

July 2008 BIM Information Exchange Demonstration:

by E. William East, PE, PhD

Engineer Research and Development Center, U.S. Army, Corps of Engineers

Executive Summary

Today's dynamic project organizations often suffer from the incompatibilities between information contents and data formats created by different project stakeholders. While the question of "format" could be solved (in the abstract) with proprietary specifications, incompatibilities still arise when users deploy different versions or apply different configurations of the same software. More importantly selection of a single software platform still does not resolve the question of the required "content" of Building Information Models (BIM) that parties need to exchange during a project life-cycle.

Until recently the term "interoperability" has been used to describe the seamless exchange of all project data for all purposes during the project. As many of us know first-hand, neither the use of proprietary software specifications or the single IFC Coordination Model View Definition file does get us to this promised land of complete interoperability.

In order to achieve our goal of interoperability we need a more refined understanding of interoperability. Specifically, our industry must be specific about exactly "what" information needs to be exchanged "when" and (only then) resolve the "format" question. If we are able to define the "what" data is needed "when", then question questions of "how" can take their appropriate role as technical discussions among software engineers and service providers.

The main purpose of this meeting was to demonstrate the results of an emerging requirements-based process that allows subject matter experts define contracted information exchanges. These contracted information exchanges are draft construction specifications that specifically define "who" is responsible to provide "what" data "when" during the project. The buildingSMART Alliance team including all stakeholders have taken these requirements and answered the "how" question through the use of an open standards (the Industry Foundation Class Model) and widely used computer information formats such as spreadsheets.

The live demonstrations conducted using commercial software and downloadable add-on products show that three contracted information exchanges (the Spatial Compliance Information Exchange, the Coordination View Information Exchange, and the Construction-Operations Building Information Exchange) can take the place of our current non-value added paper or e-paper deliverables. Now that the Alliance has demonstrated the path to create performance-based open standards that have high value to the capital facilities industry, it up to all of us to begin the hard work applying this effort on our projects.

Agenda

The National Institute of Building Science's buildingSMART Alliance, the Federal Facility Council, and the U.S. Army Corps of Engineers co-sponsored a demonstration at the National Academies of Science in Washington DC, 23-25 July. The Engineer Research and Development Center led workshop was organized to demonstrate the capability of existing commercial software to meet three performance-based, open-standard specifications for the exchange of building information. The live demonstrations by commercial software vendors simulated the creation of contractually required deliverables at different project stages.

The first specification requires that the designer provide building space and space measurement to aide in the verification of compliance against the owner's architectural program. This specification is named the "Spatial Compliance Information Exchange" or SCIE.

The second specification requires that lead design firms demonstrate that they have complied with design quality control requirements to coordinate architectural, structural, and building services design using automated clash detection software. This specification is named the "Coordination View Information Exchange" or CVIE.

The third specification requires that the designer's provide the building space and equipment list in a format that the construction contractor can to complete their facility handover documents. During construction, the contractor adds equipment make, model, and serial number. During commissioning project specific job plans can be described based on the level of detail provided by product manufacturers or commissioning agents. This handover data is then directly imported into maintenance and asset management systems. This specification is named the "Construction Operations Building Information Exchange" or COBIE.

This demonstration was the direct result of weekly meetings and additional conference calls that begin in February 2008. During these meetings the technical details of the exchange requirements were discussed and the parameters for the quantitative and qualitative evaluation of vendor products were resolved. In the weeks leading up to, and even during the meeting, the development team provided feedback to the vendors about the quality of their submissions. Over thirty sample files containing over a terabyte of total data were reviewed, usually within 24-hours and results were provided directly back to the vendors' development teams.

Each software vendor conducted live demonstrations at the July 2008 meeting showing how the required data is exported from their software. The final files provided by each vendor were passed through a file checker program to test the quality and completeness of the exchange. These results were reported during the meeting. Links to the entire agenda and these results are provided at the bottom of this page.

Keynote Address

Major General Merdith W. B. (Bo) Temple, Deputy Commanding General, Military and International Operations, Director of Military Programs, Headquarters U.S. Army Corps of Engineers, provided a welcoming message by video. MG Temple's welcome message stressed that the Corps BIM Roadmap is guiding the Corps' transition to performance-based, open-standards that stress the "Information" component of the BIM.

MG Temple attended the workshop on the final day to thank those participating in the workshop and to stress the importance of open industry standards. During MG Temple's closing remarks he said that this type of workshop should be considered as a model for future open-standards development. MG Temple identified cooperation among *all* industry stakeholders as a key to success of our efforts to achieve performance-based, open-standard information exchange standards.

Results

All Industry Foundation Class (IFC) based exports passed the testing procedure that included the automated translation of the IFC file to the required spreadsheet format required by SCIE and COBIE.

Vendors that demonstrated exports of at least one of these specifications were Autodesk, Inc. (REVIT), Bentley Systems, Inc. (Bentley Architecture), Digital Alchemy (Solibri), Onuma, Inc. (OPS), Project Blueprint Ltd. (ProjectBluePrint), and Nemetschek North America (VectorWorks). Nemetschek also announced that its ArchiCAD product would support these specifications in the near future.

Vendors present for the import of COBIE data were International Business Machines (Maximo) and TMA Systems. While no vendor demonstrated a hands-free import of COBIE data, TMA demonstrated a complete import of Operations and Maintenance data set including equipment lists, warranties, replacement parts, and job plan data.

Resources

Meeting Agenda with linked presentations
(www.buildingsmartalliance.org/news/presentations.php)

Construction Operations Building Information Exchange and Results
(www.wbdg.org/tools/cobiex.php)