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SOLIDWORKS

GRAPHICS OPTIMIZATION GUIDE



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ACCELERATING PRODUCT DEVELOPMENT THROUGH DESIGN VISUALIZATION

Design viz was at the heart of the engineering that enabled man to break the speed of sound in freefall

When a member of your team is about to jump out of a pressurized capsule 24 miles into the stratosphere you need to have total confidence in your engineering design. That's why Sage Cheshire Aerospace, the company behind the Red Bull Stratos space diving project, depends on SOLIDWORKS running on HP Z Workstations with NVIDIA Quadro GPUs.

Sage Cheshire Aerospace benefited greatly from having full interactivity with 3D models when designing the capsule that protected Austrian skydiver Felix Baumgartner from subzero temperatures.

The capsule design was incredibly complex, so it was important that the team could visualize the constituent parts in context and do so in a fluid design environment.

"In the old days you'd model an assembly

and it could be so math intensive that, as you rotate it, you might wait several minutes," says Sage Cheshire Aerospace CEO Art Thompson. "That breaks the entire flow. Now with an HP Z Workstation with NVIDIA Quadro we are able to quickly rotate complex models, keep the conversations going, look at how all the pieces fit together."

SOLIDWORKS: THE VISUALIZATION KING

SOLIDWORKS RealView is a rendering mode that presents high quality interactive models directly inside the 3D viewport. The technology makes it possible to explore new forms and materials in tandem and get instant visual feedback on new design iterations. Designers are able to make informed judgments on aesthetics much earlier on in the product development process.

With a professional GPU, SOLIDWORKS

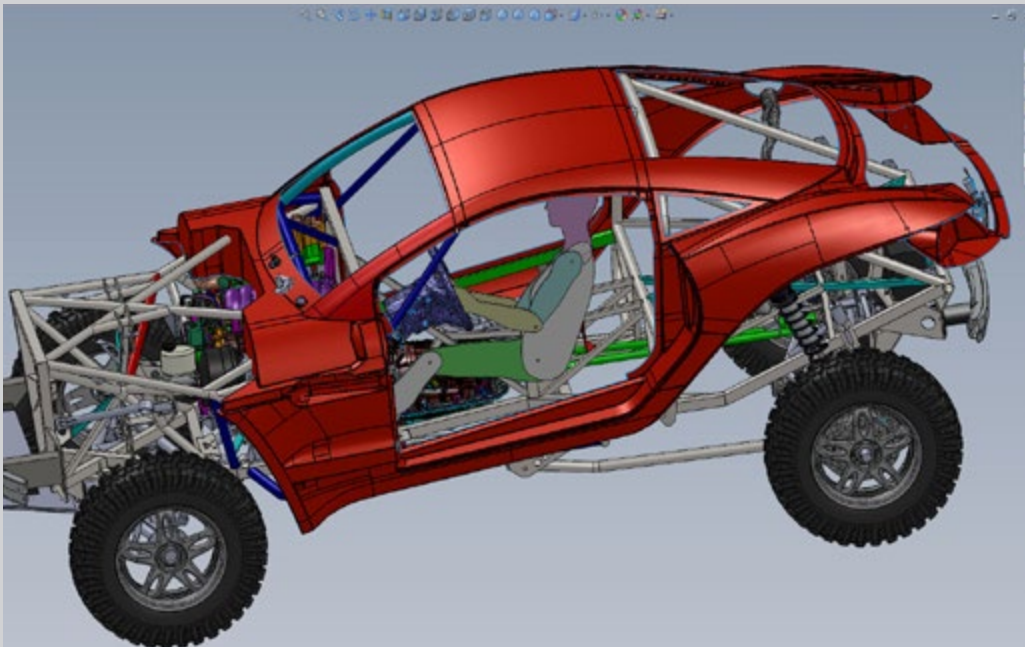
RealView is instant so designers and engineers do not have to spend time producing offline renders. However, when truly photorealistic visuals and animations are required ray trace rendering comes into play with SOLIDWORKS Visualize, an easy to use tool for photoreal imagery (formerly known as Bunkspeed).

www.sagecheshire.com



WATCH THE SAGE CHESHIRE AEROSPACE VIDEO

INSTANT VISUALIZATION INSIDE THE VIEWPORT



SOLIDWORKS is focused on 3D modeling and design so there is a big emphasis on providing high-quality interactive visualization capabilities in the viewport.

The software offers full control over shadows and lighting and there are a number of preset visual styles, which can be toggled between instantly to suit different workflows.

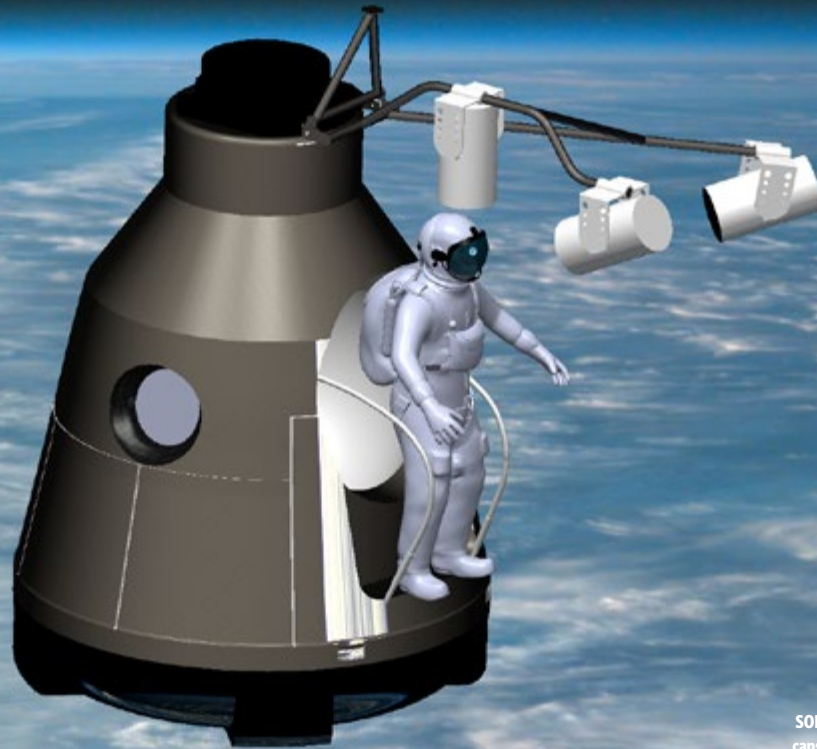
There are two main display modes inside SOLIDWORKS: OpenGL and RealView.

OpenGL mode is used predominantly in modeling workflows to give the clearest understanding of geometry. It uses standard texture mapping and casts simple shadows on the floor. The big focus is on performance and clarity and not on realism.

OpenGL mode features a number



With an HP Z Workstation with NVIDIA Quadro we are able to quickly rotate complex models, keep the conversations going, look at how all the pieces fit together. **Art Thompson,**
CEO, Sage Cheshire Aerospace.



SOLIDWORKS model of the capsule used in the Red Bull Stratos space diving project

of different display states including wireframe, shaded and shaded with edges.

'Shaded with edges' (pictured left) is arguably the most popular. It places a big emphasis on highlighting the exact topology of a model. For example, it makes it easy to see where fillet blends start and finish and is particularly useful when working with more complex surface-based geometry.

OpenGL mode provides users with full control over how a model is displayed. To facilitate modeling, most users completely shut off shadows, enable only the ambient light and use a plain white background, or one of a contrasting color, to highlight the model.

Render surfaces in different colors according to the local radius of curvature. Use zebra stripes to visualize small changes in a surface by simulating

the reflection of long strips of light on a very shiny surface.

For clean lines and smoother models enable Full-Scene Anti-Aliasing (FSAA) which removes jagged edges ("jaggies") from contours of geometries.

Increasingly, designers and engineers are demanding higher levels of realism in the viewport. SOLIDWORKS RealView is used to give the SOLIDWORKS model a more realistic appearance. It supports environment reflections, floor shadows, multi-colored effects such as car paint, as well as ambient occlusion, an effect that delivers more realistic real-world lighting.

Upping the visual quality inside the SOLIDWORKS viewport can offer huge workflow benefits. Designers and engineers are able to make judgments on aesthetics throughout the product

development process. In the past, to visualize a design at such levels of quality would have required a time consuming off line render.

With SOLIDWORKS RealView the visualization is instant and the model is fully interactive. It is also possible to render out a high-res still in seconds, which can be useful for reports.

Increasing the level of realism inside the viewport does place a bigger load on a workstation's GPU. The demands become even higher as the size and complexity of models increase.

Display resolution also has a significant part to play. 4K (3840 x 2160 resolution) displays are becoming increasingly popular but with four times as many pixels to render as Full HD (1920 x 1080 resolution) they make the workstation's GPU work even harder.

Maintaining full interactivity with high-quality models, particularly on 4K displays, can be a big challenge with older workstations. When rotating, panning and zooming around an assembly, frame rates or visual quality can drop.

HP Z Workstations are well equipped to deliver a full interactive experience with large models, even on 4K displays. High-performance Intel® Xeon® CPUs and **NVIDIA Quadro** GPUs can help users work with RealView enabled all the time, rather than having to revert back to the less demanding OpenGL modes to maintain full interactivity with the model.

Reliability is also essential in demanding workflows and HP Z Workstations undergo a rigorous testing process before they are certified by Dassault Systèmes SOLIDWORKS.

3D GRAPHICS OPTIMIZATION TIPS

How to strike a balance between visual quality and model interactivity in SOLIDWORKS

By default SOLIDWORKS is configured to deliver good dynamic performance in the viewport. It places an emphasis on maintaining interactivity then improving quality as soon as the model stops moving.

Much of this is down to 'Large Assembly Mode', which automatically switches on when an assembly reaches a certain number of components.

Large Assembly Mode is a collection of system settings specifically designed to improve the performance of assemblies. The trade-off for maintaining high-levels of interactivity in the viewport, however, is a reduction in visual quality.

A number of display features are automatically turned off, including RealView, shadows, and anti aliasing which smooths jagged edges. During dynamic view manipulation, models can

also degrade, temporarily turning parts into simplified blocks.

Using high-performance HP Z Workstations with NVIDIA Quadro GPUs it is often possible to ramp up the visual quality in the viewport without impacting the interactivity of large assemblies.

However, in order to gain access to these advanced visualization features Large Assembly Mode must first be turned off. This can be done with the click of a button or by changing the 'number of components' threshold at which it automatically turns itself on.

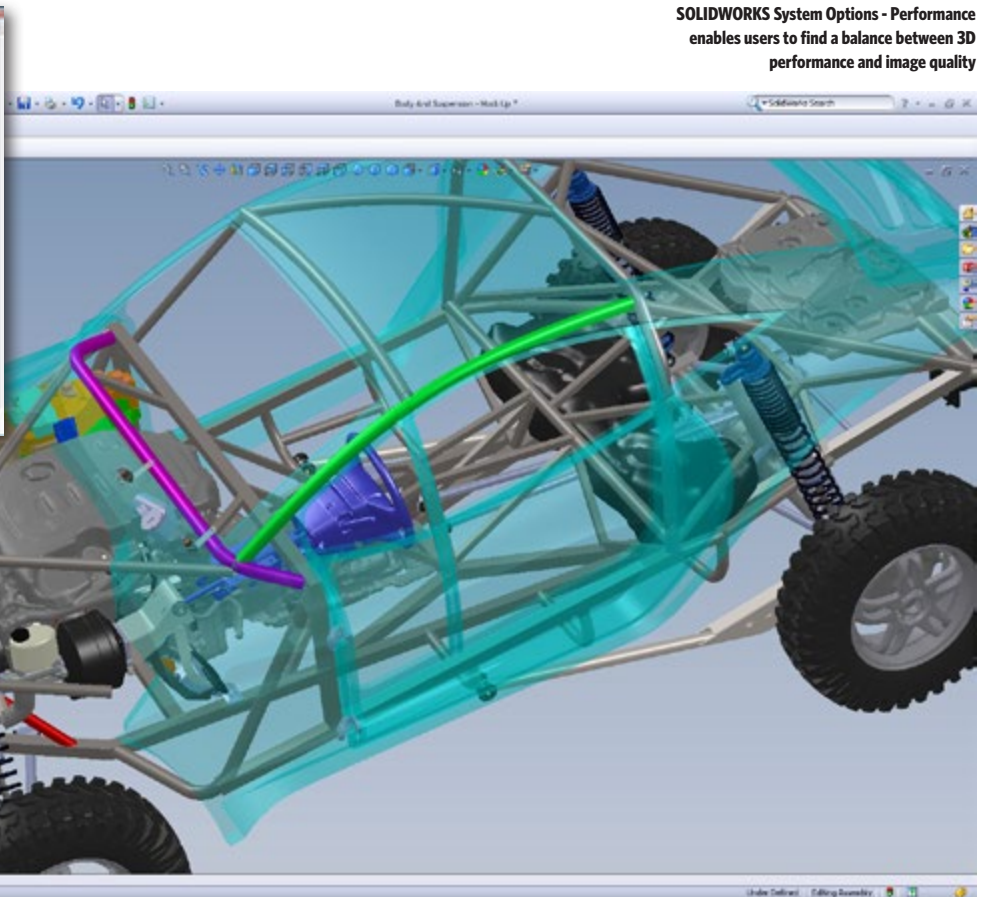
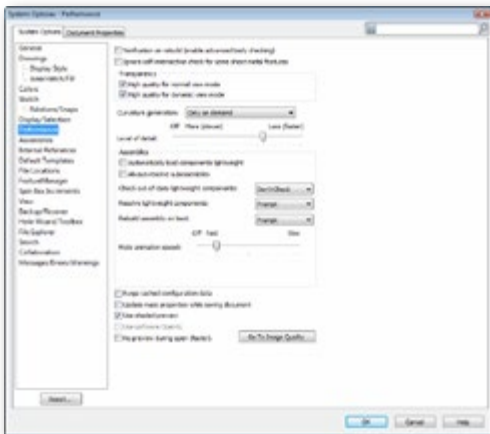
Once Large Assembly Mode is deactivated users will have access to the full range of effects, including shadows, RealView, ambient occlusion and anti-aliasing. It is also possible to dive into the SOLIDWORKS performance system settings to fine tune the software and find that perfect balance between interactivity and image quality.

High-quality transparency can be switched on or off in dynamic view mode.

It is also possible to adjust the level of detail. Setting the slider to 'off' will mean no model detail is dropped when dynamically viewing a model. Setting it to 'less' will increase performance but potentially drop more components from your assembly.

Delving even deeper into the settings Assembly Visualization can be used to check for specific components whose image quality might be slowing down the dynamic graphics performance of very large assemblies. Sort components by the number of Graphics-Triangles then hide those with high triangle counts.

Finally, when a component is hidden, by default it fades away, rather than simply disappearing. This is a nice effect, but it takes a little time so it is possible to turn that feature off to speed things up a bit.



SOLIDWORKS System Options - Performance enables users to find a balance between 3D performance and image quality

PHOTOREALISTIC QUALITY RENDERING

Bring designs to life by using physically based rendering to accurately simulate lighting and materials

Visualization has become a core skill set for designers. This is especially true for SOLIDWORKS users who often need to create high quality photorealistic images and animations of designs for marketing, client verification, product documentation, or sales support. Visualization can also be a powerful aid to developing several different looks based on various materials under consideration.

A new trend is emerging with product designers using physically based rendering earlier in their design workflow. By taking advantage of GPU power, designers can modify designs and see the results interactively while they work on them. They can iterate on designs and view the photorealistic rendering instantly, so they remain in the creative flow, confident that what they see on the screen is precisely how it will look in real life. Leveraging interactive physically based rendering enables designers to explore options early in a predictive way as they work on optimizing their product design.

SOLIDWORKS Visualize (formerly known



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as Bunkspeed) is a new physically based rendering tool, which uses NVIDIA Iray technology. Dassault Systèmes describes it as ‘the camera’ for SOLIDWORKS data.

SOLIDWORKS Visualize Standard, included with SOLIDWORKS Professional and SOLIDWORKS Premium, enables engineers, designers and non-technical users, to quickly and easily create photorealistic stills without tying up a

SOLIDWORKS license.

SOLIDWORKS Visualize Professional builds on these capabilities, adding animation, 360-degree spins and artistic filters.

SOLIDWORKS Visualize harnesses NVIDIA GPUs which means you can do your final frame renderings on the GPU (or multiple GPUs) while still working with SOLIDWORKS (CPU) on other projects or design iterations.

RENDERING WITH NVIDIA IRAY - SOLIDWORKS VISUALIZE

SOLIDWORKS Visualize Standard is a ‘push-button’ 3D renderer that accurately simulates real-world lighting and advanced materials.

It offers a seamless workflow with SOLIDWORKS CAD. Simply click the export button inside SOLIDWORKS CAD and the model will appear in SOLIDWORKS Visualize.

The model can then be ‘painted’ by dragging and dropping materials from a library. Materials can be customized by adjusting color, texture and surface finish. Additional materials can be downloaded from an extensive cloud library.

Environments can also be dragged and dropped into the scene and their position adjusted to get the desired lighting, shadows and reflections.

The viewport can be rendered in one of three ways: ‘Preview’ for

approximated rendering; ‘Fast’ for high performance ray tracing and ‘Accurate’ for fully photographic ray tracing.

SOLIDWORKS Visualize can easily handle design revisions thanks to its ‘Live CAD Update’ feature. If a model changes, the assembly will automatically update within SOLIDWORKS Visualize – without having to re-import or re-paint the model.

SOLIDWORKS Visualize Professional adds features for those that use visualization tools every day, including animation, customizable camera filters, rendering queues and network rendering.

It offers full animation of parts, models, appearances, camera views, and environments, as well as one-click 360-degree spins to present

final designs.

Different design options or color choices can be compared side-by-side with multiple viewports.

SOLIDWORKS Visualize uses NVIDIA Iray, a physically-based ray trace rendering technology. NVIDIA Iray can be accelerated by both CPUs and CUDA-based GPUs, but it thrives on GPUs with lots of cores and on-board memory.

Rendering performance scales well with multiple GPUs. When using a HP Z Workstation with multiple NVIDIA GPUs it is possible to design in SOLIDWORKS CAD and render in SOLIDWORKS Visualize with no noticeable slow down in performance.

SOLIDWORKS Visualize can also import Autodesk Alias®, Rhino®, SketchUp® and other CAD formats.



IMAGE COURTESY OF ZAMAK DESIGN ®

WORKSTATION TECHNOLOGY

What to look for when selecting a HP Z Workstation to partner SOLIDWORKS

GRAPHICS PROCESSING UNIT (GPU)

The trend to deliver more and more realism inside the viewport means the role of the GPU has never been more important.

A modern professional GPU is recommended to attain the highest levels of interactivity with models that display realistic reflections, shadows and complex lighting. Moreover, SOLIDWORKS RealView can only be used with a professional GPU, such as NVIDIA Quadro (available in HP Z Workstations).

GPU memory is an important consideration. For SOLIDWORKS, 4GB has become a minimum due to constantly increasing model data sets but, if the Quadro card is to be used for GPU rendering in SOLIDWORKS Visualize, 8GB or more is recommended.

NVIDIA Quadro GPUs are designed and built specifically for professional workstations. The GPUs have been optimized for performance and reliability when accelerating SOLIDWORKS and other 3D applications.

NVIDIA Quadro is available for all

levels of use. For SOLIDWORKS, the Quadro K2200 (4GB) is well suited to small assembly modeling from 100 to 300 components, while the Quadro M4000 (8GB) is better matched to more demanding workflows with 500 to 2,000 component assemblies, particularly when using 4K (3840 x 2160 resolution) displays, which put a greater load on the GPU.

When using a single GPU to render with NVIDIA Iray in SOLIDWORKS Visualize, the Quadro M4000 (8GB) or Quadro M5000 (8GB) are good options.

However, for best performance and workflow consider NVIDIA Multi-GPU technology.

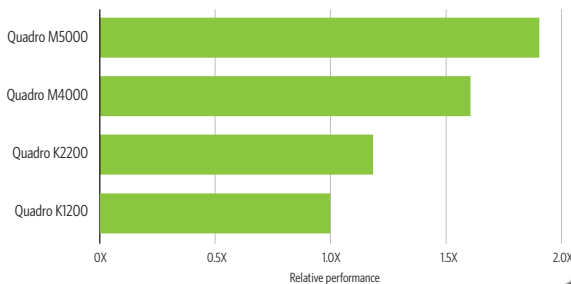
With two NVIDIA Quadro GPUs inside a HP Z Workstation users can still get interactive 3D graphics inside SOLIDWORKS, while simultaneously rendering scenes in SOLIDWORKS Visualize.

With three NVIDIA Quadro GPUs, as is possible in the HP Z840 Workstation, SOLIDWORKS Visualize scenes can render even quicker.

HP Z440 WORKSTATION



SOLIDWORKS Graphics Performance



The NVIDIA Quadro M4000 is a good option for those who work with complex models

Tests run on a workstation with Intel Xeon 3.6 GHz, 32GB RAM, running Win 7 64-bit SPL, driver version 34725. Performance testing completed with publicly available SPECviewperf® 12 benchmark information.



PROCESSOR (CPU)

The CPU is one of the most important components in a HP Z Workstation.

For SOLIDWORKS the clock speed of the CPU (GHz) is a top priority as it impacts all core operations and 3D graphics performance.

Multiple CPU cores will boost multi-

threaded processes, such as file open and save, boolean operations, and when using SOLIDWORKS Simulation. Four or six cores in a single CPU is a good choice.

To boost performance when rendering with SOLIDWORKS PhotoView 360 consider dual processors with multiple CPU cores.

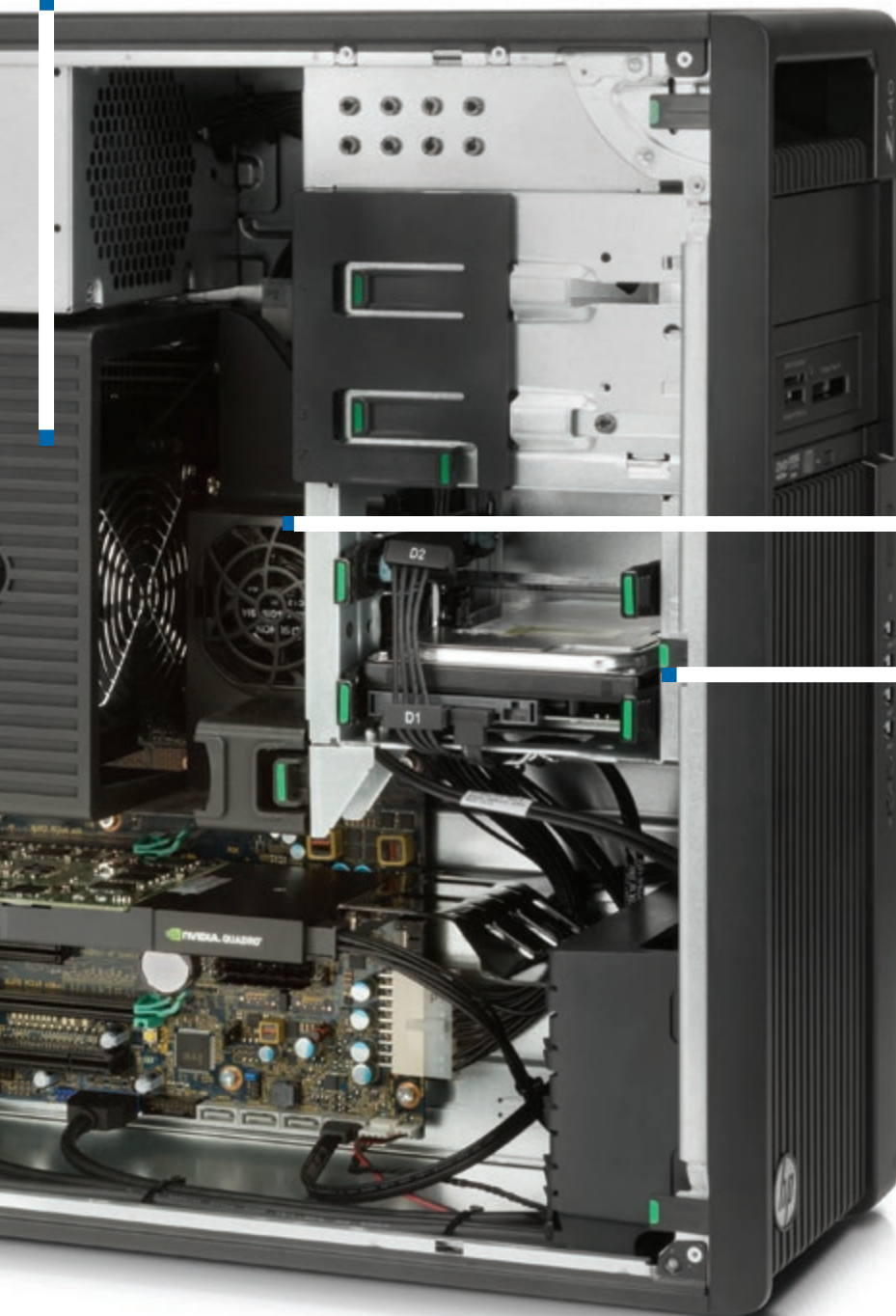
For certified performance, Intel® Xeon® processors are recommended.

MEMORY

16GB of memory is considered to be a good amount for mainstream SOLIDWORKS workflows while 32GB is recommended for particularly complex datasets.

With SOLIDWORKS it is important to consider that other applications — SOLIDWORKS Visualize, for example — may be running at the same time, which will also have an impact on memory use.

ECC memory, available in all desktop HP Z Workstations, is recommended for the highest quality results and it is important that memory is properly configured (pairs for two channels, quads for four channels).



The HP Z Turbo Drive is available in all HP Z Workstations.

STORAGE (DRIVES)

A Solid State Drive (SSD) is recommended for optimal performance. Complex datasets should load and save quicker and, as latency is low, the HP Z Workstation will feel more responsive. Random read / write access is also fast, which is particularly important when multi-tasking and swapping between applications.

SSDs traditionally come as 2.5-inch drives that use the SATA 3.0 interface. However, HP recently released its second generation HP Z Turbo Drive, an add-in PCI Express card that boasts up to 4x the sequential read performance of SATA 3.0.

While SSDs are superior to traditional hard disk drives (HDDs) in terms of performance, their cost per GB is still relatively high. As a result, an SSD is commonly ring fenced for operating system and applications, while a high capacity HDD drive is used to store data. However, with SSDs continuing to fall in price and increase in capacity the need for HDDs is diminishing.

HP Z WORKSTATIONS OPTIMIZED FOR SOLIDWORKS

HP Workstations deliver the performance, reliability, and application certifications required to accelerate product development workflows

HP offers a complete range of desktop and mobile workstations built for the challenges of product development—from part and assembly modeling with SOLIDWORKS to photorealistic renderings with SOLIDWORKS Visualize.

The HP Z Workstation family meets the full range of workstation needs—from

performance-driven computing and design work in space-constrained environments to extreme visualization with complex datasets.

HP ZBook Mobile Workstations offer high performance with exceptional battery life and feature a chassis inspired by aerospace craftsmanship and materials.



	HP Z240 SFF Workstation performance and reliability at starting prices that rival desktop PCs. SOLIDWORKS usage: Simple 3D assemblies.	HP Z240 High levels of performance and expandability in an accessible tool-free tower form factor. SOLIDWORKS usage: Complex 3D assemblies and visualization.	HP Z840 Dual-socket workstation delivers exceptional performance, industrial design, and tool-free serviceability. Large, complex 3D datasets, simulation, rendering (SOLIDWORKS Visualize).
Operating System	Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro-64) ¹	Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro-64) ¹	Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro-64) ¹
Processor	Intel® Core™ i7 6700 (3.4GHz, 4.0GHz Turbo, 4 Core) ²	Intel® Xeon® E3-1270 v5 (3.6GHz, 4.0GHz Turbo, 4 Core) ²	2x Intel® Xeon® E5-2687 v3 (3.1GHz, 3.5GHz Turbo, 10 Core) ²
Memory	16GB DDR4 2133 MHz RAM ^{3,4}	32GB DDR4 2133MHz RAM ^{3,4}	64GB DDR4 2133MHz ECC RAM ^{3,4}
GPU	NVIDIA® Quadro® K1200 (4GB)	NVIDIA® Quadro® M4000 (8GB)	Dual NVIDIA® Quadro® M6000 (12GB)
Storage	Z Turbo Drive 512GB ⁵	Z Turbo Drive 512GB and 1TB SATA ⁵	Z Turbo Drive 512GB and 1TB SATA ⁵

BRING DESIGNS TO LIFE WITH HP Z DISPLAYS

HP Z Displays offer outstanding image accuracy, exceptional adjustability, and mission-critical reliability optimized for professional use. Built with IPS panels, HP Z Displays deliver power savings over first-generation IPS technology and extra-wide viewing angles that foster collaboration.

The HP Z27n Display features a 27-inch 2560 x 1440 resolution while the HP Z24n Display features a 24-inch 1920 x 1080 resolution. For those that need to see as much design detail as

possible the HP Z27s Display offers UltraHD 3840 x 2160 resolution.

SOLIDWORKS can easily adapt to all of these different resolutions thanks to scalable vector-based icons introduced in the 2016 release. With release 2015 and before SOLIDWORKS icons on 4K displays could appear very small, making them hard to see.

HP Z Displays excel in advanced product development workflows. With complex SOLIDWORKS models the large, high-resolution screens make it easy to see minute details even when

“zoomed out” on a design.

For vivid renderings produced with SOLIDWORKS Visualize, consider the HP DreamColor 27x Studio Display. This true 10-bit display includes an integrated color calibration engine which means design visualisations are as close to real life as possible. Then, moving from the screen to presentation quality prints, HP DreamColor Displays can also be color calibrated to match photorealistic output from HP DesignJet large format printers.



	HP Z1 HP Z Workstation performance and reliability expertly designed into the back of a 27-inch diagonal beyond HD touch display. SOLIDWORKS usage: Boardrooms, for Design Review.	HP ZBook Studio G3 Mobile workstation redesigned for productivity on the go. Features 15.6-inch diagonal UHD+ display (3840 x 2160). SOLIDWORKS usage: Mobile design and presentation.	HP ZBook 15 / HP ZBook 17 HP's most powerful mobile workstations with incredible expandability. Available with QHD, FHD and optional DreamColor display. SOLIDWORKS usage: Mobile CAD, rendering, and simulation.
Operating System	Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro-64) ¹	Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro-64) ¹	Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro-64) ¹
Processor	Intel® Xeon® E3-1281v3 (3.7GHz, 4.1GHz Turbo, 4 Core) ²	Intel® Xeon® E3-1505M v5 (2.8GHz, 3.7GHz Turbo, 4 Core) ²	Intel® Xeon® E3-1505M v5 (2.8GHz, 3.7GHz Turbo, 4 Core) ²
Memory	32GB DDR3-1866 ECC RAM ^{3,4}	32GB DDR4 2133MHz ECC RAM ^{3,4}	32GB DDR4 2133MHz ECC RAM ^{3,4}
GPU	NVIDIA® Quadro® M2000M (4 GB)	NVIDIA® Quadro® M1000M (4 GB)	NVIDIA® Quadro® M3000M (4 GB)
Storage	256GB SSD and 1TB SATA ⁵	Z Turbo Drive 256GB ⁵	Z Turbo Drive 512GB and 1TB SATA ⁵

INNOVATION, QUALITY & RELIABILITY

HP continually pushes itself in every aspect of workstation design. For serviceability, its trademark tool-less design helps minimize downtime if users need to make upgrades and repairs.

HP Z Workstations feature single latch entry in order to get quick access to key components inside.

Fans, power supplies, optical drives and other components inside desktop HP Z Workstations feature green access points which makes them easy to remove and click back into place. Blind mate connectors on hard drive caddies mean users don't have to worry about power and data cables. Memory modules and graphics cards are located for easy access. Integrated handles and slide rails are built into the chassis to make it easy to move machines around the office.

HP Z Workstations have also been engineered to minimize fan noise produced by cooling fans. The HP Z840, for example, uses ducts to channel airflow over individual CPUs and memory banks to maximize cooling efficiency.

Meanwhile, HP ZBook Mobile Workstations feature the HP Duracase with magnesium-reinforced chassis, HP DuraFinish with brushed and smooth aluminum, latch-less design with precision aluminum-alloy hinges, backlight keyboard, chemically strengthened glass touchpad,



and go through MIL-STD 810G testing for drops, vibration, shock, dust, humidity, altitude, high and low temperature, and temperature shock.

HP Z Workstations feature green access points to help locate and service internal components

ACCESS & SHARE DESIGNS WITH HP REMOTE GRAPHICS SOFTWARE (RGS)

With HP Remote Graphics Software (RGS) it is possible to access your graphics-intensive workstation applications wherever you have a network connection, or share designs with your extended team. The software offers complete access to the power of a HP Workstation from any Windows or Linux computer, even a HP ElitePad tablet.

There are a number of different use cases for HP RGS. For real time collaboration across multiple sites it is possible to share your workstation screen with multiple users simultaneously for 'view only' or full interactive access.

HP RGS can also be used to support

workstation remote access across multiple offices. A company's workstation resources can be consolidated in a single location and the workforce can connect in from any computer at any location.

The software also provides flexibility for mobile workers while away from their desk — at home, on the shop floor, at client offices, or the boardroom.

With HP RGS 7.0 it is possible to access any CAD application on a HP ElitePad Windows 8 tablet. The desktop optimized user interface presents some challenges but RGS provides the control designers need without complicating the inherent simplicity of a touch screen.

This can be done with a 'virtual mouse'

that helps improve accuracy by using the entire tablet's screen as a trackpad instead of picking geometry directly. It is also possible to assign gestures to keyboard hot keys so controls can be invoked by a multi finger swipe or tap.

With HP RGS no data ever leaves the HP Workstation. Only pixel data is streamed which means huge CAD models or engineering datasets don't have to be moved between sites, which can be slow and can lead to sync issues. Project data also remains secure.

HP RGS is included as standard with HP Workstations. For set up, HP RGS sender and receiver software needs to be installed on workstation and client.

TUNE YOUR SYSTEM FOR SOLIDWORKS

HP Performance Advisor, a HP tool for performance optimization, delivers a simple, effective way to keep your HP Workstation operating at its peak potential.

A software wizard can take you from initial configuration and customization through the optimization of your system for SOLIDWORKS and other applications.

It can help ensure you are using the best certified graphics driver for your installed applications, optimized for performance and stability. It can also offer advice and apply BIOS settings. For example, enabling Intel Hyper-Threading⁶ to get maximum performance rendering with PhotoView 360 in SOLIDWORKS.

It can also help you gain a quick and accurate understanding of your entire system in one simple, interface, and then help identify bottlenecks by tracking use of memory, CPU and other resources. This can help ensure maximum performance throughout the entire life of your HP Z Workstation.

HP Performance Advisor is included with HP Z Workstations.



HP Performance Advisor features an interactive block diagram to give a crystal clear picture of all the components inside your HP Z Workstation.

HP & NVIDIA SOLIDWORKS CERTIFICATION

Product development professionals demand performance and reliability from their workstation hardware. HP Z Workstations undergo a rigorous testing process before they are proven and certified by Dassault Systèmes SOLIDWORKS and HP.

HP's application certification process is designed to ensure users receive the best possible experience when running SOLIDWORKS on HP Z Workstations.

A key part of this process is 3D graphics and here HP performs in-depth graphics driver quality testing and performance measurement. If graphics issues are identified then HP works with NVIDIA and Dassault Systèmes SOLIDWORKS to resolve them, helping protect users' investment in software and HP hardware.

HP DESIGNJET PRINTERS

HP DesignJet printers combine ease-of-use with high-quality printing and proven reliability. From individual to enterprise workgroup product development environments, the family of HP large format printers can help streamline design and engineering workflows, offering printing solutions that deliver high-quality applications fast. And with HP Mobile Printing capabilities, it's easier than ever to print on-the-go.

HP DesignJet T830 Multifunction Printer: Print, scan, copy, and share with this robust, compact 36-inch Wi-Fi true integrated multifunction printer, ideal for use in offices and manufacturing sites.

At half the size of other 36-inch MFPs (H x W x L),⁷ this machine also delivers prints three times faster than previous HP models. Easy operation helps users save time with a front-loading media roll and built-in A3/B+ tray, wireless connectivity,⁸ and a full-color 4.3-inch (109-mm) touchscreen. With HP Mobile Printing, you can easily scan, share, and print right straight from your Apple® or Android™⁹ smartphone or tablet wherever you are. Use integrated scanning to capture and share feedback, enable archiving and more. The printer creates its own Wi-Fi network for easy connectivity with Wi-Fi Direct.

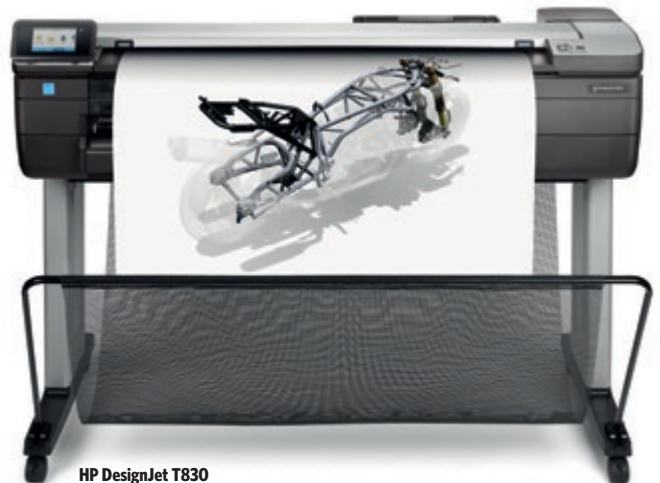
HP DesignJet T930 Printer: For design and engineering professionals, including small product development teams, this 36-inch, 6-ink printer helps boost team productivity and enhance security and is ideal for professional-quality CAD and GIS applications. Six Original HP inks produce a wide color gamut ideal for color graphics—gray and photo black inks produce precise line accuracy and true neutral grays. Productivity can be enhanced with an integrated 50-page output stacking tray, fast processing, management features, and HP Mobile Printing, which allows you to print directly to your printer from a smartphone, tablet, or USB drive.⁸ The machine also includes security features to help safeguard information.

HP DesignJet T1530 Printer & HP DesignJet T2530 Multifunction Printer:

For design and engineering advanced workgroups in enterprise environments, the dual-roll 36-inch, 6-ink printer and MFP are ideal for professional-quality CAD and GIS applications. Produce fine line quality and up to 2400 dpi resolution.

Two rolls help save time with easy front loading and automatic skew correction—work with two media types/sizes and smart switching. Get flat, collated prints with the integrated 50-page output stacking tray. Security protocols like IPSec, 802.1x, SNMPv3, and PIN printing help safeguard your information. Maximize workgroup productivity and enterprise security with the HP DesignJet T1530 Printer. Add print, scan, copy, and share functionality with the HP DesignJet T2530 Multifunction Printer.

www.hp.com/go/designjetoffice



HP DesignJet T830
Multifunction Printer

LEARN MORE HP.COM/GO/SOLIDWORKS



Learn how Sage Cheshire Aerospace, the company behind the Red Bull Stratos space diving project, depends on SOLIDWORKS running on HP Z Workstations with NVIDIA Quadro GPUs.



Create better designs with Dassault Systèmes and HP Workstations.

With HP and Dassault Systèmes, you can be confident that you've picked a winning combination. Just consider the unique HP and Dassault Systèmes relationship, plus HP-optimized workstations for CATIA, SOLIDWORKS, and other Dassault applications. HP Workstations have numerous certified applications, unique innovations, and a complete range of HP solutions.

For more information, go to hp.com/go/solidworks

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1. Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows functionality. See microsoft.com.
2. Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering is not a measurement of higher performance.
3. Each processor supports up to 2 channels of DDR3 memory. To realize full performance at least 1 DIMM must be inserted into each channel.
4. Intel Xeon E3, Intel Core i3 and Intel Pentium processors can support either ECC or non-ECC memory. Intel Core i5 and i7 processors only support non-ECC memory.
5. For hard drives and solid state drives, 1 GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB of system disk (for Windows 7 or Windows 10) is reserved for system recovery software.
6. Intel® Hyper-Threading - The hyper-threading feature is designed to improve performance of multi-threaded software products; please contact your software provider to determine software compatibility. Not all customers or software applications will benefit from the use of hyperthreading. Go to intel.com/info/hyperthreading for more information, including which processors support HT Technology.
7. The HP DesignJet T830 Multifunction Printer is the most compact 36-inch device performing large-format print/scan/copy functions and is at least half the size (without the legs) based on H x W x L specifications published as of September 2015.
8. Local printing requires mobile device and printer to be on the same network (usually Wi-Fi access points bridge wireless to wired connections) or have a direct wireless connection. Wireless performance is dependent on physical environment and distance from access point. Wireless operations are compatible with 2.4 GHz operations only. Remote printing requires an Internet connection to an HP web-connected printer. Wireless broadband use requires separately purchased service contract for mobile devices. Check with service provider for coverage and availability in your area. See www.hp.com/go/designjetmobility for more details.
9. The HP Print Service Plugin app is available for Android™ mobile devices running Android™ v.4.4 or later. The app is free from Google Play.

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