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Cross-continent collaboration for advanced research

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We present a case study and lessons learnt in cross-continent collaboration (Europe, Africa, Asia) which covers the whole lifecycle of scientific research: from conception of ideas through collaborative work on large-scale scientific experiments in different scientific fields, through the use of data processing, manipulation and storage services, to joint authorship and publication of research results and scholarly papers, data and software.
The use case - H2020 VI-SEEM project - is a collaboration between researchers from 14 countries including North Africa (Egypt), Middle East (Jordan, Lebanon, Israel), and Europe, connected via their NRENs and GEANT/ASREN which provide the basic connectivity platform. VI-SEEM is a Virtual Research Environment (VRE) which unifies the value-added services on top of the network: the existing regional High-Performance Computing, Cloud and Grid Computing resources, data management services, software and tools, as well as application specific on line software services, and delivers to cross-border communities an integrated platform for high-quality research.
This VRE aims to support the scientists and researchers by enabling full lifecycle of research: accessing and sharing relevant research data, using it with codes and tools to carry out new experiments and simulations on large-scale e-Infrastructures, and producing new knowledge and data. VI-SEEM focuses on 3 high-impact regional communities to enable the launch of new collaborations and support ongoing collaborative activities which require the use of shared e-Infrastructure resources. Digital Cultural Heritage community deals with tools and techniques for new understanding of the past and more accurate interpretations of historical interactions between human actors, agency and the rich heritage of regional cultures. Life Sciences community deals with services for understanding disease mechanisms in the populations of the region. Climate Science community predicts global and regional climate change, weather extremes, and related impacts.
The Service Catalogue offers a set of services in the areas of compute resource provisioning, data services provisioning, datasets provisioning, software and scientific workflow provisioning as well as domain-specific applications provisioning, available at https://services.vi-seem.eu/ . Services include Login (eudagain-enabled), HPC Access Service, Cloud Access Service, Grid Access Service, Data Discovery Service, Archival Service, Simple Storage, Repository, Regional Community Datasets, Scientific Application Environment, Workflow and Software Tools Repository, and a set of Application-Specific Services. Services are geographically distributed across 14 countries and are shared, and technical aspects are commonly managed.
End-user access to services and resources is provided via VRE portal: https://vre.vi-seem.eu . Data services are provided to all users via unrestricted free access, if data sets have creative commons or similar license. Access to application-specific services, and read access to the code and tools repository is provided for free, subject to fair usage policy. Access to large amounts of computation and storage resources for performing scientific simulations and storing large amounts of data is provided to excellent research projects from the region via the open calls. Calls are open once a year, addressed to scientists and researchers that work institutions in the region.
We hope that African community can benefit from this example of common technical and scientific cross-border endeavor, and are supportive of collaborations with African scientists from the target scientific fields.

Summary

We present a case study and lessons learnt in cross-continent collaboration (Europe, Africa, Asia) which covers the whole lifecycle of scientific research: from conception of ideas through collaborative work on large-scale

scientific experiments in different scientific fields, through the use of data processing, manipulation and storage services, to joint authorship and publication of research results and scholarly papers, data and software.
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