Integration Guide:
Unidesk® and Nimble Storage

Unidesk VDI management software with Citrix XenDesktop® or VMware Horizon View™ and Nimble flash-optimized hybrid storage systems are an ideal combination for high performance, easy-to-manage VDI. This white paper provides benefits and design considerations for deploying Unidesk with Nimble Storage.

unidesk®

Desktop Layering for VDI™

Introduction

Unidesk VDI management software with Citrix XenDesktop® or VMware Horizon View™ and Nimble Storage are an ideal combination for easy-to-manage, high performance VDI. Unidesk is the simpler, more powerful alternative to the separate desktop provisioning, application virtualization, image management, profile management, user virtualization, and storage optimization tools traditionally needed to create and manage virtual desktops. Nimble flash-optimized hybrid storage systems provide high performance, yet cost-effective storage in an easy-to-manage platform, perfect for delivering VDI workloads.

This white paper offers benefits and design considerations for deploying Unidesk with Nimble Storage, and provides:

- An overview of Unidesk desktop layering technology;
- A technical look at Unidesk infrastructure components and requirements;
- An understanding of how Unidesk desktop layering increases desktop density on Nimble storage arrays and maximizes IOPS by leveraging the Nimble Cache Accelerated Sequential Layout (CASL™) architecture;
- A guideline for how to integrate Unidesk with Nimble;
- Observations from a joint customer, the City of Kent, Washington, along with charts and screen shots from their Nimble/Unidesk implementation.

Audience

The intended audience for this white paper is VDI project leads, field consultants and sales engineers who want to test or deploy Unidesk VDI management in conjunction with Nimble Storage and VMware vSphere in desktop virtualization implementations using Citrix XenDesktop or VMware Horizon View.

Out of Scope

This document does not provide all configuration details for using a Nimble Storage system or implementing VMware infrastructure. Contact the product manufacturer for information about implementing these products.

Unidesk Glossary of Terms

To fully understand how Unidesk integrates with Nimble, it helps to understand common Unidesk terms.

Unidesk Term	Definition
Layer	A collection of files, settings, and registry keys captured by Unidesk that enables IT to build custom virtual desktops. Layers are modular, reusable components that can be assigned to one or many desktops in any combination, without ever having to reinstall applications or Windows patches.
Application Layer	An IT-created layer that includes an application or set of applications. You can assign one or more App layers to one or more Unidesk virtual desktops.
Operating System Layer	An IT-created layer that includes the Microsoft Windows Operating System. You can assign one OS layer to one or more Unidesk virtual desktops.
User Layer	An automatically-assigned layer that contains all of a user's personalized content. There is one User Layer per desktop. The User layer captures: • Computer name • Security Identifier (SID) • Windows Profiles • Customized settings and configurations • User-installed applications As users make changes to their desktops, Unidesk saves them in the User Layer. All desktop writes are stored in this layer.
CacheCloud®	A system of virtual appliances that replicate operating system, application, and user layers across an enterprise network. CacheCloud uses Unidesk Composite Virtualization™ technology to synthesize the layers into full, storage-efficient, persistent desktops.
CachePoint® Appliance	A virtual appliance that manages the layers and virtual desktops that you deploy to end users.
Desktop	A hosted virtual machine made up of one Operating System Layer, one or more Application Layers, and a User layer.
Gold Image	A virtual machine configured with an operating system and any desired applications that Unidesk can import to create an Operating System Layer.
Installation Machine	A special type of virtual machine that acts as a staging area for the creation of Application Layers as well as versions of Operating System and Application Layers.

Management Appliance	A virtual appliance that coordinates all of the communication in the Unidesk environment. It includes the Management Console and the management infrastructure that controls the workflow of managing virtual desktops.
Management Console	The Web-based management console that allows you to manage all of the components in the Unidesk environment. This console is accessed from the Management Appliance.
Master CachePoint Appliance	A special CachePoint Appliance that hosts a copy of all layers and versions of layers in the Unidesk environment. It also manages all of the Installation Machines used to create Operating System Layers and layer versions.

1. Unidesk Topology

As illustrated in Figure 1, Unidesk provides a virtual layered disk (or C: drive) to all of the virtual desktops hosted on VMware virtual infrastructure. Administrators use the Unidesk management interface to create, manage, update, and report on the desktop virtual machines in the environment. As directed by the administrator, the Unidesk software builds, deletes, reconfigures, backs up, and snapshots virtual desktops.
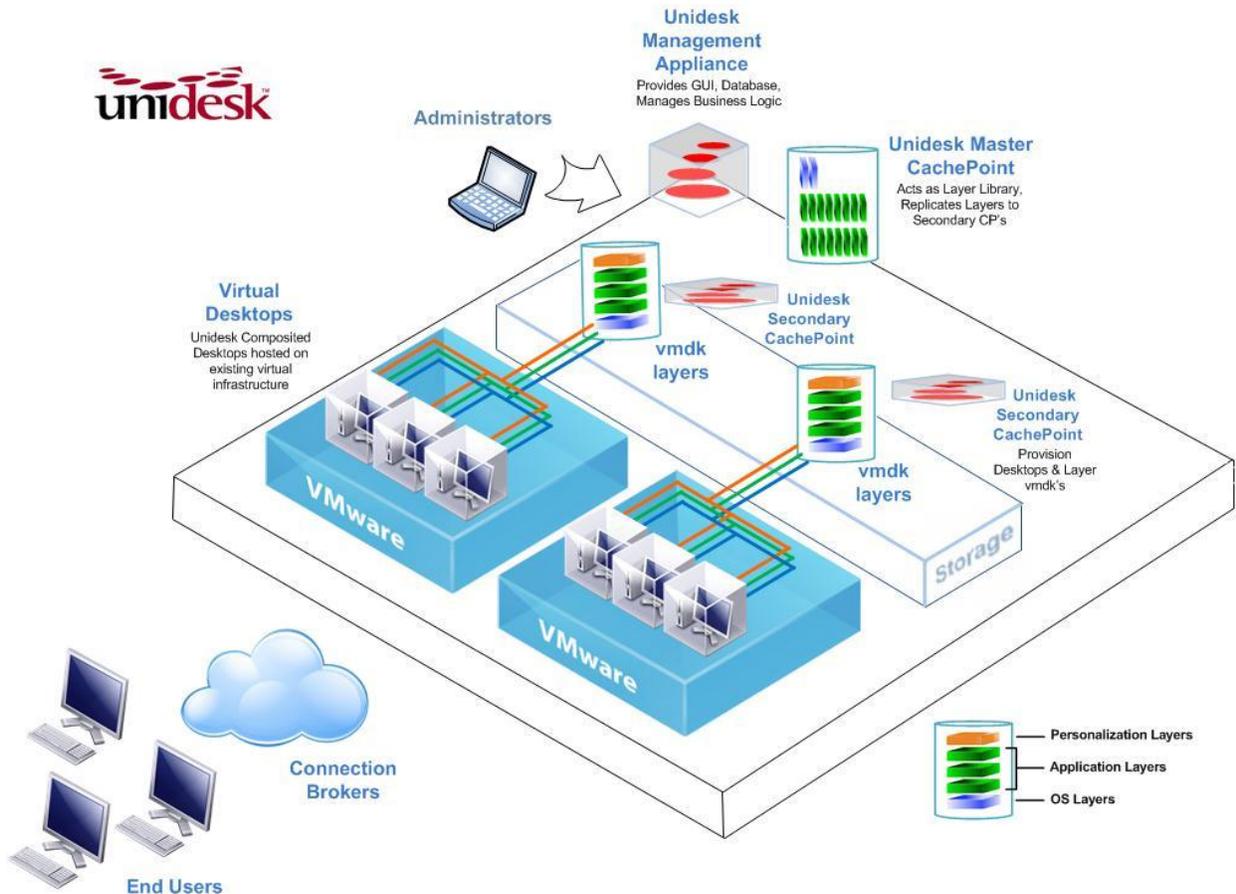

Figure 1: Unidesk topology

The Management Appliance communicates with the CachePoint Appliances in the environment. A single Master CachePoint Appliance maintains a copy of every Operating System and Application Layer in the environment. Additional CachePoint Appliances, deployed to individual VMware vSphere servers, manage cached copies of all the layers and the composite virtual disks for all of the Unidesk desktops they support.

2. Unidesk Deployment

Unidesk implementations include two types of virtual appliances: the Unidesk Management Appliance and the Unidesk CachePoint Appliance. To deploy these appliances, the installer will automatically download and import the OVF packages for you.

2.1.   Unidesk Management Appliance

The Management Appliance hosts the Web-based management console that administrators use to manage desktops and the Unidesk infrastructure. There is typically one Management Appliance in each Unidesk environment.

The Unidesk Management Appliance has the following attributes:

- •   Operating System: CentOS 6.2
- •   Size on disk: 10GB VMDK plus required VMware files
- •   CPU: 1 vcpu
- •   Assigned memory: 2048 MB
- •   Local database: MySQL

The Management Appliance maintains a local database that contains all desktop information, layer information, desktop assignments, and security details. You should back up this appliance on a regular basis using standard third party image backup tools (for additional details, see the Unidesk Recovery Concepts Guide)

2.2.   Unidesk CachePoint Appliances

The first CachePoint Appliance deployed in your environment is the Master CachePoint Appliance. This CachePoint Appliance maintains a copy of every OS and Application Layer that exists in the Unidesk environment. The Master CachePoint Appliance can also host desktops, but in larger environments, Unidesk typically recommends that a dedicated CachePoint Appliance (a desktop CachePoint Appliance) be deployed. A new CachePoint is typically deployed for every 64 desktops (64 desktops per data store) when using standard SAN. However, Nimble Storage incorporates solid state drive (SSD) technology that accelerates reads, along with inline compression and real-time write coalescing to accelerate writes. This, together with Nimble Storage support for VMware vSphere® Storage APIs – Array Integration (VAAI), enables Nimble/Unidesk customers to increase the number of desktops per CachePoint to 100 or more. Because Unidesk stores Windows OS layer and application layers only once per CachePoint, much of

these layers will stay active and remain in the flash. As a result, Unidesk desktop density will be much greater on Nimble Storage systems.
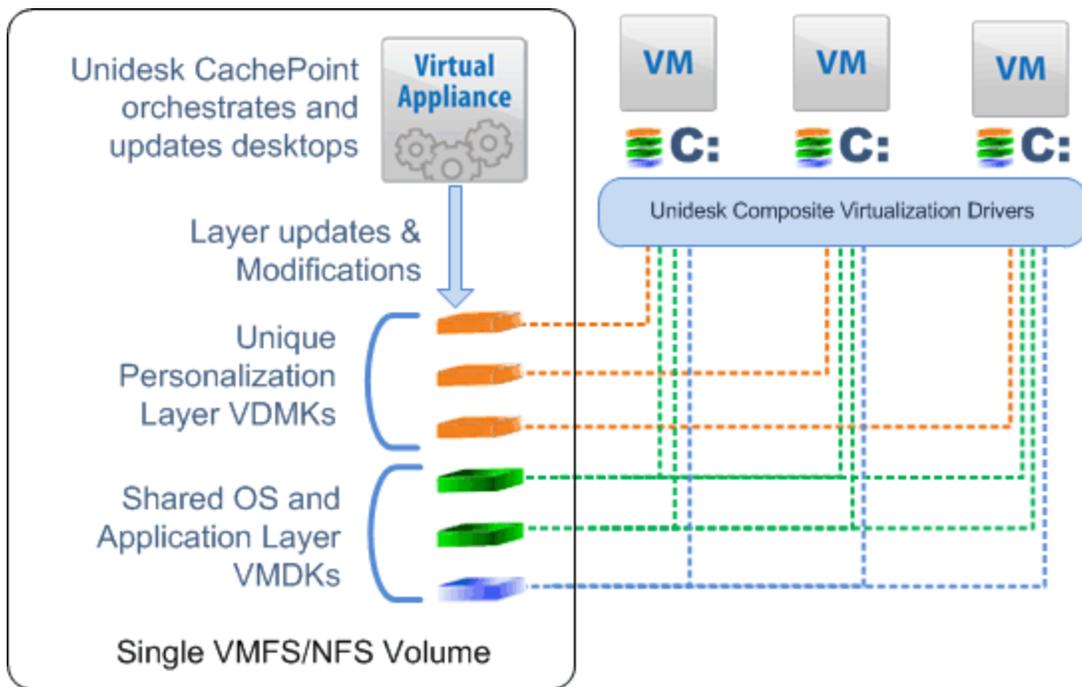

Figure 2: Unidesk topology

As shown in Figure 2, the Unidesk CachePoint Appliance has the following attributes:

- Operating System: CentOS 6.2
- Size on disk: 18GB Base OS VMDK plus VMware required files
- CPU: 2 vcpu
- Assigned memory: 2048 MB
- Local database: MySQL

2.3.　　　Unidesk Storage Considerations

When sizing CachePoint storage, you can take advantage of Unidesk's three types of storage tiers:

- Archive Tier
- CachePoint and Layers Tier
- Boot Images Tier

2.4.　　　Archive Tier

User layers are backed up to a dedicated archival storage tier. This User Layer backup, or snapshot, is used for both desktop repair and desktop recovery operations.

Unidesk customers can use a separate storage array to store the archives, or you can leverage Nimble's support for replication of a local datastore to a disaster recovery facility. Because of this, backups from one storage system can be replicated to a second storage system, providing both local recovery if the SAN is still functioning and Disaster Recovery if it is not.

Note that a full replicated CachePoint model can also be implemented using these technologies. See the Unidesk Recovery Concepts Guide for more details.

2.5.　　　CachePoint and Layers Tier

The designated data store for this tier contains the CachePoint Appliance itself and all layers used by the associated desktops. This storage tier is the focus for most of the desktop I/O. Administrators should host this tier on Nimble Storage systems to leverage the fault tolerance provided by its active-passive dual-controller architecture, and the high performance provided by its CASL architecture.

User Layer

Each desktop assigned to a CachePoint Appliance is provisioned with a unique User layer that stores all user and machine-specific information. Two VMDK files make up the User Layer. Both are thin provisioned and stored alongside the other Unidesk layers within the CachePoint storage structure. User layers require a minimum of 400 MB per desktop. How much the User layer grows depends on the amount of data written to the desktop, the number of applications that the user installs, and the size of the local profile.

When you create a desktop, you can define the maximum size for the User Layer. This feature enables administrators to effectively limit the amount of data and user-installed applications that end users can store on their virtual desktops.

Shared Layers

All persistent and non-persistent Unidesk desktops associated with a specific CachePoint Appliance share the Operating System and Application Layers, greatly reducing the amount of disk space required for VDI and increasing the density of how many desktops can be hosted on a single Nimble storage system.

For example, a Windows 7 32-bit gold image imported as a Unidesk OS layer that requires 14 GB of disk space is only stored once per CachePoint. All desktops that have been assigned this OS layer and that are hosted on the same CachePoint Appliance use the same VMDK file, eliminating all redundant Windows OS storage. So, if 100 Unidesk layered desktops are hosted on a single Nimble Storage system, they will only require 14 GB of Windows storage, instead of the 1.4 TB of Windows storage required by 100 full-sized virtual desktops.

To estimate the space that Application Layers use, simply calculate the space that each application uses on the disk, based on how much storage changes at the block level. For example, if 1.5 GB of storage is changed after an application is installed on a regular desktop, then that is how much storage will be required by the Unidesk Application layer. Add up the size estimate for all the Application layers you plan to deploy to desktops on a CachePoint, and that is the total amount of storage space required.

Remember too that with Nimble and Unidesk, customers see approximately 40% compression. So if the total storage estimate for a CachePoint is 140GB only 100 GB of storage would be consumed.

Like the OS layer, Application layers are shared across all of the desktops on a single CachePoint, greatly reducing the storage footprint as well.

For an idea on application sizing, review the following list of well-known applications. Note your size may vary depending on your method of installation.

Application	Size in GBs
Windows 7 Pro SP1 64 bit	21
Windows 7 Pro SP1 32 bit	14
Windows XP Pro SP3 32 bit	7.5
MS Office 2010 (32 bit on 64 bit OS)	2
MS Office 2007 (32 bit on 64 bit OS)	1.4
Firefox 11	0.5
Adobe Photoshop 5.1	2.2
Adobe Premiere Elements 9	3.2
Adobe Reader 10	0.9
7 Zip	0.4
do PDF Creator	0.4
Skype 5.9	0.4
EverNote	0.7
FoxIT Reader	0.5
FilZilla FTP Client	0.4
vCenter Client 5.1	2.8
iTunes 10	0.9
Systracer	0.3
View Agent 5.1	0.65
Visio 2007 (32 bit on 64 bit OS)	1.2
Visio Premium 2010 64 bit	2.1
Microsoft Lync 2010 Client	0.8
Notepad++ 6.1.5	0.4
SnagIT 11 w/.Net4	1.8
Oracle 11G Client	1
VNC Viewer 5.0.1	0.4
SAP Crystal Reports	2.5
Adobe Pro X	2.5

2.6.   Boot Images Tier

The data store assigned to the Boot Images tier contains the desktop Virtual Machines assigned to that desktop, their boot disks, and the Windows kernel and page file.

3. Nimble Storage

Nimble storage systems are well-suited for Virtual Desktop Infrastructure (VDI), and are proven to be an ideal storage target for Unidesk desktops.

Nimble's Cache Accelerated Sequential Layout (CASL™) architecture provides the consistent, optimal I/O performance required for an improved user experience. It also offers a simple to manage, cost-effective storage platform that meets the performance demands of hundreds of Unidesk VMs.

With Nimble, you get:

- Optimal VM performance. The Nimble storage system delivers IO for each Unidesk layered desktop out of cache for the shared OS and Application layers and uses write-optimized disk storage for User layers.
- Low cost per VM. Unidesk's storage reduction for shared layers and Nimble's data compression make the combined solution incredibly efficient. Up to 1,000 Unidesk virtual desktops can be run on a single Nimble CS200 or CS400 series Array (Note: The total number of desktops will be limited by overall system IO and application IO requirements. See Storage IO Optimization with Unidesk and Nimble section for more details).
- Excellent monitoring. Nimble's cloud based InfoSight portal provides a wealth of information and analytics regarding storage and IO performance, as well as real time monitoring and alerting.

3.1. Nimble Features

Nimble was designed from the ground up to maximize the benefits of an MLC SSD based cache. Nimble's patented CASL™ architecture is designed to seamlessly integrate high performance SSDs with high-capacity disks, delivering affordable performance, with local snapshots for quick recovery and replication for disaster recovery.

Other key Nimble features include:

- Inline Compression 30-75%
- Write-Optimized Layout dramatically speeds up writes. Small writes are coalesced into larger blocks in NVRAM so that writes are optimized using a single RAID stripe
- Dynamic Caching from SSD to speed up reads over traditional spinning disk
- Redundancy Features
  - Active-Passive Controllers
  - RAID 6 for Spinning Disks
  - Redundant Network paths using failover via a Path Selection Plug-in
- Space-Efficient Snapshots – Redirect-on-write snapshots consume a fraction of the space than full copies, and have no performance penalty.
- Storage Replication – Policy-driven WAN Replication includes the ability replicate compressed data, reducing bandwidth and shrinking the replication window
- VAAI support, including hardware-assisted locking, which allows for more desktops per CachePoint
- Non-disruptive upgrades
- Scale-to-Fit architecture allows for easy upgrade of Flash or increase SATA capacity without downtime

3.2. Storage Capacity Optimization with Unidesk and Nimble

The cost of storage has traditionally been one of the biggest challenges with VDI. For example, if an average desktop is 40 GB in size, 1,000 full-sized persistent virtual desktops would require **40 TB of SAN storage** just to meet capacity requirements.

VDI becomes much more space-efficient and cost-effective with Unidesk and Nimble. From a capacity standpoint, the Nimble CS240 and CS240G Arrays configured with 640 GB of SSD cache and 16-32 TB of compressed SATA storage can accommodate approximately 1,000 persistent or non-persistent Unidesk desktops. Based solely on capacity, the CS260G will support double that number of desktops. Let's see how.

First we will estimate a typical desktop configuration and estimate the portion of OS and Application layers we think will be heavily accessed and therefore cached in SSD, as well as the amount stored on the SATA disks in the array, as shown on the right. The estimate allows for 20-25 application layers and three layer versions. The extra layer versions are common in production Unidesk deployments to account for patches and updates. The model assumes that only a portion of the applications total disk blocks will be cached.

Per CP Layer Capacity Estimate	Cache GB	SATA GB
Windows OS	3.5	18
Ms Office 2010	1.5	6
Utilities	1	3
LOB1	0.5	2
LOB2	1	4
LOB3	0.3	1
LOB4	1	4
LOB5	1.3	6
Dept1	1	2
Dept2	0.2	0.5
Dept3	1.1	3
Dept4	1.5	5
Dept5	0.5	2
Dept6	0.2	1
Dept7	0.2	0.5
Dept8	0.2	0.5
Dept9	1	4
Dept10	1.2	5
Dept11	0.5	2
Dept12	0.3	1
	18	70.5

	Cache	SATA
On Average 2 Extra Versions	18	141
30% Growth Factor	5.4	42.3
Sub Total for Shared Layers	41.4	253.8
Personalization Layers @ 5 GB (70% used) per deskto		350
Boot Images @ 4 GB per desktop		400
Appliance Storage		18
Total Storage per CP (100 Desktops)	41.4	1,022
Total Storage for 500 Desktops		
Total Storage for 1000 Desktops		
Management Appliances		283
Total Storage for 500 Desktops	207	5,391.80
Total Storage for 1000 Desktops	414	10,500.80

A Unidesk/Nimble implementation for 1,000 persistent virtual desktops would require 1 Unidesk Master CachePoint, 10 Unidesk Desktop CachePoints, and 10 datastores (one for each Desktop CachePoint), for a total of **~11TB of storage**. Non-persistent Unidesk desktops would require even less: only ~**9.5 TB of storage.**

Here are the details for calculating these figures:

- 1,000 desktops
- 616 GB for the OS layers and versions
- 2767 GB for App Layers and Versions plus growth (30%)
- 3.5 GB for each User layer (3.55 TB total) – persistent desktops
- 2 GB for each User layer (2 TB total) – non-persistent desktops
- 4 GB for boot images (4 TB total) (vSwap, pagefile, dump file)

The calculation looks like this: *(Layers plus versions plus growth plus appliance) * (# of Desktop CachePoints + 1 Master CachePoint) + (# of Desktops * size of User layer@70%) + (Boot images * # of Desktops) = Total Normal Space Required*

Plugging the numbers in: *((((211.5)*1.3) + 18)*11) + (1000*5*.7) + (1000*4) = 12.5 TB* (((275+18))*11) + 3500+4000 = 3223+3500+4000 = 10,723

This brings the total amount of space required for 1,000 persistent virtual desktops to 11 TB. Compared to a full clone model, that's a **savings of 29 TB (40TB – 11TB), or 72.5%** for persistent virtual desktops.

The VDI storage footprint can be reduced even further by implementing non-persistent virtual desktops with Unidesk. Using the minimum User layer size of 2 TB, only 9.5 TB would be required for 1,000 non-persistent desktops. Compared to a full clone model, that's a **savings of 30.5 TB (40 TB – 9.5 TB), or 76%** for non-persistent virtual desktops.

3.1.　　Storage IO Optimization with Unidesk and Nimble

In any VDI environment, IOPS are an important consideration. Without sufficient IOPS, desktops will feel sluggish, take longer to reboot, and require more time for login/logout. Figuring out IOPS requirements is not always a simple matter. Knowing your users' work habits (low, medium or high workloads), how bursty VDI will be (i.e. boot storms), and how long those bursts will be sustained are all important considerations.

Traditionally, IOPS has required careful balancing between server, SAN storage, and networking. Over-provisioning SAN storage has often been required to make up for the higher latency and longer data access times of spinning disk.

Nimble Storage systems and the data pattern created by Unidesk shared layers eliminate this complexity and deliver outstanding IO performance. The Nimble CASL storage architecture breaks the link between performance and capacity by providing excellent performance without adding spindles.

A Nimble CASL storage system with SSD cache and SATA drives provides up to 17,000 Read/Write IOPS, based on 4k blocks on a Nimble 200 series array. This increases to over 38,000 IOPS on the 400 series arrays. In order to enhance read IO, Nimble caches "Hot" blocks on MLC Flash storage. In order to increase the life of the SSDs, Nimble aggregates random IOs into full block writes, which optimizes the geometry of the Flash

storage, and greatly reduces the number of writes to Flash, thereby increasing its useful life.

To increase write performance to the HDD disk subsystem, Nimble performs several distinct operations on large capacity storage:

1. As writes come in they are immediately compressed;
2. The writes are then aggregated into the optimal write geometry in NVRAM and written as sequential large block stripe writes to disk;
3. Hot blocks are then copied to Flash as necessary.
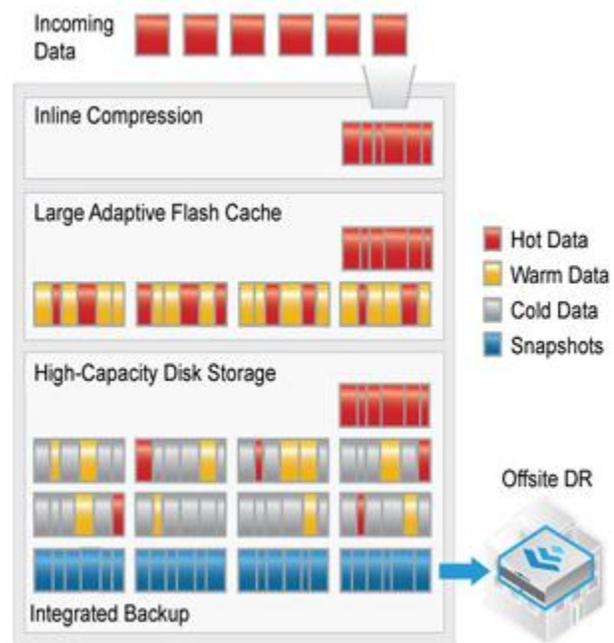
The data pattern created by Unidesk layering technology takes full advantage of the Nimble MLC flash. The **415 GB of shared application and OS layer storage** needed for 1,000 desktops easily fits on the 640 GB (CS240 or CS440) or 1.2 TB (CS260 or CS460) of Nimble SSD capacity. Since the blocks of storage that make up Unidesk layers are shared by many desktops at once, the most often used blocks stay "hot" and remain on the MLC flash providing outstanding I/O performance. Less active User layer data and less frequently used application blocks will be accessed directly by Nimble from the higher capacity SATA drives.

Of course the amount of IO you will require is difficult to estimate. Many deployments see an average load of 3 IOPS per desktop with peak averages in the 15-20 IOP range. You will want to design to the peak to ensure happy users. However, it is possible that your application portfolio and usage will demand more IOPS. Nimble addresses this by offering two levels of performance with the CS200 series and CS400 series. If you require more IO performance, choose the 400 series, which doubles the performance of the array.

3.2.   Power and Space Saving Benefits of Unidesk and Nimble

There are also significant savings in power and cooling as well as space in the datacenter with Nimble and Unidesk. Traditional SAN would require almost 6 shelves of 15K drives to provide the same IO performance as one Nimble shelf.

3.3.   Unidesk Design Considerations with Nimble

Here we will review network and storage design options for implementing Nimble Storage with Unidesk-managed VDI.

Network

Nimble offers models that provide either 6x1 Gb/s Ethernet connections or 2X10 Gb/s Ethernet connections plus 2X1 1Gb/s Ethernet connections on each of the two controllers. These connections should be split across two separate Ethernet switches to provide redundancy to the iSCSI network. In testing it has been shown that the Nimble NIC balancing algorithms work perfectly and bandwidth can be multiplied by 6 with all ports active.

Both the GB and 10 GB Ethernet connections should work fine for VDI. If you choose GB rather than 10 GB, it is recommended to configure all six ports.

LUN Configuration and Sizing

Since Nimble supports VMware VAAI with hardware-assisted locking, it is possible to support more than 64 desktops per LUN. This, plus the fact that much of the I/O for shared layers will be delivered out of the Flash cache means that the design consideration for Unidesk CachePoints will not be I/O related, but instead will be based on how many desktops can be managed with a single Unidesk CachePoint. Based on customer feedback and internal testing, up to 100 desktops can be managed by a single Unidesk CachePoint with Nimble Storage.

Unidesk desktops are often scheduled to update overnight during non-work hours. Unidesk desktop rebuilds on Nimble storage have been observed to take approximately 2.5 minutes per desktop. Therefore, updating all 100 desktops would take just over 4 hours (100*2.5/60 = 4.17 hours). Even if performance was half as good, all desktops on a single CachePoint could still be rebuilt in one maintenance window. Unidesk CachePoints can all update desktops in parallel, enabling you to update thousands of Unidesk desktops overnight. This process is processor dependent and does not generate significant disk IO.

Therefore, for 1,000 desktops, 11 LUNs would be required – 10 for secondary CachePoints and one for the Unidesk Management Appliance and Master CachePoint. Based on our earlier space calculations, each secondary CachePoint LUN would be provisioned for approximately 1 TB to allow for the 250 GB of shared layers, 350 GB of User layers, and 400 GB of boot drive storage.

Normally, 300 GB is enough capacity for the Management Appliance and Master CachePoint. If an unusually large number of layers will be deployed, this number will increase.

For N+1 or N+2 configurations, more LUNs would be provisioned to match the extra hosts, and to accommodate recovery desktops.

4. Unidesk and Nimble Customer Example

Customers are having great success implementing VDI with Nimble Storage and Unidesk. One joint customer is the City of Kent, Washington. City of Kent has deployed 150+ Unidesk desktops so far on a single Nimble storage system, using 4 Unidesk CachePoints with approximately 50 desktops each, with plans to scale to 500+.

The city's initial deployment used Pano Logic zero clients and the Pano Logic desktop broker to access its Unidesk-provisioned desktops. Since then, the city has deployed VMware View and Dell Wyse thin clients to access Unidesk desktops.

The City of Kent's Unidesk/Nimble environment is configured as follows:

- Storage Array: Nimble CS220
    - 4x1 GB NICs for iSCSI
    - 7 LUNS
- For Pano Logic
    - 1 Unidesk CachePoint per LUN
    - 4 CachePoints total
    - 50 desktops per CachePoint
    - 156 desktops total
- For VMware View
    - 1 CachePoint per LUN
    - 1 CachePoint so far, with plans to grow to 7 CachePoints
   - Will support 50 desktops per CachePoint, for a total of 350 desktops

Brad Soper, Network Administrator at the City of Kent, was kind enough to share some observations on the joint solution:

- "We installed the Nimble path plugin for vSphere and are very happy with it. It makes the process of creating a new LUN extremely simple."
- "Most of the day we average roughly 20 MB/Sec throughput with about 1,100 IOPS. During Unidesk desktop rebuild operations, the throughput will spike to about 120 MB/Sec for a short period of time and I/O will peak at about 3,000 IOPS. This is significantly below what the array is capable of. **With roughly 150 desktops we are hardly taxing the array at all.**"

- "So far, the Nimble array has scaled very well. Bringing more Unidesk CachePoints and desktops online seems to have little impact on performance."
- "We're getting very high cache hit rates with Nimble, averaging about 90%, helped by Unidesk layers keeping our Windows gold image and applications hot."
- "We currently keep all of our data stored on the Nimble system. With Unidesk's small storage footprint, we have plenty of space left over, so we even keep the backups of the desktop personalization layers on the Nimble array."

Brad also shared some Nimble Storage reports from his environment that show how the Nimble storage system is managed on a daily basis, and how it is performing with Unidesk desktops.

The first screen shot shows storage throughout and IOPS during a standard Unidesk desktop rebuild:
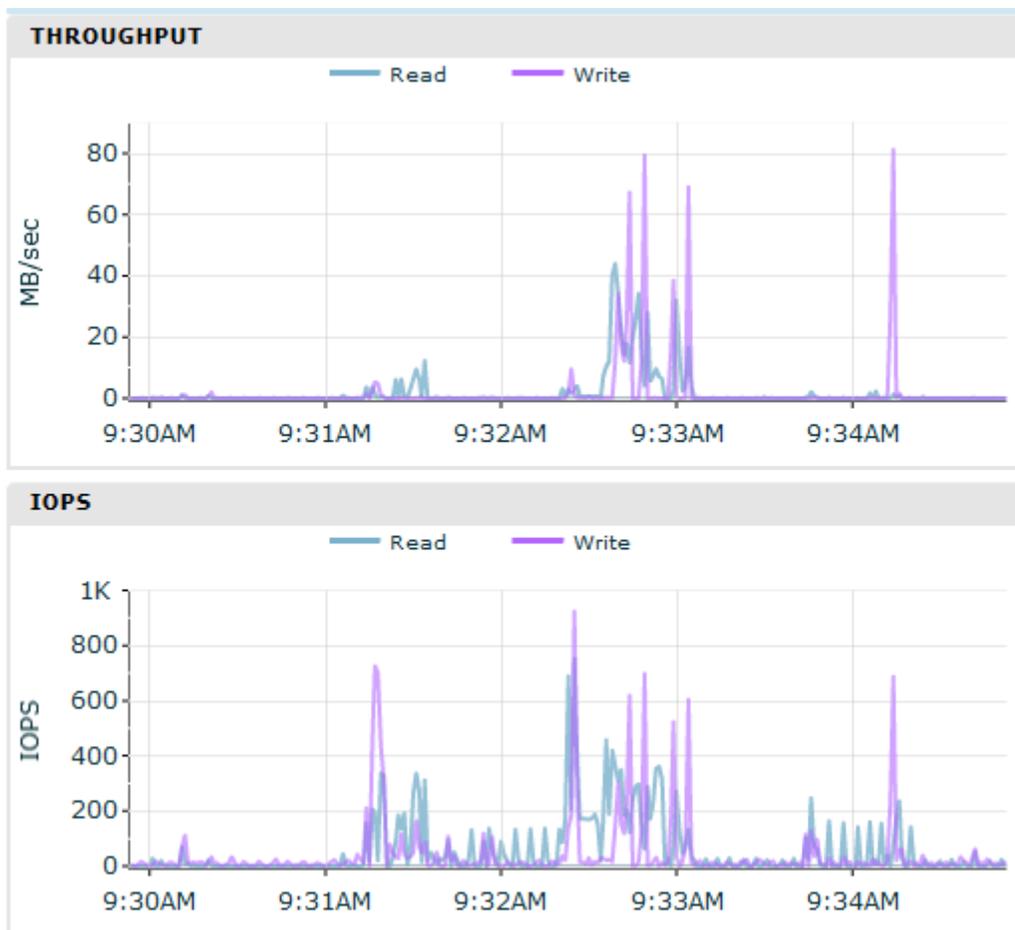
The next screen shot shows the array's overall status. Note City of Kent is getting almost 40% compression, in addition to the 70-80% space savings provided by Unidesk.
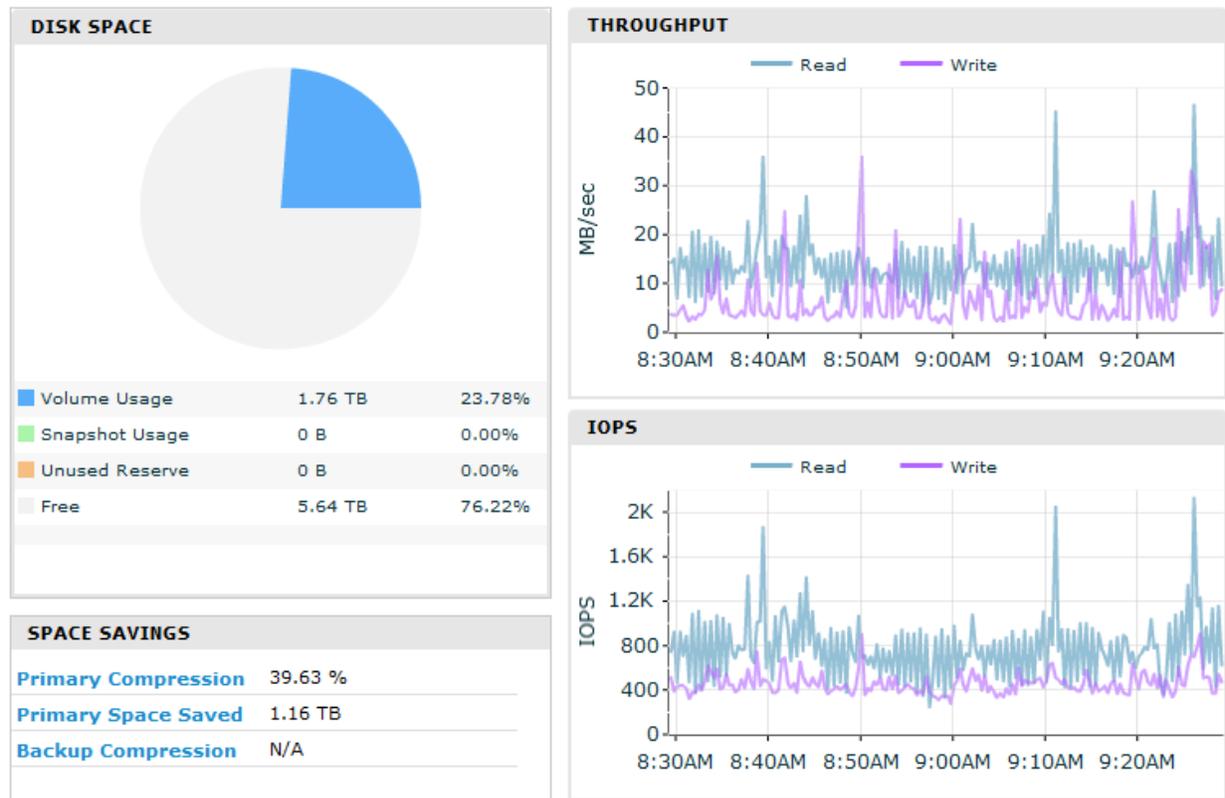
Customer Viewpoint of Nimble and Unidesk

Brad wrote this last section summarizing his thoughts on VDI, Unidesk and Nimble.

"We originally deployed our Unidesk environment on an older storage array and, while stable, we had less than desired performance results. Users felt their virtual desktops were slow and took a lot of time to startup or reboot. We had backlash from users on the general performance of their new virtual desktops. Through programs like SolarWinds, we realized the IOPS provided by the array were too limited for the performance we needed. The array worked great when we had a small number of users, but once we had over 100 users, the performance began to degrade. We called in Nimble to do a demonstration of their hybrid storage solution. Immediately it was clear the CS-220 was the storage array we needed if we were going to continue with our VDI rollout."

"When I stood up the first Unidesk CachePoint on the Nimble array, it was clear we had made the correct decision. Our Unidesk rebuild times were cut in half, and boot times for VMs went from minutes to seconds. Combined with the new release of Unidesk 2.0 and upgrading all users to Windows 7 64-bit, our VDI deployment has been saved. I constantly speak with different users and ask how they like their desktops. The response is much different today. The users are extremely pleased with the performance and don't miss their old PCs at all."

"I would recommend going forward, if you are going to seriously look into VDI, you need an array like the Nimble CS-220 combined with Unidesk. I honestly would stick with physical desktops otherwise."

"The performance and ease of use from Nimble and managing desktops in Unidesk truly makes it the only practical way to handle a VDI environment. We get the benefits of redundant management controllers so firmware updates are done live, and Nimble's simplistic web interface makes it easy to configure the array. The VMware plug-in makes creating a new LUN for your ESXi hosts extremely quick and simple. We are extremely pleased with the combination of Nimble and Unidesk. We now have the flexibility of creating custom virtual desktops with the performance of a standard PC."

Conclusion

Unidesk and technology alliance partners like Nimble Storage are helping make VDI projects more successful. Whether you choose Citrix XenDesktop or VMware Horizon View for desktop connectivity, this white paper shows that Unidesk and Nimble are an ideal combination for low cost, high performance, easy-to-manage VDI.

Unidesk is the simpler, more powerful alternative to the complex tools traditionally needed to create virtual desktops, package applications, manage images, sustain user changes, and optimize storage. Nimble provides exceptional VDI storage performance for VDI read and write operations, along with excellent reporting and troubleshooting.

With Unidesk reducing the storage footprint more than 70% for persistent desktops, and up to 76% for non-persistent desktops, you can host up to 1,000 desktops on a single Nimble storage system, or use the extra space to handle non-VDI workloads. Unidesk layering technology also creates the ideal data pattern for Nimble caching, so you can provide more than enough IOPS to satisfy your most demanding power users. Testing of IO requirements is recommended in order to determine if a CS200 series or CS400 series should be utilized for a 1,000 desktop deployment.

Together, Unidesk and Nimble are an ideal solution for small VDI environments running a few hundred desktops, or large enterprise deployments running several thousand.

About Unidesk Corporation

Unidesk Corporation (www.unidesk.com) provides the management platform that accelerates the movement of Microsoft Windows desktops® to the cloud. Unidesk® layering technology enables Virtual Desktop Infrastructure (VDI) to deliver more applications, satisfy more use cases, and offer a more personal user experience with less IT effort and less storage. By connecting to Unidesk desktops from Citrix XenDesktop®, VMware Horizon View™ and other brokering solutions, customers expedite VDI projects, reduce IT operations costs, cut VDI storage capacity requirements, and enhance worker productivity. Unidesk Corp. is a privately-held company with headquarters in Marlborough, Mass, USA.