Review of the Development and Implementation of IFC compatible BIM

Executive Summary

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The report «Review of the Development and Implementation of IFC compatible BIM» is funded by Erabuild and written by a cross-country group, consisting of personnel from VTT in Finland, Eurostep in Sweden, Rambøll in Denmark and SINTEF in Norway.

A mixture of interviews with key players in the AEC/FM Industry, interviews with research and development organizations involved with buildingSMART technology, a survey with questions distributed to a wide range of companies and organizations, and intimate hands-on knowledge of the field, was used to reach the findings and conclusions this report represents.

Technology

The vision behind the international open standards and neutral technology, collectively known as buildingSMART technology, is to enable efficient information flow during the complete lifecycle of the building and beyond. IFC compliant BIMs form part of the foundations to this vision. An Integrated BIM stores all the building information relevant during the total lifecycle of the building and provides access to that information for the participating members.

In general, to be able to share information, three specifications must be in place:

- An exchange format, defining HOW to share the information. IFC (an ISO standard in development) is such a specification.
- A reference library, to define WHAT information we are sharing. The IFD Library (an implementation of ISO 12006-3) serves this purpose.
- Information requirements, defining WHICH information to share WHEN. The IDM/MVD approach (also

an ISO standard in development) forms that specification.

For example whenever you exchange your contact information in an email, to a potential business partner, you use three open international ICT standards:
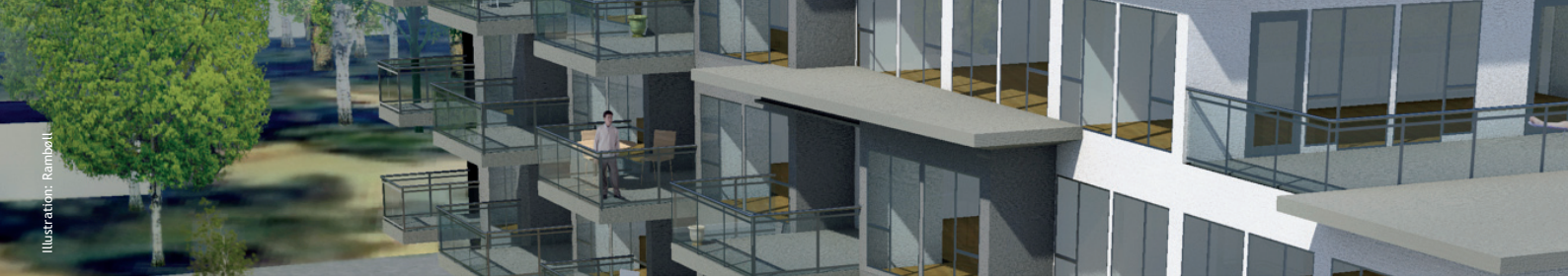
- RFC 822, the open international exchange format for email.
- The ASCII code system, our reference library for exchanging textual information.
- RFC 2821, the protocol defining what information two email servers must exchange, and when, to deliver an email from one person to the other.

However, all these three pillars for information exchange related to email, are so well integrated and implemented into our software tools and habits, so we do not think about them. They just work. This report provides recommendations for the next actions required to achieve similar level of usability for the information flow related to the entire lifecycle of a building.

Open International Standards

As email exchange over the Internet has proved, open international standards is an essential ingredient for information sharing. To unleash the full potential of more efficient information exchange in the AEC/FM Industry, both high quality open international standards and high quality implementations of these standards must be in place.

Through the results of our survey we show that CAD is still the major form of technique used in design work (over 60%) while BIM is used in around 20% of projects for architects and in around 10% of projects for engineers and contractors. IFC compliant BIM is actually used less than man-

ual drafting for architects and contractors, and show about the same usage for engineers.

The IFC standard is generally agreed to be of high quality and is widely implemented in software. However, the certification process allows poor quality implementations to be certified and essentially renders the certified software useless for any practical usage with IFC. The IFD Library is also generally seen to have the potential to solve many real world problems. However no implementation support in off the shelf software exists at the moment. As for IDM/MVD, the standards are still under development, and although certain proofs of concepts exist, it is not yet ready for implementation in off the shelf software.

Necessary Future Steps

We recommend a set of steps to improve the deployment and usage of Integrated BIM, which depends on the three open international standards, IFC, IFD and IDM/MVD, and their implementation in software and business processes.

Technical Recommendations

- Continued incremental improvement of the IFC specification with predictable release cycles is necessary. The improvements should be user driven, dictated from business needs. The specification should move towards a modular base, enabling focused improvements with less overall impact of existing implementations
- Implementation of IFD in real usage scenarios should be started, preferably with software in the early phase of the building process, and continue with other software as the process demands. Continued efforts to improve the technical aspects of the IFD Library must be ensured. Standard IFD based Product Libraries should be developed
- Production of software ready IDM/MVDs and implementation of these is necessary in real project scenarios. This should be done in parallel with the standard specification of IDM/MVD
- An Integrated BIM depends upon ability to merge models from various sources, efforts to develop open technology to improve this process is called for

Process Recommendations

- The software certification process for IFC is currently insufficient to ensure dependable software in real world projects. This must be improved, and using IDM/MVDs to build a new certification process looks promising. Similar care must be taken when developing certification for IFD related software
- USA, Finland, Norway, Denmark, Germany, Singapore and Korea are all currently working on BIM Guidelines. It is important to ensure that continued high quality efforts goes into this work, and that proper funding can be secured for an international BIM Guideline
- Integrated BIM will have impact on contractual and process issues in the AEC/FM Industry. Continued collaborative efforts to study this impact and suggest solution to challenges presented is important and must be secured
- Studies to demonstrate the business impact of implemented buildingSMART technology in the AEC/FM Industry should be carried out

Political Recommendations

- Large public clients should be early adapters and set proper demands in the marked to drive the implementation and development of buildingSMART technology forward. Public authorities must follow up with significant funding to ensure the proper long term development and implementation speed. We acknowledge that a free marked approach will not suffice to ensure the necessary open standards based foundation. However, when sufficient demand in the market is created, a free marked approach is desired for further development. This is in agreement with similar earlier efforts, like the development of the Internet
- Further stimulation and support to academic institutions to ensure long term research and educational programs in this field is important
- Finally, continued and increased international collaboration is important to ensure the full potential of these open international standards