Selecting the Right Drive For RAID Storage

Selecting the right set of drives to build a RAID storage solution is of critical importance, when reliability, performance and accessibility are primary concerns. Over the last few years, hard drive storage technology has undergone enormous changes. High-density, Multi-Terabyte hard drives are now commonplace, as disk media has grown in accordance with storage-intensive applications such as digital video production, which has seen capacity demands increase by 25 times or more to accommodate 4K resolutions. Such applications impose a high-level of stress on the storage media; countless hours of continuous I/O, and preparation and maintenance sessions for the redundant RAID 5 and 6 configurations. Choosing the right drive can have significant impacts on productivity, downtime and the mitigation of data loss.

Hard Disk Classes:

The majority of hard drives can be categorized into one of 3 primary drive classes; Desktop, NAS/RAID and Datacenter/Enterprise, Desktop class designed for single drive system or storage usage. NAS/RAID class dries were designed for professional applications that have much more stringent requirements regarding performance, accessibility and lifespan, such as video streaming servers or media production workstations. Datacenter disks are designed for enterprise applications which demand maximum reliability, such as large-scale business file servers, transaction systems and databases.

Attribute	Desktop	NAS	Datacenter/Enterprise
Built-in Error Recovery Control For RAID application	N/A	Best	Excellent
Enhanced for 24/7 Operations		Best	Excellent
Enhanced for Aggressive Workloads		Good	Best/Excellent
Reliability	Good	Best	Excellent
Noise and vibration	Good	Excellent	Excellent

Error Handling and Recovery

Desktop hard drives were not designed for RAID applications, and have controls and behaviors that prevent RAID controllers from intervening in the event of a disk related error; this can lead to a dropped disk incident and a resulting loss of productivity due to the need to rebuild the array. In worse case scenarios, multiple drives may drop offline simultaneously, which can disable an array or even lead to data loss.
Conversely, NAS and Datacenter drives were designed for multi-drive configurations, and respond quickly in an error condition or to queries from the RAID controller.

Enhanced for 24/7 Operations

Unlike desktop hard drives, which are designed for single Non-RAID computing platforms, NAS and Datacenter disks were designed to handle the stress of 24/7 operation. These type of drives are ideal for media workstations, libraries and online streaming services or transaction servers that require that storage be available and responsive at a moment's notice, and be robust enough to handle hours or days of continuous I/O.

Enhanced for Sustained Workloads

NAS drives deliver 24/7 reliability for small business or personal applications, such as data backup and media streamlining, and are designed for RAID configurations of 8 drives or less.
Enterprise drives are ideal for professional applications and heavy workloads that demand maximum reliability, data security, and transfer performance.

Reliability

In general, most modern SATA drives can be considered to have solid reliability ratings. However, NAS and Datacenter drives benefit from much higher MTBF (mean time between failure) ratings. MTBF is an industry standard measurement of hard disk reliability and refers to the average number of hours a given disk can operate before a failure occurs; the higher the MTBF rating, the more reliable the drive.

Noise and Vibration

Multi-disk array configurations will produce significantly higher levels of vibration and background noise; excessive vibration can impact the lifespan of each disk, and high-noise levels can potentially interfere with sensitive storage applications.
NAS and Datacenter disks are built with higher tolerances in mind and to accommodate applications that need to minimize the risk of mechanical noise.

Hard Drive Classes – Performance

Performance	Desktop	NAS (or Surveillance)	Datacenter (or Enterprise)
Performance Max sustain R/W	Good	Good	Best/ Excellent
Performance seek time	Good	Good	Best/ Excellent

Unlike desktop class disks, NAS and Enterprise class hard drives deliver sustained performance that satisfies the application workload requirements, while significantly improving RAID preparation and recovery sessions, maximizing productivity and minimizing downtime.

RocketStor RAID Storage - Which Hard Drive Should I choose?

Due to the requirements of today's RAID Storage Applications and recommendations from the hard disk manufacturers themselves, HighPoint recommends that only Datacenter or NAS Class hard drives be used with RocketStor RAID Enclosure solutions.

RocketStor RAID Enclosure Hard Drive Selection Class:

	Hardware Class	Turbo Class	Value Class
Suggested Hard Drive	Data Center	*NAS/Datacenter	*NAS/Datacenter