Web Services and Data Transport - Lessons Learned

PRiMO Workshop for
Waves and Water Level (WWL) Hazards Data Framework Development

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XML – Grammars & Content

- Geography ML
- Ecological ML
- Emergency ML
- MarineXML
- AXL
- Chemical
- SensorML
- NcML
- SVG

Content | Function | Interface | Plumbing

```
<os:Road>
  <gml:description> Georgia Street </gml:description>
  <os:numberLanes>4</os:numberLanes>
  <gml:centerLineOf>
    <gml:LineString srsName="EPSG:4326">
      <gml:coordinates>0.0,100.0 100.0,0.0</gml:coordinates>
    </gml:LineString>
  </gml:centerLineOf>
</os:Road>
```
XML – Services

Web Map Services
GetCapabilities
GetMap

Web Feature Services
DescribeFeatureType
GetFeature
LockFeature
Transaction
GetCapabilities

Web Coverage Services
GetCapabilities
DescribeCoverage
GetCoverage

Get me a picture!

Get me a vector (values)

Get me a grid/model
XML -> Client Applications

Content | Function | Interface | Plumbing
Architecture & Tools

- UDDI: Discovery
- WSDL: Description
- XML/SOAP: Packaging
- HTTP: Transport
- TCP/IP: Network
- XSD: Type Definition
- XSLT: Translation
- XMLSpy
Use Case #1. Simple desktop or browser map/scientific viewer
Allow user to select a collection of features for access, visualization or analysis by a client application that conforms to the WFS X.X and GML 3.X standard.

Use Case #2. Acquire static data packages
Allow a user to browse an inventory and acquire data that is pre-packaged in csv format for pre-determined volumes up to 30 days in age, and no older than 1 day.

Use Case #3. Acquire a collection of features from a partner node
A client application consumes an incoming remote data source from a certified node and integrates and/or stores it in the data mart on a scheduled or continuous basis.

Use Case #4. Create standardized data content in the data mart
An application extracts, transforms and loads latest available data sources from the warehouse to the data mart.

Use Case #5. Populate the regional data warehouse
A collection of applications read latest available data from legacy information systems and remote sensors and stores it in the warehouse.

Use Case #6. Monitor and log data and service status and statistics
Major process events and service status are enumerated in an event log.

DATA FEEDS
- WATER LEVEL
- WAVES
- CURRENTS
- SEA SURFACE TEMPERATURE
- METEOROLOGICAL

PARTNERS
- NWS
- NDBC
- COOPS
- USGS-NWIS
- OTHER 1
- OTHER 2
- OTHER 3
Proposed or Related Projects

Activities - TBD
- IOOS Data Transport Lab
- Community Information Repository (data, discovery and standards)
- OpenIOOS
- Geospatial XSL Transformations for National Marine Boundaries
- Regional Ocean Information System

Other Peoples Projects
- GEON
- GALEON – unidata/OGC
- Catalog Standard for WS (OGC)
NWIS

Services for querying the National Water Information System (NWIS)

The following operations are supported. For a formal definition, please consult the documentation linked in this page.

- **getStationsWithWQParameter**
  Given a latitude box, a start date, an end date, a USGS parameter code, and an event type, this method returns a string where each record is a new line, and each record contains (1) the number of stations, (2) the name of each station, (3) the number of observations, (4) the date of the first observation, and (5) the date of the last observation.

- **getWQParameterValues**
  Given a USGS station number, a start date, and an end date, this method returns a string where each record is a new line, and each record contains (1) the station number, (2) the number of observations, (3) the date of the first observation, and (4) the date of the last observation.

- **getWQParameterUnits**
  Given a USGS parameter code, this method returns the parameter's units.

- **getStationInfo**
  Given a USGS station number, this method returns a string (formatted as XML) containing information about the station.

- **getDischargeInfo**
  Given a USGS station number, this method returns an array with (1) the number of discharge observations, (2) the date/time of the first discharge observation, and (3) the date/time of the last discharge observation.

- **getWQParamUnits**
  Given a USGS parameter code, this method returns the parameter's units.

- **getWQParamName**
  Given a USGS parameter code, this method returns the parameter's name.

- **getWQValues**
  Given a USGS station number, a USGS parameter code, a start date, and an end date, this method returns a string with the water quality time series data/observations.
## Design Issues

### Planning
- (use cases, real-time)

### Acquisition
- (RDBMS, marts or schema trans, assembly)

### Storage
- (data, operational meta, metadata, inventories)

### Modeling
- (RDBMS, marts or schema trans, assembly)

### Quality Control
- (GTS, IDD, AWIPS, DODS, OGC)

### Transport
- (Server or Client)

### Interface & Interoperability
- (Standards creep, API v. user interface)

### Discovery
- (NSDI)

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**Table 2: FEA Reference Models**

<table>
<thead>
<tr>
<th>Reference model</th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Reference Model</td>
<td>Describes the business operations (lines of business) of the federal government independent of the agencies that perform them, including defining the services provided to state and local governments.</td>
<td>Version 2.0 released June 2003</td>
</tr>
<tr>
<td>Service Component Reference Model</td>
<td>Identifies and classifies IT service (i.e., application) components that support federal agencies and promote the reuse of components across agencies.</td>
<td>Version 1.0 released June 2003</td>
</tr>
<tr>
<td>Technical Reference Model</td>
<td>Describes how technology is supporting the delivery of service components, including relevant standards for implementing the technology.</td>
<td>Version 1.1 released August 2003</td>
</tr>
<tr>
<td>Performance Reference Model</td>
<td>Provides a common set of general performance outputs and measures for agencies to use to achieve business goals and objectives.</td>
<td>Version 1.0 released September 2003</td>
</tr>
<tr>
<td>Data and Information Reference Model</td>
<td>Describes, at an aggregate level, the types of data and information that support program and business line operations, and the relationships among these types.</td>
<td>Not yet released</td>
</tr>
</tbody>
</table>

Source: GAO.
Going Forward - Questions

Thank You....

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