

Array Performance 101 Part 2

How to get the most bang from your arrays...

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Array Performance - Agenda

- Performance Fundamentals - Part 1
- **Primary Performance Impacts - Part 2**
- Secondary Performance Impacts - Part 3
- Performance Limiters
- Workload Characterization Tools - Part 4
- Timing of Performance Choices
- Final Thoughts



Primary Impacts - Cache

- Cache hits the fastest way to do I/O 2.3 vs. 8.3 msec.
- Caveats:
 - Write hit ultimately needs to be destaged and written to disk, may impact throughput
 - Sometimes writing directly to disk is faster than a write hit followed by destage



Primary Impacts - Drives

- Fast Drives make a big difference for miss and destage activity 8.3 vs. 15.3 msec.
 - Assuming no other bottlenecks
- High capacity/slow drives can degrade miss/destage performance seriously
- Impacts mainly response time, subsystem sophistication can mask most throughput impacts if drives are not too busy



Primary Impacts - RAID

- RAID-1 - mirrored data
 - Uses closest seek to do reads
 - Writes to both, but 2nd destaged later
 - Read work split across 2X number of drives
- RAID-4, 5 - parity and data blocks
 - Parity block write penalty
 - RAID-5 parity block is distributed
 - RAID-4 has special parity drive (potential hot drive)
- LUN striping - LUNs can be striped across multiple RAID groups (of same type)
 - No hot RAID groups



Primary Impacts - Remote Replication

- Remote replication - duplicates data written on one subsystem to another remote subsystem
- Synchronous - waits until data is resident in both subsystems before signaling write completion. This yields a significant performance degradation for write activity
- Semi-synchronous - data at remote site maintained 1 to "N" I/Os behind data at primary site
- Asynchronous - duplication of data is scheduled and is only guaranteed at duplicated at the end of the scheduled activity
- Midrange - enterprise differences



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