How to Configure Your
DS SOLIDWORKS workstation

If you're in the market for a SOLIDWORKS workstation, you should begin by asking yourself three basic questions: How big are my assemblies? How many geometric surfaces do I have? How complex are my parts files? Based upon your responses, you can begin to formulate a plan.

Start with Cores

Selecting the number of processing cores in your workstation is critical. SOLIDWORKS is a **frequency bound** application (meaning that it predominantly uses only one core). Since the frequency of that core determines performance more than any other variable, a workstation with fewer cores (but higher frequency) is ideal. If you're running only SOLIDWORKS and absolutely nothing else (not even an operating system) you could get by with as few as two cores. However, in practice, Windows is quite proficient at moving tasks to "free" cores, so that an intensive application like SOLIDWORKS can get 100% of the performance from the cores that it is using (because they are not burdened with other tasks). Therefore, six or eight cores are ideal for a typical SOLIDWORKS user who is also multitasking.

Redundant Cores

"You can buy more cores, but why?" says Adrian Fanjoy of Computer Aided Technology, Inc. (CATI). Fanjoy, along with CATI Support Manager Josh Altergott, are a pair of SOLIDWORKS gurus responsible for the SOLIDWORKS World presentations

"Achieving Extreme SOLIDWORKS Performance: Hardware/Configuration" and "Achieving Extreme SOLIDWORKS Performance: Modeling Methodology." On the subject of configuring the correct SOLIDWORKS platform, both agree that, "When looking at cores, it becomes a money issue and you'll never use them (additional cores) anyway." As an example, Fanjoy cites a pair of workstations from a top tier manufacturer that are virtually identical in configuration except for the fact that one is a single processor and the other a dual. "The dual processor model is over $2000 more," he says, "$2000 more for cores many CAD designers won't be using. That's when it goes from being a performance issue to an ROI one."

The Need for Speed?

SOLIDWORKS Simulation and CPU rendering outside of SOLIDWORKS are bandwidth bound, meaning they commonly utilize multiple cores simultaneously. Therefore, if you incorporate these applications into your SOLIDWORKS workflow, a workstation with more cores can provide better performance to complete your renderings or simulations faster. In this case, more cores & threads can be advantageous, and it is best to find a good balance that maintains higher GHz and still fits within your budget. Would adding an additional processor (and therefore more cores) be beneficial? According to the CATI experts, it can, but only if you have a need for frequent local rendering.

What About Memory

"RAM is the lynchpin," say the CATI experts. You need enough RAM so you don't have to swap or borrow from the hard drive, i.e., the virtual memory.

According to them, the "unlimited" RAM available with the 64bit platform is the single best thing to happen in the world of 3D CAD. So in an ideal world, a SOLIDWORKS user could buy a massive amount of RAM, install it in his/her machine, pull up the largest, most difficult assembly, and test to determine if the system could handle it. However, in the real world we know it doesn't work that way. If you're in the process of configuring or purchasing additional RAM, take a good look at what you're currently using. You should begin with at least 32 gigs. Is your system responsive? Does it execute tasks quickly? If not, you may need to increase your RAM.

Getting Graphic

When engineers and CAD designers set out to configure the ideal SOLIDWORKS system, the area that seems to cause the most confusion (due primarily to a wealth of misinformation) is the graphics card or GPU.

"The biggest misconception is that a bigger GPU is always the way to go," says Altergott, "but that is simply not the case." At larger companies or engineering firms, the confusion is an unfortunate byproduct of the relationship between the SOLID-WORKS user and IT personnel. A CAD designer may have to rely on an inadequate workstation which causes SOLIDWORKS to run slowly or the rendering and simulation processes to take hours. The user then pleads their case to management which hands it off to IT, and in this instance, wrong decisions are made.

"In some cases," says Fanjoy, "the IT department, in order to get the SOLIDWORKs engineer off of their backs, will purchase the biggest, baddest system on the market— but it's unnecessary. An NVIDIA Quadro P1000 card will work absolutely fine in most workflows." You can opt for a more powerful GPU, but keep in mind that the majority of SOLIDWORKS video tasks are done on CPU and RAM."

At ZWorkstations, we recommend the NVIDIA RTX A2000 as an ideal mid-range graphics card for most SOLIDWORKS design workflows (and those on a budget) and the CATI experts are quick to agree. "For core SOLIDWORKS design," says Fanjoy, "RTX A2000 is a good choice."

ZWorkstations also recommends moving to a higher GPU like the NVIDIA® RTX™ line if you are looking for ultimate performance in a complex production pipeline. Fanjoy and Altergott stress that if SOLIDWORKS users also rely on other GPU-needy applications like SOLIDWORKS Visualize, a higher grade GPU is definitely a good idea. With RTX, you may not experience a dramatic performance increase right now, but it's worth noting that NVIDIA is deeply committed to SOLIDWORKS, so when you think about future versions of Visualize, the GPU upgrade makes good sense.

The SSD Difference

The calculation is simple. Your choice of hard drive makes a significant impact on performance - especially if you lack sufficient RAM of which you can take advantage. As for Fanjoy and Altergott, both are staunch proponents of solid state drives, standard features in HP Z Workstations. "With SSDs," says Fanjoy and Altergott, "the workstation boots up and loads faster, so it's worth the expense, assuming your company is using good data management as well. And you don't necessarily need a huge drive especially if you can rely on a secondary drive for additional storage."

ZWorkstations workstations utilize enterprise class NVMe M.2 SSDs to provide SOLIDWORKS users with optimal performance. This type of storage also provides the highest level of durability in order to minimize the risk to your critical data and time-sensitive projects. Consumer-grade SSDs (typically found in lower cost or mass-produced commodity PCs) fail to offer the same speed or reliability as enterprise class SSDs, and with your files, productivity, and time hanging in the balance, the selection of enterprise class SSDs is an easy (and wise) choice.

The Case for Dedicated Rendering

Because rendering is such a critical aspect of many SOLIDWORKS workflows (requiring substantial time and processing power), ZWorkstations recommends off-loading to a high CPU core count system. Available with up to 56 processing cores, HP Z8 G4 enables SOLIDWORKS users to deliver complex projects within budget and on schedule by drastically reducing rendering time.

SOLIDWORKS Visualize

Evaluating true, ray-traced real world lighting, materials, and finishes requires the SOLIDWORKS Visualize "accurate" rendering mode which takes advantage of GPU-accelerated rendering. Due to budget limitations or other factors, you may have to run this application on the same workstation you use for CAD design. If this is the case, a performance tuned workstation like the HP Z4 G4 with at least one dedicated GPU for rendering and one for CAD display, is essential. However, once again, ZWorkstations highly recommends offloading your GPU rendering to a dedicated system. SOLIDWORKS Visualize requires multiple GPUs for real-time design review or accelerated frame rendering, and ZWorkstations offers multi-GPU Supermicro tower and rackmount systems.

Conclusion

If you make sound decisions in these areas and pay attention to ROI and its relationship to performance, your result should be a SOLIDWORKS system that will save you time and money, while increasing your productivity and profits. But as you configure your system, keep in mind the parting advice of Adrian Fanjoy and Josh Altergott: "No amount of hardware can substitute for good modeling practices."