

Fall 2010

LOCATION LOCATION LOCATION GIS

22°17'2.18"N
114° 9'18.28"E

88 Floors

International
Finance Centre
22°17'6.43"N
114° 9'33.79"E

Temperature: 25 C
Humidity: 74
Air Pollution Index: 32

26th Floor
22°16'44.02"N
114° 9'0.05"E

Hong Kong Population: 7,055,071
Water: 2.63 Million Cubic Meters Per Day
Energy: 805 Terajoules Per Day

Lights Off

Lights On

90 m²
Apartment
24th Floor

22°16'46.49"N
114° 9'41.27"E
72 Floors
135,000 m²
45 Elevators

Carpet 48,600 m²
Renewable Energy:
107,219 Megajoule
Energy Use:
8,101,080 Megajoule

BIM BIM BIM

Location, Location, Location BIM, BIM, BIM

By Kimon Onuma, FAIA

THE INTERNET HAS CHANGED EVERYTHING. LAYERING maps with restaurant locations, real-time weather, real-time airline information, bus and train schedules on a computer or phone are now common place. GIS data has been around for a long time and initially was reserved to be used by those with technical backgrounds. The internet and easy access to GIS data has now made it ubiquitous to the point that users don't even know they're accessing GIS data.

What if the building industry took this location functionality and merged it with building information modeling (BIM)? Imagine BIM and geographic information systems (GIS) in a simple environment providing real-time building and GIS data. Why connect GIS to BIM? Both are complex systems describing the built environment and can help us to visualize more intelligent decisions. We would all benefit hugely from new knowledge gained by linking the data in these two key systems (**FIGURE 1**).

The building industry lags in tapping into these resources. Google's ease of use coupled with GIS is critical for location-based BIM to thrive. Standards support cloud-based BIM and GIS interoperability. The key to solving complex problems is to start simple and build up on top of the foundation. Boiling the ocean will not work.

SERVICE ORIENTED ARCHITECTURE (SOA)

Downloading an airline master list and flight schedule as an Excel file, then pouring through the document to select a flight and seat is cumbersome. It isn't impossible, but why use a file-based system when the information is rendered obsolete the minute it's saved? In a services-based approach such as Expedia, available flight data information, accessed in real-time via an internet browser, enables powerful purchasing decisions. It's simple and elegant. Service Oriented Architecture (SOA) delivers information via the internet for the specific query—in an open standard, flexible and agile format that's easily understood.

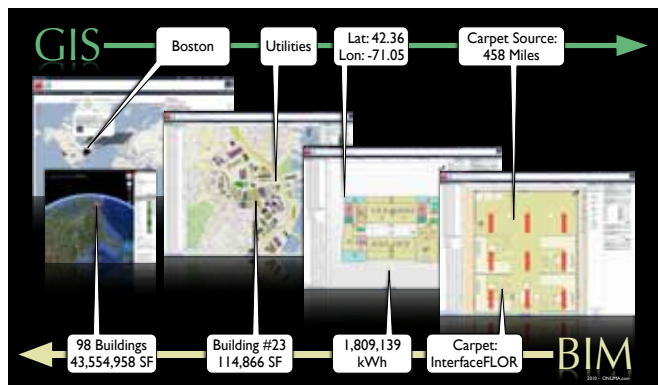


Figure 1. Real-time GIS and BIM in the cloud.

Traditionally, data is shared between applications by exporting a file from application A, then importing the file into application B, thereby creating multiple copies of the data. In an SOA approach, the data remains with application A and is used or modified by application B (or other applications).

Just as it isn't necessary to reference Excel files when making Expedia reservations, it's not necessary to move a whole BIM model. An SOA approach lets the user access pertinent BIM and GIS data. Linking complex BIM and GIS data with agile, flexible tools, apps and processes are the only infinitely scalable solution for the built environment. This is how BIM "model views" can be shared in small BIM data chunks (See the Fall 2007 and 2008 issues of *JBIM*).

With more BIM and GIS being accessed, information becomes more relevant and valuable. A live 2006 Open Geospatial Consortium demonstration (OGC Web Services, Phase 4) demonstrated the relevancy and value to these processes, garnering an American Institute of Architects Technology in Practice BIM Award by substantiating powerful cloud-base BIM + GIS + SOA + open standards. Go to: <http://goo.gl/aXlh>.

HYBRID ENVIRONMENT

The internet moves in real-time. Computing devices coupled with cloud-based tools make information more accessible to users. BIM and GIS become more robust as more users take advantage of the power of this complex combination.

Cloud-based tools are becoming the new normal. This approach allows access to computing resources much as one would tap into the electricity grid that powers a home. Google, Microsoft, IBM, Apple and others have made cloud computing central to their business strategy. For more information go to: http://en.wikipedia.org/wiki/Cloud_computing.

Hybrid approaches will be integral to BIM and GIS consumers and producers, with no single desktop or cloud-based tool solving all the BIM and GIS needs. BIM and GIS are infinitely scalable.



Figure 2. Real-time GIS and BIM in the cloud. PBS&J's Fort Belvoir Mash-Up using ESRI and ONUMA.

The more users access, consume and produce BIM and GIS data, the more relevant and valuable their information becomes.

INFORMATION DEMOCRACY

The internet moves in real-time. No one consumes last week's "new"spaper. The word itself is a relic—nothing "new" is on paper. Cloud computing enables access to tools and information in a simple way.

The seemingly random layering of information leads to more collaboration and patterns emerging that lead to more intelligent decisions. Users will absorb building, product and geographic data through open standards portals in real-time, multi-user mash-ups, while at meetings, waiting for a train, drinking coffee at Starbucks or managing a project at the job site...it is über information democracy.

STANDARDS AND FLEXIBILITY

Standards and free access for all are hallmarks of the internet. BIM and GIS also require standards for interoperability. Combining the open standards of BIM, GIS and the internet yield enormous capabilities. The internet thrives on information. BIM generates mountains of information and if properly structured, provides great value in our interconnected world (FIGURE 2).

FORT BELVOIR MASH-UP

A July 14, 2010, *Engineering News-Record* article, described the tight \$4 billion Fort Belvoir mash-up project as a "Twitter for BIM." The PBS&J Alexandria, Virginia, office used PBS&J 4D Planner, along with BIM and GIS cloud technologies to deliver "new" information and solutions mashed from ESRI, Google Earth, Onuma System and Primavera Schedule data. Weekly meetings utilizing web-based tools and data streaming from various sources make real-time decisions a reality. The client recognized the value from this process and rendered paper less relevant.

28 BIMSTORMS

Since 2008, BIMStorms have made "news" as hands-on real-time collaborations. Kenneth Wong's 2008 *Cadlyst* article summarized one event as a Woodstock for BIM that promoted

collaboration at a new level. Since the award winning web-based BIMStorm LAX event (FIGURE 3), Integrated Project Delivery (IPD) workshops have allowed more than 4,000 participants to use various tools, in cloud-based environments supported by the buildingSMART alliance™, Open Geospatial Consortium (OGC) and open standard exchanges, demonstrating that BIM elements and GIS data take the lifecycle of the built environment to a whole new level.

GETTING REAL - LINKING LIVE SENSORS TO LIVE BIM

High-performance buildings are becoming the fabric of environmentally conscious owners. Owners want them now. GSA announced that the building industry needs to address and meet Executive Order 13514 goals. Real-time building information that includes room temperature and equipment conditions can meet these goals in a BIM + GIS + cloud environment. At the 2010 Connectivity Week conference, Anto Budiardjo promoted and demonstrated the benefits of real-time BIM + GIS + Live Sensors (FIGURE 4). Linking-up, connecting, sharing and transparency are important to owners.

BIM + GIS continues to evolve and the new normal will connect desktop tools with agile and flexible cloud-based tools. Proprietary information and file-based processes will no longer be standard procedure. Embrace innovation and be part of the "new" reality by joining the buildingSMART alliance™ and/or the Open Geospatial Consortium. Join BIMStorm.com at the Ecobuild Conference in Washington, D.C. and be part of *Location, Location, Location | BIM, BIM, BIM*. Learn more at www.aecocobuild.com. ■

Kim Onuma, FAIA, is the President and Founder of Onuma. For more than a decade, he has promoted open standards as the best mechanism for integrated practice. On January 31, 2008, Onuma and his team made a turning point in architectural history. Within little over a month, his simple concept became a "Woodstock" for the building industry. BIMStorm LAX brought together a wide cross-section of building industry professionals from 11 different countries to design over 50 million square feet, creating massing models and schematic designs for 420 buildings, in real-time.



Figure 3. Real-time GIS and BIMStorm LAX poster.

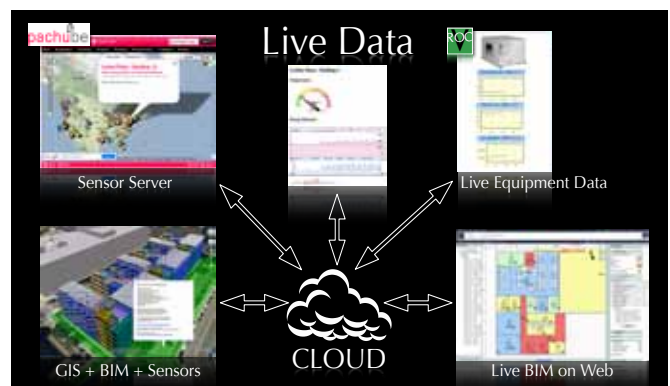


Figure 4. Real-time GIS and BIM connected to the smart grid and sensors in the cloud.