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EGI-ACE Community Workshop

[Early Adopter]

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16th-17th February 2021

Agenda:https://indico.egi.eu/event/5360/

E-RIHS is the European Research Infrastructure for Heritage Science that supports research on heritage interpretation, preservation, documentation and management. E-RIHS guarantees access to a wide range of cutting-edge scientific infrastructures, methodologies, datasets and tools, training in the use of these tools, public engagement, access to repositories for standardized data storage, analysis and interpretation.

E-RIHS supports a wide variety of research through interdisciplinary access to the four platforms (http://www.iperionhs.eu/catalogue-of-services/)

MOLAB
Mobile laboratory for in-situ diagnostics

FIXLAB
large-medium scale analytical facilities

ARCHLAB
Scientific archives for heritage science

DIGILAB
Digital tools & datasets for heritage science

E-RIHS is the only pan-European Research Infrastructure serving the Heritage Science field. It is collecting a strong interest by prominent international institutions and activating important collaborations.
Through these strong collaborations, E-RIHS aims at presenting itself as a reference for scientific research not only in Europe but worldwide.

- **ICCROM**: International Centre for the Study of Preservation and Restoration of Cultural Property
- **GCI**: Getty Conservation Institute (USA)
- **Smithsonian Institution** (USA)
- **UNAM**: Universidad Nacional Autonóma de México (MX)
- **ANTECIPA**: Associação Nacional de Pesquisa em Tecnologia e Ciência do Patrimônio (BR)
- **Universidad Nacional de San Antonio Abad del Cuzco** (PE)

Scientific community

E-RIHS partnership joins 16 countries (15 EU Member States plus Israel), 2 ERICs and 3 institutions representing scientific communities. E-RIHS PP also counts 6 observers, and involves over 100 heritage science institutions worldwide.

Background about the scientific community
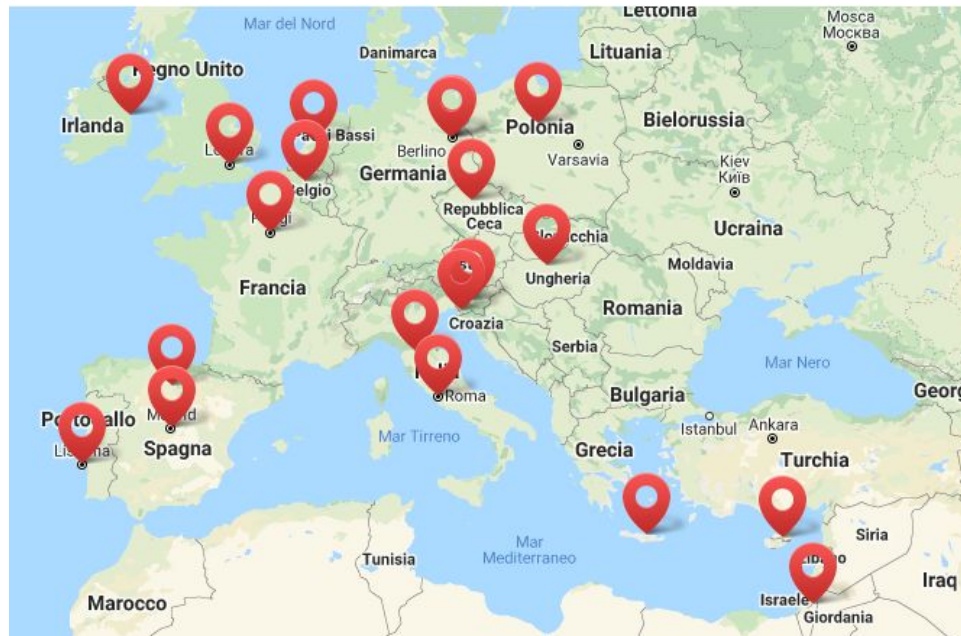
E-RIHS adopts 2 access provision methods:
- physical access (**TNA**) to the LAB and facilities (FIXLAB, MOLAB, ARCHLAB), based on periodic calls with peer review:
    - **1st open call: 2nd November 2020 – 31st January 2021**

It is estimated that the annual number of EU users (**physical access**) is 700 to 1000, of these about 10% are international users and about 5% are linked to the industrial sector.

- remote access (**VA**) for the datasets and tools (DIGILAB) based (for the moment) on a wide-access strategy

For access to e-infrastructures, it is estimated that there will be about 1000 per year, with remote accesses by researchers to heritage datasets possibly exceeding 500,000 per year.

E-RIHS DIGILAB (virtual facilities)

Virtual access to scientific data concerning tangible heritage, making them FAIR (Findable-Accessible-Interoperable-Reusable). It includes searchable registries of multidimensional images, analytical data and documentation from large academic as well as research and heritage institutions.

Ambition and challenge(s)
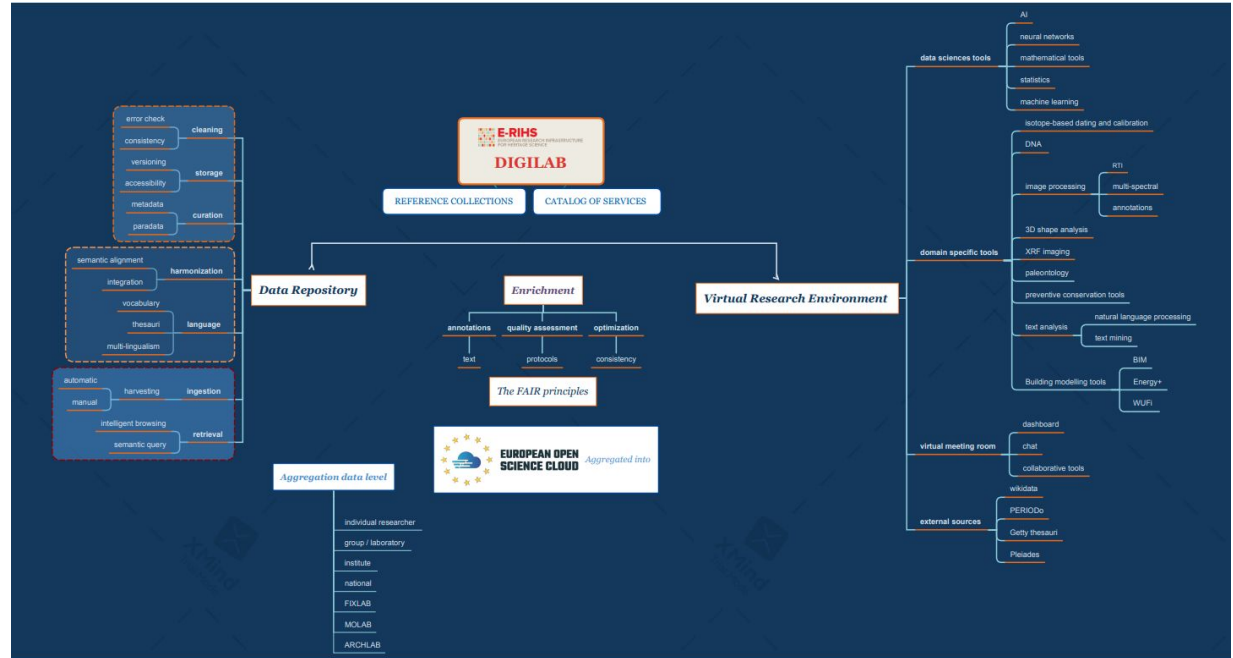
E-RIHS will contribute to major research projects on heritage carried out by European teams in a structured manner, through a coordinated array of fixed and mobile instruments, interdisciplinary expertise and research resources in the form of data banks of sector specific high-level knowledge held at world-class partners institutions

- Developing a reflective society
- Connecting people to heritage
- Creating knowledge
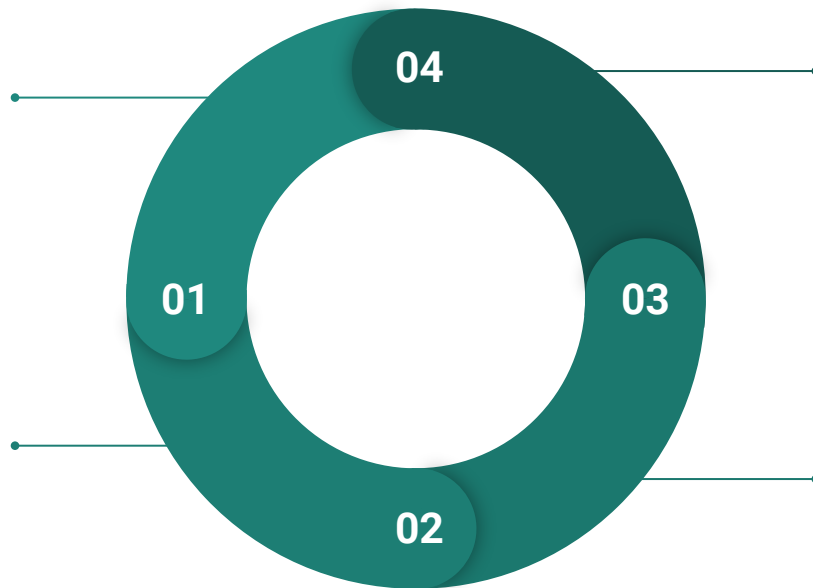- Safeguarding the cultural heritage resource

Scientific Experiment workflow

1 Pre-processing

Describe the method / describe the measurement / selection and annotation of Measurement Sites on reference images and preliminary test.

4 Disseminating

Data and metadata storage / Publication and sharing / Prepare report / Publish results

04

01

03

02

2 Measurement

Measurement / Spectra acquisition / Storage of data and metadata files

3 Post-processing

Baseline correction / peak and results assessment / Result interpretation

Example: http://ssk.huma-num.fr/#/scenarios/SSK_sc_RamanV2

Scientific Experiment workflow
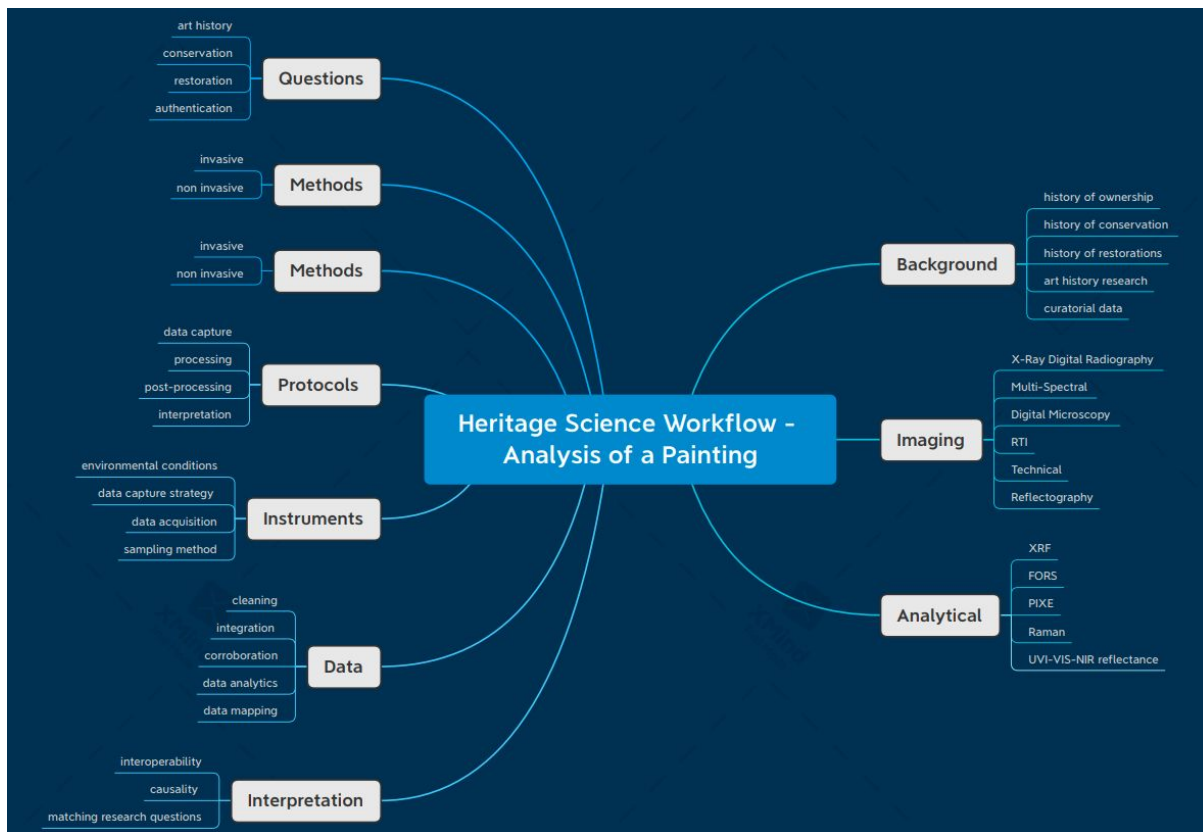
Tools and services
Early Adopter

name	description
X3ML toolkit	A set of open source components that assist the definition of mappings from XML to Entities Model RDF for information integration. It includes the 3M Editor.
RDF viewer	This tool allows for the intuitive and compact viewing of RDF files in a human readable form. It is used in this project for quality testing of semantic mappings.
D-NET	Enabling framework for the realization and operation of aggregative metadata infrastructure
X3ML engine	Transformation engine capable of applying mappings defined via the 3M Editor.
Metadata cleaner	Service for the harmonization of values according to controlled vocabularies
Metadata inspector	GUI for the visualization of transformed metadata records and detection of "uncleaned" records

Services already available in the PARTHENOS portfolio at: https://parthenos.d4science.org/

High level architecture of data space
Early Adopter
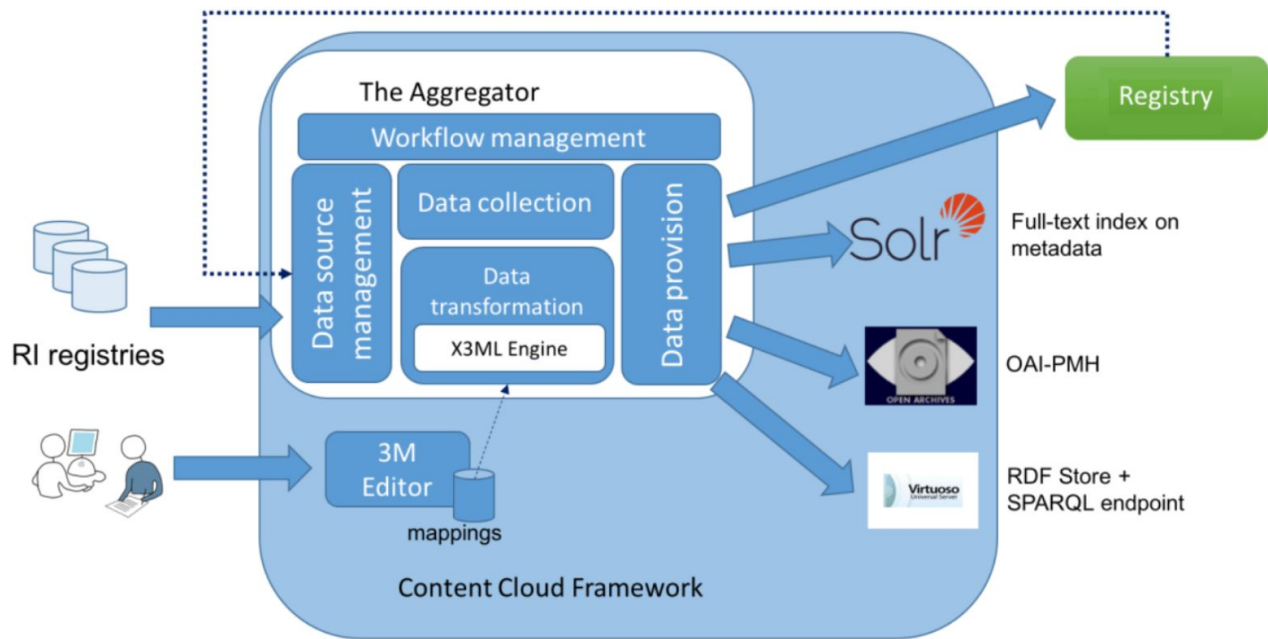
Capacity requirements

Hardware is organized as a dynamic cloud of virtual machines, supporting computation and storage, while the services are organized into e-infrastructure middleware, storage, and end user services.
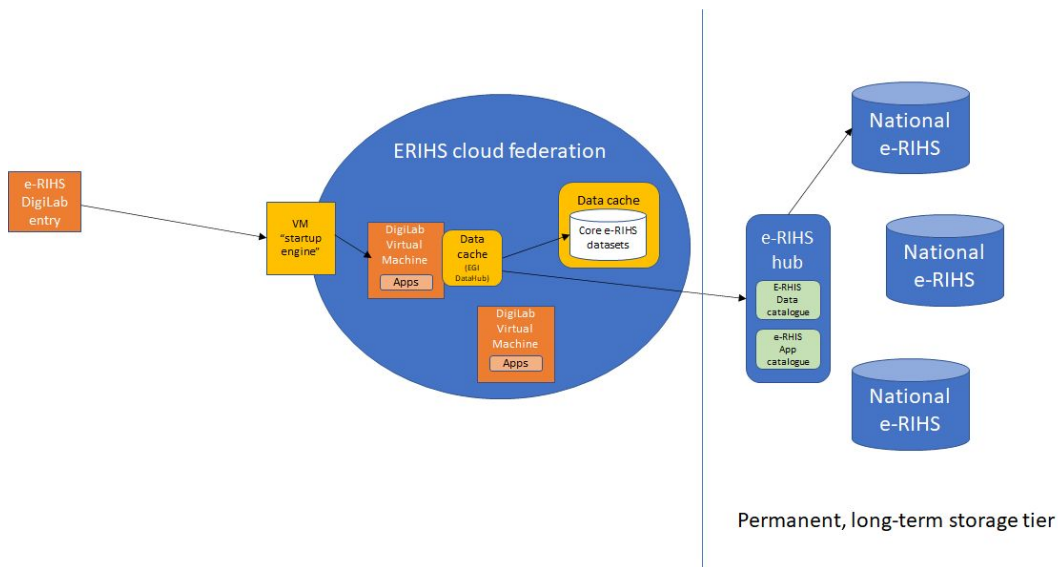
- VMs
- STORAGE capacity
- ON DEMAND GPUs for intensive analytic techniques

Technical requirements

- EGI Cloud Container
- EGI Check-In
- New Nuclear magnetic resonance (NMR), X-ray fluorescence spectroscopy (XRF), Fourier-transform infrared spectroscopy (FTIR) based tool, that analyze and provide the possibility to study and interpret the data obtained from such scientific measurements or allow users to perform simulations

Timeline

2017-2020
Preparatory
phase

2020-2021
Transition and
implementation
phase

2022
Operational
phase

Development of the Alpha version of the **Heritage Data Integration Suite**:

- support data coherence to allow seamless identification, documentation and accessibility for the partners' datasets
- select core standards to promote dataset interoperability;
- support knowledge sharing and data re-use also towards the EOSC
- started with a MOLAB pilot based on test data provided by CNR-ISPC to test **heterogeneous datasets integration**:
  - Analytical techniques: XRF images and data
  - Spatial data: 3D models with semantic annotations (graphml)
  - Other contextual data (thesauri, reference collections, secondary literature)

- MOLAB testbed (1): **MA-XRF** scan on El Greco's *Ritratto di gentiluomo* 1570, Oil on canvas, 11.5 x 16.5 cm:
    - images (.tiff, different colour depths: 8, 16, 32 bits)
    - raw data extracted and exported as text files:
        - the matrix header contains the specific chemical element in the spectroscopic notation and the geometric parameters of the scan:
            - scanning mode operated on the two axes (H and V)
            - pixel size (step)
            - acquisition time per pixel
            - data download time (Tlist_Acqu_time)

Timeline

- MOLAB testbed (2): **3D** survey and reconstruction of a roman smithy. Linked to the prototype under development in SSHOC based on:
    - **EM** a framework to connect archaeological documentation and virtual reconstruction for sites and monuments based on GraphML
        - http://osiris.itabc.cnr.it/extendedmatrix/

- **ATON** a modular framework based on node.js with advanced functionalities:
    - scalable rendering of 3D objects and virtual environments;
    - real-time collaborative features;
    - visual/immersive analytics
    - integration with complex multimedia contents
        - http://osiris.itabc.cnr.it/scenebaker/index.php/projects/aton/

- MOLAB testbed (3): other contextual data provided by CNR-OVI and CNR ISPC

  - **ISPC: Archeologia e Calcolatori**
    - OAI_DC XML records, harvested through OAI-PMH
    - PDF files of the Journal Issues

  - **OVI: text-based resources**
    - tagged textual corpora
    - vocabularies and dictionaries
    - archival descriptions (XML-EAD)
    - EAC authority files

Training for external users

Training: summer schools, such as **ARIADNE**, **CHARISMA**, **IPERION CH and IPERION HS**, **Rltrain** and other. E-RIHS will coordinate a comprehensive program of educational activities which will include a mix of training events; from short workshops and CPD (Continuous Professional Development) courses to hands-on experience on the functioning of its platforms (training camps) and summer schools:

- http://www.iperionhs.eu/training-modules/
- http://www.iperionhs.eu/training-camp/
- http://www.iperionhs.eu/doctoral-summer-school/
- http://www.iperionhs.eu/remote-training-module/

Thank you!