Minutes

Meeting		
3nd Joint SIG 3D and OCG Workshop on the CityGML UtilityNetworkADE		

Participants		
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Minute taker	Location/Date
Tatjana Kutzner	AIT, 30 June 2017

Begin	End
8:30 a.m.	5:00 p.m.

Results

1. **Presentations**

   - Tatjana gave a short introduction to the UtilityNetworkADE for the new participants.

   The presentation is available for download here:
     https://en.wiki.utilitynetworks.sig3d.org/images/upload/20160913_-_Kolbe_-_Modeling_3D_Utility_Networks_%2B_UtilityNetwork_ADE_Core_Model.pdf

   - Alexandru and Tatjana provided short status updates on the development of test data sets for the Utility Network ADE based on source data from the City of Nanaimo, the City of Rotterdam and the company AED-SICAD.

     The presentations are available for download here:
     https://en.wiki.utilitynetworks.sig3d.org/index.php/Agenda_and_results_of_the_CityGML_Utility_Network_ADE_workshop_2017_June_-_Vienna,_Austria

   - The presentation on the AED-SICAD test data set involved a discussion on how to best represent the connection between hydrants and pipes. Two possible representations are sketched below:

Representation 1

Representation 2
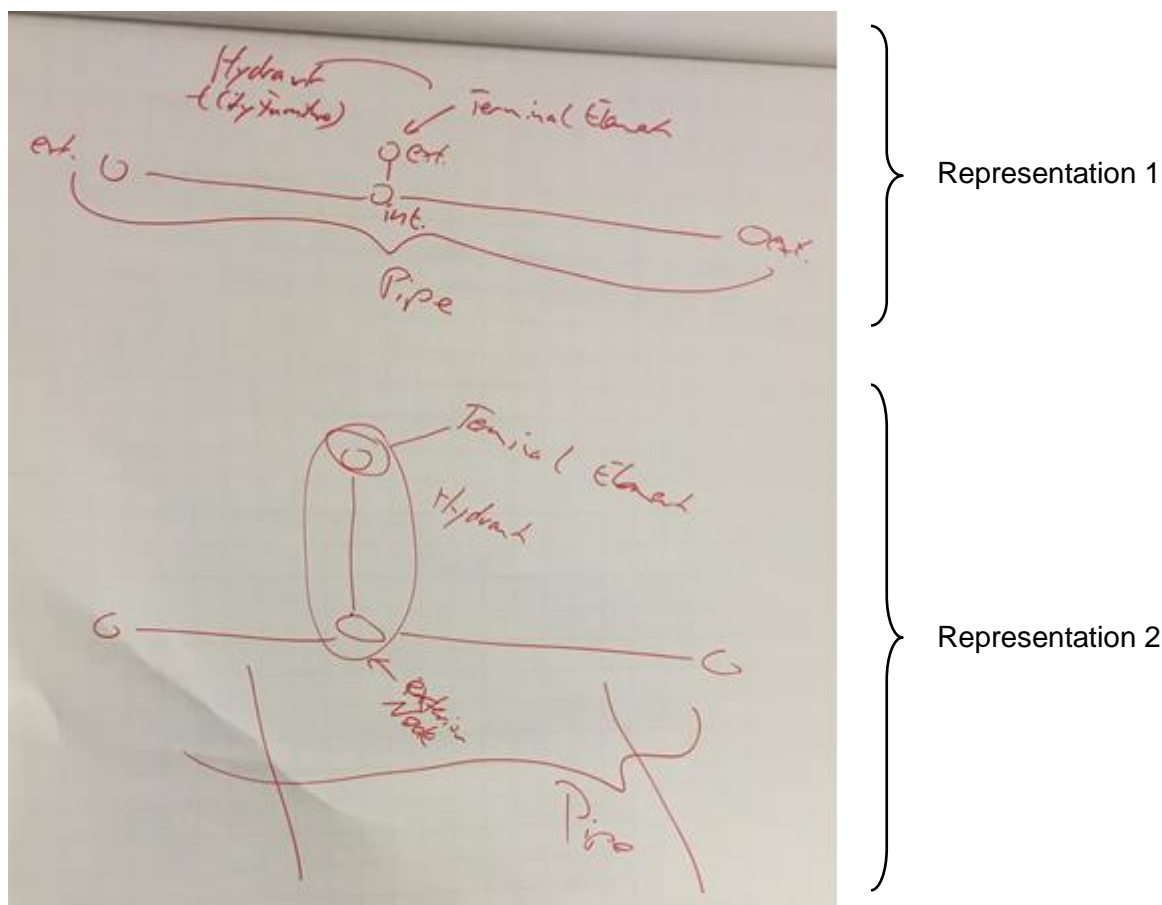
2. Mapping of the CIM model to the Utility Network ADE

A mapping between the main feature types of the CIM model and the Utility Network ADE was discussed. The results are depicted in the figures below. The discussion involved the following points:

- What is the **difference between** the Utility Network ADE feature types **TechDevice** and **SimpleFunctionalElement**?
  → Could we say that TechDevice objects (e.g. pump, valve, generator) are characterised by an active role within a network whereas SimpleFunctionalElement objects (e.g. manhole, transformer, teeFitting) are characterised by a passive role?

- **Code list FunctionValue**:
  - o The following values in the code list are to be replaced:
    - ▪ feeding → **producing**
    - ▪ draining → **consuming**
  - o The value **presuming** is to be added to the code list

- A new class **ComplexTechDevice** was suggested following the CIM type CompositeSwitch

- The code lists in the Component model currently mix values of different networks.
  → Should we define individual code lists for each network and when should the feature types be further subclassified instead?

- Feature type "**Cable**": The electricity domain differentiates between "cable" (buried in the ground) and "line" (not buried/above ground). → This differentiation is currently not represented in the ADE. It could be represented using an attribute "class" (suggested at the last workshop already) or by introducing an attribute "conductor".

Mapping between the CIM model (green writing) and the Utility Network ADE (blue writing)

Load / Energy Consumer
→ City Object connected to a Terminal – Element and with electrical energy demand

What properties must be time-dependent for what analysis?

Bus Bars – Voltage
→ Simple Functional Element

Transformers
→ Simple Functional Element ?
→ Tech Device

Switches
→ Controller Device (rather not)
→ Tech Device

Measurement Devices
→ Measurement Device

Cables / Lines / Conductor – Current
→ Conductor
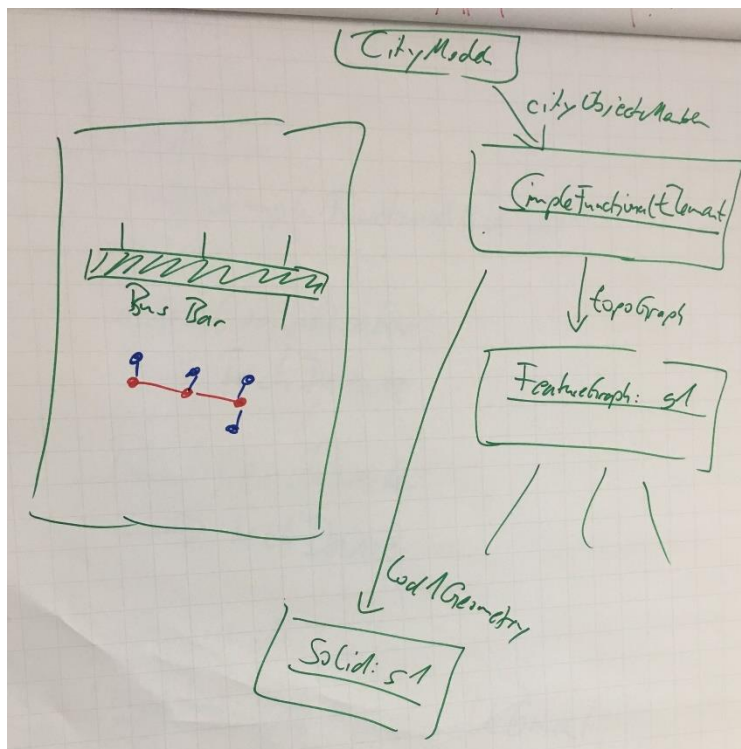

Junction
→ Simple Functional Element

Series Compensator
→ Tech Device

Rectifier Inverter
→ Tech Device

Ground
→ Simple Functional Element

Energy Source
→ City Object connected to a Terminal – Element with electric energy feed

Energy Prosumers
→ City Object connected to a Terminal – Element with electric energy feed or Load

City Model
city ObjectMember
Simple Functional Element
Bus Bar
topoGraph
FeatureGraph: s1
LoadGeometry
Solid: s1

**Regulating Cond Eq**
→ Tech Device

Synchronous Machine
→ Tech Device

Composite Switch
→ Complex Tech Device

Resistor
→ Simple Functional Element

3. Development of a new Component model

Based on the discussion which evolved during the mapping process a new Component concept was drafted which is depicted to the right. The new Component model only deals with the functional components, the distribution components and protective components are not part of the discussion.
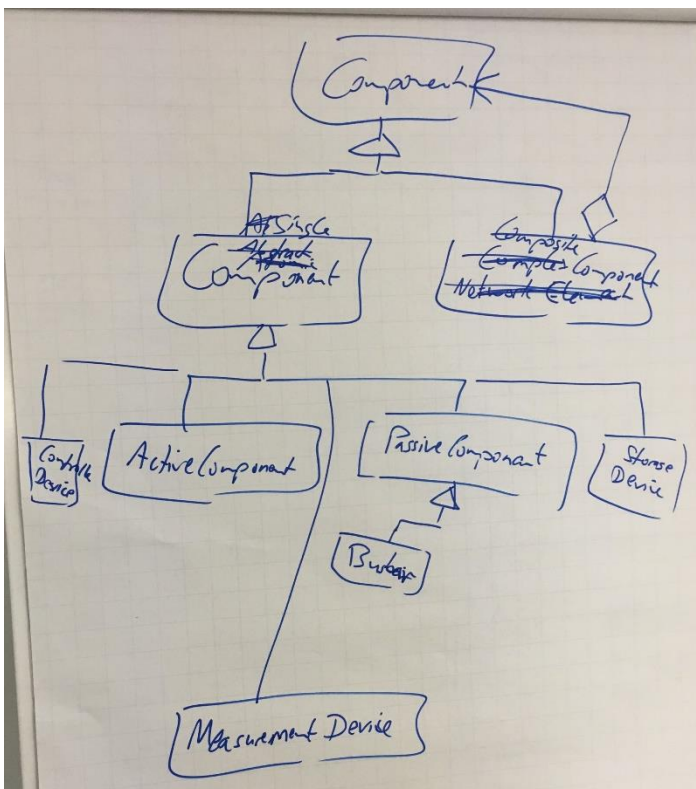

- This new Component model introduces the general feature types **SingleComponent** and **CompositeComponent** in combination with the design pattern recusive aggregation as well as the feature types **ActiveComponent** and **PassiveComponent**.

- The feature types **SimpleFunctionalElement** and **ComplexFunctionalElement** are removed. A SimpleFunctionalElement is now represented by the feature type ActiveComponent and a ComplexFunctionalElement can be represented as a CompositeComponent object aggregating several SingleComponent objects.

- The feature type **TechDevice** is removed. It is now represented by the feature type PassiveComponent.

- The feature types **StorageDevice**, **MeasurementDevice** and **ControllerDevice** are taken over as subclasses of the feature type SingleComponent.

- More specific feature types can then be defined as subclasses of the feature types defined here. E.g. a feature type **Busbar** could be defined as subclass of PassiveComponent.

- Open issues:
  - Do we still need AnyDevice or can it be represented by one of the other feature types?
  - Should the feature type TerminalElement also become a subclass of the feature type Component?
  - The feature type StorageDevice could also become a subclass of the feature type ActiveComponent.
  - Where to put a heat pump?

4. Mapping of a Combined Heat and Power model to the Utility Network ADE

Similarly, a combined heat and power (CHP) model was analysed and the following issues were raised:

- Two types of pipes need to be represented in the Utility Network ADE, feed pipes and return pipes.

- In district heating networks conversion devices are of importance, e.g. pumps.
  → Conversion devices can be considered as TechDevice objects in the current Component model.
  → Add ConversionDevice to the new Component concept?
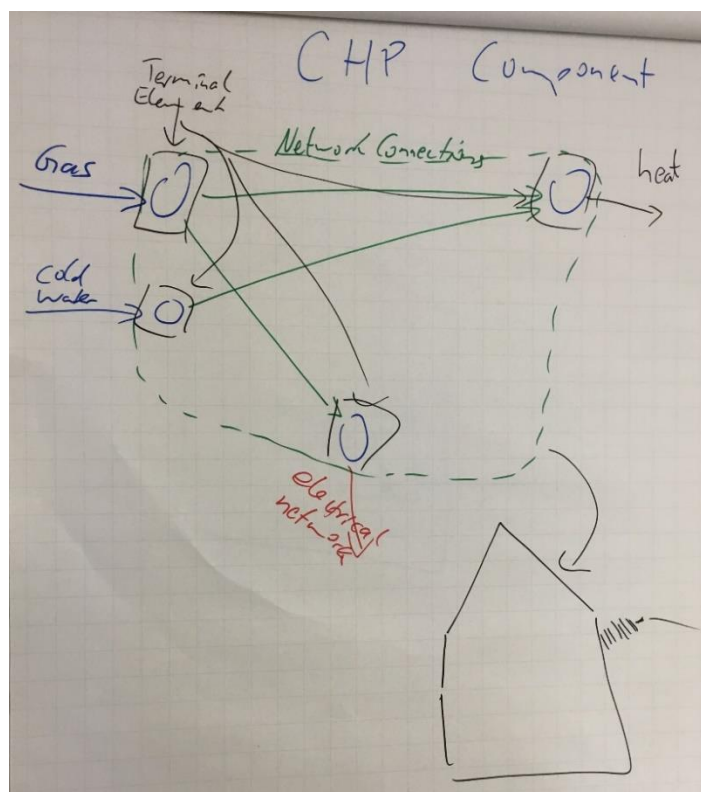
5. Further points of discussion

- Should product libraries be modelled? → Product links should rather be used.
- Is the introduction of Generic Attribute Sets – similar to IFC Property Sets – useful?

6. To Dos

- TUM finalises the new Component concept and implements it in the UML model.
- Tatjana asks AED-SICAD whether the source data provided by AED-SICAD for creating the test data set can be made available internally to the group. Currently the source data is only accessible by TUM.
- Tatjana asks TU Delft whether the source data provided by the City of Rotterdam for creating the test data set can be made available internally to the group or even be made available publicly via the github repository. Currently the source data is only accessible by TU Delft.
- Edmund prepares a proposal for electricity domain requirements.
- Alexandru prepares a letter for the City of Nanaimo to ask whether the city plans to make data on electricity networks publicly available as well.
  Addition: The city was already contacted in the meantime and agreed to share more information on the water station which also produces electricity.

7. Next workshop

- 6-8 December 2017 at EIFER, Karlsruhe
  - 6 December: Energy ADE only
  - 7 December: Energy ADE and Utility Network ADE jointly
  - 8 December: Utility Network ADE only