ADVANCED USE CASE

Using nvmecmd to verify NVMe drive is unused

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Overview

The nvmecmd command line utility can verify an NVMe drive is unused. The following command reads the drive information and verifies it against a set of rules for unused drives.

nvmecmd read.cmd.json --rules unused-drive.rules.json

This command returns 0 if all rules are met and non-zero if not.

The example output below shows a well-used drive in a system with a thermal throttling issue. The output displays one line for each failed rule. The first line indicates the drive is currently 10% used and fails the rule the drive must be 0% used.

Rules for Unused Drives

An example set of rules for unused drives is provided in the tables below. These rules can also be found in the file unused-drive.rules.json located in the \resources\nvmecmd subfolder of the NVMe Info installation. These rules check parameter values that indicate whether the drive has been used or has reported errors or thermal issues. All parameters are from Log Page 2 (SMART) except the number of self-test failures from Log Page 6.

The values for power on hours, power cycles, data read and data written may need to be adjusted if the drive was used prior to running the command.

These rules are provided as an example only and should be updated to meet user specific requirements.

TABLE 1: EXAMPLE RULES FOR UNUSED DRIVES (UNUSED-DRIVE.RULES.JSON)

Rule
Percentage Used must be 0%
Data Read must be less than or equal to 0.01 GB
Data Written must be less than or equal to 0.01 GB
Power Cycles must be less than 5
Power On Hours must be less than 5
Available Spare is 100%
Critical warnings match No
Media and Data Integrity Errors must be 0
Warning Composite Temp Time must be 0
Critical Composite Temp Time must 0
Total Time for TMT1 must be 0
Total Time for TMT2 must be 0
No Self-Test failures reported in Log Page 6

Rules File

The rules file is a simple json file with a rules.json extension. Details on how to create or modify rules files can be found in the nvmecmd User Guide. The unused-drive.rules.json file that matches the above requirements is shown below:

```
{
  "rules": [
    "'Percentage Used' = 0 %",
    "'Data Read' < 0.01 GB",
    "'Data Written' < 0.01 GB",
    "'Power Cycles' < 5",
    "'Power On Hours' < 5",
    "'Available Spare' = 100 %",
    "'Critical Warnings' match No",
    "'Media and Data Integrity Errors' = 0",
    "'Warning Composite Temperature Time' = 0 Min",
    "'Critical Composite Temperature Time' = 0 Min",
    "'Thermal Management Temperature 1 Time' = 0 Sec",
    "'Thermal Management Temperature 2 Time' = 0 Sec",
    "'Number Of Failed Self-Tests' = 0"
  ]
}
```

Read Command File

For details on the read command file (read.cmd.json) see the nvmecmd User Guide.

Log Files

The command above creates the three log files below. For additional details see the nvmecmd User Guide.

- read.summary.json Summary of the command run in json format
- nvmecmd.trace.log Capture of information displayed when command runs
- nvme.info.json NVMe drive information in json format

References

NVMe specification https://nvmexpress.org/developers/nvme-specification/

Nvmecmd User Guide http://www.epicutils.com

The nvmecmd User Guide is provided with the NVME Info application and can be found in the install path for NVMe Info under the Documentation sub-folder.