

# BIM - Small, Medium... Extra Large!

This paper describes how Autodesk Revit supports projects of all sizes - from small residential projects to large, complex commercial building projects - through Autodesk Revit Worksharing.

In the past several years, the building industry's interest in building information modeling (BIM) has shifted from evaluation to implementation. Some firms take the immediate plunge into large-scale, mission-critical projects.

Others elect to start using BIM on a small pilot project - testing the BIM waters before rolling out the system to a bigger team for use on larger projects. But once they start, they quickly see the advantages of BIM, and are eager to prove it out on larger projects.

The Autodesk® Revit® platform for building information modeling lets firms tackle projects of all size - small, medium and very large!

## Fits All Sizes

Autodesk Revit Worksharing distributes the power of its parametric building modeling environment across the project team by offering a range of collaboration modes, letting design teams choose the best way to interact based on their workflow and project requirements.

For many projects, the team can have simultaneous access to a shared building model and ad-hoc editing of building elements as needed. Very large projects can be divided into discrete shared units - usually based on separate architectural systems (core, envelope, etc.) or other physical features. And for large building projects made up of discrete wings or individual buildings, there can be a complete separation of project into individual linked models.

## On-The-Fly Editing

A purpose-built BIM system like Autodesk Revit typically reduces the manpower requirements of a project by coordinating the building information model and documents automatically. Given this happy circumstance, fewer people are required to complete a project. As a result, for many projects only a handful of users (at any given point) are needed. In this situation, the project model can simply be shared dynamically between users – each user contributing their own skill set when appropriate. If more than one person happens to be working on the building model at the same time, on-the-fly editing of model elements (a door, a wall, etc.) is accomplished in Revit via “element borrowing.”

Here's how it works. When a user action will cause an element to change, Revit first checks to see if another user is editing that element. If it's "free," Revit automatically assigns that element to the user, at which point other users are immediately prevented from manipulating it. If it's already assigned to someone else, Revit sends a message to that user, asking if the first user can borrow that particular element for modification. If yes, Revit reassigns ownership to the requesting user. If no, Revit denies the request, sending a message to the first user informing him/her of the situation.

Element borrowing lets multiple users dynamically access and edit shared portions of a project model, but minimizes the possibility of editing conflict.

## Zones of Responsibility

For very large projects and design teams - where users need to simultaneously work on different portions of the project at the same time - Revit Worksharing allows projects to be formally divided into worksets. This mode is also appropriate when a project manager wants to explicitly assign responsibilities for parts of the project to team members and limit access to others.

A workset is a logical grouping of objects in a building project that is reserved for editing by a single user at a time. Worksets usually correspond to specific zones of responsibility such as various architectural systems (shell, core, interior, ceiling, etc.) or physical features (stories, wings, tenants, etc.).

A user checks out a workset and works independently in that model, periodically posting changes back into the master project file and refreshing the workset with changes from other users. When done, the user relinquishes control of the workset by checking it back into the master file.

Worksets make it easier for an extended design team to work concurrently on a building project by limiting the prospect of multiple users trying to change the same element. As an example, one user is working on interior partitions and another is laying out furniture in the same area. To keep from bumping into each other, two worksets are created: one for interiors, one for furniture. Although all the elements of both worksets can be displayed, elements within a workset can only be edited by the user who's checked out that workset.

Continuing with the example, since the ceiling grid matches the partitions, it seems to make sense for it to be in the interiors workset. Element borrowing described above will still allow components to be dynamically allocated to a user for specific editing irrespective of their workset assignments. So if the furniture layout user wants to edit a couple of furniture-specific light fixtures in the ceiling grid, he can do so on the fly by borrowing them from the interiors user. But depending on the situation, this might get tiresome - constantly asking for permission to borrow elements. In that case, the ceiling grid could be in its own workset, checked out in whole by whoever needs to modify it.

In addition to limiting editing conflicts, worksets can also improve the performance of the system by controlling graphic display. Worksets can be displayed as needed, avoiding the memory-intensive display of parts of the building model that aren't necessary for a specific design activity. For example, you may constantly want to see an exterior workset, whereas the display of the furniture workset can be toggled on or off to suit your needs.

## Linked Models

For the very largest projects (especially multi-building projects or buildings with discrete wings) Revit Worksharing allows individual Revit building models to be linked together. Standard model-viewing mechanisms are supported for linked models, enabling a wide

range of drawings to be created across the linked model; for instance section drawings spanning multiple buildings, or site plans.

And similar to worksets, linked building projects also contains unique display settings, controlling how much of the overall project is displayed, which improves graphic performance.

## Worksharing in Action

Founded in 1945 in Honolulu, Wimberly Allison Tong & Goo ([www.watg.com](http://www.watg.com)) (WATG) is an architecture, design, planning and consulting firm with 300 professionals in six offices (Honolulu, Newport Beach, Seattle, Orlando, London, and Singapore) currently working on projects in 50 countries. The firm's expertise has positioned it as the world's leading designers in the hospitality, leisure and entertainment sectors.

After a two-year evaluation and pilot projects period, WATG selected Autodesk Revit as its BIM solution in 2002. Starting with small projects that fit a predefined profile, WATG tested ideas about how BIM-based tools could improve the quality of design and documentation while increasing efficiency and productivity. These initial projects were relatively small projects, requiring limited use of strategies for worksharing.

Their initial implementation has grown to the point where WATG is now using Revit on large, complex projects such as the Quinta do Lorde Hotel and Marina Resort complex located on the island of Madeira off the coast of Portugal.

This 230,000 sq.ft. complex, due to begin construction in the spring of this year, has been modeled in Revit. The multi-building project is separated into discrete building models, linked together on an overall site plan. Each building model has a variety of worksets based on building systems and workflow, and the entire project file can be accessed by a design team spanning WATG's offices in North America and Europe. "When we first started using Revit, it was a challenge to model very large projects," admits Jim Balding, WATG's Revit Implementation Manager. "Things have really changed in just a few years! Now we're tackling projects of all sizes with relative ease – from clubhouses and villas to our Quinta do Lorde resort project with more, even larger projects, in the works."



**Figure 1**

WATG offices around the world use Autodesk Revit Worksharing to collaborate and interact on large design projects such as this 230,000 square foot resort complex located in Madeira, Portugal.

## Fits All Sizes

State-of-the-art BIM with Autodesk Revit is proving itself on a range of projects – from small to very large. In parallel, firms are finding that Revit Worksharing provides the necessary range of collaboration features for their project design teams, customized to suit their unique requirements.

For BIM, one size may not fit all, but one BIM solution - Autodesk Revit - does fit all sizes.

## About Autodesk Revit

The Autodesk Revit platform is Autodesk's purpose-built solution for building information modeling. Applications such as Autodesk Revit Building and Autodesk® Revit® Structure 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 Autodesk Revit and the discipline-specific applications built on Revit please visit us at <http://www.autodesk.com/revit>.

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