

Facilities Information Council:

Building Information Model (BIM) Standards

What is a BIM:

“A computable representation of the physical and functional characteristics of a facility and its related project/life-cycle information using open industry standards to inform business decision making for realizing better value.

BIM can integrate all the relevant aspects into a coherent organization of data that computer applications can access, modify and/or add to, if authorized to do so.”

Working definition by Facilities Information Council, 19 Nov 2004

The Benefits of using IFC-based BIM:

Information about the assets and operations of an enterprise provides the basis for decision making and as such represent significant value to the enterprise. Facilities represent logistical resources to support the business of the enterprise and information about facilities is a vital information asset. If owners can take control of this asset over the life-cycle of the facility, in the form of shared model based information, or BIM, they can better manage the process of maximizing value to themselves, their customers and society at large, in stead of paying for sub-optimizations by project participants, maximizing their own profits.

The Cultural Challenge of using IFC-based BIM:

The challenge with model based information sharing and IFC, is that benefits are often harvested in different processes from where the extra effort occurred to create the information. Currently typical process owners are narrowly optimized for their traditional deliverables and are mostly driven by commercial forces. If someone in a down-stream process asks for specific building information in IFC-BIM format, it raises the question of who will pay for that, if doing so causes extra work, risk and responsibility.

If the cost or time consumption in sum for two or more processes are less, or quality/functionality more, by using information models in stead of traditional communication methods, then there is a potential for whoever pays for this to get a portion of that benefit. If this can be solved by simply paying something more to someone earlier in the processes and get a fair part of resulting improvements in later process, we have identified one method how this can be achieved.

The Practical Challenge of using IFC-based BIM:

IFC is an open standard data model where building information can be represented and shared between various processes and professions. It is a very dynamic, flexible model, and can be used from from early planning stages to a complete and very detailed model of the built environment.

A consequence of this flexibility is that a BIM can be a perfectly acceptable IFC model, conforming to the IFC standard if it contains a lot of information, or if it contains virtually no building information at all. In theory you could convert a drawing only containing lines and color information to the IFC format, but it's then hardly what we expect we want to have a Building Information Model. So, if someone e.g. wants an Architectural firm to produce a building information model in addition to the traditional drawings and other deliverables, it's simply not enough to say that an IFC model should be delivered. The type and quality of the information required, needs to be specified, and it should also be possible to verify that the delivery actually is according to such specification.

The Practical Challenge of using IFC-based BIM:

In order to specify what information is expected we need a "Building Information Model Delivery Manual" (BIMDM). Simply put, we could say that the BIMDM is basically a definition of what information should be delivered from one "process" to another "process" during the facility lifecycle. This must be adaptable to all kinds of processes throughout the building lifecycle which means e.g. early planning, detailed planning, as built, facility management, refurbishment, demolition etc., as well different ways of linking the processes together in different project delivery contractual arrangements. It also means that the structure of the BIMDM must be such that it allows for new sections when new "information deliverables" are defined.

"Building Information Model Delivery Manual" (BIMDM).

The BIMDM should serve several levels of needs – non-technical as well as technical. It will explain the taxonomy of processes and their relationships to different contractual arrangements. Each process will be defined in 4 main sections. (In addition there might be private/national specialties). The proposed sections are:

Section 1:

A general description in "plain language" of the actual process, and how it can be improved in one way or another if it can receive building information created elsewhere. By plain language, we mean a language that can be understood by average building professionals, even if they do not understand IFC, BIM, data structures or other current buzzwords. Actually, even lawyers, financiers and others should be able to understand this section

Section 2a:

Explanation in "plain language" of which type of building information is requested - in what quality and form - and which benefits that potentially brings. In this section it can also be mentioned what potential extra work/cost that can be involved if the information is missing or incomplete

Section 2b:

The deliverables from the processes that enriches the building information model are stated in "plain language". A lot of processes also produce information that typically can or should be added to the building model. This is a part of what is paid for when one asks for a building information model, and it should/must therefore be specified.

Section 3a:

This is the technical part of 2a, stated in technical language, intended for use by the professional(s) executing the process. It is assumed that they are familiar with the terminology and technical terms of the profession that produces the information needed by another process. This section will provide more details about classifications, technical terms, product libraries to be used, etc. and will also be very specific in pointing out which data sets and element are mandatory to conform with the BIMDM. However, this will be presented in generic terms, anticipating that specific software vendors will provide the know-how of adding the required information in their software. The user should not have to know which IFC-objects, attributes and data sets are used in this BIM accumulation of information. (This section of the BIMDM can also be used as specification to translate to specific IFC's and property sets, to actually produce rule-based pre-checking of information in an import-filter, model server or other tools.)

Section 3b:

This is the technical part of 2b

The same assumptions as for 3a are valid also here.

This can again also serve as a specification for rule-based checking that the actual delivery has been made (a model server can typically check if the requested type of information has been added to the model, but not necessarily check that it's correct, comply with building codes, etc.)

Both 3a and 3b could be used as implementation guides, and for "IFC certification" of software.

(We must remember that BIM is far more than CAD, and that different applications only will implement and support what they actually need to do their job for the user/customer. We will also see an increasing number of small and highly process specialized/adapted software applications in the future)

Section 4

The problem for all end users is to understand how his/her particular software tool(s) and the information put in to it can end up in an open standard BIM like IFC.

They should not have to learn and understand IFC or the technical details of section 3a and 3b.

Section 4 will be found as appendixes or "help" in the individual software applications where it tells the user which buttons to press and what to be particular aware of in order to achieve the "information delivery" required according to the IDM. This will be different for AutoDesk ADT, Revit, ArchiCAD, DDS, MicroStation, Riuska, Tekla, Focus ... and many others.

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Draft 0.8 - Nov 18, 2004

Draft 0.9 - Dec 13, 2004

*This is a working draft and has not been reviewed by
the Facilities Information Council*