



# Faster, Easier Server Management

With Virtualized Storage from Xiotech

One of the biggest challenges with direct-attached storage is the extensive time—and downtime—required to perform common server management tasks. Moving storage to a virtualized storage system from Xiotech significantly eases the administrative burden, while minimizing downtime and reducing costs.

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From the very beginning when Xiotech introduced virtualized storage to the marketplace, the architecture has included two key features that make server management easy and efficient:

- **No Server-Side Software:** Unlike DAS and most other networked storage options, Xiotech® systems require no storage software on the server. With most other systems, when you upgrade the storage system (controller) firmware, you must also upgrade or patch the associated software or agents on every server that accesses the storage system. Not only is this time consuming, but it often leads to periods of application unavailability.

Xiotech, on the other hand, delivers complete storage and server independence—no software on the servers means no software to upgrade or patch.

- **Powerful Boot from SAN:** The Magnitude 3D family and Emprise 7000 system enable myriad servers running diverse operating systems to simultaneously boot from the storage area network (SAN). One Magnitude 3D 4000 or Emprise 7000 system, for instance, can boot up to 248 servers, running all common operating systems. This makes installing and upgrading operating systems and applications far safer and faster than is possible in a DAS environment. It also makes server maintenance and replacements quick and easy.

## In Today's

nonstop, 24x7, always-connected world, managing servers with direct-attached storage (DAS) can be a nightmare—particularly in environments with high numbers of servers dispersed throughout the organization, or virtual servers running on physical servers with DAS.

The inherent inflexibility of DAS often leads to extensive server downtime to perform common, but necessary, maintenance tasks. Operationally, this requires administrators to often perform server maintenance at night or on weekends so user access to data and applications is not interrupted. Of course, for organizations that function 24x7, there is no good time to take servers offline. Planned downtime has become an oxymoron.

Xiotech Corporation's Magnitude 3D® family and Emprise™ 7000 system are built on a unique virtualized storage architecture, which dramatically simplifies, speeds, and reduces the cost of both server and storage management. With this innovative technology, you can easily perform most server administration in the middle of the day, without any planned downtime.

In addition, Xiotech's innovative ICON Manager software—utilizing Web Services as its communication method between servers and storage—enables you to combine many aspects of server and storage management into a single, unified whole, thus reducing even further the time required to perform critical server management tasks. This approach removes many administrative, training, and cost barriers that are present in proprietary interfaces (APIs) or slow and tedious browser-plus-Java storage management approaches.

## Server Management

Changing configurations with DAS is time consuming and wrought with challenges, perhaps causing you to avoid necessary server maintenance tasks. Xiotech eliminates this nightmare, reducing complexity, time, and cost of many server-related tasks, including:

- Applying patches
- Installing and upgrading operating systems and applications
- Adding capacity
- Changing RAID types

- Upgrading hardware
- Consolidating servers
- Server clustering
- Deploying servers remotely
- Building a test lab
- Backing up data

Let's take a closer look at how Xiotech improves server management, essentially giving you your life back.

## Applying Server Patches

Have you ever had a server patch fail and you had to rebuild a server because of it? When was the last time you applied a server patch and a backup was performed up to the point in time before that patch was installed? Be honest.

The reality is that most administrators do not complete a full backup before applying a patch. They just rely on the backup from the night before in the event that a patch does not go well. But what are you really upgrading? It is not the data volumes, it is the operating system volumes—the same volumes that you will have to rebuild from scratch if all does not go well.

Xiotech's TimeScale® Copy software enables you to quickly and easily create copies of your operating systems and their boot volumes, which you can use if something should go wrong with the patch. Emprise 7000, for instance, can perform a block-level copy of the storage volume (virtual disk or VDisk) at the nominal rate of 10-12GB/minute. This means you can completely copy a 12GB operating system volume in only 1 minute!

In the event the patch does not go smoothly, just point the server to the copy, reboot the server, and be up and running in minutes. The server will be fully functional, in the state it was prior to the patch attempt. Without this capability, you would have to reinstall the operating system and backup software, and then restore from tape, taking several hours to recover—if recovery was possible at all.

Xiotech's systems do this in minutes, not hours. No reinstalling the operating system, no installing backup software, no restoring the operating system files and configuration from tape. Just repoint and reboot.

## Upgrading Operating Systems & Applications

Do you ever think about why upgrades have to be done in the dead of night or on the weekend? And why server operating system upgrades are so painful?

Unlike applying a patch, you know that you must make a full backup before performing an operating system upgrade. A typical scenario is to wait until 10:00 pm or so on a Friday, and then start a full tape backup of the server in case you have to restore from tape. If you truly are careful, you perform two backups, just in case a tape in the first backup set is bad. This may take several hours or an entire day. Being optimistic, all tape backups might be done by 10:00 am on Saturday, taking 12 hours.

Now you begin the server upgrade. If the upgrade takes an hour and everything goes well, then you can go home—the upgrade took only 13 hours to accomplish. If it does not go well, then you get to wipe the volume clean, reinstall the operating system, reinstall backup software, and restore from tape. Now it is pushing 8:00 or 9:00 pm, and the objective is to return to where the server was before the upgrade, rather than actually performing the upgrade. The process will have to be repeated, and you now have less than 24 hours to perform the task. Meanwhile the server has been unavailable for over 24 hours!

Xiotech storage enables you to do what you were actually hired to do. As mentioned before, Emprise 7000 can perform a block-level VDisk copy at 10-12GB/minute. This reduces backup time from hours to minutes. Instead of starting the upgrade at 10:00 am on Saturday, you can begin at 10:04 pm on Friday. If the upgrade takes an hour, then you will be done by

11:05 pm and can either upgrade another server or go home at a halfway decent hour. Total upgrade time is 61 minutes, far better than the 13 hours it might take with DAS.

What happens if the upgrade does not go well? All you do is point the server to the operating system copy, boot the server, make another block-level copy, and start the upgrade again just 4 minutes later. There are no backups to tape, no reinstallation of the operating system, no reinstallation of backup software, no restoring from tapes. Just copy and upgrade. Focus your time on what you need to do, not on the supporting functions.

You can also use this same technique when upgrading applications. After all, this can destroy a boot partition as well as any patch or server operating system upgrade.

## Installing Operating Systems & Applications

How long does an operating system installation usually take? And what happens if something goes wrong? Do you really want to start all over from the beginning? What if you could just take one step back and restart the installation from the last completed step? With Xiotech's storage systems, it's not only possible, it's very easy to do.

To install an operating system, for example, first create a VDisk, identify it to the server, and begin the installation process to that VDisk. While the operating system is being installed, create several more VDIs of the same size and mirror the installation VDisk to each of those other VDIs. When you complete the first step in the installation, shut down the server and break the mirror to the first VDisk. After you complete each subsequent step, shut down the server and break the mirror to the next VDisk.

You will end up with multiple VDIs, each with a completed stage of the installation. If one of the

stages fails, stop the installation process, and copy the VDisk with the latest successful step over the install VDisk. Then begin mirroring on the next VDisk again, and in a few minutes, you are again performing the step that failed before—but you are not starting from the very beginning.

### A Practical Example

Let's look at how this works in the real world. Say you are installing Microsoft® Windows® 2008 with Microsoft SQL Server 2005 on an Emprise 7000 system. You have the operating system and patch, as well as the SQL Server application and patch, to install. Something is bound to go wrong during the install; let's face it, it almost always does.

With Xiotech storage, you don't have to worry. Simply do the following:

1. Create five VDIs that are all the same size (one for the actual installation, plus one additional VDisk for each installation step).

Using ICON Manager, this process is simple. Just right-click on the desired server and choose "Create Volume." ICON Manager will execute a wizard to create the VDisk and format the volume on Windows automatically. Most other storage management approaches force you to learn and use the Windows Disk Management snap-in to format and assign the volume. ICON Manager does this without intervention. All steps after this point are a simple matter of selecting the desired volume in ICON Manager and right-clicking to perform the desired task. No other management tools or screens are necessary.

2. Install Windows 2008 to VDisk 1 and mirror VDisk 1 to the other four VDIs.
  - When the Windows 2008 installation is complete—but before you apply the patch—shut down the server and break the mirror to VDisk 2; then bring the server back up.
  - VDIs 2, 3, 4, and 5 are complete copies of the installation to that point.
  - Because the mirror from VDisk 1 to VDisk 2 was broken, VDisk 2 remains a point-in-time copy of the installation.

3. Install the Windows 2008 patch to VDisk 1, which is still being mirrored to VDIs 3, 4, and 5.
  - When the patch has been applied, shut down the server and break the mirror to VDisk 3.
  - VDisk 2 is a copy of the Windows 2008 installation.
  - VDisk 3 is a copy of Windows 2008 with the patch applied.
4. Continue the process with SQL Server 2005 and then the SQL Server 2005 patch.

When you are done, you will have the following:

- **VDisk 1** (logically connected to the server):
  - Windows 2008
  - Windows 2008 patch
  - SQL Server 2005
  - SQL Server 2005 patch
- **VDisk 2:**
  - Windows 2008
- **VDisk 3:**
  - Windows 2008
  - Windows 2008 patch
- **VDisk 4:**
  - Windows 2008
  - Windows 2008 patch
  - SQL Server 2005
- **VDisk 5:**
  - Windows 2008
  - Windows 2008 patch
  - SQL Server 2005
  - SQL Server 2005 patch

What happens if part of the installation fails? Imagine that you get all the way through the Windows

2008, Windows 2008 patch, and SQL Server 2005 installation. However, when you get to the SQL Server 2005 patch part of the installation, you click Yes instead of No (or No instead of Yes). In any case, the SQL Server 2005 patch part of the installation does not go the way you want it to. In a normal installation, you are 1.5 hours in and you have to start all over again. Not so with Xiotech storage.

With Xiotech's storage systems, you only have to take one step back. Because VDisk 4 was successfully completed (Windows 2008, Windows 2008 patch, SQL Server 2005), this is your good copy. Break the mirror to VDisk 5, and copy VDisk 4 over VDisk 1. This replaces the failed installation VDisk with one that is good up through the SQL Server 2005 installation. Turn the server on, and it will be running through the end of the SQL Server 2005 installation, ready to start over again.

Before you start, however, remirror VDisk 1 over VDisk 5. Because this is the last step it may seem unnecessary, but who knows what you may decide to do after you get the patch installed. Now, install the patch and break the mirror when you are done. VDisk 1 is the fully installed server operating system with applications installed; VDIs 2, 3, 4, and 5 are copies at various stages of the installation. These VDIs can either be kept as "gold" copies of the installation at various stages, or may be deleted to reclaim disk space.

### *Take It to the Next Level*

What do you do with all these extra VDIs? Save them! When you deploy another SQL Server 2005 server, you already have an image that you can deploy in just minutes.

If the physical server is different than the server the VDisk was built on, you can use SYSPREP with Microsoft operating systems to prepare the server to bring the image up on another physical configuration. Novell® NetWare® and Linux® operating systems are even easier, as they almost do not care that the physical hardware has changed. NetWare only notices if you change the network adapter card, and Linux tells you what you need to delete or add to make the new configuration work. Finally, VMware® ESX Server is also very aware of what hardware it is being installed on and is able to self-configure to a great extent.

## Protecting Installations

How often has this happened to you? You build a server for a vendor to install his or her product on, only when the vendor installs the application, he or she destroys the operating system installation. With DAS, you have a lot of work ahead of you to rebuild the operating system.

Xiotech's storage systems provide a quick and easy option to protect your operating system from unintentional corruption. Simply make a copy of the operating system before the vendor arrives. If the installation goes well, you can delete the copy. If the vendor makes a mistake, then copy the recently made operating system VDisk over the original VDisk and let the vendor start again. This enables quick recovery of failed installations—just like when you apply your own patches and upgrades.

## Adding Capacity

How do you add more capacity to a server? With DAS, you must back up the server and take it offline. Then you must add disks to the server, reboot it, recognize the new disks, and restore the data. This is very risky, not to mention all the downtime associated with the procedure. It can take several hours or even several days, especially if you are restoring multiple terabytes from tape. Xiotech eliminates the hassles of increasing both logical and physical capacity for a server.

### *Adding Logical Capacity*

Using ICON Manager, you can create volumes and assign them to a server in a matter of seconds. This capability is also available for Windows virtual machines (VMs) in an ESX Server environment—creating ESX datastores, assigning them to ESX servers in

a matter of seconds and creating volumes (VMDKs) for the Windows VMs. When a server needs more capacity, you can add the space right away with no downtime (depending on the server operating system). If additional space is needed on the same volume, you can expand the VDisk on the fly, and again, depending on the operating system, add the space with no downtime to the server.

For Windows servers, this expansion process also grows the filesystem on the fly, enabling applications to continue to run without interruption or need for you to use Windows Diskpart to extend the volume. ICON Manager also frees you from using Windows dynamic disks in order to easily manage volume expansion. All ICON Manager functions for Windows servers operate on basic disks without you having to learn or use Diskpart whatsoever.

Furthermore, in Windows environments, Xiotech's Intelligent Provisioning capability enables you to set a policy such that when the volume's filesystem (NTFS) grows to exceed a certain percentage of the volume's space, the volume will be automatically expanded by a specified amount. This growth is completely transparent to applications and allows for controlled growth and guaranteed allocation—unlike thin provisioning methods that permit uncontrolled growth and deliver unguaranteed allocation, resulting in potential system crashes, downtime, data corruption and other negative outcomes.

### *Adding Physical Capacity*

When more physical disk space is needed, you can add it to Magnitude 3D 4000 or Emprise 7000 without the servers being aware, without a reboot to the system or the servers, and without users knowing it happened.

**Mixing and Matching Drives:** What happens when you want to add more physical space to a server? Assuming this is easy (which it usually is not), you may have to match the size and spindle speed of the drive to add it to your array. If you don't, then you lose valuable disk space.

For example, if you have a typical older RAID 5 set with three 18GB drives and you want to add more disk space, all you have to do is add another 18GB drive. The problem is, no one sells 18GB drives anymore. You have to buy a much larger drive (for example, a 146GB drive) and add that to the set, but you can only use 18GB of the drive because of server software

