RECOMMENDED
HARDWARE

Perfect for
SOLIDWORKS

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SOLIDSOLUTIONS
SUPPORTING EXCELLENCE

CONTENTS

SOLIDWORKS HARDWARE RECOMMENDATIONS

The following is a summary of the key components of an ideal SOLIDWORKS PC. If you are unsure about more complex requirements such as Simulation and Visualisation products see the appendix.

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. Look for the maximum “Turbo Boost” speed as the best guide of performance for most SOLIDWORKS tasks. For SOLIDWORKS parts and assemblies typically 1-2 cores are full used, not all tasks are multi-threaded, however drawings with many views, simulation and rendering tasks can benefit significantly from CPUs with more cores.

We recommend:
High GHz Intel 10th Generation 8-10 core i7, i9 or Xeon equivalent

i5/ i7 VS Xeon - The main advantage of Xeon CPUs is support for error correcting code (ECC) RAM which can correct for random hardware errors, helping to improve reliability in critical applications (making them more suitable for long renders, simulation and server products).

Some higher core count Xeon processors also contain more cache which may benefit simulation tasks that produce huge amounts of data while solving. Intel Core i5/i7 and Xeon still have the lead in SOLIDWORKS performance over AMD Processors as of October 2020.

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. When buying new 16GB as this is the current sweet point for cost and allows better multi tasking. ECC RAM is recommended for users who run long simulation tasks frequently.

We recommend a minimum of 16GB of DDR4 RAM

GRAPHICS CARD

The graphics card is fundamental to your productivity. It assists the processor accelerated operations such as zooming and rotating. On-board Intel HD graphics, and cards such as GeForce and Radeon (non Pro) are consumer level cards which are not supported. Often giving poor performance and stability. This is your productivity so you should not underestimate the potential hidden costs of having an unsupported setup.

NVIDIA are also the only graphics cards to support NVIDIA iRay used by SOLIDWORKS Visualize rendering. Graphics and those with 4GB or more memory support the new AI Denoiser (6GB+ recommend) meaning you get your results back many times faster. The latest Quadro RTX graphics cards even have dedicated ray trace cores to further accelerate renders

You can check for supported Cards & drivers on the SOLIDWORKS website at:

solidsolutions.co.uk/supported-hardware

We recommend a P2200/ T2000 or above for general SOLIDWORKS use and the RTX 3000 and above for complex datasets and Visualize

MONITOR

If buying a new monitor we recommend resolution of 1920x1080 at a minimum size of 15.6 inches for laptops or 24 inches for desktops. Please note that while resolutions above 1920x1200 such as 4K screens are better supported by SOLIDWORKS 2018 onwards we do not recommended on screens below 27 inches in size and certainly do not currently recommend these in laptops.

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:
Fast solid state drives (256GB +)

OPERATING SYSTEM (OS)

From SOLIDWORKS 2015 SOLIDWORKS is 64Bit Only, We now recommend Windows 10 Pro, Pro for Workstations or Enterprise 64bit. Pro for Workstations is required for new PC's with Xeon CPUs. SOLIDWORKS have announced that SOLIDWORKS 2020 SP5 will be the last release which will install and support Windows 7 64bit. SOLIDWORKS 2021 will not install on Windows 7, Windows 8/8.1 are not supported for versions 2018 or newer.

We recommend:
Windows 10 Pro, Pro for Workstations or Enterprise 64bit

DELL PROSUPPORT

All systems come with 3 years Dell ProSupport with highly trained 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. We can also work with the Dell team to diagnose if it is a Hardware or Software issue if needed.

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 your account manager or hardware@solidsolutions.co.uk for advice. Specifications are correct as of October 2020 although our website always has the most up to date specifications, see **solidsolutions.co.uk/hardware**

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

- SOLIDWORKS
- SOLIDWORKS SIMULATION
- SOLIDWORKS FLOW SIMULATION
- SOLIDWORKS PLASTICS
- SOLIDWORKS COMPOSER
- SOLIDWORKS ELECTRICAL
- CAM
- SOLIDWORKS VISUALIZE

With the vast range of SOLIDWORKS solutions now available what is required to improve performance varies. For instance adding more fast cores may benefit Simulation products whereas SOLIDWORKS Visualize would benefit from a higher spec Quadro graphics card. 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.

E.g. on the left is the lowest performance for SOLIDWORKS and on the right denotes best performance.

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 receive and the reassurance that it will be ideally specified for SOLIDWORKS.

If you aren't sure what is most suitable please get in contact with your account manager or email: **hardware@solidsolutions.co.uk**

DESKTOP COMPACT ENTRY LEVEL

Dell Precision™ 3240

Ultra small form factor workstation with the power for SOLIDWORKS modelling tasks with 8 core i7 CPU and Certified NVIDIA Quadro P1000 Graphics.

- Processor: Intel Core i7-10700 8 core 2.9Ghz (Turbo Boost up to 4.8 GHz)
- Memory: 16GB (2 x 8GB) 2993MHz DDR4
- Hard Drive: 512GB Pcie NVMe Solid State Drive
- Chassis: Compact desktop with 240W external power supply
- Graphics Card: 4 GB NVIDIA Quadro P1000
- Operating System: Windows 10 Professional 64bit
- Support: 3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines

Also available as Desktop Compact High End-3240 with Quadro RTX 3000 Graphics and 32GB RAM

Monitor and mount supplied separately.

DESKTOP ALL ROUNDER

Dell Precision™ 3640

Dell 3640 Mini Tower a very capable machine for general SOLIDWORKS use. with an 8 core i7 CPU, and mid-range Quadro P2200 graphics this is also well suited to occasional simulation and rendering use.

- Processor: Intel Core i7-10700K 8 Core 3.8GHz (Turbo Boost up to 5.1 GHz)
- Memory: 16GB (2 x 8GB) 2993MHz DDR4
- Hard Drive: 512GB Pcie NVMe Solid State Drive
- Chassis: 460W with 8x DVD+/-RW
- Graphics Card: 5GB NVIDIA Quadro P2200 Graphics Card,4 x Display Port
- Operating System: Windows 10 Professional 64bit
- Warranty: 3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines

DESKTOP COMPACT HIGH END

Dell Precision™ 3240

Compact but powerful desktop with the latest high end NVIDIA Quadro RTX Graphics and 32GB ram to handle complex data-sets, accelerate SOLIDWORKS Visualize and VR/AR content.

- Processor: Intel Core i7-10700 8 core 2.9GHz (Turbo Boost up to 4.8 GHz)
- Memory: 32GB (2 x 16GB) 2993MHz DDR4
- Hard Drive: 512GB Pcie NVMe Solid State Drive
- Chassis: Compact desktop with 240W external Power Supply
- Graphics Card: 6GB NVIDIA Quadro RTX 3000, 4 x mini DisplayPort, VR Ready
- Operating System: Windows 10 Professional 64bit
- Support: 3 Year Dell ProSupport and Next Business Day On-Site Service

Monitor and mount supplied separately.

Performance guidelines

DESKTOP HIGH END

Dell Precision™ 3640

Dell 3640 Mini Tower with latest high end NVIDIA Quadro RTX Graphics and 32GB ram to handle complex data-sets and accelerate SOLIDWORKS Visualize and VR/AR content. Also a good option for users of simulation products with 8 cores and sufficient RAM for most users.

- Processor: Intel Core i7-10700K 8 cores 3.8GHz (Turbo Boost up to 5.1 GHz)
- Memory: 32GB (2 x 16GB) 2933MHz DDR4
- Hard Drive: 512GB M.2 PCIe NVMe Solid State Drive
- Chassis: 460W with8x DVD+/-RW, SD Card Reader and Dust Filter
- Graphics Card: 8GB NVIDIA Quadro RTX 4000 Graphics Card, 3 x Display Port,1x USB C Virtual Link VR Ready
- Operating System: Windows 10 Professional 64bit
- Support: 3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines

DESKTOP HIGH END & SIMULATION

Dell Precision™ 3640

Dell 3640 Mini Tower with fastest Xeon CPU for ultimate SOLIDWORKS perfromance, also includes high end Quadro RTX graphics, 1TB SSD storage and 32GB ECC RAM. Again also a good fit for Simulation, Visualize users plus VR/AR content.

- Processor: Intel Xeon 1290P 10 cores threads 3.7GHz (Turbo Boost up to 5.3GHz)
- Memory: 32GB (2x16GB) 2666Mhz DDR4 Error Code Correcting (ECC) RAM
- Hard Drive: 1TB M.2 PCIe NVMe Solid State Drive
- Chassis: 460W with 8x DVD+/-RW, SD Card Reader and Dust Filter
- Graphics Card: 8GB NVIDIA Quadro RTX 4000 Graphics Card, 3 x Display Port,1x USB C Virtual Link,VR Ready
- Operating System: Windows 10 Pro for Workstations (4 cores plus) 64bit
- Support: 3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines

DESKTOP ULTIMATE & SIMULATION

Dell Precision™ 3640

Dell 3640 Mini Tower with fastest Xeon CPU for ultimate SOLIDWORKS & Simulation performance. Also includes 64GB RAM, 2TB of SSD storage and high end NVIDIA Quadro RTX graphics for dealing with the most complex data sets.

- Processor: Intel Xeon 1290P 10 cores threads 3.7GHz (Turbo Boost up to 5.3GHz)
- Memory: 64GB (2 x 32GB) 2666Mhz DDR4 Error Code Correcting (ECC) RAM
- Hard Drive: 1TB PCIe NVMe Solid State Drive
- Additional Storage-1TB PCIe NVMe Solid State Drive
- Chassis: 460W with 8x DVD+/-RW, SD Card Reader and Dust Filter
- Graphics Card: 8GB NVIDIA Quadro RTX 4000 Graphics Card, 3 x Display Port,1x USB C Virtual Link,VR Ready
- Operating System: Windows 10 Pro for Workstations (4 cores plus) 64bit
- Support: 3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines

DESKTOP HIGH END VISUALIZE

Dell Precision™ 3640

Aimed at users who deal those who use SOLIDWORKS Visualize extensively, with high end 16GB Quadro RTX 5000 cards for challenging datasets, 32GB RAM and fastest i9 CPU for dealing with complex projects.

- Processor: Intel Core i9-10900K 10 cores 3.7GHz (Turbo Boost up to 5.3GHz)
- Memory: 32GB (2x16GB) 29993 MHz DDR4 NON ECC
- Hard Drive: 1TB M.2 PCIe NVMe Solid State Drive
- Chassis: 550W with 8x DVD+/-RW, SD Card Reader and Dust Filter
- Graphics: 16GB NVIDIA Quadro RTX 5000 Graphics Card (3072 Cuda cores) , 3 x Display Port,1x USB C Virtual Link, VR Ready
- Operating System: Windows 10 Professional
- Support: 3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines

DESKTOP ULTIMATE VISUALIZE

Dell Precision™ 5820

Aimed at users who deal those who use Visualize extensively with dual graphics cards resulting in images, animations produced in typically about half the time of a system with a single graphics card.

- Processor: Intel Core i9-10900X 10 Cores 3.7GHz, Turbo boost up to 4.7GHz
- Memory: 64GB (4x16GB) DDR4 2666MHz
- Hard Drive: 1TB PCIe NVMe Solid State Drive
- Chassis: 950W with 8x DVD+/-RW,
- Graphics: Dual 16GB NVIDIA Quadro RTX 5000 Graphics Card (6144 CUDA Cores total), 3 x Display Port,1x USB C Virtual Link, VR Ready
- 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™ 5820

Primarily aimed at users who deal with large cell count Flow simulation problems, Could also be useful for heavy users of SOLIDWORKS Plastics, CPU based rendering tools such as Photoview 360. For other Simulation use it would mainly be suited to those users wanting to run multiple tasks at once.*

- Processor: Intel Xeon W-2275 14 Cores/28 Threads, 3.3GHz, Turbo boost up to 4.8GHz
- Memory: 64GB (4x16GB) DDR4 2933MHz RDIMM ECC Memory
- Hard Drive: 1TB M.2 PCIe NVMe Solid State Drive
- Additional Hard Drive: 1TB M.2 PCIe Solid State Drive
- Chassis: 950W with 8x DVD+/-RW
- Graphics: 8GB NVIDIA Quadro RTX 4000 Graphics Card, 3 x Display Port, 1x USB C Virtual Link, VR Ready
- Operating System: Windows 10 Pro for Workstations (4 cores plus)
- Support:3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines

LAPTOP ENTRY LEVEL

Dell Precision™ 3551

Smaller 15.6 inch 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 i7-10750H 6 Cores/12 Threads, 2.60GHz Turbo Boost up to 5.0 GHz
- Display: 15.6inch 1920x1080, Anti-Glare Non-Touch, 100% sRGB With Cam & Mic
- Memory: 16GB (1x 16GB) 2933MHz DDR4 Non ECC
- Hard Drive: 512GB Pcie NVMe Solid State Drive
- Graphics Card: NVIDIA Quadro P620 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 ALL ROUNDER

Dell Precision™ 7550

15.6 inch laptop, aimed at being the best balance between price and performance with solid state drive for improved responsiveness plus 16GB ram and Mid Range Quadro. A very capable machine for key functions of SOLIDWORKS parts, assemblies & drawings, occasional rendering and simulation tasks.

- Processor: Intel Core i7-10850H 6 Cores 2.70GHz,(Turbo boost up to 5.1GHz)
- Display: 15.6 Inch FHD, 1920x1080, Anti-Glare,100% DCIP3 500 Nits With Cam & Mic
- Memory: :16GB (2 x 8GB) 2933MHz DDR4 Non ECC
- Hard Drive: 512GB M.2 PCIe NVMe Solid State Drive
- Graphics Card: NVIDIA Quadro T2000 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

Also available as Ultraportable thin and light 15.6 and 17.0 inch screen options.

LAPTOP ULTRAPORTABLE ALL ROUNDER

Dell Precision™ 5550

Ultra thin and light 15.6 inch laptop, aimed at being the best balance between price and performance with solid state drive for improved responsiveness plus 16GB ram and Mid Range Quadro. A very capable machine for key functions of SOLIDWORKS parts, assemblies & drawings, occasional rendering and simulation tasks.

- Processor: Intel Core i7-10850H 6 Cores 2.70GHz,(Turbo boost up to 5.1GHz)
- Display: 15.6 Inch FHD, 1920x1080, Anti-Glare,100% DCIP3 500 Nits With Cam & Mic
- Memory: :16GB (2 x 8GB) 2933MHz DDR4 Non ECC
- Hard Drive: 512GB M.2 PCIe NVMe Solid State Drive
- Graphics Card: NVIDIA Quadro T2000 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 ULTRAPORTABLE ALL ROUNDER

Dell Precision™ 5750

The worlds smallest 17.0 inch workstation laptop, at just 8.67 mm thick at the front, 13.15mm rear and starting at 2.13kg. With an infinity edge screen all 4 sides are almost border-less meaning it feels more like a 15 inch class laptop. This spec includes an i7 CPU, 512GB Solid State Drive, 16GB ram and Mid Range Quadro T2000 graphics making it very capable machine for key functions of SOLIDWORKS.

- Processor: Intel Core i7-10750H 6 Cores 2.60GHz,Turbo boost up to 5.0GHz
- Display: 17.0 Inch FHD 1920x1200,16:10 ratio screen, 100% sRGB with Cam & Mic
- Memory: :16GB (2 x 8GB) 2993MHz DDR4 Non ECC
- Hard Drive: 512GB M.2 PCIe NVMe Solid State Drive-Class 40
- Graphics Card: NVIDIA Quadro T2000 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 ALL ROUNDER “PLUS” QUADRO RTX

Dell Precision™ 7550

Larger 17.3 inch laptop aimed at being the best balance between price and performance with solid state drive for improved responsiveness plus 16GB ram and the latest high end Quadro RTX graphics to better support complex data sets and Visualize rendering with dedicated ray tracing cores. Also well suited for occasional simulation tasks.

- Processor: Intel Core i7-10850H 6 Cores 2.70GHz,(Turbo boost up to 5.1GHz)
- Display: 17.3inch FHD, 1920x1080, Anti-Glare,100% DCIP3 500 Nits With Cam & Mic
- Memory: :16GB (2 x 8GB) 2993MHz DDR4 Non ECC
- Hard Drive: 512GB M.2 PCIe NVMe Solid State Drive
- Graphics Card: NVIDIA Quadro RTX 3000 with 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

Dell Precision™ 7550

A 15.6inch laptop with the latest high end NVIDIA Quadro RTX Graphics and 32GB ram to handle complex data-sets and acclerate SOLIDWORKS Visualize and VR/AR content. Also a good option for users of simulations products with 6 cores and sufficient RAM for most users.

- Processor: Intel Core Processor i7-10875H 8 Cores, 2.30GHz,Turbo boost up to 5.1GHz
- Display: 15.6inch FHD, 1920x1080, Anti-Glare,100% DCIP3 500 Nits With Cam & Mic
- Memory: : 32GB (2 x 16GB) 2993MHz DDR4 Non ECC
- OS/ Boot Drive: 1TB M.2 PCIe NVMe Solid State Drive.
- Graphics Card: NVIDIA Quadro RTX 3000 with 6GB GDDR6 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™ 7750

17.3inch laptop with latest high end NVIDIA Quadro RTX Graphics and 32GB ram to handle complex data-sets and accelerate Visualize and VR/AR content. Also a good option for users of simulations products with 6 cores and sufficient RAM for most users.

- Processor: Intel Core Processor i7-10875H 8 Cores, 2.30GHz,Turbo boost up to 5.1GHz
- Display: 17.3inch FHD, 1920x1080, Anti-Glare,100% DCIP3 500 Nits With Cam & Mic
- Memory: : 32GB (2 x 16GB) 2993MHz DDR4 Non ECC
- OS/ Boot Drive: 1TB M.2 PCIe NVMe Solid State Drive.
- Graphics Card: NVIDIA Quadro RTX 3000 with 6GB GDDR6 dedicated memory
- Operating System: Windows 10 Professional 64bit
- Support: 3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines

LAPTOP ULTRAPORTABLE HIGH END

Dell Precision™ 5750

The world’s smallest 17.0 inch workstation laptop. This ultra thin and light chassis with infinity edge screen all 4 sides are almost border-less meaning it feels more like a 15 inch class laptop. This high end spec includes high end Quadro RTX 3000 graphics, 32GB ram & 1TB of SSD storage to handle complex data-sets and accelerate SOLIDWORKS Visualize, VR/AR content.

- Processor: Intel Core i7-10875H 8 Cores, 2.30GHz,Turbo boost up to 5.1GHz
- Display: 17.0 Inch FHD 1920x1200,16:10 ratio screen, 100% sRGB with Cam & Mic
- Memory: : 32GB (2 x 16GB) 2993MHz DDR4 Non ECC
- OS/ Boot Drive: 1TB M.2 PCIe NVMe Solid State Drive.
- Graphics Card: NVIDIA Quadro RTX 3000 with 6GB GDDR6 dedicated memory
- Operating System: Windows 10 Professional 64bit
- Support: 3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines

LAPTOP ULTIMATE & VISUALIZE

Dell Precision™ 7550

17.3 Inch mobile desktop replacement system with specifications tailored for Visualize and complex datasets with High end Quadro RTX 4000 with 8GB of dedicated memory.

- Processor: Intel Core Processor i7-10875H 8 Cores, 2.30GHz,Turbo boost up to 5.1GHz
- Display: 17.3 inch FHD, 1920x1080, Anti-Glare,100% DCIP3 500 Nits With Cam & Mic
- Memory: 64GB (2 x 32GB) 2933Mhz DDR4
- OS/ Boot Drive: 1TB M.2 PCIe NVMe Solid State Drive.
- Graphics Card: NVIDIA Quadro RTX 4000 w/8GB GDDR6 dedicated memory
- Operating System: Windows 10 Professional 64bit
- Support: 3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines

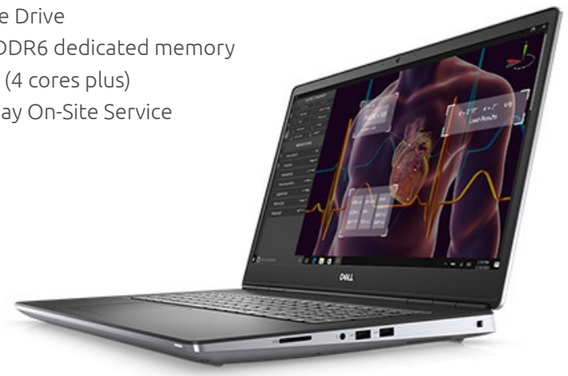
LAPTOP ULTIMATE & SIMULATION

Dell Precision™ 7550

The fastest laptop we offer for SOLIDWORKS & Simulation tasks. With the fastest mobile processor available including 64GB error code correcting RAM (ECC) an 2TB of SSD storage, it is also ideal for users of complex/long simulation runs.

- Processor: Intel Core Xeon 10885M, 8 Cores, 2.4GHz, (Turbo boost up to 5.3GHz)
- Display: 17.3 inch FHD, 1920x1080, Anti-Glare,100% DCIP3 500 Nits With Cam & Mic
- Memory: 64GB (2 x 32GB) 2666MHz DDR4 ECC
- OS/ Boot Drive: 1TB M.2 PCIe NVMe Solid State Drive.
- Additional Hard Drive: 1TB M.2 PCIe NVMe Solid State Drive
- Graphics Card: NVIDIA Quadro RTX 3000 with 6GB GDDR6 dedicated memory
- Operating System: Windows 10 Pro for Workstations (4 cores plus)
- Support: 3 Year Dell ProSupport and Next Business Day On-Site Service

Performance guidelines



APPENDIX- FAQ AND PERFORMANCE DATA

IS SOLIDWORKS SUPPORTED ON MAC?

SOLIDWORKS will not install natively on Apple computers. However, some customers run successfully on Intel based 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. The latest NVIDIA Quadro Virtual Data Center Workstation based setups support everything including accelerating SOLIDWORKS Visualize when using Pascal or Turing generation cards under VMware or Citrix environments.

RECOMMENDATIONS FOR DATA MANAGEMENT (PDM)

Ideally a dedicated Windows server/s should be used for either a 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 minimum requirements, please visit:

solidsolutions.co.uk/solidworks/requirements

We now also offer full supported private cloud hosted PDM environments a hassle free way to switch away from an on premise server.

For more information visit

solidsolutions.co.uk/cloudPDM

please contact your account manager or call **01926 333777** for further advice.

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.

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 photoview 360 rendering tasks also benefit significantly from multiple cores to varying degrees more detail on this follows below.

SOLIDWORKS VISUALISE - 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. SOLIDWORKS Visualize Professional available at extra cost including animation and many other functions to leverage your 3d data. Both options and can be installed either on the SOLIDWORKS users system or on another users system.

Speed in Visualize is primarily down to using NVIDIA GPU (graphics card) CUDA cores to achieve massive speed ups vs traditional CPUs. AMD graphics cards will not accelerate this process however the software will still run in CPU only mode on such setups.

Also note that the new Visualize AI denoiser included in versions 2018 SP3 and above is only supported on NVIDIA graphics cards with 4GB or more of dedicated video memory. This can be used to reduce the number of passes required to eliminate noose/artefacts in the render by up to 10 times. I.e. if you need 1000 passes in a traditional rendering tool you may be able to use as little as 100 using the denoiser.

When working in Visualize a mid-high end NVIDIA card (Quadro P2000+) 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. Adding a second card of the same specification will reduce render times by as much as half.

Below are some results taken from the SOLIDWORKS Visualize Benchmarks, for a benchmark project to render at 1920x1080 for 500 passes the CPU mode is the performance you would get without a supported NVIDIA graphics card.

MODEL	Quadro RTX 4000 8GB	Dual Quadro RTX 4000*	Single RTX 5000 16GB	Single RTX 6000 24GB
CUDA Cores	2304	4608	3072	4608
Ray Trace Cores	36	72	48	72
Render Time	0:56	0:32	0:46	0:34
Approx £	700	1500	1575	3500

The RTX 4000 has 2304 cores and costs approx. £900, the RTX 5000 has 3072 but costs approx £2000 each card with the RTX6000 costing around £4500 card alone.

Note: Dual RTX 4000 cards do not increase ammount of available memory it is still a maximum of 8GB.

APPENDIX- FAQ AND PERFORMANCE 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 SOLDIWORKS 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

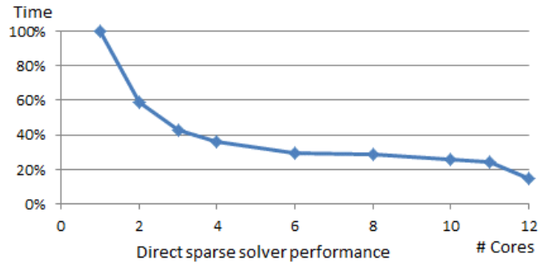
From SOLIDWORKS 2011 the curvature based mesher can take advantage of multiple cores where as the standard mesher is mostly single threaded.

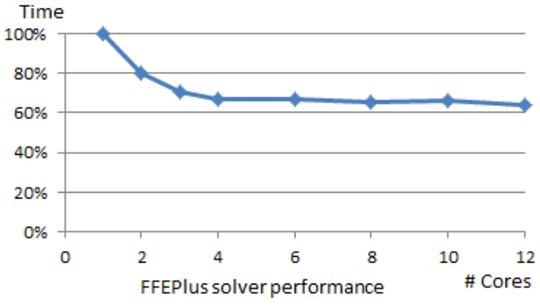
STATIC SIMULATION - ASSEMBLIES AND PARTS

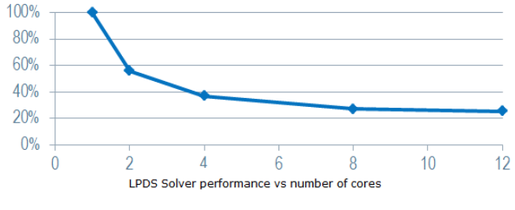
A static simulation of an assembly with bolt connectors sees a 75% improvement in solve time using the direct sparse solver when going from 1 to 4 cores. Using the FFEPlus Solver this benefit may only be 15%.

Across 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 Spare 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 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 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

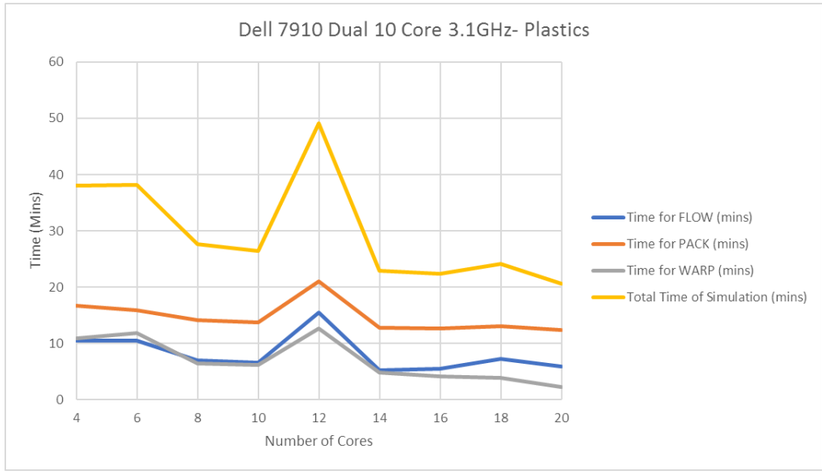
The majority of the time taken to complete a pressure vessel analysis is running static studies that you wish to combine. The actual calculations for combination of results used only one core during testing but as this made up a small percentage of the total time to perform the analysis there was a significant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

DROP TEST

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

SOLIDWORKS PLASTICS

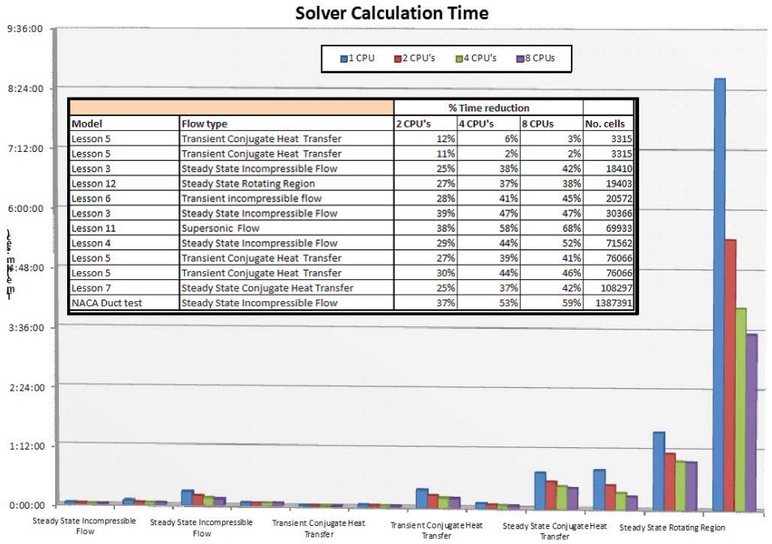
SOLDIWORKS Plastics shows good gains for all parts of the process. Note the jump here this is thought to be as when using 12 cores in our testing we were using all 10 cores from 1 CPU and 2 from the second, the data communication between the two likely being the cause of the anomalous results.



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.

FLOW SIMULATION SPEED VS NUMBER OF CORES

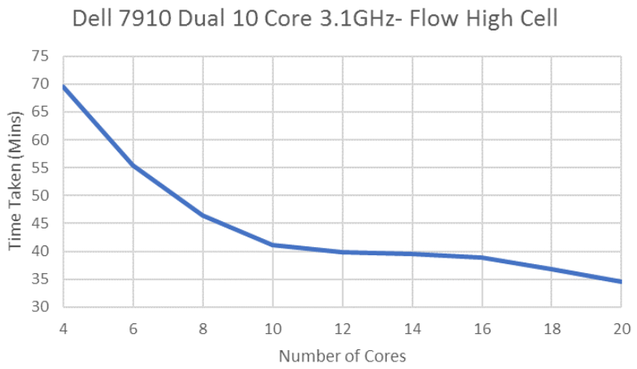


		% Time reduction			
Model	Flow type	2 CPU's	4 CPU's	8 CPUs	No. cells
Lesson 5	Transient Conjugate Heat Transfer	12%	6%	3%	3315
Lesson 5	Transient Conjugate Heat Transfer	11%	2%	2%	3315
Lesson 3	Steady State Incompressible Flow	25%	38%	42%	18410
Lesson 12	Steady State Rotating Region	27%	37%	38%	19403
Lesson 6	Transient incompressible flow	28%	41%	45%	20572
Lesson 3	Steady State Incompressible Flow	39%	47%	47%	30366
Lesson 11	Supersonic Flow	38%	58%	68%	69933
Lesson 4	Steady State Incompressible Flow	29%	44%	52%	71562
Lesson 5	Transient Conjugate Heat Transfer	27%	39%	41%	76066
Lesson 5	Transient Conjugate Heat Transfer	30%	44%	46%	76066
Lesson 7	Steady State Conjugate Heat Transfer	25%	37%	42%	108297
NACA Duct test	Steady State Incompressible Flow	37%	53%	59%	1387391

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

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



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