The 21st Century Practitioner:

Transformed by Process not Software

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Part 1

Evolve of Dissolve

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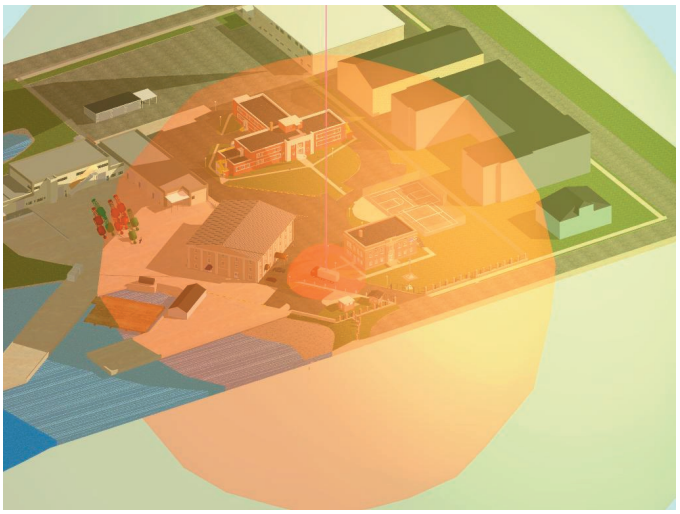
Abstract:

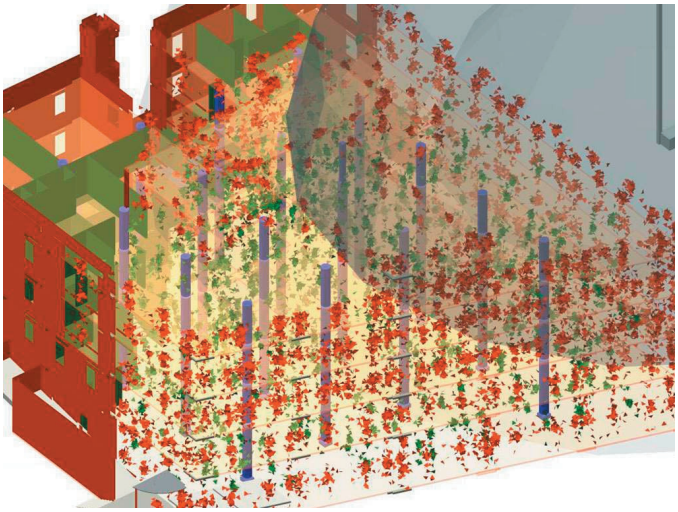
The 21st Century Practitioner will be Transformed by Process not Software. As the boundaries of architecture change there is a feeling that we are going to fall off the edge. The future of architecture and quality design will matter only if we can make a process change and realize that the horizon has no edge. Technological change will support the process change and allow architecture to be tightly integrated with all aspects of the life cycle of projects and to improve the value provided to clients.

This article will not focus on specific software. As architects we must drive the definition of how software will support us. Imagine if authors and screenwriters depended on Microsoft for their creativity. Would they wait for the next version of Microsoft Word to be able to put out a new novel? Do they look to Bill Gates for creativity beyond that of creating the software that they use to write that screenplay?

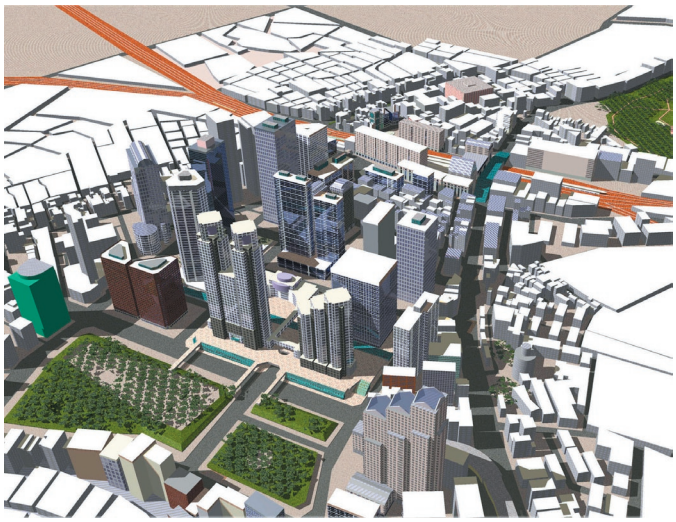
The opportunities are huge for all in architects to focus on creating a framework for interoperability. The benefits that can be gained are not imaginary or in the future, they are happening now. We must be prepared to write our own novels and make architecture relevant in this new century.



A BIMbomb at a harbor facility. Scenario based planning is possible using BIM to determine damage and impact to operations.



A BIM can be used to calculate the assembly requirements and also reverse this calculation to disassemble the data as this Standing Stone Inc. BIMbomb demonstrates.



Building Information Models have been around for over 20 years. 1995 BIM of Tokyo.

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A virtual bomb explodes on the street outside a building.

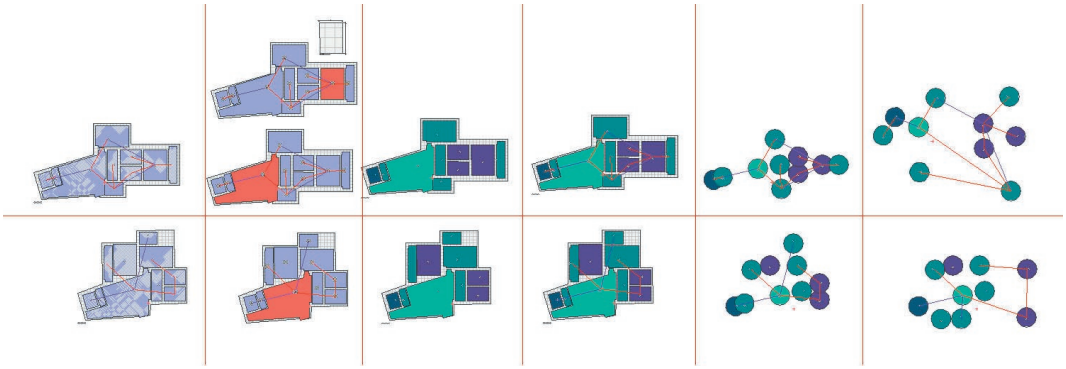
Parametric rules embedded in the digital model immediately alter the 3D image to represent how much damage has been done to the building's facade and structural system. A self-generated list makes it known how many offices have been destroyed or made inoperable. The virtual people who are impacted by the decimated offices are highlighted and cross checked with a roster of who was checked "in." All the damaged equipment is instantly registered and an inventory is generated listing immediate replacement to maintain mission critical tasks. Costs are associated with repairs and replacements.

Ten seconds after the virtual blast, the client knows to set the building back another 20 feet from the street. This potential impact on the worldwide operations of the client is immediately realized during the early planning stages.

While this may sound like a scene the architect of the future will be directing, it is actually being played out today due to the unique collaboration of architects, engineers, security experts, other professionals, and visionary clients.

Architects often point to BIM (Building Information Modeling) as the difference between 20th and 21st Century practice. In reality, it is the change in design processes demanded by an evolving society that will truly define the architect of this century. The early sharing of critical information and allowing its presentation to an increasingly wide audience is what makes the BIMbomb™ a new phenomenon – not the underlying technology.

Yes, the software makes it possible to visually present the information. Yet the software has been available for more than two decades. The client's need to quickly understand the impact of facilities on its overriding mission is what drives the creation of complex models such as the BIMbomb™. As clients attain more sophisticated understanding of every issue that impacts their mission they want architectural process improvements that match advancements they experience in other parts of their operations.



Genetic Code of the Erectheion at the Acropolis in Athens Just as Classiccal Greek Architecture followed design rules, Building Information Models can follow predetermined rules established by architects taking advantage of today's tools.

Room for Two Camps

As they did throughout the 20th Century, architects today are facing ongoing societal change and process evolution that greatly impact their practice. Some 21st Century architects are aware of these changes, such as globalization and technological acceleration, and are adopting the new processes with tools that let them keep pace with the rest of the world. Others sense the sea change crashing on the shore and react with an understandable fear. It is not easy to continuously improve processes and adapt new technologies.

For the time being demands for new buildings worldwide will allow these two sets of architects to stay in business. However, the future of these two groups will vary greatly. Architects who do not adapt to changing business processes will work for clients who maintain traditional business practices. Their opportunities to participate in innovative projects will diminish and eventually their accumulated knowledge, along with their business, will fade. But, just as there are still some architects who design buildings using only hand-drawn documents, there will be architects who manage in this traditional fashion.

Clients are changing by implementing global communication, continuous process improvement, and integrated decision making. Architects who rapidly adjust to these changing demands and are comfortable with best-in-class practices, will continue to win the prize projects. More importantly, architects who adapt new processes will increase the number of services they offer and will use their creative problem solving talents in areas that impact society beyond the walls of their buildings. These architects can see their knowledge base as valuable data or as a set of logical rules similar to the Classical Orders for designing Greek buildings.

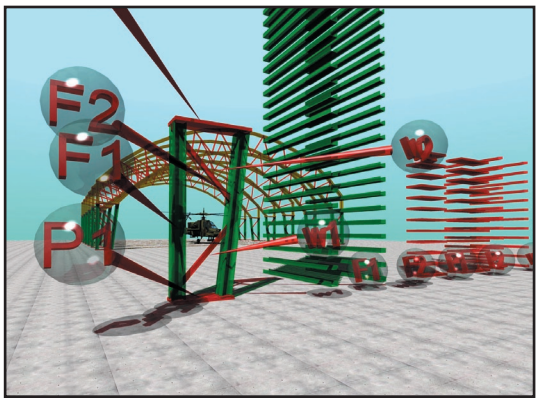
By leveraging tools like those used at travel reservation web sites such as Expedia and Travelocity, architects will be able to help guide clients through complex design issues in a short period. Projects ranging from mass-customization of kitchen cabinets to affordable personalization of every unit in a high rise apartment complex to charting social implications of mixed use developments will be addressed by the architect in an integrated manner that depicts clearly visible results. Clients driven by projects such as the Shore Facilities Asset Management Road Map of the United States Coast Guard are already starting to implement these advanced processes.

Inside the two groups will be a diverse array of architects. The traditional camp will include architects practicing much the way they are today. Those using integrated practices will include principals, project architects, and sole practitioners interacting with an increasing array of professionals adept at information management and analysis. Architects will also be able to mine the publicly and privately available data that supports decision making in ways that clients don't realize. Integrated practice will allow architects to increase the value they bring to clients by providing information trails that show how design decisions impact long-term goals. Fees will be based on this value, which is more important to a client than the hours a draftsman spend connecting lines. Information connections will be valued.

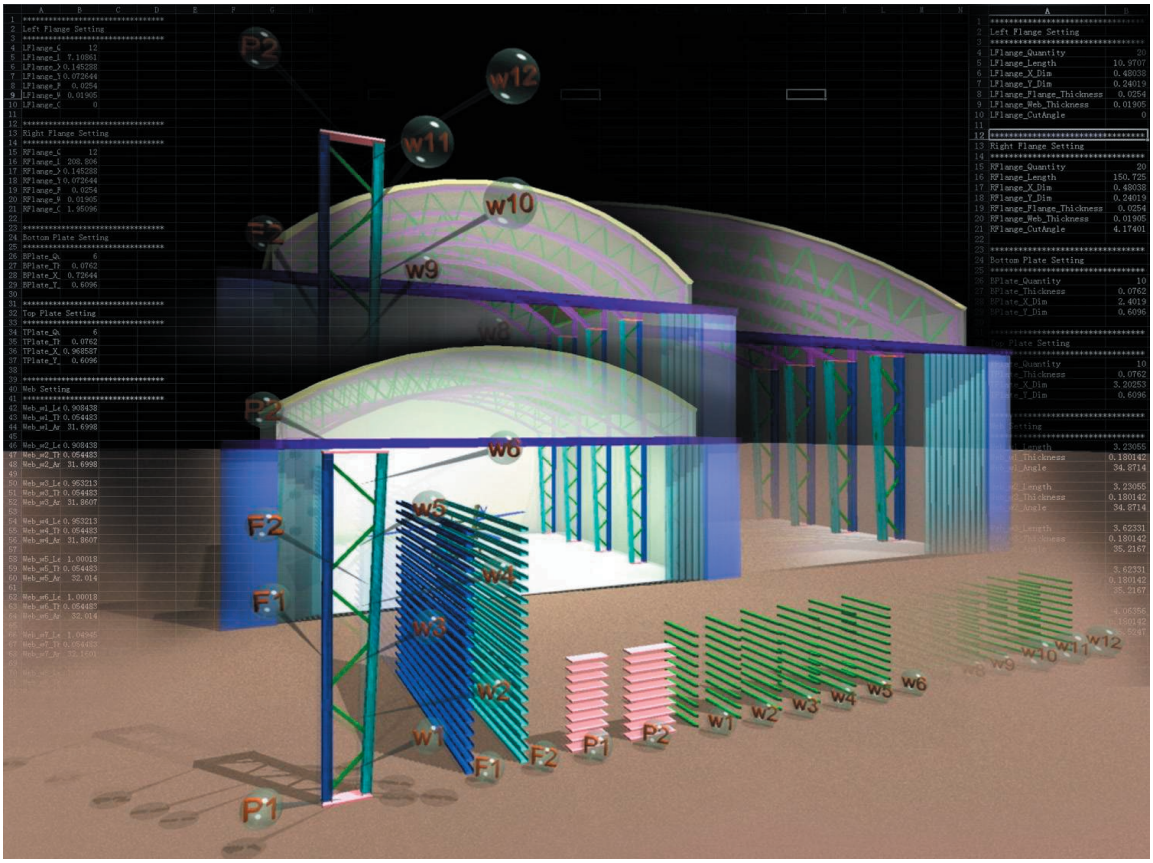
The Future is Now

The process of sharing information and using it in a manner that results in positive benefits beyond typical building goals is already in action. All one has to do is observe the practice of Frank Gehry, FAIA to understand this. Bilbao, Spain increased its presence on the world map with one of the most-noted buildings resulting from integrated practice. Gehry's firm is now sought out to design buildings that not only shelter their inhabitants, but also act as an economic catalyst for the surrounding area.

Software tools, such as the automated warehouse design program that generated these images, follow design guidelines established by architects and their consultants.



What isn't as well known is that many other large, medium and small architectural firms are using the same technology and processes to impact a growing percentage of our built environment. While not all of these firms are asked to create architectural landmarks, they are interacting with clients to understand the true impact of architectural issues on their overall missions. Not all architects need to use the tools employed at Mr. Gehry's firm to assist clients in a similarly advanced manner. Although what Mr. Gehry's firm does is revolutionary and exemplary, it is the tip of the iceberg in terms of what is possible for all architects to achieve.

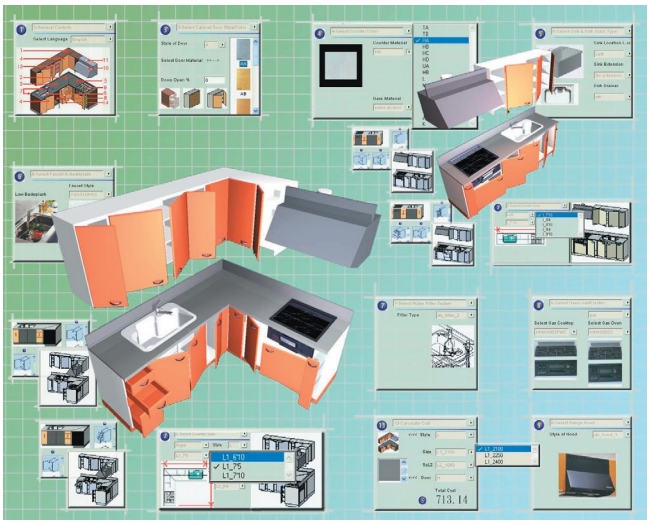


Design options can be explored in a matter of seconds. Clicking the corner of the structure and dragging it up and down changes the height, width, and other elements of the building. Required materials stack up for each iteration as soon as the dragging stops. The structural system for warehouse variations and the related material requirements are shown. The image was generated in seconds.

An 11-person architectural firm based in California with staff constantly traveling and working remotely from places such as Hawaii, Hong Kong, Japan, Hungary and England uses today's tools to enable advanced design processes. Globalized and integrated closely with consultants in Maryland, Tokyo and Helsinki the firm has completed a variety of digital design projects focused on advancing architectural processes as it also designs buildings.

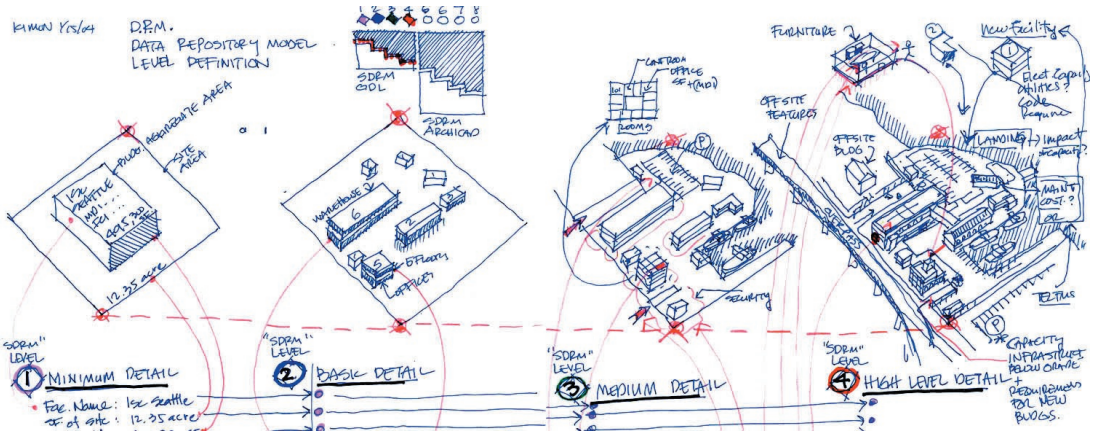
The firm's projects include:

- developing the BIMbomb™ mentioned above,
- creating an "adjustable" warehouse model that can be stretched and shrunk with the click and drag of a mouse. Knowledge captured from different client departments trigger inclusion of support spaces and equipment placement at predetermined points triggered by the main warehouse square footage. A list of all materials needed for each iteration is immediately generated along with a 3D stack of materials of each item on the list. Integrated into the system is structural engineering knowledge that sizes members and can drive manufacturing of steel.
- developing a sales, design and specification program that allows an international manufacturer of technical equipment to show clients how rooms need to be configured depending on which equipment is specified and then passing this requirement to their architects worldwide through The Internet. The manufacturer is now considering expansion into technical facility design and construction based on the success of the tool.
- assisting a federal agency to use integrated practices to reconfigure 30 command centers in 3 months instead of the projected 3 years associated with traditional design processed.
- helping a kitchen cabinet manufacturer allow their products to be visually represented in more than 1.2 million combinations based on simple user inputs. This software tool embodies a 150-page catalogue in a 400 megabit file, whereas more than 22,000 CDs would be needed to contain CAD files of this many cabinet combinations.
- building a design, specification and manufacturing software tool for a structural component manufacturer that allows architects to easily custom design components.
- using BIM tools to assist with the efficient design/build of a single family spec home.
- creation of custom web-enabled tools that interact with existing BIM programs to allow capture of institutional architectural knowledge for large-scale institutions.



An automated BIM design program helped a kitchen cabinet manufacturer allow their products to be visually represented in more than 1.2 million combinations based on simple user inputs. This software tool embodies a 150-page catalogue in a 400 megabit file, whereas more than 22,000 CDs would be needed to contain CAD files of this many cabinet combinations.

Architectural problem solving skills and techniques will not change only be enhanced by new processes and tools. Architects are inherently problem solvers and therefore are perfectly positioned to support the needs of the 21st century client.



The projects on this list are not traditional architectural projects. However, they all implement traditional architectural problem solving, information gathering, creative design solutions, graphic expertise and other products of traditional architectural education. They also benefit from use of advanced technologies that allow integration of information from multiple sources. Most importantly they demonstrate that architects' knowledge can be quantified to generate revenue beyond the percentage of construction or number of construction documents generated

Historically, architects have been seen as providing three basic services:

They gather information,

They process this information using a unique set of analytical problem solving techniques, and,

They employ mastery of visual communication skills to relate complex physical solutions in a clear and understandable manner.

That is not going to change for the 21st Century architect.

What has already changed for many architects is how they provide these services. Realizing the potential of capturing knowledge and using advanced processes, architects now can:

Gather and intelligently filter more critical information than ever before,

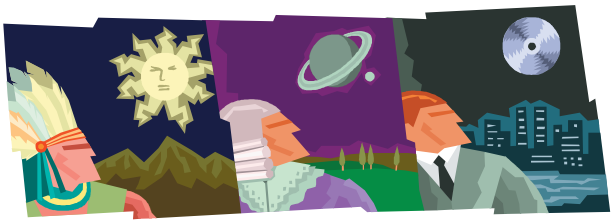
Process that information in a highly refined way to solve problems, including many outside the purview of traditional architecture,

Increase their ability to efficiently communicate ever more complex design solutions, and,

Expand the use and worth of their knowledge and data beyond the construction documents allowing for exponential increases in efficiency and value creation beyond the physical walls of the building.

The architect of the 21st Century will benefit from adding some level of data processing to their resume. Understanding how to gather, filter and process the explosion of information available to inform design decisions is a critical skill. The most important initial in "BIM" is the "I" for information. It is the management, analysis and effective use of information that will distinguish the 21st Century architect. Architecture will not be viewed on its aesthetic merits alone. Command of data will allow architecture to be increasingly rated on its ability to support a client's mission through the entire life cycle of a project.

Evolve or Dissolve



While much discussion will focus on the fear that "automated" design will eliminate the architect, the truth is that architects freed from repetitive tasks will be freed to focus on key design issues and the main reason most architects entered the profession – a desire to improve society through creative design. If architects do not show that they can add design value as the world automates itself, the 21st Century architect will be a dying breed.

Luckily, data mining and BIM tools will become increasingly user friendly and transparent to architects who can focus on their areas of expertise. If someone is able to master and orchestrate software and hardware usage and they are willing to drive process change, they have an advantage that will result is superior design solutions.

Despite the evolution of software, the 21st Century want ads for architects place a premium on comfort with technology. Recent graduates, junior architects and mid-level professionals who are comfortable working in virtual teams will be in demand. Partners will be sought for their ability to positively influence the built environment with an array of technological tools. Employers will weigh the experience of candidates who are capable of working seamlessly with distant colleagues with their specific knowledge of a project type. Is the ability to construct web-based data files that spin out specs, plans and sections to different team members at different times in different countries more important than experience with hospitality projects?

Will the position require the person to report to an office, or will candidates increase their chances of employment by showing a high remote office efficiency rating similar to that given to conscientious used book dealers on Amazon.com? Will the person need to be an employee or can they be an on-call specialty consultant? These shifts have already happened in other creative fields like the music and movie industries. Expect similar changes in architecture.

Most importantly the team will need to accept new work methods and identify new opportunities and processes on the fly by collaborating globally. Impossible? Observe a typical teen. Their multi-tasking skills include: gathering information from the Internet for a group PowerPoint project, communicating with peers across town and around the world via instant message, posting a message on MySpace, the networking website of more than 67 million users, while taking a phone call from mom. Imagine the impact on the workforce when those skills are honed and brought to our profession.

Candidates will be asked to work on projects that develop at astonishing speeds. The following scenario shows how an entire design project can be substantially completed in one day. While it may seem futuristic, completing a project in one day or less is possible with the proper collaboration tools.

The 21st Century Eight Hour Workday

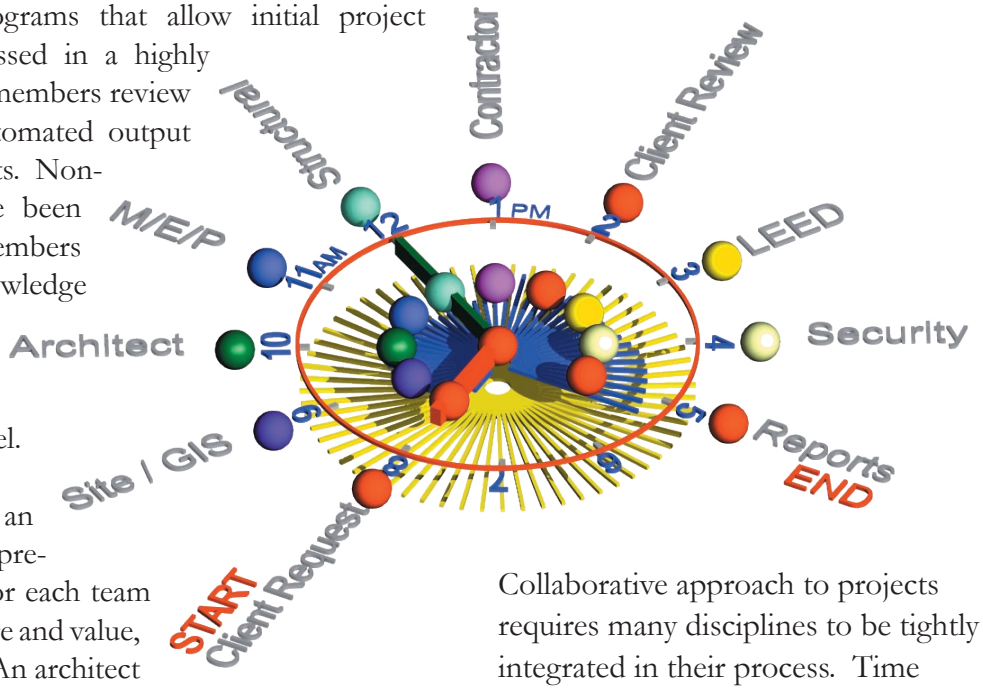
In the following scenario, a one-day building design project is described. For it to occur, the architect has pre-qualified all team members with the client specifically to provide rapid responses and a collaborative framework between the teams and client.

All team members and client representatives are proven users of web-based communications, linked databases and rapid integrated decision making. Team members have established automated knowledge programs that allow initial project requirements to be processed in a highly refined manner. The team members review and further refine this automated output using their expert skill sets. Non-disclosure statements have been signed among all team members because some expert knowledge is visible in the resulting BIM even though each team member has focused levels of access to the model.

Fees are not based on an hourly rate. The client has pre-established fee schedules for each team member based on knowledge and value, contributed to the project. An architect specializing in design of kitchen facilities will receive a lower fee for a project requiring rough space for a chain restaurant than for one needing a 450-seat dining facility run by the client.

In this scenario, a client requests the design of a research laboratory, conference center and museum that showcases the company's innovations. The research laboratory prototypes new electronic products it wants available for distribution before the end of the year. A suitable site is available in the Boston area, but it is larger than needed. The client wants to know if offices and a training center could also be included on the site. Important design issues include grouping the building components together or separating them and creating a campus setting that is integrated with the city of Boston. • An existing 20,000 square foot historic office building is on the site and the

Create the Time and Place

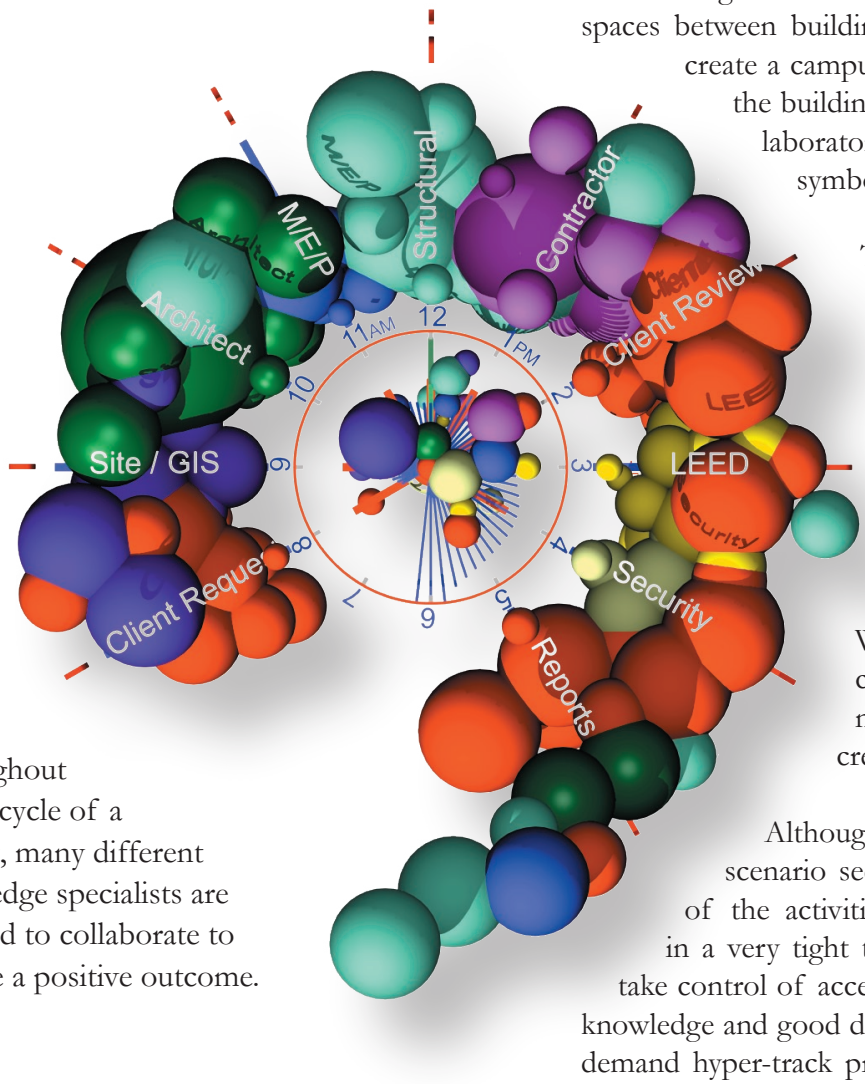


Collaborative approach to projects requires many disciplines to be tightly integrated in their process. Time moves linearly but the challenges of a project are dynamic and non linear.

client also wants to determine how to integrate that into the project. • Other key issues include: soil conditions • water table status • 100-year impact to the community • tax implications • LEED certification • construction cost variations • schedules fueled by New Urbanism • A need for dormitory space for visiting teams.

The architectural style should match the city of Boston and the surrounding educational institutions such as M.I.T. The negative spaces between buildings should be carefully considered to create a campus like atmosphere and to interact with the buildings. The museum and adjacent research laboratory will be both working spaces and symbolic of the company's mission.

The project budget, business goals and other needs will be carefully considered. The recommendation at the end of eight hours may even be to not even proceed with the project. There is value in being able to guide the client on decisions. At the end of a single day, the entire project requirements as well as preliminary BIMs, cost estimates and reports are completed. With a substantial portion of the data crunching work finalized, the architect now has more opportunities to let the creative process enrich the project.

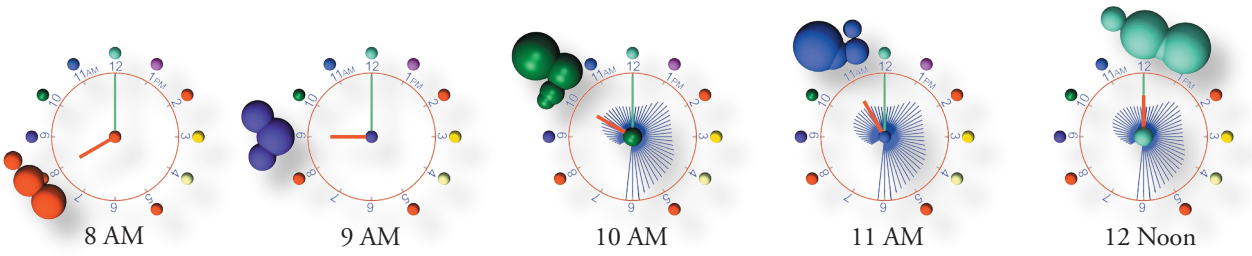


Throughout the lifecycle of a project, many different knowledge specialists are required to collaborate to achieve a positive outcome.

Although the work completed in this eight-hour scenario seems like it should take months, many of the activities described are already taking place in a very tight time frame. The suggestion here is to take control of accelerated projects to ensure architectural knowledge and good design are incorporated as market needs demand hyper-track projects. Taking control of the process also eliminates or reduces the chance of larger errors.

The Process is Not Linear

Nothing will replace the personal experience of slowly getting to know a site and letting a design percolate into in an alluring brew enticing all the senses. However, ignoring the realities of today's market makes architects vulnerable to obsolescence.



The Design Charette

8 am Start Project

• Client contacts pre-qualified team in project database to start brainstorming • Site is identified on a Google Earth™ 3D model of the Boston area • 3D BIM model of programming requirements auto generated and placed in Google Earth™ • Easement, lien, covenant and restriction database(s) checked • Data from historical office building BIM to accessed through the project database

9 am Site and GIS Review

• Confirm size of site and soil condition from GIS data in 2D and 3D • Rate each footprint location and pass data of conditions to structural analysis for foundation design • Automatically perform a preliminary code analysis by submitting the project to the city planning and zoning database • Rate distance to transportation and housing

10 am Architectural Review

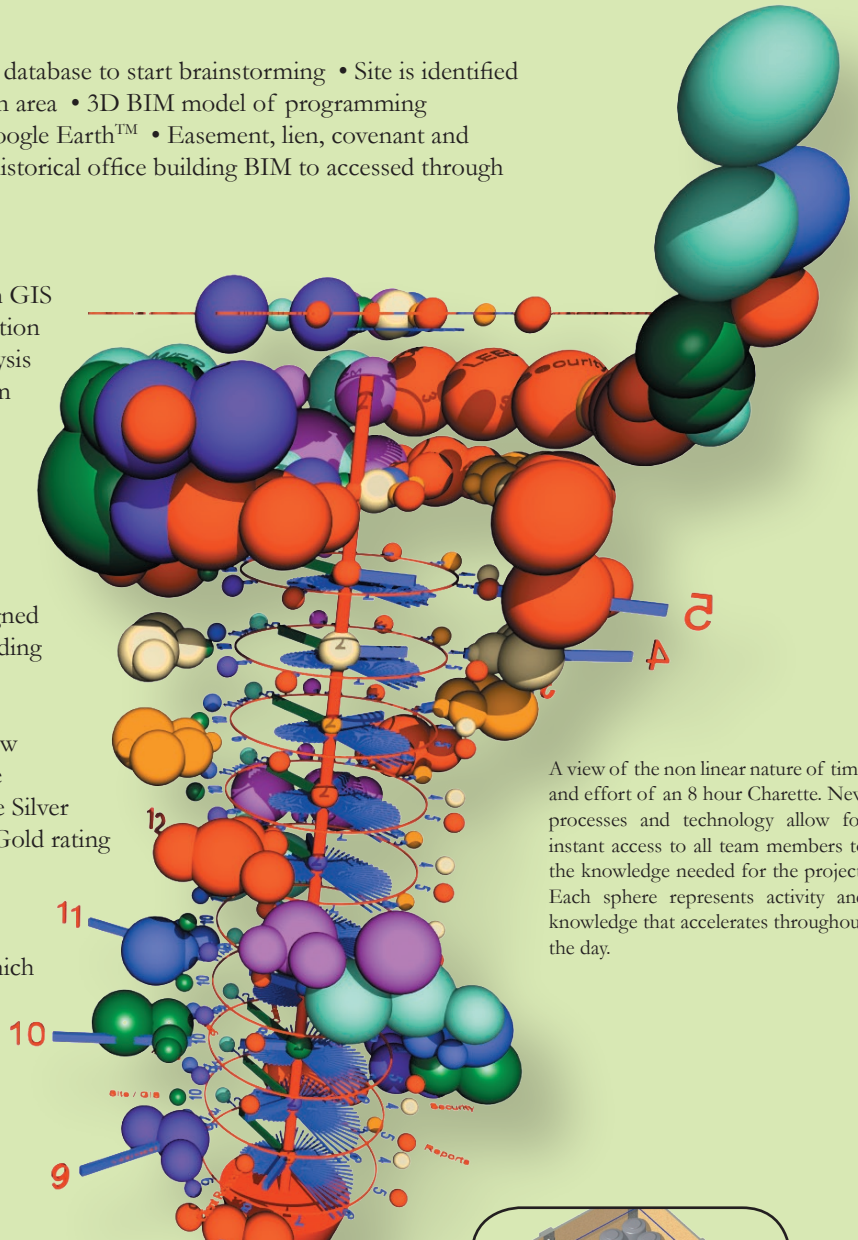
• BIM review by team members who are assigned based on availability • Data from existing building analyzed • Potential schemes studied

11 am Mechanical, Electrical, Plumbing Review

• Determine systems and costs • Performance requirements defined • Recommend to pursue Silver LEED rating on manufacturing portion and Gold rating for the rest

12 pm Structural Review

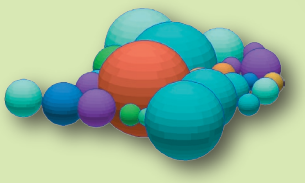
• One plan includes a multi-story building, which triggers need for underground parking • Soil conditions from GIS dictate various foundation systems • Review long span requirements



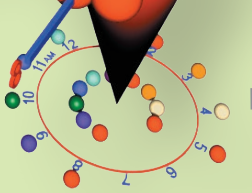
A view of the non linear nature of time and effort of an 8 hour Charette. New processes and technology allow for instant access to all team members to the knowledge needed for the project. Each sphere represents activity and knowledge that accelerates throughout the day.

	A	B
1	Name	Area
2	Office 1	120
3	Office 2	132
4	Office 3	262
5	Training	1450
6	Meeting Room	540
7	Lunch Room	750
8	Storage	158
9	Mechanical	120
10	Storage	240

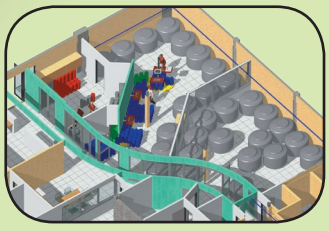
Program Requirements



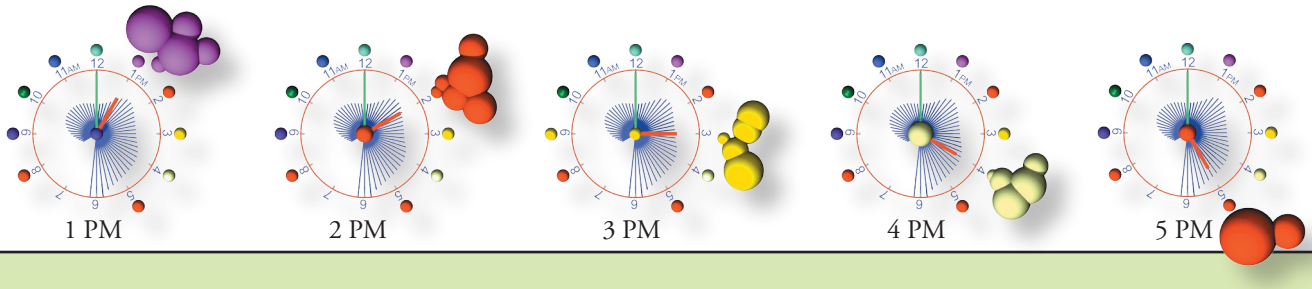
BIMblobs™ of Program Requirements

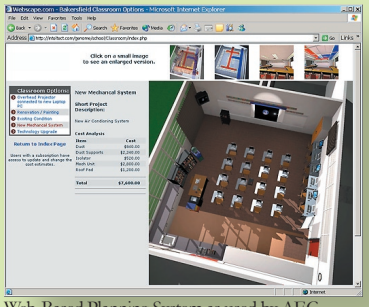


Knowledge of Team Inserted into Project

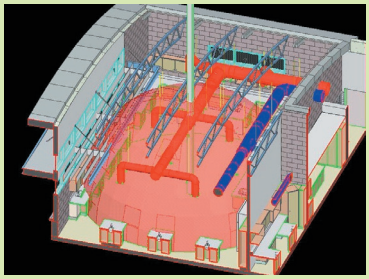


Functional Requirements in BIM

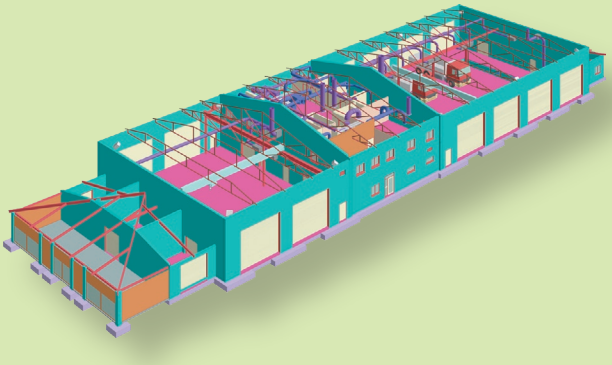




Web-Based Planning System as used by AEC Infosystem Inc.



Security Analysis using BIM



One of the BIMs produced at the end of the day.

1 pm Contractor and Construction Cost Review
• Consider contractor cost factors on a real time basis against various design options • Constructability review

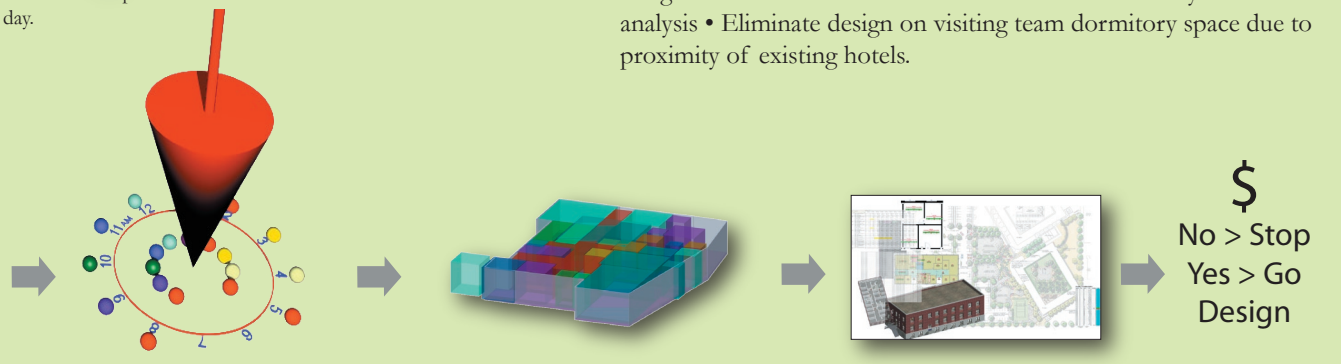
2 pm Client Mid-Day Review
• Access to on-line 3D model of Boston • Zero in on site to review options • Internet access for client to project data throughout the day • Client agrees on one site configuration based on value generated • Analysis and work on the project does not stop during this virtual review

3 pm Project Development
• MEP, Structural, Sustainability decisions are made based on LEEDS requirements • Building life cycle costing of critical system evaluated from the database • Generate traffic studies in relation to the building and submit to the city's database • Make economic analysis on all critical factors

4 pm Security Analysis
• Continue design analysis for security and force protection • Address and analyze potential threats to building occupants • Automatically analyze data from more than 100 existing BIMs of buildings in neighborhood to determine vulnerability of this site • Run 50-year analysis of threat scenarios

5 pm Project Reports Available on Line to Client and Team
• Access on-line access tp data equivalent to a 500 page project related report • Access on-line cost estimates that will form the basis for project requirements prepared from the database • On-line access for client to track changes during the construction and life of building • On-line access for team members to address issues during construction

Day 1 Mission Accomplished
• Assemble all project relevant data • Continue with current site or look for another • Project trajectory for program and budget established • Ascertain basis for further design by architect established or the basis for design build is established • On-line access to feasibility and economic analysis • Eliminate design on visiting team dormitory space due to proximity of existing hotels.

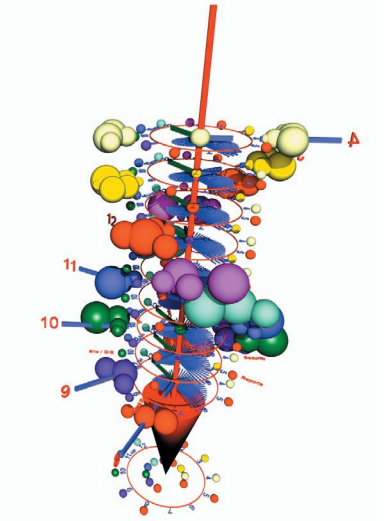


Project Data is Continually Integrated Throughout the Day

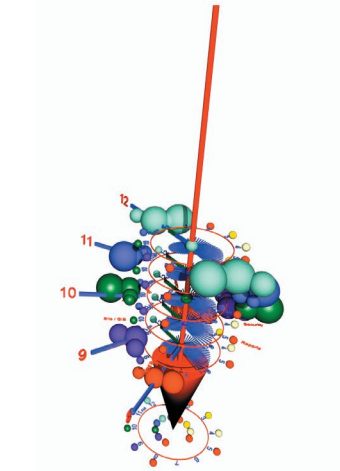
Program Requirements in 3D Data Blocks

Reports

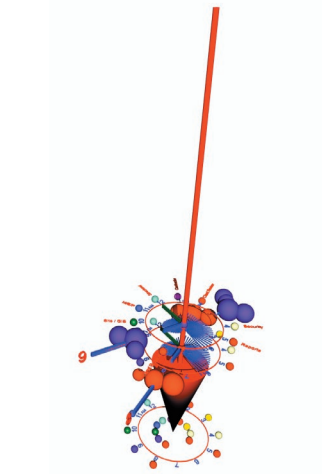
Create Value by Eliminating the Mundane



The knowledge employed in the 8 hour Charette is captured for use throughout the lifecycle of the project.



The knowledge in the datbase can also be used for other scenarios of the same project or for other projects.



Automating mundane work reduces the chance for error and allows for more time to focus on design.

Endless Opportunities

It may seem futuristic to think a building that typically requires months to design can be envisioned and brought to life in eight hours. Many architects are reporting substantial reduction in design time and substantial increase in quality with the aid of BIM tools. It is not hard to extrapolate their experience and envision a time when one-day projects are the norm for certain situations.

Looking at the mass customization techniques being employed in the computer industry by Dell and others, it is easy to see that phenomenal changes in business processes are not only possible but are becoming expected. Architects are already expected to provide services that match the hyper speed of change in the highly competitive business world. Instead of doubting the possibility of new processes to meet client needs, many architects are moving forward in innovative ways.

Again, Mr. Gehry is the shining example. The demand for his services allows him to create new contractual arrangements among building team members and clients. The new legal approach ties all entities together as an integrated whole instead of creating adversarial parties waiting for a reunion in judge's chambers. It is not hard to understand the financial benefit of eliminating legal disputes due to a change in design and building processes. The American Institute of Architects is exploring adjustments in its contract documents to allow all practitioners the option to form integrated teams as a standard legal practice.

Mr. Gehry's well-documented interest in an organic, sculptural approach to architectural design would likely make him reticent to participate in a one-day design project resulting in construction drawings. However, his establishment of a technology education operation shows his dedication to encouraging process change among architects and others in the building industry. It is beautifully ironic that the man who has done so much to advance the incorporation of aerospace technology and processes into architecture does not himself interact with computers to create his designs. In this manner he can be seen as an ideal example of the 20th Century architect. He would probably agree that the 21st Century practitioner is more likely to be characterized as having direct control of computer technology.

If it is possible to change contractual relationships to accommodate the processes of integrated practice, it is possible to create new fee structures that reflect the true value of an architect's contribution to the long-term success of a building. In addition to gaining access to more revenue streams with additional services that have been contractually fenced off, architects are using the advent of BIM as the opportunity to demonstrate their value to the long-term cost effectiveness of a building. With increased awareness of design integration benefits, it is natural to show how architects' decisions impact the life cycle costs, resale and future modifications.

The accompanying chart shows that the architect's piece of the financial pie for the life of a building is rendered insignificant during the useful life of a building. Yet, the decisions an architect makes have ongoing impact on the majority of related costs, and financial benefits for the life of the building. No more money is available to architects simply because they demonstrate that good design increases a building's value. However, fully understanding this bigger picture allows architects to explore opportunities for additional rewards for their services.

A web-based warehouse design "machine" can generate a licensing fee for the architect every time interested users generate a highly refined building by answering questions in a format similar to making airline reservations on line. More important than the licensing fee, the architect is notified that someone is seriously considering building a warehouse and can pursue the opportunity for providing more personal services.

Not every building today is designed by an architect. But by recognizing that processes and tools are available to allow some level of knowledgeable guidance for all buildings, architects can expand their impact on the built environment. Architects can not shirk the realities of an exponentially increasing population that not only require a phenomenal amount of new buildings but need them to be more effective and efficient than ever before.

Globalization is affecting all businesses including architecture at an unprecedented pace. The architect of the 21st Century needs to master the processes driven by these changes and be proactive in defining how they will support changing client needs. In order to be the master builder of the 21st century we must first master these new tools and processes.

Change is hard. We see the challenge it presents to clients on a regular basis. They look to architects for the creative insight to help them through transition and into a better environment. Architects need to look to themselves for the solutions to building a sustainable environment for the professional practice.

Let's assume that the project in the eight hour Charrette costs the equivalent of $100 to build. The architectural and engineering fees would be about $9. Assuming a 50 year life span of the building the other costs associated with the project are listed below. Supposing that the project is sold eight times during the 50 year life span, the real estate fees would total about $300. The leases generated in that same period would be $2,000. The salaries of the people in the building would be $30,000. The value generated by the building in sales could be up to $60,000 or more. Note as this stacks up in the life span of the building the architect's role is miniscule.

Permits Interest and Other Costs	$	6.00
AE Fees	$	9.00
Land Value	$	30.00
Total Construction Cost	$	100.00
Realtor Fees from Real Estate Transaction 50 Years	$	300.00
Operations and Maintenance	$	500.00
Lease Income	$	2,000.00
People Cost Employees in Building	$	30,000.00
Value Generated by Building, Sales, etc.	$	60,000.00

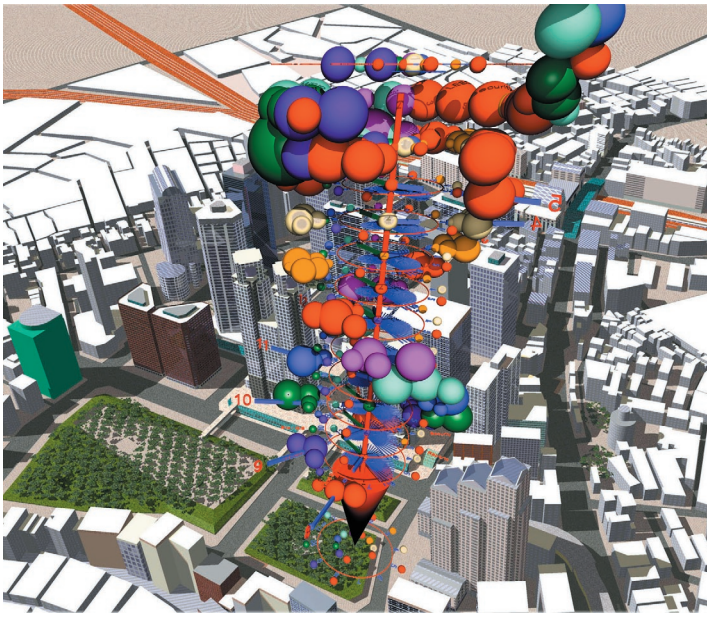
As always, acknowledging there is a need for change is the first step to a design solution. The architects who have made this step can help others by actively demonstrating the benefits and rewards they are experiencing from adopting new processes and tools. Sharing the frustrations and problems is necessary, too.

In the end, the practitioner of the 21st Century is unlike the 21st Century citizen. Confronted with an overwhelming amount of information and technology, it is understandable that some will hold on to established, comfortable methods of living. Others will see the almost endless amount of opportunity available to those who choose to educate and challenge themselves with new precepts. Know your options. Enjoy your choice.

Know your options.
Enjoy your choice.

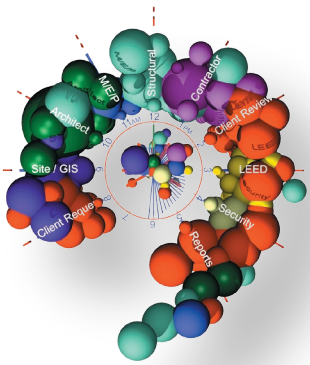
Place and Time

Project data of eight hour Charette "Landing" in Google EarthTM model of the project site. Data from all projects completed or planned can be accessed.



Fly to Tokyo

The same project data from Boston "Landing" in a BIM of Tokyo. What parts of the requirements should automatically be flagged as potential problems of landing this program in Tokyo? What team is on standby to support this project in Tokyo?



Flourish

What Next? The Horizon Has No Edge.

Will automated design processes eliminate the need for architects? Will all buildings be pre-manufactured by robots like cars without the need for human hands or human thoughts? Will architects decrease in number until they are almost extinct and then saved from devastation through heroic preservation efforts?

It is easy to present black and white projections for the future. It is more important to understand that advancements of humanity do not eliminate the good and essential elements of our past. We fly in planes, yet it still is nice to go horseback riding. People communicate instantly with email, yet is still very touching to receive a hand written letter.

Positive advancements in society tend not to eliminate anything that is worthwhile, but enrich human experience in new and exciting ways. Advancement is not without challenge, but the printing press did not eliminate the art of painting. Instead, it provided a greater opportunity to teach painting processes to a wider group of people.

BIM is not trying to prevent an architect from sketching grand plans on a napkin. BIM may even help architects synthesize extensive amounts of information during an eight-hour charette so they can arrive at a moment of inspiration that is captured on that napkin.

Sketch of Aristotle Onuma
at five years old.

Designing office buildings in eight hours will not stop an architect from camping in a forest for days in order to better understand how to site a vacation home.

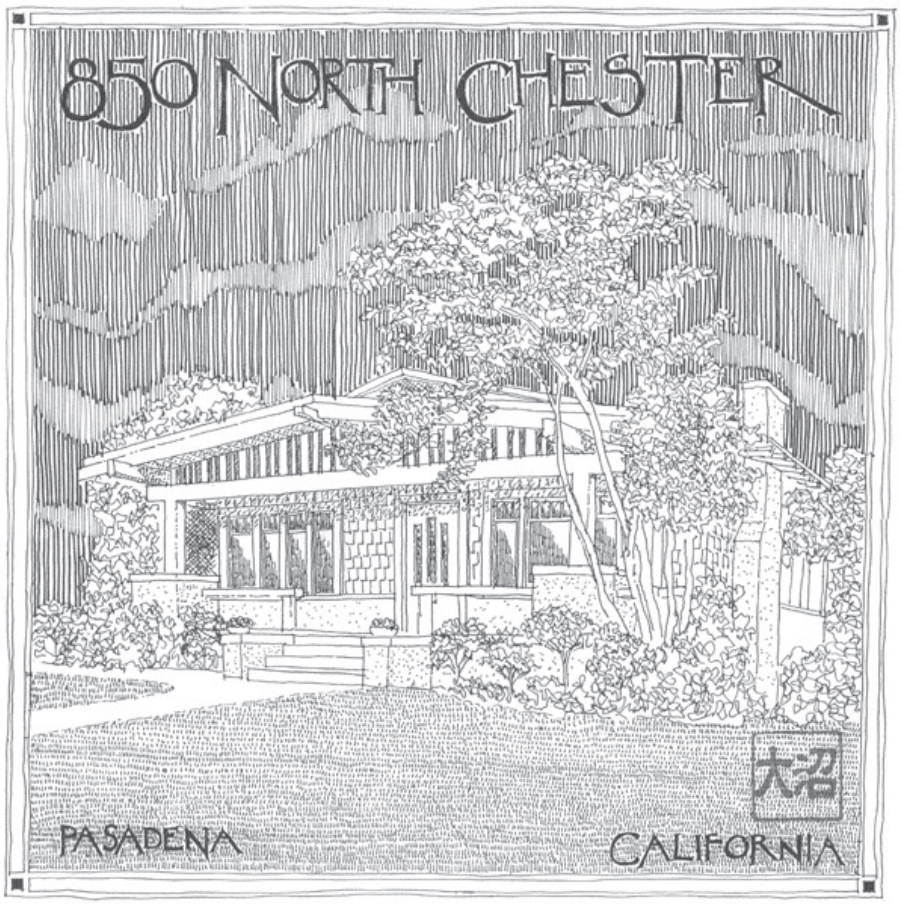
BIM will not eliminate the benefit of taking a pen in hand and sketching ideas for your mother's new house in a manner that she will understand. Or, if you choose, to take that same pen and capture the innocent smile of a child sitting.

Knowing how to represent people in all their states of being with a pencil and paper will always be a benefit to architects.

It is just that we now have a responsibility to learn how to work with other tools – tools that support new processes being developed by humanity. If architects demanded that society only accept hand-drawn construction documents at the end of the 20th Century, the profession would not exist today.

As architects on the edge with the Integrated Practice we choose the right path and the horizon of potential spreads out before us. As leaders and captains of our ships we as architects can help to chart the new course and in the end "Design Will Matter" more and the integrated practice will flourish.

Integrated Practice helps us become architects on the edge of exploring new possibilities. As early seafaring explorers learned, the edge is not a precipice that we will lead to our fall. The edge is just a horizon line that we will pass on our way to discovering an infinite amount opportunity to pursue our art with an ever-growing array of tools. As the captains of our ships, we can chart the new course for establishing how "Design Will Matter" to the enrichment of the human experience.



Sketch of a 1915 Bungalow, My First House.

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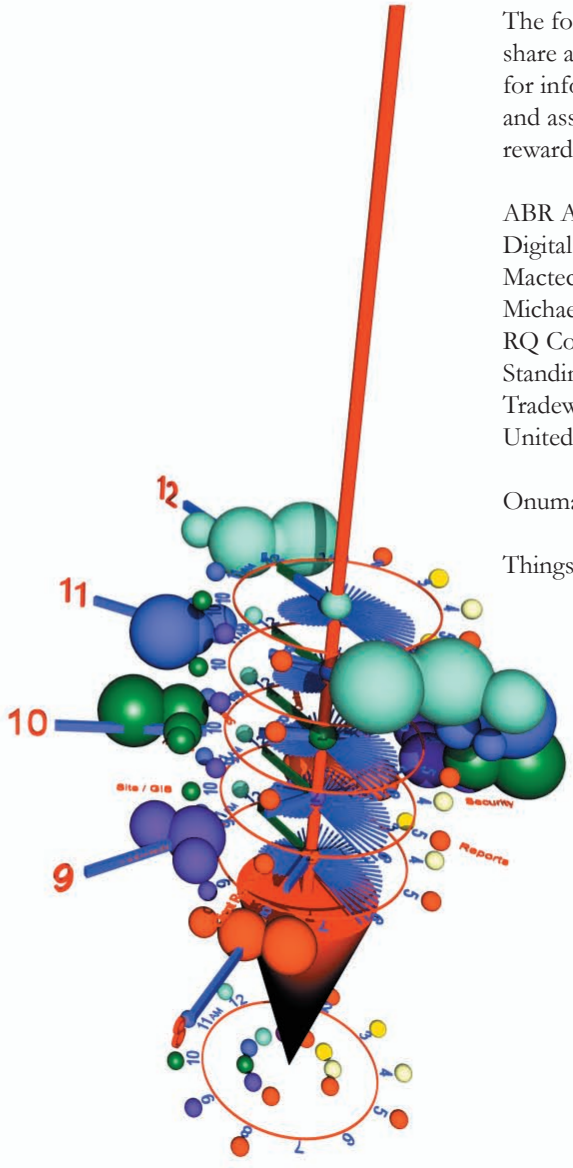
Organizations:
Cofounder: BIMconstruct.org
Cofounder and President: GDLAlliance.com
National Building Information Model Standards Committee

Resources

Architects who choose to pursue new processes and technology tools can find encouragement from the many advanced clients, professional organizations and supportive colleagues who want to assist others.

Special thanks to, who are an inspiration and leaders in the shift that is happening:

Dianne Davis of AEC Infosystems, Baltimore, MD
David Hammond of the United States Coast Guard, Chief, Shore Facilities Capital Asset Management Division, Washington, DC



The following are some BIM leading clients and companies that have much to share about their experiences. This is not a complete list. I would like to thank them for information and assistance they have shared with me. Without the support and assistance of the numerous people in these groups, my work would not be as rewarding.

ABR Architects, Schaffhausen, Switzerland
Digital Vision, Orange County, CA
Mactec / NexDSS
Michael Bordenaro, Chicago, IL
RQ Construction, Bonsall, CA
Standing Stone Consulting, Huntingdon, PA
Tradewinds Consulting
United States Coast Guard, SFCAM Road Map Team

Onuma, Inc. Team

Things on my mind recently:

9/11
Katrina
NIST Report: http://www.bfrl.nist.gov/oae/publications/gcrs/04867.pdf
The report states:

> *"the cost of inadequate interoperability in the U.S. capital facilities industry to be $15.8 billion per year. The intended audiences are owners and operators of capital facilities; design, construction, operation and maintenance, and other providers of professional services in the capital facilities industry"*

Google Earth

Kimon G. Onuma, AIA