

LifeWatch
e-Science European Infrastructure
for Biodiversity and Ecosystem Research



LIFEWATCH niche in the Biodiversity and Ecosystem research and potential synergies with **EMPHASIS**

Giorgio Matteucci
CNR-ISAFOM
Member of LifeWatch-ITA Management Committee

<https://www.youtube.com/watch?v=mFPA0R9OXvw&feature=youtu.be>

The Italian plant phenotyping landscape and the other international initiatives



5 - 6 September 2018, Metaponto - Matera

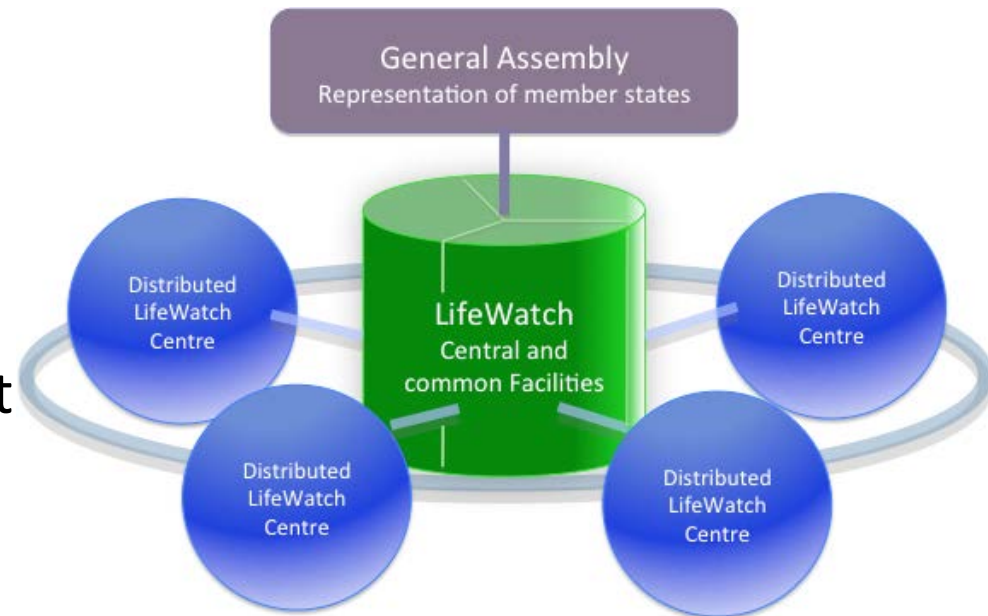


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LIFEWATCH- ERIC

LifeWatch-ERIC was formally
instituted as ERIC in March 2017.
LifeWatch-ERIC is based in Seville
Spain is hosting the Statutory Seat



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MISSION

LifeWatch is the European Infrastructure supplying **e-Science research facilities** for scientists adding knowledge and deepening understanding **on Biodiversity organisation and Ecosystem functions and services**, with the goal of supporting our societies in addressing the key planetary challenges.

The Italian plant phenotyping landscape and the other international initiatives



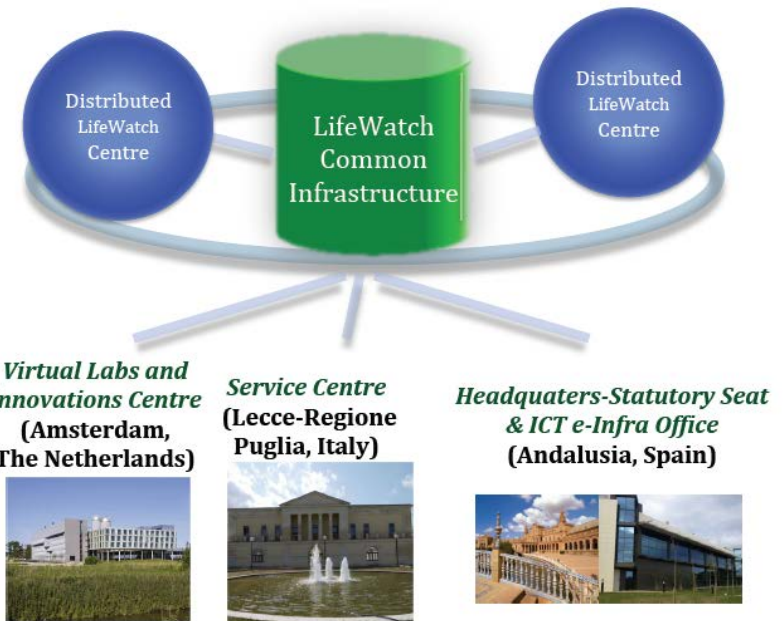
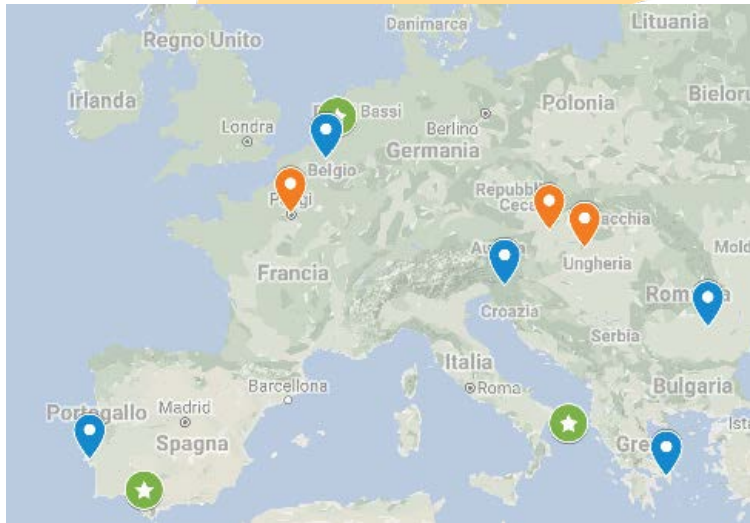
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LifeWatch-ERIC operates through its Common 'central' Facilities and Thematic Centres.



Its national networks (BE, EL, ES, IT, NL, PT, RO, SI) include a large and representative component of academic and research institutions and national authorities.

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LifeWatch-ERIC is:

- ⇒ Community driven: allowing to run frontier research on biodiversity and ecosystems;
- ⇒ Data driven: real infrastructure are the data available;
- ⇒ ICT driven: most advanced technology for big data aggregation, analysis & modelling.



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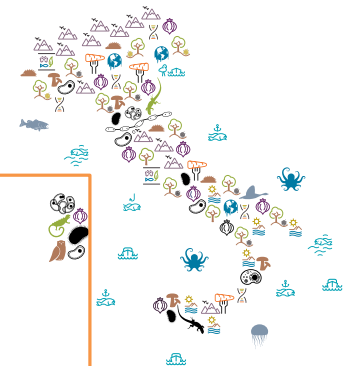
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THE REQUIREMENT

Bringing facilities from observation systems, biodiversity observatories and physical infrastructures in a same e-Science Research Centre.

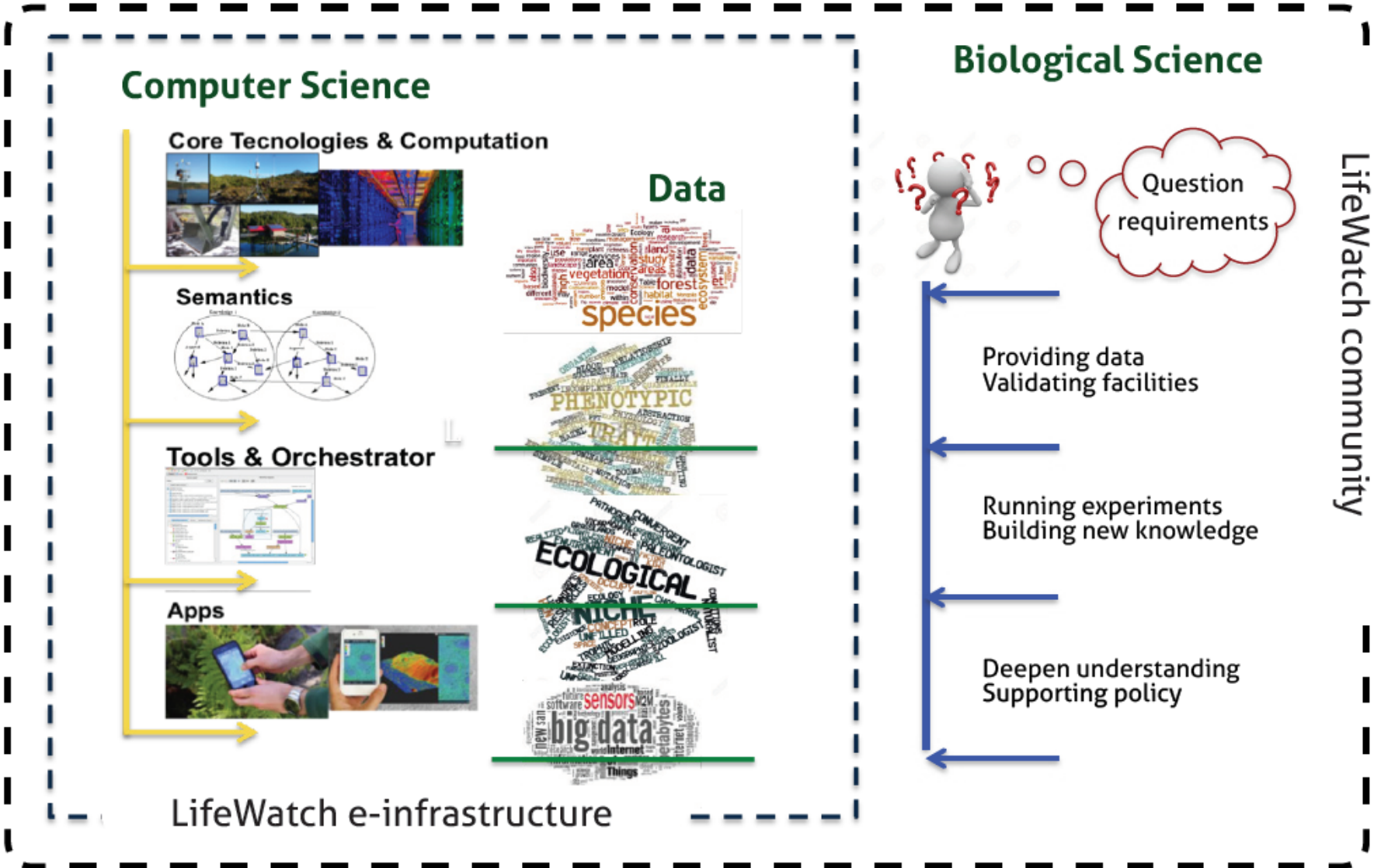


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Computer and Biological sciences Data accessibility & integration

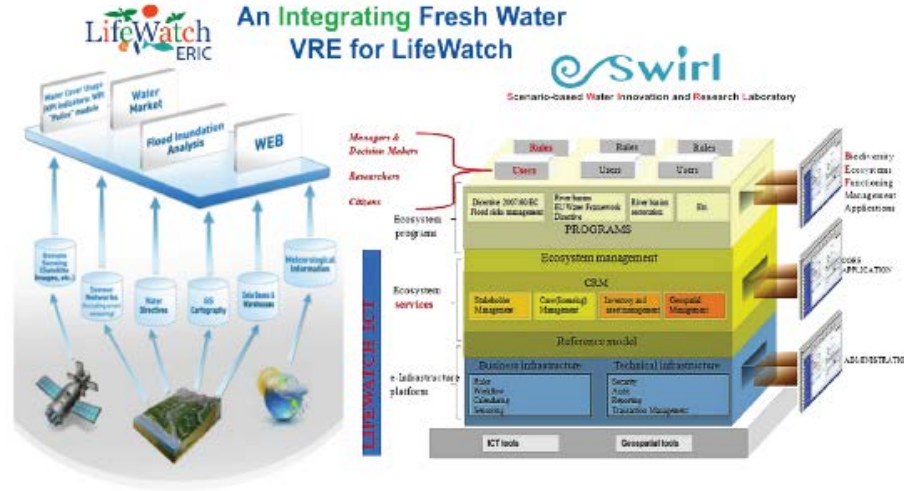




LifeWatch Phytoplankton ITALY

Home My account

- ▼ Trait
 - ▼ Phytoplankton Trait
 - Demographic Trait
 - ▼ Functional Trait
 - Behavioural Trait
 - ▼ Morphological Trait
 - Coloniality
 - Linear Dimension
 - Shape
 - ▼ Size
 - Biovolume



Phyto Virtual Research Environment

LifeWatch ERIC

A large quantity of data on phytoplankton is available, but these data are heterogeneous and distributed. Hence, locating useful information for studies and analysis poses challenges to data accessibility, interoperability and integration. LifeWatch, the e-Science European Infrastructure for Biodiversity and Ecosystem Research, provides the IT infrastructure enabling researchers to share and analyze phytoplankton data. The Phyto VRE, one of the components of the Marine VRE, is a web collaborative working environment providing users with tools, such as the Phytoplankton Traits Thesaurus, Atlas of Phytoplankton and Atlas of Shapes, and services, such as models and algorithms. The Phyto VRE enables to:

- Obtain and share harmonized data on taxonomy and morpho-functional traits
- Discover, access, integrate and analyze any dataset
- Work collaboratively and simultaneously overcoming limitations of traditional working practices and boundaries

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Marine Virtual Research Environment

LifeWatch ERIC

The LifeWatch Marine Virtual Research Environment (Marine-VRE) portal demonstrates the potential and capability emulating the LifeWatch objectives. The Marine VRE portal aims to bring together some highly relevant marine resources, data systems, web services and other online tools into one virtual environment in the context of LifeWatch. The LifeWatch Marine VRE and its components are used by thousands of researchers on a daily basis. Reference data resources such as WoRMS, MarineRegions and OBIS, are referenced in hundreds of publications per year.

The number of publications in the graph above is based on the Integrated Marine Information System (IMIS). Numbers for 2016 and 2017 are not complete yet.

Year	Number of Publications
2017	~100
2016	~150
2015	~200
2014	~250
2013	~300
2012	~350

LifeWatch ERIC | http://marine.lifewatch.eu

LifeWatch / INDIGO-WP2 Case Study

Modeling ALGAE BLOOM in a Water Reservoir

collecting monitoring data (environmental, chloro-cyano profile), and modeling hydro-bio

OPEN RESEARCH DATA

BATHYMETRY, LAND USE, STORAGE+COMPUTING, WFD, APC FOR DELFT-3D

RESEARCH DATA & ANALYSIS

DATA INTO REPLICATED DISK DRIVES

ANALYSIS

Working in FedCloud

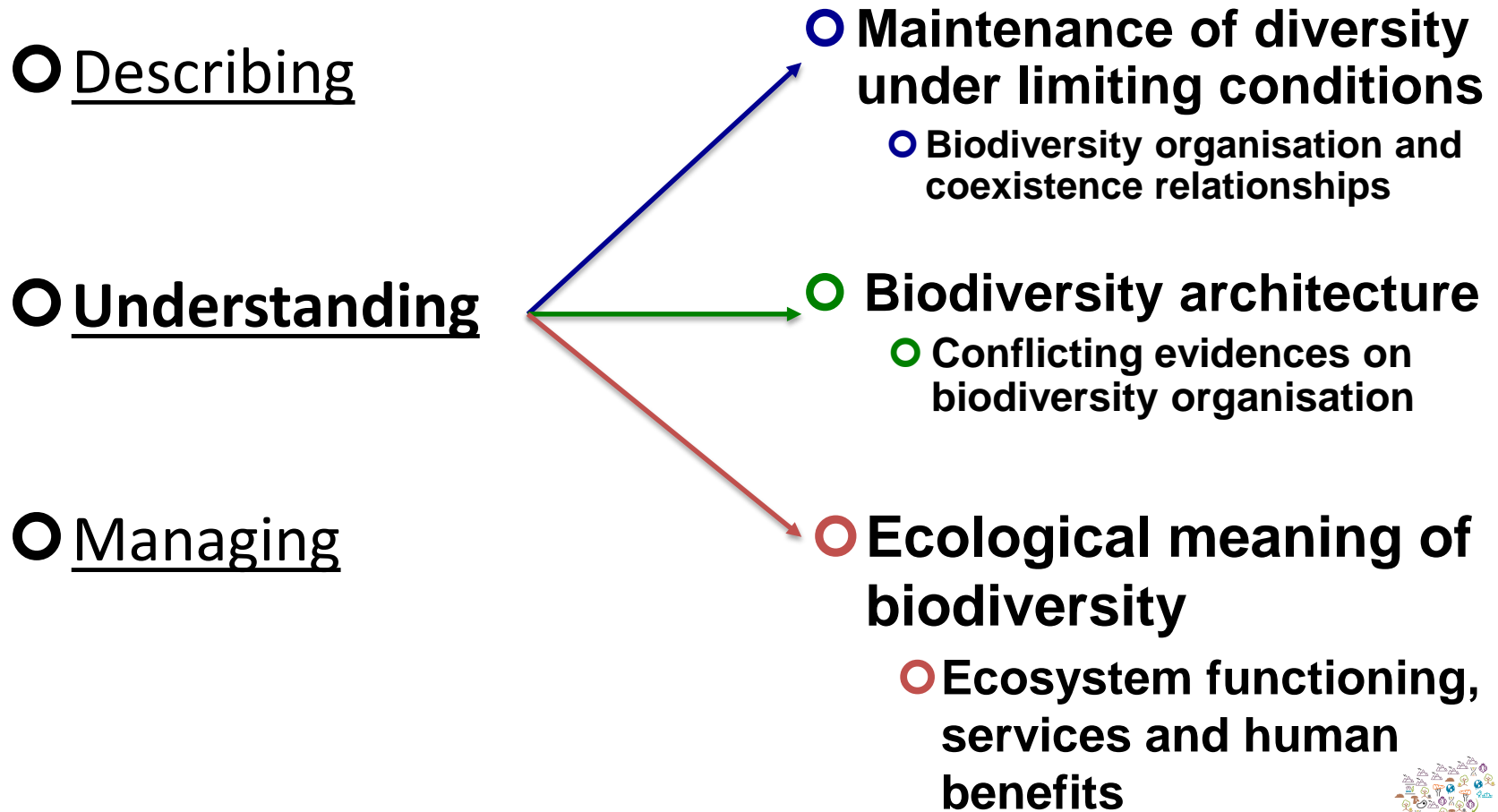
Genomic scan

Genes analysis (in R)

LifeWatch Training Centre

WELCOME TO LIFEWATCH TRAINING CENTRE

BIODIVERSITY RESEARCH SPACE



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Many different data types,
grains, scales and sources
needed

.....highly heterogeneous (structural
and semantic differences)



Heterogeneity constraints:

- Discovery
- Integration
- Re-usability

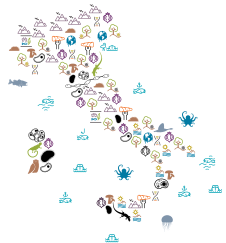
What do we need?

- Harmonization
 - Standardization
- for sharing information and
revealing its full potential

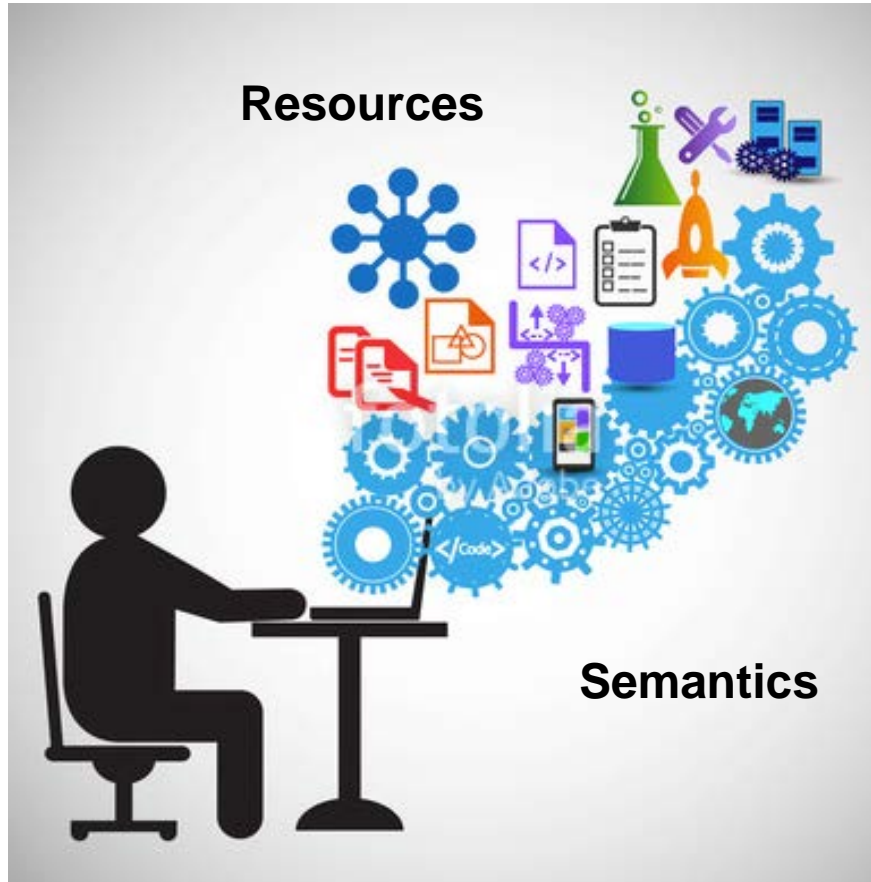
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Semantic Technology



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Phenotyping: functional traits of plants (but not only)

Information that can (must) be «added» to taxonomy

Response of plants to drivers (including stress)

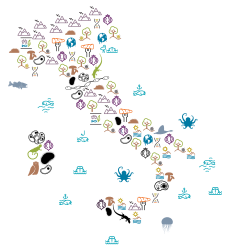
Connection to «omics»: e.g. expressions of RNA-DNA during life

LifeWatch can provide tools for connections/elaborations

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Biodiversity is life
Biodiversity is our
life

