Leveraging ICT developments for societal challenges: the BlueBRIDGE way towards Blue Growth

Donatella Castelli, CNR-ISTI

CNR-ISTI

donatella.castelli@isti.cnr.it

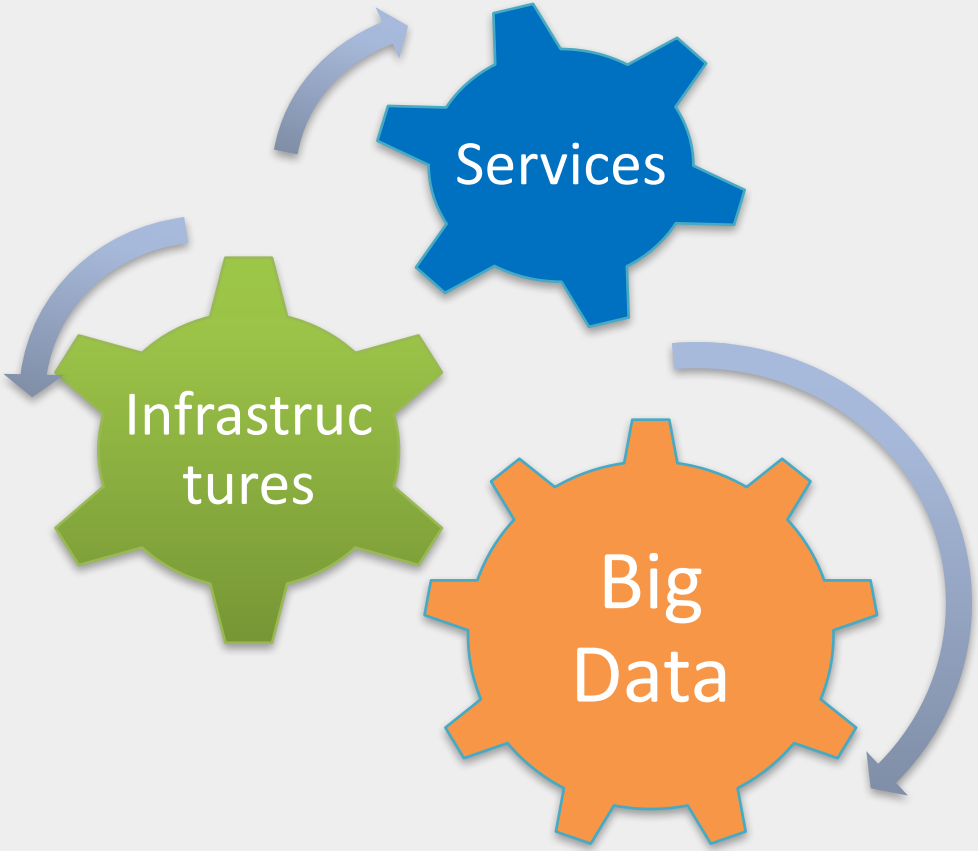
Conferenza DIITET 2016

23-23 November 2016

CNR - Rome

BlueBRIDGE receives funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 675680

A new tecnological landscape…



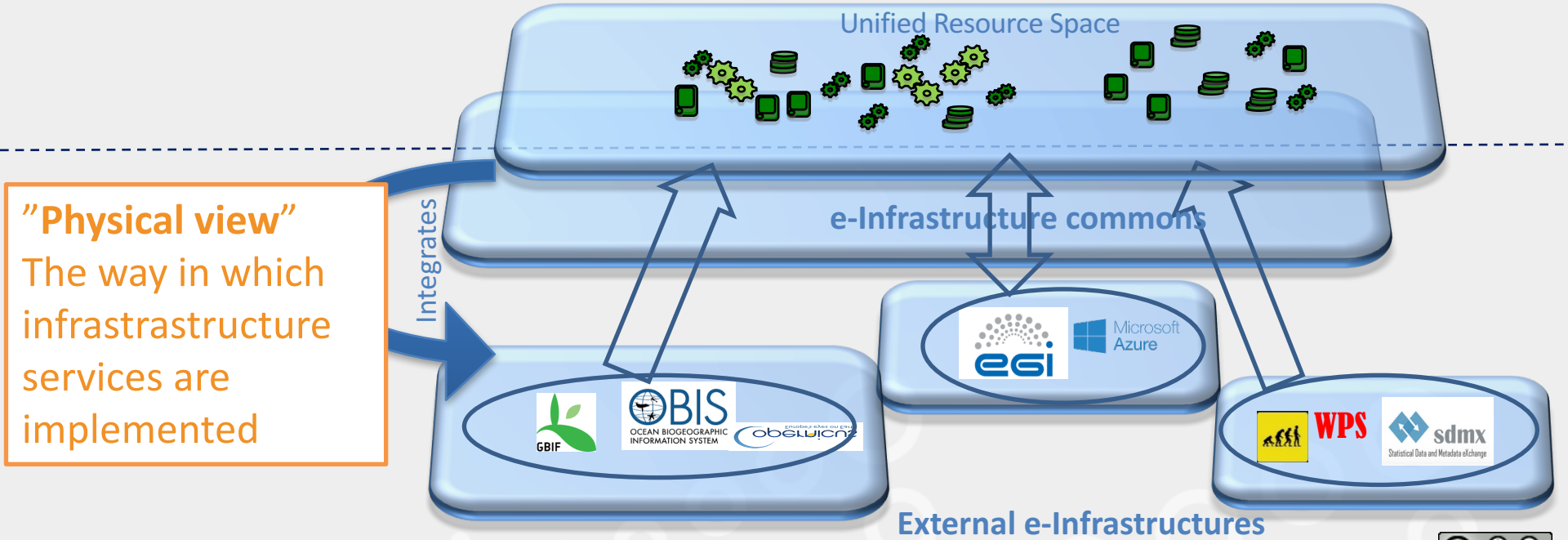
… new opportunities, new behavior, new paradigms

BlueBRIDGE

Building **R**esearch environments fostering **I**nnovation, **D**ecision making, **G**overnance and **E**ducation

for **Blue Growth**

*To **support capacity building** in **interdisciplinary research communities** actively involved in **increasing scientific knowledge about resource overexploitation, degraded environment** and **ecosystem** with the aim of providing a **more solid ground for informed advice** to competent authorities and to enlarge the spectrum of growth opportunities as addressed by the Blue Growth Societal Challenge.*


Unified Resource Space
e-Infrastructure commons
Integrates
"Physical view"
The way in which infrastrastructure services are implemented
GBIF
OBIS
OCEAN BIOGEOGRAPHIC INFORMATION SYSTEM
EGI
Microsoft Azure
WPS
sdmx
Statistical Data and Metadata eXchange
External e-Infrastructures

D4Science facilities

Databases

Cloud storage

Geospatial data

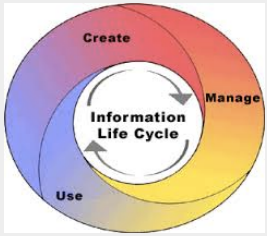
Storage

Data management

Metadata generation and management

Harmonisation

Sharing



Data Lifecycle

Cloud computing

Elastic resources assignment

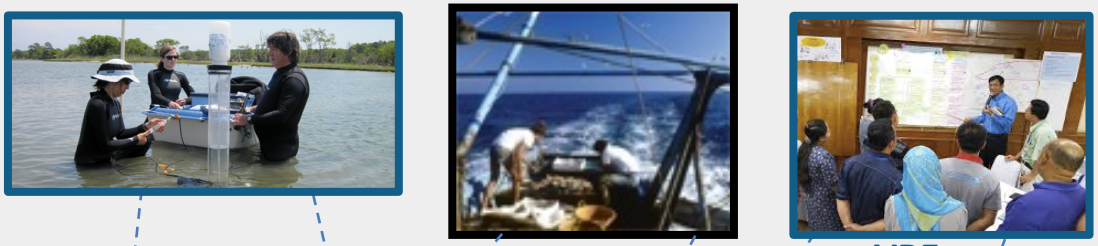
Multi-platform: R, Java, Fortran

Processing

Virtual Research Environments

"Logical view"
The way in which infrastrastructure services are perceived by the users

Enables



VRE VRE VRE

Unified Resource Space

e-Infrastructure commons

External e-Infrastructures

VRE as a Service

Created on demand

No cost for the resource providers

Open to host and operate custom software

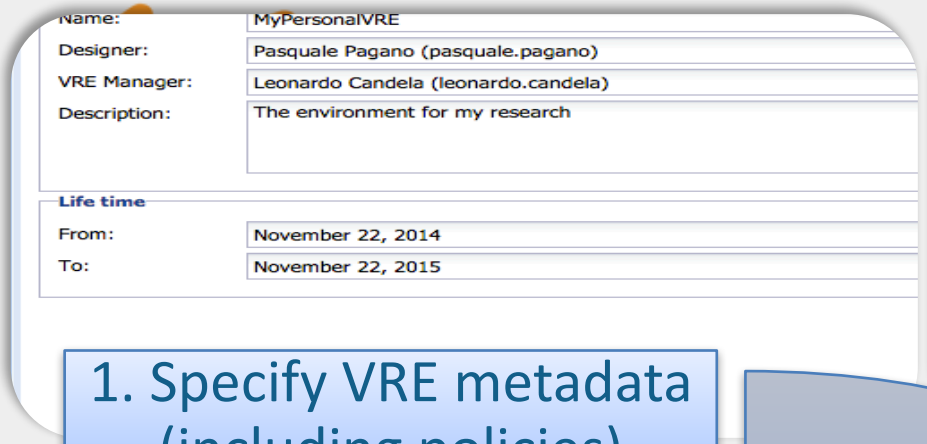
Regulated by tailored policies

An operational environment

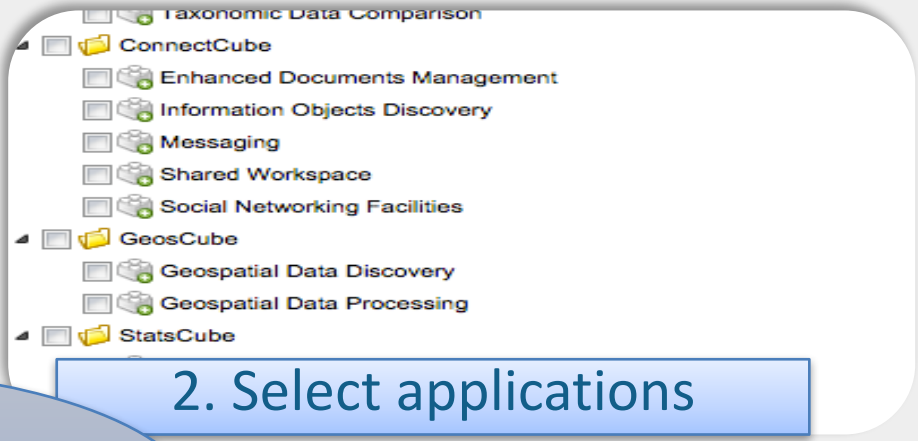
- Where **set of resources (**data, services, computational, and storage resources)
- are assigned to group **of users** via interfaces
- for a **limited timeframe**

L. Candela, D. Castelli, P. Pagano (2013) Virtual Research Environments: An Overview and a Research Agenda. Data Science Journal, Vol. 12

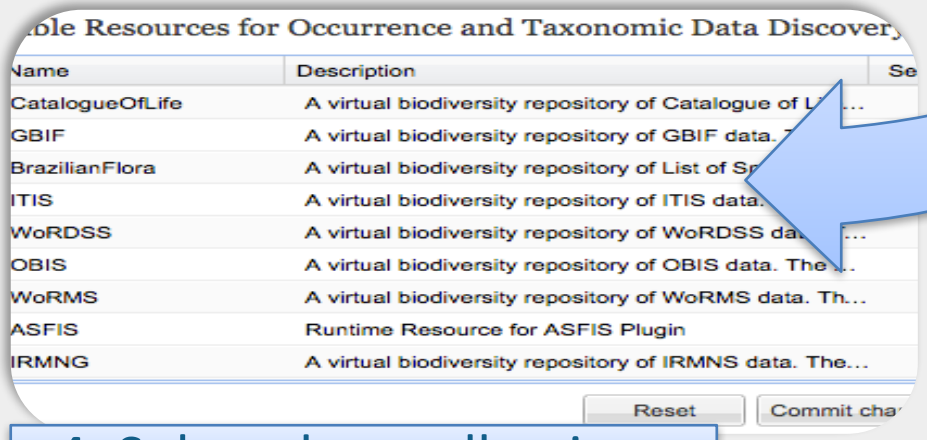
BlueBRIDGE



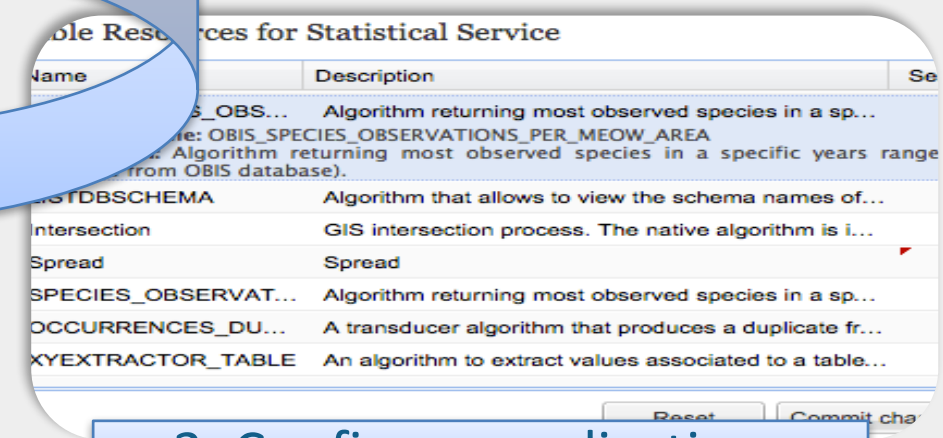
1. Specify VRE metadata (including policies)



2. Select applications



4. Select data collections



3. Configure applications

Hardware setup and software deployment completely hidden

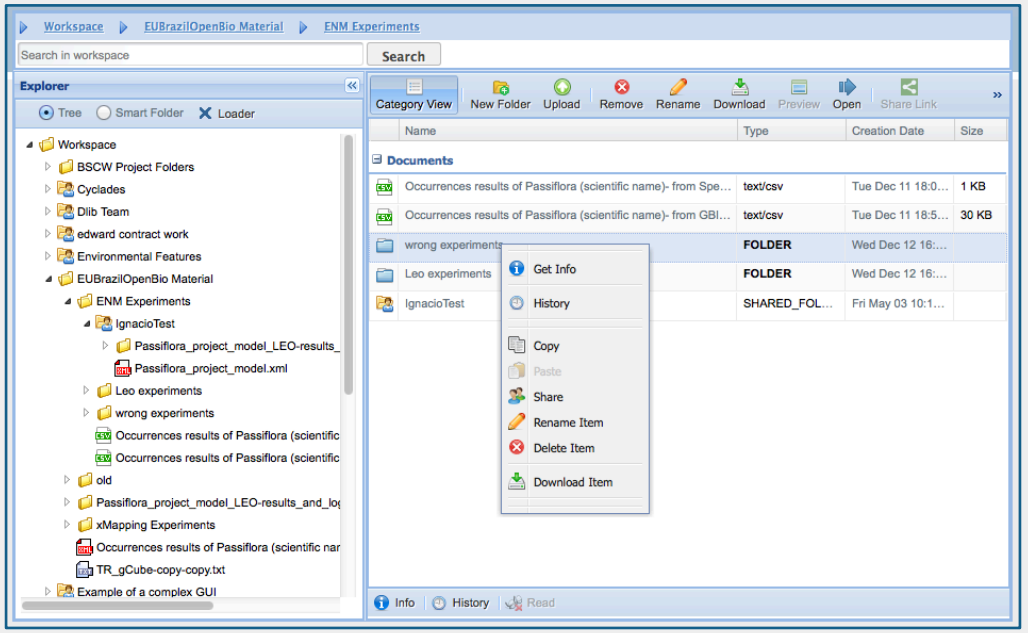
Evolving needs of its users completely supported

Collaboration

Social Networking

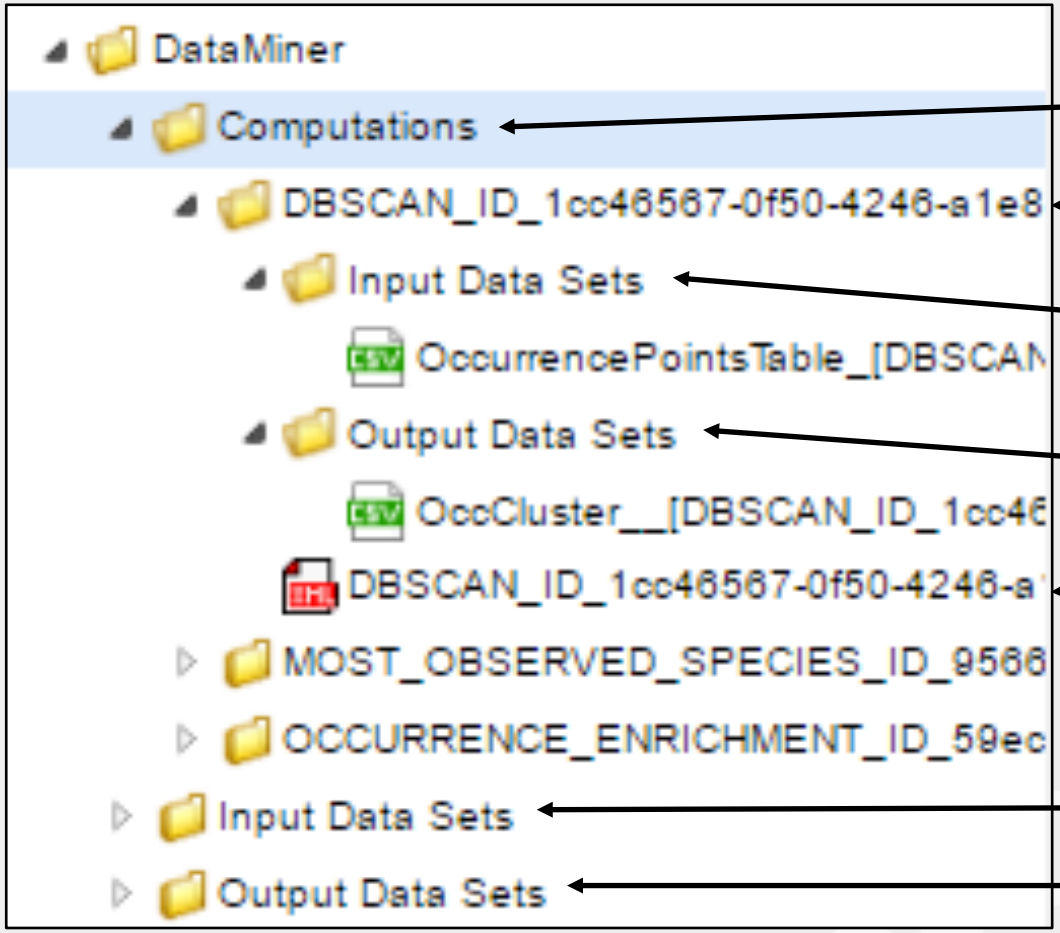
- ✓ User shared news
- ✓ Application shared news

Shared workspace



- ✓ Files, dataset, workflows, experiments, etc.
- ✓ Shared, disseminated via public URLs

User's workspace



Overall computations folder

Computation

Comp. Input data

Comp. Output data

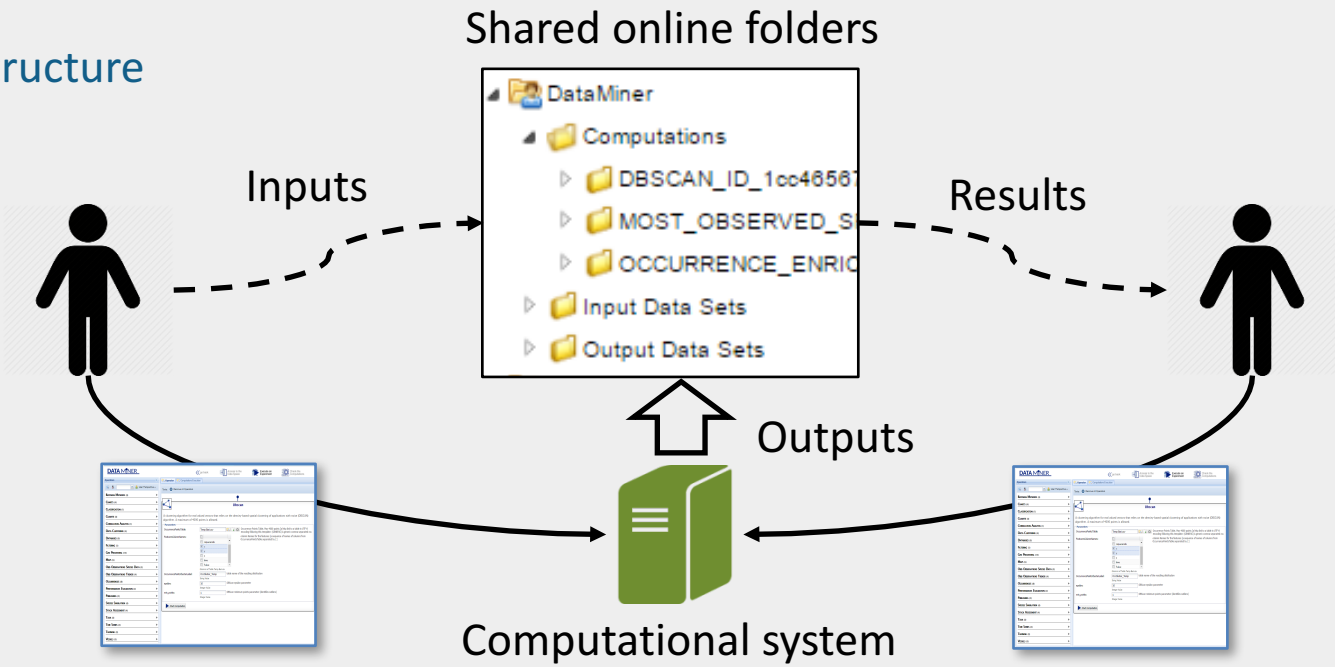
Provenance info

Overall Input Data

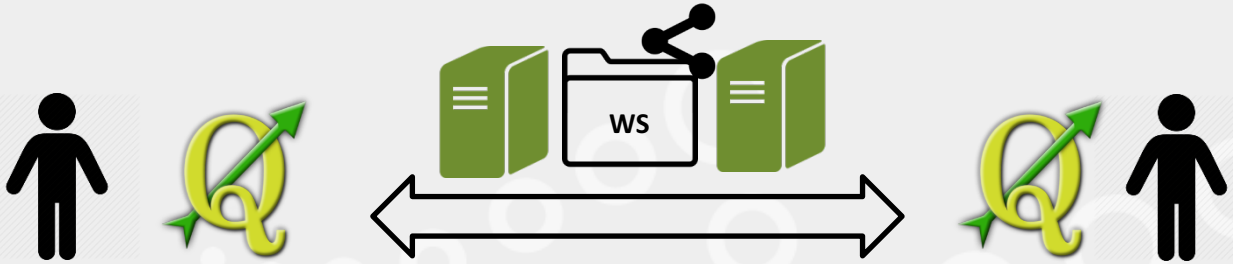
Overall Output Data

Collaborative experiments

In the e-Infrastructure

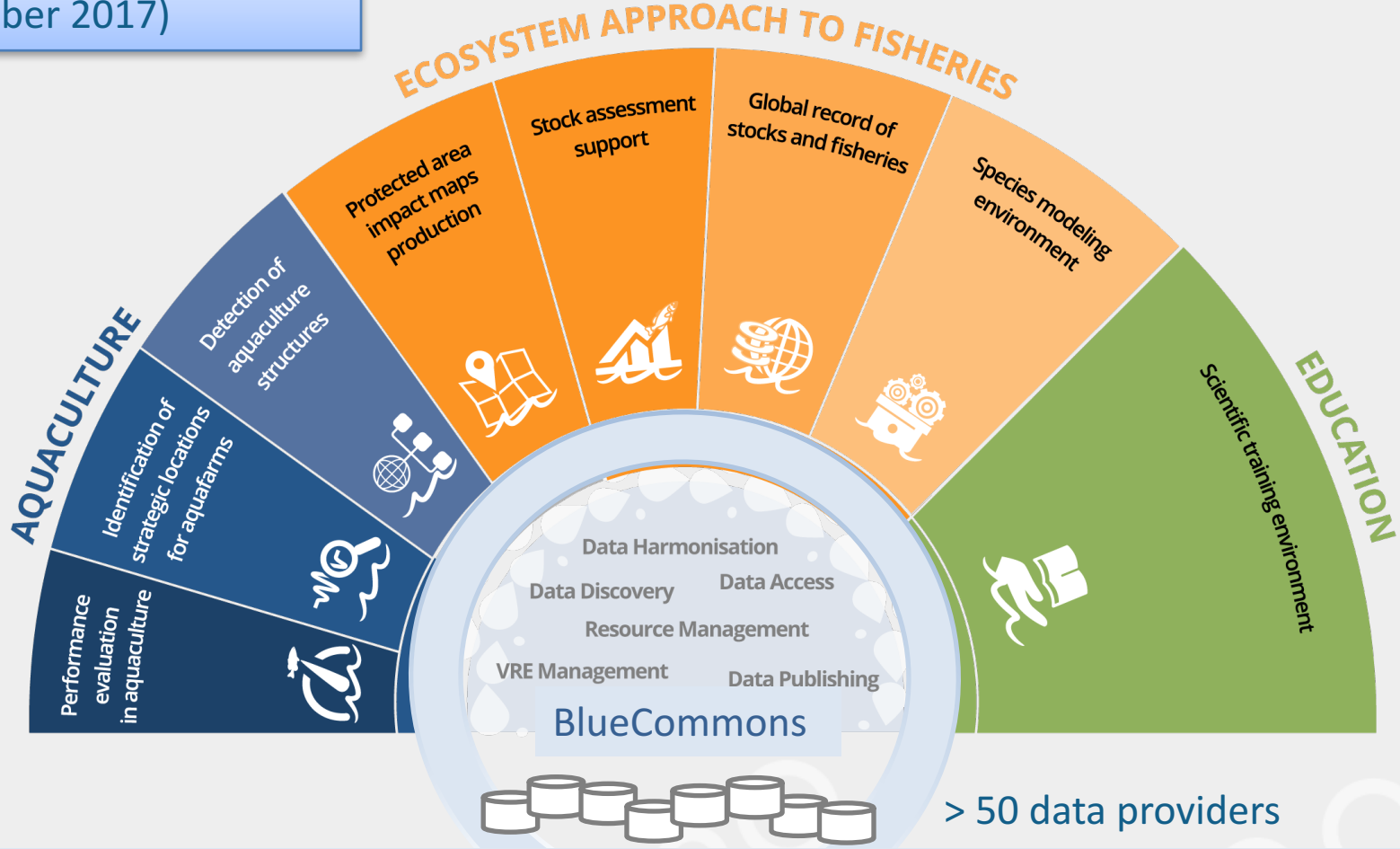


Through third party software



BlueBRIDGE Areas

27 VREs + 5 in the pipeline
(November 2017)



> 50 data providers

D4Science hybrid-data infrastructure

Stock Assessment

StockAssessment

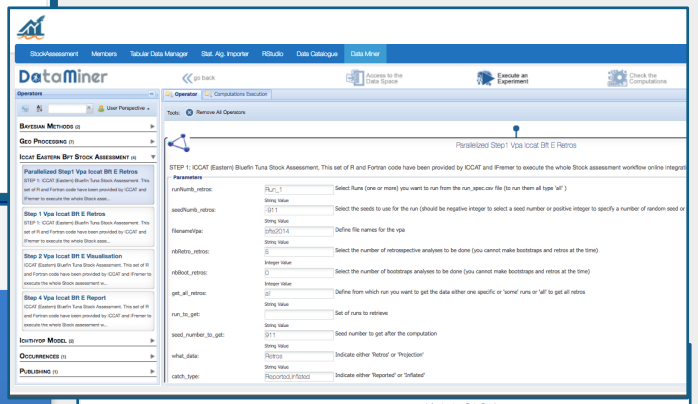
FAO, ICES, FIN, NOAA, GeoMar, IRD Wageningen University

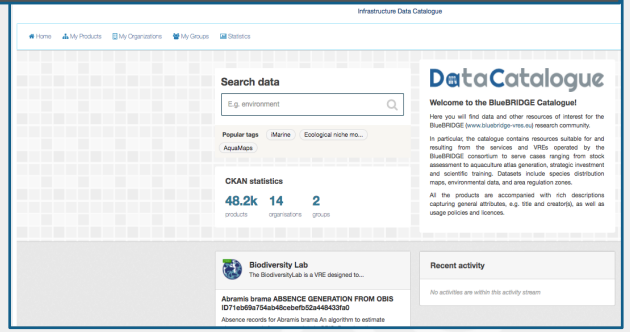
Comparing results of different stock assessment models

ICCAT

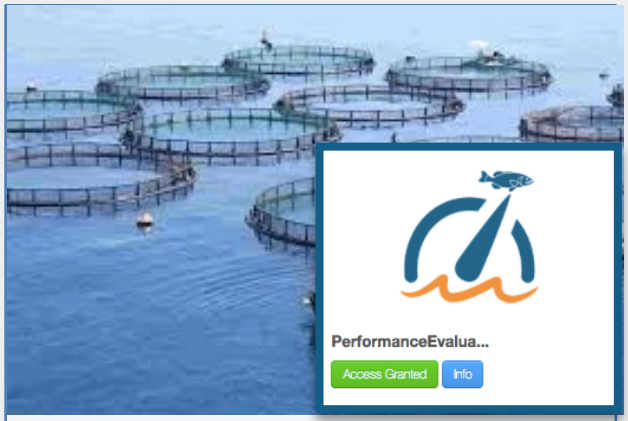
ICCAT, IRD, Ifremer

Stock assessment activities for the conservation of Atlantic Tunas





Aquaculture



PerformanceEvaluationInAquaculture

I2S (sw company)

Definition of an algorithm for production plans based on physical and envirnomental parameters

Alieia

Alieia (aquaculture company)

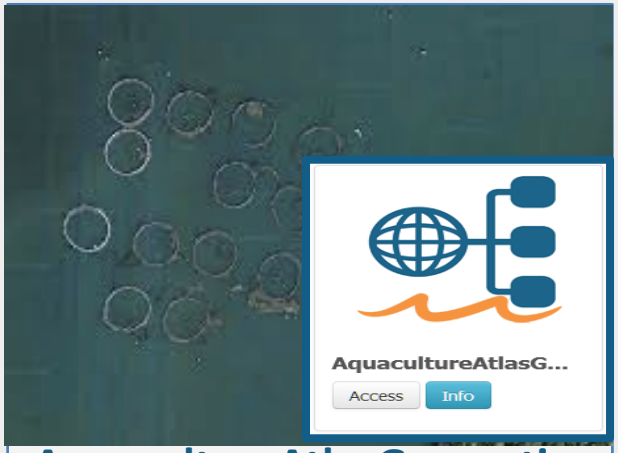
Growth Analysis and techno-economic investment analysis (what-if analysis) for the Alieia company

StrategicInvestmentAnalysis

I2S, CITE (sw company), ICRE8 (international organization)

To enable users to locate an area where an investment could be optimally placed (based on economic RoI and costs on environmental impact).

Environment



AquacultureAtlasGeneration

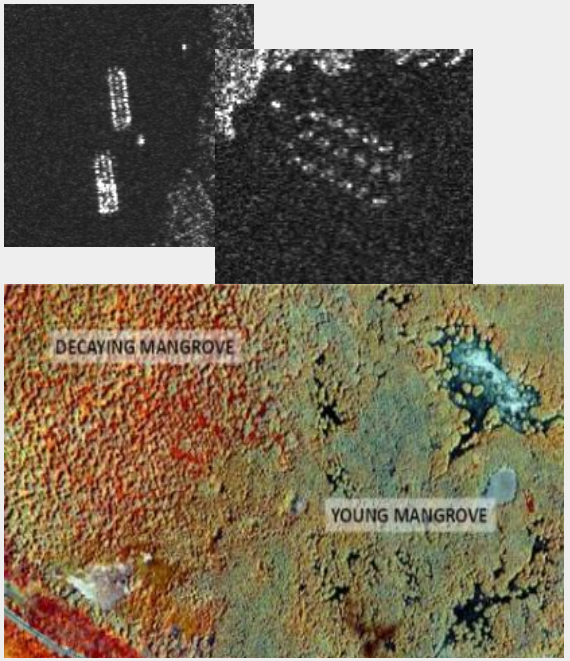
CLS, FAO, Grid-Arendal

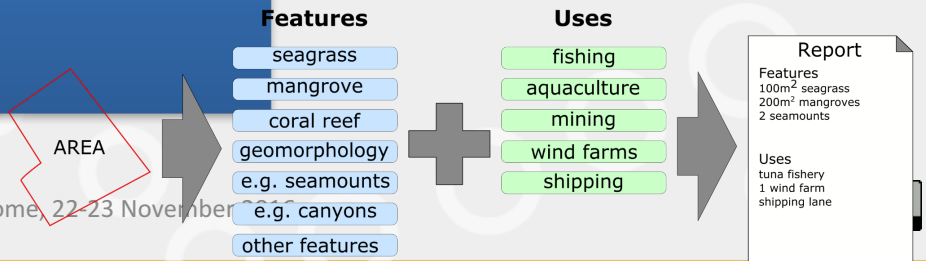
Satellite data (Sentinel) to map aquaculture facilities and their type, evolution trend and impact on vegetation

ProtectedAreaImpactMaps

Grid-Arendal, JRC

Assessment of MPA in Caribbean



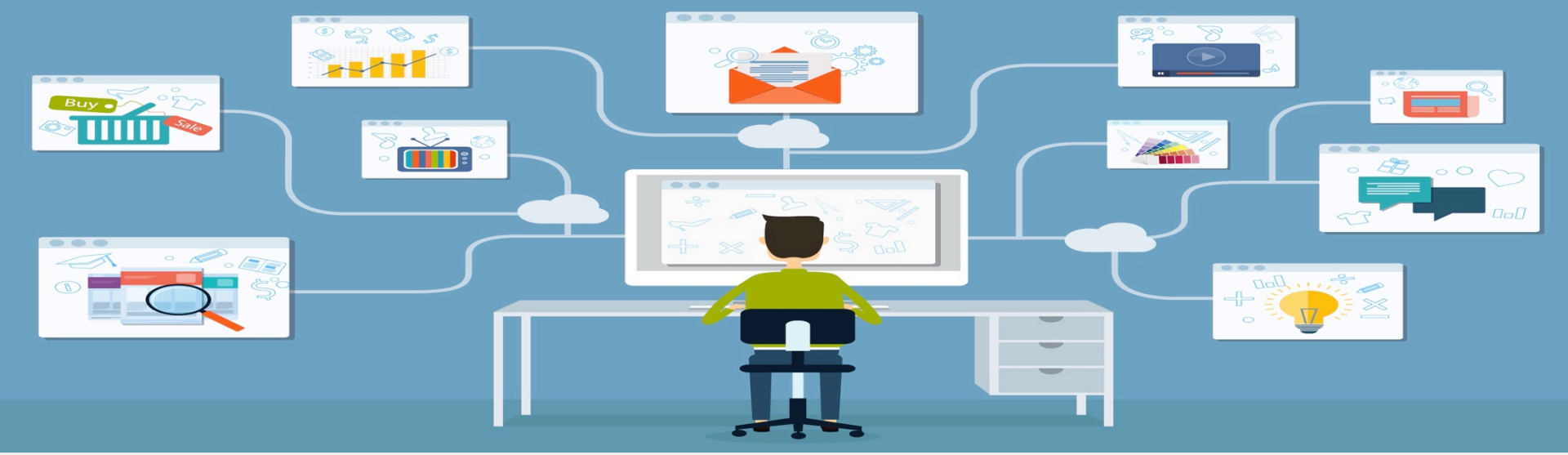


Challenges for the “Commons”

- Scalable & dynamically adaptable Resource Registry
- Economy-of-scale and costs reduction
- As-a-Service approach
- Communication standards
- Hidden complexity of computational capabilities
- Access via VRE governed by tailored policies
- Automatically collected provenance and attribution management
- Collaboration and sharing
- Re-usability

More info

- Access to VREs: i-marine.d4science.org
- Setting up your own VRE: info@bluebridge-vres.eu
- More information on BlueBRIDGE: www.bluebridge-vres.eu
- Real time updates from BlueBRIDGE: www.twitter.com/bluebridgevres



D4Science is an **hybrid data infrastructure**

technologies integrated to provide elastic access and usage of data and data-management

- *+55 **VREs** hosted*
- *+2500 **scientists** in 44 **countries***
- *+50 **data providers***
- *+25,000 **derivative data/month***
- *over a **billion quality records***
- *+20,000 **temporal datasets***
- *+50,000 **spatial datasets***
- ***99.7% service availability***

Humanities and Cultural Heritage

Social Mining

Environmental Studies

Biological and Ecological Studies