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Integrating new OGC Standards - SensorThings API and WaterML2.0 - Water Quality Interoperability experiment

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Integrating new OGC Standards

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30/01/2024

WMO Capacity Building Workshop on Hydrological Data Exchange, Standardization,
Interoperability

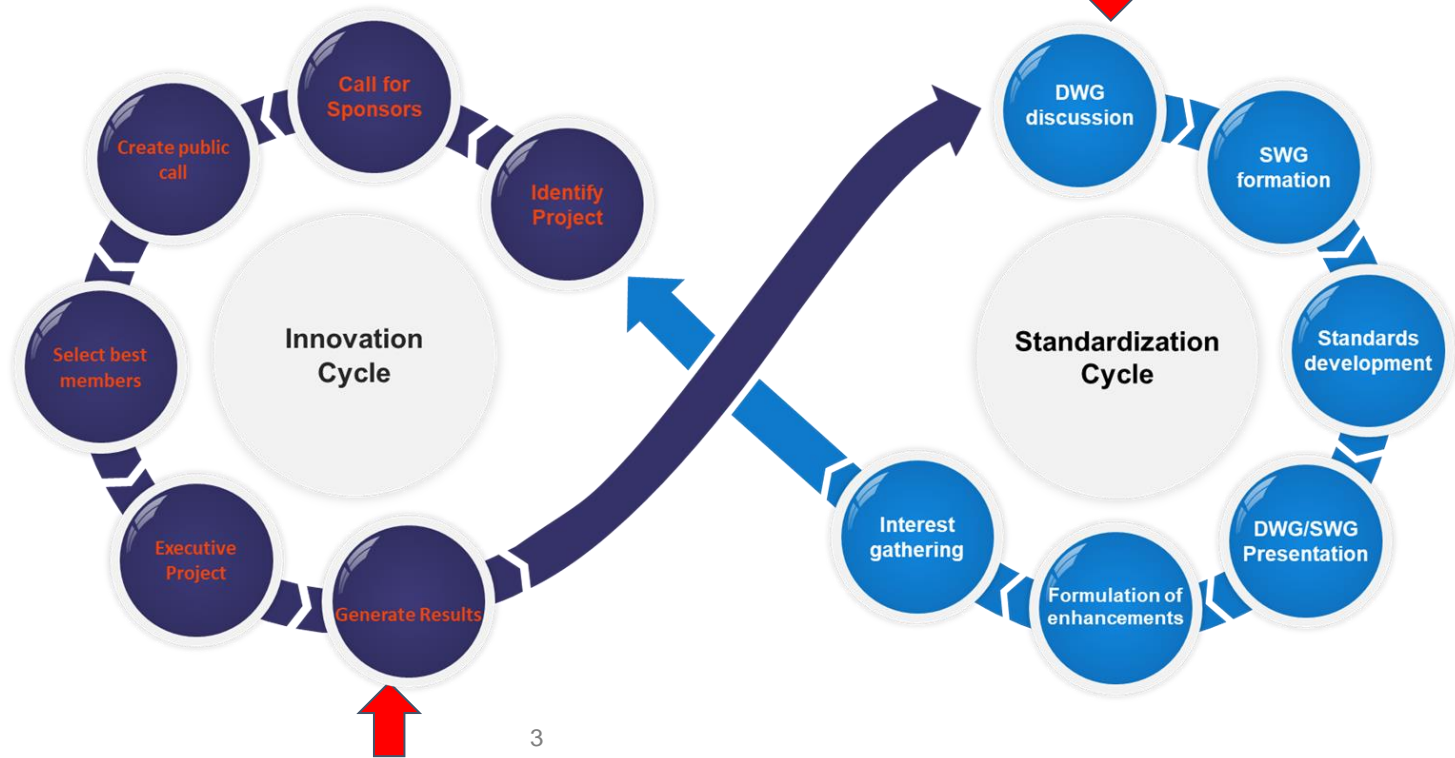


Re, WaterML2.0 <-> SensorThings API presentation 2024-01-26th

- Suggestion from the Water Quality IE experience
 - We plan to contribute back to the standard baseline
 - Water ML2.0 Part 1 'Timeseries'
 - Needs to be updated to take into account the revision of O&M (ISO 19156:2011) => Observations, Measurements and Samples a.k.a 'OMS' (ISO 19156:2023)
 - And also TimeSeries ML (issued from Part 1) : also currently integrating OMS
 - And define a best practice to expose it using SensorThings API
 - Water ML 2.0 Part 5 'Water Quality'
 - Building on the output of the Water Quality IE
 - High chance the IE will recommend in its engineering report to
 - Generate a Best Practice document
 - And also revise Part 1 (as we touched quantity during the IE)

Integrating new OGC Standards: what does that imply ?

- OGC Innovation Continuum

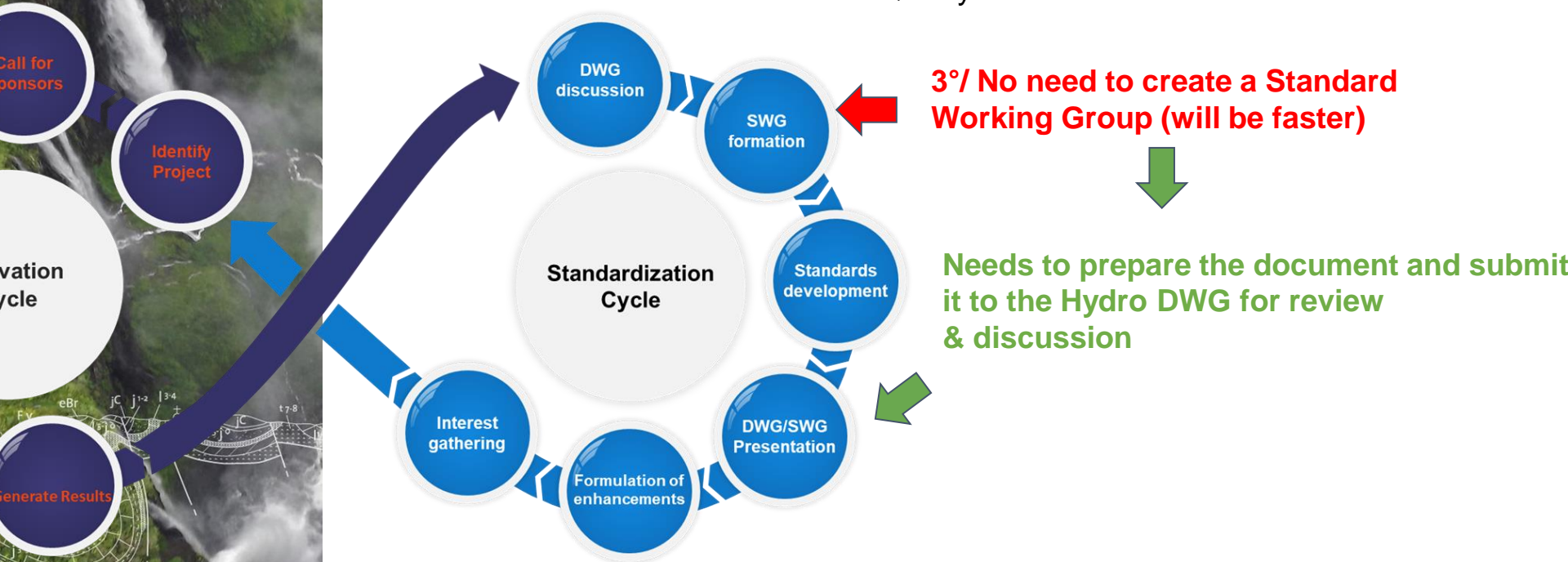


1°/ Water Quality IE output

2°/ Present the findings and suggestions to the Hydro DWG

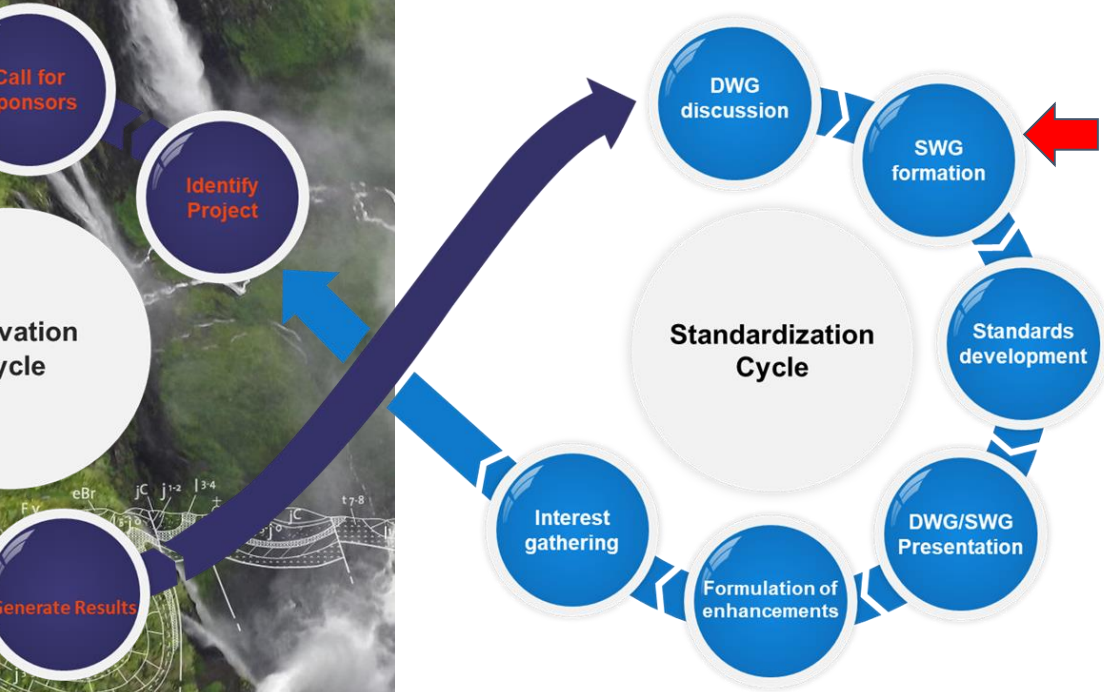
Integrating new OGC Standards: what does that imply ?

- OGC Innovation Continuum
 - Water ML2.0 Part 5 : Water Quality Best Practice review



Integrating new OGC Standards: what does that imply ?

- OGC Innovation Continuum
 - Water ML2.0 Part 1 : review



3/ A review of the standard should trigger a discussion/work at the Standard Working Group



Integrating new OGC Standards: what does that imply ?

- No matter the timeline, there is a move towards more and more use of OGC SensorThings API to exchange Observation data and, soon, Sample data
=> let's start learning / integrating it !
- We are already working on having a better implementation coverage
 - Server side : FROST already implementing the proposed Water Quality Model
 - Client side : SensorThings API Part 1 being implemented in QGIS core. Plugin will only be for Graphical User Interface
- But 1st let's get acquainted with SensorThings API Part 1

OGC SensorThings API?

- A standard for exchanging sensor data and metadata
 - Historic data & current data
 - JSON Encoded
 - RESTful
 - Adapting OASIS OData URL patterns and query options
 - Supporting OASIS MQTT messaging
- Easy to use & understandable



SensorThings API 1.1 – API

HTTP:

	GET	POST	PATCH	DELETE
v1.1	Get index			
v1.1/Type	Get all of type	Create		
v1.1/Type(id)	Get one of type		Update	Delete
v1.1/Type(id)/Entity	Get linked entity			
v1.1/Type(id)/EntitySet	Get all linked	Create Linked		

MQTT:

1. Subscribe
 - v1.1/Things
 - v1.1/Datastreams(x)
 - v1.1/Datastreams(x)/Observations
 - etc.
2. Get Notified

- Fully Explorable with just a browser
- Composable Responses
- Powerful filtering

https://datacoveeu.github.io/API4INSPIRE/sensorthingsapi/1_Home.html

Do It Yourself

- Docker Quick-Start:
<https://fraunhoferiosb.github.io/FROST-Server/deployment/docker.html>
- Full SensorThings API Tutorial
https://fraunhoferiosb.github.io/FROST-Server/sensorthingsapi/1_Home.html
- Demo service:
<https://ogc-demo.k8s.ilt-dmz.iosb.fraunhofer.de/v1.1>
(As long as nobody deletes everything)
(Or the server catches fire)



SensorThings – Live Demo

<https://airquality-frost.k8s.ilt-dmz.iosb.fraunhofer.de/v1.1>

~760 000 000 Observations

~21 000 Datastreams

~5 000 Stations

Tutorial:

https://datacoveeu.github.io/API4INSPIRE/sensorthingsapi/1_Home.html

Fancy Queries

All data for a map:

v1.1/Things?

```
$select=id,name,description,properties&  
$top=10&
```

```
$filter=properties/countryCode eq 'HR'&  
$expand=
```

```
Locations($select=location),
```

```
Datastreams (
```

```
$select=id,name,unitOfMeasurement;
```

```
$expand=
```

```
ObservedProperty($select=name),
```

```
Observations (
```

```
$select=result,phenomenonTime;
```

```
$orderby=phenomenonTime desc;
```

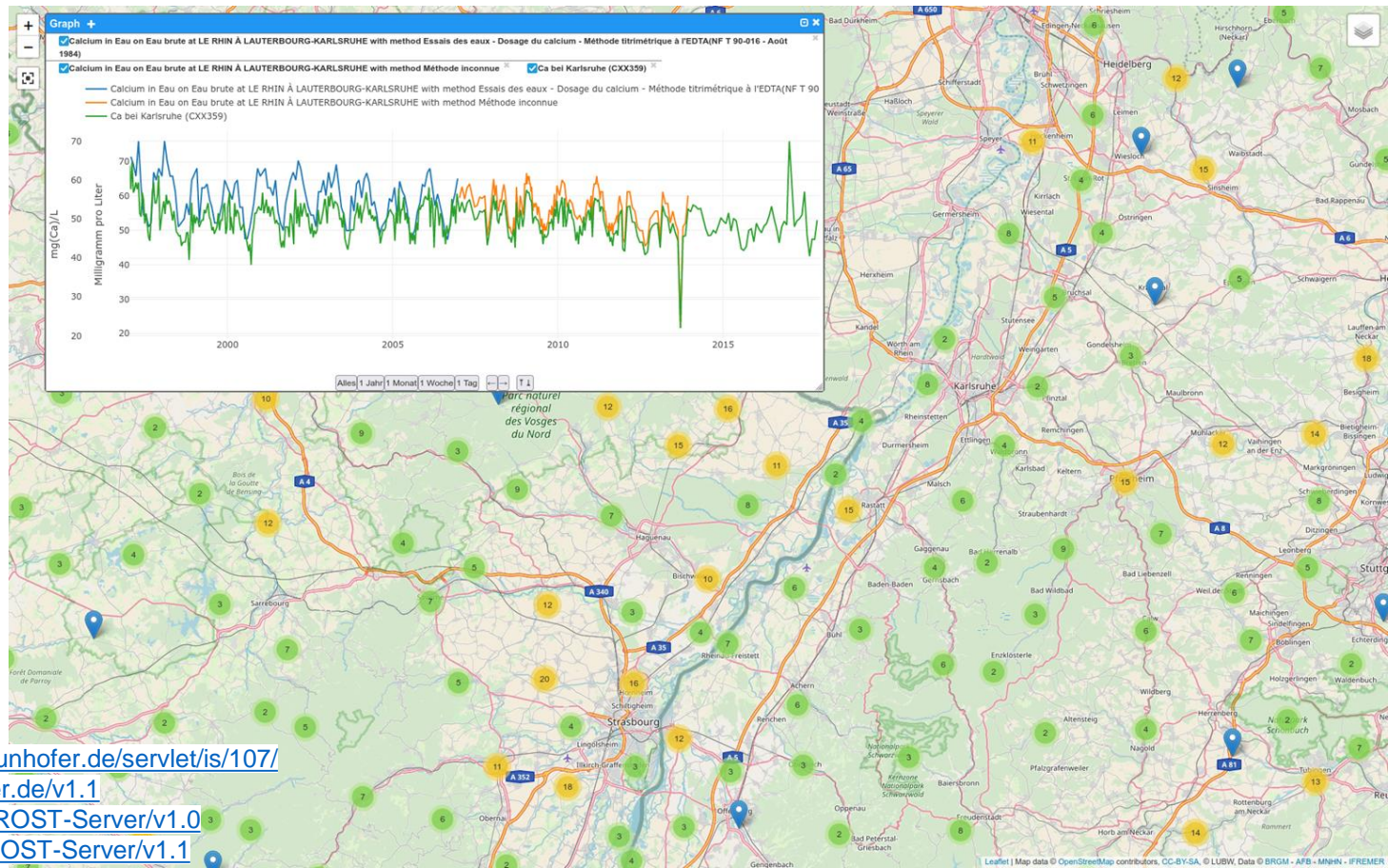
```
$top=1)
```

```
)
```

[Link](#)

FrancoGermanic Flow – API4INSPIRE

- French & German Data
- 1 Map



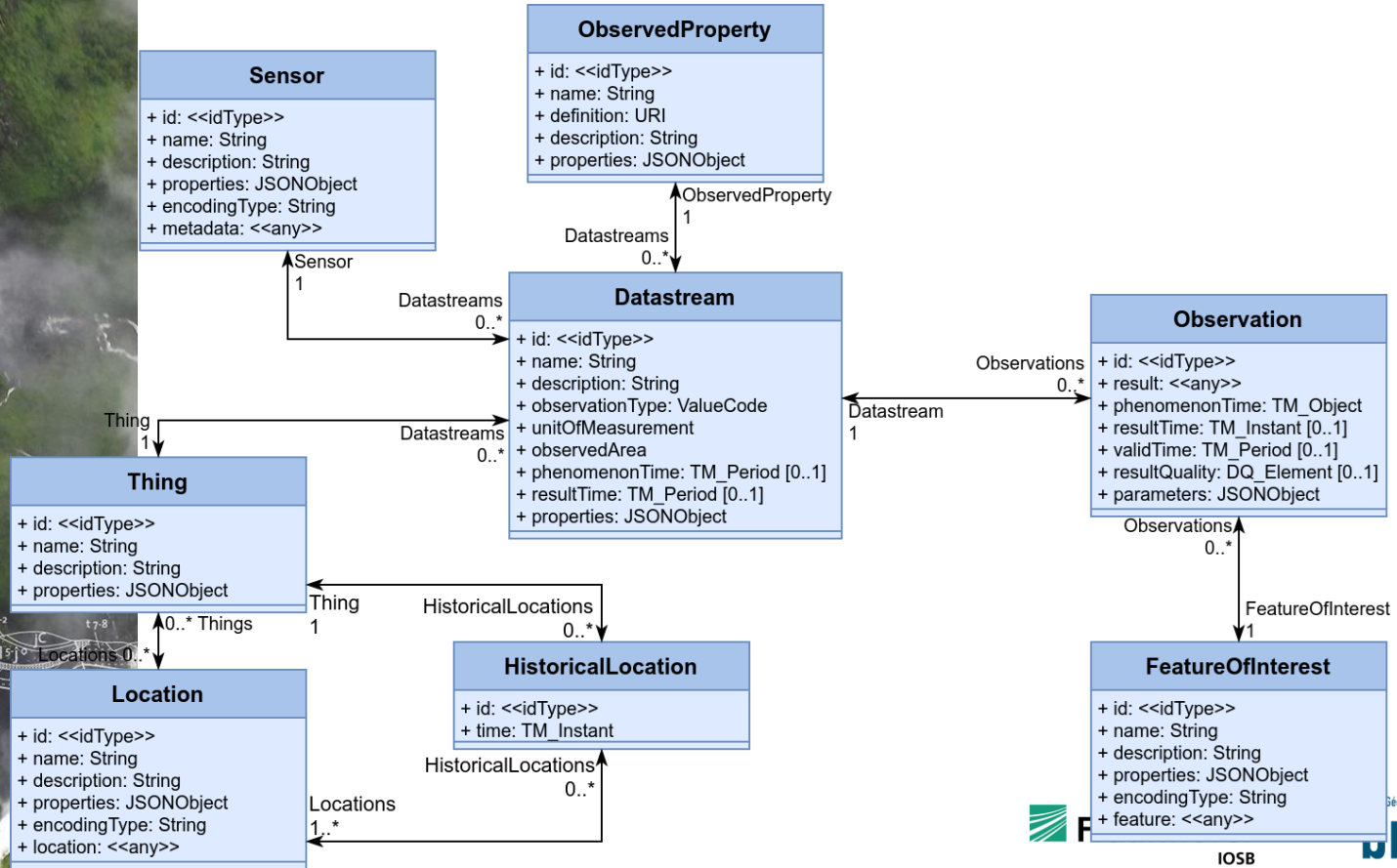
<https://api4inspire.k8s.ilt-dmz.iosb.fraunhofer.de/servlet/is/107/>

<https://lubw.k8s.ilt-dmz.iosb.fraunhofer.de/v1.1>

<https://sensorthings-wq.brgm-rec.fr/FROST-Server/v1.0>

<https://sta4hydrometry.brgm-rec.fr/FROST-Server/v1.1>

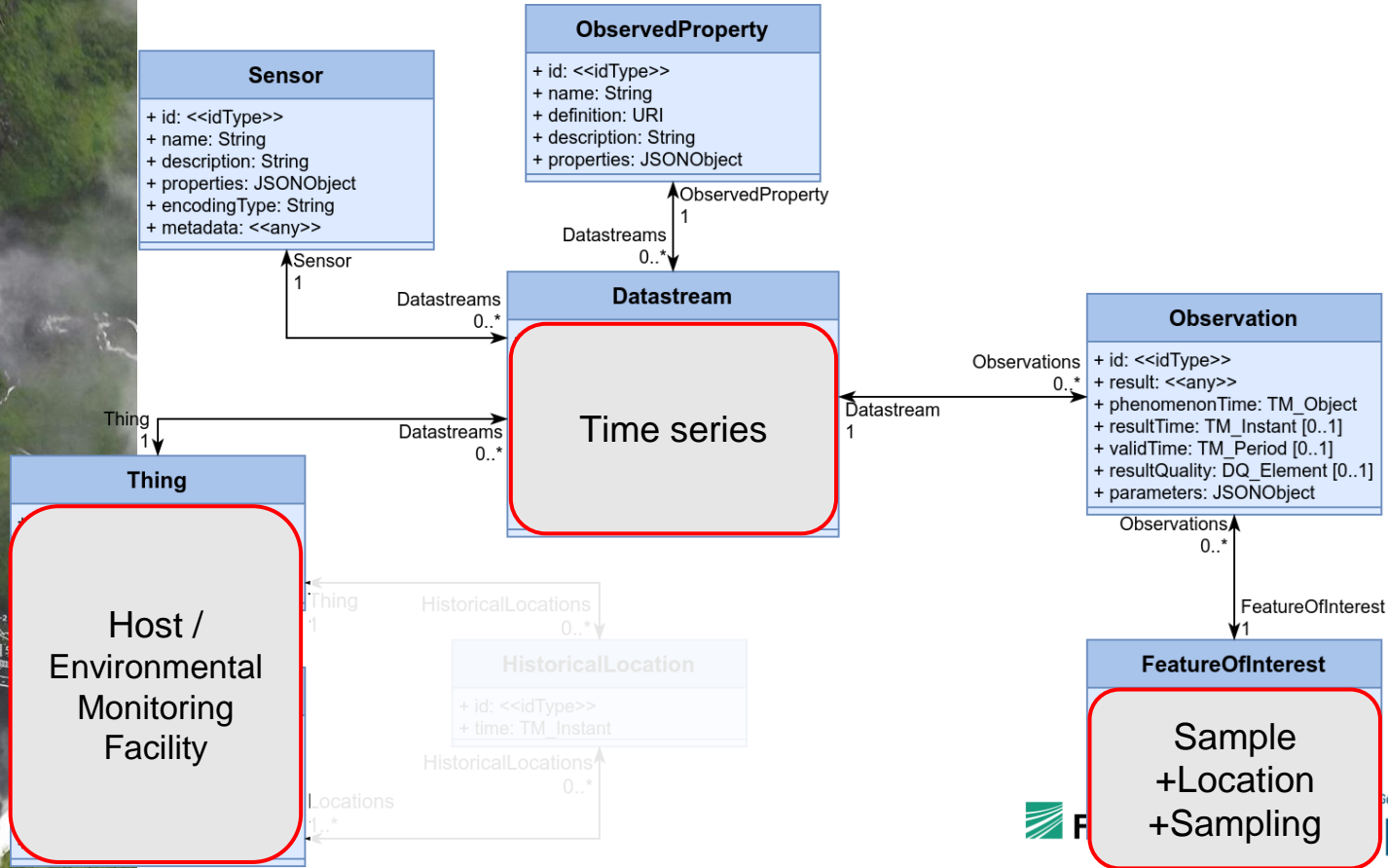
SensorThings API 1.1



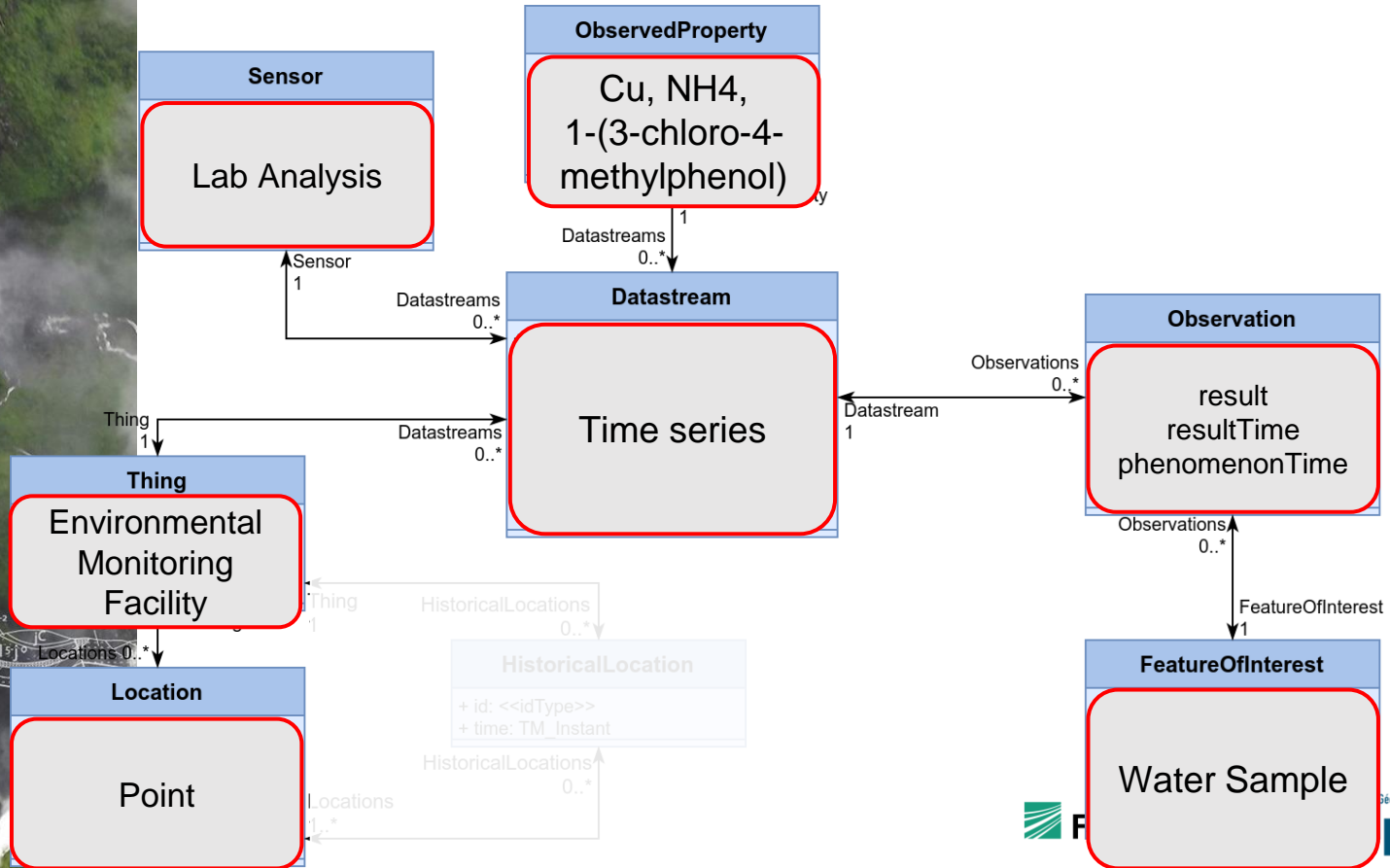
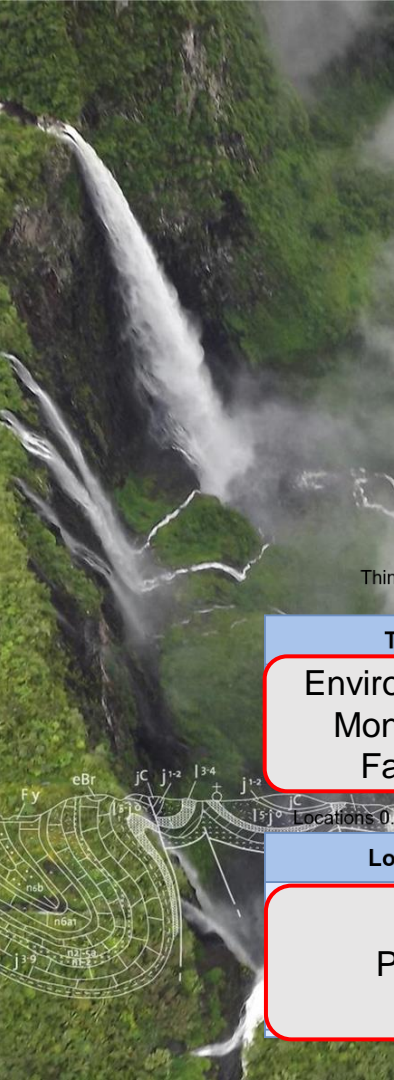
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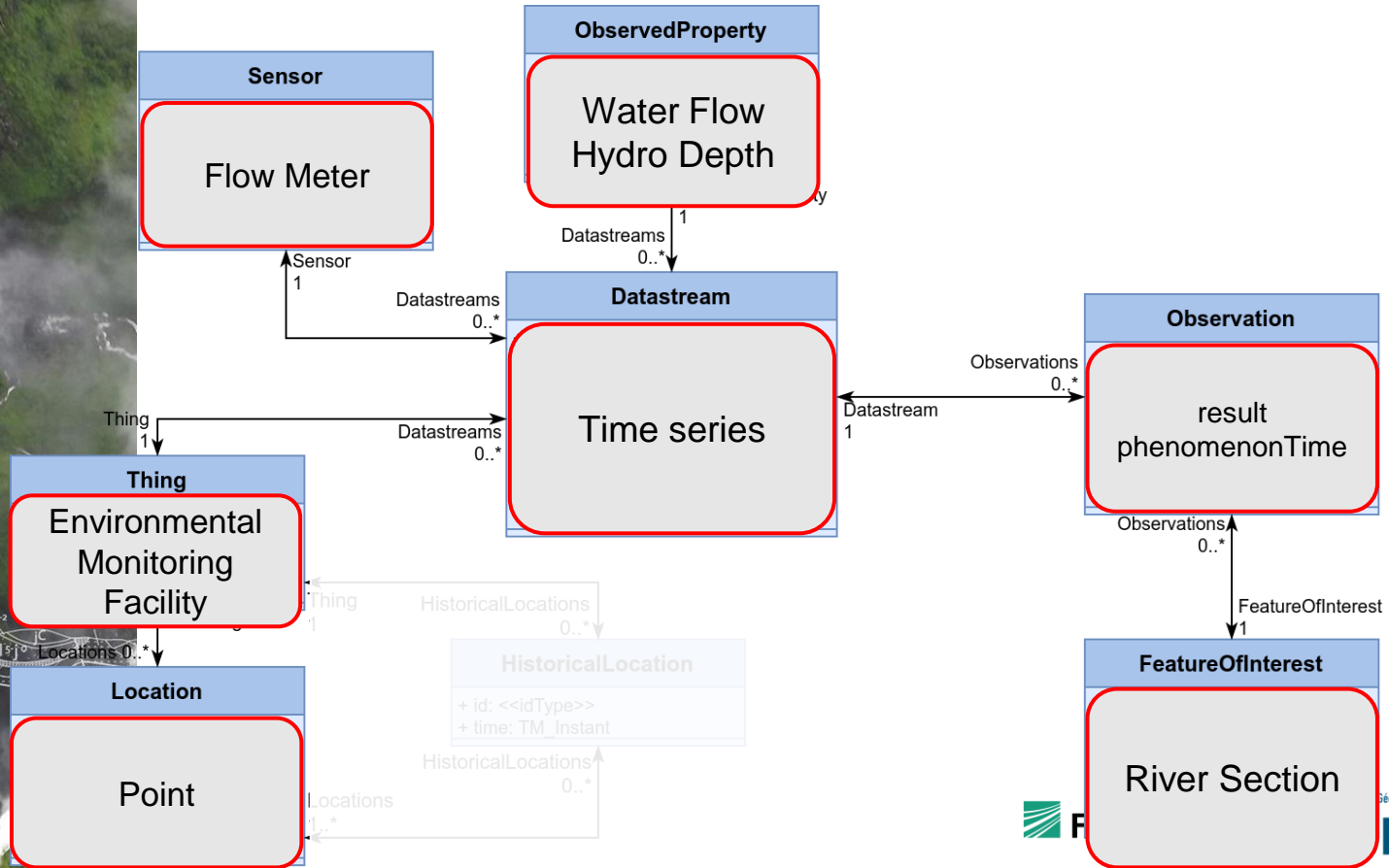
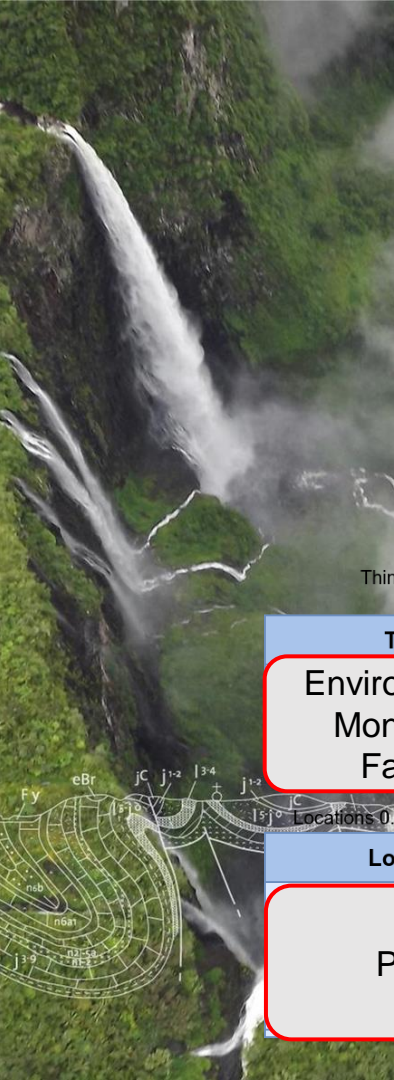
SensorThings API 1.1 – Water Quality



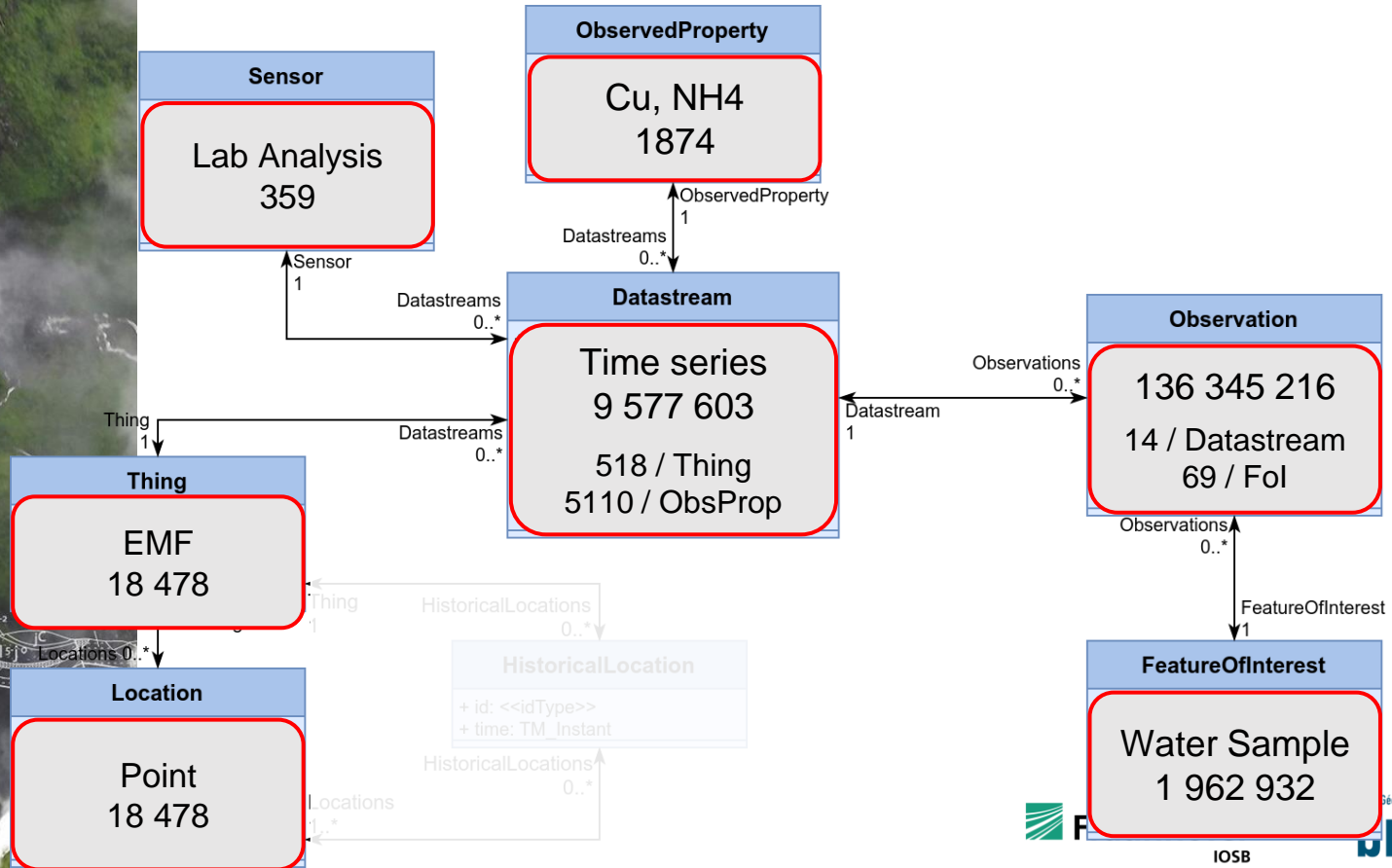
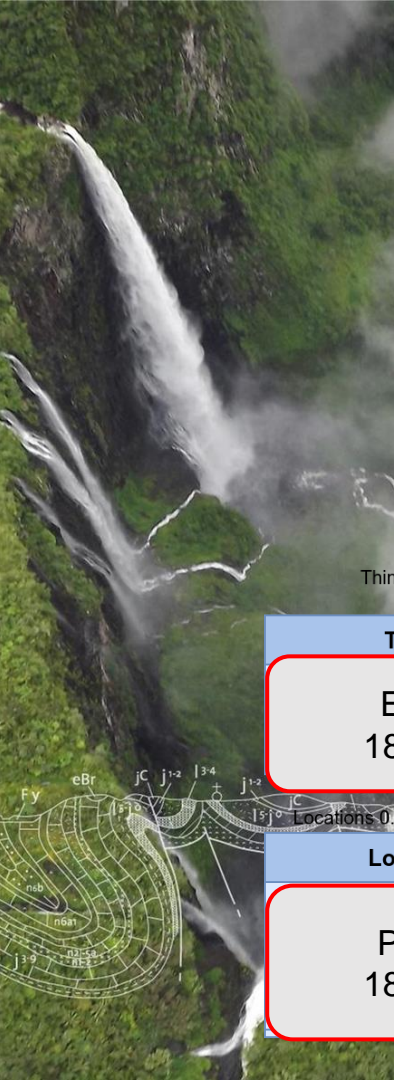
SensorThings API 1.1 – Water Quality



SensorThings API 1.1 – Water Quantity



SensorThings API 1.1 – Water Quality – BRGM





Thank you

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