BIM and Building Design Communication

This paper explores how building information modeling solutions from Autodesk can be used to explore, validate and convey architectural designs

With tools for building information modeling (BIM) from Autodesk, design professionals are equipped to produce photorealistic images, visualizations and walk-throughs that vividly communicate the intent of a design. Using intelligent 3D models stemming from the BIM process to create visualizations is more accessible, quicker and cost-effective and helps people better understand not only what a design will look like, but how it will fit into their surroundings and how they will interact with it.





Use Autodesk[®] Revit[®] software to generate real-time and rendered analytic visualizations and photorealistic visualizations.

Explore complex organic forms, study how light interacts with a design, validate a design for planning and public outreach, and even market a building before breaking ground.

In Revit you can:

- Select from multiple visual styles grouped into model display, shadows, lighting, photographic exposure, and background options to apply a visual style to a view.
- Add effects like shadows, ambient shadows, sketchy lines, or background, and then adjust all of these setting variables.
- Specify the geographical location of the project and set date and time to include real-world lighting data.
- Include a background in the view of a building to add depth and realism, using three background options: gradient (one color for the sky, one for the horizon and one for the ground), sky (calculated by Revit representative of the date and time specified), or an image.
- Realistically represent lighting conditions and iterate lighting options using both natural sun light and artificial lighting fixtures added to the project.
- Create walkthroughs of animation paths that connect camera views.
- Render within Revit. Revit 2016 adds the Autodesk Raytracer option for rendering static images. Revit continues to use the NVIDIA mental ray engine for functions such as walkthrough export, FBX export, and previews (material appearance, RPC appearance, light color temperature, and decal).

In a collaborative design environment, an image can be the most effective way to communicate a problem or change required. Graphical results of energy or structural analysis performed on a model can be a good basis from which to visually identify issues in a model.



Creating visualizations within Revit is very useful for immediate communication and validation with the design team.

Create advanced visualizations with Autodesk[®] 3ds Max[®] software

Take visualizations a step further, using Autodesk 3ds Max modeling, animation and rendering software with your Revit model to create high-quality presentation materials that can make a difference for reviews, approvals, and marketing. Fine-tune materials and adjust the lighting to create mood, populate your scene with animated characters, and add extra details such as softscape, cars, and furniture.

How to: You can import and/or file link Revit .RVT files into 3ds Max directly. The file linking capabilities of 3ds Max are great for iterative workflow where Revit changes can constantly be updated in 3ds Max. In addition to geometry, critical visual information such as materials, BIM object information and Revit views are all encapsulated in the imported or file linked files. You can then use the modeling features of 3 ds Max software to enhance the existing building information model, adding realism and breathing life into the design.

Here's how you can extend a building information model for advanced visualization:





2 Close the start-up templates window by pressing the small white « X ». You can decide to use the Start-up Templates if you wish at a later time. It will impact the choice of objects you choose to import/file link from Revit

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3 Load the Design Workspace from the quick access bar. The Design workspace is a task-based tool that guides users through the process of creating a visualization

Select the Design Standard from the drop down menu



It will load the Design Workspace ribbon



4 In the Get started tab of the Design Workspace, click on the File Links button and choose: Link Revit File



5 Navigate to the Revit File and click OPEN

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6 Choose a Revit View (note that all Revit views will be loaded with the file)



7 In the Manage Links window, go to the Presets tab and adjust the Presets accordingly. Use this example as a guide if needed

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8 In the Manage Links window, go back to the Attach tab and use the settings you just modified and attach the Revit file by clicking on the « Attach » button.

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This will attach the model to your 3ds Max Scene. Now you are ready to edit the material and accessorize your scene with people, cars, softscape and furniture. Use the Design Workspace ribbon to guide you through the steps to creating a stunning visualization.

The Design Workspace follows a task-based logical system with easy access to object placement, lighting, rendering, modeling and texturing tools in 3ds Max. The Design Workspace is organized to be a useful tool for users new to 3ds Max.





Photo Credit: Gardenian House by Sergio Mereces



Photo Credit: Atelier York Ltd.

The Populate tab in the Design Workspace provides access to the 'Populate' toolset with which you can add animated characters to your scene quickly and easily. Communicate how a space will perform when in use with figures chatting, gesturing, talking on phones, and appearing in patterns of pedestrian flow. The characters can walk along paths, or flows, or hang out in idle areas or sit on seats. The flows can be as simple or as complex as you like, and can include shallow inclines and declines.



Creating visualizations in 3ds Max from Revit BIM data is how top architects are bringing their designs to life, helping all stakeholders truly understand how the designs will behave in the physical world. 3ds Max software is becoming an industry standard for visualization and communication as part of a Revit workflow.

Use the power of the cloud

Take full advantage of the communication potential of visualizations by generating high-resolution images without taxing your internal rendering resources or requiring expensive software. Cloud rendering in Autodesk A360 takes advantage of virtually infinite computing power to create photorealistic and high-resolution images in a fraction of the time required on your desktop.

With Rendering in A360, you can perform solar studies of designs in progress, so you understand the effects of insolation and shading during the day. You can perform illuminance simulations of scenes, to better understand the effects of natural and artificial lighting. With cloud rendering in A360 you can also create interactive panoramas based on your Revit design, so that you provide an immersive experience that helps communicate a design.

How to: This service is available with the purchase of a perpetual license with Maintenance Subscription or a Desktop Subscription for select products.

Rendering from Revit or 3ds Max:

- 1. Open a 3D view in a Revit project, and click Online tab Rendering panel Render in Cloud. If prompted, sign in to your Autodesk account.
- 2. Select views, adjust settings, and click Start Rendering. Revit creates a version of your project containing just the information necessary to render then transmits it to the rendering service. Revit displays a notification appears at the top of window when transmission finishes. You can continue to work in Revit while rendering in A360.
- 3. To monitor rendering progress from Revit, click Online tab Rendering panel Render Gallery in the Revit ribbon.

Rendering in A360 from 3ds Max

In the Design Workspace Lighting and Rendering Tab, you can access rendering options including A360 rendering.



Lighting studies:

Perform illuminance simulations of scenes to check lighting levels and better understand the effects of natural and artificial lighting in your design. Conduct solar studies to visualize the impact of natural light and shadows on both the exterior and interior of your design. The Light Analysis Revit (LA/R) plug-in uses the Rendering in A360 service to perform very fast and physically accurate daylighting analyses from within Revit.

BIM-based visualizations facilitate more confident and faster decisionmaking by helping owners, clients, and project participants see and consider the impact of iterations and options on the design. Revit enables quick edits and evaluation not just of cosmetic variables like materials and colors but of significant design elements such as placement of doors and windows, accommodation for structural elements, and even orientation of a building. Making crucial decisions early in the design process helps increase the quality of a project and the level of satisfaction with results, plus helps projects stay on budget and on time.

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