The Brokering Approach for Multidisciplinary Data Discovery and Access

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Global sustainability research requires an integrated multidisciplinary effort underpinned by a collaborative environment discovering and accessing heterogeneous data across disciplines. Traditionally, interoperability has been achieved by implementing federation of systems. The federating approach entails the adoption of a set of common technologies and standards. This presentation argues that for complex (and uncontrolled) environments such as global, multidisciplinary, and voluntary-based infrastructures, federated solutions proved not to be well-accepted. In fact, the adoption of a limited common set of technologies and standards raises a couple of important issues: (a) high level entry barriers for both data producers and users; (b) lack of appropriateness to address domain specificities.

More recently, a new interoperability approach was successfully experimented: the brokering approach. This presentation identifies the principles of brokering, and gives examples of practical implementation relating to data discovery, semantic searching, and data access. The benefit of the brokering approach includes: (a) lowers barriers to participation in distributed systems for both users and resource providers (minimal burden or cost impact on existing systems); (b) accelerates interconnection of disparate systems; (c) facilitates sustainability, reusability, extensibility, and flexibility of multidisciplinary infrastructures; (d) removes need to impose common (e.g. federal, "top-down") specifications and software components enabling a more adaptive "bottom-up" evolution of infrastructures.

The Brokering approach was considered and successfully adopted by cross-disciplinary initiatives (e.g. GEOSS: Global Earth Observation System of Systems; several European FP7 programmes, NSIDC, etc.); recently, the NSF EarthCube initiative funded a project dealing with "Data Broker".