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EuroGEOSS: The Initial Operating Capacity

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"EuroGEOSS : a European Approach to GEOSS" is a large scale integrated project funded by the European Commission in its 7th Framework Programme for Research & Development. The aim of EuroGEOSS is to demonstrate the added value to the scientific community and society of making existing earth observing systems and applications interoperable, and used to address key scientific questions about the complex relationships between environment and society.
EuroGEOSS follows the technical specifications of the INSPIRE Directive, and contributes to the development of the Global Earth Observation System of Systems (GEOSS). The project is organised in two development cycles creating an Initial Operating Capability (IOC), that makes data and services available to the global community in the fields of Drought, Forestry, and Biodiversity, and an Advanced Operating Capability (AOC), which will provide access to additional resources in these three domains including environmental models, workflows, and semantic tools.
This presentation introduces and discusses the characteristics of the EuroGEOSS IOC, which was developed applying several of the principles/requirements that characterize the System of Systems (SoS) approach and the Internet of Services (IoS) philosophy:
(i) Keep the existing capacities as autonomous as possible by interconnecting and mediating standard and non-standard capacities.
(ii) Supplement but not supplant systems mandates and governance arrangements.
(iii) Assure a low entry barrier for both resource Users and Producers.
(iv) Be flexible enough to accommodate existing and future information systems as well.
(v) Build incrementally on existing infrastructures (information systems) and incorporate heterogeneous resources by introducing distribution and mediation functionalities to interconnect heterogeneous resources.
(vi) Specify interoperability arrangements focusing on the composability of inter-disciplinary concepts rather than just the technical interoperability of systems.
The key features of the EuroGEOSS IOC are the brokering and mediation frameworks that allow to discover and access autonomous and heterogeneous resources in the three thematic domains of the project. This Brokering approach extends the SOA archetype which has several shortcomings (e.g. flexibility and scalability) when applied to complex, large, and heterogeneous infrastructures, like GEOSS. Demonstrating the added value of this brokering approach is therefore one of the main contributions of EuroGEOSS to the development of GEOSS and the IoS.
The EuroGEOSS Discovery Broker mediates and distributes user queries against tens of services presently registered in the EuroGEOSS IOC – several of them are catalogs or inventory servers that propagate the query to many other resources. The key feature of the Discovery Broker is that it makes it possible for users to select among a list of well-adopted SOA and Web 2.0 discovery interfaces, and several service types, including those that comply with INSPIRE and/or OGC, specific to the three thematic areas, or service types specific to other communities (e.g. THREDDS and OPeNDAP), projects (e.g. GENESIS-DR and SeaDataNet), or social practices in Web 2.0. Building these bridges to different communities makes it possible to serve the multi-disciplinary needs of scientific research without assuming that everyone will converge on one selected standard.
In a similar way, the EuroGEOSS Access Broker makes it possible for users to access and use the datasets resulting from their queries which are returned to them based on a common grid environment they have specified by selecting the following common features: Coordinate Reference System (CRS), spatial resolution, (subset) domain, encoding format.
In keeping with the SoS principles, the EuroGEOSS Data Access Broker carries out this task by supplementing, but not supplanting, the access services providing the datasets requested. That is achieved by brokering the necessary transformation requests (those that the access services are not able to accomplish) to external processing services. Following the IoS and Web 2.0 principles, the broker publishes a Web application allowing users to: (a) select a default business logic (i.e. algorithms) implementing dedicate processing like CRS transformation and space resolution resampling; (b) upload their own business logic (i.e. processing schemes) and set it as default; (c)

select the order of the processing steps. The EuroGEOSS Data Access Broker also publishes an interface which realizes the INSPIRE transformation service abstract specification.
The presentation will highlight the most significant features of the EuroGEOSS IOC and indicate the next steps of the project in developing this capability further to include semantic tools, environmental models and workflows to support interdisciplinary research.