Oceanotron server for marine in-situ observations

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The Oceanotron is a data server dedicated to marine in-situ observations dissemination. The development of the server, coordinated by IFREMER, started in 2010. It has since been chosen as the data dissemination server for MyOcean in-situ data providers. The server is now deployed at 7 different places in Europe. The software will also be used as an interoperability server for data products in SeaDataNet2 project. IFREMER hosts the CORIOLIS marine in-situ data centre (http://www.coriolis.eu.org) and, as French NODC (National Oceanographic Data Centre, http://www.ifremer.fr/sismer/index_UK.htm), some other in-situ observation databases. As such IFREMER participates to numerous in-situ data management projects. IFREMER wished to capitalize its thematic data management expertise in a dedicated data dissemination server called Oceanotron.

Knowing the diversity of data repository formats (RDBMS, netCDF, ODV, MEDATALAS, ...) and the temperamental nature of the standard interoperability interface profiles (OGC/WMS, OGC/WFS, OGC/SOS, OpenNDAP, ...), the software architecture relies on a ocean business data model dedicated to marine in-situ observation features.

Oceanotron is a web application server which is deployed by the data providers in a tomat application server.

The Oceanotron architecture is organized around an information bus on which business units are plugged. The business units roles are:
- **Storage units**: manage datasets in their natives formats
- **Transformation units**: apply transformation on observations, e.g. convert vertical coordinates, computes ocean variables, ...
- **FrontDesks**: get request from users and send results in specific protocols.

The administrator configures datasets by combining storage units and transformation units. Frontdesks disseminate a selection of datasets. Depending on the users request and the dataset definition, a session manager routes information between the business units.

The backbone of the application is the information bus on which requests and observation datasets are transiting between the business units. On this bus, every business unit speaks the same 'ocean observation' language. The language implements in a business data model: requests, dataset metadata, observations (vertical profiles, point series and trajectories).

Oceanotron is opensource and the business units are likely to be developed by experts in the related business domain.

The shared business data model is the interface between them these expert implementations.

The shared data model has been implemented on the basis of the CSML V2 work. It aims at complying with the O&M and INSPIRE data models. The model implements the following sampling features:

<table>
<thead>
<tr>
<th>Feature type</th>
<th>Observed dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical profile</td>
<td>Z (depth or pressure)</td>
</tr>
<tr>
<td>Point serie</td>
<td>T (time)</td>
</tr>
<tr>
<td>Trajectory</td>
<td>X (lon), Y (lat), Z (depth), T (time)</td>
</tr>
<tr>
<td>Point</td>
<td>None</td>
</tr>
</tbody>
</table>

In addition to observation features, request, criteria and datasets metadata are implemented in the model.

The detailed UML model is published at: http://www.ifremer.fr/rsi/oceanotron/BOUML.htmlDoc/

The javadoc of the model implementation is available at: http://www.ifremer.fr/rsi/oceanotron/javadoc/

Other details about oceanotron are provided on the forge: https://forge.ifremer.fr/projects/oceanotron/