Implementing the Utility Network at Ørsted

Jakob Møl Mortensen, Ørsted
Signe Bramming Andersen, Similix
Jesper Vinther Christensen, Similix
Presenters

• Jakob Møl Mortensen, jakmm@orsted.dk
  - Jakob holds a Master degree in Geology and has 20+ years of professional IT experience
  - Jakob is heading the team Energy Analytics & Geo Services at Ørsted, a global utility

• Signe Bramming Andersen, signe.bramming@similix.dk
  - Signe is MSc in Economics and has 20 years of experience within the Utility industry
  - Signe is working with business development at Similix, an Esri partner with global experience with Utility Networks

• Jesper Vinther Christensen, jesper@similix.dk
  - Founder and owner of Similix, an Esri partner providing technological expertise to the global utility sector
  - Similix offers a variety of products enabling customers to migrate to and benefit from UN
Agenda

• Short introduction to Ørsted

• The Utility Network project at Ørsted

• New functionality out of the box in the Utility Network: Tracing and Subnetwork Management enabling CIM integration

• New functionality build on top of the Utility Network: Outage Management System
Ørsted Who?

Jakob Møl Mortensen

Global Utility – 3 Continents
Headquartered in Denmark
2017 Revenue 8 Billion Euro

Henrik Poulsen, CEO, Ørsted

“Our vision is a world that runs entirely on green energy. We want to be a company that provides real, tangible solutions to one of the world’s most difficult and urgent problems.”
The Ørsted Project
Jakob Møl Mortensen
Electric Distribution
European Grid Model
1 million customers
Why Ørsted considers moving to the Utility Network?
- we revised the business case after the 10.2.1 and 10.6.x support was prolonged!

1. **Business Process Support**
   - We can create a data model, that is the best possible representation of reality
   - Better dialogue across departments – shared objects created in GIS instead of interface
   - Better integrations for ADMS & ERP – service enabled architecture

2. **GIS magic for everybody**
   - Full stack implementation
   - Attractive functionality like trace and diagrams are moving into the field
   - Performance, performance and performance – thank you!

3. **Out of the box functionality**
   - Reduced need for custom code - we can transfer custom build trace to standard
   - Reduced need for manual data maintenance – we get schematics automatically
   - 3rd party license cost – based on an extended base, we can get more value for money
We are travelling in good company…

The Utility Network Community

- Lower project and operational cost
- Impact the core Esri model
- Co-develop European model on top
- If possible share development on top of Esri standard
The Data Model co-developed in the Utility Network Community

Contains:
- Asset Groups
- Asset Types
- Rules within Esri Feature Classes

You can get the UNC model and our presentation after the session
Our GIS landscape will benefit from a service enabled GIS

GIS is serving as master data system for 25+ applications at Ørsted
Our processes will benefit from an improved data model and trace.

We run a delta integration between GIS and ADMS based on IEC CIM 61968 & 61970.
We enrich the data model in automatic data migration

Objects needed in ADMS can now be created in GIS instead of in the CIM interface.

The dialogue between the Documentation Department and the Control Center is improved.
Complex Meshed Network
Two Substations
Each with several Feeders
Feeding into one Meshed Network
From Tracing to CIM Integrations

Signe Bramming Andersen

- Domain expertise generalized into a product
- Benefit from the rich data model, the tracing capabilities and the service based architecture
Looking forward – vision for the future

- Construction Projects
- Project Manager Support
- Customer Information
- Field Crew Support
- Work Planning
- Customer Connection
- Task Management
- Outage Management
- Health Monitoring
- Event & Incident Management
- Asset Diagnostics

“We are building a state of the art platform for asset optimization within the utility and energy industry”.

- Asset Diagnostics
- Master Data Management
- Process Integration
- Condition Monitoring
- Operational Excellence
- Asset Optimization
CIM based integrations

- Geometric Network
- Utility Network
- Similix CIM Adaptor
- Similix CIM Mapping User Interface
- CIM Profile in RDFS
- ADMS
- EAM
- Power Applications (e.g. Load Flow)
- TSO
CIM based integration – current version

- Can read from a Geometric Network
- Produces CIM Files with:
  - Equipment
  - Terminals
  - Connectivity Nodes
  - Containers
Automatically migrated data in UN with unfolded objects

Islev station 975: 10KV/0.4KV station with 10KV tie point

Station with tie points on MV side and MV feeder tracing via junction-junction to LV subnetwork controllers
Outage Management based on Esri UN

Jesper Vinther Christensen

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“We are building a state of the art platform for asset optimization within the utility and energy industry”.
Outage Management – Outage Reporter

Selected Equipment:
ID:
Asset Group:
Asset Type:
Location:

Work Request
• Failing Equipment trace
• Affected Customer Trace
Outage Management – Work Requester

- Work Requester

- Isolation Trace
- Re-supply Trace
- Affected Customer Trace
# Outage Management – Incident Manager

## Incident Management
- **Failing Equipment**
- **Switching Plan**
- **Events**
- **Affected Customer**

### Incident State History

<table>
<thead>
<tr>
<th>From Date</th>
<th>To Date</th>
<th>User</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 10, 2018</td>
<td>May 18, 2018</td>
<td>Operator</td>
<td>Created</td>
</tr>
<tr>
<td>May 18, 2018</td>
<td>Dec 11, 1999</td>
<td>Operator</td>
<td>Confirmed</td>
</tr>
</tbody>
</table>

### Switching Plan

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Time</th>
<th>Resulting State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load Break Switch</td>
<td>18:35</td>
<td>Closed</td>
</tr>
<tr>
<td>Sectionalizer</td>
<td>19:00</td>
<td>Open</td>
</tr>
<tr>
<td>Contactor Relay</td>
<td>19:05</td>
<td>Closed</td>
</tr>
</tbody>
</table>

## Failing Equipment

- Affected Customers:
First learnings using the Utility Network for building applications

- It is straightforward to use the rest end-points of the Utility Network services. We were up and running really fast, and were able to create and update features as expected.

- A lot of parameters need to be set in order to run traces framework – this is nice as it gives endless options – but also gives a little steep learning curve ;) We are considering how we can offer standard configurations of the trace framework.

- There are a few things we would like to see in the trace framework e.g. to be able to trace from a barrier.

- The software is fast and responsive – most traces run in 1-2 seconds.

- We are looking forward to all of the nice new features in the coming releases, e.g. a new version of Export Subnetwork, the java script API, partial posting, diagram editing and more.

- Esri gives us tremendous support in our effort to use the Utility Network, both when it comes to developing data models and applications!!