NSF EarthCube

EDM Conference Lightening Talk

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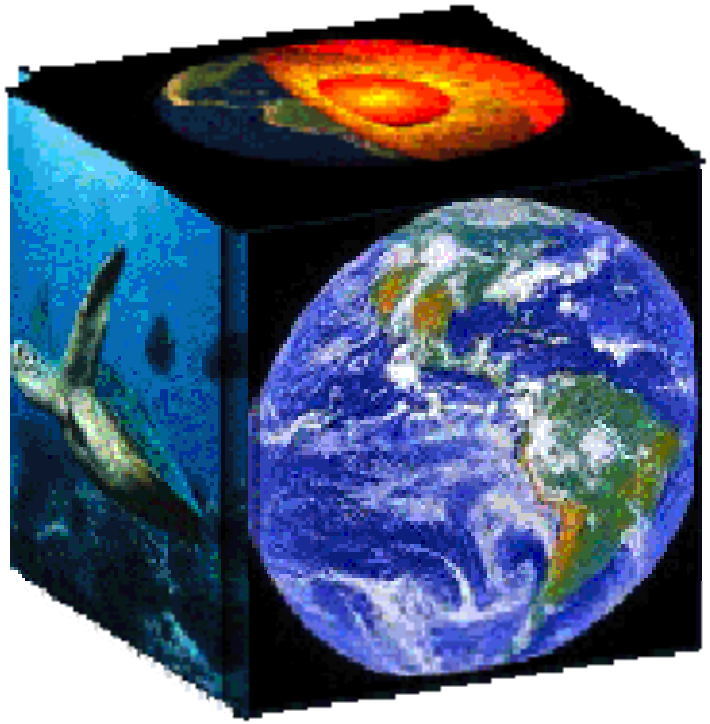
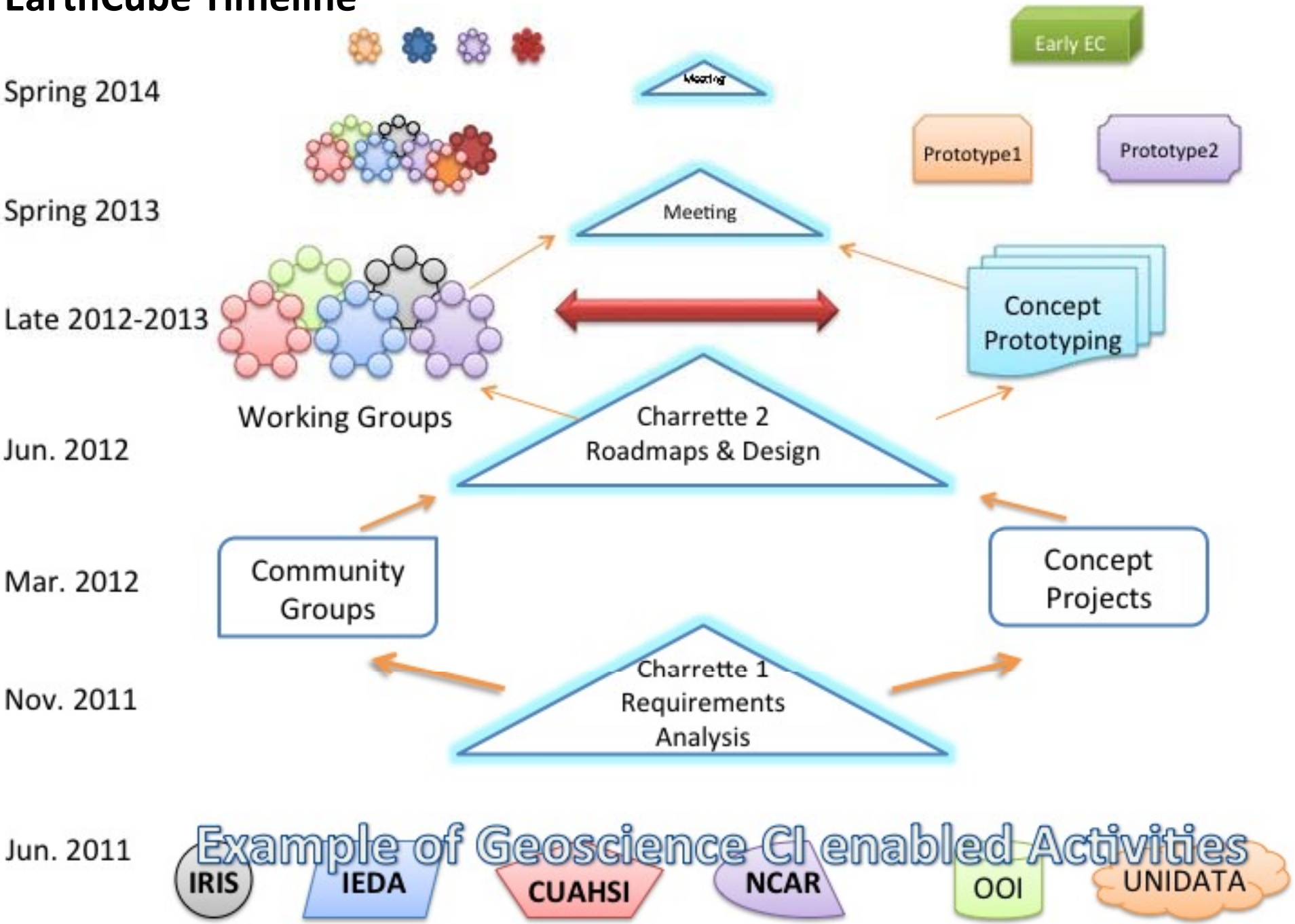
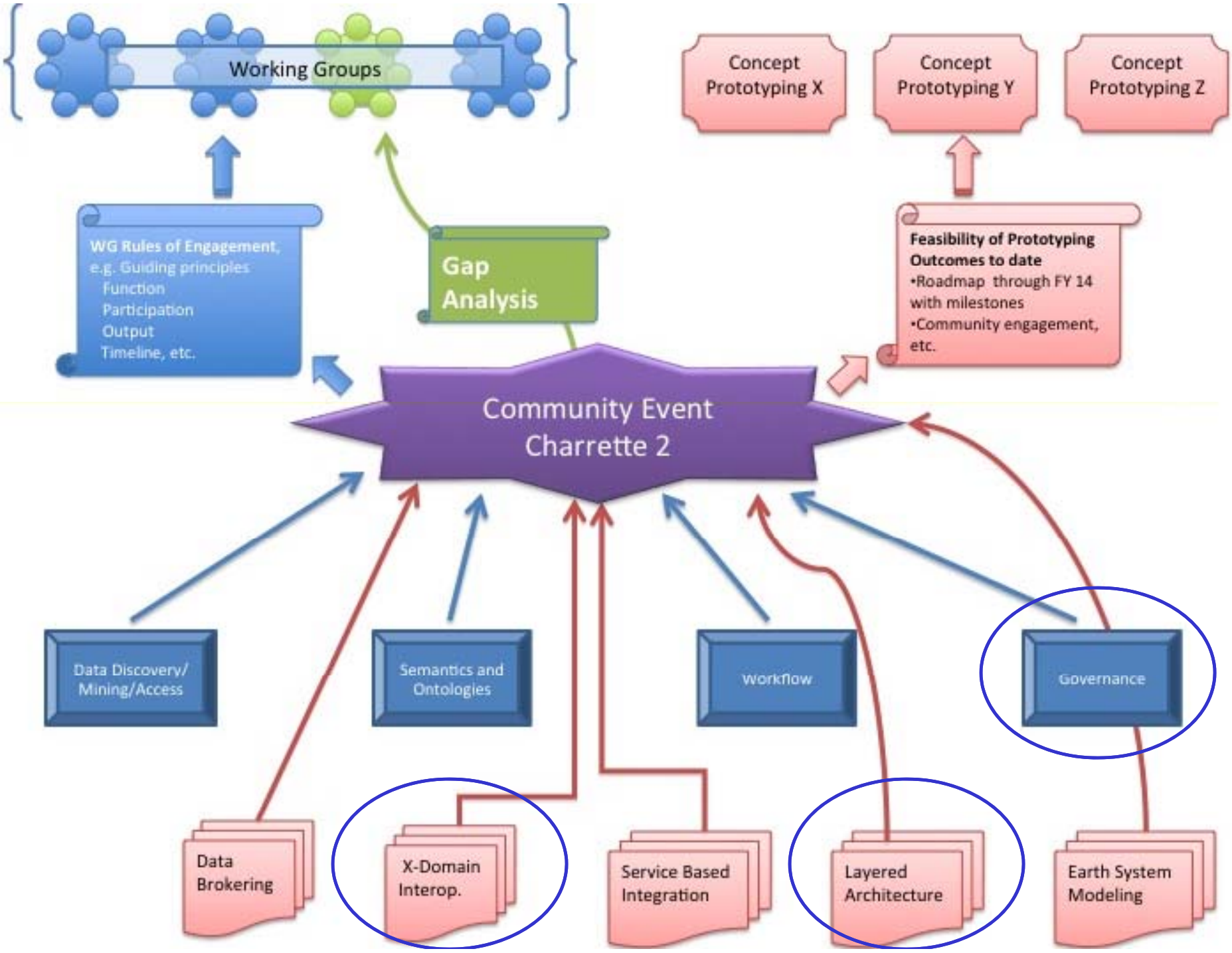
What is EarthCube?



- NSF activity to create a data and knowledge management system for the 21st Century
- Goal is to transform the conduct of research by supporting the development of a community-guided cyberinfrastructure
- Funded by NSF Directorate of Geosciences and the Office of Cyberinfrastructure

EarthCube Timeline




Working Groups
Concept Prototyping X
Concept Prototyping Y
Concept Prototyping Z
WG Rules of Engagement, e.g. Guiding principles
Function
Participation
Output
Timeline, etc.
Gap Analysis
Feasibility of Prototyping Outcomes to date
•Roadmap through FY 14 with milestones
•Community engagement, etc.
Community Event Charrette 2
Data Discovery/ Mining/Access
Semantics and Ontologies
Workflow
Governance
Data Brokering
X-Domain Interop.
Service Based Integration
Layered Architecture
Earth System Modeling

EarthCube Roadmap

Interop Concept Award

Brokering Concept Award

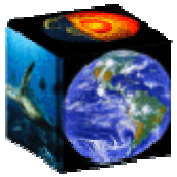
Data Discovery, Mining, Integration

Interop Concept Award

Layered Architecture Concept Award

Web Services Concept Award

Web Services Concept Award



Earth System Model Concept Award

Governance

NSF 10-point Roadmap Guidance

1. Purpose
2. Communication
3. Challenges
4. Requirements
5. Status
6. Solutions
7. Process
8. Timeline
9. Management
10. Risks

http://earthcube.ning.com/

Layered Architecture Concept Award

- 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

http://earthcube.ning.com/group/layered-architecture-concept-award

Collaborative Proposal

Collaborative Proposal: Interoperability Testbed – Assessing a Layered Architecture for Integration of Existing Capabilities

Proposal topic: "Identification and development of a new capability that leverages existing technologies and practices and that can be directly connected to the EarthCube vision"

Description:

•Multiple communities are developing cyber-infrastructure that supports Geoscience initiatives

Collaborative Proposal Cont.

Description Continued:

- Major Earth Systems Science problems typically integrate over informatics and methods across the communities
- The development of separate, disciplinary cyberinfrastructure can be either a barrier or major resources that need to be leveraged to achieve this integration
- This proposal addresses critical milestones for integrating the separate infrastructure silos to enable collaborative research

Collaborative Proposal Cont.

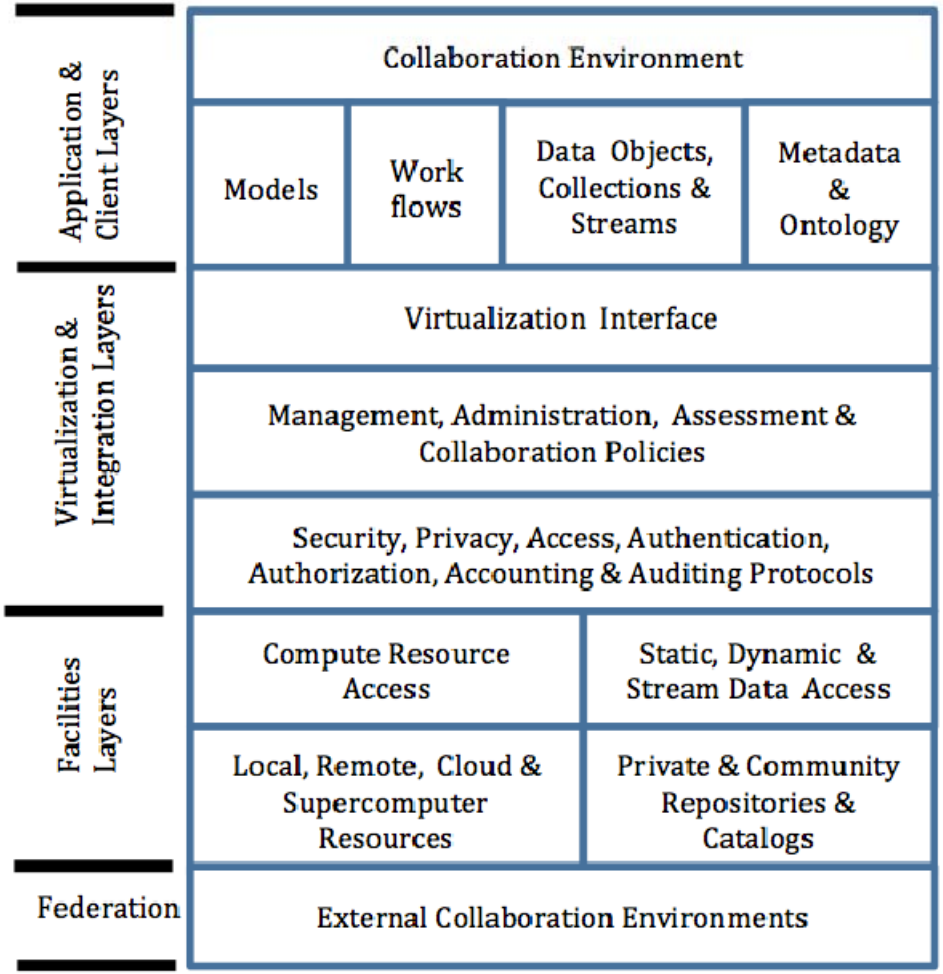


Figure 1. Layered Architecture

Collaborative Proposal Cont.

An EarthCube interoperability testbed will:

- Identify the existing infrastructure components
- The types of interaction mechanisms currently being used
- The mechanisms that need to be implemented to improve interoperability

Collaborative Proposal Cont.

The group members represent multiple technologies that span the layers of the architecture:

Architecture Layer	Technologies
Collaboration environment	UNC-CH integrated Rule Oriented Data System (iRODS)
Models	UC Boulder Community Surface Dynamics Modeling System, UNC RHESSys [25]
Data grids	GMU geospatial data grid, iRODS, DataONE OneDrive [26]
Workflows	iRODS, NCSA Cyberintegrator [27], UCSD Kepler [28], GMU BPELPower [29]
Policies	iRODS, NCSA Cyberintegrator
Web Services	OGC Sensor Web Enablement standard (SWE) [30], WHOI observation assessment (SWE) [31], NCSA Semantic Geostreaming toolkit (SWE, W3C) [32], GMU Geospatial client [33], Colorado State University NextGen Network Enabled Weather [34]
Web analysis services	GMU GeOnAS [35], DataONE Oner [36]
Web visualization services	GRASS, NOAA Environmental Information Service [37]
Network and security protocols	iRODS (Grid Security Infrastructure, Kerberos, Shibboleth, Reliable Blast UDP, parallel TCP/IP)
Repositories	NOAA CLASS, NASA Echo, GEOSS ClearingHouse
Catalog	GMU GI-Cat, CUAHSI
Federation	iRODS, CLASS

Governance

More than 60 organizations and institutions are working through an EarthCube-inspired Governance Forum to create a framework document or “roadmap” that:

•Addresses issues affecting organization, governance, and sustainability of geoscience cyberinfrastructure

•Identifies processes to achieve community-based participation

http://earthcube.ning.com/group/governance

Governance Working Group Cont.

- Identifies the needs and characteristics of the overarching community
- Recommends a strategy for further organizational or implementation activities
- A 10-member Governance Steering Committee

Expression of Interest 1022

Building a Software Engineering and Informatics Community of Practice and a Software Foundation for the Advancement of EarthCube

- The first steps toward forming this community were taken at the first Charrette
- Propose establishing a more formal collaborative software engineering and informatics Community of Practice

http://earthcube.ning.com/page/eoi

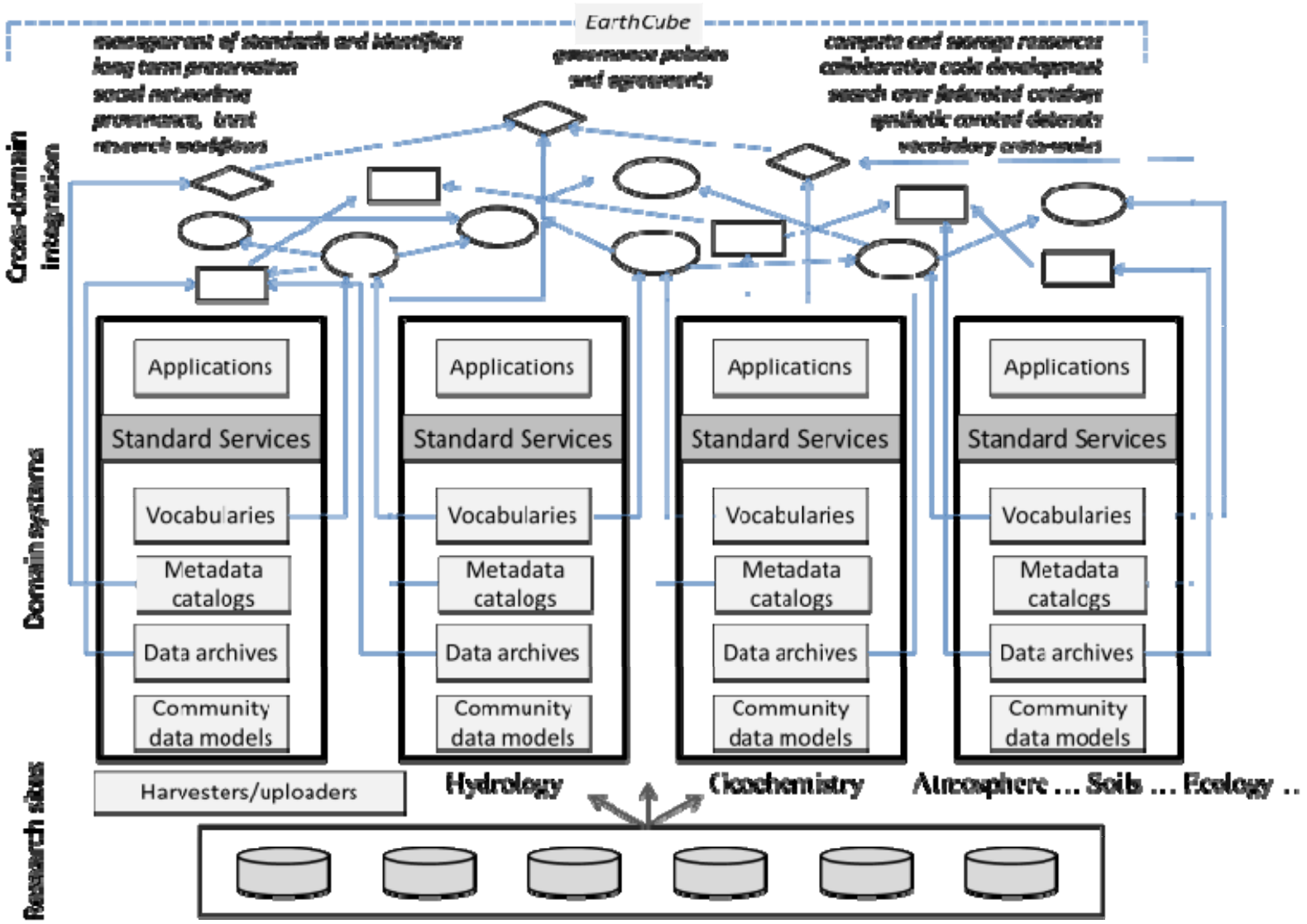
Software Engineering Governance Road-map Focus Group

- Propose the formation of a software engineering governance road-map focus group
- Produce a one page road map for directing the development of software governance for the EarthCube
- Road-map will include two main governance areas for study:
  - Formation of a software engineering and informatics Community of Practice (CoP)
  - Investigation of how to support sustainable software development for the EarthCube

Interop Concept Award

- This EAGER project will explore cross-domain interoperability needs within the geoscience
- Create an EarthCube road map to address the challenges of cross-domain interoperability
- Create a sustainable cross-domain interoperability test bed

http://earthcube.ning.com/group/interop



Vision of a reference architecture for EarthCube as is an integrated information system that includes research observatories generating large volumes of observations, domain systems that publish the data according to community conventions about data models, vocabularies and protocols, and cross-domain knowledge layer that includes federated catalogs, normalized and curated datasets integrating data from domain systems and observatories, vocabulary cross-walks, as well as social networking, governance and compute infrastructure.

Ideas for NOAA Involvement

- Check out the EarthCube web site
  - http://earthcube.ning.com/
  - Provide feedback on the web site layout
- Follow EarthCube on Twitter -- #earthcube
- Join one of the EarthCube groups to be part of the discussion

Ideas for NOAA Involvement Cont.

- Check out the Events page on the EarthCube web site
  - Attend one of the Workshops
  - Attend the 2nd Charrette / Community Event in June

- Read the Expressions of Interest for each of the groups
  - http://earthcube.ning.com/page/eoi

- Read each of the group's draft road-maps and provide feedback