Open service network for marine environmental data
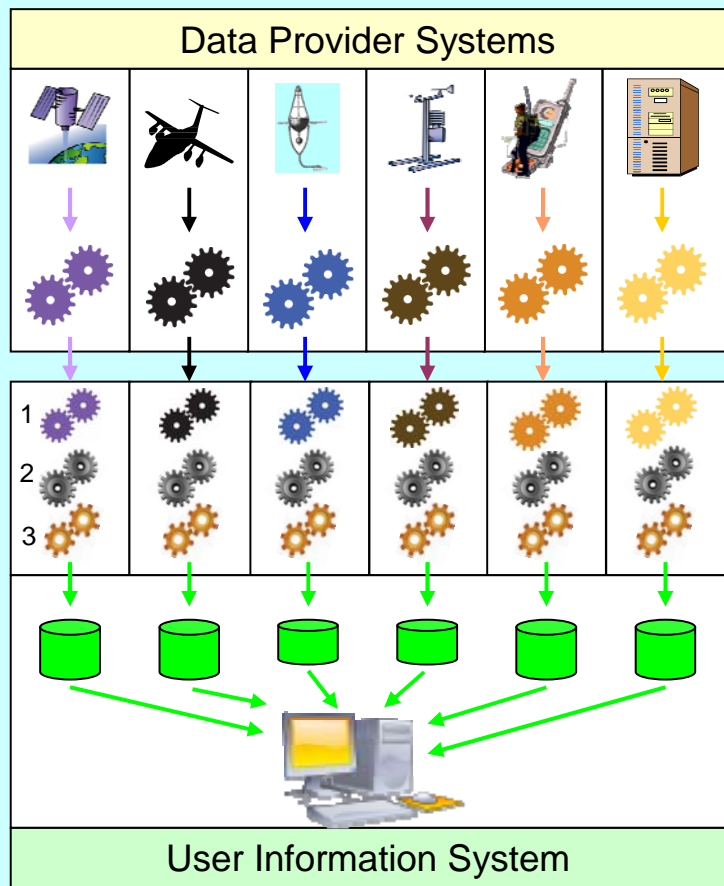
Objectives

NETMAR aims to develop a pilot European Marine Information System (EUMIS) for searching, downloading and integrating satellite, in situ and model data from ocean and coastal areas. It will be a user-configurable system offering flexible service discovery, access and chaining facilities using OGC, OPeNDAP and W3C standards. It will use a semantic framework coupled with ontologies for identifying and accessing distributed data, such as near-real time, forecast and historical data. EUMIS will also enable further processing of such data to generate composite products and statistics suitable for decision-making in diverse marine application domains.

Motivation

Today, numerous information systems and services are developed to search, browse and download marine data, such as

- Satellite and aircraft images
- Human observations from vessels, helicopters and in the field
- In situ measurements from buoys, instruments mounted on vessels and land-based stations
- Forecasts from weather, metocean, ecosystem and drift models.

However, these systems are not fully interoperable, and do not allow users to view, access, process, and analyse data from different providers without further processing. Current systems are typically based on custom-built or proprietary software. Thus, users need tools of their own to read and extract (1), reformat (2) and reproject (3) relevant parts of the retrieved datasets, before being able to visualise and analyse them together. This is time consuming and improving interoperability between marine data systems is therefore needed for more efficient data usage.

Data Provider Systems

User Information System

Case studies

NETMAR will develop six case studies: (1) Arctic Sea Ice and Metocean System, (2) Near real time monitoring and forecasting of oil spills, (3) Relationships between physical and biological variables, (4) Ecosystem model validation, (5) International Coastal Atlas Network (ICAN) for coastal zone management, and (6) Phytoplankton blooms in Gulf of Biscay and English Channel.
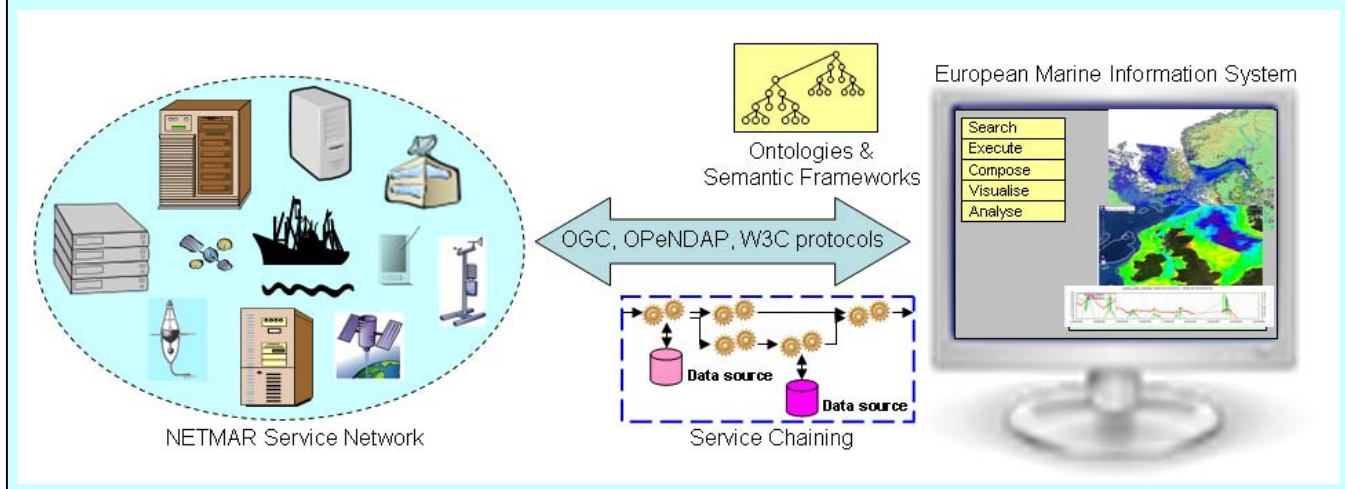
Methodology

Standardising data/metadata formats and exchange protocols contributes to bridging existing marine monitoring and forecasting systems, but is not sufficient to reach full interoperability. The semantics of services, including an uncertainty model, must also be defined to allow transparent computer-based discovery and access. NETMAR will therefore develop a semantic framework for marine data services backed by a multi-lingual and multidomain ontology to facilitate searches across (human) languages and different application domains.

Processing services and adaptive service chaining services will also be developed, to enable users to generate new products suited to their needs. Both data retrieved from existing systems as well as the products generated dynamically can be visualised in a web-GIS, which in addition to offering tailored presentation of data also includes a decision-support system (DSS) based on the six case studies.

Expected results

The EUMIS will be comprised of subsystems for service discovery, access and chaining, all based on standard communication protocols for accessing delivery or processing services in the NETMAR service network. EUMIS will use a common ontology and semantic framework to search for services across application domains and (human) languages, and to ensure that complex services are composed according to the semantics of the individual services. EUMIS will also offer visualisation of the retrieved or computed products, and decision-support tailored to the identified user needs.

Project web site: http://www.netmar-project.eu/

Consortium

Coordinator: Prof. Stein Sandven (stein.sandven@nersc.no)
Nansen Environmental and Remote Sensing Center
Thormøhlensgate 47, 5006 Bergen, Norway

British Oceanographic Data Centre, Natural Environment Research Council, UK

Plymouth Marine Laboratory, UK

Centre of Documentation, Research and Experimentation on Accidental Water Pollution, France

Institut Francais de Recherche pour l'exploitation de la Mer, France

Coastal and Marine Resources Centre, University College Cork, Ireland

Meteorologisk Institutt, Norway