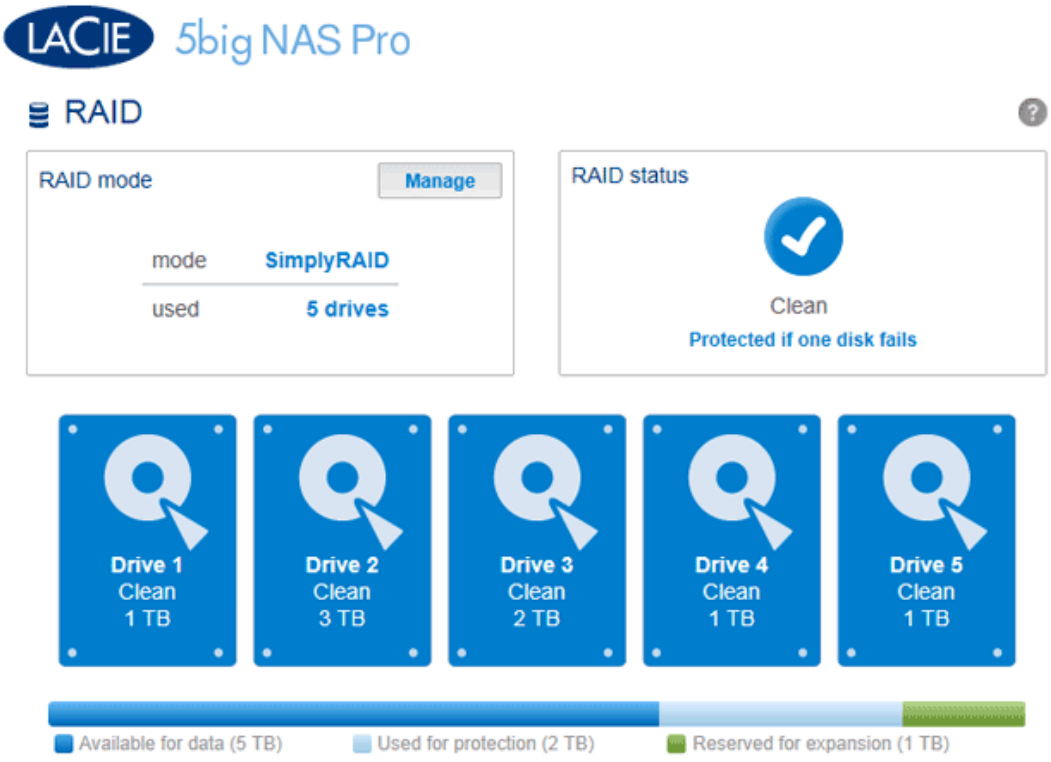
MANAGE RAID - LACIE 5BIG NAS PRO



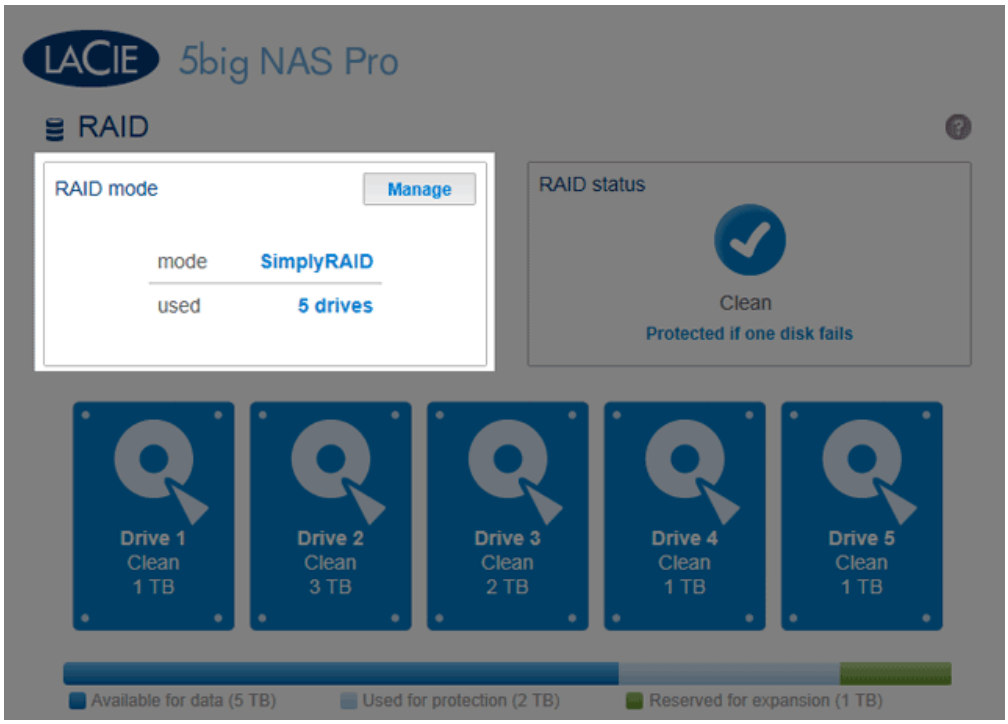
Your LaCie 5big NAS Pro optimizes disk performance and capacity using LaCie SimplyRAID. No matter the capacity of your disk(s), LaCie SimplyRAID will prepare the LaCie 5big NAS Pro storage for immediate use as well as future expansion. LaCie SimplyRAID accommodates your storage needs, allowing you to:

- Install disks of varying capacities (1TB, 2TB, and 3TB)
- Replace smaller capacity disks with larger capacity disks
- Upgrade storage capacity without deleting or moving data
- Protect data without compromising performance

While LaCie recommends the benefits of LaCie SimplyRAID, the Dashboard RAID page also gives you the option to manually configure RAID.

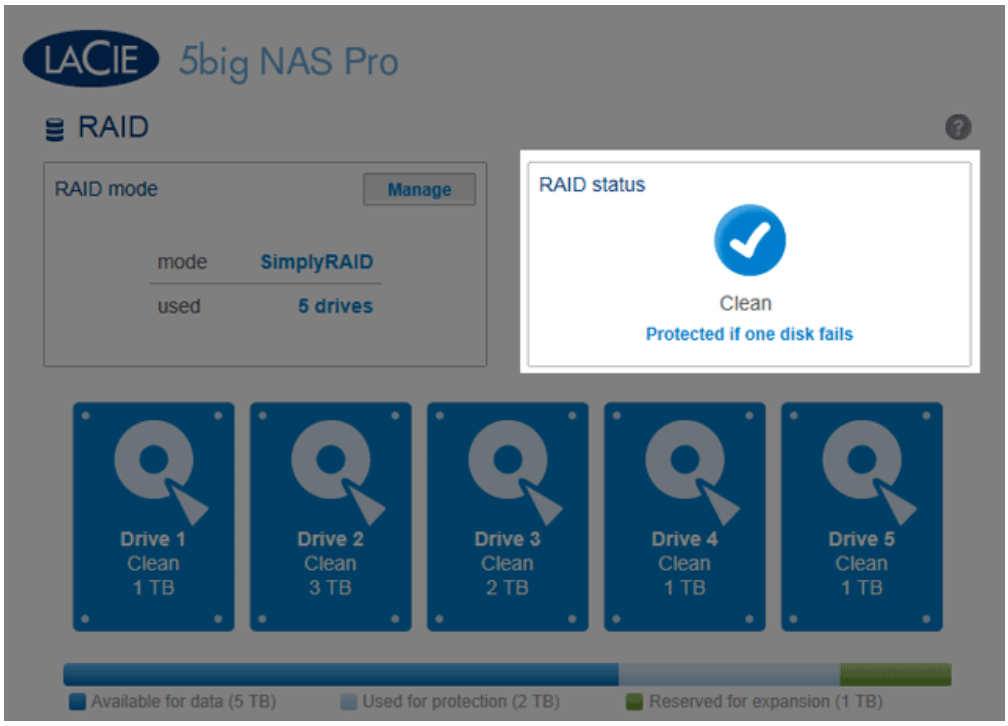
REVIEW YOUR RAID SETTINGS

RAID mode



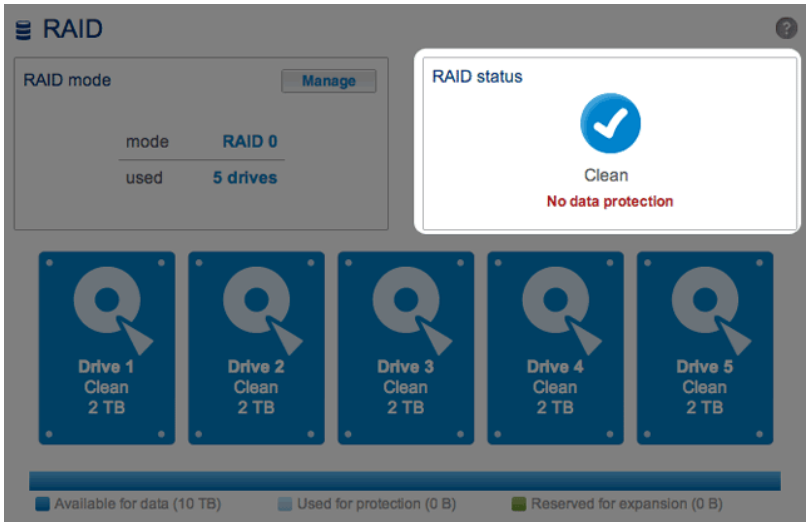
This box shows you the current RAID scheme for your LaCie NAS, as well as the number of disks involved in the scheme.

RAID Status

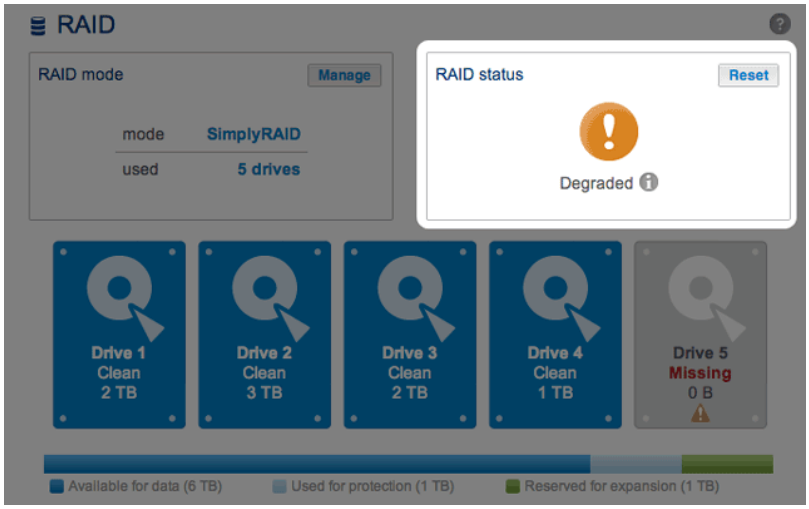


This box lets you know whether the array is healthy, degraded, or synchronizing.

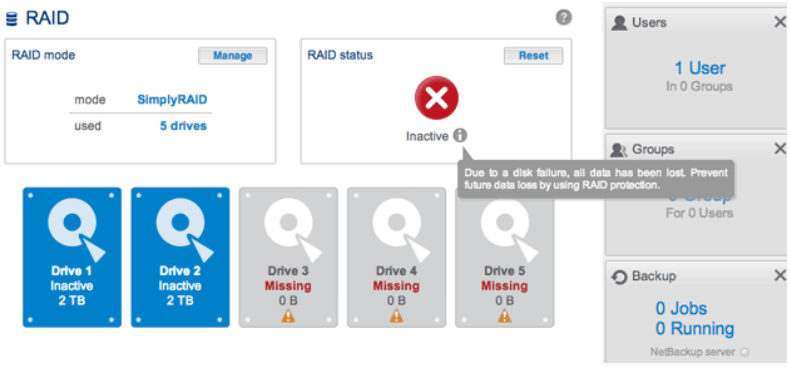
- RAID 0 (no data protection).



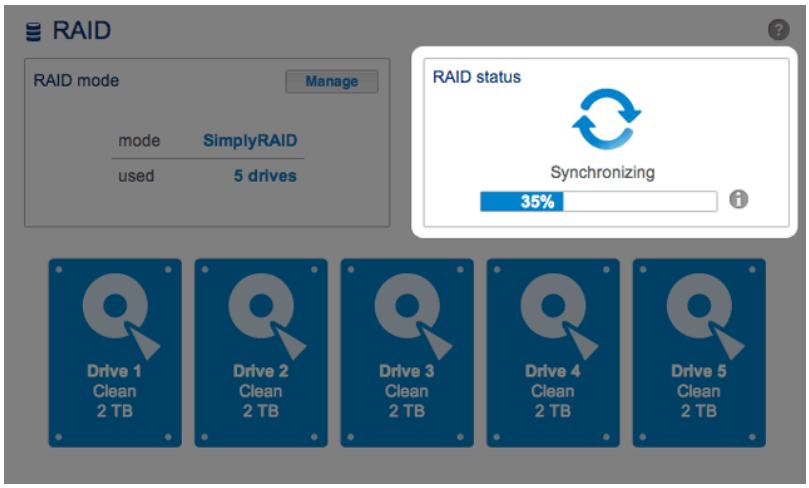
- RAID degraded due to a missing disk.



- RAID failure due to missing or bad disks.

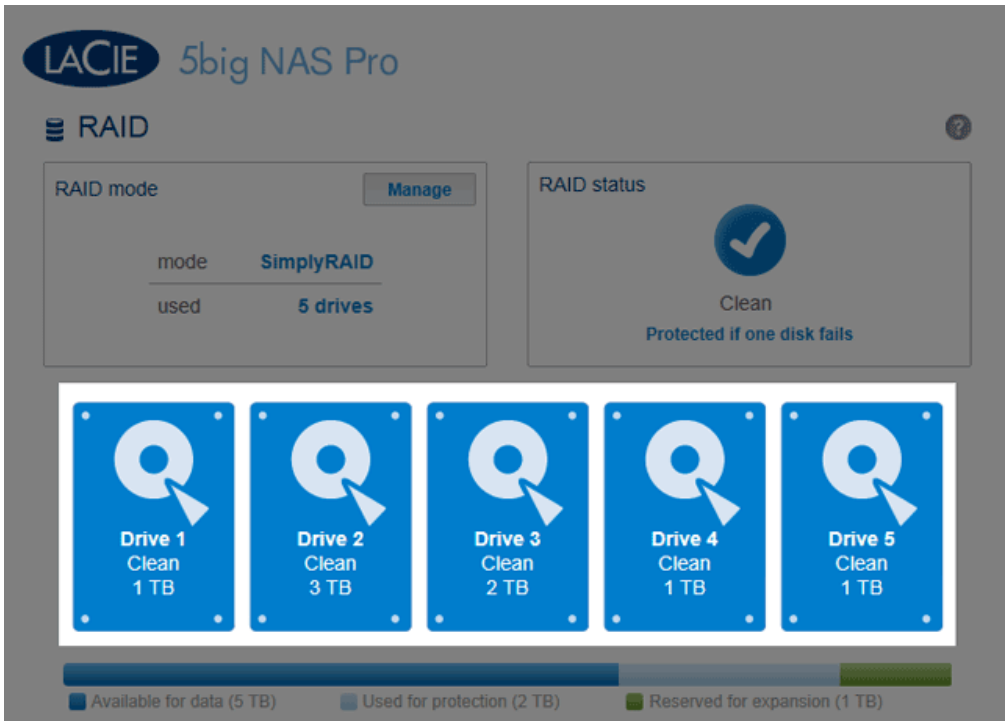


- RAID synchronizing following a disk replacement.

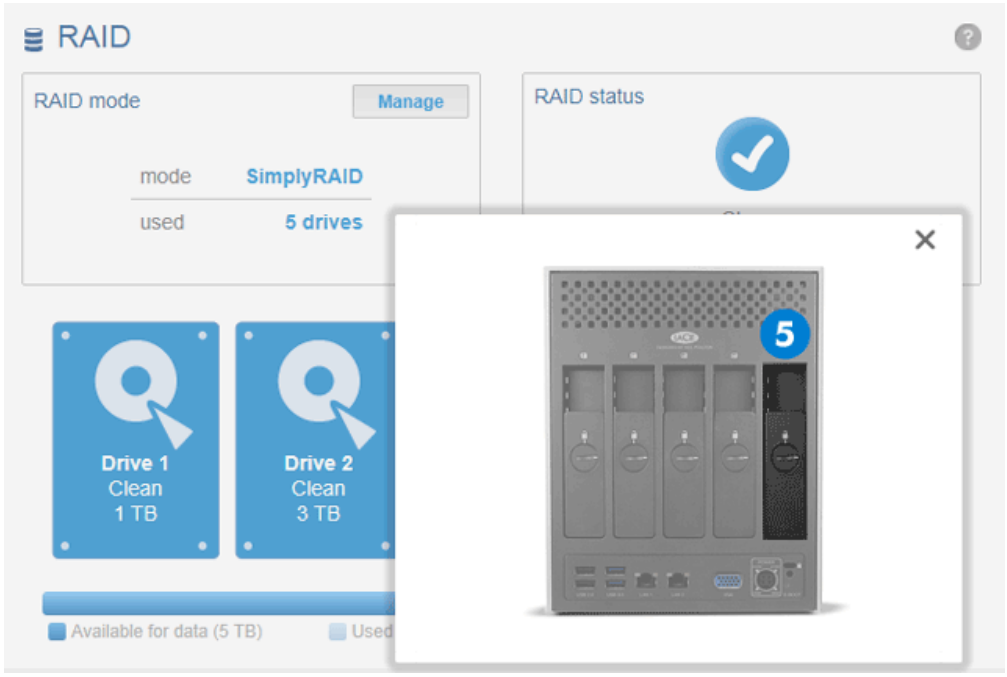


See RAID Status: Expand, Replace, and Reset for instructions on expanding your array and replacing disks.

Hard Drive Map

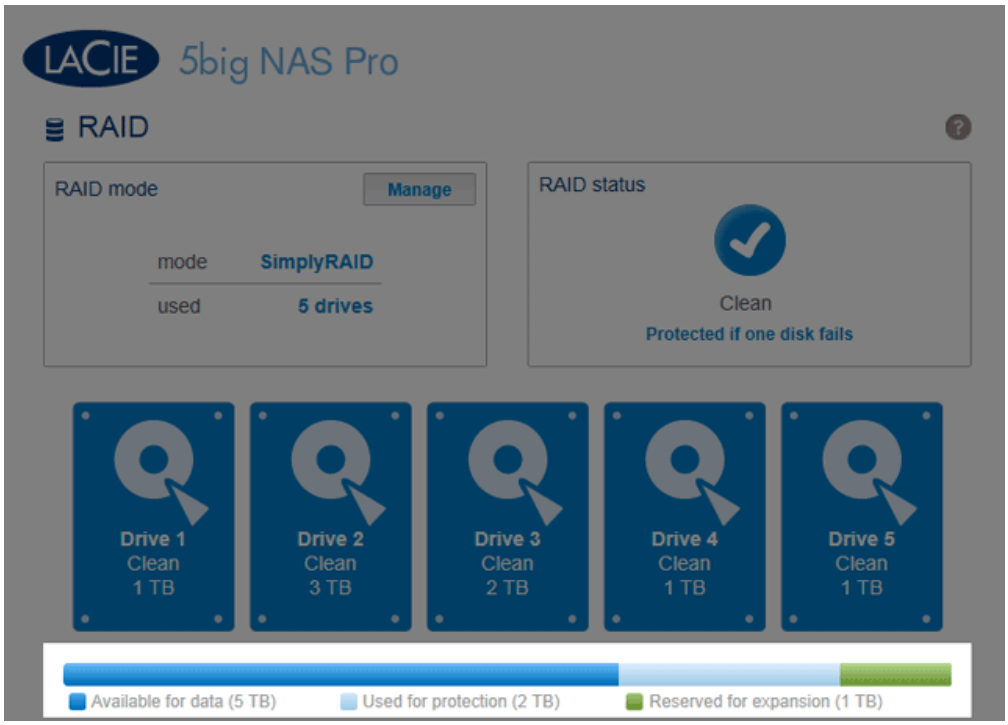


Click the illustration of the disk to see which slot in the LaCie NAS the disk occupies.



Click on the Hard Drive to see its physical location

Storage Distribution



The multicolor bar below the disks provides a fast reference on how LaCie SimplyRAID distributes the LaCie 5big NAS Pro storage.

- Dark blue: Storage capacity for your data.
- Light blue: Protection in case one or two disks fail. The light blue indicator will vary in size depending upon single or double disk protection.
- Green: Disk capacity that spans beyond the level of RAID assigned by LaCie SimplyRAID. This space is reserved for expansion should you add new or larger capacity disks.

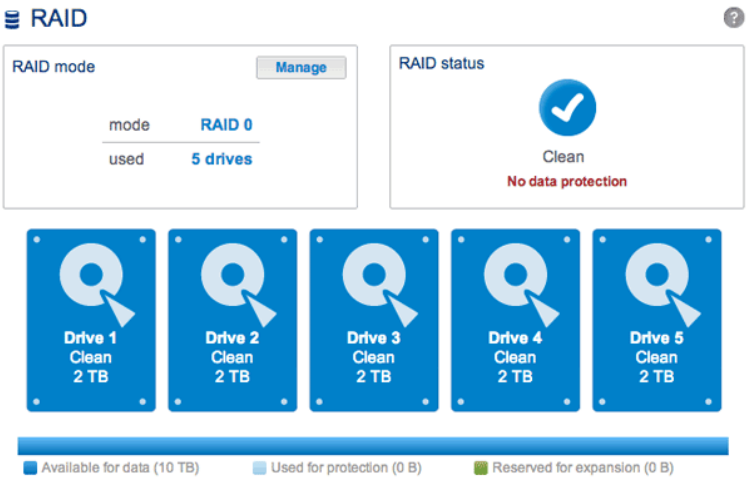
Storage capacity and distribution

Factors that determine available data capacity include:

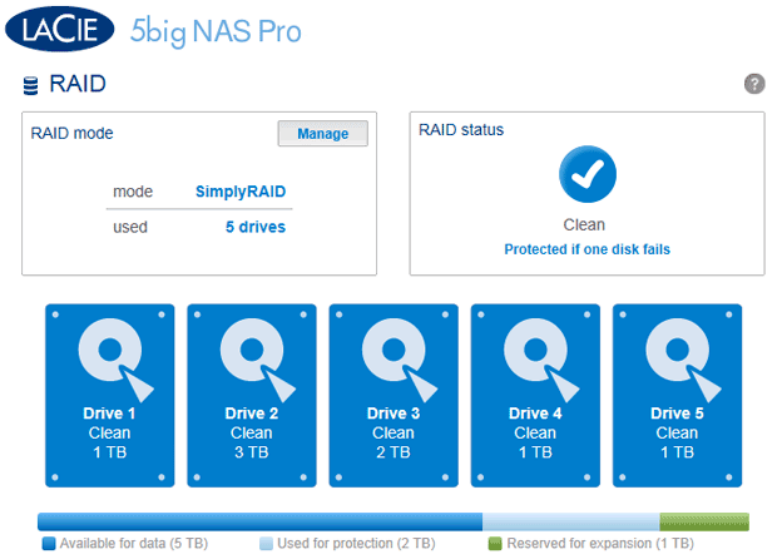
- The amount of disks in the enclosure
- The storage capacity of each disk (see note below on mixed capacities)
- RAID Mode
- Single disk or double disk security

Examples:

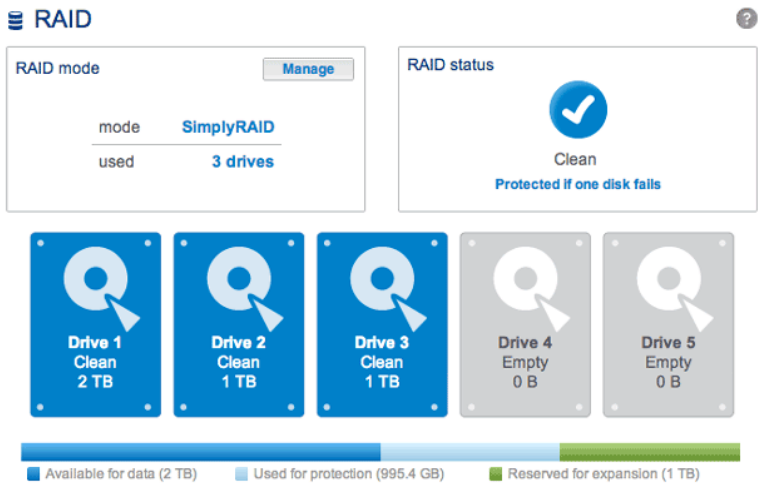
- **Manual RAID 0 configuration with five disks.** The only color is dark blue since RAID 0 has no protection and all the disks are of equal capacity (2TB).



- **LaCie SimplyRAID configuration with five disks.** All colors are represented since the RAID array uses single disk security and the disks are of mixed capacities.



- **LaCie SimplyRAID configuration with three disks.** All colors are represented since the RAID array uses single disk security and the disks are of mixed capacities.


RAID
RAID mode
Manage
mode
SimplyRAID
used
3 drives
RAID status
Clean
Protected if one disk fails
Drive 1
Clean
2 TB
Drive 2
Clean
1 TB
Drive 3
Clean
1 TB
Drive 4
Empty
0 B
Drive 5
Empty
0 B
Available for data (2 TB)
Used for protection (995.4 GB)
Reserved for expansion (1 TB)

ABOUT RAID MODES

Refer to the table below for an overview of the different RAID modes, and see the descriptions for details. Note that this information is summarized in the **RAID Setup Wizard** on the Dashboard.

RAID Mode	Minimum Hard Drives	Data Capacity	Protection	Performance	Factory Default
SimplyRAID	2	Optimized	★★★★★	★★★★½	Yes
RAID 0	2	100%	☆☆☆☆☆	★★★★★	–
RAID 1	2	50%	★★★★½	★★☆☆☆	–
RAID 5	3	60% - 75% (estimate varies by disk configuration)	★★★★½	★★★★☆	–
RAID 6	4	60% (estimate varies by disk configuration)	★★★★½	★★★★☆	–

Note on RAID 0 and 4TB hard drives: RAID 0 configurations with five hard drives cannot surpass 16TB. LaCie recommends against using five 4TB hard drives in a RAID 0 configuration.

Note on RAID 1: RAID 1 will not be available in four- and five-disk configurations.

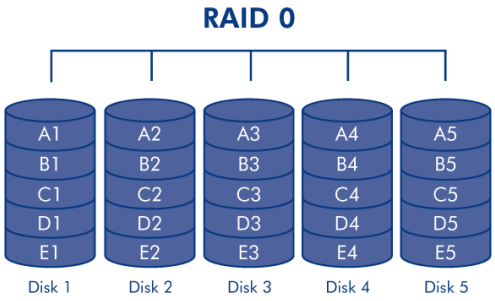
LaCie SimplyRAID

RAID configurations will use equal disk capacties among the pool of hard drives to protect data. Rather then lose hard disk capacity overhead in mixed disk environments, SimplyRAID will preserve the extra space to use when new disks are added to the enclosure. Unlike standard RAID models, you can easily expand the array without losing data. For example, two 1TB disks will create a RAID 1 array without any disk capacity overhead. However, one 1TB disk paired with one 2TB disk can only create 1TB of protection since data cannot surpass the storage capacity of the smallest disk. SimplyRAID will calculate the overhead and prepare it for future disk expansion.

RAID 0

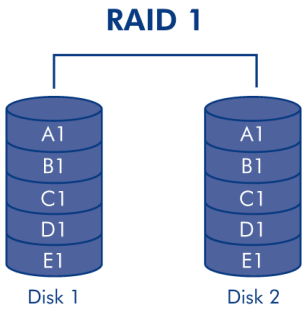
RAID 0 (also called Spanning mode in some LaCie devices), is the fastest RAID mode. In a RAID 0 array, the available capacities of each disk are added together so that one logical volume mounts on the computer. It offers the best performance but no protection in the case that a disk fails.

Caution: In a RAID 0 array, if one physical disk in the array fails, the data of all disks becomes inaccessible because parts of the data have been written to all disks.



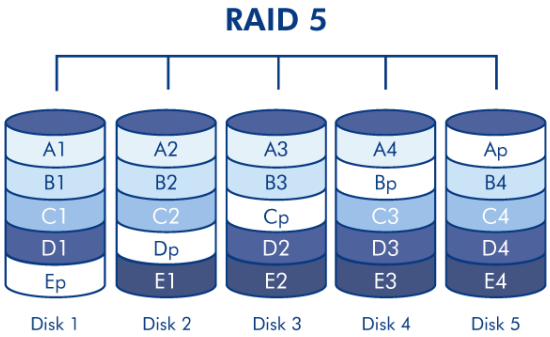
RAID 1

RAID 1 is a secure RAID mode that is available if the LaCie 5big NAS Pro has only two disks installed. RAID 1 provides data safety since all data is written to each disk at the same time. In the event of a single disk failure, data remains available on the other disk. Due to the time it takes to write the data twice, performance is slightly reduced. RAID 1 is a good choice when safety is more important than speed. However, RAID 1 also reduces the available disk space by 50% due to the need to write each bit of data on each hard drive.



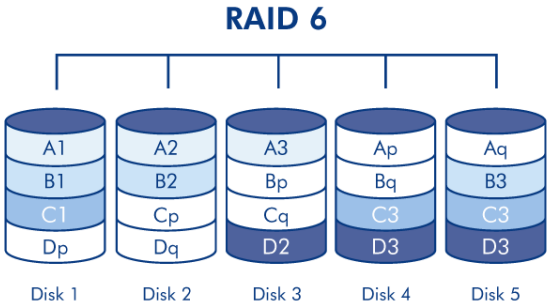
RAID 5

In RAID 5, data is striped across all disks (minimum of three) and a parity block for each data block (P in the illustration below) is written on the same stripe. If one physical disk fails, the data from the failed disk can be rebuilt onto a replacement disk. No data is lost in the case of a single disk failure, but if a second disk fails before data can be rebuilt to a replacement hard drive, all data in the array will be lost.



RAID 6

In RAID 6, data is striped across all disks (minimum of four) and two parity blocks for each data block (p and q in the illustration below) are written on the same stripe. If one physical disk fails, the data from the failed disk can be rebuilt onto a replacement disk. This RAID mode can support up to two disk failures with no data loss. RAID 6 provides for faster rebuilding of data from a failed disk.

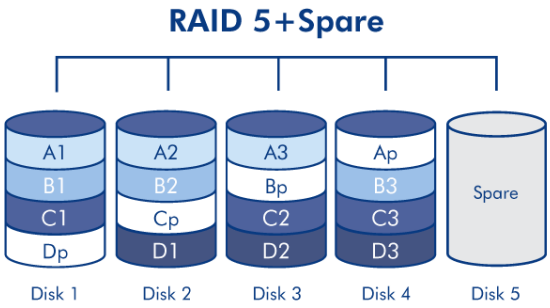


RAID 1+Spare(s), RAID 5+Spare(s), and RAID 6+Spare

RAID Mode	Maximum Spare(s)
RAID 1	3
RAID 5	2
RAID 6	1

In a RAID 1 configuration, the same data is written across all hard disks in the array. With RAID 5 and RAID 6, data is available from the parity blocks. In both cases, a RAID+Spare array gives you a “hot-spare” that is ready to rebuild the system should a disk fail. If a hard disk in the RAID array fails, the data is immediately copied or rebuilt onto the hot spare disk. The clear advantage for a RAID array with a spare is that you do not have to wait for a replacement disk.

When the failed disk is replaced, the replacement becomes the new hot spare. No data is lost in the case of a single disk failure, but if a second disk fails before the system can rebuild data to the hot spare, all data in the array will be lost. It is possible to create an array with more than one spare.



See RAID Setup Wizard for instructions on creating a spare hard drive (Only available with **Standard** mode. LaCie SimplyRAID optimizes disk space for you.)

RAID SETUP WIZARD

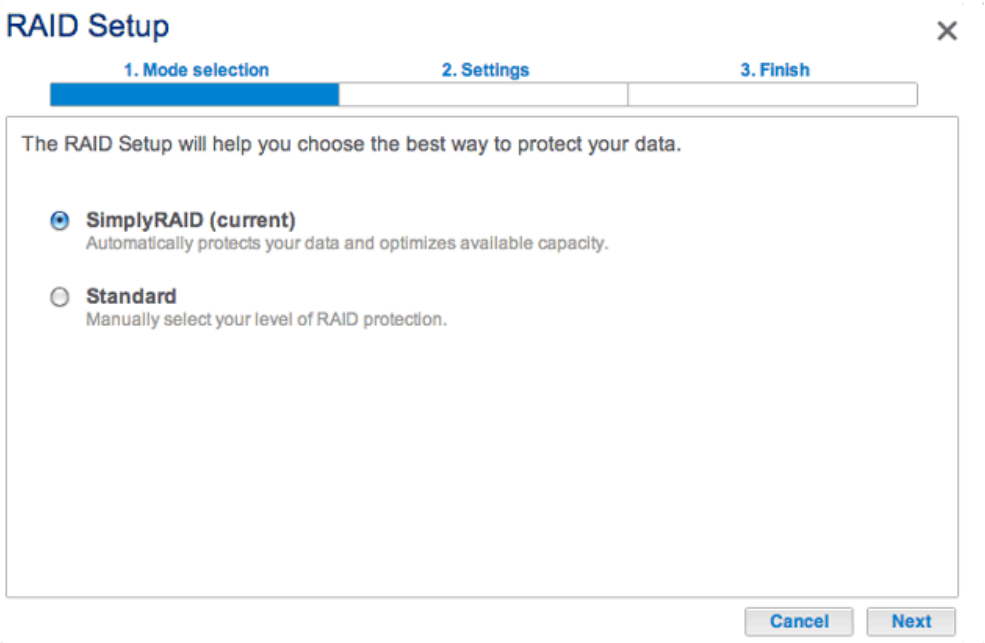
Follow the directions to run the RAID Setup Wizard. You may select:

- **LaCie SimplyRAID:** LaCie's smart RAID configuration agent.
- **Manual RAID:** Configure your array using standard RAID models based upon the amount of disks in your

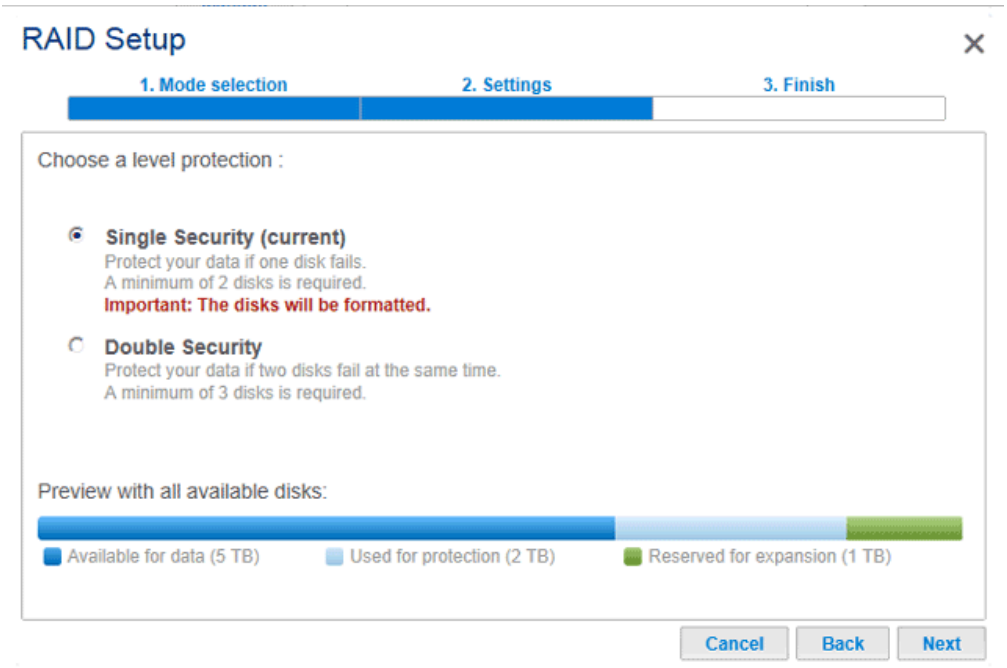
enclosure.

LaCie SimplyRAID

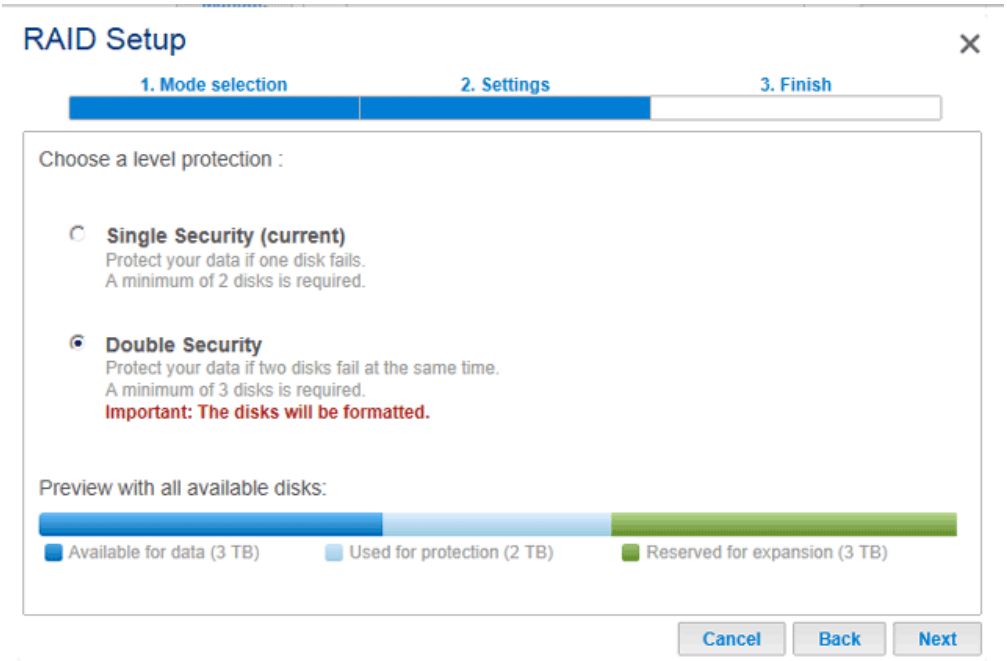
1. Click the **Manage** button to launch the RAID Setup Wizard.
2. Select **SimplyRAID** then click **Next**.



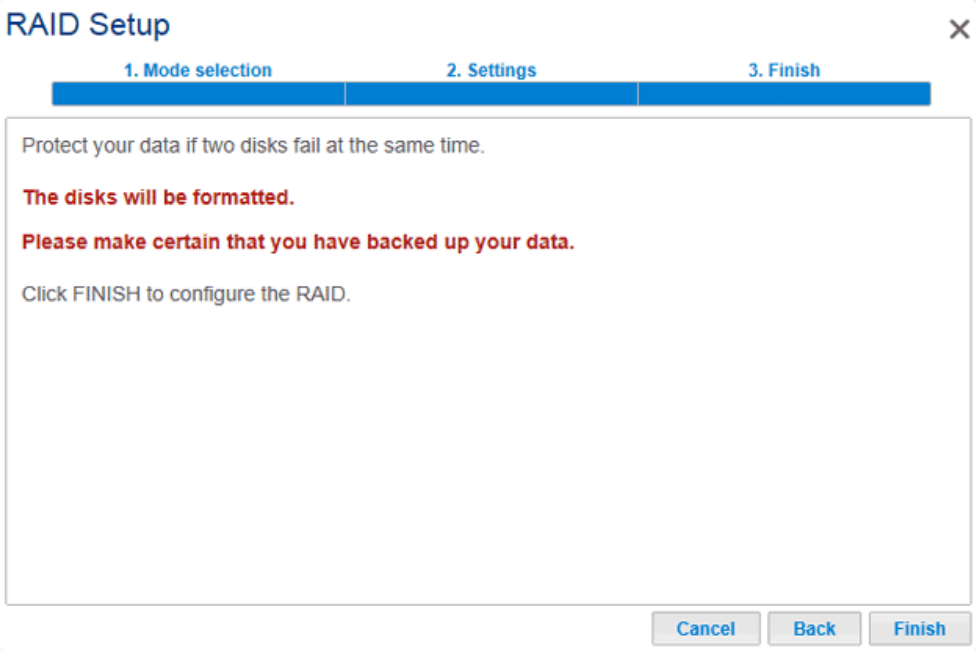
3. Choose the level of security then click **Next**. Please note that all data on the disks will be deleted to create the initial RAID configuration. Future updates to storage capacity will not delete data.
   - Single security will protect data against the loss of a single hard disk (minimum of two hard disks required).



   - Double security will protect data against the loss of two hard disks (minimum of three hard disks required).



4. Click **Finish** to configure the RAID, then **Yes** at the prompt.

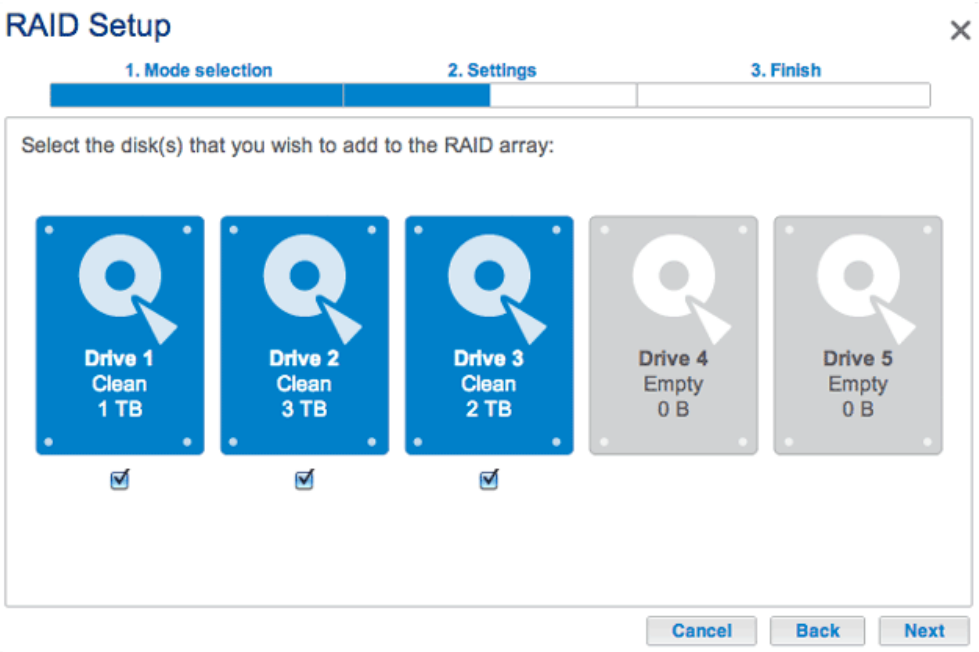


Manual RAID

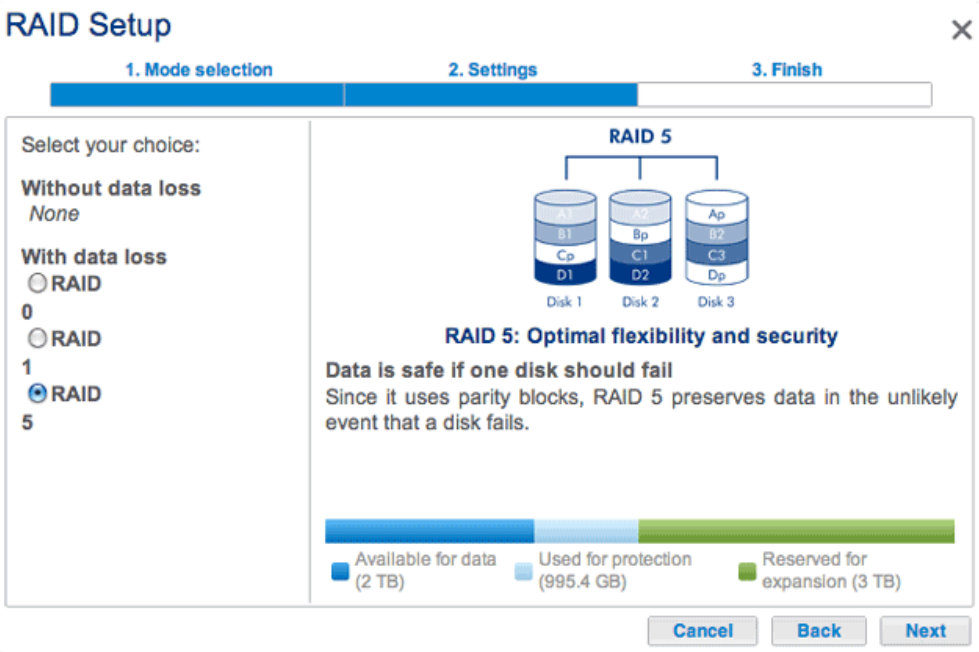
Your options to select the level of RAID are predicated upon the number of disks in your array. For example, a three-disk configuration allows you to select from RAID 0, RAID 1, or RAID 5. A four- or five-disk configuration offers RAID 0, RAID 5, or RAID 6.

Adding a spare: If you intend to create an array with a spare drive, you must leave at least one hard drive bay free. For example, a four-disk RAID 6 array with spare would require that you create the RAID 6 with the first four disks (from left to right) before moving to the next section to add the fifth hard disk as the spare.

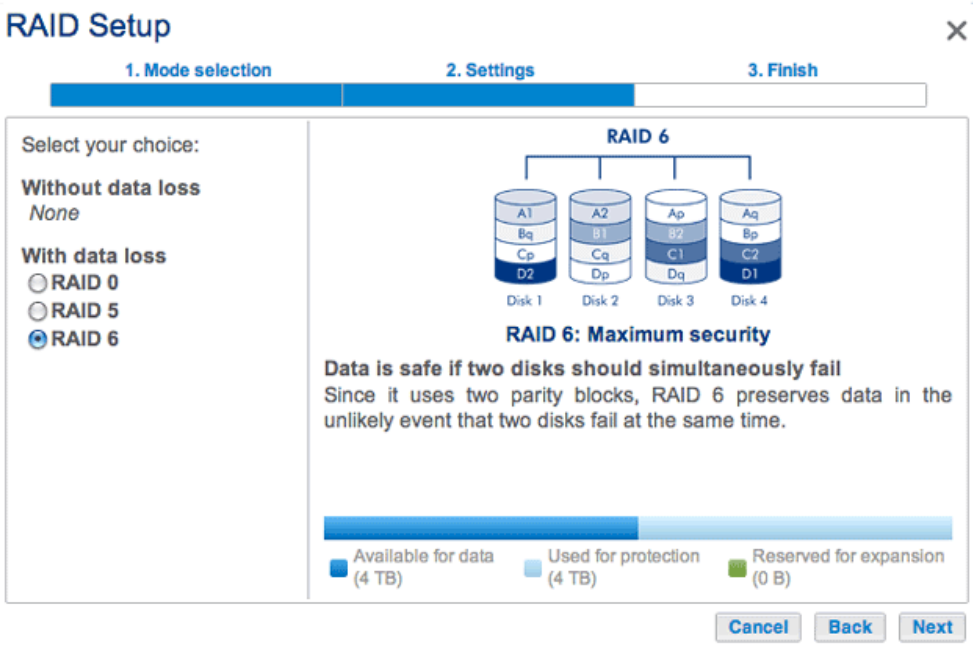
1. Click the **Manage** button to launch the RAID Setup Wizard and **Standard** for a manual configuration.
2. Select the disks for your array by checking their respective boxes. Click **Next**.



3. Choose a RAID level. Clicking the RAID mode's button will give you an explanation of its strengths and weaknesses. If you are reconfiguring the RAID, the new mode will erase files on existing shares but your Dashboard configuration will not be affected.



Three-disk configuration includes: RAID 0, RAID 1, and RAID 5



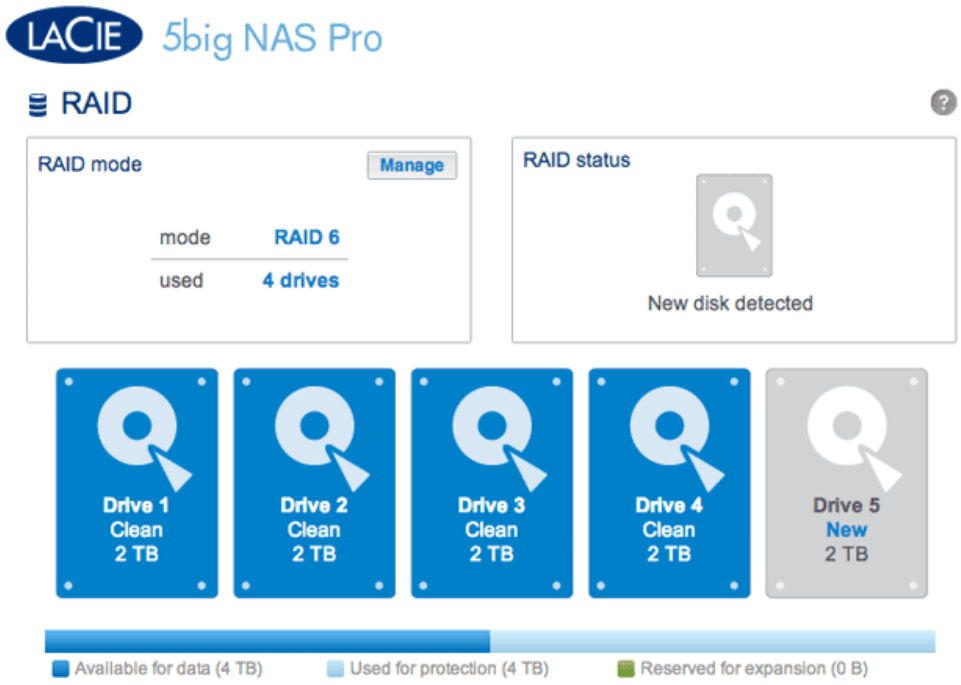
Four- and five-disk configurations include: RAID 0, RAID 5, and RAID 6

4. Click **Next**.
5. Review the information then confirm the RAID mode by clicking **Finish**. Click **Yes** at the final prompt.

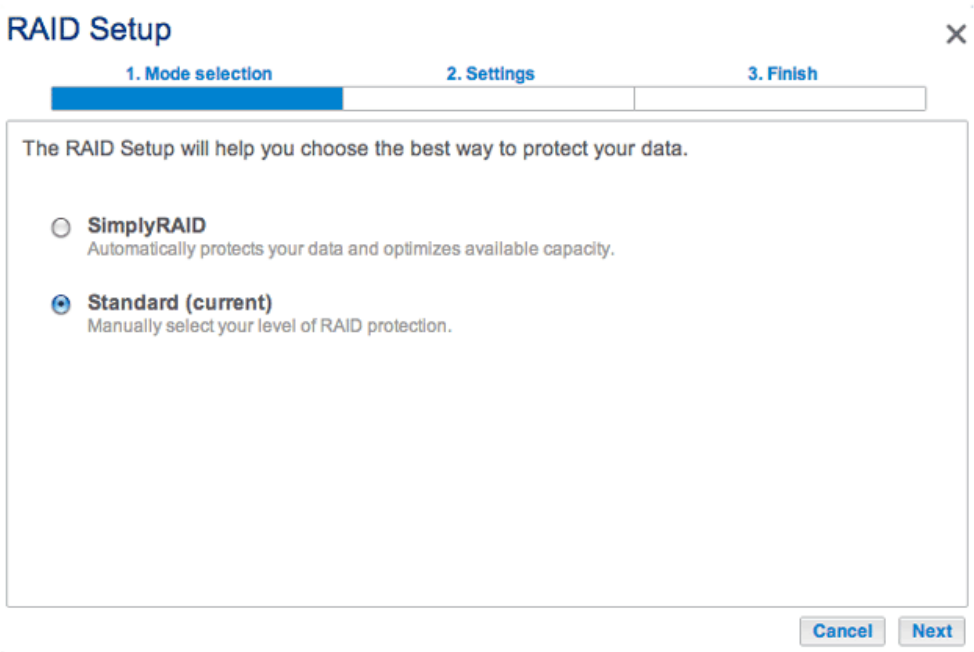
Manual RAID+Spare

Before adding a spare hard drive, you must follow the instructions above (**Standard (Manual)**) to create the array. When creating the array, please leave a minimum of one hard drive bay free for the spare. You may follow the directions below with RAID 1, RAID 5, or RAID 6 arrays.

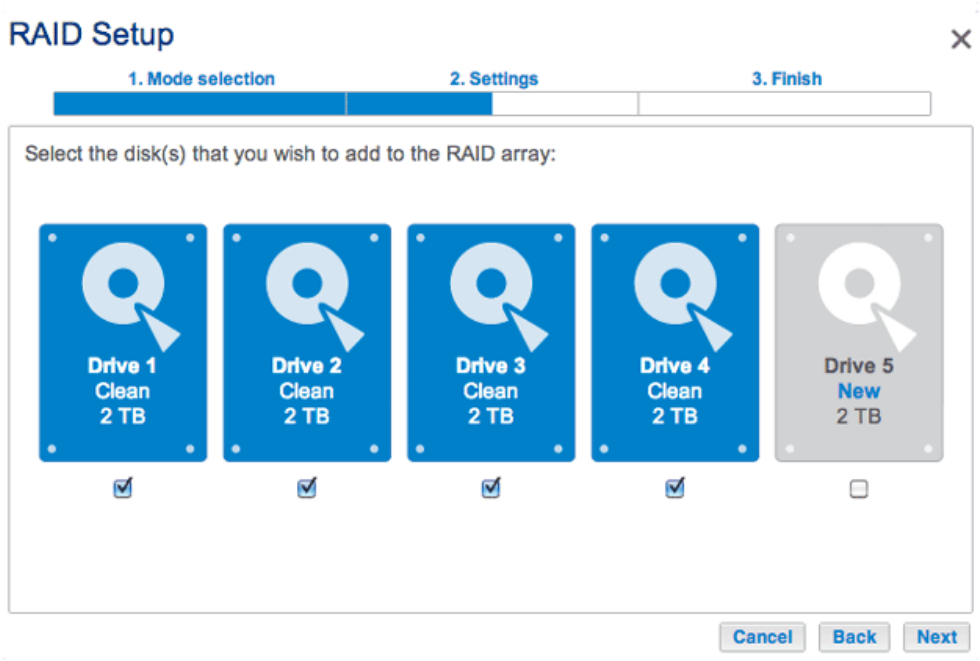
1. If you have not inserted the spare hard drive(s) to the LaCie NAS, please see Remove/Insert a Hard Disk for instructions. To add the spare, **Dashboard > RAID** should display at least one *New* hard drive.



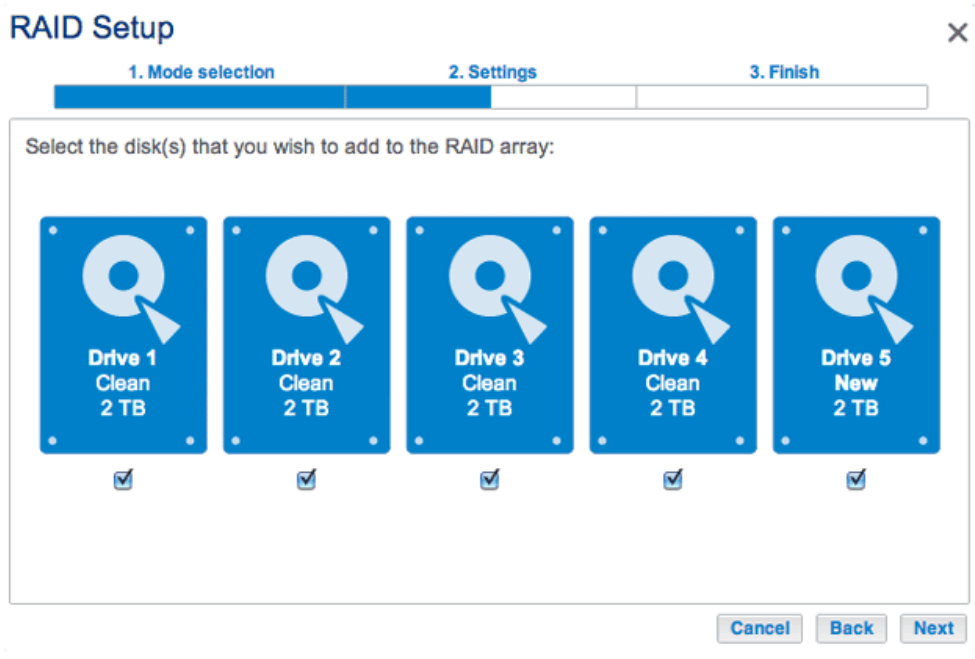
2. Click **Manage**.
3. Select **Standard (current)** and click **Next**.



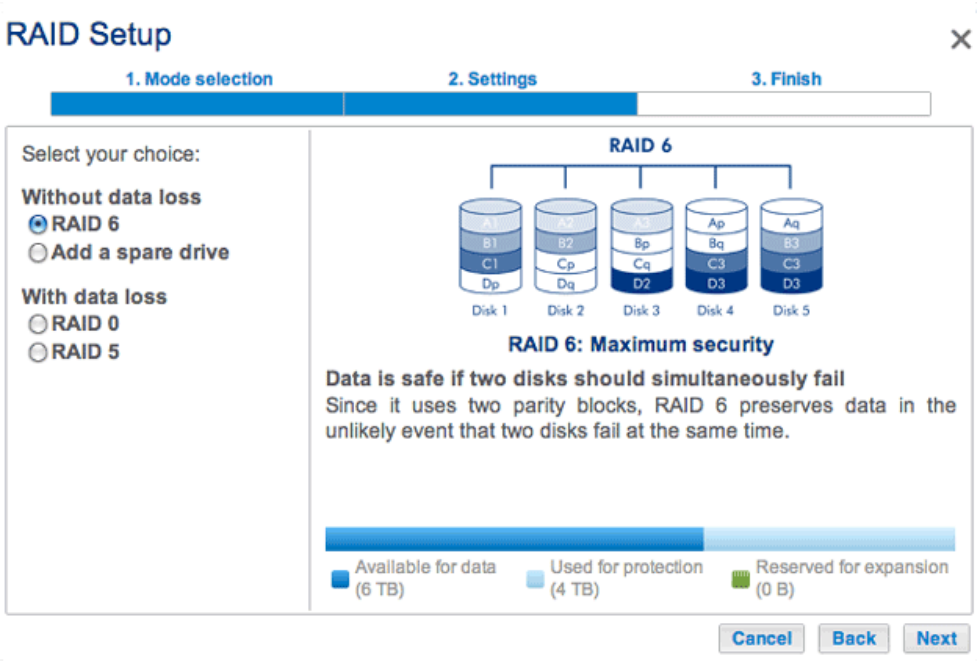
4. Make certain that all disks in the RAID array are selected.



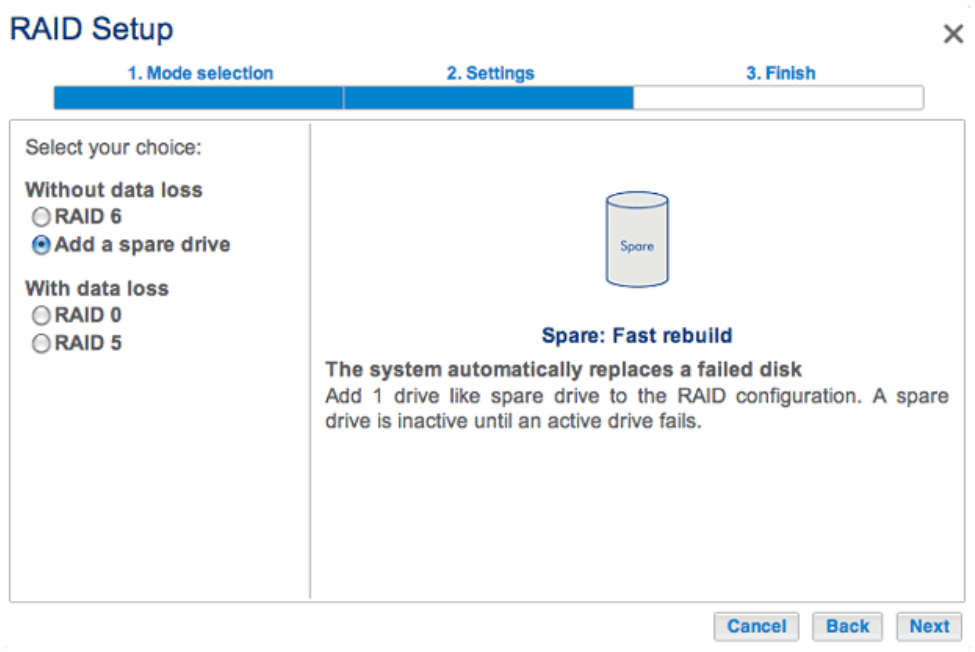
5. Check the box under the *New* hard drive(s) and click **Next**.



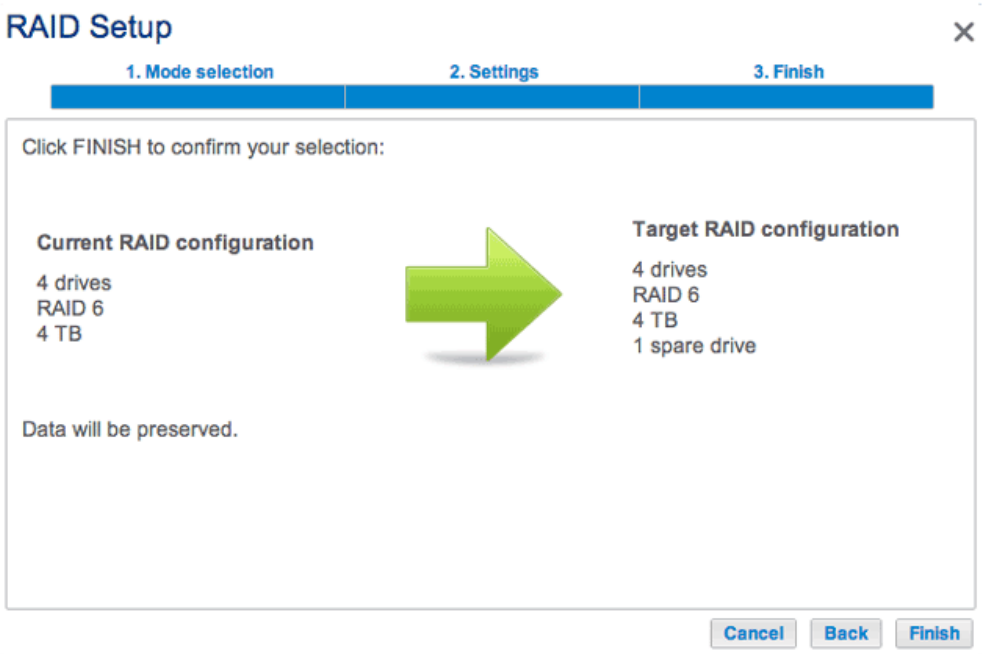
6. Confirm that your current RAID configuration is listed.



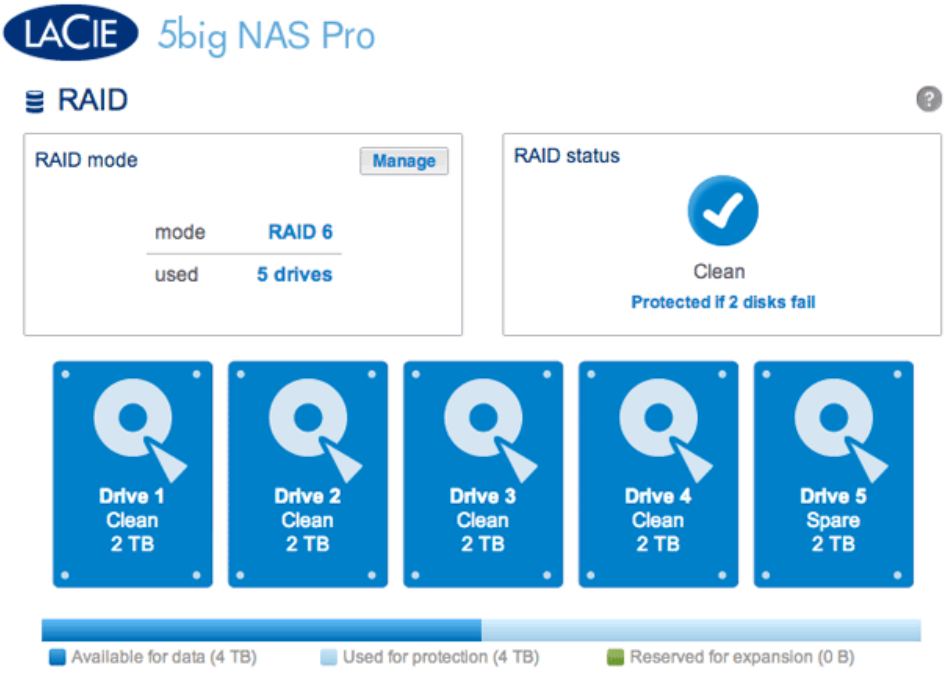
7. Click on the radio button next to **Add a spare drive** and click **Next**.



8. Confirm the configuration and click **Finish**.



9. The *Spare* is now available.



Rebuilding Times

Rebuilding a protected RAID array can take many hours, depending on the capacity of the hard disks and your LaCie NAS's available resources (concurrent tasks such as backups or torrent downloads will slow rebuilding). Changing to an unprotected RAID mode (e.g. RAID 0) takes less than five minutes. Note that data is accessible during rebuilding.

RAID STATUS: EXPAND, REPLACE, AND RESET

The RAID Status box will inform you of changes to your array that may require action on your part. Follow the instructions below to:

- Remove and/or insert a disk
- Perform one of the following:
  - *Expand* your RAID with a new disk
  - *Replace* a missing or failed disk
  - *Reset* the RAID configuration with the available disks

Important info: If a hard disk that you have purchased from LaCie fails, please contact your LaCie reseller or LaCie Customer Support.

Hard Disk Replacement/Expansion with Unprotected and Protected Arrays

Unprotected RAID Arrays and Swapping/Expanding Hard Disks:

- Removing a hard disk from a RAID 0 array while the device is powered on may cause you to lose data. To avoid problems, shut down the LaCie NAS before removing healthy disks. Return the hard drives to their proper bays before powering on the LaCie NAS.
- In cases where a hard drive has failed or you wish to expand storage capacity, data will be lost when replacing/swapping hard disks.

Protected RAID Arrays and Swapping/Expanding Hard Disks: If your array is protected (e.g. RAID 1), you can remove a hard disk while the product is turned on without damaging the array and losing data, a process also referred to as “hot-swapping”. In most instances, LaCie recommends hot-swapping when replacing or expanding hard disks in the LaCie NAS. For example, if you swap or insert unclean hard drives (with data) from another LaCie NAS (e.g. a LaCie 2big NAS to a LaCie 5big NAS Pro), you may experience problems when first booting your current LaCie NAS.

When replacing or expanding hard drives in a protected RAID array:

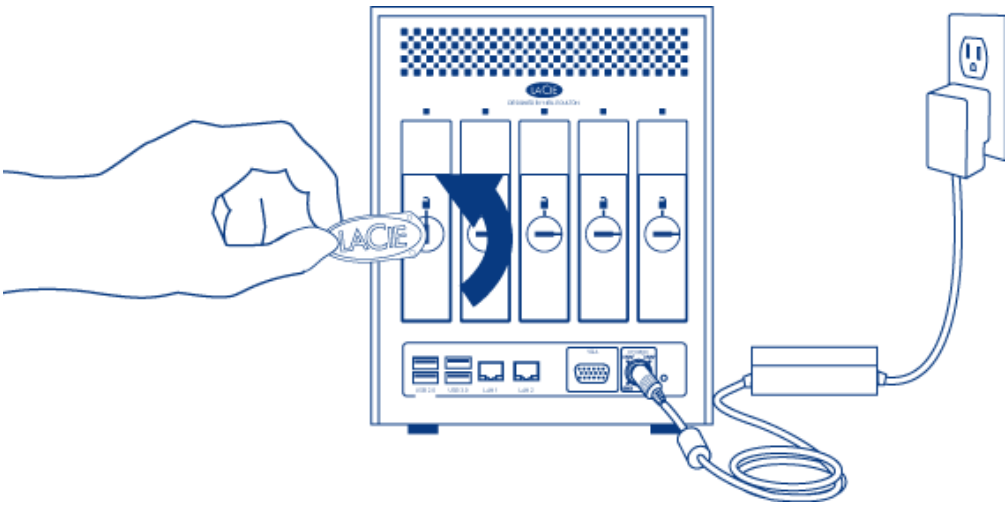
- Perform the operation while the LaCie NAS is powered on (hot-swapping).
- Use clean hard drives (without data).

Remove/Insert a Hard Disk

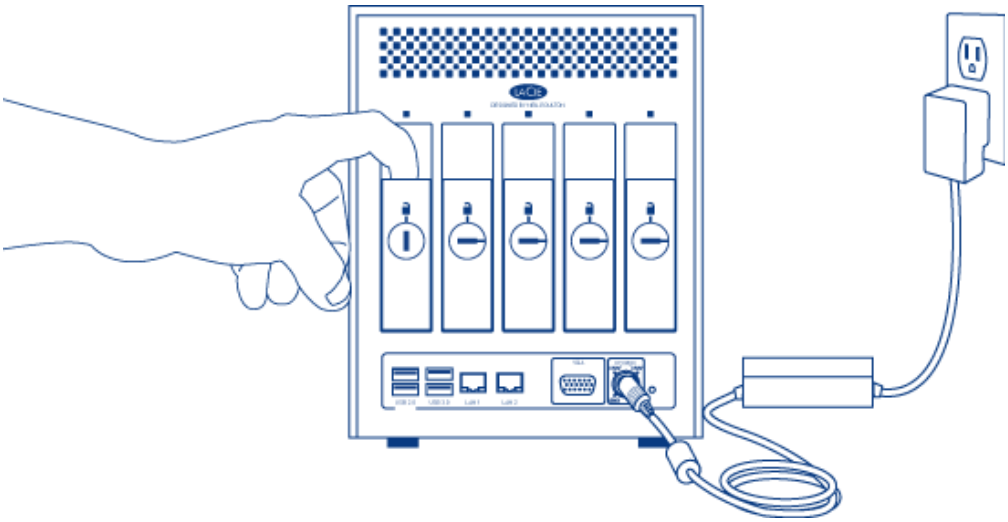
Disk Removal

Caution: After continuous use of the LaCie NAS, hard drives may be hot. Use caution when removing.

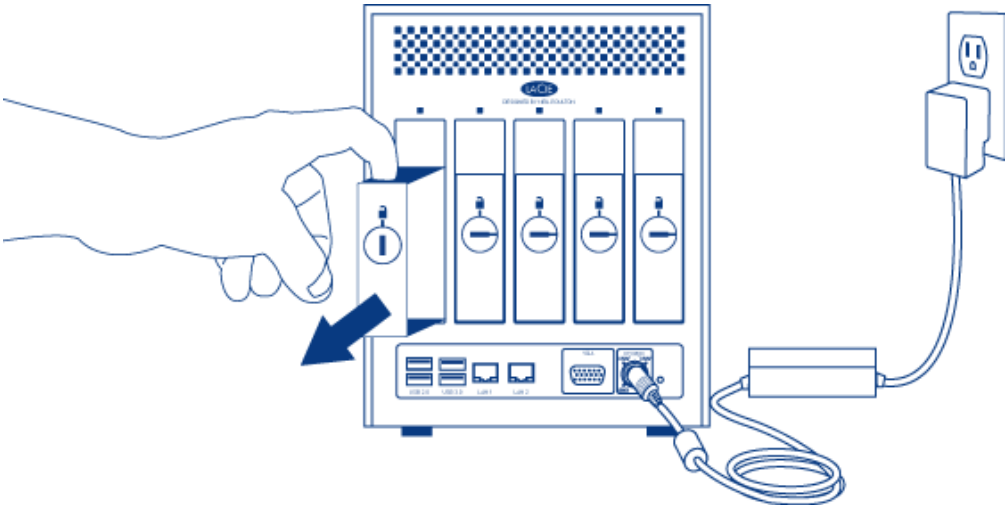
1. The hard drive tray may be locked. To unlock it, use the included disk drawer key to turn the lock until the slot is vertical.



2. Draw out the hard drive tray by inserting your finger into the space behind the tray handle and pulling to disengage the tray.

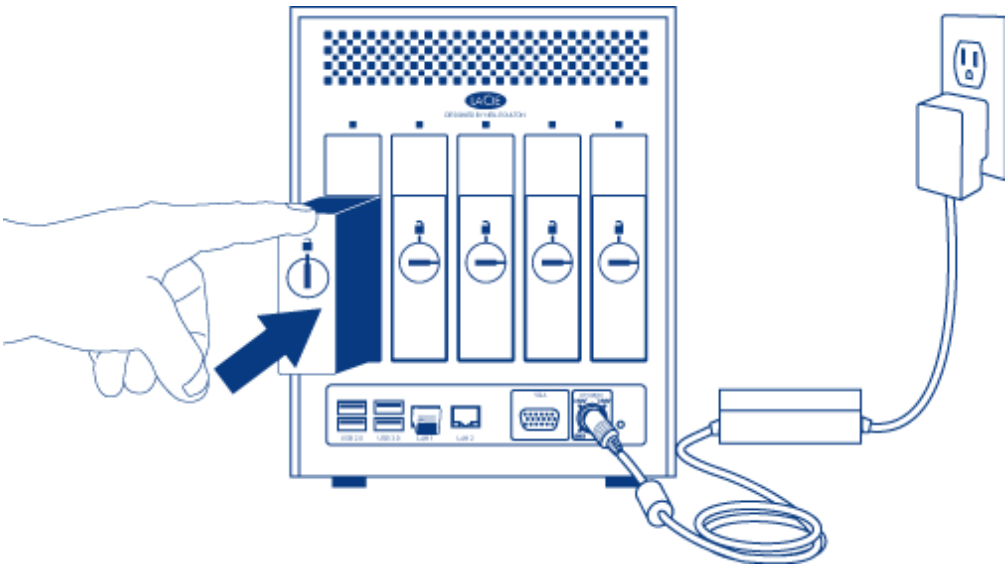


3. Grasp the tray handle and carefully extract the drive.

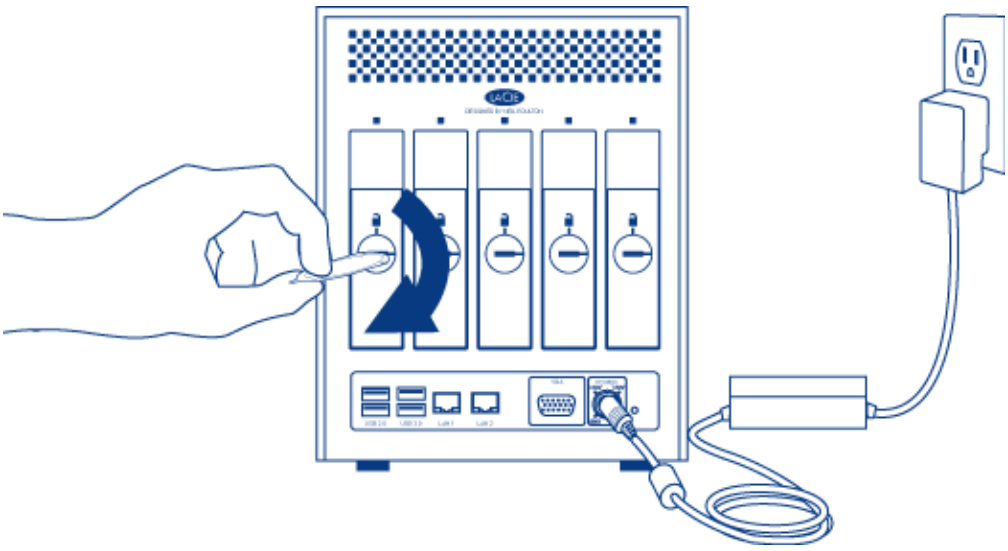


Disk Insertion

1. Carefully insert the tray into an empty hard drive bay. When the tray is most of the way in and you feel resistance, press the drive tray handle firmly until you feel the drive snap into place and the drive tray handle is flush with the back of the LaCie NAS.



2. Use the disk drawer key to lock the drive.



Expand your RAID array Hard Disk Capacity

SimplyRAID

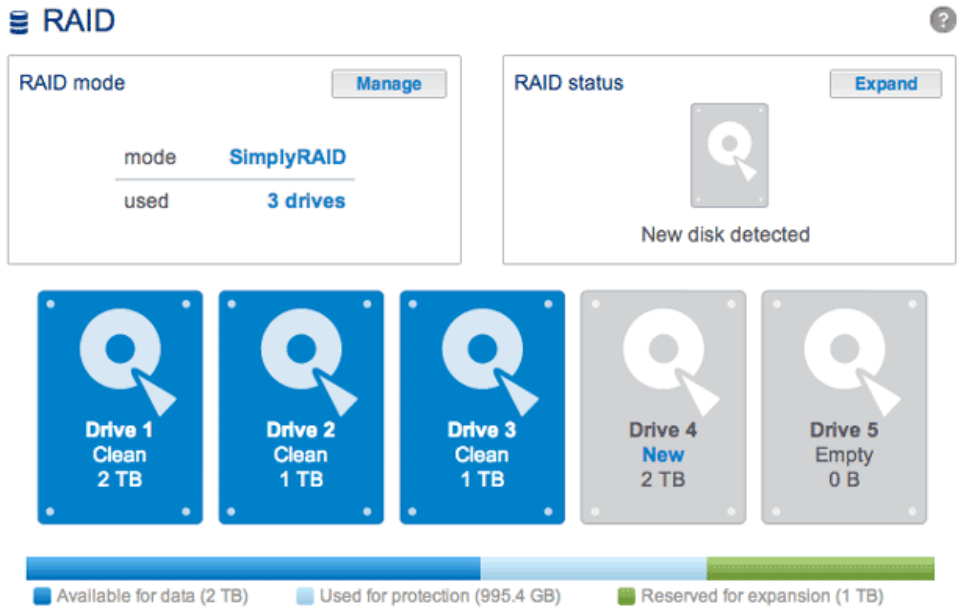
LaCie SimplyRAID allows you to expand your total storage capacity by removing hard disks (one at a time) and replacing them with larger capacity hard disks. It is not possible to replace existing hard disks with lower capacity hard disks. Please note that **data stored on the new disk will be deleted**.

The instructions below pertain to storage expansion in a LaCie 5big NAS Pro chassis with available or empty drive slots. If you are exchanging an existing hard disk in your array for a hard disk of greater capacity, please

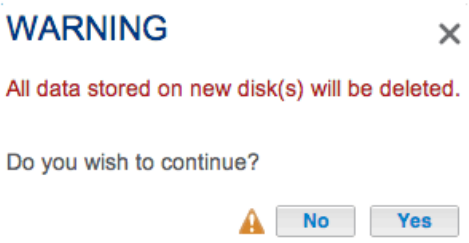
follow the instructions in Replace a failed or missing disk.

Adding Hard Disks: Please note that performing the steps below will **delete all data stored on the new, larger capacity hard disk**.

1. Insert a new hard drive into an available drive slot in your LaCie 5big NAS Pro (see Remove/Insert a Hard Disk for instructions). Please be patient while the LaCie NAS Dashboard gathers the information on the new hard disk.
2. Click on **Expand** in the RAID Status box.



3. A prompt will ask you to confirm that you wish to add the disk to the array.



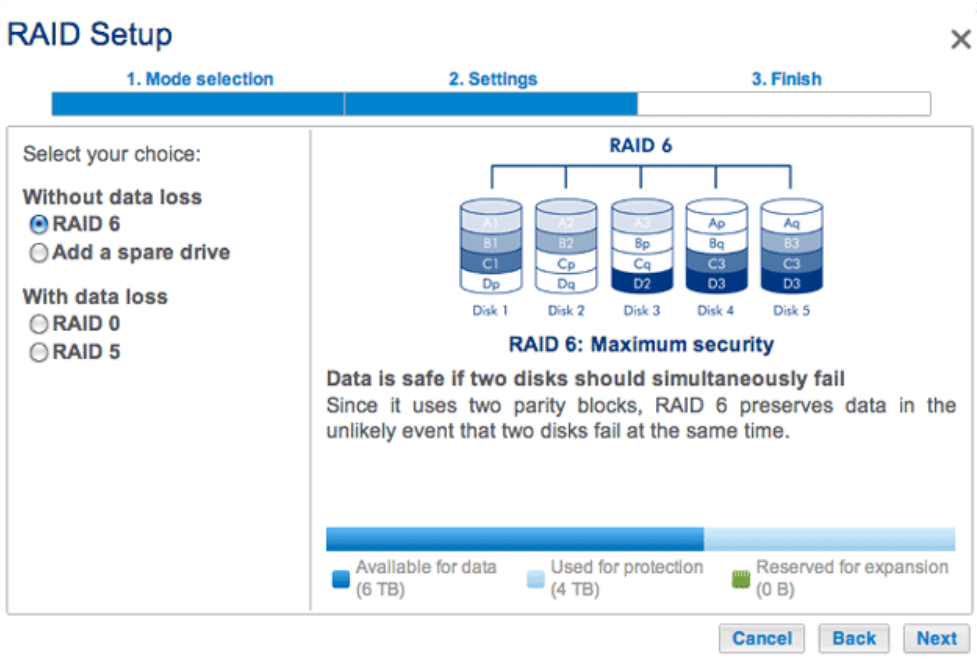
The Dashboard will become unavailable for a brief period of time as the system configures the RAID. You may continue to access files stored on your LaCie NAS during the RAID synchronization.

Manual

For instructions on how to exchange an existing hard drive in your protected RAID array for a larger capacity hard disk, please see the instructions for the LaCie 2big NAS: Expand Disk Capacity.

For instructions on how to expand your protected RAID array once you have added a new hard disk to an available or empty drive slot, please see RAID Setup Wizard. Select the **Manual+Spare** link and you will have the option to use the new disk as a Spare or to add the storage to the array.

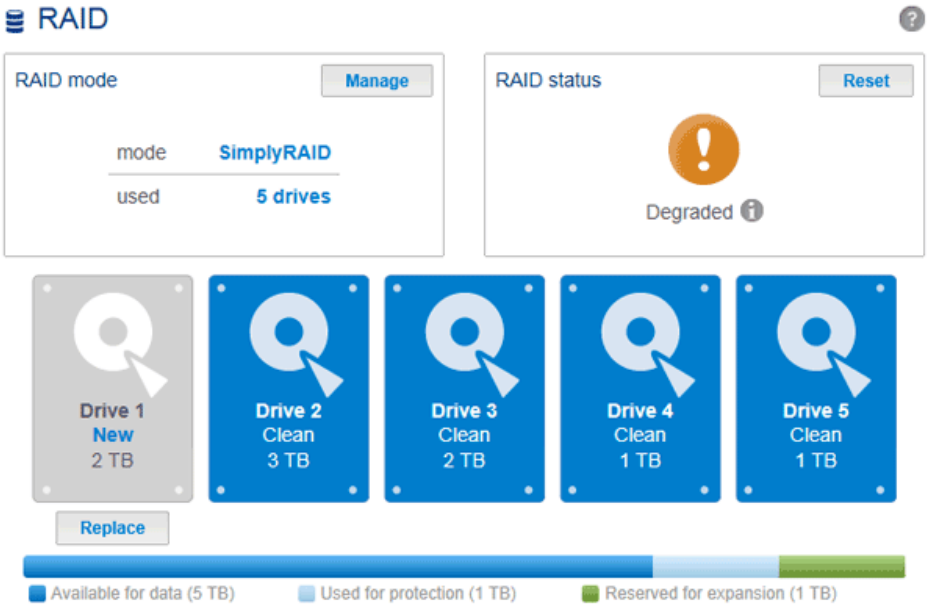
Please make certain to select the radio button for your RAID array under the heading **Without data loss** (Step 6).



Replace a failed or missing disk

If you have configured your RAID as *Standard* (Manual as opposed to SimplyRAID), the new disk must have equal or greater capacity than the disk it is replacing.

1. Remove the failed disk and insert a new hard drive per the instructions above.
2. Go to **Dashboard > RAID**. The recently inserted hard disk will be labelled **New**.
3. If the LaCie 5big NAS Pro RAID configuration is SimplyRAID, RAID 1, RAID 5, or RAID 6:
    1. Click the **Replace** button below the New Disk. **DO NOT** click on *Reset*.

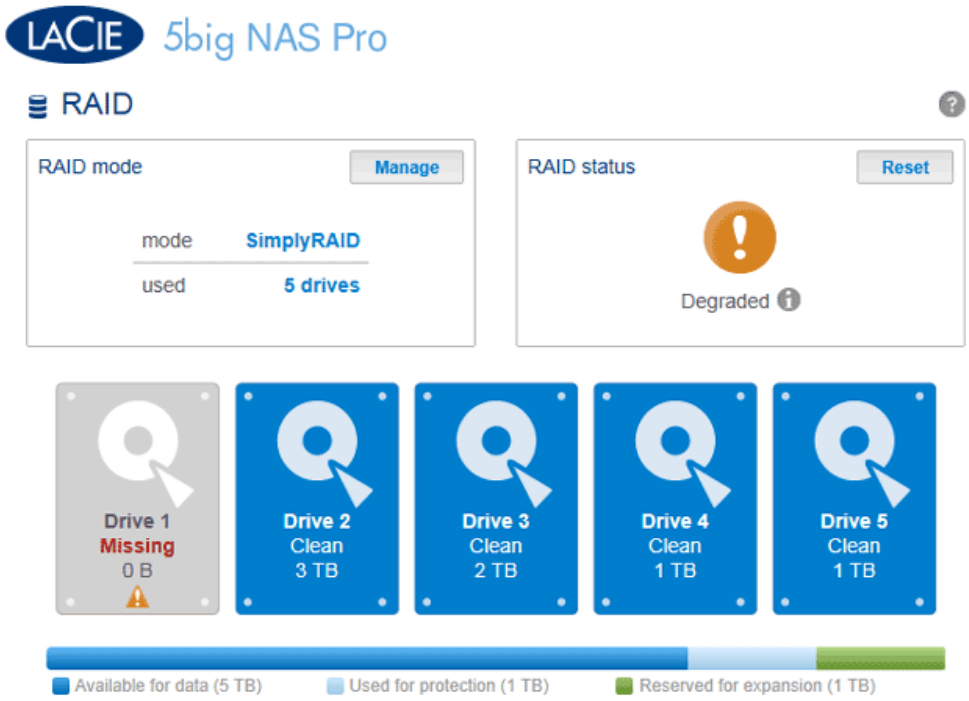


    2. Confirm the addition and complete the RAID Setup Wizard.

3. You may continue to use the LaCie NAS during the RAID synchronization.
4. If the LaCie 5big NAS Pro RAID configuration is RAID 0:
   1. Click the **Manage** button and complete the RAID Setup wizard.

The Dashboard will become unavailable for a brief period of time as the system configures the RAID. On protected RAID arrays, you may continue to access files stored on your LaCie NAS during the RAID synchronization.

Reset the RAID array (SimplyRAID only)



If a hard drive in the array fails and you do not have a replacement disk, you can use the **Reset** button to reconfigure the RAID. The Reset button will optimize the RAID configuration using the remaining disks. LaCie recommends that you back up your files since all data will be deleted while creating the new RAID array.