

AEC3

IFC Overview

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*Status of Standardisation, Implementation, and
Use of model-based work together with IFC*

Dr. Thomas Liebich

Vision

- ▶ to provide a universal basis for process improvement and information sharing in the construction and facilities management industries.

Mission

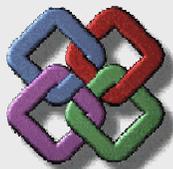
- ▶ to define, promote and publish a specification for *sharing* data throughout the project life-cycle, globally, across disciplines and across technical applications.

Deliverables

- ✓ *Industry Foundation Classes (IFCTM and ifcXMLTM)*

International Alliance for Interoperability

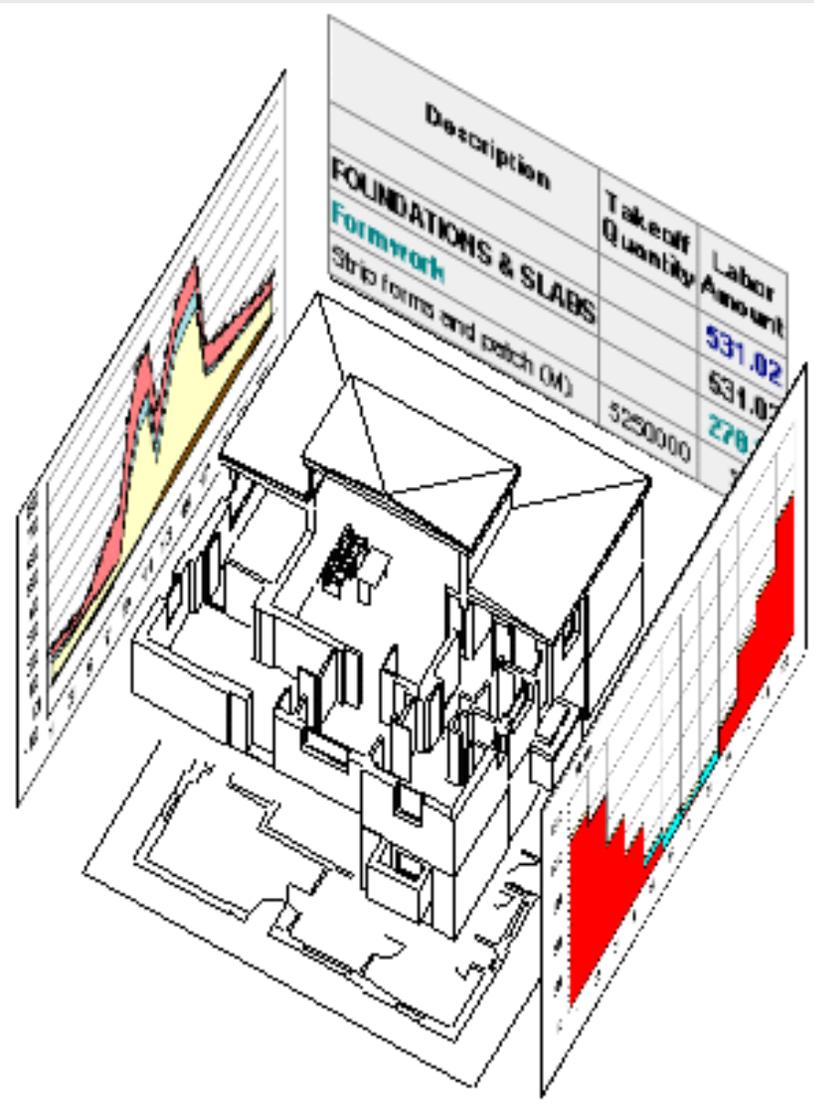
- ▶ sets the standard for object-based data exchange and sharing of virtual buildings
 - ▶ international
 - ▶ industry-driven
 - ▶ cross-discipline
 - ▶ all data for the virtual building model – object oriented paradigm



Industry Foundation Classes

- ▶ is the data exchange and sharing standard for building and construction life cycle information
 - ▶ goes beyond CAD information
 - ▶ involves engineering and other applications
 - ▶ includes whole life-cycle of buildings
- ▶ Is ISO certified
 - ▶ ISO/PAS 16739





✗ 2D Drafting

- ▶ individual 2D plans – paper space
- ▶ no risk control by clash detection
- ▶ no calculation of quantities, costs, thermal loads, etc.

✓ 2D/3D Model

- ▶ visualisation – model space
- ▶ clash detection on 3D geometry
- ▶ no calculation of quantities, costs, thermal loads, etc.

✓ building model (now called “BIM”)

- ▶ intelligent elements
- ▶ derivation of 2D plans
- ▶ clash and risk assessment
- ▶ calculation of quantities, costs, thermal loads, etc.

Analysis

- thermal performance
- structural analysis
- cost estimation
- collision checking
- design brief verification
- (others)

Construction

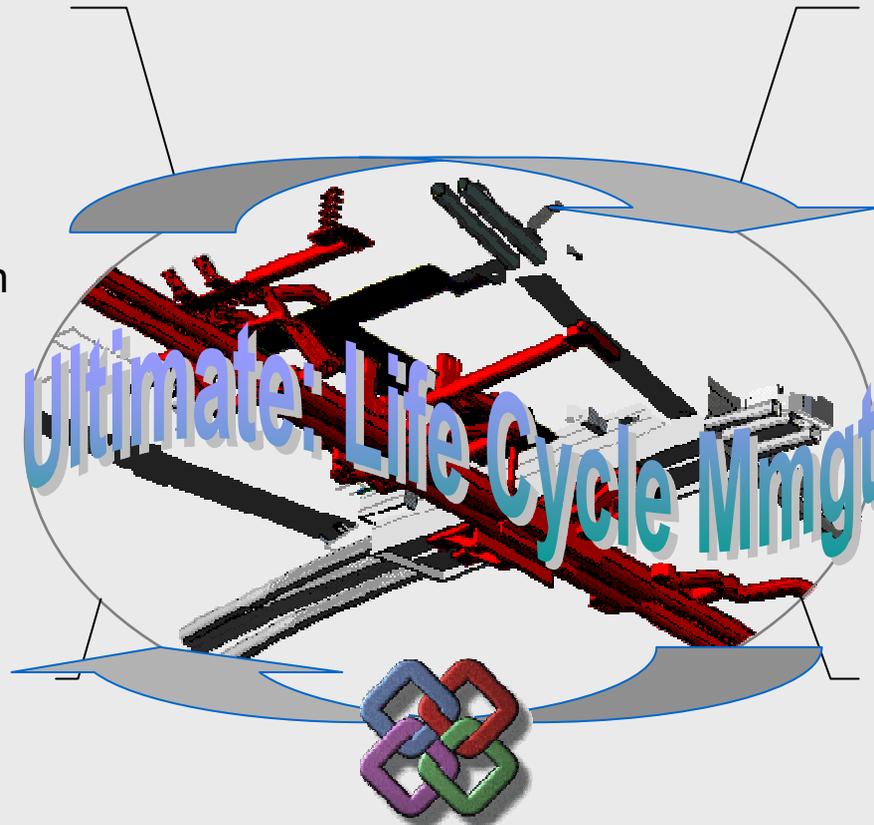
- cost control
- building site planning
- work scheduling
- progress control (4D)
- (others)

Design

- architecture
- building services
- electrical engineering
- structural engineering
- urban planning
- (others)

Operation and mgmt

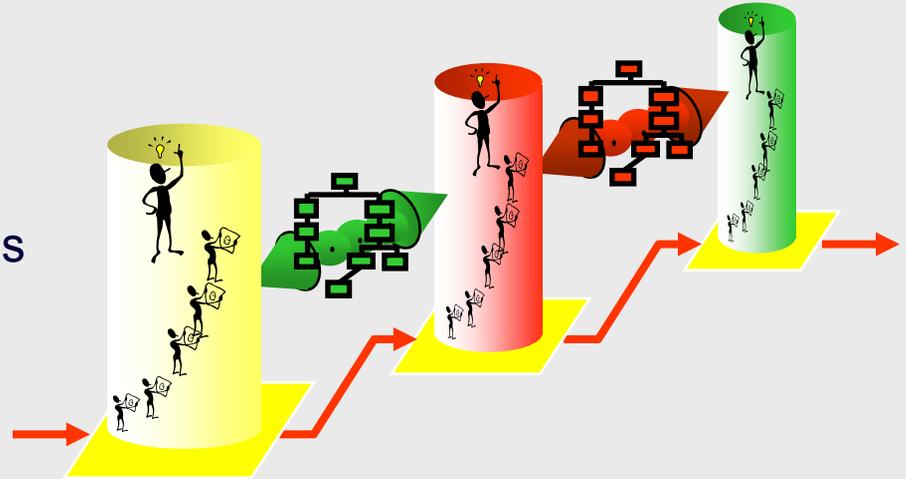
- facility management
- move management
- operation and mgmt
- reconstruction
- (others)



*„like DXF is the exchange format for
CAD drawings,
IFC is the exchange format for BIM“.*

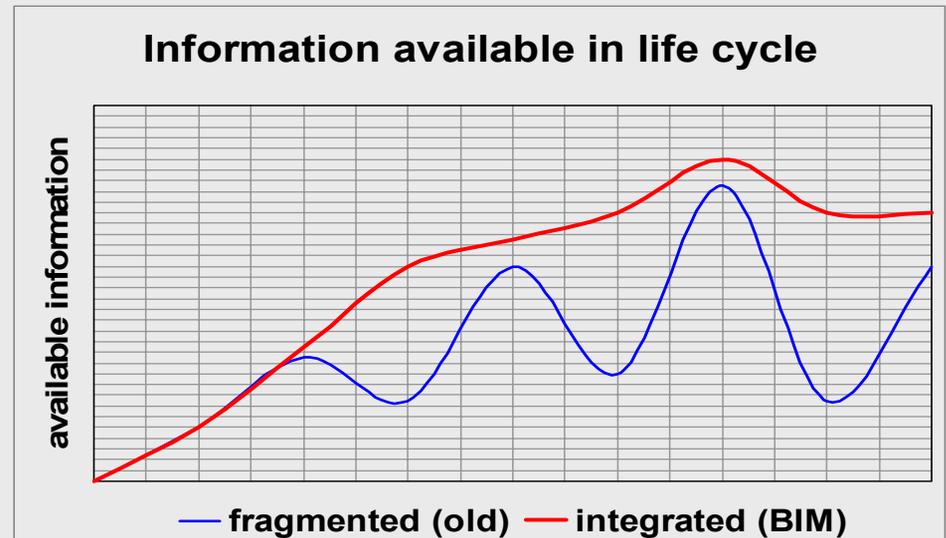
▶ Process integration

- ▶ inter-disciplinary
- ▶ enables sharing of knowledge across organisational boundaries
- ▶ takes away risk by reliable cost, quantity and clash control for all disciplines



▶ Data integration

- ▶ digital information created for reuse throughout the life cycle
- ▶ all disciplines can share consistent project data
- ▶ no re-keying of data, less errors

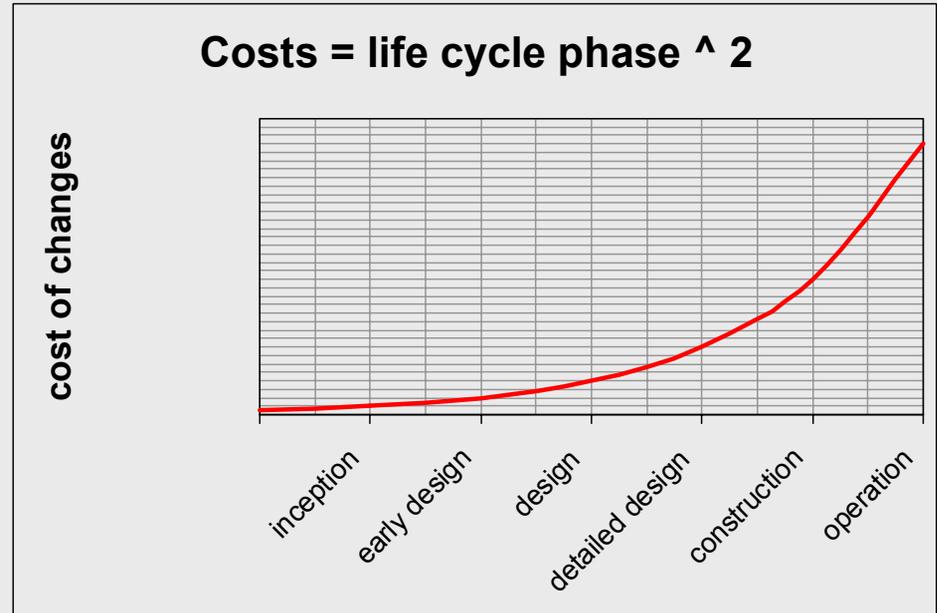


▶ Risk management

- ▶ lower construction risks
- ▶ lower budget risks
- ▶ lower security risks

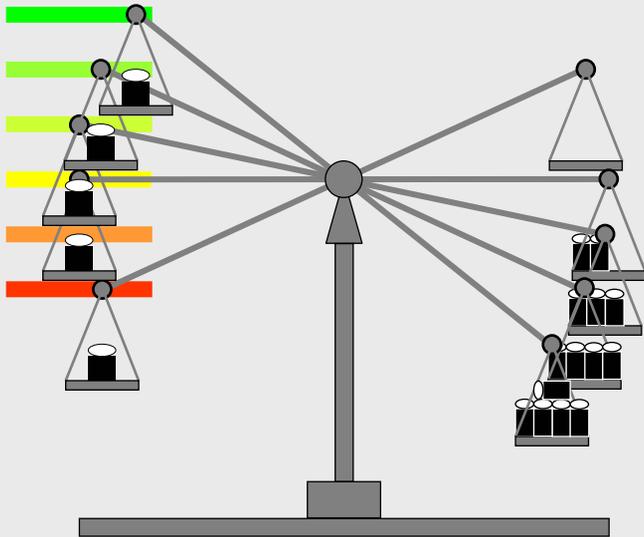
▶ IT/CAD system integration

- ▶ for designer and consultants
 - ▶ time saving, less costs by avoiding the parallel use of IT systems
- ▶ for building owner
 - ▶ free bidding for best value, no constraints by IT system compatibility
- ▶ for administration
 - ▶ can demand non-proprietary data



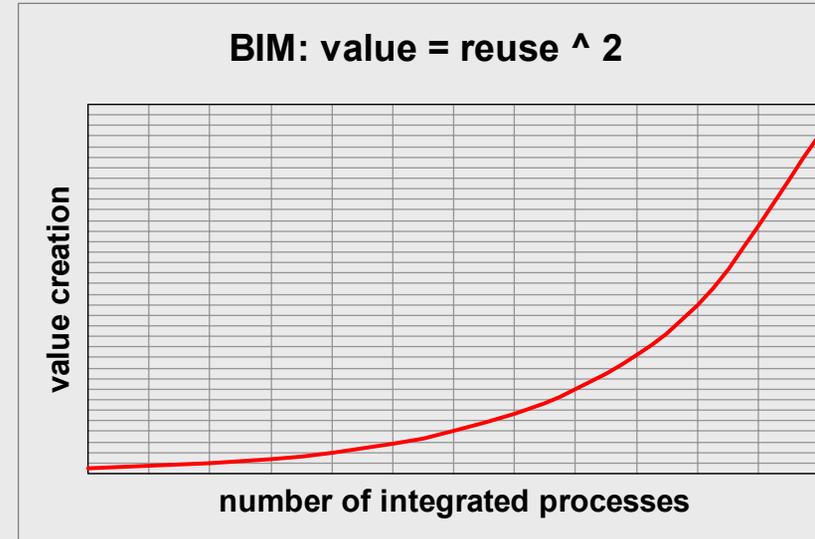
interoperability

- of processes
- of computer systems



- ▶ **more effort needed at the beginning**
 - ▶ technical – creating the building information model, attributing it, sharing it
 - ▶ cultural – mind change, training, move all stakeholders along with
- ▶ **benefits come along the process**
 - ▶ consistent data pool, collision checking
 - ▶ change management
 - ▶ take-off quantities, estimate costs
 - ▶ extraction for the structural analysis
 - ▶ extraction for the thermal analysis
 - ▶ construction management
 - ▶ schedules for component supplies
 - ▶ take-over into facility management
 - ▶ <...>

- ▶ reuse of BIM data is essential
 - ▶ requires many software applications to share data
 - ▶ requires data exchange/sharing on object level
 - ▶ drawing based (2D) exchange not sufficient
- ▶ use of standards is required
 - ▶ not a single software vendor can cover all processes
 - ▶ data to be shared across proprietary boundaries
 - ▶ open, international standards preferred

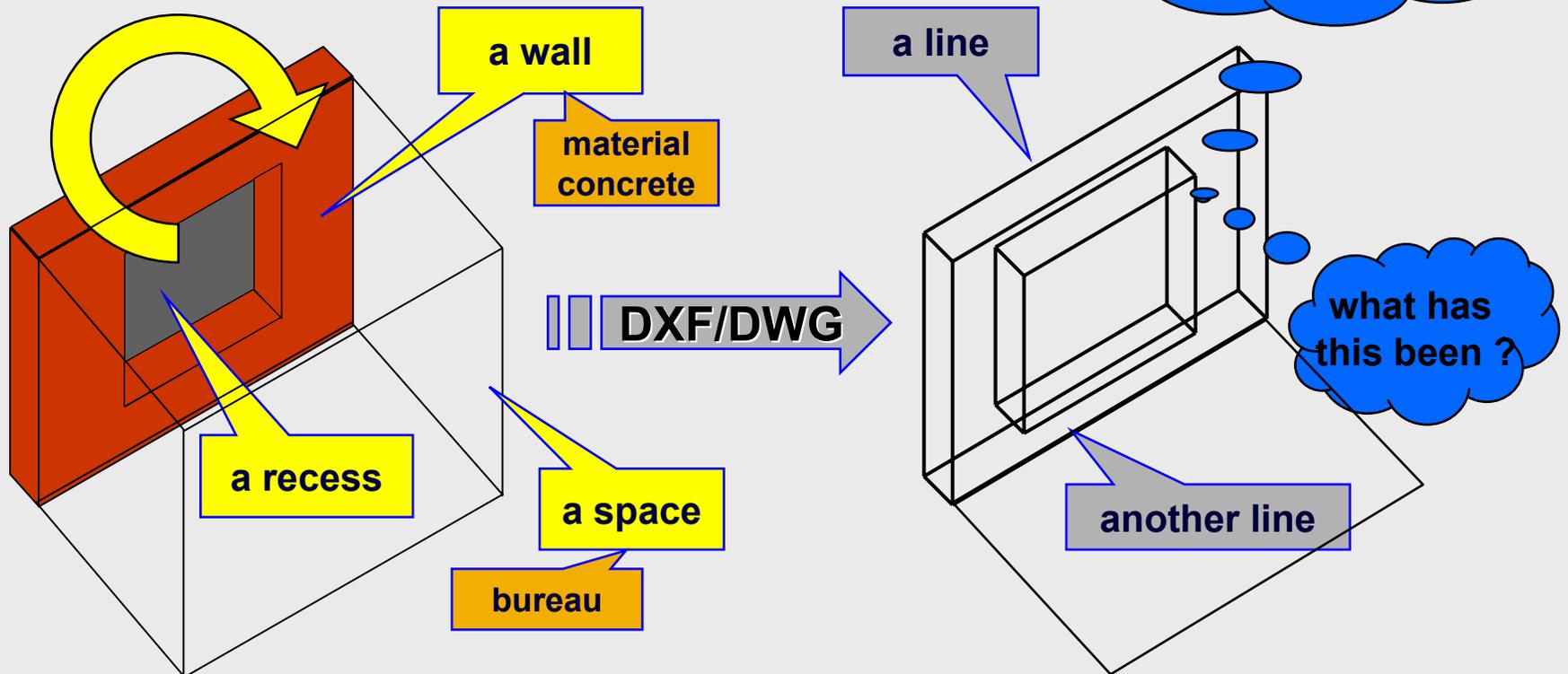


**value of building information model
= (number of processes using it) ²**

Why isn't DXF/DWG sufficient ?

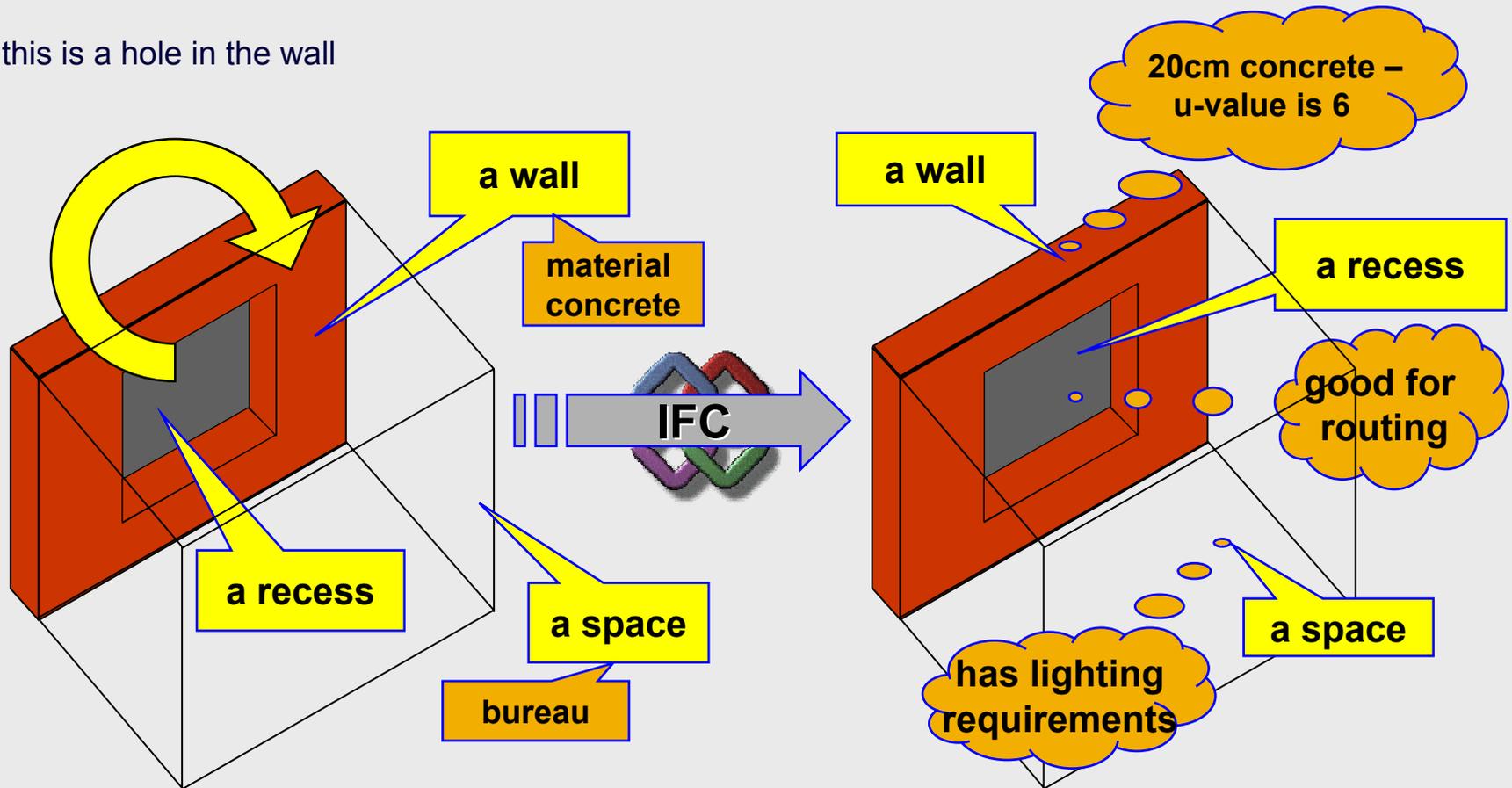
- ▶ drawing based standards do not exchange the object information, only geometry and presentation – same for formal (STEP drafting) and informal (DXF/DWG) standards

this is a hole in the wall

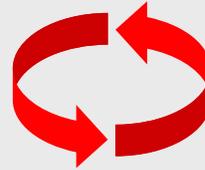


- ▶ all intelligent object information are exchanged, they can be reused and interpreted in other applications throughout the life cycle

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- ▶ CA(A)D systems,
- ▶ HVAC and electrical CAD,
- ▶ Energy simulation and evaluation,
- ▶ Structural analysis and engineering
- ▶ Quantity take-off, cost estimation
- ▶ Collision checking, building regulation checking,
- ▶ Catalogue data, etc.



IFC™ 2x
IMPLEMENTATION

Certified in accordance with official IAI
facilitated approval procedures for
IFC™ 2x - 24 October 2002

➤ **IFC is the most supported neutral exchange and sharing format for Building Information Models**

▶ Usage within the Building Industry

- ▶ Many national and international projects and pilot projects using IFC within the design phase
- ▶ Examples where IFC is used as database for FM
- ▶ Pilot applications where IFC are used as the schema for model servers to coordinate project planning activities
- ▶ And more ...

▶ Usage within the Building Authorities

- ▶ Use IFC to exchange within the organization
- ▶ Use IFC to communicate with external consultants
- ▶ Use IFC to hand-over situation plans
- ▶ Use IFC to check building submissions
- ▶ And more ... 

- ▶ **IFC is the neutral international standard for „*building information modeling*“ or „BIM“**
- ▶ **some authorities already plan to use IFC as a national standard, or even to require IFC models for checking, archiving and later FM operations**
- ▶ **the use of 3D and building models is more accepted now in the industry**
- ▶ **the potentials of „BIM“ can now be used across systems with help of IFC**
- ▶ **IFC essentially gives back the control of the data to the owners and users**

more information

 www.iai-ev.de