Unveiling IFC2x4

the Next Generation of openBIM Interoperability

buildingSMART

Dr Thomas Liebich (AEC3)
buildingSMART International, MSG Lead

Highlights

New foundation for openBIM for the upcoming minimum five years

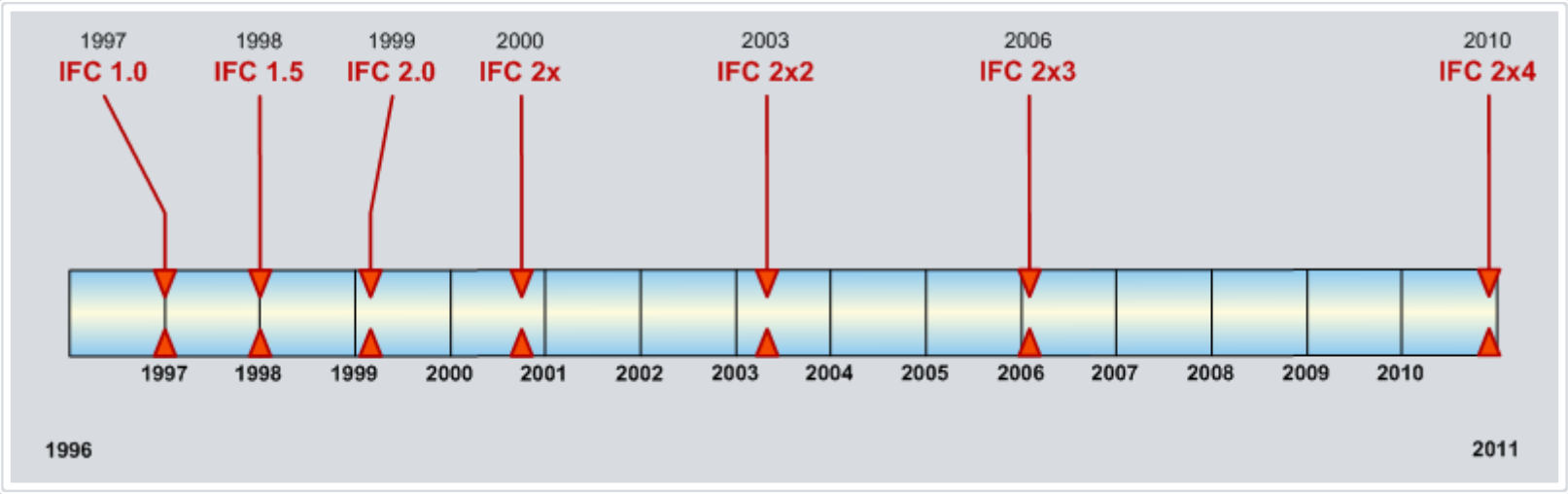
First major enhancement of IFC since 2003 (release of IFC2x2)

Longest development cycle and review period in IFC history

Quality over speed in release management

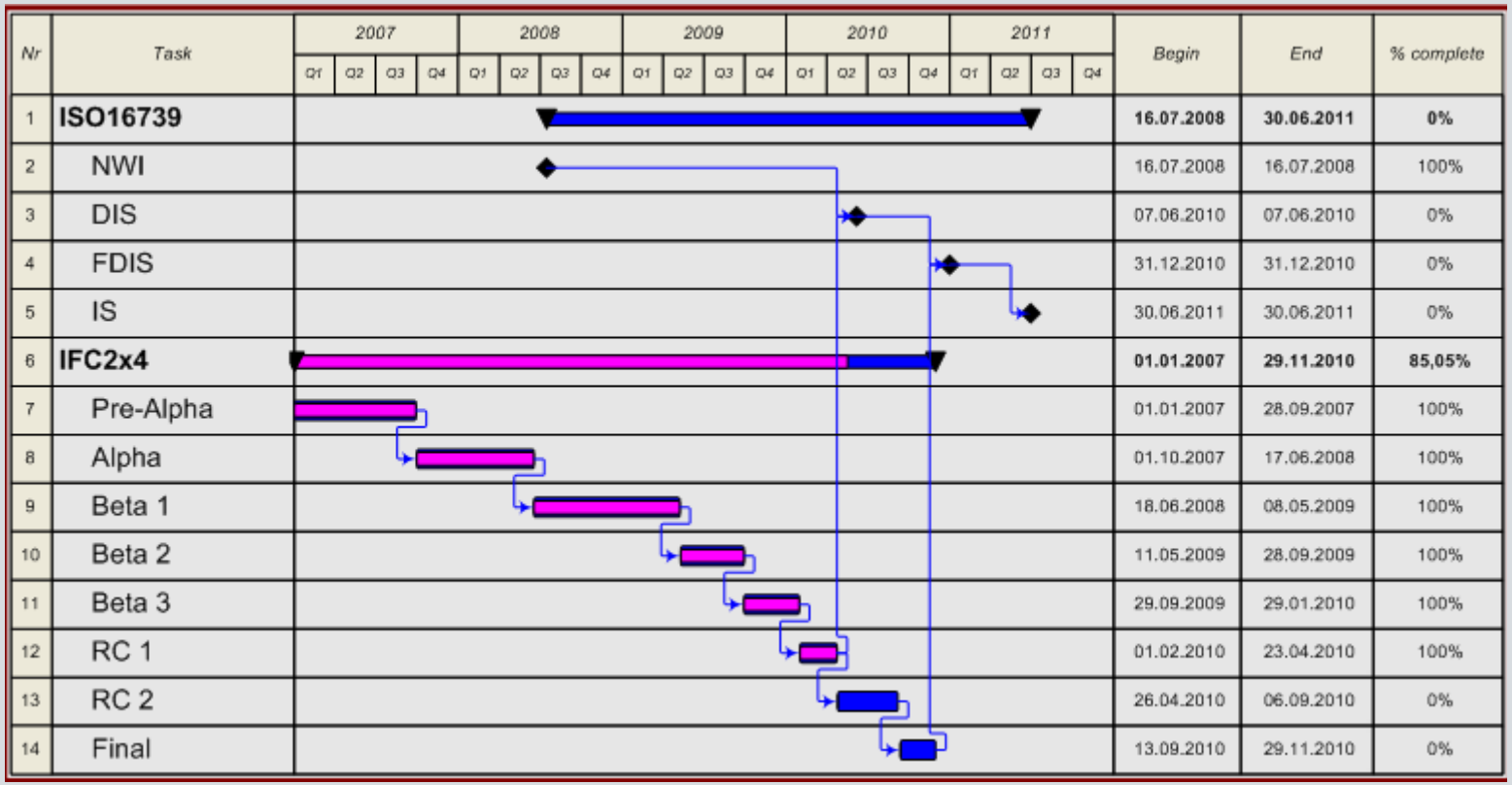
Targeted to be a full ISO standard

IFC development history



buildingSMART

IFC2x4 release plan



Nr	Task	Begin	End	% complete
1	**ISO16739**	**16.07.2008**	**30.06.2011**	**0%**
2	NWI	16.07.2008	16.07.2008	100%
3	DIS	07.06.2010	07.06.2010	0%
4	FDIS	31.12.2010	31.12.2010	0%
5	IS	30.06.2011	30.06.2011	0%
6	**IFC2x4**	**01.01.2007**	**29.11.2010**	**85,05%**
7	Pre-Alpha	01.01.2007	28.09.2007	100%
8	Alpha	01.10.2007	17.06.2008	100%
9	Beta 1	18.06.2008	08.05.2009	100%
10	Beta 2	11.05.2009	28.09.2009	100%
11	Beta 3	29.09.2009	29.01.2010	100%
12	RC 1	01.02.2010	23.04.2010	100%
13	RC 2	26.04.2010	06.09.2010	0%
14	Final	13.09.2010	29.11.2010	0%

IFC2x4 as full ISO standard

Currently Publicly Available Specification ISO/PAS 16739

New work item NWI started in 2008 to transpose IFC2x4 as ISO/IS

IFC2x4 release candidate as input for draft international standard DIS

- Rework according to ISO supplementary directive (documentation format)
- Submission for ballot by all national members of ISO TC184/SC4
- Depending on results (1) rework, (2) submission as FDIS, (3) IS

Final target ISO/IS 16739 in 2011

Major input into IFC2x4 development

Multiple intensive reviews of previous developments + lessons learnt

First time to value quality over speedy release cycles

Lessons learnt from intensive IFC2x3 implementation and certification

External review by many domain and software teams in various chapters

buildingSMART IFC development projects

IFG – necessary BIM information to connect to GIS world

IFD – extension to enable external libraries and dictionaries

PM4 – standardized base quantities for spaces and building elements

EL2 – electrical installations in buildings

ST6 – CIS/2 to IFC harmonization (plus structural steel and pre-cast projects)

Some facts ...

4 years of development

~ 6 person/year direct development effort

Time spend in buildingSMART International Model Support Group (50% volunteered)

More spend by external reviewers, project development teams, bSI community

> 1100 issues / proposals / change requests handled

All are logged and are traceable at http://www.iai-tech.org/jira

Each contributing to better coverage, higher quality, more precise documentation

target: secure IFC to remain the true openBIM standard worldwide

New IFC2x4 specification layout

buildingSMART

Major improvements – an extract – 1

Consistency throughout the IFC schema

Same concept, same modeling style

Reduction of the “multiple ways to do”

Symmetrical specialization trees

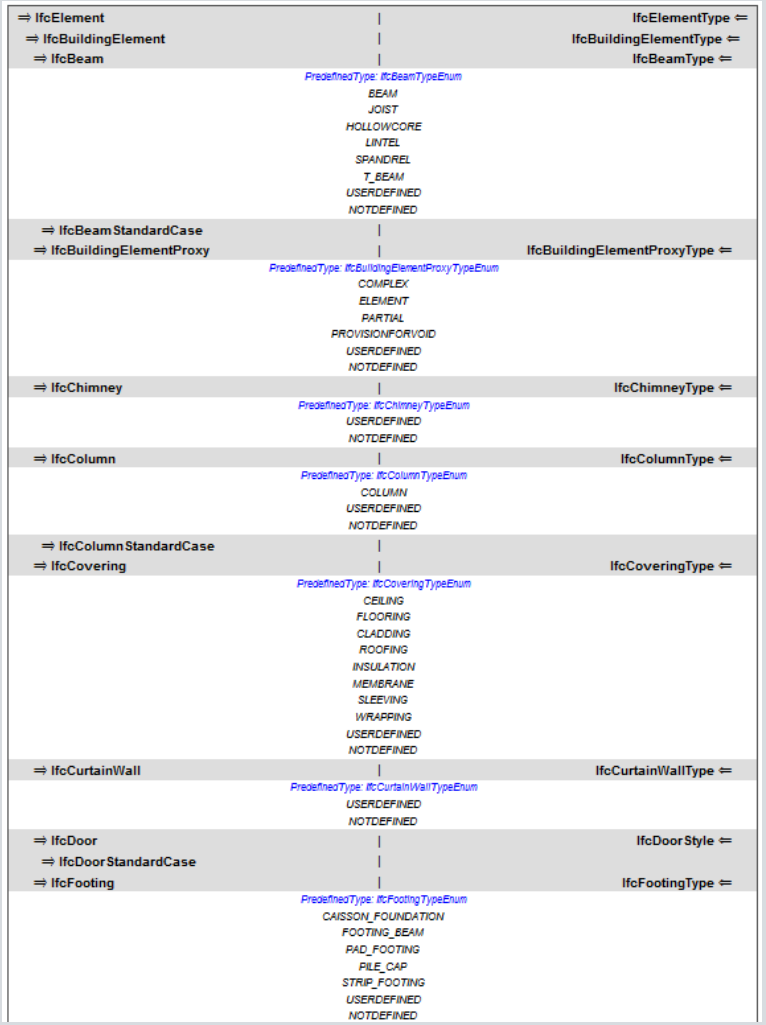
Complete the building / building service element catalogue

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



buildingSMART

Major improvements – an extract – 2

Structural steel and timber

Definition of material profile association, Alignment at a cardinal point, anisotropic material properties

Structural analysis and detailing

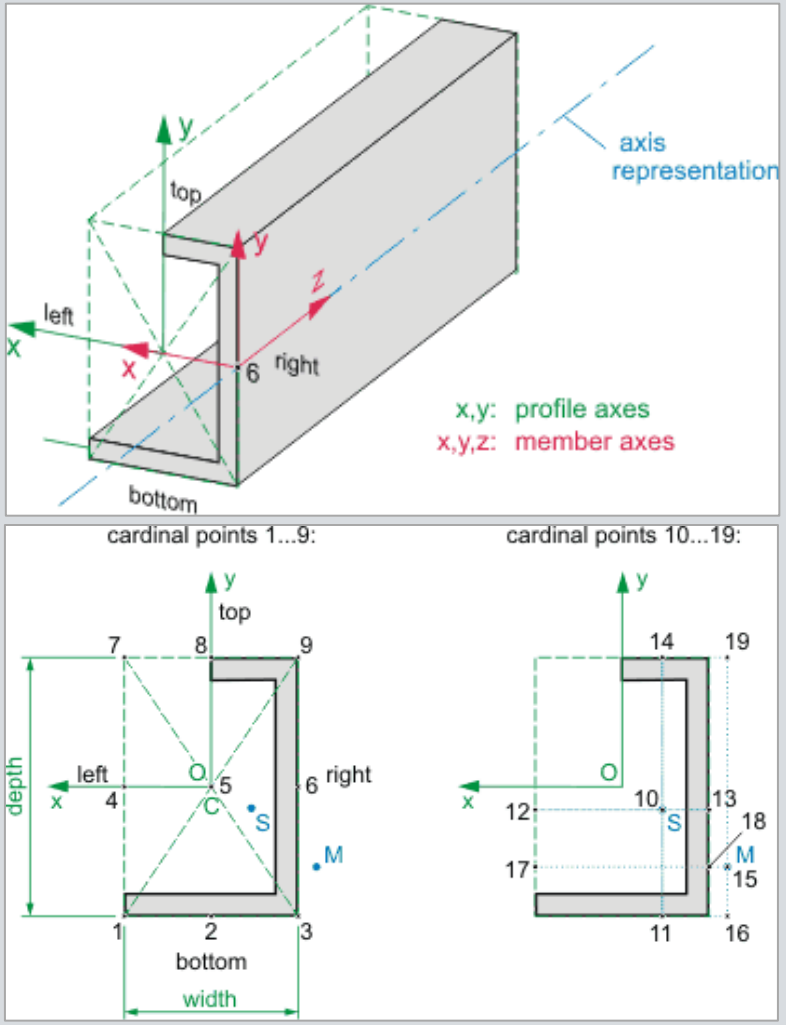
Enhancement of analysis model

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



buildingSMART

Major improvements – an extract – 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

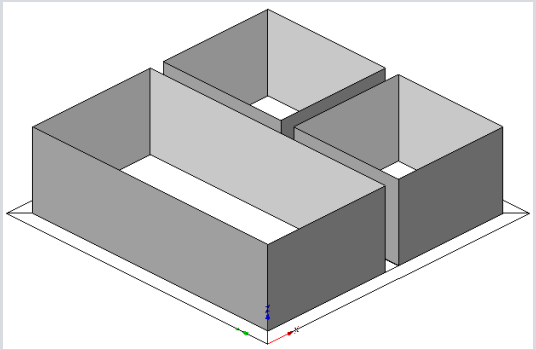
Adding environmental impact indicators and values to elements and element types

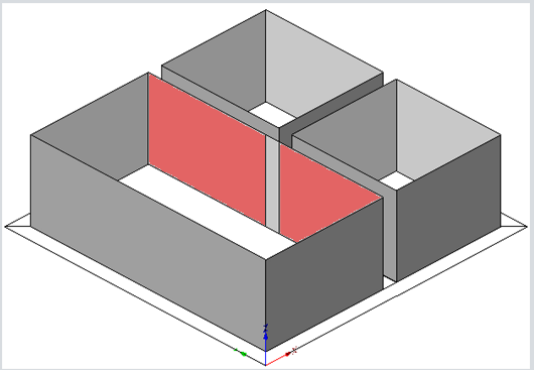
Site planning

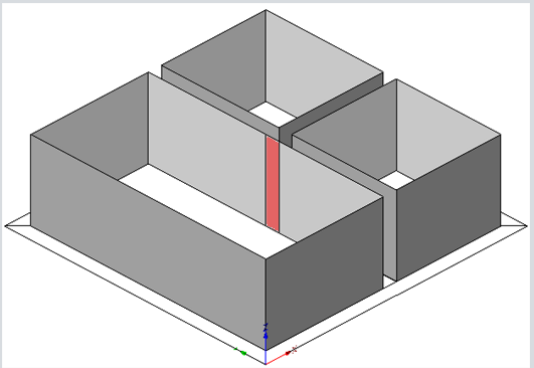
General geographic feature element enabling basic site planning and GIS connection

GIS coordinate system transformation

Enabling the mapping of a building design into a GIS system and vice versa







Major improvements – an extract – 4

Multi-lingual property sets

Property sets defined as separate XML schema + configuration files including aliases in different languages – linked to IFC spec

So far French and German, more to follow

Major efficiency improvement for 4D

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

Major efficiency improvement for 5D

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

Name	Definition
Reference • **de-DE**:Bemusterung • **fr-FR**: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-DE**:Identifikator der projektinternen Referenz für diesen Raum, z.B. nach der Raumklassifizierung des Bauherrn, wie "Büroraum Klasse 1" • **fr-FR**:Référence à l'identifiant d'un type spécifié dans le contexte de ce projet (exemple : "type A1"). A fournir s'il n'y a pas de référence à une classification en usage.
FloorCovering • **de-DE**:Bodenbelag • **fr-FR**:RevetementSol	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. • **de-DE**:Angabe des Materials für den Bodenbelag. Diese Angabe wird im Raumbuch verwendet und oft im Raumstempel angezeigt. • **fr-FR**:Indication sur la nature du revêtement de sol.
WallCovering • **de-DE**:Wandbekleidung • **fr-FR**:RevetementMur	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. • **de-DE**:Angabe des Materials für die Wandbekleidung, oder den Wandbelag Diese Angabe wird im Raumbuch verwendet und oft im Raumstempel angezeigt. • **fr-FR**:Indication sur la nature du revêtement de mur.

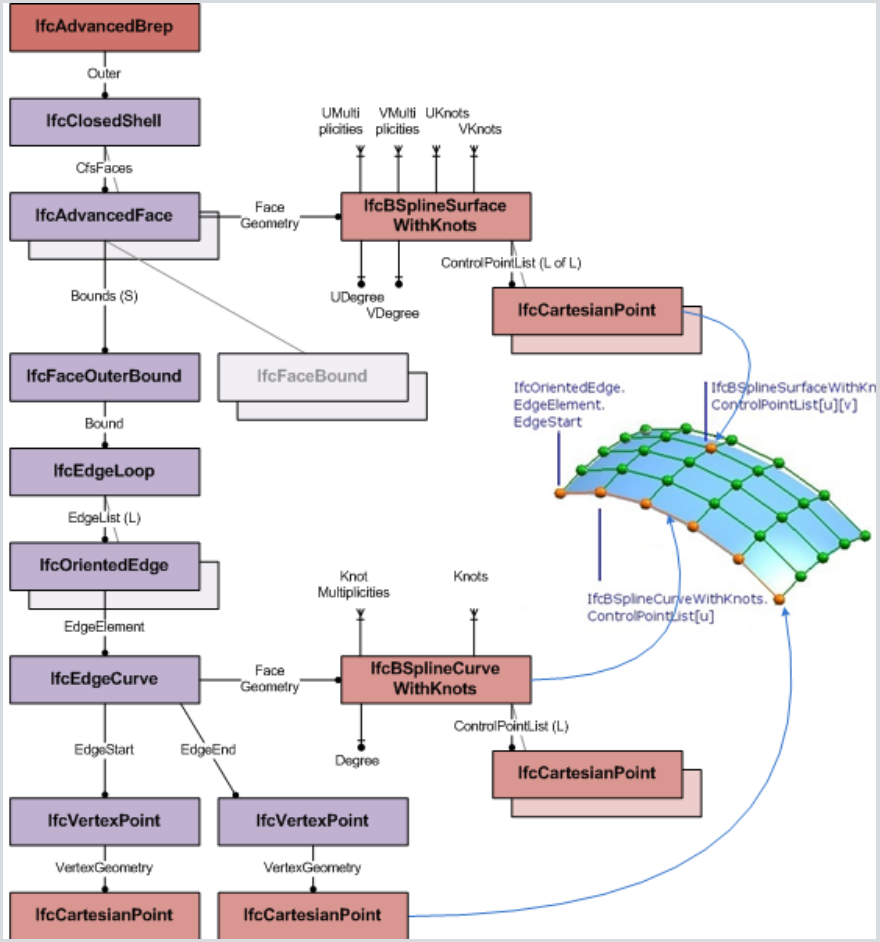
Major improvements – an extract – 5

Enhancement of geometry resource

Adding support for NURBS, support for tapering in extrusions, and non-planar surfaces and surface bounds

Documentation improvement

Documentation, explanations and many examples are added to improve under-standing and readability of the spec



buildingSMART

Major improvements – an extract – 6

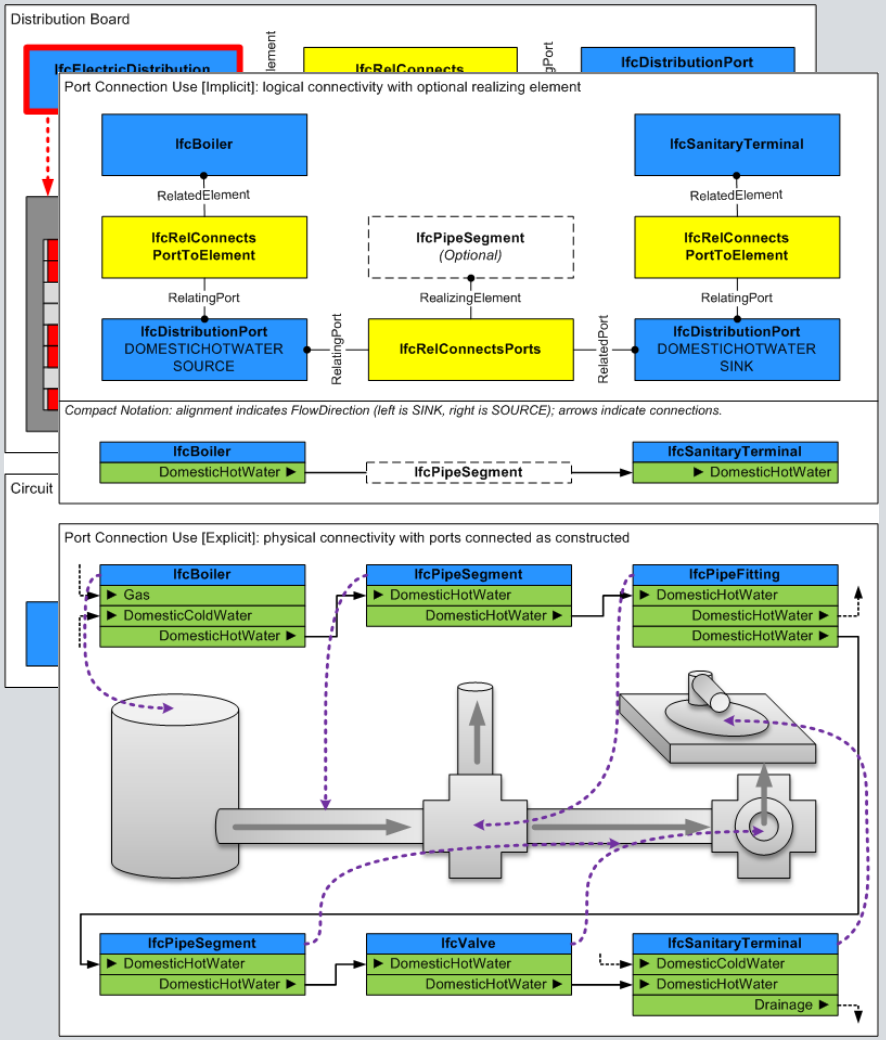
Connectivity and system models

redesign of the building service part

enhancements on connectivity

port usage improved

documentation update throughout

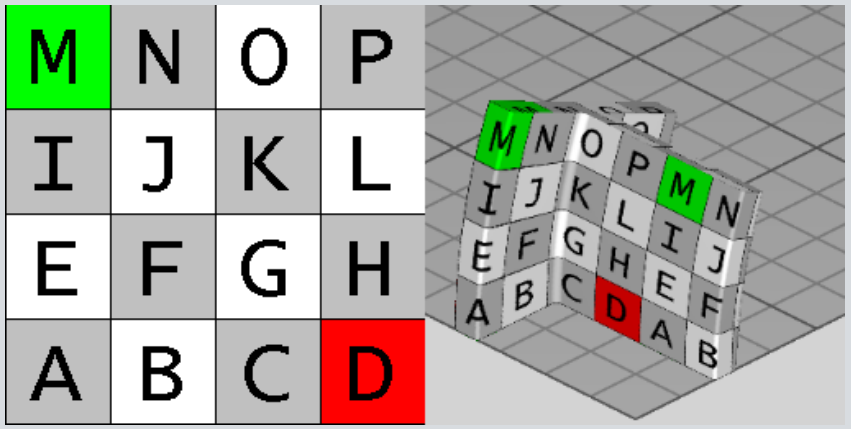


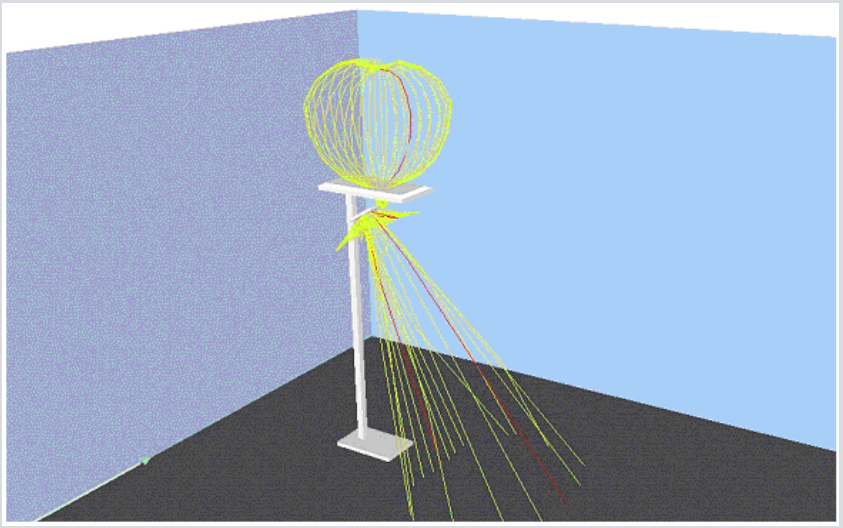
buildingSMART

Major improvements – an extract – 7

Enhancement of lighting and shading component

- texturing, including multi-textures
- lighting, including light distribution
- following the X3D standard





Makes IFC2x4 the most encompassing and complete open specification for BIM data formats

buildingSMART

Prospect

IFC2x4 – the next step to openBIM

More and better support for interoperability in construction

- Additional use cases supported
- Higher efficiency for the support of existing use cases

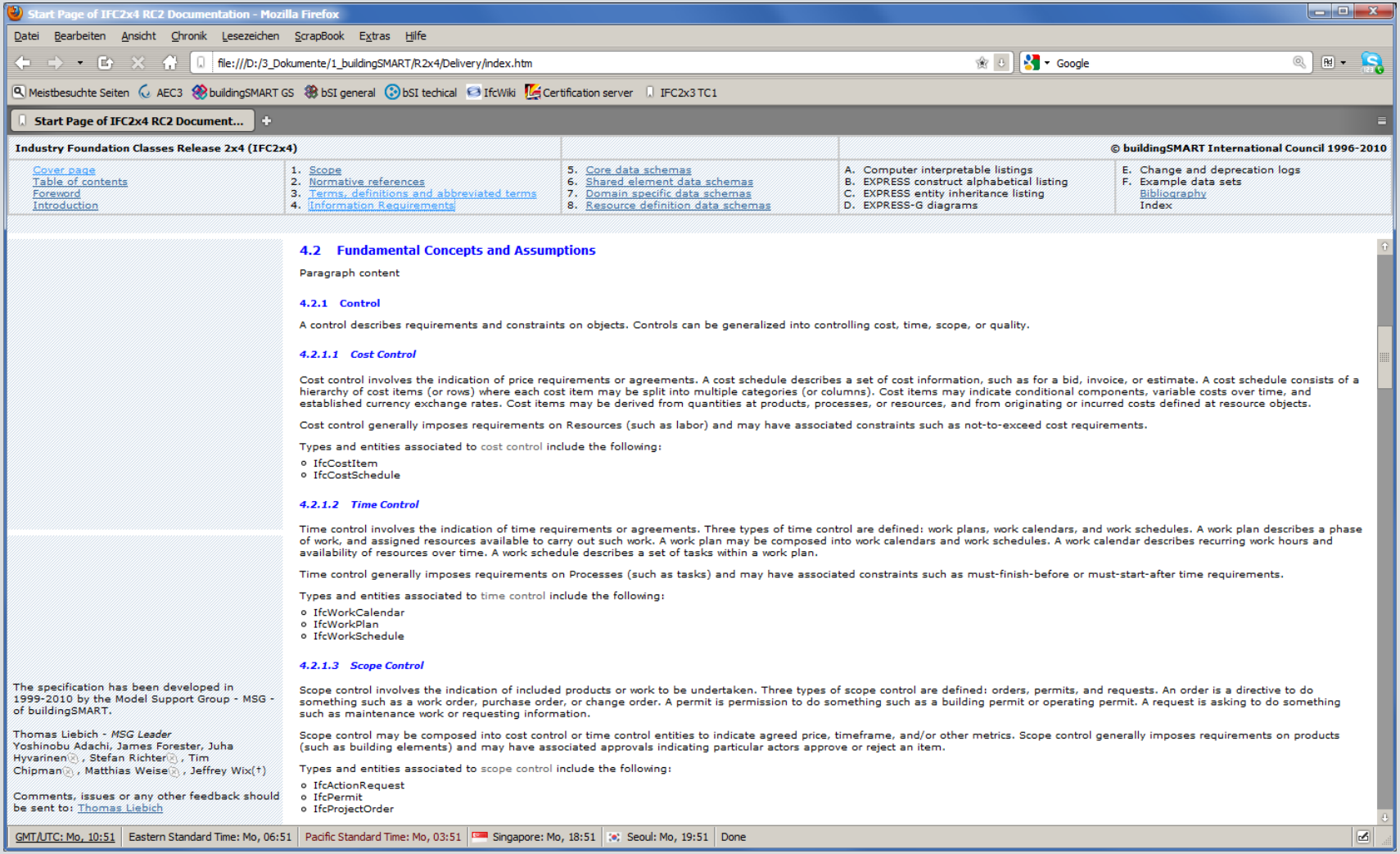
Will be available as EXPRESS and XML schema

- full IFC schema used for general BIM exchange requirements
- simplified IFC XML schema support added for simpler exchange requirements

Submitted for full ISO Standard 16739

Expect first implementations in 2011

Next – submit IFC2x4 as ISO 16739 DIS



buildingSMART

Feedback

please provide it via: http://www.iai-tech.org/jira

or contact tl@aec3.com