

OGC SensorThings API Data Model

Dr. Hylke van der Schaaf Reinhard Herzog SensorThing API Data model **ObservedProperty** The Core + id: <<idType>> Sensor + name: String + id: <<idType>> + definition: URI + description: String + name: String + properties: JSONObject + description: String + properties: JSONObject **★**ObservedProperty + encodingType: String + metadata: <<anv>> Datastreams ASensor **Datastream** Datastreams Observation + id: <<idType>> Observations + id: <<idType>> + name: String 0..* + result: <<any>> + description: String + observationType: ValueCode + phenomenonTime: TM Object Datastream Thing Datastreams + unitOfMeasurement + resultTime: TM Instant [0..1] n ∗ + observedArea + validTime: TM Period [0..1] + phenomenonTime: TM Period [0..1] + resultQuality: DQ Element [0..1] Thing + resultTime: TM Period [0..1] + parameters: JSONObject + properties: JSONObject + id: <<idType>> Observations A + name: String 0..* + description: String + properties: JSONObject Things HistoricalLocations FeatureOfInterest ♣0..* Things Locations 0.. HistoricalLocation **FeatureOfInterest** Location + id: <<idType>> + id: <<idType>> + time: TM Instant + name: String + id: <<idType>> + description: String + name: String HistoricalLocations • + properties: JSONObject + description: String 0.. + encodingType: String + properties: JSONObject Locations



+ feature: <<anv>>

+ encodingType: String + location: <<any>>



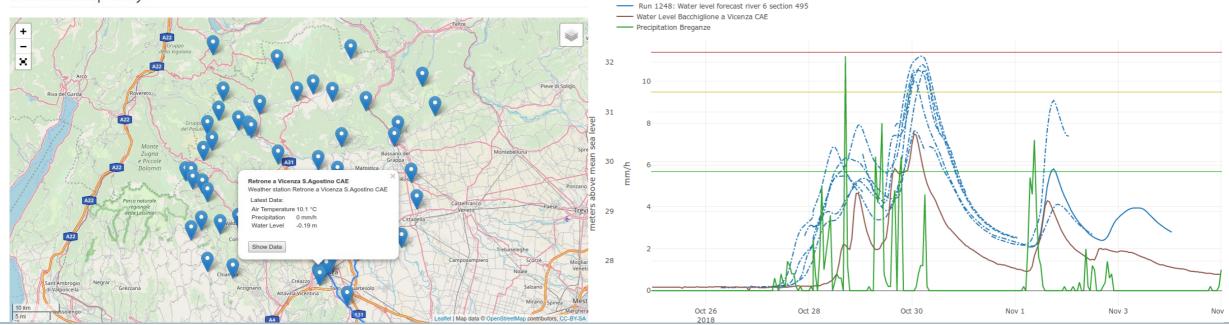
- EU-Project in Horizon 2020 framework
- Integrated solution to support forecasting, early warnings, transmission and routing of the emergency data, aggregated analysis of multimodal data and management of the coordination between the first responders and the authorities
- http://beaware-project.eu/



BeaWARE Flood Scenario Data

- Past, Current & Predicted
 - Weather (Temperature, Humidity, Rainfall, etc)
 - Water levels in rivers

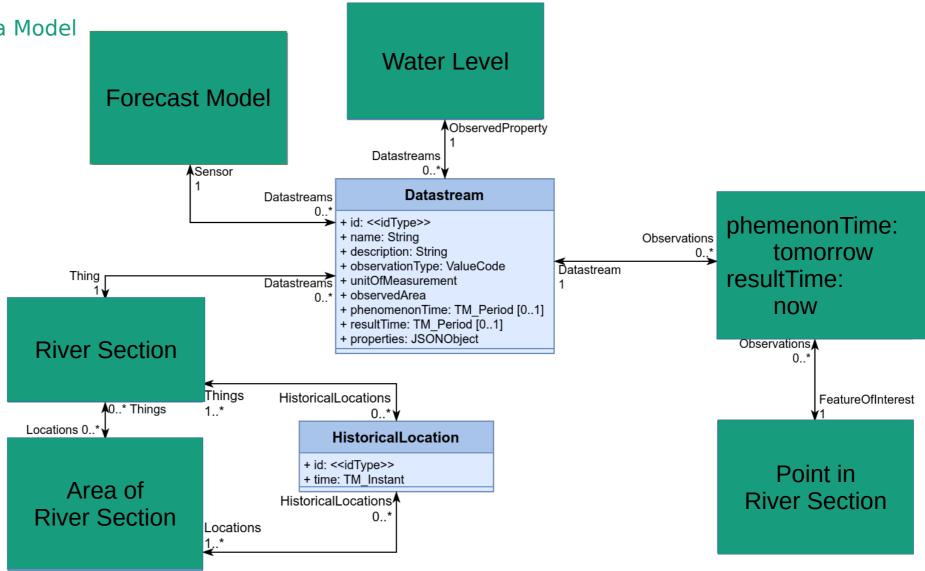
Overview Map (Italy)





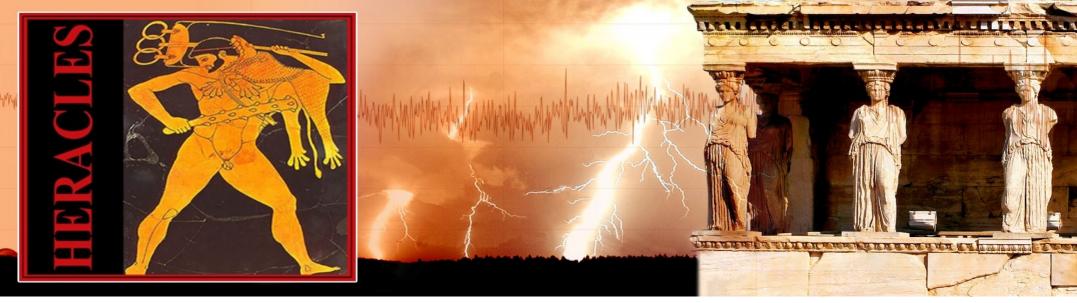
BeAWARE

Flood Scenario Data Model



SensorThings API - Data Model





- EU-Project in Horizon 2020 framework
- Design responsive systems/solutions for protecting Cultural Heritage against climate change effects
- Semantic Modeling of cultural heritage, risks, climate effects, materials, sensors, simulation models, ...

SensorThings API - Data Model

http://www.heracles-project.eu/



HERACLES Building Data

HERACLES > HERACLES Knowledge Base > Instances > SensorIndividuals > Accelerometer



Accelerometer

Accelerometer measure acceleration caused by shocks or structural influences. The sensors can identify individual frequencies and their impact on the observed object. The picture below shows the accelerometers on the roof of the Gubbio Palace.

Accelerometer #3

Accelerometers #1 and #2





In the pictures below sample charts of possibly obtained data is shown. The left picture shows the accelerometer amplitudes (positive values). The right picture shows a frequency analysis and depicts the occurence of specific frequencies and their distribution. In the right column sample data in text files is provided as content.



Sensor

Sensor endpoint

Endpoint for Accelerometer

Sensor monitors

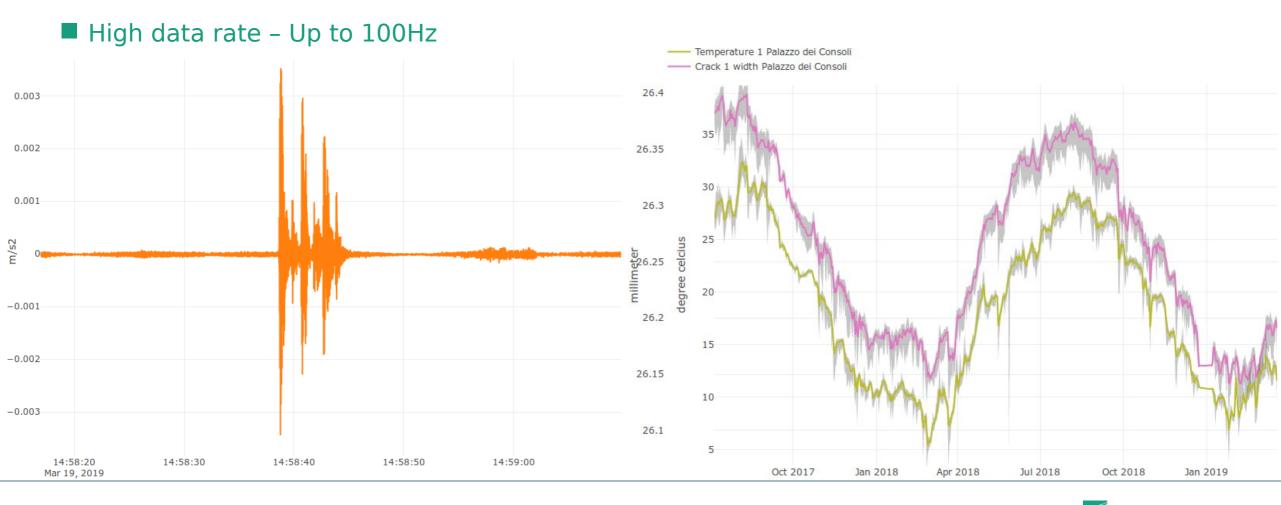
Palace of Gubbio

Sensor produces dataset

Acceleration Data Set

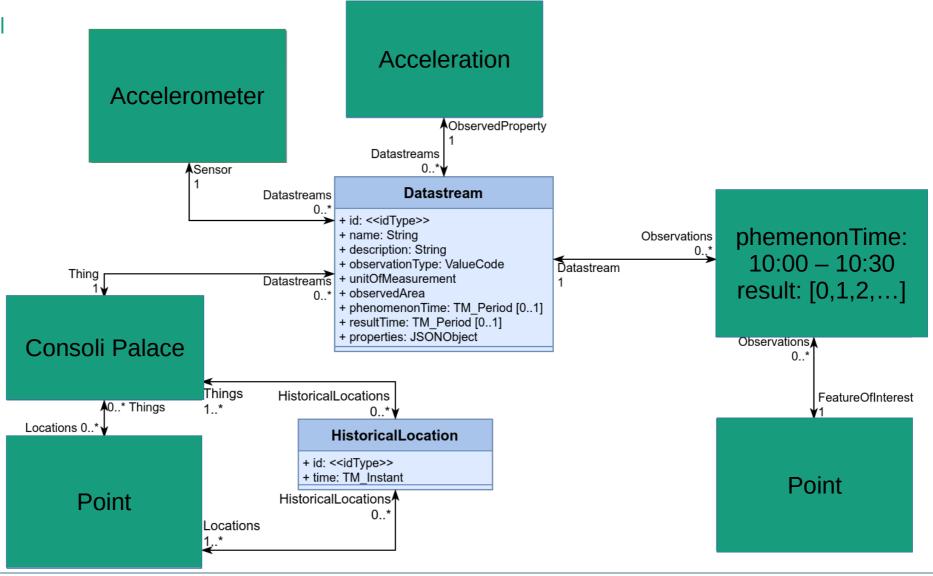


HERACLES Building Data





HERACLES Building Data Model



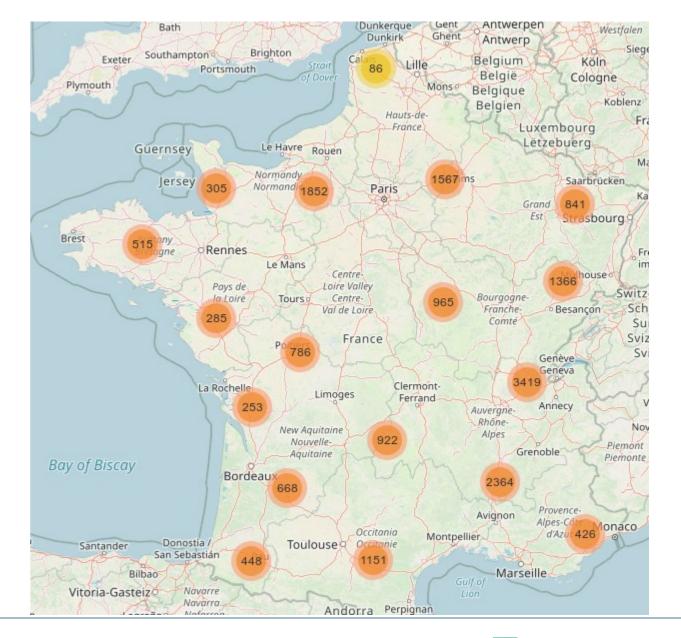
SensorThings API - Data Model



BRGM

French surface water database

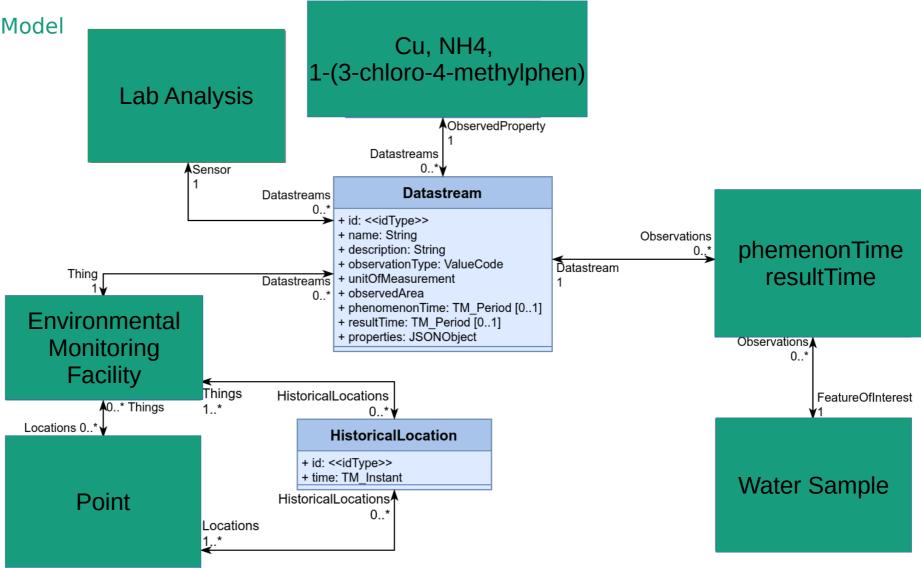
- French surface water quality database
 - 18478 Stations1874 Observed Properties136000000 Observations
 - INSPIRE Aligned
 - Water samples
 - analysed in laboratory
 - many results per sample





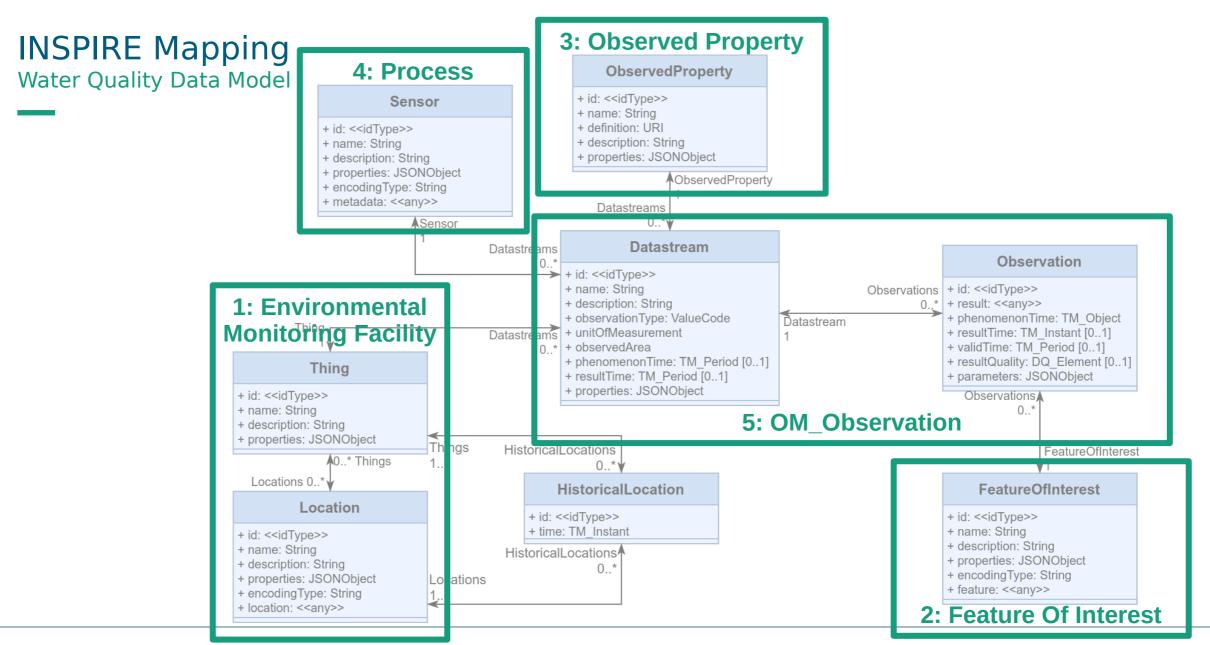
BRGM

Water Quality Data Model





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SensorThings API - Data Model



29.09.2022

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Building Management

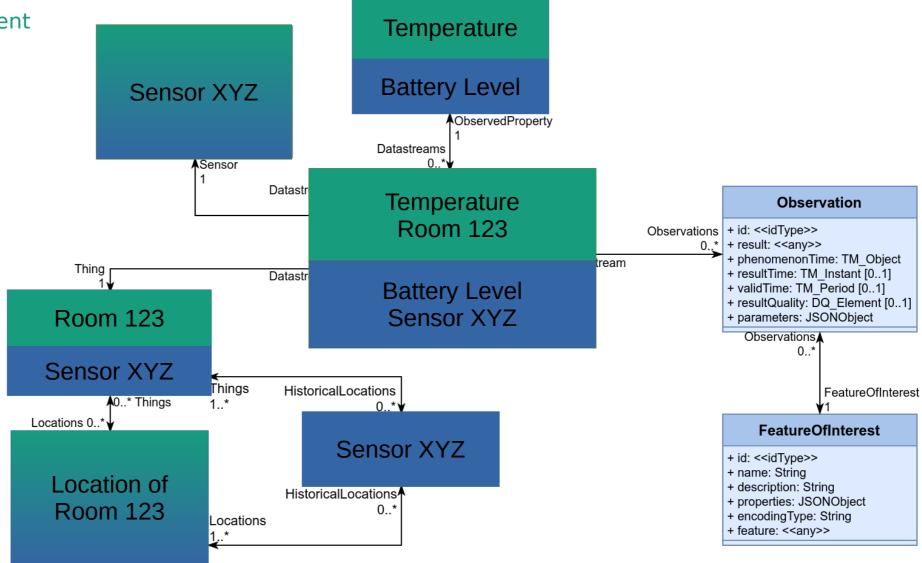
- LoRa Sensors measure
 - Room-Related properties (Temperature, Humidity)
 - Sensor-Related properties (Battery level, RSSI)
- Sensors are occasionally moved
 - Room-Related Observations flow in different Datastreams
 - Sensor-Related Observations keep the same Datastream

SensorThings API - Data Model

- Multiple sensors can be in the same room
 - At the same time
 - At different times
- Sensors are identified by their LoRa-ID



IOSB Building Management





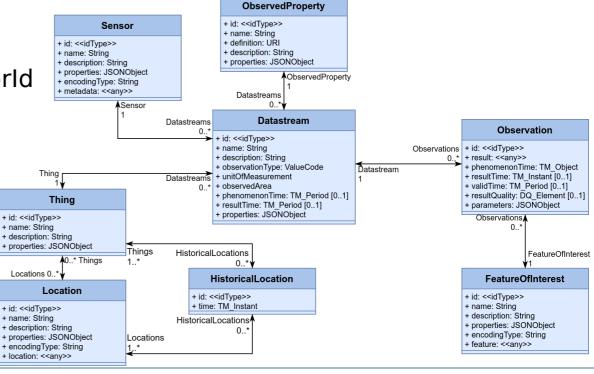
© Fraunhofer IOSB

Finding the right Datastream

Building Management

Get the current Datastream for Sensor XYZ and Property ABC?

v1.0/Datastreams?\$filter=
Sensor/properties/sensorId eq 'XYZ'
and ObservedProperty/name eq 'ABC'
and Thing/Locations/Things/properties/sensorId
eq Sensor/properties/sensorId





Contact

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