

Multi Report Version 1.4c (13 March 2022)

DISCLAIMER: While I have tried to make a single script to work with all hard drives and solid state drives, it will not work with every variation. Manufacturers do things their own way and we make the best of what we are given. With that said I hope that the majority of people who use this script find it beneficial. But remember, there is no substitute for monitoring your drives and paying attention to warning emails.

Multi Report Version 1.4c is a greatly enhanced version of the previous versions of Multi Report. New features include:

- Improvements to run on FreeNAS/TrueNAS Core and TrueNAS Scale.
- Fully Customizable Reports in Email.
- Creates a report for SMART and Non-SMART drives.
- Updated Configuration Backup to select day the backup is sent vice every run of the script.
- Added Statistical Data Collection (in CSV) of the drives to be used for drive trend analysis. Also delivered via email as the user configures the system.
- Added "-s" switch to aid in statistical data collection without sending any email. This is great for high frequency data collection.
- Added corrections for UDMA CRC Errors.
- Added ignore for UDMA CRC Errors.
- Added corrections for Multi Zone Errors.
- Added Drive Ignore List.

DETAILED DESCRIPTION

In this version of the script we have added many highly customizable features described below.

Fully Customizable Reports in Email

The reports that are generated are now highly customizable by selecting which columns of data you desire. You may customize the following fields:

- | | |
|-----------------------|---------------------------------|
| - Device ID | - Reallocated Events |
| - Drive Serial Number | - Current Pending Sectors |
| - Model Number | - Offline Uncorrectable Sectors |
| - HDD Capacity | - Ultra DMA CRC Errors |
| - *Rotational Rate | - *Seek Error Rate |
| - SMART Status | - *Multi Zone Error |
| - Temp | - Last Test Age |
| - Power On Time | - Last Test Type |
| - Start/Stop Count | - #Wear Level |
| - *Load Cycle Count | |
| - *Spin Retry Count | |
| - Reallocated Sectors | |

NOTE: * = HDD Only, # = SSD Only

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Create Non-SMART Report in Email

When enabled (default) any detectable drives that do not support SMART will have whatever data obtained about the drive appended to the end of the email report.

Configuration Backup File

The previous version of emailing the configuration file with each run of the script has been updated to allow the user to select any day of the week (Mon, Tue, Wed, Thu, Fri, Sat, Sun), or the first day of the month (Month), or the original of every time the script is run (All).

Statistical Data Collection

A new feature called Statistical Data Collection will create a comma separated values (CSV) file containing the following data from the SMART drives Date, Time (in TrueNAS Scale resolution is to the hundredths of a second), Device ID, Drive Type, Serial Number, SMART Status, Temp, Power On Hours, Wear Level, Start/Stop Count, Load Cycle Count, Spin Retry Count, Reallocated Sectors, Reallocated Sector Events, Pending Sectors, Offline Uncorrectable Sectors, UDMA CRC Errors, Seek Error Rate, and Multi Zone Errors. This data will allow the user to perform data analysis of this drive data to track trends. The CSV file can be opened by any spreadsheet program such as Microsoft Excel.

The statistical data file must be configured to be stored on a hard drive in order to survive reboots. The default is to store the file in the "/tmp/" location but this need to be changed should this feature be used properly.

The statistical data file also has a Purge feature that by default will purge the CSV file of any data over 730 days (2 years). This threshold is user configurable.

WARNING: Do not run this script with multiple instances. The shared temporary files may become corrupt.

The script also has a switch "-s" that when appended to the script to run it (example: multi_report_v1.4c.sh -s) that the script will run to only collect data for the CSV file. This feature is good when you desire to run the script often to collect drive data.

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UDMA CRC ERRORS

Unfortunately when a drive experiences an UDMA CRC Error it becomes permanently part of the drives record. These are not critical problems unless the count continues to increase. In order to offset this reporting problem there is a pair of parameters the user can set to force an offset. These values are UCRC1SN which equals the Drive Serial Number and UCRC1CNT which equals the drives current UDMA_CRC_Error_Count. Within the report the value will be zero and highlighted Yellow it indicates that this value was overridden. Should another error occur the count will increase accordingly and an Error message will result. Up to 8 drives can be added.

Unfortunately I had one user whom has an issue with this adjustable correction (see Known Issues) so I added a simple IgnoreUDMA setting that will not report UDMA CRC Errors as a failure. This means you the user will need to monitor your drives should the count increase. TrueNAS also reports a change in the errors as well.

MULTI ZONE ERRORS

This is exactly the same operation as the UDMA CRC ERRORS functionality except the variables are MULTIZONE1SN and MULTIZONE1CNT.

DRIVE IGNORE LIST

The Drive Ignore List was created to remove any drive by Serial Number from the entire reporting system. Some USB drives or maybe Virtual Drives are not desired. This list is designed differently from the previous lists in that it's a simple comma separated list and you may enter as many drives as desired. (example: IGNOREDRIVES="WD-23JBY123, WD-RXU7QT,OU81TWO"

IGNORE SEEK ERROR RATE

Due to some drives reporting some odd seek error rates the user can ignore these in the emailed report so they do not generate an error message. If all your drives report low seek error rates then this feature can remain disabled.

KNOWN ISSUES

There is one known issue that I am unable to replicate. One user reported that two drives with 19 and 18 UDMA CRC Errors did not subtract the offset value correctly when running on TrueNAS Scale. Thanks to that user, he allowed me remote access and I verified the issue. I have not solved the issue it as of this writing but there seems to be an issue with passing the serial number through as a variable into the function. The current solution for his situation was to do it old school and enter the serial numbers deep within the code (see line 1058). If someone has an issue with specific drive corrections, you may edit the script to make the change within the function and it "should" work. (See Advanced Configuration)

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CONFIGURATION INSTRUCTIONS

- 1) Place the script in a location on your pool to run from. The file needs to be executable so use the command 'chmod +x multi_report_v1.4c.sh' for example. Additionally you may change the file name from .txt to .sh so it looks proper.
- 2) Edit the script using your preferred method. For FreeNAS/TrueNAS Core I prefer using 'ee' and for TrueNAS Scale I prefer to use 'nano'. 'vi' works on both platforms if you like that editor.

Time to make some changes (line number are based on the original code, before the user edits anything and they will provide you a general location to look in the script to make changes. Note that the script is descriptive to aid in these changes.

- 3) At line 101
Setup the 'email="your_email@address.com"' line.
This is the absolute minimum change required to make this script run. Make this change and try to run the script using './script_name' for example: './multi_report_v1.4c.sh' If you get a failure, then examine your changes. It may be easier at this point to delete the script and start from the very beginning.
- 4) At Line 102
Setup the 'from=' line if desired, it is not required to be changed.
- 5) At line 114 (Recommend skipping the Custom Report Section until after you have seen one of the reports, the default is to list everything.) Setup the values you desire to be included in the report. A '"true"' value will include the selection, a '"false"' value will disable this selection from the custom email report.
- 6) At line 161
Setup the Drive Ignore list as desired. This is useful if you have a drive that you do not want to see, for example a USB drive. You must use the drive serial number and the format to use is specified in the script. If the serial number does not match exactly, the drive will be listed in the report. This also removes the drive from the statistical data file.
- 7) At line 176
Setup the Drive UDMA_CRC_Error_Count Flags. This will "adjust" the errors presently listed for a specific drive and subtract that value. Example: Drive "XYZ" has 5 UDMA CRC Errors (which are permanently recorded on the drive) you would then enter UCRC1SN="XYZ" UCRC1CNT=5. You may enter up to 8 drives. The custom report will now show "0" errors and be highlighted in yellow. This will not affect the statistical data file.
- 8) At line 198
Setup the MultiZone Errors, exactly the same as UDMA_CRC_Errors. You may enter up to 8 drives.

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9) At line 217 through line 240

Now look through the Report Status Summary Table Settings variables. The defaults should be a good place to start but change them as desired, details are in the script on each parameter.

10) At line 244

Setup the Export Data File if you plan to use the statistical file data. This MUST be located in a subdirectory that will store the file. The default is `"/tmp/statisticalsmartdata.csv"` in order to ensure the script runs without an error message, however when the system is rebooted, the data goes away. I recommend you change this to the same path that the multi_report script is located. Also `"expDataEnable"` must be set to `"true"` in order to record the data. Ensure you setup all the expData variables.

11) At line 248

The FreeNAS/TrueNAS configuration backup settings need to be setup as well if you plan to use this feature. The backup location again needs to be a safe place to store the data, `"/tmp/"` allows the script to not fail but the backup file will be gone upon reboot.

12) Lastly you can play around with the colors used in the report if desired. The default values work well but someone will want to make it personalized. I'd recommend you make the script work normally before tweaking these things.

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ADVANCED CONFIGURATION

So let's say you have a SSD that doesn't report using standard SMART report wording. If you scroll to around line 930 you will see the following lines:

```
/Rotation/{rotation=$3} \  
/Device Model/{modelnumber=$3 " " $4 " " $5 " " $6 " " $7} \  
/User Capacity/{capacity=$5 $6} \  
/Background/{lastTestHours=$10} \  
/# 1/{altlastTestHours=$7} \  
/# 1/{altlastTestType=$4} \  
END {
```

If you have a SSD that reports using the command 'smartctl -a /dev/xxx' the wear level as:

```
"282 Wear_Level 0x00012 099 100 000 pre-fail Always - 99"
```

then you can add the following line just above "END {"

```
"/Wear_Level/{wearLevel=$3} \" or  
"/Wear_Level/{wearLevel=$10} \" but not both
```

to look like this

```
/Rotation/{rotation=$3} \  
/Device Model/{modelnumber=$3 " " $4 " " $5 " " $6 " " $7} \  
/User Capacity/{capacity=$5 $6} \  
/Wear_Level/{wearLevel=$10} \  
END {
```

"/Wear_Level/" is the drive specific word we are matching. If you used just "Wear" then it could match multiple places so make it as complete of a match as possible.

"{wearLevel=\$10} \" is the variable 'wearLevel' and we are using the 10th string of data with '=\$10'. We we could use the third string with '=\$3' but typically the tenth string is more applicable. You will need to determine your way forward. The formatting of the new line must be exact, meaning correct spacing, using the correct brackets. The script will fail if you make even the smallest of typographical errors.

If you add more definitions that work then please toss me a private message on the forum so I can add the new definitions to the program for everyone.

If you find a piece of data you would like to collect or recommend a change, please send me a message. This script is open for anyone to modify/upgrade as they see fit and share.

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Editing for Drive Corrections (Known Issues Work Around)

WARNING

Punctuation is everything in a script. The omission or addition of a quote, semicolon, comma, parenthesis, or curly braces will break the script. While editing the script pay close attention to what you are changing. I make mistakes easily myself such as using a parenthesis vice curly braces.

So you happen to have an issue with one of your drives for UDMA CRC Errors or Multi Zone Errors. You have a few options to handle it:

- 1) Ignore Drive - One of my least favorite thing is to ignore a drive, especially if it's a data drive but you could opt to use the "IGNOREDRIVES" feature. Please note that this feature was added mainly for those rogue devices (satadom, USB Flash Drives) that just do not support SMART and any data gleaned from these devices is generally useless.
- 2) UDMA CRC Errors (Manual Adjustment) - To make an adjustment within the function you need to follow these steps:
 - a. Remove the drive entry from the UCRC1SN section (line 178 area) or whatever you do may happen twice.
 - b. Scroll down to line 1057 in the script an locate "# Hard Coded UDMA Corrections" where you will find a few examples (not really examples as they fix one persons problems).
 - c. Change the example to match your situation where the drive serial number is within the double quotes and the crcErrors subtracts the count within the said drive.
 - d. You may add as many drives as required.
- 3) Multi Zone Errors (Manual Adjustment) - To make an adjustment within the function you need to follow these steps:
 - a. Remove the drive entry from the MULTIZONE1SN section (line 200 area) or whatever you do may happen twice.
 - b. Scroll down to line 1081 in the script an locate "# Hard Coded MultiZone Corrections" where you will find an example I made up where we subtract a count of 3.
 - c. Change the example to match your situation where the drive serial number is within the double quotes and the MultiZone subtracts the count within the said drive.
 - d. You may add as many drives as required.

Please note that my intention for this script modification was to place every piece of configuration at the front of the script and attempt to make the configuration easy. I also wanted to expand the script to allow for some customization and data analysis (it's the engineer in me). Unfortunately I am unable to take into account every possible issue that may come up due to drives, controllers, the operating system, but I have tried to be all inclusive. I suspect I will have a few people reach out to me with a problem and I welcome the feedback. I will try to fix their current problem and roll that fix into an update.

-Joe Schmuck