



Interoperability Position Statement

(approved by the AIA Board of Directors December 2009)

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Public Policy Position Statements at
www.aia.org/advocacy.*

The AIA believes that all industry-supporting software must facilitate, not inhibit, project planning, design, construction, commissioning and lifecycle management. This software must support non-proprietary open standards for auditable information exchange and allow for confident information exchanges across applications and across time.

This is best accomplished through professional, public- and private sector adoption of open standards. The AIA encourages its members and other industry organizations to assume a leadership role in the ongoing development of open standards.

Explanation

Why Interoperability?

Not all architects (or consultants, contractors, subcontractors, suppliers or owners) use the same software packages for their work, nor should they: each should use the best tool for the job in their particular business enterprise. But industry stakeholders do not work in a vacuum: they must share information in order to complete projects, and the amount of necessary information sharing is increasing at a dramatic pace. Transforming business processes require data interoperability. Data interoperability demands clear definition of necessary business information exchanges. Not every exchange must contain all data; however, business information exchanges required to facilitate the project should contain the information appropriate and necessary to perform the function of the exchange or task at hand.

There are many dimensions to the data or information contained in software packages used in the AEC industry today. Begin by considering a building information model: every single object in a model has dozens or hundreds of discrete pieces of associated alphanumeric or geometric data. Multiply that by the hundreds or thousands of objects in the model. Then layer on possible other uses of the data beyond the model, like performance analysis of the design (structural, thermal, lighting, etc.), project management, estimating or facility management software, or sharing of the data between different BIM applications, and so on. Acknowledge that some of the data is time-sensitive and may change over the life of the model. The complexity of ensuring those hundreds of thousands of pieces of data be shared between packages in an accurate, consistent, complete and effective fashion, especially when one

acknowledges the proprietary nature of the software packages, is mind-boggling. It's also hugely wasteful and ineffective: a 2004 study by the National Institute of Standards and Technology suggests that \$15.8 billion is lost annually in the AEC industry due to the lack of accurate and effective information exchange. The 2007 McGraw Hill SmartMarket Report on Interoperability states that on average, 3.1% of the cost of every project is waste due to lack of interoperability. The AIA must assume a leadership role in seeking a solution to this problem and should work with other organizations to reach effective and positive outcomes.

Why open standards?

Effective information exchange requirements in other technologically intensive fields such as emergency response, GIS, finance and healthcare are demonstrating the fundamental value of open standards based information exchange. The AEC industry is not an exception and may anticipate benefits similar to those experienced in other fields. Consider:

*Every AEC software package is based on a particular, unique data **schema** (data organization framework—how content is organized). This data schema is typically proprietary and hidden.*

To accurately exchange information between any two software packages, one of the following must be true:

- 1) package B must be based on the same schema as package A; or*
- 2) package B must be able to directly import (map) data into its schema from the schema of package A; or*
- 3) package A must be able to export (map) data from its schema into a transfer format or neutral exchange schema, from which package B must be able to import (map) the same data into its schema.*

Condition 1 is uncommon; schemas are typically unique to every software package, and are protected as proprietary information. Condition 2 involves close collaboration of the developers of the two software packages but limits an exchange to just those implemented. Condition 3 is potentially the most robust, but requires that the two developers agree to the specifics of the neutral exchange schema.

*If the example is expanded to include not just two packages but the larger world of software packages used by all project participants, and the complexity of the hundreds of thousands of pieces of necessary data exchange outlined above is layered on top, it becomes clear that two developers agreeing on a neutral exchange schema is insufficient and that the AEC industry as a whole needs to agree on and support a neutral transfer schema. This is most practical through industry-wide adoption of an **open data-sharing standard** (exchange schema), visible and transparent to all, supporting business workflows defined as much as possible by users.*

Why should AIA members care?

Overall productivity loss and fragmentation in the capital facilities development industries is no longer tolerable. Architects need to practice

the best way they know, and practice profitably; software interoperability problems must not hold them back. Potential of loss of competition in the software market is not acceptable.

Without software interoperability:

- Expense to the AEC and Owner in training and re-training in multiple platforms will increase;*
- Waste in time, materials, energy and money will increase;*
- AEC and Owner productivity will continue its decline as data re-entry, document versioning and checking, and other workflow problems increase;*
- The capital facility industry may segment again, this time around software solutions;*
- Collaborative delivery models such as Integrated Project Delivery will not deliver the benefits the profession anticipates;*
- Architects may not be able to access files in the future without fear of loss of data or loss of whole file;*
- Lack of competition may yield fewer affordable software solutions necessary to support architects' business practices;*
- Architects may lose future commissions and necessary collaboration partners;*
- The software industry will not achieve the robust development of the analysis and simulation tools and interfaces necessary to serve the rapidly changing industry;*
- New software concepts, tools and opportunities may be marginalized if dominant software companies release interoperability features following their own agendas.*

A large, competitive, interoperable software market is needed for innovation to flourish.