

Collaborative Project Management and BIM

This white paper examines the impact of Collaborative Project Management solutions when used to disseminate and manage the quality information that comes from a building information model.

Think about how your office would function without email. Perhaps you remember those days of stacked plastic inboxes and outboxes overflowing with paper. Standing over a copy machine duplicating memos and sending them off via trusty manila interoffice envelopes or, even worse, a postage stamp! Email is so pervasive that we've forgotten the inefficiencies that surrounded the simple act of correspondence before the Internet.

Too bad we can't say the same about collaboration.

The Need for Efficient Communication and Collaboration

The 2005 FMI/CMAA Sixth Annual Survey of Owners¹ reported once again that problems with coordination and collaboration among team members is near the top of the list of concerns that keep owners awake at night. This survey of the largest building owners in the world states that "successful owners build a culture of ownership through the construction process to align the stakeholders and achieve desired project outcomes and program goals." A key ingredient in aligning stakeholders is efficient communication and collaboration.

To understand the effects of *inefficient* project communication and collaboration, let's use the example of a large resort hotel building project entrenched in paper-based, ad hoc collaboration processes. The architect has been shipping paper drawings, emailing scanned documents, and spending lots of time on the phone with the owner to wrap up the schematic design.

But now the design moves to the construction documentation phase. The MEP and structural consultants begin their detailed work, the owner starts the plan review cycle with the local government office, the contractor begins assembling bid packages, and countless other specialty consultants for food service, landscaping, and so on join the team. As the CD stage progresses, the number of information consumers increases exponentially - creating a complex web of communication requirements. There are over 50 different companies involved in the project at this point. Design changes are falling

¹ An annual survey produced by the Construction Management Association of America (CMAA) in partnership with FMI Corporation that focuses on key construction industry trends from the owners' perspective. The survey is available at http://cmaanet.org/user_images/sixth_owners_survey.pdf.

through the cracks under the weight of the information distribution; the task of communicating with all the various constituents in the design review process is at the breaking point. Related project data like timelines, specifications, and contracts are similarly going astray. The actual distribution of information is just part of the issue. The architect's office is having trouble keeping track of who should get what and when, and the owner is getting more and more concerned that the project is going over budget.

And this is just during the design stage. Think about permits, RFIs, change orders, contracts, warranty documents, and equipment manuals; general contractors, subcontractors, equipment suppliers, project managers, lawyers, accountants, and tenants. You can quickly grasp the drawbacks of decentralized, ad hoc project collaboration and information sharing.

Collaborative Project Management Tools

The feedback from the owners in the survey referenced earlier is that one of the ways for project teams to communicate more effectively is the use of a project collaboration tool that everyone on the team can access. Collaborative Project Management (CPM) solutions seek to improve communication by enabling the distribution of the coordinated, reliable information that comes from building information modeling (BIM) and making it available - in an appropriate form - to the participants in the building process.

Why "appropriate form"? For instance, most people involved in a building project based on a Revit[®] software application don't need to access the building information model directly using Revit. There are many more people who need to use the design information than there are people who actually need to create it. A DWF[™] file is a good example of building information distributed in an appropriate form. The function of the DWF file specification is to distribute and communicate design information to anyone needing to view, review, print, or access it for any purpose – without losing critical data and without these people needing to know or even have the native building information modeling software.

Another essential feature of collaboration in today's global economy is the need for an extended team to access, view, and comment on information as needed - regardless of their company or location. Technologically speaking, this translates into the need for a web-based, on-demand collaboration solution that can not only span geographies and time zones, but more importantly, can span organizations - offering a neutral infrastructure for all parties to participate in and relieving anyone from its IT burden.

BIM Enabled by Efficient Communication and Collaboration

Information is, literally, at the center of BIM and as the building model is tapped for more and more uses - cost estimating, project planning, and building performance analysis for example - the overall amount of quality information that can be output from the building model keeps increasing. This results in more data that can and should be shared among the extended project team. How can the combination of BIM and web-based CPM solutions enable more efficient project communication and collaboration? Let's return to the resort example used earlier, but this time featuring the use of BIM and CPM.

The resort owner and the architect have been working closely throughout schematic design, using Revit[®] Architecture software for the design of the hotel complex and Autodesk Collaborative Project Management solutions to facilitate project communication. The architect's design team (located in both Las Vegas and New York) has had simultaneous access to a shared building model. Electronic design reviews with the owner and key design consultants (like the site engineer) have relied on Autodesk[®] Design Review software. Critical components of the building information model were published (in

digital DWF files) from Revit directly to a Buzzsaw[®] collaborative hub established by the resort owner.

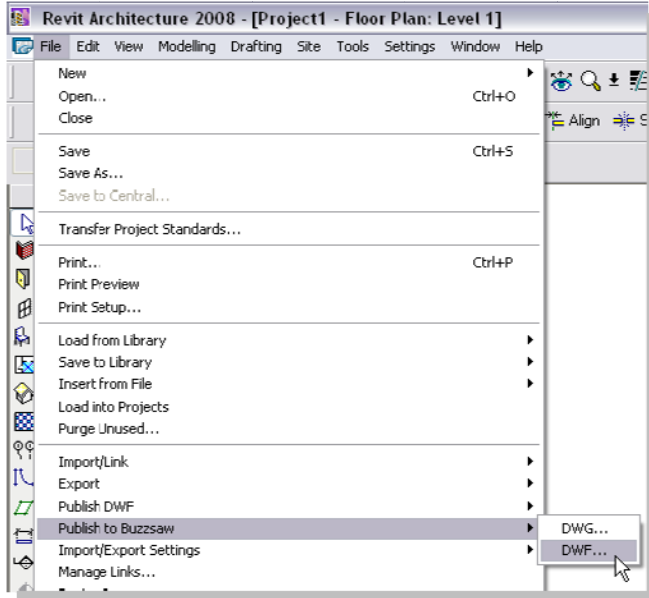


Figure 1:

To publish a DWF file of the building information model to a Buzzsaw collaborative hub, click “Publish to Buzzsaw” from the File pull-down menu and then select DWF.

Note: DWG™ files can also be exported directly to Buzzsaw by clicking “Publish to Buzzsaw” and selecting DWG.

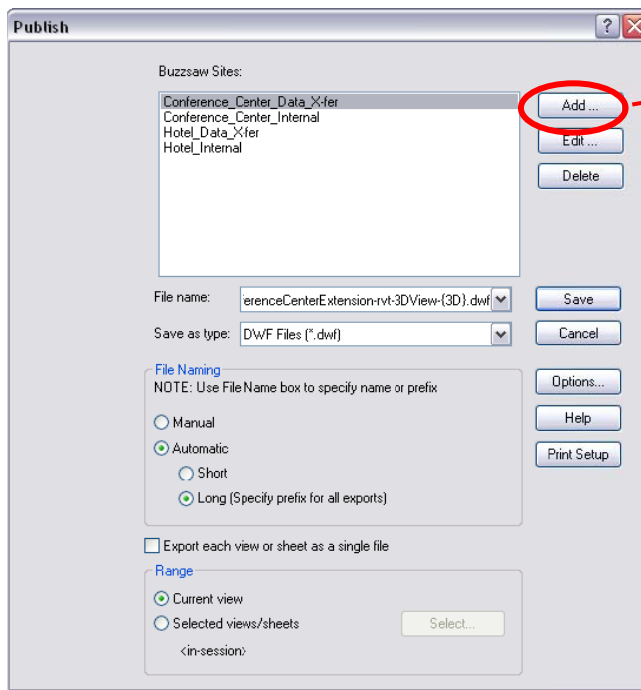
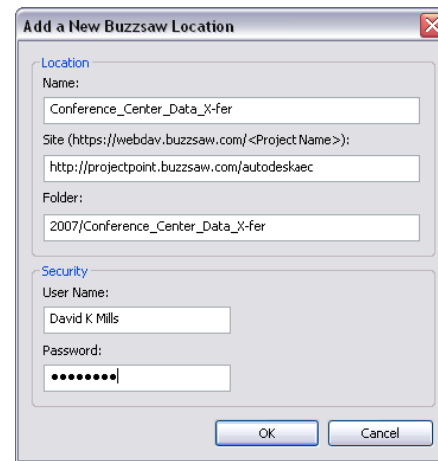


Figure 2:

When publishing a building information model to Buzzsaw, a dialog box appears to help the user select an existing collaboration site (left) or add a new collaboration site (below).



Design Review automatically preserved all markup information, so any comments or changes noted during a review were imported and tracked directly in the Revit application. There was no need for shipping paper drawings across the country, emailing scanned drawings, or late-night conference calls across time zones.

As the design moved to the construction documentation phase, the architect (using Revit Architecture) and the structural engineer (who uses Revit[®] Structure software) wanted to exchange and cross-link their respective Revit models, so they used the owner’s collaboration site to store and share the data. The MEP engineer (who uses a solution

based on AutoCAD® software) needed the architectural DWG files for x-referencing - so for easy access the architect posted the DWG files to the collaboration site and the MEP engineer was automatically emailed a URL, which he clicked on to bring him into the site and download the DWG files.

As the CD stage progressed and the number of information consumers increased, the electronic design review cycle bore the weight of the information - powered by Autodesk Design Review and Collaborative Project Management solutions to manage the design review process and related files respectively. And the task of communicating the right project information to the right people was enhanced by using the collaborative hub to keep track of who should get what and when.

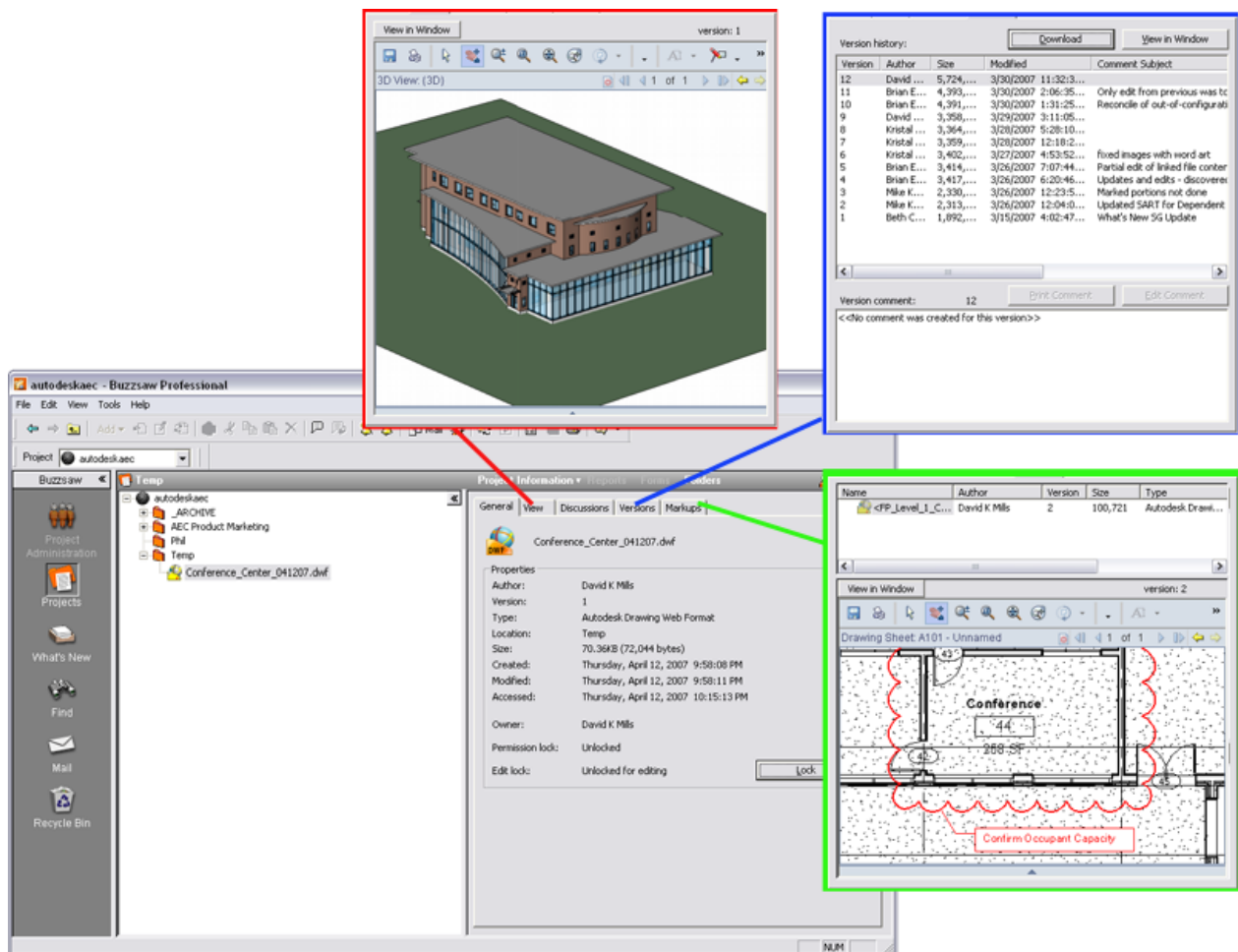


Figure 3:

Buzzsaw offers version tracking as well as native 2D or 3D viewing capabilities (depending on the file type). An extension to viewing capabilities, DWF markups and red-lines can be added directly to the DWF file without having to leave the collaboration site. General file information and a discussion board are additional features that further enhance the collaborative toolset.

Summary

We've seen the tremendous business benefits that BIM can deliver, improving the ability and efficiency of designing complex building projects. Forward-looking firms are also using CPM solutions to expand the impact of BIM - pushing its benefits to all participants in the design, build, own, and operate continuum, throughout a project's lifecycle.

CPM solutions adds structure to project communication and business processes, helping to both improve project quality and increase accountability. CPM combined with BIM links together the major stakeholders in a building project and enables a shared project vision, all based on the superior building information available from the building information model.

About Collaborative Project Management

Autodesk Collaborative Project Management solutions--Buzzsaw and Constructware--delivered on-demand, enable the effective management of all project-related communication, information and business processes across the plan, build and operate phases of the building lifecycle. Our purpose built, collaborative document, design, bid, construction, cost and operations solutions help organizations meet their most immediate needs, then take an incremental and integrated approach to optimizing business processes across their project teams, organizations or value chain. By connecting people, information and processes, our customers are able to increase productivity, and optimize project and program performance.

For more information about Collaborative Project Management please visit us at <http://www.autodesk.com/discovercpm>.

About Revit

The Revit platform is Autodesk's purpose-built solution for building information modeling. Applications such as Revit Architecture, Revit Structure, and Revit[®] MEP built on the Revit platform are complete, discipline-specific building design and documentation systems supporting all phases of design and construction documentation. From conceptual studies through the most detailed construction drawings and schedules, applications built on Revit help provide immediate competitive advantage, better coordination, and quality, and can contribute to higher profitability for architects and the rest of the building team.

At the heart of the Revit platform is the Revit parametric change engine, which automatically coordinates changes made anywhere — in model views or drawing sheets, schedules, sections, plans... you name it.

For more information about building information modeling please visit us at <http://www.autodesk.com/bim>. For more information about Revit and the discipline-specific applications built on Revit please visit us at <http://www.autodesk.com/revit>.



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