Building FAIR Environmental Services Platforms in Europe

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Abstract. Research Infrastructures (RIs) in Europe are in a key position for development of new research policies, access methods and technical solutions. European RIs cover almost all fields of science, and disciplinary collaborations between them are the key for creating practical standards and best practices for the whole communities. For this reason, they are also in a strong position to develop the practical implementations of FAIR policies on actual research service provision. European environmental RIs have worked together on these issues from early 2010s in ENVRI community, and the current iteration of this collaboration – ENVRI PLUS has been a major development for common standardized services. The next proposed iteration ENVRI FAIR would then be the crucial step from planning to implementation of real actionable FAIR services for environmental research in the framework of European Open Science Cloud initiative.

Keywords: Research Infrastructures, data management, FAIR, international collaboration.

1 Introduction

The European research infrastructures are major producers of services (including data services) for researchers in Europe and beyond. Due to their longevity and high level of expertise, they are a natural place to develop new service access methods, access policies, interfaces and many other common developments. It should be noted that RIs are not projects - they are intended as long-term science platforms [1].

The European Commission has been funding the development of these organizations from academic facilities and networks to professional service platforms, sustained by the EU member states. As many of the RIs are from similar fields of science, it is reasonable to consider that many of the technical and political solutions should be similar. Similarly, many of scientific questions require use of multiple facilities, and similar solutions make the barrier of use smaller. For these reasons, the European Commission has also supported cluster projects, covering wide range of Research Infrastructures from a specific field. This common development has been a very successful model for creation of common and interoperable systems.

European Commission has also been very active in creation of European Open Science Cloud (EOSC) [2,3] which is aimed to be the platform for science in Europe and in beyond. This platform integrates the existing IT infrastructures, and also involves the RIs as a key producer of services and data. One of the main aspects of the EOSC initiative is the use of FAIR (Findable, Accessible, Interoperable and Re-useable) principles in their service requirements. For this reason, the cluster activities of RIs must reflect this requirement.

Figure 1 The ENVRI community covers all major European research infrastructures, from Solid Earth, Marine, Ecosystem and Atmospheric domains, as well as some infrastructures working between the domains.

2 ENVRI Community and Projects

2.1 ENVRI community

ENVRI is a community of major European Environmental Research Infrastructures, covering the whole Earth System sciences, from deep ocean observations, solid earth, land ecosystems, coastal and fresh water systems, atmospheric composition and dynamics, up to highest levels of atmosphere. Examples of these facilities in the environmental domain are Integrated Carbon Observation System (ICOS), European LTER contribution, European Incoherent Scatter Scientific Association EISCAT. The community also contains many multidisciplinary

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infrastructures, working between these domains (Figure 1).

The ENVRI Community is a long-term collaboration between these organizations, and facilitates their collaboration activities, maintains a Board of Environmental Research Infrastructure directors, sustains the results of each ENVRI project and supports the creation of funded activities by consulting the funding agencies.

2.2 ENVRI PLUS project

The environmental RIs have been for several years supported by ENVRI PLUS project funded by the European Commission, with the aim of creating common solutions for these organizations, in the areas of technical development, data management, service access, societal impact, strategic collaboration, communication and other aspects. The most relevant for this discussion is the activities in the Data for Science work packages, which have created for example a standard Reference Model for RI service provision, drafted common architecture and created far more consistent landscape of data services in the European environmental research.

2.2 ENVRI FAIR initiative

New initiative ENVRI FAIR will answer to these challenges. Directly involving the European environmental RIs in the ESFRI roadmap, and some key technical specialist partners, this initiative concentrates on creating FAIR services for the upcoming EOSC and for the research communities worldwide. Common policies, open standards, interoperability solutions, operational services, and stewardship of data on the basis of FAIR (Findable, Accessible, Interoperable, Re-usable) principles require a common approach. The ENVRI FAIR includes as well further development what is actually meant by FAIR in the virtual service provision in the environmental domain.

ENVRI-FAIR is the connection of the ESFRI Cluster of Environmental Research Infrastructures (ENVRI) to the European Open Science Cloud (EOSC). Participating research infrastructures (RI) of the environmental domain cover the subdomains Atmosphere, Marine, Solid Earth and Biodiversity / Ecosystems and thus the Earth system in its full complexity.

The overarching goal is that at the end of the proposed project, all participating RIs have built a set of FAIR data services which enhances the efficiency and productivity of researchers, supports innovation, enables data- and knowledge-based decisions and connects the ENVRI Cluster to the EOSC.

This goal is reached by:

(1) well defined community policies and standards on all steps of the data life cycle, aligned with the wider European policies, as well as with international developments;

(2) each participating RI will have sustainable, transparent and auditable data services, for each step of data life cycle, compliant to the FAIR principles.

(3) the focus of the proposed work is put on the implementation of prototypes for testing pre-production services at each RI; the catalogue of prepared services is defined for each RI independently, depending on the maturity of the involved RIs;

(4) the complete set of thematic data services and tools provided by the ENVRI cluster is exposed under the EOSC catalogue of services.

The initiative is planned to start from 2019 and run for 4 years, with a strong connection to other cluster project in Europe, the international FAIR community (e.g. Research Data Alliance and others) and with other international and national initiatives.

3 International collaboration needs

This kind of approach does not work from purely one project perspective, and connection to other European, international and regional programmes working in the FAIR policy, standards and definitions are a crucial part of the activities. The presentation concentrates on creating these interfaces to FAIR related international initiatives and informing the further developments planned in the next 4 years.

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References

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