Enhancing Research Infrastructures with VRE4EIC components: the EPOS success story

The European Plate Observing System (EPOS) highlights how its research infrastructure has become more efficient and user friendly by utilizing technology developed in the frame of the EU H2020 VRE4EIC project.

In the last decades quite an amount of tools, technologies and software has been developed to support and improve research throughout the entire data lifecycle. This includes software, modeling tools, and even code that can be used and reused by researchers around the world. However, more and more emphasis has been given to the structural components that enable a research infrastructure to be sustainable, robust and, even most importantly, compliant to the FAIR principles. Such principles prescribe—in order to enable reproducible science—that data need to be findable, accessible, interoperable and reusable. It is usually up to research infrastructure designers, developers and managers to find the best architecture and technologies to enable FAIR to become reality in their scientific domain.

In this framework, VRE4EIC is promoting the adoption of common, standard technical solutions in order to facilitate research infrastructures in facing shared challenges and thus complying with FAIR principles.

This is the case of the European Plate Observing System (EPOS), a Distributed Research Infrastructure, which in the long term plans to facilitate the integrated use of data, data products, and facilities from distributed research infrastructures for solid Earth science in Europe.

In order to enable Accessibility (the “A” of FAIR), the EPOS central hub, which provides access to a wealth of different types of data and services from communities, had to implement appropriate Authorization mechanisms. Such mechanisms are usually referred to as “AAAI”, which stands for Authentication, Authorization, and Accounting Infrastructure. Instead of creating such an infrastructure “from scratch”, EPOS took advantage of the existing VRE4EIC AAAI Service building block. This component provides a “plug-and-play” solution for the authentication of users, and in addition, it integrates different authentication mechanisms from various AAI providers (e.g. eduGAIN, Facebook, Google, and others) in one single system. Due to its integrability into service-based architecture, it can be easily plugged into micro-services-oriented architectures, such as the one of EPOS.

The EPOS User Interface (see Figure) enables the discovery and search of datasets in the solid Earth domain, which includes several communities such as Seismology, GPS, satellite data, volcanic observatories, and others. An authentication widget is also available for access to the specific dataset. The authentication, in this case, is managed by the VRE4EIC AAAI service component, which is simply “plugged-in” to the EPOS main system. Starting from this first pilot, EPOS has also benefited from VRE4EIC studies and developments in other fields. For instance, for the workflow management and the metadata system architecture (both projects use the Common European Research Information Format (CERIF) model).

The EPOS use case has demonstrated the suitability of the strategy adopted by VRE4EIC for supporting and enhancing e-Research Infrastructures, in particular with respect to the AAAI service. An important benefit is that it saved efforts in integrating authentication services on EPOS. From the user’s perspective, it allows easy access through existing credentials from Facebook, eduGAIN, and other Identity Providers.
Now, imagine that many other research infrastructures would use such shared solutions produced by VRE4EIC. How much development and sustainability efforts would they save by integrating metadata catalogue services, AAAI services, and other common solutions in an easy way?

The answer is not trivial, also because other players are available on the EU landscape. However, the expertise brought in by a pool of scientists and engineers in VRE4EIC, strongly connected with the communities, is doubtless precious and capable of optimizing the technical dimension and sustainability, as demonstrated by the EPOS pilot.

**Keywords**

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