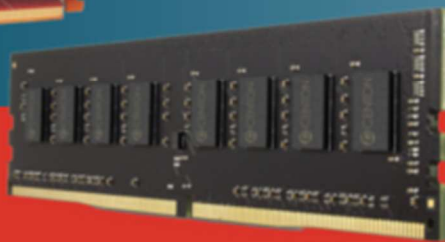




MAKE GREAT DESIGN HAPPEN

SOLIDWORKS Hardware Guide

2017 Update



HARDWARE



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

SOLIDWORKS HARDWARE RECOMMENDATIONS

Below is a summary of key components of an ideal SOLIDWORKS PC, all of this document is important but if you only read one page make it this one!, if you are unsure about your more complex requirements such as Simulation and Visualisation products see appendix from page X onwards.

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. For SOLIDWORKS parts and assemblies typically 2 cores are used, not all tasks are multi-threaded however drawings with many views, simulation, rendering tasks can benefit significantly from CPUs with more than 4 cores.

i5/ i7 VS Xeon- The main advantage of Xeon CPU's is they support error correcting code (ECC) ram which can correct for random hardware errors and in some 6core + CPU's contain more cache which may benefit simulation tasks which product huge amounts of data while solving.

We recommend- High GHz Intel i5/ i7 Quad Core or Xeon Equivalent

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. ECC ram is recommended for users who run long simulation runs / renders frequently.

We recommend a minimum of 8GB of DDR3 or DDR4 RAM

GRAPHICS CARD

The graphics card is fundamental to your productivity. It assists the processor accelerating operations such as zooming and rotating. Onboard Intel HD graphics, gaming cards such as GeForce and Radeon (Non pro) are not supported often giving poor performance and stability.

Workstation class graphics cards such as NVIDIA Quadro (Not NVS) or AMD Fire Pro and the new Radeon **Pro** are the only ones supported for use with SOLIDWORKS. However SOLIDWORKS Visualize which is part of SOLIDWORKS Professional subscription is only accelerated by NVIDIA cards. This combined with a history of strong driver stability and performance means we only supply and recommend NVIDIA Quadro graphics cards.

Speed of rotation, zooming and stability are all improved. You can check for supported drivers on the SOLIDWORKS website at <https://www.solidworks.com/sw/support/videocardtesting.html>

We recommend- NVIDIA Quadro K620 or above Graphics Card

STORAGE (HARD DRIVE)

Solid State Drives (SSD) offer a significant performance upgrade and are recommended to at least be used for your operating system and programs if budget allows. Try to allow for 25-50% free for best performance.

We recommend- One fast solid state drive (256GB +) for programs + 1 optional additional storage 7200rpm drive

OPERATING SYSTEM (OS)

From SOLIDWORKS 2015 SOLIDWORKS is **64Bit Only**. We now recommend Windows 10 Pro or Enterprise 64bit. Windows 7 64Bit is still supported but Microsoft are ending their support as of 2020.

SOLIDWORKS have not announced when they intend to stop supporting Windows 7 64bit but we would expect it to be at a similar time to Microsoft.. We do not recommend windows 8.1 64bit, SOLIDWORKS 2018 is the last release to support it.

We recommend- Windows 10 Pro or Enterprise 64bit

MONITOR

If buying a new monitor we recommend resolution of 1920x1080 at a minimum size of 21.5 inches. Please note that resolutions above 1920x1200 such as 4K screens are better supported by SOLIDWORKS 2016 onwards but not recommended on screens below 27inches in size.

For Laptops we recommend at least 15.6 Inch 1920x1080. Lower resolutions mean less space for your work and the SOLIDWORKS interface. We do not recommend 4K screens at such a small size as 17 or 15 Inches, 1920x1080 should be sufficient and give readable size text, icons etc.

RECOMMENDED DELL HARDWARE

We have partnered with Dell for many years for both our own internal use and to provide systems to our customers so that they can benefit from the discounts we received and the reassurance that it will be ideally specified for SOLIDWORKS. All systems come with 3 years Dell ProSupport with highly training technicians based in Ireland. In the event an issue cannot be solved over the phone they will typically dispatch an engineer to fix the system the following working day.

Below is a guide of what we recommend for most users. These are only guidelines for the majority of users, if you have a question please contact support or your account manager for advice. Specifications are correct as of November 2015 see <https://www.solidsolutions.co.uk/solidworks-support/hardware-advice.aspx> for latest details.

With such a range of products we have added a new performance guideline for then most commonly used products provided by Solid Solutions

Key

	SOLIDWORKS		SOLIDWORKS Composer
	SOLIDWORKS Simulation		SOLIDWORKS Electrical
	SOLIDWORKS Flow Simulation		SolidCam
	SOLIDWORKS Plastics		SOLIDWORKS Visualize

Example

The example gets 4 out of 5 for SOLIDWORKS, Composer and Electrical but 2/5 for Simulation and some other products. In order to improve those areas more CPU cores, RAM or a higher spec graphics card may be needed.

With the vast range of SOLIDWORKS products now available what is required to improve performance varies so for instance adding more fast cores may benefit simulation products whereas Visualize would benefit from a higher spec Quadro graphics card. Here you can start to see why it may not be as simple as just spending more, what you invest in is key and we aim to help you get the most for your money.



If you still aren't sure please get in contact with your account manager or support@solidsolutions.co.uk

HARDWARE



Desktop Entry Level- Dell Precision™ 3420 SFF- Small Form Factor PC, aimed at SOLIDWORKS who create less complex assemblies/parts.

Processor: Intel i5-7500 Quad Core 3.40GHz (Turbo Boost up to 3.8 GHz)

Memory: 16GB (2 x 8GB) 2400MHz DDR4 Non ECC Ram

OS/Boot Drive: 256GB M.2 PCIe NVMe Solid State Drive.

Additional Hard Drive: 1TB 3.5 Inch 7200 RPM Hard Drive

Optical Drive: 8x DVD+/-RW Drive

Graphics Card: 4 GB NVIDIA Quadro K1200

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

Keyboard: QuietKey USB Keyboard Black

Operating System: Windows 10 Professional 64bit

Support: 3 Year Dell ProSupport and Next Business Day On-Site Service



Performance guidelines



Desktop All Rounder- Dell Precision™ 3620MT- The Best balance for price and performance for general SOLIDWORKS as well as occasional simulation/rendering

Processor: Intel Core i7-7700 3.60GHz (Turbo Boost up to 4.2 GHz)

Memory: 16GB (2 x 8GB) 2400MHz DDR4 Non ECC RAM

Hard Drive: 512GB M.2 PCIe NVMe Solid State Drive.

Additional Hard Drive: 1TB 2.5 Inch 7200 RPM Hard Drive.

Optical Drive: 16x DVD+/-RW Drive

Graphics Card: 4 GB NVIDIA Quadro M2000

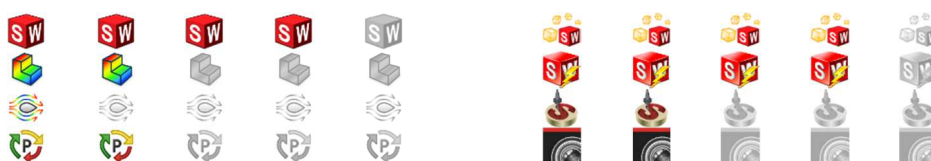
Mouse: Dell Optical (Not Wireless) Scroll USB (3 Button Scroll) Black Mouse

Keyboard: QuietKey USB Keyboard Black

Operating System: Windows 10 Professional 64bit

Support: 3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines



Desktop High End - Dell Precision™ 3620MT - Aimed at users with large datasets with the fastest CPU available, high end 8GB Quadro M4000 graphics card and 32GB of Ram this is great for users with large datasets, as well as being strong for more occasional Simulation and Rendering.

Processor: Intel(R) Core i7-7700K 4.2GHz (Turbo Boost up to 4.5 GHz)

Memory: 32GB (4x8GB) 2400MHz DDR4 ECC RAM

Hard Drive: 512GB Solid State 2.5" Serial Hard Drive

Additional Hard Drive: 1TB 3.5" Serial ATA (7,200Rpm) Hard Drive

Optical Drive: 16x DVD+/-RW Drive

Graphics Card: 8 GB NVIDIA Quadro M4000

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

Keyboard: QuietKey USB Keyboard Black

Operating System: Windows 10 Professional 64bit

Support: 3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines



MORE CORES?

Although a quad core machine is the best balance between cost and performance for most SOLIDWORKS only users if you use Simulation or CPU based rendering tools such as Photoview 360 extensively you may see a benefit from a system with more cores. Also note that 2D Drawings with many views benefit from an increase in cores, but most tasks in SOLIDWORKS prefer fewer faster cores rather so adding more than 4cores is typically not beneficial as the speed of those cores will start to drop. 6-8 fast cores are typically the sweet point of performance vs cost for SOLIDWORKS + Simulation and/or CPU based renderers. A quick way to check the worth of an upgrade is number of cores x speed in GHz. E.g. 4 cores at 4.2GHZ = 16.8 GHZ, 6 cores at 3.6GHZ = 21.6. This isn't to say you will get the full % increase in performance just that you don't want to sacrifice too much speed in the pursuit of more cores.

EXPECTED IMPROVEMENT

This will vary between different aspects of the software for instance with Photoview 360 if you double the amount of cores the render time can be as much as halved. With Simulation and Flow Simulation it is not so clear cut but is often still very beneficial. Please see appendix page X-X for more information on types of simulation and how benefits vary between different tasks. Also note that our specs include ECC RAM which can correct for random calculation errors which all PC's experience. This is why servers that have to run 24/7 365 days a year use Xeon CPU's and ECC ram.

Desktop High End Simulation - Dell Precision™ 5810 - Aimed at users who use Simulation tools extensively, with 6 core Xeon CPU and error correctly ECC RAM.

Processor: Intel Xeon E5-1650 v4 6 Cores 3.6GHz, Turbo boost up to 4.0 GHz)

Memory: 32GB (4x8GB) 2133MHz DDR4 ECC RDIMM

Hard Drive: 512GB 2.5" Serial ATA Solid State Boot Drive

Additional Hard Drive: 1TB 3.5" Serial ATA (7,200Rpm) Hard Drive

Optical Drive: 16x DVD+/-RW Drive

Graphics: 8GB Quadro M4000

Mouse: Dell Optical (Not Wireless) Scroll USB Black Mouse

Keyboard: QuietKey USB Keyboard Black

Operating System: Windows 10 Professional 64bit

Support: 3 Year Dell ProSupport and Next Business Day On-Site Service



Performance guidelines



Desktop High End Visualize - Dell Precision™ 5810 - Aimed at users who want the best balance for SOLIDWORKS Visualize with latest high end Pascal generation NVIDIA Quadro Graphics,

Processor: Intel Xeon E5-1630 v4 4 Cores 3.7GHz, Turbo boost up to 3.9GHz)

Memory: 32GB (4x8GB) 2133MHz DDR4 ECC RDIMM

Hard Drive: 512GB 2.5" Serial ATA Solid State Boot Drive

Additional Hard Drive: 1TB 2.5" Serial ATA (7,200Rpm) Hard Drive

Optical Drive: 16x DVD+/-RW Drive

Graphics: 16GB Quadro P5000

Mouse: Dell Optical (Not Wireless) Scroll USB Black Mouse

Keyboard: QuietKey USB Keyboard Black

Operating System: Windows 10 Professional 64bit

Support: 3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines



Desktop Ultimate Simulation- Dell Precision™ T5810- Aimed at users who carry out extremely large simulation tasks particularly users who want to run multiple tasks at once

Processor: 1 x Intel Xeon E5-1680v4 (3.2GHz, Turbo boost up to 3.8 GHz, (8 cores)

Memory: 64GB (8x8GB) 2133MHz DDR4 ECC RDIMM

Hard Drive: 512GB 2.5" Serial ATA Solid State Boot Drive

Additional Hard Drive: 1TB 3.5" Serial ATA (7,200Rpm) Hard Drive

Optical Drive: 8x DVD+/-RW Drive

Graphics: 8GB Quadro M4000

Mouse: Dell Optical (Not Wireless) USB Black Mouse

Keyboard: QuietKey USB Keyboard Black

Operating System: Windows 10 Professional 64bit

Support: 3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines



Desktop Ultimate Flow Simulation- Dell Precision™ 7910 - Primarily aimed at Flow simulation users with large datasets users but also beneficial for CPU based rendering tools such as Photoview 360 and possibly for other simulation types where multiple studies are run at once.

Processor: 2 x Intel Xeon E5-2687W (3.1GHz, Turbo boost up to 3.8 GHz, (10 cores per CPU 20 Cores total)

Memory: 64GB (4x16GB) 2133MHz DDR4 ECC RDIMM

Hard Drive: 512GB 2.5" Serial ATA Solid State Boot Drive

Additional Hard Drive: 1TB 3.5" Serial ATA (7,200Rpm) Hard Drive

Optical Drive: 8x DVD+/-RW Drive

Graphics: 8GB Quadro M4000

Mouse: Dell Optical (Not Wireless) USB Black Mouse

Keyboard: QuietKey USB Keyboard Black

Operating System: Windows 10 Professional 64bit

Support: 3 Year ProSupport and Next Business Day On-Site Service



Laptop Entry Level - Dell Precision™ 3520 -15.6inch laptop, aimed at users who don't produce large assemblies or very complex parts but still a very capable machine for key functions of SOLIDWORKS parts, assemblies & drawings.

Processor: Intel Core i5-7440HQ Quad Core (2.80GHz Turbo Boost up to 3.8GHz)

Display: 15.6inch Ultra Sharp FHD 1920x1080 Wide View Anti-Glare LED-backlit

Memory: 8GB (1x 8GB) 2133MHz DDR4 Dual Channel

OS/Boot Drive: 500GB 2.5" 7200 RPM drive

Optical Drive: No internal optical drive available

Graphics Card: NVIDIA Quadro M620 with 2GB GDDR5 dedicated memory

Operating System: Windows 10 Professional 64bit

Support: 3 Year Dell ProSupport with next business day on-Site Service



Performance guidelines



Laptop- All Rounder - Dell Precision™ 7520

15.6inch laptop giving the best balance between cost and performance. This system supports higher spec graphics card and more RAM has been added along with a Solid State Drive for improved performance. A very capable machine for key functions of SOLIDWORKS parts, assemblies & drawings and occasional renders/ simulation.

Processor: Intel Core i5-7440HQ Quad Core (2.80GHz Turbo Boost up to 3.8GHz)

Display: 15.6inch Ultra Sharp FHD 1920x1080 Wide View Anti-Glare LED-backlit

Memory: 16GB (2 x 8GB) 2400MHz DDR4 Non ECC Ram

OS/Boot Drive: 256GB M.2 PCIe Solid State Drive

Additional Storage Drive: 1TB 7200 Rpm Hard Drive

Optical Drive: No internal optical drive available

Graphics Card: NVIDIA Quadro M2200M with 4GB GDDR5 dedicated memory

Operating System: Windows 10 Professional 64bit

Support: 3 Year Dell ProSupport and Next Business Day On-Site Service



Performance guidelines



Laptop High End-Dell Precision™ 7720

Larger 17.3 Inch mobile desktop replacement system with the best performance for more demanding SOLIDWORKS datasets also well suited to occasional simulation and rendering use for these more complex parts and assemblies.

Processor: Intel Core i7-7820HQ Quad Core 2.90GHz,(Turbo boost up to 3.90GHz)

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

Memory: 32GB (2 x 16GB) 2400MHz DDR4 Non ECC Ram

OS/ Boot Drive: 512GB M.2 PCIe NVMe Solid State Drive.

Additional Hard Drive: 1TB 2.5" 7,200Rpm additional storage Drive

Optical Drive: No internal optical drive available

Graphics Card: NVIDIA Quadro P3000 w/6GB GDDR5 dedicated memory

Operating System: Windows 10 Professional 64bit

Support: 3 Year Dell ProSupport and Next Business Day On-Site Service



Performance guidelines



Laptop High End Simulation - Dell Precision™ 7720

Aimed at heavy Simulation use with the fastest mobile CPU available benefiting both SOLIDWORKS and Simulation in particular. As this is a Xeon CPU it also supports error correcting RAM ensuring increased reliability for long simulation runs

Processor: Intel Core Xeon E3-1535M v5 Quad Core Xeon 3.1 GHz, (Turbo boost up to 4.2GHz)

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

Memory: 32GB (2x 16GB) 2133MHz ECC DDR4 Dual Channel

OS/Boot Drive: 512GB M.2 PCIe NVMe Solid State Drive

Additional Hard Drive: 1TB 7200rpm additional storage drive.

Optical Drive: No internal optical drive available

Graphics Card: NVIDIA Quadro P3000 w/6GB GDDR5 dedicated memory

Operating System: Windows 10 Professional 64bit

Support: 3 Year Dell ProSupport and Next Business Day On-Site Service



Performance guidelines



Note this is really as high as you can go with regards to performance for Simulation in a workstation class laptop, it doesn't get 5 stars to indicate that you may wish to consider a Desktop with more cores if performance is your priority.

Laptop High End Visualize - Dell Precision™ 7720

17.3 Inch mobile desktop replacement system with the best performance vs price ratio for SOLIDWORKS Visualize. This is also our first VR certified specification in a laptop.

Processor: Intel Core i5-7440HQ Quad Core (2.80GHz Turbo Boost up to 3.8GHz)

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

Memory: 32GB (2 x 16GB) 2400MHz DDR4 Non ECC Ram

OS/ Boot Drive: 512GB M.2 PCIe NVMe Solid State Drive.

Additional Hard Drive: 1TB 2.5" 7,200Rpm additional storage Drive

Optical Drive: No internal optical drive available

Graphics Card: NVIDIA Quadro P4000 w/8GB GDDR5 dedicated memory

Operating System: Windows 10 Professional 64bit

Support: 3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines



Note that the Quadro P5000 is the highest specification mobile Quadro card available but this adds approx. £500 to the price for approx. 15% performance improvement we made some compromise, for large datasets the P5000s increased memory may be worthwhile.

Laptop – Ultra Portable – Dedicated Use- Dell Precision™ 5520

The sleekest model in the range at just 17mm maximum thickness and starting at just 1.8kg this still packs in a quad core CPU and 4GB NVIDIA Quadro professional graphics and has been specified for a user who is dedicated to using SOLIDWORKS but for whom portability is key.

Processor: Intel Core i5-7300HQ Quad Core 2.50GHz, (Turbo Boost up to 3.50GHz)

Display: 15.6" Ultra Sharp FHD IPS 1920x1080 Wide View Anti-Glare LED-backlit

Memory: 16GB (1 x 16GB) 2400MHz DDR4 Non ECC Ram

Boot/OS Drive: 1TB M.2 PCIe NVMe Solid State Drive Boot Drive

Additional Hard Drive: 2TB 5400rpm hard drive additional storage drive.

Optical Drive: No internal optical drive available

Graphics Card: NVIDIA Quadro M1200M w/4GB GDDR5 dedicated memory

Operating System: Windows 10 Professional 64bit

Support: 3 Year Dell ProSupport and Next Business Day On-Site Service



If you are unsure of your requirements please contact support@solidsolutions.co.uk for help.

Appendix- FAQ and Performance data

FAQ

IS SOLIDWORKS SUPPORTED ON MAC?

SOLIDWORKS will not install natively on Apple computers. However, some customers run successfully on Mac OSX based systems, using emulation (parallels) or Boot Camp (installing windows on mac to dual boot). Please note that SOLIDWORKS may suffer from the lack of graphics acceleration on Apple Mac based machines, as pro level graphics along with certified graphics drivers are not available this is particularly noticeable on more complex data sets such as assemblies with many components.

WHAT ABOUT VIRTUALISATION?

SOLIDWORKS have tested to confirm that the software will install on certain virtualisation platforms, however support in terms of performance and stability is down to the virtualisation provider and graphics card manufacturer.

See http://www.solidworks.com/sw/support/11168_ENU_HTML.htm However note that supported does not mean that performance will be up to scratch, graphics acceleration is lacking in many solutions. Those based on NVIDIA GRID or AMD Multi GPU technology allow full hardware acceleration of virtualised systems. We have not tested this setup however SOLIDWORKS have tested drivers for certain NVIDIA GRID cards on Citrix Xen platforms.

RECOMMENDATIONS FOR DATA MANAGEMENT (PDM)

Ideally a dedicated Windows server/s should be used for either a SOLIDWORKS Workgroup PDM or SOLIDWORKS PDM Standard and Professional vaults. 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 USE MORE THAN ONE CORE?

This is common misconception in some operations 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 the full use of 1-2 cores is more typical during a rebuild so less faster cores are better than more slower cores.

However, drawings with multiple views, most simulation and photo rendering tasks also benefit significantly from multiple cores, more detail on this follows below.

SLOWDOWNS-SHOULD I ADD MORE RAM?

Adding more RAM will not solve performance issues unless you are running out, tools such as the windows performance monitor or even at a basic level the task manager. Run your normal tasks and see if you are running low (the SOLIDWORKS performance Monitor should also alert you) you only need enough so that you don't run out this would start using virtual memory on your hard disc which is many times slower. Often using best practices in the software can speed things up otherwise you have to identify where the bottlenecks are before upgrading hardware.

PHOTOVIEW 360- HOW CAN I SPEED UP MY RENDERS

Photoview 360 only uses CPU for rendering and the scaling for is this pretty much linear, i.e. if you go from 4 cores to 8 cores you would expect the render to take around half the time. However, some tasks such as lighting calculations are less multithreaded so this is only a rough guide. Despite not using the graphics card for rendering a certified card is still recommended.

Network rendering is also supported so long as the machine running the render is on subscription. Other PC's can install the free network render client. A benefit is typically seen when a single render takes more than 5 minutes. More info can be seen on [MySolidSolutions](http://www.mysolid.com).

Note that the clients Pc's should be reasonably modern in order to be of benefit and have an Open GL capable graphics card we have seen issues with on board graphics e.g. servers. If unsure a low end Quadro or Fire Pro card would be the safest bet.

SOLIDWORKS VISUALISE-WHAT IS REQUIRED AND HOW CAN I SPEED UP MY RENDERS?

SOLIDWORKS Visualize Standard is a new standalone product for which a complimentary license is provided with each SOLIDWORKS Professional and Premium subscription. This and can be installed either on the SOLIDWORKS users system or on another users system. Visualize can leverage either CPU cores, NVIDIA GPU (graphics card) CUDA cores or a hybrid that users both run solely on the GPU/multiple GPUs. AMD graphics cards will not accelerate this process however the software will still run in CPU only mode on such setups.

When working in Visualize a mid-high end NVIDIA card (Quadro M2000+) will show significant acceleration with 4GB will be enough in most cases but large assemblies may demand more otherwise it will revert to CPU mode which is considerably slower. The below test render at 1920x1080 using accurate mode @ 1000 passes illustrates the point neatly.

Model	CPU Mode 4 Cores @ 3.5GHz	1 x Quadro K2200 GPU only Mode	1 x Quadro M4000 GPU only Mode	1x Quadro P5000 (GPU Mode) GPU only Mode
CUDA Cores	None	640	1664	2560
Render Time	40 Mins	12 Mins 10 Secs	6 Mins 30 Secs	4Mins 15 Seconds

SOLIDWORKS Visualize Professional available at extra cost including animation and many other functions to leverage your 3d data.

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 is currently the sweet point as you should then have resources to continue to work in SOLIDWORKS and other programs to a degree without affecting the solve time significantly.

Below you can find data based on some testing by SOLIDWORKS and Solid Solutions which is an indication only, there is no guarantee of how well a particular simulation study will take advantage of multiple cores.

SOLIDWORKS SIMULATION

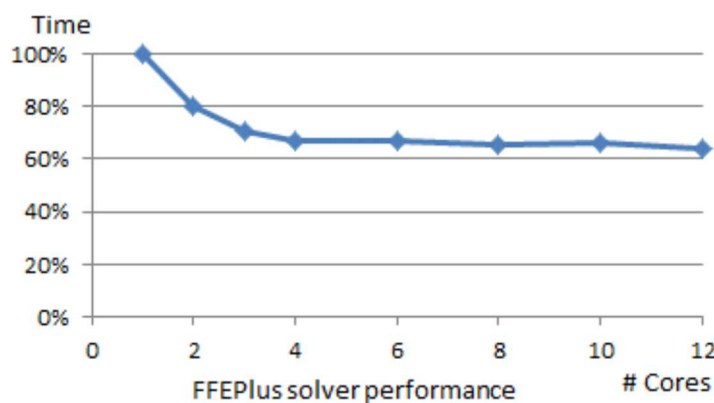
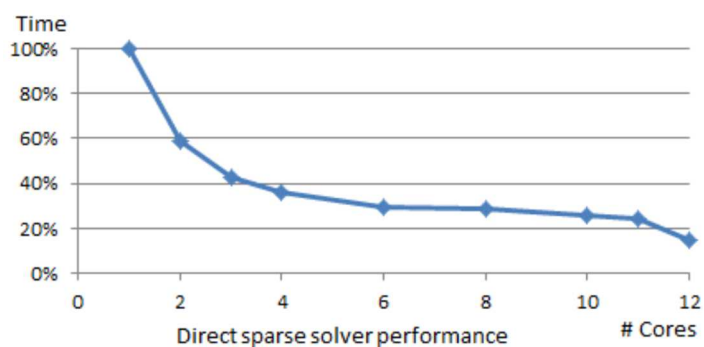
MESHING

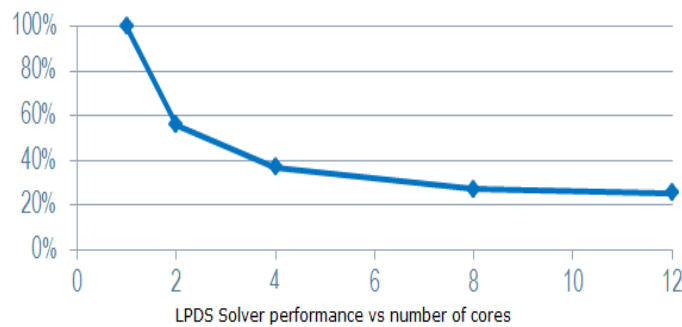
From SOLIDWORKS 2011 the curvature based mesher can take advantage of multiple cores where as the standard mesher is mostly single threaded.

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 may only be 15%.

Below is a table produced by SOLIDWORKS showing the performance increase for static simulation of more cores on the various solvers; Direct Sparse, FFEPlus and Large Problem Direct Sparse Solvers.





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.

OTHER SOLIDWORKS SIMULATION TYPES

NON LINEAR SIMULATION

A similar setup as a non-linear simulation on a single part yields a 58% improvement using the direct sparse 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 whereas 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

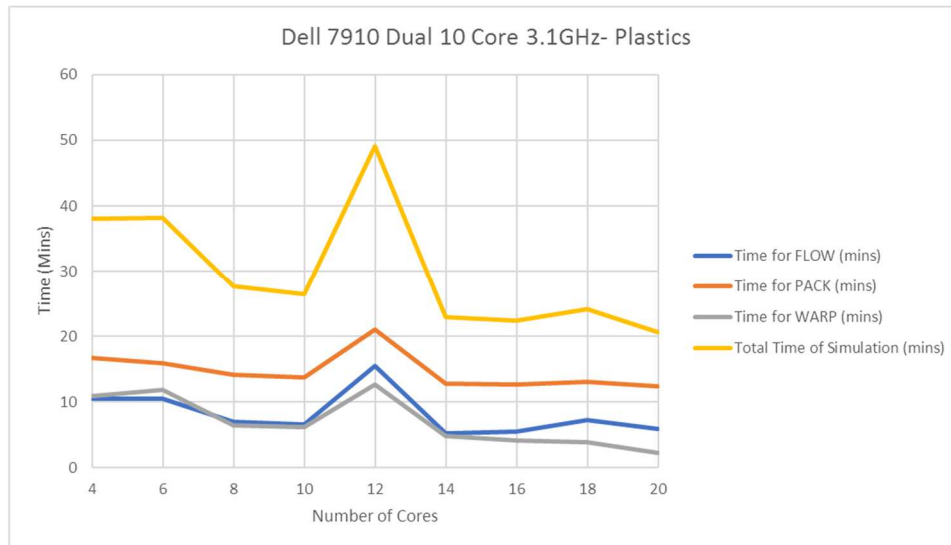
Only one solver type available, the test model used only one core.

HARDWARE



SOLIDWORKS PLASTICS

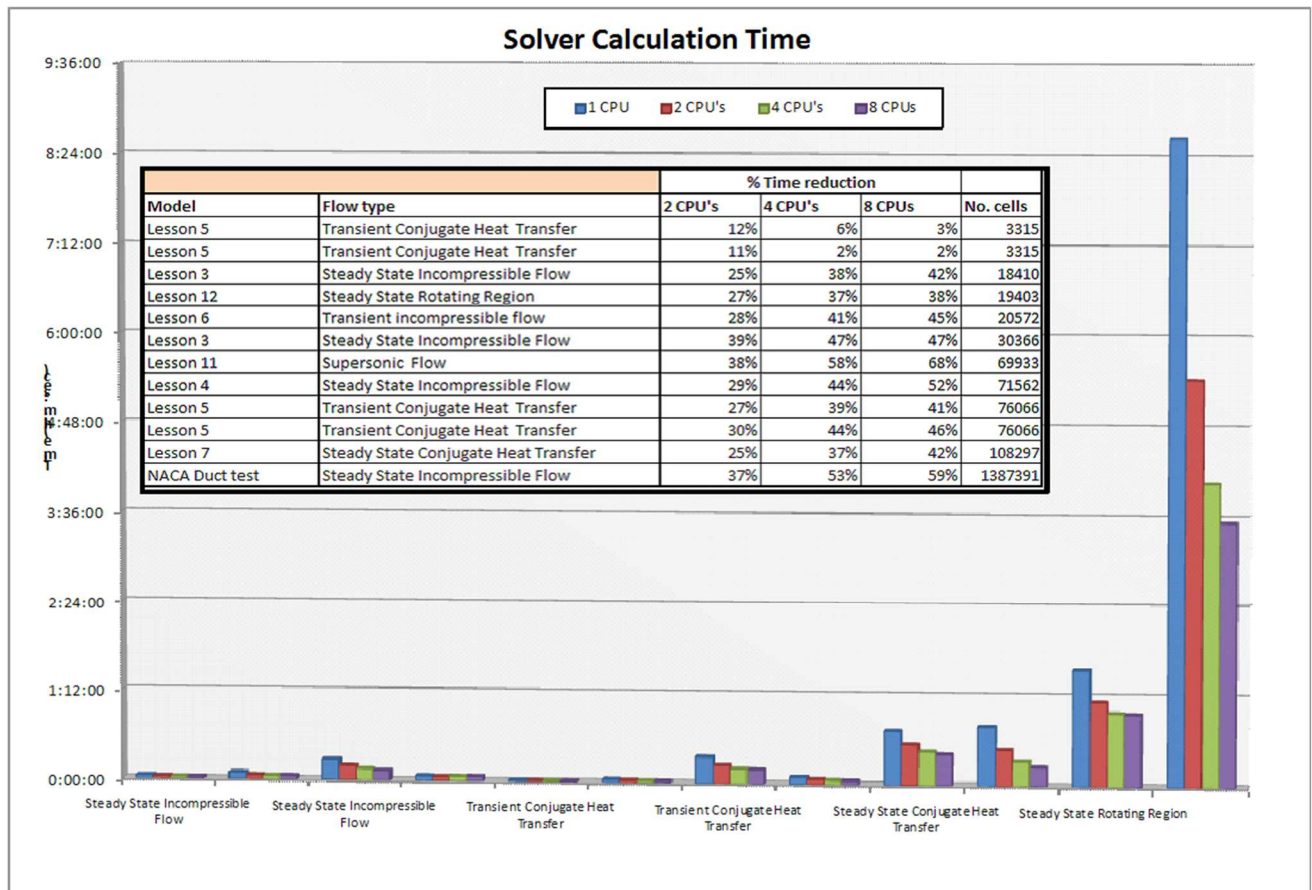
SOLIDWORKS Plastics shows good gains for all parts of the process. Note the jump here this is thought to be as when using 12 cores in our testing we were using all 10 cores from 1 CPU and 2 from the second, the data communication between the two likely being the cause of the anomalous results.



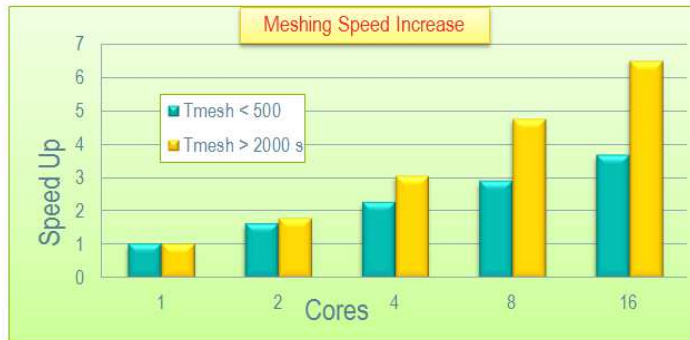
FLOW SIMULATION

In SOLIDWORKS Flow Simulation, great improvements were made in SOLIDWORKS 2012 and above to take advantage of more than 4 cores, larger cell count models see the most benefit. As with most Simulation returns for a single study diminish after 4 cores. There is also the possibility to continue working in SOLIDWORKS while solving 2 studies at once using the batch run function. This would be a good reason to justify the purchase of a PC with more than 6 cores.

FLOW SIMULATION SPEED VS NUMBER OF CORES

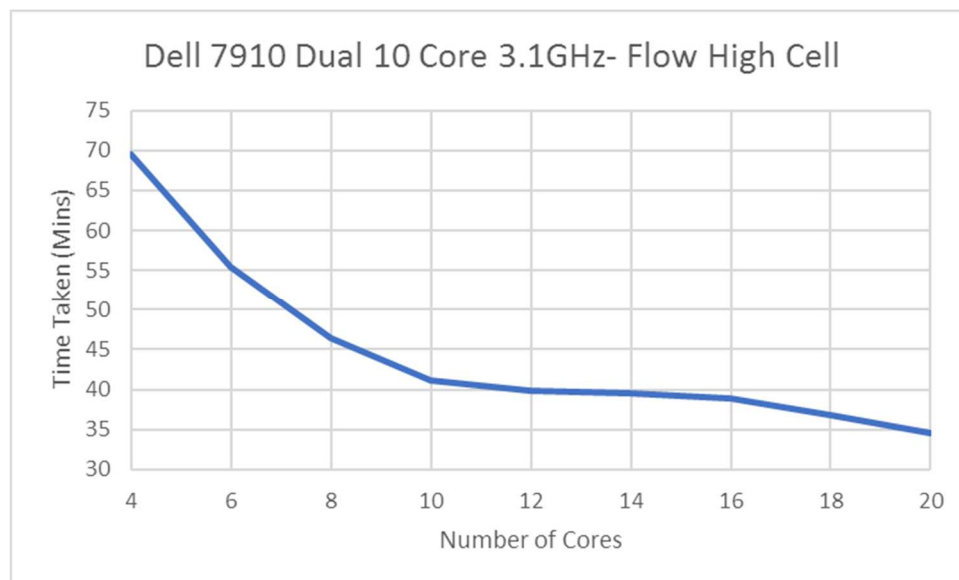


. FROM SOLIDWORKS 2014 ONWARDS MESHING IS MULTITHREADED, WITH THE LARGEST GAINS BEING FOR LARGE MESHES



- Larger meshes see the highest gain
- For a single core, meshing is 30% faster on average compared to 2013

Flow Simulation problems with a large cell count also typically show more benefit from core counts over 8 cores than smaller problems



If you are unsure about your requirements please contact your account manager or support@solidsolutions.co.uk