

Drive Self-Test User Guide

Version 1.03

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Description: drive_selftest.sh is a small script which schedules and runs S.M.A.R.T. Short and Long tests for your drives (HDD/SSD/NVMe). This additionally augments Multi-Report v3.1 as SMART testing was removed from Multi-Report v3.1.

Why now?

Drive_Selftest was designed with two main purposes:

1. To divorce SMART testing from Multi-Report.
 - a. TrueNAS will eventually include full support for NVMe drives which makes this a good opportunity to separate SMART testing from the Multi-Report script.
2. To automatically schedule and test systems with a large quantity of drives.
 - a. Several people have dozens of drives, some over the 200 drive mark that I have chatted with. Instead of trying to individually schedule groups of drives to test on certain days, this script takes the work out of the task for you. You have one restriction, same as within TrueNAS, you must run the script every day to ensure all drives are tested and none get skipped.

Script Output:

The script does not generate its own email for a report, this data is echoed to the console (STDOUT) and when run via CRON Job, the job can send you a nice email if you do not hide the standard output. This will not include a test failure, this script only attempts to launch a SMART test. Use Multi-Report or rely on TrueNAS to report any failures.

Configuration:

1. The script, when used as a stand-alone script is setup by default to run SMART Short tests on all drives each time the script is run, and run SMART Long tests on one seventh of the drives each day of the week. NOTE: If a Long test is scheduled for a drive, a Short test will not be run on that same drive that day.
2. If using drive_selftest.sh along with Multi-Report 3.1 or greater, use the Multi-Report ‘-config’ option to configure the settings and the default setup in this situation is no drive testing at all, it must be configured via Multi-Report. If drive_selftest.sh is being used as

a stand-alone script, the configuration is performed from within the script commencing around line 80 and it must be done manually. There are about 14 values that you may change if desired.

3. The script name should be “drive_selftest.sh” to work with Multi-Report.
4. *IMPORTANT REQUIREMENT: The script should be run once a day or some drives may not be tested.*

Configuration Options:

These are the variable that are to be configured as needed.

1. *Test_ONLY_NVMe_Drives Mode* – This option allows the user to disable testing all HDD/SSD’s and test ONLY NVMe drives when set to “true” (Default = “false”). Why would you desire this? If TrueNAS is testing your HDD/SSD’s but it doesn’t schedule NVMe drives. This gives you the ability to test your NVMe drives.
2. *Short or Long Test_Mode* – There are three test modes:
 - a. Test Mode 1 = Test drives IAW the Weekly or Monthly options.
 - b. Test Mode 2 = Test All Drives each time the script is run.
 - c. Test Mode 3 = No Drives Tested.
3. *Short or Long Time_Delay_Between_Drives* – This is the time in seconds between sending the SMART test commands to start a Short test. The default is 1 second.
4. *Short or Long SMART_Testing_Order* – The drives can be tested in specific order:
 - a. Drive Name: (ada0, ada1 or sda, sdb) by setting this value to “DriveID”.
 - b. Drive Serial Number: The serial number are sorted and then run in sequence by setting this value to “Serial”. The intention for this option is to possibly spread out the drives in a very large system when performing SMART Long tests to mitigate heat buildup and high power draw in one cabinet.
 - c. The defaults are: Short by “DriveID”, Long by “Serial”.
5. *Short or Long Drives_to_Test_Per_Day* – You may select the minimum number of drives you would like tested each ‘authorized’ testing day. The default is 1 drive. It is perfectly fine to leave this value at “1” as the script will calculate the correct minimum value depending on how many drives and how many authorized days are configured.
6. *Short or Long Drives_Test_Period* – How long to test all drives.
 - a. Week: All drives if the script is run every day will be tested in 1 week.
 - b. Month: All drives if the script is run every day will be tested in 1 month.

NOTE: The script must be run on the authorized days at a minimum to ensure all drives are tested per the schedule.
7. *Short or Long Drives_Tested_Days_of_the_Week* – This is the authorized days of the week that the script is allowed to run a Short or Long SMART test. There are seven values allowed: 1=Monday, 2=Tuesday, 3=Wednesday, 4=Thursday, 5=Friday, 6=Saturday, 7=Sunday. These values are comma separated in parentheses.

- a. Example of usage: `Long_Drives_Test_Days_of_the_Week="1,2,4,7"` would allow scheduled SMART Long tests to run all days except Wednesday and Saturday.
- 8. `Short_Drives_Test_Delay` – This is a value in seconds for the script to pause and wait before exiting the script. Its purpose is for Multi-Report Integration, to allow SMART Short tests to complete before returning to the Multi-Report script. If you are using this script as standalone, you may change this value to “1” second so the script exits quickly.
- 9. `Ignore_Drives_List` – This is the same feature as in Multi-Report but only for drive testing. This will remove the drive with this serial number from all calculations and any testing.
- 10. `Drive_List_Length` – When a list of drives is output to the report, this limits how many drives are listed on a single line to make it more readable. The default is 10.
- 11. `Enable_Logging` – This value (true or false) will create a file called “`drive_test_dd_txt`” (where dd = day of the month) in the script file directory by default. See next option. The logs are based on the day of the month and they will overwrite themselves each month.
- 12. `LOG_DIR` – The value is “`$SCRIPT_DIR`” which resolves to the current directory the script is being run from. This can be changed to place your log files in a separate location, for example: `LOG_DIR="$SCRIPT_DIR/smart_logs"` (assuming you have a directory called “`smart_logs`”).

Command Line Switches:

- 1. There are several command line switches:
 - a. The script runs normally without any command line switches.
 - b. `-help` Displays Help Information
 - c. `-timer` Generates a text file with a timeline breakdown to aid in troubleshooting.
 - d. `-demo` Run on its own, will provide you a simulated list of drives tested given the user configured changes.

NOTE: `-demo` does not work correctly when `Test_ONLY_NVMe_Drives="true"`. We are working on a resolution.

- e. `-clearlog` Removes all log files from the `/DS_Log` directory.
- f. `-debug` For development operations.

The Default Setup:

The drive_selftest.sh script defaults are setup as listed below and there are only two values that I would expect anyone to change. All the other values will work as set, maybe I should take away those options 😊 :

1. Short Tests: Run a SMART Short test everyday, 7 days a week, 130 second delay at the end in case you are using Multi-Report as well. A short test will not be run on a drive when it has a Long test scheduled for the same time.
 - a. Likely Changes:
 - i. Short_Test_Mode
 - ii. Short_Drives_Test_Delay
 - iii. Short_Drives_Tested_Days_of_the_Week to allow testing only on specific days of the week.
 - b.
2. Long Tests: Run a SMART Long test on each drive once a week, 7 days a week.
 - a. Likely Changes:
 - i. Long_Drives_Test_Period from “Week” to “Month”
 - ii. Long_Drives_Tested_Days_of_the_Week to allow testing only on specific days of the week.

Scenarios:

These scenarios are examples of what this script will do. The drive names are from a TrueNAS CORE system. Drives would be sda, sdb, sdc in a SCALE system.

Scenario 1 (50 Drives, Week Option, No Sunday testing):

Drive Count: 50

Long_Test_Mode=1

Long_Time_Delay_Between_Drives=1

Long_SMART_Testing_Order="DriveID"

Long_Drives_Test_Period="Week"

Long_Drives_Tested_Days_of_the_Week="1,2,3,4,5,6"

Results:

Monday:

ada0, ada1, ada2, ada3, ada4, ada5, ada6, ada7, ada8

Tuesday:

ada9, ada10,

ada11, ada12, ada13, ada14, ada15, ada16, ada17

Wednesday:

ada18, ada19, ada20, ada21,

ada22, ada23, ada24, ada25, ada26

Thursday:

ada27, ada28, ada29, ada30, ada31, ada32,

ada33, ada34, ada35

Friday:

ada36, ada37, ada38, ada39, ada40, ada41, ada42, ada43,

ada44

Saturday:

ada45, ada46, ada47, ada48, ada49

Scenario 2 (200 Drives, Week Option, No Saturday or Sunday testing):

Drive Count: 200

Long_Test_Mode=1

Long_Time_Delay_Between_Drives=1

Long_SMART_Testing_Order="DriveID"

Long_Drives_Test_Period="Week"

Long_Drives_Tested_Days_of_the_Week="1,2,3,4,5"

Results:

Monday:

ada0, ada1, ada2, ada3, ada4, ada5, ada6, ada7, ada8, ada9,
ada10, ada11, ada12, ada13, ada14, ada15, ada16, ada17, ada18, ada19,
ada20, ada21, ada22, ada23, ada24, ada25, ada26, ada27, ada28, ada29,
ada30, ada31, ada32, ada33, ada34, ada35, ada36, ada37, ada38, ada39

Tuesday:

ada40,
ada41, ada42, ada43, ada44, ada45, ada46, ada47, ada48, ada49, ada50,
ada51, ada52, ada53, ada54, ada55, ada56, ada57, ada58, ada59, ada60,
ada61, ada62, ada63, ada64, ada65, ada66, ada67, ada68, ada69, ada70,
ada71, ada72, ada73, ada74, ada75, ada76, ada77, ada78, ada79

Wednesday:

ada80, ada81,
ada82, ada83, ada84, ada85, ada86, ada87, ada88, ada89, ada90, ada91,
ada92, ada93, ada94, ada95, ada96, ada97, ada98, ada99, ada100, ada101,
ada102, ada103, ada104, ada105, ada106, ada107, ada108, ada109, ada110, ada111,
ada112, ada113, ada114, ada115, ada116, ada117, ada118, ada119

Thursday:

ada120, ada121, ada122,
ada123, ada124, ada125, ada126, ada127, ada128, ada129, ada130, ada131, ada132,
ada133, ada134, ada135, ada136, ada137, ada138, ada139, ada140, ada141, ada142,
ada143, ada144, ada145, ada146, ada147, ada148, ada149, ada150, ada151, ada152,
ada153, ada154, ada155, ada156, ada157, ada158, ada159

Friday:

ada160, ada161, ada162, ada163,
ada164, ada165, ada166, ada167, ada168, ada169, ada170, ada171, ada172, ada173,
ada174, ada175, ada176, ada177, ada178, ada179, ada180, ada181, ada182, ada183,
ada184, ada185, ada186, ada187, ada188, ada189, ada190, ada191, ada192, ada193,
ada194, ada195, ada196, ada197, ada198, ada199

Scenario 3 (200 Drives, Month Option, No Sunday Testing):

Drive Count: 200

Long_Test_Mode=1

Long_Time_Delay_Between_Drives=1

Long_SMART_Testing_Order="DriveID"

Long_Drives_Test_Period="Month"

Long_Drives_Tested_Days_of_the_Week="1,2,3,4,5,6"

Results:

Friday 01 November

Drive IDs: ada0, ada1, ada2, ada3, ada4, ada5, ada6, ada7, ada8

Saturday 02 November

Drive IDs: ada9, ada10, ada11, ada12, ada13, ada14, ada15, ada16, ada17

Monday 04 November

Drive IDs: ada18, ada19, ada20, ada21, ada22, ada23, ada24, ada25, ada26

Tuesday 05 November

Drive IDs: ada27, ada28, ada29, ada30, ada31, ada32, ada33, ada34, ada35

Wednesday 06 November

Drive IDs: ada36, ada37, ada38, ada39, ada40, ada41, ada42, ada43, ada44

Thursday 07 November

Drive IDs: ada45, ada46, ada47, ada48, ada49, ada50, ada51, ada52, ada53

Friday 08 November

Drive IDs: ada54, ada55, ada56, ada57, ada58, ada59, ada60, ada61, ada62

Saturday 09 November

Drive IDs: ada63, ada64, ada65, ada66, ada67, ada68, ada69, ada70, ada71

Monday 11 November

Drive IDs: ada72, ada73, ada74, ada75, ada76, ada77, ada78, ada79, ada80

Tuesday 12 November

Drive IDs: ada81, ada82, ada83, ada84, ada85, ada86, ada87, ada88, ada89

Wednesday 13 November

Drive IDs: ada90, ada91, ada92, ada93, ada94, ada95, ada96, ada97, ada98

Thursday 14 November

Drive IDs: ada99, ada100, ada101, ada102, ada103, ada104, ada105, ada106, ada107

Friday 15 November

Drive IDs: ada108, ada109, ada110, ada111, ada112, ada113, ada114, ada115, ada116

Saturday 16 November

Drive IDs: ada117, ada118, ada119, ada120, ada121, ada122, ada123, ada124, ada125

Monday 18 November

Drive IDs: ada126, ada127, ada128, ada129, ada130, ada131, ada132, ada133, ada134

Tuesday 19 November

Drive IDs: ada135, ada136, ada137, ada138, ada139, ada140, ada141, ada142, ada143

Wednesday 20 November

Drive IDs: ada144, ada145, ada146, ada147, ada148, ada149, ada150, ada151, ada152
Thursday 21 November

Drive IDs: ada153, ada154, ada155, ada156, ada157, ada158, ada159, ada160, ada161
Friday 22 November

Drive IDs: ada162, ada163, ada164, ada165, ada166, ada167, ada168, ada169, ada170
Saturday 23 November

Drive IDs: ada171, ada172, ada173, ada174, ada175, ada176, ada177, ada178, ada179
Monday 25 November

Drive IDs: ada180, ada181, ada182, ada183, ada184, ada185, ada186, ada187, ada188
Tuesday 26 November

Drive IDs: ada189, ada190, ada191, ada192, ada193, ada194, ada195, ada196, ada197
Wednesday 27 November

Drive IDs: ada198, ada199

Thursday 28 November

Drive IDs: Nothing To Test This Day

Troubleshooting:

There are no magical ‘-dump’ routines built into the drive_selftest.sh script, however if you are using Multi-Report, the ‘-dump emailall’ or ‘-dump emailextra’ will include the relevant data from this script.

If you are having issues with this script, you have four options for assistance:

1. Post a question on the TrueNAS Forums in the Multi-Report thread.
2. If using Multi-Report, run the script using ‘-dump emailall’ and enter a hint of the problem you are having. An email will be sent to yourself and Joe.
3. Send Joe a Message on the TrueNAS Forum with a description of the problem.
4. Or if you send Joe an email joeschmuck2023@hotmail.com please use a subject line that includes “Drive_Selftest”, and a description of the problem.

NOTE: Joe will answer any email as soon as he sees one arrive, however he does not live in front of the computer so sometimes you will get a very fast answer, sometimes it could take 24 hours, but usually it is pretty quick. I live in the U.S.A., East Coast (NYC time zone).

Common expected problems:

1. Q. All of my drives are not being tested, why not?
 - A. Odds are you are not running the script once every day.
2. Q. Where are the log files located?
 - A. The log files will be located in your script directory, in a new directory called ‘DS_logs’.
3. Q. TrueNAS already tests some of my drives configured in the GUI, how can I test the rest of my drives using this script and not test those drives which TrueNAS will test?
 - A. In the script is a value called Ignore_Drives_List="". Just add the serial numbers of the drives you wish to not test with the script and separate each serial number with a comma.
Example: Ignore_Drives_List="OU812,PI31415926,LIGHT186282MPS"
4. Q. What is the minimum and maximum quantity of drives that I can test?
 - A. The minimum is 1 drive. The maximum is more than you or I have. Theoretically it can be thousands of drives, I only simulated up to 500 drives.

Suggestions:

If you have any recommendations, feel free to reach out and let me know about suggested improvements. If you have an idea on how to implement those recommendations, please provide that as well.