Multi-Report

User Guide

Updated 22 April 2023

Multi-Report User Guide (Version 2.2 to 2.4)

This user guide will provide an explanation of how to run the Multi-Report script and how to configure it for your specific use. Please read this entire user guide before proceeding as there are many customizations for practically every situation.

IF YOU HAVE A PROBLEM

Have a problem? First check the Common Problems and Solutions section of this user guide. If you discover a drive that does not appear to be addressed, please run the script using the '-dump email' and enter a short message pointing out the problem when asked. An example is: "I have this big red alarm, what is it and how can I fix it?" or "Arg! I have ada2 errors and I don't think they are valid". This will send me an email with all your dump data and I will be able to look into the issue and address it. I will respond to you once I receive the data and can analyze it. If you are just sending me drive data for collection purposes, please enter a message similar to "Hi Joe, here is some drive data for you."

NOTE: When you send me an email, I will know the address you sent it from. I will not share your email, go buy a new car with it, or sell it to the Mafia. I may use it to send you back a message if you reported a problem.

CHANGES FROM V 2.3

- Added common Problems and Solutions
- Updated Appendix A

CHANGES FROM V 2.2

- The installation of version 2.2 were deemed too difficult for some people so the installation has been simplified. The running file is still 'multi_report.sh'. The Symlink has been removed. If you have version 2.2 installed, the '-update' feature will upgrade you to v2.3.
- Bugfix for Custom Drive List – Wear Level and Helium Level.

Contents

What is Multi-Report?

Multi-Report is a joint effort to produce a simple script that would report key drive data points in order to predict drive failure and deliver that via email. Additionally multi-report can maintain statistical data in a Comma Separated Value (CSV) format compatible with any typical spreadsheet program.

This is a highly configurable program designed to allow the end user the ability to customize the script to the specific needs of the user.

Versioning

Multi-Report versioning is controlled by the version number and the date. Example: "multi_report_v2.2_04_Apr_2023.txt" and Beta will be clearly identified. Small bug fixes are likely to have a third digit, for example: "multi_report_v2.2.1_02_Apr_2023.txt" The multi_report_config.txt is also recognized by versioning text in the first line of the file.

New Version Update Alert

Multi-Report v2.2 implements checking the GitHub repository and should an update be available, it will notify the user in the first few lines of the email report and those lines will be RED in color. I have not implemented Automatic Updating (yet) as I feel users should be in full control of their software. In order to perform the software update, the user must run the script using the '-update' switch. Follow the prompts. The script will exit after the update.

Messages from the Creator

Multi-Report v2.2 implements a message delivery system that will let users know of up coming updates or problems and concerns about the product. These messages will appear just under the "Execution Time:" information.

What do I ask for in return?

I would like to create the best and most inclusive free product but to do that, whenever someone has a problem, or when someone installs a NEW model drive, I would appreciate a little data in return. By running the script using the '-dump email' switch you will be prompted to enter a simple short message and then an email will be generated to my personal email address (created just for this project) that will contain drive configuration data. Drive Model data I already have and was used to test this script is listed in Appendix A.

Initial Setup

The basic setup for Multi-Report is to install the script into a Dataset within your pool, and preferably a dataset that has an accessible share such as SMB. This will make everything easier to manipulate in the future. For this example, the script is named "multi_report.sh" and the dataset is located at '/mnt/mypool/scripts'. If you are not using the 'root' user to setup this script, you must use an

administrator account you create and precede the commands with 'sudo'. I prefer to use 'root' but that is just me.

Prerequisites:

1. TrueNAS Core/Scale must be installed and operating normal.
2. TrueNAS must have the email account setup already. If you cannot send yourself an email, it is not setup properly.
3. If you have a previous version of 'multi_report.sh', you must remove or rename it. You should retain the 'multi_report_config.txt' file and it will be upgraded automatically.
4. I highly recommend that you place any scripts in its own directory as depicted below.

Steps to establish a basic setup: (Do not enter the single quotes)

NOTE: V2.2 or V2.3 steps only apply to the respective installation you are performing.

In the examples below the dataset location will be '/mnt/my_pool/scripts' and the Multi-Report script will retain its original name. Ex: 'multi_report_v2.2_2023_04_08.txt'

1. Copy the script to a Dataset. NOTE: The dataset path cannot have any spaces in the path.
   Incorrect Example: '/mnt/my pool/scripts'
   Correct Example: 'mnt/my_pool/scripts'
2. Open an SSH terminal window, or Shell and log in (you will need elevated privileges).
3. Type 'cd /mnt/my_pool/scripts'
4. Ensure that there is no file called "multi_report.sh" in the directory. See prerequisites.
5. Copy the script 'multi_report_v2.2_2023_04_08.txt' into your script running directory.
6. V2.3 Rename the script to 'multi_report.sh'.
7. V2.3 Make the file executable 'chmod +x multi_report.sh'
8. V2.2 Give the file some execute permissions 'chmod 777 multi_report_v2.2_2023_04_08.txt'
9. V2.2 Make the file executable 'chmod +x multi_report_v2.2_2023_04_08.txt'

First Time Installation (No External Configuration File)

10. If this is not your first time using multi_report and you have an external configuration file, proceed to step 17.
11. V2.3 Run the script './multi_report.sh -config'
12. V2.2 Run the script './multi_report_v2.2_2023_04_08.txt -config'. NOTE: If you run the script without a configuration file, the script will display an error message and direct you to create a configuration file.
13. Press the 'n' key to create a New configuration file.
14. Read the questions and enter the answers (Email Address, EmailAlert Address, and From Address). If you would like to send to more than one email address, use a comma to separate the emails addresses.
    Example of multiple emails: 'joe@aol.com,joe@work.com'
15. The Automatic Drive Compensation is good to use if you have any drives which have UDMA_CRC_ERRORS or bad sectors errors. This will offset the value and bring it back to a zero value. Should other issues occur, the value will increment. This is useful to identify drives which increment slowly so you do not have to remember what the value was previously.
16. The script will create an external configuration file called 'multi_report_config.txt' where the user "could" edit this file with a simple text editor, however it's strongly advised against it due to

the tight formatting restrictions. If you venture out to manually edit the configuration file and it starts working incorrectly, recreate a new configuration file using the steps above.

Previous Installations (With External Configuration File)

17. V2.3 Run the script './multi_report.sh'. This will run the script normally and upgrade the External Configuration File if required.
18. V2.2 Run the script './multi_report_v2.2_2023_04_08.txt'. This will perform a few things:
    a. Create a symbolic link to 'multi_report.sh'
    b. Upgrade the External Configuration File
19. V2.2 Let's run the script again but this time without any CLI switches './multi_report.sh'.
20. If all goes well you will receive an email that contains a chart and text section.
21. Examine the email, look for errors. The drive may be reporting a failure when you may feel the report is in error. If this is what you feel, please forward me your script data using the '-dump email' switch. I can confirm what the drive is reporting and if the script is in error.

Unfortunately, because manufacturers do not have a standard to live by, it's almost impossible to take into account every drive configuration and the end user will need to do some customizations. They are easy.

If you have any drive errors such as a Sector Error or the Wear Level is incorrect, then you will need to customize some of the settings.

NOTE: ADVANCED INFORMATION - If you do not want to run the script using the file name "multi_report.sh" then you must change the variable in the script under the "Auto-generated Parameters" called "runfilename" to the filename you desire. By default, it is set to "multi_report.sh". A Symlink will be created after you run the script for the first time, meaning the file name you are running, while it may look like its own file, it is really the full length multi_report file name. Do not delete it. Why a Symlink? This preserves any CRON job you have setup and it was pointed out to me that the original (previous) script file is retained, after version 2.2, prior versions are deleted if they are named "multi_report.sh".

The Multi-Report External Configuration File

The external configuration file is a file created to limit the needless reconfiguring of the parameters when upgrading the script to newer versions. The script will generate the configuration file and update the configuration file with the upgrades. The configuration file by default will create itself in the same directory as the script is located and the name of the file is 'multi_report_config.txt'.

This configuration file is normally edited from within the script using the '-config' switch but may be edited using a simple text editor.

Prior to exiting the configuration tool ensure you WRITE the changes to your configuration file or the changes will be lost.

External Configuration File Update

Multi-Report is controlled by a configuration file called "multi_report_config.txt" and this configuration file is adjusted to control the configuration of Multi-Report. Most of these adjustments can and should be

made from running the '-config' switch (see below). When the script is run it will check the version of the configuration file. Should the configuration file be out of date it will create a copy of the configuration file and then create an updated version of the configuration file. Both files will be sent to the user with the emailed report. This allows a user the ability to revert easily to the previous version should they desire. Additionally, when a software update occurs, a backup of the configuration file is made on the system so you may use that file as well to revert back to the original.

Explanation of the Email

Header information

The email generated contains the following information:
Program Version, Operating System Version
Report Run Date and Time
How long it took to execute the script.

Zpool/ZFS Status Report Summary

Pool Name, Status, Capacity, Fragmentation, Errors, Last Scrub Age, Scrub Duration

Hard Drive Summary Report / SSD Summary Report / NVMe Summary Report

Device ID, Drive Identification, Capacity, SMART Status, Temperature, Power On Hours, Drive Errors Last Test Age, Last Test Type

These are the core identifiers used in this script and will lead any user to easily identify a problem. Any errors have the background color changed making it obvious.

Encrypted TrueNAS_Config in Email

If you desire the TrueNAS_Config.zip file to be encrypted then you MUST manually edit the 5th line of the script and enter a password. Why encrypt this data? While the data "should" be perfectly safe since the password file is encrypted, some of us prefer a little extra security. Additionally, normally Windows Explorer will not open the encrypted attachment, you must use a third-party application. I recommend 7-Zip which is a free community-based program.

Reference: https://www.7-zip.org/download.html

To add encryption, you are looking at line #5 of the script, not the multi_report_config.txt file and then looking for line #5 (see below).

TrueNASConfigEmailEncryption="" # Set this to "" for no encryption or enter some text as your passphrase.

By default, there is no encryption, additionally some email providers will block certain encrypted content.

And example of a password might be:

TrueNASConfigEmailEncryption="ThisIsMyPassword#3#2@1!"

There are two files in the .zip file:

freenas-v1.db – Main Configuration File

pwenc_secret – All the passwords in an encrypted format.

When you restore 'freenas-v1.db' the other file will automatically be restored.

Setting up a Dedicate Script Directory

I will be honest here, I run the script as 'root' and I provide my script directory full permissions, as well as my script. But my TrueNAS server is behind a firewall and is not exposed to the internet so risk is extremely low to my system. I'm 100% certain there are smarter ways to do this but this works for me so I'll share it. Please know that I'm not a networking guru so if someone tells me there is a better way to do this, I'll be happy to test it out and then update the instructions.

1. Create a new dataset and give it a name.
    a. Set Share Type to SMB so you can easily move files into the share.
    b. Set user to 'root'
    c. Group 'wheel'
    d. Set ACL to OPEN
    e. Save
2. Lets setup SMB
    a. Windows Shares (SMB)
    b. Add – Enter the path and name you want to call your Share.
    c. Advanced options – Allow Guest
    d. Submit
    e. You should be able to access the share via SMB now.

Running the Script

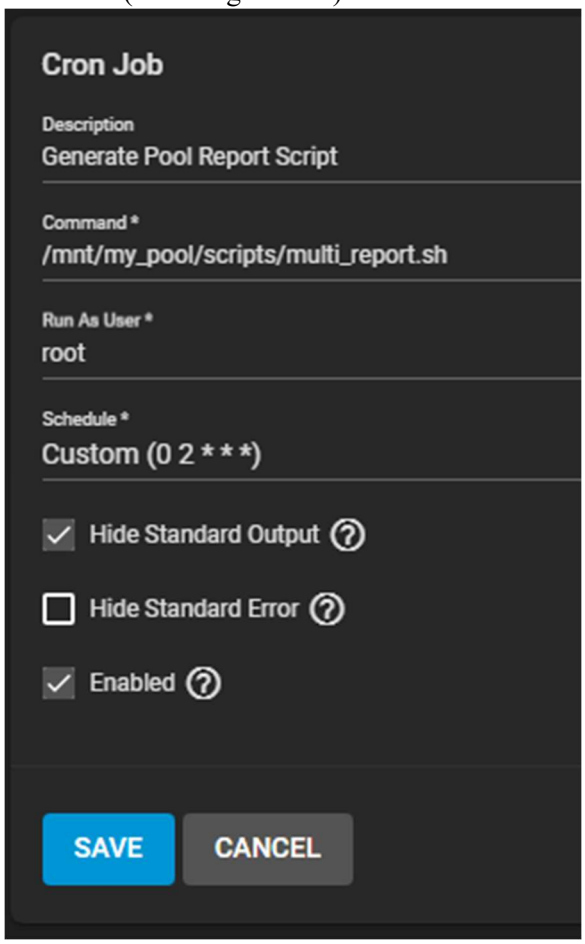
The script can be normally executed by simply entering the program name "./multi_report.sh" the script will run normally. Below are various command line options you may use with the script in order to configure, run, and troubleshoot. Read these options carefully.

Setting Up a CRON Job

Typically, this type of script is designed to be automated to run periodically. In order to run this script, we will setup a CRON job.

TrueNAS Core:

1. Log into the TrueNAS GUI.
2. Click on Tasks -> Cron Jobs.
3. On the right screen click ADD.
4. Next fill in the Description, Command, Run As User, Schedule, Hide Standard Output, and Enabled. (See image below)



5. We identified a job Description called “Generate Pool Report Script”.
6. We identified the command to run this script as “/mnt/my_pool/scripts/multi_report.sh”.

   Note: The full path to the location of the script is required.

7. Run as is set to “root”, but this could be any user with privledges.
8. Schedule is Custom (0 2 * * *) which means 0 minutes, 2 hours, All Days/Months/Years, or in other words, 2AM every day the script will run.
9. Hide Standard Output is Checked.

10. Hide Standard Error in Unchecked.
11. Enabled is Checked.
12. Now click SAVE.

TrueNAS Scale is similar to setup.

Recommended Script and SMART Testing Schedule

The first thing you must know is that S.M.A.R.T. was designed to warn a user that a failure would occur in less than 24 hours. That was the goal and to be honest, SMART can give a person notification well in advance of a common media failure problem, HOWEVER SMART is not very good at warning a person of a pending spindle motor electronics failure. So first understand that it's not perfect and it's an attempt to provide us some sort of notification in advance. It is not a genie in a bottle. Do not over-expect. With all that said, it is recommended (by me) to run a SMART Short Test once a day and run a SMART Long/Extended test once a week. These are both non-destructive read-only tests. The Short Test generally takes less than 2 minutes to complete, whilst the Long/Extended Test can take 5 hours, 10 hours, 18 hours, or longer. Your SMART data provides you the time in minutes that the Long/Extended Test will take. For this example, we will say you have a 14TB hard drive and it takes 19 hours to complete a Long/Extended Test. Below is an example of a schedule you could used based on the NAS being used during the Day Light Hours:

SMART TEST	Run Start	Runtime
SHORT	11:05 PM (All Days)	2 minutes
LONG/EXTENDED	11:10 PM (Friday)	19 Hours
multi_report.sh	6 AM (All Days)	2 minutes

The above schedule would first run a Short Test every day. Then it would run a Long/Extended Test only on Fridays just after the SMART Short Test completed. And you would get a status report from Multi-Report every morning at 6 AM. Concerns about running the SMART Long/Extended Test are amplified by the drive size and drive count. If you do have large hard drives, say 14TB, and you have 12 of said hard drives, you would not want to perform a SMART Long/Extended Test on all the drives at the same time as this will affect performance when the NAS needs to be useful. Instead perform a SMART Long/Extended Test on two drives a day. This will generally make your NAS more responsive and the huge power consumption would be reduced and spread out over time, thus easing the load on the poor power supply.

Command Line Switches

-config
Configuration

The '-config' switch will present the user with highly configurable series of menus.

Below is the first menu you will see when invoking this switch.

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Configuration File Management

*** WARNING - A CONFIGURATION CURRENTLY FILE EXISTS ***

N)ew configuration file (creates a new clean external configuration file)

U)pdate configuration file (updates select static variables to default)

A)dvanced configuration (must have a configuration file already present)

H)ow to use this configuration tool (general instructions)

X) Exit

NOTE: In using this configuration script when the value is:

Number or Text: The current value will be displayed. You have the option to just press Enter/Return to accept the current value or you may enter a different value.

True or False: The current value will be displayed. You have the option to press Enter/Return to accept the current value or you may press 't' for true or 'f' for false.

Make your selection:

New Configuration File – Will create a new external configuration file in the same directory in which the script resides.

Update Configuration File – This option will reset most of the static variable to factory defaults.

Advanced Configuration – This option provides a step-by-step menu driven customization of the multi_report_config.txt file. See the Advanced Configuration section for details.

How to use this configuration tool – These are the basic instructions on how to answer questions. (See next page)

-m [-s]
Monitor

The '-m' switch by itself will check for any Critical Alarms and any Warning Temperatures. If present a simple short email will be generated to the email(s) on file. No statistical data will be collected unless the '-s' switch is also specified.

-s [-m]
Statistical Data Only

The '-s' switch will only record statistical data in the CSV file and no email will be sent out, unless used with the '-m' switch (see above). This is useful if you want to setup a CRON task to run periodically to collect temperature data over time for example. The statistical data file is a Comma Separated Value (CSV) format which can be opened in any spreadsheet program.

-dump [all] or [email]
Dump drive data files and Multi-Report configuration data

The -dump will generate several files for each drive in the system and append these files and the multi_report_config.txt file to the generated email. This is useful when troubleshooting a drive problem. Option 'all' which will include the Statistical Data File and the TrueNAS configuration file. Option 'email' will send the data generated in the '-dump' command also to joeschmuckatelli2023@hotmail.com which is a dedicated email to support this project. No personal information will be sent except your email address. Sorry, I can't get away from that but I will not share your information with anyone.

-u7zip
Uninstall 7-zip on Scale systems. 7-zip it automatically installed if 7-zip is not present on Scale. This option allows the user an easy way to uninstall 7-zip.

-update
The '-update' switch will update your script with the version on the GitHub server and then exit.

-h
Command line help

This will provide a brief listing of the command line switches and a brief description

-help
Help

This will provide detailed help information.

Multiple Instance Protection

This script will check to find out if another instance is running and if it does detect this, it will exit immediately. This is to prevent data of a same named file form having it changed by two running scripts at the same time.

How to use this configuration tool

This tool has many options and you should be able to perform a complete configuration using this tool.

In order to use the advanced options, you will need to have created an external configuration file then the tool will be able to read and write to this file.

Throughout this process you will be asked questions that require three different responses:

1) String content: Where you will either enter a new string followed by the Enter/Return key, or just press Enter/Return to accept the current value.

2) Numeric content: Where you will either enter a new number followed by the Enter/Return key, or just press Enter/Return to accept the current value.

3) True/False content: Where you will either enter 't' or 'f' followed by the Enter/Return key, or just press Enter/Return to accept the current value.

4) Some options will give you a choice of 'd' to delete the value and continue, or 'e' to Edit.

Advance Configuration Settings

This is the main configuration if the defaults are not exactly what you desire.

Advanced Configuration Settings

A) Alarm Setpoints (Temp, Zpool, Media, Activate In/Out, Ignore)

B) Config-Backup (Edit Config-Backup & Multi-Report_Config Settings)

C) Email Address (Edit Email address and Encryption)

D) HDD Column Selection (Select columns to display/hide)

E) SSD Column Selection (Select columns to display/hide)

F) NVMe Column Selection (Select columns to display/hide)

G) Output Formats (Hours, Temp, Non-Existent, Pool Capacity)

H) Report Header Titles (Edit Header Titles, Add/Remove Text Section)

I) Statistical Data File Setup

J) TLER / SCT (Setup if TLER is active)

K) Drive Errors and Custom Builds (Ignore Drives, UDMA CRC, MultiZone, Reallocated Sectors, ATA Errors, Warranty Expiration)

S) Custom Drive Configuration

W) Write Configuration File (Save your changes)

X) Exit - Will not automatically save changes

Make your selection:

Alarm Configuration Settings

Temperature Settings (Global)

- ✓ HDD Warning Temperature (45)
- ✓ HDD Critical Temperature (50)
- ✓ HDD Max Temperature Override for power Cycle Enabled (true)
- ✓ SSD Warning Temperature (45)
- ✓ SSD Critical Temperature (50)
- ✓ SSD Max Temperature Override for power Cycle Enabled (true)
- ✓ NVMe Warning Temperature (50)
- ✓ NVMe Critical Temperature (60)

Zpool Settings

- ✓ Pool Scrub Maximum Age (37) days
- ✓ Pool Used Percentage (80)
- ✓ Pool Fragmentation Percentage (80)

Media Alarm Settings (Global)

- ✓ SSD/NVMe Wear Level Lower Limit (9)
- ✓ Sector Errors Warning (0)
- ✓ Sector Errors Critical (9)
- ✓ Reallocated Sectors Warning (0)
- ✓ Raw Read Errors Warning (5)
- ✓ Raw Read Errors Critical (100)
- ✓ Seek Errors Warning (5)
- ✓ Seek Errors Critical (100)
- ✓ MultiZone Errors Warning (0)
- ✓ MultiZone Errors Critical (5)
- ✓ Helium Minimum Level (100)
- ✓ Helium Critical Alert Message (true)
- ✓ S.M.A.R.T. Test Age Warning (2) days
- ✓ NVMe Media Errors (1)
- ✓ Flag Device ID RED on Error (true)

Activate Input/Output Settings

- ✓ Automatic SSD Detection (true)
- ✓ Automatic NVMe Detection (true)
- ✓ Force non-SMART Devices to report (true)
- ✓ Remove non-SMART data from report (false)

Ignore Alarms
- ✓ Ignore UDMA CRC Errors (false)
- ✓ Ignore Raw Read Rate Errors (false)
- ✓ Ignore Seek Errors (false)
- ✓ Ignore MultiZone Errors (false)
- ✓ Disable Warranty Email Header Warning (true)
- ✓ ATA Auto Enable (false)

Monitor Email Settings (only for the '-m' switch)
- ✓ Alert On Warning Temperature (true)
- ✓ Alert On Critical Error (true)

Config-Backup
- ✓ Save Local Copy of TrueNAS config-backup file (false)
- ✓ TrueNAS Backup Location (/tmp/)
- ✓ TrueNAS Backup Email Enabled (true)
- ✓ Day of the week to attach TrueNAS Backup file (Mon)
- ✓ Multi_Report_Config Email Enable (true)
- ✓ Day of the week to attach Multi_Report_Config (Mon)
- ✓ Attach Multi_Report_Config on any change (true)

Email Address
- ✓ Email Address
- ✓ Monitoring Email Address
- ✓ From Email Address (TrueNAS@local.com)
- ✓ TrueNAS Configuration Backup Encryption Passphrase

Output Formats
- ✓ Power On Hours Time Format (h)
- ✓ Temperature Display (*C)
- ✓ Non-Existent Value (---)
- ✓ Pool Size and Free Space (zfs)
- ✓ Mouseover (alt)

Statistical Data File Setup
- ✓ Statistical File Location (default to script location)
- ✓ Statistical Data Recording Enabled (true)
- ✓ Statistical Data Email Enabled (true)
- ✓ Statistical Data Purge Days (730)
- ✓ Day of week email attach Statistical Data (Mon)

TLER / SCT
- ✓ Activate TLER (false)
- ✓ TLER Warning Level (TLER_No_Msg)
- ✓ SCT Read Timeout Setting (70)
- ✓ SCT Write timeout Setting (70)

Drive Errors and Custom Builds

- ✓ Ignore Drives List (none)
- ✓ Automatic Drive Compensation 'y/n'
- ✓ Automatic ATA Error Count Updates (false)
- ✓ ATA Error Count (none)
- ✓ Drive Warranty Expiration Date Warning (none)
- ✓ Drive Warranty Expiration Chart Box Pixel Thickness (1)
- ✓ Drive Warranty Expiration Chart Box Pixel Color (#000000)
- ✓ Drive Warranty Expiration Chart Box Background Color (#f1ffad)

Custom Drive Configuration (Drive Serial Number Specific)

This adjusts individual media alarms for individual drives. For example, if you have one drive that is giving you an alarm condition such as a Sector Alarm, you can change the alarm setpoint for this specific drive. By default, Sector Warning = 1, if you have 3 bad sectors already then you can use this custom configuration to set the Sector Warning value to 4, or any other number you desire. This is drive specific, based on the drive serial number.

Custom Drive Configuration Mode

This feature allows you the user to customize the script to properly handle drives which may not conform to normal settings. This consists of the following:

- Temperature Warning, Temperature Critical
- Sectors Warning, Sectors Critical, Reallocated Sectors Warning
- MultiZone Warning, MultiZone Critical
- Raw Read Error RateWarning, Raw Rear Error Rate Critical
- Seek Error Rate Warning, Seek Error Rate Critical
- Test Age, Ignore Test Age
- Helium Minimum Level. Wear Level Adjustment (reverse value)

Why would you need such customizations? Well, that is a good question and the simple answer is, because manufacturers do not have a common SMART definition and they provide the data they desire.

When would I use this feature?

Example: You have a drive that always reports the Test Age is a high value such as 437 days. You know that you ran a SMART test and it passed however the drive data does not relate it properly to the power on hours value. In this situation you can just Ignore Test Age and you will not generate an alarm condition.

Example: You have a single drive with a Helium value of 97%. Under normal conditions this is an alarm issue. But you do not want to lower the warning setting for all the drives from 100 to 96% so you can use this feature to adjust the alarm setpoint to 96% just for the one drive.

If you choose to customize a drive you will be presented with the Drive ID, Drive Serial Number, and the "system default" setting.

Press Return to accept the "system default" value. If you change the system value, this setpoint will be used and this value will be coded for this one drive.

Common Problems and Solutions

Below is a list of the most common problems I answer.

1. Q: My Last Test Age is giving me an alarm, how do I clear it?
   A: By default, the script expects the user to run a SMART Short or Long test once every 48 hours (2 days) or more frequently, but if you are a person who sleeps the drives for long periods of time, 2 days would not be reasonable for you. If you are testing less frequent then you can change this value by running the script in configuration mode "./multi_report.sh -config". Select 'Advanced Configuration' -> 'Alarm Setpoints' -> 'Media Alarm Settings' -> then press Return until you see "S.M.A.R.T. Test Age Warning (2)" and then enter a new number of days. For example, if you test once a week, make the value 7 or 8 days. Make sure you 'Write' the changes before exiting.
2. Q: If I hide a column, why do I still have an alarm?
   A: Hiding a column does not remove the data from being check for a problem condition. The problem condition should be addressed. There are however certain adjustments you can make if a single drive is alarming and you want to change the setpoint for that one drive. Example: Drive ada1 continues to exceed the high temperature setpoint and you need to raise this one drive from the default of 45C to 50C. You can make this adjustment for just this one drive using the Custom Drive Configuration in the -config Advanced Configuration section, option S.
3. Q: My Wear Level value is "0" and it should be "100". How can I fix this?
   A: First of all, this can be fixed using the Custom Drive Configuration in the Advanced Configuration menu. But also please run the script using the '-dump email' and type me a short message pointing me to the problem. I'd like to update the script to properly recognize the drive if possible.
4. Q: I noticed my drive model is not listed in Appendix A. Does this mean my drive is not supported?
   A: Your drive is supported so long as "smartmontools" can read the drive data, even if the drive is not in the smartmontools database. However if smartmontools or the drive manufacturer does not provide the data we are using, then there will be gaps. Appendix A is just a list of drive data I have for simulation purposes because I cannot afford to purchase dozens of different drives to test this script on, and I thank those people who have sent me their data to help this effort.
5. Q: I want to change the names of the columns, for example I want to change "Spinning Rust Summary Report column "Curr Temp" to "Temp". Can I do that?
   A: You can change practically any item in the report however this is a purely manual operation and requires you to edit the 'multi_report_config.txt' file. Open your favorite simple text editor and scroll down to the section titled "REPORT CHART CONFIGURATION". There you will find entries for every chart group and column titles. For the scenario above go to the line titled HDD_Drive_Temp_Title="Curr Temp" and change it to HDD_Drive_Temp_Title="Temp", then save the file. WARNING !!! This file is not forgiving if you add or delete a special character (comma, quotation, etc) then the script may fail. This is why the '-config' option is desired to be used, however the column titles are not built in to the '-config' option at this time.
6. Q: When I view my email using Gmail, the chart data appears out of place or not complete.
   A: Most email clients will display the HTML data correctly however the Gmail web based email viewer may block the data from being presented properly. I suspect this is a security feature of

Gmail. Your options are: 1) use another email client, 2) figure out how to make Gmail web based email client work, then tell everyone how you did it, 3) live with the results.

Need Help?

If you need help you have a few options and you could do one, two, or all if desired.

1. Post a question in the TrueNAS forum Resources Discussion area for Multi-Report.
2. Post a Private Message to JoeSchmuck.
3. Send me an email to: joeschmuck2023@hotmail.com
4. Use the '-dump email' option and when asked for a message, type a short message pointing at the problem and an email address if you want me to respond. Joe Schmuck will respond to the email he received if from unless the message states otherwise.
5. If you have a suggestion to fix a possible problem, please send me a message.

Appendix A Drive Models Tested: (As of 15 April 2023)

HDD Model Number
SEAGATE OOS14000G (SCSI)
WDC WD140EDGZ-11B2DA2
HGST HUH721010AL5200 (SCSI)
TOSHIBA MG07ACA14TE
TOSHIBA MG08ACA14TE
TOSHIBA MG09ACA18TE
HGST HDN726060ALE614
WDC WD80EFZX-68UW8N0
WDC WD60EFZX-68B3FN0
WDC WD60EFRX-68MYMN1
WDC WD10JFCX-68N6GN0
WDC WD40EFRX-68WT0N0
WDC WD80EFZZ-68BTXN0
ST2000VN004-2E4164
ST4000VN008-2DR166
ST12000NM0008-2H3101
ST16000NM001G-2KK103
ST12000NM001G-2MV103
ST6000VN001-2BB186
ST3000VN007-2AH16M

SSD Model Number
IBM HUSML4040ASS600 (SCSI)
SanDisk SD8SBAT128G1122
WDC WDS500G1R0A-68A4W0
SATADOM-MV 3ME
HITACHI HUSMM808 CLAR800 (SCSI)
HPE VO000960JWTBK (SCSI)
KINGSTON SA400S37120G
KINGSTON SA400S37960G
INTEL SSDSC2BX016T4
INTEL SSDSC2BB080G4
INTEL SSDSC2BX800G4
INTEL SSDSA2M040G2GC
INTEL SSDSA2CT040G3
Lexar 240GB SSD
PNY CS900 120GB SSD
SAMSUNG MZ7LM240HMHQ-00003
Samsung SSD 850 EVO 1TB
Samsung SSD 850 PRO 256GB
Samsung SSD 860 EVO 250GB
SuperMicro SSD
Seagate IronWolf ZA250NM10002-2ZG100

NVMe Model Number
CT500P3SSD8
CT1000P3PSSD8
INTEL SSDPEK1A118GA
INTEL SSDPE21D280GA
KINGSTON SNV2S500G
Samsung SSD 960 EVO 250GB
Samsung SSD 970 EVO Plus 250GB
Samsung SSD 980 PRO 1TB
SAMSUNG MZVL2512HCJQ-00BL7
SAMSUNG MZVL2256HCHQ-00B00

If you have a drive model not listed above, please use '-dump email' to forward the data to Joe Schmuck.

Appendix B Changelog

Below is a copy of the changelog for the multi_report.sh script.

See Changelog file on github.com/JoeSchmuck

```
###### ZPool & SMART status report with FreeNAS/TrueNAS config backup
### Original script by joeschmuck, modified by Bidelu0hm, then by melp (me)

### Version: v1.3 TrueNAS Scale (Jeff Alperin 12-6-21)

### Version v1.4, v1.5, v1.6 → v2.3 FreeNAS/TrueNAS (Core & Scale) (joeschmuck)

### Changelog:
# V2.4 (21 April 2023)
#   - Added NVMe Media Errors
#   - Added Total Data Written for all drives that support it.
#   - Updated User Guide
#
# V2.3 (14 April 2023)
#   - Simplified User Installation
#   - Bugfix for Custom Drive Configuration - Wear Level, Helium Level.
#   - Updated User Guide
#
# V2.2 (10 April 2023)
#   - Bugfix for Test Age always being = "2".
#   - Bugfix for SSD Wear Level for certain drives.
#   - Bugfix for Scale, no TrueNAS Config Backup without 7-zip.
#   - Added Automatic Update Notification for newer version.
#   - Added Message from the Creator.
#   - Added Symlink - "multi_report.sh" is the file name to run from this point forward.  Read the User Guide for more details.
#   - Changed TrueNASConfig Backup to zip file type attachment.
#   - Adjusted for drive that passes SMART Test but reports the test hour as '0'.
#
# V2.1 (29 March 2023)
#   - Updated TrueNAS password backup to include encrypted password file, and enable encrypted Config File in email.
#   -- NOTE: The encrypted password is on line #5 of this script and must remain there.
#
#   - Updated script to use 'json' data.
#   - Fixed script to allow for a zero hour runtime on a drive.
#   - Renamed variables so they make more sence.
#   - More details when using a '-dump' switch.
#   - Added Runtime.
#   - New Wear Level & Helium Level formula.
#   - Added Backup of original multi_report_config.txt attachment along with the new configuration file.
#
#   The multi_report_config.txt file will automatically update previous versions to add new features
#   and will not be backwards compatible.
#
# V2.0.10 (6 March 2023)
#   - Fixed introduced error '-s' sending emails.
#
# V2.0.9 (5 March 2023)
#   - Only one running instance allowed.
#   - Minor updates to recognize SMART testing in progress for certain drives.
#
# V2.0.8 (23 February 2023)
#   - Added Email/Text Monitoring Feature for NugentS to try out.
#   - Edit multi_report_config.txt for additional email address.
#   - Use '-m' switch to invoke.  Statistical data is recorded each time the script is run.
#   - Added last two lines to display elapsed time of script running.
#
# V2.0.7 (7 February 2023)
```

```
#   - Bug Fix: Nuisance error message, did not impact operation but it doesn't look good.
#   -- "Cannot open input file /tmp/zpoollist.txt" and "/tmp/zpoolstatus.txt".  Only occurs in Core
#   -- during TrueNAS configuration file attachment operation (default is Monday).
# V2.0.6 (1 February 2023)
#   - Reduced drive data collection.  Added 'zpool' data collection.
#
# V2.0.5 (27 January 2023)
#   - Adjusted Zpool Status to allow 'resilvering' status message. (Line 1340)
#   - Updated '-dump email' command to allow user to enter comments to the author.
#
# V2.0.4 (26 January 2023)
#   - Fixed if Zpool does not provide a number for fragmentation, will now display non_exist_value string.
#
# V2.0.3 (24 January 2023)
#   - Hacked HDD SMART Testing in progress with "NOW" in the '# 1' line.  Will fix better later.
#
# V2.0.2 (24 January 2023)
#   - Fix Wear Level that may fail on some drives.
#
# v2.0.1 (21 January 2023)
#   - Fixed Zpool Fragmentation Warning for 9% and greater (Hex Math issue again).
#
# v2.0 (21 January 2023)
#   - Formatted all -config screens to fit into 80 column x 24 lines.
#   - Removed custom builds
#   - Fixed Custom Configuration Delete Function.
#   - Fixed Zpool Scrub Bytes for FreeNAS 11.x
#   - Fixed SMART Test to allow for 'Offline' value.
#   - Modified Wear Level script to account for 'Reverse' Adjustment.
#   - Added Wear Level Adjustment Reversing to the Custom Drive configuration.
#   - Added Output.html to -dump command.
#   - Added Mouseover and Alternate '()' to Mouseover for normalized values (Reallocated Sectors, Reallocated Sector Events, UDMA CRC,
MultiZone).
#   - Updated Testing Code to accept both drive_a and drive_x files.
#   - Added Zpool Fragmentation value by request.
#   - Added '-dump email' parameter to send joeschmuck2023@hotmail.com an email with the drive data and the multi_report_config.txt file
ONLY.
#   - Added Drive dump data in JSON format.  It looks like a better way to parse the drive data.  Still retaining the older file format for now.
#
#   The multi_report_config file will automatically update previous versions to add new features.
#
# v1.6f (27 December 2022)
#   - Added recognition for WDC SSD "230 Media_Wearout_Indicator".
#   - Adjusted the language to English for the Date calculations.
#   - Updated datestamp2 "date" command to be compatible with FreeBSD 11 and earlier.
#   - Updated Zpool Status Report to display Used Space Capacity when using the "zpool" reporting configuration.
#   - Added customizable alarm setpoints for up to 24 drives.
#   -- This feature allows for customizing drives which do not fit into the default parameters.
#   -- It is not intended to individualize each drive, but you could if you wanted.
#   -- This allows the option for removal of the three custom code options.
#   - The configuration file in the email will now change to FreeNAS or TrueNAS based
#   -- on the software running vice FreeNAS hard-coded.
#   - Corrected several spelling errors throughout script.
#
#   The multi_report_config file will automatically update previous versions to add new features.
#
#   - Future Plan: Remove custom code for snowlucas2022, diedrichg, and mistermanko in version 2.0.
#
# v1.6e (11 November 2022)
#   - Fixed gptid not showing in the text section for the cache drive (Scale only affected).
#   - Fixed Zpool "Pool Size" - Wasn't calculating correctly under certain circumstances.
#   - Added Toshiba MG07+ drive Helium value support.
#   - Added Alphabetizing Zpool Names and Device ID's.
#   - Added No HDD Chart Generation if no HDD's are identified (nice for SSD/NVMe Only Systems).
```

```
#   - Added Warranty Column to chart (by request and must have a value in the Drive_Warranty variable).
#   - Removed Update option in -config since the script will automatically update now.
#   - Updated instructions for multiple email addresses.
#   - Updated instructions for "from:" address, some email servers will not accept the default
#   -- value and must be changed to the email address of the account sending the email.
#   - Added the No Text Section Option (enable_text) to remove the Text Section from the email output
#   -- and display the chart only, if the value is not "true".
#   - Added Phison Driven SSD attribute for correct Wear Level value.
#
#   NOTES: If there is an error such as the host aborts a drive test and an error occurs, the script may
#   report a script failure.  I do not desire to account for every possible drive error message.
#   If you take a look at your drive data, you may notice a problem.  Fix the problem and the
#   script should work normally.  If it still does not, then reach out for assistance.
#
#   The multi_report_config file will automatically update previous versions to add new features.
#
# v1.6d-2 (09 October 2022)
#   - Bug fix for NVMe power on hours.
#   --- Unfortunately as the script gets more complex it's very easy to induce a problem.  And since I do not have
#   --- a lot of different hardware, I need the users to contact me and tell me there is an issue so I can fix it.
#   --- It's unfortunate that I've have two bug fixes already but them's the breaks.
#   - Updated to support more drives Min/Max temps and display the non-existent value if nothing is obtained vice "0".
#
#   The multi_report_config file is compatible with version back to v1.6d.
#
# v1.6d-1 (08 October 2022)
#   - Bug Fix for converting multiple numbers from Octal to Decimal.  The previous process worked "most" of the time
#   -- but we always aim for 100% working.
#
#   The multi_report_config file is compatible with version back to v1.6d.
#
# v1.6d (05 October 2022)
#   - Thanks goes out to ChrisRJ for offering some great suggestions to enhance and optimize the script.
#   - Updated gptid text and help text areas (clarifying information)
#   - Updated the -dump parameter to -dump [all] and included non-SMART attachments.
#   - Added Automatic UDMA_CRC, MultiZone, and Reallocated Sector Compensation to -config advanced option K.
#   - Fixed Warranty Date always showing as expired.
#   - Added Helium and Raw Read Error Rates to statistical data file.
#   - Added Raw Read Error Rates chart column.
#   - Added compensation for Seagate Seek Error Rates and Raw Read Error Rates.
#   - Added Automatic Configuration File Update feature.
#   - Added selection between ZFS Pool Size or Zpool Pool Size. ZFS is representative of the actual storage capacity
#   -- and updated the Pool Status Report Summary chart.
#   - Added ATA Error Log Silencing (by special request).
#   - Added 0.1 second delay after writing "$logfile" to eliminate intermittent file creation errors.
#   - Fixed Text Report -> Drive Model Number not showing up for some drives.
#   - Added option to email copy of multi_report_config.txt upon any automatic script modification and/or by day.
# v1.6c (28 August 2022)
#   - Supports external configuration file (but not required).
#   - Completely Configurable by running the script -config parameter (this took a lot of work).
#   - Added HDD/SSDmaxtempovrd variables to combat some bogus SSD values.
#   - Added TLER (SCT) support.
#   - Added support for drives which do not support recording over 65536 hours for SMART Tests and rolls over to start at zero again.
#   - Added -dump parameter to create and email all of the drives smartctl outputs as text file email attachments.
#   - Added support for Helium drives.
# v1.6: (05 August 2022)
#   Thanks to Jeff, Simon, and Sean for providing me more test data than I could shake a stick at and friendly constructive opinions/advice.
#   - Complete rewrite of the script.  More organized and easier for future updates.
#   - Almost completely got rid of using AWK, earlier versions had way too much programming within the AWK structure.
#   - Reads the drives much less often (3 times each I believe).
#   - Added test input file to parse txt files of smartctl -a output. This will allow for a single drive entry and ability
#   -- for myself or any script writer to identify additional parameters for unrecognized drives.
#   -- Usage: program_name.sh [HDD|SSD|NVM] [inputfile_a.txt] [inputfile_b.txt]
#   - Added better support for SAS drives.
```

```
#   - Fixed NVMe and SAS Power On Hours for statistical data recording, and other things.
#   - Added Critical and Warning Logs to email output with better descriptive data.
#   - Logs (stored in /tmp/) no longer deleted after execution to aid in troubleshooting, but deleted at the start of the script.
#   - Added HELP file, use program_name.sh [-h] [-help]
#   - Added SCT Error Recovery to the Text Report section.
#   - Added Zpool Size, Free Space, and Temp Min/Max.
#   - Added customizable temperature values and customizable Non-Value fields (use to be coded to "N/A").
#   - Added support for SandForce SSD.
# v1.5:
#   - Added NVMe support
#   - Added clearer error reporting for Warning and Critical errors.
#   - Known Problems: The NVMe Power On Time has a comma that I can't get rid of, yet. I want to remove the comma when the data is
retrieved.
#   -- NVMe's are not all standardized so I expect tweaks as different drive data arrives.
#   -- onHours that includes a comma will not record correctly in the statistical data file.  This is related to the NVMe problem above.
#   -- Zpool Summary does not indicate Scrub Age warning, likely the entire summary has issues.
# v1.4d:
#   - Fixed Scrub In Progress nuisance error when a scrub is in progress.
#   - Added offsetting Reallocated Sectors for four drives.  This should be for testing only. Any drives
#   -- with a significant number of bad sectors should be replaced, just my opinion.
#   - Added Drive Warranty Expiration warning messages and ability to disable the Email Subject line warning.
#   -- NOT TESTED ON OTHER THAN U.S. FORMATTED DATE YYYY-MM-DD.
#   - Added HDD and SSD individual temperature settings.
#   - Changed order of polling Temperature data from HDD/SSD.
# v1.4c:
#   - Rewrite to create functions and enable easier editing.
#   - Added Custom Reports.
#   - Added disabling the RAW 'smartctl -a' data appended to the end of the email.
#   - Added sorting drives alphabetically vice the default the OS reports them.
#   - Added RED warning in Device for any single failure in the summary (deviceRedFlag switch controlled).
#   - Added some additional SSD definitions.
#   - Fixed sorting last two SMART Tests, now reports them in proper order.
#   - Fixed detecting "SMART Support is: Enabled", for white spaces.
#   - Changed IGNORE DRIVES to a String Format to clean up and simplify programming.
#   - Added MultiZone_Errors support for up to eight drives.
#   - Added sectorWarn variable to complement the sectorCrit variable.
#   - Added ignoreSeekError variable to ignore some of those wild Seek Error Rate values.
#   - Added ignoreUDMA CRC Errors due to the "Known Problem"
#   - Fixed md5/sha256 error on TrueNAS Scale (only used during config backups).
#   - Added selectable config backup periodicity by day vice every run.
#   - Added Exporting statistical data for trend analysis.
#   -- Can be setup to email statistics weekly, monthly, or not at all.
#   -- The -s switch will run Data Collection Only, no email generated.  Note: Do Not run two instances at once, the temp files do not survive.
#   - Fixed the Capacity to remove the brackets "[]", thanks Jeff Alperin.
#   - Fixed Scrub Age failure due to 1 day or longer repair time, now shows anything >24 hours.
#
#   - Known Problem: One user reported UDMA_CRC_Errors is not subtracting correctly, have not been able to personally replicate it.
#   -- This error seems to occur around line #1027
# v1.4b:
#   - Added SMART test remaining percentage if Last Test has a SMART Test is in progress.
#   - Fix for empty SMART fields, typically for unsupported SSD's.
#   - Added IGNORE SMART Drive so you can ignore specific drives that may cause you weird readings.
#   --- Updated so blank SSD table header is removed when you ignore all the drives (just crazy talk).
# v1.4a:
#   - Fixed report errors for if a SCRUB is in progress, now shows estimated completion time.
#   - Fixed report error for a Canceled SCRUB.
#   - Fixed FreeBSD/Linux use for SCRUB report (minor oversight).
# v1.4:
#   - Run on CRON JOB using /path/multi_report_v1.4.sh
#   - Fixed for automatic running between FreeBSD and Linux Debian (aka SCALE) as of this date.
#   - All SMART Devices will report.
#   - Added conditional Subject Line (Good/Critical/Warning).
#   - Added Automatic SSD Support.
#   --- Some updates may need to be made to fit some of SSD's. Code in the area of about line 530 will
```

```
#   --- need to be adjusted to add new attributes for the desired SSD's fields.
#   - UDMA_CRC_ERROR Override because once a drive encounters this type of error, it cannot be cleared
#   --- so you can offset it now vice having an alarm condition for old UDMA_CRC_Errors.
#   - Added listing NON-SMART Supported Drives.  Use only if useful to you, some drives will
#   --- still output some relevant data, many will not.
# v1.3:
#   - Added scrub duration column
#   - Fixed for FreeNAS 11.1 (thanks reven!)
#   - Fixed fields parsed out of zpool status
#   - Buffered zpool status to reduce calls to script
# v1.2:
#   - Added switch for power-on time format
#   - Slimmed down table columns
#   - Fixed some shellcheck errors & other misc stuff
#   - Added .tar.gz to backup file attached to email
#   - (Still coming) Better SSD SMART support
# v1.1:
#   - Config backup now attached to report email
#   - Added option to turn off config backup
#   - Added option to save backup configs in a specified directory
#   - Power-on hours in SMART summary table now listed as YY-MM-DD-HH
#   - Changed filename of config backup to exclude timestamp (just uses datestamp now)
#   - Config backup and checksum files now zipped (was just .tar before; now .tar.gz)
#   - Fixed degrees symbol in SMART table (rendered weird for a lot of people); replaced with a *
#   - Added switch to enable or disable SSDs in SMART table (SSD reporting still needs work)
#   - Added most recent Extended & Short SMART tests in drive details section (only listed one before, whichever was more recent)
#   - Reformatted user-definable parameters section
#   - Added more general comments to code
# v1.0:
#   - Initial release
```