July 2008 BIM Information Exchange Demonstration: Result Summary

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In July 2008 a demonstration of software vendor ability to produce compliant COBIE files was conducted by the buildingSMART Alliance, the Federal Facility Council, and the U.S. Army, Corps of Engineers. To allow vendors to differentiate their products from other presenters during the demonstration, vendors were allowed to choose their own building model. These models are all available, as are vendor presentations and software configuration instructions (if provided by the vendors) through links on this page. The objective of providing this complete set of information is to ensure that readers are able to follow vendor instructions to reproduce the results achieved during the July 2008 demonstration.

Vendors were asked to demonstrate their ability to comply with a set of three contracted information exchanges: Spatial Compliance Information Exchange (SCIE), Coordination View Information Exchange (CVIE), and Construction Operations Building Information Exchange (COBIE). This page provides the summary results of both quantitative and qualitative testing against these information exchange specifications presented on 25 July 2008 at the National Academies of Sciences.

Overall Results

All participating vendors showed the ability to meet the three specifications with only minor qualitative issues outstanding. While these qualitative issues could be resolved, in the case of the SCIE and COBIE specifications by manual modifications to the resulting data files, it is recommended that vendors complete their implementation of these exports such that all qualitative issues are resolved. The detailed performance of each vendor's submissions, as well as sample files, may be found on specific pages for SCIE, CVIE and COBIE.

System	Focus	Route	SCIE	CVIE	COBIE
OPS	Planning	direct	pass	n/a[1]	pass
Bentley	BIM Design	via IFC	pass	pass	pass
Revit	BIM Design	direct	fail	n/a[1]	fail[2]
Revit	BIM Design	via IFC	pass	pass	pass
Vectorworks	BIM Design	via IFC	pass	Pass	pass
ArchiCAD	BIM Design	via IFC	n/a[1]	n/a[1]	n/a[1]
PBL	2-D Design	direct	pass	n/a[1]	pass

[1] software not tested against this requirement.

[2] re-testing one week later showed sufficient compliance for this to be upgraded to "pass."

Vendors not participating in the July 2008 demonstrations may also be able to meet the requirements for some or all of the contracted information exchanges. These vendors may be asked to demonstrate how they can meet the criteria detailed in the specifications and the subsequent analysis conducted during the July 2008 demonstrations.

One of the key aspects of this demonstration was that of transparency. Users and vendors may make their own independent evaluations using the methods summarized here and discussed in detail on the specific information exchange pages.

Quantitative measures of issues in vendors' tools.

Three quantitative criteria were selected to be summarized to emphasize the variations in capability and quality of the information exchange provided for each of the three tested information exchange requirements.

The focus of the Spatial Compliance Information Exchange (SCIE) is measurement of the gross and rentable areas according to the harmonized ASTM-ANSI standard for space measurement. The SCIE and COBIE specifications request this harmonized ASTM-ANSI standard, however, proprietary (vendor- or agency-specific) values are allowed provided that the calculation method is explicitly stated in the SCIE and COBIE file under the Floor and Space worksheets. Since the harmonized standard as only recently been published in ASTM for, the test provided was to determine if a complete set of space measurement values could be provided. The highest quality solutions, for SCIE, are those in which all space measurements are provided with the specification of the calculation method used.

The minimum focus of the Coordination View Information Exchange is the clear expression of hard collisions between the physical objects within the building. To trace collisions back to their sources it is important that entities within the IFC Coordination View file, upon which the CVIE is based, are strongly typed. This means that all objects should be named and associated with type-objects – i.e. not just associated with model geometry. Models that do not have properly identified objects have, for historical reasons, simply used the IFC entity called "proxy elements." The qualitative measure of appropriately typed model objects has assisted to provide a rating of the demonstrated software solutions. The highest quality solutions, for CVIE, are those that contain zero, or close to zero, proxy elements.

For the Construction Operations Building Information Exchange (COBIE) deliverable a critical aspect of the file is that that individually named components found during design and construction such as doors, windows, equipment, valve tags, etc be classified according to the type of component. The Register worksheet provides the translation between the designers' selection of different material, product, and equipment types and the construction contractor's requirement for product submittals. It is important, therefore, for the designers submittal register to clearly identify the types of each piece of equipment. To require submittals for five individual pumps when all the pumps are of the same type is not

reasonable. The highest quality solutions, for COBIE, are those that contain a "reasonable" ratio of individually named components to component types.

System	Focus	Route	SCIE	CVIE	COBIE
			Space areas	IFC Proxies	C/T ratio
OPS	Planning	direct	net only	n/a[1]	22.6
Bentley	BIM Design	via IFC	yes	2	4.1
Revit	BIM Design	direct	yes	n/a[1]	0.5
Revit	BIM Design	via IFC	yes	1820	5.5
Vectorworks	BIM Design	via IFC	none	0	1.0
ArchiCAD	BIM Design	via IFC	n/a[1]	n/a[1]	n/a[1]
PBL	2-D Design	direct	none	n/a[1]	4.3

[1] software not tested against this requirement.

One of the primary concerns of those selecting, or evaluating, software for use to produce contracted information exchange will be the amount of time required to configure a given software system, produce the SCIE and COBIE files, and then manually update the SCIE and COBIE file to ensure that a deliverable will meet the contracted information exchange.

During our July 2008 Demonstration vendors were allowed to select and use their own models for SCIE and COBIE information exchange. This was done to allow vendors to explore the entire range of business cases that are impacted by SCIE and COBIE-related business processes. Since one specific model was not required during the July Demo, it is not possible to objectively compare estimates of the amount of time required by users of each system to manually produce acceptable SCIE and COBIE files. What could be done is to provide a measure of the relative amount of effort needed. The final table, below, evaluates the tested software products according the level of manual effort required produce a correct deliverable. The products are organized in order of minimum effort required at the top of the list, to the maximum amount of manual effort required at the bottom of the list.

System	Focus	Route	**Quality** (10=least effort to fix manually)			
to COBIE			**SCIE**	**CVIE**	**COBIE**	**Overall**
OPS	Planning	direct	9	n/a[1]	9	9
Bentley	BIM Design	via IFC	8	7	7	8
Revit	BIM Design	direct	4[2]	7	4[2]	4[2]
Revit	BIM Design	via IFC	7	6	7	6
Vectorworks	BIM Design	via IFC	7	n/a[1]	7	7
ArchiCAD	BIM Design	via IFC	n/a[1]	n/a[1]	n/a[1]	n/a[1]
PBL	2-D Design	direct	6	n/a[1]	7	6
Solibri	BIM Checking	via IFC	n/a[1]	8	n/a[1]	8

[1] software not tested against this requirement.

[2] re-testing one week later showed sufficient compliance for this to be upgraded to a 5.

System	**Focus**	**Route**	**Quality** (10=least effort to fix manually)			
from COBIE			**SCIE**	**CVIE**	**COBIE**	
IBM Maximo	O & M	via IFC	8	n/a[1]	7	7
TMA Systems	O & M	direct	9	n/a[1]	8	8

[1] software not tested against this requirement.

The specific manual setup and modifications required can be obtained by directly contacting your local vendor representative. If the local representative is unfamiliar with these requirements, you may have success in posting questions to the IFC-BIM Forums.