Enable secure remote access to 3D data without sacrificing visual performance

A technology strategy to centralize 3D apps and data while providing an outstanding user experience

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Design and manufacturing companies must adapt quickly to the demands of an increasingly global and competitive economy. To speed time to market for products, they need to be able to collaborate and manage design lifecycles effectively with both onsite and offshore, mobile and remote employees. At the same time, they have to maintain security and control over intellectual property even as their workforce becomes more mobile and distributed, and their computing environment becomes more diverse.

"Engineers at the India location of ABB Schweiz are able to work as if they were in Switzerland, where the corporate datacenter is located. They are using Dassault SolidWorks, virtualized and delivered over 150-200 ms RTL network connections, five to six hours per day. The Citrix solution facilitates collaboration of global teams and ensures that all design data remains in one central location. At the same time, ABB developers have gained new flexibility with the ability to access their CAD workstations on any device."

ABB Schweiz AG

To achieve these goals, companies that rely heavily on collaborating and exchanging 3D models and 2D drawings need to overcome several key challenges. Product and design data residing on users' workstations is difficult to secure and to share with other team members, partners, suppliers and customers. Indeed, the most common ways to exchange design data remain email, FTP and physical media, cumbersome and asynchronous methods that fail to support real-time 3D collaboration. Data synchronization across global design centers becomes less efficient with each passing year as file sizes grow at a faster rate than network capacity. It is far too difficult to access designs from the factory floor or the field in order to make simple edits or analyze a change in real time. Security has become a critical problem as product and design data stored and shared among partners and suppliers increases the risk of intellectual property theft.

This white paper discusses a technology strategy to enable secure, real-time remote collaboration on design data and model-based deliverables with stunning visual performance. Based on Citrix® virtualization solutions and Dell data center solutions with NVIDIA GPU acceleration technology, this approach can help companies meet their time-to-market goals and keep intellectual property secure while lowering IT costs.

Users of high-end design data embrace the centralized delivery of 3D apps and workstations

Centralization is transforming IT environments in organizations of all kinds, as desktops, apps and data are moved from endpoints to the datacenter, where they can more effectively be managed, maintained and secured. Desktops and apps are virtualized—that is, abstracted from the underlying hardware—and executed on server-based virtual machines rather than the user's endpoint device. This makes it possible to deliver desktops and apps on-demand as a service to users anywhere, providing an experience that looks, feels and acts like a traditional PC no matter how people access it or what kind of device they use. Virtualization is now a core element of mainstream IT strategies to support mobility, consumerization, telework and other key trends.

For many companies, the trend of virtualizing and hosting 3D applications or entire workstations in the datacenter is driven by several factors, including security, mobility and time to market.

Security – As organizations expand their collaboration with contractors, business partners and outsourcing providers, they need more effective ways to safeguard product design intellectual property and customer data across this virtual workforce. Many choose to lock down the corporate network and provide remote access via VPN solutions, but this approach is actually counterproductive, extending the secured network to unsecured remote devices. By hosting apps and workstations in the datacenter, and sending only pixel display data to the endpoint device through a secure remoting protocol, they can eliminate the need to poke a hole through the firewall with a VPN.

Mobility – The rise of mobile devices in the enterprise is especially significant for design and manufacturing companies, making it possible to pull up design documents and sophisticated 3D models right on the shop floor or at a customer location. This can greatly accelerate design and production as well as help companies communicate and collaborate more effectively with customers to meet their needs. However, most 3D applications are Microsoft Windows-based, optimized for a full-size screen and relying on right-click inputs for full functionality. For tablets to fulfill their potential in design and manufacturing, they need to be able to provide the full functionality of these apps through touch-screen inputs with a satisfying user experience. By centralizing and virtualizing 3D apps in the datacenter, companies can leverage mobile optimization policies built into the remoting protocol to intelligently touch-enable Windows-based application controls. Users gain the ability to work with drop-down boxes, enlarged controls and automatic keyboard pop-up when touching a text field—without the need for source code changes.

Time to market – The demands of global markets make it essential for design and manufacturing companies to accelerate time to market while maintaining cost control. Follow-the-sun development cycles and geographically dispersed teams make it possible for work to continue around the clock—provided the company can empower team members with real-time, remote collaboration on design data. Application hosting empowers development teams to work productively during different time periods by centralizing data and making it available to other teams in real time rather than forcing them to transfer 3D model data in bulk over the network on a daily basis. At the same time, hosting workstations in the datacenter is a highly cost-effective way to let multiple users share the same resources concurrently, even from different locations, and to provide the same workstation resources to other non-concurrent users in different time zones as the day progresses.

Early adopters have already been realizing the benefits of datacenter-hosted design and engineering workstations, and graphics-intensive 3D design and PLM applications. Now, with recent technological innovations and falling hardware costs, centralization is quickly becoming a mainstream strategy for the design and manufacturing industry. Advancements in deep compression have improved utilization over low-bandwidth networks, and new GPU-sharing technology for hosted and virtualized environments enables a rich experience for even the most demanding graphics apps. Faced with more complete, high-performance and cost-effective solutions than ever, organizations throughout the industry are moving forward and virtualizing their high-end graphics apps.

A solution by Citrix, Dell and NVIDIA to deliver 3D apps centrally with a high-performance experience

The most complete and effective virtualization solution for 3D apps comes from Citrix, the longtime leader in virtualization and mobile workstyles; Dell, the global leader in cloud

"Wiha's CAD developers were quick to embrace their XenDesktop virtual desktops, which provide high performance for Siemens Solid Edge application and allow them to use the 3D space mouse from 3Dconnexion as easily as they had previously when it was locally installed on PCs. Centralized single-image management helps the company keep all of its virtual CAD workstations up-to-date and problem-free."

Wiha Werkzeuge, Gmbh

computing; and NVIDIA, the world leader in visual computing technologies. Accessible on any device, including thin clients, tablets and Mac and Windows laptops, the combined solution provides compression and graphics acceleration technologies to optimize professional 3D graphics apps over low-bandwidth, high-latency networks. In this way, Citrix, Dell and NVIDIA are meeting the needs of industrial design and manufacturing companies wherever, whenever and with whomever their professionals work.

The solution is based on Citrix XenDesktop® with HDX™ 3D Pro, a desktop and app virtualization solution designed to support high-end designers and engineers, and the Dell Wyse Datacenter for Virtual Workstations solution, which uses NVIDIA GRID™ technology to allow multiple virtual machines to efficiently leverage the power of a single GPU within the virtualized server. The Dell Wyse Datacenter for Virtual Workstations solution is the industry's first ISV certified solution that incorporates best-in-class datacenter hardware, such as the Dell Precision R7610 and the PowerEdge R720 servers, and virus-immune Wyse thin clients. Additional solution elements include Citrix Receiver™, Citrix XenServer® and Citrix StoreFront with Citrix NetScaler Gateway™.

XenDesktop – a complete platform for hosting and delivering apps and desktops

Both Gartner and IDC have named Citrix a leader in desktop and app virtualization. XenDesktop enables companies to virtualize and deliver both apps and desktops over any type of network and cloud infrastructure. Offering open APIs capable of supporting any hypervisor technology, as well as supporting complex network topologies and any storage infrastructure, XenDesktop provides a single, unified platform to build a common service delivery architecture for all Windows apps and desktops. Companies can use common policies

and tools to simplify deployment and management for users in any location and network environment.

Virtualization with XenDesktop enables industrial companies to achieve four key objectives:

• Empowering users anywhere in the world with real-time access to professional 3D CAD/CAM/CAE apps and workstations, as well as real-time collaboration around centrally hosted data, to accelerate time to market
• Providing full functionality on mobile devices for Windows-based 3D graphics apps, extend-ing their utility to the manufacturing floor, customer sites and anywhere else design and manufacturing professionals work
• Securing intellectual property and customer information by centralizing all data within the datacenter, where it can be safeguarded much more effectively than on endpoints distributed around the world, and eliminating the need to exchange data via email, FTP, physical media and other outdated methods
• Reducing cost and improving IT efficiency by making it possible to share and scale hard-ware resources across employees and partners, and reduce dependency on client hardware that is traditionally distributed throughout the organization and requires periodic labor-intensive maintenance

XenDesktop supports the full range of desktop and app delivery scenarios through a single platform, allowing the flexibility to optimally address every use case in the organization. For industrial design and manufacturing companies, two delivery scenarios are especially useful: VDI delivery and hosted-shared delivery.

XenDesktop VDI delivery – Appropriate for demanding 3D design, visualization and simulation applications used by designers and engineers, this scenario provides a virtualized desktop and dedicated GPU for each user and

delivers a persistent desktop user experience. With the NVIDIA virtualized GPU hardware solution described below, a single GPU can be shared with many users who view and edit 3D data from high-end graphics applications.

XenDesktop hosted-shared delivery –
Appropriate for light 3D graphics workloads and 2D business graphics apps that can be supported adequately with a shared GPU, XenDesktop hosted-shared delivery (also known as Terminal Services delivery) lets companies host and share a full desktop or individual apps on Microsoft Windows Server. This is the most cost-effective and scalable delivery option for supporting graphics users.

HDX 3D Pro technologies – Enhanced performance over any network connection

The XenDesktop remoting protocol includes HDX 3D Pro technologies, which are specifically designed to enhance the visual performance and delivery of high-performance, graphics-intensive applications. Key capabilities include:

• Multiple WAN optimization technologies that improve user density over the network, increase server scalability in the datacenter and lower bandwidth requirements for graphics-intensive applications
• Deep compression technologies and quality of service (QoS) controls to prioritize and optimize application performance over any network connection, including WANs with as little as 2MB of bandwidth and RTL as high as 200ms
• Hardware-level GPU acceleration for achieving faster frame rates and smoother visual performance
• Full support for OpenGL and DirectX apps without the need for special hooks or coding

Dell Wyse Datacenter for Virtual Workstations – End-to-end, ISV-certified solution for graphic-intensive workloads

Built atop Dell's industry leading workstations and proven desktop virtualization solution, the Dell Wyse Datacenter for Virtual Workstations solution offers a tested and certified approach to simplifying and speeding the deployment of high-performance, reliable and secure desktop virtualization running graphic and data-intensive workloads. The solution combines optimized Dell servers, such as the Precision R7610 and PowerEdge R720 servers, Dell storage and networking hardware, virus-immune Dell Wyse thin clients, client management software and Dell services.

The Dell Wyse Datacenter for Virtual Workstations solution leverages NVIDIA GRID technology to efficiently harness the power of shared GPUs within a virtual environment, making it possible to maximize the number of users with access to true GPU-based graphics acceleration. Each VM communicates through Citrix XenDesktop to its own dedicated vGPU driver, and each vGPU driver sends command and control to the one physical GPU over its own dedicated input channel. As frames are rendered, the driver returns rendered frames back to the virtual desktop, which then streams it back to the remote host.

The end-to-end approach of the Dell solution ensure that customers can quickly gain workforce and IT efficiencies through secure sharing of applications and common data, rapid deployment and efficient scaling and centralized management of infrastructure. Many ISV vendors, including Siemens, PTC, Intergraph, SolidWorks and Autodesk, have certified their applications on top of the solution.

NVIDIA GRID technology – Graphics acceleration for virtualized desktops and apps

NVIDIA GRID technology delivers a rich experience for professional 3D graphics apps by offloading graphics processing from the CPU to the GPU in virtualized environments. As the first truly virtualized GPU hardware solution, NVIDIA GRID vGPU allows multiple virtual machines to directly access the graphics processing power of a single GPU, avoiding the tradeoffs between performance and scalability that come with previous approaches such as GPU sharing and GPU pass-through. Design organizations gain high performance and low latency for 2D, 3D and imaging, including and 100 percent API support, while scaling gracefully with the number of users. As a result, companies can broaden the reach of virtual desktop environments by efficiently sharing GPUs across the complete spectrum of users, including designers and engineers as well as knowledge workers.

By complementing XenDesktop and Dell server technology with integrated GRID software and NVIDIA GPUs, datacenter managers can empower users anywhere with rich graphics capabilities to improve productivity, support follow-the-sun work cycles and collaborate effectively from anywhere, with anyone. For users, GRID provides a highly responsive experience for demanding professional 3D graphics applications on any device they choose to use—even tablets.

Additional solution elements

Technologies for server virtualization and easy application provisioning and access on any device complete the solution.

Citrix Receiver – Easy access on any device

Citrix Receiver is a universal thin client that lets design and manufacturing professionals access their virtualized desktops and apps on any device they choose—Windows, Mac, Linux, iOS or Android. Citrix Receiver can be downloaded and installed easily by the user and simply needs a URL to point to. After that, the client manages itself, downloading any additional components it needs based on the service offered to the user. Mobile optimization policies intelligently touch-enable Windows-based application controls, such as the drop-down box, with enlarged controls and automatic keyboard pop-up when a text field is touched. As a result, without any source code changes, Windows applications are made fully usable on mobile devices with touch displays.

XenServer – Integrated server virtualization

XenServer delivers best-in-class performance for desktop virtualization with an integrated virtualization platform for XenDesktop. XenServer maximizes the number of users who can be supported on each server, streamlines storage operations and secures the VM network to ensure a high-quality user experience while providing IT controls. XenServer provides GPU pass-through to enable dedicated per-VM or per-user GPU access. GRID vGPU provides further cost efficiencies by sharing GPUs with many VMs or users in a VDI environment to achieve improved economies of scale over dedicated GPU configurations.

StoreFront with NetScaler Gateway – A self-service enterprise app store

To balance employees' desire for flexibility and a consistent experience with the security and control requirements of IT, StoreFront provides a self-service enterprise app store offering access to Windows apps and desktops via the Citrix Receiver client. The NetScaler Gateway functionality of StoreFront provides identity-based provisioning and control for all apps,

desktops and devices, including devices owned by partners, suppliers, contractors, customers and employees themselves. These capabilities enable IT to protect apps, design data and customer information with policy-based controls, such as restriction of application access to authorized users, automatic account de-provisioning for terminated employees and remote wipe for data and apps stored on lost devices.

Conclusion

Virtualizing professional 3D graphics apps and workstations offers unique advantages to help design and manufacturing companies meet the demands of today's business environment. Professionals gain a way to access and collaborate securely around real-time design data and model-based deliverables, no matter how widely team members are dispersed, the device they choose or the network connection they use. Real-time collaboration, follow-the-sun work cycles and user mobility help companies accelerate time to market, while the centralization of desktops, apps and data improves security for intellectual property and customer information. The solution provided by Citrix, Dell and NVIDIA helps many of the world's largest design and manufacturing companies realize the full benefits of this strategy with capabilities designed specifically to support professional 3D graphics apps and deliver an exceptional user experience. Many large architecture, engineering, construction and manufacturing firms are already seeing the benefits of Citrix XenDesktop, HDX 3D Pro technologies and Dell servers and workstations with NVIDIA GRID technology, gaining valuable advantages in competitive markets. To learn more, please visit www.citrix.com/xendesktop/3d and www.dell.com/workstationvirtualization.

About Dell
Dell Inc. listens to customers and delivers worldwide innovative technology, business solutions and services that give them the power to do more. Dell Services develops and delivers a comprehensive suite of services and solutions in applications, business process, consulting, infrastructure and support to help customers succeed. For more information, visit www.dell.com.

About NVIDIA
NVIDIA (NASDAQ: NVDA) awakened the world to computer graphics when it invented the GPU in 1999. From our roots in visual computing, we've expanded into super, mobile and now virtualized computing. The introduction of NVIDIA GRID and GPU virtualization delivers visually demanding applications from either on-premise or cloud based virtualized servers. Learn more at www.nvidia.com.

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Citrix (NASDAQ:CTXS) is a leader in mobile workspaces, providing virtualization, mobility management, networking and cloud services to enable new ways to work better. Citrix solutions power business mobility through secure, personal workspaces that provide people with instant access to apps, desktops, data and communications on any device, over any network and cloud. This year Citrix is celebrating 25 years of innovation, making IT simpler and people more productive. With annual revenue in 2013 of $2.9 billion, Citrix solutions are in use at more than 330,000 organizations and by over 100 million users globally. Learn more at www.citrix.com.