Virtual Desktop Solutions for Remote 3D Visualization

Desktop virtualization solutions have become popular due to the ability of flash storage to accelerate read and write I/O, which improves the end user experience. Remote virtual desktops are now widely used in remote offices, call centers, and general purpose office applications. Until recently, however, applications that used high-performance graphics required expensive, dedicated workstations loaded with multicore CPUs, RAM, and local SSD drives. Now, a combination of server-based GPU hardware, software integration with desktop virtualization software, and all-flash storage has enabled remote desktops for a wide range of 3D graphics applications, including seismic analysis and CAD/CAM: use cases that previously required dedicated workstations.

Companies in the oil and gas industry, such as Apache Corp, are among those beginning deployments of remote 3D virtualization using Schlumberger Petrel in order to improve efficiencies and speed the analysis of seismic data. Tech OnTap® recently had the opportunity to interview Brian Casper, technical marketing engineer for end user computing, and ask a few questions about this new approach for graphics-intensive applications.

TOT: Why are companies moving to remote virtual desktops for 3D visualization in the oil and gas industry?

**Casper:** Oil and gas companies that do a lot of seismic analysis have been early adopters, but we’re seeing the same trend across other graphics-intensive applications. The primary reason to use remote 3D desktops is to increase user productivity by making it easier to access powerful apps from multiple devices and locations. For example, a user can kick off an analysis in the office and then log in during the evening on another device to check status or continue working. There are also other benefits that are not as obvious.

With remote 3D desktops, the datasets remain in the data center regardless of the access location. This is a good approach for companies that have specialists working in politically unstable regions, such as oil and gas facilities in some parts of the Middle East. The ability to run sophisticated models remotely without putting intellectual property at risk is a big win. The same applies in the manufacturing industry, where companies use...
multiple contract manufacturers to produce parts and products. With remote 3D, detailed drawings and specifications can be accessed using remote workstations, while the data remains safely stored in the data center.

Another benefit is the low bandwidth required to analyze huge datasets such as those used in oil and gas. One square mile of seismic data can range from tens to hundreds of terabytes of data. Rather than transferring these huge datasets over a network to run on local systems, the analysis can be done on servers and GPUs in the data center so that only the display data needs to be sent over the network.

**TOT:** How is this solution different from traditional VDI solutions based on Citrix and VMware?

**Casper:** Set-up and management of remote 3D desktops are similar to traditional VDI and should be easy for someone already familiar with Citrix XenDesktop or VMware Horizon View. The basic steps required to get going are:

1. Install NVIDIA GPUs in the server chassis, either PCIe or mezzanine card, depending on the server.
2. Install a hypervisor plug-in to manage the cards and user profiles.
3. Update the graphics driver in the guest OS with the NVIDIA GPU driver. This replaces the virtualized graphics driver that uses the server CPU to render graphics. After being installed, the GPU receives all requests to render graphics from the application running in the guest OS and returns the updated graphics frames as a high-definition video stream.
4. Finally, the administrator sets up user profiles and tunes performance using the plug-in management tool. For example, the administrator can dedicate an entire GPU to a single high-performance user or share GPU resources (cores and video RAM) among many users for a more cost-effective solution.

NVIDIA offers a test drive of the GRID GPU technology that can be accessed over the Internet at no charge (registration required).

**TOT:** What are some of the key considerations when deploying remote 3D desktops?

**Casper:** There are a few things to consider when planning for this solution. First, check to see if your application has been optimized to work with server-based GPUs. There are currently over 300 listed in the NVIDIA apps catalog. Next, keep in mind there will be fewer users per server than in a traditional VDI environment. I usually recommend starting with normal best practices guidelines for VDI and then scaling back the numbers of users to
enable more resources per user. Finally, you should plan to use all-flash storage to achieve consistent high performance. Although some very high-capacity datasets may still need a hybrid flash-disk solution to keep costs down, even these will transition to all flash as the technology advances and prices continue to drop.

**TOT:** What NetApp® solutions and resources are available for companies evaluating remote 3D desktops

**Casper:** There are two ways to go. You can reference our detailed deployment guides for Citrix XenDesktop and VMware Horizon View to build your own solution using an all-flash array. Another approach is to work with one of our certified partners to deploy a FlexPod® solution, which is a turnkey system based on a jointly certified reference architecture from NetApp and Cisco.

Source: NetApp, 2016
Casper: Yes. The Data Fabric architecture from NetApp enables you to deploy either on premises or in the cloud. Service provider partners such as IBM SoftLayer already offer the solution as a cloud service. It is also possible to deploy NVIDIA technology using Amazon Web Services (AWS). This can be combined with NetApp Private Storage for AWS to build a solution that offers the scale and on-demand capabilities of AWS along with the security and high performance of a NetApp all-flash system that houses your datasets next to (but not inside of) the cloud.

To learn how Apache Corporation uses NetApp flash solutions to speed the discovery of new oil and gas deposits, check out the success story and technical case study.