Flexible computing

DELL POWER SOLUTIONS | February 2008

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For enterprise administrators, managing growing numbers of client systems can prove to be a difficult task. Concerns ranging from physical security to patch management can increase the total cost of ownership of these systems far beyond their initial purchase price. The Dell On-Demand Desktop Streaming solution in conjunction with Dell EasyConnect technology is designed to address these challenges, helping simplify IT, increase efficiency, and enhance security while providing end users with stable, robust client systems.

Simplifying IT with Dell On-Demand Desktop Streaming

The Dell On-Demand Desktop Streaming solution with Dell EasyConnect technology is designed to stream virtual disks from servers to diskless client systems. Deploying this solution can help enterprise administrators simplify IT, increase efficiency, and enhance security while providing end users with stable, robust client systems.

Understanding Dell On-Demand Desktop Streaming

The Dell On-Demand Desktop Streaming solution utilizes Dell OptiPlex™ client desktops, Dell PowerEdge™ servers, and Citrix® Provisioning Server for Desktops software. In this solution, the OptiPlex clients boot like traditional clients, but receive the desktop session from the server in real time. To help minimize network traffic, the clients only pull the necessary information from the server on demand, rather than the entire image.

By utilizing diskless client systems that stream their virtual disks (known as vDisks) from a networked PowerEdge server in real time, this solution enables administrators to maintain tight control over their environment while helping simplify management and enhance security. On-Demand Desktop Streaming differs from other thin-client solutions in that the OptiPlex clients use their local processor, memory, and graphics resources, enabling them to achieve performance levels similar to those of comparably configured systems using local hard drives.

Administrators can configure client systems to provide a variety of boot options using one of two vDisk modes:

- **Standard mode**: This one-to-many mode streams a read-only vDisk to multiple client systems, helping both increase physical security and decrease the number of images to maintain, with updates to a single vDisk automatically updating multiple clients when the clients reboot.

- **Private mode**: This one-to-one mode creates an individual read/write vDisk for each client, essentially storing the client hard drive securely on a data center server.

Enterprises can deploy this solution in either stand-alone or highly available configurations. In the stand-alone configuration, one streaming server handles

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booting, licensing, streaming, and caching for all clients. The highly available configuration, in contrast, incorporates up to 4 licensing servers and 10 streaming servers. This configuration allows clients to fail over to a different server if their current server fails, and enables load balancing across multiple servers. To help avoid performance degradation, enterprises should size their On-Demand Desktop Streaming deployment such that it can handle the total user load even following a server failure. Figure 1 illustrates an example of each configuration, with the highly available configuration incorporating two streaming servers and network attached storage (NAS) for client write caching.

SIMPLIFYING IT AND INCREASING EFFICIENCY

When clients boot using standard mode, they cache the writes that would normally be applied to their hard drive to storage on a networked server. This approach allows the vDisk to be read-only and remain unchanged regardless of the number of clients using it. If an OS patch is required, administrators can switch the vDisk to private mode, apply the changes, and redeploy the vDisk in standard mode. The changes are then propagated to all clients using that vDisk the next time they reboot, helping simplify routine system maintenance.

Moving data from individual consumer-class hard drives—which may have a higher failure rate relative to other components—to a redundant array of enterprise-class server drives also helps significantly reduce the risk of data loss from a drive failure. And storing data in a controlled data center environment, where administrators can maintain optimal power and cooling conditions, helps significantly reduce the risk of data loss from other hardware failures as well.

Another advantage of centralized user data is that the client hardware becomes easily replaceable. When hardware failures occur, enterprises should not need a large team of experienced IT staff to reinstall and reconfigure the replacement hardware. Instead, administrators should be able to simply plug in the replacement client and start streaming the same image immediately—helping significantly reduce end-user downtime following a failure. In addition, because standard mode does not allow clients to commit changes to the OS, performance typically does not degrade over time—every time a client boots, it should start with a fresh OS that can perform as it did the first time the client booted. This approach helps significantly reduce problems related to OS stability, performance, or functionality, helping free IT staff to focus on other matters.

ENHANCING SECURITY

Discarding traditional client systems carries the risk of residual, and potentially sensitive, information remaining on the hard drive. Because the Dell On-Demand Desktop Streaming solution does not store data on local client systems, organizations can typically discard these systems as needed without worrying about this type of residual data. When working with extremely sensitive information, administrators can also use the Port Blocker feature of the On-Demand Desktop Streaming software to help prevent the removal of data from the client system by selectively disabling components such as USB ports, CD drives, or floppy disk drives. This additional layer of security helps protect against someone removing data from the IT environment either inadvertently or intentionally.

The Dell On-Demand Desktop Streaming solution also helps control spyware and viruses. In standard mode, rebooting a client system restores the OS...
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boot over the network in this type of
with Dell EasyConnect technology can
use PXE, this solution can fit seamlessly
work to segregate multiple PXE servers.
helps avoid the need to divide the net-
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Execution Environment (PXE) servers to
helping eliminate the need for Preboot
bootstrap in the BIOS of client systems,
EasyConnect also provides an embedded
easy deployment, and enhanced server management.

Simplified licensing
Dell On-Demand Desktop Streaming solutions with Dell EasyConnect technology include client license information embedded in the BIOS of client systems, Dell EasyConnect helps provide simplified licensing, easy deployment, and enhanced server management.

Easy deployment
EasyConnect also provides an embedded bootstrap in the BIOS of client systems, helping eliminate the need for Preboot Execution Environment (PXE) servers to boot clients over a network. If the organization already uses PXE, this approach helps avoid the need to divide the network to segregate multiple PXE servers.

Or, if the organization does not want to use PXE, this solution can fit seamlessly into the environment. Because only clients with Dell EasyConnect technology can boot over the network in this type of configuration, administrators can maintain tight control over network access.

Enhanced server management
Adding clients to the On-Demand Desktop Streaming database in traditional deployments can be time-consuming, requiring administrators to first gather information such as the Media Access Control (MAC) address of each client and then enter this information into the database. Dell EasyConnect integrates this information into the BIOS of client systems, allowing clients to be automatically added to the database when they first boot, using their Dell service tag as a unique identifier. After clients are added to the database, administrator-specified settings can be automatically applied and the proper vDisk can be automatically associated with the service tag and delivered to the client without administrator intervention. This approach allows administrators to quickly bring many clients online while helping ensure that they are all configured in the same way.

Testing Dell On-Demand Desktop Streaming
In August 2007, Dell engineers performed tests using the Futuremark 3DMark06 benchmark on Dell OptiPlex desktops—one with a traditional hard drive and one using Dell On-Demand Desktop Streaming simultaneously with 99 other clients using the same vDisk in standard mode on a stand-alone server. The test environment consisted of a Dell PowerEdge 2950 server with one dual-core Intel® Xeon® 5160 processor at 3.0 GHz, 4 GB of RAM, and the Microsoft® Windows Server® 2003 Release 2 (R2) Standard Edition OS connected through a Gigabit Ethernet network to Dell OptiPlex 745 desktops, each with one Intel Core™2 Duo E6400 processor, 1 GB of RAM, an ATI Radeon™ X1300 PRO graphics processor, and the Microsoft Windows® XP Professional Edition OS.

The 3DMark06 benchmark stresses processor, memory, and graphics resources using high-resolution game sequences and assigns a score based on system performance. Figure 2 shows that both systems returned virtually the same score—1,783 for the traditional hard drive configuration, and 1,788 for the streaming configuration—demonstrating that Dell On-Demand Desktop Streaming does not result in a client performance penalty.

Building a Flexible OS Streaming Environment
The Dell On-Demand Desktop Streaming solution with Dell EasyConnect technology is designed to simplify IT, increase efficiency, and enhance security for enterprise administrators while providing end users with stable, robust client systems that can provide performance levels similar to those of comparably configured systems using local hard drives. Administrators should carefully evaluate the number of servers and streaming server options when choosing a configuration. Deploying a properly sized and configured environment can help administrators increase IT agility, security, and productivity in their infrastructure.

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