The agINFRA Science Gateway to Grid and Cloud Infrastructures for Agricultural Sciences

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Abstract

agINFRA (www.aginfra.eu) is an Integrated Infrastructure Initiative (I3) project, funded by the European Commission, that tries to introduce the agricultural scientific communities into the vision of open and participatory data-intensive science. In particular, agINFRA aims to design and develop a scientific data infrastructure for agricultural sciences that will facilitate the creation of policies and the deployment of services that will promote sharing of data among agricultural scientists and develop trust within and among their communities. agINFRA aims to remove existing obstacles concerning open access to scientific information and data in agriculture, as well as to improve the preparedness of agricultural scientific communities to face, manage and exploit the abundance of relevant data that is available and can support agricultural research.

Ultimately, agINFRA demonstrates how a data infrastructure for agricultural scientific communities can be set up to facilitate data generation, provenance, quality assessment, certification, curation, annotation, navigation and management.

The agricultural domain includes a wide variety of increasingly complex, multi-disciplinary topics. Subjects vary from plant science and horticulture to agricultural engineering and agricultural economics to the environment generally and include an ever-growing array of inter-related research issues such as the linkages between climate change on the one hand and food security, or the loss of agro-biodiversity, or pressure on individual species on the other.

These differing subjects are extensively researched by scientists all over the world, thereby consuming as well as producing an enormous volume of data. agINFRA aims to optimize the use and development of existing research infrastructures by delivering a virtual agricultural data infrastructure to scientific communities that significantly empowers and enriches the existing advances.

agINFRA goal is to deliver a set of core elements for a data infrastructure in agricultural research and innovation that will serve the needs of data-intensive science in a globalized world. In this context, easy exchange and accessibility of scientific knowledge will the basis for a faster economic growth and social development, involving both the agricultural research teams in Europe, as well as their international counterparts.

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The integration of existing services requires a registry of existing systems, a challenge that has started to be addressed since the earliest stages of the project (agINFRA has started on the 15th of October 2011). Many of those systems will be addressed by a unique point of reference for both final users and system/data maintainers efficiently and securely.

In the context of this very complex scenario, this contribution wants to demonstrate how the adoption of the Catania Science Gateway Framework (www.catania-science-gateways.it) can have a key role during and also beyond the agINFRA project lifetime proving a unique environment able to deal with this heterogeneity of systems. In particular, it will be shown how the agINFRA Science Gateway (http://aginfra-sg.ct.infn.it/), registered as a Service Provider of the IDEM federation, together with the CLEVER cloud middleware, can provide a unique interface able to access the different services of the project. Among others, the integration and use of the WebGIS-enabled Italian Soil Information System (ISIS), developed by the Agrobiology and Pedology Research Centre of the Italian Agricultural Research Council, will be shown.

This very challenging target could be reached only thanks to the adoption of widely accepted standards such as SAGA and SAML that ensure the sustainability, reliability and scalability of the proposed architecture.