nvme-cli NVMe drive management

CONCEPTS

Use the character device (/dev/nvme0) for controller commands and the block device (/dev/nvme0n1) for namespace ones. The digits are not linked across the two.

Subsystem nvme-subsys0
Controller /dev/nvme0
Namespace /dev/nvme0n1

nvme-cli 3.x groups commands (nvme id ctrl, nvme log smart, nvme ns create). The old dashed names still work as deprecated aliases that warn on stderr.

format, sanitize and ns delete destroy data and cannot be undone. Check the device path against nvme list first, twice.

DISCOVER

`nvme list`
List NVMe devices with size and model

`nvme list -o json`
List devices as JSON

`nvme list-subsys`
Show subsystems, controllers and paths

`nvme id ctrl /dev/nvme0`
Show controller model, serial, firmware

`nvme id ns /dev/nvme0n1`
Show namespace size and LBA formats

`nvme id ns /dev/nvme0 -n <nsid>`
Show a namespace via the controller

`nvme list-ctrl /dev/nvme0`
List controller IDs in the subsystem

`nvme --version`
Show the nvme-cli version

HEALTH AND LOGS

`nvme log smart /dev/nvme0`
Show SMART health, wear, temperature

HEALTH AND LOGS (cont.)

`nvme log smart /dev/nvme0 -o json`
SMART log as JSON for scripts

`nvme log error /dev/nvme0`
Show the error log

`nvme log error /dev/nvme0 -e <n> -V`
Last n entries, valid ones only

`nvme log fw /dev/nvme0`
Show firmware slots and active revision

`nvme log sanitize /dev/nvme0`
Show sanitize status and progress

Key SMART fields

Field	Meaning
`critical_warning`	Non-zero means act now
`percentage_used`	Wear estimate, may pass 100
`available_spare`	Spare blocks left (%)
`media_errors`	Data integrity errors
`unsafe_shutdowns`	Power loss without flush
`data_units_written`	Units of 512,000 bytes

SELF-TEST

`nvme device-self-test /dev/nvme0 -s 1`
Start a short self-test

`nvme device-self-test /dev/nvme0 -s 2`
Start an extended self-test

`nvme device-self-test /dev/nvme0 -s 1 -w`
Short test, wait for completion

`nvme log self-test /dev/nvme0`
Show self-test results

NAMESPACES

`nvme id ns-list /dev/nvme0`
List active namespace IDs

`nvme ns create /dev/nvme0 --nsze=<blocks> --ncap=<blocks> --flbas=0`
Create a namespace

`nvme ns attach /dev/nvme0 -n <nsid> -c <ctrl-id>`
Attach a namespace to a controller

NAMESPACES (cont.)

`nvme ns delete /dev/nvme0 -n <nsid>`
DESTROYS the namespace and its data

FORMAT AND ERASE

`nvme format /dev/nvme0n1 --lbaf=<n>`
ERASES: reformat with LBA format n

`nvme format /dev/nvme0n1 --block-size=4096`
ERASES: reformat to 4K blocks

`nvme format /dev/nvme0n1 --ses=1`
ERASES: format plus user data erase

`nvme sanitize /dev/nvme0 -a start-block-erase`
ERASES: block erase the whole drive

FIRMWARE

`nvme fw download /dev/nvme0 --fw=<file>`
Upload a firmware image

`nvme fw commit /dev/nvme0 -s <slot> -a 1`
Store image in slot, activate at reset

`nvme fw download /dev/nvme0 --fw=<file> --xfer=0x20000`
Download in 128 KiB chunks

OPTIONS AND HELP

`nvme <command> -o json`
Machine-readable output

`nvme <command> -v`
More detail (repeat for more)

`nvme <command> --dry-run`
Print the command without sending it

`nvme help`
List all subcommands

RECIPES

Wipe a drive and wait

```
# confirm the target first
nvme list
nvme sanitize /dev/nvme0 -a
start-block-erase
watch -n5 nvme log sanitize /dev/
nvme0
```