Towards a Conceptual Design of a Cross-Domain Integrative Information System for the Geosciences

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The Vision

EarthCube: complex socio-technical system of systems, in which communication between various domain subsystems and previously disconnected CI components, people and organizations enables more comprehensive, data-intensive research designs and knowledge sharing.
Key Perspectives on EarthCube CI

- EarthCube as a system of systems
- EarthCube as a cross-domain integration environment
- EarthCube as an environment for alignment of stakeholder interests
- EarthCube as an environment for scholarly communication
New types of queries

- Who else in the community is interested in information resources I am using, and what is their background and interests?
- How do I find resources that have documentation of their prior use in the context I am interested in?
- Which data resources that I have generated have been cited, and in which journals and disciplines?
- What is the “reputation” of a specific data source/data provider?
- What issues have been reported with respect to usage of a given information resource or a model?
- How do I find researchers for my project team who have worked on a specific data or model?
- Have the results reported in a given paper been reproduced?
- Are the information resources that I found appropriate for my use case? What is known about their readiness and fitness-for-use in a similar context?
Challenges

- The key issue: adoption of research enterprise to 21st century technology; promoting community engagement

- Some interesting questions:
  - What is the **scope** of the system?
  - How to have technical and social subsystems **reinforce** each other, as technical developments reshape social networks and attitudes? How to promote, encourage and reward social behavior leading to EarthCube success?
  - How to create a **self-organizing** system, based on trust and a new rewards system?
  - How to **reconcile domain differences**, given that different communities not only focus on different research designs, use different tools and conventions, but are going through different phases of self-organization and consensus-building?
  - How to conceptualize “**fitness for re-use**” and “interoperability-readiness”?
Approach

- Understand community expectations
- Analyze what has been done, and what leads to success
  - Architecture designs of other systems
  - Enhance existing patterns of information exchange
- Incorporate emerging social technology in research enterprise
  - Klout, PeerIndex, Academia.com, Mendeley, Google Scholar, LinkedIn, ResearchGate... 40+ research profiling systems
- Integrate with recognized cyberinfrastructure components:
  - catalogs, data services, repositories, standards, workflows
Some survey snapshots informing conceptual design
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Connecting people, projects, resources, publications, curricula...
Advisory Team of Large Information System Architects

- USGS
- Academic Data Centers
- National Research Facility
- Geoscientists
- Social organization experts
- Mendeley
- OGC
- IBM
- Microsoft
- Elsevier
- ESRI

Different perspectives on information system development

A summit planned for the end of Year 1
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