The JERICO e-Infrastructure

JERICO Coastal Ocean Resource Environment (J-CORE)

Miguel Charcos[1] (mcharcos@socib.es); Miguel Ángel Alcalde[1] (maalcalde@socib.es); Francoise Pearlman[2] (jsp@sprintmail.com); Jay Pearlman[2] (jay.pearlman@fourbridges.org); Juan Gabriel Fernández[1] (jfernandez@socib.es); Peter Thijsse[3] (peter@maris.nl); Patrick Gorringe[4] (patrick.Gorringe@smhi.se); Joaquín Tintoré[1,5] (jtintore@socib.es)

(1) SOCIB, Spain; (2) IEEE, France; (3) MARIS, The Netherlands; (4) SMHI, Sweden; (5) IMEDEA, Spain

ABSTRACT

e-JERICO expands the capabilities of JERICO by providing a virtual representation of its assets which are represented in a catalog of inter-related resources to facilitate the understanding of the relation between data, software, BP, documents... This representation is critical to provide the different users with the appropriate information and tools for their needs. The conceptual design of e-JERICO accounts for the current scenario of JERICO where resources are distributed among partners. An interoperability layer allows harvesting the information of and accessing the resources in order to customize the responses to each type of user.

01 JERICO Distributed Resources

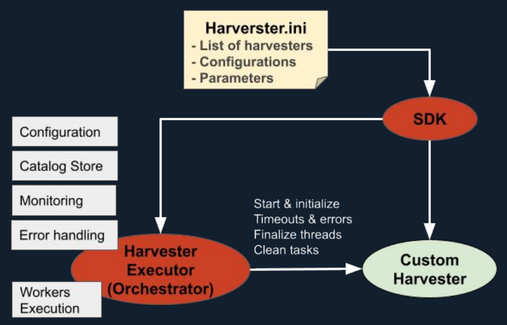
JERICO integrates a variety of observing platforms and technologies to observe and monitor the coastal areas in Europe. The system provides complex and coupled information of the physical, chemical and biological processes through data from fixed buoys, piles, moorings, drifters, ferrybox, gliders, HF radars and coastal cable observatories. Providing easy access and disseminating information of these multidisciplinary resources requires a virtual infrastructure capable of linking and integrating each of these resources in a single and standard digital platform.

The JERICO Coastal Ocean Resource Environment (J-CORE) addresses the need to integrate resources through access to diverse resource providers such as data aggregators (e.g. EMODnet, CMEMS, SeaDataNet) and document repositories (e.g. OBPS, Ocean Docs), software tools, e-libraries and training materials in a seamless way according to user needs. J-CORE helps scientists and other users to address new ways to gather and use coastal information for addressing societal issues.

02 Interoperability Layer

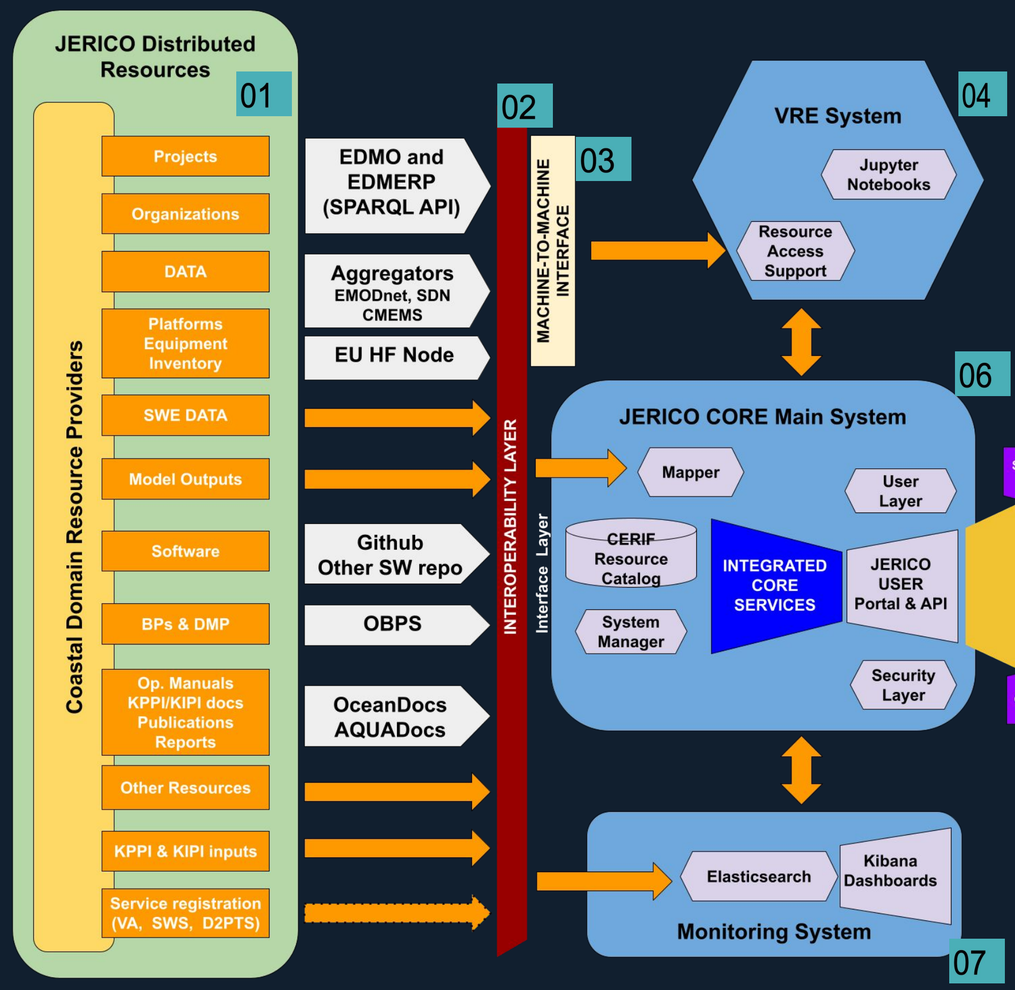
We are currently working on collecting data from the following servers and providers

- **ERDAPP** harvester allows to harvest dataset information from EMODnet and CMEMS. Additionally, it is possible to use it to harvest datasets metadata from any institution running an ERDDAP server.
- **DSPACE** harvester allows to gather documentation metadata from repositories of OBPS, OceanDocs or national infrastructures (e.g. CSIC).
- **Github** harvester is used to collect metadata of JERICO software
- **SPARQL** harvester is used to collect information of organizations and projects from the Seadatanet EDMO and EDMERP servers
- **Thedds** harvesters are used to harvest information among data centers providing such a service in order to identify datasets at different stages of the data cycle
- **SWE** harvesters will be developed to gather the information from SOS servers related to sensors with SWE capabilities and link datasets to the data source
- **File server** harvesters are used to collect metadata from json files that are used to complete information of resources that cannot be collected automatically



Harvesters can be developed by any institution when needed in order to collect resources from any JERICO partner or other organizations. We provide a Software Development Kit (SDK) to facilitate this development and to guarantee the integrity and coherence of the input metadata.

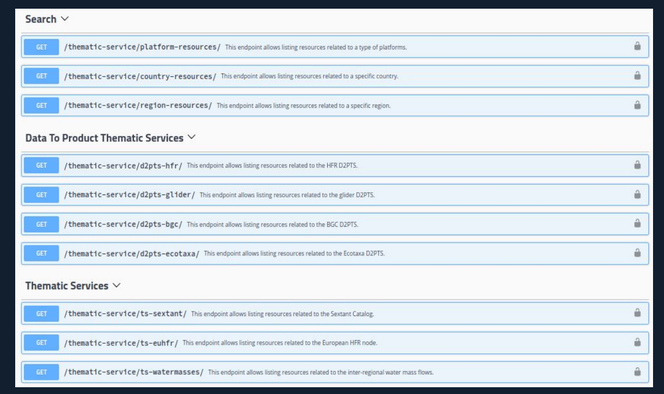
Metadata information from distributed providers is stored in a central repository by the interoperability layer. We use a RDF triplet store which provides the power of creating a graph of knowledge using the distinct descriptions of each source. This knowledge base catalog is in line with the current tendencies of the semantic web to make the internet information machine readable. For this purpose, we created a metadata template mapping information from providers to standard ontologies.



03 Machine-to-Machine Interface

We provide a set of API to allow external services to integrate into the J-CORE ecosystem. Services may be of a range of types including user interfaces, thematic services supporting scientific processes or tools reporting on the status of ocean health. We provide three endpoints:

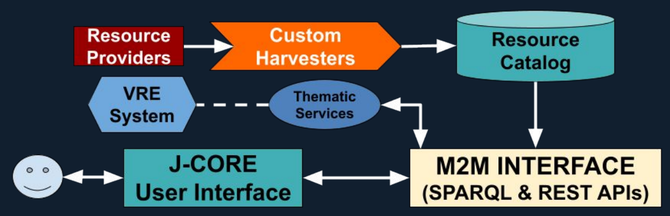
- A SPARQL endpoint to perform search of triplets in the catalog and integrate into the semantic web
- A REST API to retrieve information from each type of entities and navigate to related of resources.
- A REST API to collect subsets of information for thematic services such as the D2PTS (see poster 124 - “D2PTS Integration into J-CORE”)



04 Virtual Research Environment (VRE)

J-CORE VRE long-term plans will be in synergy with the efforts of the European Open Science Cloud (EOSC) for federating e-infrastructures. However, in order to anticipate the needs for integration with the EOSC infrastructures we are exploring the methods of interacting with JERICO resources to engage communities more broadly. We will incorporate a Jupyter Hub where partners can create and share custom tools that use the resource catalog to transform how coastal science is done. For this purpose, we will provide a python library as a client of the endpoints implemented in the interoperability layer.

05 Thematic Services



Services may be built over the current catalog, endpoints and VRE to respond to the needs of science and society. These thematic services will integrate data and engage different types of users by eliminating the current bounds of research and providing outputs that are customized for each type of user. During JERICO-S3 these thematic services will include search functionality for specific sets of resources, thematic services that analyze the coherence with related catalogs (e.g. Sextant and EU HFR), trans-regional services with a common scientific goal and the D2PTS prototypes that will exploit the potential uses of JERICO CORE.

07 Monitoring System

Monitoring technologies such as Elastic stack are widely used in companies monitoring large amount of data. We are planning to use Elasticsearch and Kibana to monitor the access to data and services as well as the health of the J-CORE infrastructure.

06 Main System

We are collaborating with the European Plate Observing System (EPOS) to integrate existing capabilities of their e-infrastructure in the CORE main system. These capabilities will include metadata mapping to an interoperable CERIF catalog, a system manager to orchestrate user requests, user access and system security. We aim not only to work in synergy in future developments but also to step forward into making data interoperable between ocean and Earth sciences.