The D4Science Approach toward Grid Resource Sharing: the Species Occurrence Maps Generation Case

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Biodiversity community investigates the totality of genes, species, and ecosystems of a region. In this community AquaMaps (www.aquamaps.org) is an approach to generate model-based, large-scale predictions of currently known natural occurrence of marine species. The AquaMaps service permits the biodiversity community to establish/predict species geographic distribution based on species ecological envelopes according to an algorithm that can be handled by species experts. In order to extend and enhance this service, an innovative approach based on a large-scale, grid-based e-Infrastructure has been put in place in the context of the D4Science (www.d4science.eu) EU project.

This e-Infrastructure is a framework enabling secure, cost-effective and on-demand resource sharing across organisation boundaries. A resource is here intended as a generic entity, physical (e.g. storage and computing resources) or digital (e.g. software, processes, data), that can be shared and interact with other resources to synergistically provide functions serving its clients, either human or inanimate.

Thus, the D4Science e-Infrastructure lifts the grid-paradigm at an application-level and poses as a “mediator” in a market of resources aiming to accommodate the needs of resource providers and consumers. This potentially not-limited market allows a new development paradigm based on the notion of Virtual Research Environment (VRE), i.e. integrated environment providing seamless access to the needed resources as well as facilities for communication, collaboration and any kind of interaction among scientists and researchers. D4Science supports the building of VREs by dynamically aggregating the needed constituents after on-demand hiring them through the e-Infrastructure. In this development paradigm, the resulting research environments are considered as organised “views” built atop the available assets, ranging from computers and servers to collections and services. This paper focuses on the implementation of the D4Science infrastructure by describing the innovative cooperation envi-
ronment designed for the AquaMaps VRE to provide biodiversity scientists with a seamless access to rich array of data sources and facilities.