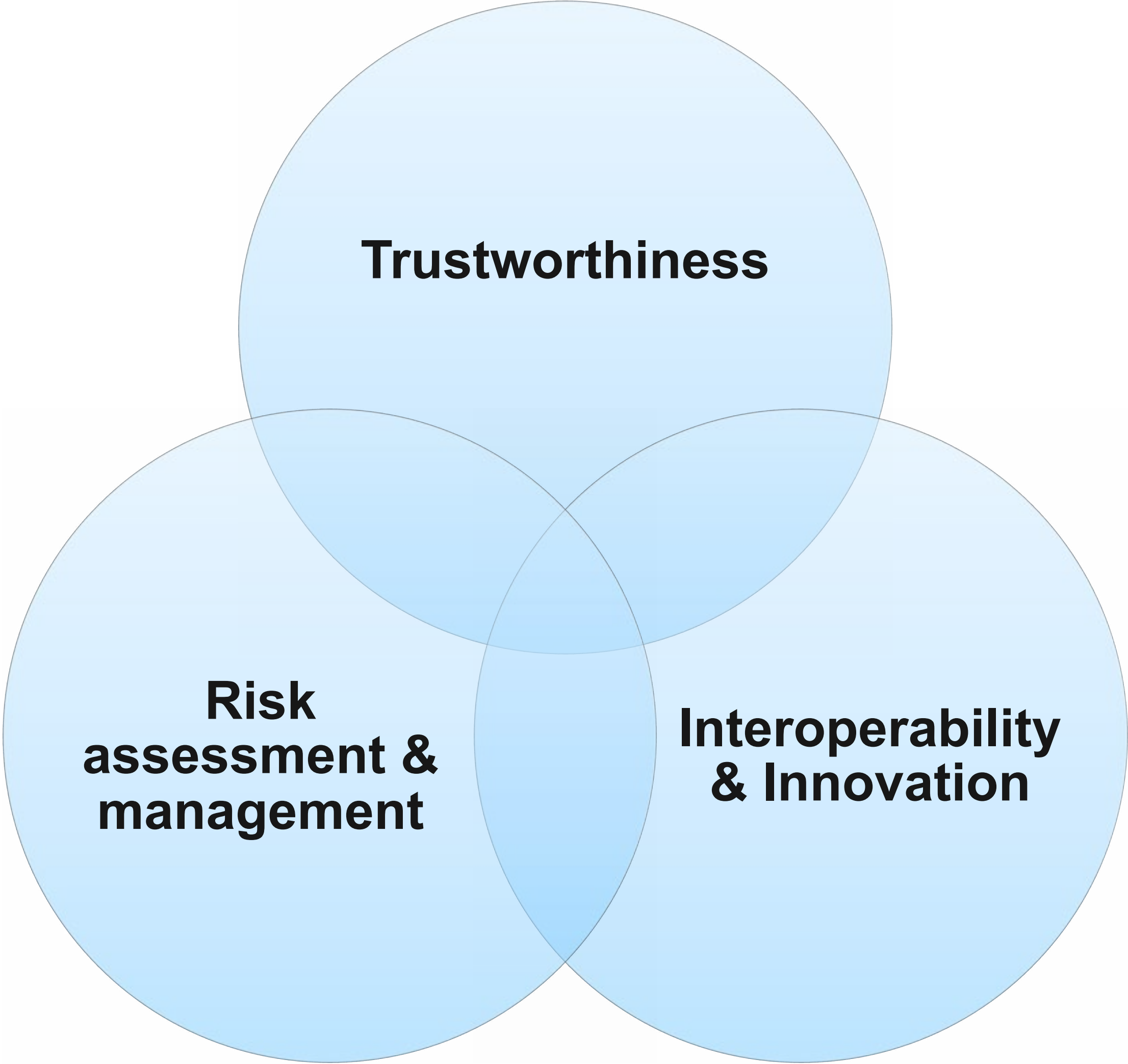
April 17, 1800 - 1900 UTC	First Session	} 2pm Montreal Time
May 15, 1800 - 1900 UTC	Second Session	
June 17 - 21	Montreal Member Meeting	
Sep 19, 0200 - 0300 UTC	Third Session	} 11am Seoul Time
Oct 16, 0200 - 0300 UTC	Fourth Session	
Nov 4 - 8	Seoul Member Meeting	
Dec 18 <u>1400</u> - 1500 UTC	Fifth Session	} <u>3pm</u> Central European Time
Jan 15, <u>2025</u> 1400 - 1500 UTC	Sixth Session	

**Times and dates subject to change based on speaker availability

Agenda

- Welcome and Introduction (10 min)
 - Kyoung-Sook Kim (National Institute of Advanced Industrial Science & Technology (AIST))
- GeoAI Speaker Series Discussion (20 min)
 - Micah Brachman (OGC)
- Taiwan's Innovative Fusion of AI and Geospatial Technologies Advancing Sustainability and Industrial Area Management (20 min)
 - Tien-Yin (Jimmy) Chou (Feng Chia University)

What is OGC role?



Motion to approve GeoAI Speaker Series

- The GeoAI DWG approves on online GeoAI Speaker Series.
 - There was no objection to unanimous consent.

Motion to approve Lokendra Chauhan as Curator

- The GeoAI DWG approves Lokendra Chauhan as Curator of the GeoAI Speaker Series.
 - There was no objection to unanimous consent



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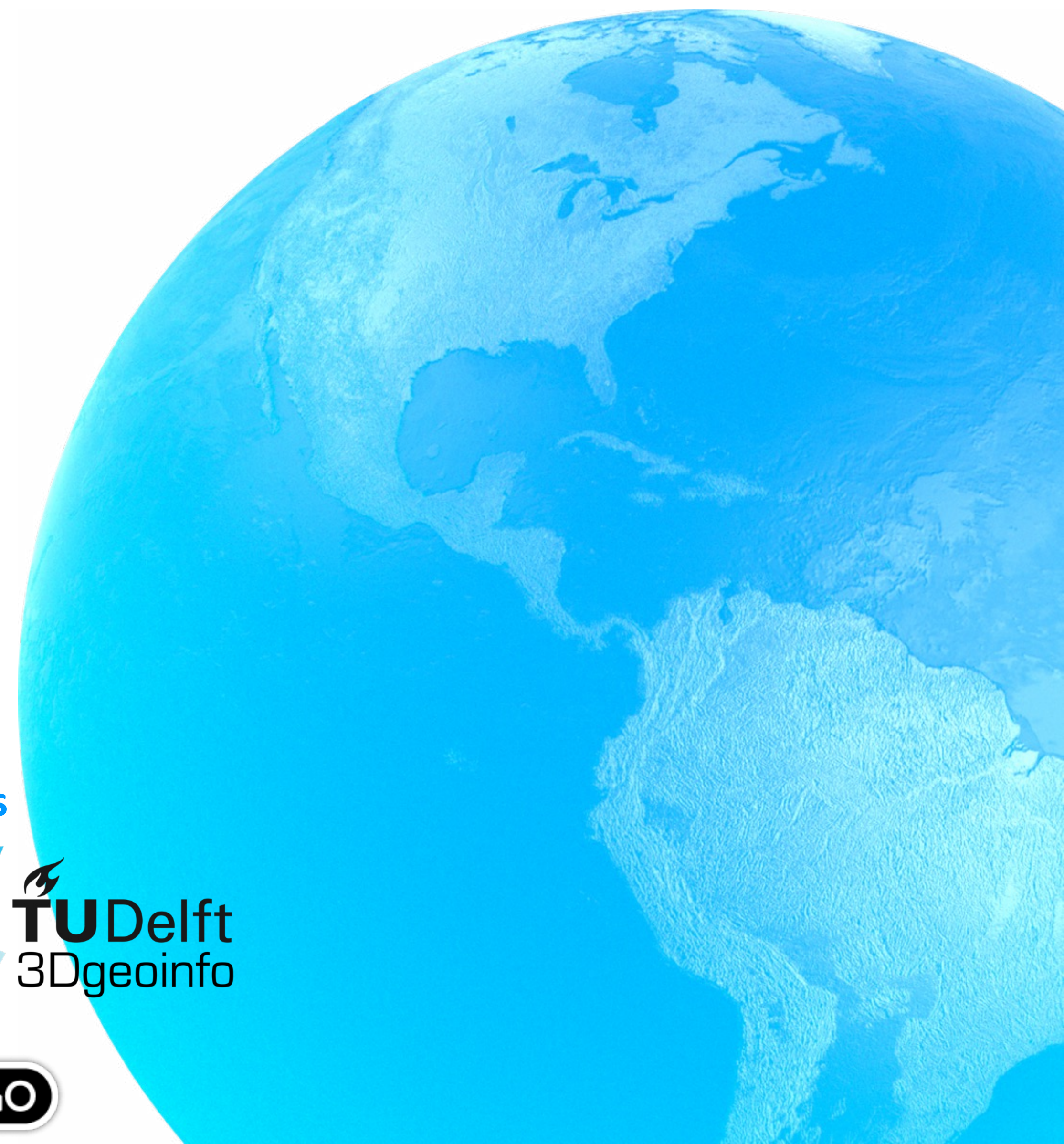
Geospatial Data Requirements Ad-hoc

The 128th OGC Member Meeting

Meeting Sponsors



Joan Maso, UAB-CREAF
28 March 2024



The most important thing for this WG is...

We saw that there are some groups (NOAA, ESA-CIS², EEA-GEO) using a similar model for data requirements and there is an opportunity for standardization.

What we talked about this week

- There are some groups doing similar things: NOAA, ESA-CIS², EEA-GEO.
 - The Management and Uses of NOAA's User Observation Requirements Information is a database of system-agnostic user needs for environmental parameters required to produce specific products and services to meet mission objectives. User observation needs from NOAA's users that have been reviewed and validated by Leadership and the NOAA Observing Systems Council (NOSC).
 - CIS² is an open database designed to record the requirements of the Copernicus Services, ESA, and EUMETSAT for in-situ data, the features of each dataset and the barriers to their continuous use, in order to provide a clear picture of what data is already available and what would be needed to deliver improved and more reliable products and monitoring services.
 - The G-reqs is a database tool and a standard methodology designed to collect needs and requirements for in-situ datasets in support to the implementation of the GEO Work Programme. In contrast with the most existing systems where requirements are collected with a concrete service or product in mind, G-reqs provides a user-driven approach, based on the concept of Needs that can be fulfilled by executing a set of tasks that require in-situ data.
- There are many commonalities on user requirements among these groups.

Where we are headed in the coming year

- We have produced a charter draft
 - It is available here: https://portal.ogc.org/files/?artifact_id=107410
 - Deliverables are:
 - The provision of common standard data model for Geospatial Data Requirements
 - To make the Geospatial Data Requirements FAIR by means of the new OGC API.
- We request that the OGC membership review it
- We will incorporate the proposed changes
- We will propose this in the next Geospatial Data Requirements ad-hoc in the next MM session for the adoption of this charter

Session Agenda

- Management and Uses of NOAA's User Observing Requirements Information
 - Meredith Wagner (NOAA)
- CIS2 – Copernicus In Situ Component Information System overview
 - Cristina Negri Arnoldi (e-geos, Italy)
- G-reqs as a in-situ requirements tool for GEO
 - Alba Brobia (UAB-CREAF)
- Discussion about next steps and possible creation of a SWG
 - Joan Masó (UAB-CREAF)



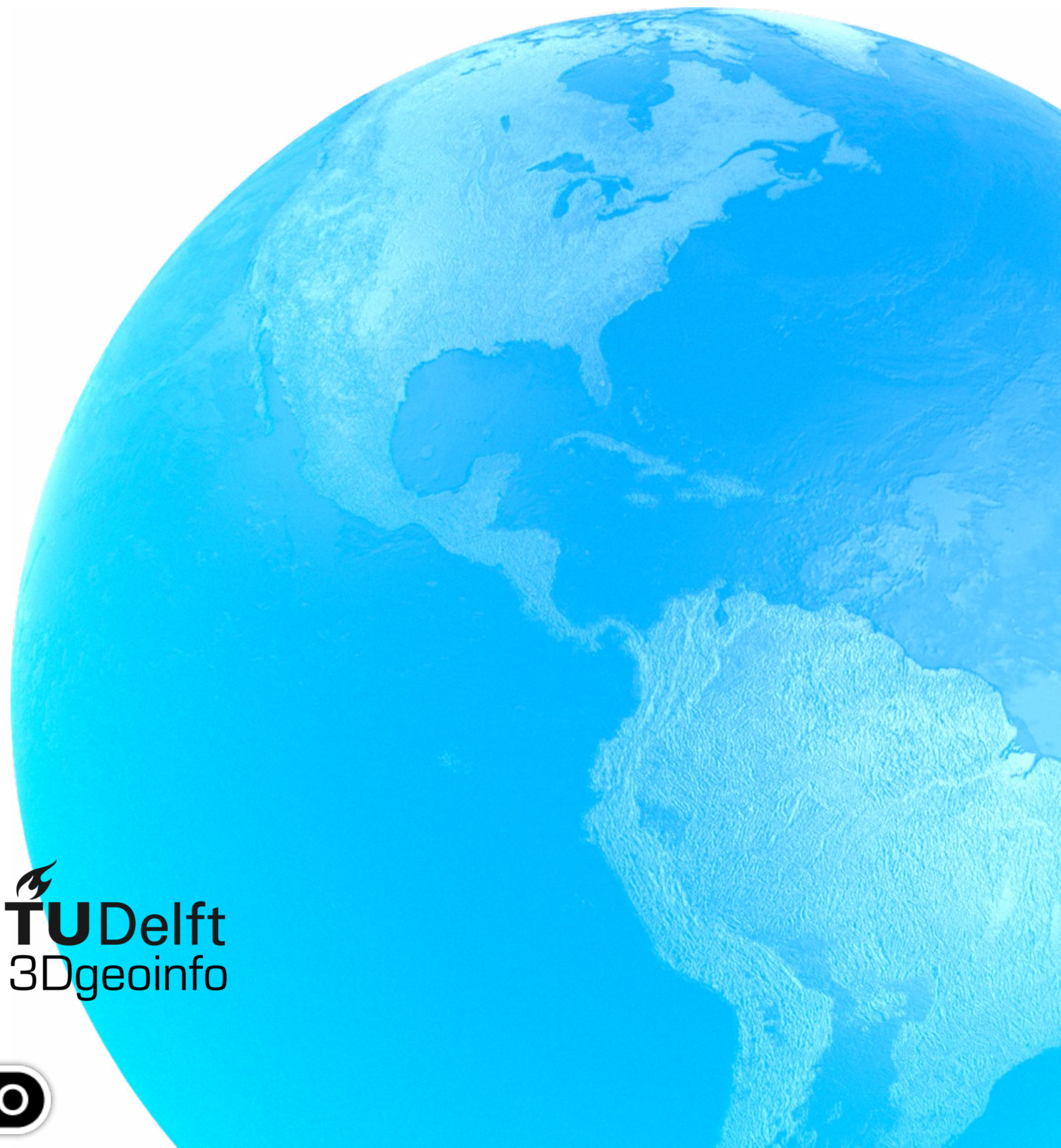
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Geospatial User Feedback

The 128th OGC Member Meeting

Joan Maso, UAB-CREAF
28 March 2024

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GeoTIFF SWG

The 128th OGC Member Meeting

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Chuck Heazel, Heazeltech
28 March 2024





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IndoorGML SWG TC Report

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Ki-Joune Li, PNU
28 March 2024



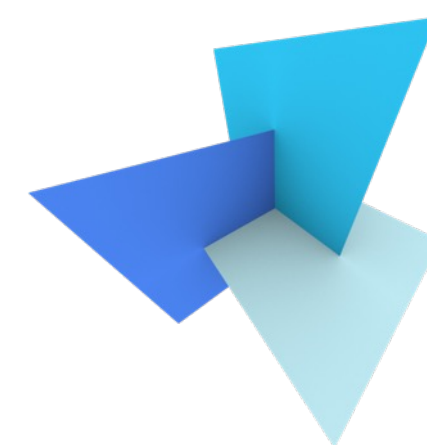
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ISG DWG

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Alban BERGERET, Epic Games
28 March 2024



The most important thing for this WG is...

- The evolution of game engine tech to support the constraints of GIS data.
- The evolution of game engine ecosystem with more and more providers of tools and pipelines to bring GIS Data to the game engines

What we talked about this week

- Intro
 - How game engines evolved over time to support Large Open Worlds
 - Which pipelines exist to bring these data as 3D content?
 - What future do we expect in this field? Procedural content!
 - Bonus – CAE just had the first FAA-issued Level-D certification for a FFS using Unreal Engine
- Duality AI
 - A GIS-based data pipeline using AI to create Site twins to run simulation of autonomous agents, using different sets of initial conditions.
- ESRI
 - How Maps SDKs for game engine allow new type of applications, from Desktop to XR, with a no-code/low-code approach, using existing OGC standards at the core.

Where we are headed in the coming year

- More power on the Game engine side to display more content
- More and more GIS Data, with more and more semantics, extracted by AI.
- Procedural 3D content generated from this data
- => It will require established standard of feature catalog to have this information meaningful to machines.

Next Quarter WG Communications Plan

- Alban won't be able to make it for Montreal
 - Find a solution to have the DWG meeting happen.

Session Agenda

- Quick Introduction (A. Bergeret) – 15mn
 - *How game engines evolved over time to support Large Open Worlds*
 - *Which pipelines exist to bring these data as 3D content?*
 - *What future do we expect in this field?*
- Duality.ai (Sunil Shah) – 30mn
 - *Geospatial to Simulation: Building Digital Twins of Real-World Places*
- ESRI (Michael Branscomb) – 30mn
 - *From Meshes to Metaverses: Building an open ecosystem for seriously geospatial games.*
- Q&A ? Open discussions – 15mn

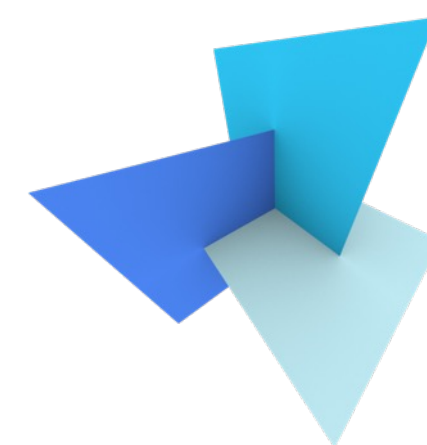


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Observational Data – Special Session

The 128th OGC Member Meeting

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Kathi Schleidt, DataCove e.U.
28 March 2024

The most important thing for this WG is...

Due to **diverse approaches** in the provision of **Observational Data**, it is quite **difficult to merge data** from different sources (especially when coming from different communities). Various standards working groups don't seem to be leveraging existing OGC abstract topics (e.g. OMS), but modelling their own observational data approaches.

This is, to an extent, a repercussion from a **lack of interaction** between working groups that utilise Observational Data.

- As a first step, we would like to **raise awareness** of what exists within the OGC abstract topics;
- as a second step, we'd like to show how these **conceptual models** can be **integrated** within thematic standards, **ensuring harmonisation** between the conceptual OMS data model and those using Observational Data in other groups.

This would help guarantee that both users and providers of this data, in all working groups, are aligned, resulting in improved data synergy regardless of Observational Data provenance.

What we talked about this week

- Commonalities:
 - Observable Properties across standards
 - How to reuse, align
 - Observational Metadata
 - Simplified views on complex Observations
 - Semantic Transposition
- Interoperability:
 - Different APIs
 - Combining derived Observations with in-situ Observations
- Actions
 - Examples/Training Material
 - Keep Talking!!!

Session Agenda

- Block 1 (1:30 – 3:00 pm)
 - Short introduction to OMS
 - Problem Statement - Invited Talks
 - Tour de Models
- Block 2 (3:30 – 5:00 pm)
 - Discussion topics (open to suggestions)
 - Identification of commonalities
 - Issues on interoperability
 - Actions

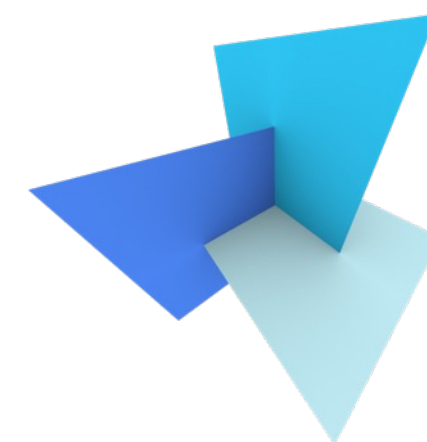


Observations, Measurements and Samples (OMS) SWG

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Kathi Schleidt, DataCove e.U.
28 March 2024





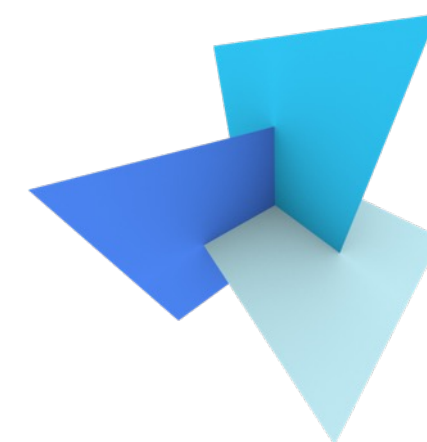
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OGC API Common SWG

The 128th OGC Member Meeting

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Joan Maso, UAB-CREAF, Editor
Jerome St. Louis, ECERE, Presenter
28 March 2024



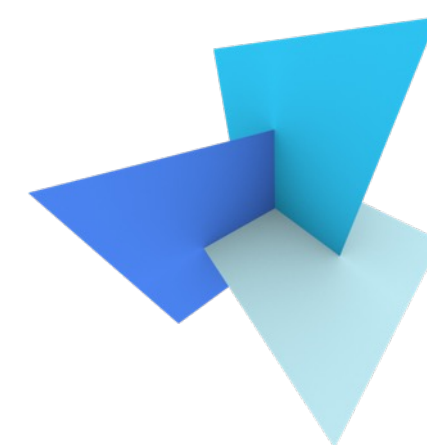


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OGC API – Processes SWG

Benjamin Pross, 52°North GmbH
28 March 2024

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Point Cloud DWG Report to TC

The 128th OGC Member Meeting

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Stan Tillman, Hexagon
28 March 2024

The most important thing for this WG is...

Following the advancement of LAS 1.5 and LAZ as a Community Standard

What we talked about this week

- Overview of the nD-PointCloud Project
- Point Cloud Data Storage and Transmission in Arrow and Parquet
- ASPRS LAS 1.5 happenings and activities
- Two announcements:
 - Participation in the IEEE EO Point Cloud group
 - The submission of LAZ (based on LAS 1.4) as a Community Standard

Where we are headed in the coming year

- Bring in the latest LAS 1.5 (when it is ready)
- Support the addition of LAZ as a Community Standard
- Continue to discuss the use of 3D GeoVolumes as a transfer standard for point clouds.

Next Quarter WG Communications Plan

- < Are there any upcoming events (e.g., conference papers) related to your WG that you would like OGC to promote? > N/A
- <Is there a new project or outcome that you think is worthy of an article or blog post? Please add a short description.> N/A
- <Have there been any articles published online/in magazines that reference the work your WG is doing?> N/A

Session Agenda

- ~~• 3d LoD2 building reconstruction benchmark at IGNF~~
 - ~~• Bruno Vallet, IGN France~~
- Overview of the nD-PointCloud Project
 - Overview of the nD-PointCloud Project
 - Peter van Oosterom, TU Delft
 - VPC loader for potree
 - Thijs van Lankveld, TU Delft
 - Apache Parquet for nD-Pointclouds storage and retrieval
 - Martijn Meijers, TU Delft
- Point Cloud Data Storage and Transmission in Arrow and Parquet
 - Howard Butler, Hobu
- ASPRS LAS 1.5 happenings and activities
 - Howard Butler, Hobu

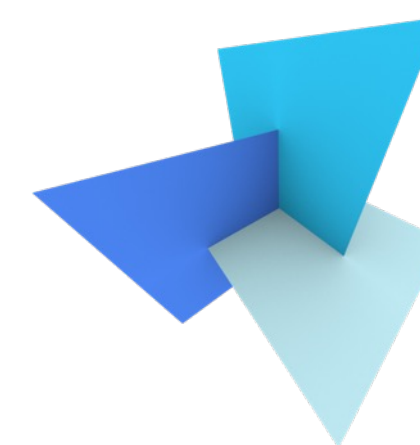


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POI SWG

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Christine Perey
28 March 2024



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Security DWG

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Andreas Matheus, Secure Dimensions
28 March 2024



The most important thing for this WG is...

SECURITY

What we talked about this week

How to apply F.A.C.T.S. (Testbed 19 ER Agile Reference Architecture) to OGC API Processes

Where we are headed in the coming year

- Unclear

Next Quarter WG Communications Plan

- The chair was asked about this and said that the Security DWG has no fixed telecom schedule but could very quickly schedule telecons if there is a need

Session Agenda

- Trusted Low Cost Sensor
 - Andreas Matheus (Secure Dimensions)
- ~~• How to secure pygeoapi and streamline protected OGC APIs~~
 - ~~• Francesco Bartoli (GEOBEYOND)~~
- The Trusted Teapot Process -- or -- the good, the bad and the ugly
 - Andreas Matheus (Secure Dimensions)
- Discussion
 - All



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Space Standards DWG

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Chuck Heazel, Heazeltech
28 March 2024

The most important thing for this WG is...

Our objective is to identify and coordinate work that is already being done.

Only standardize where no one else is addressing the issue and

We have the appropriate expertise.

What we talked about this week

- Overview of the Charter
- Election of Chairs
 - Don Sullivan (NASA)
 - Dr Anneley Hadland (Helyx)
 - Charles Heazel (Heazeltech)
- Discussion of the way ahead

Where we are headed in the coming year

- Identify stakeholders in the Space domain,
- Gather and organize information about their missions and standards,
- Identify activities that the OGC can perform to address gaps.

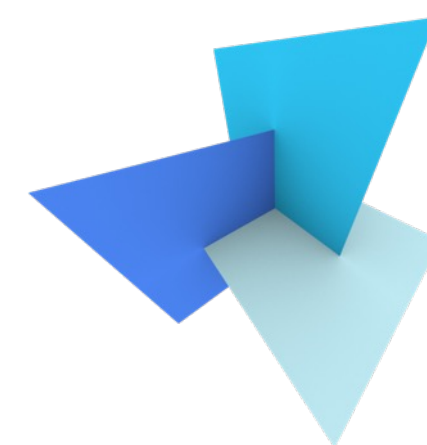


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TimeseriesML SWG

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Paul Hershberg, NOAA/NWS
28 March 2024



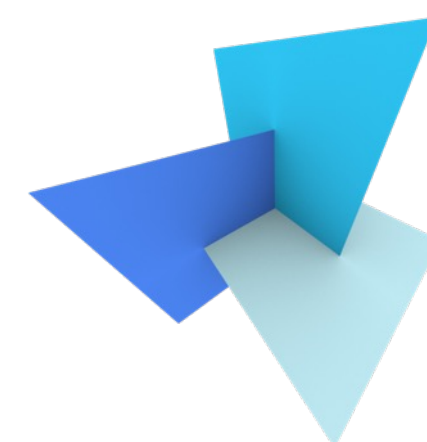
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Training Data Markup Language for AI Standard Working Group (TrainingDML-AI SWG)

The 128th OGC Member Meeting

Peng Yue, Wuhan University
Danielle Ziébelin
Boyi Shangguan
28 March 2024

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UxS DWG Closing Plenary Report

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Don Sullivan, NASA
28 March 2024

Agenda

- **Hillyfields Data Capture: Autonomous Car, Quadcopter, Two People, Spy on Each Other**
 - Steve Smyth, Open Site Plan
- **A flexible, interoperable, open architecture for deploying capabilities onto UxS platforms**
 - Sam Meek, Helyx Secure Information Systems
- ~~Insight into REPMUS~~
 - ~~Teodor Hanchivici, Kongsberg Geospatial~~
- **Discussion on overlap with Connected Systems**
 - All
- **NASA UxS Update**
 - Don Sullivan, NASA Airborne Science Program (as time permits)

No recommendations, no motions

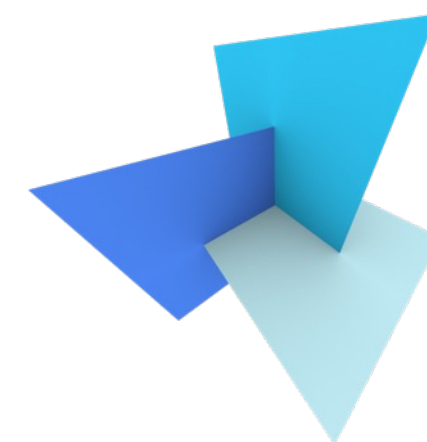


UDT DWG Built Environment meetings

The 128th OGC Member Meeting

Carsten Rönsdorf, OS
27 March 2024

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The most important thing for this WG is...

Two sessions with different focus points:

1. Broad future direction for LandInfra set: Plan to embed in other SWGs rather than re-chartering LandInfra SWG.
2. Urban Digital Twins paper on the way to put a stake in the ground and communicate OGC's 'offer' in Digital Twins in the built environment.

What we talked about this week

- LandInfra
- The concept of Urban Digital Twins and the variety of different perspectives on it.
- Ideas for future steps in UDT include
 - Focus on natural environment standards (start to list these)
 - Differentiation of UDTs to make them less daunting, particularly for smaller cities and towns
 - Use case focus
 - Scope for a COSI activity in the UDT space

Next Quarter WG Communications Plan

- Discussions with other SWGs about embedding LandInfra concepts
- Finalise Urban Digital Twins position paper for June meeting and vote

Future of LandInfra

- LandInfra / InfraGML - current state, unfinished and new business (HC Gruler)
(10 min)
- Input from other OGC initiatives(20 min)
 - IDBE SC (Carsten Roensdorf)
 - LandAdmin DWG (Peter van Oosterom / Eva-Maria Unger)
 - Geotech IE (Mickaël Beaufils)
- Input COSI team - OGC Building Blocks and general modular design patterns
(Rob Atkinson) (15 min)
- Discussion about the future (45 min)

What Urban Digital Twins mean to OGC

- Humans as Sensors in Urban Digital Twins, Binyu Lei
- Data spaces, Francesca Noardo
- UDT discussion paper, co-chairs
- Panel: round table with reps from Urban Environment-related OGC WGs

About this Working Group

- Integrating data in the built environment with an objective to describe how OGC standards can enable Urban Digital Twins
- This DWG is a merger of the old Smart Cities DWG, LandInfra DWG and Energy and Utilities DWG.