

Accelerate Architectural Design in Autodesk Revit

Intel accelerates the architectural design process with 13th Gen Intel® Core™ i9 “K” SKU processors when using Autodesk Revit, delivering up to 64% higher performance than 13th Gen Intel® Core™ i5 processors.¹

The Architectural Workflow



The adoption of Building Infrastructure Management (BIM) solutions by AEC professionals is on the rise as more and more business owners ask for digital project delivery to drive efficiency, sustainability, and value for their investments. Modern design and engineering workstations are required to provide increased productivity, accelerating **time-to-results** and unleashing better opportunities for highly iterative design workflows resulting in better planning, more innovative design approaches, and high-performance focused capabilities.

A combination of advancements in software requirements and hardware capabilities is challenging traditional concepts of what is achievable, affordable, and possible. From a software requirement standpoint, the modern AEC landscape has inflated the file sizes of data-rich 3D models and project files, which increases the compute demand on the hardware in order to manipulate those 3D models.

Recent advancements in hardware design have led to increased capabilities to power the manipulation of 3D models. These advancements provide higher levels of responsiveness, visualization fidelity, and faster, more accurate modeling, thus enabling faster **time to results** for AEC professionals.

Architectural Design (AEC) Workflow

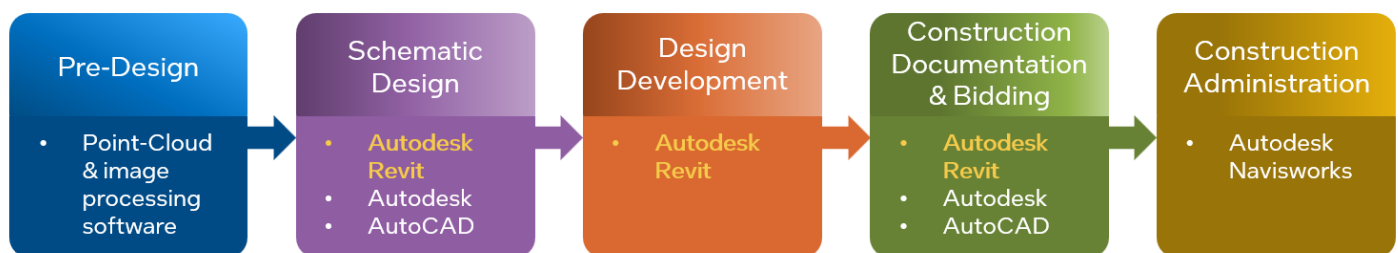


Figure 1. AEC workflow utilizing Autodesk Revit within the Schematic Design and Design Development stages

Modern AEC workflows require a combination of multiple applications to achieve each stage of the entire workflow and require high amounts of processing power.

Without the proper processing power, users can be subject to **lowered productivity** as they experience system lagging, long model opening time, and slow processing. This lowered productivity can **lead to project delays**, production bottlenecks, higher operational costs, as well as **dissatisfaction of the AEC professional**.

Common Pain Points for Architectural Design in Autodesk Revit

Modeling in Autodesk Revit

Modeling is the foundational element of Building Infrastructure Management (BIM) and the Architectural 3D model is a cornerstone to the entire process. Development and management of a model is a continuous and collaborative process through design, engineering, construction and building operations and maintenance. Because Architectural 3D Models have become so important to the entire construction process, increasing levels of information are being added to the 3D model such as the location HVAC systems and venting, Water lines, Electrical lines and more.

This increased levels of project file complexity of 3D Models has become taxing on design and engineering workstations.

Historical solutions to these complex 3D Models have been to keep data organized and use multi-project file work-arounds to manage the total size of the model, however demands from business owners to deliver a singular 3D model project file has made these solutions difficult to implement.

With this singular 3D model project file being so large; modern design and engineering workstations are required to reduce model loading times and ensure high level of interactivity with those models.

When looking for a modern design and engineering workstation solution for modeling, keep these factors in mind:

- 1. Fast single-threaded CPU performance** with a high clock speed to power model interactivity.
- 2. Total System (RAM) Memory size capacity**, in order to load the entire 3D model into memory without needing to load from storage, which can cause lower model interactivity. RAM is also consumed when multiple files and/or views are open at the same time, and loading linked models.
- 3. High memory bandwidth and low memory latency** to further increase model interactivity. A fast and stable connection can reduce the time it takes to synchronize with the central model or load linked models.

13th Gen Intel® Core™ i9 “K” SKU processors deliver up to 26% higher performance while modeling in Autodesk Revit 2022.²

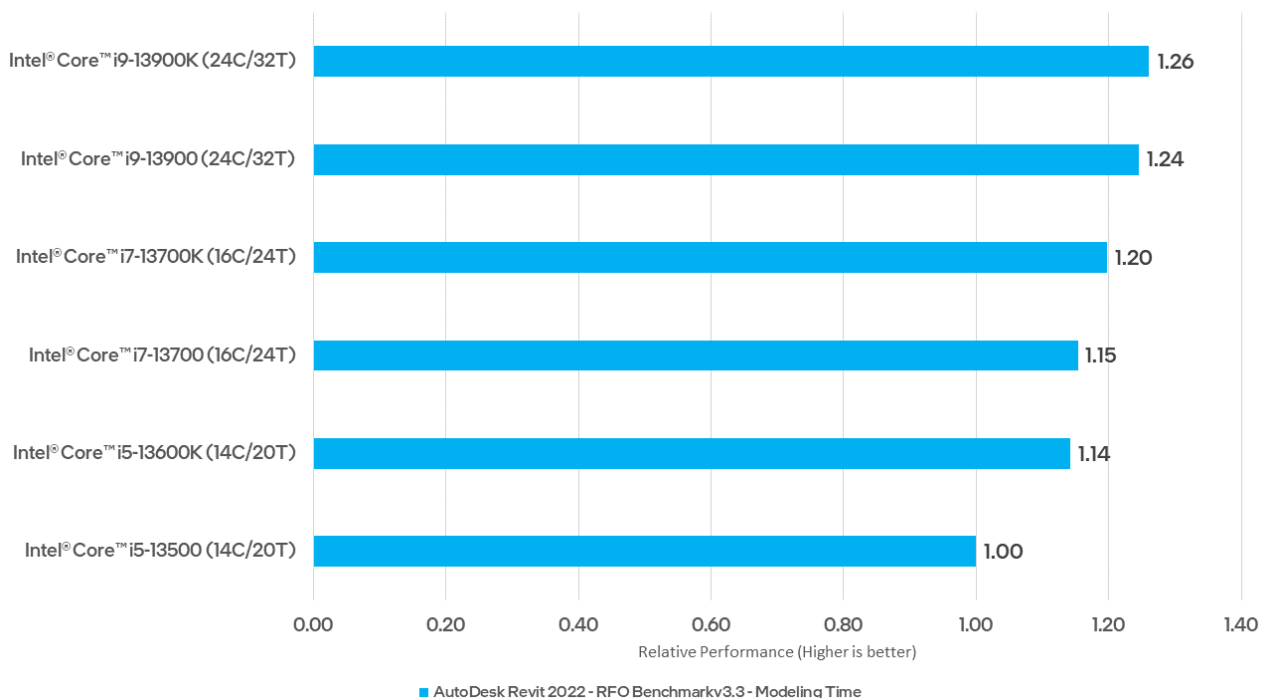


Figure 2. 13th Gen Intel® Core™ processors with higher single-threaded performance accelerate active modeling performance in Autodesk Revit



Common Pain Points for Architectural Design in Autodesk Revit Continued

Visualization in Autodesk Revit

During the Design Development stage of the AEC Workflow, AEC professionals will need to visualize several images of their current Architectural 3D Model for approval from business owners.

This visualization task within Autodesk Revit utilizes an Intel Embree ray-traced solution to simulate the light rays as they travel across and bounce off the walls and various design elements of the Architectural 3D Model.

While ray-traced rendering delivers high-quality image results, it doesn't come without pain points; namely the **time-to-render**. Productivity can be compromised by slower time-to-render for a single image as the AEC professional waits for their system to output the image for approval.

This **time-to-render** is affected by the large number of calculations needed to accurately simulate the light rays in a scene which is dependent on several key factors including (but not limited to) the location of light sources and objects of varying textures within the 3D model. These dependencies result in the need to potentially trace hundreds-of-thousands to millions of individual light rays' interactions to generate just a single final image.

To shorten the **time-to-render** of a CPU-based path traced image, several hardware factors should be considered when choosing a workstation solution:

- **Number of CPU compute cores** within the system, which can help parallelize light calculations to happen at the same time. Increasing the number of CPU cores can shorten the time-to-render however, going from 8 to 16 CPU cores doesn't lead to a perfect doubling of CPU compute and doesn't necessarily lead to your time-to-render being cut in half.
- **System memory (RAM) capacity** within the system; larger and more complex 3D models will need additional RAM to store the necessary data close to the CPU for computing. Without enough RAM, a CPU will have to wait for data from a storage device, which can introduce additional latency and dramatically slow down the time-to-render. With a workstation that has the capability of large memory capacities, means that you can future-proof your systems to handle the 3D models/workloads of tomorrow.

13th Gen Intel® Core™ i9 “K” SKU processors deliver up to 64% higher performance in visualization in Autodesk Revit 2022.¹

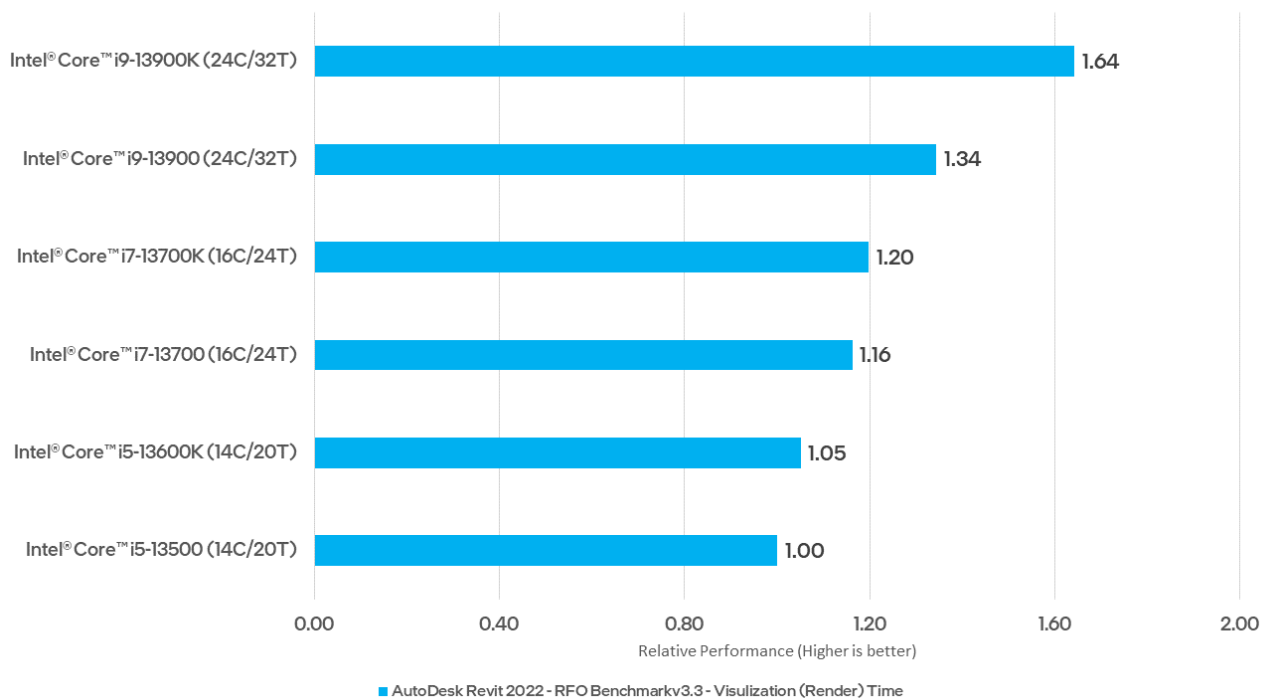


Figure 3. 13th Gen Intel® Core™ processors with higher CPU core counts accelerate visualization performance in Autodesk Revit 2022



Summary

- Increased demands on the Architectural 3D Models within the AEC workflow have increased the compute demands of design and engineering workstations to maintain the same levels of productivity.
- Faster CPU frequency can lead to increased modeling performance within AEC software solutions like Autodesk Revit.
- Higher CPU core count can lead to increased visualization performance for path-traced rendering within AEC software solutions like Autodesk Revit.

Where to Find 13th Gen Intel® Core™ Processor-Powered Workstations



Dell Precision workstations

Shop mobile, rack, and tower workstations from Dell. See the top workstation deals today.



Lenovo workstations

Lenovo P-series workstations offer professional power and ultimate versatility.



HP Z workstations

From mini to full tower, HP Z workstations deliver professional-grade performance.

Other Workstation Vendors



BOXX Systems



Puget Systems



Falcon NorthWest



¹Testing done by Intel as of January 2023

Utilizing Autodesk Revit RFO Benchmark – Render Time (Seconds, lower is better) as the performance metric. Comparing performance of an Intel® Core™ i9-13900K (8+16 core) processor to an Intel® Core™ i5-13500 (6+8 core) processor.

System Configuration:

Processor: Intel® Core™ i9-13900K processor, 56C/112T, Turbo up to 5.8 GHz, Motherboard Name: Supermicro X13SAE (Intel® W680 Chipset), Motherboard type: Production, BIOS: v2.0, Graphics: Nvidia Quadro RTX4000, Graphics Driver version: 517.40, Memory: 64GB (2x32GB) DDR5-4800MHz ECC UDIMMs, Storage: Samsung 980 Pro 1TB, OS: Microsoft Windows® 11 Pro (22H2) Service Pack 22621.512, CPU Cooler: Air cooled

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