Brokering Capabilities for EarthCube – supporting Multi-disciplinary Earth Science Research

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The goal of NSF's EarthCube is to create a sustainable infrastructure that enables the sharing of all geosciences data, information, and knowledge in an open, transparent and inclusive manner. Brokering of data and improvements in discovery and access are a key to data exchange and promotion of collaboration across the geosciences.

In this presentation we describe an evolutionary process of infrastructure and interoperability development focused on participation of existing science research infrastructures and augmenting them for improved access. All geosciences communities already have, to a greater or lesser degree, elements of an information infrastructure in place. These elements include resources such as data archives, catalogs, and portals as well as vocabularies, data models, protocols, best practices and other community conventions. What is necessary now is a process for levering these diverse infrastructure elements into an overall infrastructure that provides easy discovery, access and utilization of resources across disciplinary boundaries. Brokers connect disparate systems with only minimal burdens upon those systems, and enable the infrastructure to adjust to new technical developments and scientific requirements as they emerge.

Robust cyberinfrastructure will arise only when social, organizational, and cultural issues are resolved in tandem with the creation of technology-based services. This is a governance issue, but is facilitated by infrastructure capabilities that can impact the uptake of new interdisciplinary collaborations and exchange. Thus brokering must address both the cyberinfrastructure and computer technology requirements and also the social issues to allow improved cross-domain collaborations. This is best done through use-case-driven requirements and agile, iterative development methods. It is important to start by solving real (not hypothetical) information access and use problems via small pilot projects that develop capabilities targeted to specific communities. Brokering, as a critical capability for connecting systems, evolves over time through more connections and increased functionality. This adaptive process allows for continual evaluation as to how well science-driven use cases are being met.

There is a near term, and possibly unique, opportunity through EarthCube and European e-Infrastructure projects to increase the impact and interconnectivity of projects. In the developments described in this presentation, brokering has been demonstrated to be an essential part of a robust, adaptive technical infrastructure and demonstration and user scenarios can address of both the governance and detailed implementation paths forward. The EarthCube Brokering roadmap proposes the expansion of brokering pilots into fully operational prototypes that work with the broader science and informatics communities to answer these questions, connect existing and emerging systems, and evolve the EarthCube infrastructure.