WORK PACKAGE 7: FEDERATED RESEARCH INFRASTRUCTURE FOR A RAPID POLICY RESPONSE
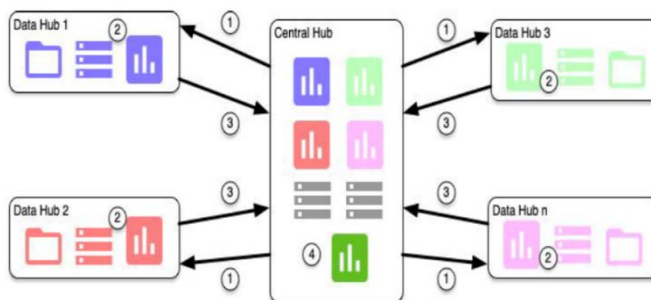
PHIRI, the Population Health Information Research Infrastructure, develops, implements and deploys a **federated research infrastructure** (RI) that leverages the reuse of real-world data to answer policy relevant research questions on the direct and indirect effects of the COVID-19 pandemic on the European population. The PHIRI infrastructure delivered aspires to play a key role in the European Health Data Space for secondary use (EHDS2) as well as in the European Open Science Cloud (EOSC).

This Work Package focuses on:

1. Showing the potential of the federated RI for a rapid cycle analysis using a **demonstration pilot case**.
2. Testing alternative options for the final implementation of the federated RI.
3. Designing an enhanced version of the current federated RI, including: a) a strategy for the distribution of algorithms and outputs; b) Machine to machine communication protocols (e.g, APIs); and c) Exploring EOSC – EGI ACE – computing solutions (hardware and software).
4. Building an **IT developers network** whose aim is building capacity in the nodes composing the federated RI while assuring continuity.

THE ARCHITECTURE

The PHIRI federated architecture consists of a number of **country nodes (PHIRI partners)** and a **central orchestrating hub at IACS (Instituto Aragonés de Ciencias de la Salud)**. The exchange flow between the nodes and the orchestrating hub develops as in the figure on the right. In (1), the orchestrating hub develops, implements and shares the **analytical pipeline** (software solutions that streamlines an interoperable response of the data hubs to the research queries) and provides support to the

deployment of the federated RI in the nodes. In (2), nodes acting as **data hubs deploy the pipeline** on premise; In (3), the federation of nodes **shares back digital objects (e.g, aggregated outputs or models);** and in (4), the orchestrating hub can perform meta-analyses with those outputs if required.

PROTOTYPING THE ORCHESTRATION OF A USE CASE

The PHIRI federated RI builds on a stepwise approach aiming at full interoperability at any stage; starting with the formalization of the research query as a common data model for all the nodes, following with the deployment of the analytical pipeline on premise to run the analyses, and finalizing with the collection of the research results and their publication.

ELEMENTS IN PLACE & NEXT STEPS

Once the four research queries had been formalized in the corresponding common data models (March 2022) (Use Case A; Use Case B; Use Case C; Use Case D) each node identified and started to collect the data required to answer the research query. The PHIRI federated RI APP provides the algorithms for data quality assessment and analysis. Next, nodes run the analyses and shared the research results for further comparative analysis with the orchestrating hub who then compiled and published the outputs (June 2022). Finally, discussions for an enhanced PHIRI Research Infrastructure have started with a view to liaise the PHIRI infrastructure with the EHDS2 and EOSC.

www.phiri.eu/wp7
PHIRI.IACS@aragon.es
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