The Current Status of EarthCube with an EarthScope Perspective

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Key Aspects of EarthCube

- EarthCube
  - Empowers cross-domain data discovery, interoperability,
  - Current domain access will be through existing centers
  - Leverage existing CI
  - RoadMaps

- Outline
  - The initial organization
  - The evolving framework
  - Links to other NSF efforts
  - Engaging the geosciences community
Active EarthCube Groups

Collaboratively produced framework to form an integrated & synergistic path forward

Community Events

Special Interest Groups

Data Discovery/Mining/Access

Semantics and Ontologies

Workflow

Governance

Hydrosheric Model (OHMF)

Data GeoData

Data Brokering

X-Domain Interop.

Service Based Integration

Layered Architecture

Earth System Modeling
Community Groups

- Data Discovery, Access and Mining
  - Data Access Services: Tanu Malik, University of Chicago
  - Data Discovery Services: Chaitanya Baru, San Diego Supercomputer Center
  - Data Mining Services: Rahul Ramachandran, University of Alabama Huntsville

- Governance
  - Lee Allison, Arizona Geological Survey

- Semantics and Ontology
  - Krishna Sinha, Virginia Tech

- Workflow
  - Yolanda Gil, University of Southern California
Governance

- **Group Description:**
  - Governance refers to the processes, structure and organizational elements that determine, within an organization or system of organizations, how power is exercised, how stakeholders have their say, how decisions are made, and how decision makers are held accountable.
Group Description:

Data refers to the ability to discover and organize all of the geoscience and related data and information resources and providing services that enable easy and efficient access to these resources and core capabilities for analysis and mining.
Semantics and Ontology

Group Description:

Semantics and ontologies cover number of research areas such as the development and use of ontologies to standardize the meaning of terms, support the use of standards, resolve heterogeneous terms as well resolve terms across subdomains (bridging). Ontologies are also needed in understanding metadata and for provenance-aware services.
Workflow

- **Group Description:**
  - Workflows are used to manage complex computations that have many steps or use large data. Workflow systems assist scientists to select models appropriate for their data, configure them with appropriate parameters, and execute them efficiently.
Concept Groups

- Web Services
  - Tim Ahern, Incorporated Research Institutions for Seismology
- Brokering
  - Siri Jodha Singh Khalsa, University of Colorado
- Cross-Domain Interoperability
  - Ilya Zaslavsky, San Diego Super Computer
- Earth System Model
  - David Gochis, UCAR
- Layered Architecture
  - Reagan Moore, University of North Carolina, Chapel Hill
- Open Hydrospheric Modeling Framework
  - Xu Liang, University of Pittsburgh
- Dark GeoData
  - Shanan Peters, University of Wisconsin
**Web Services Concept Award**

- **Group Description:**
  - The Service Based Integration Platform for EarthCube (SBIP-E) Concept Group is leveraging the use of web services to allow access to geoscience data from multiple domains. Particular emphasis will be placed on supporting data integration with spatial and time constraints and investigate methods for the integration of these data into a common access method.
**Brokering Concept Award**

- **Group Description:**
  
  Brokering is a technically agnostic, middleware-based approach to mediating interactions across heterogeneous multidisciplinary data sources and services.
Group Description:

Our goal is to create a sustainable cross-domain interoperability test bed to continuously examine interoperability challenges and develop solutions through partnerships between domain scientists and CI researchers.
Layered Architecture Concept Award

- **Group Description:**
  - A Layered Architecture will be used to explore interoperability mechanisms between the multiple protocols used by geoscience community technologies. A testbed will demonstrate feasibility of this approach by integrating selected technologies for use within test cases.
Earth System Model Concept Award

- **Group Description:**
  - This project seeks to explore new opportunities for adapting, relaxing and enhancing various model coupling structures in order to accelerate broader utilization of community weather and climate models by the rest of the Earth sciences community and specifically, those closely related to hydrology.
Group Description:
The Open Hydrospheric Modeling Framework (OHMF) Concept Group aims to develop an open meta-modeling framework, which can integrate data and models easily and incrementally for knowledge discovery and management, for the research and applications communities (initially focused on the hydrosphere).
Dark GeoData

- **Group Description:**
  - We are testing the idea that advanced web crawling and text/content processing algorithms, when provided with an a priori semantic and scientific context, can effectively discover and bring to light a large proportion of geological 'dark data' pertaining to the rock record.
The General Framework

Domain A
Domain B
Domain C
Domain D
Long Tail

Web Services
Test Beds Standards Based
Interoperability Test Bed OGC
Brokering
Models
Tools Visualization Registries Semantics Workflows

October 29-30, 2012 - Tempe, Arizona
Current EarthCube Framework
Status

- NSF put a high priority on developing roadmaps for EarthCube
  - Integrating input from each of the EAGER funded groups
  - Identified infrastructure required
  - Established the timeline

- Each concept and community group proposed a variety of tasks they would perform
  - Testbeds
  - Demonstration projects
  - Involvement of their groups

- The concept groups are in various stages of completing their demonstration projects
Roadmaps

- Purpose
- Communication
- Challenges
- Requirements
- Status

- Solutions
- Process
- **Timeline**
- Management
- Risks
Use Case Scenarios

- These are extremely important for geoscientists to articulate the things they need to do to take the next steps in their research.
- Use case scenarios are narratives that capture the needs of the domain scientists.
- Please give extra effort in developing these.
EarthCube was proposed as a GEO – OCI
  part of NSF’s broader CyberInfrastructure for the 21st Century (CIF21)
  GEO was the first to promote an actual CIF21 activity
  EarthCube was being led by Geoscientists working with cyberinfrastructure specialists.

At a recent EarthCube PI meeting only 3 of the ~20 people present considered themselves domain scientists.

It is essential for domain scientists to clearly state what they need to do to further their research goals.

Cyberinfrastructure specialists need to help develop the required infrastructure to help implement the vision articulated by the domain scientists.
Thanks!
Concept Cloud

What specific disciplinary data do you most often use in your research?