

IFC4 – the new buildingSMART Standard

Official Release Date of buildingSMART's IFC4 – 12. March 2013

Official Release Date of ISO 16739 – 21. March 2013

What's new in IFC4 ?

presented by


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IFC4 – buildingSMART data standard for tomorrow


 IFC4 Documentation

+

Industry Foundation Classes Release 4 (IFC4)


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Industry Foundation Classes
IFC4 Official Release

Walt Disney Concert Hall Los Angeles California | Frank O. Gehry & Partners | Photo KH 2009

The specification has been developed in 1999-2013 by the  Model Support Group - MSG - of buildingSMART International Ltd.

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Comments, issues or any other feedback should be logged at the buildingSMART  [issue database](#)

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IFC4 as full ISO standard

Now: IFC4 as Full International Standard ISO 16739 (publication stage 60-60 as of 21.03.2013)



INTERNATIONAL STANDARD ISO 16739:2013(E)

First edition 2013-##-##

Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries

Classes de fondation d'industrie (IFC) pour le partage des données dans le secteur de la construction et de la gestion des installations

ISO 16739:2013(E)

PROOF/ÉPREUVE

ICS 25.040.40

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What is new, and why support IFC4

IFC4 at a glance

- enhances the capability of the IFC specification in its main architectural, building service and structural elements with new geometric, parametric and other features
- enables numerous new BIM workflows – including 4D and 5D model exchanges, manufacturer, product libraries, BIM to GIS interoperability, enhanced thermal simulations and sustainability assessments
- links all IFC property definitions to the buildingSMART data dictionary
- improves readability and ease of access to the documentation with numerous implementation concepts and fully linked examples
- contains ifcXML4 schema, fully integrated into the IFC specification in addition to the EXPRESS schema
- is fully integrated with new mvdXML technology and allows easy definition of data validation services for IFC4 data submissions
- corrects technical problems found since the release of the IFC2x3
- enables the extension of IFC to infrastructure and other parts of the built environment

Why implement IFC4 ?

- Keep your customers happy by improving your IFC support
- Take advantage of the technical improvements of IFC4
- Remember, it is now possible to formally support model view definitions and validate them
- Benefit from IFC the easy way with Simple ifcXML
- Broaden your IFC support with the new IFC4 objects and workflows – it will help you to attract new customers
- Reach a wider market with IFC4 – as a full ISO standard, it will become a pre-condition for tenders in some markets

Some facts ...

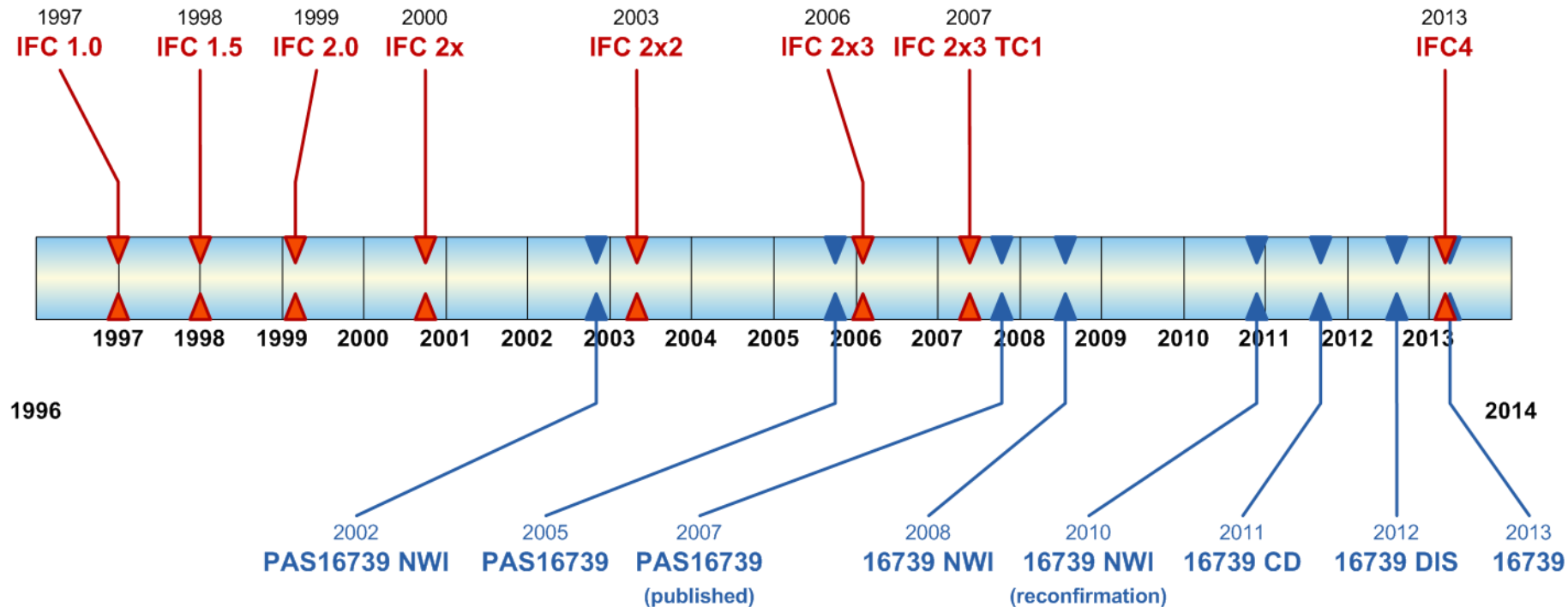
6 years of development

- **~ 8 person/year direct development effort**
 - Time spend by buildingSMART Model Support Group (50% volunteered)
 - More spend by external reviewers, project development teams, bSI community
- **> 1200 issues / proposals / change requests handled**
 - All are logged and are traceable at <http://www.buildingsmart.org/jira>
 - Each contributing to better coverage, higher quality, more precise documentation

Single goal: secure IFC as the true openBIM standard worldwide

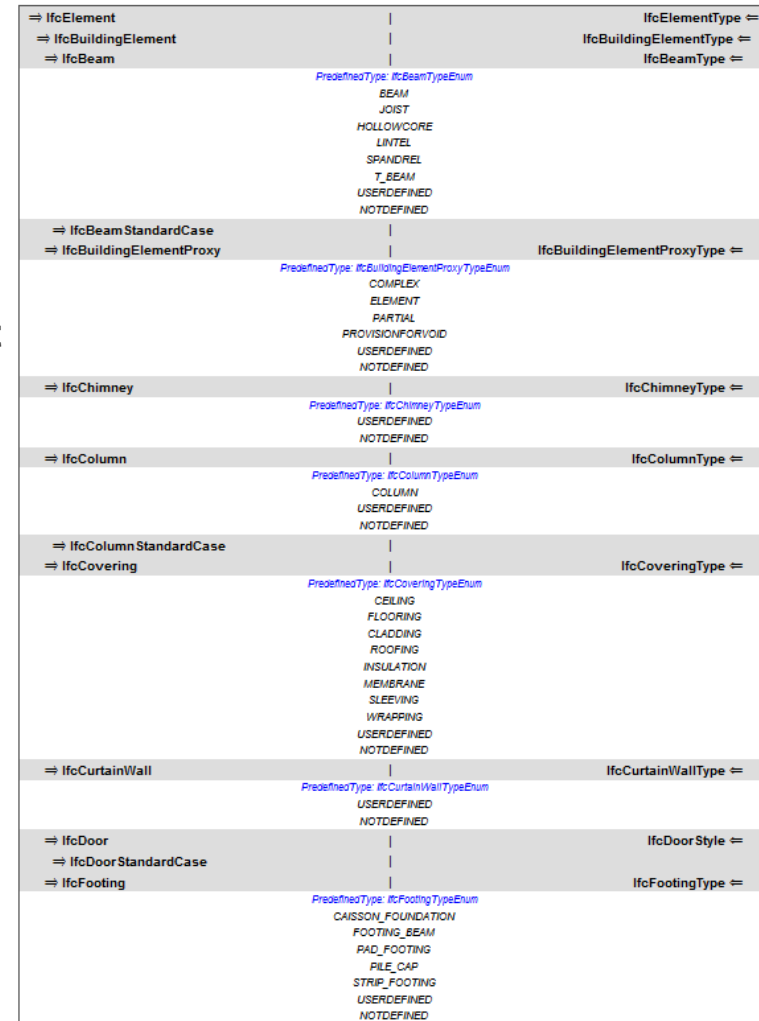
History of IFC Development

- IFC 1.0 to IFC 2.0 – early prototypes use: 2000 - 2002
- IFC 2x to IFC 2x2 – early adopters use: 2002 - 2008
- IFC 2x3 – in practical use today use: 2008 - 2016
- IFC 4 – forthcoming use: from 2014 onwards



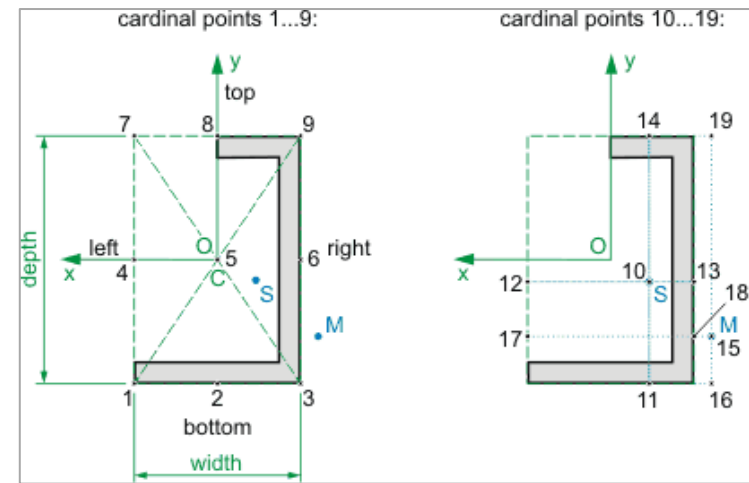
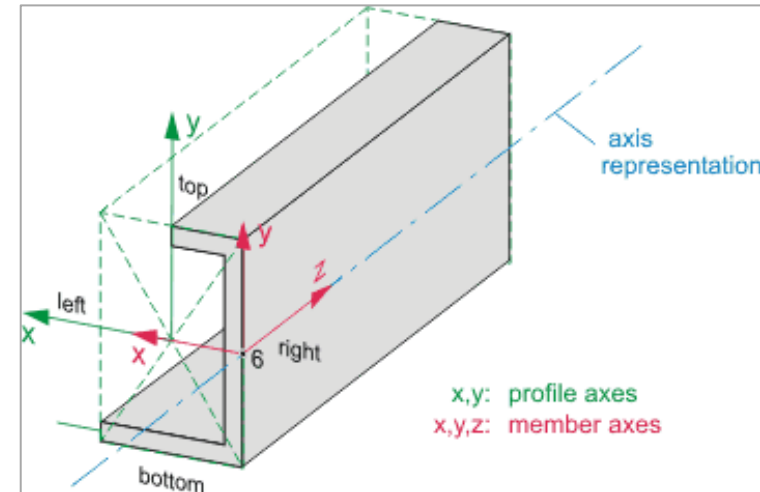
Major improvements – No.1

- **Consistency throughout the IFC schema**
 - Same concept, same modeling style
 - Reduction of the “multiple ways to do”
 - Symmetrical specialization trees
- **Complete the building / building service element catalogue**
 - Adding missing element types (like shading device, solar device, burner, communication appliance, or electric distribution board)
 - General overhaul of the building service and control definitions, and of port connectivity
- **Separation between general element definitions and parametric definitions**
 - Adding standard case definitions for elements



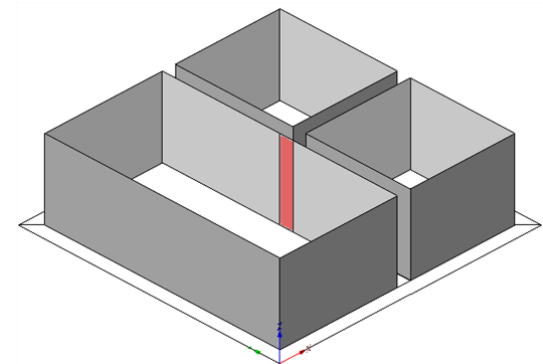
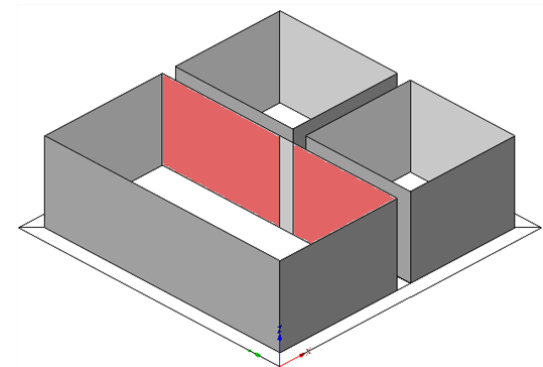
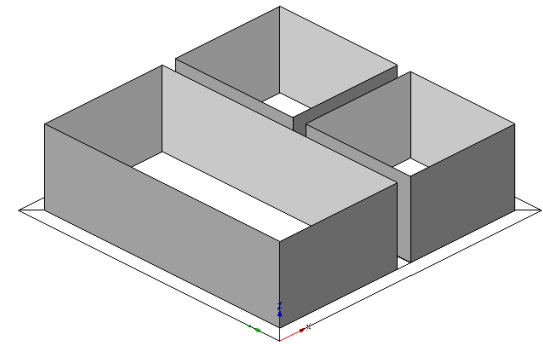
Major improvements – No.2

- **Structural steel and timber**
 - Definition of material profile association,
 - Alignment at a cardinal point,
 - Anisotropic material properties
- **Structural analysis and detailing**
 - Enhancement of analysis model
 - Better support of detailing (simplified multiple placements, e.g. for fasteners, rebar)
 - Foundations enhanced by types
- **Standardized quantities for QTO**
 - Definition of international base quantities, defined as separate XML schema + configuration files linked to IFC spec



Major improvements – No.3

- **Energy and other performance analysis**
 - Improvement of space boundaries, adding spatial zones and external spaces (against ground, water, air), shading devices
- **Environmental impact values**
 - Adding environmental impact indicators and values to elements and element types
- **Site planning**
 - General geographic feature element enabling basic site planning and GIS connection
- **GIS coordinate system transformation**
 - Enabling the mapping of a building design into a GIS system and vice versa



Major improvements – No.4

Major efficiency improvement

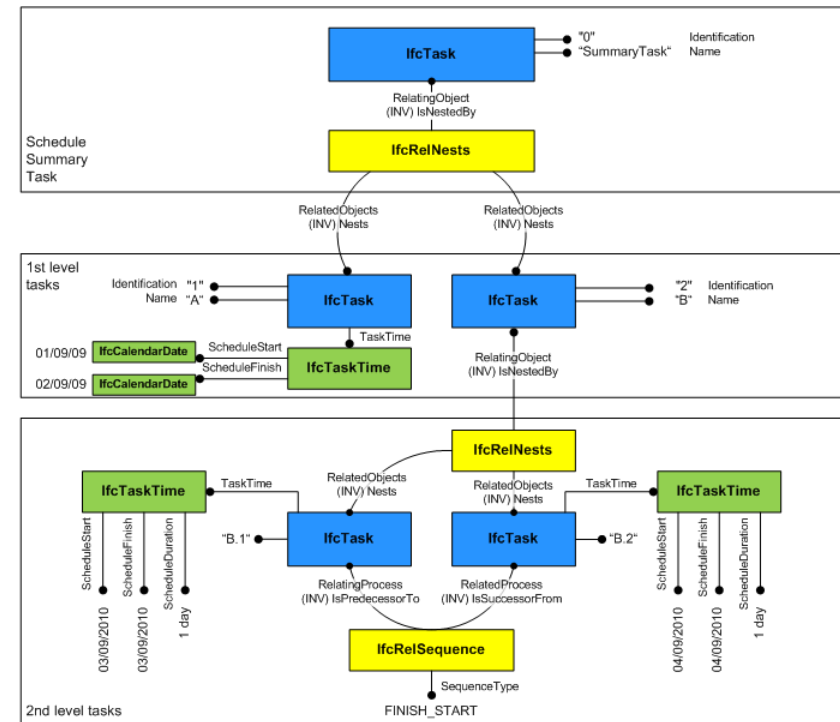
- Rework of the scheduling definitions, adding calendar support, switch to ISO 8601 time format, simplification of task relations.
- First prototypes show full support for MS Project and 75% decrease of model footprint

Add type/occurrence concept for processes

- Re-usable definitions for tasks, events and procedures

Major efficiency improvement for 5D

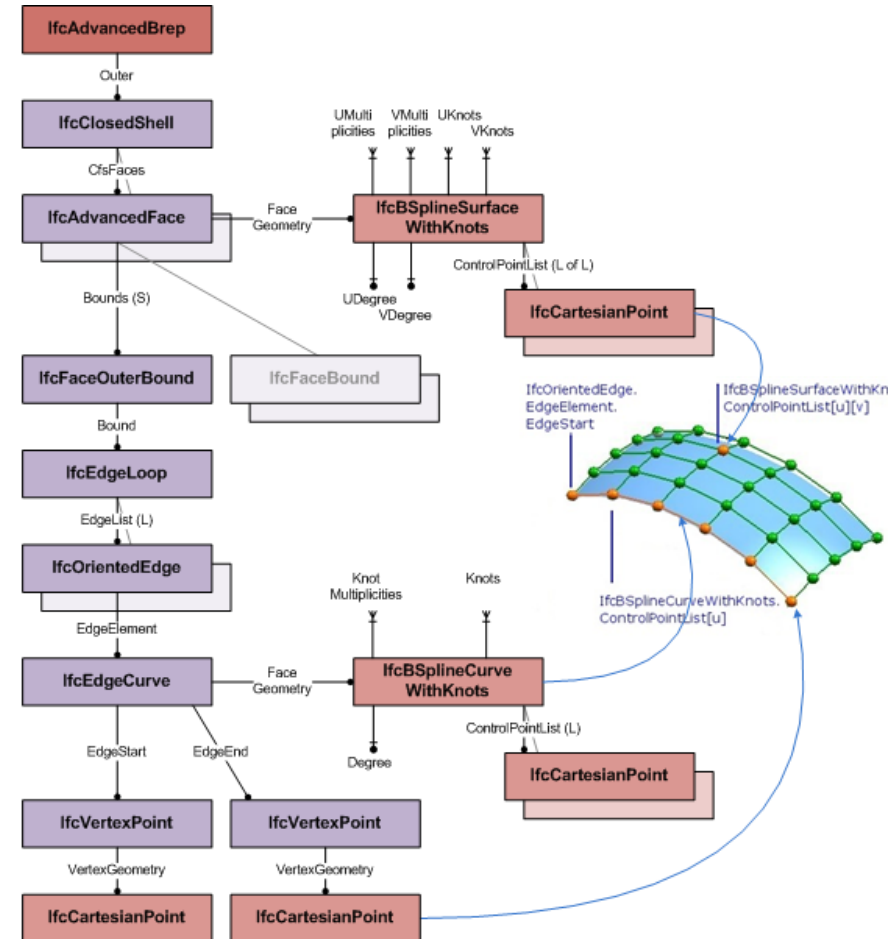
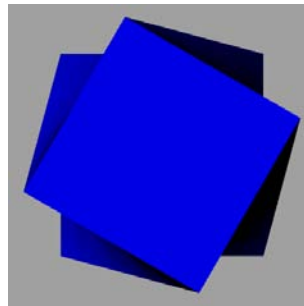
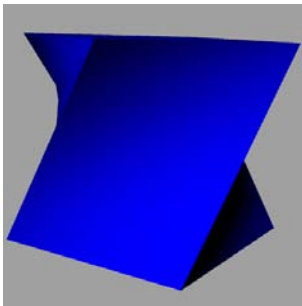
- Similar rework for cost items and construction resources, now linked to schedule and BIM



	Task Name	Duration	Start	Finish	Pre	Tue 01 Sep	Wed 02 Sep	Thu 03 Sep	Fri 04 Sep	Sat 05 Sep
1	A	2 days	Tue 01.09.09	Wed 02.09.09		0 6 12 18	0 6 12 18	0 6 12 18	0 6 12 18	0 6 12 18
2	B	2 days	Thu 03.09.09	Fri 04.09.09						
3	B.1	1 day	Thu 03.09.09	Thu 03.09.09						
4	B.2	1 day	Fri 04.09.09	Fri 04.09.09	3					

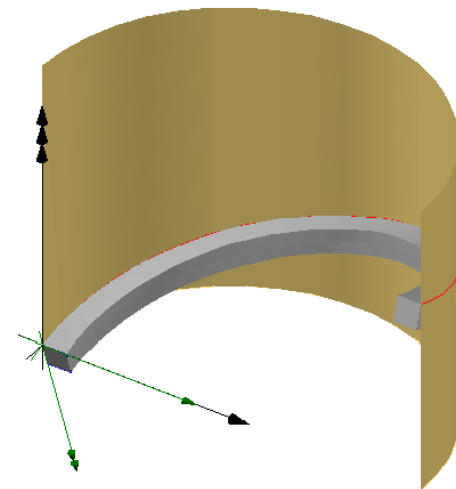
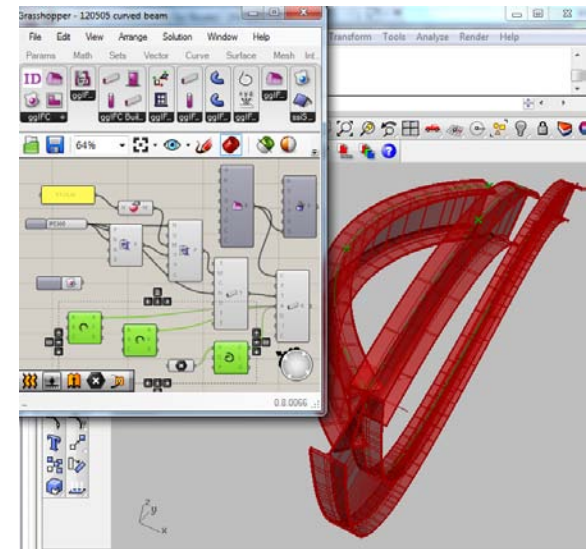
Major improvements – No.5

- **Enhancement of geometry resource**
 - Adding support for non-uniform rational b-spline representation (NURBS)



Major improvements – No.6

- **Enhancement of geometry resource**
 - Support for tapering in extrusions
 - Support for arbitrary sweeps
 - Non-planar surfaces and surface bounds



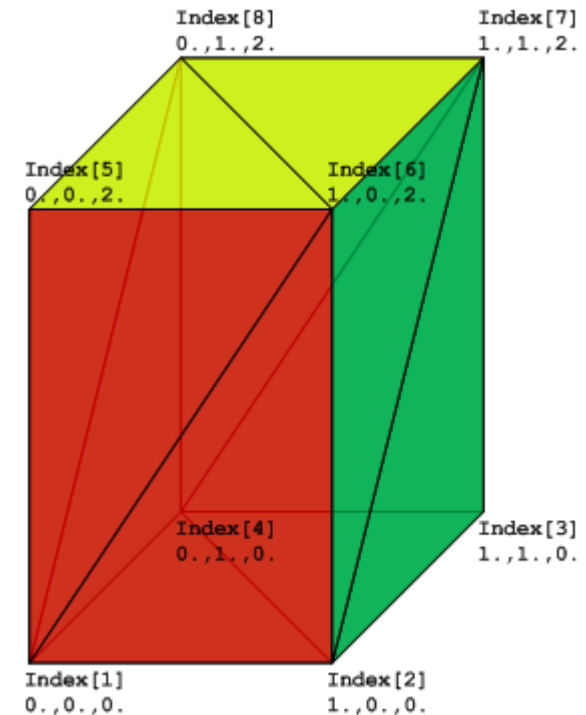
Major improvements – No.7

▪ Effective geometry for mobile applications

- Tessellated geometry
- with optional vectors per vertex
- with optional color per face
- with optional texture maps per face

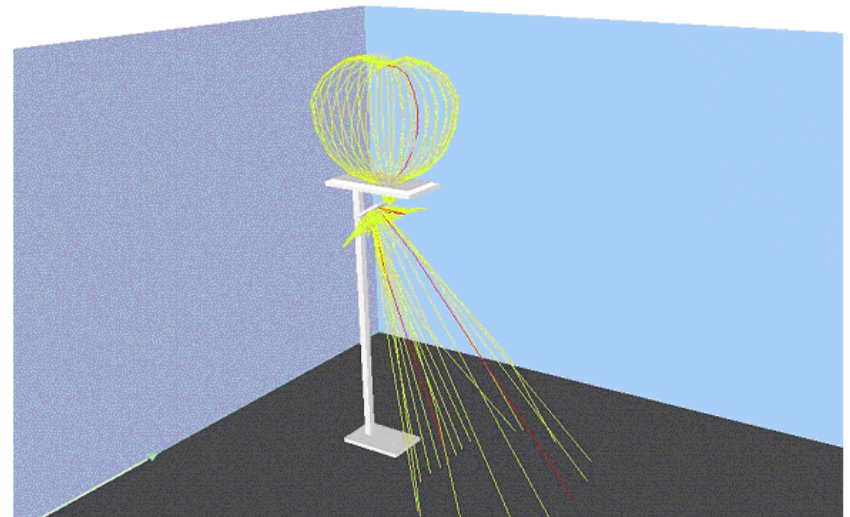
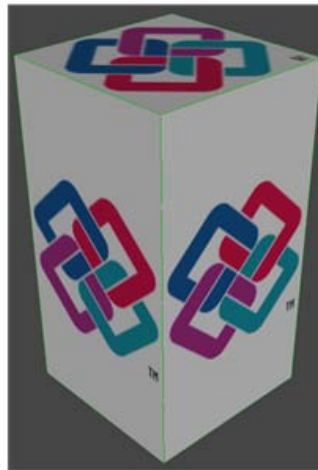
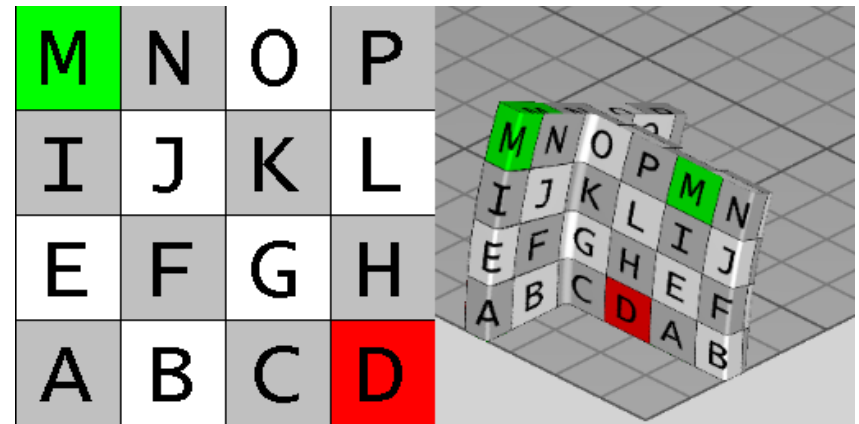
```
<IfcShapeRepresentation id="i1577060274" RepresentationIdentifier="Body" RepresentationType="Tessellation">  
  <ContextOfItems xsi:type="IfcGeometricRepresentationSubContext" xsi:nil="true" ref="i1577060223"/>  
  <Items>  
    <IfcTriangulatedFaceSet id="i1577060279" Closed="true"  
      CoordIndex="1 6 5 1 2 6 6 2 7 7 2 3 7 8 6 6 8 5 5 8 1 1 8 4 4 2 1 2 4 3 4 8 7 7 3 4">  
      <Coordinates xsi:type="IfcCartesianPointList3D" CoordList="-500. -500. 0. 500. -500. 0. 500. 500. 0.  
        -500. 500. 0. -500. -500. 2000. 500. -500. 2000. 500. 500. 2000. -500. 500. 2000."/>  
    </IfcTriangulatedFaceSet>  
  </Items>  
</IfcShapeRepresentation>
```

```
#1020= IFCSHAPEREPRESENTATION(#202,'Body','Tessellation',(#1021));  
/* tessellated surface representation by triangulation ----- */  
/* cube, 1m width, 1m depth, 2m height ----- */  
#1021= IFCTRIANGULATEDFACESET(#1022,$.T.,((1,6,5),(1,2,6),(6,2,7),(7,2,3),(7,8,6),(6,8,5),(5,8,1),  
  (1,8,4),(4,2,1),(2,4,3),(4,8,7),(7,3,4)),,$);  
#1022= IFCCARTESIANPOINTLIST3D((( -500., -500., 0.), (500., -500., 0.), (500., 500., 0.), (-500., 500., 0.),  
  (-500., -500., 2000.), (500., -500., 2000.), (500., 500., 2000.), (-500., 500., 2000.)));
```



Major improvements – No.8

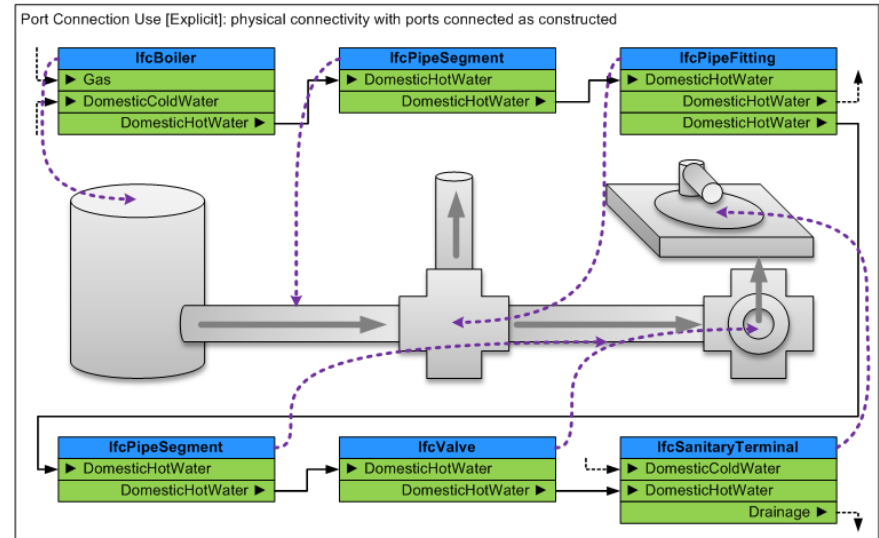
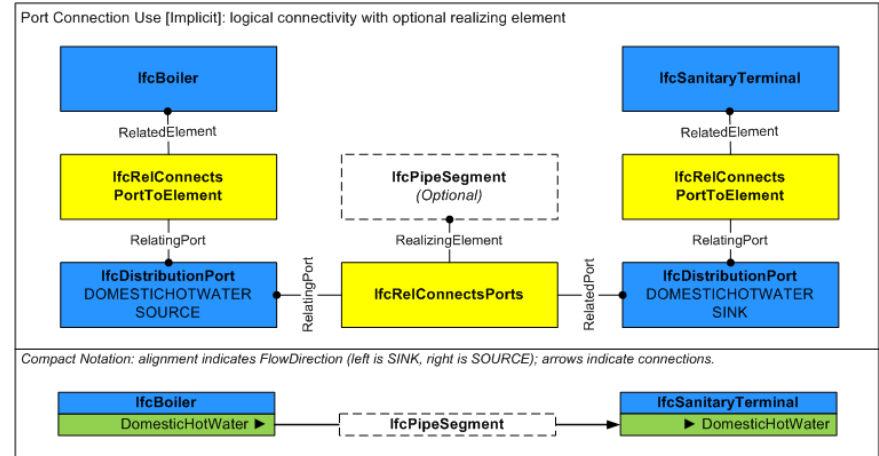
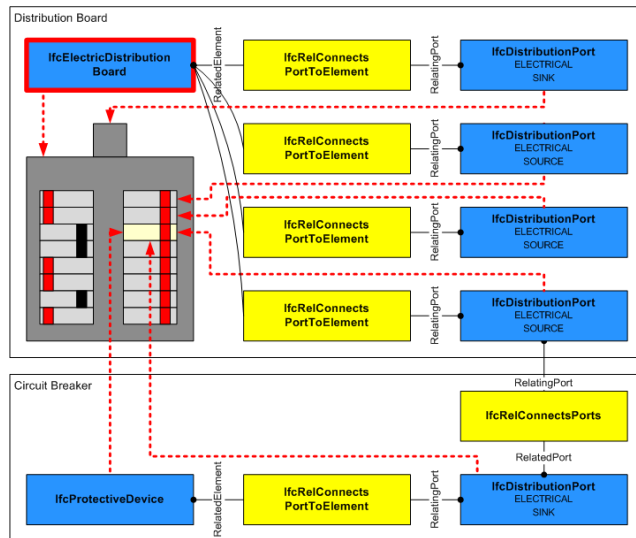
- **Enhancement of lighting and shading component**
 - texturing, including multi-textures
 - lighting, including light distribution
 - following the X3D standard



Major improvements – No.9

■ Connectivity and system models

- redesign of the building service part
- enhancements on connectivity
- port usage improved
- documentation update throughout



Major improvements – No.10

Property Set Definition

- covered by the following languages:
 - German “de-DE”
 - French “fr-FR”
 - Japanese “ja-JP”
 - Korean “ko-KR”
 - Chinese “zh-CN”

Quantity Set Definition

- covered by the following languages:
 - German “de-DE”
 - French “fr-FR”
 - Japanese “ja-JP”

Defined in XML Definitions rendered into IFC documentation

```
<PropertyDef ifdguid="a81efd00d20811e1800000215ad4efdf">
  <Name>Reference</Name>
  - <Definition>
    Reference ID for this specified type in this project (e.g. type 'A-1'). Used to store the non-classification driven
    internal project type.
  - <Definition>
    Reference ID for this specified type in this project (e.g. type 'A-1'). Used to store the non-classification driven
    internal project type.
  - <PropertyType>
    - <TypePropertySingleValue>
      <DataType type="IfcIdentifier"/>
    - <TypePropertySingleValue>
      <TypePropertySingleValue>
    - <PropertyType>
    - <NameAliases>
      <NameAlias lang="de-DE">Raumtyp</NameAlias>
      <NameAlias lang="fr-FR">Reference</NameAlias>
      <NameAlias lang="ja-JP">参照記号</NameAlias>
      <NameAlias lang="ko-KR">참조 ID</NameAlias>
    - <NameAliases>
    - <DefinitionAliases>
      - <DefinitionAlias lang="de-DE">
        Bezeichnung zur Zusammenfassung gleichartiger Räume zu einem Raumtyp (auch Funktionstyp genannt).
        Alternativ zum Namen des "Typobjekts", insbesondere wenn die Software keine Raumtypen als Typobjekte
        unterstützt.
      - <DefinitionAlias>
      - <DefinitionAlias lang="fr-FR">
        Référence à l'identifiant d'un type spécifié dans le contexte du projet (exemple : "type A1"). Utilisé pour
        enregistrer un type sans recourir à une classification.
      - <DefinitionAlias>
      - <DefinitionAlias lang="ja-JP">
        このプロジェクトにおける参照記号 (例: A-1)。分類コードではなく内部で使用するプロジェクトタイプとして使
        用されるもの。
      - <DefinitionAlias>
      - <DefinitionAlias lang="ko-KR">
        이 프로젝트의 참조 ID (예 : A-1). 분류 코드가 아닌 내부에서 사용되는 프로젝트 형식으로 사용됩니다.
      - <DefinitionAlias>
    - <DefinitionAliases>
  - <PropertyDef>
```

buildingSMART Data Dictionary

PSD-XML

Reference

P_SINGLEVALUE / IfcIdentifier

EN Reference: Reference ID for this specified type in this project (e.g. type 'A-1'). Used to store the non-classification driven internal project type.

DE Raumtyp: Bezeichnung zur Zusammenfassung gleichartiger Räume zu einem Raumtyp (auch Funktionstyp genannt). Alternativ zum Namen des "Typobjekts", insbesondere wenn die Software keine Raumtypen als Typobjekte unterstützt.

FR Reference: Référence à l'identifiant d'un type spécifié dans le contexte du projet (exemple : "type A1"). Utilisé pour enregistrer un type sans recourir à une classification.

JP 参照記号: このプロジェクトにおける参照記号 (例: A-1)。分類コードではなく内部で使用するプロジェクトタイプとして使用されるもの。

KO 참조 ID: 이 프로젝트의 참조 ID (예 : A-1). 분류 코드가 아닌 내부에서 사용되는 프로젝트 형식으로 사용됩니다.

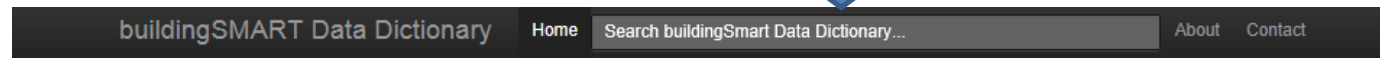
Major improvements – No.11

```
<PropertyDef ifdguid="f7d662e01ac3437c813a29287858ec80">
```

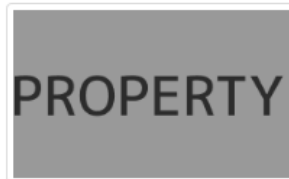
IFD GUID

```
<Name>IsExternal</Name>
- <PropertyType>
  - <TypePropertySingleValue>
    <DataType type="IfcBoolean"/>
  </TypePropertySingleValue>
</PropertyType>
<Definition>Indication whether the element is designed for use in the exterior (TRUE) or not (FALSE). If (TRUE) it is an external element and faces the outside of the building.</Definition>
- <NameAliases>
  <NameAlias lang="de-DE">Außenbauteil</NameAlias>
  <NameAlias lang="fr-FR">Est extérieur</NameAlias>
  <NameAlias lang="ja-JP">外部区分</NameAlias>
  <NameAlias lang="zh-CN">是否外部构件</NameAlias>
</NameAliases>
```

Integration of IFC content in IFD



Concept of type IfdPSetProperty



Pset_ColumnCommon.IsExternal |

Indication whether the element is designed for use in the exterior (TRUE) or not (FALSE). If (TRUE) it is an external element and faces the outside of the building.

column common . is external |

Details

GUID 1tk6u0qSeHuO00025QrESV
Version id 1
Version date 2012.07.19 19:52:12
Status DRAFT
Type PROPERTY

Major improvements – No.12

New richness of extensible property and quantity definitions

- Direct mapping from old Property Set Definition (PSD) format to new property templates
- Fully automated schema validation of buildingSMART and regional property set definitions supported
- Integration of **multiple** language references
- Publication of full list of IFC Property Sets (all-in-one-file) as
 - An IFC definition file, utilizing new property set and property templates (*IFC4.ifc*)
 - An ifcXML definition file, utilizing new property set and property templates (*IFC4.ifcxml*)
 - Lookup <http://> for each property set into the buildingSMART data dictionary
 - Fully rendered Web-pages

Property and quantity templates

Property sets and quantity sets are defined within IFC-SPF and IFC-XML files.

Description	ASCII file	HTML file
IFC-SPF property and quantity templates	ifc4.ifc	
IFC-XML property and quantity templates	ifc4.ifcxml	

Major improvements – No.13

Full integration of simple ifcXML into IFC4 specification

- the simple ifcXML transformation is included in IFC4 development tools and specification
- IFC4 documentation is bilingual (no separate deliverables for IFC EXPRESS and XSD)
- Same IFC documentation can be used for IFC EXPRESS and ifcXML developments

Schemas are also published at the following URLs:

- **IFC EXPRESS:** <http://www.buildingsmart-tech.org/ifc/IFC4/final/IFC4.exp>
- **ifcXML XSD:** <http://www.buildingsmart-tech.org/ifcXML/IFC4/final/ifcXML4.xsd>
- **ifcXML Config:** http://www.buildingsmart-tech.org/ifcXML/IFC4/final/config/ifcXML4_config.xml

Schema definitions

This schema is defined within EXPRESS and XSD files.

Description	ASCII file	HTML file
IFC EXPRESS long form schema	ifc4.exp	ifc4.exp.htm
IFC XSD long form schema	ifcXML4.xsd	ifcXML4.xsd.htm

XSD Specification:

```
<xs:element name="IfcWindowType" type="ifc:IfcWindowType" substitutionGroup="ifc:IfcBuildingElement"
nillable="true"/>
<xs:complexType name="IfcWindowType">
  <xs:complexContent>
    <xs:extension base="ifc:IfcBuildingElementType">
      <xs:attribute name="PredefinedType" type="ifc:IfcWindowTypeEnum" use="optional"/>
      <xs:attribute name="PartitioningType" type="ifc:IfcWindowTypePartitioningEnum" use="optional"/>
      <xs:attribute name="ParameterTakesPrecedence" type="xs:boolean" use="optional"/>
      <xs:attribute name="UserDefinedPartitioningType" type="ifc:IfcLabel" use="optional"/>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

EXPRESS Specification:

```
ENTITY IfcWindowType
SUBTYPE OF IfcBuildingElementType;
  PredefinedType          : IfcWindowTypeEnum;
  PartitioningType        : IfcWindowTypePartitioningEnum;
  ParameterTakesPrecedence : OPTIONAL BOOLEAN;
  UserDefinedPartitioningType: OPTIONAL IfcLabel;
WHERE
  CorrectPredefinedType : (PredefinedType <> IfcWindowTypeEnum.USERDEFINED) OR ((PredefinedType =
                                                                    IfcWindowTypeEnum.USERDEFINED) AND EXISTS(SELf\IfcElementType.ElementType
END_ENTITY;
```

EXPRESS-G diagram

Major improvements – No.14

A single solid in ifcXML for IFC2x3

50 XML lines = 100%

```
<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>

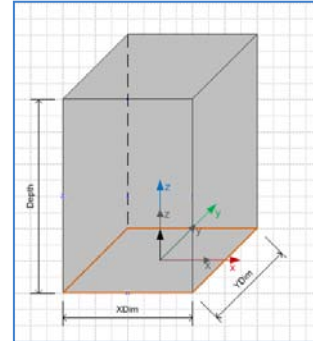
<IfcAxis2Placement3D id="i1308624494">
  <Location>
    <IfcCartesianPoint xsi:nil="true" ref="i1308624433"/>
  </Location>
</IfcAxis2Placement3D>
```

```
<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>

<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>
        </Position>
      </IfcAxis2Placement2D>
    </IfcAxis2Placement2D>
  </Position>
</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>
```

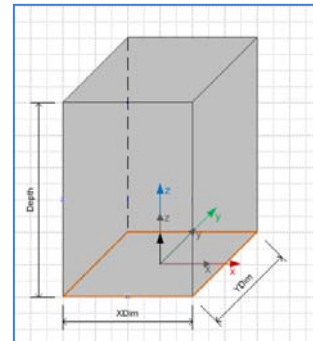


Same single solid in ifcXML4

7 XML lines = down to 14%

```
<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>
```

6 times more efficient



Major improvements – No.15

- **Documentation improvement**
 - Documentation, explanations and many examples are added to improve understanding and readability of the spec
 - direct URL addressing of each IFC construct (entity, type, pset, etc.)

4.4.2.7.6 Body Brep Geometry

The *Body Brep Geometry* is the representation of the 3D shape of a product by faceted boundary representation models.

The following attribute values for the `IfcShapeRepresentation` holding this geometric representation shall be used:

- `IfcShapeRepresentation.RepresentationIdentifier = 'Body'`
- `IfcShapeRepresentation.RepresentationType = 'Brep'`
- `IfcShapeRepresentation.Items = IfcFacetedBrep`

Figure 47 illustrates an instance diagram.

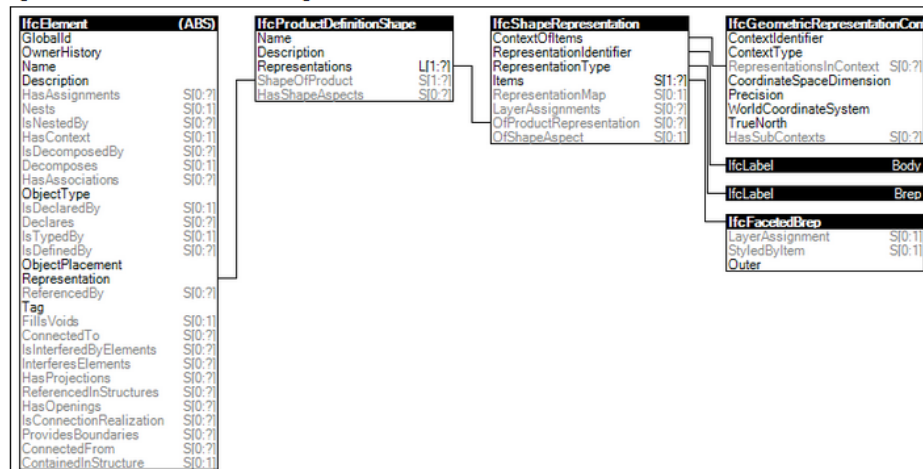


Figure 47 – Body Brep Geometry

■ [Link to this page](#)

Based on the composed URL:

<IFC specification URL/>+<release name/>+<version/>+<html/>+<link/>+<name of IFC construct>+<.htm>

Each IFC entity, type, property set or quantity has its own URL, for example:

<http://buildingsmart-tech.org/ifc/IFC4/final/html/link/IfcBeamStandardCase.htm>

<http://buildingsmart-tech.org/ifc/IFC4/final/html/link/IfcBeamTypeEnum.htm>

http://buildingsmart-tech.org/ifc/IFC4/final/html/link/Pset_BeamCommon.htm

http://buildingsmart-tech.org/ifc/IFC4/final/html/link/QTO_BeamBaseQuantities.htm

Major improvements – No.16

Full integration of mvdXML into IFC4 specification

- Concept templates (chapter 4)
- Concepts assigned to roots (chapter 5,6,7)
- mvdXML available as baseline to MVD developers

Common Use Definitions

The following concepts are inherited at supertypes:

- IfcRoot: [Identity](#), [Revision Control](#)
- IfcElement: [Product Placement](#), [Box Geometry](#), [FootPrint Geometry](#), [Body SurfaceOrSolidModel Geometry](#), [Body Tessellation Geometry](#), [Body Brep Geometry](#), [Body AdvancedBrep Geometry](#), [I Geometry](#)
- IfcBuildingElement: [Surface 3D Geometry](#)

[Instance diagram](#)

Object Typing

The [Object Typing](#) concept applies to this entity as shown in Table 80.

Type
IfcBeamType

Table 80 – IfcBeam Object Typing

Property Sets for Objects

The [Property Sets for Objects](#) concept applies to this entity as shown in Table 81.

PredefinedType	Name
	Pset_BeamCommon
	Pset_ReinforcementBarPitchOfBeam

A.1 Common Use Definitions

Model view definition

Model view definitions are defined within MVD-XML files.

Description	ASCII file
MVD-XML model view definitions	IFC4.mvdxml

Major improvements – No.17

■ IFC4 unit test case examples

- A set of unit test cases added to the IFC4 documentation
- Each with a downloadable ifc file, and a fully commented and linked html file
- Link also from the entity definition to all available unit test files (to be extended)

E.2.1 CSG primitive

The block geometry can be expressed using the constructive solid geometry model, expressing it as a CSG primitive.

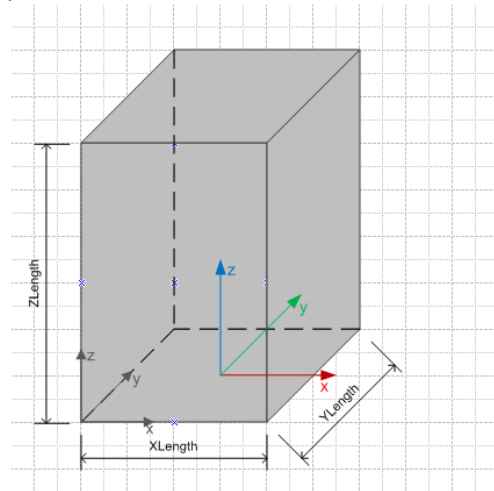


Figure E2 – Basic shape represented as CSG primitive

Figure E2 shows the block geometry represented by an CSG primitive.

- Proxy with IfcShapeRepresentation RepresentationType="CSG" with hyperlinks
- Proxy with IfcShapeRepresentation RepresentationType="CSG" source file

```
/* each IFC data set containing elements in a building context has to include a building ----- */
/* at absolute minimum (could have a site and stories as well) ----- */
#500= IFCBUILDING ('2FC2DorxHDT8NI01kdXi8P', $, 'Test Building', $, $, #511, $, $, .ELEMENT., $, $, $);
/* if the building is the uppermost spatial structure element it defines the absolut position -- */
#511= IFCLOCALPLACEMENT ($, #512);
/* no rotation - z and x axes set to '$' are therefore identical to "world coordinate system" -- */
#512= IFCAXIS2PLACEMENT3D (#901, $, $);
/* if the building is the uppermost spatial structure element it is assigned to the project ---- */
#519= IFCRELAGGREGATES ('2YBqaV_8L15eWJ9DA1sGmT', $, $, $, #100, (#500));

/* shared coordinates - it is permissible to share common instances to reduce file size ----- */
#901= IFCARTESIANPOINT ((0.,0.,0.));
#902= IFCDIRECTION ((1.,0.,0.));
#903= IFCDIRECTION ((0.,1.,0.));
#904= IFCDIRECTION ((0.,0.,1.));
#905= IFCDIRECTION ((-1.,0.,0.));
#906= IFCDIRECTION ((0.,-1.,0.));
#907= IFCDIRECTION ((0.,0.,-1.));

/* ----- */
/* proxy element with CSG shape representation, assigned to the building ----- */
#1000= IFCBUILDINGELEMENTPROXY ('1kTvXnbbzCWw8lcMdlR4o', $, 'P-1', 'sample CSG', $, #1001, #1010, $, $);
/* proxy element placement relative to the building ----- */
#1001= IFCLOCALPLACEMENT (#511, #1002);
/* set local placement to 1 meter on x-axis, and 0 on y, and 0 on z axes ----- */
#1002= IFCAXIS2PLACEMENT3D (#1003, $, $);
/* no rotation - z and x axes set to '$' are therefore identical to those of building ----- */
#1003= IFCARTESIANPOINT ((1000.,0.,0.));
/* proxy element shape representation ----- */
#1010= IFCPRODUCTDEFINITIONSHAPE ($, $, (#1020));
/* a single shape representation of type 'CSG' is included ----- */
#1020= IFCSHAPE REPRESENTATION (#202, 'Body', 'CSG', (#1021));
/* CSG representation consisting of a single primitive ----- */
/* box, 1m width, 1m depth, 2m height ----- */
#1021= IFC CSG SOLID (#1022);
#1022= IFCBLOCK (#1023, 1000., 1000., 2000.);
#1023= IFCAXIS2PLACEMENT3D (#1024, $, $);
#1024= IFCARTESIANPOINT ((-500., -500., 0.));

/* proxy element assigned to the building ----- */
#10000= IFCRELCONTAINEDINSPATIALSTRUCTURE ('2TnxZkT08eDuMuhUUFNy', $, 'Physical model', $, $, #1000, #500);

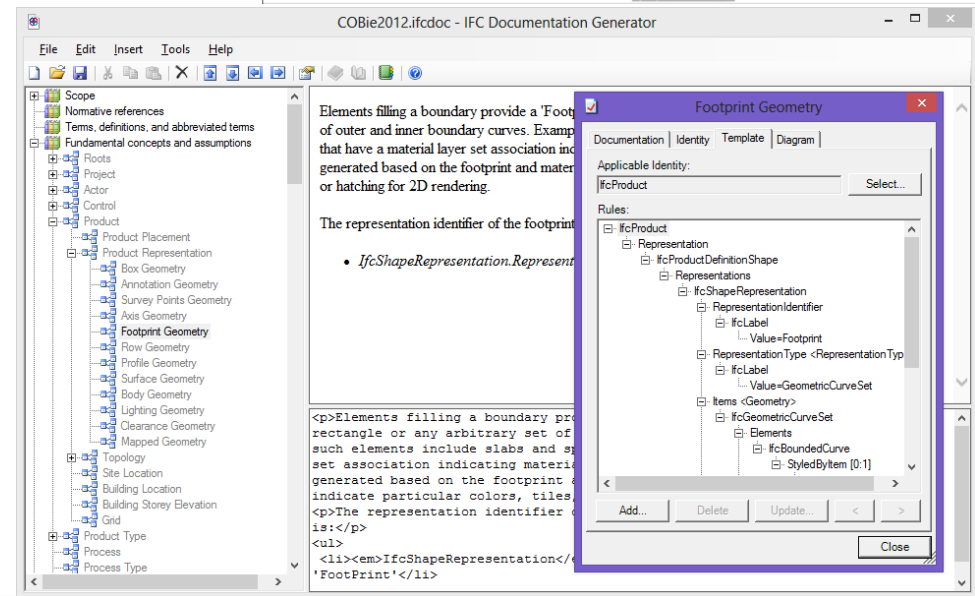
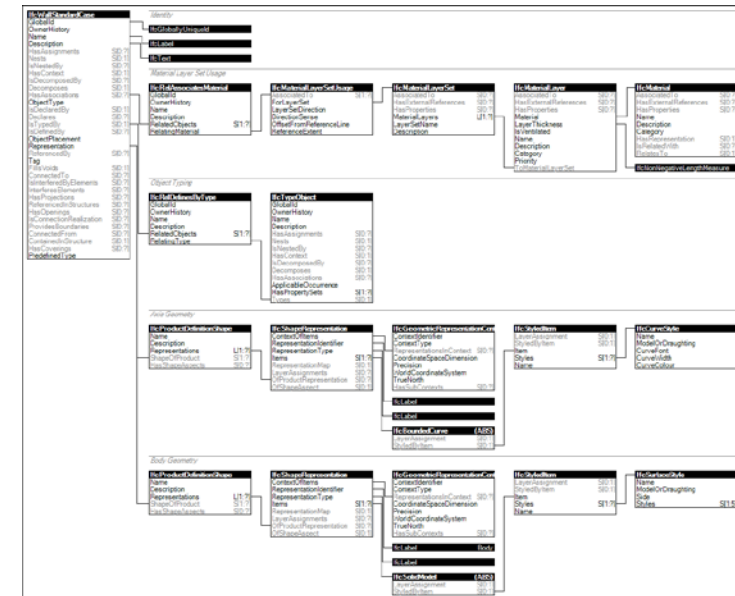
ENDSEC;
END-ISO-10303-21;
```

Each instance linked to the entity specification

Major improvements – No.18

IFC-DOC tool – new case tool for IFC

- Windows utility used for producing IFC documentation and Model View Definitions
- IFC4 documentation automated to ensure consistency and cross-linking
- Generates HTML, diagrams, schemas (EXPRESS, XSD), and all documentation.
- Create Model View Definitions in mvdXML format, validate IFC files against MVDs
- Edit definitions, property and quantity sets, concepts, templates, translations.
- Upload and download to bSI Repository
- Free and open source for bSI members
- Download at www.buildingsmart-tech.org



IFC4 on the web – published today !



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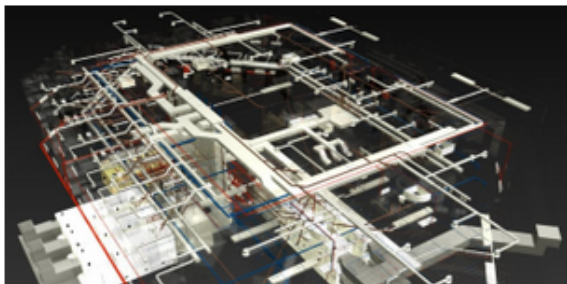
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IFC4 Release Summary

by [Thomas Liebich](#) — last modified Mar 11, 2013 04:30 PM



IFC4 Release

Official landing page to publish the current IFC4 release. It contains the downloads of the IFC4 specification and the EXPRESS and XSD schema. Additional links to IFC4 related resources will be published here as well.

IFC4 specification downloads

> download EXPRESS file <				> online IFC EXPRESS schema location <
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> download HTML documentation <				> online access to HTML documentation <

IFC4 development resources and documents

Links to upcoming development resources and other implementation documentation will be gradually published here. In the meantime, please check the publication of the intermediate [pre releases of IFC4](#) for additional information and examples.

Specifications

- [IFC Overview](#)
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<http://www.buildingsmart-tech.org/specifications/ifc-releases/ifc4-release>