Swedish Standard for Geographic Information on Water System

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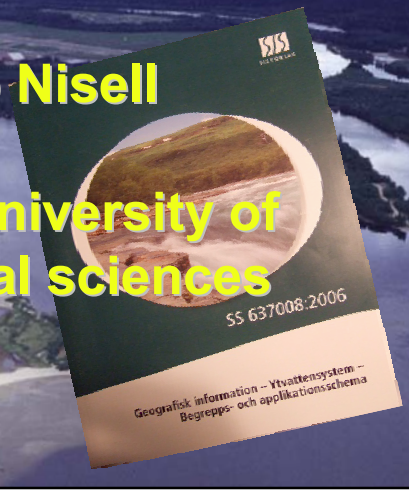
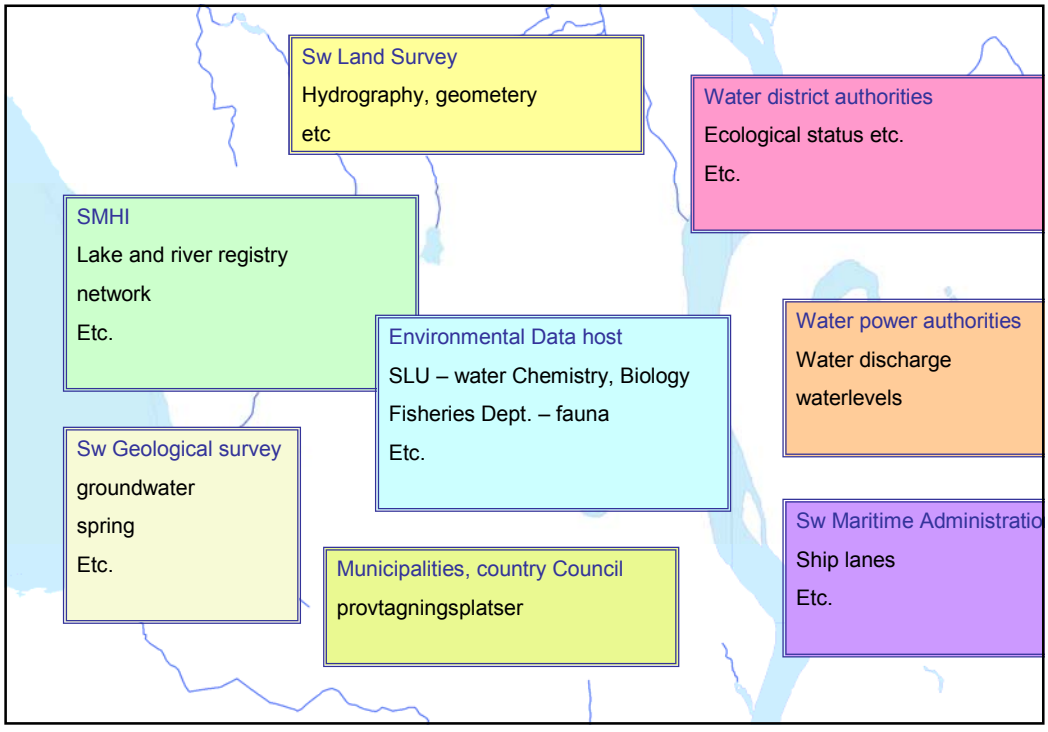




Participants

- **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

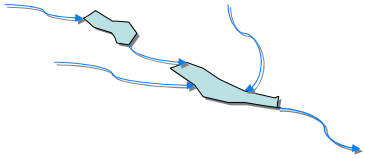
Objects are of a defined feature class

Lakes

River Reachs

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”

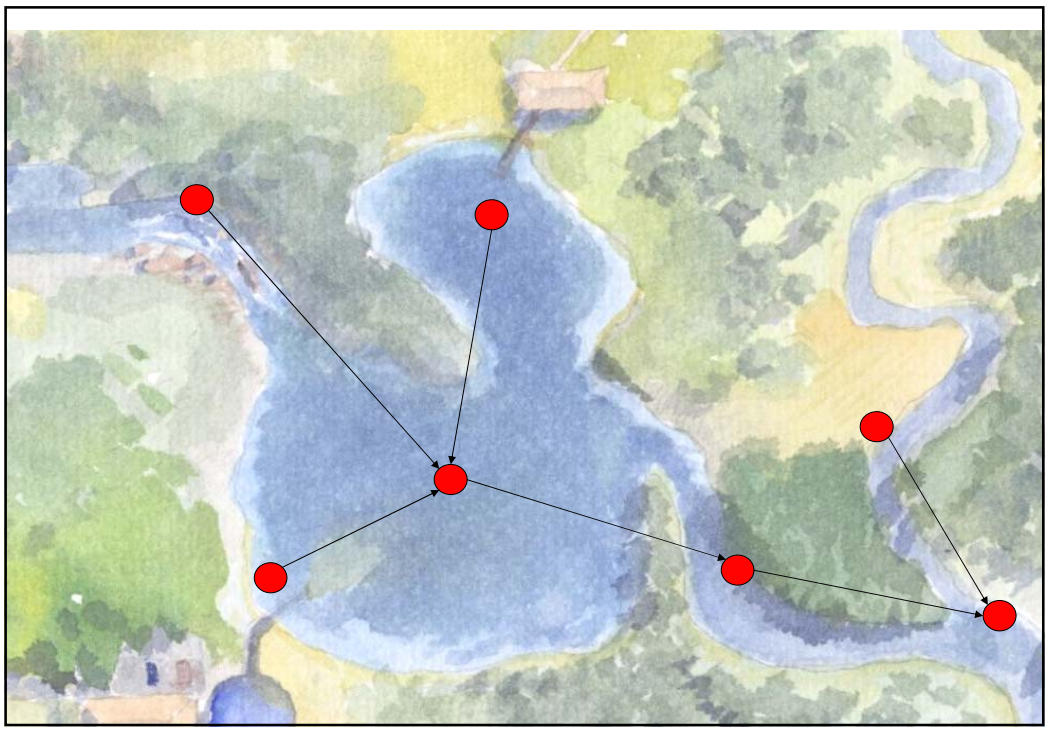
Logical network

✓Each feature is described as a node referenced by it’s identity UUID

✓Each feature can be connected to other using a link

✓Not dependent on geometry

✓Simple to apply in database tables and queries



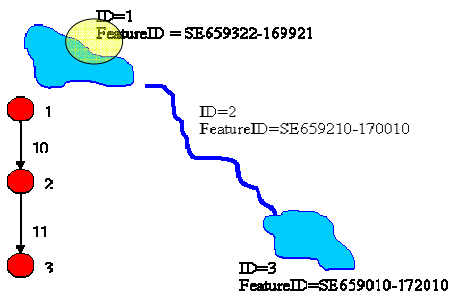
Node link system

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

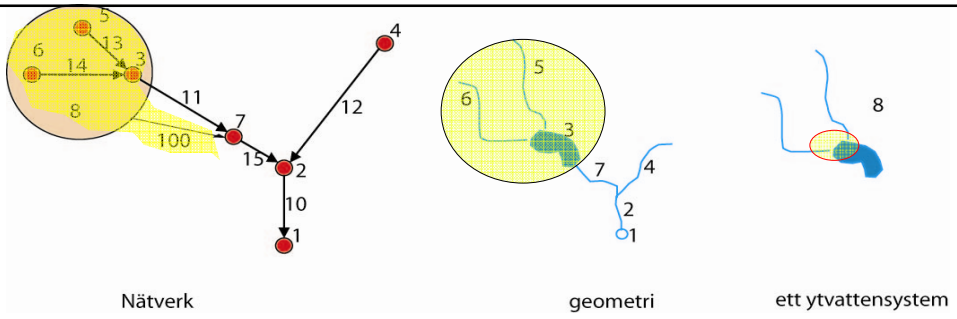
- A link is the logical connections of nodes.

Example of network implementatation



Länktabell		
linkID	startnode	endnode
10	1	2
11	2	3

Nodtabell		Option	Option
ID	FeatureID	Incoming	outgoing
1	SE659322-169921		10
2	SE659210-170010	10	11
3	SE659010-172010	11	



Link

UUID	startnode	endnode
10	2	1
11	3	7
12	4	2
13	5	3
14	6	3
15	7	2
100	8	7

Node

UUID	class
1	Outlet
2	River Reach
3	Lake
4	River Reach
5	River Reach
6	River Reach
7	River Reach
8	SurfaceWaterSystem

Network

member	complex
5	8
6	8
3	8

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>
   <WS_Lake> ……
<dataset>
```

Modify (update)

Sends a modification on the area of Storsjön

```
<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.

```
<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

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

Advantages using a common XML-schema

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

<gml:Point> <CatchmentArea> <Lake>

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