MaREI Centre for Marine and Renewable Energy

ERI Environmental Research Institute University College Cork

COMMON SENSE
MARINE SENSORS - MARINE MONITORING

UCC University College Cork, Ireland Coláiste na hOllscoile Corcaigh

Declan Dunne – University College Cork

COMMON SENSE Web Platform

COMMON SENSE FINAL EVENT

Barcelona, Spain, 27 January 2017

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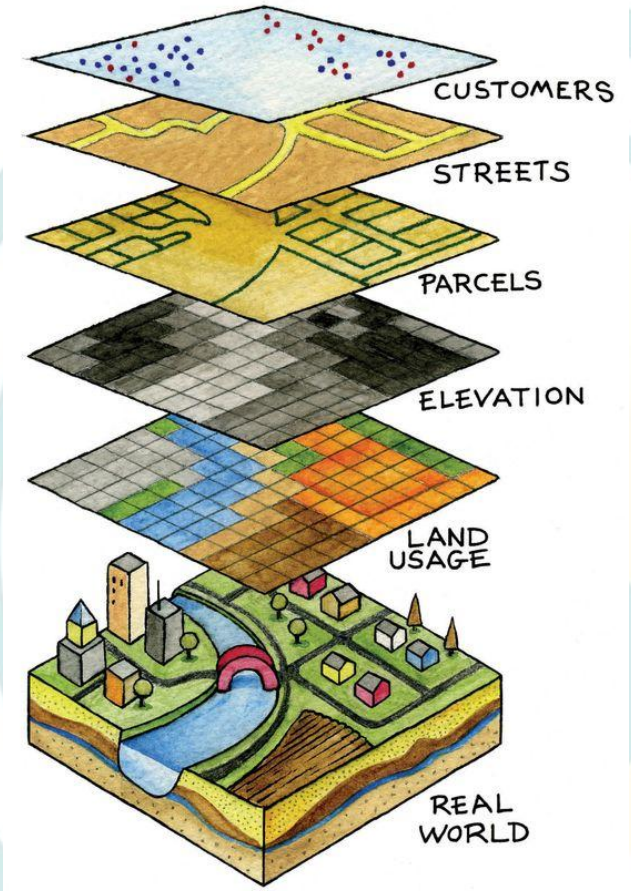
Background



Adding value to Environmental Science using ICT and Geomatics

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COMMON SENSE data management objectives

- Design and implement a Common Sensor **Web Platform** for connecting, processing, storing, managing and sharing sensor data
- Underpinned by the Open Geospatial Consortium (OGC) **Sensor Web Enablement (SWE)** suite of standard encodings and web services
- **Interoperability**: e.g. to enable data exchange with existing systems such as the GEOSS
- Built on **open source software**

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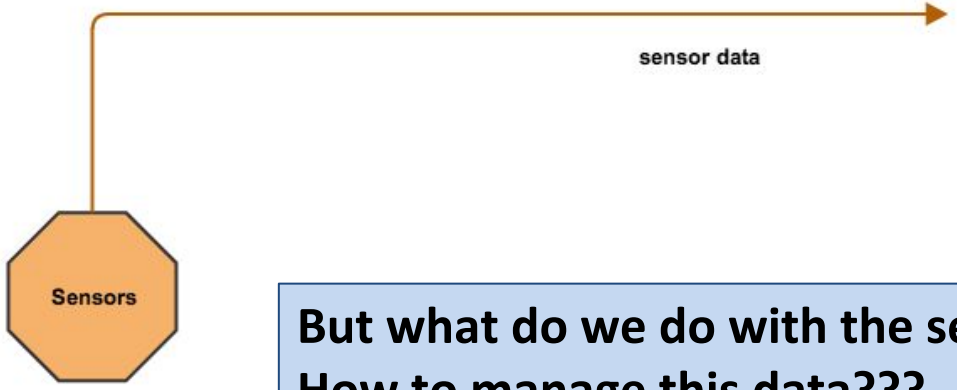
Implementation questions – sensors

We have a sensor



But what do we do with the sensor data outputs???
How to manage this data???

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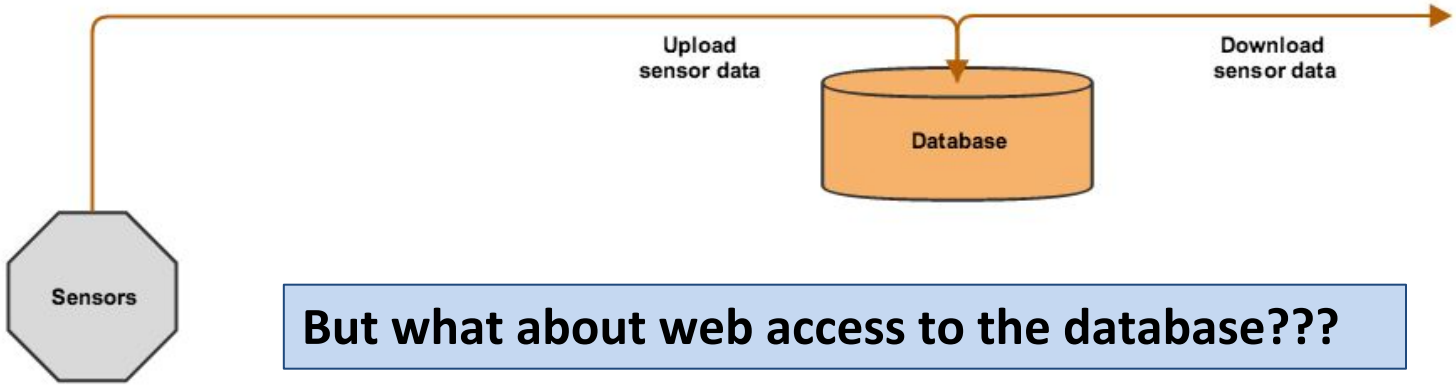
Implementation questions – database

We decide to upload the sensor data to a database



But what about web access to the database???

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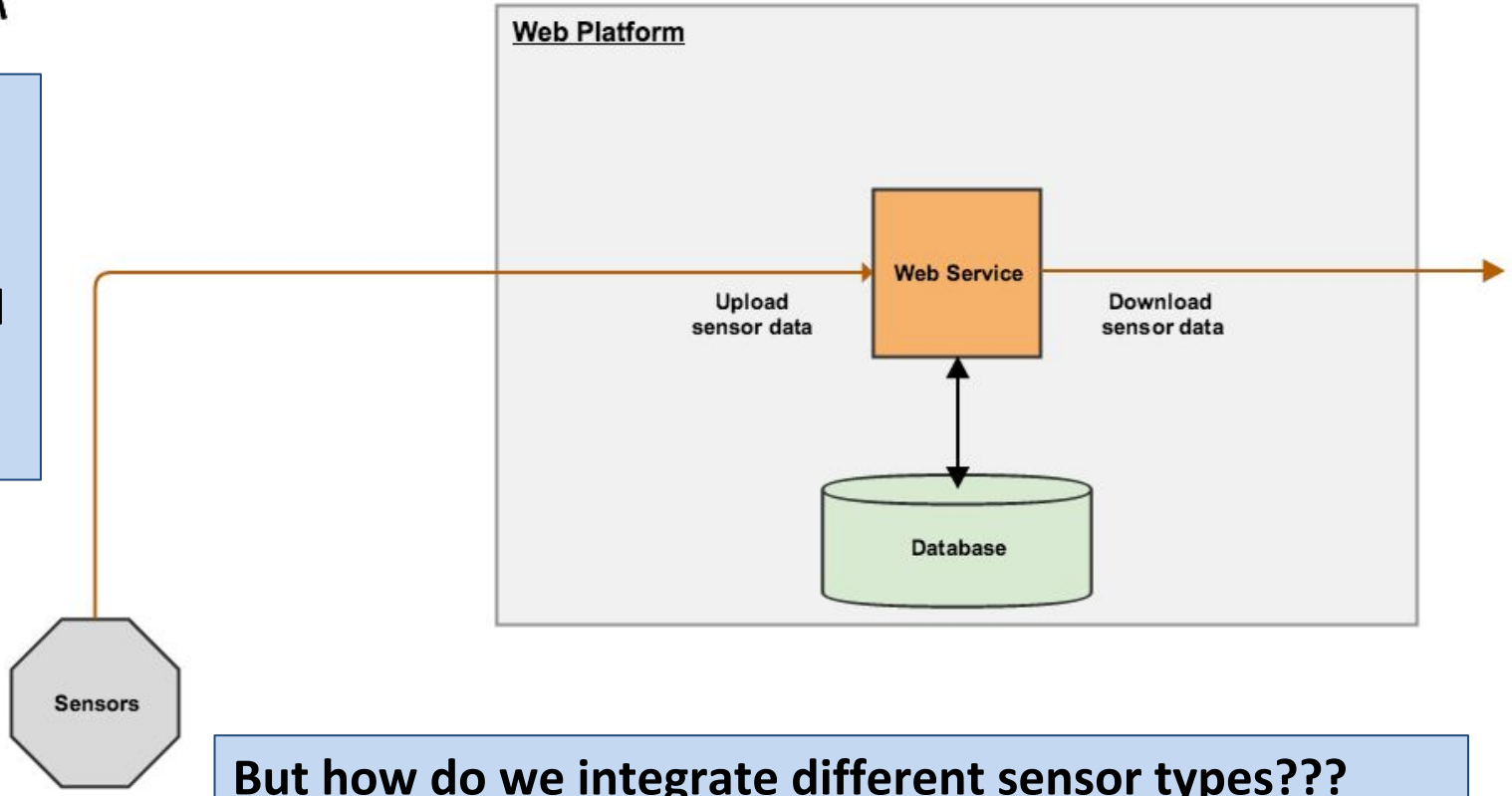
Implementation questions – web access to data

We have web access to the database for uploading and downloading data.



But how do we integrate different sensor types???

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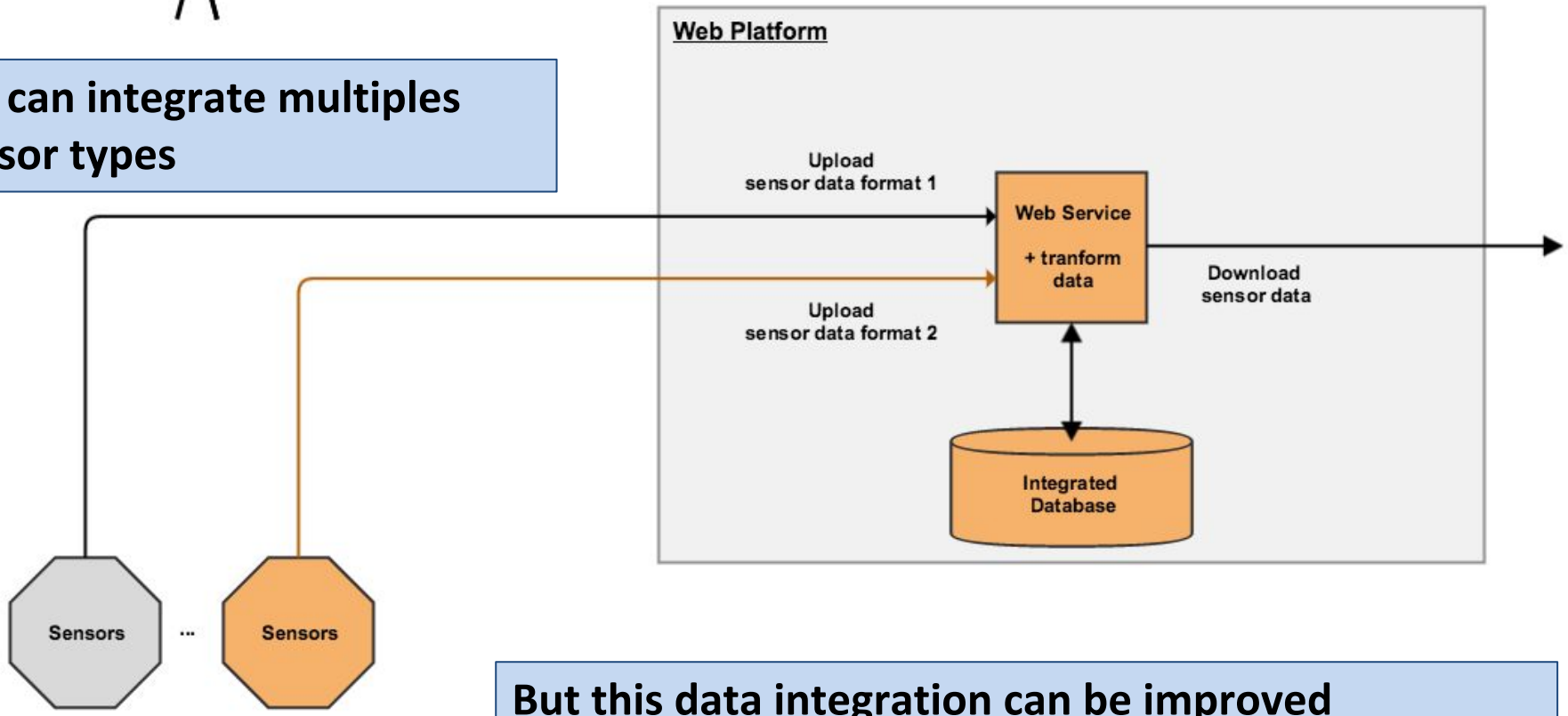
Implementation questions – sensor data integration 1

We can integrate multiples sensor types



But this data integration can be improved

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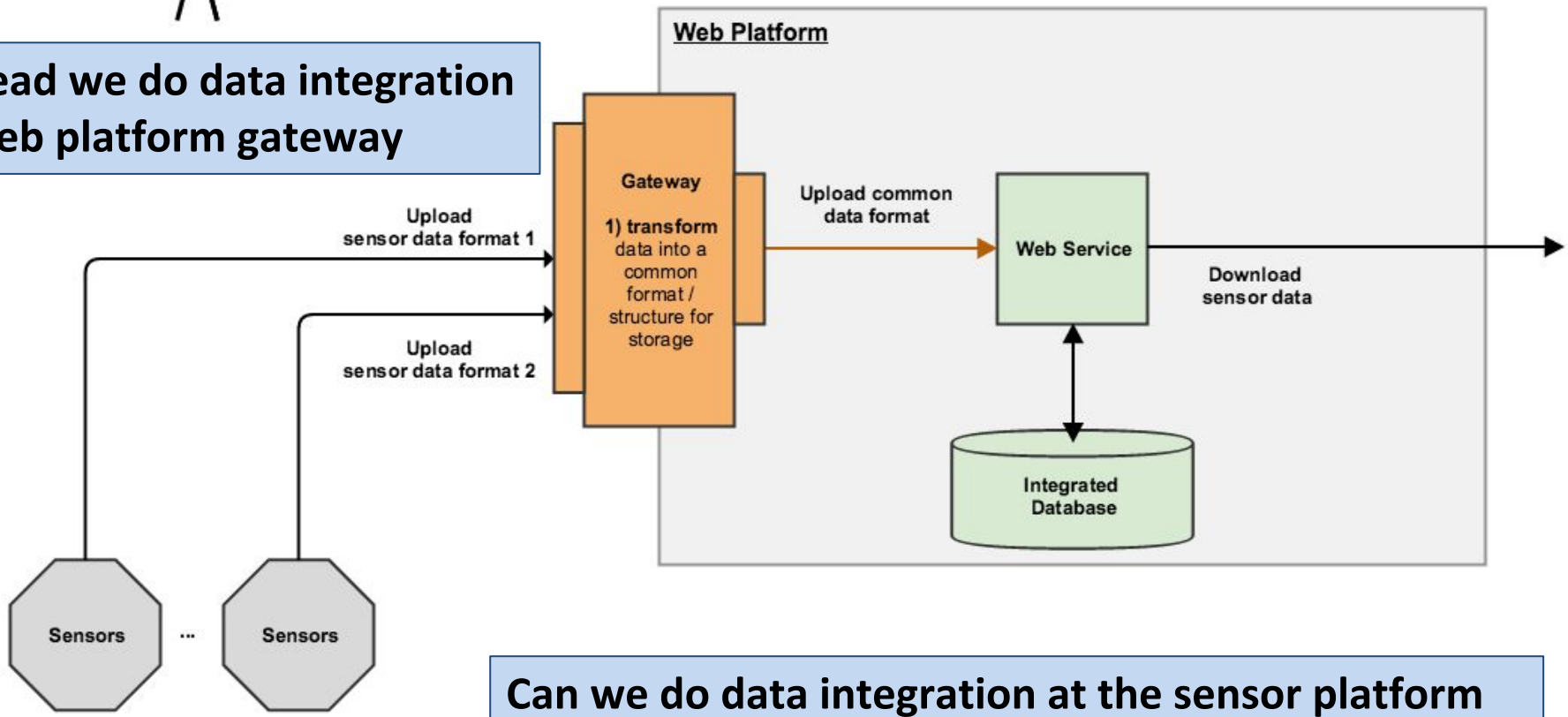
Implementation questions – sensor data integration 2

Instead we do data integration in web platform gateway



Can we do data integration at the sensor platform level???

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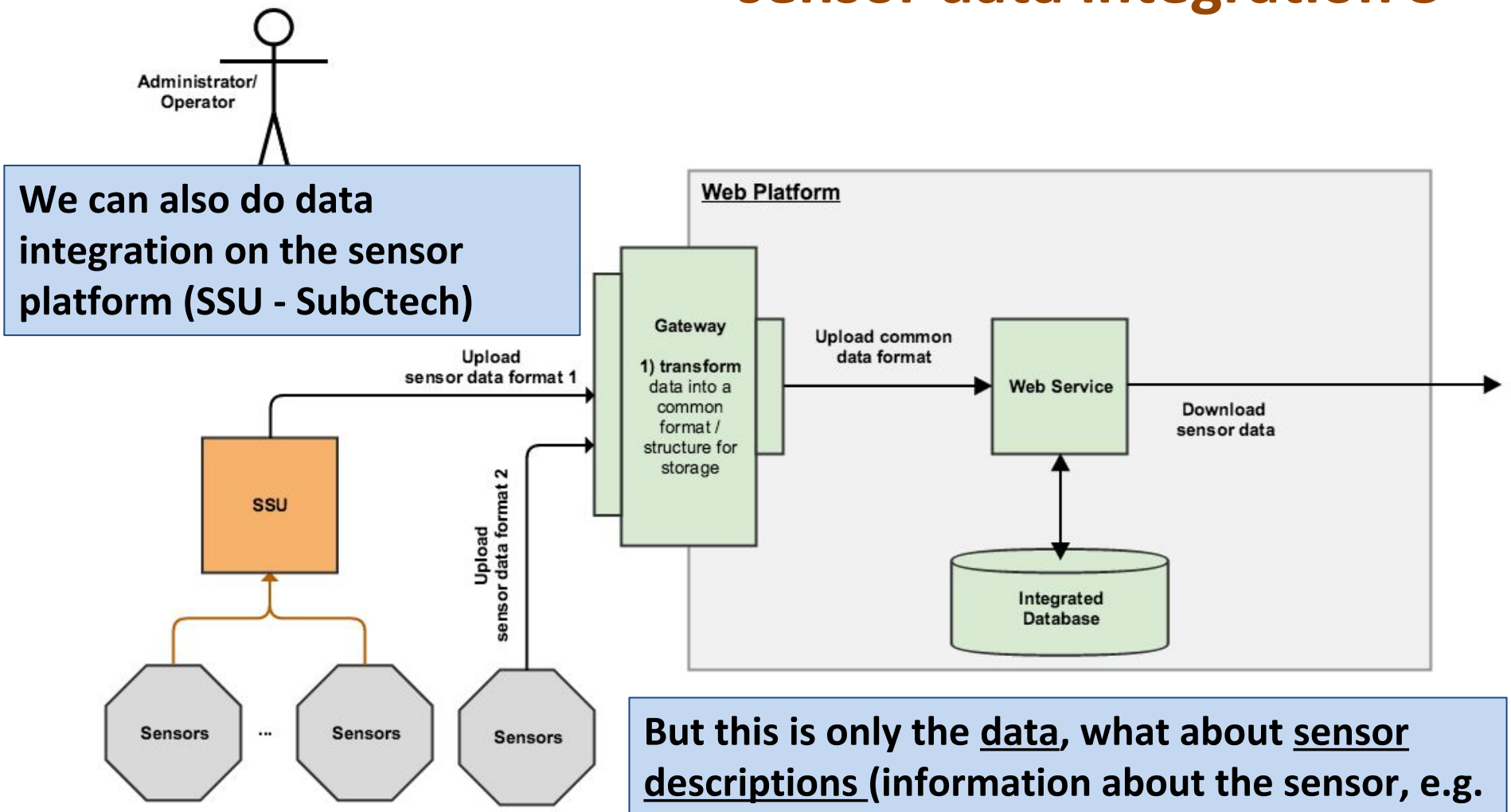
Implementation questions – sensor data integration 3

We can also do data integration on the sensor platform (SSU - SubCtech)



But this is only the data, what about sensor descriptions (information about the sensor, e.g. calibration information, evaluate quality)???

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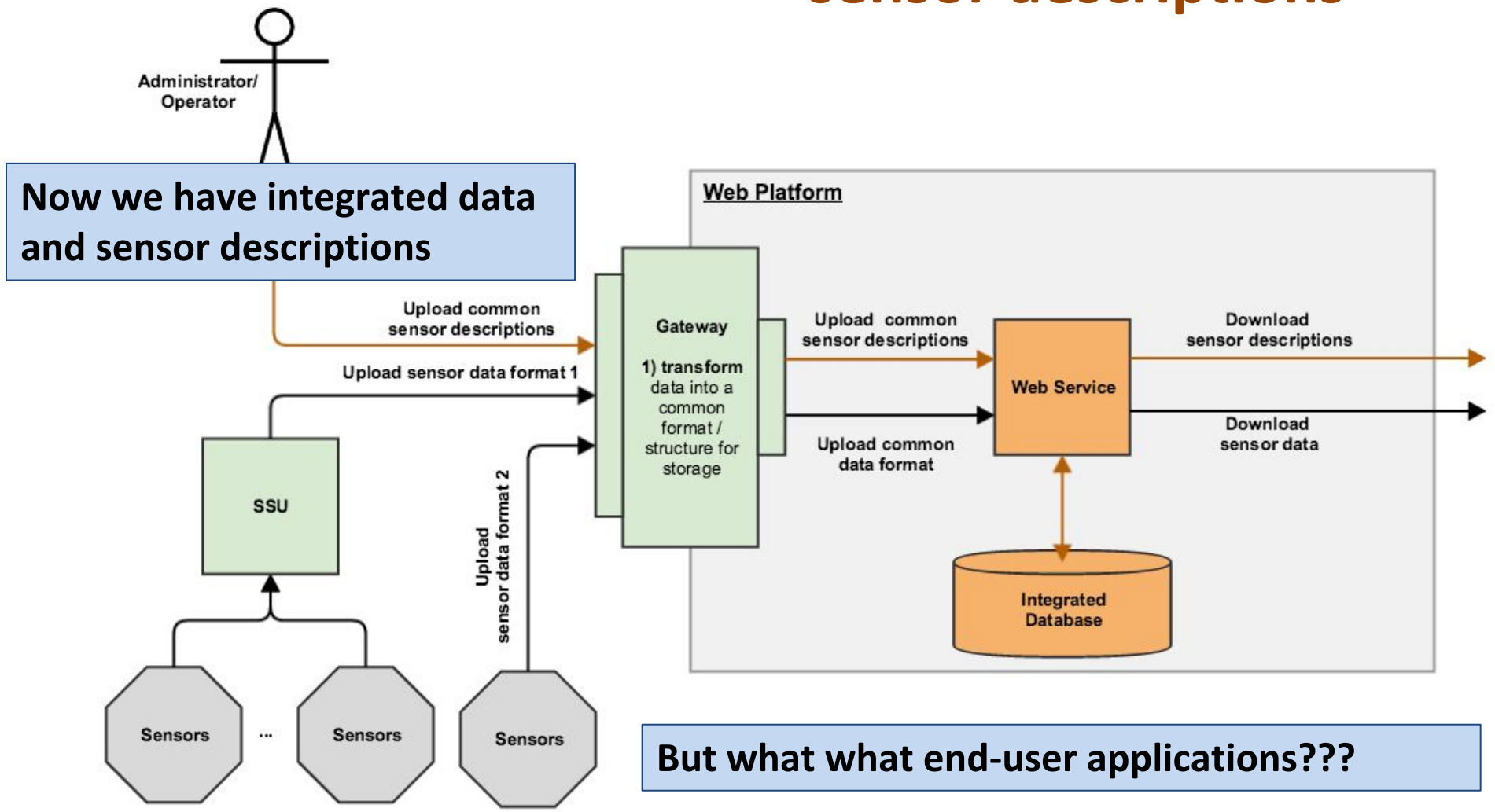
Implementation questions – sensor descriptions



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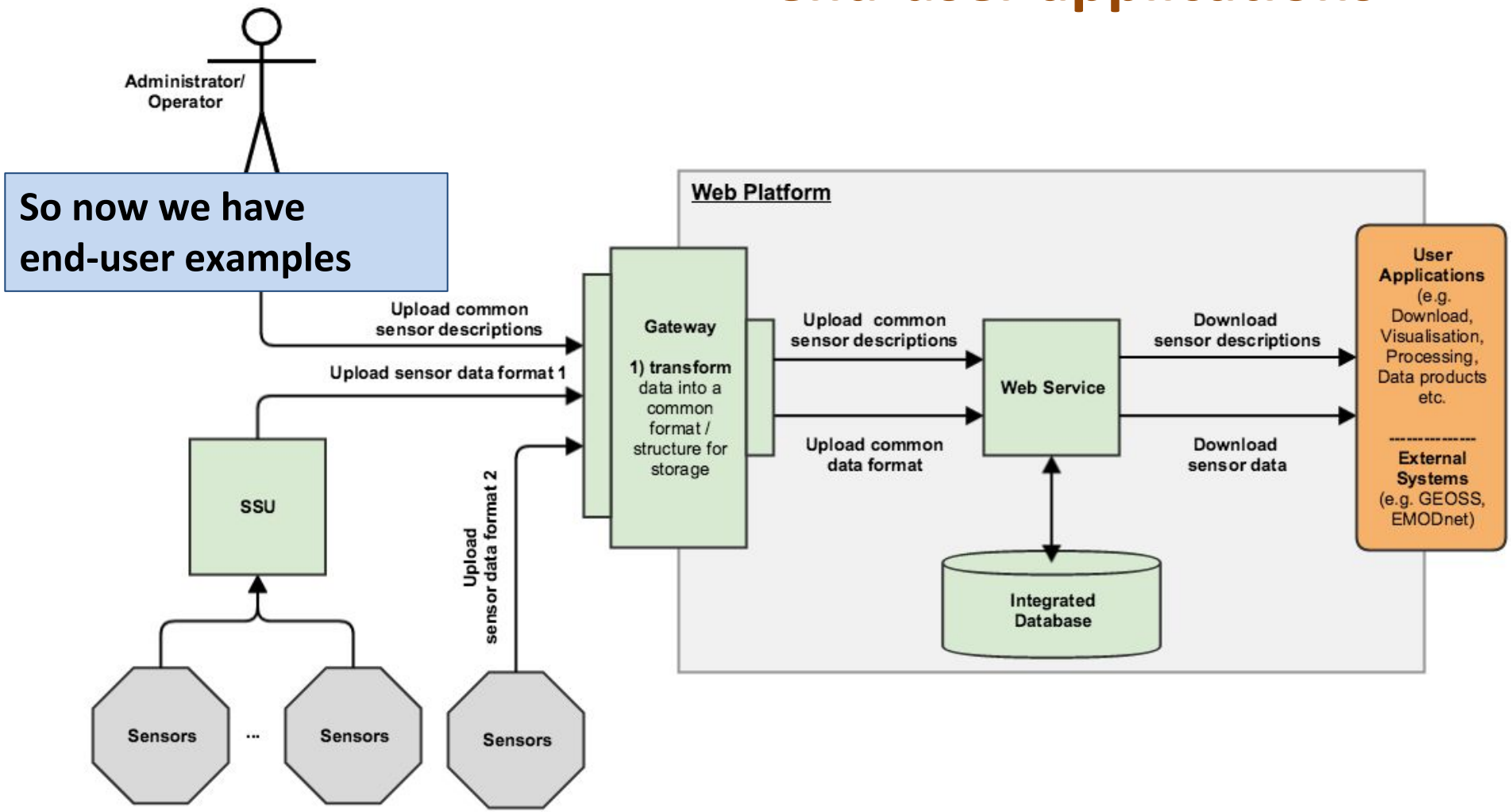
Implementation questions – end-user applications



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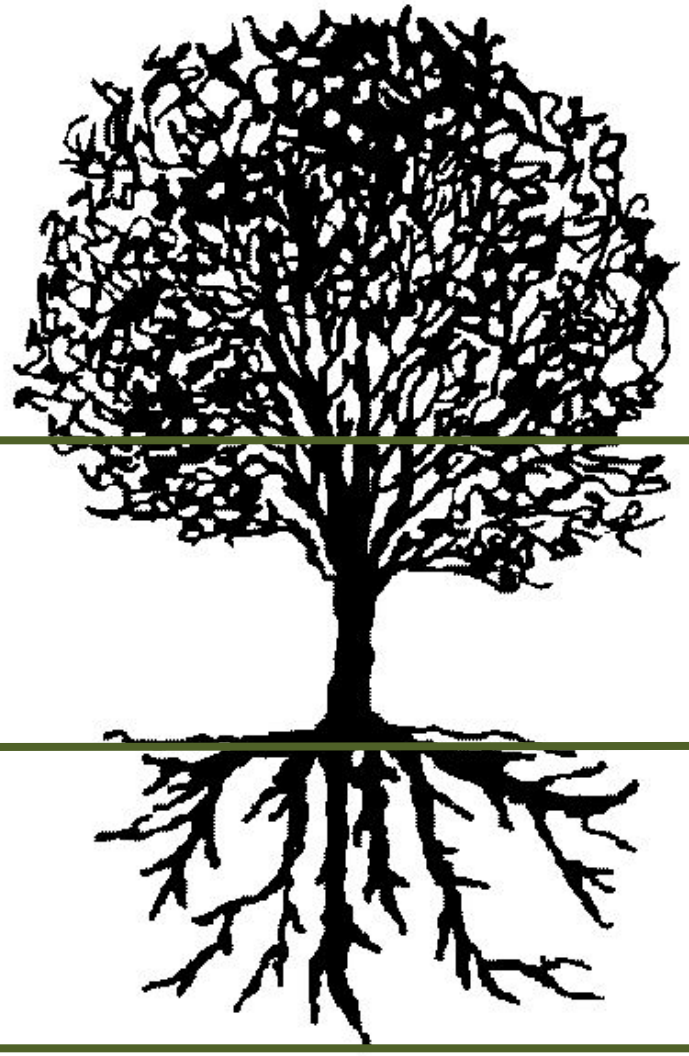
End-to-end data integration challenges



End user applications

(e.g. portal, DSS, EIA, risk management, external systems, services,…)

Standards

Diverse datasets

Programme for research, technological development and demonstration under grant agreement No 614155.

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Web Platform – technology choices

- Open Geospatial Consortium (OGC)
  Sensor Web Enablement (SWE) suite of standard encodings and web services.
  - **Common data exchange format: Observations & Measurements (O&M)** (XML type data format)
  - **Common sensor description exchange format: SensorML** (XML type metadata format)
  - **Data access web server: Sensor Observation Service (SOS)** (web service for uploading and downloading sensor data and descriptions – using 52North SOS open source software)

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Web Platform – technology choices

- Web Platform integration with the Sensor Platform (SSU - SubCtech)
  - **Data inputs to web platform:**
    NMEA data format received from the SSU
    Web platform gateway automatically transforms NMEA to O&M
  - **Real-time data stream upload supported using telecommunications**
    1 second sampling rate tested from Barcelona to a server in Cork
  - **Batch upload**
    Bulk data upload, useful if sensor is offline

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Interdisciplinary approach essential (e.g. SensorML)

Sensor: Manufacturer knows the capabilities and limitations (range limitations, precisions, etc.).

Setup: Sensor Operator modifies configurations (new limitations and specific capabilities) but typically use the manufacturer's software.

Deploy: Field Operator knows issues relating to the deployment/maintenance (location, precision of location, sensor swap, cleaning).

Collect: In logging data streams for distribution or archival, decisions are made (length of data window for summaries, timestamps) / data manager.

Process: Typically, data are processed; data manager knows the process history.

Distribute: Data goes out to the world; fully-described standards-based encoding (all agents).

Use: User sees and selects data using Complete Lifecycle Metadata.

Workshop Sensor Web Enablement (SWE), Oceanology International (ref: X-DOMES)

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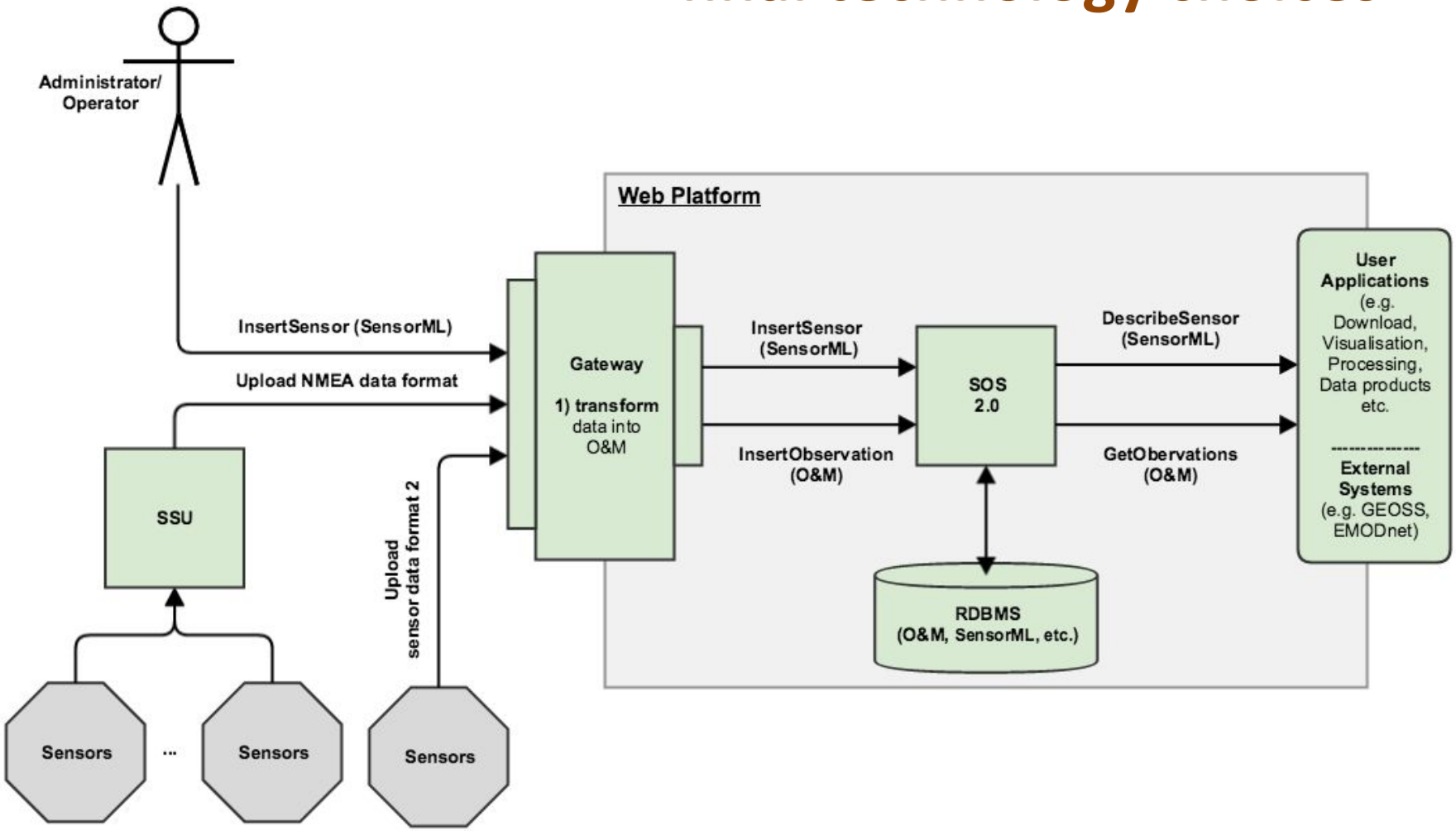
Web Platform – final technology choices



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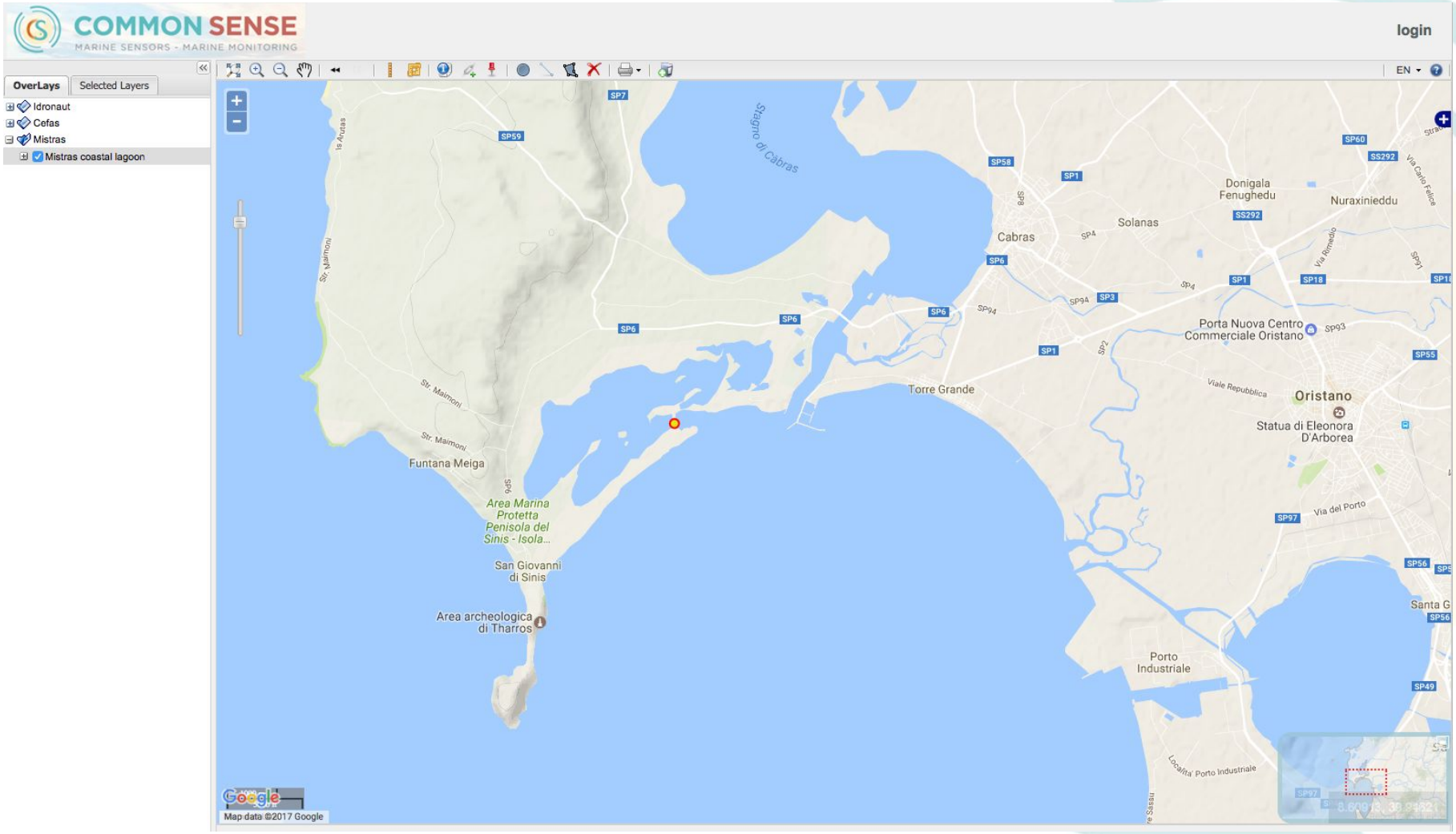
Web Platform Portal



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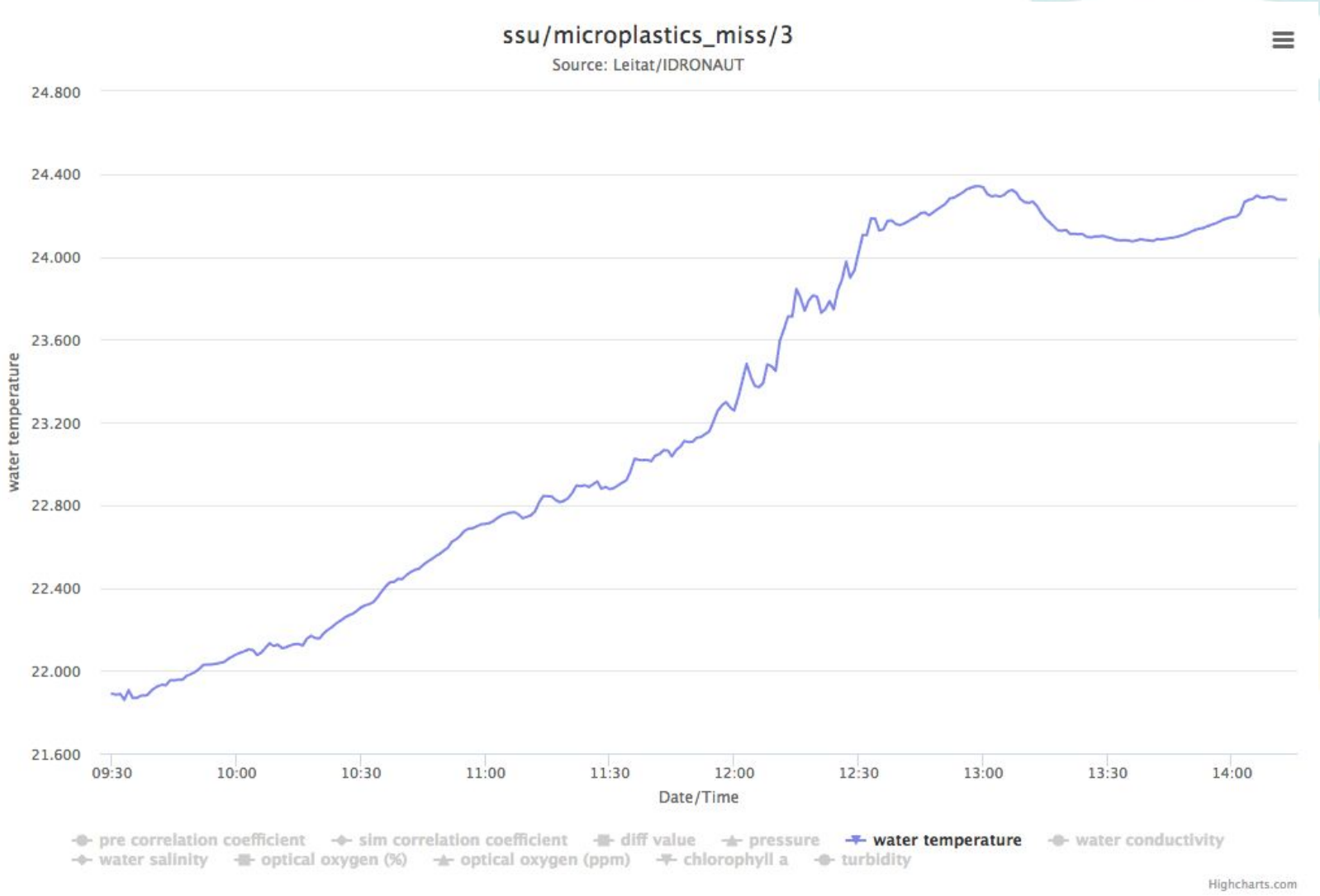
Web Platform Portal



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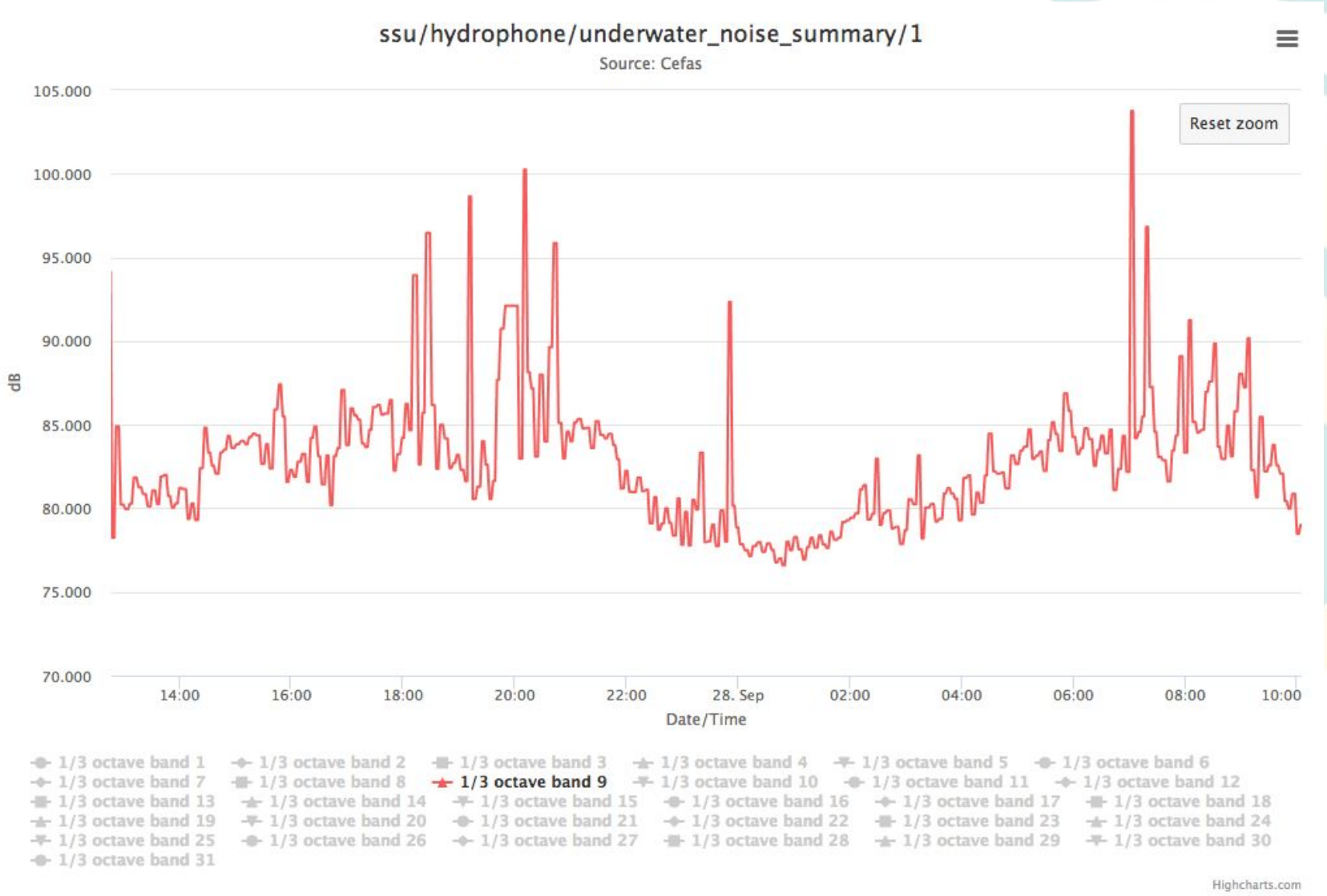
Web Platform Portal



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Web Platform Portal

http://commonsense.ucc.ie/plots/ssu_stream_0.html

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Thank you for your Attention

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