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HERE'S HOW TO GET THE MOST OUT OF AUTODESK REVIT WITH TWINMOTION

Getting the powerful performance needed to transform Autodesk Revit models into a real-time, visually immersive experience with Twinmotion

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EXECUTIVE SUMMARY

Today's design and modeling software, such as Autodesk Revit and other Building Information Modeling (BIM) software, can be used to design and lay out huge environments, from a single building to an entire section of a city. Those models are often created with standard, placeholder-like architectural assets that communicate the intent of the design without going overboard in the level of development and detail.

In addition, BIM software is limited when it comes to rendering models. Once a scene is set up, CPU rendering can take hours. If changes are necessary because something doesn't look right or a setting was missed, the rendering process begins again. This all leads to wasted time, frustration, and a major reduction in productivity for users.

A visualization tool such as Epic Games' Twinmotion enables modeling without limitation, as long as the right hardware is provided. Robust hardware such as a Dell Precision 3660 fixed workstation (or better) or a Dell Precision 7000 series mobile workstation with Intel Xeon CPUs and NVIDIA RTX™ professional GPUs will allow model rendering, realistically visualized over several iterations, in real time without long delays.

Visualization software with real-time rendering enables users to see quick results and to provide a more realistic representation of the model through the application of richer, more lifelike materials and animation. With this enhanced visualization, customers get a more compelling and realistic representation of the final environment.

How Twinmotion and supportive hardware are game-changers for rendering and visualization

Epic's Twinmotion is a real-time visualization tool powered by Unreal Engine, a development engine, which enables designers, engineers and architects in a variety of industries to produce high-quality images, videos and interactive presentations from design data. Autodesk and Epic made Twinmotion for Autodesk Revit available to all Autodesk Revit users in the fall of 2022.

Using Twinmotion provides architecture, engineering, construction, and operations (AECO) professionals with a more accurate representation of the final rendering of an Autodesk Revit model on-screen. If you change lighting in Twinmotion, for example, you can see shadows update, depth and texture on the asset material, getting a close representation of what the final rendering will look like.

TOP REASONS TO USE TWINMOTION

- Render large, complex models in real time, and visualize models effectively and productively.
- Increase user satisfaction and the user experience.
- It's intuitive to use, requiring a low learning curve.
- It serves as a stepping stone into virtual reality (VR).
- It's free to licensed Autodesk Revit users.

Twinmotion can handle the size and scale of Autodesk Revit models, whether the project is a home, an office building, an airport and surrounding area or even an entire city. And Twinmotion takes seconds or minutes, not hours, to produce a final render. According to Vince Daniele, IMAGINiT Team Manager, "It's instant feedback. If you change something in the Autodesk Revit model, you synchronize, and it's done."

The main reason a designer uses Twinmotion is to create the experience of their space. In an Autodesk Revit model, most things are documentation driven—black and white drawings with some 3D capabilities. While Autodesk Revit allows you to work in a data-rich 2D and 3D environment, it was not purpose-built to navigate around the environment and create a visually immersive experience (Figure 1 on the following page). Twinmotion brings the viewer into the model, enabling a person to "fly" around a waterfront scene and see the reflection of clouds off of the water, watch boats moving in a harbor and people walking along a boardwalk.

This capability is critical when making product selections and doing a walkthrough with the customer or stakeholder, showing them what the space looks like with materials and lighting. The customer gets a sense of what the design and environment will look like as accurately as possible. In this capacity, Twinmotion is ideal for communicating options to a customer. For example, the designer could provide a high-end visualization of two different entryways to a building, easily moving between both scenarios.

"Architects and engineers are some of our most demanding users. And, as they should be, they want more from us, like our multi-year journey to re-engineer the graphics pipeline in Autodesk Revit to make it USD native and create blazing fast performance on modern GPUs and adding real-time visualization capabilities into your Autodesk Revit workflow, capabilities that transform your design into immersive VR experiences with real-time speed and high-fidelity graphics in a matter of minutes."

Andrew Anagnost, CEO of Autodesk

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Figure 1. Twinmotion takes modeling output (left) and creates a realistic, visual representation in real time (right) with animation.
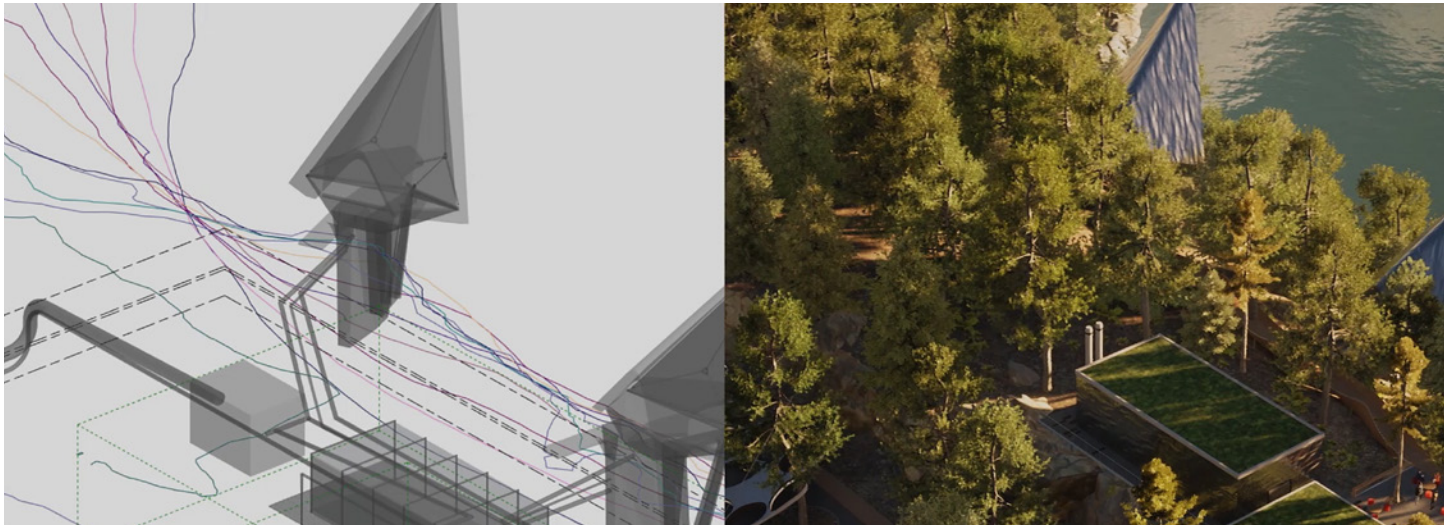
Twinmotion also supports high-quality artifacts and assets, such as furniture and landscape items, that are more realistic.

While neither changes made in Twinmotion nor its assets are pushed back to Autodesk Revit, changes made in Twinmotion can be held in place even after a design change in Autodesk Revit. For example, say you replace the RPC trees from Autodesk Revit with a Twinmotion tree and then synchronize changes. After making design changes in Autodesk Revit and pushing the modified model back to Twinmotion, the Twinmotion trees remain persistent in the visualization without any rework on the designer's part.

The right supporting hardware is key

To leverage the full extent of Twinmotion with Autodesk Revit and create high-end visualizations while avoiding lags in performance, users need powerful supporting hardware. Specifications for general workstation computers for Autodesk Revit focus more on CPU and RAM. It's common for Autodesk Revit users to have integrated graphics, not a discrete GPU. Twinmotion requires a professional, robust graphics card; a discrete GPU with RTX technology and a minimum of 8 GB of VRAM will result in a much better user experience, especially when iteratively visualizing and improving a model.

Newer Intel Xeon CPUs do not pose a limit during rendering or visualization. According to Intel, the newest generation of Intel CPUs deliver "the high frequency needed to run low-threaded modeling applications like Autodesk Revit, as well as the core count to support multi-tasking and multi-threaded features and applications." This mainly affects the speed of modeling a great amount of detail without a noticeable lag.

RECOMMENDED HARDWARE FOR TWINMOTION WITH AUTODESK REVIT

- A discrete GPU card with NVIDIA RTX™ technology and a minimum of 8 GB VRAM capacity
- A high-frequency CPU with adequate core count to support multi-tasking and multi-threaded applications
- A workstation-class system with a solid-state drive

Intel Xeon CPUs and NVIDIA RTX GPUs run reliably on the Dell Precision 3660 fixed workstation (or better) or a Dell Precision 7000 series mobile workstation, which are designed to handle professional workloads like large and complex Autodesk Revit models. Enterprise NVIDIA GPU drivers, considered best in class, are frequently updated to incorporate new enhanced capabilities for professional projects.

Joe Eichenseer, IMAGINiT Director, points out that you cannot get optimal performance by running Twinmotion on a subpar CPU with a great GPU—"they have to play together." During initial loading, Twinmotion breaks down a model into thousands of separate files. Those tasks rely on CPU processing. Once the model is in Twinmotion, a majority of the navigation and command execution that result in what displays on the screen are GPU dependent. Joe adds, "If you don't have a modern GPU, you won't be able to take advantage of all the cool things [like generative design] that Autodesk is working on. It might not hit you today, but it's coming."

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The value of real-time rendering with appropriate hardware

Any organization that relies on designers to provide products and services, whether to the organization or external customers, can reap the benefits of Twinmotion:

- **Increased user satisfaction and user experience**
  Using Twinmotion with real-time rendering saves a significant amount of time. Users no longer have to wait hours for a process to complete, and they receive immediate feedback on design decisions, which is important internally as well as when communicating with a customer or stakeholder. The end result in Twinmotion is also highly immersive and interactive.

- **Free to licensed Autodesk Revit users**
  Making Twinmotion so widely available puts this toolset into the hands of users who are looking to become an expert with visualization techniques, potentially elevating themselves within their organizations and engaging in new conversations they were never a part of before.

- **Lower learning curve**
  Because the Twinmotion interface and navigation is intuitive, the learning curve is relatively short. A Twinmotion fundamentals class, for example, can be completed in one day. Training helps users get up to speed quickly and achieve great results.

GPU RAM PLAYS A SIGNIFICANT ROLE IN PERFORMANCE

The system Vince Daniele used to test workflows and models as background for this white paper, and which proved to be highly reliable, was a Dell Precision 7560 with a single Intel Xeon processor and 64GB of DDR4 RAM, and an NVIDIA RTX graphics card with 16 GB of DDR6 VRAM. Previously, Vince used a standard workstation with discrete graphics but with only 2 GB of VRAM, which regularly ran into performance issues while using Twinmotion, even when loading a relatively small file.

- **Less need to outsource rendering**
  Because of the time involved to render models in BIM software, some companies outsource that task. It's not inexpensive. Some companies may pay $3,000 to $10,000 for rendering a model just to create a marketing package around a product. With Twinmotion, the right hardware and a little training, a designer is just a few clicks away from a rendered product.

CONCLUSION

Visualization provides significant and immediate value to Autodesk Revit users. Because Autodesk Revit does not have real-time rendering capabilities built in, designers should look to Twinmotion visualization software. Twinmotion brings lifelike assets, visualization and animation to Autodesk Revit models along with real-time rendering. One of the main uses of Twinmotion by designers is to better communicate projects to customers and stakeholders.

A professional GPU with RTX technology and a modern CPU are important system components when using tools like Twinmotion to iteratively visualize. To meet user expectations for performance, we recommend a high-end workstation, such as a Dell Precision 3660 fixed workstation or a Dell Precision 7000 series mobile workstation (more specifically, the Dell Precision 7770 17" mobile workstation) with the highest available configurations and an NVIDIA RTX professional graphics card with at least 24 GB of VRAM.

FOR MORE INFORMATION

To learn more about Dell Precision Workstations visit Dell.com/Precision.

VIRTUAL REALITY AND DIGITAL TWINS

Executives and designers alike want an easy solution for VR and the creation of digital twin, but the investment has historically been prohibitive.

The first attempt at a one-click solution for VR in Autodesk Revit had issues, creating extremely large files that had to be recreated after updates were made in Autodesk Revit. Today, Twinmotion and the Unreal Engine serve as the gateway to VR. They support digital twin visualization much more efficiently without losing data. It's easy for non-programmers to work directly in the Unreal Engine to set up a VR experience, and all of the required tools are embedded into Twinmotion.

Where Twinmotion offers some interactivity, such as a door swinging open when approached, running an Autodesk Revit model in the Unreal Engine provides an environment to create a much higher interactive experience. For example, a user modeling an airport in the Unreal Engine can stream real-time information into the model to view the logistics of flights arriving and departing on-screen. Because VR applications are highly demanding on computer systems, they require a powerful GPU and supporting hardware. The GPU is especially important as the level of realism in a VR experience increases, and a discrete, robust GPU with a high refresh rate will provide a smooth, high-quality experience.

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This white paper was created based on input from subject matter experts Joe Eichenseer, IMAGINiT Director, Building Lifecycle Solutions and Vince Daniele, IMAGINiT Team Manager, Building Solutions, both of whom have extensive industry knowledge.

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