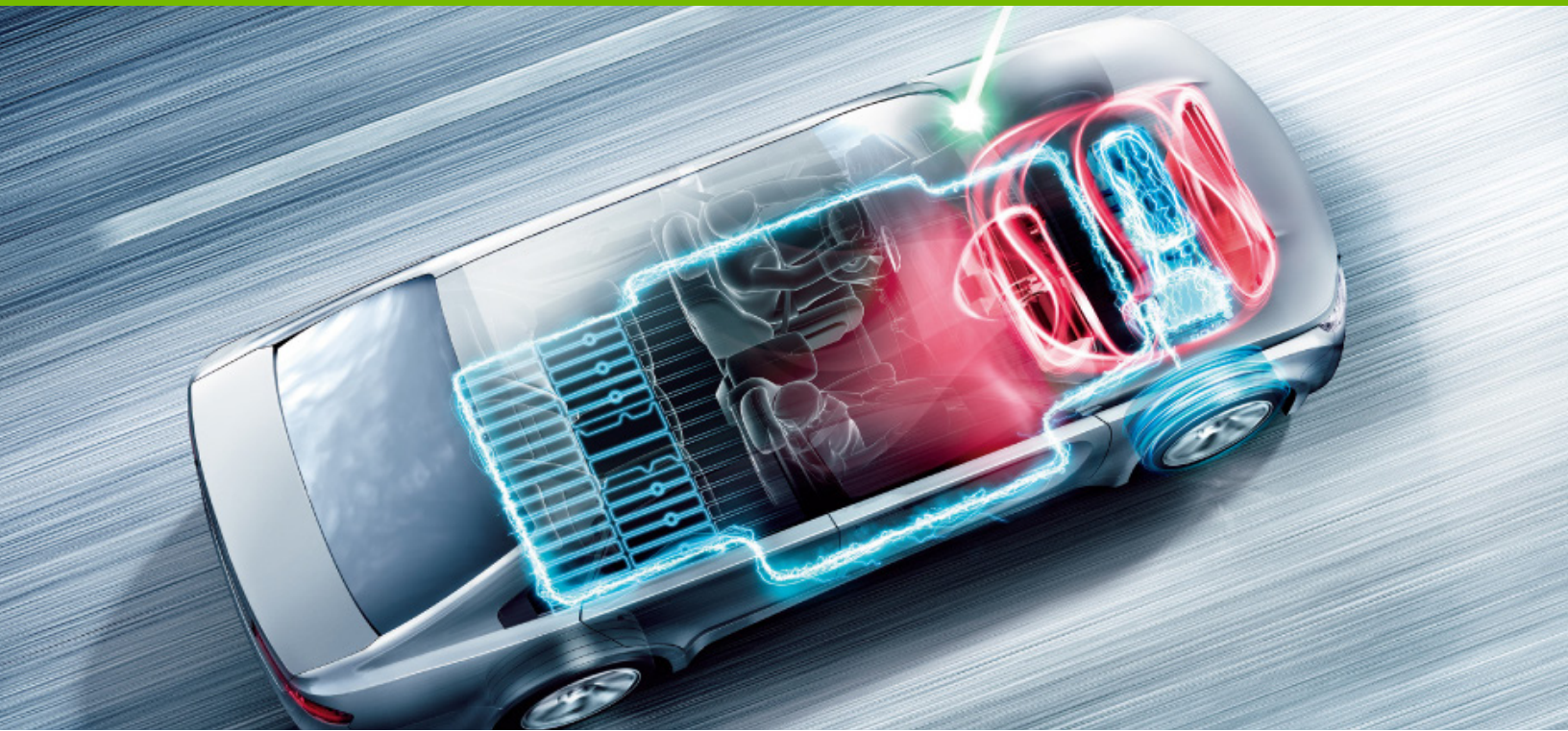


# DRIVE BETTER MANUFACTURING PROCESSES WITH VIRTUALIZED GRAPHICS APPLICATIONS.

Use NVIDIA Virtual GPU Solutions to Gain Creative Freedom, While Compressing Design Cycles and Lowering Costs



**NVIDIA.**

Finding profit in the automotive industry isn't easy. Few industries are as heavily regulated or as impacted by cyclical demand and changing consumer tastes. To succeed, motor vehicle manufacturers must lower capital expenditures, chase new markets, and respond with agility to technological disruptions around every corner.

Automotive companies are becoming more reliant on IT for strategic decision-making as well as tactical operations, and that includes the adoption of virtual desktop infrastructure (VDI) for key design and engineering applications. Automotive design groups face growing pressure to rapidly deliver vehicle innovations, respond to market demands, and support an ever-expanding product range. Meanwhile, remote workers, external suppliers, and partners require faster and better access to data.

NVIDIA virtual GPU solutions make it easier for automakers to build and connect collaborative teams worldwide, scale compute resources as needed, safeguard data and protect intellectual property, and facilitate mobility. These benefits help firms stay competitive and agile in a business environment that demands efficiency and rewards rapid response to change.

## TRANSFORM YOUR WORKFLOWS FOR GREATER EFFICIENCY.

NVIDIA delivers virtual GPU technology that helps end-user devices work as well as traditional workstations, while improving productivity and streamlining management and maintenance. Many leading creative and technical professionals trust NVIDIA® Quadro® Virtual Data Center Workstation (Quadro vDWS) software for design applications—and NVIDIA GRID® software for office productivity applications—to accelerate workflows and provide access to trusted tools anywhere, on any device.

- > **Enhanced Collaboration—Bring in Experts from Around the World.** Fierce competition for designers, data scientists, software engineers, and other critical team members makes it imperative for automakers to pull from as wide a talent pool as possible. Quadro vDWS enables seamless collaboration for teams in geographically dispersed locations with no performance degradation. NVIDIA virtual GPU technology also makes it possible to quickly scale up resources in emerging markets, where much of the industry's growth potential exists today.
- > **Improved Data Protection—Safeguard Design Secrets and Eliminate Data Loss and Corruption.** NVIDIA virtual GPU technology helps automotive manufacturers protect valuable assets by securing design files in the data center. Teams around the world can work with confidence, knowing that files are protected and that they're working seamlessly with other collaborators on a single master data file that represents the current version of every project.
- > **Lower IT Costs—Save on Hardware, Power, Staff Time, and More.** With NVIDIA virtual GPU technology, onboarding that used to take hours now only takes a few minutes. And because virtual machines can be up and running rapidly with no special equipment, you can respond more quickly to changing project requirements and spin up additional resources on demand. Employees who once required multiple physical workstations can now use one virtual workstation to access all their apps and data. Troubleshooting is more efficient too, and upgrades can be made with no disruption or data loss. What's more, less hardware means lower power consumption and less maintenance.



### WHAT IS GPU VIRTUALIZATION?

GPU virtualization enables every virtual machine to get the benefits of a GPU just like a physical desktop has. Because work that was typically done by the CPU has been offloaded to the GPU, the user has a much better experience and more users can be supported.

- > **No Downtime—Keep Your Projects Moving Forward 24/7.** Because teams can utilize the same pool of virtual workstation resources in shifts, design and engineering tasks can be completed around the clock with no idle resources. Virtual GPUs also facilitate mobility, while providing access to apps without the need for a physical workstation.

## NVIDIA VIRTUAL GPU SOLUTIONS




<p><b>Virtualization with NVIDIA GRID and NVIDIA Tesla GPUs</b></p> <p>The <b>NVIDIA GRID Virtual PC (GRID vPC) and Virtual Applications (GRID vApps)</b> software are positioned for general-purpose VDI across all sectors of the automotive industry.</p> <p><b>BENEFITS</b></p>	<p><b>Virtualization with NVIDIA Quadro vDWS and Tesla GPUs</b></p> <p><b>Quadro vDWS</b> is ideally positioned for design and engineering teams that work on complex and sensitive files from multiple locations.</p> <p><b>BENEFITS</b></p>
<p>Supports increasing graphical requirements of modern office productivity applications</p> <p>Supports up to two 4K monitors or four HD monitors for increased productivity</p> <p>Cost-effectively scales VDI across your organization for as little as \$2 per user per month<sup>1</sup></p> <p>Lowers IT management costs</p> <p>Enforces security in the data center</p> <p>Increases employee and contractor mobility</p> <p>Centrally manages business continuity and disaster recovery</p>	<p>Supports up to four 4K monitors and large frame buffer sizes for increased productivity</p> <p>Enforces security in the data center</p> <p>Lowers IT management costs</p> <p>Increases mobility</p> <p>Centrally manages business continuity and disaster recovery</p> <p>Ensures less downtime, even during maintenance with live migration</p>
<p><b>COMMON APPLICATIONS</b></p> <p>Adobe Creative Cloud, Microsoft Office</p>	<p><b>COMMON APPLICATIONS</b></p> <p>ANSYS Discovery Live, ANSYS Fluent, ANSYS Mechanical, Autodesk AutoCAD, Autodesk Alias, Autodesk VRED, Dassault Systèmes CATIA, Dassault Systèmes SIMULIA, Dassault Systèmes SOLIDWORKS, McNeel Rhino, PTC Creo, Siemens NX, Siemens Teamcenter</p>

## TESTED AND CERTIFIED FOR ENTERPRISE-CLASS RELIABILITY

NVIDIA virtual GPU solutions set the industry standard for virtualized creativity. To maximize performance—and to get the best possible experience from your IT investment—NVIDIA Quadro professional graphics solutions are tested and certified by all the leading workstation OEMs and have received independent software vendor (ISV) certifications for more than 100 professional applications and IT management tools. What’s more, Quadro software drivers are designed for stability and long lifespans.

<sup>1</sup> Assumes cost of subscription, NVIDIA GRID software, and hardware, with three-year amortization of two Tesla M10 cards supporting 87 GRID vApps users.

## CUSTOMER EXAMPLES

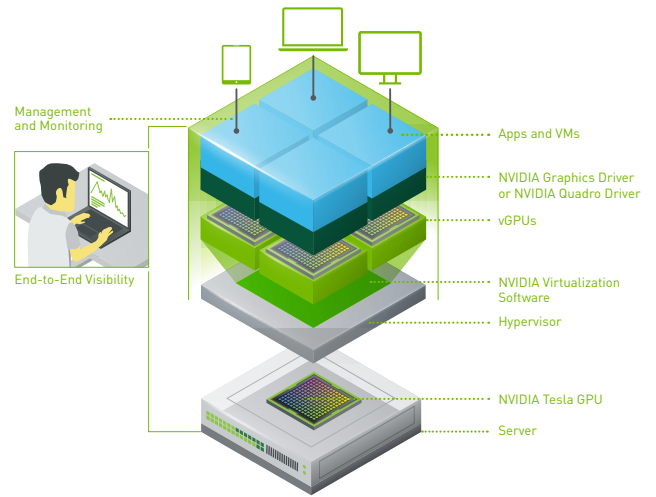
 <p><b>DENSO</b> Crafting the Core</p>		
<p><b>DENSO International America</b> U.S., Canada, and Mexico Denso Corporation, Aichi, Japan</p>	<p><b>Honda R&amp;D Co. Ltd.</b> Tochigi, Japan</p>	<p><b>Tofaş</b> Istanbul, Turkey</p>
<p>One of the largest global automotive suppliers, DENSO deployed an NVIDIA Quadro vDWS solution to reduce the management complexity of physical workstations with six different boot environments. With NVIDIA technology in place, DENSO's IT team delivered virtual workstations that performed just like physical workstations when dealing with large datasets and graphics-intensive software. Users were so satisfied with the new virtual workstation environment that the firm experienced a 250 percent uptick in usage almost immediately.</p>	<p>Honda deployed next-generation engineering virtual desktop infrastructure (VDI) powered by NVIDIA Quadro vDWS to enhance productivity and operational efficiency in their R&amp;D and production centers. With graphics acceleration in the data center, NVIDIA Quadro vDWS enabled the team to use computer-aided design (CAD) and computer-aided engineering (CAE) applications on any device—even low-cost laptop computers. Additionally, Honda IT is now able to allocate the right level of performance for power users and knowledge workers alike. Across all Honda group companies, more than 4,000 VDI systems are experiencing better application performance and user experience, as well as faster access to data and enhanced security of IP.</p>	<p>Turkey's industrial giant, one of Fiat Chrysler's three worldwide strategic manufacturing centers, explored a VDI solution to increase worker mobility. The firm used NVIDIA virtual GPU technology to build out its VDI, which includes dedicated GPUs for designers and pooled GPUs for cost engineers and project managers. IT overhead was reduced thanks to ease of scaling, simplified resource management, and enhanced data security. And while upfront per-user costs haven't changed much, the ongoing reduction in operating and management costs delivers significant overall savings.</p>

## KEY AUTOMOTIVE USER GROUPS

			
<p><b>USE CASES</b></p>	<p>Engineers, designers, CAD/CAE users</p> <p>For remotely viewing and editing very large 3D models and images</p>	<p>Marketing departments, creative and design professionals, illustrators</p> <p>For general-purpose VDI using virtualized design and creative applications such as Adobe® Creative Cloud®</p>	<p>Accounting, finance, and human resources departments</p> <p>For general-purpose VDI using virtualized Windows 10 or Linux desktops and common office productivity applications</p>
<p><b>RECOMMEND</b></p>	<p>NVIDIA Quadro vDWS on NVIDIA Tesla® P4, P40, M60, P100, or V100; or P6 for blade-server form factors (supports up to four 4K displays)</p>	<p>NVIDIA GRID vPC and GRID vApps on Tesla M10 or P6 (supports up to four HD or two 4K displays)</p>	<p>NVIDIA GRID vPC and GRID vApps on Tesla M10 or P6 (supports up to four HD or two 4K displays)</p>

# HOW NVIDIA VIRTUAL GPU<sub>s</sub> WORK

In a VDI environment powered by NVIDIA virtual GPUs, NVIDIA virtual GPU software is installed at the virtualization layer along with the hypervisor. This software creates virtual GPUs that enable every virtual machine (VM) to share the physical GPU installed on the server. The NVIDIA virtualization software includes a graphics driver for every VM. Quadro vDWS includes, for example, the powerful Quadro driver. Because work that was typically done by the CPU is offloaded to the GPU, the user has a much better experience, and demanding engineering and creative applications can now be supported in a virtualized, cloud environment.



# WHAT MAKES NVIDIA VIRTUAL GPU<sub>s</sub> POWERFUL

## EXCEPTIONAL USER EXPERIENCE

Ultimate user experience, with the ability to support both compute and graphics workloads for every virtual GPU (vGPU)



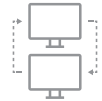
## PREDICTABLE PERFORMANCE

Consistent performance with guaranteed quality of service, whether on premises or in the cloud



## BEST USER DENSITY

Industry's highest user-density solution with support for up to 24 virtual desktops per physical GPU. Lower total cost of ownership (TCO) with up to eight vGPU profiles for the most flexibility to provision resources to match your users' needs



## OPTIMAL MANAGEMENT AND MONITORING

End-to-end management and monitoring for real-time insight into GPU performance. Broad partner integrations so you can use the tools you know and love



## CONTINUOUS INNOVATION

Regular cadence of new software releases to ensure you stay on top of the latest features and enhancements



## BROADEST ECOSYSTEM SUPPORT

Support for all major hypervisors. Most extensive portfolio of professional app certifications with Quadro drivers



For more information, visit [www.nvidia.com/virtualgpu](http://www.nvidia.com/virtualgpu)

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