

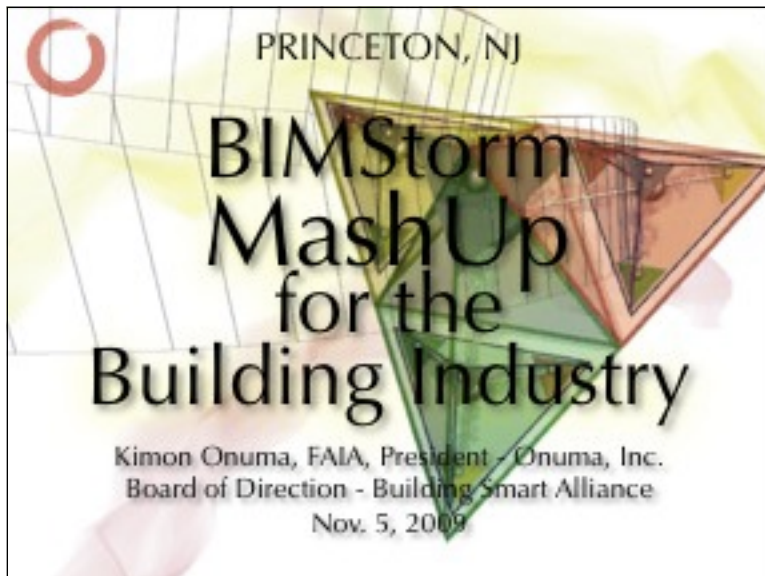


The building industry is chaotic, unpredictable, constantly changing and becoming more complex every day. Layer on top of that the challenges of global warming, the financial collapse, and globalization and this becomes a toxic mix that unless it is managed properly is a recipe for disaster.

“A good hockey player  
plays where the puck is”

“A great hockey player  
plays where the puck  
is going to be”

Wayne Gretzky



This is our view of the building industry. Decisions happen in a non linear way. The chaos of the industry needs to be looked at from a point of view of being able to react quickly, have access to information in real time, and stitch together disparate tools, processes and people. The complexity and challenges facing this industry can only be solved by integration at an unprecedented scale. BIMStorm are web based workshops, playing off of brainstorm. The focus is on real time collaboration through cloud computing.



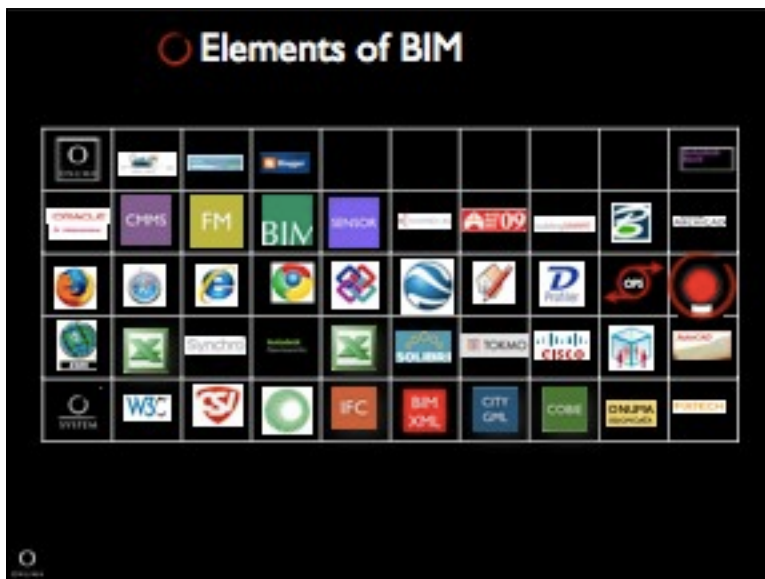
Onuma, Inc. is a hybrid company. We are building architects as well as software architects. We have been using BIM since 1993. The Onuma team is a 21st century organization with specialists in the building industry and computer scientists that mash and hash through the challenges of the building industry to revolutionize architecture.



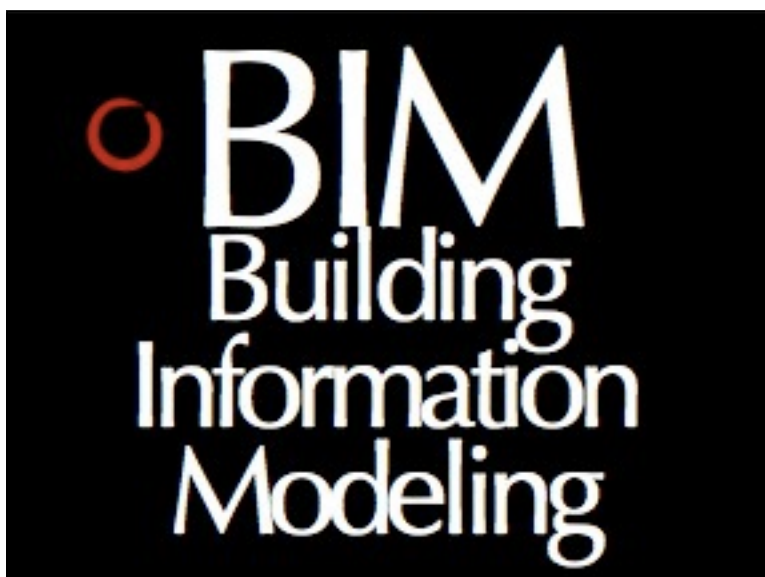
The technology exists today on the internet. Real time bids to consumers using a simple interface to request travel. One does not have to wait two weeks to get a bid on an airline seat. The reason this works is that the information is available in real time, presented in an easy to use interface that requires minimal or no training and is smart enough to not ask the passenger how much fuel would you like on this flight. There are very few mid-air collisions in the airline industry, unfortunately in the building industry 30-50% of the flights are “mid-air collisions”



The culture of the internet and the generation of today is naturally wired to collaborate in real time. Twitter is just the beginning of the sophistication that will be possible when this generation defines how collaboration will move away from our current practices and move into hyper drive for the building industry. Nothing will be the same.



The tools will continue to expand and users will plug and play what they need using open standard exchanges. This is a natural progression. The tools we use will not be reduced, they will be expanded to support the needs of the building industry. The complexities of the building industry cannot be solved by a few tools. Just like the internet has many web sites, and tools, so will the building industry.





The "i" of BIM is where all the information is stored. We believe focusing on the "i" is central to the success of any level of BIM from simple models to complex models.



Information supports knowledge and decision making. BIM has the potential of transforming the building industry today.



One of our clients, the US Coast Guard stated: "we own our data". The message was that data and knowledge cannot be trapped into any proprietary tool or business agenda. The data must be able to flow between applications using open standards.

"The data about our facilities,  
is more valuable than  
the physical facility itself"



The US Coast Guard was an early user of Keyhole. Keyhole was acquired by Google and re-branded as Google Earth. Onuma developed a link between the Onuma System and Google Earth to provide a world view to Coast Guard BIM drivers. Buildings and assets were linked and the US Coast Guard nicknamed the system, "Sim-Coast Guard" for it's ability to drive scenario planning. Links to desktop BIM applications such as ArchiCAD were included in the development. This all happened in nine months. This pattern of development, testing, implementation and adjustment is methodology that

Not Just  
"The Project"

Although the design and construction of "the building" and "the project" is very important, if you take a larger more holistic view, it is not just about the single project. The single building is part of the environment regardless of if is owned by a single owner or is part of a larger portfolio of 8000 buildings of the US Coast Guard. Knowing how your building functions and impacts the environment, your business and your bottom line is critical to any organization. The current condition in the industry is that most owners know very little about what they own, what decisions are being made or how to plan



Onuma was responsible for a series of tasks with US Coast Guard projects that included the Shore Facilities Capital Asset Management Road Map. The SFCAM Road Map included identifying an overall strategy, implementing through pilot projects and rapid iterative development of integrated BIM solutions. Integrated Decision Making was a task within the Road Map. This pre-dates the Integrated Project Delivery defined by the AIA. Every opportunity to link data across stove-piped processes was identified. Solutions were developed that garnered recognition of the US Coast Guard being the leading



The Onuma System was used to successfully link missions to facilities and graphically depict the scenarios in BIM. US Coast Guard facilities are spread throughout the earth and have the ability to link across geographies allowed for visualizing the impact of decisions at both a macro and micro level. The use of open standards created the conduit for linking to other desktop BIM applications and databases.



# It's Broken Let's Fix It


The industry IS broken and does need fixing now. It is pretty much operating as if we were in the 19th century.



OFFICE OF  
MANAGEMENT AND BUDGET

"Cloud-computing will help to optimize the Federal data facility environment and create a platform to provide services to a broader audience"

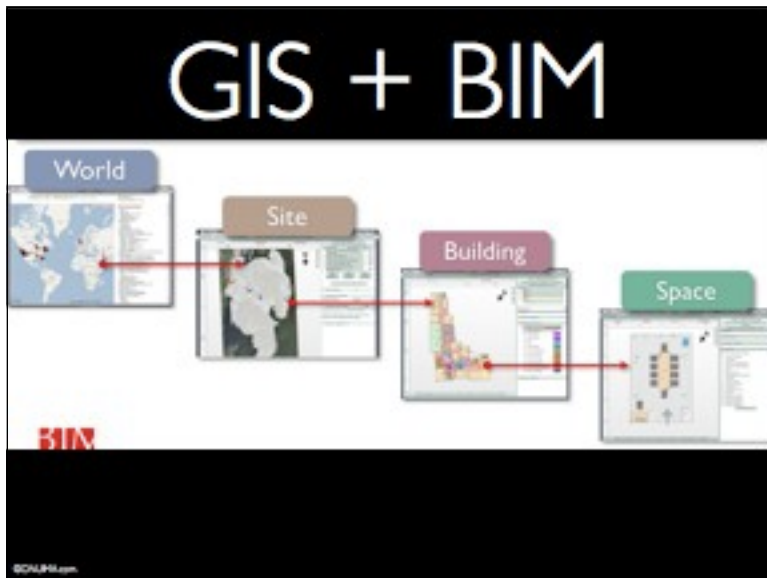
Cloud computing is changing the landscape of how organizations can manage data. The US government even identifies it as a solution.



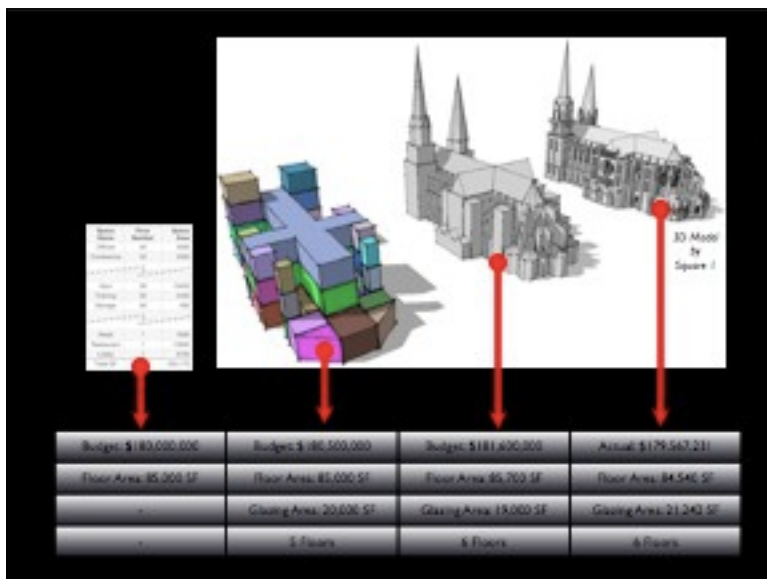
SYSTEM

BIM MODEL SERVER

The Onuma System is a web-based BIM Model Server and editor. It is a cloud computing system. It allows users to interact with simple to use interfaces on BIM data. The lowest common denominator is an Excel file. There is no linear path to how the system can be used. There is no software to install, therefore it makes it easy for anyone to log in with proper access, and proceed with work regardless of what computer they are on. The Onuma System can run on the Onuma servers and can also be installed on other servers. It was installed on the US Coast Guard servers and is currently running on other servers.



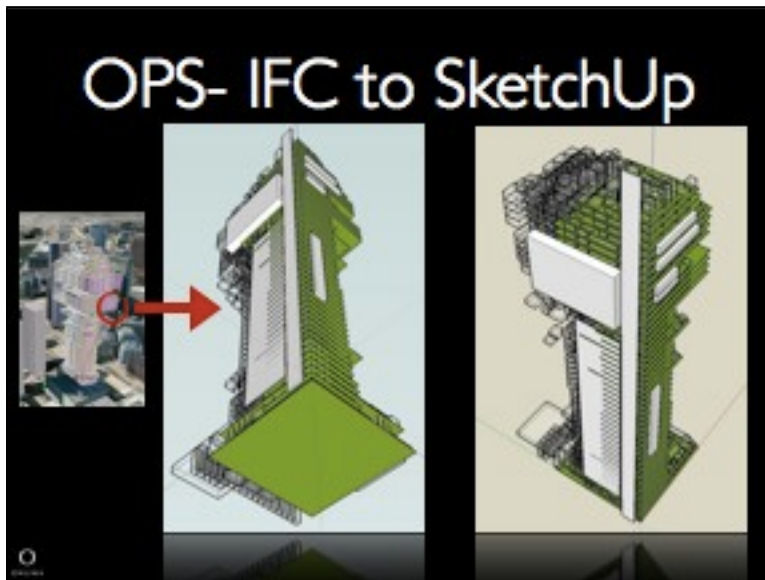
Link geography and buildings. BIM + GIS = Solution for global warming. The Onuma System manages both GIS data and BIM data from the same database.



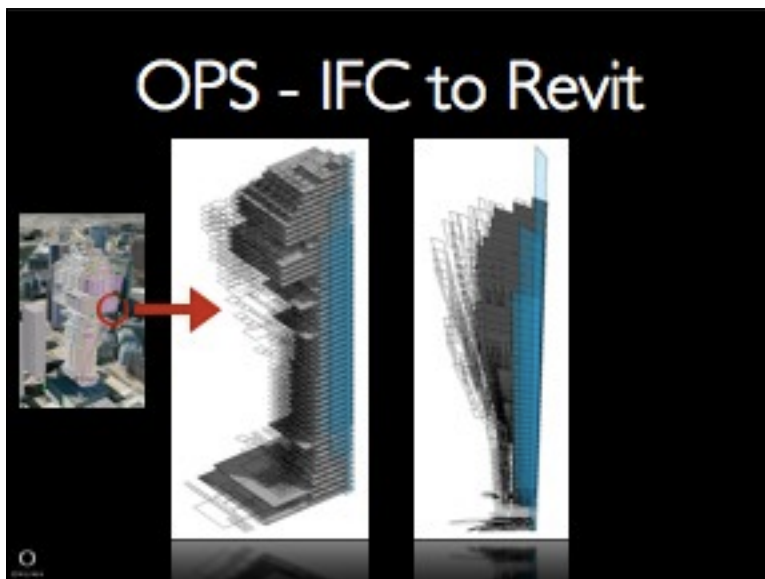
BIM does not have to be complex. Start simple now, with minimal training. Knowledge is the most important ingredient. Simple models can be created in minutes and complex data attached to them for scenario planning.



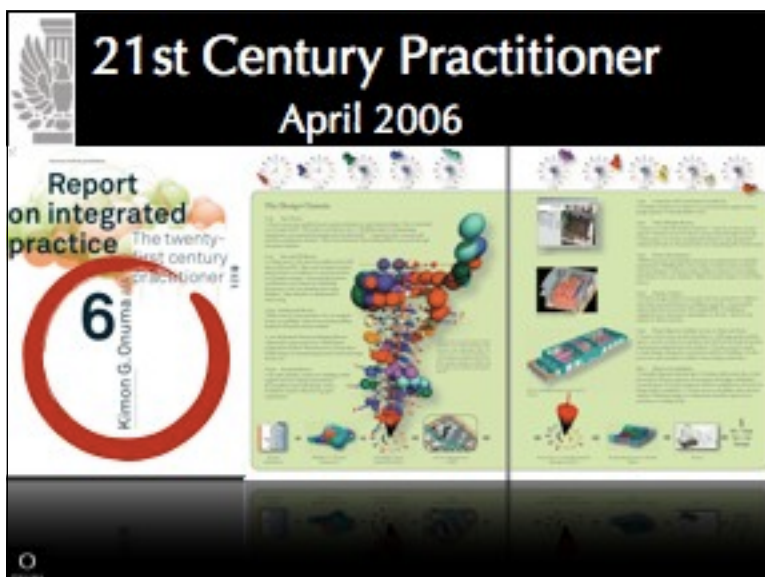
This is an example of an automatically created BIM using Excel the Onuma System and then exported for rapid viewing in Google Earth. It is a 54 story tower created strictly in Excel. No designer has touched the design yet.



The resulting data can then be exported to SketchUp. The designer's task at this point is to study design alternatives. The difference is that they are working with the exact Program Requirement data that minutes ago started in an Excel file or another linked database.



Here is the same data also exported to Revit. The Revit user is relieved of the task of manually typing in 500 spaces and associated attributes. More time is left for design. The edited Revit model can then be imported back to the Onuma system for checking the delta to the original requirement.



In spring of 2006, an eleven chapter Report on Integrated Practice was published by the AIA. Kimon Onuma wrote Chapter 6 and outlined the vision of what the 21st century practitioner would be. A bulk of the definition was based on actual projects that were ongoing with the US Coast Guard. At the center of the paper was a section titled "The Design Charrette" defining what appeared to be a science fiction scenario of collaboration across the industry on a project. This foreshadowed the development of 2007 and 2008 BIMstorms.



Over 3,000 participants took part in BIMStorms during 2,008. Penn State participated in the 24 hour BIMStorm LAX. 130 teams from around the world, collaborated in real-time in this BIMStorm, and created 420 buildings. This image demonstrates how students are looking in on the live data streaming in from the Onuma System Model Server, and providing input in real time to the participants. The 21st century is about immediate access to live data for scenario planning. The youth of today is not only naturally wired for this, they are expecting nothing less from the industry. Although the tools are the enabler, they



BIMStorms are global phenomenon. In one year, close to half a billion square feet of projects were designed.



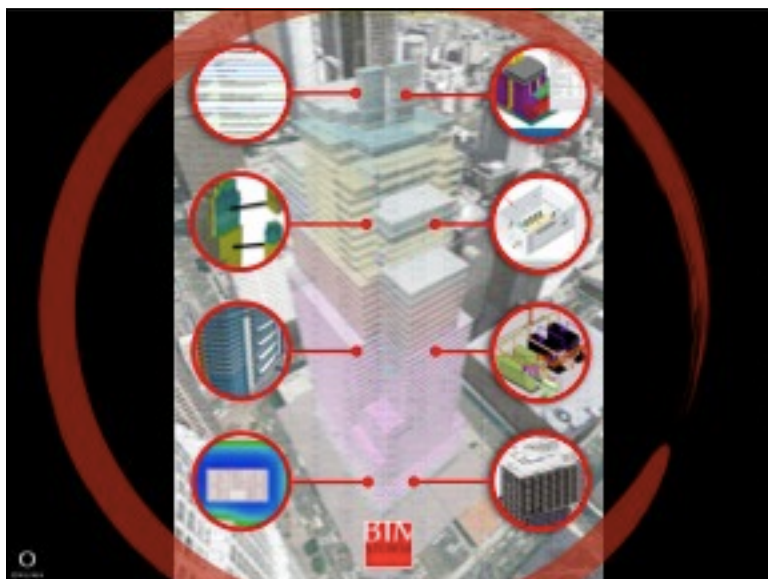
The Los Angeles BIMStorm was a virtual online charrette with teams spread throughout the world. Although we could have planned a physical gathering, working virtually in this BIMStorm proved possibilities that can be accomplish an astounding amount of work in a short period of time.



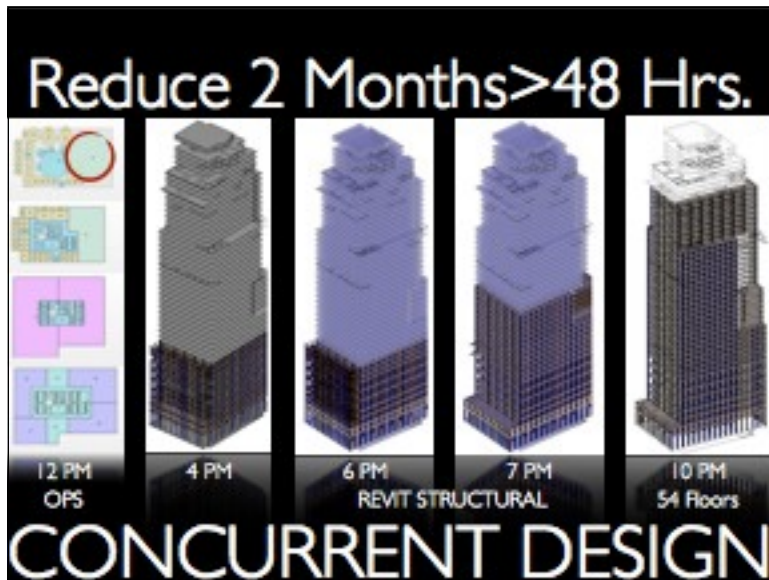
The Los Angeles BIMStorm involved 130 teams for 24 hours creating 420 buildings. The result was visible in Google Earth, which drew from the Onuma System Model Server in real time as the teams edited their designs. Let's focus on one building.



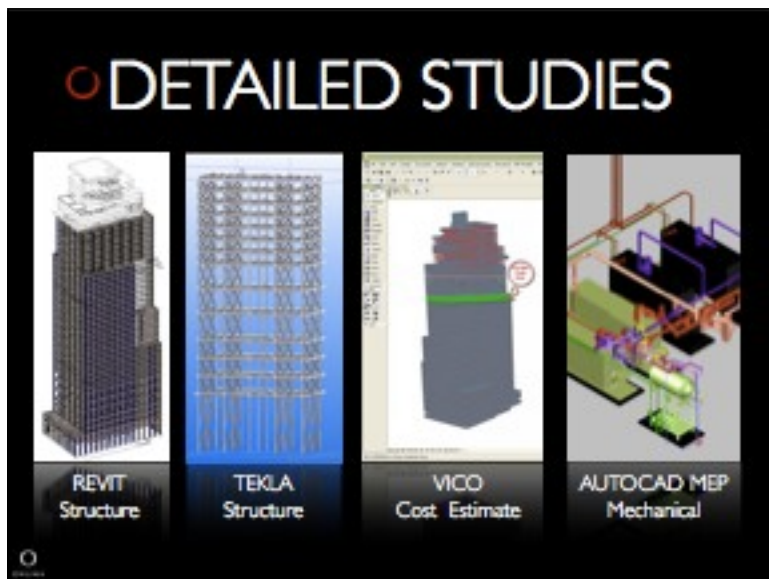
Here is the same building that minutes ago was imported from Excel. The designer in the Onuma System has spent another 30 minutes to form the building by editing floor plates and location of spaces to create this mixed use tower. Not much time is used in this design, which allows flexibility on the team to try many iterations.



Interoperability in the Onuma System Model Server allows other teams with their tool of choice and pull data using IFC, GBXML, XML, CityGML, KML, Excel and other formats to continue more detailed designs based on the same data. In this view, you can see Vico, Autodesk MEP, Revit Structure, Ecotect, SketchUp, Whitestone, all pulling data into their tool. The result is that experts from many domains can interact in real time and affect the overall direction of a project much earlier and faster.



Within 24 hours studies were completed. What typically takes two months was completed within this short period. Here is an example of data flowing from the Onuma System, into Revit Structure.



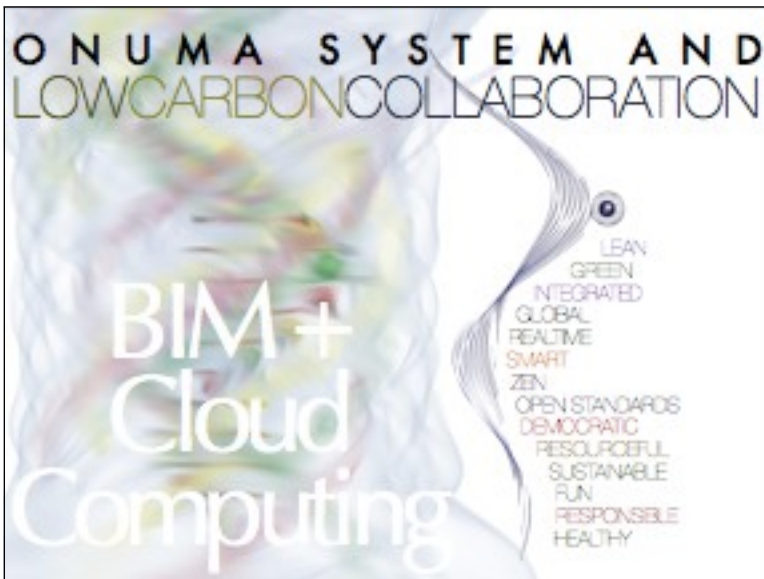
Teams then took the model into their tools of choice and rapidly tested various scenarios with the same data. One engineering team was using Revit Structure another Tekla Structure for a different result. Another team suggested going to concrete using VICO. The solutions can then be compared one to the next to evaluate strengths and weaknesses. Typically this process would take weeks or months and was completed in a hours or a few days. These are not final solutions, but sketches of ideas using data that was initially generated from an owner's request that made its way into BIM and



Energy studies from the same data were conducted using open standards. This is the Ecotect team from the UK pulling GBXML data from the Onuma System Model Server.



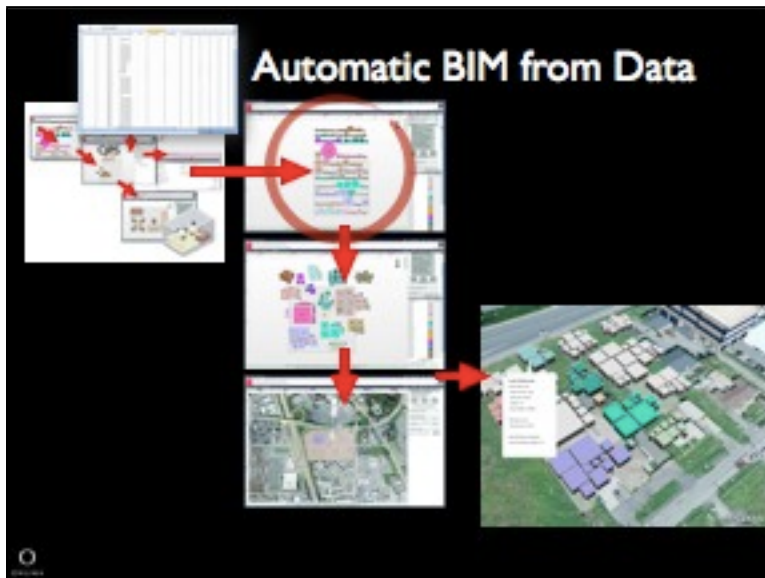
24 Hours. Over 130 teams. 420 Buildings. The LA BIMStorm yielded massive amount of data. The equivalent of 2.8 million pages of documents were never printed. Data and information in the 21st century will rapidly move toward non printed real time data. This is already happening in other industries such as the airline reservation system. The building industry is poised to make a large shift.



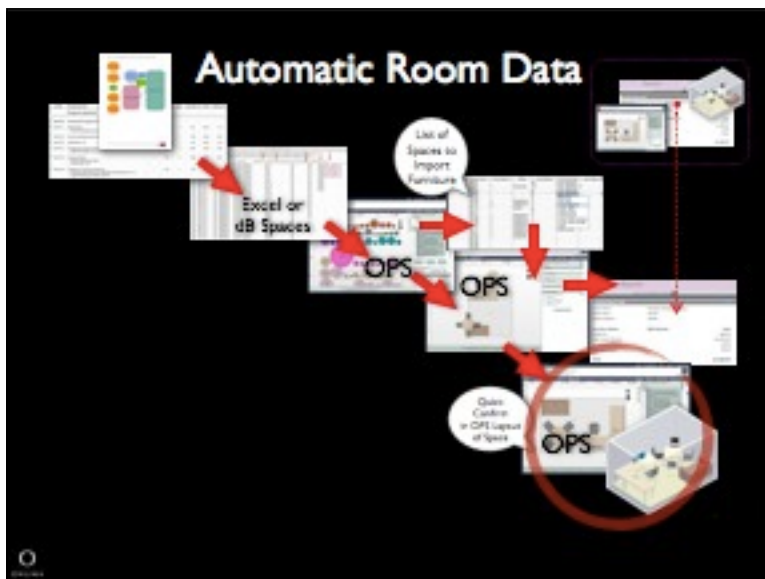
The mere act of collaborating in a more efficient way in the design process prior to any construction happens is smarter and more efficient. The BIMStorm process coined the term "Low Carbon Collaboration" to describe this new reality.







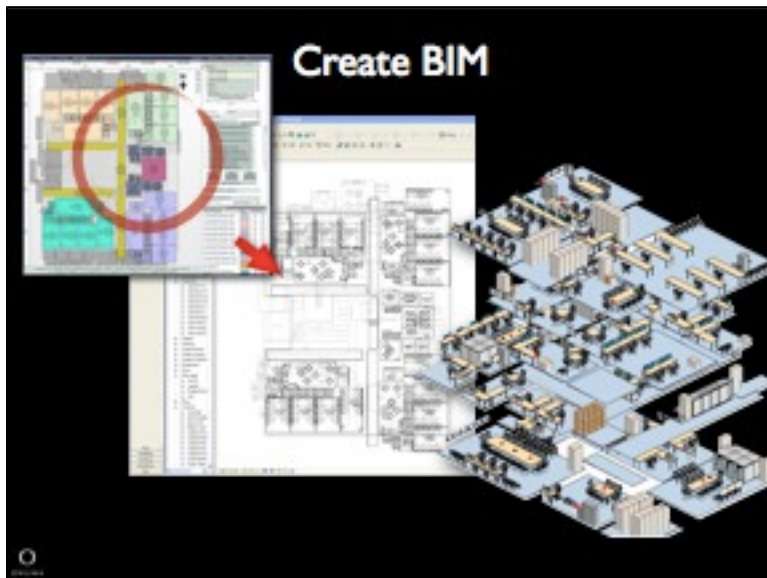
Data was also used to create the furniture and equipment. The teams could then use the Onuma System to rapidly create scenarios and document decisions.



Room Data sheets are created from the project requirements and data in the Onuma System.



Spaces could then be manipulate for various layouts. Varying course of action were created and compared to each other to reach a decision on direction.



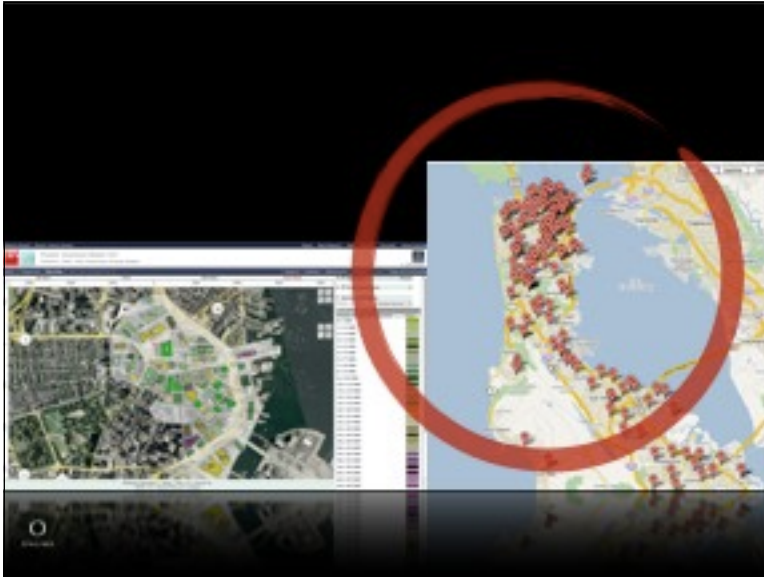
Once a decision is made that the course of action is correct the same data could be used to automatically create a BIM in Revit or ArchiCAD.



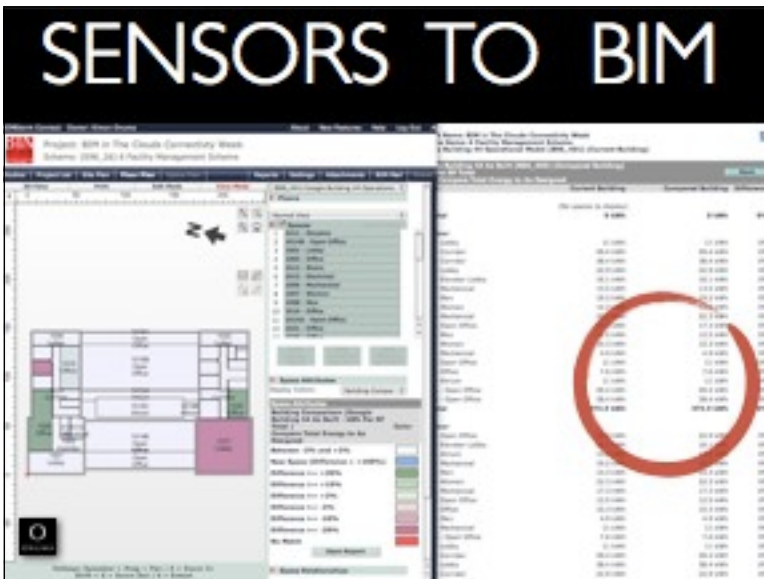
The Onuma System is a cloud computing based system. It can therefore link to other systems such as the TOKMO cost estimating system to generate real time cost estimates based on the plans being created in Onuma.



In the past month, new connections between BIM and the Smart Grid were established by Onuma.



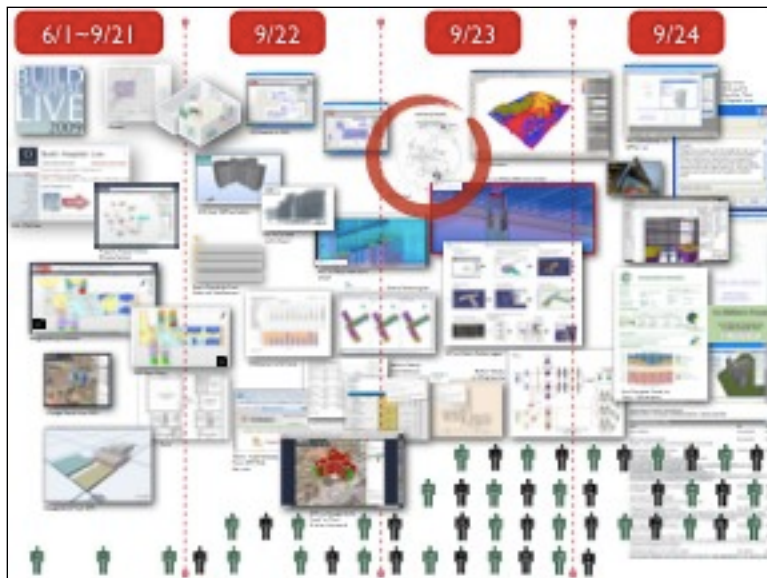
The Smart Grid using the Onuma System can manage an existing portfolio of projects and visualize all the way from the global view down to a city and individual floor plan of a building.



Sensor data such as that from the CISCO Mediator can be visualized in real time.



The BIMStorm Build Hospital Live is moving from Oslo to Washington DC. Join us live in Washington DC or virtually through the web at <http://BIMStorm.com>.



The OSLO Build Hospital Live involved teams from around the world designing a hospital in real time through the BIMStorm process.

# Disruptive Technologies

Revolutions cannot happen without disruptions. There will be casualties and in order to survive in this new age on uncertainty organizations must embrace this change. The cultural shift that is necessary to change the status quo needs to drive this change.

Kimon Onuma, FAIA  
Onuma 8

KG@Onuma.com  
<http://BIMStorm.com>

# Live Animations of Presentations available at:

<http://www.onuma.com/products/BimTube.php>

<http://BIMStorm.com>

