

simple ifcXML

proposal to generate use case specific simple ifcXML standards

example using a small exchange requirement

conclusions and recommendations

simple ifcXML workflow

- 1) establish the use case(s) to be enabled by the s-ifcXML transaction
- 2) define the exchange requirement
- 3) define the exchange requirement model (mapping to IFC)
- 4) create the model view specific sub schema – filtering (automated)
- 5) create the ifcXML binding for the sub schema - binding (automated)
- 6) implementation, validation and deployment
 - iterative process – may involve “goto” 3, 4, 5
 - advantage: simple schema, easy to focus, less “start-up” time and experience necessary

New development for product use case

Will be applicable to the product (catalogue) use case

- Supporting Norwegian proposal (e.g. buildingSMART Norway pilot)
- Supporting SPie (working with NIBS)
- Supporting Mefisto (German project)
- Any other in this area

Piloting example – simplified geometry and simple XML structure

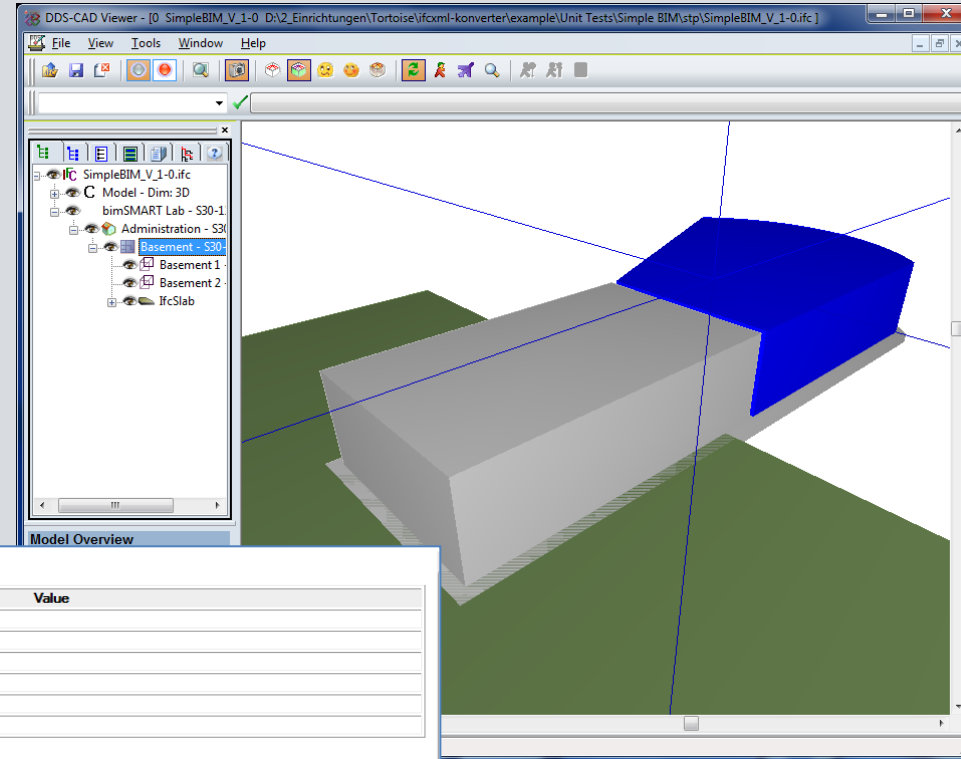
- Use case: scope of BIMxml (sample BIMxml file on BIMxml.org website)

Use Case - SimpleBIM

Initial design sketches

- site
- building layout
- stacking (stories)
- blocking (space layout)
- major site and building "furniture"

sample taken from BIMxml



001 (IfcSpace)	
Name	Value
GlobalId	0LUFSYlnCHfv_z8CkqvQL
Name	001
LongName	Basement 1
CompositionType	ELEMENT
InteriorOrExteriorSpace	INTERNAL
ElevationWithFlooring	0 m

Pset_SpaceCommon (IfcPropertySet)		
Name	Value	Description
CeilingCovering	GYP. Board (SC)	Label to indicate the material or finish of the space flooring. The label is used for room book information and often displayed in room stamp.
WallCovering	GYP. Board (SC)	Label to indicate the material or finish of the space flooring. The label is used for room book information and often displayed in room stamp.
FloorCovering	Integral Ginch Cove Base	Label to indicate the material or finish of the space flooring. The label is used for room book information and often displayed in room stamp.

Filtering – define the SimpleBIM sub schema



„full“ ifcXML – ca. 800kB
ca 850 <element /> definition



sub schema ifcXML – ca. 35kB
ca 35 <element /> definition

XML binding – Technical insights -1-

Today – ifcXML for IFC2x3

```
<IfcDirection id="i1308624439">  
  <DirectionRatios ex:cType="list">  
    <ex:double-wrapper>0.</ex:double-wrapper>  
    <ex:double-wrapper>1.</ex:double-wrapper>  
    <ex:double-wrapper>0.</ex:double-wrapper>  
  </DirectionRatios>  
</IfcDirection>
```

a single direction (pointing to Y)



Expected “full” ifcXML for IFC4

```
<IfcDirection id="i1865">  
  <DirectionRatios>0. 1. 0.</DirectionRatios>  
</IfcDirection>
```

Expected “simple” ifcXML for IFC4

```
<IfcDirection id="i1865" DirectionRatios="0. 1. 0."/>
```

Could be just one ?!

XML binding – Technical insights -2-

A single solid in ifcXML for IFC2x3

```
<IfcExtrudedAreaSolid id="i1308624490">
  <SweptArea>
    <IfcRectangleProfileDef xsi:nil="true"
      ref="i1308624493"/>
  </SweptArea>
  <Position>
    <IfcAxis2Placement3D xsi:nil="true"
      ref="i1308624494"/>
  </Position>
  <ExtrudedDirection>
    <IfcDirection xsi:nil="true" ref="i1308624497"/>
  </ExtrudedDirection>
  <Depth>2000.</Depth>
</IfcExtrudedAreaSolid>

<IfcAxis2Placement3D id="i1308624494">
  <Location>
    <IfcCartesianPoint xsi:nil="true" ref="i1308624433"/>
  </Location>
</IfcAxis2Placement3D>

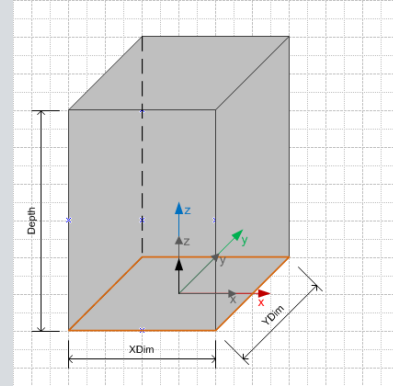
<IfcDirection id="i1308624497">
  <DirectionRatios ex:cType="list">
    <ex:double-wrapper>0.</ex:double-wrapper>
    <ex:double-wrapper>0.</ex:double-wrapper>
    <ex:double-wrapper>1.</ex:double-wrapper>
  </DirectionRatios>
</IfcDirection>
```

50 XML elements = 100%

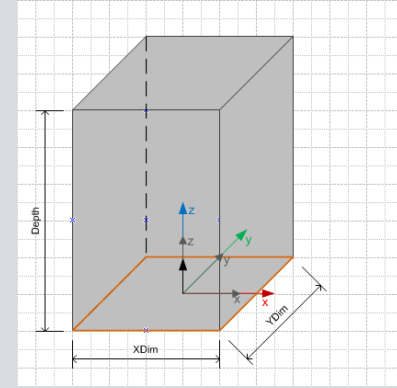
```
<IfcRectangleProfileDef id="i1308624493">
  <ProfileType>area</ProfileType>
  <ProfileName>1m x 1m rectangle</ProfileName>
  <Position>
    <IfcAxis2Placement2D>
      <Location>
        <IfcCartesianPoint xsi:nil="true"
          ref="i1308624379"/>
      </Location>
    </IfcAxis2Placement2D>
  </Position>
  <XDim>1000.</XDim>
  <YDim>1000.</YDim>
</IfcRectangleProfileDef>

<IfcCartesianPoint id="i1308624379">
  <Coordinates ex:cType="list">
    <IfcLengthMeasure>0.</IfcLengthMeasure>
    <IfcLengthMeasure>0.</IfcLengthMeasure>
  </Coordinates>
</IfcCartesianPoint>

<IfcCartesianPoint id="i1308624433">
  <Coordinates ex:cType="list">
    <IfcLengthMeasure>0.</IfcLengthMeasure>
    <IfcLengthMeasure>0.</IfcLengthMeasure>
    <IfcLengthMeasure>0.</IfcLengthMeasure>
  </Coordinates>
</IfcCartesianPoint>
```



XML binding – Technical insights -2- cont.



Same in expected “full” ifcXML for IFC4

```
<IfcExtrudedAreaSolid id="i1922">
  <SweptArea>
    <IfcRectangleProfileDef id="i1925">
      <ProfileType>area</ProfileType>
      <ProfileName>1m x 1m rectangle</ProfileName>
      <XDim>1000.</XDim>
      <YDim>1000.</YDim>
    </IfcRectangleProfileDef>
  </SweptArea>
  <Position>
    <IfcAxis2Placement3D id="i1928">
      <Location>
        <IfcCartesianPoint id="i1959">
          <Coordinates>0. 0. 0.</Coordinates>
        </IfcCartesianPoint>
      </Location>
    </IfcAxis2Placement3D>
  </Position>
  <ExtrudedDirection>
    <IfcDirection id="i1931">
      <DirectionRatios>0. 0. 1.</DirectionRatios>
    </IfcDirection>
  </ExtrudedDirection>
  <Depth>2000.</Depth>
</IfcExtrudedAreaSolid>
```

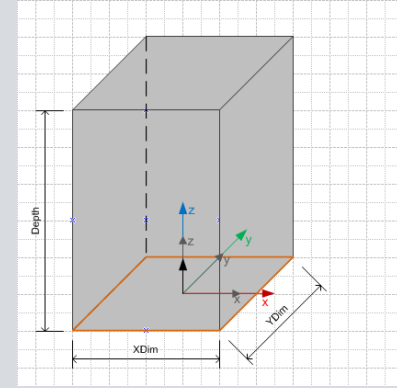
or in "simple" form ...

```
<IfcExtrudedAreaSolid id="i1922">
  <SweptArea xsi:type="IfcRectangleProfileDef" id="i1925">
    <ProfileType>area</ProfileType>
    <ProfileName>1m x 1m rectangle</ProfileName>
    <XDim>1000.</XDim>
    <YDim>1000.</YDim>
  </SweptArea>
  <Position xsi:type="IfcAxis2Placement3D" id="i1928">
    <Location id="i1959">
      <Coordinates>0. 0. 0.</Coordinates>
    </Location>
  </Position>
  <ExtrudedDirection xsi:type="IfcDirection" id="i1931">
    <DirectionRatios>0. 0. 1.</DirectionRatios>
  </ExtrudedDirection>
  <Depth>2000.</Depth>
</IfcExtrudedAreaSolid>
```

25 XML elements = down to 50%

17 XML elements = down to 34%

XML binding – Technical insights -2- cont.



or even in "simplier" form [note: no information loss]

```
<IfcExtrudedAreaSolid id="i1922" Depth="2000.">
  <SweptArea xsi:type="IfcRectangleProfileDef" id="i1925" ProfileType="area" ProfileName="1m x 1m rectangle"
    Xdim="1000." Ydim="1000." />
  <Position xsi:type="IfcAxis2Placement3D" id="i1928">
    <Location id="i1959" Coordinates="0. 0. 0." />
  </Position>
  <ExtrudedDirection id="i1931" DirectionRatios="0. 0. 1." />
</IfcExtrudedAreaSolid>
```

7 XML elements = down to 14%

Should this be the ifcXML in future ?!

Prospect

- get ifcXML right !
- attract more and also smaller software developers
- more and faster implementation for upcoming use cases

- proliferate !
- will be published with IFC4 (and model view definitions based on it)
- can be applied retrospectively to IFC2x3 (and its model view definitions)