Open Geospatial Consortium

Taking Advantage of Innovation and FAIR Principles

2023-09-06 | Scott Simmons, Chief Standards Officer, OGC

FAIR, a convenient acronym

- Findable
- Accessible
- Interoperable
- Reusable

today will be FAIRLY FAIR

Open Geospatial Consortium

today will be FAIRLY FAIR

- Findable
- Accessible
- Interesting
- Reusable

today will be FAIRLY FAIR

- Findable
- Accessible
- Interesting
- Reusable
- Less
- Yawning

Open Geospatial Consortium

today will be FAIRLY FAIR

- Findable
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- Less
- Yawning

Fair: adjective > marked by impartiality and honesty **:** free from self-interest, prejudice, or favoritism
Merriam-Webster

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…but remember

- One size does not
  - Fit
  - All
  - In
  - Reality

Nebraska State Fair

FAIR, a convenient acronym

- Findable - first, you have to find the data
- Accessible
- Interoperable
- Reusable

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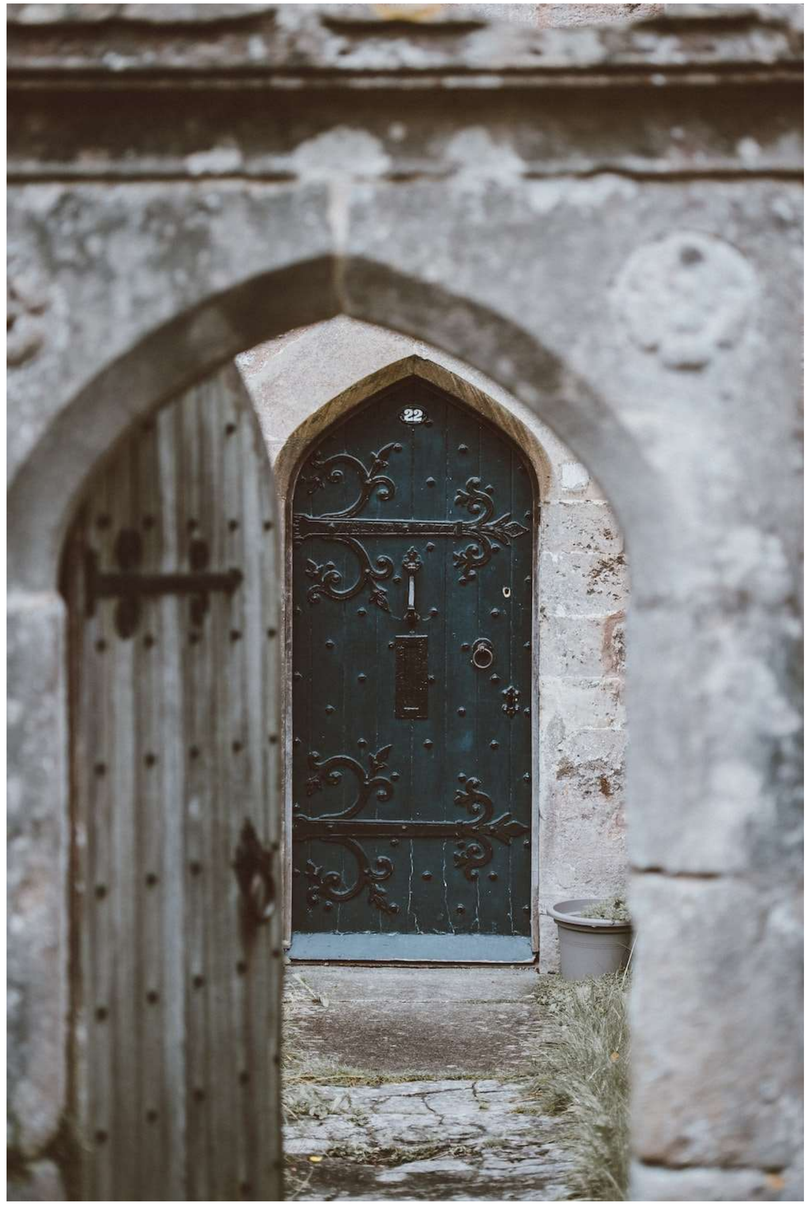
FAIR, a convenient acronym

- Findable
- Accessible – then you need to get to the data
- Interoperable
- Reusable



FAIR, a convenient acronym

- Findable
- Accessible
- Interoperable – once accessed, the data should work with other data
- Reusable

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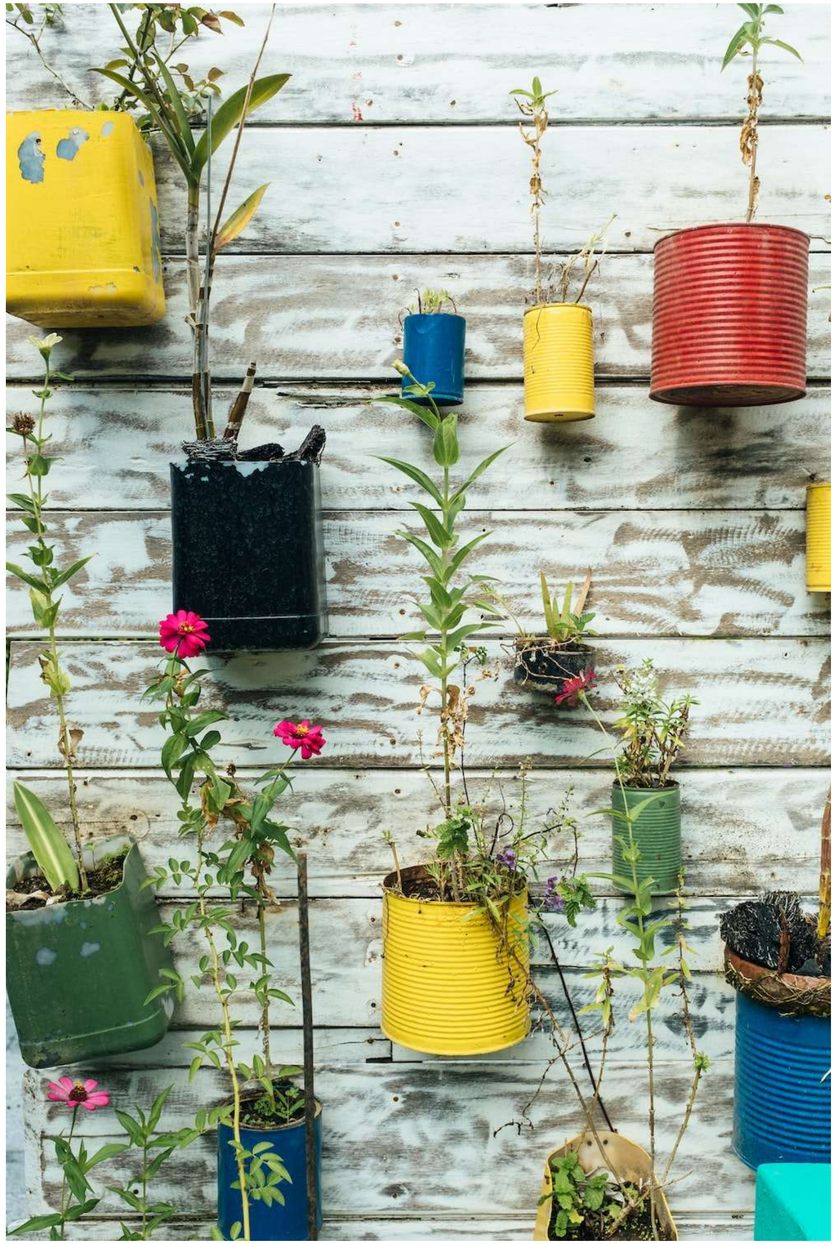
FAIR, a convenient acronym

- Findable
- Accessible
- Interoperable
- Reusable – interoperate to satisfy many scenarios



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DESIGN

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To make things FAIR, we have to design to FAIR

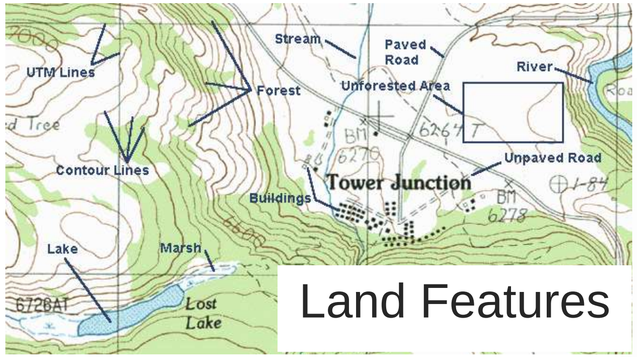
- Bottom-up design
  - **R**: design a content model that maximizes **Reusability**
  - **I**: ensure the content model is **Interoperable**, may have to reduce some Reusability
  - **A**: encode the data in a format that is **Accessible** to the user community
  - **F**: create metadata and offer the content via a **Findable** service


Reusable


NO ROCK
CLIMBING
OR DIVING
14FT 5IN

LandInfra / InfraGML

http://www.opengeospatial.org/standards/landinfra

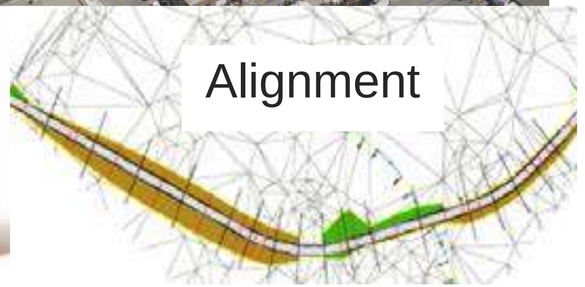


Land Features

Core

Facilities

Projects



Alignment

Land Division

Roads

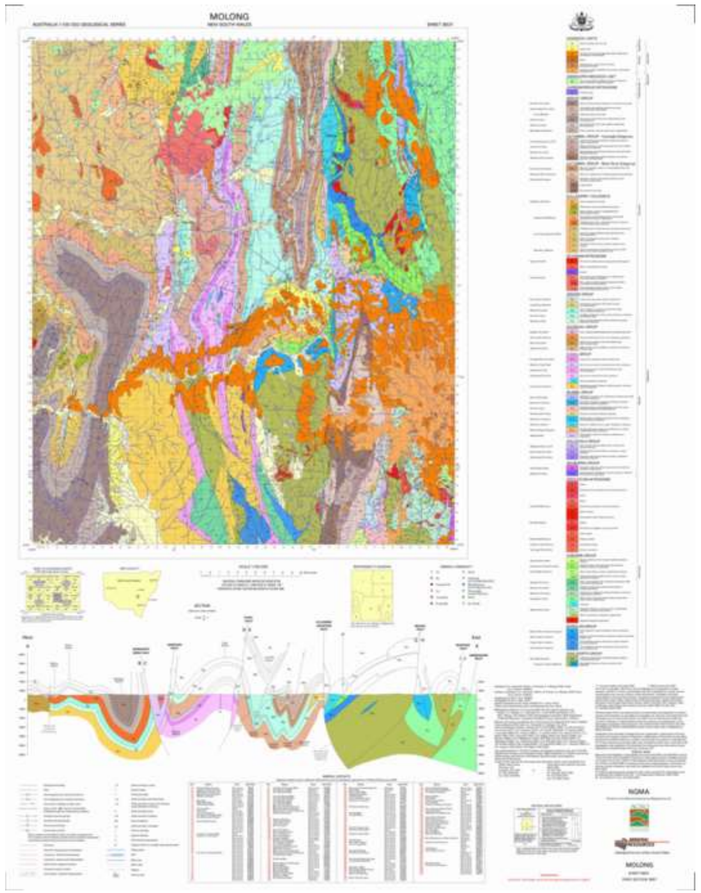
Railway

Survey

Condominiums

GeoSciML

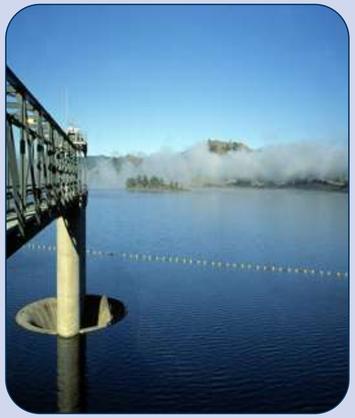
- GeoScience Markup Language
  - the original use case was to exchange data typically found on a geological map
    - geologic units, geologic time, faults, folds, etc
  - the scope of GeoSciML has expanded over the last 13 years to also cover geological sampling and analytical data



WaterML2.0 Standards

Part 1 - Timeseries

Part 2 – Ratings, Gaugings and Sections



Part 3 – Surface water features

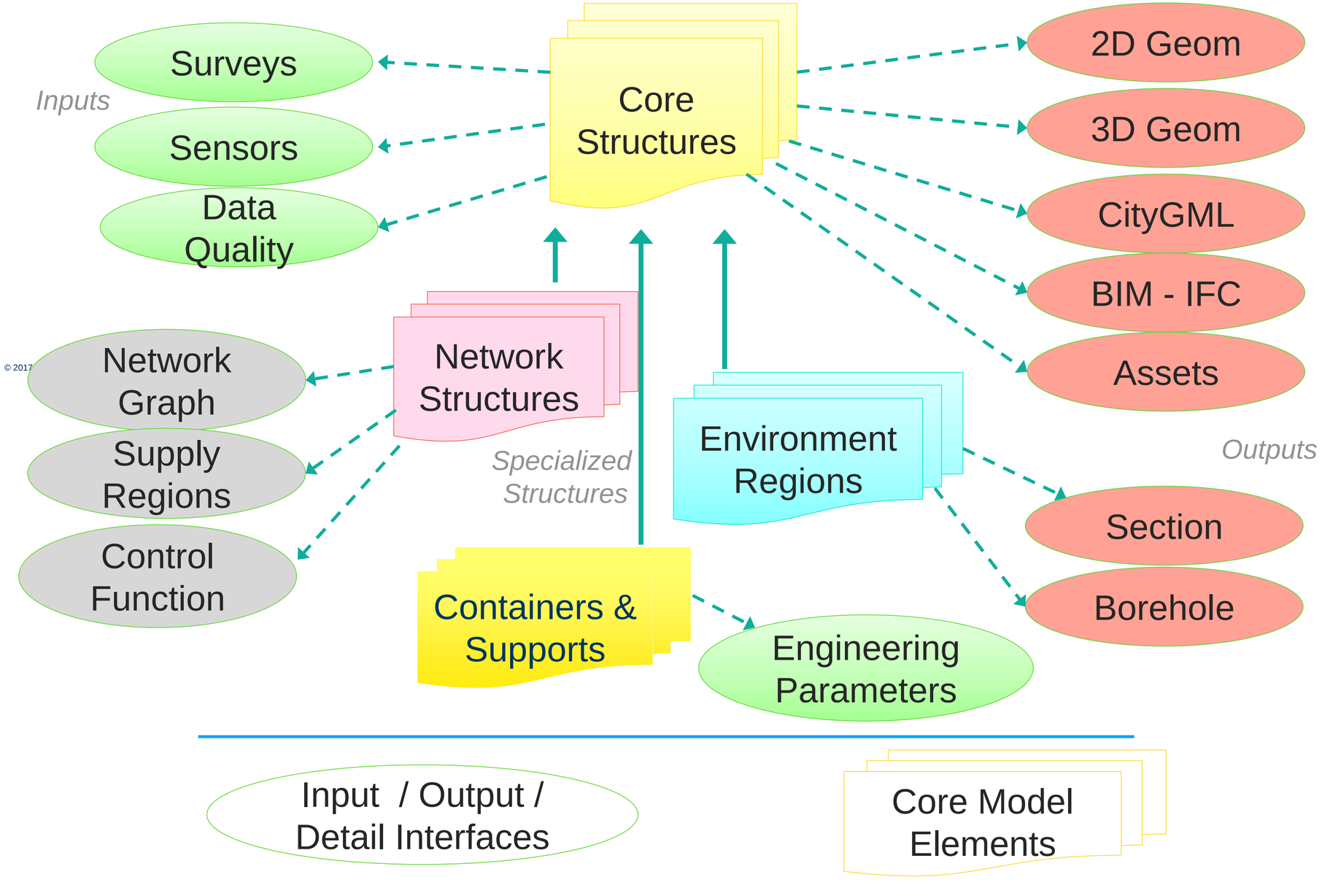
Part 4 – Groundwater

Part 5 – Water quality (best practice)

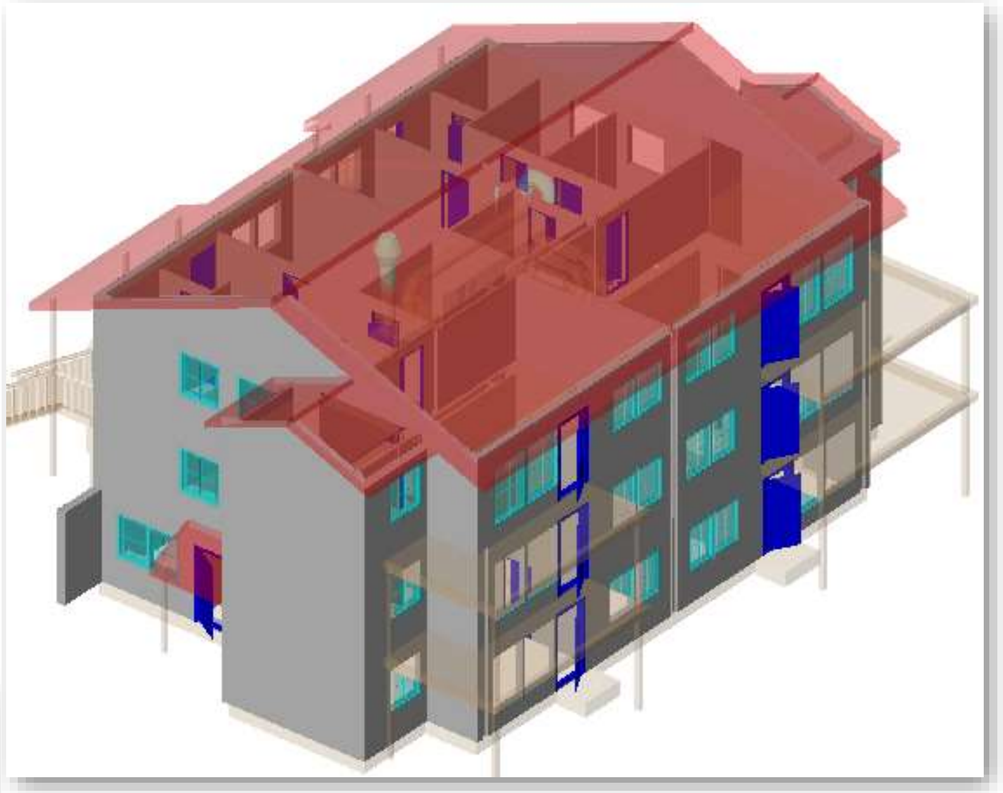

Interoperable

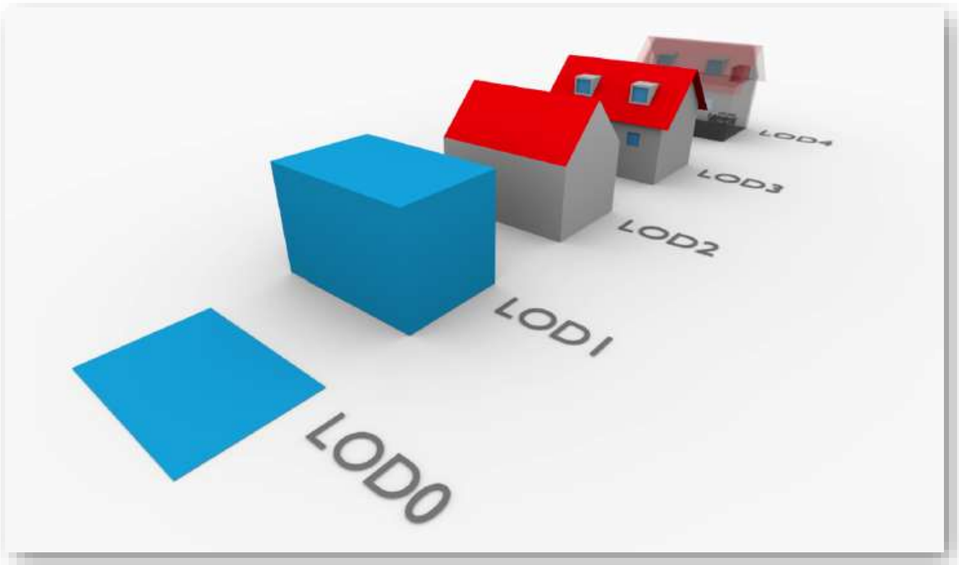
REALLY describing the built environment

MUDDI Model Structure

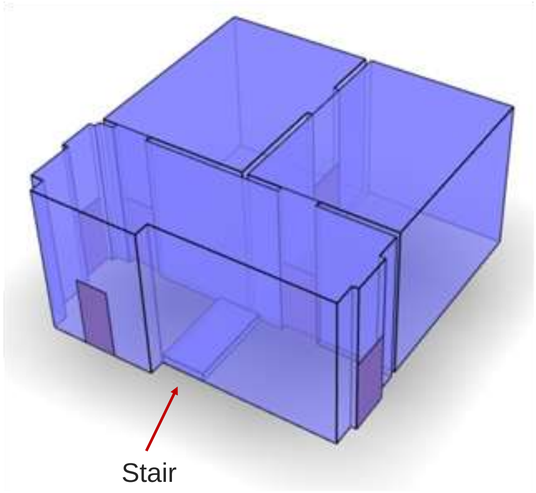


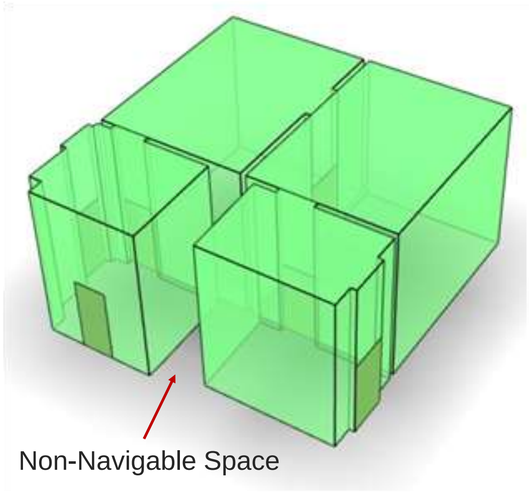
CityGML

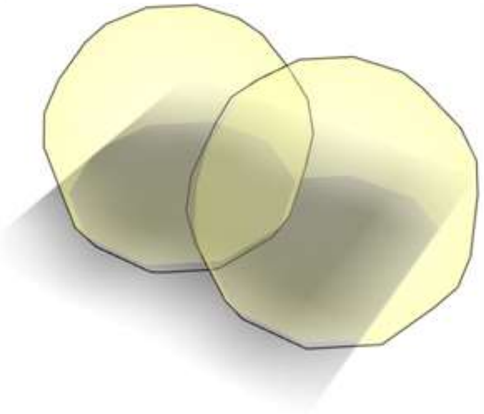


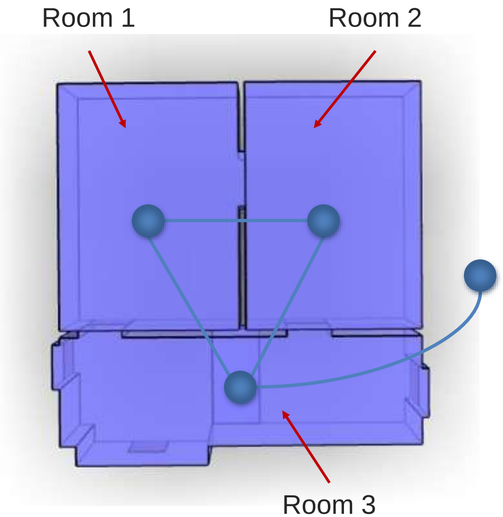


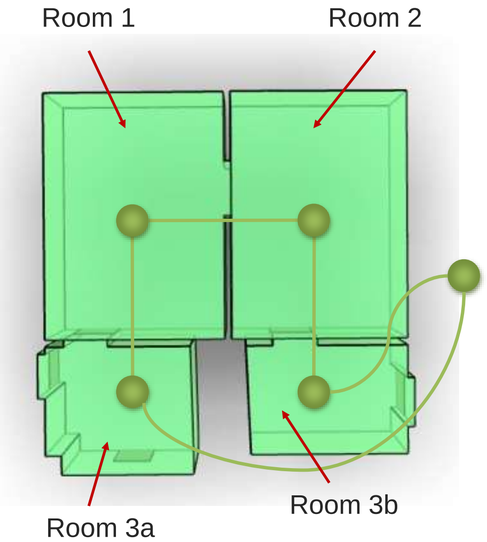
IndoorGML – Multi-Layered Space

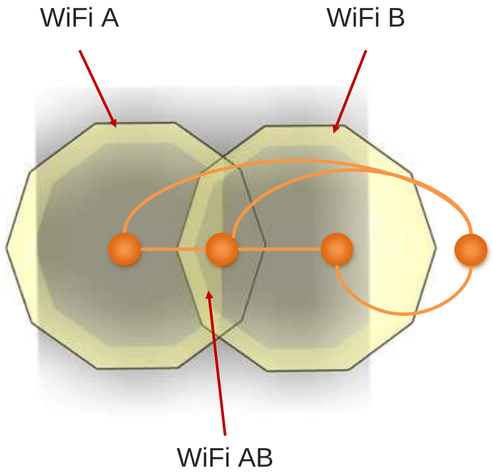













Accessible

Popular and performant encodings are important


GeoJSON ✓


JSON-FG ✓

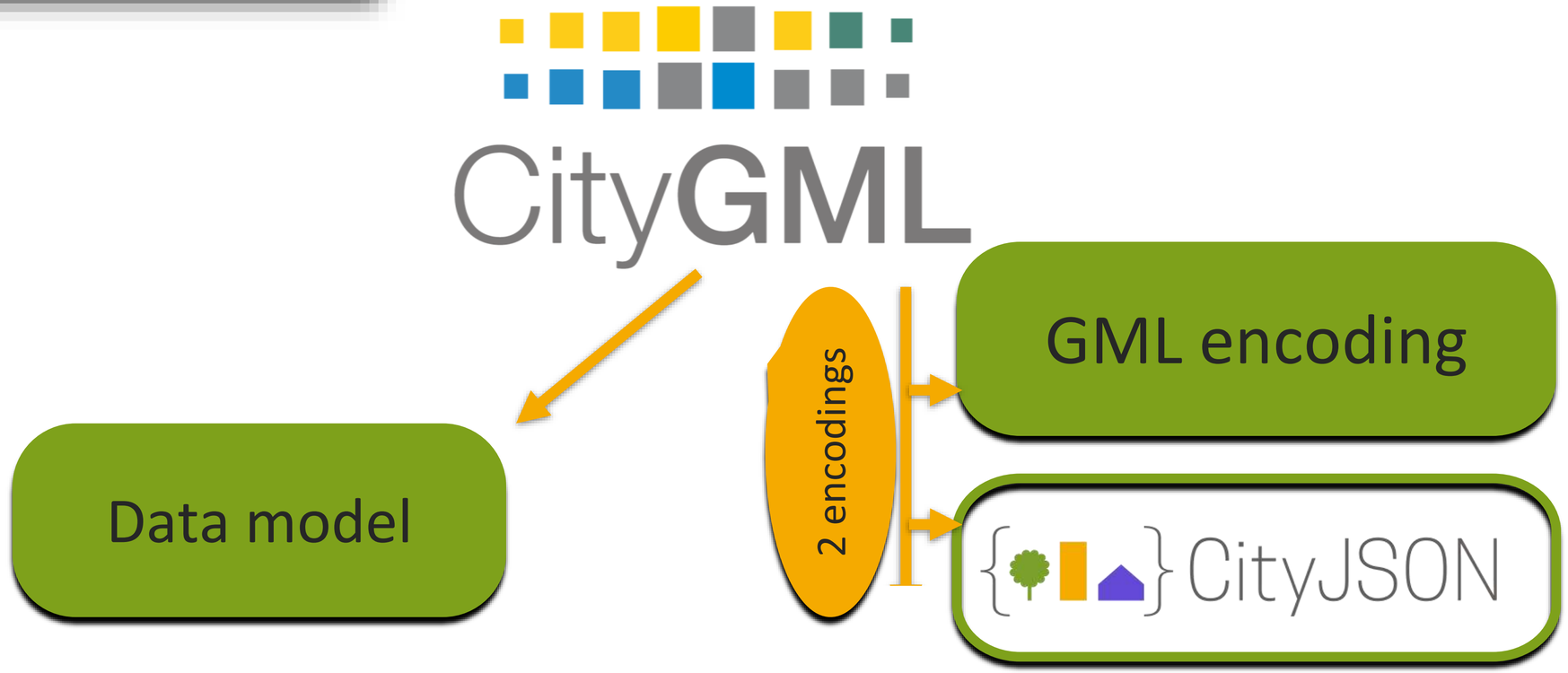
Ledoux *et al. Open Geospatial Data, Software and Standards* (2019) 4:4
https://doi.org/10.1186/s40965-019-0064-0

Open Geospatial Data, Software and Standards

ORIGINAL ARTICLE Open Access

CityJSON: a compact and easy-to-use encoding of the CityGML data model

Hugo Ledoux*, Ken Arroyo Ohori, Kavisha Kumar, Balázs Dukai, Anna Labetski and Stelios Vitalis



CityJSON: a compact and easy to use encoding of the CityGML data model

CityGML 3.0 GML encoding

```
<gml:Dictionary gml:id="roofTypes">
    <gml:metaDataProperty>
        <cmd:CodeListMetaData>
            <cmd:dataType>RoofTypeValue</cmd:dataType>
            <cmd:namespace>http://www.opengis.net/citygml/building/3.0</cmd:namespace>
            <cmd:language>en</cmd:language>
            <cmd:authority>xyz</cmd:authority>
            <cmd:version>1.0</cmd:version>
        <cmd:CodeListMetaData>
    </gml:metaDataProperty>
    <gml:description>Roof type values</gml:description>
    <gml:identifier codeSpace="https://ogc.org/citygml/3.0/codelists/gml/rooftypes">RoofTypeValue</gml:identifier>
    <gml:dictionaryEntry>
        <gml:Definition gml:id="id1">
            <gml:description>roof primarily a single plane, not necessarily level</gml:description>
            <gml:identifier codeSpace="https://ogc.org/citygml/3.0/codelists/gml/rooftypes">1000</gml:identifier>
            <gml:name>flat roof</gml:name>
        </gml:Definition>
    </gml:dictionaryEntry>
    <gml:dictionaryEntry>
        <gml:Definition gml:id="id2">
            <gml:description>a roof that has a ridge and two gables</gml:description>
            <gml:identifier codeSpace="https://ogc.org/citygml/3.0/codelists/gml/rooftypes">3100</gml:identifier>
            <gml:name>saddle roof</gml:name>
        </gml:Definition>
    </gml:dictionaryEntry>
</gml:Dictionary>
```

CityJSON


```
{
"type": “CityJSON",
"version": “1.0”,
"metadata": {
"referenceSystem":
"urn:ogc:def:crs:EPSG::7415",
},
"CityObjects": {
"id-1": {
"type": "Building",
"attributes": {
"measuredHeight": 22.3,
"roofType": "gable",
"owner": “Elvis Presley"
},
"geometry": [
{
"type": "MultiSurface",
"boundaries": [
[[0, 3, 2, 1]], [[4, 5, 6, 7]], [[0, 1, 5, 4]]
]
}
]
}
},
"vertices": [
[23.1, 2321.2, 11.0],
[111.1, 321.1, 12.0],
...
],
"appearance": {
"materials": [],
"textures":[],
"vertices-texture": []
}
}
```


human-readable file

computers prefer this over XML

ready for the web

~6X more compact than CityGML


Findable

Metadata and APIs

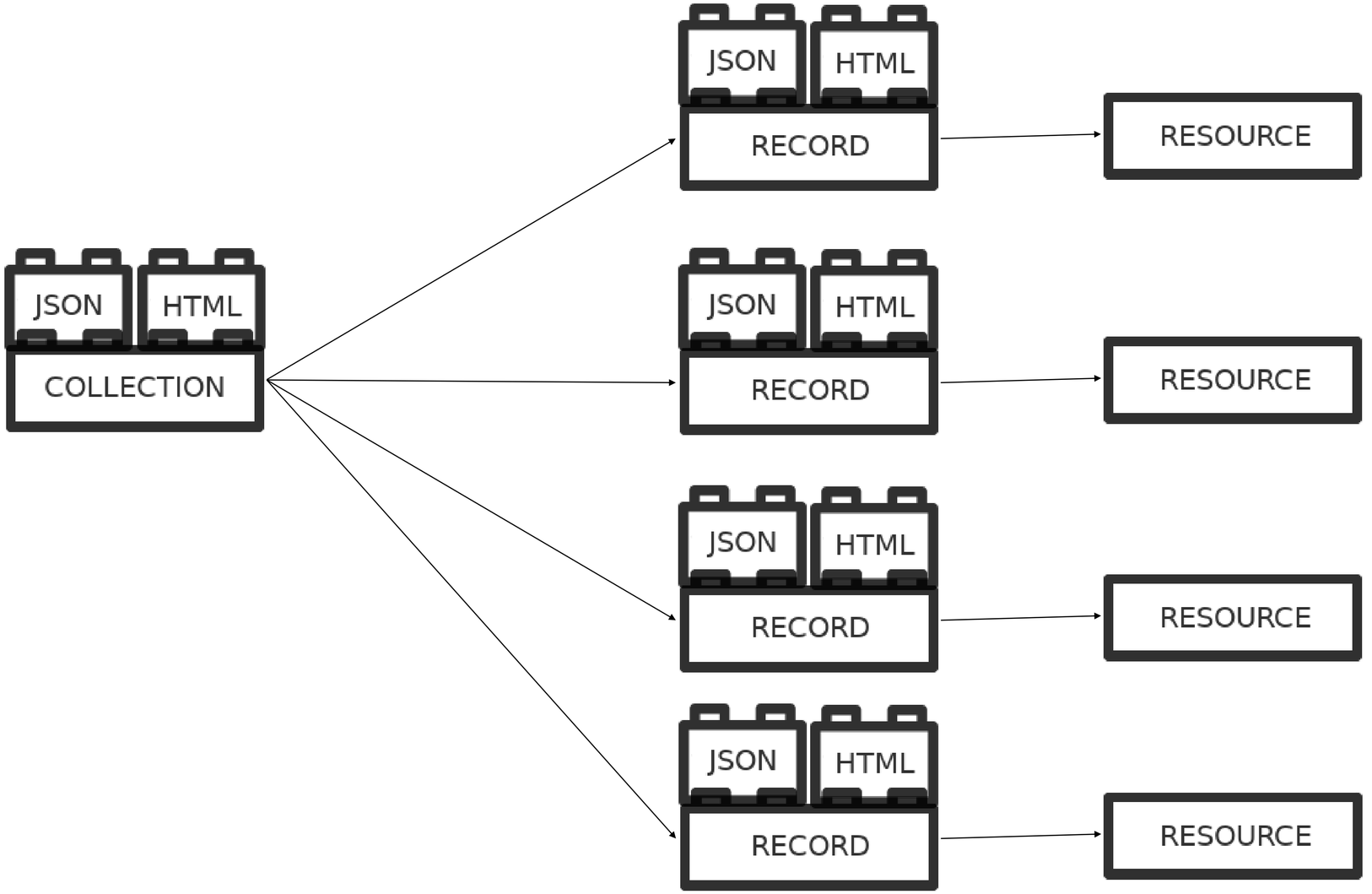
- Write good metadata
- Expose metadata to a discovery API
- Provide data via a resource-applicable API

ISO Geospatial Metadata

The ISO19115 family tree

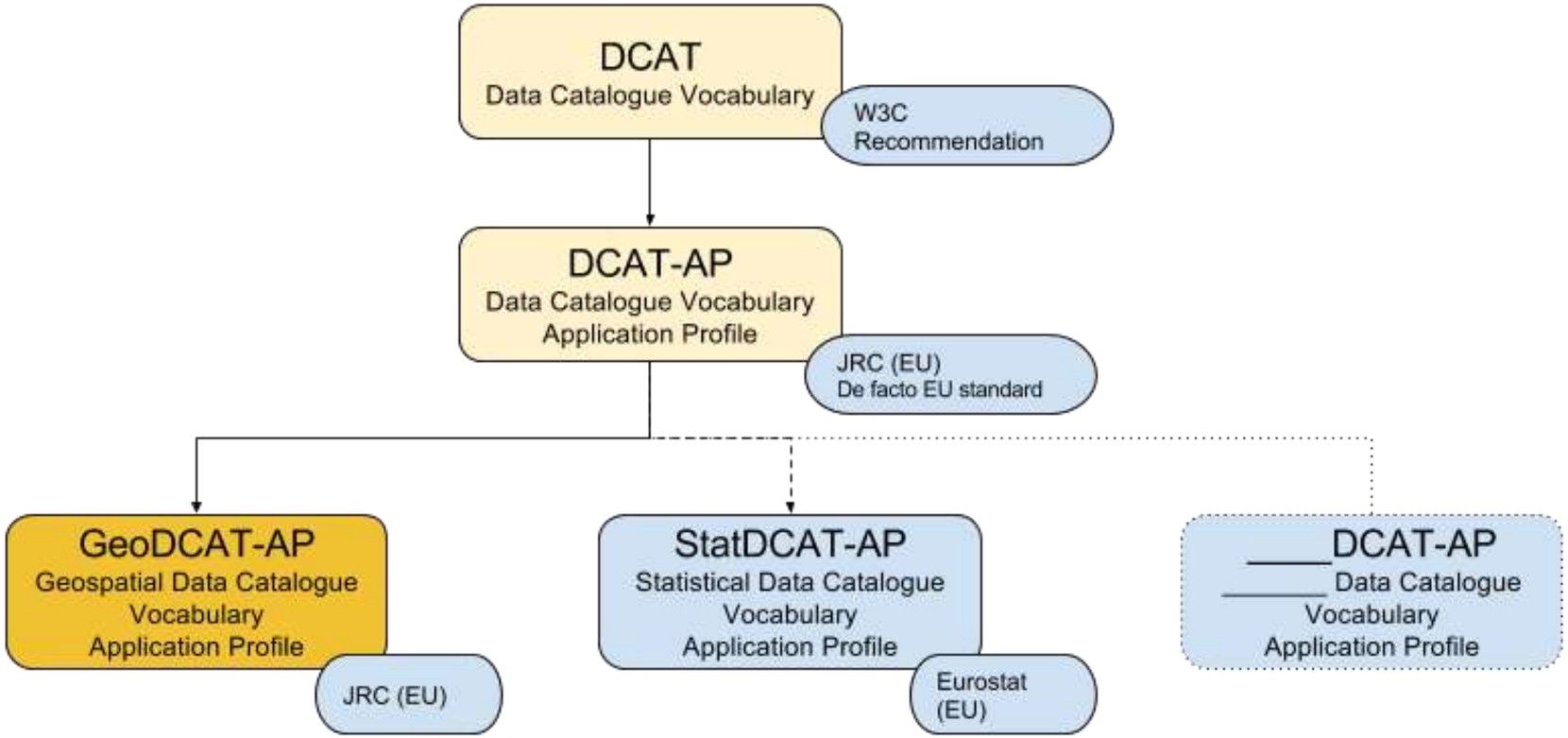
- ISO TC211 - Geographic information/Geomatics
- ISO19115:2003 & ISO19139
  - ISO19119 Geographic information — Services
  - ISO 19110:2016 Methodology for Feature Cataloguing
- ISO19115-1:2014, amd.1:2018 and amd.2-2020 - not backwards compatible
- ISO19115-3:2016 Geographic information — Metadata — Part 3: XML schema implementation for fundamental concepts

OGC API – Records: Crawlable Catalogue



GeoDCAT: modern web library science

- DCAT – Family based on the core DCAT W3C recommendation (= standard)



geoportal.arctic-sdi.org/#

SEARCH
MAP LAYERS
SELECTED LAYERS 1
MY DATA
MAP PUBLISHING

Username
Password
Login

Search

Location Search | **Metadata Search**

Search metadata for datasets, dataset series or services.

polar bears **Search**

Hide search options

Resource type: Dataset

Resource name: * No selection *

Responsible party: * No selection *

Keyword: * No selection *

Topic category: * No selection *

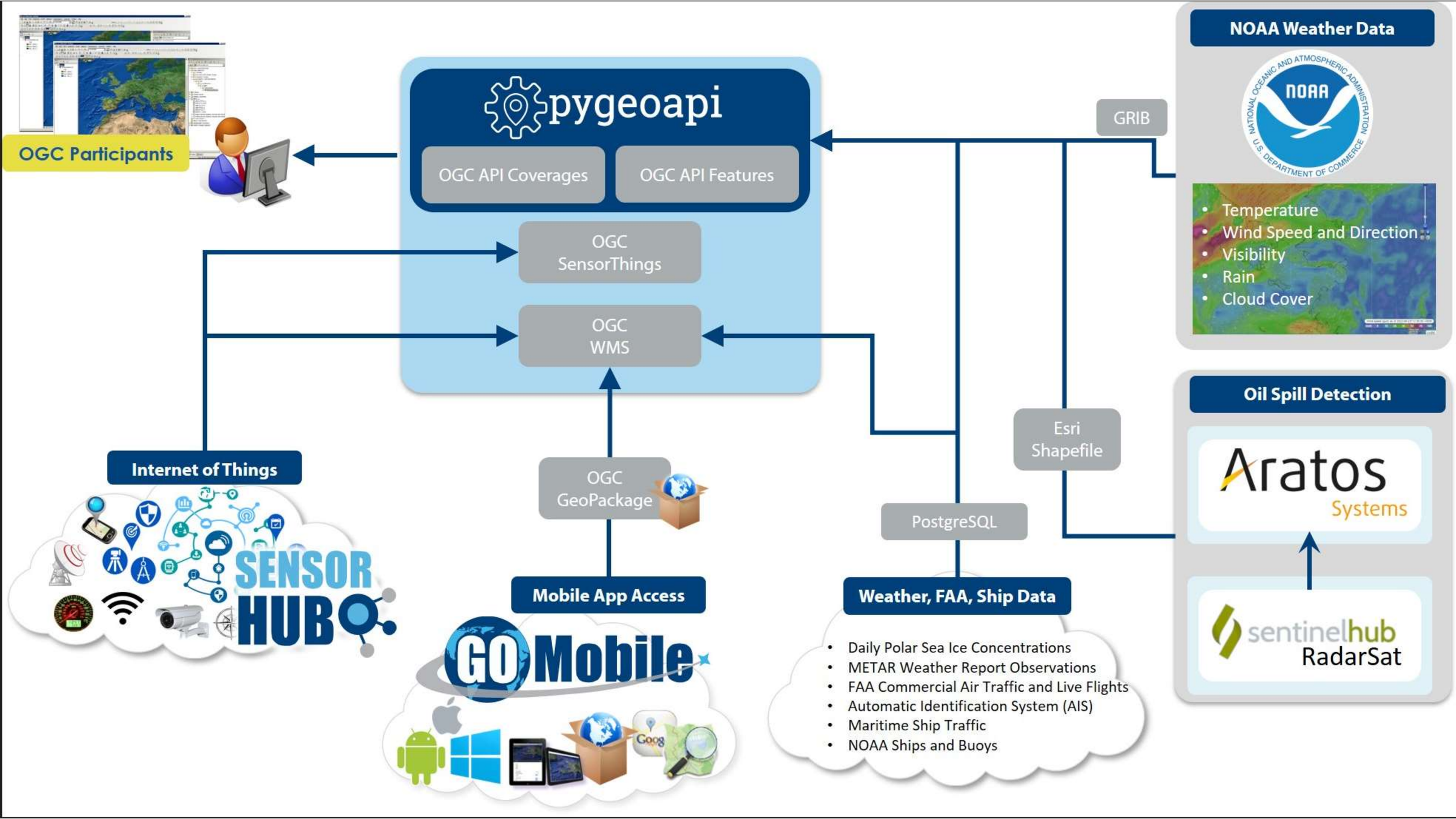
Metadata language: * No selection *

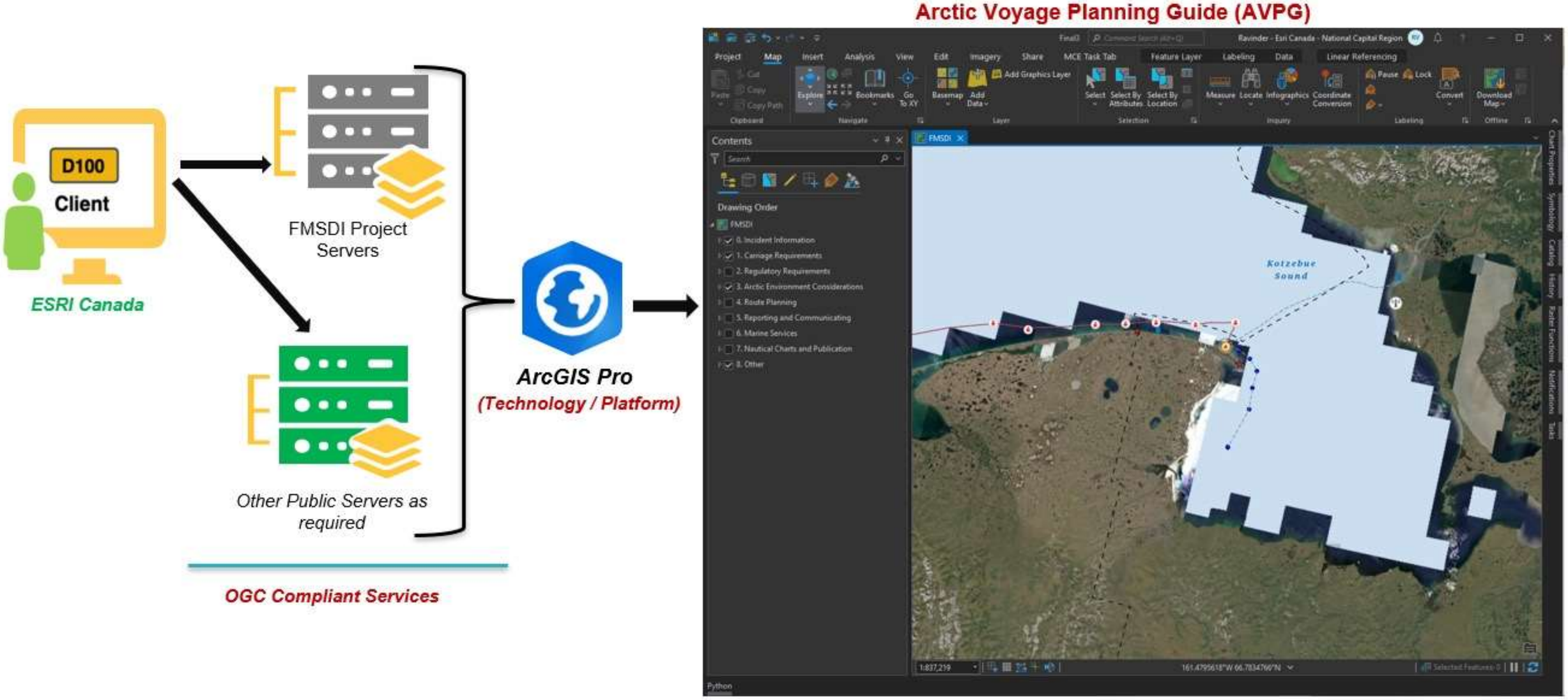
Resource language: * No selection *

Search area: **Limit the search area on the**

United States
China
Canada
Russia
Greenland
Svalbard
St. Pierre and Miquelon
Jan Mayen
Iceland
Finland
Faroe Is.
Sweden
Norway
Aland
Estonia
Latvia
Scotland
Lithuania
N. Ireland
Ireland
Denmark
Belarus
Wales
Netherlands
Poland
Ukraine

500 km
200 mi


OGC Participants
pygeoapi
OGC API Coverages
OGC API Features
OGC SensorThings
OGC WMS
GRIB
NOAA Weather Data
NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE
Temperature
Wind Speed and Direction
Visibility
Rain
Cloud Cover
Internet of Things
SENSOR HUB
OGC GeoPackage
Mobile App Access
GO Mobile
PostgreSQL
Esri Shapefile
Weather, FAA, Ship Data
Daily Polar Sea Ice Concentrations
METAR Weather Report Observations
FAA Commercial Air Traffic and Live Flights
Automatic Identification System (AIS)
Maritime Ship Traffic
NOAA Ships and Buoys
Oil Spill Detection
Aratos Systems
sentinelhub
RadarSat


Arctic Voyage Planning Guide (AVPG)
D100
Client
ESRI Canada
FMSDI Project Servers
Other Public Servers as required
ArcGIS Pro
(Technology / Platform)
OGC Compliant Services
Contents
Drawing Order
FMSDI
0. Incident Information
1. Carriage Requirements
2. Regulatory Requirements
3. Arctic Environment Considerations
4. Route Planning
5. Reporting and Communicating
6. Marine Services
7. Nautical Charts and Publication
8. Other
Kotzebue Sound

Esri Canada

Thank You

Community

500+ International Members
110+ Member Meetings
60+ Alliance and Liaison partners
50+ Standards Working Groups
45+ Domain Working Groups
25+ Years of Not for Profit Work
10+ Regional and Country Forums

Innovation

120+ Innovation Initiatives
380+ Technical reports
Quarterly Tech Trends monitoring

Standards

65+ Adopted Standards
300+ products with 1000+ certified implementations
1,700,000+ Operational Data Sets
Using OGC Standards