Swedish Standard for Geographic Information on Water System

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SMHI
Lake and river registry network
Etc.

Sw Land Survey
Hydrography, geometry etc.

Sw Geological survey
groundwater
spring
Etc.

Environmental Data host
SLU – water Chemistry, Biology
Fisheries Dept. – fauna
Etc.

Municipalities, country Council
proviagningsplatser

Water district authorities
Ecological status etc.
Etc.

Water power authorities
Water discharge
waterlevels

Sw Maritime Administration
Ship lanes
Etc.
Participants

- SIS, Swedish Standard Institute
- Swedish Land Survey,
- Elforsk
- Water District Authorities
- Swedish Environmental Protection Agency
- Swedish Maritime Administration
- Swedish Association of Local Authorities and Regions
- Swedish Geological Survey
- Swedish Meteorological and Hydrological Institute, SMHI

Scope

- supply a framework for information content and structure
- supply a common set of terms and concepts
- facilitate exchange of data between organizations
- facilitate consolidation of data from several producers
- simplify development of software applications
- make data sampling more cost effective
- simplify generalizations between different scales
- supply a system independent exchange format
Content of the standard

- Definitions
- Hierarchy
- Network
- Hierarchy network
- Identifiers
- Versioning
- Geometry ISO 19107 and GML
- Temporal ISO 19108
- Metadata ISO 19115
- Application schema uses ISO 19109
- Data exchange XML (ISO 19118) and GML (ISO 19136)

Object oriented approach

Objects are of a defined feature class

Lakes
River Reaches
Sampling Points
Catchment Areas
Surface Water Systems
Object oriented approach

Attributes
- Identity
- Name
- Geometry
- Etc.

Relation to other objects
Ex) Part of a system
Or “Water received from”

Logical network

✓ Each feature is described as a node referenced by its identity UUID
✓ Each feature can be connected to other using a link
✓ Not dependent on geometry
✓ Simple to apply in database tables and queries
Node link system

A node can be a
1. Surface water body
2. Water location
3. Hydrological area
4. Surface water complex
5. A complex of nodes of type 1-4
   • A link is the logical connections of nodes.
Example of network implementation

<table>
<thead>
<tr>
<th>Link</th>
<th>Node</th>
<th>Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>UUID</td>
<td>startnode</td>
<td>endnode</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>12</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>13</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>14</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>100</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Data exchange

Based on all features
Unique ID UUID
Uses XML/GML
XML and GML schemas are freely available
Possibility to extend XML-GML schemas

Dataset

Sends an original dataset
<dataset>
  <WS_Lake uuid=EISK-3432-AKEK-3113>
    <PhenomenonIdentity>
      "SE674383-152838"
    </PhenomenonIdentity>
    <name>'Storsjön' </name>
    <area>26.5</area>
    <geometry> .....</WS_Lake>
  </dataset>
Sends a modification on the area of Storsjön

```xml
<update>
  <modify>
  <WS_Lake uuid=EISK-3432-AKEK-3113>
    <area>23.8</area>
  </WS_Lake>
  </modify>
  </update>
```

Modify (add)

Send an update adding a new lake to the dataset.

```xml
<update>
  <add>
  <WS_Lake uuid=BKKE-2232-GTEK-8923>
    <PhenomenonIdentity>
      "SE654713-147901"
    </PhenomenonIdentity>
    <name>'lillsjön'</name>
    <area>3.2</area>
    <geometry>.....
  </WS_Lake>
  </add>
  </update>
```
Modify (delete)

Sends an update deleting a lake from the dataset

```xml
<update>
  <delete uuidref="EISK-3432-AKEK-3113" />
<update>
```

Advantages using a common XML-schema

- Water chemistry, identities, topology, network, geometry, morphometry, water flow can be contributed from different organisations.
- Data can be distributed as webservices
- A unique ID UUID is used as a key
conclusions

- Standardization – cooperation
- Standardization – takes time
- Object orientated – takes time
- Lots of work to build datasets
  - 100 000 - 300 000 lakes
  - 500 000 km river
- Growing demand for "intelligent" datasets
- Possibility to chose ambition

THANK YOU!
For more information
www.stanli.se