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buildingSMARTalliance™



There's a
Storm
Brewing in the
Construction Industry...
are you Ready?

Integration Today Using Open Standards: BIMStorm™, Rotterdam to Los Angeles and Beyond

By Kimon Onuma, FAIA

Projects from BIMStorm™ players. The image is from Google™ Earth, which had a network link to BIMStormPenn State iCON Lab during the BIMStorm™ providing interaction in real time with Google™ Earth and other applications. This is a stacked view of all schemes in an inverted pyramid representing actual square footage.



Penn State iCON Lab during the BIMStorm™.



I OFTEN GET ASKED: “what BIM platform should we use?” We all like simple decisions. Vanilla or chocolate? PC or Mac? Revit, ArchiCAD, VectorWorks, or other BIM? We like sticking to a brand. For BIM, “open standards” is the “new brand” we need to stick to. Information stored in proprietary formats will become irrelevant in this information centric age. Organizations that understand this will flourish like the Internet and those that do not will fade like a Betamax.

BIMStorm™ was proof that a stunning amount of collaboration and change is possible today with many tools. Yet, tools do not matter. BIM does not matter. Data and knowledge is valuable and BIM is just a container for data. What does matter is how data is exchanged and the process in which it’s exchanged. The “new brand” gives us broader choices on how data is used which will liberate the industry to get down to business. Technology is not the barrier to change, the cultural shift in how we collaborate is the challenge.

MODEL SERVERS

Expedia uses the open standards of the web to harness data which lets reservations happen in real-time. There are no phone calls to check flight or hotel availability because it is all happening in real-time. Imagine downloading static Excel or PDF files for an airline reservation.

BIMStorm™ is much like Expedia. Model servers are different from storing actual BIM files on an FTP site and downloading the entire building. With a model server, data is accessible to users without needing to download the BIM and opening it in client applications.



Tower in BIMStorm™. Rendering by Acusourcing, background by Google™ Earth, BIM by Onuma.

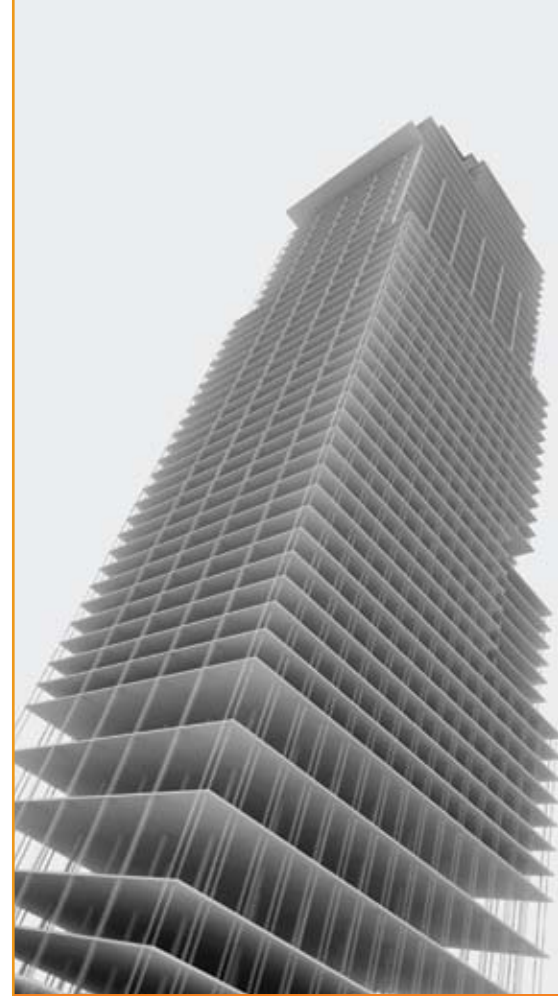
The recent Boston, Rotterdam and Los Angeles BIMStorms™ prove model server based exchanges work. Many users were able to work on multiple projects in real-time, making the massive scale collaboration possible.

ROTTERDAM TO LOS ANGELES

The Netherlands Department of Ministry (RGD) invited 60 architectural teams to a five day charrette to design a series of buildings valued at 1.3 billion Euros in Rotterdam. Along with cost and area calculations, RGD wanted BIM. With 60 teams doing their own project and

using different coordinate systems, the bridges and buildings were not aligning. Cost and area calculations could not be aggregated and did not update automatically.

Last November 2007 the project started with the teams using a variety of tools and processes, from paper and pencil to 3D models. BIM did not appear until the second day and models were not using a standard format or a common geospatial coordinate system. Aligning projects to each other and deriving calculations proved to be impossible. The situation was spiraling out of control.



Structural BIM image by SSFM, rendering by Acusourcing, BIM by Onuma.

A panel of industry experts observed the BIMStorm™ and commented:

LARS CHR CHRISTENSEN, BUILDINGSMART INTERNATIONAL

"BIMStorm™ LAX was a sandbox and revolutionary in the way it allowed participants to collaborate in real time. We need more time to play around now in order to avoid mimicking the old way of doing things and really understand how we should utilize the full BIMStorm™ and interoperability potential."

MARIO GUTTMAN, AIA

"The BIMStorm™ was an eye opener that things are going to change a lot more quickly than we thought because change doesn't have to be planned out in advance. Everything is going to be out there for your application to access and we don't need an endless series of committee meetings to make this happen."

TONY RINELLA

"BIMStorm™ is a revelation for Integrated Project Delivery teams looking for new and efficient means of collaboration. We saw international design and analysis talents coming

together instantly as needed to further projects. BIMStorm™ opens a new universe of possibilities for procurement and contracting in our increasingly competitive and globalizing AECOO economy."

DANA K. "DEKE" SMITH, FAIA

"The buildingSMART alliance™ is all about changing the way we do business and for a brief 24 hours some of us stopped how we normally do work and we played and had a little fun. We stepped out of our stovepipes a bit and we saw what life might be like without all the self-imposed conventions, working in a collaborative free information exchange world. We did not worry about digital rights management, and contract law or liabilities. It was a breath of fresh air and we needed that to start the change in the industry."

RK STEWART, FAIA

"Collaboration continues to be the biggest question across the industry. How people can share data to make projects move forward. The BIMStorm™ was the condensed period that focused a certain amount of collaboration but

there were some pretty clear lines that people did not cross when they had the opportunity to. Communication happened on the fringes and then it fed back to the center, why did some teams decide to go to a 2nd channel, or why did they hold to the boundary of a site and not go further."

MICHAEL TARDIF, ASSOC. AIA, HON. SDA

"BIMStorm™ LAX, as a proof-of-concept demonstration, provided a very large number of participants an opportunity to kick the tires and evaluate OPS technology. From that perspective, it was an unqualified success. Future BIMStorms™, as public events, could be even more successful if they were planned more closely with a municipal or regional planning authority, and if teams had more information about other participating teams and the skills they bring to the process. The educational experience would be greatly enhanced by introducing these real-world conditions and constraints, with the added bonus that the results might help move an actual urban-planning effort forward."

TOOLS

Adobe MAPublisher, AEC3 Xabio, ArchiCAD, Autodesk Revit, Autodesk Revit Structural, DDS CAD, Ecotect, EliteCAD, Erdas Imagine, ESRI ArcInfo, Firefox, GeoPDF, GoToWebinar, Google Earth/Maps/Docs, Green Building Studio, Hammers and Nails, Internet Explorer, Keynote, Mac, Microsoft Access/Excel/Powerpoint/Word/Live Maps, MySQL/PHP/Apache, NavisWorks, ONUMA Planning System (OPS) Model Server, OPS BIM application, Paper and Pencil, PC, Penn State iCON Lab, Rhino, SketchUp, Skype, Solibri, VectorWorks, Whitestone's MARS System.

OPEN STANDARDS

Industry Foundation Classes (IFC); International Code Council, SmartCodes™; Open Geospatial Consortium (OGC) WFS, CityGML; Open Standards Consortium for Real Estate (OSCRE); and World Wide Web Consortium (W3C)™.

At midnight on the third day one of the teams implemented the BIMStorm™ process. Their team connected with U.S. teams to learn the tools. By six the following morning they programmed all the project requirements, landing their projects in BIM, Google Earth and meeting client requirements. The mix of the BIM open standards of IFC and Open Geospatial Consortium Web Feature Services was a winning combination.

BIMStorm™ Los Angeles was just a simple concept last December 2007, but by the end of January 2008 it became the building industry's "Woodstock." A cross section of the industry came together to design Los Angeles during a 24 hour period. One hundred and thirty-three designers collaborated in real-time. Some teams worked together without making the effort to team up. Some got lost.

Pre-storm activities included master planning, and practice sessions to introduce new processes and tools. Access to municipal data is typically difficult or impossible to get to. Los Angeles was no exception. GIS and parcel data were obtained from the city and translated and imported to the model server to make it accessible to the BIMStorm™ participants.

AROUND THE WORLD

A 30 block area of Los Angeles quickly expanded to 60. Buildings totaled 55 million square feet. During the eye of the storm, everything from mega structures to hospitals were swirling in Web nirvana. The projects were shared and visible by all participants via open standards being posted to the model server. Users logged in through the web to view and interact with data. The data became the authoritative source of information.

During the early morning hours of January 31, "BIMmers" from the east to the west began collaborating. By noon engineering teams from Honolulu to Manila engaged their efforts to provide structural support on a 54-story building. Multiple buildings and fire stations were located in the BIMStorm™ arena. While many U.S. teams closed for the night, teams in Hawaii, Asia and Europe picked up the project and designed the HVAC and structural systems. For the first time, global "BIMmers" reacted much like stock market investors. These requests were then picked up by teams to resolve the design and placed on sites. Data was opened in energy analysis tools to generate calculations and graphics. Connecting the dots from early design through to the

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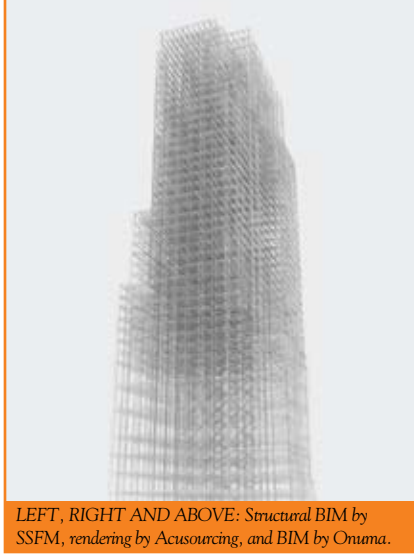
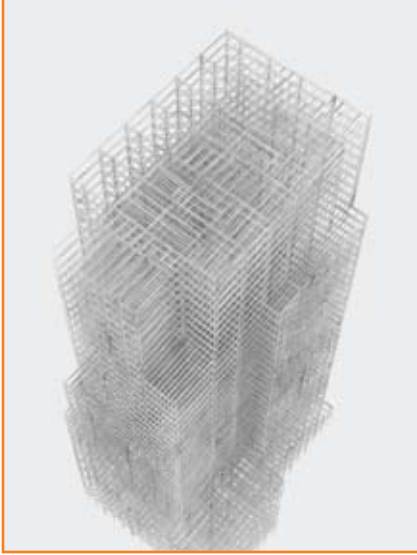
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LEFT, RIGHT AND ABOVE: Structural BIM by SSFM, rendering by Acusourcing, and BIM by Onuma.



20-year life-cycle was possible by sharing design decisions with many different experts and software. Building code checking using International Code Council rules, happened in parallel.

Not all projects were moving at the same level of detail. Some projects, like a hospital designed by a Los Angeles team were in greater detail, with operating room equipment specifications included by a German team, along with cost estimate reports, and a 20 year operations and maintenance estimate. Other projects were at sketchier levels. At the base level, all 420 projects were in IFC format.

The unprecedented event got the State of Wisconsin Department of Administration, U.S. Coast Guard, U.S. Army Corps of Engineers, fire departments, home builders and project requests in the model server.

The event opened new ways to BIM (a verb, like Google). BIMStorm™ LAX was a hyper collaborative effort. A real project would be more structured. However, introducing new ways to BIM was important, so the rules to play in the sandbox were loose.

COMMUNICATION AND TRANSACTIONS

With teams from 11 countries and more than 3,000 observers, using traditional methods of communication, meetings, phone calls, emails, etc. would have taken more than 24 hours to coordinate. Using open standards based exchanges and a model server allowed us to change how transactions happened and minimize coordination driven communication. Data in real time using a common format allowed decisions to flow through the model.

While this was an excellent exercise, there were communication glitches and traditional communication methods were still needed.

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- Rick Welcher, Myers&Company Architectural Metals Inc, USA*

Structures that Do Business

Martina Center
Vellamo, Finland

COLLABORATE
Exchange model data with architects and other project participants

DESIGN & DETAIL
Model the structure in 3D and manage changes

FABRICATE
Transfer data with planning and automation systems

DELIVER
Produce quality output for an error-free project

ERECT
Plan and manage in 4D

Tekla Structures is building information modeling (BIM) software that streamlines the delivery process of design, detailing, fabrication, and construction organizations. While integrating openly with architectural models, its strength lies in the contractor end of the process. Thousands of Tekla Structures users in more than 80 countries have successfully delivered BIM-based projects across the world.

Contact Tekla for more information, tel. 1.877.TEKLA.OK

TEKLA Structures

www.tekla.com

Virtual scenarios promote informed decisions. To create many scenarios, data has to talk the same language. A common communication format, supported by open standards is necessary. Visualizing many virtual train wrecks allows you to minimize or eliminate costly mistakes.

DIGESTING THE STORM

The Capability Maturity Model (CMM) measures 11 areas of practices and processes of BIM implementation. The success of the BIMStorm™ can be measured

against these factors as an entire exercise of 420 buildings. Individual team efforts and projects could also be reviewed with these metrics.

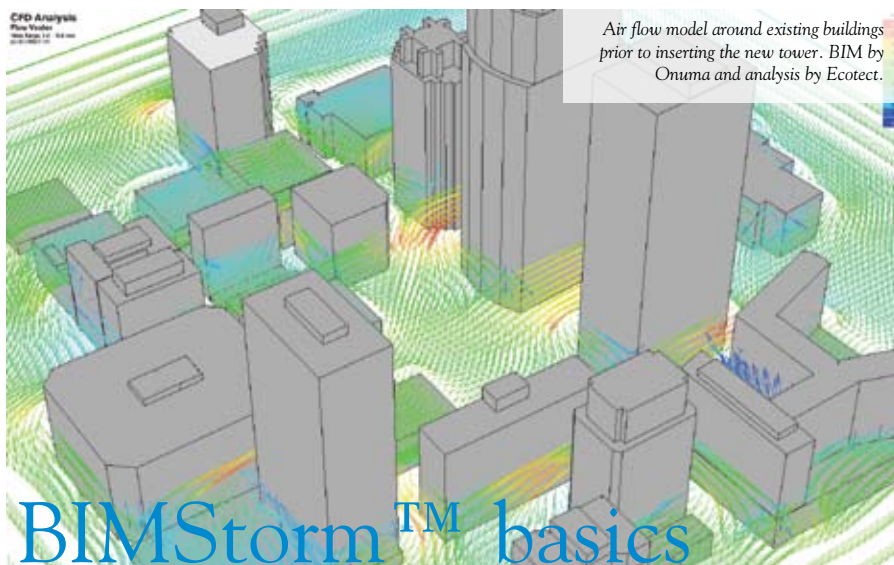
1. Data richness;
2. Life-cycle views;
3. Change management;
4. Roles or disciplines;
5. Business process;
6. Timeliness/response;
7. Delivery method;
8. Graphical information;
9. Spatial capability;

10. Information accuracy; and
11. Interoperability/IFC support.

BIMStorm™ was not perfect. Standards are still evolving. There were surprises, problems and chaos. What was clear is that even today a stunning amount of collaboration is possible in a BIG way, one only needs to accept the new process. Just like the Internet that is never complete, if you wait for standards to be “finished” you will watch the train leave the station. All are welcome aboard, the train is moving fast.

We all learned that as a group we can start to tip the culture of the industry in 2008. BIMStorm™ demonstrated the potential of collaboration with open standards. The future of the “new brand” is up to us as an industry to define. The horizon is wide open for all that are willing to embrace this change. ■

Kimon Onuma is recognized as a leader in building industry and has a unique perspective that spans architecture, planning, programming, software development and technology strategies. Onuma was one of the first firms to use BIM on large scale U.S. government facilities in 1994. He developed the ONUMA Planning System (OPS), a BIM Model Server and editor, which was used on projects such as the US Coast Guard (USCG) Sector Command Center System and streamlined the design process of 35 sector projects to six months. ONUMA has received numerous awards, including the 2006 Fiatech CETI award, and AIA BIM Awards. In 2006 he authored Chapter Six of the American Institute of Architect's (AIA) book, “The 21st Century Architect—Integrated and Interoperable,” for their AIA Conference on Integrated Practice. Onuma is on the Board of Direction of the buildingSMART alliance™.



The origins of the BIMStorm™ go back to the mid 90s when ONUMA was using BIM in ways that focused on the “i” or information of BIM. This process allowed ONUMA to collaborate worldwide with teams on projects. Throughout the 90s the process and tools continued to evolve within ONUMA. For the most part, the deliverables to clients at the time were traditional CAD and other documents generated by OPS, but not the data itself. Forward looking clients started to recognize the value of OPS and ONUMA gradually started to integrate it closer with projects and engage the project teams in more advanced use of the “i” of BIM.

Although many clients saw the benefits of the output capability of OPS, there was one client that stood out among the rest that immediately understood the full potential. The United States Coast Guard in 2003, saw and developed a larger vision called “The Framework for Integrated Decision-Making” at the core of the Shore Facilities Capital Asset Management Road (SFCAM) Map lead by David Hammond in Washington DC. Others in the USCG such as CDR Jack Dempsey, Paul Herold, LCDR Jeff Brockus, William Scherer, CAPT Jay Manik (Ret.), and many more actively participated in the vision of the SFCAM Road Map and supported OPS and BIM being used on projects. The big and early vision of the Coast Guard has been instrumental in helping to change the entire industry. We would like to thank David Hammond and the USCG for this.

BIMStorm™ has been a vision of ONUMA since the mid 90s but until the industry embraces the change required, and follow the forward looking organizations such as the USCG, GSA, DHS, Smithsonian and others, nothing will be possible. This is a challenge to the rest of the industry. Help us raise the bar.

Other leading firms are now using OPS on projects in ways that exponentially increase the value provided to the industry.

FOR MORE INFORMATION:

BIMStorm™: <http://BIMStorm.com>

Players: <http://BIMStorm.com/LAX/play>

Panel: <http://BIMStorm.com/LAX/panel>

Live links to projects: www.onuma.com/products/WfsCatalog.php

Send request to access the projects

here: www.onuma.com/services/BIMStormRegistration1.php

Discussion forum: www.onuma.com/services/BIMStormRegistration1.php

Capability maturity model: http://aecbytes.com/viewpoint/2007/issue_33.html

Discussion forum: www.onuma.com/services/BIMStormRegistration1.php

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