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Why specify and monitor hard disk drive workloads

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The reliability of hard disk drives (HDD) has been quantified historically by a mean time to failure (MTTF), or an annualized failure rate (AFR), defined at a specified operating temperature, and an assumed functional duty cycle. We provide justification for replacing the ambiguous concept of duty cycle with the readily quantifiable “workload”, which is defined as the total amount of data read from or written to the drive per unit time. This relatively subtle change leads to the conclusion that MTTF alone is insufficient to describe the field reliability of HDDs. This results from the fact that HDD failure rates are more tightly coupled to the total amount of data transferred rather than the total power-on-time. It immediately follows that a metric based on Mean Petabytes to Failure (MPbF) is most appropriate to quantify the intrinsic reliability of HDDs. Until MPbF is accepted as the critical measure of product quality, however, WD will specify both the MTTF and the maximum workload at which the product meets the MTTF requirement to unambiguously define the HDD reliability. Furthermore, WD will offer a new drive feature, the Drive Workload Monitor (DWM), that will facilitate retrieval of the total data transferred at any point of the HDD lifetime.

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