SUBJECT: SOLIDWORKS HARDWARE RECOMMENDATIONS - 2013 UPDATE

KEYWORDS: HARDWARE, CORE, PROCESSOR, GRAPHICS, DRIVER, RAM, STORAGE

SolidWorks Hardware Recommendations - 2013 Update

Below is a summary of key components of an ideal SolidWorks PC, while each point is important, if you only read one page make it this one! Full recommended specs are provided on p2 and onwards including specs for Simulation and Photoview rendering.

Processor (CPU)

This carries out the majority of calculations within SolidWorks; the most common limiting factor is the speed in GHz of the CPU, the faster (GHz) the better. Not all tasks are multi threaded however simulation and rendering tasks can benefit significantly from multi core CPUs. Please note if you have older hardware check that the CPU supports SSE2 (Streaming SIMD Extensions 2) instructions or SolidWorks 2011 will not run, see http://en.wikipedia.org/wiki/SSE2 for more details.

We recommend- Intel i7 Quad Core or Xeon Equivalent (usually 1 or 2 steps below the fastest is most cost effective)

Memory (RAM)

When a document is opened in SolidWorks it is loaded into RAM, you need enough so that Windows does not resort to using the hard disc (virtual memory). RAM is rated in MHz for speed; each increase tends to yield marginal gains so cost is a key factor, often the prices for the latest faster RAM is much higher. When buying new go for at least 8-16GB as this is the current sweet point for cost.

We recommend a minimum of 8GB of DDR3 RAM

Graphics Card

The graphics card assists the processor accelerating operations such as zooming and rotating. Workstation class graphics cards, Nvidia Quadro or ATi Fire Pro are the only ones supported and tested for use with SolidWorks. Speed of rotation, zooming and stability are improved, ultimately this is your productivity.

We recommend- Nvidia Quadro 2000 or above Graphics Card

Storage (Hard Drive)

Solid State Drives (SSD) offer a significant performance upgrade, however due to their current expense you may need to compromise on the size. Although 10GB of free space is the bare minimum to install and use SolidWorks, you also need space for you documents etc. Internally we use Samsung 830 SSD drives + a regular hard drive for bulk storage.

We recommend- One fast solid state drive (128GB +) for programs + 1 additional bulk storage 7200rpm drive (500GB +)

Operating System (OS)

Windows XP will **NOT** be supported from SolidWorks 2013, as a result we have been recommending Windows 7 64Bit for some time. Also SolidWorks 2014 will NOT install on Vista. Go for the 64bit version as you will be able to access more than 4GB of RAM. Mac OSX is not supported but some customers do run on a Mac using boot camp or emulation, although we do not test this setup. Windows 8 (64bit only) is supported as of SolidWorks 2013 SP0 however Windows 7 is a known reliable system.

We recommend- Windows 7 64bit

Monitor

A surprisingly common question, if buying new we go for at least a 21.5inch widescreen at 1920x1080 resolution, these can be bought from around £100. The minimum resolution requirement to run SolidWorks is 1024x768.

We recommend- At least a widescreen 21.5 inch 1920x1080 monitor

SOLID SOLUTIONS RECOMMENDED SPECS

Below is a guide of what we recommend for most users. We use and supply Dell Precision hardware after many years of using it successfully internally and great feedback from our customers.

These are only guidelines for the majority of users, if you have a question please contact support or your account manager for advice. If you are a Simulation or Flow Simulation user see page 5-6 for more info on the benefits of multi core systems.

Specifications are correct as of November 2012 see http://www.solidsolutions.co.uk/Solid-Solutions-Promotions.aspx for details.

Laptop Hi End (Large Assemblies & Simulation) - Dell Precision™ M6700

A mobile desktop replacement system designed to be an all rounder aimed at most users including Simulation and Photoview 360. Including a Quad core processor, workstation class graphics and a Solid State Disc.

Processor: Intel Core I7-3720QM (2.60GHz, Turbo Boost up to 3.6 GHz, Quad Core)

Display: 17.3" Ultra Sharp FHD 1920x1080 Wide View Anti-Glare LED-backlit

Memory: 16GB (4 x 4GB) 1866MHz DDR3 Dual Channel

Hard Drive: *256GB 2.5" Serial ATA Solid State Boot Drive*

Additional Hard Drive: 500GB 2.5" Serial ATA (7,200Rpm) Hard Drive

Optical Drive: 8X DVD+/-RW Drive Slot Load

Graphics Card: NVIDIA Quadro K3000M with 2GB GDDR5

Wireless*:* EMEA Intel Centrino Advanced-N 6205 (802.11 b/g/n 1x1) Half Mini Card

Bluetooth: Dell Wireless 380 Bluetooth Card

Operating System: Windows 7 Professional (64Bit OS)

3Yr ProSupport and Next Business Day On-Site Service

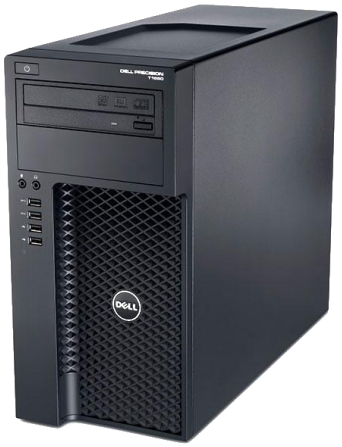
This specification is designed to be the best value for money, The processor can be increased up as high as 3GHz and the amount of RAM can be increased to 16 or 32GB* if required for heavy users of simulation and photo rendering. There could be a benefit in doing so; however the price increase is significant.

* If increased to 32GB then only1600MHz of RAM is supported currently.

Desktop All-Rounder- Dell Precision™ T1650

Aimed at everyday users of SolidWorks, but still a very capable machine for complex part, assembly, and occasional simulation and photo rendering tasks

Processor: One Intel Xeon E3-1240v2 (3.40GHz, Turbo Boost up to 3.8 GHz, Quad Core)



Memory: 16GB (4x4GB) 1600MHz DDR3 Non-ECC

Hard Drive: *256GB 2.5" Serial ATA Solid State Boot Drive*

Additional Hard Drive: 500GB 2.5" Serial ATA (7,200Rpm) Hard Drive

Optical Drive: 16x DVD+/-RW Drive

Graphics Card: 1 GB NVIDIA Quadro 2000 (2DP & 1DVI-I)

Mice: Dell Optical (Not Wireless) Scroll USB (3 Button Scroll) Black Mouse

Keyboard: QuietKey USB Keyboard Black

Operating System: Windows 7 Professional (64Bit OS)

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A Quad core machine is the best balance between cost and performance currently, even if some tasks do not take advantage of all cores, Turbo Boost technology from Intel will automatically turn off unused cores and speed up the remaining cores (to a maximum of 3.8GHz in this case) This machine is capable of carrying out simulation and rendering tasks.

If you use simulation and/ or Photoview 360 extensively you may see a benefit from a system with more cores and perhaps more RAM. For instance, with Photoview 360, if you double the amount of cores the render time can be as much as halved.

From SolidWorks 2013 Photoview 360 also includes network rendering so render tasks can be carried out across multiple machines.

Desktop Hi-End (Large Assemblies & Simulation) - Dell Precision™ T3600

Aimed at users who deal with very large assemblies and those who use simulation and photo rendering extensively.

Processor: Intel Xeon E5-1650 (3.2GHz, Turbo boost up to 3.8 GHz, 6 Cores)

Memory: 16GB (4x4GB) 1600MHz DDR3 ECC RDIMM

Hard Drive: *256GB 2.5" Serial ATA Solid State Boot Drive*

Additional Hard Drive: 500GB 2.5" Serial ATA (7,200Rpm) Hard Drive

Optical Drive: 8x DVD+/-RW Drive

Graphics: 2 GB NVIDIA Quadro 4000 (2DP & 1DVI-I)

Mice: Dell Optical (Not Wireless) Scroll USB (3 Button Scroll) Black Mouse

Keyboard: QuietKey USB Keyboard Black

Operating System: Windows 7 Professional (64Bit OS)

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The speed of an even number of cores can be increased. However the price goes up significantly, 6 fast cores is currently the sweet point for price vs cost when it comes to specifying a machine for SolidWorks Simulation, Flow Simulation and Photo rendering. This system also includes a high end workstation class graphics card from Nvidia. This is primarily of benefit when manipulating complex parts and assemblies.

MORE RAM?

More memory can also be specified, this again puts the price up significantly so 16GB is again the best price point currently. The key question is how much RAM is enough. If possible, testing how much RAM is used by a dataset typical to your usual work and then leaving some head room over and above this is ideal.

When the amount of available RAM is exceeded slowdowns can result as programs start to use the hard disc as an alternative.

MORE CORES?

It can also be tempting to specify more cores/ processors at a lower speed; this can be counterproductive in some cases. A quick sanity check is speed in GHz x number of cores. **More** slower cores are not necessarily better than **less** faster cores, especially when cost is an issue. The best cost vs performance is currently 6 cores but you can go as high as 16 cores per machine, this would be 2 x 8 core processors.

See the FAQ on page 5 for more details on Simulation and the benefits of multiple cores.

For our latest hardware offers see http://www.solidsolutions.co.uk/Solid-Solutions-Promotions.aspx for more details.

Is SolidWorks Supported on Mac?

SolidWorks is designed and certified to work on Windows based systems although Windows XP is not supported from SolidWorks 2013 onwards. Windows Vista Support is also being phased out as Microsoft ends its support. SolidWorks 2014 will not support Windows Vista.

Please note that SolidWorks is not supported on Apple Mac based machines, but some of our customers are running it successfully using Parallels or Boot Camp.

What Are the Recommendations For Workgroup And Enterprise PDM Servers

Ideally a dedicated Windows server should be used for either a SolidWorks Workgroup PDM or SolidWorks Enterprise PDM vault. Besides giving maximum performance for the CAD users, using a dedicated server provides a location to store company standards and templates. For hardware specifications for a PDM system, please visit:

http://www.solidworks.com/sw/support/PDMSystemRequirements.html

Does SolidWorks Support Multiple Cores?

SolidWorks is multi-threaded. Many of the activities such as dialogue box interaction, drawings etc take advantage of this technology. Even a cut extrude with many profiles is multi threaded, however, the solving process (rebuilding) used for parametric modelling is by nature very linear i.e. one feature must be rebuilt before the next therefore SolidWorks will not always use all the available cores.

Most simulation and photo rendering tasks also benefit significantly from multiple cores. See below for more details

Which Simulation Types Benefit Most From Multi Core processors?

Most simulation types see some benefit from multiple cores; simulations using the direct sparse solver see the most benefit.

Keep in mind that if you have capacity to spare in terms of available cores and RAM you should be able to continue working productively in SolidWorks while carrying out simulations. In general if running a single study, performance improvements diminish with more than 4 cores available to the study.

For that reason 4-8 cores seems to be the sweet point as you should then have resources to continue to work in SolidWorks and other programs without affecting the solve time significantly.

Below is some data based on some testing by SolidWorks which is an indication only, there is no guarantee of how well a particular simulation study will take advantage of multiple cores.

SolidWorks Simulation Types

Meshing

From SolidWorks 2011 the curvature based mesher can take advantage of multiple cores where as the standard mesher is mostly single threaded.

Static Simulation - Assemblies and Parts

A static simulation of an assembly with bolt connectors sees a 75% improvement in solve time using the direct sparse solver when going from 1 to 4 cores. Using the FFEPlus Solver this benefit is only 15%

The most computationally intensive stages of the analysis using a sparse solver are generally decomposition of stiffness matrix and solving contact constraints. These are the stages which support multi-core, hence making them less time consuming.

NON LINEAR SIMULATION

A similar setup as a non linear simulation on a single part yields a 58% improvement using the direct spare solver but no improvement when using the FFEplus.

THERMAL SIMULATION

Thermal simulation sees an 82% improvement using the direct sparse solver, again no improvement when using FFEPlus.

OTHER SIMULATION TYPES

Simulation types which are mostly single threaded are:

FATIGUE

The fatigue solver itself uses only one core in testing but preparing to run a fatigue study involves running one or more static studies which do benefit from multiple cores, overall there is an improvement.

FREQUENCY

Frequency saw less improvement in testing than most simulation types, contrary to the other simulation types direct sparse solver saw 0% improvement where as the FFEPlus Solver saw a 25% improvement.

OPTIMIZATION

Most of the time spent solving an optimization analysis is taken up by running loops of design iterations of the studies defined for constraints. The benefit would depend on the type of study optimised.

LINEAR DYNAMIC

The actual post dynamic analysis and stress calculations use special solvers which used only one core in testing. However, performing a linear dynamic analysis involves first finding resonant frequencies, which did show usage of more than one core when using the FFEPlus solver.

PRESSURE VESSEL DESIGN

The majority of the time taken to complete a pressure vessel analysis is running static studies that you wish to combine. The actual calculations for combination of results used only one core during testing but as this made up a small percentage of the total time to perform the analysis there was a significant performance improvement.

DROP TEST

Only one solver type available, the test model used only one core.

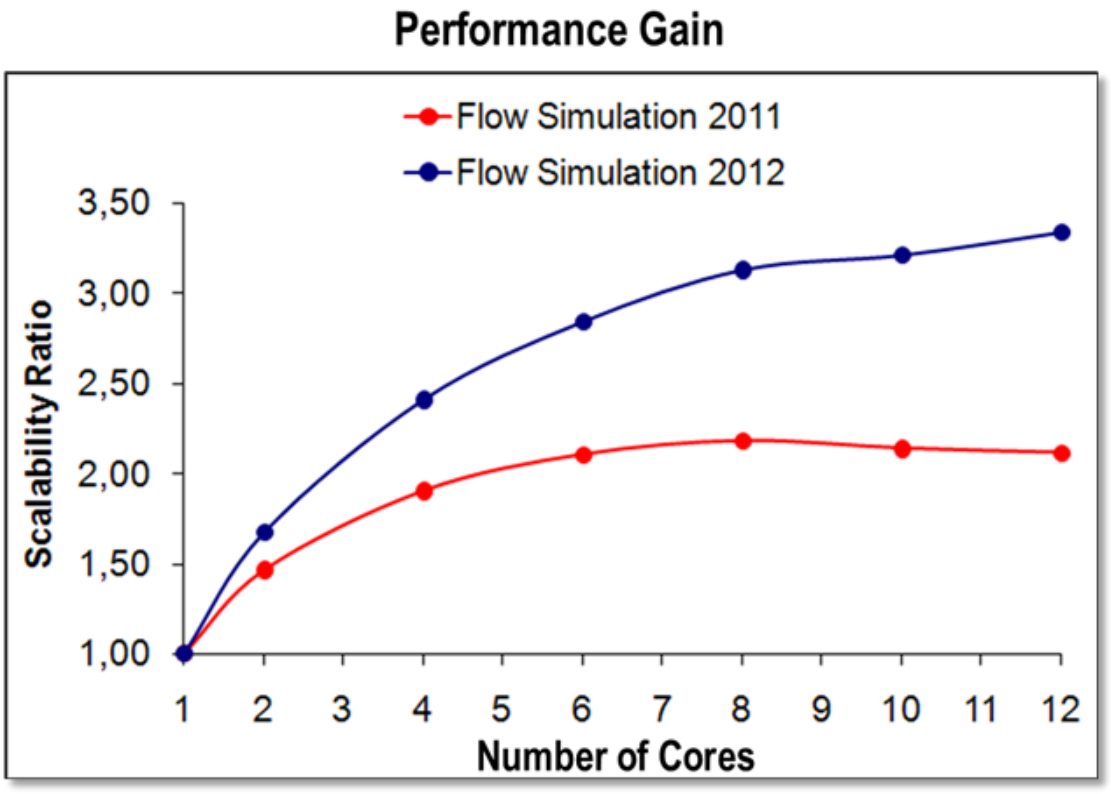
SOLIDWORKS PLASTICS

SolidWorks Plastics is multi threaded although we do not currently have any data on the performance improvements yet.

FLOW SIMULATION

Below is a graph showing the typical benefit of more cores on the time to solve a study within Flow Simulation, great improvements were made in SolidWorks 2012 and above to take advantage of more than 4 cores. It can also be set to use a remote machine as a solver.

N.B. The meshing within Flow Simulation is still mostly single threaded as of SolidWorks 2013


Performance Gain
Flow Simulation 2011
Flow Simulation 2012
Scalability Ratio
3,50
3,00
2,50
2,00
1,50
1,00
1
2
3
4
5
6
7
8
9
10
11
12
Number of Cores