WATERS Network seeks to understand and predict the multi-scale processes coupling water with Earth and human systems.

- Science questions:
  1. How do hydrologic and related earth surface systems respond to natural and human-induced changes in climate and the environment?
  2. How do multi-scale natural, managed and engineered processes and systems affect the water environment, and how can those processes and systems be modeled, designed, and optimized for sustainability?
  3. How do people understand water processes and organize themselves, individually and collectively at different scales, to respond to challenges in the water environment?

CI Architecture

- Functionality
  - Access to observatory data
  - Automated data cleaning, quality control
  - Integrated third-party data
  - Analysis/visualization tools
  - Computational models
  - Digital Observatory interfaces
  - Research-driven control of sensor network
  - Data publication and discovery
  - Community coordination / knowledge management
  - Community software development
  - Curation and preservation of data
  - Support for EOT activities
  - Overall CI operations and maintenance
- Architecture
  - “Best practice” ~5 years from now
  - Service-oriented, including semantics, workflow, virtual observatory management
- Activities
  - Ongoing development and pilot observatory efforts, e.g. CUAHSI HIS
- ~Current Thinking
  - see http://www.watersnet.org/docs/CyberinfrastructurePlan.pdf

CI Barriers/Challenges

- Designing for 30 years
  - Changing science
  - Changing technologies
  - Increasing scale
- Supporting PI-scale research on top of community infrastructure, for a very diverse set of users
- Enabling new research
  - Cross-scale, systems-oriented, computation-observation
  - Virtual observatories customized for different communities
- Balancing central control with innovation at the edges
  - Designing for innovation, continuing integration of new components