CUAHSI Hydrologic Information System

Goal: Enhance hydrologic science by facilitating user access to more and better data for testing hypotheses and analyzing processes

- Advancement of water science is critically dependent on integration of water information
  - Querying nation’s repository of water data
  - Linking small integrated research sites (<100 km2) with global climate models
  - Integrating data from multiple disciplines to understand controls on hydrologic cycle

- It is as important to represent hydrologic environments precisely with data as it is to represent hydrologic processes with equations

Water quantity and quality
Rainfall & Snow
Remote sensing
Meteorology
Soil water
Hydrologic Information System Service Oriented Architecture

Deployment to test beds

Test bed HIS Servers

Customizable web interface (DASH)

Central HIS servers

Global search (Hydroseek)

Other popular online clients

Test bed HIS

Servers

Central HIS

servers

Desktop clients

GIS

Matlab

IDL

Splus, R

Excel

Programming (Fortran, C, VB)

Modeling (OpenMI)

HTML - XML

WSDL - SOAP

WaterOneFlow Web Services, WaterML

Metadata catalogs

Ontology

Controlled vocabularies

ETL services

Data publishing

ODM DataLoader

ODMTools

Streaming Data Loading

Ontology tagging (Hydrotagger)

Server config tools

WSDL and ODM registration

HIS Lite Servers

External data providers

External data providers

Deployment to test beds

Global search (Hydroseek)

Other popular online clients

Desktop clients
<table>
<thead>
<tr>
<th>CI Challenges</th>
<th>Examples in HIS</th>
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<tbody>
<tr>
<td>Better understanding of user needs and research scenarios</td>
<td>User surveys, workshops</td>
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<tr>
<td>Integration of federal data collections, state agencies, observations from PI</td>
<td>MOUs with agencies, WaterML, common publication and data discovery</td>
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<td>projects, streaming data</td>
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<tr>
<td>Data modeling and integration tools for differently sampled and organized</td>
<td>ODM and extensions</td>
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<td>data (observations, grids, spatial data, multimedia)</td>
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<tr>
<td>Standardization of data exchange protocols</td>
<td>WaterML and WaterOneFlow services</td>
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<tr>
<td>Huge and heterogeneous nomenclatures, controlled vocabulary, identifier and</td>
<td>Hydroseek and Hydrotagger, CV management system</td>
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<tr>
<td>ontology management and search</td>
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<tr>
<td>Supporting data registration and several modes of data discovery, plus rapid</td>
<td>Central publication and data discovery, OLAP, catalog harvesting</td>
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<td>analysis of data availability</td>
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<td>Making the data available as model inputs</td>
<td>Working with OpenMI, CSDMS</td>
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<td>Leveraging and interoperation with other domain infrastructures: for</td>
<td>Incorporating THREDDS, integration with RBNB streaming middleware, GEON</td>
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<td>atmospheric data, ocean observations, geology and geomorphology, etc.</td>
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<td>Definition and management of cross-scale complex objects, e.g. digital</td>
<td>Ongoing</td>
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<td>watershed, digital aquifer, river channel</td>
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<td>Organizing development community around a common software development and</td>
<td>Common CVS, BSD-licensed code</td>
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<td>licensing model</td>
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<td>Software packaging, support, training, maintenance and updates, data</td>
<td>HIS Server and HIS Server Lite for test beds, virtual servers at SDSC</td>
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<td>preservation, and - funding Production HIS</td>
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