It is late in the day and you still have hours left to go on the project you're running in Autodesk Revit*. You have to run, and then re-run, structural simulations on a specialized server, which is slowing you down. Or maybe you are continually forced to close applications, because having everything open at once makes your Autodesk application—whether AutoCAD*, Inventor*, Revit, Maya*, or 3ds Max*—run too slowly. Wouldn’t it be great if you could do everything smoothly on your own local workstation?

Meet the Demands of Intensive Design Workloads Locally with Intel Technologies

You can do everything locally when you upgrade to workstations powered by Intel® Xeon® processors, which let industrial designers, and anyone else, handle complex design projects on individual, local workstations. With graphics capabilities integrated directly on the processor, workstations powered by Intel Xeon processors eliminate the need for a separate video card. For larger workloads that require a discrete card, integrated graphics capabilities help boost performance.

Good graphics cards only get you partway to the performance needed to stay productive. CPUs that can handle the sheer number-crunching required by graphics-intensive projects—and that support sufficient memory—are also critical. Enter the Intel Xeon processor E3 v5 family and the Intel Xeon processor E5 v4 family.

The Intel® Xeon® Processor E3 v5 Family Handles Everyday Design Projects with Ease

Workstations powered by the Intel Xeon processor E3 v5 family deliver the computational power needed to easily run everyday projects—from AutoCAD to Revit and from Maya to 3ds Max and beyond. This gives you the power on your local computer to work with projects with hundreds or even thousands of parts. The Intel Xeon processor E3 v5 family also comes with a built-in productivity enhancer: Intel® Turbo Boost Technology 2.0, which automatically enables the processor to run faster than its rated operating frequency when a workload demands more speed. This accelerates the processor and improves the graphics performance when needed for peak loads.

Design productivity is about being able to clearly see the projects that you are working on. The Intel Xeon processor E3 v5 family supports up to three monitors—even 4K monitors—to help ensure that you have enough visual real estate to work effectively and in high resolution.
Workstation Options

Workstations powered by the Intel® Xeon® processor E3 v5 family are available in a variety of usage models:

- Pedestal workstations, the traditional desktop-workstation form factor
- Mobile workstations, for designers on the go who still need the power of a workstation
- Remote workstations, server-based workstations that provision processors for users on a 1:1 basis

Workstations powered by the Intel Xeon processor E5 v4 family are designed for high-performance computing, and they are available in different form factors:

- High-end workstations capable of handling simulation workloads
- Servers that can provide compute resources for design and simulation tasks for multiple users

Another productivity booster with the Intel Xeon processor E3 v5 family is its integrated graphics. Intel® HD Graphics P530 comes built in to the die of the Intel Xeon processor E3 v5 family, and it enhances graphics rendering on your computer:

- For smaller projects, Intel HD Graphics P530 eliminates the need for a separate graphics card. In these use cases, graphics functionality can be handled directly from the processor, making entry-level workstation performance more affordable.
- For bigger projects that require the additional power of a discrete graphics card, Intel HD Graphics P530 provides additive graphics performance overall. Intel HD Graphics P530 shares memory with the CPU; because fewer graphics computations have to be moved off of the CPU, through RAM, and to the graphics card, graphics performance is optimized.

The Intel Xeon Processor E5 v4 Family Tackles the Most Demanding Projects

Running simulations can create inefficiencies. You have to interrupt your current workflow, send the simulation to another computer, and wait for the results. Lather, rinse, repeat.

With a workstation powered by the higher-performance Intel Xeon processor E5 v4 family, you have the design capability and computational power to handle demanding simulation projects locally, such as those in Autodesk Nastran* and Autodesk Explicit FEA*. Because you can run simulations on your local workstation as needed, you reduce time spent waiting and increase productivity. In addition, local computational power enables you to handle the largest AutoCAD or Revit projects locally.

Figure 1. Autodesk 3ds Max* user interface
Beyond sheer computing power, the Intel Xeon processor E5 v4 family comes with additional hardware-assisted capabilities beyond those available with the Intel Xeon processor E3 v5 family, including:

**Intel® Turbo Boost Max Technology 3.0** enhances Intel Turbo Boost Technology 2.0 by identifying your processor’s fastest core and directing your most critical workloads to it; routing workloads in this way can enhance the performance of single-threaded applications, such as AutoCAD and Revit, by 15 percent.¹²

**Intel® Advanced Vector Extensions 2** (**Intel® AVX 2.0**) provides additional performance for floating-point-intensive workloads, such as simulations, by more efficiently handling similar computations simultaneously.

**Intel® Hyper-Threading Technology** (**Intel® HT Technology**) uses processor resources more efficiently by enabling multiple application threads to run on each core and increasing processor throughput.

**Intel® Rapid Storage Technology** provides protection against data loss in the event of hard-drive failure and accelerates the performance of solid-state drives (SSDs) by dynamically adjusting system power-management policies to deliver up to 15 percent faster performance during heavy multitasking compared to default power management.³

**Performance beyond Processors: Intel® SSDs**

The benefits of Intel® technologies for demanding design workloads extend beyond Intel Xeon processors. Intel® SSDs enhance performance for large design projects that require frequent reads from and writes to stored data. Writing and reading data to and from storage is much slower than accessing data in memory. Large AutoCAD, Revit, VRED®, and other projects generally involve more data than can be stored in local computer memory, and therefore make frequent hits to your computer’s storage. This can cause software to run slowly and reduce your productivity.

Intel SSDs help address this problem by more efficiently moving data from storage into your computer’s processor and retaining frequently used data in memory. Specifically, the Non-Volatile Memory Express* (NVMe*) specification and Peripheral Component Interconnect Express* (PCIe*) technologies in the Intel® SSD 750 Series and Intel® SSD Data Center (DC) D3600 and D3700 Series let your workstation access data much faster than when using serial ATA (SATA) connections to storage.⁴

**Handle the Most Advanced Simulations**

Imagine having some of the computational power of a supercomputer in a local workstation and being able to run advanced simulations locally. For the most intense and demanding simulations and advanced computing needs, this is exactly the kind of performance that Intel® Xeon Phi™ processors provide.

Intel Xeon Phi processors can serve as a coprocessor to the Intel Xeon processor E5 family, with the Intel Xeon processor E5 family used as the primary CPU. This can bolster the already fast performance of the Intel Xeon processor E5 family for complex local simulations. Workstations can also use Intel Xeon Phi processors as primary processors. Preliminary testing at Intel indicates that one Intel Xeon Phi processor offers performance similar to two processors from the Intel Xeon processor E5 family while consuming less power.⁵ And, as opposed to specialized accelerators, such as GPUs, Intel Xeon Phi processors are binary-compatible with Intel Xeon processors, allowing you to run any x86 workload without needing to recompile. This can help avoid compatibility issues with simulation software, such as Autodesk Nastran and Explicit FEA.

**Certified Applications**

These Autodesk computer-aided design (CAD), engineering, and digital content-creation applications are certified on the Intel® Xeon® processor E3 v5 family and Intel® HD Graphics P530, which helps ensure complete processor and integrated graphics compatibility:

- Autodesk AutoCAD*
- Autodesk Inventor*
- Autodesk Revit*
- Autodesk Maya*
- Autodesk 3ds Max*

Using a discrete graphics card in conjunction with the Intel Xeon processor E3 v5 family can provide certification for additional Autodesk applications. Check with your graphics-card manufacturer for details.
Get the Most Out of Your Workstation

When you concentrate more performance in your workstation, you gain productivity. The Intel Xeon processor E3 v5 family and the Intel Xeon processor E5 v4 family, combined with Intel SSDs, can enhance the performance of even enormous AutoCAD, Revit, 3ds Max, and other projects on local workstations. And the Intel Xeon processor E5 v4 family and Intel Xeon Phi processors can put the ability to run simulations directly into the hands of designers and engineers.

Whether you are looking to upgrade a three-year-old workstation or are looking to take your performance to the next level, see how Intel technologies can turbocharge your productivity.

For more information, visit intel.com/workstations or intel.com/xeon-phi.