DARIAH-EU

Archetipo
WORKING GROUP

From data to knowledge preservation in Heritage Science

toward the implementation of the E-RIHS new platform “DIGILAB.it”

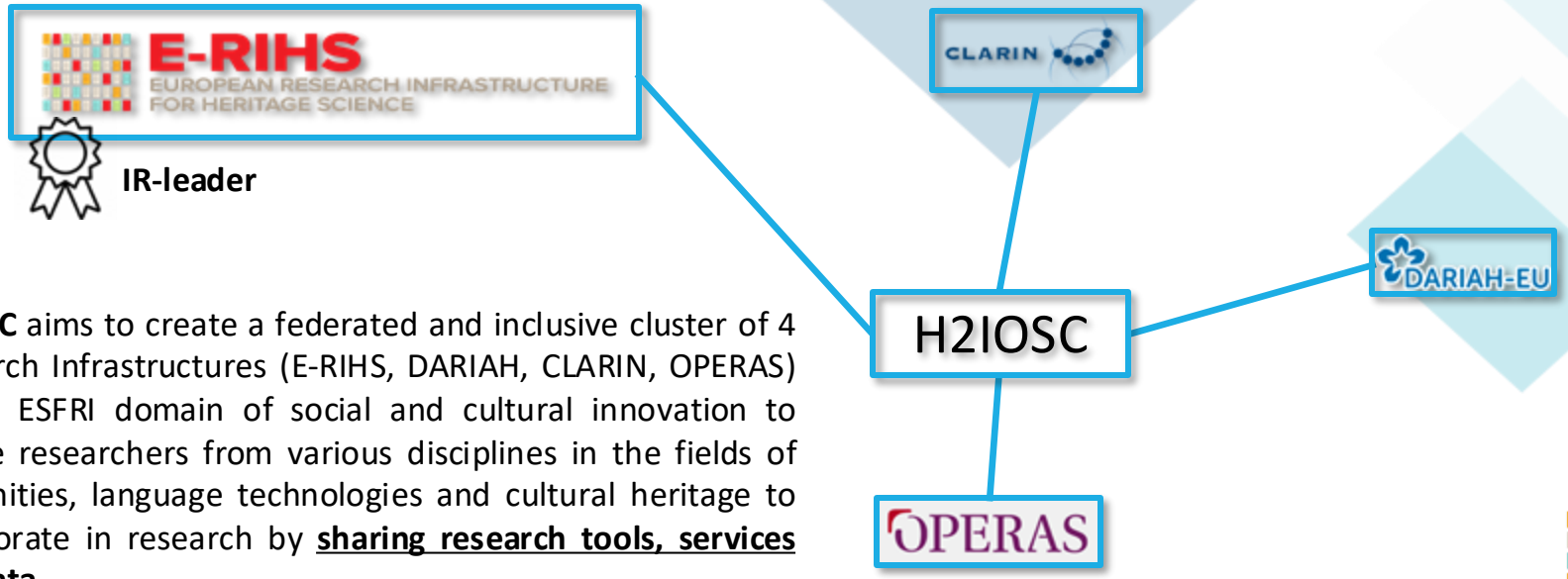
Alberto Bucciero

INTERNATIONAL WORKSHOP

DIGITAL INTEGRATED STRATEGIES TO SAFEGUARD HERITAGE CONSTRUCTION TECHNOLOGIES

September 30 - October 5, 2024 | Poggioreale, Trapani

Humanities and Heritage Italian Open Science Cloud – H2IOSC



H2IOSC aims to create a federated and inclusive cluster of 4 Research Infrastructures (E-RIHS, DARIAH, CLARIN, OPERAS) in the ESFRI domain of social and cultural innovation to enable researchers from various disciplines in the fields of humanities, language technologies and cultural heritage to collaborate in research by **sharing research tools, services and data**.

E-RIHS

Integrated platforms of the E-RIHS

Archlab:

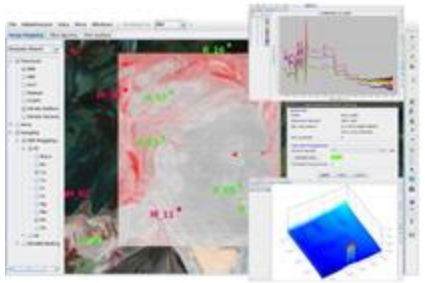
Access to physical heritage science collections and archives, such as technical images, samples and reference materials, analytical data and conservation documentation, as stored in museums, galleries and research institutions.

Molab:

Access to an impressive array of advanced mobile analytical instrumentation for non invasive measurements on valuable or immovable objects, archaeological sites and historical monuments.

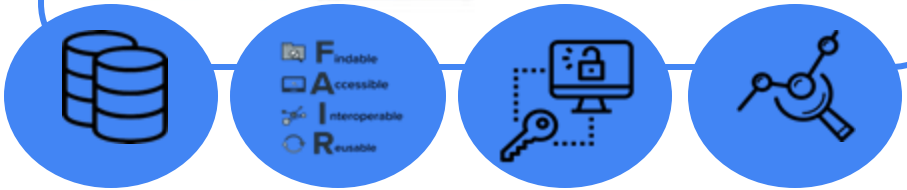
Fixlab:

Access to large-scale and medium-scale facilities particle accelerators and synchrotrons, neutron sources; **non-transportable analytical instruments**.



Digilab:

Virtual access to scientific data concerning tangible heritage, making them FAIR. It includes searchable registries of multidimensional images, analytical data and documentation.



DIGILAB: HUB FOR HS DATA

As part of the **H2IOSC** project, the primary objective of E-RIHS is to implement the last missing piece of the Research Infrastructure: the DIGILAB platform

DIGILAB is the digital infrastructure (**hardware and software**) of E-RIHS for the aggregation, interoperability, publication and redistribution of data, in accordance with European policies and international standards.

It will provide users with access to an interoperable ecosystem of data, tools and services to support the research, protection, conservation, enhancement and interpretation of cultural heritage

Cluster of federated DataCenters

DATA STORAGE

DATA FAIR-IFICATION

DATA ACCESS

DATA ANALYSIS

E-RIHS

Research Data vs Results

PUBLICATIONS AND DATA

Three main questions:

1. Where are the data used to find the scientific results presented in a publication?
2. How were they used?
3. **How are they related to each other?**

E-RIHS

#1: Where are the data used to find the scientific results presented in a publication?

OneDrive

GDrive

Dropbox

iCloud

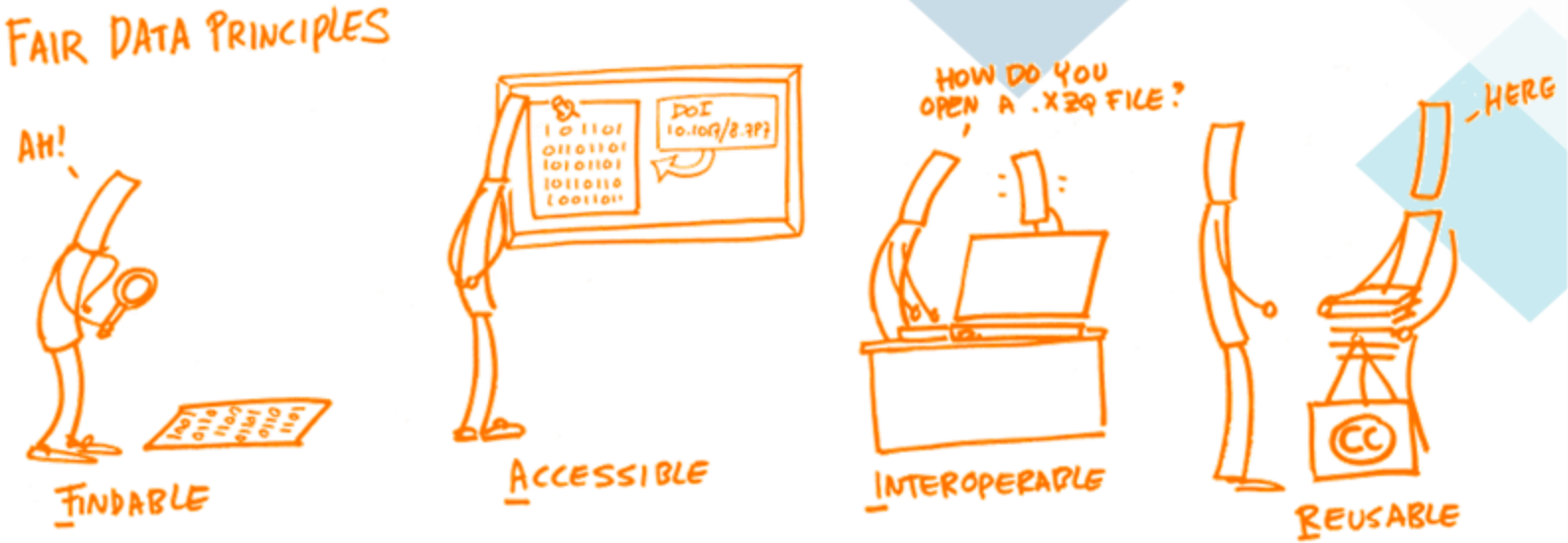
Do we really need another VIRTUAL DRIVE?

Is the capability of storing and retrieving data enough ?

E-RIHS

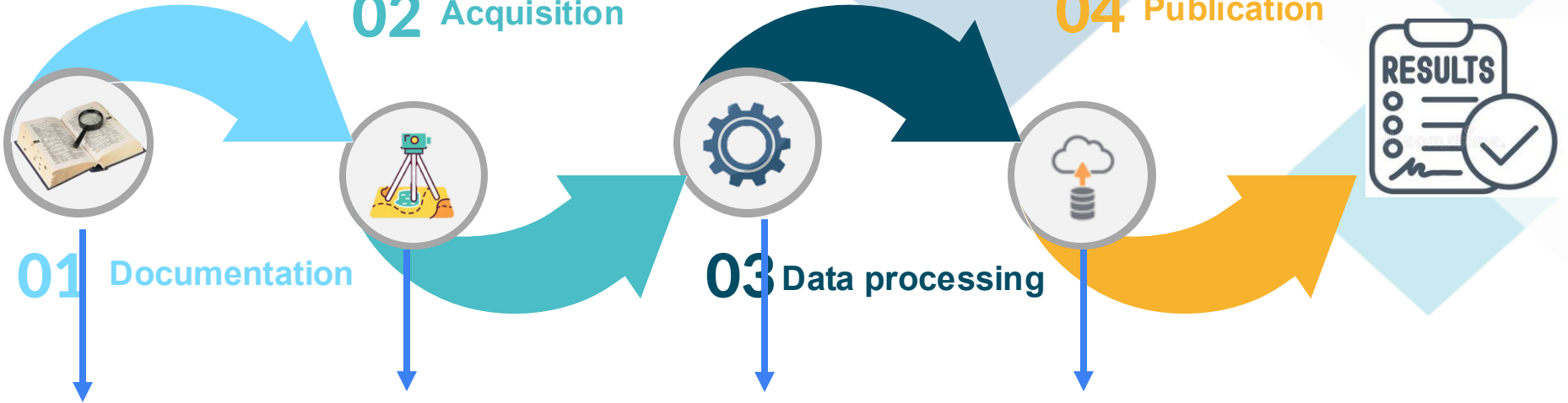
#1: Preserve DATA FAIRNESS

Is it necessary to store all datasets in one or more federated repositories and ensure compliance with the principles of



#2: How were they used?

Save the scientific research WORKFLOW



Preliminary analysis, bibliographic study (articles, images, etc.)

Diagnostic surveys, remote sensing, access to physical libraries or virtual archives, etc.

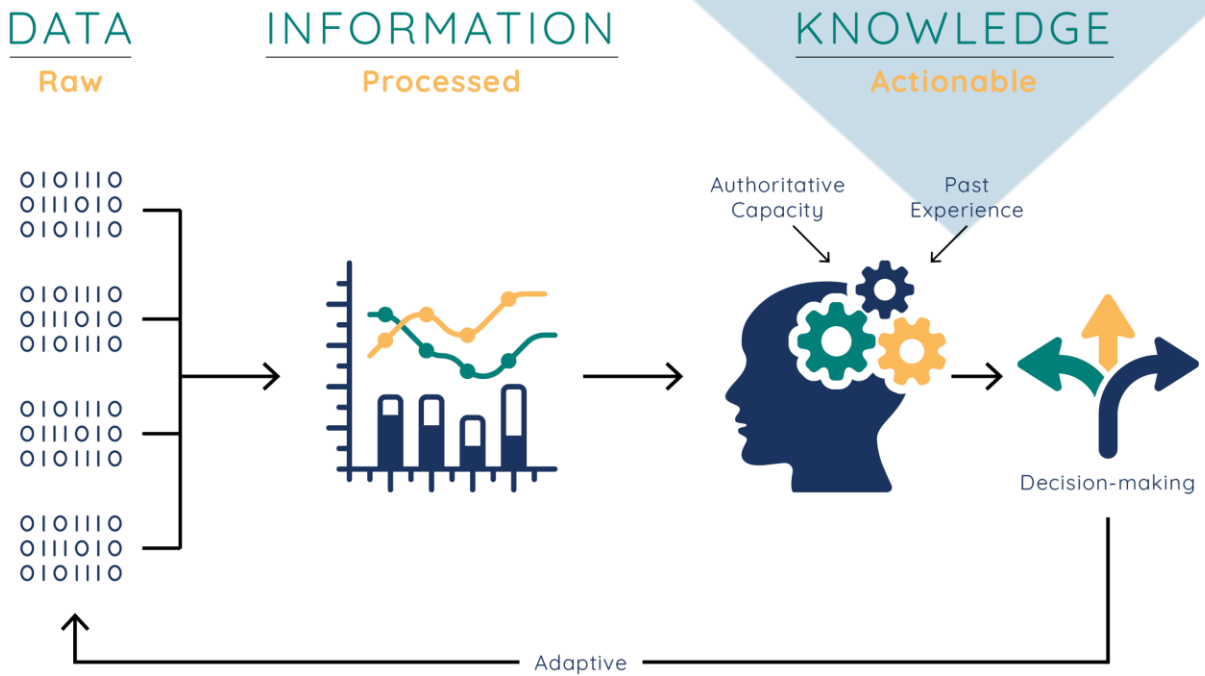
Post-processing of data, re-processing of knowledge.

Sharing and publishing scientific results in Open Access journals or repositories

E-RIHS

#3: How are they related to each other?

Discover KNOWLEDGE



(REF. https://internetofwater.org/valuing-data/what-are-data-information-and-knowledge/)

E-RIHS

39,5

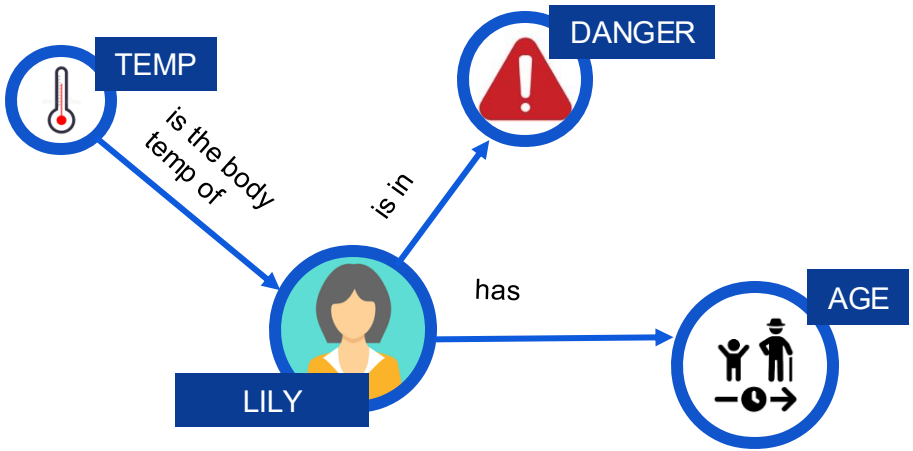
39,5 degrees of temperature

39,5 is the body temperature of someone, danger?

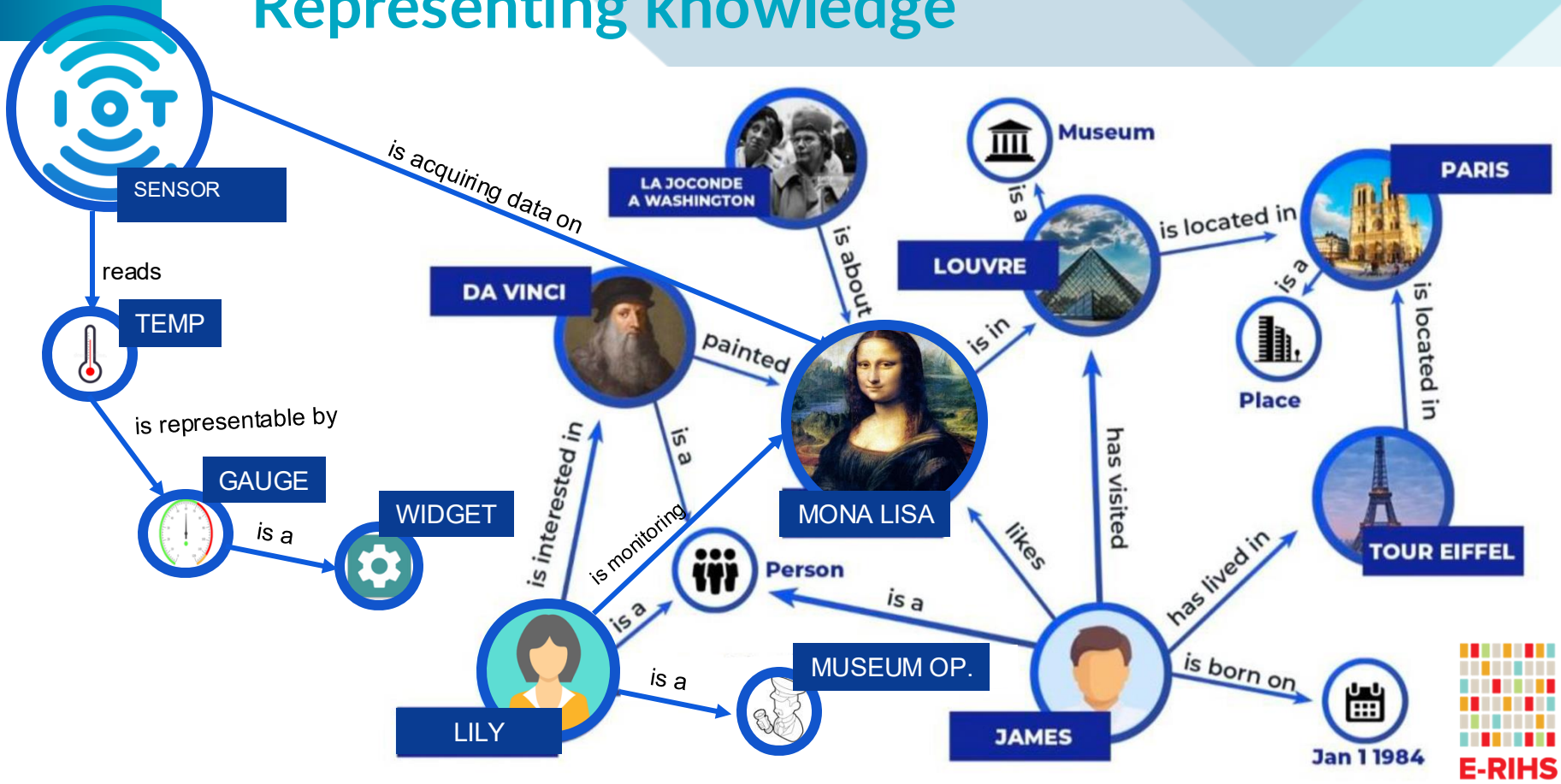
Data

Information

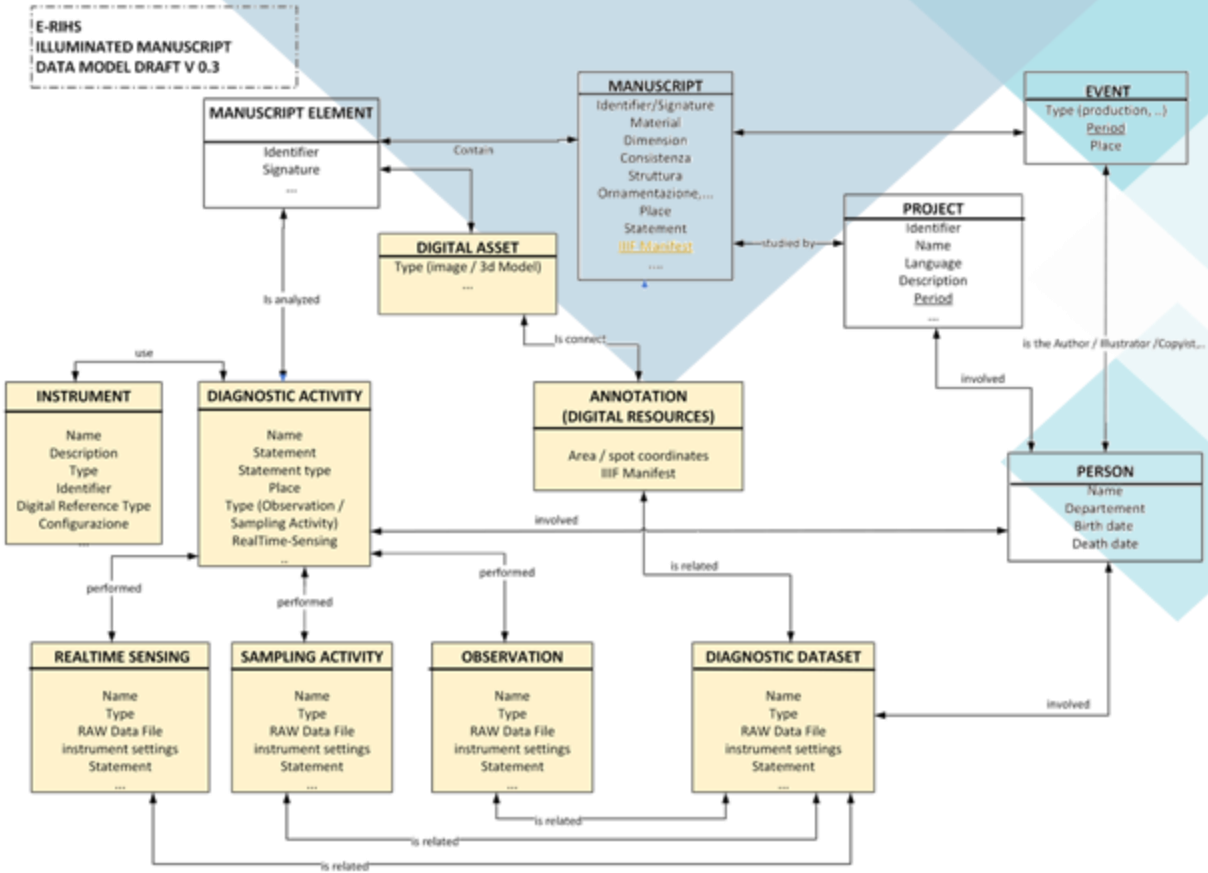
Knowledge



Representing knowledge



CIDOC-CRM



[Confidential Under publication]

DIGILAB PILLARS

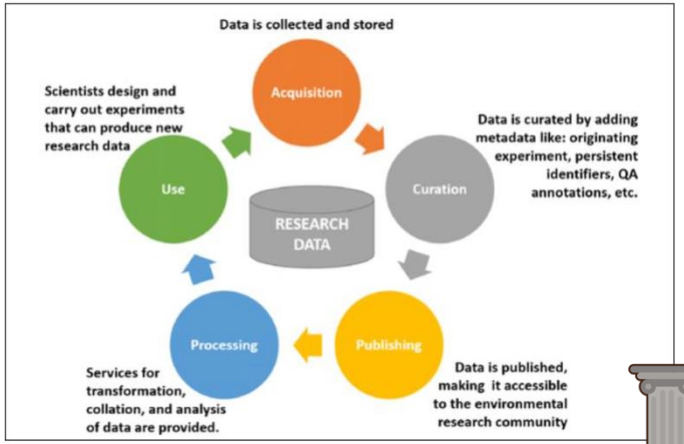
DIGILAB.it

Data management **Process management** **Knowledge management**

E-RIHS

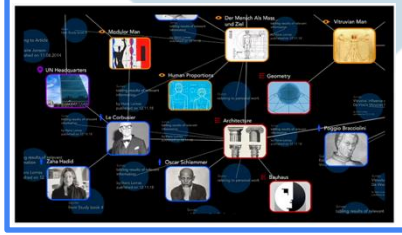
DIGILAB: SEMANTIC HUB FOR HS KNOWLEDGE TO CAPTURE THE HS DATA DURING ITS WHOLE LIFECYCLE

Data lifecycle management (DLM): safeguarding data appropriately throughout its existence



SOURCE: **ENVRI REFERENCE MODEL**: (https://envri.eu/wp-content/uploads/2020/07/The-ENVRI-Reference-Model.pdf)

Knowledge graphs capture the different ways in which events, actors, and things connect and relate across time and space.



SOURCE: Connect, communicate and represent knowledge with context

Still image

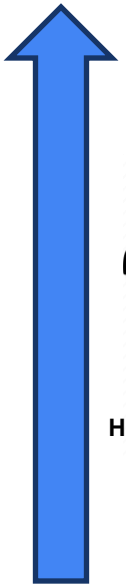
Research workflows capture the scientific process in which the research take place

SOURCE: Integrating research into the design process

Dynamic image

DIGILAB: SEMANTIC HUB FOR HS KNOWLEDGE

Requirements



HS Community

Needs

8. Allow the **remote access and control** to physical instruments to conduct experimentations in real environments (**XVRE**)

7. Allow users to **collaborate** in a **shared workspace** in order to manipulate data, services, tools and workflows (**CVRE**)

6. Provide the capability of **combine services, tools and workflows** in order to create new ones (**VRE**)

5. Provide a set of **pre-configured** scientific workflows to the community

4. Support the **design** the **publication** and **execution** of **scientific workflows** intended as sequence of steps of a generic scientific data creation process

3. Give access to data, digital tools and services provided by the HS research community through a visual and ergonomic interaction based of **3D knowledge graph**

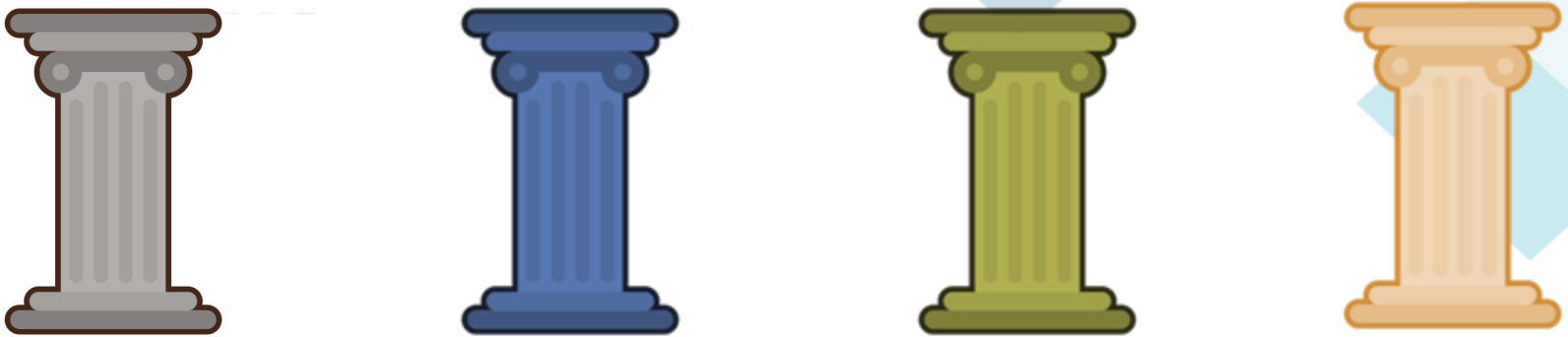
2. Provide simple facilities to automatically build **forms** to help the **data input** and customized **reports**

1. Give users a personal data space to **store** his/her own **structured** data and metadata mapping them against one or more **ontologies** in form of a **Heritage Digital Twin (HDT)**

E-RIHS

DIGILAB 4° PILLAR

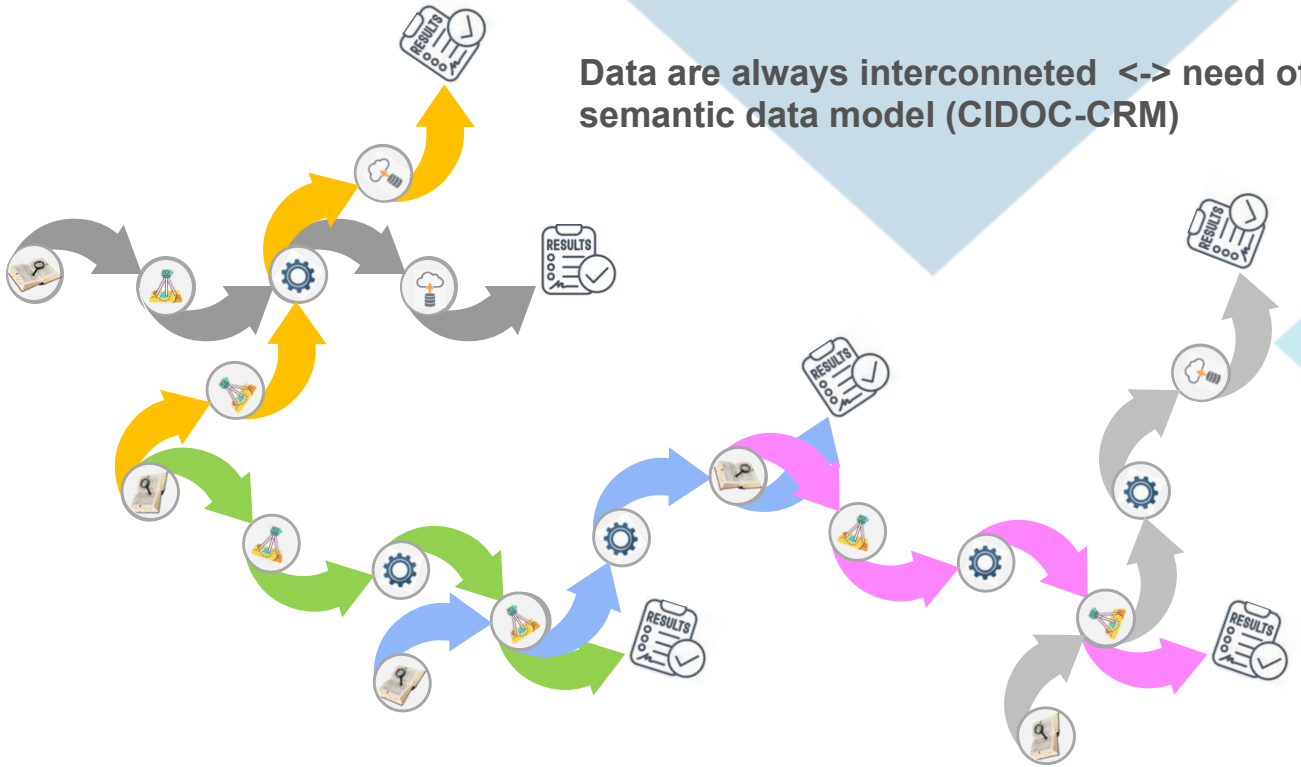
DIGILAB.it



Data management | Process management | Knowledge management | CVRE

E-RIHS

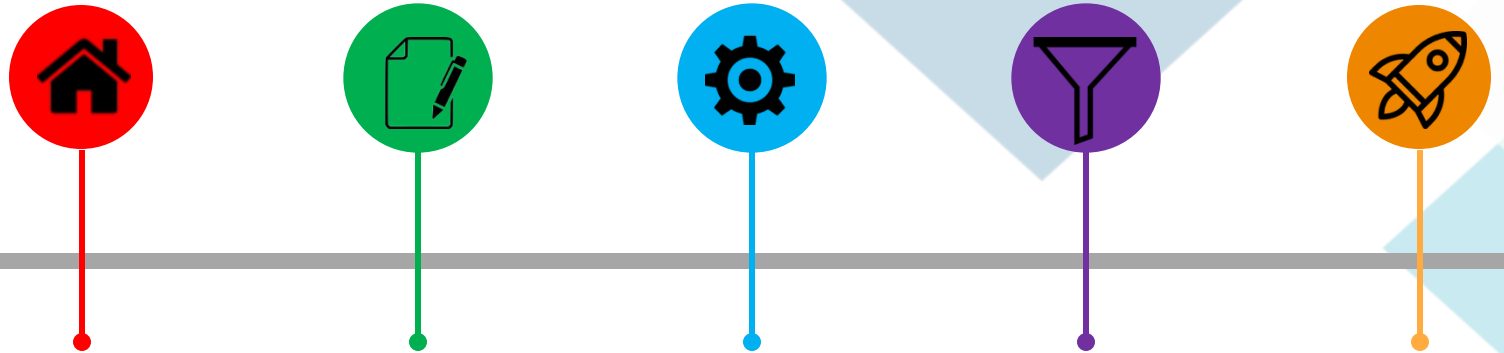
Linked (Open) Data: the importance of semantics to keep relations between digital resources



Data are always interconneted <-> need of a semantic data model (CIDOC-CRM)

E-RIHS

DIGILAB Roadmap



Project start

APRIL ‘24

End of the design

DECEMBER ‘24

End of development

JUNE ‘25

Customization and repository population

July ‘25

Deploy and go live

SEPTEMBER ‘25

Thanks for your attention!

Alberto Bucciero
Digital Heritage Innovation Lab
Institute of Heritage Science

alberto.bucciero@cnr.it
+39 347-3836207
https://www.ispc.cnr.it/it_it/2021/06/16/dhilab-digital-heritage-innovation-lab/