Deliver High-Performance Virtual Desktop Experiences

Accelerate 3D Graphics with Cisco, Citrix, and NVIDIA

In collaboration with:

NVIDIA   **CITRIX®**

Highlights

- Built on the industry's fastest-growing rack and blade server solution and a leading virtualization platform
- Offers improved productivity for an expanded user base, including graphics-intensive workstations demanding high-quality 3D rendering
- Accesses NVIDIA GRID GPUs through the integration of Citrix HDX 3D Pro and NVIDIA GRID software
- Includes support for vGPUs, dedicated-mode (GPU pass-through) GPUs, and shared-mode GPUs
- Delivers an uncompromised and rich user experience that scales easily
- Can be delivered within the Cisco UCS managed environment, expanding Cisco UCS differentiation to graphics-intensive use cases
- Provides an exceptional price-to-performance ratio that enables you to expand your deployments for business demands

Cisco® Desktop Virtualization Solution with Citrix XenDesktop and NVIDIA GRID technology accelerates 3D graphics to any device anywhere.

The old way of working isn't working anymore. Although high-end dedicated graphics workstations are commonly used by product design and manufacturing teams, clinicians, animators, video editors, and scientists, these expensive platforms tie people to their desks. New solutions must support a mobile and globally distributed workforce, provide ubiquitous fast access to accelerated graphics, and maintain corporate and personal data security. That's why many organizations are shifting from a desktop-based environment to one based on desktop virtualization.

Virtual desktops typically render graphics using the CPU power in data center servers, which can slow desktop workload performance when applications are graphics intensive. Although general-purpose CPUs are excellent for many types of processing, graphics processors with parallel-processing capabilities are best for graphical rendering. With Cisco Unified Computing System™ (Cisco UCS®), Citrix XenDesktop and XenApp software, and NVIDIA GRID graphics processors, you can deliver a rich user experience to users anywhere and on any device. This centralized approach increases worker productivity and improves the user experience while simplifying desktop maintenance and management.

High-End Graphics Anywhere

For users of graphics-intensive applications to be most productive, your IT infrastructure must deliver a rich experience for every type of tool, from enterprise applications and corporate services to powerful, special-purpose applications such as Autodesk Inventor and 3ds Max, Dassault CATIA, Adobe Premiere Pro and Illustrator, and advanced magnetic resonance imaging (MRI) and computed tomography (CT) with high-end rendering requirements. If you currently use

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a traditional approach to desktop virtualization, your users are likely frustrated by poor application responsiveness—and the lack of shared graphics processing unit (GPU) solutions has likely negatively affected the economics of your virtual desktop deployments.

The Solution

The combination of Cisco UCS, Citrix XenDesktop, and NVIDIA GRID gives your workers access to their Microsoft Windows and Linux desktops. They can use their graphics-intensive applications and rich environments in a virtualized desktop environment without sacrificing the level of interactivity that they've come to expect from their desktop workstations.

With this solution, NVIDIA GRID graphics cards installed in Cisco UCS blade server chassis or rack servers perform all the graphics processing. This approach lets users access their applications and files using Citrix XenDesktop and XenApp clients on any device that they choose and experience highly responsive graphics rendering. When you need to scale your solution, you can add graphics accelerator cards to the blade server chassis or connect a multiple-slot PCI expansion chassis to provide your rack servers with access to additional graphics accelerator cards.

A Choice of Deployment Options for Rich User Experiences
Depending on the graphics-processing requirements of applications, your

IT staff can assign each worker a dedicated GPU for high-end graphics acceleration of virtual desktops, a virtual GPU (vGPU) shared across multiple virtual applications, or a vGPU shared across multiple virtual desktops (Figure 1).

With a dedicated GPU, the virtual machine has direct access to the GPU and provides full API support for OpenGL 4.3; Microsoft DirectX 9, 10, and 11; and NVIDIA CUDA 5.0. Alternatively, users can share a GPU across virtual machines with API support for DirectX 9 or OpenGL 2.1. With a vGPU, multiple virtual machines use physical GPUs installed locally in the hypervisor, and the virtual machines or users share the GPU resources
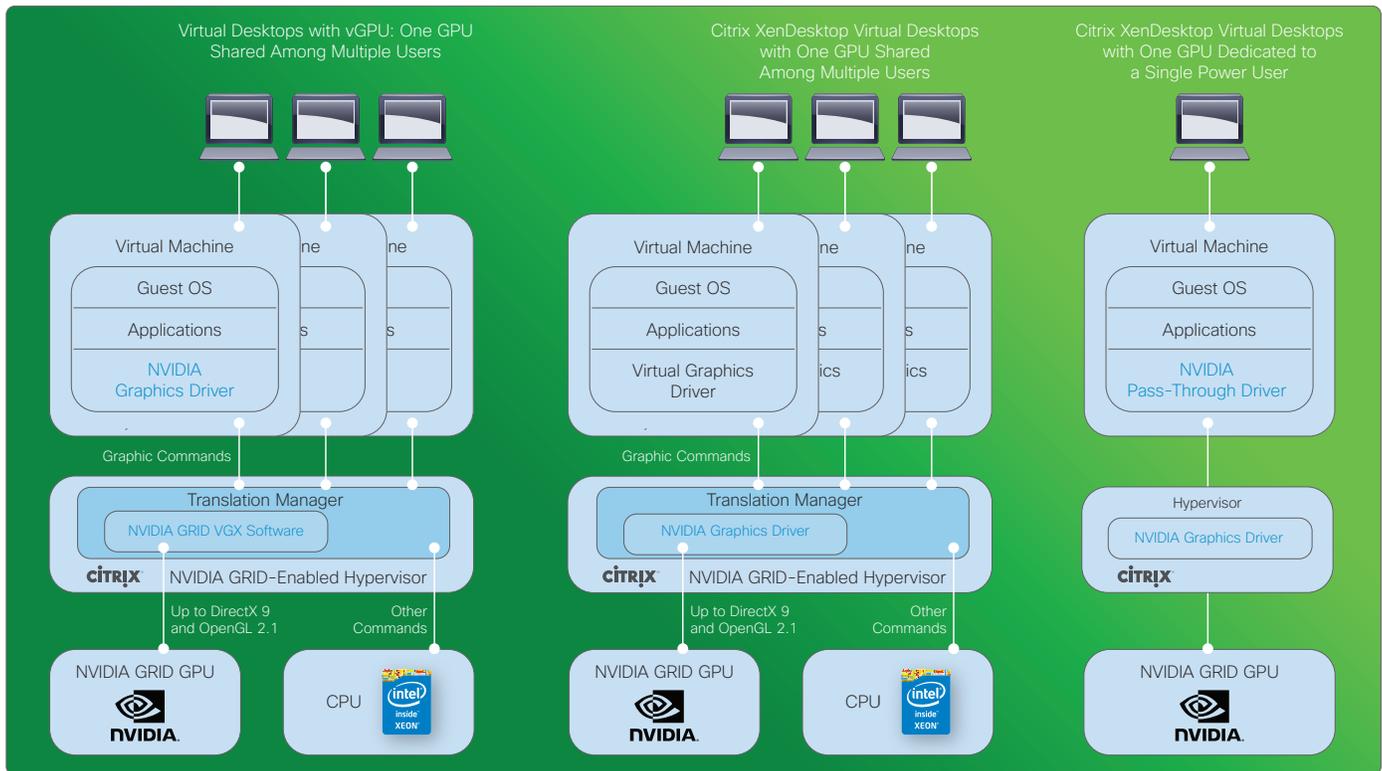

Figure 1. Several Virtual Desktops Can Share One GPU, or You Can Assign One GPU per Virtual Desktop Depending on the User's Graphics Needs

using a shared PCI-mode profile. This solution extends the benefits of current Cisco Desktop Virtualization solutions to users with any type of graphics-accelerated workload.

IT Benefits

Your IT administrators benefit from the easy management, business continuity, and added security that virtualized desktops bring to your data center. In fact, your Cisco UCS servers and NVIDIA graphics cards can be managed within a Cisco UCS Manager domain, significantly reducing total cost of ownership (TCO). Furthermore, the capability to virtualize all your desktops gives you the flexibility to outsource projects or send them offshore in a secure, centralized environment.

This flexibility is especially useful when outsourcing product development or engineering to third parties who have the expertise necessary to complete a project, but who may be located in a different geographic area. In a healthcare setting, clinicians can access MRI and CT scans at patient bedsides, at home, or on the go while using the device of their choice, optimizing workflow and improving patient outcomes.

Citrix XenDesktop and XenApp

Citrix XenDesktop and XenApp transform desktops and applications into secure, on-demand services available to any user, anywhere, on any device. The Citrix solution delivers applications as well as full virtual workstations for high-end graphics users to Microsoft Windows endpoints, Apple devices, laptops, tablets, thin clients, and smartphones. Your deployments can run on your premises or at cloud scale with a desktop-as-a-service (DaaS) approach. As a result, your IT staff can centrally manage and update applications and increase security through tight controls and encrypted data while providing instant access to users anywhere and on any device. Furthermore, support for multiple hypervisor options gives you flexibility and investment protection when you have developed a body of knowledge related to server virtualization implementations.

Management Simplicity with a Virtual Application Delivery Approach

Virtual application delivery allows your IT staff to centrally manage and deploy Microsoft Windows applications as on-demand services. The capability to manage and update a single instance of an application rather than hundreds or thousands across the enterprise helps you reduce IT complexity and lower your cost of desktop management by as much as 50 percent.

Cisco Unified Computing System

The foundation of Cisco Desktop Virtualization Solutions, Cisco UCS provides an open, end-to-end, service- and application-optimized infrastructure for next-generation virtual workspaces. Jointly delivered with Citrix and NVIDIA, the solution can help you:

* Increase productivity by simplifying data center infrastructure and deployment processes
* Improve protection of data center infrastructure and assets with consistent security settings that travel with the virtual desktop
* Support more desktops per server with predictable performance
* Achieve accelerated return on investment (ROI), improved deployment speed, significantly reduced operating costs, and greater investment protection

Cisco UCS is a single converged system with configuration automated through integrated, model-based management to simplify and accelerate deployment of graphics-intensive applications and enterprise-class applications and services running in bare-metal, virtualized, and cloud-computing environments. With all components managed as a single system (Figure 2), integration with Citrix XenDesktop simplifies the deployment and ongoing management of the entire virtual desktop infrastructure to reduce operating costs. Whereas Cisco UCS Manager handles a single Cisco UCS management domain, Cisco UCS Central Software extends the unified management domain for virtual desktop administrators, spanning thousands of servers across the data center and around the world.

NVIDIA GRID

NVIDIA GRID technology lets you offload graphics processing from the CPU to the GPU in virtualized environments. This capability gives your desktop managers the freedom to deliver true PC graphics-intensive experiences to more virtual users for the first time. Your IT staff and data center managers can use industry-leading virtualization solutions such as Citrix XenDesktop together with high-performance Cisco UCS with NVIDIA GRID to offer a better experience for their most graphics-intensive users from anywhere and on any device.

With NVIDIA Grid 2.0, you can take advantage of the latest GPU architecture and support twice as many users and maintain performance levels. If performance is your highest priority, reduce the number of users by 50 percent and watch your performance double. The addition of a Mobile PCI Express Module (MXM) form-factor adapter, optimization for Cisco UCS B-Series Blade Servers, and support for Linux guest workloads further enhances your capability to deliver high-performance, graphics-intensive solutions to more users.

High-Performance Graphics on More Desktops

Cisco Desktop Virtualization with Citrix XenDesktop and NVIDIA GRID gives you choice in deploying high-performance graphics–enabled virtual desktops to meet varying user requirements and manage them all in a consistent and secure way. By running graphic-intensive applications in your data center rather than on individual workstations, you keep your data set files close to the application, allowing them to load quickly and increasing overall performance.

Designer and Engineer Virtual Workstation

This virtual workstation, with a 1:1 user-to-GPU ratio, is for designers and engineers who need uncompromised graphics-rendering capabilities to create and work with complicated data sets using graphics-intensive applications such as three-dimensional
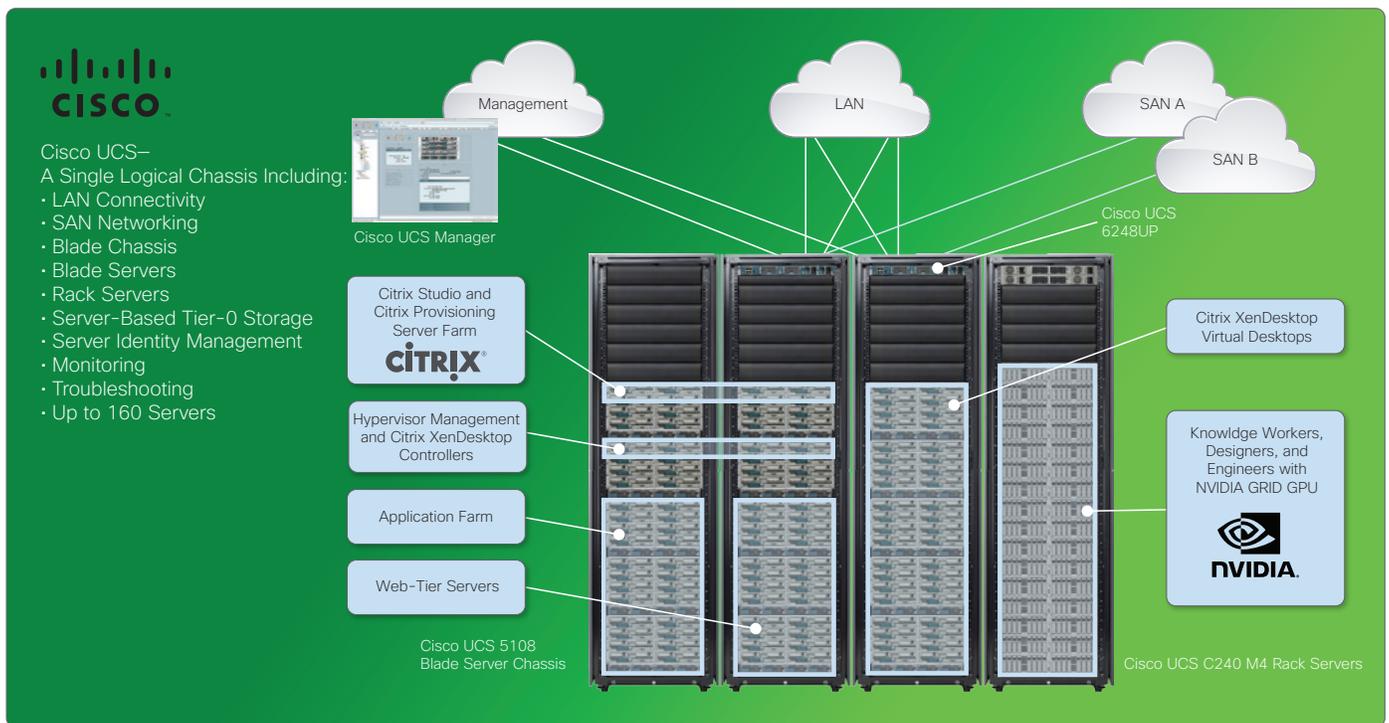

Figure 2. Up to 160 Cisco UCS Blade Servers and Rack Servers Can Be Managed as a Single Logical Chassis for Citrix Services

(3D) design and medical diagnostics. Users benefit from the enhanced experience of a GPU-powered desktop for everyday tasks and improved user density, with lower costs. This workstation can be used for oil and gas, manufacturing, media and entertainment, and medical imaging workloads.

Power-User Virtual Workstation

This virtual workstation, with a shared GPU, is for users of visual data such as 3D images and 2D graphs and line charts. Often using a specialized application beyond the typical Microsoft Office Suite and web tools, these users may have tried virtual desktop infrastructure (VDI) without GPU acceleration and were not satisfied. Deploying this workstation can help:

- **Healthcare environments** deliver accelerated clinical graphics to nurses' stations, doctors' offices, and doctors' tablets without compromising patient health records

- **Educational institutions** provide access to engineering and design applications to students in the classroom and computer lab or off campus with the same user experience and performance

- **Government agencies** conduct geospatial research, simulation and training exercises, and other graphics-intensive activities

- **Manufacturing teams** share complex models and data, manage product lifecycles, and run manufacturing-floor and job-site workloads with the same performance whether they are in the office or at a supplier or client location

Graphics-Enhanced Virtual Desktop

The enhanced virtual desktop, with vGPU, is for knowledge workers who use office applications, email, video conferencing, and multimedia Internet applications. Deploying this virtual desktop can help:

- **Financial services** organizations and insurance companies perform better analyses at lower cost

- **Media and entertainment** groups—performing tasks ranging from video editing, animation, and photo retouching to web design and graphics layout—decrease their reliance on expensive, difficult-to-maintain desktop workstations and standalone software licenses

- **Oil and gas** companies deliver 3D visualization to engineers, geoscientists, and other workers whether they are local, in a remote office, or in the field

- **Other industries,** such as life sciences, telecommunications, government, and education applications, deliver a better experience to get a better outcome

Change the Way You Work

With Cisco Desktop Virtualization with Citrix XenDesktop, NVIDIA GRID, and Cisco UCS, your workers, students, clinicians, and scientists won't be tethered to physical workstations. They can work anywhere and access the graphics-intensive applications they need to be productive. Your IT staff can focus less on routine tasks and more on strategic IT initiatives by reducing the time needed for desktop patching, provisioning, and updates from hours to minutes. And your end users benefit from an uncompromised experience that is consistent across devices and locations, delivered across an infrastructure that supports quality of-service (QoS).

For More Information

For more information about Cisco Desktop Virtualization solutions with Citrix, visit http://www.cisco.com/go/citrix.

For more information about Citrix XenDesktop and XenApp, visit http://www.citrix.com/xendesktop/3d.

For more information about NVIDIA GRID, visit http://www.nvidia.com/vdi.