EVER-EST: a virtual research environment for Earth Sciences

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There is an increasing requirement for researchers to work collaboratively using common resources whilst being geographically dispersed. By creating a virtual research environment (VRE) using a service oriented architecture (SOA) tailored to the needs of Earth Science (ES) communities, the EVEREST project will provide a range of both generic and domain specific data management services to support a dynamic approach to collaborative research.

EVER-EST will provide the means to overcome existing barriers to sharing of Earth Science data and information allowing research teams to discover, access, share and process heterogeneous data, algorithms, results and experiences within and across their communities, including those domains beyond Earth Science. Researchers will be able to seamlessly manage both the data involved in their computationally intensive disciplines and the scientific methods applied in their observations and modelling, which lead to the specific results that need to be attributable, validated and shared both within the community and more widely e.g. in the form of scholarly communications.

Central to the EVEREST approach is the concept of the Research Object (RO) , which provides a semantically rich mechanism to aggregate related resources about a scientific investigation so that they can be shared together using a single unique identifier. Although several e-laboratories are incorporating the research object concept in their infrastructure, the EVER-EST VRE will be the first infrastructure to leverage the concept of Research Objects and their application in observational rather than experimental disciplines.

Development of the EVEREST VRE will leverage the results of several previous projects which have produced state-of-the-art technologies for scientific data management and curation as well those which have developed models, techniques and tools for the preservation of scientific methods and their implementation in computational forms such as scientific workflows. The EVER-EST data processing infrastructure will be based on a Cloud Computing approach, in which new applications can be integrated using "virtual machines" that have their own specifications (disk size, processor speed, operating system etc.) and run on shared private (physical deployment over local hardware) or commercial Cloud infrastructures.

The EVER-EST e-infrastructure will be validated by four virtual research communities (VRC) covering different multidisciplinary Earth Science domains including: ocean monitoring, natural hazards, land monitoring and risk management (volcanoes and seismicity). Each VRC will use the virtual research environment according to its own specific requirements for data, software, best practice and community engagement. This user-centric approach will allow an assessment to be made of the capability for the proposed solution to satisfy the heterogeneous needs of a variety of Earth Science communities for more effective collaboration, and higher efficiency and creativity in research.

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