LifeWatch ERIC e-Science for NIS research workshop | 20-21 May 2021

An event organised within the framework of the LifeWatch ERIC Internal Joint Initiative and with the support of the ENVRI-FAIR project
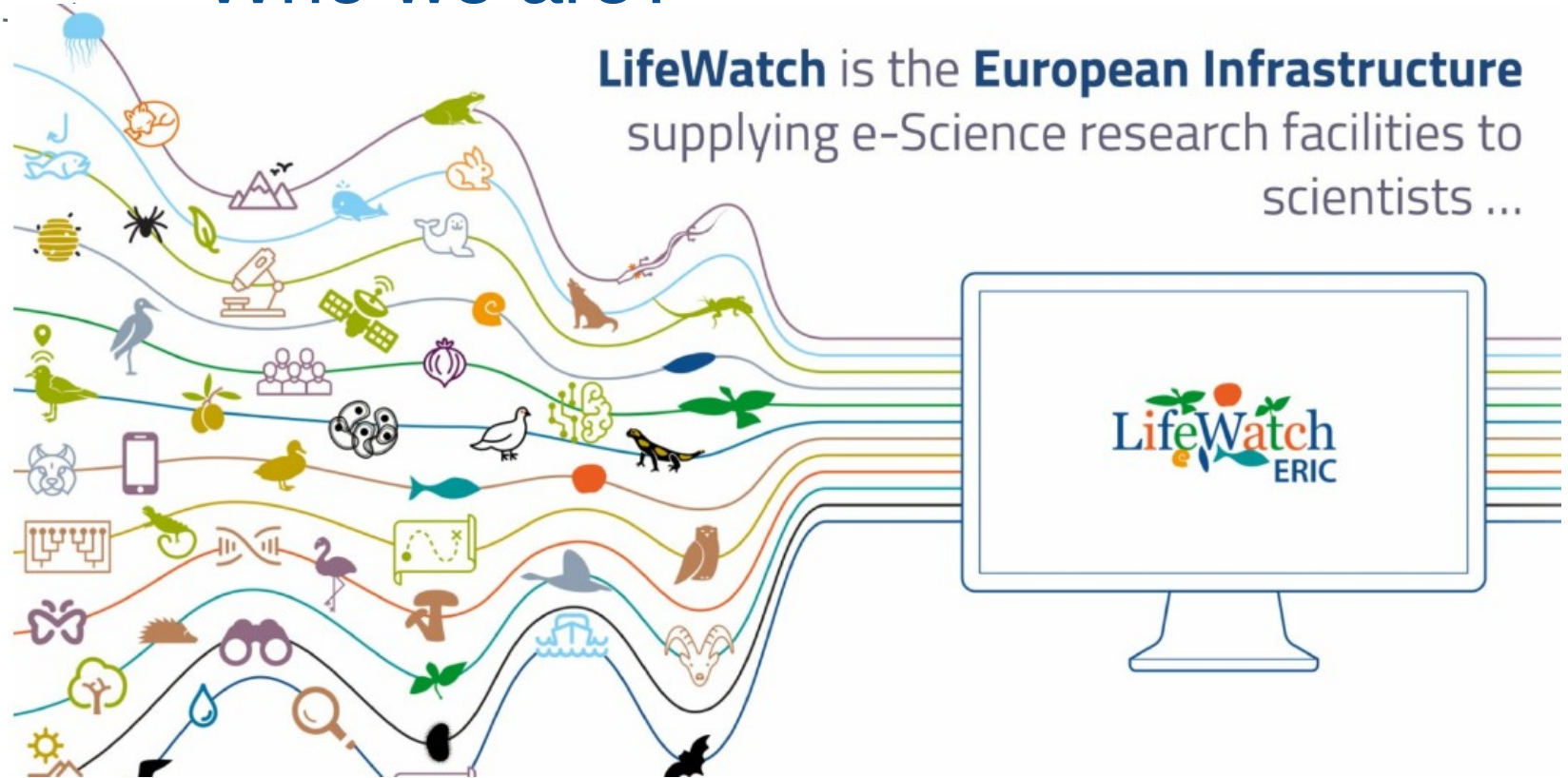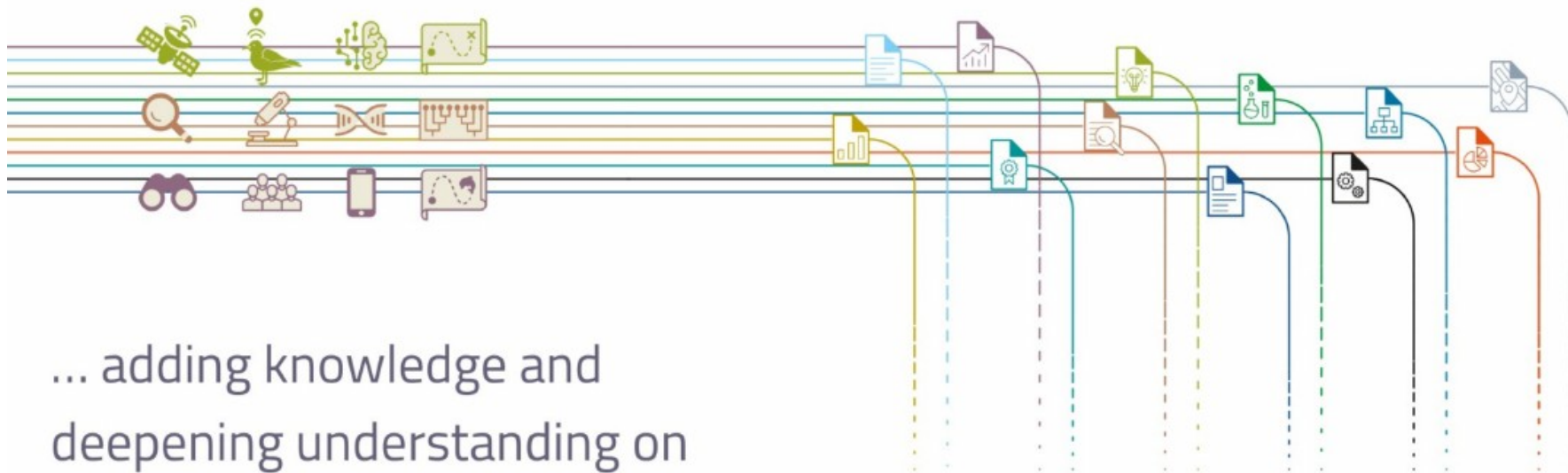
LifeWatch ERIC Internal Joint Initiative on Non-Indigenous Invasive Species

By: Christos Arvanitidis, Juan Miguel González-Aranda, Alberto Basset, Peter Van Tienderen and Lucas de Moncuit de Boiscuillé

Who we are?

LifeWatch is the **European Infrastructure** supplying e-Science research facilities to scientists ...
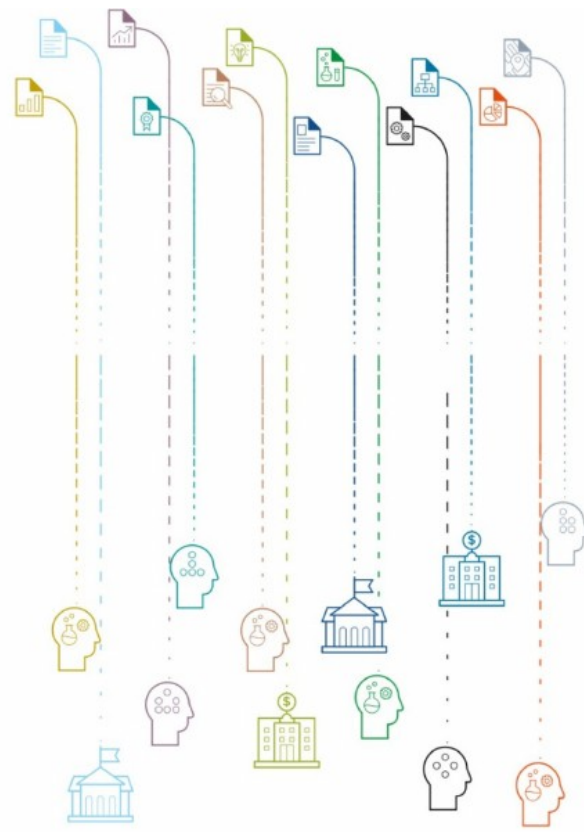
Who we are?

... adding knowledge and deepening understanding on **Biodiversity** organisation and **Ecosystem** functions and services ...
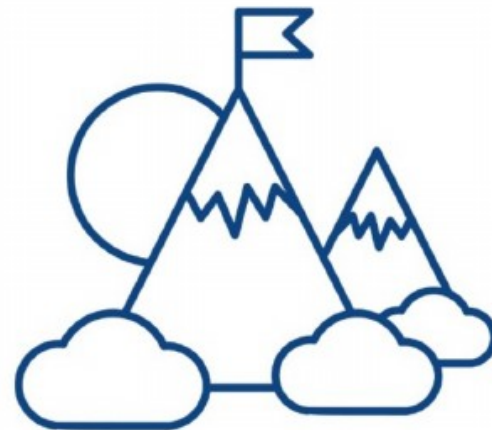
Who we are?

... in **support** of our **societies** to address the **key planetary challenges**.

LW ERIC mission

LifeWatch ERIC's mission is to be a worldwide provider of content and services for the Biodiversity research community by:

LW ERIC mission

- Offering new opportunities for large-scale scientific development;

- Enabling accelerated data capture with innovative technologies;

- Supporting knowledge-based decision-making for biodiversity and ecosystem management;

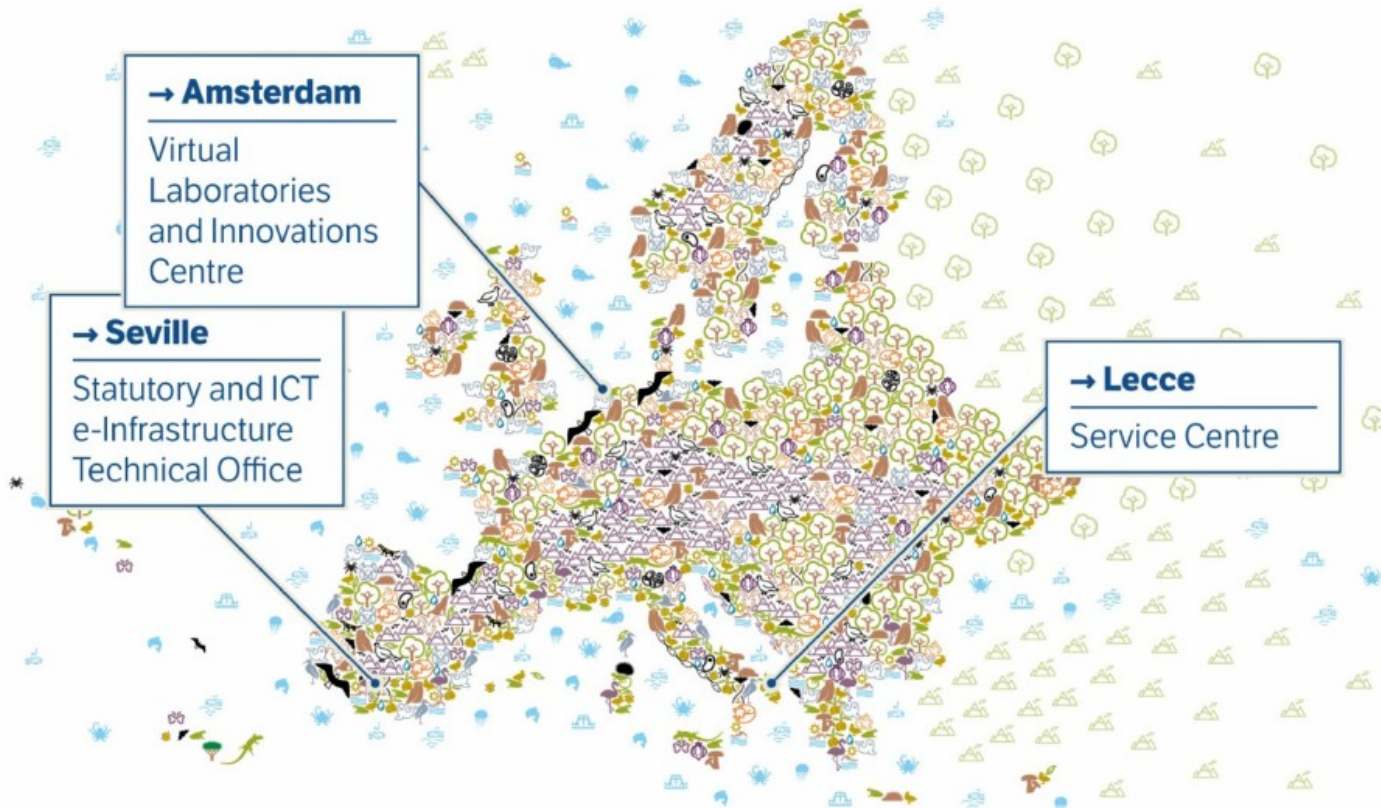- Providing training, dissemination and awareness programmes.

LW ERIC main ingredients

- Open access data (FAIR)

- Reproducible analytics
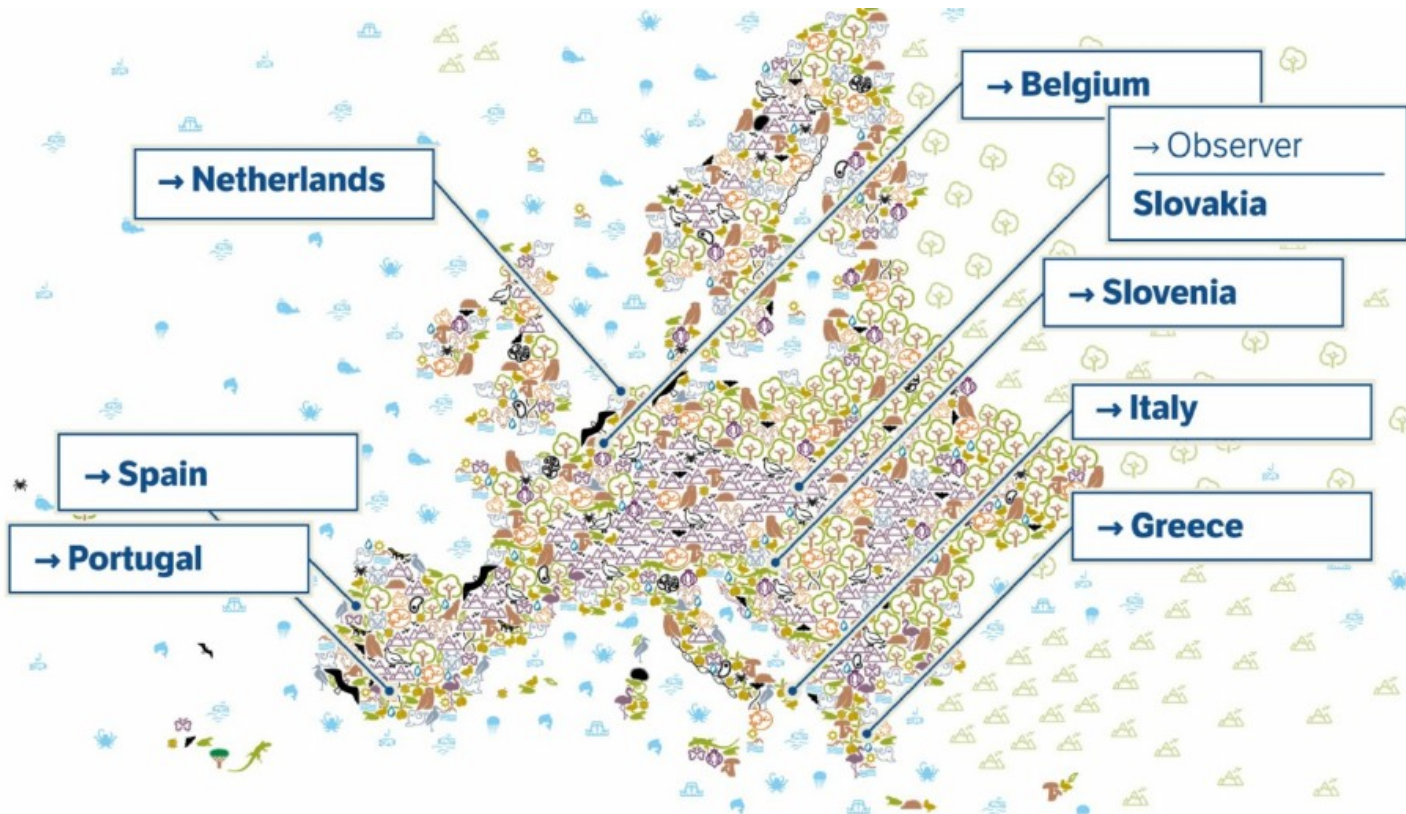
- Mobilized communities

How we work: Common Facilities

How we work: National Nodes

LW ERIC in a nutshell

https://www.youtube.com/watch?v=m4n-cAcgpl0&feature=youtu.be

Our cultural challenge

"Shift scientists' attitude from working in isolation, on single-core PCs, into using and benefiting from an ecosystem of web services available on www.lifewatch.eu ..."
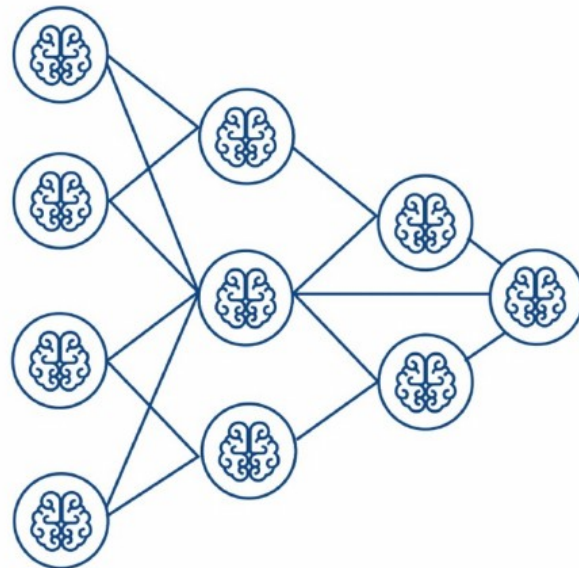
Our cultural challenge

"... with the capability to scale up researchers' interests and work on global hypotheses, ensuring transparency, repeatability and attribution for their endeavor."

Our cultural challenge

"This change would direct most of the scientific effort from a single-core (SCBs) operation, or **brain-etics**

to high performance brain network synthesis (HPBNs) or **brain-omics**"

What we provide: FAIR Data

- Find the data and metadata you are looking for, thanks to our **Catalogue of resources**;

- Freely access, use and share large datasets of different types and sources;

- Work with interoperable data, thanks to our standards, thesauri and ontologies;

- Reuse and combine data for different research questions, generating new services and meeting community standards.
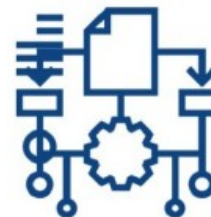
FIND

ACCESS

INTEROPERATE

**RE-USE**

What we provide: Technology layer

LifeWatch ERIC
Tesseract

- Making data, services and VRE accessible and usable in a FAIR optics;

- Engaging, tracking, accounting and securing biodiversity and ecosystem resources & services provision, through the LifeWatch ERIC blockchain platform;

- Providing cloud & computational power, and storage capacity to create models for future scenarios;

- Supporting smart ecosystem management in the context of climate change, also thanks to the application of innovative technologies like deep learning and artificial intelligence.

CLOUD & COMPUTATIONAL POWER

ARTIFICIAL INTELLIGENCE
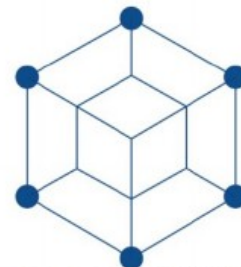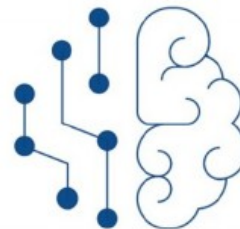
BLOCKCHAIN

DEEP LEARNING

LifeBlock

IJI: Non-Indigenous Invasive Species

* Boost the integration of tools & services into the LifeWatch ERIC web portal;

* Focus on a major scientific issue in biodiversity and ecosystem research with relevant socio-economic implications;

* Produce new and synthetic knowledge needed by institutions, administrations and managers to give solutions to major environmental problems at different scales;

Internal joint initiative

LifeWatch ERIC needs to boost its construction and to engage users in developing their research activities into the Virtual Research Environments of the e-Science Infrastructures, by clearly demonstrating and documenting the added value these new technologies bring to address challenging hot topics.

LifeWatch ERIC has started an Internal Joint Initiative with the exact aim of addressing these needs and reinforcing the positioning of **LifeWatch ERIC** within the biodiversity and ecosystem scientific community. As a subject for the demonstration case, LifeWatch ERIC has selected non-indigenous and invasive species (NIS).

If you are interested in the IJI and want to join us on the validation cases, just drop us an e-mail service.centre[at]lifewatch.eu.

Validation cases

Nine validation cases have been agreed on by the scientific community representatives focusing on various aspects of NIS invasion, stemming from the desire of the infrastructure to use the most participative interdisciplinary approach to investigate this wide topic.

As an immediate result of this collaboration, scientists and ICT experts jointly outlined a conceptual paper and designed a workflow that will serve as a living timeline along which different e-tools have to be developed to help address relevant issues related to NIS for scientists, managers, decision-makers and society.

1. Combining Modeling and remote sensing techniques to monitor and control the spread of invasive species: the case of *Ailanthus altissima*

2. European ARMS programme: long-term monitoring of hard-bottom communities for invasive marine species

3. Risk assessment of NIS introduction and establishment, habitat vulnerability to NIS and estimation of the impact on Biotopes

4. Functional biogeography of invasive species: the case of two widely-distributed omnivorous crustaceans

5. Successive invasions in the Mediterranean Sea: How the history of *Caulerpa taxifolia* can inform on the new invaders *Caulerpa racemosa* and *Rugulopteryx okamurae*

Internal Joint Initiative

- Rationale & Objectives
- Framework & Knowledge Map
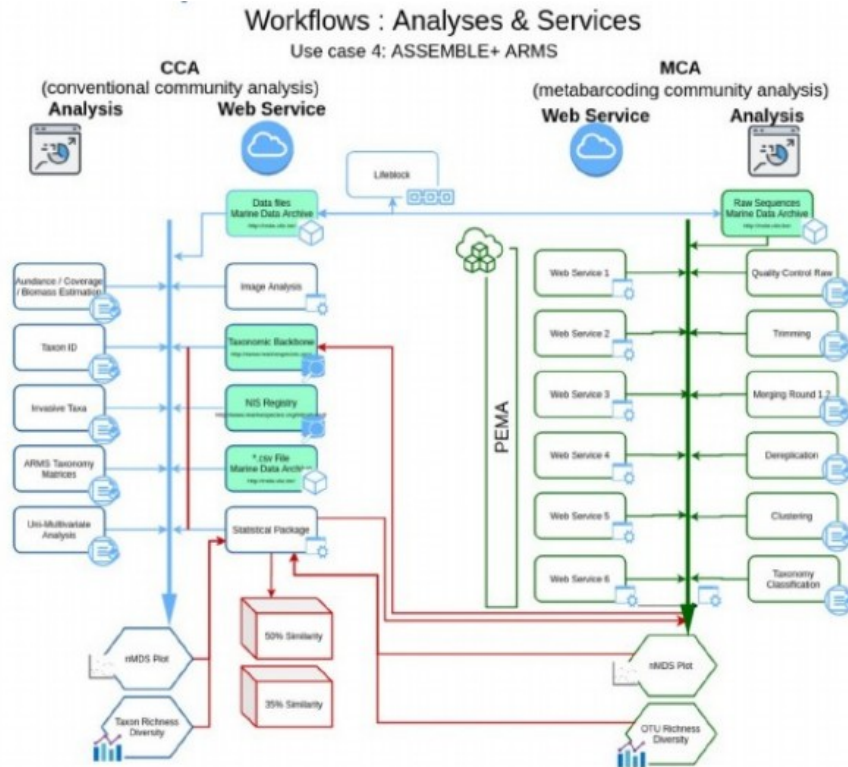- Validation Cases
- Dahlem Type Workshops
  - Roma, 02-06/12/2019
  - Seville, 14-18/10/2019
- Collaborative Space

IJI: Non-Indigenous Invasive Species

https://www.youtube.com/watch?v=HtDzII9dN4k&feature=youtu.be

- 2 Dahlem Type Workshops in 2019 (Seville & Rome);

- 5 Validation cases identified;

- Teams formed;
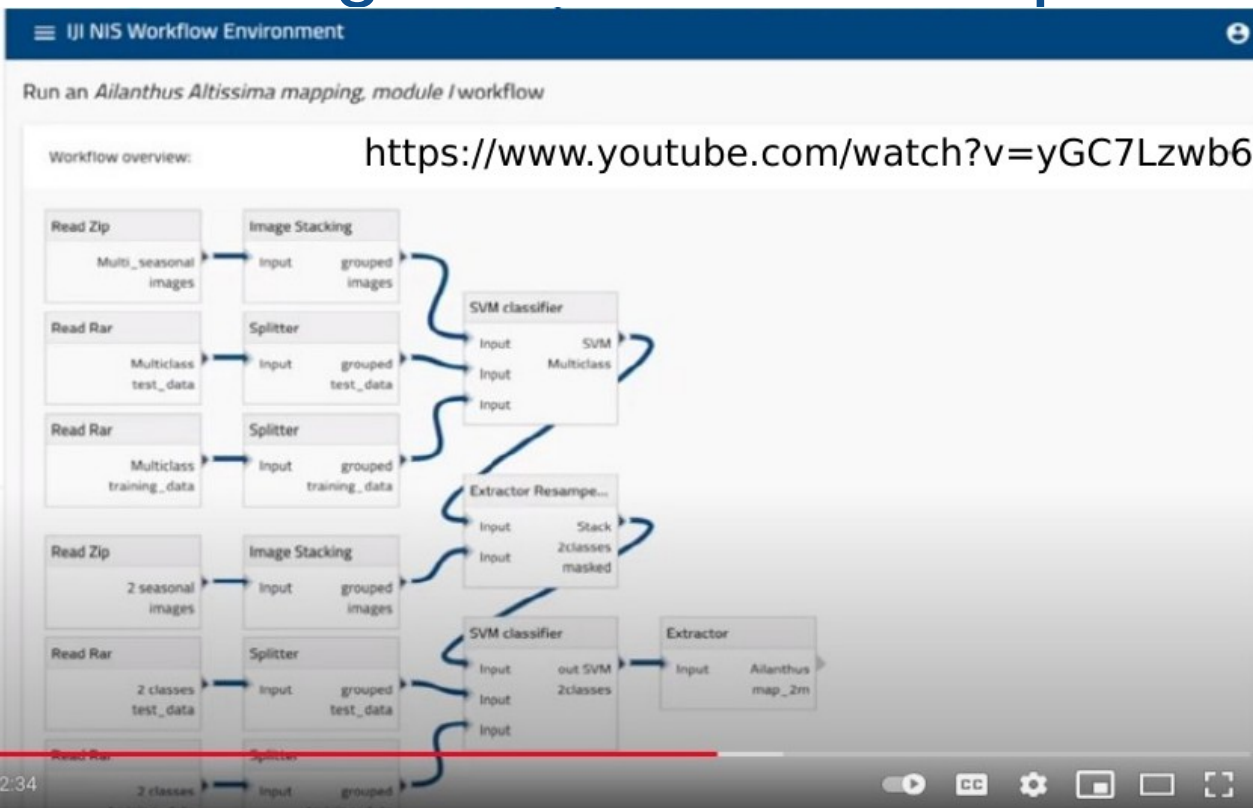
- Workflows designed;

- 1 scoping paper on its way.

Workflows : Analyses & Services
Use case 4: ASSEMBLE+ ARMS

IJI: Non-Indigenous Invasive Species

https://www.youtube.com/watch?v=yGC7Lzwb6bs

Thank you for your attention

email: ceo@lifewatch.eu

Website: www.lifewatch.eu

Twitter: @LifeWatchERIC