extending the data model
INSPIRE Utility Networks
from a business point of view

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EuroGeographics KEN
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Topics
Utility networks in the Netherlands

Statistics 2016

- ~1.7 million km for water, gas, electricity, telecom, sewerage, fossil fuels and chemicals
- mostly underground
- ~15,000 excavation excavators: building, agricultural and UN
- ~1,100 network administrators
- 32,858 excavation damages on UN
- Average costs €796 per damage
Preventing excavating damage

KLIC
- Information Centre for Cables and Pipelines
- Started in 1968, nation wide since 1986
- Reports of excavations are transferred to network administrators
- Since 2008
  - A legal obligation (WION-act) for network administrators and excavators
  - A service of Kadaster
- Since 2010:
  - Webservice
  - Fully automated transfer to network administrators
  - Fully automated delivery of combined maps (PNG) to the excavator
  - Rate based (2017: €19 per request)
Future business requirements (< 2020)

Good results, but .... the industry demands:

1. A further decline of damages due to excavations
2. Improvement on efficiency
3. Use of network information in other domains, e.g.  
   - Planning and zoning  
   - Public order and security
User needs (< 2020)

- Ubiquitous service: 24x7, near realtime, any place, any device
- Sharp images while zooming in
- Multiple layered maps: cables / pipelines, (planned) topography, type of soil, cadastral boundaries, addresses etc.
- An administration of reported excavations and provided information
- Authenticated applicants, made known to the network administrators
- Authorization, based on the applicants profile
- Rate per request
- Webservices (WMS, WFS)
- And … meet the requirements of INSPIRE UN
**KLIC vs INSPIRE**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>KLIC</th>
<th>INSPIRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legislation</td>
<td>NL-WION</td>
<td>2007/2/EC</td>
</tr>
<tr>
<td>Strict roadmap</td>
<td>+/-</td>
<td>√</td>
</tr>
<tr>
<td>High quality demands (availability, usability etc.)</td>
<td>√</td>
<td>+/-</td>
</tr>
<tr>
<td>All networks enclosed</td>
<td>√</td>
<td>X</td>
</tr>
<tr>
<td>Realtime delivery</td>
<td>X</td>
<td>√</td>
</tr>
<tr>
<td>Webservices WMS, WFS</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Authentication, Authorization, Accounting</td>
<td>√</td>
<td>+/-</td>
</tr>
<tr>
<td>Current data</td>
<td>√</td>
<td>- -</td>
</tr>
<tr>
<td>Unlimited requested area</td>
<td>X</td>
<td>√</td>
</tr>
</tbody>
</table>
Consequences

1. INSPIRE UN must be a part of KLIC
   - Many similarities
   - Less costs for the utility administrators
   - Prevent cannibalization on KLIC

→ INSPIRE UN shall be an additional product of KLIC

2. Common information model for multiple applications
   - Many similarities
   - Less costs in building the information system
   - INSPIRE is leading

→ information model KLIC shall be an extend on INSPIRE UN
Designing the model

- Designed by Geonovum (with a little help from AGIV)
- 4 basic methods:
  - Subtyping
  - By association
  - Application domain extension
  - Mixin multiple inheritance
- Most suitable is the Mixin-method
  - The only method to combine 2 models
  - The Dutch model is still recognizable
  - We are not forced into the INSPIRE-model
  - We maintain flexibility
Inheritance
Mixin Multiple Inheritance

Mixin class

```xml
<featureType>
UtilityLink
</featureType>

<featureType>
UtilityLinkSet
<voidable>
+ utilityDeliveryType :UtilityDeliveryTypeValue [0..1]
+ warningType :WarningTypeValue
</voidable>
</featureType>

<featureType>
Cable
</featureType>

<featureType>
ElectricityCable
<voidable>
+ operatingVoltage :Measure
+ nominalVoltage :Measure
</voidable>
</featureType>

<featureType>
KabelOfLeiding
</featureType>

+ eisVoorzorgsmaatregel :CharacterString [0.."]
+ geoNauwkeurigheidXY :NauwkeurigheidValue [0..1]
+ toelichting :CharacterString [0..1]
+ verhoogdRisicoJa :Boolean [0..1]

<featureType>
ExtraInformatie
</featureType>

+ diepeNauwkeurigheid :NauwkeurigheidValue
+ dieptePeil :Measure
+ datumOpmetingDieptePeil :DateTime [0..1]
+ ligging :GM_Object [0..1]
```
IMKL extend

INSPIRE Utility Network Base
Final remarks
Thanks for your attention