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Data Access Services interoperability in the Geosciences by means of the GI-axe Brokering Framework

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Many software tools are in use in the different Geosciences domains to the aim of publishing, accessing, evaluating and using available datasets in a service based environment. These tools/services are often domain-specific and usually support a small and disciplinary set of protocols and data models.

On the other hand, multidisciplinary applications need to access many of these tools/services belonging to different domains in order to retrieve heterogeneous datasets (e.g. satellite acquired gridded coverages and in-situ sensor time series), then "uniformly process them" and achieve a deeper insight. Moreover datasets, to be easily processed, should be available according to a given Common Grid Environment (CGE): i.e. a geospatial environment characterized by a common spatio-temporal CRS (Coordinate Reference System), resolution, extension and by a common format encoding.

Now, the interoperability effort needed by multidisciplinary applications is ordinarily in charge of data providers servers or user clients: in both cases, this represents a high entry barrier.

The GI-axe Access Broker addresses this interoperability issue by taking charge of the needed implementation effort. It acts as an intermediation service between the User Clients and the Data Provider Services, placing itself in a third party (Broker) Layer. Indeed the Access Broker can access datasets available through well known access services in use by the Geosciences communities (e.g. OGC WCS, WMS, WFS, OPeNDAP, FTP, REST APIs, ...) and republish them according to the application client interfaces.

Moreover, GI-axe transforms datasets according to the a CGE specified by Users. In doing so it may resort to external processing services already in use by the community, supplementing the functionalities already supported by the data provider services. The external processing services list can be configured by Users.

GI-axe is also a flexible framework, composed of extensible components. This architecture design makes it particularly apt to cope with additional (and even) future standard access services.

GI-axe has been first developed and experimented in the multidisciplinary interoperability framework of the EU funded EuroGEOSS project. Presently, is utilized in the GEOSS Discovery & Access Brokering framework (GEO DAB). It is also being experimented in different multidisciplinary pilots in the context of the "Data Broker" Concept Award of the NSF Earth Cube initiative.