Hard Disk Failures

official vendor claims (data sheet):

1,000,000 to 1,500,000 hours *mean time to failure (MTTF)*

~0.88% *annualized failure rate (AFR)*

in reality:

- 2-4% AFR
- up to 13% on some systems
Redundant Array of Inexpensive Disks (RAID)

motivation:

be able to survive one or multiple disk failures

core idea:

multiple cheap disks

store data redundantly

=> different RAID levels: different degrees of redundancy/performance
RAID 0

- 2 \times R
- 2 \times W
RAID 4

\[ B_1 \text{xor} \ B_2 \text{xor} \ B_3 = \text{stripe 1 parity} \]

\[ B_8 = B_7 \text{xor} B_9 \text{xor} \text{stripe 3 parity} \]
RAID 5
hard disk failure rates as reported in:

_Disk failures in the real world:_

_What does an MTTF of 1,000,000 hours mean to you?_

Bianca Schroeder, Garth A. Gibson

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