

# 5BIG NAS PRO: ABOUT RAID MODES

Refer to the table below for an overview of the RAID modes available to the LaCie 5big NAS Pro. Note that the levels of performance and protection will differ based upon the number of drives in the volume. The *New storage volume* wizard includes a helpful tooltip with star ratings for performance and protection based upon the amount of disks in the volume.

RAID Mode	Minimum Hard Drives
SimplyRAID	1 (no data protection) or 2 (with data protection)
JBOD	1
RAID 0	2
RAID 1	1 (no data protection) or 2 (with data protection)
RAID 5	3
RAID 6	4

The factory default RAID for an enclosure purchased with five hard drives is SimplyRAID with single-disk protection.

**Note on enclosures with one hard drive:** You can create a SimplyRAID or a RAID 1 volume with a single drive in the enclosure. Single-disk volumes can be expanded by adding new disks to the enclosure and following the instructions at [Hard Disk Expansion: Single-Disk and Unprotected Volumes](#). Data will remain intact on the volume during expansion. Additionally, expanding RAID 1 and SimplyRAID will provide protection against the loss of a single hard drive. However, there is NO DATA PROTECTION when the volume has only one hard drive.

**Important info on NAS backup:** It is recommended that all users back up data to DAS or another NAS as further protection against disk failure or secondary points of failure (e.g. hardware, network, etc.). See [Backup Jobs](#) for details.

## GET HELP CHOOSING YOUR RAID

Understanding RAID and its many levels is critical when deciding how best to apportion the disks in your NAS. To help administrators configure their RAID volumes, LaCie NAS OS provides a handy star rating system with an intuitive storage capacity bar.

The last step of the *New storage volume* wizard provides:

- A list of available RAID configurations that are compatible with the amount of disks in the volume
- A tooltip that rates each level of RAID for the volume

**Note:** Step-by-step instructions on how to use the New storage volume wizard are available in [New Storage Volume Wizard](#).

## Available RAID configurations

**New storage volume** ×

1. Type 2. Settings 3. Finish

Select your choice : i

☒ **SimplyRAID**  
Single security

☐ **SimplyRAID**  
Double security

☐ **JBOD**

☐ **RAID 0**

☐ **RAID 1**

☐ **RAID 5**

☐ **RAID 6**

**SimplyRAID: Single security**

Automatically protects your data and optimizes available capacity.  
Data is protected if one disk fails.

Capacity 74%

Protection ★★★★★

Performance ★★★★★

Scalability ★★★★★

Available for data (6 TB) Used for protection (2 TB) Reserved for expansion (0 B)

Cancel Back Next

The screenshots in this section represent levels of RAID available to an enclosure with:

- Three 2TB disks
- Two 1TB disks

All levels of RAID can be selected except for RAID 1, which is not compatible with volumes greater than three disks. Choose a RAID's radio button next to review its strengths and weaknesses in the center of the window. See the three examples below:

### ▪ RAID 0

**New storage volume** ×

1. Type 2. Settings 3. Finish

Select your choice : i

☐ **SimplyRAID**  
Single security

☐ **SimplyRAID**  
Double security

☐ **JBOD**

☒ **RAID 0**

☐ **RAID 1**

☐ **RAID 5**

☐ **RAID 6**

**RAID 0**

Simultaneous Read/Write across all striped disks for optimal performance.  
No data protection

Capacity 100%

Protection ⚠

Performance ★★★★★

Scalability ☆☆☆☆☆

Available for data (8 TB) Used for protection (0 B) Reserved for expansion (0 B)

Cancel Back Next

### ▪ RAID 6

New storage volume

×

1. Type

2. Settings

3. Finish

Select your choice :

☐ SimplyRAID  
Single security

☐ SimplyRAID  
Double security

☐ JBOD

☐ RAID 0

☐ RAID 1

☐ RAID 5

☒ RAID 6

RAID 6

Using dual parity blocks ensures that data is safe in case of a disk failure.  
Data is protected if two disks fail at the same time.

Capacity

37%

Protection

★★★★★

Performance

★★★☆☆

Scalability

★★★☆☆

Available for data  
(3 TB)

Used for protection  
(2 TB)

Reserved for expansion  
(3 TB)

Cancel

Back

Next

## ▪ SimplyRAID Double security

New storage volume

×

1. Type

2. Settings

3. Finish

Select your choice :

☐ SimplyRAID  
Single security

☒ SimplyRAID  
Double security

☐ JBOD

☐ RAID 0

☐ RAID 1

☐ RAID 5

☐ RAID 6

SimplyRAID: Double security

Automatically protects your data and optimizes available capacity.  
Data is protected if two disks fail at the same time.

Capacity

49%

Protection

★★★★★

Performance

★★★☆☆

Scalability

★★★★☆

Available for data  
(4 TB)

Used for protection  
(4 TB)

Reserved for expansion  
(0 B)

Cancel

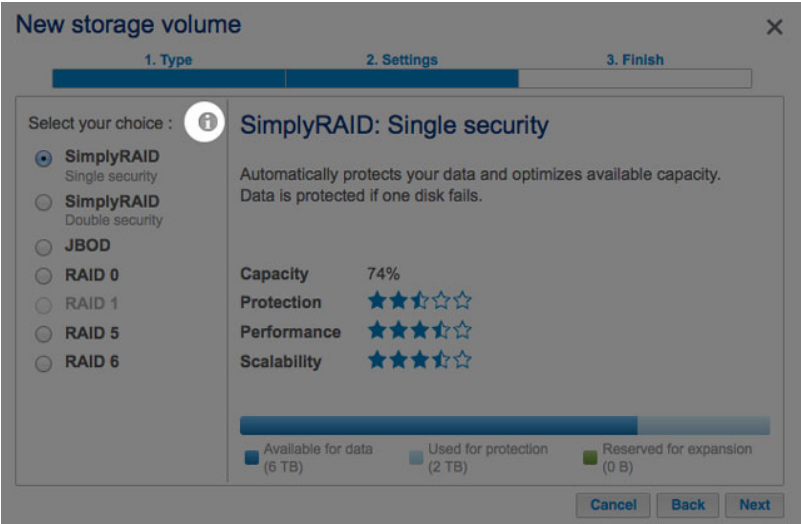
Back

Next

As the screenshots above show, RAID 0 is the best choice for storage capacity but it has a major weakness, no data protection. Both RAID 6 and SimplyRAID Double security offer data protection even if two disks fail. However, SimplyRAID optimizes storage capacity far better than RAID 6, giving users more space to store files.

# Tooltip comparison

There is an easy way to compare all levels of RAID in one table, the tooltip. Click on the **i** next to **Select your choice**.



A table will appear comparing all levels of rate via star ratings and the storage capacity bar.

**RAID options with selected disks**

RAID mode	Performance	Protection	Scalability	Capacity
SimplyRAID - Single security	★★★★★	★★★★★	★★★★★	<div><div></div></div>
SimplyRAID - Double security	★★★★★	★★★★★	★★★★★	<div><div></div></div>
JBOD	☆☆☆☆☆	⚠	★★★★★	<div><div></div></div>
RAID 0	★★★★★	⚠	☆☆☆☆☆	<div><div></div></div>
RAID 5	★★★★★	★★★★★	★★★★★	<div><div></div><div></div></div>
RAID 6	★★★★★	★★★★★	★★★★★	<div><div></div><div></div><div></div></div>

Available for data    Used for protection    Reserved for expansion

## 5BIG NAS PRO: RAID OPTIONS

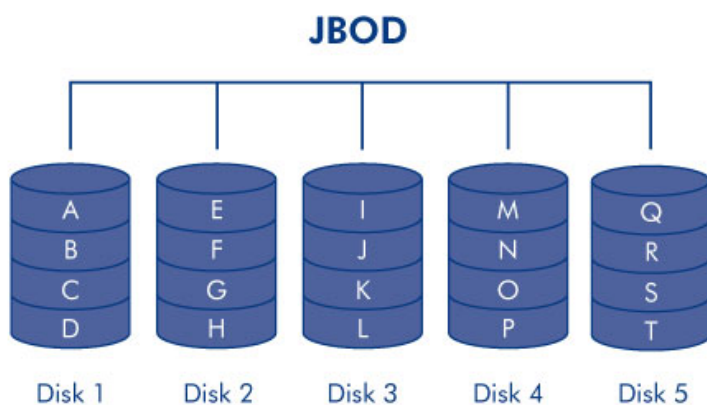
Choose the level of RAID to learn how it works with your NAS.

LaCie SimplyRAID

Most RAID modes use equal disk capacities among the pool of hard drives to protect data. Rather than lose storage capacity overhead in mixed disk environments, SimplyRAID preserves the extra space for use when new disks are added to the enclosure. This means that, 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.

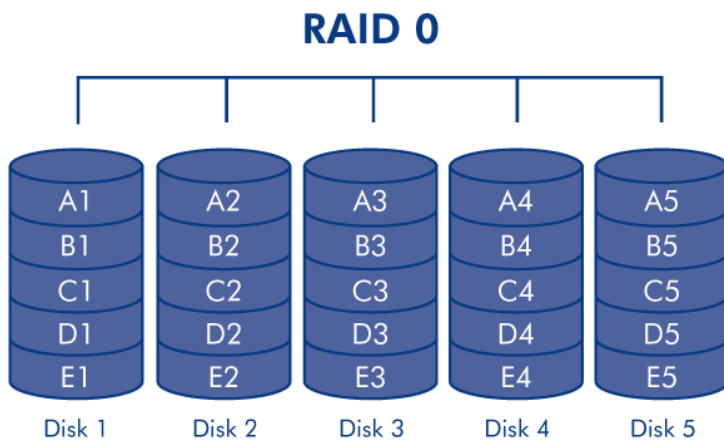
## JBOD (Just a Bunch of Disks)

Disks in a JBOD configuration store data sequentially. For example, data is written to Disk 1 first. Once Disk 1 is full, data will be written to Disk 2, then Disk 3, etc. Two advantages to this level of RAID are the availability of 100% of the disks' total storage capacity and easy expansion. However, all data will be lost if a single disk fails.



## RAID 0

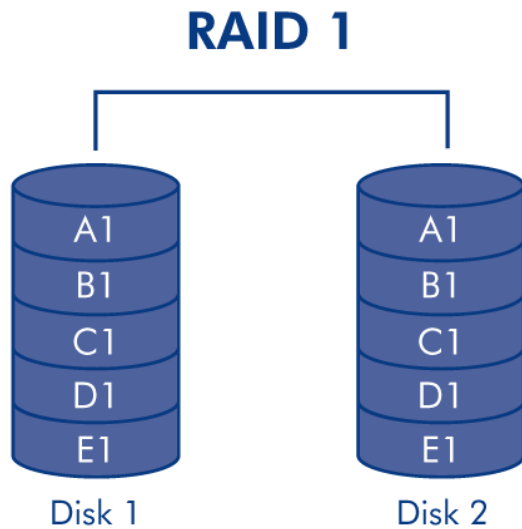
RAID 0 is the fastest RAID mode since it writes data across all of the volume's disks. Further, the capacities of each disk are added together for optimal data storage. However, RAID 0 lacks a very important feature for a NAS: data protection. If one disk fails, all data becomes inaccessible. When weighing performance against protection, keep in mind that a NAS's transfer rates are contingent upon the bandwidth of the network as well as its own hardware. For example, with both LAN ports bonded and connected to a router that supports port aggregation, the 5big NAS Pro cannot exceed 200MB/s. A recommended option is RAID 5, which offers comparable performance, approximately 75% storage capacity (based upon total available disks and storage capacities), and data protection.





## RAID 1

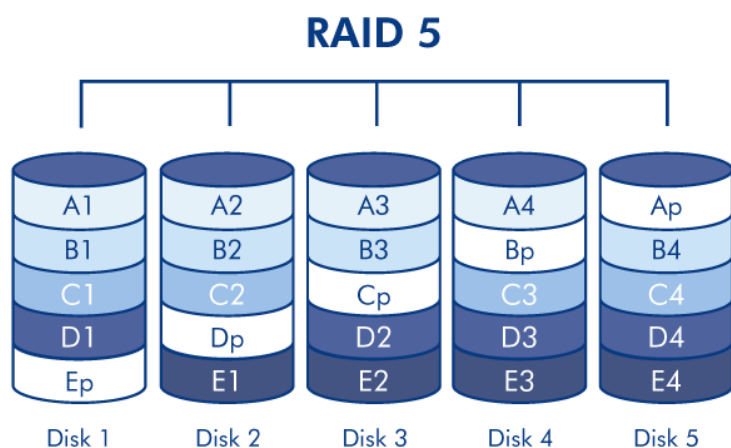
RAID 1 provides enhanced data security since all data is written to each disk in the volume. If a single disk fails, data remains available on the other disk in the volume. However, due to the time it takes to write data multiple times, performance is reduced. Additionally, RAID 1 will cut disk capacity by 50% or more since each bit of data is stored on all disks in the volume.



**Note on RAID 1 disk requirements:** A standard RAID 1 configuration includes two disks of equal capacity. However, NAS OS allows you to create a RAID 1 volume with up to three disks or, three disks plus a spare. It is also possible to create a RAID 1 volume using a single disk. While such a volume cannot provide any data protection, it is ready for expansion when you add a new disk. Data protection would become available once the second disk is added to the RAID 1 volume.

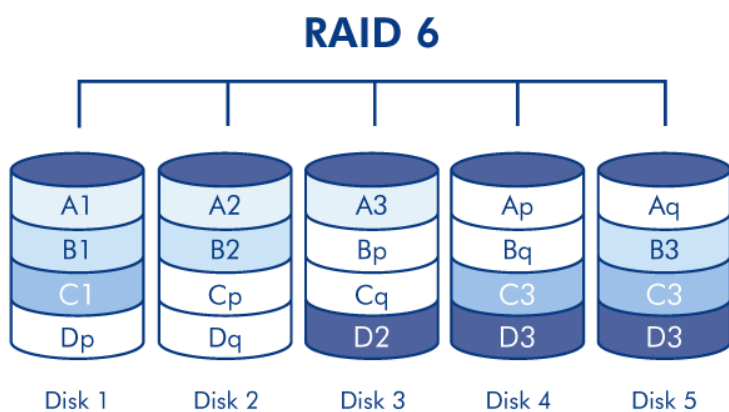
## RAID 5

RAID 5 writes data across all disks and a parity block for each data block is written on the same stripe (**p** in the illustration below). A minimum of three disks is required to create a RAID 5 volume. 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 the replacement hard drive, all data in the array will be lost.



## RAID 6

RAID 6 writes data across all disks and two parity blocks for each data block are written on the same stripe (**p** and **q** in the illustration below). A minimum of four disks is required to create a RAID 6 volume. 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 synchronizing from a failed disk is slower than RAID 5 due to the use of double parity. However, it is far less critical due to double-disk security.



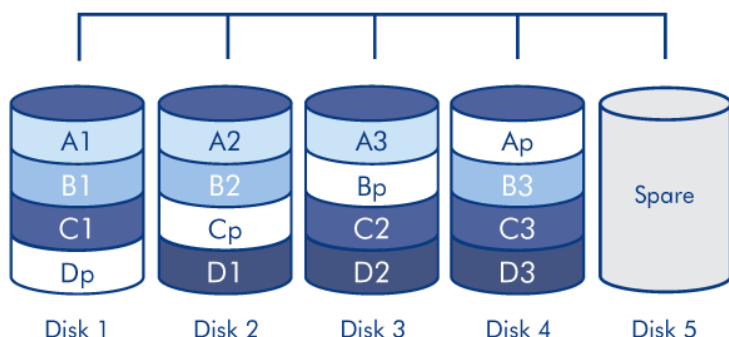
RAID Mode	Maximum Spare Drives
RAID 1	3
RAID 5	2
RAID 6	1

In a RAID 1 configuration, the same data is written across all hard disks in the volume, protecting your data against the loss of one disk. With RAID 5 and RAID 6, data is available from the parity blocks and protected should one or two drives fail, respectively. A RAID+Spare volume gives you a “hot-spare” that is ready to synchronize data immediately should a disk fail. If a hard disk in the volume fails, the data starts to synchronize with the spare. The clear advantage for a RAID volume with a spare is that you do not have to wait for a replacement disk.

When the failed disk is replaced, the replacement disk becomes the new hot spare.

To create a volume with a spare hard drive, you must choose **Custom** in the *New volume wizard*. Selecting **Quick setup** in the *New volume wizard* will automatically configure a volume with LaCie SimplyRAID and single disk protection. SimplyRAID optimizes disk space across all hard drives to maximize data storage. Therefore, it does not include the option to add a spare drive. See [New Storage Volume Wizard](#) for instructions on creating volumes with the *New volume wizard*.

### RAID 5+Spare



**Important info:** For RAID+Spare volumes, data remains intact when a single disk fails and the spare begins synchronizing automatically. If a second disk in the volume fails before synchronization is complete, all data in the volume will be lost.