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Standard Technology - **What is RAID?**

WHAT IS RAID?

RAID stands for **R**edundant **A**rray of **I**ndependent (or **I**nexpensive) **D**isks.

The concept of RAID is to combine multiple small, inexpensive disk drives into an array of disk drives which performs better than a large, expensive drive. The array of drives appears to computers as a single drive. Disk arrays can be made fault-tolerant by redundantly storing data (i.e. duplicating all or part of the data stored on the drives). If one of the hard drives fails, the data is still preserved on the remaining healthy drive(s), which store so called parity data. Parity data from healthy drive(s) is used to re-create the data located on the faulty drive. There are several implementations of RAID, most provide disk fault-tolerance and each implementation offers different trade-offs in features and performance.

In the event of a drive failure (fault-tolerant RAID modes only), data is still available in its entirety to users. However, the portion of the requested data that resides on the failed drive needs to be re-created from the parity information on the healthy drives(s). Therefore, if a drive failure is present, the faulty drive should be replaced as soon as possible. Keep in mind that in the event of a drive failure, there is no more additional redundancy, so if a second drive fails, data loss is often avoidable. There are specific RAID modes and other similar technologies such as "Hot-spare" (link to Hot-spare) that assist in providing additional layers of protection.

After replacing the failed drive, the RAID architecture is rebuilt, restoring redundancy to the array.

The term and technology RAID has been safely used by the world's largest companies since 1987. For nearly the past 10 years, RAID options have been commonplace in small business and consumer applications.

Buffalo Makes RAID Easy!

Although RAID is an amazing and complex technology, rest assured that Buffalo has made it easy. As a user of a Buffalo storage device, very little needs to be known about RAID to enjoy the convenience and robustness of it.

First, all of Buffalo's storage devices come configured in a default RAID mode. The default mode is product specific and was selected by Buffalo engineers to ensure the best experience. Buffalo storage users can simply begin using their device out of the box without having to configure any RAID settings. All Buffalo storage products that have multiple drives ship in a redundant RAID configuration, offering customers the benefit of fault-tolerance.

Secondly, in the event that a drive fails, Buffalo storage devices can notify users of the failed drive in many different ways (email, audible alerts, red lights, etc.). To restore the RAID array, a user simply replaces the hard drive, an easy task with Buffalo's storage devices. After the drive replacement, the Buffalo storage device will rebuild the RAID array and redundancy will be restored automatically.

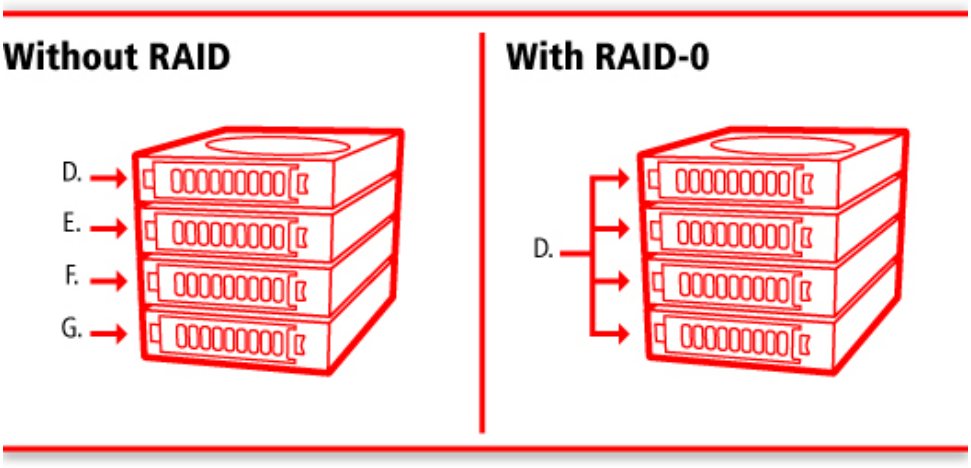
The Three Most Common RAID Options:

RAID-0: Striping (No Redundancy)

RAID-0 uses all drives as a single array of storage. All drives are seen as one-massive drive. The capacity of the drive is the combined capacity of all drives in the array.

The disadvantage to RAID-0 is that it offers no fault-tolerance. If one hard drive in the array fails, then the data in the entire RAID array is compromised. The fact that there are multiple drives in a RAID-0 array increases the opportunity for a hard drive failure. Since a single hard drive failure makes all of the data in the array unusable, RAID-0 is significantly more prone to data loss than a single drive configuration.

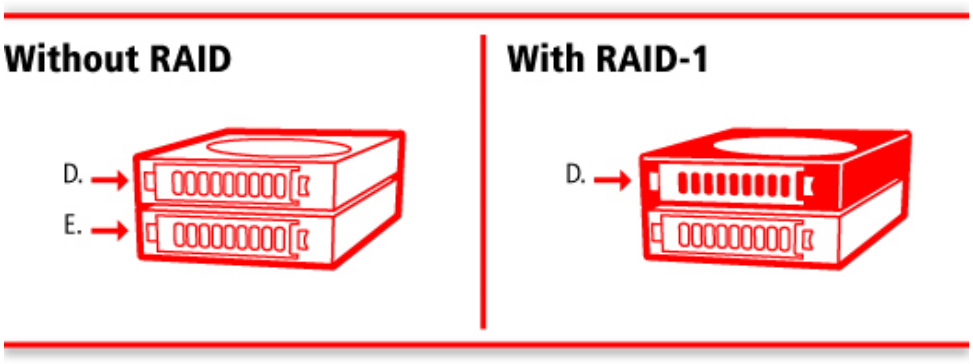
RAID-0 should be used in cases where maximum capacity is required but data redundancy is not a requirement.



RAID-1: Mirroring (with Redundancy)

RAID-1 provides fault tolerance but also decreases overall capacity. RAID-1 is often referred to as disk mirroring. In a RAID-1 array, the system will save the data to all hard drives in the array simultaneously. In the case of a drive failure, the healthy drive will assume the role of the main drive and the data is accessible without interruption. Once the faulty drive is replaced, the RAID array will be restored to its original condition. RAID-1 is ideal in two-drive configurations seeking redundancy in lieu of capacity.

RAID-1 is the Buffalo recommended configuration for all devices with 2 hard drives.

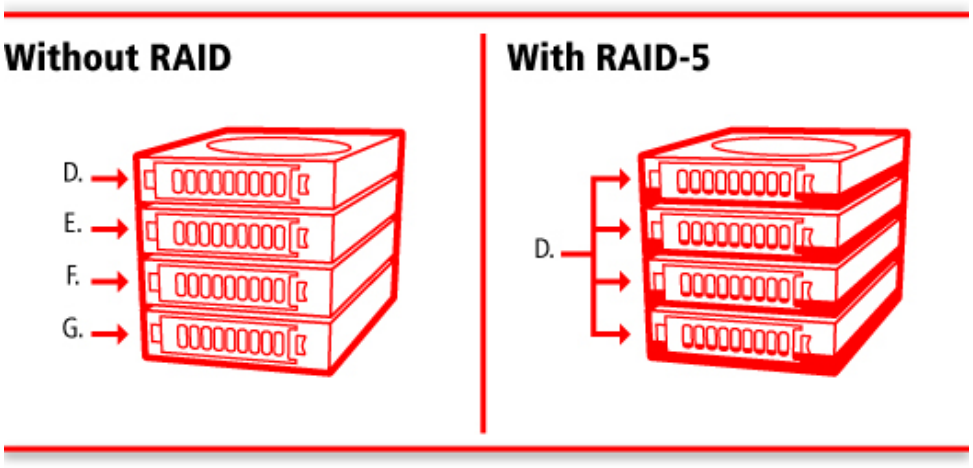


Area filled in with red represents parity/redundant information.

RAID-5:(with Redundancy)

RAID-5 requires at least 3 physical drives. Data is split into blocks and stored over all of the drives. Parity data is distributed amongst all of the drives and is used to regenerate lost data during a drive failure. In case of a drive failure, RAID-5 will be able to regenerate the missing data from the parity data remaining on the healthy drives. This regeneration occurs automatically and on-the-fly, meaning a user still has immediate access to their data after a single drive failure. RAID-5 is ideal in configurations with three or more drives seeking a combination of increased capacity and redundancy.

RAID-5 is the Buffalo recommended configuration for all devices with 3 or more drives.



Area filled in with red represents parity/redundant information.

Buffalo **network storage devices** and **external drives** support RAID.

Learn more about Buffalo Network Storage and solutions supporting RAID: LinkStation™, and .