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.