INNOVATIVE DATA MANAGEMENT SERVICES
FOR AQUACULTURE, FISHERIES & EDUCATION

@BlueBridgeVREs
www.bluebridge-vres.eu
CREATING AND DELIVERING **TAILORED DATA MANAGEMENT SERVICES**
FOR **FISHERIES, AQUACULTURE AND EDUCATION SECTORS**
THROUGH COLLABORATIVE WEB-BASED RESEARCH ENVIRONMENTS BUILT ON TOP OF A HYBRID-DATA INFRASTRUCTURE

**www.bluebridge-vres.eu**

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**Who’s behind BlueBRIDGE?**

**IT Research & Academic Institutions**
National Research Council of Italy
FORTH Institute of Computer Science

**Blue Growth related scientific institutions**
Food and Agriculture Organization of the United Nations
ICES
IRD

**Companies**

**Companies**

**Companies**

**Training, dissemination & outreach specialists**

**Administration office**

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**About BlueBRIDGE**

BlueBRIDGE (Building research environments fostering Innovation, Decision making, Governance and Education for Blue Growth) is a Horizon 2020 Project delivering tailored data management services to different communities (aquaculture, ecosystem approach to fisheries and education) and stakeholders (international organizations, SMEs, policy makers, research centres, enterprises, etc.).

The BlueBRIDGE services are operated through collaborative web-based research environments also referred to as Virtual Research Environments (VREs) built on top of a hybrid-data infrastructure (D4Science, www.d4science.org).

Launched in September 2015, BlueBRIDGE is supported by a consortium of 14 partners with different but complementary competences.
A VRE (Virtual Research Environment) is a web-based system that can be accessed on-demand through a simple user interface. It provides users from different disciplines, institutions or even countries, with secure access to collaborative tools, services, data and computational facilities meeting their specific needs. The hardware setup and software deployment, required to operate these facilities is translated into easy and intuitive operations for the VRE creator.

Why set up a VRE?

Users can set up a VRE in order to:
- solve a data management issue that requires collaboration among different actors
- improve their existing ICT services or technologies and offer a better service to their customers
- develop a new service enhancing their portfolio.

The benefits

Here are some of the benefits that users can get from setting up a BlueBRIDGE VRE:
- Easy access to a variety of datasets (single sign on; access to harmonised data)
- On-demand access to data (no need to download data and harmonise data)
- A unique environment where users can combine data and services and set up tailored applications. Users are also able to easily integrate their own software/application (R, Java, Python, JavaScript are only a few examples) in the VRE if they need it
- No need to worry about user management, security, accounting, monitoring and alerting (all the things that usually users have to do when buying a VM on Amazon or on any other provider)
- No need to worry about the set up of computational resources and about storage resources
- Free consultancy from the BlueBRIDGE consortium
DO YOU HAVE A DATA MANAGEMENT ISSUE?

If the answer to this question is yes, you are a potential user of BlueBRIDGE.

The VREs were developed to support users in solving data access, harmonisation, discovery, and publishing issues. Therefore, each community that deals with these issues can make use of the VREs.

The mission of BlueBRIDGE however, is to support three specific sectors, by building tailored-made VREs for:

- Aquaculture
- Ecosystem approach to fisheries
- Education

Are VREs only for scientists?

The VREs can be used by very different stakeholders that might not necessarily have technical skills, including international organizations, small and large private companies, research centres, not-for profit organisations, start-ups, etc. They are conceived to hide the technicalities to the user.

Innovative data management services for aquaculture, fisheries & education
Each VRE delivered by BlueBRIDGE could be equipped with different types of resources:

**Datasets**

Seamless access to heterogeneous datasets:

- **BIOLOGICAL AND ECOLOGICAL LIST OF NAMES**
  (Catalogue of Life, World Register of Marine Species - WoRMS, World Register of Deep-Sea Species - WoRDSS, Taxonomic, trophic level and life history traits data from FishBase, etc.)

- **GEO-REFERENCED CHEMICAL AND PHYSICAL VARIABLES WITH GLOBAL GEOSPATIAL COVERAGE**
  (World Ocean Atlas, EMODnet, Copernicus Marine Environmental Monitoring System, Planet OS, GEBCO, etc.)

- **BIOLOGICAL AND ECOLOGICAL DATA**
  (Global Biodiversity Information Facility (GBIF), Ocean Biogeographic Information System (OBIS), etc.)

- **RASTER DATA**
  (Copernicus, Ocean Surface Current Analyses Real-time (OSCAR), NOAA Ocean Currents Data, etc.)
# Services & Technologies

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<th>Name</th>
<th>Description</th>
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<td><strong>RStudio</strong></td>
<td>RStudio makes R easier to use. It includes a code editor, debugging &amp; visualization tools.</td>
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<td><strong>Data Miner</strong></td>
<td>DataMiner Manager is a computational engine for performing data analytics operations. Specifically, it offers a unique access to perform data analytics on heterogeneous data, which may reside either at client side, in the form of comma-separated values files, or be remotely hosted, possibly in a database.</td>
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| **Spatial Data Infrastructure** | The Spatial Data Infrastructure includes:  
- Geoserver cluster to manage vector data accessible via OGC WMS and WFS protocols;  
- Geonetwork to manage spatially referenced metadata accessible via OGC CSW protocol;  
- Thedds Data Service cluster to manage NetCDF, OpenDAP, and HDF5 datasets accessible via OPeNDAP protocol. |
| **Storage Infrastructure** | The Storage infrastructure supports storage of files organized in directories. Policies can be associated with directories by selecting private to a single user, restricted access to specified users, shared with all users of the VRE. |
| **Relational Database** | Relational Database with transactional replication.                                                                                       |
| **Social Framework** | All applications running on the infrastructure are made accessible through a portal. It includes facilities for the management of users, for communicating with users via posts and notifications, for managing access policies, etc. |
| **SmartGears Framework** | SmartGears framework is to make your Tomcat based application runnable on the infrastructure. It manages on behalf of the application authentication, authorization, accounting, monitoring, and alerting. |
| **Performance evaluation in aquaculture** | Techno economic investment analysis and what if analysis.                                                                                   |
| **Data harmonization** | The Data Harmonization facility supports the semi-automatic harmonization of time series with respect to code lists and controlled vocabularies. It provides a suite for human curators that can define tailored template for harmonizing series of time series. |
| **Data Publication** | Species distribution maps generation; Production of indicators; Facilities for creating and managing enhanced documents; generation of standard ISO 10139 metadata for geospatial datasets. |
Data Analytics

BlueBRIDGE makes available facilities for:

- **SPECIES OCCURRENCE AND GEOSPATIAL DATASETS PROCESSING**
  - Time Series Analysis, Time Geo Chart, XYExtractor, ZExtraction, Raster Data Publisher, ESRI-GRID Extraction, Maps Comparison

- **PERFORMING DATA MINING TASKS ON TABULAR AND COMPUTER SCIENCE DATA**
  - Feed Forward Neural Network Regressor, Feed Forward Neural Network Trainer, Dbscan, Kmeans, Lof, Xmeans, WEB App Publisher, Quality Analysis, Generic Charts, Stat Val

- **THE MANAGEMENT AND SUPERVISION OF ECOSYSTEMS**
  - Absence Cells from AquaMaps, Absence Generation from OBIS, Estimate Monthly Fishing Effort, Ecopath with Ecosim, Estimate Fishing Activity, SEADATANET Interpolator, Species Maps from Points, BiOnym

- **THE DEVELOPMENT OF OPTIMIZED FEEDING AND GROWTH MODELS**
  - Simulfishkpis

- **SUPPORTING DECISION MAKING AND STRATEGIC INVESTMENT ANALYSIS AND DOING BETTER PLANNING IN AQUACULTURE**
  - Mpa Intersect V2
The **BlueBRIDGE Gateway** is the unique access point for the BlueBRIDGE VREs with more than 30 available.

There are three different types of VREs:
- **public VREs**: by registering, you can access and play with them;
- **restricted VREs**: access to the VRE is moderated by the VRE manager. To request access, register through the BlueBRIDGE Gateway;
- **private VREs**: these VREs are customised for specific users that decide not to make them public and therefore not accessible by external users.

If you are interested in setting up a similar VRE, please contact us at info@bluebridge-vres.eu.

**BlueBRIDGE VREs at a glance**

### Aquaculture
- VREs supporting the performance evaluation, benchmarking and decision making process of aquafarms
- VREs supporting the discovery of aquaculture production facilities (size & position)

### Ecosystem approach to fisheries
- VREs supporting the creation of a global inventory of stocks and fisheries
- VREs supporting stock assessment for fishery management

### Education
- VREs supporting the set up and delivery of educational courses that require the usage of datasets and tools

### Project Management
- VREs supporting the BlueBRIDGE consortium to manage the different activities in the project (social framework to enable communication among the partners; file repository; task management; real-time dashboard to track activities and KPIs; wikis)

### Common data management needs
- VREs supporting the generation of new knowledge from data, including support for tabular data validation, data enrichment and efficient analytical tools
- VREs making the use of the R programming language easier (code editor, debugging & visualization tools)

**BlueBRIDGE Gateway**
bluebridge.d4science.org/explore

Innovative data management services for aquaculture, fisheries & education
The Fisheries Data Interoperability Working Group (FDIWG)


THE OBJECTIVE OF THE FISHERIES DATA INTEROPERABILITY WORKING GROUP IS TO DEVISE A GLOBAL DATA EXCHANGE AND INTEGRATION FRAMEWORK TO SUPPORT SCIENTIFIC ADVICE ON STOCK STATUS AND FISHERIES MANAGEMENT. THE PROPOSED FRAMEWORK WILL FACILITATE THE USE OF DE-FACTO, AND PREFERABLY OPEN, STANDARDS FOR THE IDENTIFICATION, DESCRIPTION, MAPPING AND PUBLICATION OF FISHERIES DATA SUPPORTING SCIENTIFIC PROCESSES.

Expected key Impacts of the Working Group

- Reduced costs related to reuse of data.
- Increased adoption of existing common standards, vocabularies and best practices related to fisheries data management with new communities, such as regional projects.
- Increased general awareness about research open data and interoperability standards among the fisheries organizations.
- Enhanced access, discovery (metadata) and reuse of fisheries data across specific domains.
- Fisheries data provenance attribution, expected to foster legal interoperability.
- New opportunities for Data Structure Definition (DSD) and ontology based knowledge management in the fisheries sector.

Working Group activities:

- Promote existing facilities for data sharing on capture, landing, effort, size classes, vessel monitoring system and production through sharing of structural data definitions. This promotion will be supported by demonstrations of live examples of data sharing;
- Facilitate access to data by recommending standards and assist in adoption of tools and facilities;
- Recommend existing data tools;
- Recommend Master Data Management solutions for classifications and multilingual / multi-locale data; mapping between local classifications and regional and global ones.
- Connect existing data networking initiatives.

In April 2017, the FDIWG organized its first meeting at the 9th RDA Plenary Meeting. All the workshop presentation are available at the following url: https://snurl.eu/1DiAJ9. For more information and to join the RDA FDIWG visit www.rd-alliance.org/groups/fisheries-data-interoperability-wg.
Interested in BlueBRIDGE?

Access our VREs: bluebridge.d4science.org/explore
Set up your own VRE: info@bluebridge-vres.eu
Get more information on BlueBRIDGE: www.bluebridge-vres.eu
Join us at future events: www.bluebridge-vres.eu/events
Get real-time updates from BlueBRIDGE: www.twitter.com/bluebridgevres

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