

Problem Set 12

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1 RAID systems rely on redundancy to achieve high availability.

This statement is true. By adding redundancy with a RAID array, the stored data will remain available to the users even after the failure of a single (or in some cases, multiple) disk.

2 RAID 1 (mirroring) has the highest check disk overhead.

This statement is true. RAID 1 uses an extra check disk for every disk in the array, which results in n check disks for a raid array of size n . This means the number of check disks required grows linearly with the array size. RAID 3, 4, 5, 6 each have constant cost check disk overhead. Raid 3, 4, and 5 each require a single check disk, while Raid 6 requires two.

3 For small writes, RAID 3 (bit-interleaved parity) has the worst throughput.

This statement is true. Raid 3 stripes bits across the various disks, which means that only a single read operation can be performed at a time.

4 For large writes, RAID 3, 4, and 5 have the same throughput.

This statement is false. RAID 3 is limited by the necessary for spindle synchronization, and RAID 4 is bottlenecked by the single parity disk. RAID 5, on the other hand, has both the data and parity information spread across disks and thus has higher throughput.