

DRPM: Dynamic Speed Control for Power Management in Server Class Disks

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Motivation

- 22.3 W IBM Ultrastar 36ZX server disk vs. 57.8 W 1.6 GHz Intel Xeon CPU
- 4-way Xeon SMP with 140 disks used by Dell for TPC benchmark uses 13.5 times more power for disks than CPUs
- current approaches
 - on - no perf compromise or power saved
 - spindown - savings, but serious penalty

DRPM vs TPM

- Spindle motor is 50-80% of idle power
- for short idle periods TPM may expend more energy than is saved
- DRPM doesn't have long spin up delay and can service requests in a lower power (speed) mode (with longer rotation and transfer delays)
- DRPM allows adaptive tradeoff between power and performance