

RAID - THREE-DISK SERVER

A 5big Office/Office+ with three drives offers many options for the user, including the RAID configuration. While it is possible to create Spanned disks or RAID 0 arrays, LaCie highly recommends mirroring and RAID 5 for optimal protection of your data. RAID 0 can offer some speed advantages but data will not be duplicated across both volumes as with mirroring. Users risk losing data if one of the disks should fail in a RAID 0 array.

SUGGESTED RAID CONFIGURATION FOR THREE DISKS

Volume	Disks and RAID Level	Usage	Notes
Windows	2 Disks Mirror	Windows must run from its own volume. Storing data on the system volume will impact server performance. Page file*	A Mirror requires two drives, making it ideal for the Windows operating system. A Mirror offers redundancy, duplicating each file on the two disks that make up the volume. If one disk should fail, the system data will be available on its mirrored drive. If Disk 0 should fail, it will be possible to recover the system boot disk before restarting the server.
Data	3 Disks RAID 5	The Data volume should be used to create Shared Folders and store data.	RAID 5 requires three or more disks. RAID 5 offers improved storage capacity. While mirroring has an overhead of 50% storage capacity due to file duplication, RAID 5 parity on the Data volume has approximately 20% overhead. This means that close to 80% of the total capacity is available for storing data. RAID 5 includes many features that improve performance. For example, RAID 5 uses block level parity to secure files. Block level parity takes far less time to write data across the disks in the volume than mirroring files across two drives. RAID 5 volumes may not host the Windows operating system.
Data 2	1 Disk (60GB) Partition	The volume can be used to create Shared Folders and store data. Write the page* file to this volume to extend the server's physical memory.	Since a page file may be recreated, you can take advantage of a partition that is not protected.

*The page file can be created on the Windows volume or the Data 2 volume.

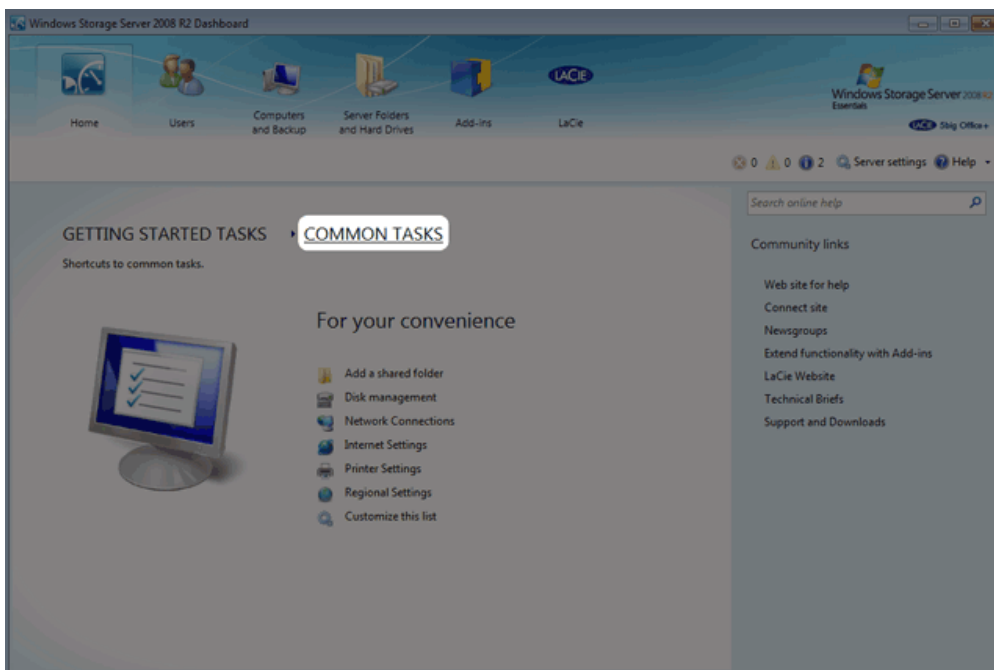
Important info: Mirroring and RAID 5 provide solid protection if one drive in their respective arrays should encounter problems. However, LaCie highly recommends backing up the data stored on your professional server regularly in order to guard against worst case scenarios (i.e. accidental data deletion, malicious programs, viruses, etc.). LaCie professional servers include USB 2.0 and eSATA ports to attach desktop drives for use as backup storage. You can also backup your data to another server on the network.

ADJUSTING THE RAID

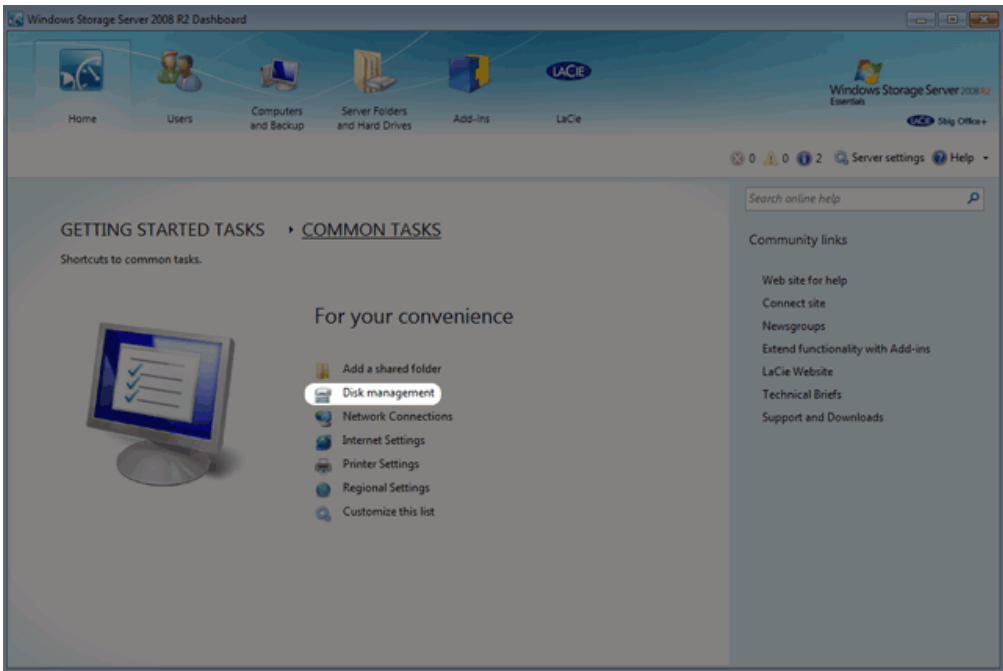
Administrators may change RAID configurations to suit the needs of a business or after a server system recovery.

Use Disk Management to view or change RAID configurations in Windows:

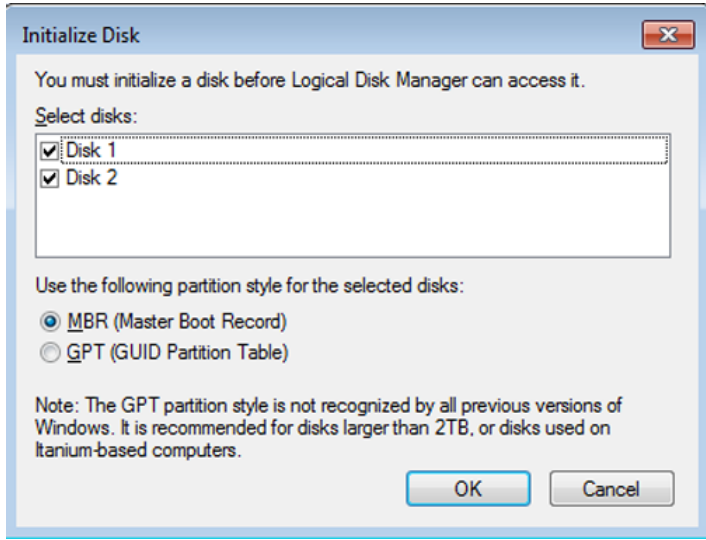
1. Launch the Dashboard from a Windows workstation on the same network as your LaCie 5big Office/Office+.
Start > All Programs > Windows Home Server 2011/Windows Storage Server 2008 R2 > Windows Home Server 2011 Dashboard/Windows Storage Server 2008 R2 Dashboard
2. Select the **Home** tab.
3. Click once on **COMMON TASKS**.



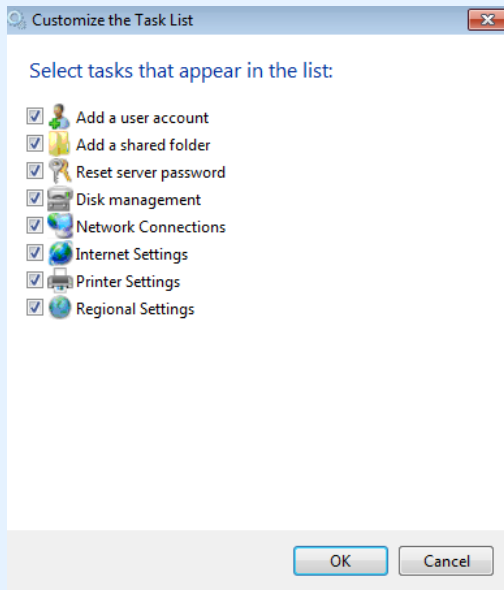
4. Click once on **Disk Management**.



The first time Disk Management is launched, you may be prompted to initialize your drives using MBR or GPT. For information on MBR and GPT formats, please read [MBR, GPT and the 5big Office/Office+ Operating Systems](#). You may initialize the disks at this step or choose **Cancel**. The drives will be initialized as MBR when creating the arrays.



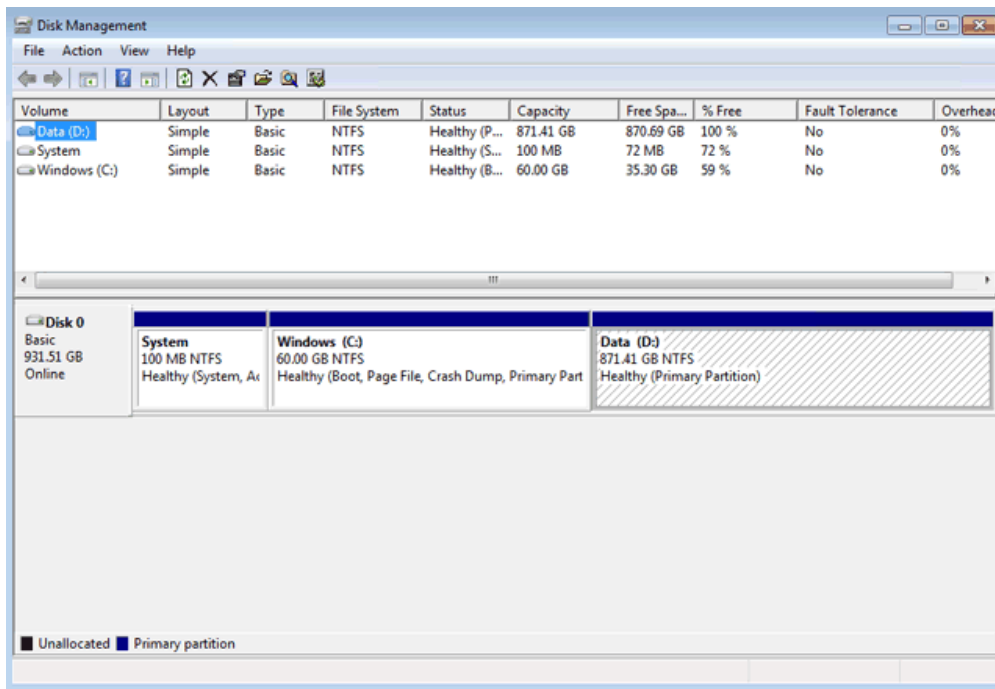
Note: If you do not see Disk Management among the *Common Tasks*, you can add it by clicking **Customize this list**. Check the box next to each task that you wish to include on the *Common Tasks* list then click **OK**.



Important info: Please note that Disk 1 should not be initialized as GPT since it will be used to create a mirror of the Windows operating system.

5BIG OFFICE/OFFICE+ SINGLE DISK DEFAULT CONFIGURATION

A single disk 5big Office/Office+ is shipped with three partitions, System, Windows, and Data. The screenshot below shows all three partitions on a single hard drive, Disk 0. Volume C contains the Windows operating system and volume D is meant to store data. As shipped, volume C takes up 60 GB.



If you have not inserted disks into the 5big enclosure, please see [Removing and Installing Disks](#) for instructions.

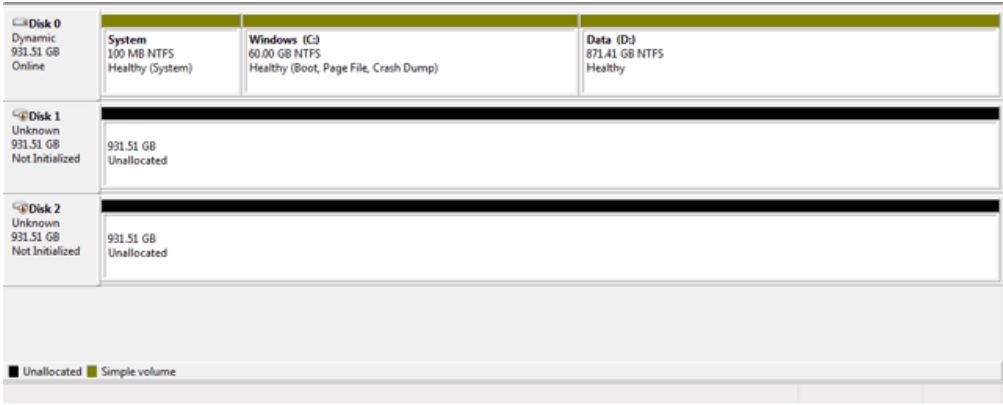
BOOT ORDER AND CREATING THE WINDOWS MIRROR

All Windows system files will be duplicated on each disk in the Mirror. To protect your system files and to save important data collected by the operating system, LaCie recommends a RAID 1 configuration for the System and Windows volumes. In case of disk failure, all files will be accessible on the disk paired for the Mirror.

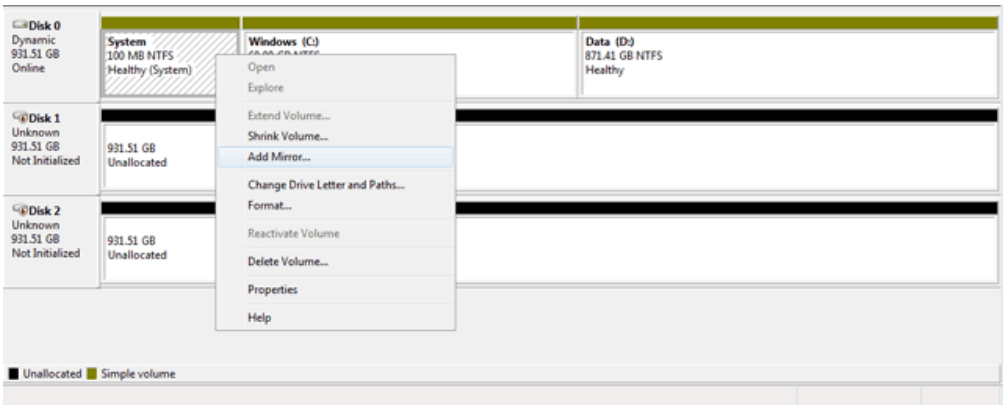
Though the bootloader file will be duplicated on both disks, your version of Windows will only boot from Disk 0. Therefore, it is highly recommended that you do not restart the server if Disk 0 experiences problems. Instead, replace Disk 0 (Disk Tray Slot 1) as soon as possible and rebuild the RAID 1 onto the new drive. **Windows may not startup properly if you reboot before the Mirror is rebuilt.**

CREATING THE SYSTEM MIRROR

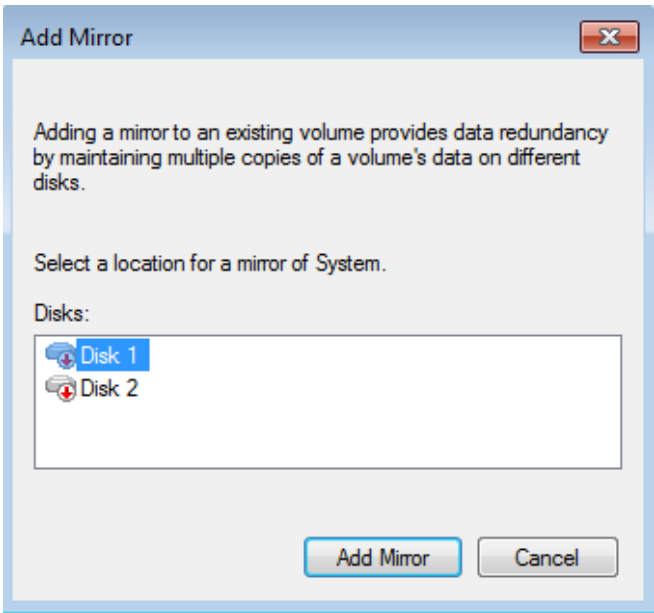
1. Insert the new disks into Drive Tray Slots 2 and 3.
2. Go to Disk Management [Adjusting the RAID](#).
3. The second and third disks will appear as *Unallocated*.



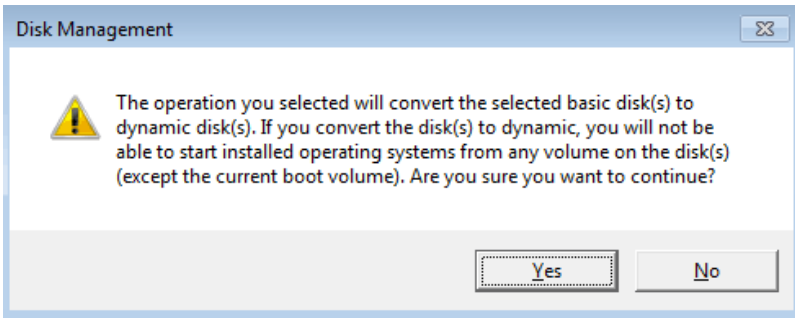
4. Right-click on the **System** volume to select **Add Mirror...**



5. A prompt will ask you to select a location for the mirror. Choose **Disk 1** and click **Add Mirror**.

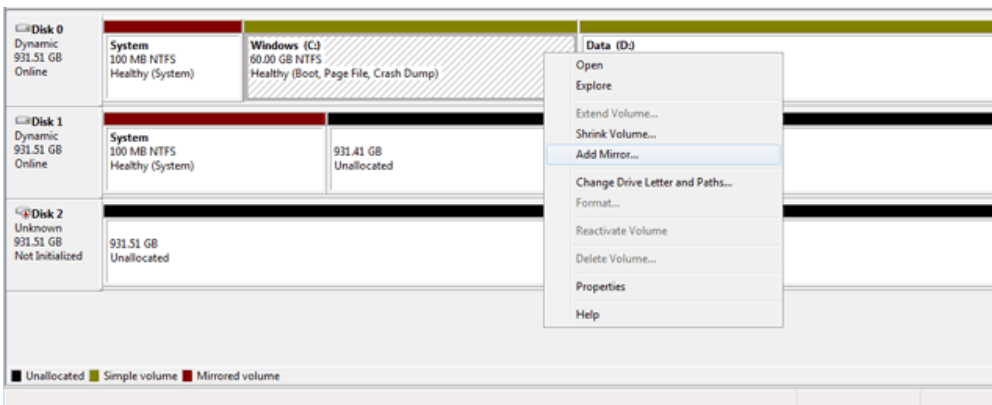


6. A Disk Management warning will appear. Please click **Yes** to continue.

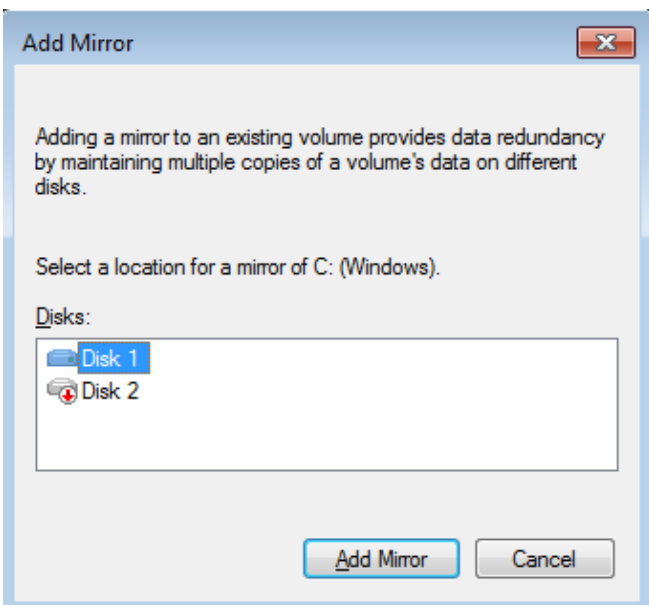


CREATING THE WINDOWS MIRROR

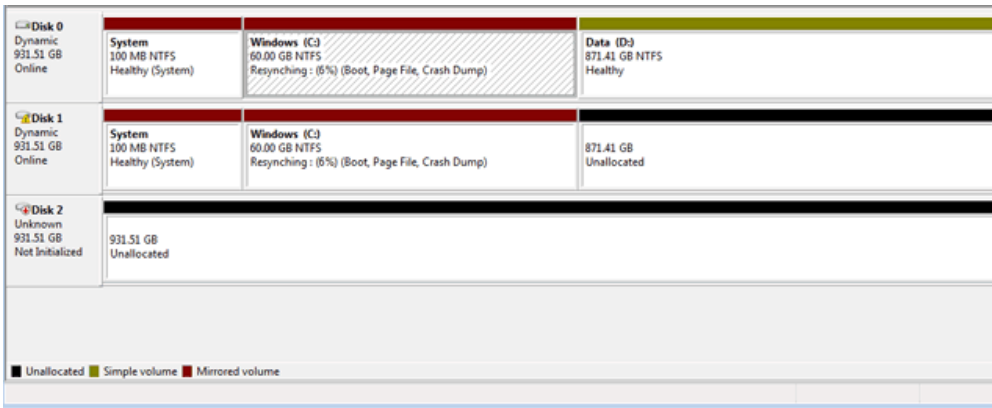
1. Create the System Mirror before the Windows Mirror.
2. Right-click on the **Windows** volume to select **Add Mirror...**



3. A prompt will ask you to select a location for the mirror. Choose **Disk 1** and click **Add Mirror**.



4. It may take ten minutes to resync the RAID 1 array.



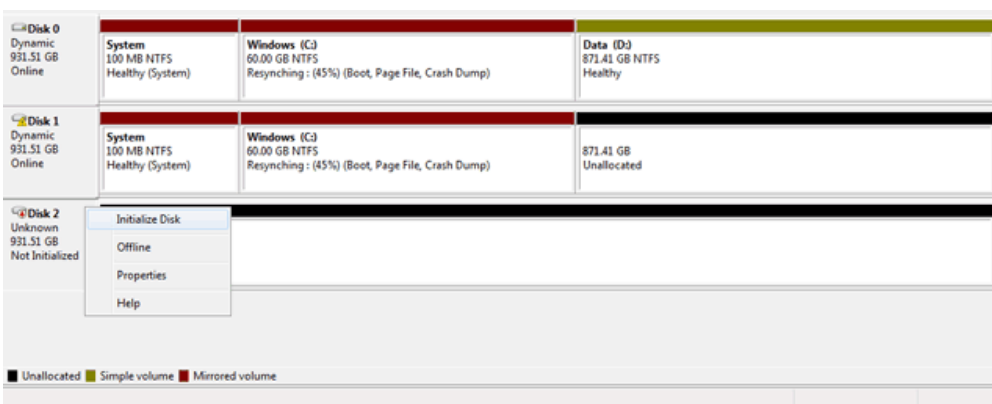
Note: Please keep the following in mind as Mirrored and/or RAID 5 volumes resync:

- Rebooting the 5big Office/Office+ while Disk Management is resyncing a Mirrored or RAID 5 volume will not harm the configuration or its data. However, since the process was interrupted, Disk Management will restart the resync at 0% once the 5big Office/Office+ has rebooted.
- Due to the capacity of the RAID 5 volume, rebooting while a resync is in progress could extend the operation for many hours.
- A volume that is in the midst of a resync may be accessed by workstations on the network. Users can perform common actions with the volume(s), such as reading files, writing files, or moving Shared Folders. However, performance will be degraded while Windows is resyncing Mirrored and/or RAID 5 volumes.

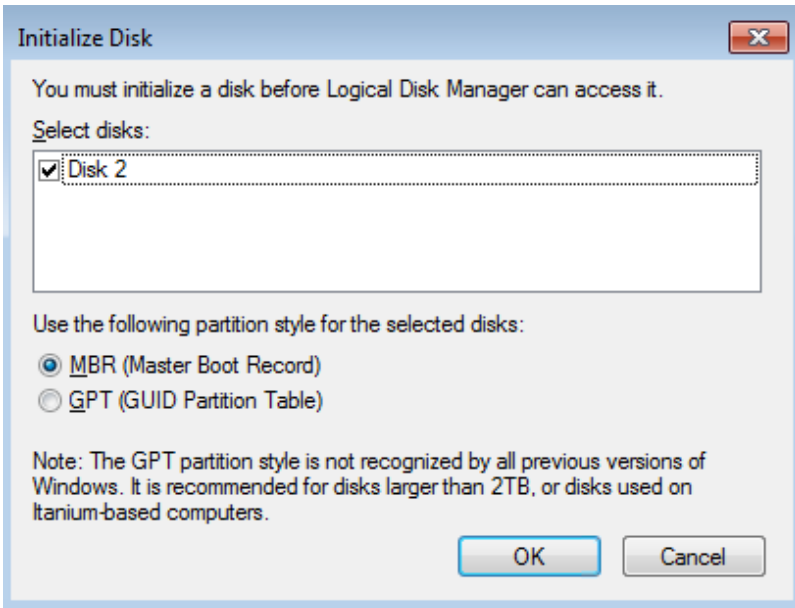
CREATING THE DATA 2 [E] PARTITION

For organizational purposes, LaCie recommends creating a sole partition on Disk 2 [E] before building the RAID 5 array.

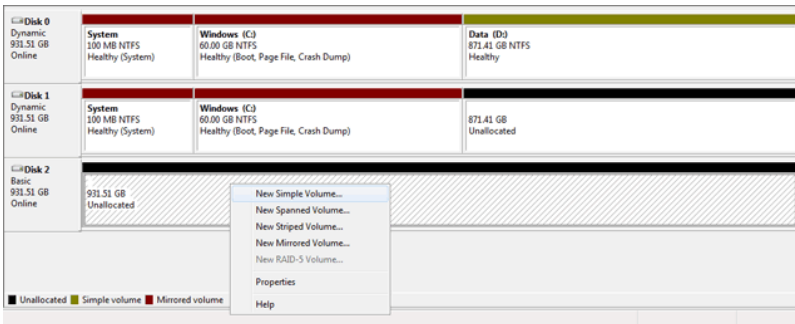
1. Right-click on the **Disk 2** to select **Initialize Disk**.



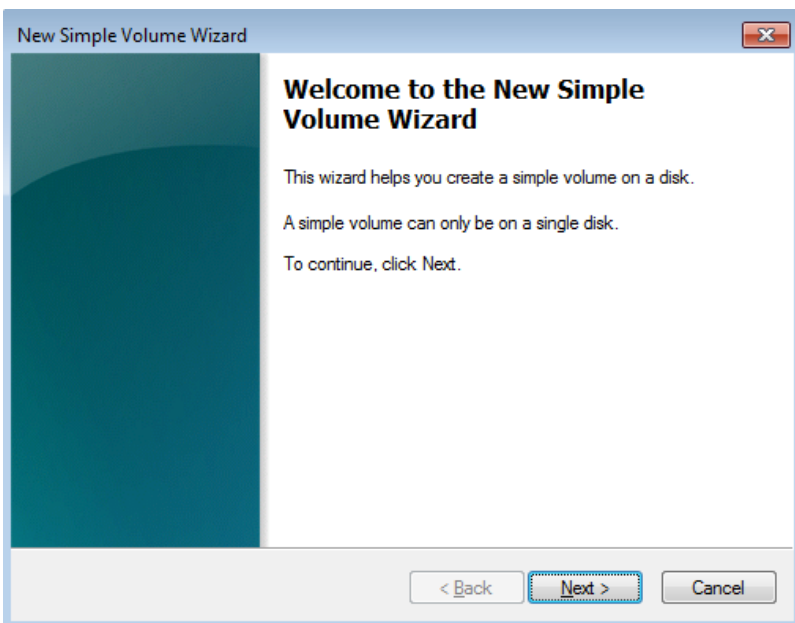
2. Based upon the type of disk you are using, select MBR or GPT. Click **OK**.



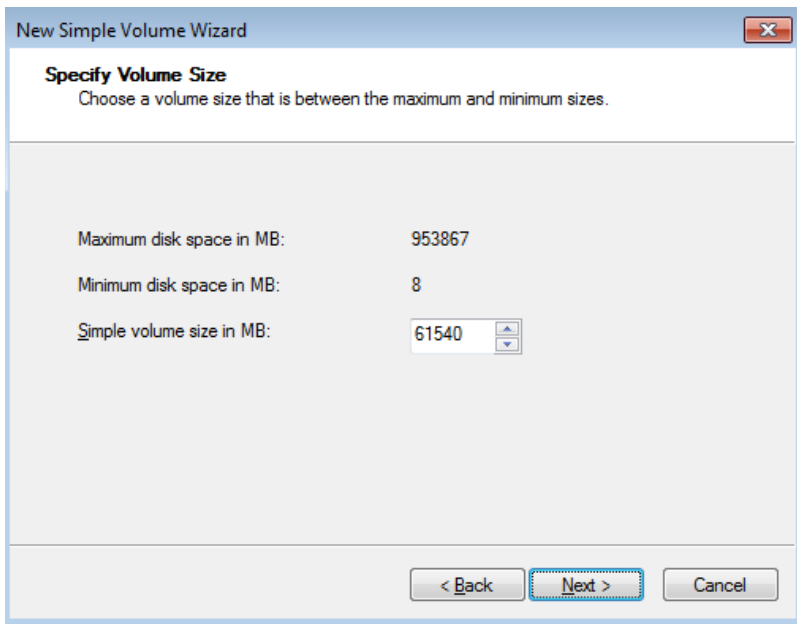
3. From Disk 2, right-click on **Unallocated**. Select **New Simple Volume...**



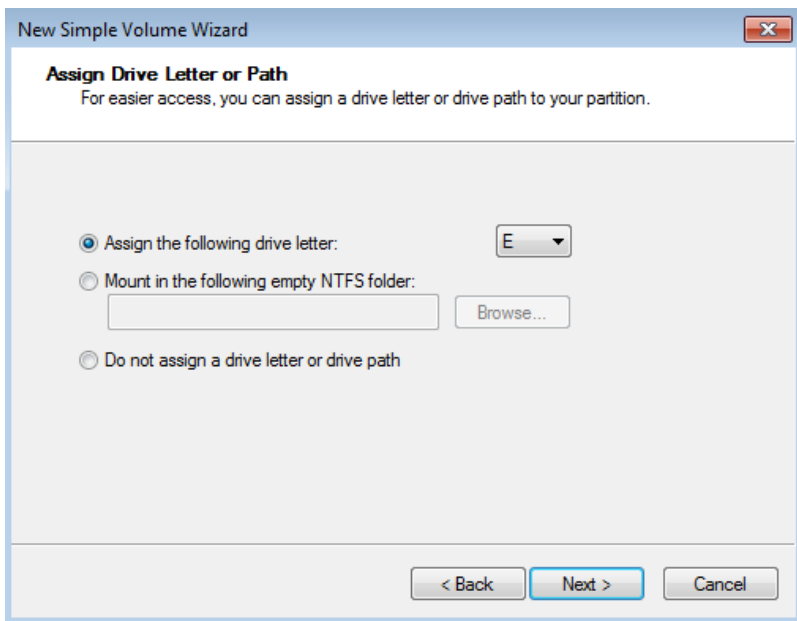
4. The New Simple Volume Wizard will launch. Click **Next**.



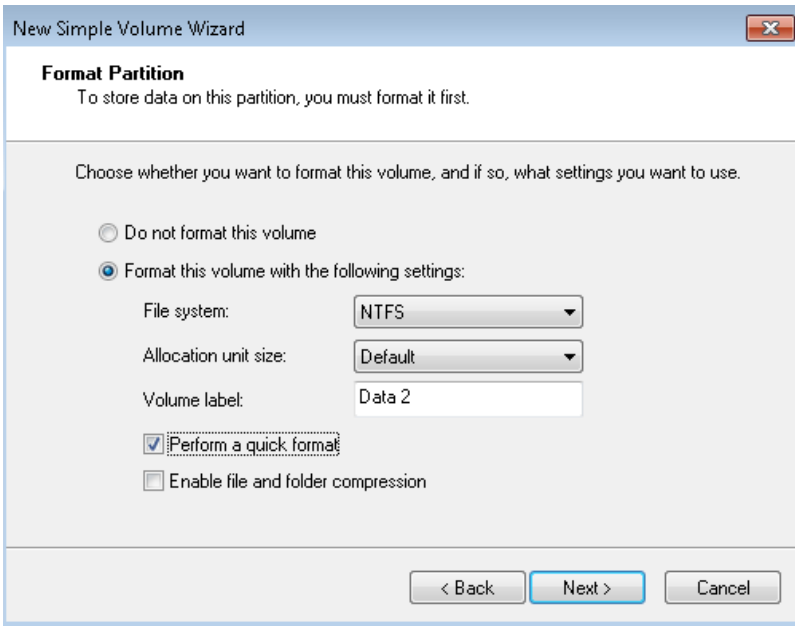
5. To allow the proper amount of storage for the RAID 5 array, please create a partition of **61540MB**. Click **Next**.



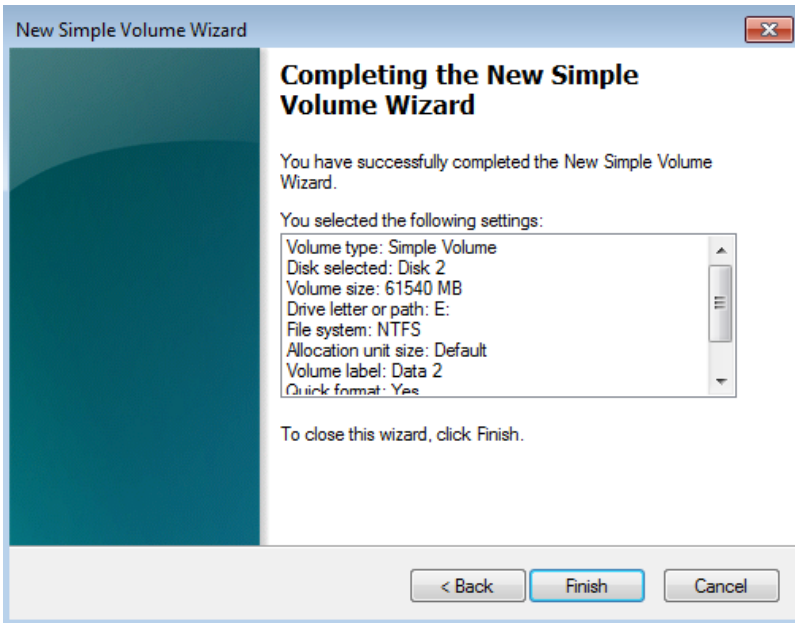
6. Select a drive letter and click **Next**.



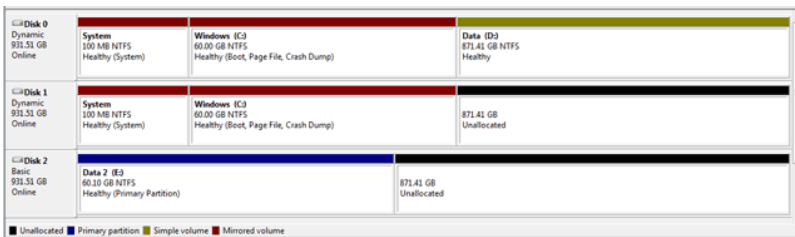
7. You may name the volume. In this example, we have called it Data 2. LaCie recommends keeping the defaults NTFS (file system) and *Perform a quick format*. Click **Next**.



8. Review your choices then click **Finish**.



9. The partition is now available. Please make certain to backup data stored on Data 2 since it is not protected on a RAID array.

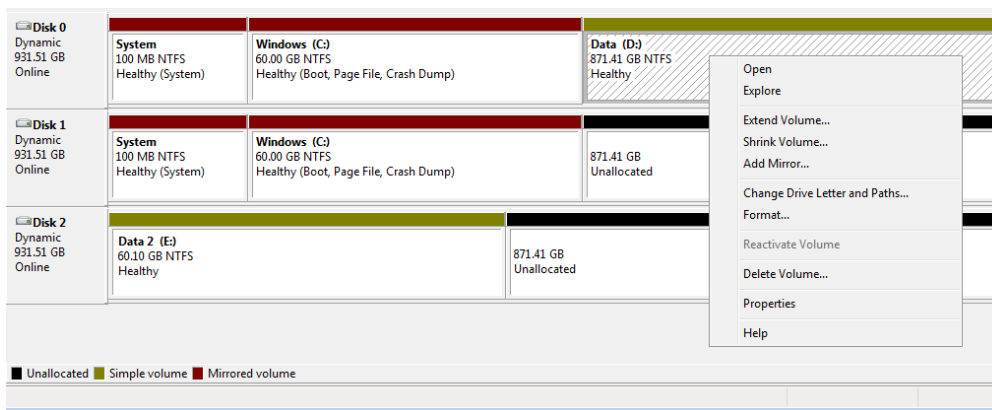


Important info: Following the steps below will help you create a large capacity RAID 5 volume to store and share your data. As noted in [LaCie RAID Configurations and Windows Backup](#), Windows backup does not support volumes greater than 2TB. If you intend to use the Windows backup solution in the server Dashboard, please see [RAID - Creating Multiple Partitions](#) for instructions on creating volumes that do not exceed 2TB.

PREPARING THE 5BIG OFFICE/OFFICE+ FOR RAID 5

Move Shared Folders to a New Location

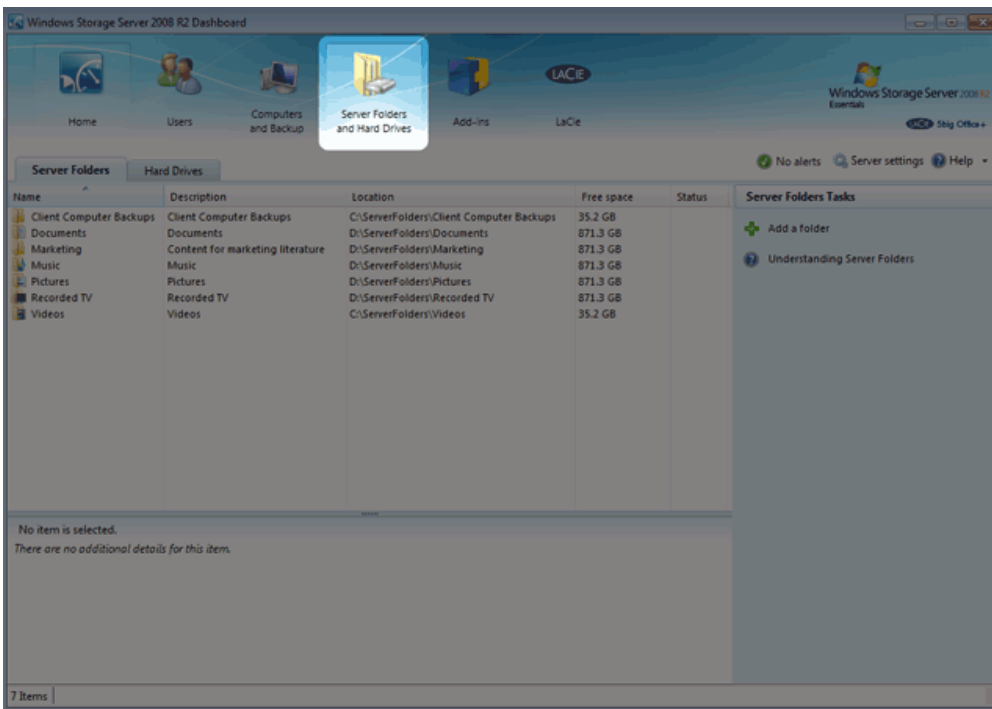
Windows cannot build the RAID 5 array with Shared Folders stored on the existing Data [D] partition.



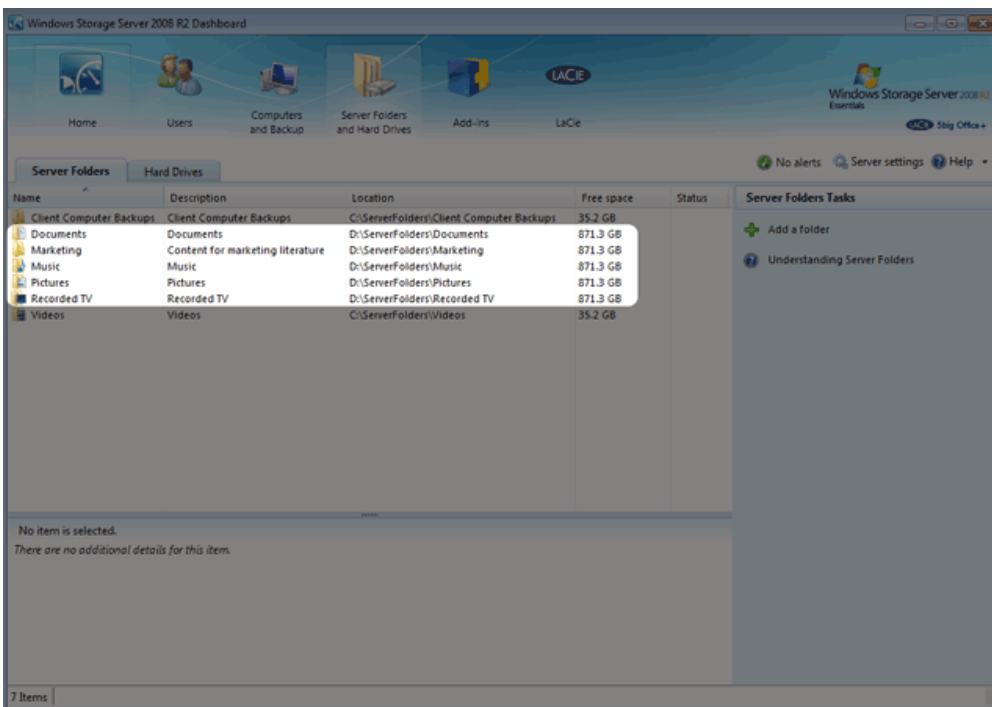
RAID 5 is not available

Following the creation of the System and Windows Mirrors, you must prepare the storage for the RAID 5 array. The first step is to move all Shared Folders to another location. In this example, we will move them from the Data [D] volume to the Windows [C] volume. Based upon the needs of your company, the move can be permanent or temporary.

1. Create the System Mirror, Windows Mirror, and Data 2 partition before the Data RAID 5 array.
2. Open the Dashboard and select the tab **Server Folder and Hard Drives**.



3. Look for Shared Folders that are stored on the Data [D] volume.



4. Right-click on the first Shared Folder to select **Move the folder**. In this example, the Shared Folder *Documents* will be moved.

Name	Description	Location	Free space	Status
Client Computer Backups	Client Computer Backups	C:\ServerFolders\Client Computer Backups	35.2 GB	
Documents	Documents	D:\ServerFolders\Documents		
Marketing	Content for marketing literature	D:\ServerFolders\Marketing		
Music	Music	D:\ServerFolders\Music		
Pictures	Pictures	D:\ServerFolders\Pictures		
Recorded TV	Recorded TV	D:\ServerFolders\Recorded TV	07.12 GB	
Videos	Videos	C:\ServerFolders\Videos	35.2 GB	

5. The **Move a Folder** wizard will appear. Please read the text before clicking **Next**.



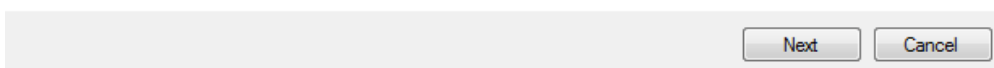
Getting started

This wizard helps you move a server folder to a new location. Before you move the folder:

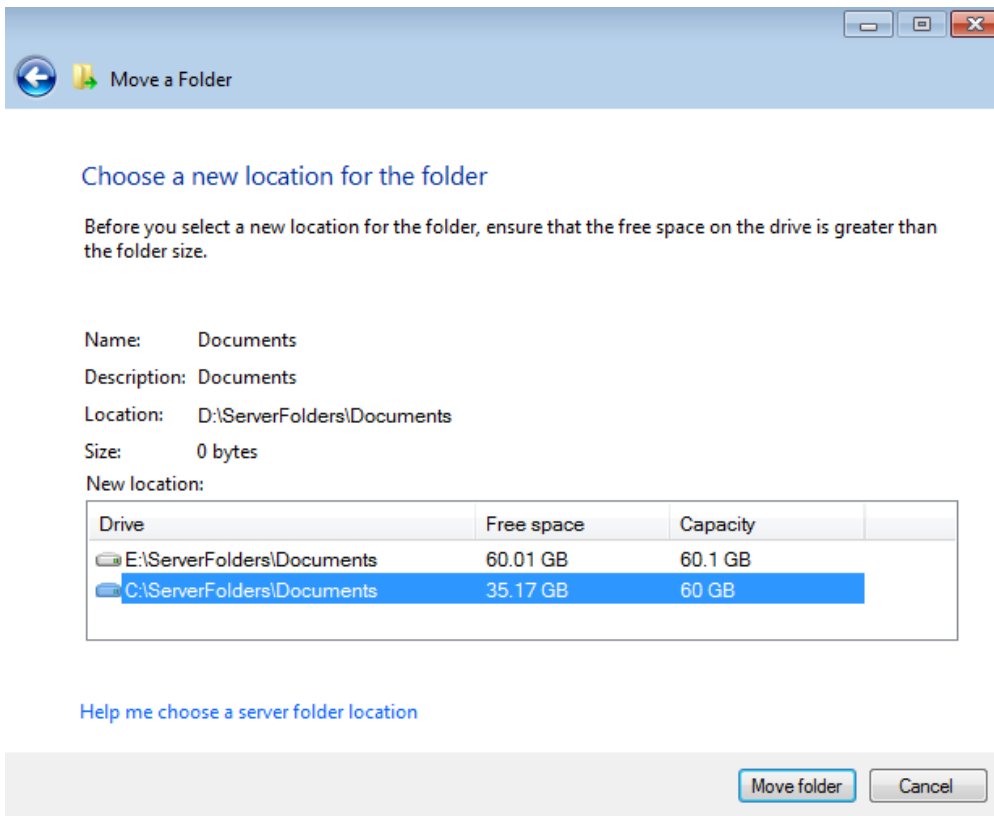
- Back up your server.
- Ensure that none of the files in the folder are open or in use.

While the move is in progress, do not add files to the folder. Added files will not be moved.

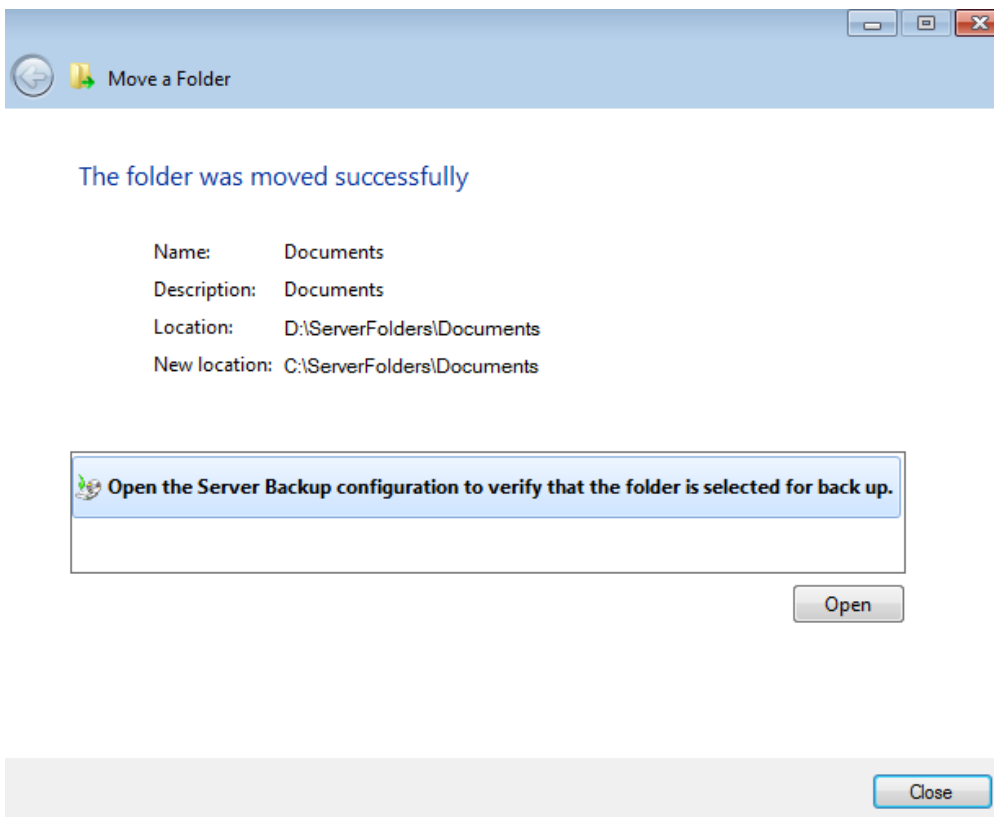
Moving Server Folders



6. Select a **New location** for the Shared Folder. In this example, we are moving *Documents* to the Windows [C] volume. The Data 2 [E] partition is also available if we require additional space for the remaining Shared Folders. Click **Move Folder** once you have selected a *New location*.



7. A prompt will let you know when the Shared Folder has been moved. Click **Close**.

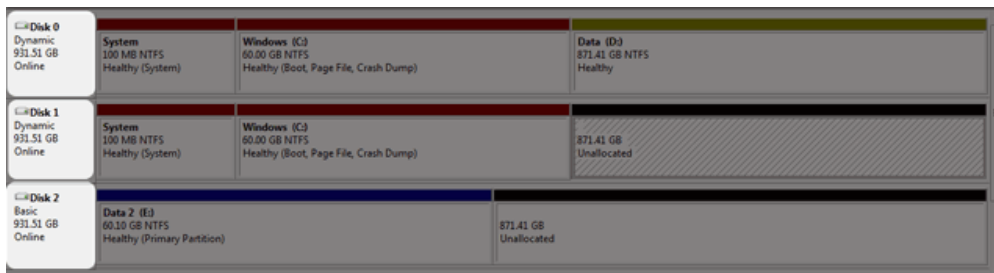


8. Repeat the steps for each Shared Folder on Data [D].

Server Folders		Hard Drives		
Name	Description	Location	Free space	Status
Client Computer Backups	Client Computer Backups	C:\ServerFolders\Client Computer Backups	35.2 GB	
Documents	Documents	C:\ServerFolders\Documents	35.2 GB	
Marketing	Content for marketing literature	C:\ServerFolders\Marketing	35.2 GB	
Music	Music	C:\ServerFolders\Music	35.2 GB	
Pictures	Pictures	C:\ServerFolders\Pictures	35.2 GB	
Recorded TV	Recorded TV	C:\ServerFolders\Recorded TV	35.2 GB	
Videos	Videos	C:\ServerFolders\Videos	35.2 GB	

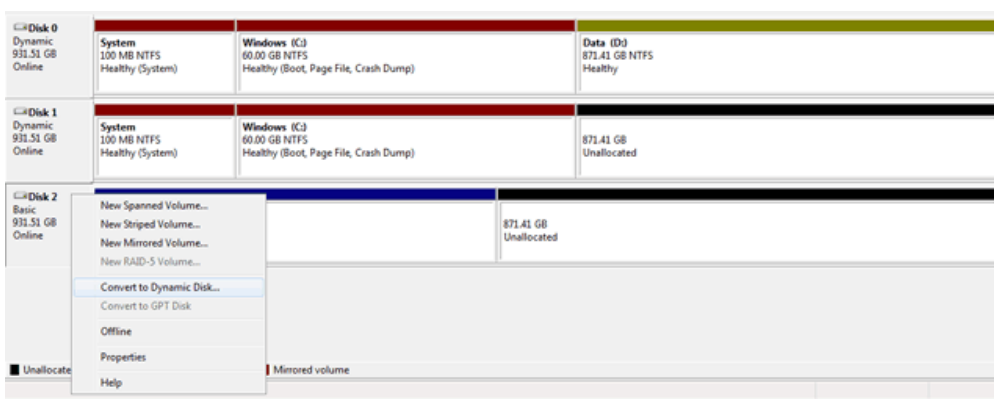
Basic to Dynamic

It may be necessary to convert Disk 2 to a Dynamic disk. The screenshot below shows the three hard drives as they appear in Disk Management. Please note that Disks 0 and 1 are listed as *Dynamic* while Disk 2 is *Basic*. A RAID 5 array only supports Dynamic disks.

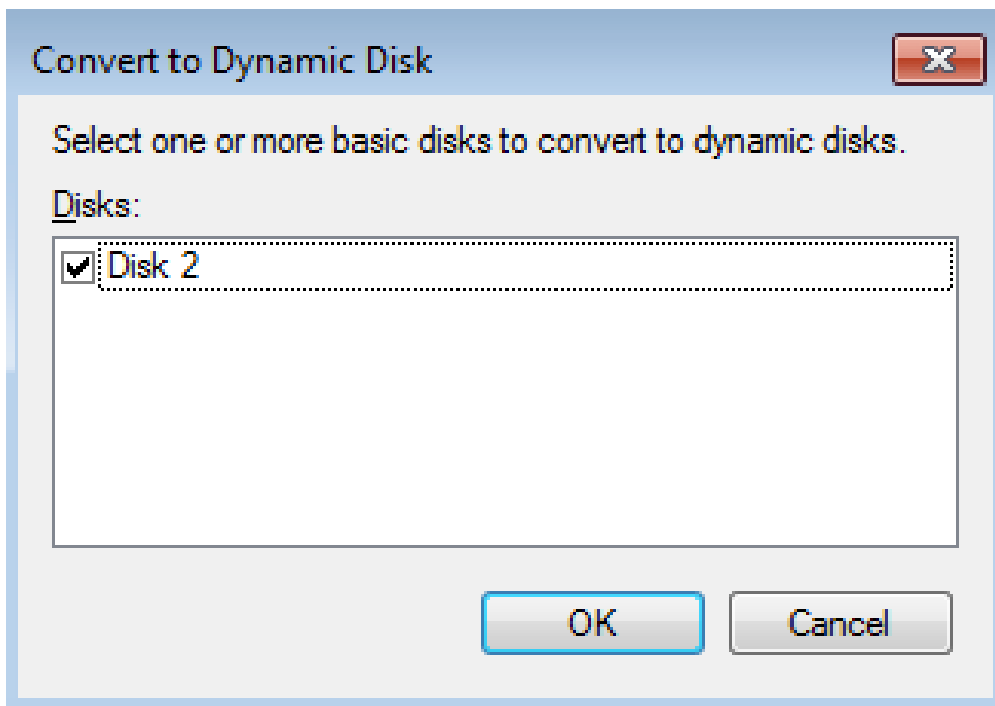


Please follow the easy directions below to convert Disk 2 from Basic to Dynamic:

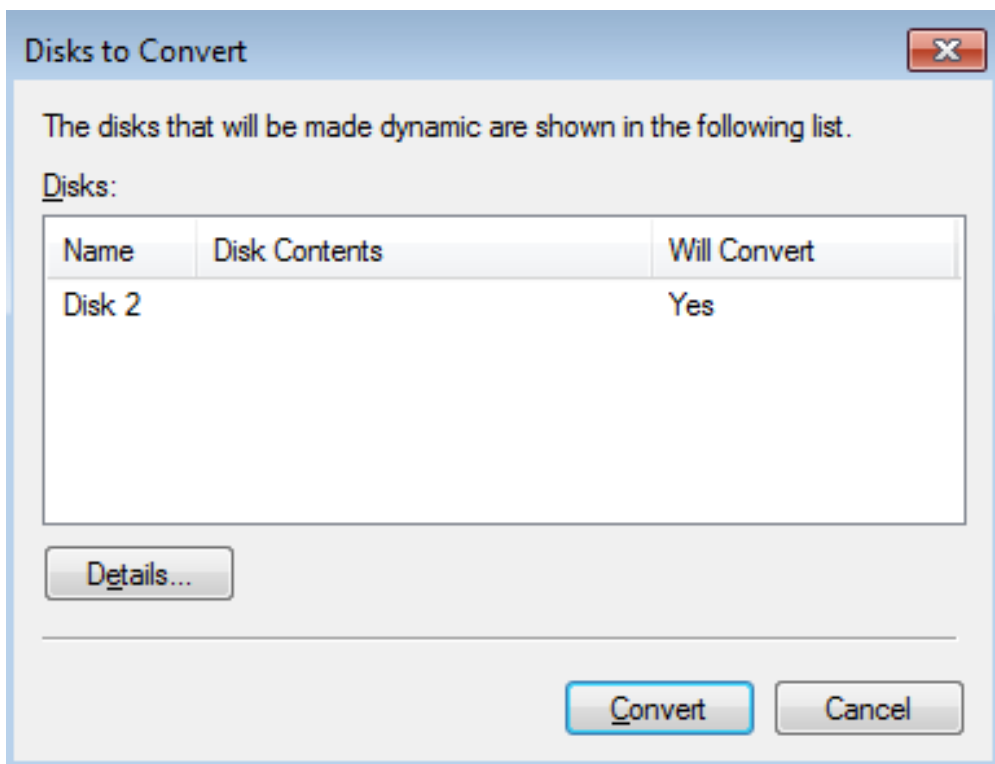
1. Right-click on the Disk 2 icon on the left and select **Convert to Dynamic Disk...**



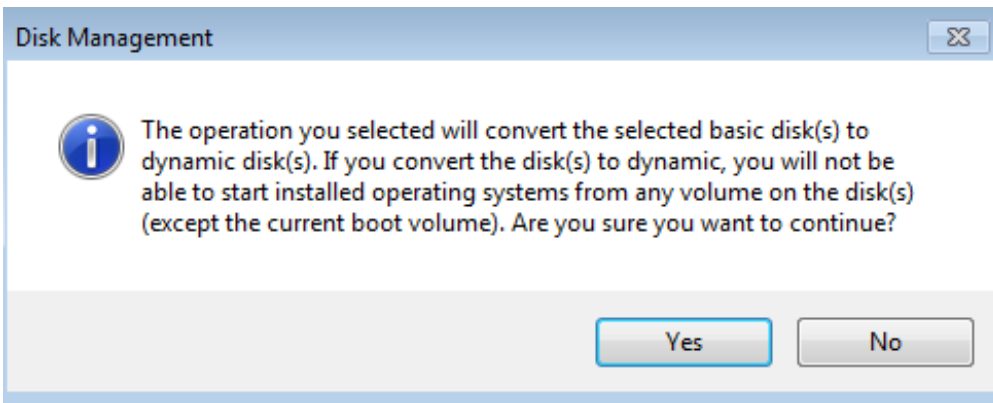
2. A prompt will ask you to select the disks for conversion. Select **Disk 2** and click **OK**.



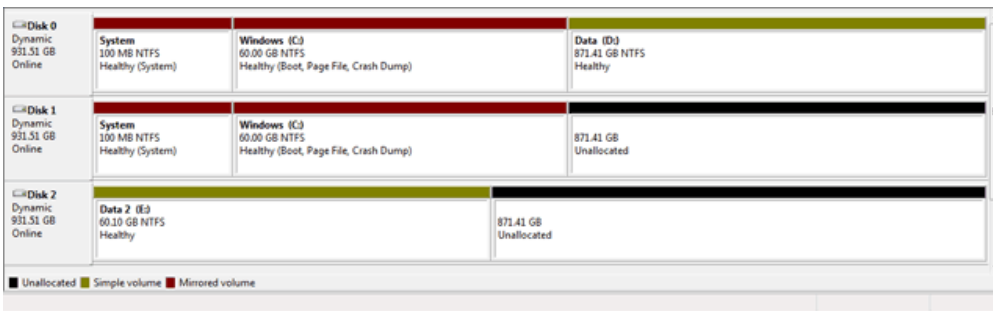
3. The *Disks to Convert* window will ask you to confirm your selection. Click **Convert**.



4. Click **Yes** on the Disk Management prompt.



5. Disk 2 has been converted to Dynamic.

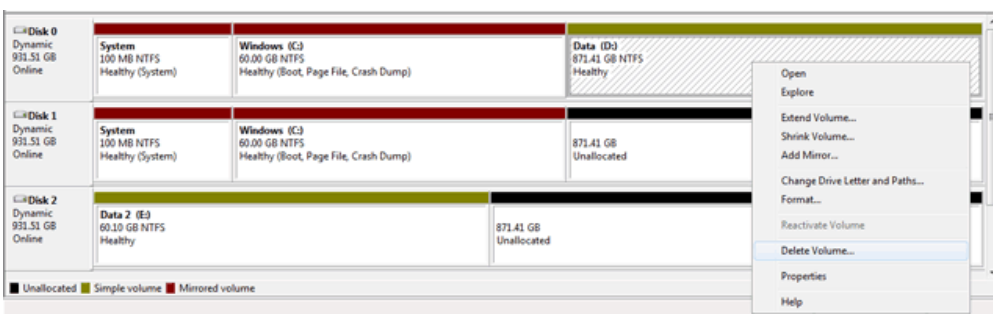


Delete Data [D]

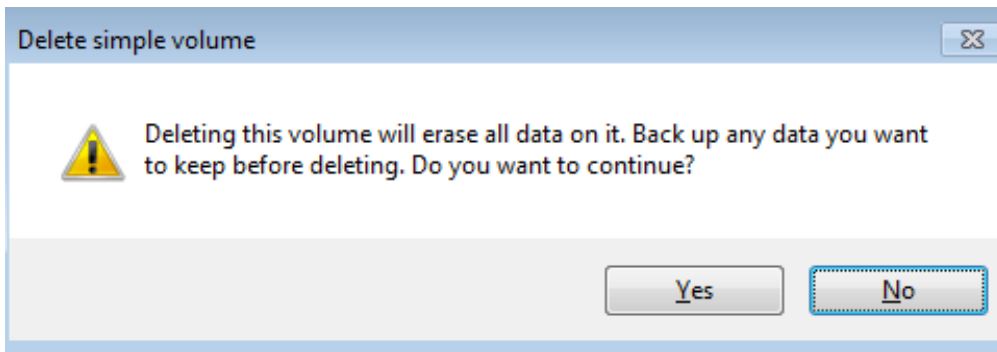
Building a RAID 5 array requires a minimum of three *Unallocated* disks. The Unallocated section may be the entire disk or a part of it. LaCie recommends combining disks that share the same size since RAID 5 will always adhere to the lowest capacity. For example, a RAID 5 array using three disks of 50GB, 75GB, and 100GB will only offer 50GB to the user once the configuration is complete.

In our example, all Disks 0, 1, and 2 have partitions that equal 871.41GB. However, the original Data [D] partition must be deleted in favor of an Unallocated section. Since deleting a volume is destructive, please make certain to copy all files that may be stored on Data [D] before following the steps below.

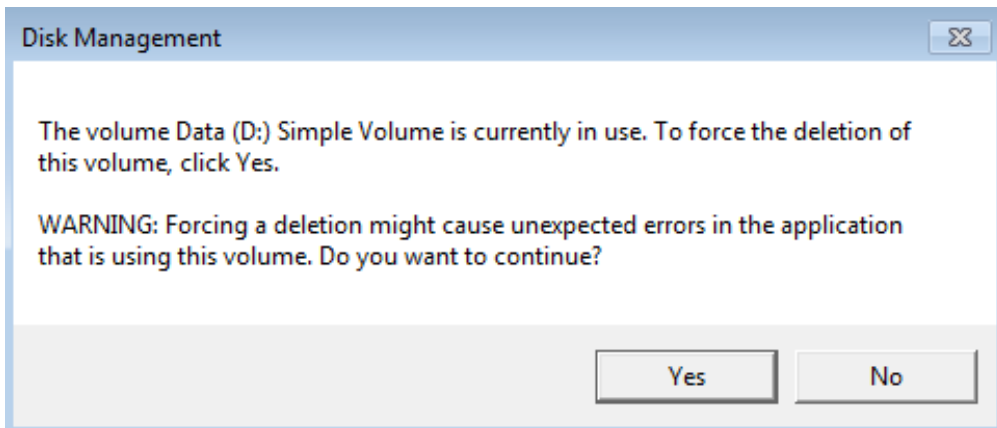
1. Right-click on Data [D] to select **Delete Volume...**



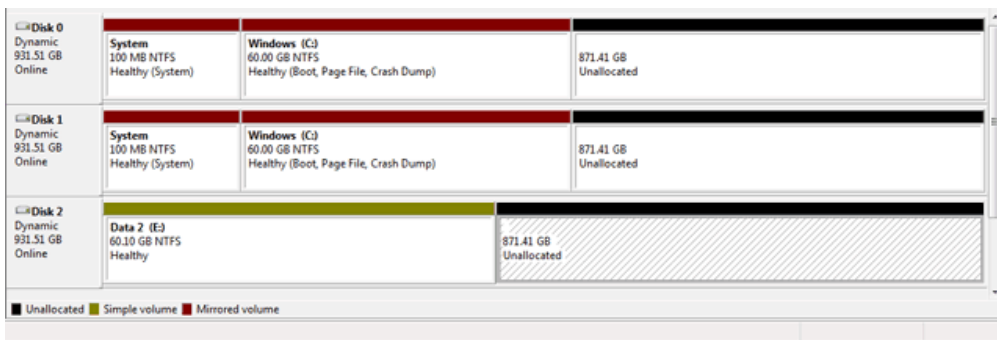
2. If you have copied all data from Data [D], click **Yes** at the *Delete simple volume* prompt.



3. You may receive a notice indicating that Data [D] is in use. Most likely, this is due to the Dashboard. Click **Yes** to continue.



4. Disk 0 now has an Unallocated partition.



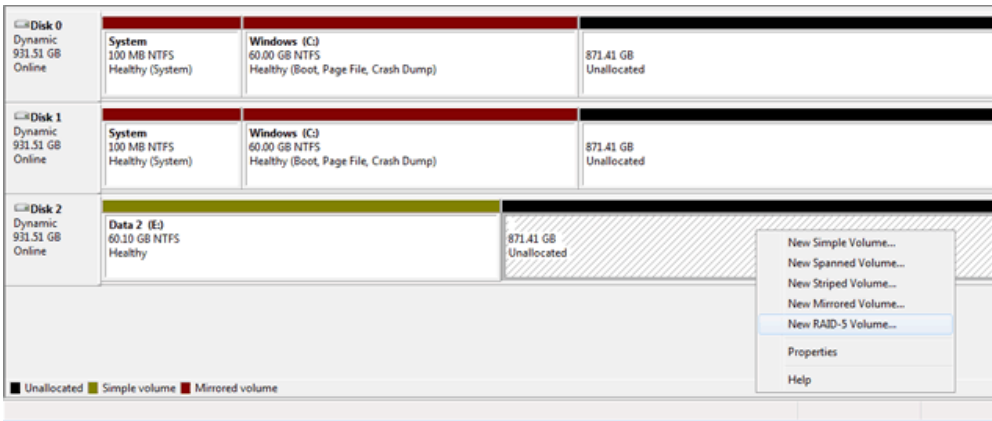
CREATING THE DATA RAID 5 ARRAY

Before attempting to build the RAID 5 volume, please make certain to:

- Create the System Mirror, Windows Mirror, and Data 2 partition before the Data RAID 5 array.
- Follow the steps to prepare the three disks for a RAID 5 array ([Preparing the 5big Office/Office+ for RAID 5](#)).

Create the RAID 5 Volume:

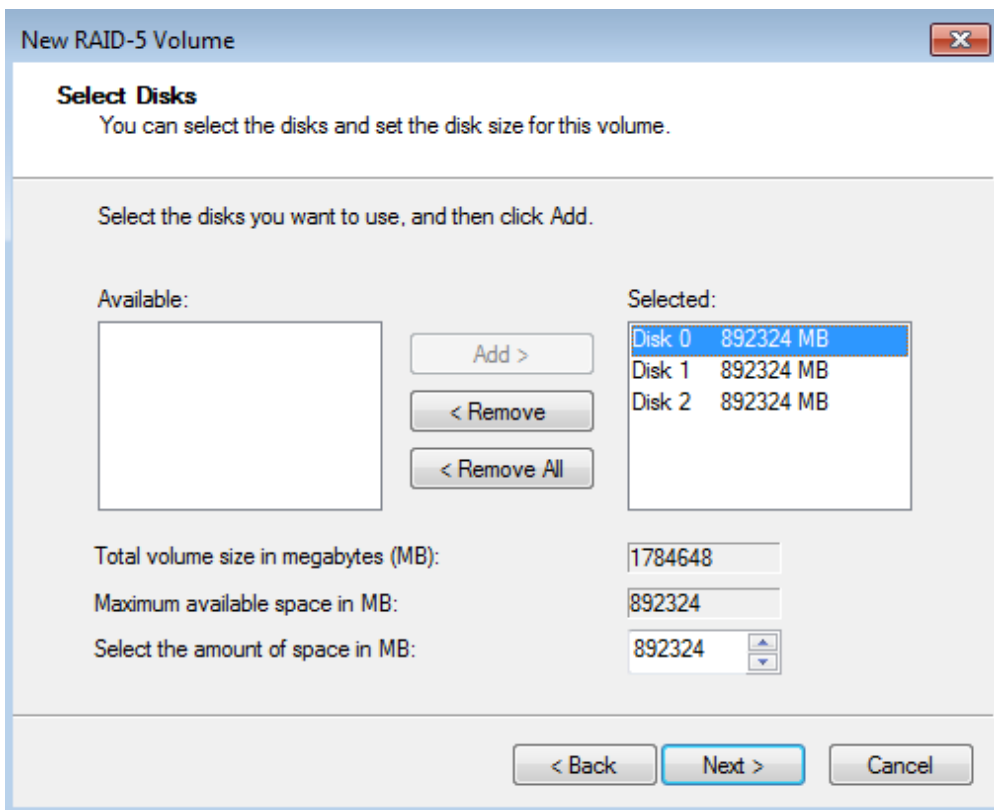
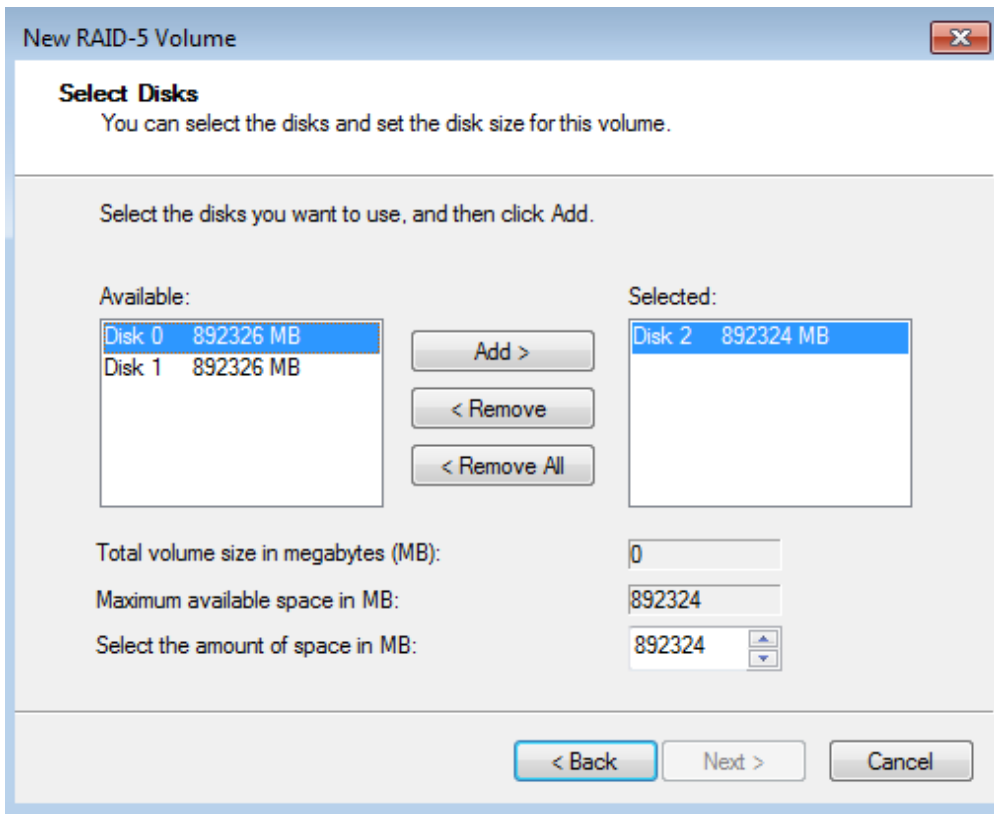
1. Right-click on the **Unallocated** section of Disk 2. (You may not have the option to create a RAID 5 volume when right-clicking on the Unallocated sections of Disks 0 and 1.) Select **New RAID-5 Volume...**



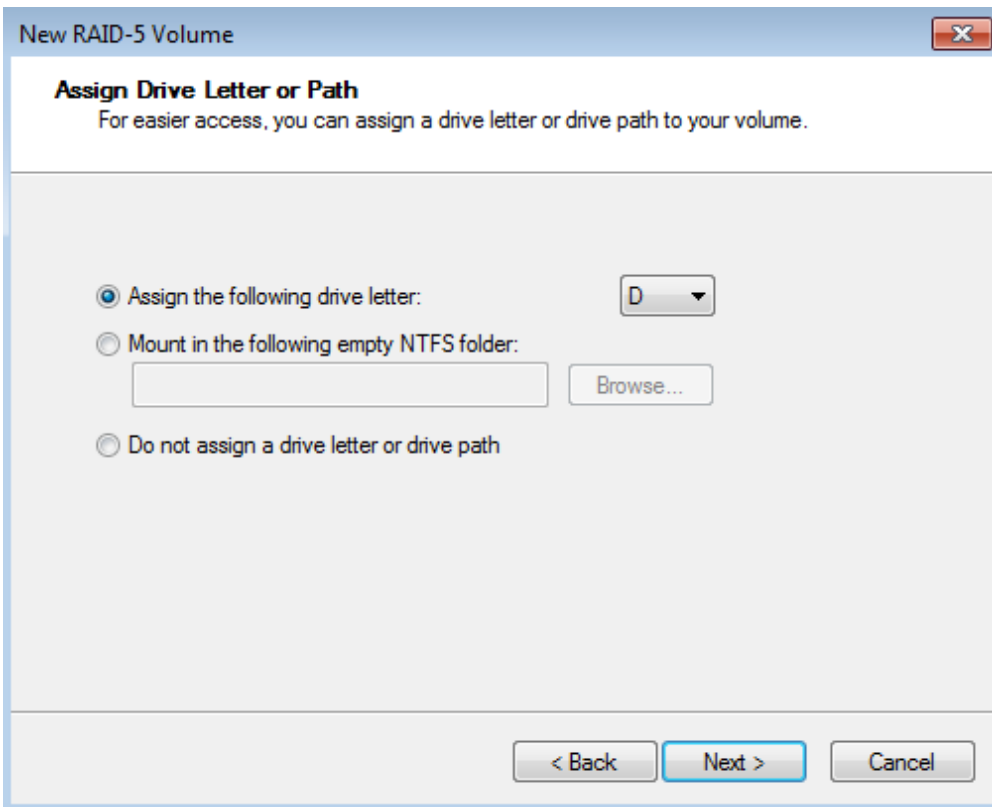
2. The *New RAID-5 Volume Wizard* will open. Click **Next**.



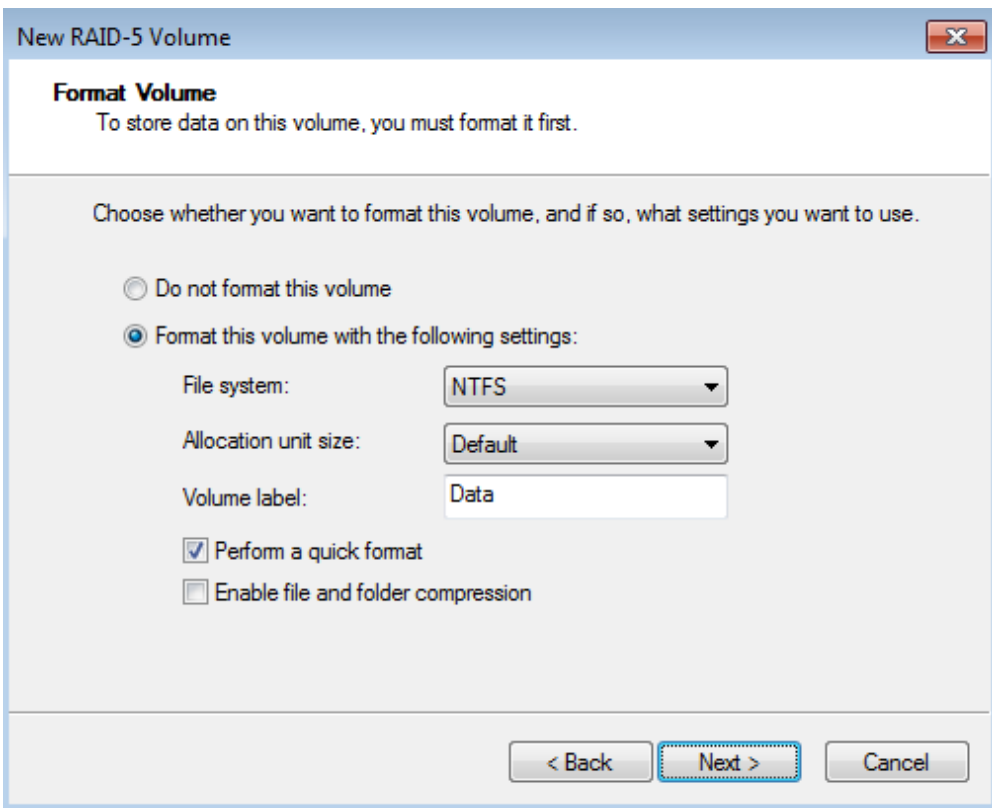
3. You will be prompted to select disks for the RAID 5 volume. Please select each disk and click **Add**.



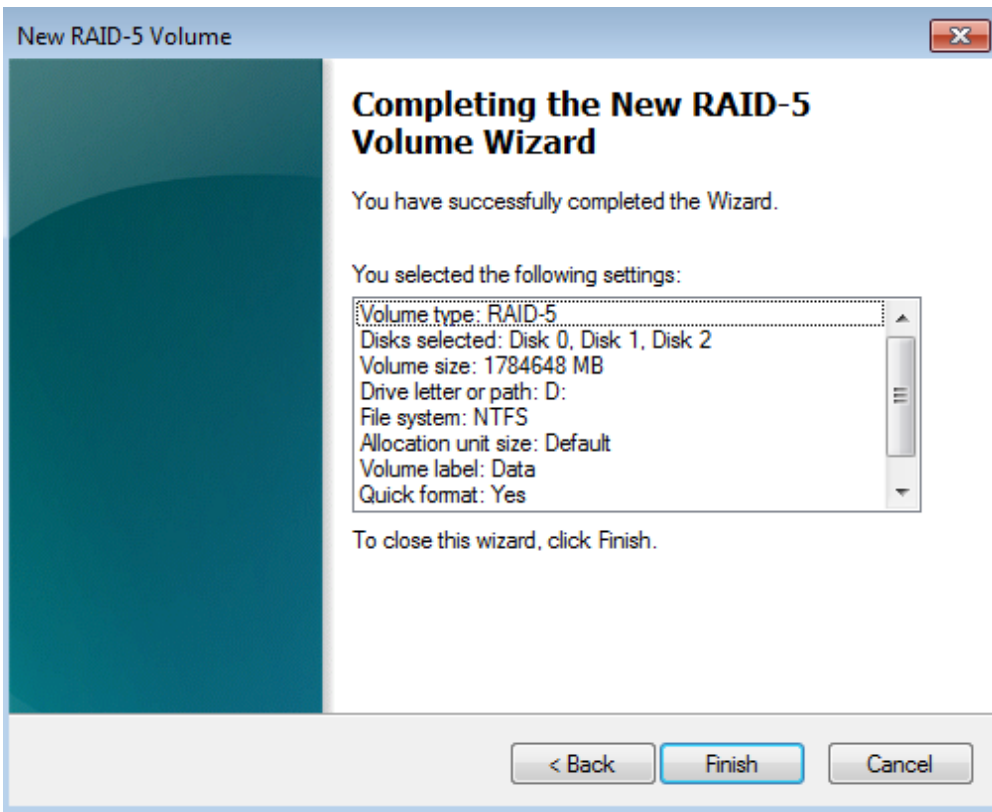
4. Once all disks have been selected, click **Next**.
5. LaCie recommends assigning the letter *D* to the RAID 5 volume. Click **Next**.



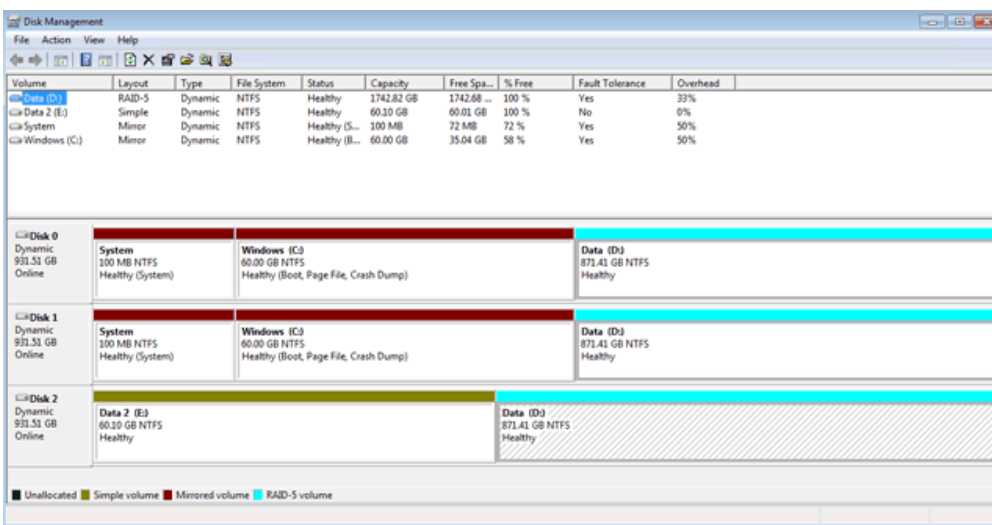
6. LaCie recommends keeping the defaults *NTFS* and *Perform a quick format*. In this example, the RAID 5 volume is named *Data*. Click **Next**.



7. Review the settings and click **Finish**.



8. The RAID 5 volume will begin resyncing. It may take up to a day to create the RAID 5 array.



Note on Shared Folders: LaCie recommends moving the Shared Folders back to the Data [D] partition once the RAID 5 volume has been created. Go to [Preparing the 5big Office/Office+ for RAID 5](#) for instructions on moving Shared Folders.

Note: Please keep the following in mind as Mirrored and/or RAID 5 volumes resync:

- Rebooting the 5big Office/Office+ while Disk Management is resyncing a Mirrored or RAID 5 volume will not harm the configuration or its data. However, since the process was interrupted, Disk Management will restart the resync at 0% once the 5big Office/Office+ has rebooted.
- Due to the capacity of the RAID 5 volume, rebooting while a resync is in progress could extend the operation for many hours.
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