WHITE PAPER

Jumpstart VDI Deployments with VSA for View

April, 2012

TABLE OF CONTENTS

1.0 Challenges in Deploying VDI

Desktop virtualization has taken the IT world by storm, and for good reason — it vastly minimizes the headaches associated with desktop operating system upgrades, security patching, and software provisioning in comparison with traditional fat client architectures. Deploying a Virtual Desktop Infrastructure (VDI) environment dramatically lowers IT administrative workloads and drives efficiencies that reduce both capital and operating system expenses, resulting in tremendous savings.

However, keeping a Virtual Desktop Infrastructure in sync with changing business needs can prove to be a challenge. After initial installation, most VDI environments are in a constant state of flux. As new departments or branch offices are brought into the infrastructure, the number of users increases and the mix of user profiles changes. New servers, hypervisors, and storage systems are added periodically. As a result, IT administrators face an ongoing cycle of provisioning new desktops and reconfiguring the desktop pool, repeating the process over and over again to rebalance available resources and provide reasonable and predictable performance. Each time, VDI configuration is largely a process of trial and error until an administrator is lucky enough to arrive at a desktop pool layout that meets desired business and performance goals.

What makes the task of VDI deployment so hard is that it's difficult to characterize performance across the different layers of the Virtual Desktop Infrastructure (storage hardware, hypervisors, server resources, I/O controllers, networking, and client devices). This causes IT administrators to struggle with a baffling and almost blind process of troubleshooting and reconfiguration. Overprovisioning is quite common since administrators lack an effective way to gauge end-to-end performance or to calibrate the configuration against requirements. Because there is little visibility into how configuration variables precisely impact VDI performance, IT departments often resort to installing additional expensive servers and storage systems to circumvent performance issues. While adding hardware may speed time-to-deployment, it unnecessarily adds cost and ultimately impacts the project's return on investment (ROI).

2.0 Introducing VSA for View

In working with the VMware View product team, we recognized the complexity and challenges associated with properly configuring virtual desktops and associated VM storage. It became clear that what customers needed was a way to configure the Virtual Desktop Infrastructure and related storage more accurately and transparently — and to be able to reconfigure it dynamically — with less guesswork and less pain. If customers were able to have better visibility, automated configuration, optimized I/O, and best practices into the VMware desktop and storage provisioning process, administrators could deploy VMs into the hands of users more quickly and at less cost, ultimately improving user productivity and accelerating ROI.

Understanding that end-to-end performance characterization is critical to optimizing VDI storage configurations, SGI is introducing VSA for View as part of the SGI NAS solution to take the complexity and guesswork out of VMware deployments. Tightly coupled with VMware View, VSA for View automates the iterative trial-and-error steps required to configure a Virtual Desktop Infrastructure, provisioning both VM desktops and associated storage. While VMware View is capable of configuring compute and memory resources for VM desktops, it is not designed to optimize VM storage characteristics. VSA for View, on the other hand, examines end-to-end performance, fine-tunes both VM and storage resources, and provisions the desktop pool, creating cost-effective configurations that are able to meet the distinctive performance demands of VDI workloads.

To aid in provisioning VMware desktops with VSA for View, predefined profiles store optimized configuration variables, allowing administrators to deploy best practices for VDI out-of-the-box. Benchmarking and calibration capabilities provide end-to-end performance measurements and support rapid reconfiguration, during which SGI NAS VSA for View automatically rebalances desktop VMs and associated storage resources. To optimize I/O operations, VSA for View incorporates a proven and economical approach to VDI storage — the core SGI NAS open storage solution.

2.1 Leveraging SGI NAS

VSA for View takes advantage of the innovative SGI NAS storage software that abstracts commodity storage devices, pools storage, and presents the storage pool to the Virtual Desktop Infrastructure. As an OpenStorage solution, SGI NAS is designed to counter the high cost, poor performance, and management complexity of traditional VDI storage.

Because VSA for View can leverage SGI NAS technology, it enables remarkable I/O performance, especially for VDI workloads that are predominantly characterized by random writes. Since VDI workloads are particularly sensitive to write latencies, SGI NAS applies ZFS and solid state technologies to create write caches that boost VDI performance while keeping overall storage costs low.

SGI NAS implementations often result in savings over traditional storage solutions of 70% to 80%. In an average VDI deployment for 250 users, a traditional appliance with proprietary disk technology may cost around $150K, with a maintenance fee of about $30K per year. In contrast, a comparable SGI NAS-based solution costs about the same as the proprietary system's annual maintenance fee. The savings stem from the ability to deploy commodity storage components and a fully supported, open software-based solution. Unlike traditional proprietary appliances, customers can achieve significant savings whether the SGI NAS appliance supports a small number of users or whether it is scaled to support storage needs across a large enterprise. Since VSA for View leverages SGI NAS technology, VDI deployments can benefit from SGI's cost-effective approach of using OpenStorage.

2.2 Benefits of a VSA for View Solution

VSA for View makes it easy to build a ready-to-use, calibrated desktop pool to jumpstart VDI initiatives. Key benefits include:

- **Fast VDI provisioning, configuration, and tuning.** VSA for View includes a powerful user interface with wizards that guide administrators through VDI deployment, benchmarking, calibration, and reconfiguration.
- **Automated and intelligent configuration.** Using profiles that capture best practices, VSA for View enables out-of-the-box VDI deployments. VSA for View automates the processes of configuring and rebalancing the Desktop Infrastructure, adjusting desktop and storage distribution to equalize load.
- **Good visibility into performance.** Built-in VSA for View benchmarks measure end-to-end performance, all the way from the client endpoint through the storage devices.
- **Built-in calibration and analytics.** VSA for View automatically modifies configurations based on specified criteria, making it easy to fine-tune configurations without requiring elite administrative expertise.
- **Low-cost, performance-optimized VDI.** Because of the ability to integrate SGI NAS for View makes it easy to deploy economical commodity storage structured as Hybrid Storage Pools, with caching that accelerates write-sensitive VDI performance.

3.0 Product Architecture

As shown in Figure 1, VSA for View tightly integrates with VMware infrastructure. VSA for View embeds a SGI NAS server as a VM, or alternatively uses storage pools exported from an external SGI NAS appliance or other NFS-mounted devices. In the case of local storage on an ESX server, VSA for View abstracts the local Hard Disk Devices (HDDs) and Solid State Devices (SSDs) into a Virtual Storage Appliance (VSA), exporting the VSA to the ESX hypervisor supporting the desktop pool. Because VSA for View can make use of locally attached storage in this way, I/O performance can be more predictable since it is unaffected by network anomalies.

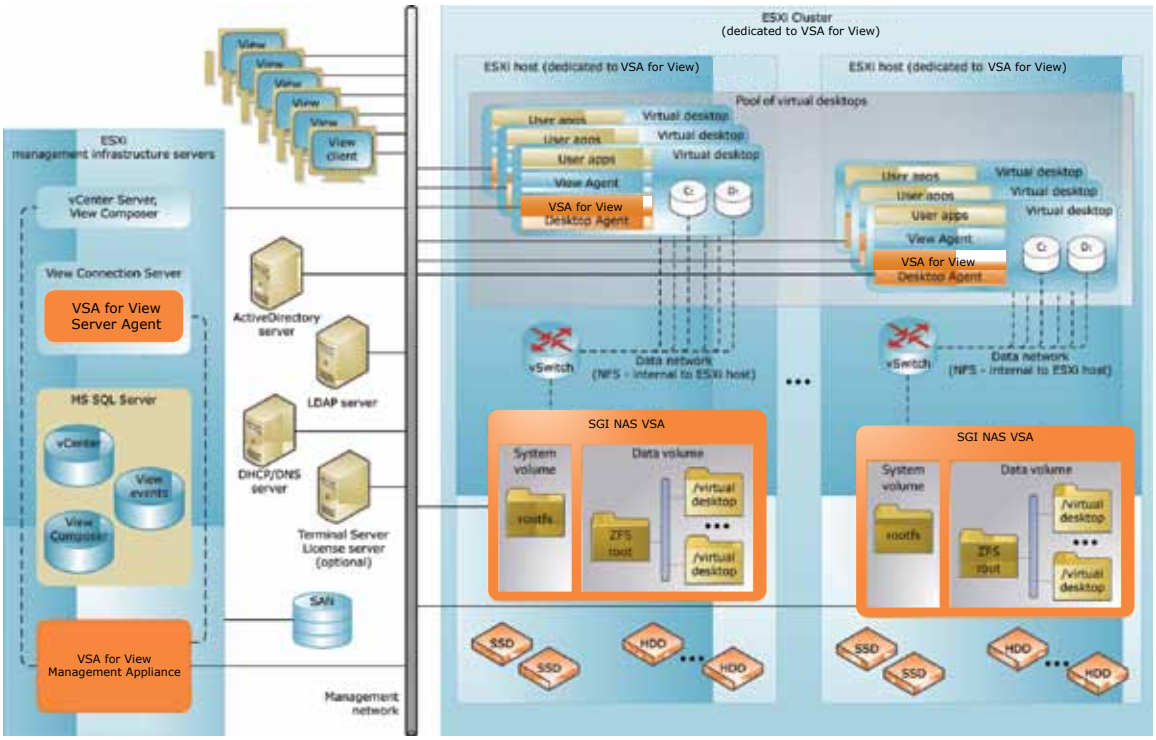

Figure 1. VSA for View presents storage to the VMware Virtual Desktop Infrastructure.

VSA for View integrates into a VMware VDI provisioning and management infrastructure with the following VMware 5 components:

- VMware vSphere 5 Enterprise Plus for Desktop Systems
- VMware vCenter Server 5
- VMware View Manager 5 with Composer and Offline Desktop

VSA for View leverages supporting infrastructure components such as Active Directory and Microsoft SQL server. Of course, the appropriate VMware and Microsoft licenses are required in addition to VSA for View licensing.

3.1 Key Components

There are four key components in VSA for View.

Name	Description	Notes
VSA Management Appliance	Provides VSA for View management functions	Can be installed on any ESXi host in the network
SGI NAS VSA	VSA that provides storage management for the VSA for View environment	Installed on an ESXi host that is dedicated to VSA for View
VSA for View Server Agent	Provides communication between the VSA for View and the View Connection Server	Installed on the View Connection Server
VSA for View Desktop Agent	Provides communication between VSA for View and desktops	Installed on the desktop template, which is usually installed on the dedicated SGI NAS VSA ESXi host

3.2 Creating VDI Storage with VSA for View

To create storage pools from locally attached storage, VSA for View packages SGI NAS functionality as a VM template installed on an ESX hypervisor. The SGI NAS VM coalesces the attached storage capacity into a Virtual Storage Appliance that provides storage to the Desktop Infrastructure. There are significant advantages to packaging SGI NAS functionality as a VM:

- **Good scalability.** The VSA for View approach offers the ability to scale. As additional hypervisors are added to the infrastructure to support more desktops, another storage VM can be added. One VSA can exist for each ESX host in the ESX cluster.
- **Reduced network load.** The SGI NAS VM delivers I/O to the hypervisor directly from within the hypervisor, decreasing network traffic and making I/O performance more consistent. Because no additional network ports are needed for the hypervisor to communicate to storage, fewer slots are needed on the server.
- **Storage hardware independence.** Since VSA for View runs on any supported VMware-compatible hardware, customers can deploy a cost-effective SGI NAS solution without concerns of hardware support. Integrating SSD components — either locally or in an attached SGI NAS appliance — enables caching that can significantly optimize VDI performance.

3.3 How VSA for View Abstracts Storage

Figure 2 shows a storage-centric view of the VSA for View architecture implemented with local storage. Physical storage devices reside at the bottom of the stack. The VMware ESX hypervisor runs on one of these storage devices, and the remaining devices are formatted as Virtual Machine File System (VMFS) volumes, one volume per device.

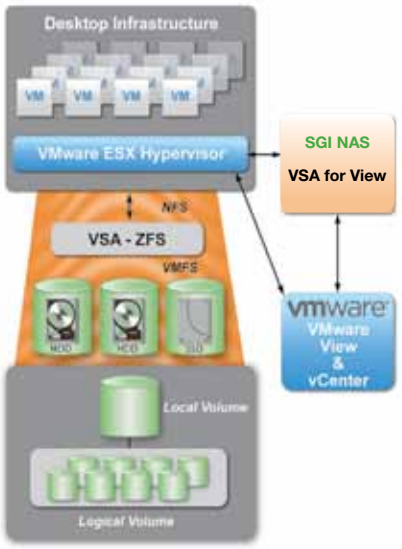

Figure 2. VSA for View abstracts local storage as a Virtual Storage Appliance.

Under the direction of VSA for View, the VM abstracts and pools VMFS volumes as a VSA using ZFS technology. Since VMFS understands which devices are HDDs and SSDs, ZFS can construct a Hybrid Storage Pool, applying fast SSDs as caching devices. The ZFS pool is then exported using NFS to the ESX hypervisor, allowing the Desktop Infrastructure VMs to access the underlying VSA storage. VSA for View directs VMware vCenter to create VMs based on the compute, memory, and storage parameters it has optimized, characterizing end-to-end performance of each configuration, and reconfiguring and automatically rebalancing resources as necessary.

While VMware offers a VSA product that uses a somewhat similar approach to abstracting VDI storage, its design restricts the number of supported hypervisors, limiting its scalability in a shared storage configuration. In contrast, given adequate CPU and memory resources, the VSA for View design scales well with more hypervisors. In addition, VSA for View offers significant advantages in its ability to benchmark and tune VDI deployments and optimize performance for VDI workloads.

4.0 Deployment Scenarios

VSA for View is extremely flexible and can be implemented in small to large VMware deployments that use internal or external storage investments. Customers can start with a complete, self-contained VDI solution on an ESX host that serves the desktop virtual machines, as shown previously in Figure 2. This type of deployment is ideal for companies interested in kick-starting a VDI initiative or for populating satellite offices. Such a configuration is well-suited for supporting "floating desktops" where desktop state is not maintained and capacity requirements are small. Examples of such deployments are kiosk, classroom, or office desktops that use cloned VMs or other reusable desktop images that store no user data in the VM itself.

For larger storage capacities — such as those needed to support dedicated or stateful desktops — VSA for View is designed to scale. The software supports a storage model that implements external SGI NAS appliances or NFS-attached storage managed under VSA for View. With external SGI NAS appliances, VSA for View can configure floating or dedicated desktop images, larger numbers of desktops, and desktop images that deliver greater storage capacities. Multiple storage volumes can be exported to multiple VMware hypervisors, and in this way storage can be shared across hypervisors. A shared storage approach can be implemented to enhance availability (see "Deployment Recommendations" on page 15).

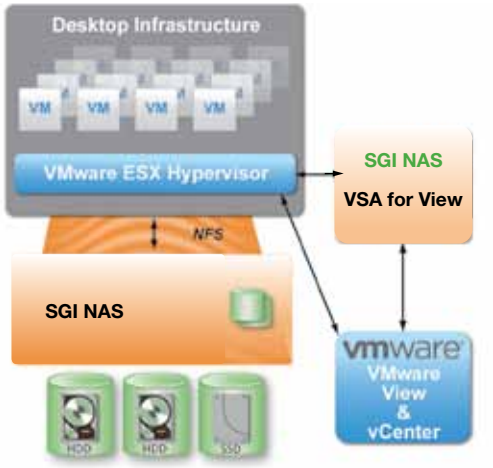

Figure 3. VSA for View can be deployed using external SGI NAS appliances.

4.1 ZFS Advantages in SGI NAS

The SGI NAS VM in VSA for View and the standard SGI NAS product both use ZFS as the underlying filesystem. Designed as a 128-bit filesystem for modern storage devices, ZFS addresses shortcomings of legacy filesystems developed for floppy disks and 1980s' hard disks — shortcomings that still are evident in many traditional storage implementations today. Unlike earlier filesystems, ZFS integrates volume management functions and virtualizes devices into a single shared storage pool from which SGI NAS can configure data volumes that consume pooled space as needed. For VSA for View, ZFS offers these advantages:

- **Hybrid Storage Pool design.** Because ZFS abstracts and pools storage devices, it simplifies the creation of Hybrid Storage Pools (see "Configuring a Hybrid Storage Pool" on page 15). A Hybrid Storage Pool balances device characteristics and enables trade-offs between performance, capacity, availability, and cost. For example, a storage architect can add high-speed but more expensive SSDs into the traditional storage hierarchy between costly RAM and more economical, larger capacity storage that is composed of multiple hard disk drives. One of the benefits of a VSA for View implementation is that it allows high-speed devices like SSDs to be applied to accelerate I/O operations and meet performance goals of VDI workloads.

- **Data integrity.** ZFS natively implements end-to-end checksumming and transactional copy-on-write operations that prevent silent data corruption. The SGI NAS VM configures data volumes in mirrored or RAID-Z configurations to automate data recovery. (RAID-Z is a ZFS data replication model similar to RAID-5 that prevents stripe corruption or "write holes" caused by RAID-5's inherent read-modify-write architecture.) For VSA for View deployments, the use of RAID10 or RAID Z2, which is RAID-Z with double parity, is recommended.
- **Fast snapshot and cloning.** ZFS supports data replication through point-in-time copies or snapshots. In conjunction with vCenter, SGI NAS takes advantage of ZFS snapshots to accelerate VM cloning during provisioning.
- **Accelerated write performance.** ZFS's block allocation algorithms condense an I/O stream of many small random writes into a single, more efficient, sequential write operation. This fundamental ZFS feature dramatically accelerates performance for random write-intensive VDI workloads.
- **Inline deduplication.** ZFS intrinsically supports inline deduplication, which can save storage capacity and decrease the number of required I/Os to physical disks in the pool when data is highly redundant. With VSA for View, configuring data volumes for deduplication is optional. Deduplication can be efficient for VDI persistent storage since VM images are largely the same, but often proves counter-productive for temporary VM session storage since user session data has little redundancy.
- **Inline compression.** Compression is another configurable option for ZFS data volumes. Like deduplication, it conserves storage space and reduces the amount of I/O. In ZFS, compression occurs at the block level and not at the file level like other filesystem compression implementations. With VSA for View, compression can be applied effectively to VDI temporary storage to enhance write speeds.

5.0 Using the Wizards

VSA for View includes wizards that automate the trial-and-error configuration steps required to deploy a Virtual Desktop Infrastructure. Although VMware vCenter does the actual VM provisioning, VSA for View directs the creation of VM desktops and VSAs based on parameters specified via the user interface. Wizards allow administrators to tweak VM and storage configuration parameters easily.

The built-in wizards mask the underlying complexity of VDI deployment. There are four VSA for View wizards that provision, reconfigure, test, and fine-tune VDI configurations:

- VDI Deployment Wizard
- Redeployment/Reconfiguration Wizard
- Performance Analyzer
- Calibration Wizard

The wizards walk the administrator through the configuration steps for VDI provisioning and optimization until the VDI is complete and ready-to-use. The wizards load default profiles that have predefined settings reflecting known best practices for certain VDI workloads. Parameter settings can be customized manually or modified automatically (based on performance benchmarks) to meet specific site and performance criteria.

5.1 VDI Deployment Wizard

After the VSA for View and VMware components are properly installed and licensed, an administrator can use the VDI Deployment Wizard to provision an ESX cluster with a ready-to-use VM desktop pool. The VDI Deployment Wizard accomplishes what is equivalent to more than 150 steps that would otherwise have to be performed manually. In contrast, the VDI Deployment Wizard guides the administrator through the initial provisioning process in just four steps:

1. **Select cluster.** The VDI Deployment Wizard requests the name of the ESX Cluster on which you wish to deploy the Desktop Infrastructure.
2. **Specify the desktop pool type: stateless or persistent.** Floating or "stateless" desktops are cookie-cutter images that contain no personal settings or user-specific data (user data is stored on a network file share or VMware View persistent disk). Dedicated or "persistent" desktops, on the other hand, preserve user data, settings, and VM-installed applications.
3. **Configure the virtual desktop pool and the desktop pool profile.** The third step is to define the virtual desktop pool, including the name of the pool, the number of VMs to be created, and the VM template that should be used in creating the VMs. In addition, the administrator selects one of the predefined profiles and customizes settings as needed. There are three main groups of profile parameters:
   - Storage settings, such as configuration of RAID levels and options for caches, block sizes, compression, and deduplication.
   - Storage resources, e.g., the CPU and memory resources that should be allocated for the virtual SGI NAS appliance.
   - Desktop settings, such as datastore specifications, the desktop memory reservation policy, the logoff interval, and so forth.

   VSA for View profiles include optimizations known to enhance performance for VDI workloads. For example, engineers conducted proof-of-concept testing to characterize VDI workloads with SGI NAS. What they learned was that the majority of I/O operations to storage (more than 50%) were 4K in size for VDI workloads. Additional testing showed that ZFS compression, and not deduplication, had a positive impact on performance. Thus, the default VSA for View profile includes settings for a 4K block size and the use of compression, with deduplication set to off.
4. **Select SGI NAS and deploy.** For a pool of virtual desktops, the administrator can select a SGI NAS VSA (one VSA per ESX host), a bare-metal SGI NAS appliance, or an external SGI NAS appliance. The VSA for View dashboard shows key steps in the deployment process as they are executed: "create block" (creating the VSA); "create file storage"(configuring the VSA for NFS export); "create pool" (creating the desktop pool); and "rebalance pool" (reallocating desktops and VSAs). After initial provisioning, VSA for View automatically analyzes desktop and VSA distribution, determining which hypervisors need storage and rebalancing desktops with respect to storage locality.

As shown in Figure 4, as each operation is performed on behalf of the wizard, the VSA for View Manager dashboard displays a message describing the completed activity. Corresponding messages related to each provisioning task also are displayed on the vCenter dashboard (VSA for View communicates to VMware vCenter to direct VM creation, and vCenter does the actual provisioning task). When the VDI deployment is complete, VMware View reports when the desktops are prepared for use.

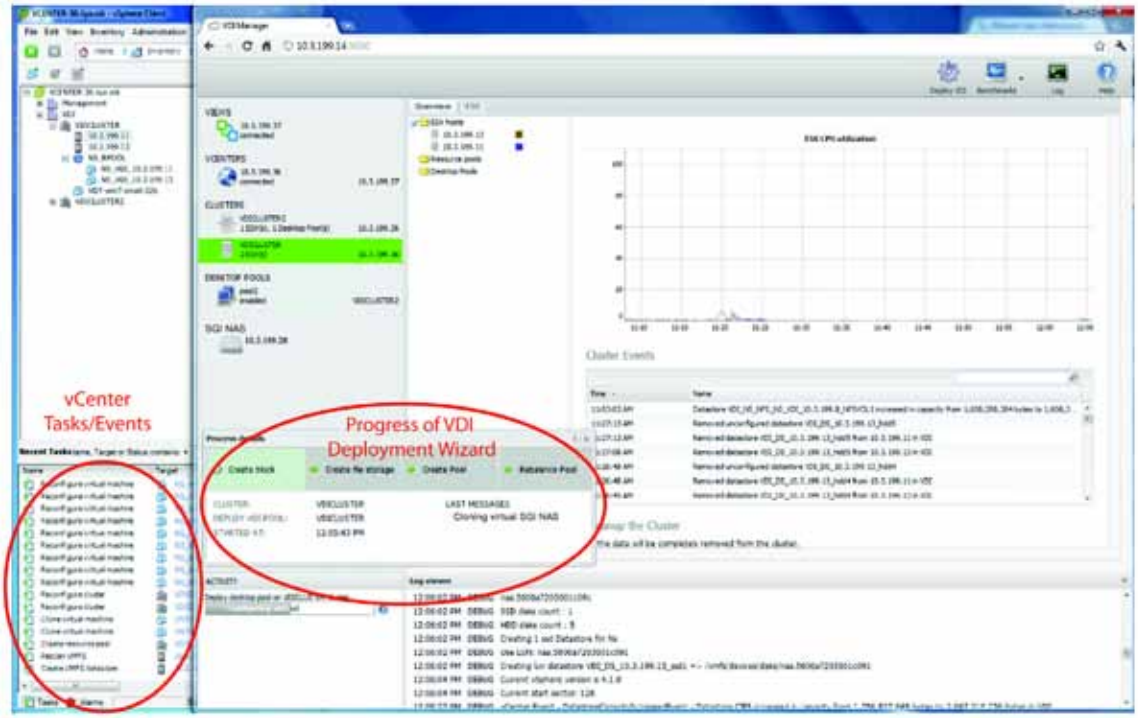

Figure 4. The VDI Deployment Wizard

5.2 Redeployment/Reconfiguration Wizard

The Redeployment/Reconfiguration Wizard allows an administrator to change parameter settings for an existing desktop pool. There are three categories of settings to alter the configuration of a desktop pool:

- Resource settings, such as CPU and memory allocations for each desktop as well as CPU and memory resources available for each SGI NAS virtual appliance.
- Storage settings, such as ZFS compression, inline deduplication, block size, and cache sizes.
- Desktop settings, such as the number of desktops, the display protocol, the user assignment mode, and logoff policies.

Once the administrator has adjusted configuration settings, VSA for View validates the defined options and automatically performs the necessary reconfiguration tasks, rebalancing the Desktop Infrastructure to accommodate the required changes. As shown in Figure 5, the wizard displays ongoing progress, and the administrator can observe the corresponding reconfiguration steps under “Recent Tasks” in vCenter. While the desktop pool is being reconfigured, it (and the associated SGI NAS-managed storage) is temporarily unavailable. When reconfiguration completes, VSA for View signals completion and VMware View updates the number of available desktops.

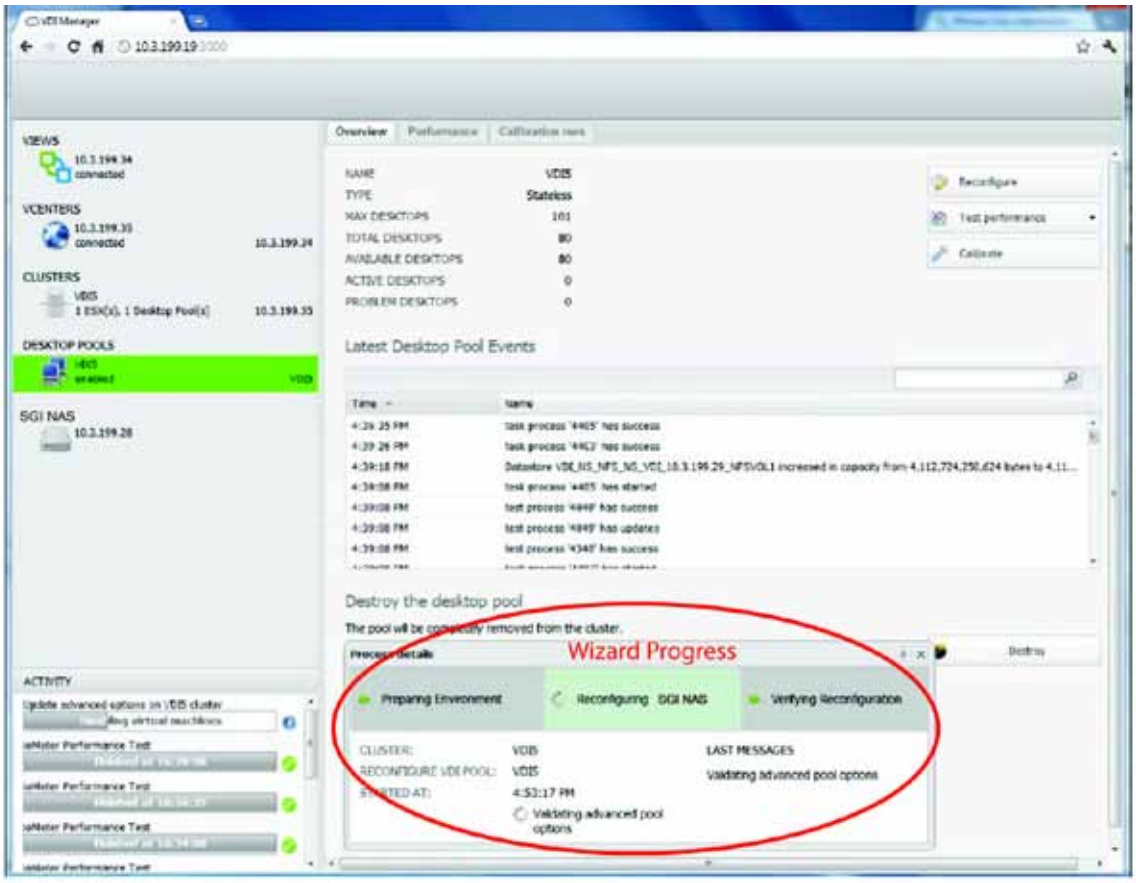

Figure 5. Reconfiguration/Redeployment Wizard.

5.3 Performance Analyzer

The Performance Analyzer allows an administrator to measure end-to-end performance — all the way from the client desktop to the storage device. From the VSA for View dashboard, the administrator selects a benchmark, specifying the number of desktops to be tested, read/write characteristics for the test, and the number of test iterations to execute. There are two benchmarks currently available:

- SQLIO, a publicly available Microsoft benchmark that helps to measure the I/O capacity of a given configuration.
- Iometer, an open source I/O subsystem measurement and characterization tool.

The administrator can choose to run a single iteration of a benchmark (a single-step test) versus multiple iterations in which the read/write mix increments (a multiple-step test). As an example of a multiple-step test, if an administrator specifies a read/write increment of 25%, the wizard executes five tests — 100% write/0% read, 75% write/25% read, 50% write/50% read, 25% write/75% read, and 0% write/100% read. Performance data can be stored for later analysis.

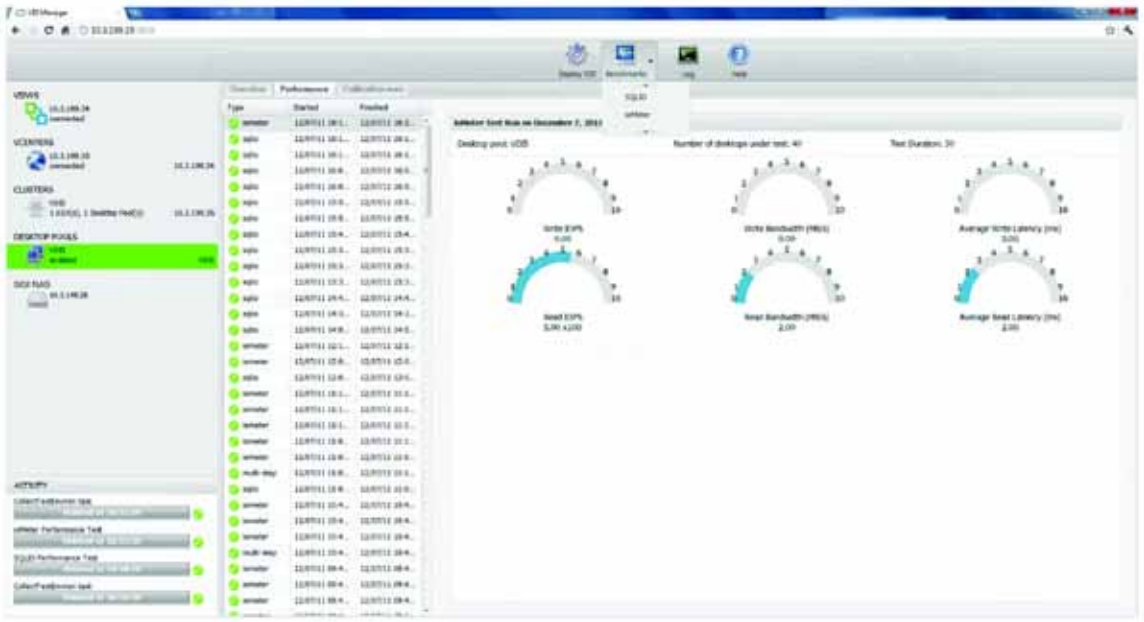

Figure 6. The Performance Analyzer characterizes end-to-end performance.

Figure 7. A multiple-step test shows the effect of altering the read/write mix at each step.

5.4 Calibration Wizard

The Calibration Wizard performs analytics on the VDI environment, automatically modifying the VDI desktop pool to satisfy the specified criteria. For example, the wizard can maximize the number of desktops as long as the number of IOPS is greater than a defined value. Alternatively, it can increase or decrease VSA resources as long as the configuration continues to meet a certain performance threshold. The Calibration Wizard uses the SQLIO or Iometer benchmarks to monitor performance levels. When the specified criteria is met, the wizard reconfigures the desktop pool accordingly.

Figure 8. The Calibration Wizard dynamically reconfigures to meet user-specified criteria.

6.0 Deployment Recommendations

The following recommendations for deploying VSA for View blend common-sense principles with best practices:

- Apply SSDs in a Hybrid Storage Pool approach, hosting temporary storage for virtual machines on SSDs.
- Use default profiles as a starting point. For VDI workloads, most configurations benefit from a 4K block size, ZFS compression, and deduplication off. Configure
- RAID 10 or RAID Z2 to protect against disk failure.
- Configure for the appropriate level of desktop persistence and availability. The type of desktop image needed for each user — floating or dedicated — depends on the nature of the user's role and applications.
- Apply mirroring to the golden image and SGI NAS VSAs to improve resilience.
- Use a separate network for NFS-attached storage. If VSA for View is used to manage NFS-mounted storage, it is ideal to have a network dedicated to data transfers.

6.1 Configuring a Hybrid Storage Pool

ZFS simplifies the creation of Hybrid Storage Pools, applying high-speed devices like SSDs to accelerate read or write I/O operations and meet performance demands. Without the latencies imposed by moving parts, SSDs can deliver tens of thousands of IOPS versus hundreds of IOPS for HDDs. In addition, SSDs use less power and offer packaging advantages over HDDs.

Figure 9 shows the key components of a ZFS Hybrid Storage Pool:

- **Adaptive Replacement Cache (ARC).** The ARC is the main ZFS cache stored in RAM.
- **Level Two Adaptive Replacement Cache (L2ARC).** The L2ARC provides a larger, second-level cache to accelerate read operations. As shown in Figure 9, SSDs can be deployed here to cache read operations. Sizing RAM is important in calculating the size of the L2ARC. (For example, it would make sense to store database pointers in RAM to enable quick access to records in the L2ARC, and to size RAM and the L2ARC accordingly.)
- **ZFS Intent Log (ZIL).** A separate intent log allows synchronous writes to be written quickly and acknowledged in the transactional model that ZFS uses. For VDI workloads, adding SSDs as a ZIL to cache writes significantly enhances performance.

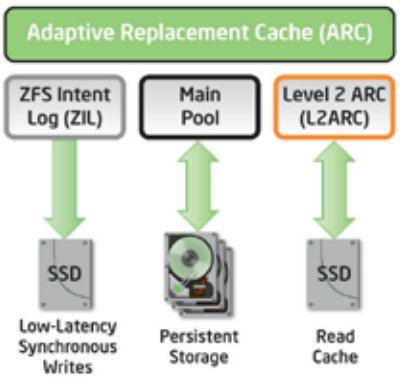

Figure 9. SGI NAS enables efficient Hybrid Storage Pool designs.

6.2 Configuring Floating or Dedicated Desktops

A critical decision in properly configuring a VDI deployment is whether to provision floating or dedicated desktop images. Indeed, this is the second question posed by the VDI Deployment Wizard (after asking the name of the ESX Cluster). The floating or dedicated decision depends on the nature of the user and whether they need to make changes to the desktop image, such as installing applications and data within the VM image itself rather than to a persistent NFS share or VM View disk.

Since floating desktops are exact clones, they usually imply that the environment requires less storage capacity and there is no need to back up the VM desktop images. From an operational perspective, if a VMware ESX server goes down, the connection broker can start new VDI instances in other ESX hosts using a clone and floating desktops again can be available.

In contrast, dedicated desktops preserve operating system state and changes to the desktop VM. As a result, there needs to be a backup strategy in place, and availability is more of a concern. In some cases, it may be necessary to implement clustered external SGI NAS appliances to meet required desktop availability targets.

In addition to embedded SGI NAS virtual appliances, VSA for View can incorporate storage from external SGI NAS appliances. Using the VDI Deployment Wizard, the administrator selects an external SGI NAS appliance for a given pool of virtual desktops. VSA for View then mounts appliance storage as an NFS filesystem for the Desktop Infrastructure. In the wizard, the administrator can define a ratio of desktops that use local versus external storage.

6.3 Configuring for Availability

To achieve a design that increases desktop availability, VSA for View can be implemented in conjunction with multiple hypervisors and clustered SGI NAS appliances (Figure 10). The external SGI NAS appliances are configured with an optional software module, the SGI NAS HA Cluster plug-in. The HA Cluster plug-in facilitates storage continuity in the event of appliance service-level exceptions, such as power outages, disk failures, lost network connectivity, or unplanned downtime of a single appliance node. Multiple hypervisors and desktop VM copies (e.g., via VMware vMotion) increase availability for dedicated desktop VMs. (Note that at VSA for View's initial release, VMware HA is not supported in conjunction with the product.)

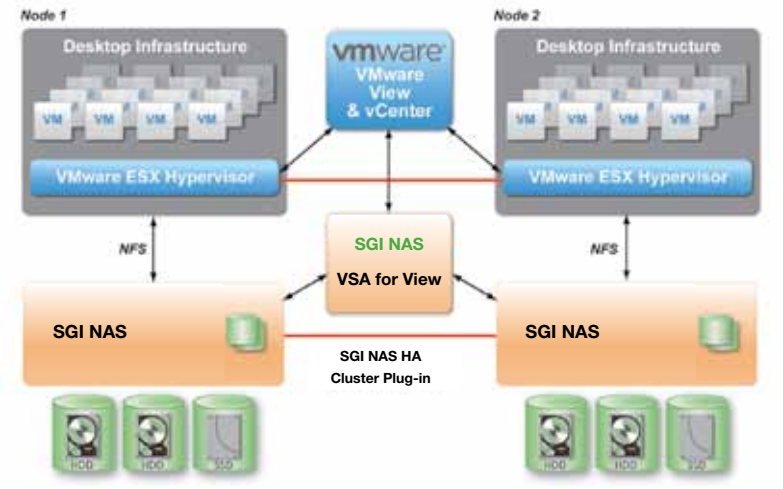

Figure 10. VSA for View enables a highly available architecture.

7.0 Summary

VSA for View can help organizations get strategic VDI initiatives up and running quickly. With only four steps required to build an optimized VMware desktop pool, VSA for View streamlines deployment and creates an out-of-the-box, ready-to-use VDI solution. Because it takes advantage of proven, open source SGI NAS technology, VSA for View brings cost-effective storage and performance-optimized I/O to VDI deployments.

Easy-to-use wizards lead the administrator through configuration and tuning. Built-in intelligent profiles and calibration eliminate guesswork, optimizing desktop pool layout and applying best practices. VSA for View includes benchmarking capabilities that give administrators clear visibility into the complex VDI environment, all the way from the client endpoint through the storage components, making it easier to create a desktop infrastructure that delivers predictable and responsive performance.

VSA for View simplifies the reconfiguration process every time VDI requirements change, rebalancing desktop VMs and storage automatically. Given the incredibly dynamic nature of VDI implementations, VSA for View slashes the time needed to prepare desktops for use, helping VDI user communities to be more productive in less time.

To see how VSA for View can jumpstart your VDI initiative and minimize your VDI storage costs, contact SGI and get started with your own evaluation.

8.0 References

See the following sites for more information.

Reference	Url
SGI NAS	www.sgi.com/nas
SQLIO Disk Subsystem Benchmark Tool	www.microsoft.com/download/en/details.aspx?id=20163
Iometer Project	www.iometer.org

Global Sales and Support: sgi.com/global