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 areprimary concerns. Over the last few years, hard drive storage technology has undergone enormous changes. High-density Terabyteshard 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 Enterprise.Desktop classdesigned 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. Enterprise class disks are designed for enterprise applications which demand maximum reliability, such as large-scale business file servers, transaction systems and databases.

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

Enhanced for 24/7 Operations

Unlike desktop hard drives, which are designed for general home and office computing platforms, NAS and Enterprise class 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 Aggressive Workloads

Unlike desktop drives, NAS and Enterprise class hard drives are well suited for environments that call for frequent, high-stress, sustained read and write sessions such as media editing and production applications.

NAS drives in particular, are ideal for aggressive workloads that demand maximum reliability. Most NAS drives were designed for RAID configurations of 8 drives or less, and continuous large-block I/O sessions.

Reliability

In general, most modern SATA drives can be considered to have solid reliability ratings. However, NAS and Enterprise class 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.

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 Enterprise drives were designed for multi-drive configurations, and respond quickly in an error condition or to queries from the RAID controller.

Noise and Vibration

Desktop hard drives are designed for single-disk, general-use environments, where mechanical noise and vibration are not major concerns. Multi-disk configurations however, 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 Enterprise 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	NAS (or Surveillance)	Enterprise (or Datacenter)
Performance Max sustain R/W	Good	Excellent
Performance seek time	Good	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 Enterprise/RAID or NAS Class hard drives be used with RocketStor RAID Enclosure solutions.
NAS drives in particular, are ideal for aggressive workloads that demand maximum reliability. Most NAS drives were designed for RAID configurations of 8 drives or less, and continuous large-block I/O sessions.

RocketStor Solution Hard Drive Selection Table:

RAID Class	Hardware Class	Turbo Class	Value Class
Suggested Hard Drive	NAS/Enterprise	NAS/Enterprise	NAS