

# The Storage Latency Hierarchy

Technology	Latency	Size (e.g.)
L1 CPU Cache	4 cycles (~1 nsec)	32K
L2 CPU Cache	10 cycles (3 nsec)	256K
LLC CPU Cache	40 cycles (13 nsec)	1 MB
DRAM	240 cycles (80 nsec)	16 GB
NVRAM	1200 cycles (400 nsec)	128 GB
RDMA Read	6K cycles (2 usec)	16 GB
FLASH Read	150K cycles (50 usec)	128 GB
FLASH Write	1500K cycles (500 usec)	128 GB
HDD Write min	1500K cycles (500 usec)*	4 TB
HDD Read min	15000K cycles (5 msec)	4 TB
HDD Read max	75000K cycles (25 msec)	4 TB
Tape File Access	1500000000K cycles (50 sec)	6 TB

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\* Write to track cache