



StorTrends 3400i Dual Controller SAN with Zoned Bit Recording

Advanced Data Management with Automated Tier-Based Data Storage Capability

Introduction

Old data is either good or just space-eating content. Most companies value every bit of data gathered - until it becomes outdated or is no longer useful. But when it comes to space management, old data often competes for space with new entries. So where should old data reside? Organizations are faced with a conflicting challenge: to either sustain an ever-increasing investment to retain all data no matter its age, or run the risk of deleting old data in the hope it will never be needed.

To help organizations survive this dilemma, AMI introduced its concept of **Data Tiering** - sometimes referred to Information Lifecycle Management (ILM) technology - to its line of StorTrends Network Storage products. However, a Data Tiering solution is only as effective as the storage appliance it runs on, and the **StorTrends 3400i SAN** has the power and performance to make the most of this data management challenge. This 3U Dual Controller IP-SAN Storage Solution features 16 hot-swappable hard drives and is scalable up to 256 TB of storage capacity through the addition of multiple **StorTrends 3202j JBOD** expansion units. The 3400i lets users choose large capacity NL-SAS hard drives or high performance 15,000 RPM SAS hard drives and is now even more effective with the latest addition to its Data Tiering feature set: **Zoned Bit Recording (ZBR)**.

Classic Hard Disk Sectors vs. Zoned Bit Recording

In a classic hard disk setup, the controller typically cannot handle complicated data zoning arrangements which move between tracks on the disks. This is the primary reason for standard hard disks to follow a uniform arrangement of 17 sectors per track.

However, new technologies have greatly improved hard disk performance in this regard, by adding larger amounts of internal cache to speed data access. Hard disks have also increased their capacity and speed by utilizing the larger outer tracks of the disk to the maximum extent possible.

Given the previous constraints of hard disk technology, the inner circles of the hard disk were tightly packed with bits - while the outer circles, though bigger in size, were restricted to using the same number of sectors by reducing the bit density. In other words, the spaces in the outer circles were less utilized, despite their capacity for storing respectively large quantities of data.

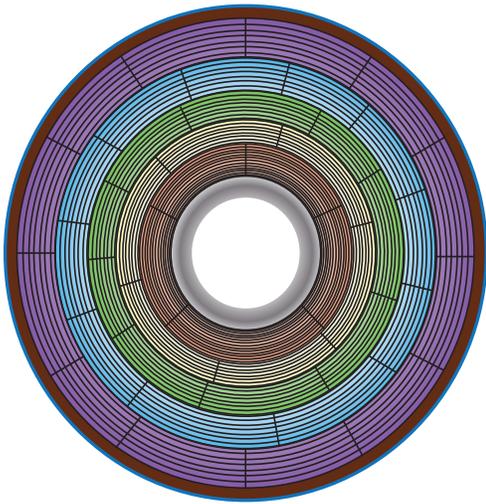
ZBR breaks open traditional limitations on hard disk data zoning and offers innovative data management features: a game-changing technology for those seeking a cost-effective solution for advanced data retrieval and data tiering.

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StorTrends Zoned Bit Recording - Digging Deeper

The most important aspect of Zoned Bit Recording is how it efficiently utilizes the hard disk's tracks by categorizing the stored data based on its frequency of use. From this perspective, ZBR can be best described an intelligent **tier-based data sorting technology** in the way it distributes data to specific locations within the hard disk based on its use.

StorTrends ZBR technology splits track spaces into zones based on their distance from the disk's center. Each zone is assigned a



ZBR Track Segmentation

certain number of sectors per track. In classic disk segmentation, the number of sectors remains the same for all tracks. But with ZBR, the number of sectors keeps increasing per track from the center of the disk to the outer edge. This zoning method helps to more effectively utilize the increased space of the outer tracks. It also increases the overall system performance and facilitates green computing by reducing energy consumption.

StorTrends Zoned Bit Recording - A Macro View

One of the most compelling features of StorTrends ZBR is its ability to read each track at a constant speed irrespective of the amount of data stored within. ZBR can facilitate a faster raw data transfer rate while reading the outer cylinders by maintaining a constant angular velocity on the platters as the tracks are read.

In organizations where both old and new data is accessed with regularity, ZBR is of great value due to the quick data accessibility it can provide. Because StorTrends ZBR technology ensures that frequently accessed data is blocked in the fastest tier of the disks on the faster moving outer tracks, this in turn exponentially increases the overall performance of the StorTrends 3400i SAN.

StorTrends Short Stroking Technology

To increase performance and reduce system seek time at the disk level, StorTrends ZBR also employs **Short Stroking** technology as part of its Data Tiering feature set. In short, this technology allows StorTrends to store data only on the outer tracks of the disk platter, keeping the inner tracks empty until needed. Together with StorTrends ZBR, Short Stroking also contributes to increased media transfer rate and improved system performance, due to the fact that the outer disk tracks spin at a higher rate than the inner tracks.

StorTrends 3400i SAN and ZBR: A Winning Combination

The StorTrends ZBR technology featured in the StorTrends 3400i SAN is a fully automatic feature and requires no specific user configuration. The StorTrends 3400i does, however, provide certain configuration options for storing high or low priority data in specific hard disk zones. Users can, for example, configure the StorTrends 3400i to keep high priority data on the faster access zones. Users can also direct the StorTrends 3400i to store less critical data on the lower cost, high capacity NL-SAS drives rather than more expensive, high performance SAS drives. Doing so will improve the Quality of Service (QoS) by reserving the faster SAS drives for high priority data only.

In summary, **Zoned Bit Recording** and **Short Stroking** technology give added depth and functionality to the **Data Tiering** capabilities of the StorTrends 3400i Dual Controller SAN storage appliance. These features make the StorTrends 3400i suitable for a variety of environments because of the benefits they provide in flexible data capacity expansion and improved media transfer rates. together with strong green computing credentials to effectively save energy and floor space.

*Data management with the **StorTrends 3400i SAN** is seamless and automatic, thanks to Zoned Bit Recording (ZBR).*

ZBR delegates data to specific locations within the hard disk based on its usage. Frequently accessed data is stored in the fastest tier of the disks on the outer tracks which are moving at a faster rate - for the most rapid access.

StorTrends also utilizes Short Stroking technology to store data only on the outer tracks of the platter and keeps the inner tracks empty until needed, which in turn reduces the system's seek time at the disk level. This also increases the media transfer rate and improves system performance.



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