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 -c` *`<dev>`*
Drive SMART capabilities

`smartctl -H -q errorsonly` *`<dev>`*
Print only on problems (for scripts)

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

INFORMATION AND HEALTH (cont.)

`smartctl -s on` *`<dev>`*
Enable SMART on the drive

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

`smartctl -X` *`<dev>`*
Abort a running self-test

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 -d scsi` *`<dev>`*
Treat as SCSI/SAS drive

`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

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

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