smartctl Disk health check

CONCEPTS

Run as root. Without it most commands fail with a permission error on the device node.

PASSED only means no attribute has crossed its failure threshold. A drive can still be dying: watch reallocated, pending and uncorrectable sectors.

Find drive --scan, lsblk
↓ `-i / -H`
Check health verdict + attributes
↓ `-t short|long`
Self-test runs inside the drive
↓ `-l selftest`
Read the log pass or first bad LBA

Device is the whole disk, such as /dev/sda or /dev/nvme0, not a partition like /dev/sda1.

INFORMATION AND HEALTH

`smartctl --scan`
List devices smartctl can see

`smartctl -i <dev>`
Model, serial, firmware, capacity

`smartctl -H <dev>`
Overall health: PASSED or FAILED

`smartctl -A <dev>`
Vendor attributes (NVMe: health log)

`smartctl -a <dev>`
Info, health, attributes, error and test logs

`smartctl -x <dev>`
Extended: all of -a plus device stats, SCT data

`smartctl -j -a <dev>`
JSON output for tools like jq

SELF-TESTS

`smartctl -t short <dev>`
Quick test, usually a few minutes

`smartctl -t long <dev>`
Full surface test, minutes to hours

`smartctl -l selftest <dev>`
Show self-test results

SELF-TESTS (cont.)

Self-tests run on the drive itself and are non-captive by default, so the disk stays usable. Check back with -l selftest after the estimated time.

LOGS AND ERRORS

`smartctl -l error <dev>`
Drive error log

`smartctl -l xerror <dev>`
Extended error log, more entries (ATA)

DEVICES AND NVME

`smartctl -d <type> <dev>`
Force the device type

`smartctl -d sat <dev>`
USB or SATA bridge (SCSI-to-ATA)

`smartctl -a /dev/nvme0`
NVMe health log: spare, wear, temperature

`smartctl -d megaraid,<n> /dev/sda`
Disk n behind a MegaRAID controller

NVMe paths: /dev/nvme0 is the controller, /dev/nvme0n1 a namespace. Both normally work with -a.

READING ATTRIBUTES

Attributes worth watching (ATA)

ID / name	Concern when
`5 Reallocated_Sector_Ct`	raw above 0 and rising
`187 Reported_Uncorrect`	raw above 0
`197 Current_Pending_Sector`	raw above 0 (unreadable sectors)
`198 Offline_Uncorrectable`	raw above 0
`199 UDMA_CRC_Error_Count`	rising: suspect cable or port
`194 Temperature_Celsius`	sustained above ~55 C

READING ATTRIBUTES (cont.)

Health log fields (NVMe)

Field	Concern when
Critical Warning	not 0x00
Available Spare	near Threshold
Percentage Used	approaching 100%
Media and Data Integrity Errors	above 0
Temperature	sustained above ~70 C

In the -A table, a normalized VALUE falling to its THRESH means failing; the RAW column is vendor-specific and often counts something other than you expect.

A rising pending-sector count that later turns into reallocations is the classic sign of a failing disk. Back up first, test later.

SCRIPTING AND OPTIONS

`smartctl -n standby <dev>`
Skip the check if the drive is asleep

`smartctl -V`
Show version

Exit status bits (add up)

Bit	Value	Meaning
0	1	Command line did not parse
1	2	Device open failed or in low-power mode
2	4	SMART command failed or bad checksum
3	8	Disk failing
4	16	Prefail attribute at/below threshold
5	32	Attribute was below threshold in the past
6	64	Error log has entries
7	128	Self-test log has errors

Test one bit in a script with shell arithmetic, for example $(($? & 8)) for a failing disk.