

# EXPERIENCE REAL-TIME COLLABORATION IN AEC

Increase Mobility, Boost Productivity,  
and Improve Version Control with  
NVIDIA Virtual GPU Solutions



In the architecture, engineering, and construction (AEC) industry, firms often have multiple global and field offices that need to routinely collaborate on individual projects. Widely dispersed engineers and architects, as well as external vendors and contractors, form teams that touch all parts of a project cycle, from design to construction.

The nature of AEC work makes collaboration and mobility essential, but the PC hardware required to run high-end design and AEC applications makes mobility complex and difficult. To meet the needs of today's distributed AEC teams, firms now turn to virtual workstations to run resource intensive applications for processing large amounts of data. Engineers in satellite offices and project trailers previously might wait up to an hour for models to load and open on their local workstations—impacting productivity and reducing billable hours. With virtual workstations, models can be accessed efficiently and securely.

Complicating matters is the issue of version control. Coordinating across locations and servers to make sure everyone has the latest version of a design is a slow and arduous process that increases potential for confusion and error. AEC firms struggle to transfer project files from local workstations to the data center to ensure version control and improve disaster recovery capabilities. Therefore, AEC firms must look to solutions that improve collaboration and mobility, while also providing robust support for version control, to enhance productivity and quality.

- > Integrated Project Delivery will bring about the need for greater collaboration in all phases of projects.<sup>1</sup>
- > Travel and IT costs to support this distributed model can quickly add up, causing project delays and budget overruns.
- > AEC firms are trending towards more cloud-based solutions to enable better collaboration.<sup>2</sup>
- > Gaps in collaboration and data version control cause approximately 15% to 17% of additional construction rework costs.<sup>3</sup>

## NVIDIA VIRTUALIZATION TECHNOLOGY ACCELERATES REAL-TIME COLLABORATION FOR WIDESPREAD AEC TEAMS

AEC firms are turning to virtualization solutions to enable distributed teams to collaborate on projects across the globe. However, graphics-intensive applications, combined with workstation performance and network limitations, mean that loading times can be excessive. This results in lost productivity and billable hours. By adding NVIDIA virtual GPU (vGPU) solutions to their VDI environments, AEC firms are realizing significant benefits, including real-time collaboration with dispersed teams and external partners, improved productivity, and robust version control. The value of virtual GPUs has been extensive:

### WHAT IS GPU VIRTUALIZATION?

GPU virtualization enables every virtual machine to get the same GPU benefits as a physical desktop. 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

- > **Collaborate Anywhere on Any Device.** Shifting design models and moving data off physical workstations into the data center not only secures mission-critical designs, but also speeds the design process. Designers and engineers have the freedom to use the device of their choice to access fully capable 3D virtual workstations with no compromise in performance or user experience. Employees gain mobility and real-time collaboration capabilities through instant access to the applications and data they need from anywhere—at the office, on the road, on the construction site, or even at home.
- > **Increase Productivity with Real-Time Performance.** AEC firms can deliver superior graphics performance to architects and engineers on virtual desktops from the data center. Users get the same responsive experience in a virtualized environment as they would expect from a physical workstation, viewing and working with large 2D and 3D models without lag or delay. This translates to increased efficiency and productivity, reducing the risk of project delays and lost billable hours.
- > **Ensure Version Control for Greater Consistency.** As design and engineering resources become more dispersed, maintaining version control of data and files becomes increasingly difficult. With NVIDIA vGPU solutions, AEC firms no longer need to worry about errors and rework caused by multiple copies of data residing on local workstations. Centralizing designs in the data center allows for greater consistency and control over design changes, resulting in improved quality and enhanced security.



## NVIDIA VIRTUAL GPU SOLUTIONS

### Virtualization with NVIDIA Quadro® vDWS and NVIDIA® Tesla® GPUs

The NVIDIA **Quadro Virtual Data Center Workstation** (Quadro vDWS) enables access to 3D AEC applications in a virtualized environment.

#### BENEFITS

- Data version control for more consistency
- Less rework due to improved collaboration
- More secure access for external suppliers and contractors
- Data and designs more secure
- Lower IT management costs
- Applications perform faster due to reduced data movement
- Extend accessibility to project files secured in the data center
- Increased employee mobility
- Business continuity and disaster recovery managed centrally
- Cloud ready

#### COMMON APPLICATIONS

AECOsim Building Designer, Allplan, ANSYS Fluent, Autodesk 3ds Max, Autodesk AutoCAD, Autodesk Revit, Bentley MicroStation, NEMETSCHEK, SketchUp

### Virtualization with NVIDIA GRID® and NVIDIA Tesla GPUs

**NVIDIA GRID vPC/vApps** are positioned for general-purpose VDI in AEC firms for knowledge workers in finance, human resources, marketing and other users of office productivity applications.




#### BENEFITS

- Virtualized graphics design applications for an increasingly mobile workforce
- Support for increasing graphical requirements of Windows 10 and modern productivity applications
- Support for up to four HD or two 4K resolution monitors for increased productivity
- Cost-effective solution to scale VDI across your organization
- Lower IT management costs

#### COMMON APPLICATIONS

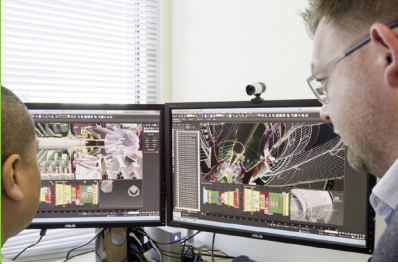

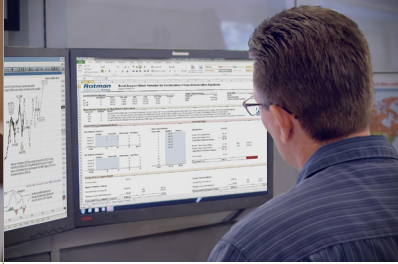
Adobe Creative Cloud, Microsoft Office

## CUSTOMER EXAMPLES

		
<b>CannonDesign</b> Chicago, IL, USA	<b>Browning Day Mullins Dierdorf (BDMD)</b> Indianapolis, IN, USA	<b>Whitney Bailey Cox &amp; Magnani, LLC (WBCM)</b> Baltimore, MD, USA
<p>CannonDesign deployed state-of-the-art VDI powered by NVIDIA virtual GPUs to unify its global workforce and enable seamless collaboration. Leveraging GPU-enabled secure, digital workspaces that rival physical workstations, the company's VDI now meets the needs of knowledge workers, designers, and engineers while enabling higher density with twice the performance. The biggest payoff has been savings of 13.5 hours per week in employee time, equating to approximately \$2,500 per week in billable hours. The company has also seen an 85% reduction in server space.</p> <p><a href="#">Learn more &gt;</a></p>	<p>BDMD replaced aging, underpowered workstations with a VDI environment powered by NVIDIA Tesla P4 and Quadro vDWS to keep pace with the demands for collaboration and efficiency while ensuring the firm's engineers and designers had access to the tools they needed to be productive. Taking advantage of the management and monitoring tools provided with Quadro vDWS was a game changer for BDMD. Now, IT can immediately make simple updates during the workday without disrupting user VMs. Previously, this work would have to be scheduled in the late evenings when users were offline.</p> <p><a href="#">Learn more &gt;</a></p>	<p>WBCM deployed a VDI powered by NVIDIA vGPUs to deliver consistently great user experiences and improve collaboration for remote workforces. WBCM is able to deliver fully 3D-capable virtual workstations that follow employees, wherever they are. And, WBCM's VDI allows all employees, not just engineers and designers, to take advantage of graphics acceleration by enabling high quality, no-compromise Windows 10 user experiences. Plus, virtualization has helped WBCM keep projects on track and enhance productivity by letting remote workers access designs from the job site, while ensuring version control and added security through centralization of data.</p> <p><a href="#">Learn more &gt;</a></p>

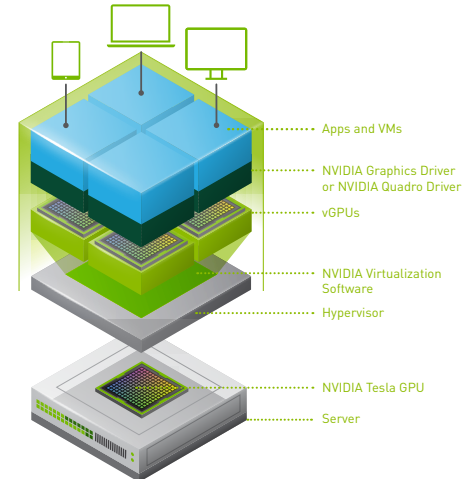


## KEY AEC USER GROUPS

			
	Architects, Engineers, Designers	Marketing, Creative, Design, Illustrators	Accounting, Finance, Human Resources
<b>USE CASES</b>	For remotely viewing and editing very large 3D models and images	For general-purpose VDI, using virtualized design and creative apps such as Adobe Creative Cloud	For general purpose VDI, using virtualized Windows 10 and common office productivity apps
<b>RECOMMEND</b>	Quadro vDWS on Tesla P4, P40, P100, V100, M60, or P6 (supports up to four 4K displays)	GRID vPC/vApps on Tesla M10 or P6 (supports up to four HD or two 4K displays)	GRID vPC/vApps on Tesla M10 or P6 (supports up to four HD or two 4K displays)

## HOW NVIDIA VIRTUAL GPU WORKS

In a VDI environment powered by NVIDIA virtual GPU, the NVIDIA virtual GPU software is installed at the virtualization layer along with the hypervisor. This software creates virtual GPUs that let every virtual machine (VM) share the physical GPU installed on the server. The NVIDIA virtualization software includes a graphics driver for every VM. Quadro vDWS, for example, includes 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 and cloud environment.



# WHAT MAKES NVIDIA VIRTUAL GPU POWERFUL

## EXCEPTIONAL USER EXPERIENCE

Superior performance, with the ability to support both compute and graphics workloads for every vGPU



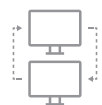
## PREDICTABLE PERFORMANCE

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



## BEST USER DENSITY

The industry's highest user density solution, with support for up to 24 virtual desktops per physical GPU, plus lower TCO with up to 8 vGPU profiles for the most flexibility to provision resources to match your users' needs



## OPTIMAL MANAGEMENT AND MONITORING

End-to-end management and monitoring that delivers real-time insight into GPU performance, as well as broad partner integrations so you can use the tools you know and love



## CONTINUOUS INNOVATION

Regular cadence of new software releases that ensures you stay on top of the latest features and enhancements



## BROADEST ECOSYSTEM SUPPORT

Support for all major hypervisors and the most extensive portfolio of professional apps certifications with Quadro drivers



Supermicro SuperServer  
SYS-2029U-E1C1T

Supermicro High Performance VDI Solutions. Designed for NVIDIA® Virtual GPU Software.

- Dual Intel® Xeon® Processor Scalable Family (Skylake-SP) with 2 UPI up to 10.4 GT/s
- Up to 3TB 3DS ECC RDIMM/LRDIMM; DDR4 up to 2666MT/s, in 24 DIMM slots
- 1 PCI-E 3.0 x16(FH, 10.5"L); 5 PCI-E 3.0 x8(FH, 10.5"L); 1 PCI-E 3.0 x8(LP); 1 PCI-E 3.0 x8(internal LP)
- 2x 10GBase-T ports with Intel® X540 Ethernet Controller; 3 USB 3.0 ports(2 rear, 1 Type A); 1 Serial Port
- 24 Hot-swap 2.5" Drive Bays; 24 SAS3 ports support via Expander and AOC; Optional drive support: 20 SAS3 + 4 SAS3/ NVMe; Optional 2 Rear Hot-swap 2.5" Drive Bays
- 1000W Redundant Power Supplies with PMBus



### About Super Micro Computer, Inc. (SMCI)

Supermicro (SMCI), the leading innovator in high-performance, high-efficiency server technology is a premier provider of advanced server Building Block Solutions® for Data Center, Cloud Computing, Enterprise IT, Hadoop/Big Data, HPC and Embedded Systems worldwide. Supermicro is committed to protecting the environment through its "We Keep IT Green®" initiative and provides customers with the most energy-efficient, environmentally-friendly solutions available on the market.

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## SOURCES

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3. Construction Industry Institute. (1989, May 1). Retrieved from <https://www.construction-institute.org/resources/knowledgebase/best-practices/quality-management/topics/rt-010/pubs/rs10-2>

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