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Architecture and Usability Aspects of Environmental Data Portals

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Web / Data Portal Architecture

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Definitions

Web Portal

A web site that acts as a starting point or gateway to Internet content, services, and information. Portals expose this information via a consistent set of visual elements and organizational constructs that improve the user experience and may relate, unify, or otherwise enhance the content.

Data Portal

A web site that acts as a starting point or gateway to Internet content, web/data services, and related information. Portals expose this information via a consistent set of visual elements and organizational constructs that improve the user experience and relate, unify, and otherwise enhance the content. Data portals focus on providing centralized, robust access to specific data and supported manipulations.
Web Portal Characteristics

- Content
  - Dynamic
  - Static
- Unification / consolidation
- Automation
- Secure exposure
- Data services
  - Selection
  - Manipulation
  - Transformation
  - Acquisition
Architecture Tiers

- **Client**
  - Consumes or accesses information

- **Web / Data Portal**
  - Provides access to information
  - Provides various features

- **Data Sources (back-end)**
  - Persistent storage
  - Includes various sources
General Client Data Access

Web / Data Portal

Clients

Public Users
Collaborators
Applications

Data Services

Other
NetCDF
MVC
Excel
CSV
REST
SOAP

Standardized Query
Processed Data

Query Manager
Post-Processing

Data Source Requests
Combined Data

Request Dispatcher
Data Access Manager

Data Aggregator

Raw Results

Remote Sources

WRCC
Public Stores

Data Loggers
Web Services

Cameras
Satellites

Local Database

Data Sources
General Data Acquisition

Data Sources
- Remote Sources
  - WRCC
  - Public Sources
  - Data Loggers
  - Web Services
  - Cameras
  - Satellites

Local Database

Request / Query
Response / Data
Verified Data

Web / Data Portal

Scheduler
- HTML
- SOAP
- Campbell Logger
- HDF5
- NetCDF
- Other

Importer
- Standardized Data

Data Validator & Analyzer
Data Services
Logical Components

- Scheduler
- Data services
  - Importer
  - Exporter
  - Validation
  - Manager
- Data stores
  - Database
  - Service
  - File
Logical Server Architecture

- Web server
- Database Failover Cluster
- Storage server
Physical Implementation

- Plan for redundancy
  - Failover clusters
- Optimize hardware utilization
  - Virtualization
- Ease upgrades
  - Virtualization resource allocation
  - Easy transfer to new hardware
- Fast recovery
  - Restoration of virtual machines
- Isolation of components
Software Selection

- Database
  - Microsoft SQL 2008 Enterprise Edition

- Web development
  - ASP.NET 3.5 or above

- Operating systems
  - Windows Server 2008
    - Datacenter Edition
    - Web Server
    - Enterprise