Integrated Observations Database

Release 2

At time of implementation some issues arose that meant out of scope work was required. We decided that in the bigger scheme of things some in scope work would be sacrificed for the out of scope work. This ensured that things were done to future proof the database. For example, Sensor Observation Services has been replaced by SensorThingsAPI.

## Out of Scope

### Merge database drift

Originally the idea was to have a Staging and Live database with procedures to move data from Staging to Live. The databases had drifted too much so it was decided to merge them and only have a Live database. A huge amount of effort was required to correct the drift and merge the databases.

### ProjectSite broken into Programmes and Projects

The ProjectSite table was split into Programmes, Projects and Sites. This enabled modelling the real world, which was not possible before.

### Organization now linked to Sites, Stations, and Instruments with Roles

An Organization can now be linked to a Site, Station or Instrument with a Role, e.g Owner, Manager. So a Site might be owned by SAEON but an instrument in the Site might be owned by the CSIR. This is typical in the marine environment and couldn’t be modelled before.

### 1 to Many now Many to Many with StartDate and EndDate

The 1 to Many relationships between Stations, Instruments and Sensors meant that if an instrument moved to another station, which happens in the marine environment, the old history was lost. The relationships were replaced with Many to Many including a StartDate and EndDate. This also helped with making the Import Batches more flexible. This had repercussions throughout the system and practically all forms had to be rewritten to hand the new schema.

### Data Query expand on demand and limited offerings

Once merged the database had 83 million observations and 52 Phenomena, 768 Offerings and 3080 Phenomena Offerings. This made the Data Query form unusable as the whole tree was being loaded when the form opened. The form was rewritten so that tree nodes were only expanded on demand. There was also a request to limit the phenomena offerings to only those that had observations as the tree had a lot of redundant nodes. Expand on demand and limited phenomena offerings made this form usable again.

### Automated UI Tests

To ensure changes did not break anything Automated UI Tests were required to be written. The Ext.net components used in Release 1 were circa 2011, the ASP.Net WebForms framework from circa 2008, neither were designed with UI Testing in mind. In short to be testable an element must be identifiable. ASP.Net WebForms generated IDs on the fly, so they could not be used for testing. Some Ext.Net components had no IDs, so they too could not be used for testing. A huge effort was made rewriting the forms to make them testable. Automated UI Tests using Selenium IDE now cover the following forms: Organisations, Programmes, Projects, Sites, Stations, Instruments, Sensors, as well as the Many to Many relationships between them.

### Identity Service

During implementation of Release 2 there was a requirement for single sign on for all SAEON web sites, preferably using OpenID. After some research we decided on the new OpenID Connect specification that was ratified late 2016. A bare bones OpenID Connect Identity Service was created and proof of concept sites across some of the spectrum of SAEON platforms were tested. The SAEON Identity Service will become the Single Sign On point for all SAEON websites in future. Until further development on the service is done only limited login features are available.

### WebAPI documentation

In order to make the WebAPI useable documentation was added to the WebAPI website

## In Scope - Not done

### Metadata and DOI services

The services required to create Metadata records and DOIs became available very late in the project. That means any Download related features were not implemented. At a later stage these will be retrofitted into Release 2 and the Download features enabled.

## In Scope – Changed

### Sensor Observation Services

Since 2007 the Sensor Observation Service (SOS) was an official OGC standard. It was a SOAP based web service that returned SensorML. Things on the web have changed a lot since then. In 2016 OGC approved the SensorThings API standard specification, a new RESTful and JSON-based standard provide functions similar to SOS.

A decision was made not to implement the SOAP/SensorML web service, but rather the RESTful/JSON Web API.

As per http://docs.opengeospatial.org/is/15-078r6/15-078r6.html

However, SensorThings API does not follow the OData Common Schema Definition Language and as a result does not follow its metadata service entity model. Thus, SensorThings API should not be seen as an OData compliant API. SensorThings API’s future work will explore possible harmonization between SensorThings API and OData.

So there are some technical issues with the current non-standard naming conventions that hopefully will be fixed soon. For now we provide semantically equivalent sanitised standard names for the non-standard ones.

Mandatory properties in the specification are not mandatory in the observations database so for now some objects returned are not valid in terms of the specification.

The current thinking is that if you download observations you need to accept a license and a metadata record and DOI are issued for the download and it cached data. This is not handled in the SensorThings API so for now everything but downloads of observations is implemented.