

buildingSMART International and Industry Foundation Classes (IFC)

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Agenda

Who is buildingSMART International?

What is IFC?

Why IFC?

buildingSMART
International home of openBIM

About Users Standards Compliance Chapters Members News Site Map

Professional Leadership

buildingSMART is transitioning from a volunteer led to a professionally led organization. We are building a fully professional leadership team.

READ MORE

Driving transformation of the built asset economy through creation & adoption of open, international standards

- What is openBIM ?**
A universal approach to the collaborative design, realization and operation of buildings based on open standards and workflows. Industry Foundation Classes (IFC) buildingSMART is the sharing of information between the project, design, procurement, maintenance and operations teams
- What's in it for me?**
Benefits include New Markets, Scale Benefits, Improved Performance and Industry Development. Specific benefits to building owners and operators, product manufacturers and others.
- Our Standards**
buildingSMART aim to promote increasing international consensus on specific standards to accelerate implementation and uptake for mutual benefit. For a list of published international standards.
- Why buildingSMART?**
Significant improvements in cost, value and environmental performance can be achieved.
- Data Dictionary**
The buildingSMART Data Dictionary (bSDD) is a library of objects and their attributes. It's used to identify objects in the built environment and their specific properties regardless of language
- Compliant Software**
All software successfully tested for compliance with buildingSMART Standards.

Who is buildingSMART International?

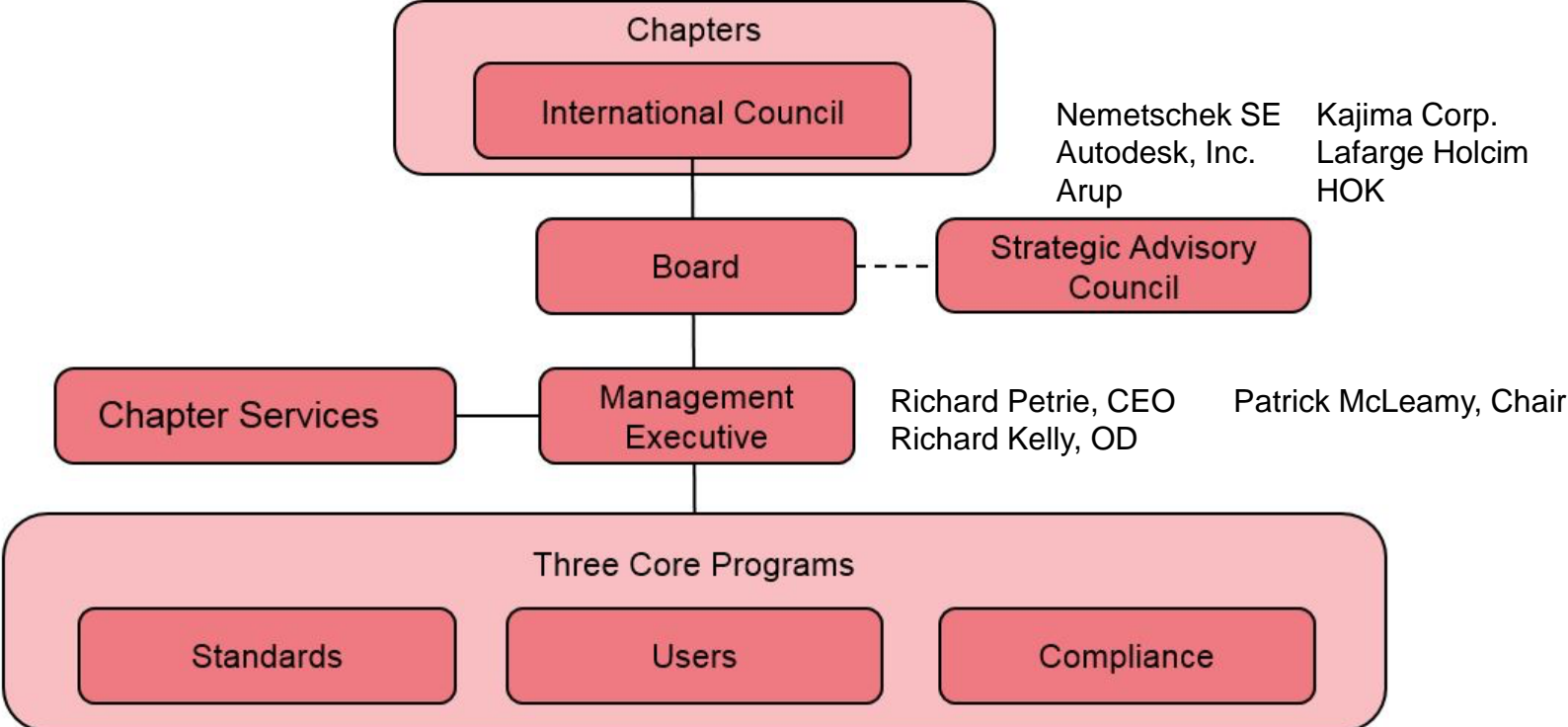
Who is buildingSMART International?



<http://buildingsmart.org>

Who is buildingSMART International?

buildingSMART Organization



Who is buildingSMART International?

Companies and organizations “putting their money where there mouth is”!

Strategic Advisory Council €200k+



International Members €20k-40k

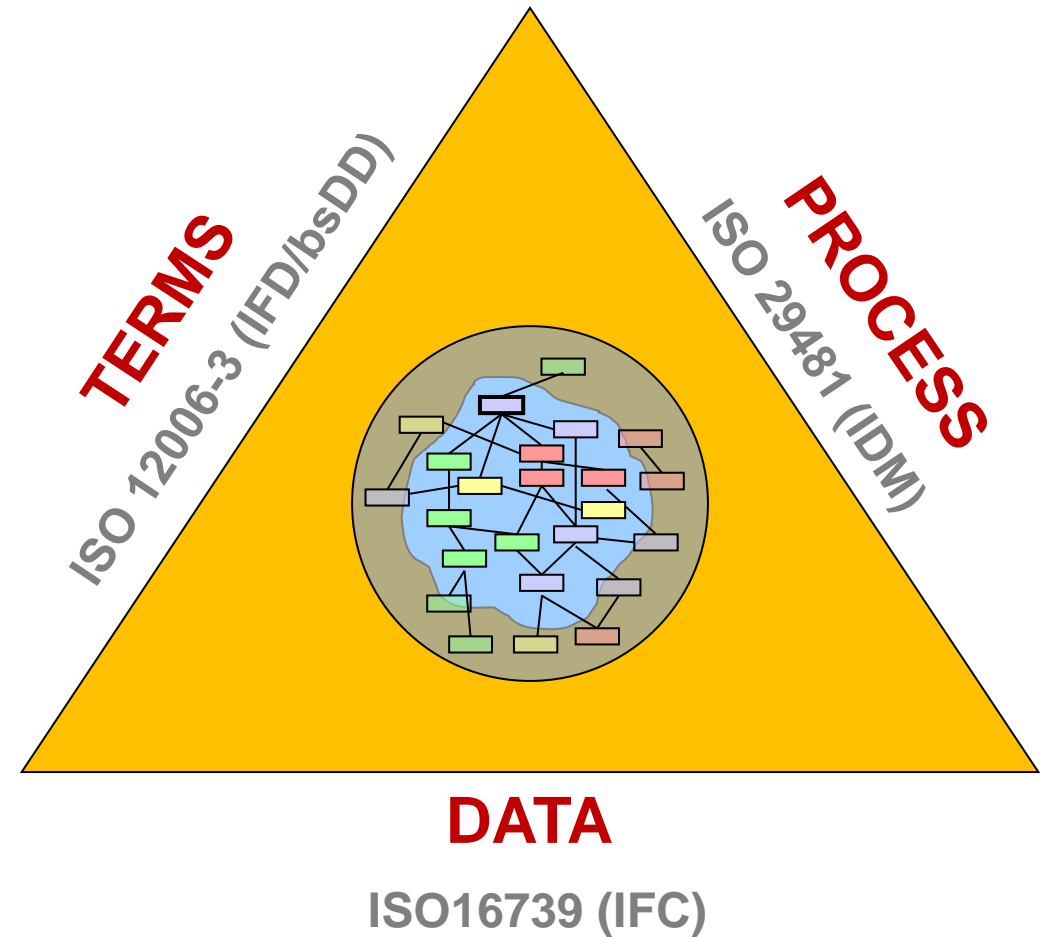


Standard Members €8k-15k



Who is building SMART International?

**Develop and maintain
open international standards
for BIM**



Who is buildingSMART International?

IDM (Information Delivery Manual)

Formal business case representation of data exchange

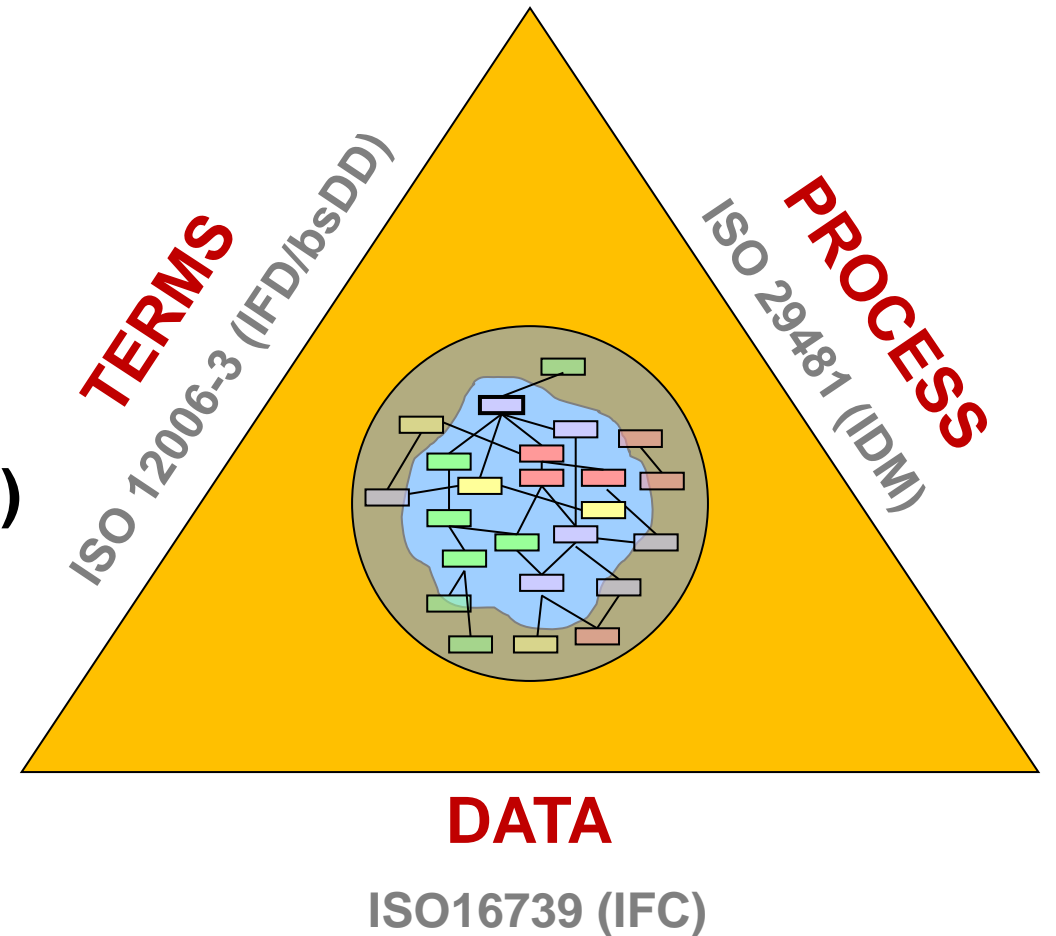
IFC (Industry Foundation Classes)

Technical specification of data model

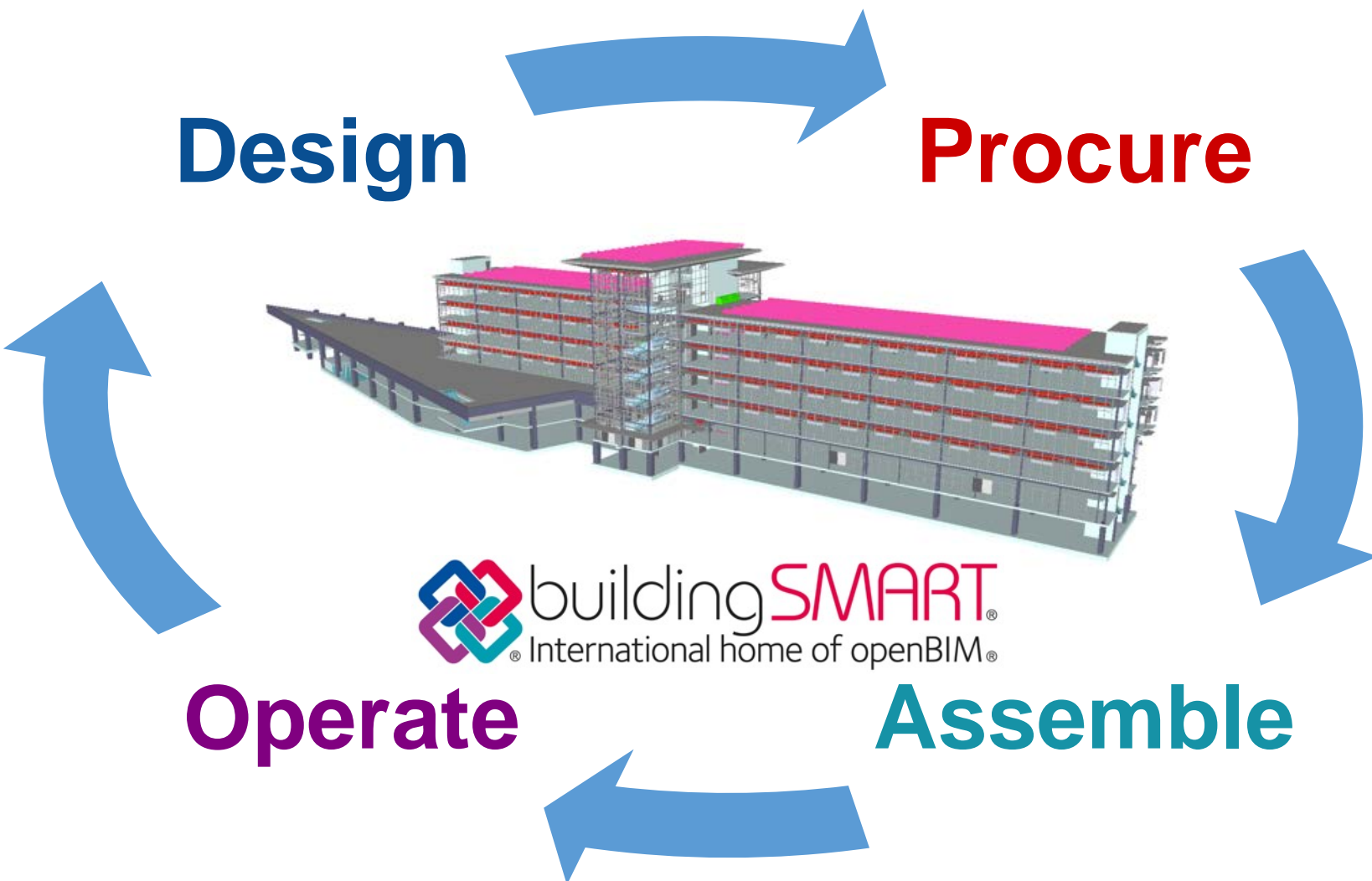
IFD (International Framework for Dictionaries)

aka buildingSMART Data Dictionary (bDDD)

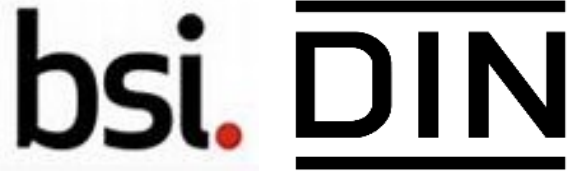
Unique and consistent definitions of all concepts



Who is buildingSMART International?



Who is buildingSMART International?



“IFC4”

ISO 16739

EN ISO 16739

DIN EN ISO 16739
BSI EN ISO 16739



ISO 8879
XML



ISO 10303
STEP



ISO 19775
X3D

ISO TC184/SC4 (data model standard)
ISO TC59/SC13 (process, terms, BIM guidance, etc.)
OGC (BIM and Geospatial)

Who is buildingSMART International?

People. From all over the world. Working together. Making a difference.



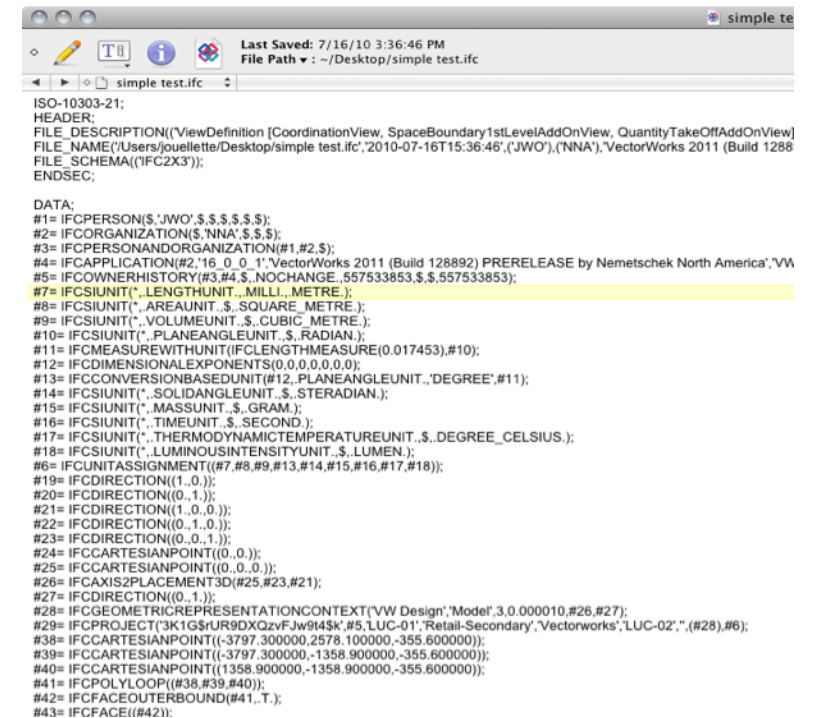
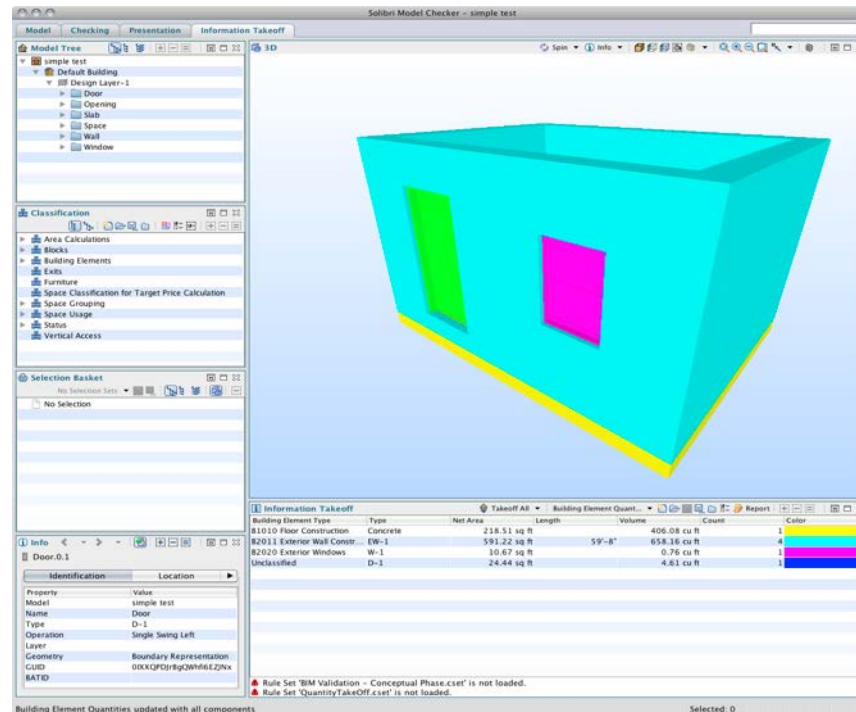
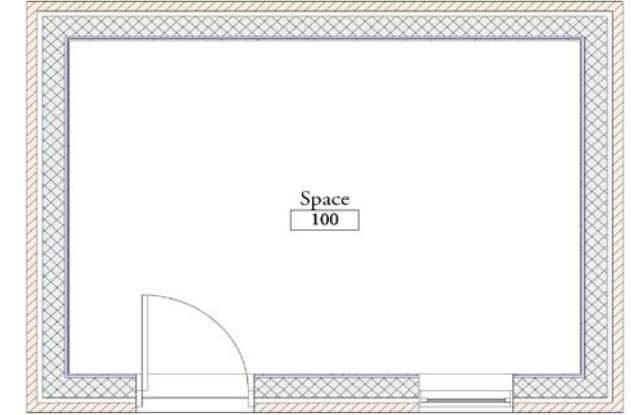
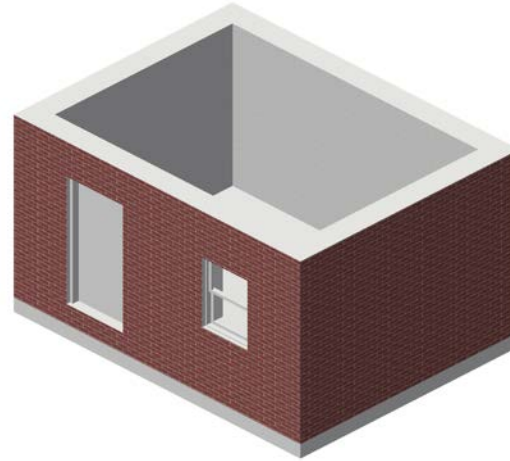
London, October 2017

What is IFC?

What is IFC?

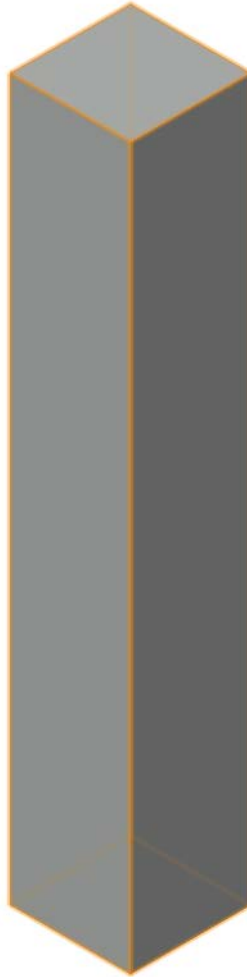
A non-proprietary, open standard means of describing the built environment and freely exchanging and/or storing that information digitally

Geometry
+
Information



What is IFC?

What is it?



What is IFC?

Geometry

Solid?

Surfaces?

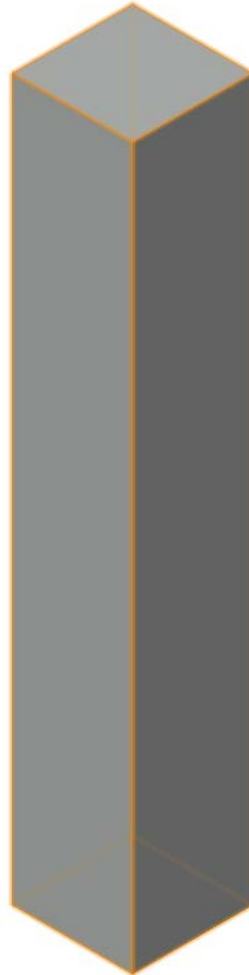
Semantics

Column?

Wall?

Pile?

Duct?



Attributes/Properties

Identity?

Color/Material?

Weight?

Manufacturer?

Performance?

Classification?

Relationships

Internal / External?

Story / Level?

Connections?

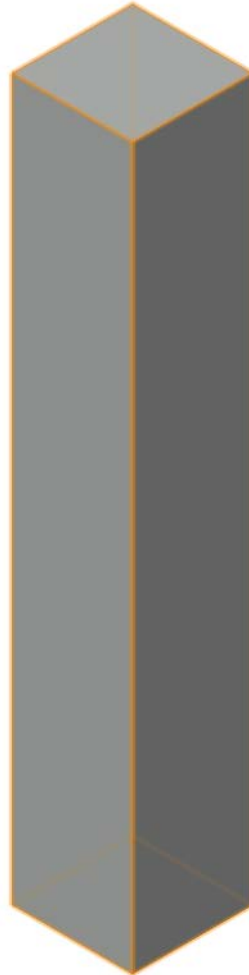
What is IFC?

Geometry

Solid: An extrusion of a 300mm x 300mm rectangular profile

Semantics

Column



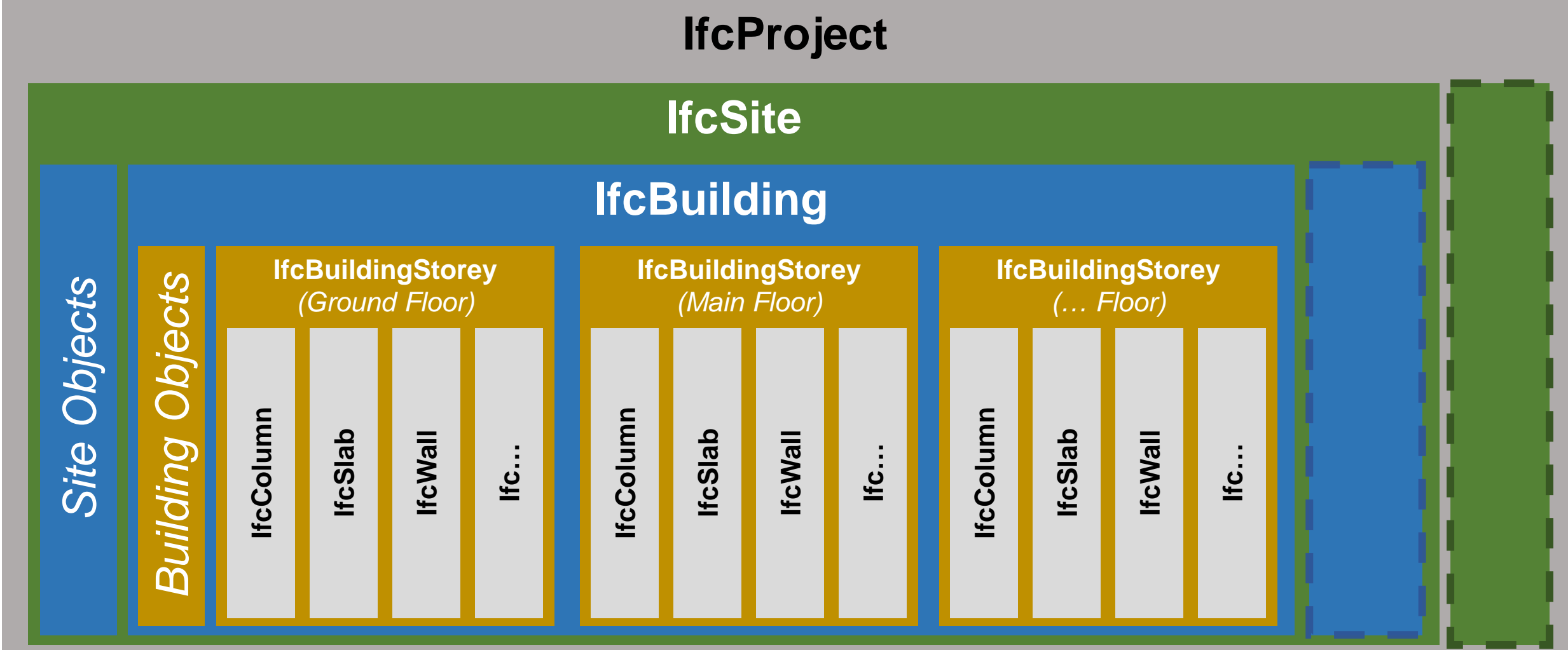
Attributes/Properties

Column D-2, RGB140-142-140, Cast Concrete, 150lbs/ft³, 5400psi

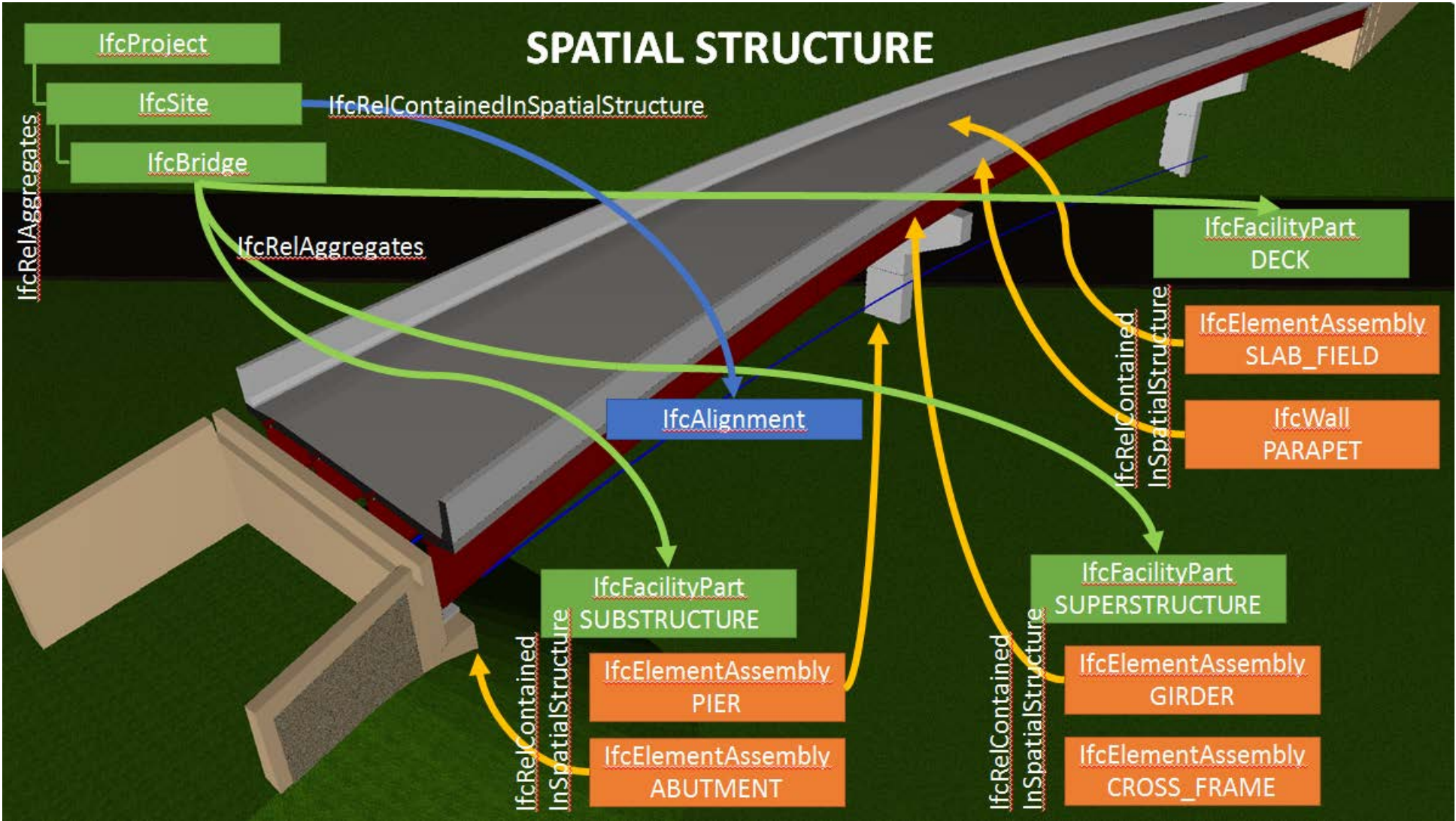
Relationships

Internal bearing, 2nd story, bearing on footing below and supporting slab above, structural system, has reinforcing

What is IFC?

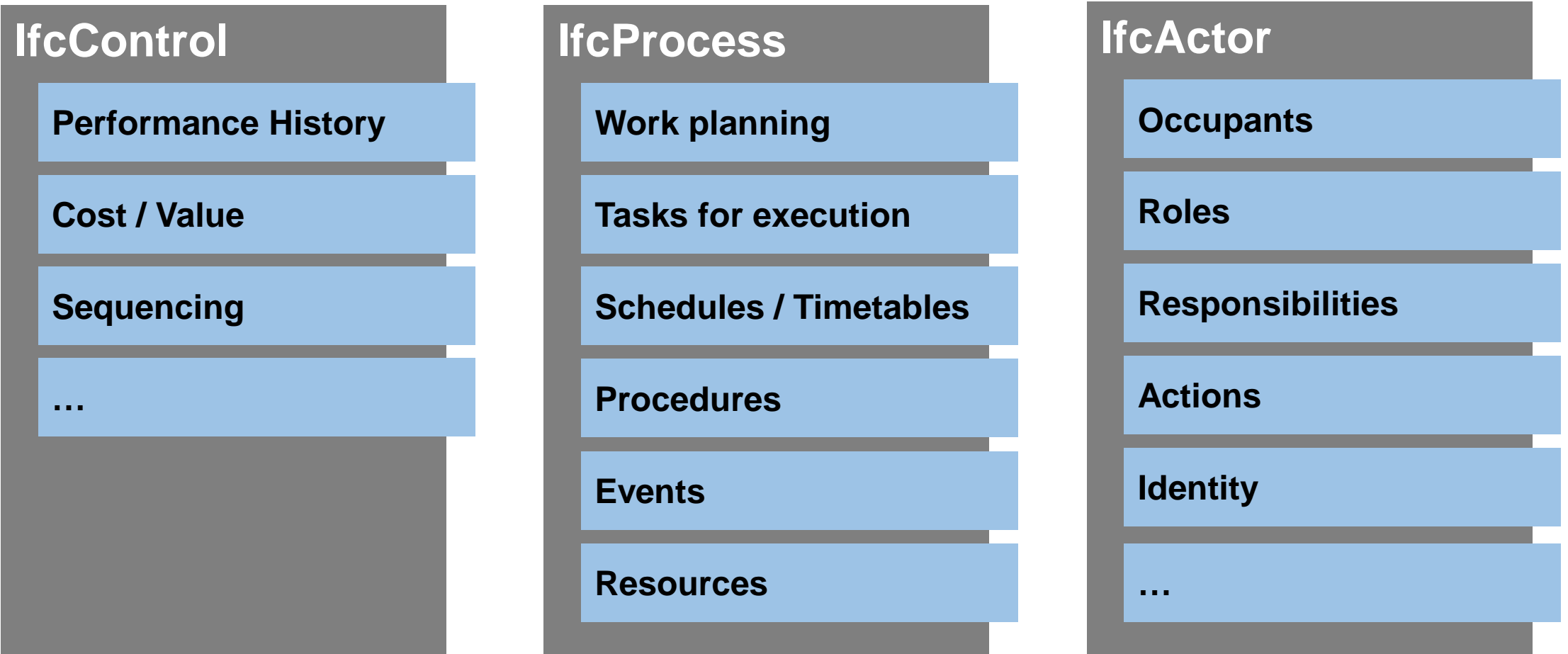


What is IFC for Bridges?



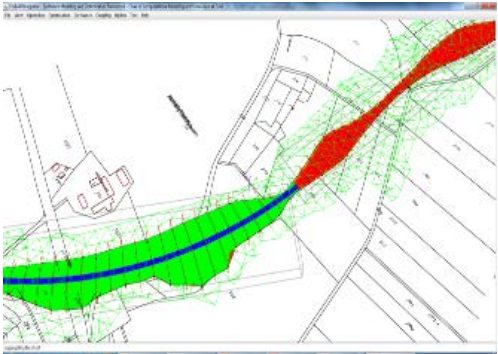
What is IFC?

More than just objects....

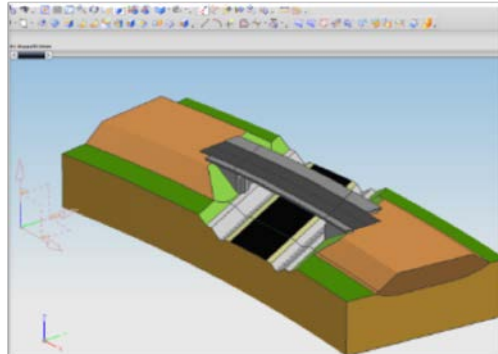


What is IFC?

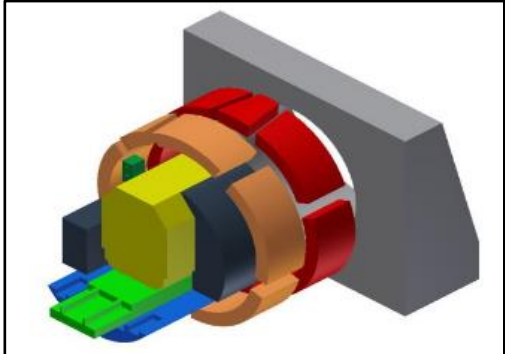
More than just buildings....



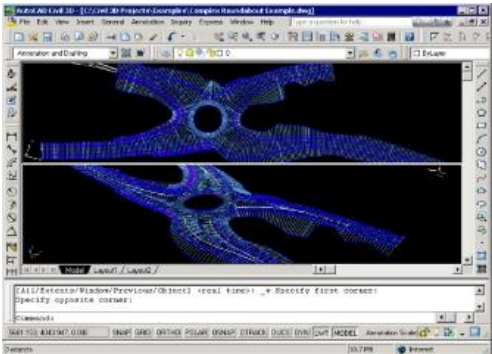
Alignment
Common baseline



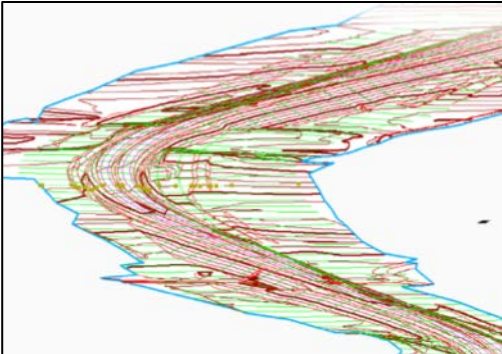
Bridges
IFC-Bridge



Tunnelling
IFC-Tunnel



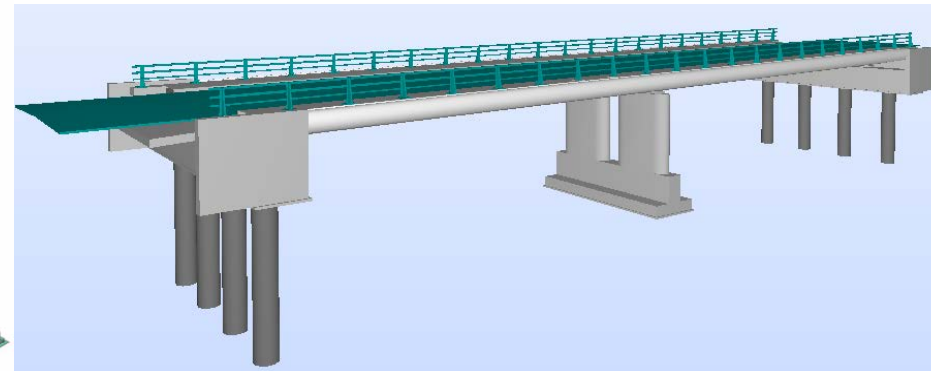
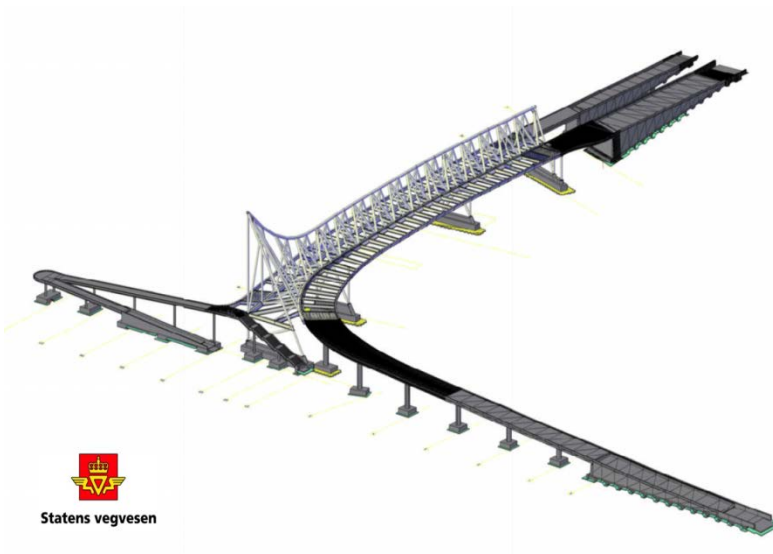
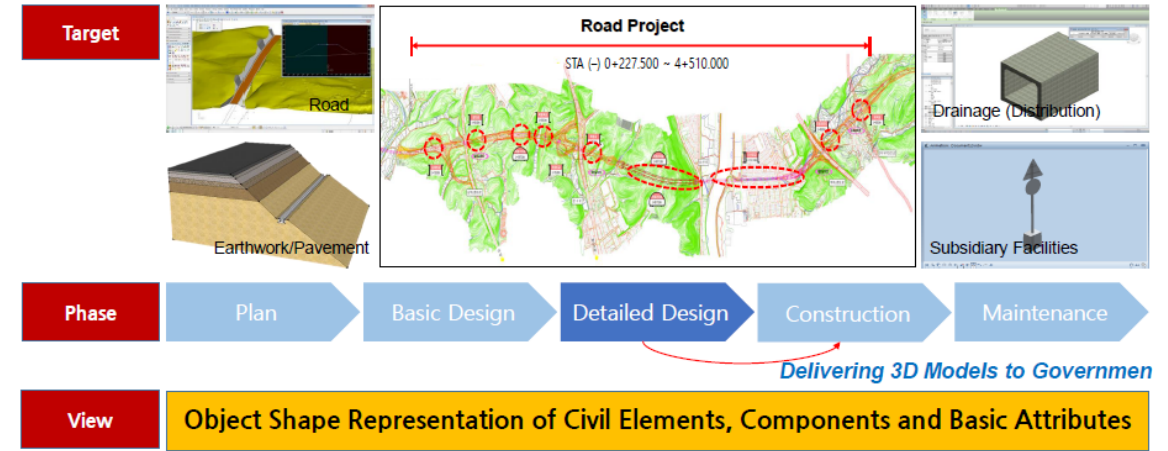
Roads
IFC-Road



Railways
IFC-Railway

Infrastructure Initiatives

- Korean IFC-Roads project
- Chinese IFC Rail project
- IFC-Bridge project - France, Germany, Japan, Netherlands, Norway, Sweden, U.S.



National Resources: UK BIM Level 2



BS 5536-2:2016

Briefing for design and construction. Code of practice for asset management (Linear and geographical infrastructure)

BS 5536-2:2016 is part of the BIM level 2 suite of documents developed to help the construction industry adopt BIM. It gives recommendations for briefing for design and construction in relation to energy, telecommunication, transport, water and other utilities' infrastructure to ensure that design takes into account the expected performance of the asset in use over its planned operational life. It is applicable to the provision of documentation supporting this purpose during design, construction, testing and commissioning, handover, start-up of operations and defined periods of aftercare.

The new standard adopts the structure and format of its companion document, BS 5536-1:2015, and as such incorporates the principles of briefing associated with BIM Level 2 and Government Soft Landings.

BS 5536-2 is the only standard to provide briefing recommendations for the design and operational performance of infrastructure assets. It provides an evidence based approach to design and construction, coordinating recommendations, not just from the asset management standards (ISO 55000 series), but also the BIM PAS's 1192-2, -3 and -5, and Government Soft Landings.

U.S. NBIMS



National BIM Standard - United States® Version 3

5 Practice Documents

5.8 Practical BIM Contract Requirements US Army Corps of Engineers BIM Contract Requirements for Design Build Projects

CONTENTS

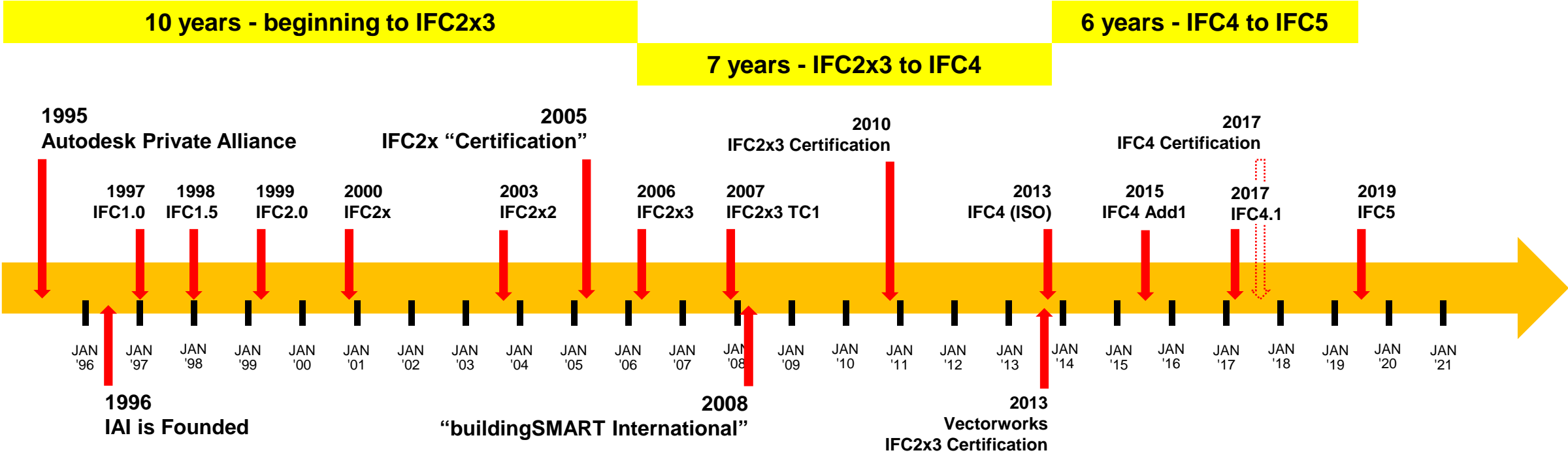
| | | |
|--------------|---|----|
| 5.8.1 | Scope – General Criteria | 2 |
| 5.8.1.1 | Business case description | 2 |
| 5.8.1.2 | Unique Features of the USACE BIM Contract Requirements (UBR): | 2 |
| 5.8.2 | Normative references | 3 |
| 5.8.3 | Terms, definitions, symbols and abbreviated terms | 4 |
| 5.8.4 | Best Practice Use | 7 |
| 5.8.4.1 | Description of use | 7 |
| 5.8.4.2 | Process map | 9 |
| 5.8.4.2.1 | BPMN description | 9 |
| 5.8.4.2.1.1 | Phase 1. Implementation of Corporate Policy | 9 |
| 5.8.4.2.1.2 | Phase 2. Request for Proposal | 10 |
| 5.8.4.3 | Guide for use | 11 |
| 5.8.4.3.1 | Implement corporate policy and required document templates | 11 |
| 5.8.4.3.2 | Owner's RFP technical evaluation factor for contractor BIM qualifications | 12 |
| 5.8.4.3.3 | BIM contract language | 12 |
| 5.8.4.3.4 | Project Execution Plan | 12 |
| 5.8.4.3.5 | Minimum modeling requirements | 12 |
| 5.8.5 | Demonstrated Use and Acceptance | 12 |
| 5.8.5.1 | Evidence of repeatability | 13 |
| 5.8.5.2 | Documentation of Success | 14 |
| Annex A | | 15 |
| Bibliography | | 15 |

The NBS BIM Toolkit is a core component of BIM Level 2



| CIVIL | Buildings | Linear Infrastructure | Geospatial infrastructure |
|--|---|---|---|
| <p>Buried expansion joint Buried expansion joint system</p> | <p>Complexes</p> <ul style="list-style-type: none"> University campus Private home Hospital Airport | <p>Rail network</p> <p>Road network</p> | <p>Wastewater treatment plant</p> |
| <p>Fish pass Eel and elver passes</p> | | | |
| <p>Rail track Ballasted rail track systems</p> | | | |
| <p>Tunnel lining Unit lined tunnel system</p> | <p>Entities</p> <ul style="list-style-type: none"> Teaching block House Nurses residential Block | <p>Bridge</p> <p>Tunnel</p> | <p>Primary wastewater treatment plant</p> |

What is IFC?



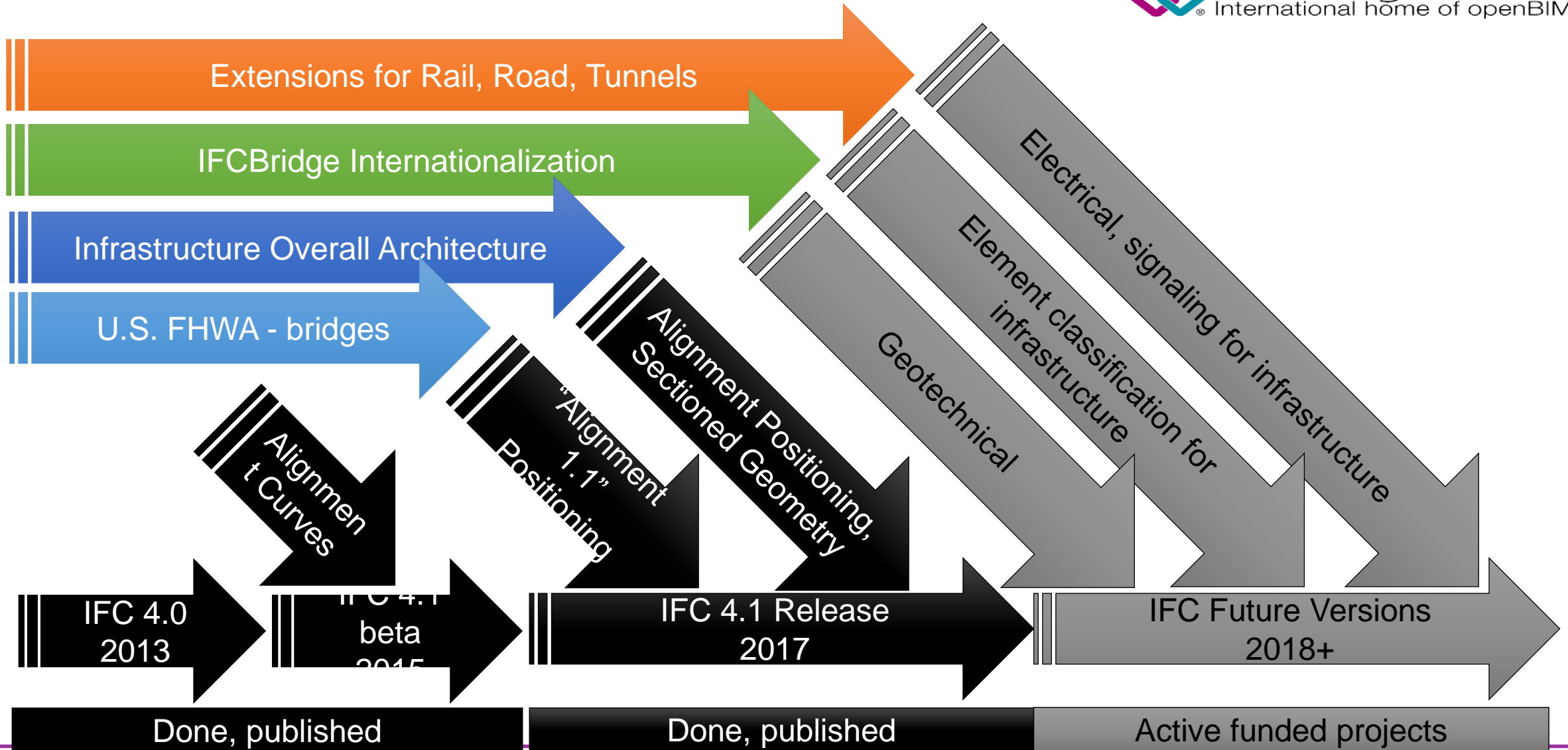
Courtesy of Dr. Thomas Liebich, AEC3 Deutschland GmbH

International Integration Meetings – IFCBridge WG

- February 2016: Korea (KICT)
 - Roadway and bridge classifications and spatial structure for transportation
- February 2016: China Railway Corp
 - Railway and bridge classifications and transitional curves
- April 2016: Netherlands (bSI)
 - China, France, US joint meeting, IFC bridge integration project funded
- September 2016: Korea (bSI)
 - IFC 4.1 released
 - IFC bridge project MOU signed to develop a unified standard version of IFC for bridges based on work of FHWA project and efforts in other countries (China, Korea, France, Germany, Japan, Netherlands, Finland, Sweden)
- April 2017: Barcelona Summit
 - IFC Bridge international integration begins
- November 2017: London Summit
 - IFC Bridge international data requirements finalized
- December 2017: Munich Workshop
 - Elaboration of taxonomy and pre-stressing components identification



International Integration Timeline

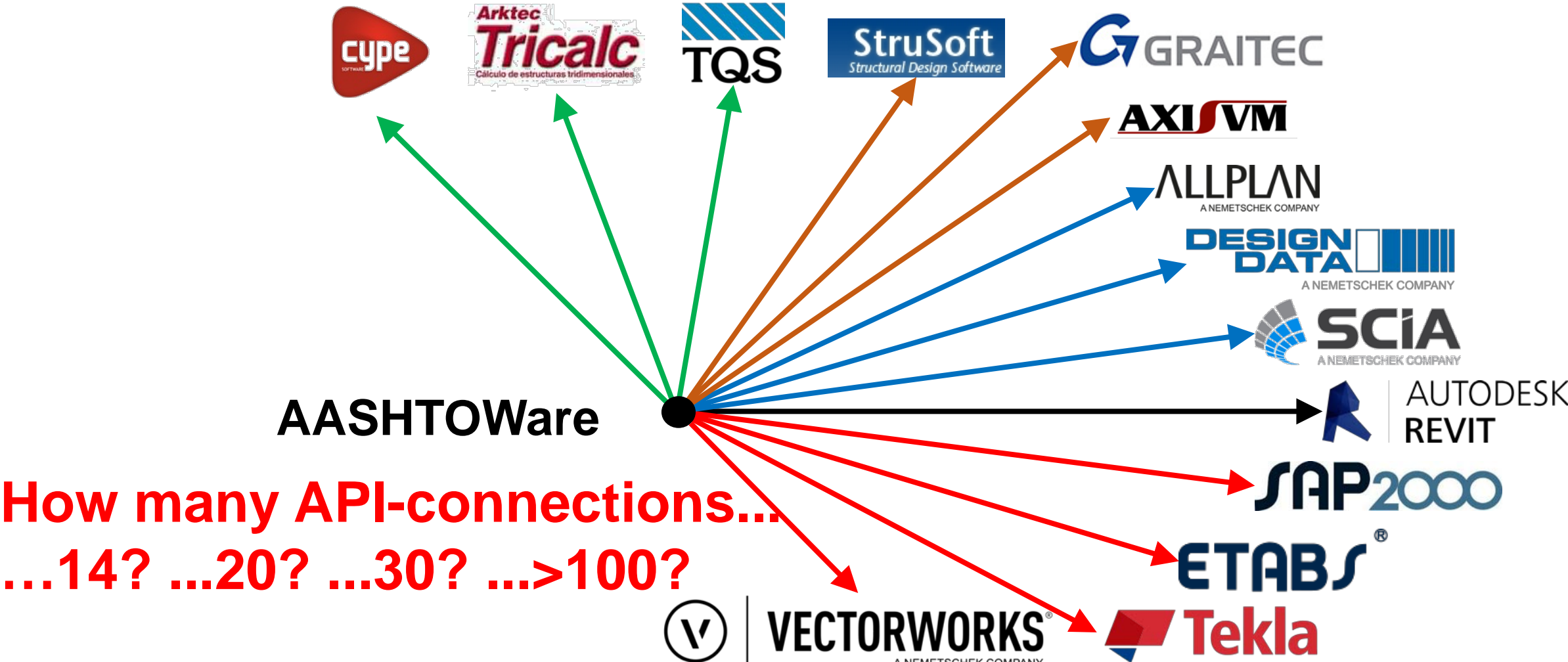


Why IFC?

Why IFC?



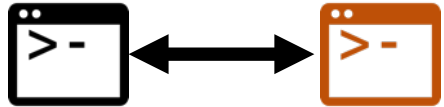
Why IFC?



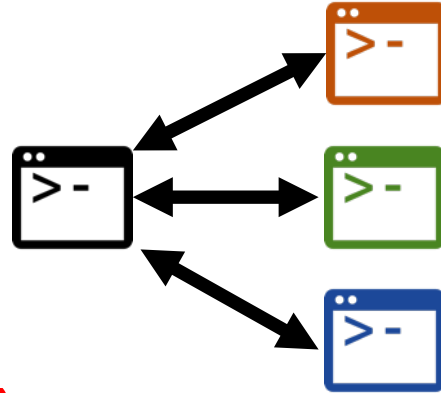
How many API-connections...
...14? ...20? ...30? ...>100?

Why IFC?

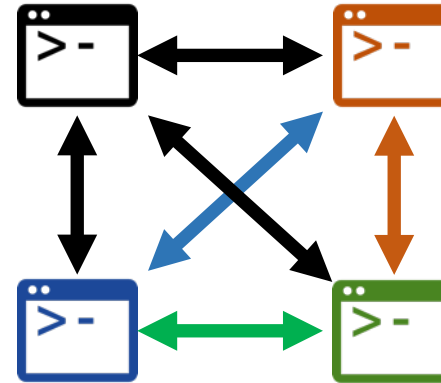
One-to-One



One-to-Many

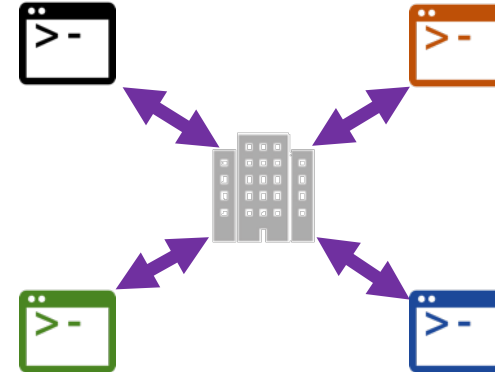
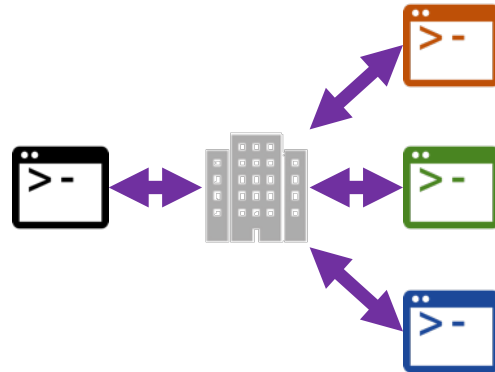


Many-to-Many



Application-centric (API)

Content-centric (IFC)

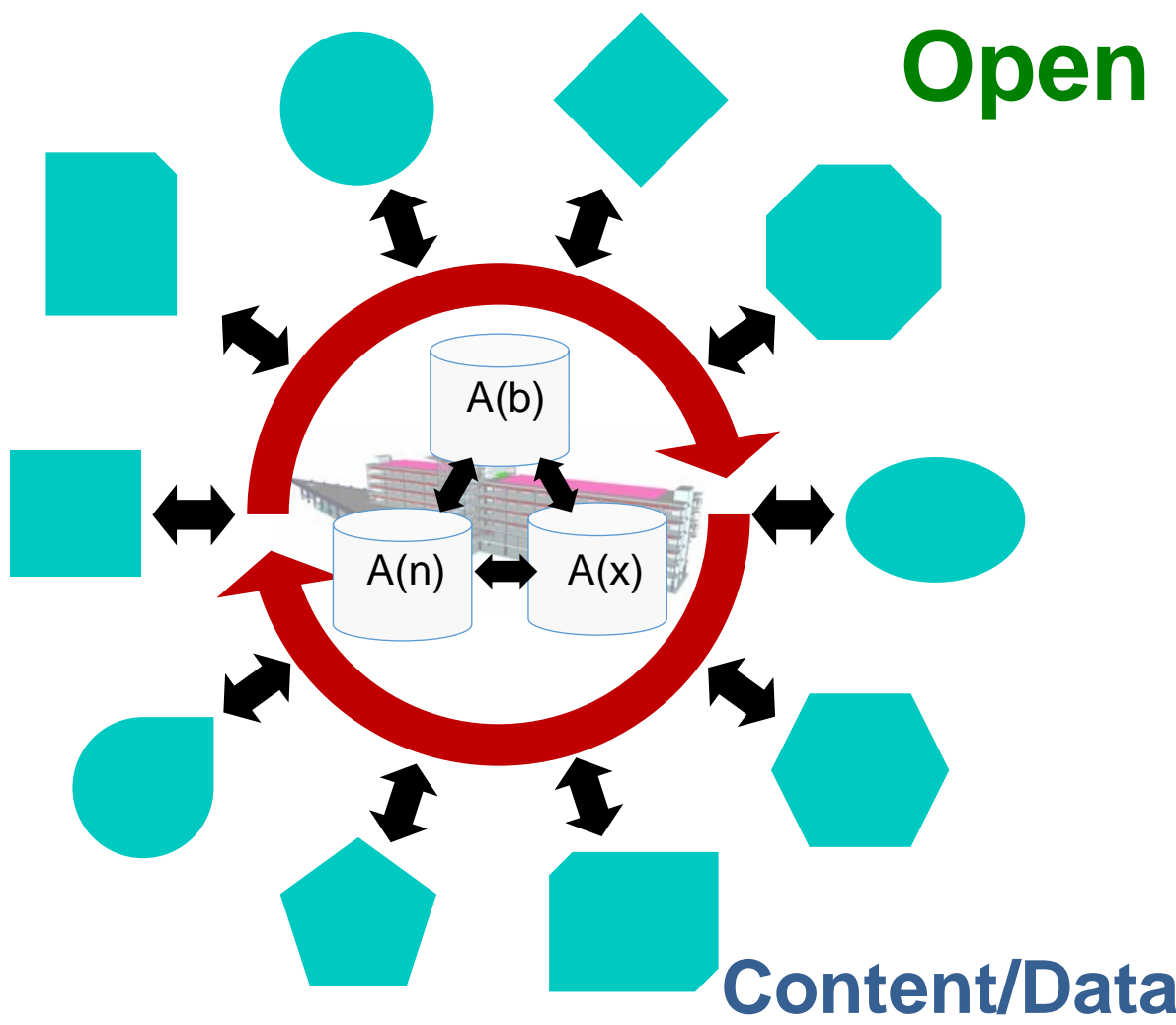


✓ Less work

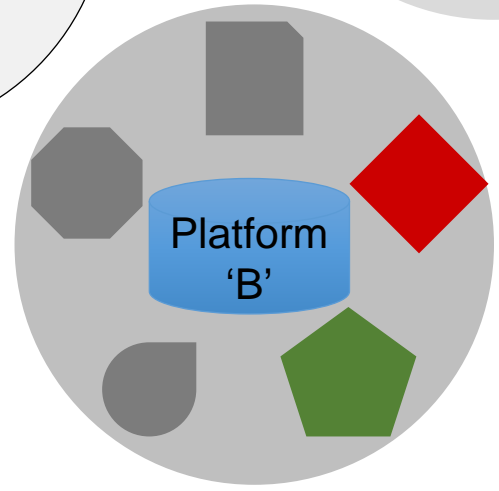
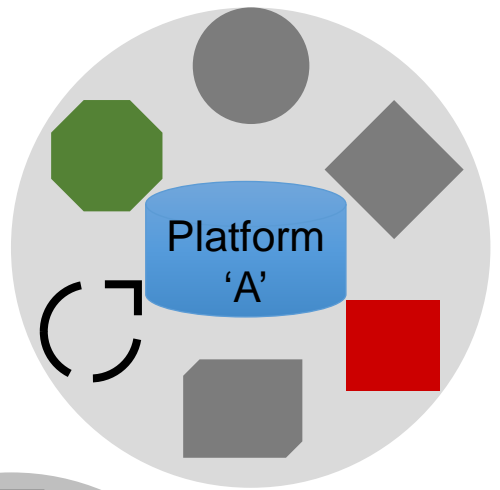
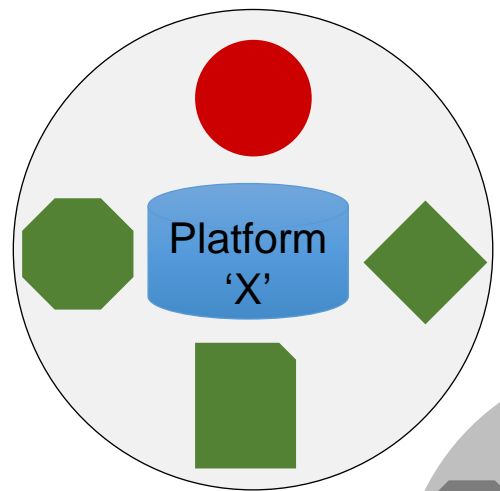
✓ Lower Threshold

✓ Larger Ecosystem

Why IFC?



Closed



Tools/Apps

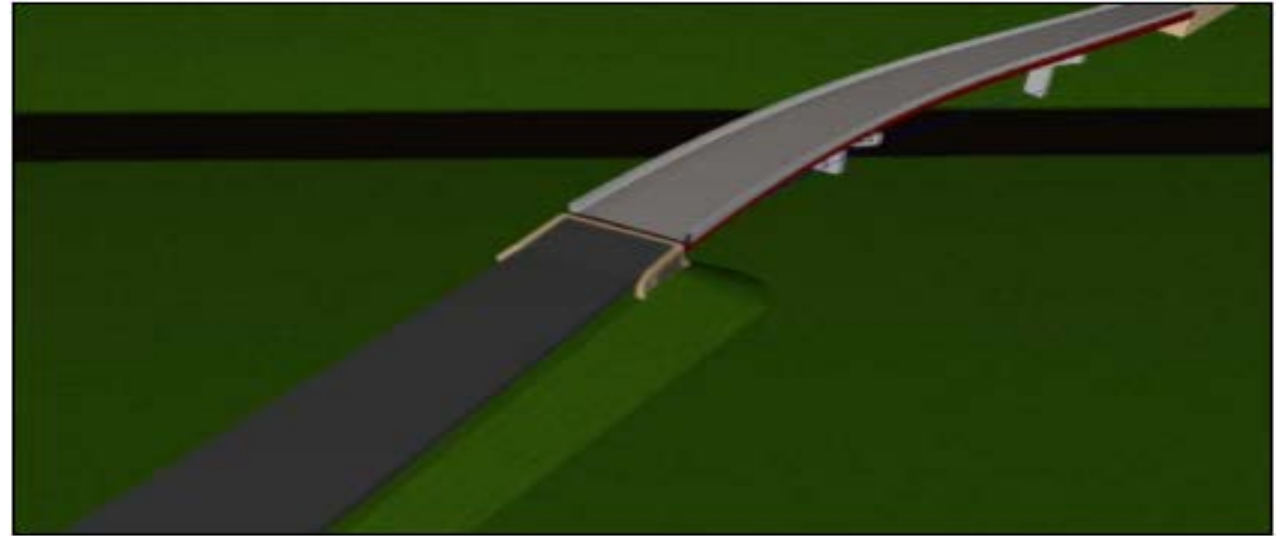
Why IFC?

Value

Ownership

Portability

Extensibility



Q&A

Thank you!

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tim@timchipman.com

<http://www.buildingsmart.org>

<http://www.buildingsmart-tech.org>