

- A comparison of CityGML, INSPIRE Building, a Swedish building standard and IFC

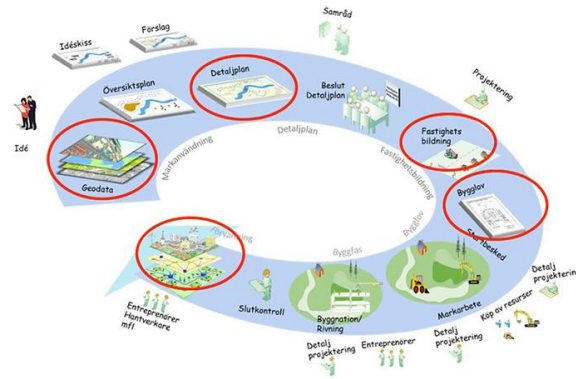


²Department of Physical Geography and Ecosystem Science – Lund University

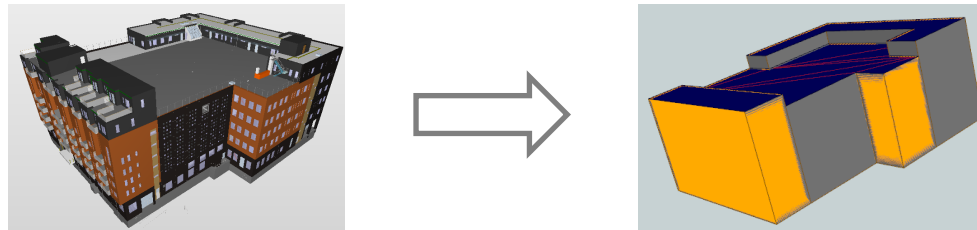
LANTMÄTERIET



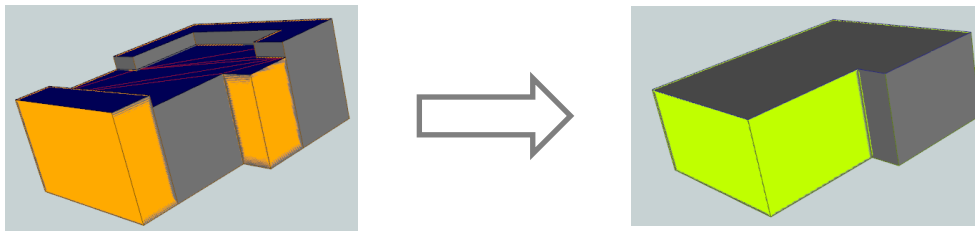
Information exchange of 3D building information



- From BIM model to geodata model:



- Between geodata models:



**Information
structures**

Semantics

Standard

**Geometric
transformations**

Information
exchange
issues

**Level of Development
vs.
Level of Detail**

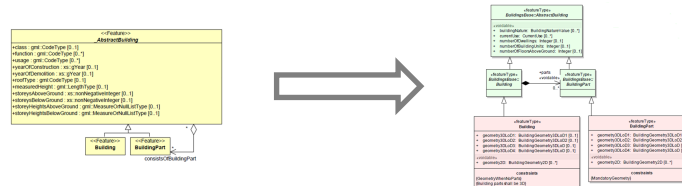
**Coordinate system
transformations**

Level of Detail

Information structure issues during exchange and transformation

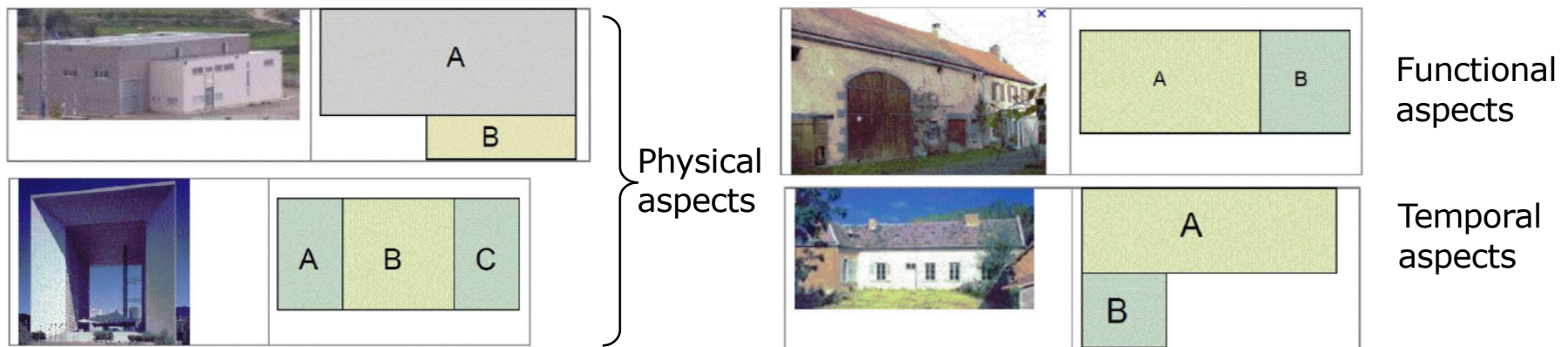
- The definition and categorisation of small building parts (e.g. windows, doors and beams) can affect the complexity of the transformation of data (Isikdag and Zlatanova, 2009; de Laat and van Berlo, 2010; El-Mekawy et al., 2012 and Oldfield et al., 2017)
 - From IFC to IFC
 - From IFC to CityGML
- From CityGML to INSPIRE BU – “*no fragmentation of building parts in further parts*” is allowed when a CityGML-model is transformed to INSPIRE BU (Roschlaub and Batscheider 2016)

No comparison of *building parts* in various standards was found in the literature studied



What are building parts?

- Building parts is an example of a information structure
- A building can be divided into building parts when it is not homogenous, due to:



- Legal aspect – division into legal spaces
- Building parts are defined similar, but not identical in the following standards:



Test Case: Comparison of building part structures in four standards

How can information structures affect data harmonisation?

- *Within a standard* – when the definition of concepts is ambiguous and described as recommendation instead of requirements
- *Between standards* – when related standards share many concepts that are defined in slightly different ways

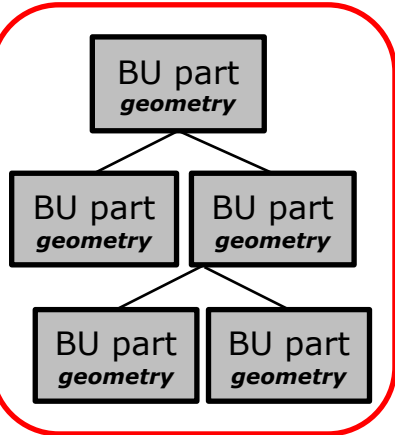
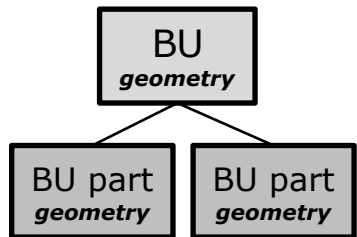
Aim:

- Study how building parts is defined in four geodata and BIM specifications
- Describe possible reasons for a building to be divided into building parts in potential applications

Conclusions from the specification comparison



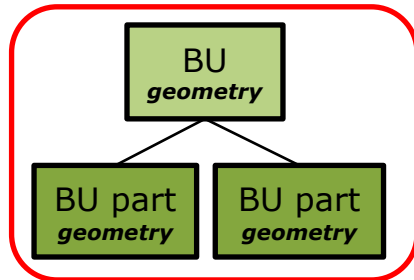
Building



Structures of building parts is allowed



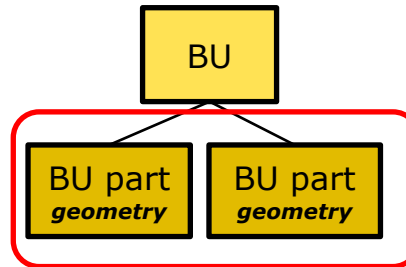
Building



Only building - building part structures is allowed



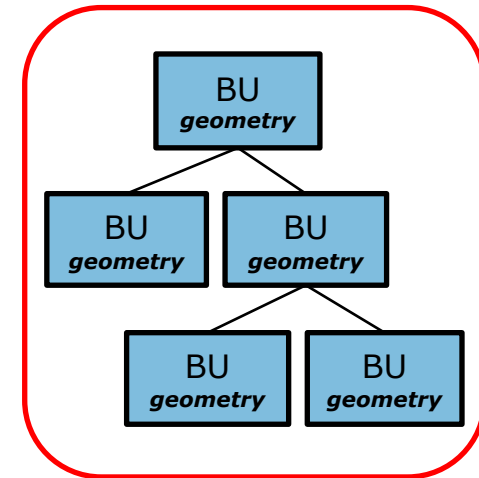
Svensk geoprocess Building



The geometry is only defined on building parts

IFC

Building



There are no building parts, but structures of buildings are allowed

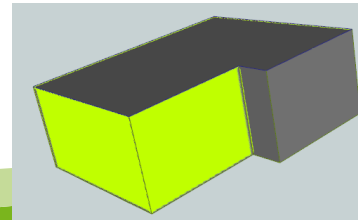
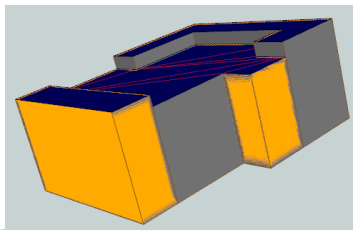
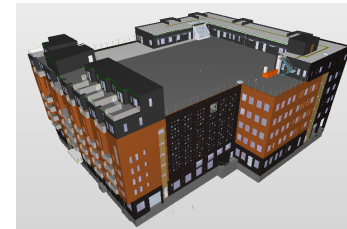
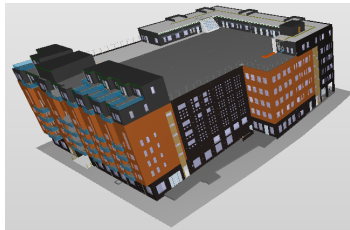
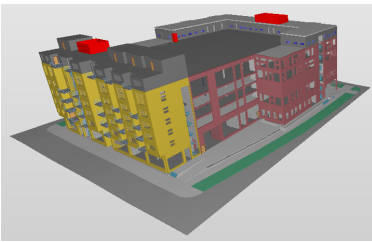
Conclusions cont.



- The structural differences of building parts have consequences when information is exchanged within and between standards
- The way a building is divided into building parts could have consequences when this information is used later in a different context, for example:
 - The building-building part structure of a geodata model will be the same as in the BIM model, if this is the source
 - In the building permit process, building parts can be divided due to physical aspects, but 3D real property formation might want a functional division
- Should three different geodata specifications be used for 3D buildings? Or, should we rather only use CityGML with extensions?
- Or, at least have clear recommendations of how to use building parts in a national context

Future research

- Perform tests with 3D geodata building information to evaluate if and how different ways of dividing a building into parts would affect building permit and 3D real property formation applications
- Evaluate if having the geometry on the building or on the building parts make any difference in these applications



Thank you for your attention!

Questions?

