WHY SANDISK® NAS 800 SSDS HAVE OVER-PROVISIONED CAPACITIES

Overview

The newly announced SANDISK® NAS 800 SSDs do not have the typical decimal capacities for each of its models; 960GB (vs.1TB)[1], 1.92TB (vs. 2TB)[1], 3.84TB (vs. 4TB)[1], and 7.68TB (vs. 8TB)[1]. SANDISK® NAS 800 SSDs are purpose-built for 24/7 NAS systems and have been **over-provisioned** to reserve extra NAND blocks. These reserved NAND blocks help the SSD manage data writes smoothly, minimize NAND block wear, and ensure high performance over time, so the SSD lasts through heavy use.

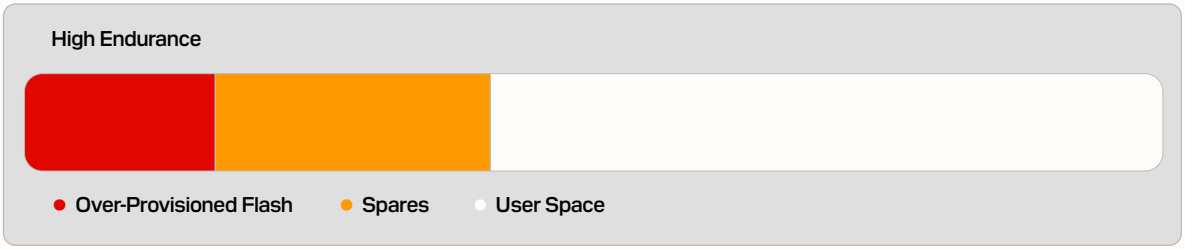

Figure 1: Example of Over-provisioning of an SSD

Why Over-Provisioning Matters for Write Endurance

- **Reduces Wear:** Flash memory wears out when written too often. Reserved NAND blocks let the SSD distribute writes more evenly in the user space.
- **Lowers Write Amplification:** Moving out old data takes additional background writing and consequently can impact wear of the SSD and write performance. Having reserved NAND blocks lowers the total number of additional writes required for the data within the user space, thereby reducing the write amplification and wear for the user.
- **Helps Data Cleanup:** The drive needs free blocks to clean up old data. Reserved NAND blocks help maintain the speed of the SSD during data cleanup.

Importance for a 5-Year Limited Warranty[3]

- **Protects TBW[2] Limits:** Warranties are subject to Terabytes Written (TBW)2 limits. Over-provisioning helps keeps physical wear of the user space low to allow for more use of the SSD before reaching that limit.
- **Prevents Early Failure:** Over-provisioning helps reduce NAND blocks in the user space from wearing down too fast within the limited warranty period.

Use Cases and Benefits

- **Video Editing:** Moving huge files takes massive write cycles. Over-provisioning helps maintain transfer speeds during long jobs.
- **Virtual Machines:** Running many systems may cause random, nonstop writes. Extra space helps handle the mixed data load smoothly.

1. 1GB = 1 billion bytes and 1TB = 1 trillion bytes. Actual user capacity may be less depending on operating environment.
2. TBW (terabytes written) values calculated using JEDEC client workload (JESD219) and vary by product capacity.
3. See www.sandisk.com/support for additional details.

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