Using IoT standards for push-based communication of hydrological data

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(Wupperverband)
Water Ressource Management

- Catchment area >800 km²
- 14 reservoirs
- 11 seewage plants
- Precipitation: < 1400 mm/anno
- Inhabitants: ca. 900,000
Current Data flow: batch processing

- manual
- auto

- expert system
- 52N SWE Schema (Helgoland / SOS)
- SOS (not used actively)
- Helgoland-API
Current Data flow: batch processing

- manual
- auto
- expert system
- DB
  - 52N SWE Schema (Helgoland / SOS)
- SOS (not used actively)
- Helgoland-API
NodeRED (nodered.org)

- Low Code Programming (NodeJS, JS)
- Event-Driven Applications
- Well documented
- OpenSource
- Large Community
- Lots of plugins
Visualisation (TaMiS)
SensorThings

Documentation: developers.sensorup.com
Query Options: expand, select, orderby, count, ...

Datastreams with some metadata ≈ helgoland-api/timeseries:

<root-url>/sensorthings/Datastreams?
$expand= ObservedProperty($select=description,name,id),
        Thing($select=description,name),
        Sensor($select=description,name),
        Observations(
          $top=1;
          $orderby=phenomenonTime%20desc;
          $expand=FeatureOfInterest;
          $select=result,phenomenonTime,FeatureOfInterest)
SensorThings (Sensing Profile)

- Provides two fit-for-purpose APIs
  - One for push-based access
  - One for pull-based access
- Easy to adopt and lightweight
  - Based on standards (MQTT)
  - Dataset/Datastream metadata managed in database
- Allows for service based data processing in the sensor web (Apache Kafka)
- Allows for service based Data Science (Apache Spark, Jupyter Notebook)

An OGC standard as practical as the WMS for the Sensor Web at last!
Next Steps

- Evaluation of submission of manual measures
- Evaluation of scalability on our IT-infrastructure
- Evaluation of performance in our IT-infrastructure
- Evaluation of integration with OPC-UA
- Role out to all WV-facilities

Feature Requests

- Integration with current SOS-DB-Schema so that STA and Helgoland-API can be served from same DB-Schema (harmonisation of primary keys)
- Better JavaScript support, current support of helgoland toolbox is rudimentary and does handle datastreams as second class citizens
- Datastream / Dataset Metadata Editor (No SensorML!!!)
- Role based editing of Datastreams clusters