Gain High-Performance Virtual Desktops with Uncompromised 3D Graphics Experiences Delivered by Cisco, Citrix, and NVIDIA

Solution Brief
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In collaboration with:

NVIDIA CITRIX

Highlights

- Built on the industry's fastest-growing server solution and the most widely adopted virtualization platform
- Offers improved productivity for an expanded user base, including graphics-intensive workstations demanding high-quality three-dimensional (3D) rendering
- Includes support for both dedicated mode (graphics processing unit [GPU] pass-through) and shared mode GPU with NVIDIA GRID™ GPUs through the integration of Citrix HDX 3D Pro and NVIDIA GRID software
- Delivers an uncompromised experience that scales easily
- Can be delivered within the Cisco Unified Computing System™ (Cisco UCS®) managed environment, expanding Cisco UCS differentiation to graphics-intensive use cases
- Provides an exceptional price-to-performance ratio that enables organizations to expand their deployments to match business demands

Do you want a true graphics workstation experience with all the benefits of virtual desktops even for users interacting with graphics-intensive applications? Cisco® Desktop Virtualization with Citrix XenDesktop and NVIDIA GRID™ delivers excellent 3D graphics to any device anywhere.

Virtual desktops and applications have been deployed successfully for task workers and many knowledge workers, but not for users working with applications that require high-performance graphics. Until recently, application graphics have been rendered using the general-purpose CPUs in data center servers. This additional burden on the CPU can slow all desktop workloads running on a server. Although 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 NVIDIA GRID, desktop managers can increase the span of control, security, and management efficiency of centralized virtual desktops and applications, giving users a true graphics workstation experience anywhere they need it and on any device. This approach greatly simplifies desktop maintenance and management tasks performed by IT staff and increases worker productivity and motivation.

Evolution of the High-End Graphics Workstation

The approach for delivering high-end graphics workstation–like capabilities to anyone, at any time and anywhere, is evolving. Businesses are transitioning to a more geographically dispersed workforce. To grow with this trend, IT departments

are seeking ways to resiliently secure sensitive corporate information while also delivering excellent service to users. In today's workplace, that means enabling users to work untethered from specific locations and hardware to increase productivity.

The traditional approaches to desktop virtualization have not delivered the application responsiveness and user experience required by high-end graphics applications typically used by designers and power users. Examples of these applications include Autodesk Inventor and 3ds Max, Dassault CATIA, Adobe Premiere Pro and Illustrator, and advanced magnetic resonance imaging (MRI) and computed tomography (CT). As a result, transitioning users who use advanced graphics applications to virtual desktops and applications has been difficult. Additionally, the lack of shared graphics processing unit (GPU) solutions has negatively affected the economics of virtual application deployment for high-end users.

Benefits for End Users

With Cisco UCS, Citrix XenDesktop, XenApp, and NVIDIA GRID, workers are now free to access their graphics-intensive applications and files remotely in a virtualized desktop environment with the same level of interactivity that they've come to expect from their high-end graphics workstations. With this solution, NVIDIA GRID graphics cards that are installed in Cisco UCS C-Series Rack Servers perform all the graphics processing, rather than the CPU. This approach enables end users to access their applications and files using Citrix XenDesktop and XenApp clients on any device that they choose and to experience highly responsive graphics rendering on those devices. Depending on the graphics-processing requirements of the application, organizations can assign each worker a dedicated GPU for high-end graphics acceleration of virtual desktops or a shared virtual GPU across multiple virtual applications (Figure 1). When Citrix XenDesktop is used with Citrix HDX 3D Pro and 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. Citrix XenApp with shared virtual GPU allows users to share a GPU, through Citrix HDX 3D Pro, using DirectX9 or OpenGL 2.1. Users with graphics-intensive workloads can now get all the benefits of current Cisco Desktop Virtualization solutions: increased flexibility, business continuity, mobility, and productivity.

Benefits for IT Departments

Easy management, business continuity, and added security that virtualized desktops bring can now be extended to graphics-intensive applications and users. This capability improves IT staff efficiency and lowers costs. In fact, Cisco UCS C-Series Rack Servers can be managed within a Cisco UCS or Cisco UCS Central Software management domain, which greatly reduces the total cost of ownership (TCO). Furthermore, virtualizing graphics-intensive desktops and applications gives businesses the flexibility to outsource these resources or send them offshore in a secure,

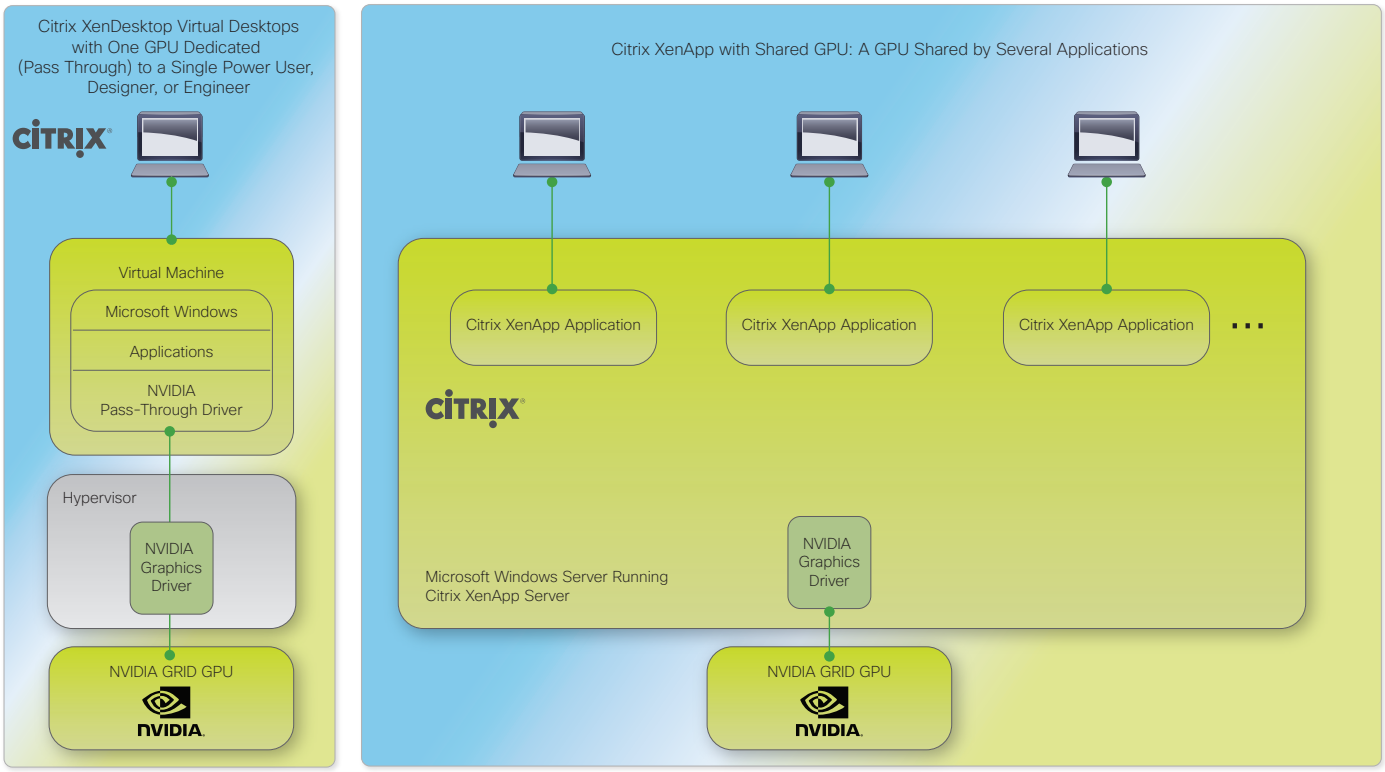

Figure 1. Administrators Can Assign Citrix XenDesktop Virtual Desktops to a Dedicated GPU (GPU Pass-Through) or to Share One GPU Across Multiple Applications and Users with Citrix XenApp, Depending on the User's Graphics Needs

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 detailed 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 are important elements in the Cisco Desktop Virtualization architecture. They enable IT departments to simultaneously deliver flexible end-user computing, exceptional desktop data security, and superior scalability and management while substantially reducing TCO. This solution transforms desktops and applications into a secure, on-demand service available to any user, anywhere, and on any device. With Cisco UCS and NVIDIA GRID graphics processors, Citrix XenDesktop and XenApp can deliver even more applications or full virtual workstations for high-end graphics users to PCs, Apple Macintosh computers, tablets, smartphones, laptop computers, and thin clients. Both Citrix XenDesktop and Cisco UCS support multiple hypervisor options, giving companies flexibility and choice. This flexibility can be especially helpful for companies that have developed a body of knowledge related to server virtualization implementations.

Citrix XenApp enables IT departments to simplify and improve application

management using a virtual application delivery approach. Virtual application delivery provides centralized management and deployment of any Microsoft Windows application as an on-demand service. This capability greatly improves application manageability by:

- Allowing IT departments to centrally manage and update a single instance of an application rather than hundreds or thousands across the enterprise, thus greatly reducing complexity and lowering the cost of desktop management by as much as 50 percent
- Improving application security through control and encrypted access to data and applications
- Providing instant delivery of applications to users anywhere and on any device
- Allowing IT departments to focus on strategic initiatives by automating the process of delivering and updating applications

Citrix XenDesktop and XenApp software together with Cisco UCS architecture, storage optimization, and simplified management bring a level of cost control to all corporate desktops not achieved with traditional solutions.

Cisco Unified Computing System

Cisco UCS is the foundation of Cisco Desktop Virtualization solutions. Cisco UCS provides an end-to-end, service- and application-optimized basis for virtual workspaces. This solution is

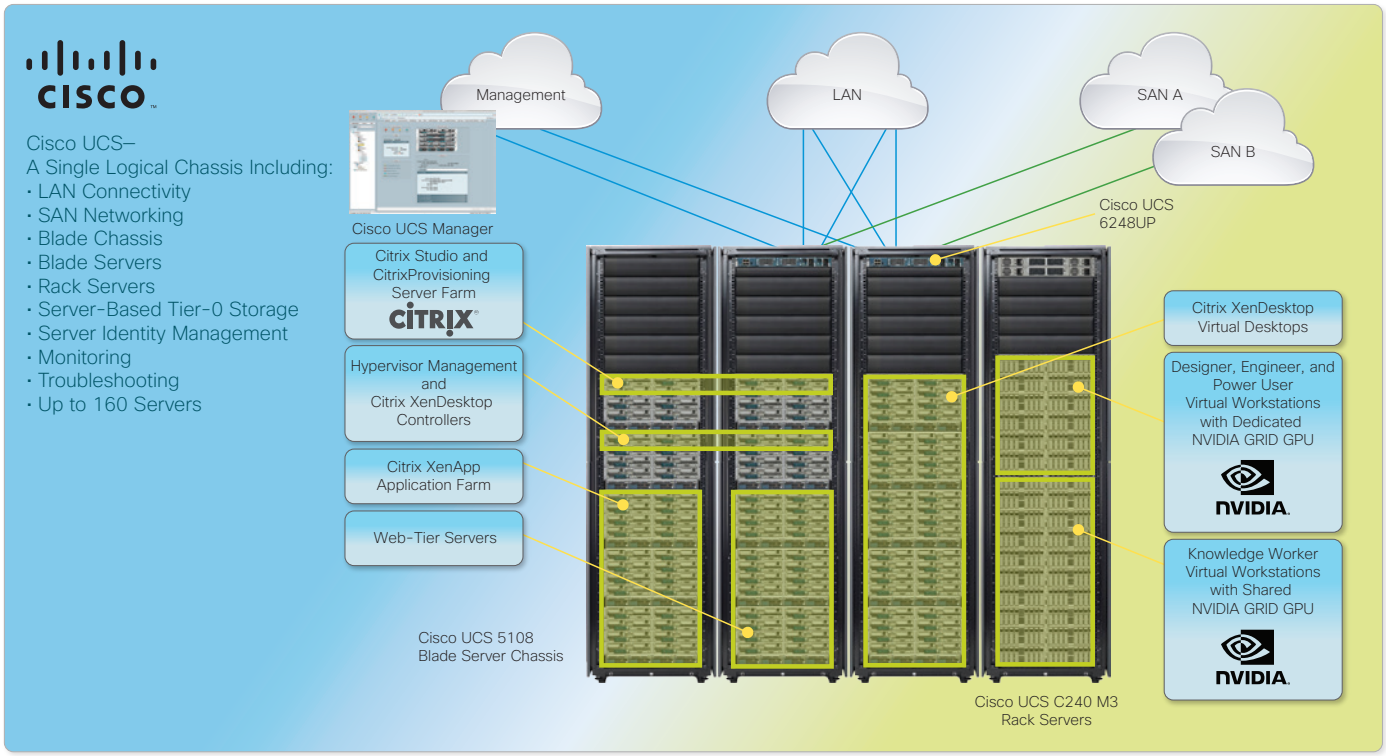

Figure 2. Up to 160 Cisco UCS Blade Servers and Rack Servers Can Be Managed as a Single Logical Chassis for Citrix XenDesktop and XenApp Services

delivered jointly with Citrix and NVIDIA to:

- **Simplify:** Accelerate time to productivity by simplifying data center infrastructure and deployment processes.
- **Secure:** Improve protection of data center infrastructure and assets with consistent security settings that travel with the virtual desktop.
- **Scale:** Support more desktops per server with predictable performance.
- **Save:** Achieve accelerated return on investment (ROI), improved deployment speed, greatly reduced operating costs, and investment protection.

Cisco UCS is a single converged system. Its configuration is automated through integrated, model-based management to simplify and accelerate deployment of enterprise-class applications and services. With all components managed as a single system (Figure 2) and management integration with Citrix Studio and Provisioning Server deployment, ongoing management of the entire virtual desktop infrastructure is greatly simplified, and operating costs are reduced. Cisco UCS Manager handles a single Cisco UCS management domain of up to 160 Cisco UCS blade or rack servers. For enterprises that need to manage thousands of servers across the data center and around the world, Cisco UCS Central Software extends the unified management domain for virtual desktop administrators.

NVIDIA GRID

NVIDIA GRID technology offers the capability to offload graphics processing from the CPU to the GPU in virtualized environments. This capability gives desktop managers the freedom to deliver true workstation graphics-intensive experiences to more virtual users. IT departments and data center managers can now use industry-leading virtualization solutions, such as Citrix XenDesktop and XenApp, together with high-performance Cisco UCS with NVIDIA GRID to offer a better experience for their most graphics-intensive users, including highly responsive multimedia and professional applications, enabling a more mobile, flexible, and productive workforce.

Expand Your Virtual Desktop Coverage

Now businesses can manage even more of their desktops and applications consistently and securely while providing increased flexibility and a high-performance graphics experience to users. Cisco Desktop Virtualization with Cisco UCS, Citrix XenDesktop and XenApp, and NVIDIA GRID gives you choice in deploying high-performance graphics-enabled virtual desktops to meet user needs:

- **Designer and Engineer Virtual Workstation:** This virtual workstation, with a dedicated GPU, is for designers and engineers who need uncompromised graphics-rendering capabilities to create and work with complicated data sets using graphics-intensive applications (3D design, medical diagnostics, etc.). 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, medical imaging, and public-sector applications.
- **Power-User Virtual Workstation:** This virtual workstation, with a dedicated GPU, is for users of visual data (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. This workstation can be used in healthcare (nurses' stations, doctors' offices, doctors' tablets, etc.), educational institutions (engineering and design schools, etc.), government (simulation and training, geospatial research, etc.), and manufacturing (product data management, product lifecycle management, manufacturing-floor and job-site workloads, support, etc.) applications.
- **Graphics-Enhanced Applications:** These virtual applications, sharing a GPU, are for users who use office applications, email, video conferencing, and multimedia Internet applications, often called

knowledge workers. These virtual applications are excellent for financial services (retail, commercial and investment banking, insurance, etc.), manufacturing, life sciences, oil and gas, media and entertainment, telecommunications, government, and education environments.

Excellent Solution for All Virtual Desktop Needs

Cisco Desktop Virtualization with Citrix XenDesktop and XenApp, NVIDIA GRID, and Cisco UCS delivers truly scalable solutions for customers of all sizes across a wide range of industries requiring high-quality 3D graphics. Workers, students, and clinicians are no longer tethered to physical workstations, but can gain the mobility and flexibility they need to be productive while accessing mission-critical, graphics-intensive applications anywhere, on any device.

This solution simplifies virtual desktop management and reduces the time needed for desktop patching, provisioning, and updates from hours to minutes. End users benefit from an uncompromised experience that is consistent across devices and locations, delivered across a quality-of-service (QoS)–enabled infrastructure that is virtual machine and virtual desktop aware.

For More Information

For additional information about Cisco Desktop Virtualization with Citrix XenDesktop and XenApp and NVIDIA GRID, please visit:

- Cisco Desktop Virtualization solutions: http://www.cisco.com/go/citrix
- Citrix XenDesktop and XenApp: http://www.citrix.com/xendesktop/3d
- NVIDIA GRID: http://www.nvidia.com/vdi

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