User Guide

WDDCS Tool
1ET1813
Rev. 1.4
July 2021
Software Version v2.1.4.0

Western Digital.

Table of Contents

Revision History

Date	Document Revision	Software Version	Description
August 2019	1.0	v1.0.4.0	Initial release
March 2020	1.1	v1.1.8.0	• Added Release Notes *(page 3)* • Added Required/Recommended Utilities *(page 2)* • Added support for Windows Server throughout • Changed wording of **sg3_utils** and **smp_utils** references in getlog *(page 44)* • Separated instructions for enabling/disabling zoning in zone *(page 84)* • Added the following support for Ultrastar Data102, Ultrastar Data60, and Ultrastar Serv60+8: ◦ Enclosure nickname feature for FW 2040+ (see diag nickname *(page 30)*) ◦ Pre-defined zoning and custom binaries for FW 2030+ (see zone *(page 84)*) ◦ E6 Event, Console, and Crash log collection (see getlog vendor *(page 47)*) for FW 2040+ • Added **zone status** command to report status and configuration of zoning • Added **read err_cnts** and **clear err_cnts** to Supported RCLI Commands By Enclosure *(page 63)* and updated other sections of table
December 2020	1.2	v1.1.8.0	Added note about setting IP addresses without specifying a device. See Release Notes *(page 3)* and iom *(page 61)*.
January 2021	1.3	v2.0.6.0	• Updated outputs for **help** command options • Updated Release Notes *(page 3)* • Added instructions for the following commands: version *(page 84)*, diag reset-iom-<a|b> *(page 33)*, diag reset-enc *(page 32)*, diag clear-crashevent *(page 28)*, diag clear-eventlog *(page 29)*, **getlog drives-noprompt**, and **getlog all-noprompt** • Added **gpio**, **iom gpio**, and **show autosync** commands to rcli *(page 63)*. • Added Health Analysis *(page 60)* • Updated show *(page 81)* section with instructions for show handles *(page 82)* command

Date	Document Revision	Software Version	Description
July 2021	1.4	v2.1.4.0	• Removed older OSs from Tested Operating Systems *(page 2)* • Updated Release Notes *(page 3)* • Updated outputs for **`help`** and **`version`** commands • Added diag timestamp *(page 34)*, diag autosync-enable *(page 35)*, and diag autosync-disable *(page 36)* • Updated table of enclosure support for diag *(page 27)* commands • Added optional **`-nostatdelay`** flag to fw download *(page 38)*, and updated outputs in fw download_activate *(page 39)* and fw download_reset *(page 40)* • Updated table of information captured by getlog vendor *(page 47)* command • Removed note about **`iom`** prefix in Supported RCLI Commands By Enclosure *(page 63)*

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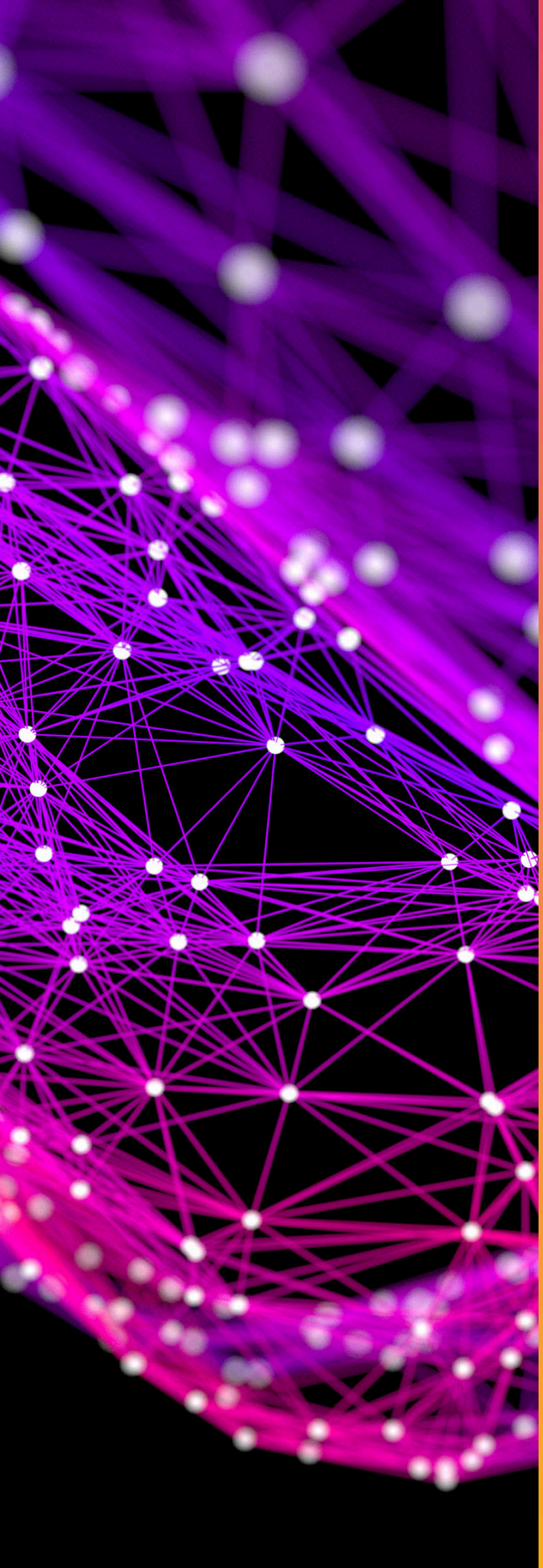


Overview

In This Chapter:

1.1 WDDCS Tool Overview

The WDDCS Tool is a command line utility for capturing discrete host and enclosure data for analysis and troubleshooting, and performing common management functions such as upgrading firmware and configuring drive zones. It runs on the most common Linux and Windows server operating systems and leverages other utilities already installed on the host, such as sg3_utils and smp_utils.

1.2 Supported Enclosures

The WDDCS Tool supports the following enclosures:

Table 1: Supported Enclosures

Product Name	Regulatory Model	Product ID
Ultrastar Data60	H4060-J	H4060-J
Ultrastar Serv60+8	H4060-S	H4060-S
Ultrastar Data102	H4102-J	H4102-J
4U60 G1 Storage Enclosure	G460-J-12	4U60_STOR_ENCL
4U60 G2 Storage Enclosure	G460-J-12	4U60G2_STOR_ENCL
2U24 Flash Storage Platform	G224-J-12	2U24_STOR_ENCL
Storage Enclosure Basic	EA7000	STOR ENCL JBOD

1.3 Tested Operating Systems

The WDDCS Tool has been tested on the following operating systems:

Operating System	Version
CentOS	7.x, 8.x
Red Hat Enterprise Linux (RHEL)	7.x, 8.x
Oracle Linux (OL)	7.x, 8.x
Ubuntu	16.x, 18.x
Windows Server	2016, 2019

1.4 Required/Recommended Utilities

The following utilities are either required or recommended for operating the WDDCS Tool:

Utilitity	Minimum Version	Status	Download Location
sg3_utils[1]	1.42	Required	http://sg.danny.cz/sg/sg3_utils.html

1. sg3_utils should be added to the *PATH* environment variable.

Utilitity	Minimum Version	Status	Download Location
smp_utils[2]	0.98	Recommended	http://sg.danny.cz/sg/smp_utils.html

1.5 Release Notes

This section describes known issues, fixed issues, and features introduced with the current version of the WDDCS Tool.

Table 2: Known Issues

Software Version	Ref. ID	Issue	Workaround/Notes
v2.1.4.0	ITR 22578	Need change in response for `rcli iom` commands in Single IOM mode	To be addressed in a future release
v2.1.4.0	ITR 22594	wddcs zone file shows error and success if file does not exist	To be addressed in a future release

Table 3: Fixed Issues

Ref. ID	Description
ITR 22520	Fix health html containing non-ascii characters at the end of the file
ITR 22552	Change to message string for health analysis of html on temp/voltage/current
ITR 22575	Fix for using special Linux characters in arguments (ex. `zone config=$1`)

Table 4: New Features

Ref. ID	Description
ITR 22479	Retrieve bundle logs via enhanced E6 command
ITR 22485	New `wddcs diag timestamp` feature to show and set internal date/time
ITR 22490	Add ability to enable and disable the auto synchronization feature on Ultrastar Data60 and Ultrastar Data102 platforms
ITR 22491	Windows package now has a subfolder similar to Linux
ITR 22536	Change firmware upgrade SES Page 0xe polling interval to 15 seconds for `-nostatdelay` option
ITR 22562	Add `wddcs show` and `wddcs iom` as logs to `wddcs getlog vendor all`
ITR 22569	New `-nostatdelay` option to skip the default 15 minute delay after download for Ultrastar Data60, Ultrastar Data102, and Ultrastar Serv60+8
N/A	Add `wddcs show_vpd_<dev>.txt` to `wddcs getlog vendor` for 4U60 G2 Storage Enclosure

2. smp_utils is for Linux only.

1.6 Intended Users

The intended users of the WDDCS Tool are:

- Customers of HGST/WD products
- HGST/WD Customer Support
- HGST/WD Engineering

Installation

The WDDCS Tool may be installed on a variety of Linux operating systems as well as Windows Server. The following sections provide installation instructions for each package.

In This Chapter:

2.1 Unzipping the Installation File

Step 1: Transfer the `wddcs_<version>.zip` file to the desired directory on the server in question.

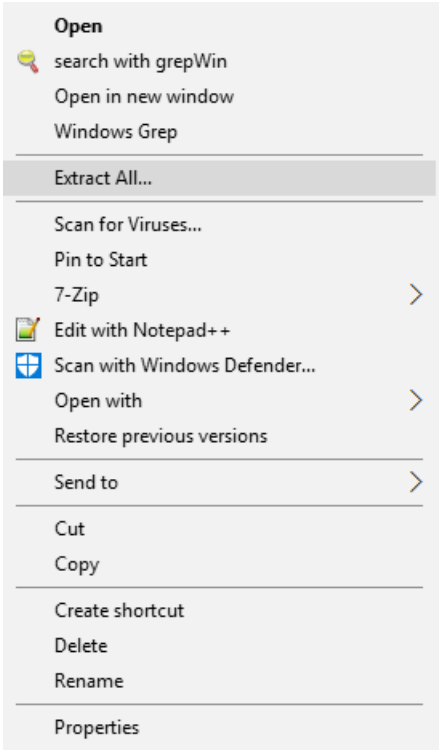
Step 2: Unzip/extract the `wddcs_<version>.zip` file:

a. For Linux operating systems, use the `unzip` command:

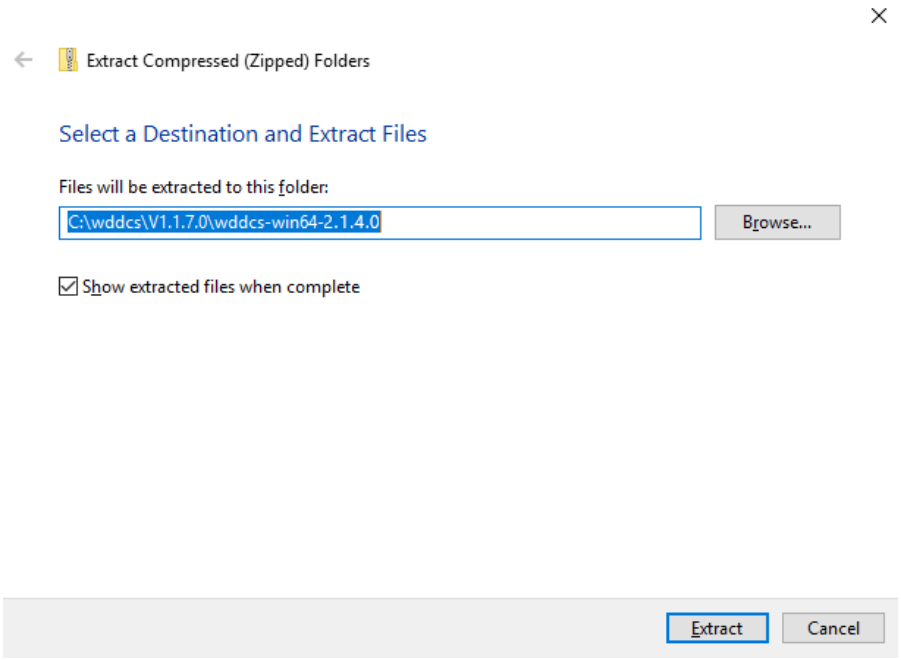
```
# unzip wddcs_<version>.zip
Archive:  wddcs_<version>.zip
  inflating: customer/wddcs-<version>-amd64.deb
  inflating: customer/wddcs-<version>-x86_64.rpm
  inflating: customer/wddcs-<version>-x86_64.tar.gz
```

b. For Windows Server operating systems:

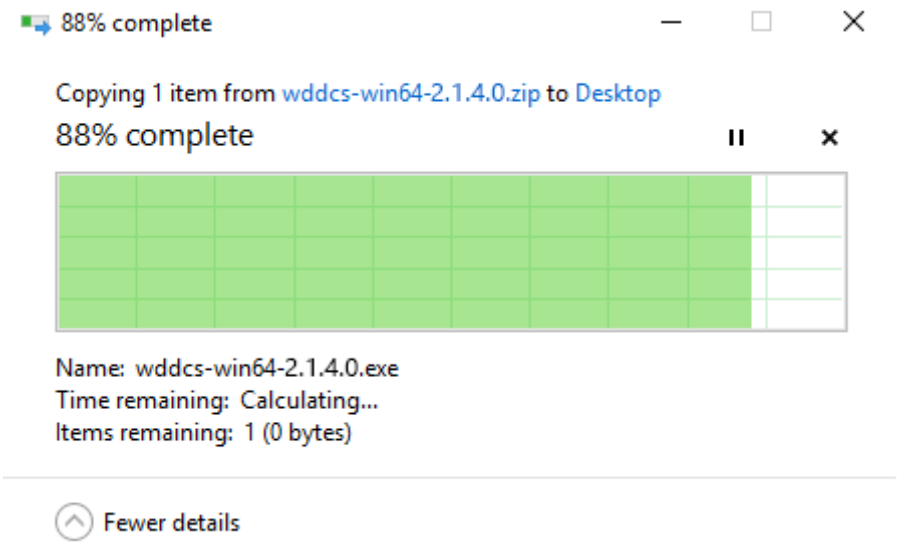
a. Right-click the zip file and select **Extract All**:



b. Accept or choose a directory for the extracted files. Click the checkbox for **Show extracted files when complete**. Then click the **Extract** button:



c. A window may appear briefly, showing the extraction progress:

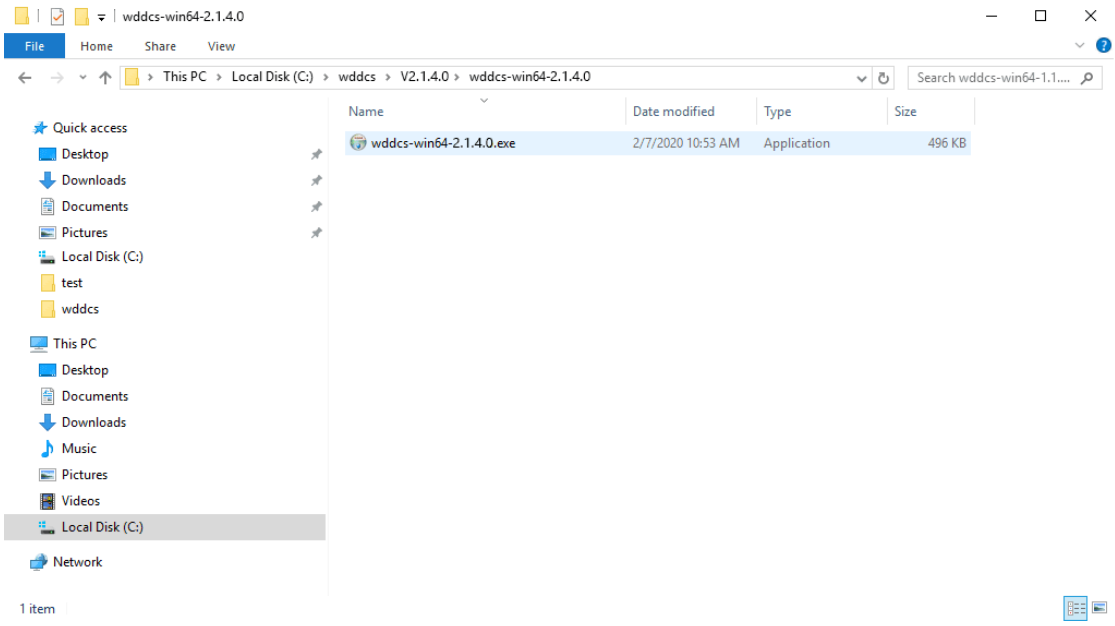


Step 3: If needed, view the contents of the directory to verify the presence of the unzipped files:

a. For Linux operating systems, use the `ls` command:

```
# ls
wddcs-<version>-amd64.deb  wddcs-<version>-x86_64.rpm  wddcs-<version>-
x86_64.tar.gz
```

b. For Windows operating systems, the `wddcs-win64-<version>.exe` file is located within nested directories for the version and operating system.



The `.deb`, `.rpm`, `.tar.gz`, and `.exe` files provide four options for installing the WDDCS Tool package. Instructions for each option are provided in the following sections.

2.2 Installing on Debian/Ubuntu

Follow these steps to install the WDDCS Tool on Debian/Ubuntu operating systems.

Step 1: From the `customer` directory where the `.deb` file is located, use the `dpkg –i` command to install the `wddcs-<version>-amd64.deb` package. For example:

```
# dpkg –i wddcs-<version>-amd64.deb
Selecting previously unselected package wddcs.
(Reading database ... 527023 files and directories currently installed.)
Preparing to unpack wddcs-<version>-amd64.deb ...
Unpacking wddcs <version> ...
Setting up wddcs <version> ...
```

The `wddcs` executable file will be installed to the `/opt/wdc/wddcs/` directory.

Step 2: Verify that the following directory and files have been created or installed:

- Directory: `/opt/wdc/wddcs/`
- File: `/opt/wdc/wddcs/wddcs`
- File: `/opt/wdc/wddcs/WDC_EULA.txt`
- File: `/opt/wdc/wddcs/RELEASE.txt`
- File: `/opt/wdc/wddcs/eula.sh`

Step 3: Verify that the `dpkg -l` command returns the tool name, version, and a description of the tool:

```
# dpkg -l | grep -i wddcs
```

```
ii wddcs    <version>    amd64    Western Digital tool to support Data Center
 System
```

Step 4: Run the `wddcs` command with no arguments.

a. If the EULA has already been accepted, the wddcs command syntax help text will appear:

```
wddcs v2.1.4.0
wddcs usage:
wddcs [target [...]] operation [operation argument [...]]
    [target] - device path (ie: /dev/sg1)
               up to 128 targets may be specified
               if no targets are specified, all detected devices are
 targeted
    operation - operation to execute
    [operation argument] - argument specific to given operation

The following operations are supported:
    diag       display, set, and clear diagnostic page data
    fw         firmware related operations
    getlog     capture various types of log data
    iom        display and set IOM configuration
    rcli       display detailed data about the enclousure and components
    show       scan SEP devices and display the product or device data
    zone       display and configure zones
```

b. If this is the first time the `wddcs` command has been used, the EULA prompt will appear. See End User License Agreement *(page 11)* for more details.

2.3 Installing on RHEL/CentOS

Follow these steps to install the WDDCS Tool on Red Hat Enterprise Linux (RHEL) or CentOS operating systems with the Red Hat Package Manager (RPM).

Step 1: From the `customer` directory where the `.rpm` file is located, use the `rpm -i` command to install the `wddcs-<version>-x86_64.rpm` package. For example:

```
# rpm –i wddcs-<version>-x86_64.rpm
```

Step 2: Verify that the following directory and files have been created or installed:

- Directory: `/opt/wdc/wddcs/`
- File: `/opt/wdc/wddcs/wddcs`
- File: `/opt/wdc/wddcs/WDC_EULA.txt`
- File: `/opt/wdc/wddcs/RELEASE.txt`
- File: `/opt/wdc/wddcs/eula.sh`

Step 3: Run the `wddcs` command with no arguments.

a. If the EULA has already been accepted, the wddcs command syntax help text will appear:

```
wddcs v2.1.4.0
wddcs usage:
wddcs [target [...]] operation [operation argument [...]]
    [target] - device path (ie: /dev/sg1)
               up to 128 targets may be specified
```

```
                if no targets are specified, all detected devices are
 targeted
    operation - operation to execute
    [operation argument] - argument specific to given operation

The following operations are supported:
    diag        display, set, and clear diagnostic page data
    fw          firmware related operations
    getlog      capture various types of log data
    iom         display and set IOM configuration
    rcli        display detailed data about the enclousure and components
    show        scan SEP devices and display the product or device data
    zone        display and configure zones
```

b. If this is the first time the `wddcs` command has been used, the EULA prompt will appear. See End User License Agreement *(page 11)* for more details.

2.4 Installing via tar.gz

Follow these instructions to install the WDDCS Tool via tar.gz.

Step 1: From the directory where the `.tar.gz` file is located, use the `tar xvfz` command to gunzip/untar the `wddcs-<version>-x86_64.tar.gz` file. For example:

```
# tar xvfz wddcs-<version>-x86_64.tar.gz
wddcs-x86_64-<version>/opt/
wddcs-x86_64-<version>/opt/wdc/
wddcs-x86_64-<version>/opt/wdc/wddcs/
wddcs-x86_64-<version>/opt/wdc/wddcs/eula.sh
wddcs-x86_64-<version>/opt/wdc/wddcs/WDC_EULA.txt
wddcs-x86_64-<version>/opt/wdc/wddcs/Third-Party_Notices.txt
wddcs-x86_64-<version>/opt/wdc/wddcs/EULA_Exhibit_A-Third_Party_Licenses.txt
wddcs-x86_64-<version>/opt/wdc/wddcs/wddcs
wddcs-x86_64-<version>/opt/wdc/wddcs/.wdc_lic
```

The `wddcs` executable will be installed to the `wddcs-<version>-x86_64/opt/wdc/wddcs/` directory within the working directory where the installation files were unzipped.

Step 2: Change directory into the `<unzip location>/wddcs-<version>-x86_64/opt/wdc/wddcs/` directory. For example:

```
# cd /home/wddcs/wddcs-<version>-x86_64/opt/wdc/wddcs/
```

Step 3: Verify that the following files are available:

```
# ls -al
total 1064
drwxrwxr-x. 2 501 501    4096 Feb 28 05:50 .
drwxrwxr-x. 3 501 501    4096 Feb 28 05:50 ..
-rw-r--r--. 1 501 501       1 Jul 10 22:00 .wdc_lic
-rw-r--r--. 1 501 501    1199 Feb 28 05:50 EULA_Exhibit_A-
Third_Party_Licenses.txt
-rw-r--r--. 1 501 501   20349 Feb 28 05:50 Third-Party_Notices.txt
-rw-r--r--. 1 501 501   18117 Feb 28 05:50 WDC_EULA.txt
-rw-r--r--. 1 501 501     340 Feb 28 05:50 eula.sh
```

```
-rwxr-xr-. 1 501 501 1024744 Feb 28 05:50 wddcs
```

Step 4: Run the `wddcs` command with no arguments.

a. If the EULA has already been accepted, the wddcs command syntax help text will appear:

```
wddcs v2.1.4.0
wddcs usage:
wddcs [target [...]] operation [operation argument [...]]
    [target] - device path (ie: /dev/sg1)
               up to 128 targets may be specified
               if no targets are specified, all detected devices are
 targeted
    operation - operation to execute
    [operation argument] - argument specific to given operation

The following operations are supported:
    diag       display, set, and clear diagnostic page data
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    iom        display and set IOM configuration
    rcli       display detailed data about the enclousure and components
    show       scan SEP devices and display the product or device data
    zone       display and configure zones
```

b. If this is the first time the `wddcs` command has been used, the EULA prompt will appear. See End User License Agreement *(page 11)* for more details.

2.5 End User License Agreement

Regardless of which Linux installation package is used, the WDDCS Tool will prompt the user to read the EULA before use:

```
Read the end user license agreement. [enter]:
```

Step 1: Press `enter` to read the EULA.

Step 2: If needed, press `space` to page through the EULA content, or press `q` to quit:

```
--More--[Press space to continue, 'q' to quit.]
```

After completing or quitting the EULA, the user is prompted to accept:

```
Do you accpet the EULA? [y/n]:
```

Step 3: Press `y` to accept the EULA.

If the EULA is not accepted, the following error message will appear:

```
ERROR: you have not accepted the license agreement (EULA)
```

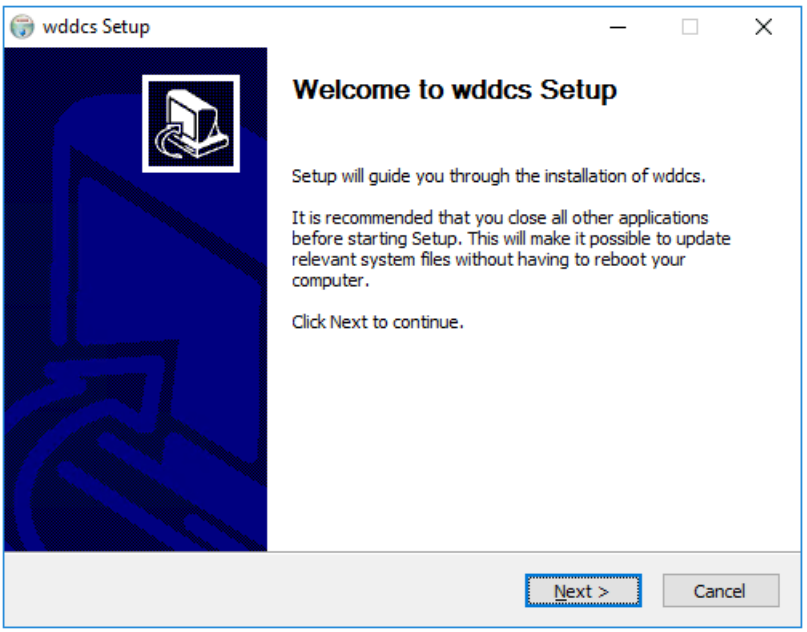
Note: Until the EULA is accepted, the user will be prompted to read it each time the WDDCS Tool is executed.

2.6 Installing on Windows Server (First Install)

Follow these instructions to install the WDDCS Tool for the first time on Windows Server operating systems.

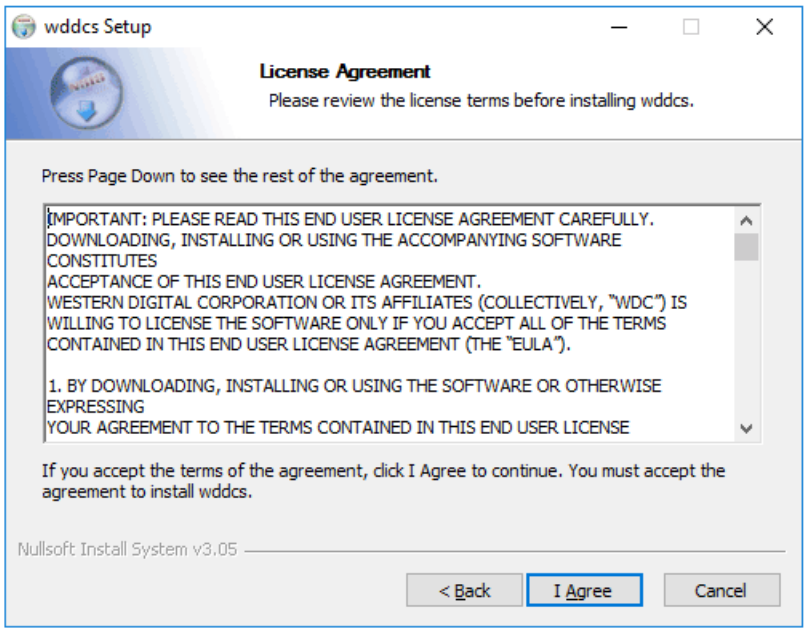
Step 1: In the directory containing the unzipped `.exe` file, double-click the `wddcs-win64-<version>.exe` file.

A **wddcs Setup** dialog box appears, welcoming the user:



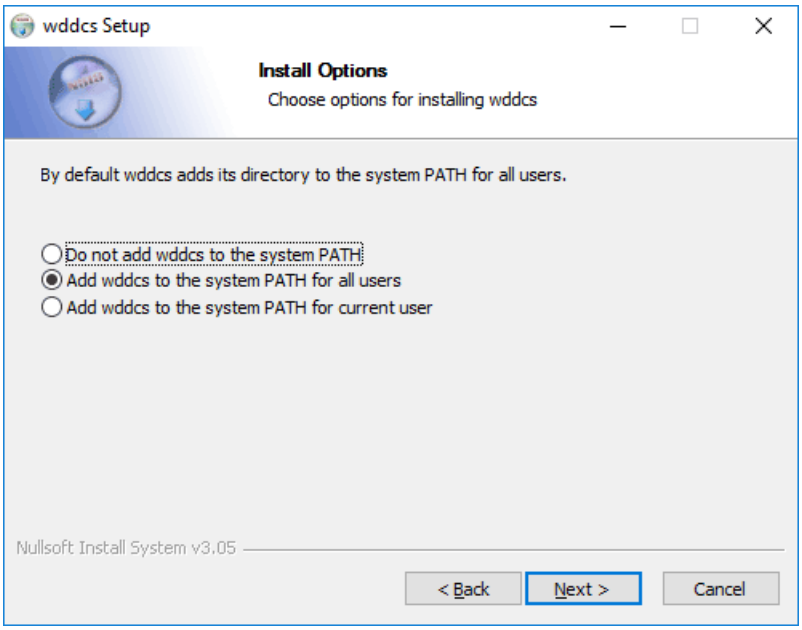
Step 2: Click the **Next** button.

The **wddcs Setup** window updates to show the license agreement:



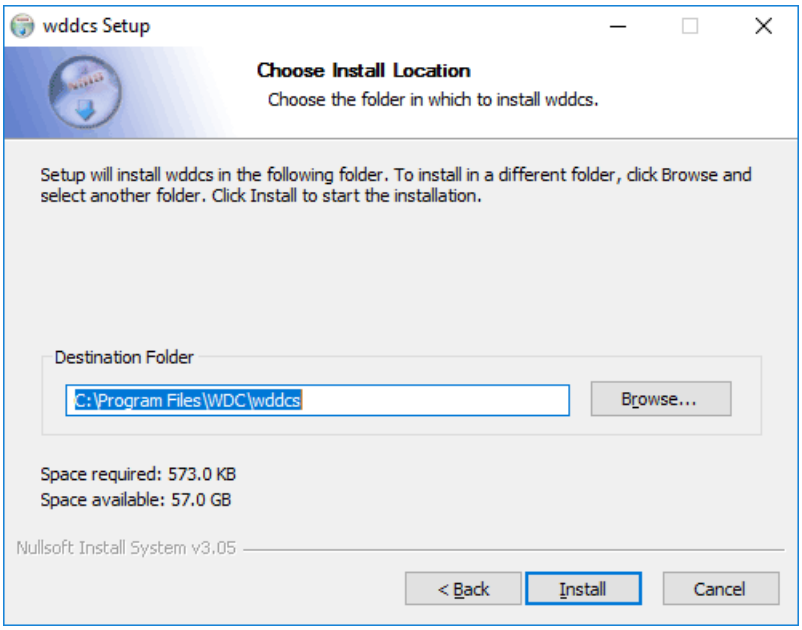
Step 3: Read through the license agreement, and then click the **I Agree** button.

The **wddcs Setup** window updates, prompting the user to choose a system PATH option. The *Add wddcs to the system PATH for all users* option is selected by default:



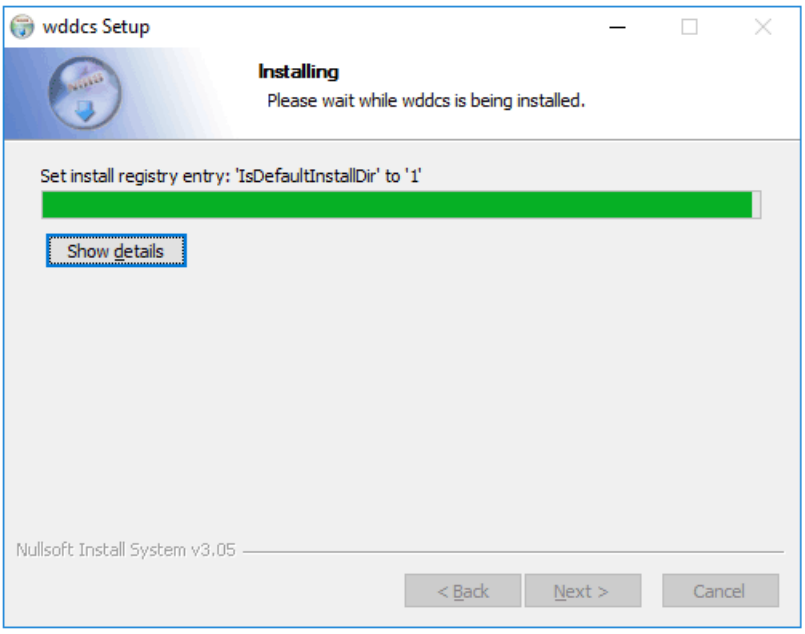
Step 4: Click the **Next** button.

The **wddcs Setup** window updates, prompting the user to accept the default installation directory or choose another:

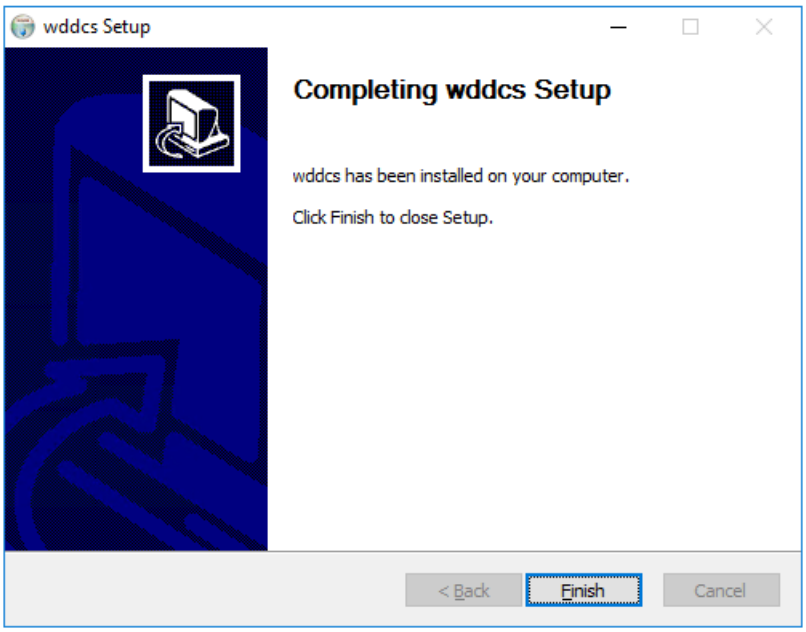


Step 5: Click the **Install** button.

The **wddcs Setup** window updates, showing the installation progress:



After a few seconds, the **wddcs Setup** window updates again, showing that the installation is complete:



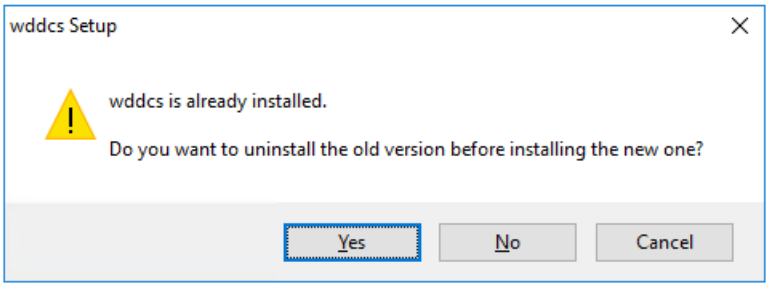
Step 6: Click the **Finish** button.

2.7 Installing on Windows Server (Reinstall)

Follow these instructions to install a new version of the WDDCS Tool on Windows Server operating systems where an existing version has already been installed.

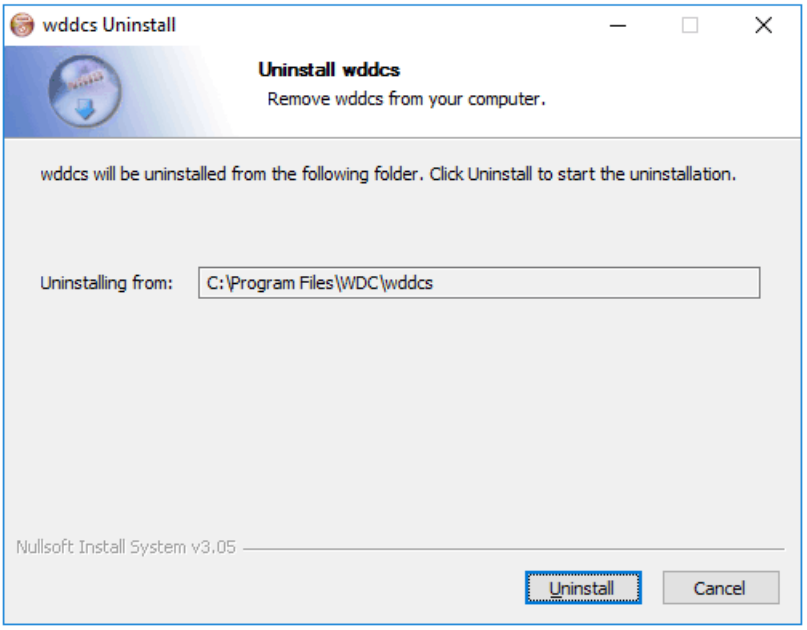
Step 1: In the directory containing the unzipped `.exe` file, double-click the `wddcs-win64-<version>.exe` file.

A **wddcs Setup** dialog appears, asking if the user wants to uninstall the previous version of the WDDCS Tool:



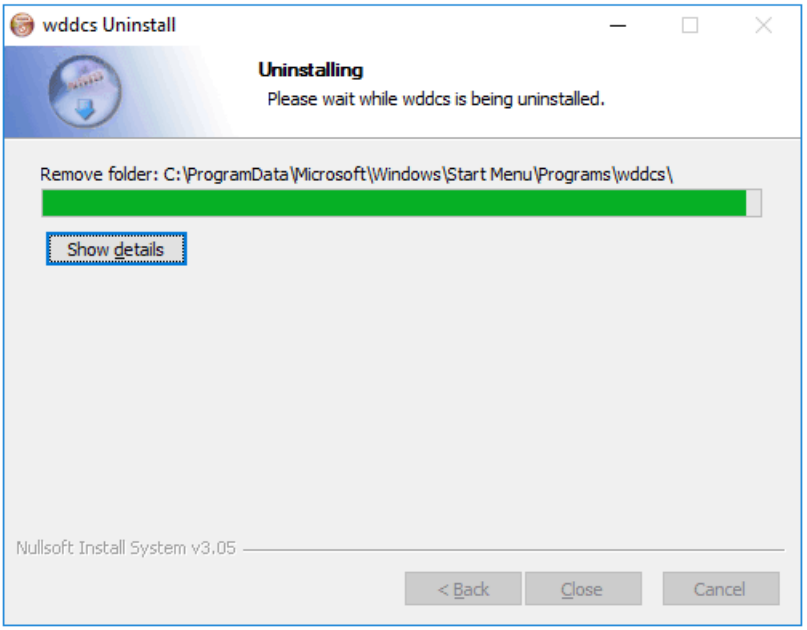
Step 2: Click the **Yes** button:

A **wddcs Uninstall** dialog box appears, notifying the user of the directory from which the WDDCS Tool will be uninstalled:

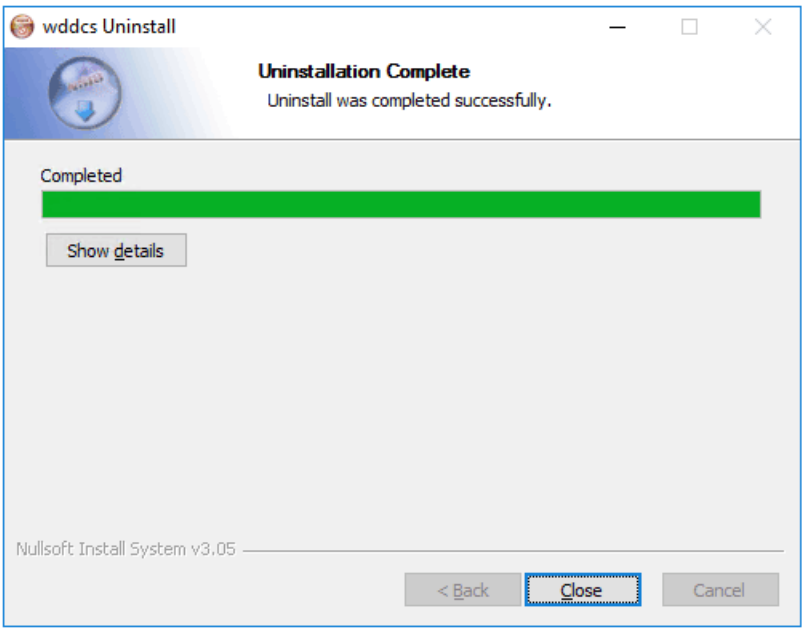


Step 3: Click the **Uninstall** button.

The **wddcs Uninstall** window updates, showing that the WDDCS Tool is being uninstalled:

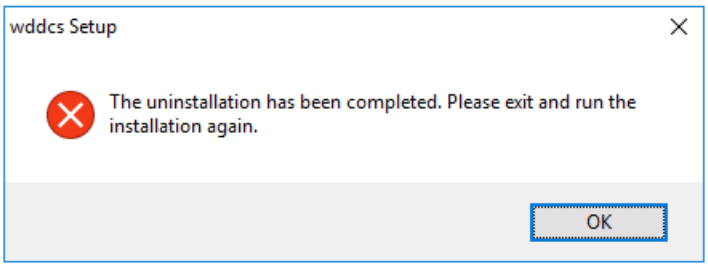


After a few seconds, the **wddcs Uninstall** window updates again, showing that the uninstallation is complete:



Step 4: Click the **Close** button.

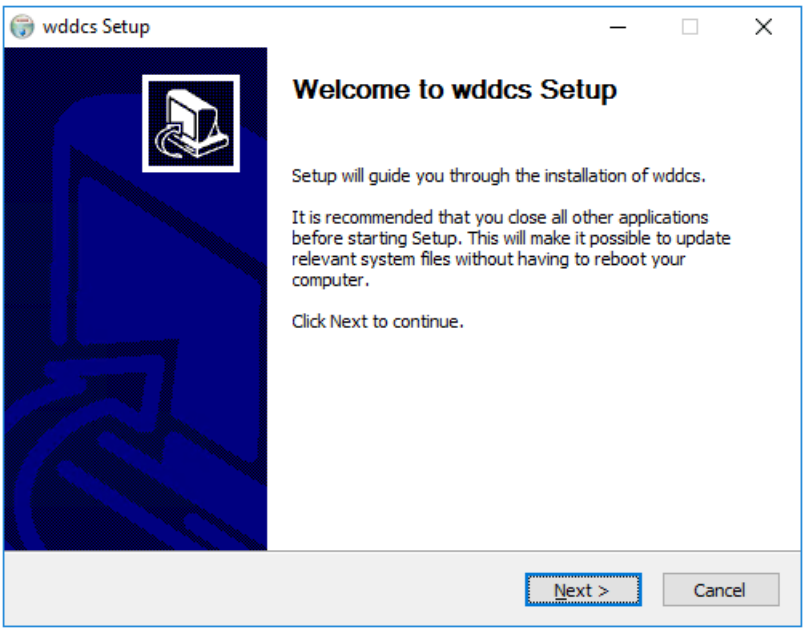
The **wddcs Setup** window reappears, asking the user to exit and run the installation again:



Step 5: Click the **OK** button.

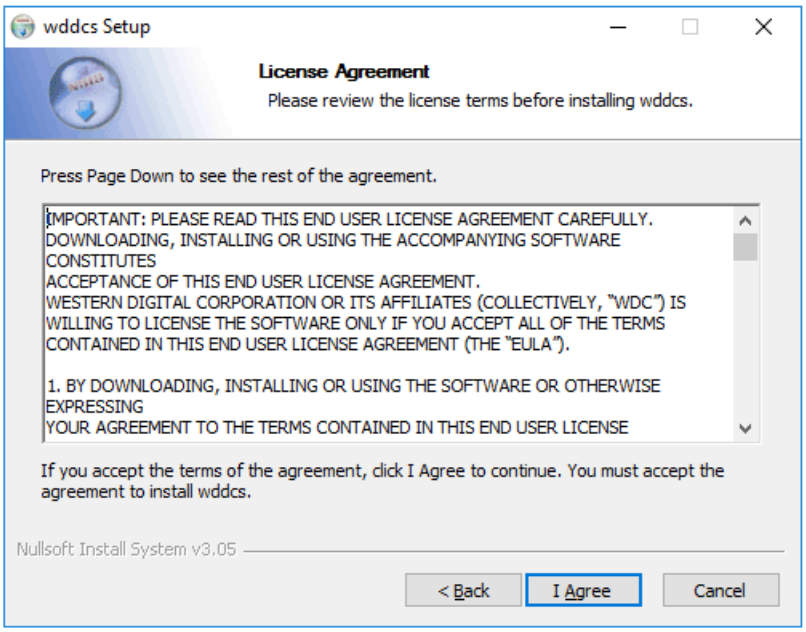
Step 6: In the `wddcs-win64-<version>` directory, double-click the `wddcs-win64-<version>.exe` file again to start the new installation.

A **wddcs Setup** dialog box appears, welcoming the user:



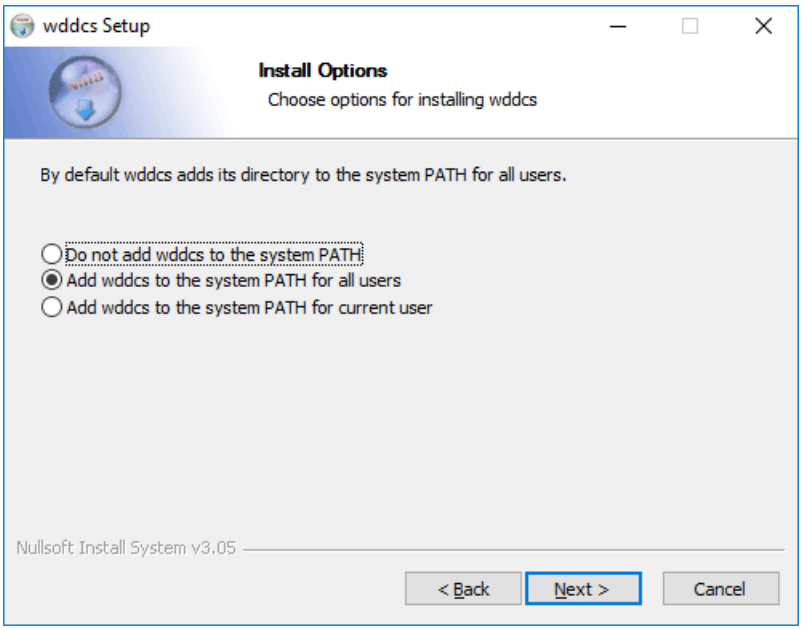
Step 7: Click the **Next** button.

The **wddcs Setup** window updates to show the license agreement:



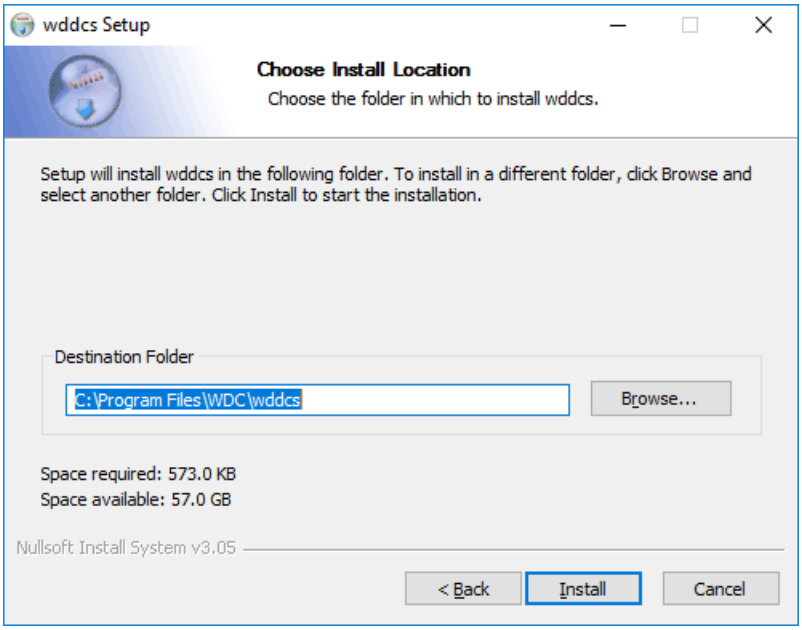
Step 8: Read through the license agreement, and then click the **I Agree** button.

The **wddcs Setup** window updates, prompting the user to choose a system PATH option. The *Add wddcs to the system PATH for all users* option is selected by default:



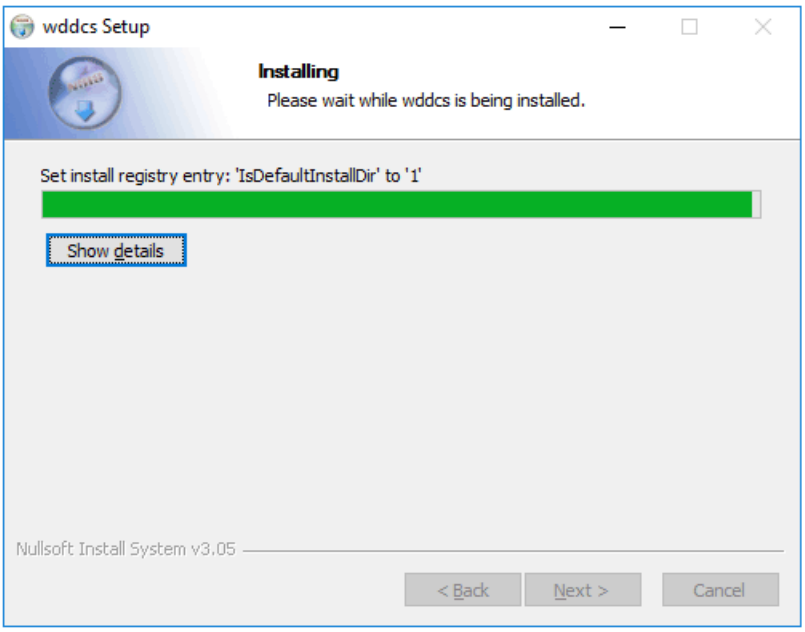
Step 9: Click the **Next** button.

The **wddcs Setup** window updates, prompting the user to accept the default installation directory or choose another:

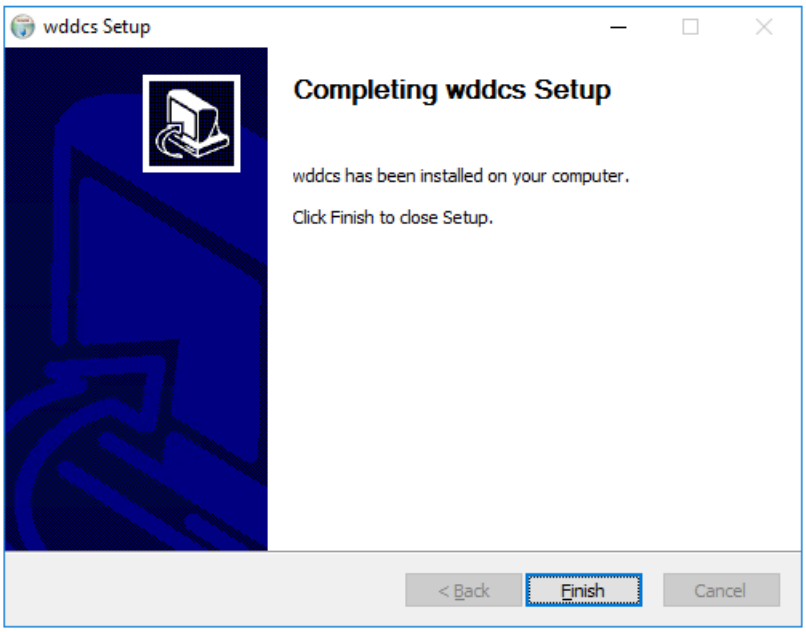


Step 10: Click the **Install** button.

The **wddcs Setup** window updates, showing the installation progress:



After a few seconds, the **wddcs Setup** window updates again, showing that the installation is complete:



Step 11: Click the **Finish** button.

Commands

This section provides instructions for issuing commands from the WDDCS Tool.

In This Chapter:

Important: Because the WDDCS Tool supports both Linux and Windows operating systems, OS-specific command prompts (`#` or `C:\>`), device references (`/dev/sg0` or `SCSI1:4,64,0`), and paths (`/wddcs/v2.1.4.0` or `wddcs\v2.1.4.0`) have been included where command shell outputs are OS-specific; they have been omitted or replaced with generic references (`<device>`, `<path>`, etc.) where outputs apply to both OSs.

3.1 help

The `wddcs help` command is used to print the usage text (command syntax, operations, arguments, and explanations) for the following WDDCS Tool commands:

- `diag`
- `fw`
- `getlog`
- `help`
- `iom`
- `rcli`
- `show`
- `zone`

The following sections detail the usage text for each of these commands.

3.1.1 help diag

The `wddcs help diag` command is used to print the usage text for the `wddcs diag` command.

Step 1: Use the `wddcs help diag` command to print the usage text for the `wddcs show` command:

```
wddcs help diag
wddcs v2.1.4.0
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Usage:
    diag <identifier>

Options for <identifier>:
    clear-crashevent   clear crash event logs
    clear-eventlog     clear event logs
    nickname           display current nickname diagnostic page
    nickname=<string>  set new nickname (use quotes if name has spaces)
    nickname=          clear any previously set nickname
    reset-enc          reset the enclosure
    reset-iom-a        reset IOM A of the enclosure
    reset-iom-b        reset IOM B of the enclosure
    timestamp          display the enclosure's internal date and time
    timestamp=<value>  set the enclosure's temporary internal date and time
                       <value> must be a 32-bit epoch time value
    autosync-enable    enable auto synchronization feature
    autosync-disable   disable auto synchronization feature


Examples:
    diag nickname=DC2
    diag nickname="DC2 Cage2"
```

3.1.2 help fw

The `wddcs help fw` command is used to print the usage text for the `wddcs fw` command.

Step 1: Use the `wddcs help fw` command to print the usage text for the `wddcs fw` command:

```
wddcs help fw
wddcs v2.1.4.0
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Usage:
    fw activate | reset | status
    fw download* <file> [-nostatdelay]

Options for [argument]:
    download <file>            download microcode with the given binary file
    download_activate <file>   download followed by the activate command
    download_reset <file>      download followed by the IOM reset command
    activate                   activate the previously downloaded firmware
    reset                      reset IOMs
    status                     display the download microcode diagnostic page
 0Eh
```

```
    -nostatdelay               optional flag to skip the default delay after
 a download command

The "fw" command requires the user to specify one target device.
Example: ./wddcs /dev/sg0 fw download <file>
Example: ./wddcs /dev/sg0 fw download_activate <file> -nostatdelay
```

or

```
...
Example: wddcs SCSI1:4,64,0 fw download <file>
Example: wddcs SCSI1:4,64,0 fw download_activate <file> -nostatdelay
```

3.1.3 help getlog

The `wddcs help getlog` command is used to print the usage text for the `wddcs getlog` command.

Step 1: Use the `wddcs help getlog` command to print the usage text for the `wddcs getlog` command:

```
wddcs help getlog
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates
Usage:
    getlog [<identifier> [<identifier>] ...]

Options for <identifier>:
    common           get publicly known logs
    vendor           get vendor specific logs
    system-heavy     get system host logs that cause heavy loads on the
 drives
    system-light     get system host logs that cause light load on drives
    system           combination of system-heavy and system-light
    drives           get logs from the attached physical drives (nvme, sas,
 sata)
    drives-noprompt  same as above but without prompting for user
 confirmation
    pack=<path>      combine all requested logs into a single packaged file
                     "=<path>" is optional (saved to the default log dir if
 not specified)
    timeout=<sec>    seconds to wait when spawning a process to get logs
    all              includes all of the above identifiers
    all-noprompt     same as above but without prompting for user
 confirmation
```

3.1.4 help

The `wddcs help` command is used to print the usage text for the `help` command.

Step 1: Use the `wddcs help` command to print the usage text for the `help` command:

```
wddcs help
wddcs v2.1.4.0
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wddcs usage:
```

```
wddcs [target [...]] operation [operation argument [...]]
    [target] - device path (ie: /dev/sg1)
               up to 128 targets may be specified
               if no targets are specified, all detected devices are targeted
    operation - operation to execute
    [operation argument] - argument specific to given operation

The following operations are supported:
    diag       display, set, and clear diagnostic page data
    fw         firmware related operations
    getlog     capture various types of log data
    iom        display and set IOM configuration
    rcli       display detailed data about the enclousure and components
    show       scan SEP devices and display the product or device data
    zone       display and configure zones
```

Note: Using the `wddcs help version` command produces the same output.

3.1.5 help iom

The `wddcs help iom` command is used to print the usage text for the `wddcs iom` command.

Step 1: Use the `wddcs help iom` command to print the usage text for the `wddcs iom` command:

```
wddcs help iom
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Usage:
    iom [oobm|oobm=<iom>,<ip>,<netmask>,<gateway>]

Arguments:
    oobm        display current OOBM values
    oobm=<args> set new OOBM values
         <iom>     = [A|B]
         <ip>      = [x.x.x.x]
         <netmask> = [x.x.x.x]
         <gateway> = [x.x.x.x]
                     x must be 0-255

    Default is to display current IOM single or dual setting

Example to change IOM A to static addresses:
    iom oobm=A,192.168.0.10,255.255.255.0,192.168.0.1

Example to change IOM B to DHCP:
    iom oobm=B,0.0.0.0,0.0.0.0,0.0.0.0

Example to display current OOBM:
    iom oobm

Example to display if enclosure is set to single or dual IOM:
    iom
```

3.1.6 help rcli

The `wddcs help rcli` command is used to print the usage text for the `wddcs rcli` command.

Step 1: Use the `wddcs help rcli` command to print the usage text for the `wddcs rcli` command:

```
wddcs help rcli
wddcs v2.1.4.0
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Usage:
    rcli <command string>

Arguments:
    <command string>
        Any of the commands allowed by the enclosure firmware.
        Specify in quotes if the command has spaces.
        Maximum command length is 256 characters.

Example:
    rcli "show drives"
```

3.1.7 help show

The `wddcs help show` command is used to print the usage text for the `wddcs show` command.

Step 1: Use the `wddcs help show` command to print the usage text for the `wddcs show` command:

```
wddcs help show
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Usage:
    show           scan for all enclosures and display the following:
                       product description
                       serial number
                       firmware revision
                       product name
    show handles   display connected drives with slot #, serial number,
 capacity,
                   port address, expander, and OS device handle name
```

3.1.8 help zone

The `wddcs help zone` command is used to print the usage text for the `wddcs zone` command.

Step 1: Use the `wddcs help zone` command to print the usage text for the `wddcs zone` command:

```
wddcs help zone
wddcs v2.1.4.0
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Usage:
```

```
    zone config=<value>
    zone file=<file>
    zone reset
    zone status

Details:
    config=<value>  configure zones to the given pre-defined value
    config=0        disable zoning
    config=<1-3>    pre-defined configuration per product type
                    H4102-J:
                      1: 17 drives visible to each host port
                      2: 34 drives visible to each pair of consecutive host
 ports (i.e. A1, A2)
                      3: 51 drives visible to each 3x consecutive host ports
 (i.e. A1, A2, A3)
                    H4060-J:
                      1: 10 drives visible to each host port
                      2: 20 drives visible to each pair of consecutive host
 ports (i.e. A1, A2)
                      3: 30 drives visible to each 3x consecutive host ports
 (i.e. A1, A2, A3)
    file=<file>     send binary config file to the IOM
    reset           reset the current IOM
    status          display current zone configuration setting

The "zone" command requires the user to specify one target device
Example: ./wddcs /dev/sg0 zone reset
```

or

```
...
Example: wddcs SCSI1:4,64,0 zone reset
```

3.2 diag

The `wddcs diag` command is used to display, set, or clear diagnostic page information for the feature or component specified in the command option.

Options

The following sections provide instructions for using these `diag` command options:

- `clear-crashevent` – clears crash events on all expanders
- `clear-eventlog` – clears all expander event logs
- `nickname` – displays, sets, or clears the enclosure nickname
- `reset-enc` – resets both IOMs in staggered fashion
- `reset-iom-<a|b>` – resets the desired IOM
- `timestamp` – displays or sets the IOM's internal date and time
- `autosync-<enable|disable>` – enables or disables the firmware auto syncronization feature

Enclosure Support

The `wddcs diag` command and options are supported on the following enclosures:

Command	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
`diag`	✗	✗	✗	✗	✓	✓	✓
`diag clear-crashevent`	✓	✗	✗	✓	✓	✓	✓
`diag clear-eventlog`	✗	✗	✗	✗	✓	✓	✓
`diag nickname`	✗	✗	✗	✗	✓	✓	✓
`diag nickname=<string>`	✗	✗	✗	✗	✓	✓	✓
`diag nickname=`	✗	✗	✗	✗	✓	✓	✓
`diag reset-enc`	✓	✗	✗	✗	✓	✓	✓
`diag reset-iom-<a|b>`	✗	✗	✗	✓	✓	✓	✗
`timestamp`	✓	✗	✗	✓	✓	✓	✓
`timestamp=<value>`	✓	✗	✗	✓	✓	✓	✓
`autosync-<enable|disable>`	✗	✗	✗	✗	✓	✓	✗

3.2.1 diag clear-crashevent

The `wddcs <device> diag clear-crashevent` command is used to clear crash event records from all primary and secondary expanders for a given SEP device.

Step 1: Use the `wddcs show` command to determine the SEP device handle for the desired enclosure:

```
wddcs show
wddcs v2.1.4.0
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Device: <device>
    product : <product_abbreviation>
    serial  : <serial_number>
    firmware: <fw_version>
    name    : <product_name>

...
```

Step 2: Use the SEP device handle along with the `wddcs <device> rcli "debug dump"` command to verify the presence of crash event logs for that enclosure:

```
wddcs <device> rcli "debug dump"
```

```
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>

Total records created: 1

FW Crash(2000-004) Time Stamp: 216744:13:22, Reason: General exception

  General purpose registers
  pc      0xc012a2c0    r7      0x00000001    r14       0x00000000    r21
 0x00000000
  r1      0x9c0979b8    r8      0xc2100000    r15       0x000000c2    r22
 0x00000000
  r2      0x9c05acb0    r9      0x00000000    r16       0x9c05ac68    r23
 0x00000000
  r3      0x00000000    r10     0x00000010    r17       0xc2100000    r24
 0x00000001
  r4      0x9c05acb0    r11     0x00000001    r18       0x00000004    r25
 0x00000001
  r5      0xc2100000    r12     0xc0129454    r19       0x00000000    r26
 0x00000000
  r6      0x00000004    r13     0x00100000    r20       0x00000000    r27
 0x00000000
  gp      0x9c009000    sp      0x9c07f888    fp        0x00000000    ra
 0xc00b3c80
  Special registers
  Cause   0x80800408    EPC     0xc012a2c0    BadVAddr  0xc2100000    EBase
 0x9f041000

  CAUSE: TLB Exception.
```

Step 3: Use the `wddcs <device> diag clear-crashevent` command to clear the crash event logs:

```
wddcs <device> diag clear-crashevent
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Commands have been sent to clear the crash logs
```

Step 4: Repeat the `wddcs <device> rcli "debug dump"` command to verify that the crash event logs were cleared:

```
wddcs <device> rcli "debug dump"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
No crash records available
```

3.2.2 diag clear-eventlog

The `wddcs <device> diag clear-eventlog` command is used to clear event logs from all primary and secondary expanders for a given SEP device. Clearing event logs prior to troubleshooting is useful for limiting subsequent logs to only those problematic events that were purposefully reproduced.

Before you begin:

- The `wddcs <device> diag clear-eventlog` command requires FW version 3000 or later for supported enclosures.

Step 1: Use the `wddcs show` command to determine the SEP device handle for the desired enclosure:

```
wddcs show
wddcs v2.1.4.0
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Device: <device>
    product : <product_abbreviation>
    serial  : <serial_number>
    firmware: <fw_version>
    name    : <product_name>

...
```

Step 2: Use the SEP device handle along with the `wddcs getlog vendor` or `wddcs getlog all` command to capture log data (including event logs) for the device.

Step 3: Navigate to the output directory where the log files are stored. This will either be the temporary directory or the directory specified in the `pack=<path>` command option, if used.

Step 4: Review the list of event log files and note their file sizes (bolded in the following example):

```
-rw-r--r--. 1 root root 129856 <date> <time> eventlog_exp_0_<device>.bin
-rw-r--r--. 1 root root    160 <date> <time> eventlog_exp_1_<device>.bin
-rw-r--r--. 1 root root    576 <date> <time> eventlog_exp_2_<device>.bin
...
```

Step 5: Use the `wddcs <device> diag clear-eventlog` command to clear the event logs:

```
wddcs <device> diag clear-eventlog
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Commands have been sent to clear the event logs
```

Step 6: Repeat the `wddcs getlog vendor` or `wddcs getlog all` command to capture the new event logs.

Step 7: Review the list of event log files and note their reduced file sizes (bolded in the following example):

```
-rw-r--r--. 1 root root    64 <date> <time> eventlog_exp_0_<device>.bin
-rw-r--r--. 1 root root    64 <date> <time> eventlog_exp_1_<device>.bin
-rw-r--r--. 1 root root    64 <date> <time> eventlog_exp_2_<device>.bin
...
```

3.2.3 diag nickname

The `wddcs <device> diag nickname` command is used to display, set, and clear values of the nickname diagnostic page.

Step 1: Use the `wddcs <device> diag nickname` command to view the nickname diagnostic page for a single SEP device within an HGST/WD-developed enclosure:

```
wddcs <device> diag nickname
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Page id           : 0Fh
Page length       : 2Ch
Generation code   : 0h
Nickname status   : 00h - No errors
Additional status : 00h
Language code     : 0000h
Nickname          :
```

a. To set the nickname, include the `nickname=<string>` argument. For example:

```
wddcs <device> diag nickname="Cloud DataCenter Rack1"
wddcs v2.1.4.0

Device: <device>
Enclosure nickname has been set to: Cloud DataCenter Rack1
```

Executing the `wddcs <device> diag nickname` command again will show that the nickname has been set to the specified value:

```
wddcs <device> diag nickname
wddcs v2.1.4.0

Device: <device>
Page id           : 0Fh
Page length       : 2Ch
Generation code   : 0h
Nickname status   : 00h - No errors
Additional status : 00h
Language code     : 0000h
Nickname          : Cloud DataCenter Rack1
```

b. To clear the nickname, include the `nickname=` argument without specifying a value. For example:

```
wddcs <device> diag nickname=
wddcs v2.1.4.0

Device: <device>
Enclosure nickname has been cleared
```

Executing the `wddcs <device> diag nickname` command again will show that the nickname has been cleared:

```
wddcs <device> diag nickname
wddcs v2.1.4.0

Device: <device>
Page id           : 0Fh
Page length       : 2Ch
Generation code   : 0h
```

```
Nickname status   : 00h - No errors
Additional status : 00h
Language code     : 0000h
Nickname          :
```

3.2.4 diag reset-enc

The `wddcs <device> diag reset-enc` command is used to reset both IOMs in a staggered fashion.

Before you begin:

- The order of the IOM resets will depend on which IOM device handle is specified in the reset command. The specified IOM will be the last device to reset.

Step 1: Use the `wddcs iom` command to determine the SEP device handle and IOM identifier for both IOMs:

```
wddcs iom
wddcs v2.1.4.0
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Device: <device>
Dual IOM operation
IOM B

Device: <device>
Dual IOM operation
IOM A
```

Step 2: Use the `wddcs <device> diag reset-enc` command to reset both IOMs in a staggered fashion. The IOM device specified in the command will be the last device to be reset:

```
wddcs <device> diag reset-enc
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Commands have been sent to reset the enclosure
```

Step 3: If needed, use the `wddcs iom` command again to verify which IOM is being reset. In the following example, the enclosure reports `Dual IOM operation`, but the IOM being reset doesn't appear in the output:

```
wddcs iom
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Dual IOM operation
IOM A
```

When both IOMs have finished resetting, the `wddcs iom` command will display both devices again:

```
wddcs iom
```

```
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Dual IOM operation
IOM B

Device: <device>
Dual IOM operation
IOM A
```

3.2.5 diag reset-iom-<a|b>

The `wddcs <device> diag reset-iom-<a|b>` command is used to reset an IOM.

Step 1: Use the `wddcs iom` command to determine the SEP device handle and IOM identifier for the desired IOM:

```
wddcs iom
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Dual IOM operation
IOM B

Device: <device>
Dual IOM operation
IOM A
```

Step 2: Use the appropriate reset command (either `wddcs <device> diag reset-iom-a` or `wddcs <device> diag reset-iom-b`) with the device handle to reset the IOM:

```
wddcs <device> diag reset-iom-b
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Commands have been sent to reset the IOM
```

Step 3: If needed, use the `wddcs iom` command again to verify that the IOM is being reset. In the following example, the enclosure reports `Dual IOM operation`, but the IOM being reset doesn't appear in the output:

```
wddcs iom
wddcs v2.1.4.0
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Device: <device>
Dual IOM operation
IOM A
```

When the IOM has finished resetting, the `wddcs iom` command will display both devices again:

```
wddcs iom
wddcs v2.1.4.0
```

```
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Dual IOM operation
IOM B

Device: <device>
Dual IOM operation
IOM A
```

3.2.6 diag timestamp

The `wddcs <device> diag timestamp` command is used to display or set an IOM's internal date and time.

Note: If the OOBM is connected to a network and able to retreive the date from an NTP server, the OOBM will set the timestamp automatically. The `wddcs <device> diag timestamp` feature is intended for setting the timestamp when the OOBM is unable to retreive the date.

Step 1: Use the `wddcs show` command to determine the SEP device handles for each IOM in the enclosure:

```
wddcs show
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
    product : <product>
    serial  : <serialnumber>
    firmware: <version>
    name    : <productname>

...
```

Step 2: Use the `wddcs <device> diag timestamp` command, along with the SEP device handle for an IOM, to view that IOM's internal date and time:

```
wddcs <device> diag timestamp
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
  Microseconds (RTC)      = 00047E7E1204C0E5h
  Seconds (Epoch)         = 1264979840 (4B660F80h)
  Local date (yyyy/mm/dd) = 2010/01/31
  Local time (24hh:mm:ss) = 16:17:20
```

a. To set the timestamp, include the `=<value>` argument. The value must be a 32-bit epoch time value. For example:

```
wddcs <device> diag timestamp=1618591800
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
```

```
The time stamp has been set to 0x6079C038
```

Executing the `wddcs <device> diag timestamp` command again will show that the timestamp has been set to the specified value:

```
wddcs <device> diag timestamp
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
  Microseconds (RTC)      = 0005C019C5D2837Dh
  Seconds (Epoch)         = 1618591809 (6079C041h)
  Local date (yyyy/mm/dd) = 2021/04/16
  Local time (24hh:mm:ss) = 10:50:09
```

Step 3: If needed, repeat these steps to display or modify the other IOM's internal date and time.

3.2.7 diag autosync-enable

The `wddcs <device> diag autosync-enable` command is used to enable the firmware autosync feature of an enclosure.

Step 1: Use the `wddcs show` command to determine the SEP device handles for each IOM in the enclosure:

```
wddcs show
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
    product : <product>
    serial  : <serialnumber>
    firmware: <version>
    name    : <productname>

...
```

Step 2: Use the `wddcs <device> rcli "show vpd"` command, along with one of the IOM device handles, to view the vital product data for the enclosure and confirm that the autosync feature is currently **disabled**. The enclosure configuration bits will provide this information:

```
wddcs <device> rcli "show vpd"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
  ...
  Encl:Config       = x5A0000000000000
  ...
```

Note: If the highlighted bits from this example are set to `08` on the enclosure, the autosync feature is already **enabled**.

Step 3: Use the `wddcs <device> diag autosync-enable` command, along with one of the IOM device handles, to enable the autosync feature:

```
wddcs <device> diag autosync-enable
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Auto synchronization has been enabled
```

Step 4: Repeat the `wddcs <device> rcli "show vpd"` command to view the enclosure configuration bits and verify that the autosync feature was enabled:

```
wddcs <device> rcli "show vpd"
wddcs v2.1.4.0
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Device: <device>
  ...
  Encl:Config       = x5A0000000000800
  ...
```

Result: The autosync feature is now enabled.

3.2.8 diag autosync-disable

The `wddcs <device> diag autosync-disable` command is used to disable the firmware autosync feature of an enclosure.

Step 1: Use the `wddcs show` command to determine the SEP device handles for each IOM in the enclosure:

```
wddcs show
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
    product : <product>
    serial  : <serialnumber>
    firmware: <version>
    name    : <productname>

...
```

Step 2: Use the `wddcs <device> rcli "show vpd"` command, along with one of the IOM device handles, to view the vital product data for the enclosure and confirm that the autosync feature is currently **enabled**. The enclosure configuration bits will provide this information:

```
wddcs <device> rcli "show vpd"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
  ...
  Encl:Config       = x5A0000000000800
  ...
```

Note: If the highlighted bits from this example are set to `00` on the enclosure, the autosync feature is already **disabled**.

Step 3: Use the `wddcs <device> diag autosync-disable` command, along with one of the IOM device handles, to disable the autosync feature:

```
wddcs <device> diag autosync-disable
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Auto synchronization has been disabled
```

Step 4: Repeat the `wddcs <device> rcli "show vpd"` command to view the enclosure configuration bits and verify that the autosync feature was disabled:

```
wddcs <device> rcli "show vpd"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
  ...
  Encl:Config       = x5A0000000000000
  ...
```

Result: The autosync feature is now disabled.

3.3 fw

The `wddcs fw` command—along with its options—is used to perform firmware-related operations for HGST/WD-developed enclosures.

Options

The following sections provide instructions for using each of these command options:

- `download <file>` – download microcode with the given binary file, or bundle, depending on the enclosure
- `download_activate <file>` – download, followed by the activate command
- `download_reset <file>` – download, followed by the reset command
- `activate` – activate the previously-downloaded firmware
- `reset` – reset the IOM(s) after a firmware download command has completed successfully
- `status` – display the download microcode diagnostic page 0Eh
- `-nostatdelay` – optional flag to skip the default delay after a download command

Note: All of the `wddcs fw` command options require the user to specify a single target SEP device. For example:

```
wddcs <device> fw activate
```

Important: The `wddcs fw` command options are intened to be used in different sequences or combinations depending on various factors, such as enclosure type and maintenance availability. To choose the appropriate process, see Choosing the Correct Firmware Upgrade Process *(page 90)*.

Support

The `wddcs fw` command and options are supported on the following enclosures:

Command	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
`fw download`	✓	✓	✓	✓	✓	✓	✓
`fw download_activate`	✓	✓	✓	✓	✓	✓	✓
`fw download_reset`	✗	✗	✗	✗	✓	✓	✓
`fw activate`	✓	✓	✓	✓	✓	✓	✓
`fw reset`	✗	✗	✗	✗	✓	✓	✓
`fw status`	✓	✓	✓	✓	✓	✓	✓
`-nostatdelay`	✗	✗	✗	✗	✓	✓	✓

3.3.1 fw download

The `wddcs <device> fw download <file>` command is used to execute a firmware download of a SEP FW binary file—or a SEP /OOBM FW bundle—to a single SEP device within an HGST/WD-developed enclosure.

Before you begin:

- The `wddcs <device> fw download <file>` command requires availability of an SEP FW file—or if applicable, an SEP/OOBM FW bundle—on the host in question.
- The `wddcs <device> fw download <file>` command requires—and will only accept—a single SEP handle.
- If the download command fails as a result of an SEP download failure, the `wddcs <device> fw download <file>` command should come back to the prompt immediately.

Step 1: Use the `wddcs <device> fw download <file>` command to perform a firmware download to a single SEP device within an HGST/WD-developed enclosure. For example:

```
wddcs <device> fw download <file>
```

Note: There is a default fifteen (15) **minute** delay before the WDDCS Tool begins checking SES page 0xe for the download completion status at fifteen (15) **second** intervals. To skip the initial fifteen (15) minute delay, use the `-nostatdelay` flag. However, be aware that skipping the default delay may result in intermittent status errors.

```
wddcs <device> fw download <file> -nostatdelay
```

The user is prompted to either issue the `fw activate` or `fw reset` command when ready. The recommended commands will vary, depending on the product type:

```
wddcs v2.1.4.0
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Device: <device>
Sent <#> segment(s)
Download has finished to the SEP, please wait.
The completion status will be checked after 15 minutes.

Download status complete (0x11)
Firmware was downloaded successfully
When ready, please issue the "fw activate" or "fw reset" command for the new
 firmware to take effect
```

3.3.2 fw download_activate

The `wddcs <device> fw download_activate <file>` command is used to execute a firmware download of a SEP FW binary file—or a SEP/OOBM FW bundle—to a single SEP device within an HGST/WD-developed enclosure and subsequently activate the downloaded firmware.

Before you begin:

- This command requires availability of an SEP FW file—or if applicable, an SEP/OOBM FW bundle—on the host in question.
- The `wddcs <device> fw download_activate <file>` command requires—and will only accept—a single SEP handle.
- If the download command fails as a result of an SEP download failure, the `wddcs <device> fw download_activate <file>` command should come back to the prompt immediately.

Step 1: Use the `wddcs <device> fw download_activate <file>` command to perform a firmware download to a single SEP device within an HGST/WD-developed enclosure and subsequently activate the downloaded firmware. For example:

```
wddcs <device> fw download_activate <file>
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Sent <#> segment(s)
Download has finished to the SEP, please wait.
The completion status will be checked after 15 minutes.

Download status complete (0x11)
Firmware was downloaded successfully
```

```
Starting the activation process...

This method of firmware activation will be disruptive.
Please consider activating firmware offline to avoid any disruptions to I/O.

If the platform configuration is based on dual IOMs, the IOM(s) in question
will go offline for a period of time while the update is finalized.
If the platform configuration is based on a single IOM, the enclosure
will go offline for a period of time while the update is finalized.

If you still prefer to continue with this method, press 'Y' or 'y':
```

The WDDCS Tool notifies the user that the IOM or enclosure will go offline.

Step 2: Enter `Y` or `y` to proceed:

```
y
Firmware activation command was sent successfully
```

3.3.3 fw download_reset

The **`wddcs <device> fw download_reset <file>`** command is used to execute a firmware download of a SEP FW binary file—or a SEP/OOBM FW bundle—to a single SEP device within an HGST/WD-developed enclosure and subsequently reset the IOMs for that device.

Before you begin:

- This command requires availability of an SEP FW file—or if applicable, an SEP/OOBM FW bundle—on the host in question.
- The **`wddcs <device> fw download_reset <file>`** command requires—and will only accept—a single SEP handle.
- If the download command fails as a result of an SEP download failure, the **`wddcs <device> fw download_reset <file>`** command should come back to the prompt immediately.

Step 1: Use the **`wddcs <device> fw download_reset <file>`** command to perform a firmware download to a single SEP device within an HGST/WD-developed enclosure and subsequently reset the IOMs for that device. For example:

```
wddcs <device> fw download_reset <file>
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Sent <#> segment(s)
Download has finished to the SEP, please wait.
The completion status will be checked after 15 minutes.

Download status complete (0x11)
Firmware was downloaded successfully
Starting the reset process...

Please ensure both paths to each drive are available before proceeding
with the reset of the 1st IOM to ensure that at least one path to each drive
will be available during the IOM reset to activate firmware.
The IOM will go offline for a period of time while the update is finalized.
Press 'Y' or 'y' when ready to continue:
```

The WDDCS Tool notifies the user that the first IOM will go offline.

Step 2: Enter `Y` or `y` to proceed:

```
y
1st IOM has been reset

Please ensure both paths to each drive are available before proceeding
with the reset of the 2nd IOM to ensure that at least one path to each drive
will be available during the IOM reset to activate firmware.
The IOM will go offline for a period of time while the update is finalized.
Press 'Y' or 'y' when ready to continue:
```

The WDDCS Tool notifies the user that the first IOM was reset and that the second IOM will go offline.

Step 3: Enter `Y` or `y` to proceed:

```
y
2nd IOM has been reset

IOM was reset successfully
```

The WDDCS Tool notifies the user that the second IOM was reset.

3.3.4 fw activate

The `wddcs <device> fw activate` command is used to activate previously-downloaded firmware on a single SEP device within an HGST/WD-supported enclosure.

Before you begin:

- This task requires that an SEP FW binary file or SEP/OOBM FW bundle file has already been successfully downloaded to the IOM/Enclosure in question.
- The `wddcs <device> fw activate` command requires—and will only accept—a single SEP handle.
- For the 2U24 Flash Storage Platform and the 4U60 G1 Storage Enclosure:
  - The `wddcs <device> fw activate` command must be run **for each IOM within a chassis**. This also assumes that the method used to download the firmware involves using mode 0xE (download microcode with offsets, save, and defer activate) instead of mode 0x7 (download microcode with offsets, save, and activate).

Step 1: Use the `wddcs <device> fw activate` command to activate previously-downloaded firmware on a single SEP device within an HGST/WD-supported enclosure. For example:

```
wddcs <device> fw activate
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
This method of firmware activation will be disruptive.
Please consider activating firmware offline to avoid any disruptions to I/O

If the platform configuration is based on dual IOMs, the IOM(s) in question
will go offline for a period of time while the update is finalized.
If the platform configuration is based on a single IOM, the enclosure
will go offline for a period of time while the update is finalized.
```

```
If you still prefer to continue with this method, press 'Y' or 'y':
```

The user is notified that the IOM or enclosure will go offline.

Step 2: Enter `Y` or `y` to continue:

```
y
Firmware activation command was sent successfully
```

3.3.5 fw reset

The `wddcs <device> fw reset` command is used to sequentially reset each IOM on an HGST/WD-developed enclosure after a successful firmware download.

Step 1: Use the `wddcs <device> fw reset` command to sequentially reset each IOM on an HGST/WD-developed enclosure after a successful firmware download. For example:

```
wddcs <device> fw reset
wddcs v2.1.4.0
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Device: <device>
Please ensure both paths to each drive are available before proceeding
with the reset of the 1st IOM to ensure that at least one path to each drive
will be available during the IOM reset to activate firmware.
The IOM will go offline for a period of time while the update is finalized.
Press 'Y' or 'y' when ready to continue:
```

The user is prompted to ensure that both paths to each drive are available before resetting the first IOM.

Step 2: Enter `Y` or `y` to continue:

```
y
1st IOM has been reset

Please ensure both paths to each drive are available before proceeding
with the reset of the 2nd IOM to ensure that at least one path to each drive
will be available during the IOM reset to activate firmware.
The IOM will go offline for a period of time while the update is finalized.
Press 'Y' or 'y' when ready to continue:
```

The user is notified that the first IOM was reset—thereby activating the firmware—and is then prompted to ensure that both paths to each drive are available before resetting the second IOM.

Step 3: Enter `Y` or `y` to continue:

```
y
2nd IOM has been reset

IOM was reset successfully
```

The user is notified that the second IOM was reset and that the IOM reset process was successful.

3.3.6 fw status

The `wddcs <device> fw status` command is used to check the firmware download status for a SEP binary file or a SEP/OOBM bundle, either during the download process or afterward, or it will notify the user that no download is in progress.

Before you begin:

- The `wddcs <device> fw status` command must be run in a second shell, separate from the one running the `wddcs <device> fw download <file>` command.

Step 1: Use the `wddcs <device> fw status` command, while the firmware download is in progress, to check the status of the download.

Important: The first status command may return incorrect information. Run the command **at least twice** to get an accurate status.

```
wddcs <device> fw status
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Page id           : 0Eh
Page length       : 14h
Generation code   : 0h
Download status   : 03h -Updating nonvolatile storage with deferred microcode
Additional status : 0h
Download max size : 19FFEAh (1703914)
Buffer id         : 0h
Buffer offset     : 0h
```

Step 2: Use the `wddcs <device> fw status` command, after the firmware has been downloaded, to verify the status of the download. For example:

```
wddcs <device> fw status
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Page id           : 0Eh
Page length       : 14h
Generation code   : 0h
Download status   : 11h -Download completed. Requires hard reset or power on
Additional status : 0h
Download max size : 19FFEAh (1703914)
Buffer id         : 0h
Buffer offset     : 0h
```

Step 3: Using the `wddcs <device> fw status` command, when no download is in progress, returns the following:

```
wddcs <device> fw status
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
```

```
Page id           : 0Eh
Page length       : 14h
Generation code   : 0h
Download status   : 00h -No download operation is in progress
Additional status : 0h
Download max size : 19FFEAh (1703914)
Buffer id         : 0h
Buffer offset     : 0h
```

3.4 getlog

The `wddcs getlog` command—along with its options—is used to capture various types of log data for HGST/WD-developed enclosures.

Options

The following sections provide instructions for using each of these command options:

- `common` – retrieves publicly-known logs
- `vendor` – retrieves vendor-specific logs
- `system-heavy` – retrieves system host logs that cause heavy loads on the drives
- `system-light` – retrieves system host logs that cause light loads on the drives
- `system` – a combination of `system-heavy` and `system-light`
- `drives` – retrieve logs from the attached physical drives (NVMe, SAS, SATA).
- `pack=<path>` – in addition to individual output files, combines all requested logs into a single, packaged file in the specified path. Intended to be used with the other options listed here.
  - If `pack=<path>` is not specified, the file will be saved to the temporary directory on the host in question: `/tmp` (for Linux) or `C:\Users\<username>\AppData\Local\Temp\` (for Windows).
  - For Windows, the `pack=<path>` option requires PowerShell 5+. For later versions, the system will print `Packing not done: requires PowerShell version 5 or above`. On Windows Server, upgrading to Windows Management Framework 5.x will provide PowerShell 5.x.
- `timeout=<sec>` – specifies the maximum time, in seconds, before the WDDCS Tool moves on to the next command for retrieveing data. The default is sixty (60) seconds.
- `all` – includes all of the above identifiers

Note: Before collecting log data, installation of `sg3_utils` (version 1.42+) is **required**, and `smp_utils` (version 0.98+) is **recommended**. These utilities may be downloaded from the following locations:

- http://sg.danny.cz/sg/sg3_utils.html
- http://sg.danny.cz/sg/smp_utils.html

3.4.1 getlog common

The `wddcs getlog common` command is used to capture `sg_ses` and `sg_inq` info for all SEP devices within HGST/WD-developed enclosures.

Before you begin:

- Unless the `pack=<path>` option is used, the output directory and files will be saved in the temporary directory on the host in question.
- The name of the output directory will include the host name and timestamp (when the command was executed), for traceability.
- The output files will be placed into a subdirectory named `ses`.
- The name of the output files will include the SEP device sg handle, to denote which device was queried.

The `wddcs getlog common` command will capture the following information (listed by enclosure type):

Table 5: Enclosure Information Captured by the `getlog common` Command

	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
SES Pages							
0x0	✓	✓	✓	✓	✓	✓	✓
0x1	✓	✓	✓	✓	✓	✓	✓
0x2	✓	✓	✓	✓	✓	✓	✓
0x3	✓	✓	✓	✓	✓	✓	✓
0x5	✓	✓	✓	✓	✓	✓	✓
0x7	✓	✓	✓	✓	✓	✓	✓
0xA	✓	✓	✓	✓	✓	✓	✓
Join	✓	✓	✓	✓	✓	✓	✓
SG_INQ							
SG INQ	✓	✓	✓	✓	✓	✓	✓
SG INQ Hex	✓	✓	✓	✓	✓	✓	✓
SG INQ 0x83	✓	✓	✓	✓	✓	✓	✓

Step 1: Use the `wddcs getlog common` command to retrieve the SES pages and SG_INQ info for all SEP devices within HGST/WD-developed enclosures:

Example of Linux output:

```
# wddcs getlog common
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates
```

```
Device: /dev/sg3
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_00h_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_01h_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_02h_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_03h_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_05h_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_07h_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_0Ah_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
ses_join_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/sg_inq_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<<datestamp>_<timestamp>/ses/
sg_inq_hex_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
sg_inq_page_83h_sg3.txt
...
```

Example of Windows output:

```
C:\> wddcs getlog common
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: SCSI4:0,35,0
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_00h_scsi4_0-35-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_01h_scsi4_0-35-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_02h_scsi4_0-35-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_03h_scsi4_0-35-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_05h_scsi4_0-35-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_07h_scsi4_0-35-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_0Ah_scsi4_0-35-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\ses_join_scsi4_0-35-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\sg_inq_scsi4_0-35-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\sg_inq_hex_scsi4_0-35-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses
\sg_inq_page_83h_scsi4_0-35-0.txt
...
```

a. To limit the results to a single SEP device, include at least one device handle for the enclosure. For example:

```
wddcs <device> getlog common
```

b. To combine the logs into a single, packaged file, include the `pack` option and specify the target location for the file by including `=<path>`. For example:

```
wddcs <device> getlog common pack=<path>
```

c. To specify a maximum wait time for each subsequent log retreival issued by the getlog command, include the `timeout` option and specify the number of seconds to wait by including `=<sec>`. For example:

```
wddcs <device> getlog common pack=<path> timeout=<sec>
```

3.4.2 getlog vendor

The `wddcs getlog vendor` command is used to capture vendor-specific log information for all SEP devices within specific HGST/WD-developed enclosures.

Before you begin:

- Unless the `pack=<path>` option is used, the output directory and files will be saved in the temporary directory on the host in question.
- The name of the output directory will include the host name and timestamp (when the command was executed), for traceability.
- The output files will be placed into the subdirectories named `ses` and `jbodlogs`
- The name of the output files will include the SEP device handle, to denote which device was queried.

The `wddcs getlog vendor` command will capture the following vendor-related information (listed by enclosure type):

Table 6: Vendor Information Captured by the `getlog vendor` Command

	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
SES Pages							
0xEA	✓	✗	✗	✓	✓	✓	✓
0xEB	✓	✗	✗	✗	✗	✗	✗
0xED	✓	✗	✗	✓	✓	✓	✓
0x85	✓	✗	✗	✗	✗	✗	✗
0x87	✓	✗	✗	✗	✗	✗	✗
0x95	✓	✗	✗	✗	✗	✗	✗

	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
0x97	✓	✗	✗	✗	✗	✗	✗
0x17	✓	✗	✗	✗	✓	✓	✓
RCLI Commands							
`bundle_log.tgz`	✗	✗	✗	✗	✓	✓	✓
`debug dump`	✓	✗	✗	✓	✓	✓	✓
`device_handles`	✗	✗	✗	✗	✓	✓	✓
`err_cnts 0-35 read`	✓	✗	✗	✓	✗	✗	✗
`err_cnts 0-47 read`	✗	✗	✗	✗	✓	✓	✓
`err_cnts 36-67 read`	✓	✗	✗	✗	✗	✗	✗
`gpio`	✓	✗	✗	✓	✓	✓	✓
`i2c read fpga port 1`	✗	✗	✗	✗	✓	✓	✓
`i2c read fpga port 2`	✗	✗	✗	✗	✓	✓	✓
`i2c read fpga port 3`	✗	✗	✗	✗	✓	✓	✓
`i2c read fpga port 4`	✗	✗	✗	✗	✓	✓	✓
`i2c scan`	✓	✗	✗	✓	✓	✓	✓
`iom ...`	✗	✗	✗	✗	✗	✗	✗
`phyinfo`	✓	✗	✗	✓	✓	✓	✓
`phyinfo buffer`	✓	✗	✗	✓	✓	✓	✓

	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
`qinfo`	✓	✗	✗	✓	✓	✓	✓
`rmt debug dump`	✓	✗	✗	✗	✗	✗	✗
`rmt err_cnts 0-35 read`	✓	✗	✗	✗	✗	✗	✗
`rmt err_cnts 36-67 read`	✓	✗	✗	✗	✗	✗	✗
`rmt phyinfo`	✓	✗	✗	✗	✗	✗	✗
`rmt phyinfo buffer`	✓	✗	✗	✗	✗	✗	✗
`rmt qinfo`	✓	✗	✗	✗	✗	✗	✗
`rmt show phys`	✓	✗	✗	✗	✗	✗	✗
`rmt show threads`	✓	✗	✗	✗	✗	✗	✗
`rmt status sas_phy`	✓	✗	✗	✗	✗	✗	✗
`sec1 debug dump`	✗	✗	✗	✓	✓	✓	✓
`sec1 err_cnts 0-35 read`	✗	✗	✗	✓	✗	✗	✗
`sec1 err_cnts 0-60 read`	✗	✗	✗	✗	✓	✓	✓
`sec1 err_cnts 36-67 read`	✗	✗	✗	✗	✗	✗	✗
`sec1 phyinfo`	✗	✗	✗	✓	✓	✓	✓
`sec1 phyinfo buffer`	✗	✗	✗	✓	✓	✓	✓
`sec1 qinfo`	✗	✗	✗	✓	✓	✓	✓

	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
`sec1 show phys`	✗	✗	✗	✓	✓	✓	✓
`sec1 show threads`	✗	✗	✗	✓	✓	✓	✓
`sec1 status sas_phy`	✗	✗	✗	✓	✓	✓	✓
`sec2 debug dump`	✗	✗	✗	✓	✓	✓	✓
`sec2 err_cnts 0-35 read`	✗	✗	✗	✓	✗	✗	✗
`sec1 err_cnts 0-60 read`	✗	✗	✗	✗	✓	✓	✓
`sec2 err_cnts 36-67 read`	✗	✗	✗	✗	✗	✗	✗
`sec2 phyinfo`	✗	✗	✗	✓	✓	✓	✓
`sec2 phyinfo buffer`	✗	✗	✗	✓	✓	✓	✓
`sec2 qinfo`	✗	✗	✗	✓	✓	✓	✓
`sec2 show phys`	✗	✗	✗	✓	✓	✓	✓
`sec2 show threads`	✗	✗	✗	✓	✓	✓	✓
`sec2 status sas_phy`	✗	✗	✗	✓	✓	✓	✓
`show ac`	✓	✗	✗	✓	✓	✓	✓
`show autosync`	✗	✗	✗	✗	✓	✓	✗
`show cable`	✗	✗	✗	✗	✓	✓	✓
`show drives`	✓	✗	✗	✓	✓	✓	✓

	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
show drives high	✓	✗	✗	✓	✓	✓	✓
show drives low	✓	✗	✗	✓	✓	✓	✓
show dual	✗	✗	✗	✓	✓	✓	✓
show enc	✗	✗	✗	✓	✓	✓	✓
show gpio	✓	✗	✗	✓	✓	✓	✓
show hosts	✓	✗	✗	✓	✓	✓	✓
show le	✓	✗	✗	✓	✓	✓	✓
show phys	✓	✗	✗	✓	✓	✓	✓
show sensor	✓	✗	✗	✓	✓	✓	✓
show ses	✓	✗	✗	✓	✓	✓	✓
show thermon	✓	✗	✗	✓	✓	✓	✓
show threads	✓	✗	✗	✓	✓	✓	✓
show vpd	✗	✗	✗	✓	✓	✓	✓
status sas_phy	✓	✗	✗	✓	✓	✓	✓
wddcs_iom.txt	✓	✗	✗	✓	✓	✓	✓
wddcs_show.txt	✓	✗	✗	✓	✓	✓	✓
zonecfg	✗	✗	✗	✓	✓	✓	✓

E6 Logs

	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
E6 Console Log Capture	⊗	⊗	⊗	⊗	✓	✓	✓
E6 Crash Log Expander 1 Capture	⊗	⊗	⊗	⊗	✓	✓	✓
E6 Crash Log Expander 2 Capture	⊗	⊗	⊗	⊗	✓	✓	✓
E6 Crash Log Expander 3 Capture	⊗	⊗	⊗	⊗	✓	✓	✓
E6 Event Log Expander 1 Capture	⊗	⊗	⊗	⊗	✓	✓	✓
E6 Event Log Expander 2 Capture	⊗	⊗	⊗	⊗	✓	✓	✓
E6 Event Log Expander 3 Capture	⊗	⊗	⊗	⊗	✓	✓	✓

Step 1: Use the `wddcs getlog vendor` command to capture vendor-specific log information for all SEP devices within specific HGST/WD-developed enclosures. For example:

Note: Actual captured files may vary, based on the enclosures attached to the host in question.

Example of Linux output:

```
# wddcs getlog vendor
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: /dev/sg3
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_EAh_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_EDh_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_17h_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/jbodlogs/
i2c_scan_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/jbodlogs/
show_gpio_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/jbodlogs/
show_enc_sg3.txt
...
```

Example of Windows output:

```
C:\> wddcs getlog vendor
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: SCSI4:0,35,0
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_EAh_scsi4_0-35-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_EDh_scsi4_0-35-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_17h_scsi4_0-35-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\jbodlogs
\consolelog_exp_0_scsi4_0-35-0.bin
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\jbodlogs
\consolelog_exp_1_scsi4_0-35-0.bin
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\jbodlogs
\consolelog_exp_2_scsi4_0-35-0.bin
...
```

a. To limit the results to a single SEP device, include at least one device handle for the enclosure. For example:

```
wddcs <device> getlog vendor
```

b. To combine the logs into a single, packaged file, include the `pack` option. In addition, specify the target location for the file by including `=<path>`. For example:

```
wddcs <device> getlog vendor pack=<path>
```

c. To specify a maximum wait time for each subsequent log retreival issued by the getlog command, include the `timeout` option and specify the number of seconds to wait by including `=<sec>`. For example:

```
wddcs <device> getlog vendor pack=<path> timeout=<sec>
```

3.4.3 getlog system-heavy

The `wddcs getlog system-heavy` command is used to capture a smaller subset of host data than the `wddcs getlog system` command; it includes only the operations that cause heavy system load and excludes all others.

Before you begin:

- Unless the `pack=<path>` option is used, the output directory and files will be saved in the temporary directory on the host in question.
- The name of the output directory will include the host name and timestamp (when the command was executed), for traceability.
- The output files will be placed into the following subdirectories:
  - For Linux - `disks`, `system`, and `system/lvm`
  - For Windows - `hostlogs`

- The name of the output files will include the SEP device handle, to denote which device was queried.

Step 1: Use the `wddcs getlog system-heavy` command to capture the host data:

Example of Linux output:

```
# wddcs getlog system-heavy
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/disks
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/system
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/system/lvm
```

Example of Windows output:

```
C:\> wddcs getlog system-heavy
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Created files in C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\hostlogs
```

a. To limit the results to a single SEP device, include at least one device handle for the enclosure. For example:

```
wddcs <device> getlog system-heavy
```

b. To combine the logs into a single, packaged file, include the `pack` option. In addition, specify the target location for the file by including `=<path>`. For example:

```
wddcs <device> getlog system-heavy pack=<path>
```

c. To specify a maximum wait time for each subsequent log retreival issued by the getlog command, include the `timeout` option and specify the number of seconds to wait by including `=<sec>`. For example:

```
wddcs <device> getlog system-heavy pack=<path> timeout=<sec>
```

3.4.4 getlog system-light

The `wddcs getlog system-light` command is used to capture a smaller subset of host data than the `wddcs getlog system` command; it includes operations that cause a light system load and excludes all others.

Before you begin:

- Unless the `pack=<path>` option is used, the output directory and files will be saved in the temporary directory on the host in question.
- The name of the output directory will include the host name and timestamp (when the command was executed), for traceability.
- The output files will be placed into the following subdirectories:
  - For Linux - `disks`, `logs`, `jbodlogs`, `proc`, `ses`, `smp`, `system`, and `system/lvm`
  - For Windows - `disks`, `hostlogs`, and `ses`

- The name of the output files will include the SEP device handle, to denote which device was queried.

Step 1: Use the `wddcs getlog system-light` command to capture the host data:

Important: This function may take up a large amount of space in the temporary directory, which could affect the root file system. Please ensure the file system has enough space to support this operation. Several megabytes of data may be captured, depending on the number of drives and enclosures attached to the host in question.

Example of Linux output:

```
# wddcs getlog system-light
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/disks
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/system
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/system/lvm
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/proc
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/logs
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/smp
```

Example of Windows output:

```
C:\> wddcs getlog system-light
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Created files in C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\disks
Created files in C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\hostlogs
Created files in C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses
```

a. To limit the results to a single SEP device, include at least one device handle for the enclosure. For example:

```
wddcs <device> getlog system-light
```

b. To combine the logs into a single, packaged file, include the `pack` option. In addition, specify the target location for the file by including `=<path>`. For example:

```
wddcs <device> getlog system-light pack=<path>
```

c. To specify a maximum wait time for each subsequent log retreival issued by the getlog command, include the `timeout` option and specify the number of seconds to wait by including `=<sec>`. For example:

```
wddcs <device> getlog system-light pack=<path> timeout=<sec>
```

3.4.5 getlog system

The `wddcs getlog system` command is used to capture the host data related to disks, host message logs, and system-related information. It combines the operations of both the `wddcs getlog system-light` and `wddcs getlog system-heavy` commands.

Before you begin:

- Unless the `pack=<path>` option is used, the output directory and files will be saved in the temporary directory on the host in question.
- The name of the output directory will include the host name and timestamp (when the command was executed), for traceability.
- The output files will be placed into the following subdirectories:
  - For Linux - `disks`, `logs`, `jbodlogs`, `proc`, `ses`, `smp`, `system`, and `system/lvm`
  - For Windows - `disks`, `hostlogs`, and `ses`
- The name of the output files will include the SEP device handle, to denote which device was queried.

Step 1: Use the `wddcs getlog system` command to capture the host data:

Important: This function may cause a heavy load on the system. To capture a smaller subset of the host data and reduce the system load, see getlog system-light *(page 54)*.

Important: This function may take up a large amount of space in the temporary directory, which could affect the root file system. Please ensure the file system has enough space to support this operation. Several megabytes of data may be captured, depending on the number of drives and enclosures attached to the host in question.

Example of Linux output:

```
# wddcs getlog system
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/disks
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/system
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/system/lvm
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/proc
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/logs
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/smp
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/disks
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/system
Created files in /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/system/lvm
```

Example of Windows output:

```
C:\> wddcs getlog system
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates
```

```
Created files in C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\disks
Created files in C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\hostlogs
Created files in C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses
```

a. To limit the results to a single SEP device, include at least one device handle for the enclosure. For example:

```
wddcs <device> getlog system
```

b. To combine the logs into a single, packaged file, include the `pack` option. In addition, specify the target location for the file by including `=<path>`. For example:

```
wddcs <device> getlog system pack=<path>
```

c. To specify a maximum wait time for each subsequent log retreival issued by the getlog command, include the `timeout` option and specify the number of seconds to wait by including `=<sec>`. For example:

```
wddcs <device> getlog system pack=<path> timeout=<sec>
```

3.4.6 getlog drives

The `wddcs getlog drives` command is used to capture logs from the attached physical drives (NVMe, SAS, SATA). This feature is not meant to take the place of tools like HUGO to capture E6 Logs from HDDs.

Before you begin:

- Unless the `pack=<path>` option is used, the output directory and files will be saved in the temporary directory on the host in question.
- The name of the output directory will include the host name and timestamp (when the command was executed), for traceability.
- The output files will be placed into a subdirectory named `ses`.
- The name of the output files will include the SEP device handle, to denote which device was queried.

Step 1: Use the `wddcs getlog drives` command to retrieve the drive info:

```
wddcs getlog drives
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

The data capture on drives can be intensive when they are under a heavy I/O
 load.
Please consider capturing the drive logs while the drives are under a lighter
 I/O load.
If you want proceed with the capture of the drive logs, press 'Y' or 'y':
```

The user is notified of the potential system load resulting from capturing drive data.

Step 2: Enter `Y` or `y` to proceed:

Example of Linux output:

```
# y
```

```
Device: /dev/sda
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/disks/
scli_show_sda.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/disks/smartctl_-
a_sda.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/disks/
sg_logs_page18h_sda.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/disks/sdparm_-
i_sda.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/disks/
sg_inq_sda.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/disks/sg_inq_-
p0x80_sda.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/disks/sg_inq_-
p0x83_sda.txt
...
```

Example of Windows output:

```
C:\> y

device: /dev/sda
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\disks\smartctl_health_sda.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\disks\smartctl_extended_sda.txt
...
```

a. To limit the results to a single SEP device, include at least one device handle for the enclosure. For example:

```
wddcs <device> getlog drives
```

b. To combine the logs into a single, packaged file, include the `pack` option. In addition, specify the target location for the file by including `=<path>`. For example:

```
wddcs <device> getlog drives pack=<path>
```

c. To specify a maximum wait time for each subsequent log retreival issued by the getlog command, include the `timeout` option and specify the number of seconds to wait by including `=<sec>`. For example:

```
wddcs <device> getlog drives pack=<path> timeout=<sec>
```

d. To skip user prompts during the operation, use the `-noprompt` command. For example:

```
wddcs <device> getlog drives-noprompt
```

3.4.7 getlog all

The `wddcs getlog all` command is used to capture all log data for all SEP devices within HGST/WD-developed enclosures. It combines the `common`, `vendor`, `system`, and `drives` command options.

Before you begin:

- Unless the `pack=<path>` option is used, the output directory and files will be saved in the temporary directory on the host in question.
- The name of the output directory will include the host name and timestamp (when the command was executed), for traceability.
- The output files will be placed into the subdirectories named `disks`, `jbodlogs`, `hostlogs`, and `ses`.
- The name of the output files will include the SEP device handle, to denote which device was queried.

Step 1: Use the `wddcs getlog all` command to retrieve the SEP device info:

Example of Linux output:

```
# wddcs getlog all
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_00h_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_01h_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_02h_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_03h_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_05h_sg3.txt
*File saved: /tmp/wddcs_<hostname>_<datestamp>_<timestamp>/ses/
page_07h_sg3.txt
...
```

Example of Windows output:

```
C:\> wddcs getlog all
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: SCSI4:0,32,0
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_00h_scsi4_0-32-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_01h_scsi4_0-32-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_02h_scsi4_0-32-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_03h_scsi4_0-32-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_05h_scsi4_0-32-0.txt
*File saved: C:\Users\ADMINI~1\AppData\Local\Temp
\2\wddcs_<hostname>_<datestamp>_<timestamp>\ses\page_07h_scsi4_0-32-0.txt
...
```

Note: Actual captured files may vary, based on the enclosures attached to the host in question.

a. To limit the results to a single SEP device, include at least one device handle for the enclosure. For example:

```
wddcs <device> getlog all
```

b. To combine the logs into a single, packaged file, include the `pack` option. In addition, specify the target location for the file by including `=<path>`. For example:

```
wddcs <device> getlog all pack=<path>
```

c. To specify a maximum wait time for each subsequent log retreival issued by the getlog command, include the `timeout` option and specify the number of seconds to wait by including `=<sec>`. For example:

```
wddcs <device> getlog all pack=<path> timeout=<sec>
```

d. To skip user prompts during the operation, use the `-noprompt` command. For example:

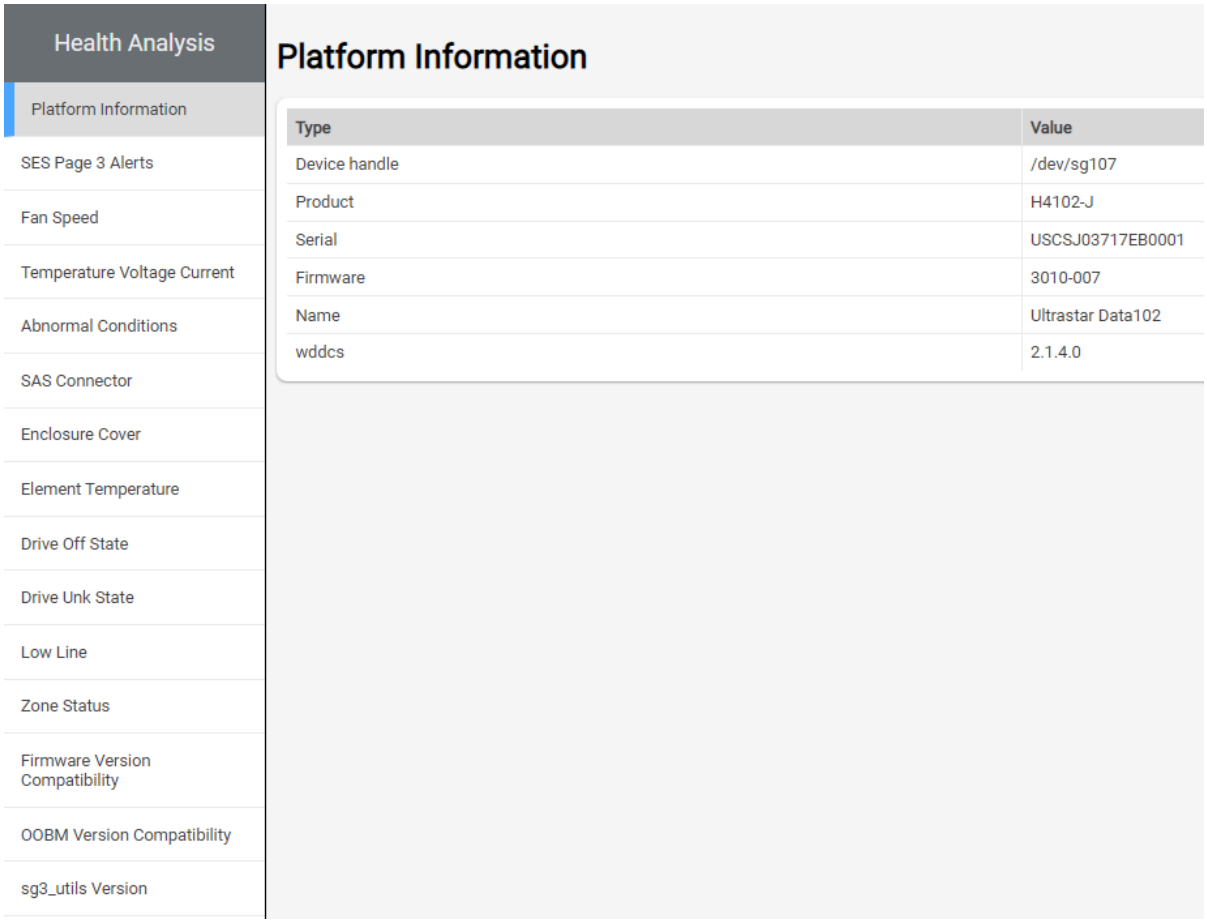
```
wddcs <device> getlog all-noprompt
```

3.4.7.1 Health Analysis

In addition to capturing log data in text files, the `wddcs getlog all` command produces an html file that can be opened in a browser. This provides a user-friendly method of reviewing log data.

Open the `health_analysis.html` file in a browser to view the log data in a GUI format. The following image shows the **Platform Information** page. Use the navigation bar on the left side to access additional pages.

Figure 22: Health Analysis - Platform Information



3.5 iom

The `wddcs iom` command—without arguments—is used to determine the IOM configuration for SEP devices within HGST/WD-developed enclosures. With arguments, the `wddcs iom <args>` command is used to either determine current OOBM values or set new OOBM values.

Before you begin:

Possible IOM configurations by enclosure:

- Ultrastar Data102 – dual or single, depending on configuration
- Ultrastar Data60 – dual or single, depending on configuration
- Ultrastar Serv60+8 – single only
- 4U60 G2 Storage Enclosure – dual or single, depending on configuration
- Storage Enclosure Basic – single only

The `wddcs iom` command and options are supported on the following enclosures:

Table 7: Supported `iom` Commands by Enclosure

Command	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
`iom`	✓	✗	✗	✓	✓	✓	✓
`iom oobm`	✗	✗	✗	✗	✓	✓	✓
`iom oobm` (set static)	✗	✗	✗	✗	✓	✓	✓
`iom oobm` (set DHCP)	✗	✗	✗	✗	✓	✓	✓

Step 1: Use the `wddcs iom` command to print the IOM configuration.

- The output will print `Dual IOM operation` for devices with a dual IOM configuration.
- The output will print `Single IOM operation` for devices with a single IOM configuration.

```
wddcs iom
wddcs v2.1.4.0
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Device: <device>
Dual IOM operation
IOM B

Device: <device>
Dual IOM operation
IOM A
```

a. To limit the results to a single SEP device, add the SEP device handle:

```
wddcs <device> iom
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Dual IOM operation
```

b. To determine the current OOBM values, include the `oobm` argument:

```
wddcs <device> iom oobm
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
    IOM B   : DHCP (1)
    IP      : 10.202.239.109
    Netmask : 255.255.252.0
    Gateway : 10.202.236.1
    OOBM FW : 2.2.1
    MAC     : 00:0C:CA:05:00:1A
```

c. To set the OOBM values, include the `oobm=<iom>,<ip>,<netmask>,<gateway>` option, where:

- `<iom>` = `A` or `B`
- `<ip>` = #.#.#.# (the IP address as four, decimal-separated, numerical values from 0-255)
- `<netmask>` = #.#.#.# (the netmask as four, decimal-separated, numerical values from 0-255)
- `<gateway>` = #.#.#.# (the gateway as four, decimal-separated, numerical values from 0-255)

For example, to set IOM A to `static`:

```
wddcs <device> iom oobm=A,192.168.0.10,255.255.255.0,192.168.0.1
```

To change IOM B to `DHCP`:

```
wddcs <device> iom oobm=B,0.0.0.0,0.0.0.0,0.0.0.0
```

Caution: When setting IOM IP addresses to either static or DHCP, always specify a SEP device. Failure to do so could result in multiple IOMs with the same IP address or all A/B IOMs being set to DHCP.

3.6 rcli

The `wddcs <device> rcli <command string>` command is used to capture detailed data about HGST/WD-developed enclosures and their components.

Before you begin:

- Commands that are not supported on a certain enclosures will report as `not supported`. For example:

```
wddcs <device> rcli <command string>
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
rcli cmd: <command string>
This command is not supported on this platform
```

Step 1: Use the `wddcs <device> rcli <command string>` command to run an RCLI command from the WDDCS Tool. If the command string contains spaces, enclose it with quotation marks (i.e. "command string"). See Supported RCLI Commands By Enclosure *(page 63)* for a list of supported RCLI command strings.

3.6.1 Supported RCLI Commands By Enclosure

This section defines the RCLI commands supported by the WDDCS Tool for each HGST/WD-developed JBOD enclosure.

Legend for RCLI Commands By Enclosure

- **0-#** = **Supported**

- ✓ = **Supported**
- ✗ = **Not Supported**

Note: In the table below, click the linked command strings—where applicable—to view an example of that string used in conjunction with the `wddcs rcli` command.

Table 8: RCLI Commands By Enclosure

RCLI Command String	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
`clear err_cnts`	✓	✗	✗	✓	✓	✓	✓
`debug dump`	✓	✗	✗	✓	✓	✓	✓
`err_cnts 0-35 clear`	✓	✗	✗	✓	✓	✓	✓
`err_cnts 0-47 clear`	✓	✗	✗	✗	✓	✓	✓
`err_cnts 0-60 clear`	✓	✗	✗	✗	✓	✓	✓
`err_cnts 36-67 clear`	✓	✗	✗	✗	✗	✗	✗
`err_cnts <PHY_ID> clear`	0-67	✗	✗	0-35	0-47	0-47	0-47
`err_cnts 0-35 read`	✓	✗	✗	✓	✓	✓	✓
`err_cnts 36-67 read`	✓	✗	✗	✗	✗	✗	✗
`err_cnts <PHY_ID> read`	0-67	✗	✗	0-35	0-47	0-47	0-47
`gpio`	✓	✗	✗	✓	✓	✓	✓
`i2c scan`	✓	✗	✗	✓	✓	✓	✓
`iom gpio`	✗	✗	✗	✗	✓	✓	✗
`phyinfo` *(page 69)*	✓	✗	✗	✓	✓	✓	✓
`phyinfo buffer` *(page 69)*	✓	✗	✗	✓	✓	✓	✓
`qinfo`	✓	✗	✗	✓	✓	✓	✓

RCLI Command String	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
`read err_cnts`	✓	✗	✗	✓	✓	✓	✓
`rmt debug dump`	✓	✗	✗	✗	✗	✗	✗
`rmt err_cnts 0-35 clear`	✓	✗	✗	✗	✗	✗	✗
`rmt err_cnts 36-67 clear`	✓	✗	✗	✗	✗	✗	✗
`rmt err_cnts <PHY_ID> clear`	0-67	✗	✗	✗	✗	✗	✗
`rmt err_cnts 0-35 read`	✓	✗	✗	✗	✗	✗	✗
`rmt err_cnts 36-67 read`	✓	✗	✗	✗	✗	✗	✗
`rmt err_cnts <PHY_ID> read`	0-67	✗	✗	✗	✗	✗	✗
`rmt phyinfo`	✓	✗	✗	✗	✗	✗	✗
`rmt phyinfo buffer`	✓	✗	✗	✗	✗	✗	✗
`rmt qinfo`	✓	✗	✗	✗	✗	✗	✗
`rmt show phys`	✓	✗	✗	✗	✗	✗	✗
`rmt show threads`	✓	✗	✗	✗	✗	✗	✗
`rmt status sas_phy`	✓	✗	✗	✗	✗	✗	✗
`sec1 debug dump`	✗	✗	✗	✓	✓	✓	✓
`sec1 err_cnts 0-35 clear`	✗	✗	✗	✓	✓	✓	✓
`sec1 err_cnts 0-60 clear`	✗	✗	✗	✗	✓	✓	✓
`sec1 err_cnts 36-67 clear`	✗	✗	✗	✗	✓	✓	✓

RCLI Command String	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
`sec1 err_cnts <PHY_ID> clear`	✗	✗	✗	0-35	0-67	0-67	0-67
`sec1 err_cnts 0-35 read`	✗	✗	✗	✓	✓	✓	✓
`sec1 err_cnts 0-60 read`	✗	✗	✗	✗	✓	✓	✓
`sec1 err_cnts 36-67 read`	✗	✗	✗	✗	✓	✓	✓
`sec1 err_cnts <PHY_ID> read`	✗	✗	✗	0-35	0-67	0-67	0-67
`sec1 phyinfo` *(page 70)*	✗	✗	✗	✓	✓	✓	✓
`sec1 phyinfo buffer` *(page 71)*	✗	✗	✗	✓	✓	✓	✓
`sec1 qinfo`	✗	✗	✗	✓	✓	✓	✓
`sec1 show phys` *(page 74)*	✗	✗	✗	✓	✓	✓	✓
`sec1 show threads`	✗	✗	✗	✓	✓	✓	✓
`sec1 status sas_phy`	✗	✗	✗	✓	✓	✓	✓
`sec1 tx_para_get<0-67>`	✗	✗	✗	✗	✓	✓	✓
`sec2 debug dump`	✗	✗	✗	✓	✓	✓	✓
`sec2 err_cnts 0-35 clear`	✗	✗	✗	✓	✓	✓	✓
`sec2 err_cnts 0-60 clear`	✗	✗	✗	✗	✓	✓	✓
`sec2 err_cnts 36-67 clear`	✗	✗	✗	✗	✓	✓	✓

RCLI Command String	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
`sec2 err_cnts <PHY_ID> clear`	✗	✗	✗	0-35	0-67	0-67	0-67
`sec2 err_cnts 0-35 read`	✗	✗	✗	✓	✓	✓	✓
`sec2 err_cnts 0-60 read`	✗	✗	✗	✗	✓	✓	✓
`sec2 err_cnts 36-67 read`	✗	✗	✗	✗	✓	✓	✓
`sec2 err_cnts <PHY_ID> read`	✗	✗	✗	0-35	0-67	0-67	0-67
`sec2 phyinfo` *(page 72)*	✗	✗	✗	✓	✓	✓	✓
`sec2 phyinfo buffer` *(page 73)*	✗	✗	✗	✓	✓	✓	✓
`sec2 qinfo`	✗	✗	✗	✓	✓	✓	✓
`sec2 show phys` *(page 74)*	✗	✗	✗	✓	✓	✓	✓
`sec2 show threads`	✗	✗	✗	✓	✓	✓	✓
`sec2 status sas_phy`	✗	✗	✗	✓	✓	✓	✓
`sec2 tx_para_get<0-67>`	✗	✗	✗	✗	✓	✓	✓

`show ac` *(page 75)*
`show actuator`
`show actuators`
	✓	✗	✗	✓	✓	✓	✓

`show autosync`	✗	✗	✗	✗	✓	✓	✗
`show cable`	✗	✗	✗	✗	✓	✓	✓
`show devices`	✓	✗	✗	✓	✓	✓	✓
`show drive`	✓	✗	✗	✓	✓	✓	✓

RCLI Command String	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
show drives *(page 76)*							
show drives high	✓	✗	✗	✓	✓	✓	✓
show drives low	✓	✗	✗	✓	✓	✓	✓
show dual *(page 76)*	✗	✗	✗	✓	✓	✓	✓
show enc *(page 77)*	✗	✗	✗	✓	✓	✓	✓
show fw	✓	✗	✗	✓	✓	✓	✓
show gpio show io	✓	✗	✗	✓	✓	✓	✓
show hosts *(page 77)*	✓	✗	✗	✓	✓	✓	✓
show le show led show leds	✓	✗	✗	✓	✓	✓	✓
show phys *(page 78)*	✓	✗	✗	✓	✓	✓	✓
show sensor *(page 78)* show sn show sensors	✓	✗	✗	✓	✓	✓	✓
show ses *(page 79)*	✓	✗	✗	✓	✓	✓	✓
show thermon	✓	✗	✗	✓	✓	✓	✓
show threads	✓	✗	✗	✓	✓	✓	✓
show vpd *(page 80)*	✗	✗	✗	✓	✓	✓	✓
status sas_phy	✓	✗	✗	✓	✓	✓	✓
tx_para_get<0-47>	✓	✗	✗	✓	✓	✓	✓
vpd set *(page 80)*	✓	✗	✗	✓	✓	✓	✓
zonecfg *(page 80)*	✗	✗	✗	✓	✓	✓	✓

RCLI Command String	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
`zonecfg disable`	✗	✗	✗	✓	✓	✓	✗

3.6.2 RCLI Command String Examples

3.6.2.1 rcli phyinfo

The `wddcs <device> rcli phyinfo` command is used to display the primary SAS Expander PHY information for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli phyinfo` command to display the primary SAS Expander PHY information for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli phyinfo
wddcs v2.1.4.0
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Device: <device>
Phy Type Link Route SAS                Change  Zone    Zone  Conn  Conn
 Conn
ID       Rate Attr  Address            Count   Group   Info  Type  Elem
 Phy
                                                                   Index
 Link
-------------------------------------------------------------------------------
0   ---  ---    T   ---                0x00    0x08    0x04  0x05  0x66
 0x03
1   ---  ---    T   ---                0x00    0x08    0x04  0x05  0x66
 0x03
2   ---  ---    T   ---                0x00    0x08    0x04  0x05  0x66
 0x03
3   ---  ---    T   ---                0x00    0x08    0x04  0x05  0x66
 0x03
4   End  12G    T   0x500605b00e7b00d0  0x02    0x09    0x04  0x05  0x6e
 0x03
5   End  12G    T   0x500605b00e7b00d0  0x02    0x09    0x04  0x05  0x6e
 0x03
6   End  12G    T   0x500605b00e7b00d0  0x02    0x09    0x04  0x05  0x6e
 0x03
7   End  12G    T   0x500605b00e7b00d0  0x02    0x09    0x04  0x05  0x6e
 0x03
8   ---  ---    T   ---                0x00    0x0a    0x04  0x05  0x6f
 0x03
9   ---  ---    T   ---                0x00    0x0a    0x04  0x05  0x6f
 0x03
10  ---  ---    T   ---                0x00    0x0a    0x04  0x05  0x6f
 0x03
...
```

3.6.2.2 rcli "phyinfo buffer"

The `wddcs <device> rcli "phyinfo buffer"` command is used to display the primary SAS expander PHY info buffer information for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "phyinfo buffer"` command to display the primary SAS expander PHY info buffer information for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "phyinfo buffer"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
PHY  Link  Drv    Buffer  SAS     SAS     SATA    SATA    Conn  Conn  OAF
 Snoop
ID   Rate  Link   Enable  Buffer  Buffer  Buffer  Buffer  Mgmt  Mgmt  Early
 TMF
           Rate           3G      6G      3G      6G      3/6G  12G   Accept

-------------------------------------------------------------------------------
0    ---   ---    -       -       *       *       *       *     *     -
 -
1    ---   ---    -       -       *       *       *       *     *     -
 -
2    ---   ---    -       -       *       *       *       *     *     -
 -
3    ---   ---    -       -       *       *       *       *     *     -
 -
4    12G   12G    -       -       *       *       *       *     *     -
 -
5    12G   12G    -       -       *       *       *       *     *     -
 -
6    12G   12G    -       -       *       *       *       *     *     -
 -
7    12G   12G    -       -       *       *       *       *     *     -
 -
8    ---   ---    -       -       *       *       *       *     *     -
 -
9    ---   ---    -       -       *       *       *       *     *     -
 -
10   ---   ---    -       -       *       *       *       *     *     -
 -
...
```

3.6.2.3 rcli "sec1 phyinfo"

The `wddcs <device> rcli "sec1 phyinfo"` command is used to display the secondary SAS expander 1 PHY information for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "sec1 phyinfo"` command to display the secondary SAS expander 1 PHY information for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "sec1 phyinfo"
```

```
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Phy Type Link Route SAS                Change  Zone    Zone  Conn  Conn
 Conn
ID       Rate Attr  Address            Count   Group   Info  Type  Elem
 Phy
                                                                  Index
 Link
--------------------------------------------------------------------------------
0   ---  ---    T   ---                0x00    0x38    0x04  0x20  0x2a
 0x00
1   ---  ---    T   ---                0x00    0x3a    0x04  0x20  0x2c
 0x00
2   ---  ---    T   ---                0x00    0x43    0x04  0x20  0x35
 0x00
3   ---  ---    T   ---                0x00    0x44    0x04  0x20  0x36
 0x00
4   ---  ---    T   ---                0x00    0x45    0x04  0x20  0x37
 0x00
5   ---  ---    T   ---                0x00    0x46    0x04  0x20  0x38
 0x00
6   ---  ---    T   ---                0x00    0x47    0x04  0x20  0x39
 0x00
7   ---  ---    T   ---                0x00    0x48    0x04  0x20  0x3a
 0x00
8   ---  ---    T   ---                0x00    0x49    0x04  0x20  0x3b
 0x00
9   ---  ---    T   ---                0x00    0x4a    0x04  0x20  0x3c
 0x00
10  ---  ---    T   ---                0x00    0x4b    0x04  0x20  0x3d
 0x00
...
```

3.6.2.4 rcli "sec1 phyinfo buffer"

The `wddcs <device> rcli "sec1 phyinfo buffer"` command is used to display the secondary SAS expander 1 PHY info buffer information for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "sec1 phyinfo buffer"` command to display the secondary SAS expander 1 PHY info buffer information for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "sec1 phyinfo buffer"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
PHY  Link  Drv    Buffer  SAS     SAS     SATA    SATA    Conn  Conn  OAF
 Snoop
ID   Rate  Link   Enable  Buffer  Buffer  Buffer  Buffer  Mgmt  Mgmt  Early
 TMF
           Rate           3G      6G      3G      6G      3/6G  12G   Accept

--------------------------------------------------------------------------------
```

```
0    ---   ---    -       -       *       *       *       *       *      -
 -
1    ---   ---    -       -       *       *       *       *       *      -
 -
2    ---   ---    -       -       *       *       *       *       *      -
 -
3    ---   ---    -       -       *       *       *       *       *      -
 -
4    ---   ---    -       -       *       *       *       *       *      -
 -
5    ---   ---    -       -       *       *       *       *       *      -
 -
6    ---   ---    -       -       *       *       *       *       *      -
 -
7    ---   ---    -       -       *       *       *       *       *      -
 -
8    ---   ---    -       -       *       *       *       *       *      -
 -
9    ---   ---    -       -       *       *       *       *       *      -
 -
10   ---   ---    -       -       *       *       *       *       *      -
 -
...
```

3.6.2.5 rcli "sec2 phyinfo"

The `wddcs <device> rcli "sec2 phyinfo"` command is used to display the secondary SAS expander 2 PHY information for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "sec2 phyinfo"` command to display the secondary SAS expander 2 PHY information for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "sec2 phyinfo"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Phy Type Link Route SAS                Change  Zone    Zone  Conn  Conn
 Conn
ID       Rate Attr  Address            Count   Group   Info  Type  Elem
 Phy
                                                                   Index
 Link
--------------------------------------------------------------------------------
0   End  12G    T   0x5000cca25306eadd  0x02    0x0e    0x04  0x20  0x00
 0x00
1   End  12G    T   0x5000cca25306859d  0x02    0x0f    0x04  0x20  0x01
 0x00
2   End  12G    T   0x5000cca253068459  0x02    0x10    0x04  0x20  0x02
 0x00
3   End  12G    T   0x5000cca253068569  0x02    0x11    0x04  0x20  0x03
 0x00
4   End  12G    T   0x5000cca253068581  0x02    0x12    0x04  0x20  0x04
 0x00
5   End  12G    T   0x5000cca2532b9751  0x02    0x13    0x04  0x20  0x05
 0x00
```

```
6   End  12G    T   0x5000cca25306873d  0x02    0x14    0x04  0x20  0x06
 0x00
7   End  12G    T   0x5000cca25307011d  0x02    0x15    0x04  0x20  0x07
 0x00
8   End  12G    T   0x5000cca253068411  0x02    0x16    0x04  0x20  0x08
 0x00
9   End  12G    T   0x5000cca2530684b1  0x02    0x17    0x04  0x20  0x09
 0x00
10  End  12G    T   0x5000cca2530702f9  0x02    0x18    0x04  0x20  0x0a
 0x00
...
```

3.6.2.6 rcli "sec2 phyinfo buffer"

The `wddcs <device> rcli "sec2 phyinfo buffer"` command is used to display the secondary SAS expander 2 PHY info buffer information for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "sec2 phyinfo buffer"` command to display the secondary SAS expander 2 PHY info buffer information for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "sec2 phyinfo buffer"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
PHY  Link  Drv    Buffer  SAS     SAS     SATA    SATA    Conn  Conn  OAF
 Snoop
ID   Rate  Link   Enable  Buffer  Buffer  Buffer  Buffer  Mgmt  Mgmt  Early
 TMF
           Rate           3G      6G      3G      6G      3/6G  12G   Accept

--------------------------------------------------------------------------------
0    12G   12G    -       -       *       *       *       *     *     -
 -
1    12G   12G    -       -       *       *       *       *     *     -
 -
2    12G   12G    -       -       *       *       *       *     *     -
 -
3    12G   12G    -       -       *       *       *       *     *     -
 -
4    12G   12G    -       -       *       *       *       *     *     -
 -
5    12G   12G    -       -       *       *       *       *     *     -
 -
6    12G   12G    -       -       *       *       *       *     *     -
 -
7    12G   12G    -       -       *       *       *       *     *     -
 -
8    12G   12G    -       -       *       *       *       *     *     -
 -
9    12G   12G    -       -       *       *       *       *     *     -
 -
10   12G   12G    -       -       *       *       *       *     *     -
 -
```

```
...
```

3.6.2.7 rcli "sec1 show phys"

The `wddcs <device> rcli "sec1 show phys"` command is used to display the PHY information of the secondary SAS expander 1 for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "sec1 show phys"` command to display the PHY information of the secondary SAS expander 1 for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "sec1 show phys"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>

A Sec 1 Expander PHYs
 Id  Type  SAS               Rate   Local      Remote   1.5G  3G  6G 12G
-------------------------------------------------------------------------
  0 : DRV Disabled                  C0FF0000             *   *   *   *
  1 : DRV Disabled                  C0FF0000             *   *   *   *
  2 : DRV Disabled                  C0FF0000             *   *   *   *
  3 : DRV Disabled                  C0FF0000             *   *   *   *
 ...
 39 : DRV 5000CCA25306EC05   12G    C0FF0000   80FF0001   *   *   *   *
 40 : DRV 5000CCA2530684AD   12G    C0FF0000   80FF0001   *   *   *   *
 41 : DRV 5000CCA25306EA45    6G    C0FC0000   80FF0001   *   *   *
 42 : DRV 5000CCA25306F0A1    6G    C0FC0000   80FF0001   *   *   *
 43 : DRV 5000CCA253068705   12G    C0FF0000   80FF0001   *   *   *   *
 ...
```

3.6.2.8 rcli "sec2 show phys"

The `wddcs <device> rcli "sec2 show phys"` command is used to display the PHY information of the secondary SAS expander 2 for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "sec2 show phys"` command to display the PHY information of the secondary SAS expander 2 for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "sec2 show phys"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>

A Sec 2 Expander PHYs
 Id  Type  SAS               Rate   Local      Remote   1.5G  3G  6G 12G
-------------------------------------------------------------------------
  0 : DRV 5000CCA25306EADD   12G    C0FF0000   80FF0001   *   *   *   *
  1 : DRV 5000CCA25306859D   12G    C0FF0000   80FF0001   *   *   *   *
  2 : DRV 5000CCA253068459   12G    C0FF0000   80FF0001   *   *   *   *
  3 : DRV 5000CCA253068569   12G    C0FF0000   80FF0001   *   *   *   *
  4 : DRV 5000CCA253068581   12G    C0FF0000   80FF0001   *   *   *   *
```

```
  5 : DRV 5000CCA2532B9751   12G    C0FF0000   80FF0001   *   *   *   *
  6 : DRV 5000CCA25306873D   12G    C0FF0000   80FF0001   *   *   *   *
  7 : DRV 5000CCA25307011D   12G    C0FF0000   80FF0001   *   *   *   *
  8 : DRV 5000CCA253068411   12G    C0FF0000   80FF0001   *   *   *   *
  9 : DRV 5000CCA2530684B1   12G    C0FF0000   80FF0001   *   *   *   *
 10 : DRV 5000CCA2530702F9   12G    C0FF0000   80FF0001   *   *   *   *
 ...
```

3.6.2.9 rcli "show ac"

The `wddcs <device> rcli "show ac"` command is used to display the PWM information for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "show ac"` command to display the PWM information for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "show ac"
wddcs v2.1.4.0
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Device: <device>
 ac:pwmEnc          = 54 % (Enclosure Fan PWM)
 ac:pwmIom          = 42 % (IOM Fan PWM)
 ac:pwmPsuA         = 0 % (PSU A Fan PWM)
 ac:pwmPsuB         = 0 % (PSU B Fan PWM)
```

Note: For Ultrastar Data60, Ultrastar Serv60+8, and Ultrastar Data102 enclosures, if the IOM fan's PWM is less than (<) 50%, the PSU PWMs will display 0%. If the the IOM fan's PWM is greater than (>) 50%, the PSU PWMs will match the IOM fan's PWM up to a maximum of 85%.

3.6.2.10 rcli "show cable"

The `wddcs <device> rcli "show cable"` command is used to display the host cable information for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "show cable"` command to display the host cable information for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "show cable"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Cable status: 00
Host  0(-): Not installed
Host  1(-): OK  , ZG:09 LEN: 3m, FCI Electronics, 10117949-3030LF
Host  2(-): Not installed
Host  3(-): Not installed
Host  4(-): Not installed
Host  5(-): Not installed
Host  6(-): Not installed
Host  7(-): OK  , ZG:09 LEN: 3m, FCI Electronics, 10117949-3030LF
Host  8(-): Not installed
```

```
Host  9(-): Not installed
Host 10(-): Not installed
Host 11(-): Not installed
```

3.6.2.11 rcli "show drives"

The `wddcs <device> rcli "show drives"` command is used to display the drive information for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "show drives"` command to display the drive information for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "show drives"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>

Slot  SAS Addr         State    Vendor   Product          FW   Serial
-------------------------------------------------------------------------------
 0   : 5000CCA25306EADD On -Rdy  HGST HUH721212AL4204 C3D0 8DG3TXZD
 1   : 5000CCA25306859D On -Rdy  HGST HUH721212AL4204 C3D0 8DG3L5YD
 2   : 5000CCA253068459 On -Rdy  HGST HUH721212AL4204 C3D0 8DG3L3AD
 3   : 5000CCA253068569 On -Rdy  HGST HUH721212AL4204 C3D0 8DG3L5JD
 4   : 5000CCA253068581 On -Rdy  HGST HUH721212AL4204 C3D0 8DG3L5RD
 5   : 5000CCA2532B9751 On -Rdy  HGST HUH721212AL5200 A3D0 8DGSZ5LH
 6   : 5000CCA25306873D On -Rdy  HGST HUH721212AL4204 C3D0 8DG3L99D
 7   : 5000CCA25307011D On -Rdy  HGST HUH721212AL4204 C3D0 8DG3VDXD
 8   : 5000CCA253068411 On -Rdy  HGST HUH721212AL4204 C3D0 8DG3L2SD
 9   : 5000CCA2530684B1 On -Rdy  HGST HUH721212AL4204 C3D0 8DG3L41D
 10  : 5000CCA2530702F9 On -Rdy  HGST HUH721212AL4204 C3D0 8DG3VJSD
...
```

3.6.2.12 rcli "show dual"

The `wddcs <device> rcli "show dual"` command is used to display the dual IOM status information for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "show dual"` command to display the dual IOM status information for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "show dual"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
dualCompatStatus: DUAL_IOM_COMPATIBLE
DualEnabled     : True
IomInit         : True
linkAlive       : True
otherpresent    : True
isSynched       : True
Slot            : A
XO Status       : XO_STS_IS_XO
```

```
isThisActive    : True
isOtherActive   : True
```

3.6.2.13 rcli "show enc"

The `wddcs <device> rcli "show enc"` command is used to display the enclosure information for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "show enc"` command to display the enclosure information for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "show enc"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>

Enclosure Information (IOM A)
-------------------------------------------------
  ENCL CONFIG : 4U102
  PARTNUM     : Encl:1ES0294-1A
  SERIAL      : USCSJ04017EA0001
  IOM A
    PARTNUM   : 1EB0246
    SERIAL    : THCLS03517EL0052
    FW(PRI)   : <version>
    FW(SEC1)  : <version>
    FW(SEC2)  : <version>
    FW(OOBM)  : <version>
    MAC       : 00:0C:CA:05:00:16
    IP ADDR   : 10.202.237.141
  IOM B
    PARTNUM   : 1EB0246-B2
    SERIAL    : THCLS03517EL0091
    FW(PRI)   : <version>
    FW(SEC1)  : <version>
    FW(SEC2)  : <version>
    FW(OOBM)  : <version>
    MAC       : 00:0C:CA:04:00:5B
    IP ADDR   : 10.202.237.183
```

3.6.2.14 rcli "show hosts"

The `wddcs <device> rcli "show hosts"` command is used to display the host information for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "show hosts"` command to display the host information for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "show hosts"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
```

```
Host 00(x----------------): Not Connected
Host 01(x----------------): Not Connected
Host 02(x----------------): Not Connected
Host 03(x----------------): Not Connected
Host 04(x500605B00E7B00D1,12G): Ready
Host 05(x500605B00E7B00D1,12G): Ready
Host 06(x500605B00E7B00D1,12G): Ready
Host 07(x500605B00E7B00D1,12G): Ready
Host 08(x----------------): Not Connected
Host 09(x----------------): Not Connected
Host 10(x----------------): Not Connected
Host 11(x----------------): Not Connected
Host 12(x----------------): Not Connected
Host 13(x----------------): Not Connected
Host 14(x----------------): Not Connected
Host 15(x----------------): Not Connected
Host 16(x----------------): Not Connected
Host 17(x----------------): Not Connected
Host 18(x----------------): Not Connected
Host 19(x----------------): Not Connected
Host 20(x----------------): Not Connected
Host 21(x----------------): Not Connected
Host 22(x----------------): Not Connected
Host 23(x----------------): Not Connected
```

3.6.2.15 rcli "show phys"

The `wddcs <device> rcli "show phys"` command is used to display the PHY information of the primary SAS expander for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "show phys"` command to display the PHY information of the primary SAS expander for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "show phys"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>

A Pri   Expander PHYs
 Id  Type  SAS               Rate   Local      Remote   1.5G  3G  6G 12G
-------------------------------------------------------------------------
  0 : HST                          C0FF0000             *   *   *   *
  1 : HST                          C0FF0000             *   *   *   *
  2 : HST                          C0FF0000             *   *   *   *
  3 : HST                          C0FF0000             *   *   *   *
  4 : HST 500605B00E7B00D1   12G   C0FF0000   803F0001   *   *   *   *
  5 : HST 500605B00E7B00D1   12G   C0FF0000   803F0001   *   *   *   *
  6 : HST 500605B00E7B00D1   12G   C0FF0000   803F0001   *   *   *   *
  7 : HST 500605B00E7B00D1   12G   C0FF0000   803F0001   *   *   *   *
  8 : HST                          C0FF0000             *   *   *   *
  9 : HST                          C0FF0000             *   *   *   *
 10 : HST                          C0FF0000             *   *   *   *
 ...
```

3.6.2.16 rcli "show sensor"

The `wddcs <device> rcli "show sensor"` command is used to display the sensor information from a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "show sensor"` command to display the sensor information from a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "show sensor"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
 sn:tmpSlot000        =     28 Deg C   (TEMP SLOT 000)
 sn:tmpSlot001        =     27 Deg C   (TEMP SLOT 001)
 sn:tmpSlot002        =     28 Deg C   (TEMP SLOT 002)
 sn:tmpSlot003        =     28 Deg C   (TEMP SLOT 003)
 sn:tmpSlot004        =     28 Deg C   (TEMP SLOT 004)
 sn:tmpSlot005        =     28 Deg C   (TEMP SLOT 005)
 sn:tmpSlot006        =     27 Deg C   (TEMP SLOT 006)
 sn:tmpSlot007        =     27 Deg C   (TEMP SLOT 007)
 sn:tmpSlot008        =     28 Deg C   (TEMP SLOT 008)
 sn:tmpSlot009        =     27 Deg C   (TEMP SLOT 009)
 ...
```

3.6.2.17 rcli "show ses"

The `wddcs <device> rcli "show ses"` command is used to display the SES information for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli "show ses"` command to display the SES information for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "show ses"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>

|Status|
Online
Zoning: Disabled

|Identification|
Vendor: HGST
Product: H4102-J
SerialNum: USCSJ04017EA0006
FwRev: <version>

|SES Status|
CONN HOST 01: Not Installed()
CONN HOST 02: Not Installed()
CONN HOST 03: Not Installed()
CONN HOST 04: Not Installed()
CONN HOST 05: Not Installed()
```

```
CONN HOST 07: Not Installed()
CONN HOST 08: Not Installed()
CONN HOST 09: Not Installed()
CONN HOST 10: Not Installed()
CONN HOST 11: Not Installed()
```

3.6.2.18 rcli "show vpd"

The `wddcs <device> rcli "show vpd"` command is used to display vital product data for a single SEP device within an enclosure that supports RCLI commands.

Note: The `wddcs <device> rcli "vpd set"` command accomplishes the same purpose.

Step 1: Use the `wddcs <device> rcli "show vpd"` command to display vital product data for a single SEP device within an enclosure that supports RCLI commands. For example:

```
wddcs <device> rcli "show vpd"
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
    Encl:Type         = x01
    Encl:PartNum      = '1ES0255-06'
    Encl:SerialNum    = 'USCSJ03717EB0001'
    Encl:ProductName  = 'H4102-J'
    Encl:Vendor       = 'HGST'
    Encl:BdCustomer   = ''
    Encl:SASAddr      = x5000CCAB04000600
    Encl:Config       = x5A00000000000000
    Encl:Nickname     = ''
    Encl:BdPartNum    = '1EB0227-A1'
    Encl:BdSerialNum  = 'THCLS03217EK001A'
    Encl:DrvStateBits = x76
    IomA:BdName       = ''
    IomA:BdSerialNum  = 'THCLS03517EL00AB'
    IomA:BdPartNum    = '1EB0246'
    IomA:BdCustomer   = ''
    IomA:MACAddr      = 8:'0000000CCA05001B'
    IomB:BdName       = ''
    IomB:BdSerialNum  = 'THCLS03517EL000A'
    IomB:BdPartNum    = '1EB0246'
    IomB:BdCustomer   = ''
    IomB:MACAddr      = 8:'0000000CCA05001A'
    MainBB:BdName       = 'BB60'
    MainBB:BdSerialNum  = 'THCLS05117EJ0002'
    MainBB:BdPartNum    = '1EB1032-30'
    AuxBB:BdName       = 'BB42'
    AuxBB:BdSerialNum  = 'THCLS05117EH0004'
    AuxBB:BdPartNum    = '1EB1034-30'
```

3.6.2.19 rcli zonecfg

The `wddcs <device> rcli zonecfg` command is used to determine the zoning configuration for a single SEP device within an enclosure that supports RCLI commands.

Step 1: Use the `wddcs <device> rcli zonecfg` command to determine the zoning configuration for a single SEP device within an enclosure that supports RCLI commands.

If zoning is **disabled**, the output will be as follows:

```
wddcs <device> rcli zonecfg
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Zoning (Disabled)
```

If zoning is **enabled**, the output will be as follows:

```
wddcs <device> rcli zonecfg
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Zoning (Enabled)
Host    : Slots
------------------------
  Host <host#> : <slot#>-<slot#>
  Host <host#> : <slot#>-<slot#>
  Host <host#> : <slot#>-<slot#>
  Host <host#> : <slot#>-<slot#>
  Host <host#> : <slot#>-<slot#>
  Host <host#> : <slot#>-<slot#>
```

3.7 show

The `wddcs show` command is used to scan for SEP devices within HGST/WD-developed enclosures and display their product or device information.

Options

The following sections provide instructions for using each of these command options:

- `show` – scans for all enclosure products and displays the SEP handle, product description, serial number, firmware revision, and product name
- `show handles` – displays connected drives with slot number, serial number, capacity, port address, expander, and OS device handle name

Support

The `wddcs show` command and options are supported on the following enclosures:

Command	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
`show`	✓	✓	✓	✓	✓	✓	✓
`show handles`	✗	✗	✗	✓	✓	✓	✓

3.7.1 show

The `wddcs show` command is used to scan for all SEP devices within HGST/WD-developed enclosures and display the following information:

- SEP device handle
- Product ID
- Serial number
- Firmware version
- Product name

Note: The ouput will only include information for HGST/WD-developed enclosures.

Step 1: Use the `wddcs show` command to scan for all SEP devices within HGST/WD-developed enclosures and display the product information:

```
wddcs show
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
    product : <product>
    serial  : <serialnumber>
    firmware: <version>
    name    : <productname>

...
```

3.7.2 show handles

The `wddcs show handles` command is used to scan for all connected drives and display the following information:

- Slot number
- Serial number
- Capacity
- Port address
- Expander
- OS device handle

Note: The ouput will only include information for HGST/WD-developed enclosures.

Step 1: Use the `wddcs show handles` command to display the device information:

Linux Example:

```
wddcs show handles
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>

  Enclosure IOM         : A
  Enclosure SAS Address : 5000CCAB0400063C

  Slot  SN        Cap(GB)  Port Address      Expander            Drive Handle
  ------------------------------------------------------------------------------
     0  2EG5S94R  8001     5000CCA23B0A7535  2:5000CCAB0400067F  /dev/sds
     1  2EG3R8YR  8001     5000CCA23B06C321  2:5000CCAB0400067F  /dev/sdw
     2  2AH8D03Y  12000    5000CCA27A479E21  2:5000CCAB0400067F  /dev/sdaa
     3  8CH2X2NE  12000    5000CCA26F3DA6B5  2:5000CCAB0400067F  /dev/sdae
     4  2AH6KTNY  12000    5000CCA27A445221  2:5000CCAB0400067F  /dev/sdag
     7  2AH4DUUY  12000    5000CCA27A4064A5  2:5000CCAB0400067F  /dev/sdai
     8  2AH84ZVY  12000    5000CCA27A4734E5  2:5000CCAB0400067F  /dev/sdak
     9  2AGG13SY  12000    5000CCA27A19859D  2:5000CCAB0400067F  /dev/sdam
    10  2AH84V6Y  12000    5000CCA27A4732A5  2:5000CCAB0400067F  /dev/sdao
    ...
```

Windows Example:

```
wddcs show handles
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>

  Enclosure IOM         : A
  Enclosure SAS Address : 5000CCAB050008BC

  Slot  SN        Cap(GB)  NAA WWID          Expander            Drive Handle
  ------------------------------------------------------------------------------
     0  7SGEK22C  8001     5000CCA25218A390  1:5000CCAB050008BF  PD1
     1  2EGHD8KV  8001     5000CCA23B1BFE98  2:5000CCAB050008FF  PD2
     2  2EGN1S2V  8001     5000CCA23B2477E0  1:5000CCAB050008BF  PD3
     3  9JG1EU5G  14000    5000CCA25802A0E0  2:5000CCAB050008FF  PD4
     4  9JG1EJUG  14000    5000CCA258029CD4  2:5000CCAB050008FF  PD5
     5  7SGEB4AC  8001     5000CCA252184A90  2:5000CCAB050008FF  PD6
     6  2EGNLYJV  8001     5000CCA23B257A44  2:5000CCAB050008FF  PD7
     7  2EGNLSLV  8001     5000CCA23B257764  2:5000CCAB050008FF  PD8
     8  2EGMBAHV  8001     5000CCA23B233674  2:5000CCAB050008FF  PD9
     9  2EGNVVLV  8001     5000CCA23B25F0F8  2:5000CCAB050008FF  PD10
    10  2EGND35V  8001     5000CCA23B251368  2:5000CCAB050008FF  PD11
    ...
```

a. To limit the results to a single device, include the device's SEP handle:

```
wddcs <device> show handles
```

3.8 version

The `wddcs version` command is used to print the version of the installed WDDCS Tool and its modules.

Step 1: Use the `wddcs version` command to print the version of the installed WDDCS Tool and its modules:

```
wddcs version
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

 MODULE          VERSION     HASH
 ------          -------     ----
 wddcs           2.1.4.0     8fa85ed543e24275db34ef81a3a6490225617f65
 yadl            1.14.16     fda00a5917d7ae7ded8b1032ff52dedf525fe2ac
 yextata         2.3.0       ba08f5b1f214381b4935b5481072ecd66a94cf93
 yextnvme        8.2.0       df0ab01eed32d49b85ac9e11649df5bf63ca9de3
 yextscan        1.1.0       a8cb19553f9a0df285426188377f00533aa2e314
 yextscsi        2.3.0       c8337f29a5bdea82971a0959c81ffb6a3e633107
 yextses         1.8.4       2b9056f43efbbaa27160385dbc2f9862fc4d6e68
 cutils          1.7.1       c7a3a905d1e7a3e6aa8016e1bb434a71af3fd0a6
```

3.9 zone

The `wddcs zone` command—along with its options—is used to configure zoning for certain HGST/WD-developed enclosures with FW version 2030-026 and later.

Options

The following sections provide instructions for using each of these command options:

- `config=<value>` – configures zone setting to the given value:
  - A value of `0` disables zoning
  - The values of `1` through `3` enable a pre-defined zoning configuration
- `file=<file>` – sends a binary zone configuration file to the IOM
- `reset` – resets the IOM/SEP device for configuration settings to take effect
- `status` – displays the current zone configuration setting

Support

The `wddcs zone` command and options are supported on the following enclosures:

Command	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
`zone config=0` (disable)	✗	✗	✗	✗	✓	✓	✗

Command	Storage Enclosure Basic	4U60 G1 Storage Enclosure	2U24 Flash Storage Platform	4U60 G2 Storage Enclosure	Ultrastar Data60	Ultrastar Data102	Ultrastar Serv60+8
`zone config=1`	✗	✗	✗	✗	✓	✓	✗
`zone config=2`	✗	✗	✗	✗	✓	✓	✗
`zone config=3`	✗	✗	✗	✗	✓	✓	✗
`zone file=<file>`	✗	✗	✗	✗	✓	✓	✗
`zone reset`	✗	✗	✗	✗	✓	✓	✗
`zone status`	✗	✗	✗	✗	✓	✓	✗

Note: For unsupported enclosures, the `wddcs zone` command will return `Operation not supported on this product`.

3.9.1 zone config (enable zoning)

The `wddcs <device> zone config` command—with the values of `1` through `3`—is used to enable zoning for a single SEP device within supported HGST/WD-developed enclosures.

Caution: Zone configuration should only be performed during a maintenance window, when the system is not in production.

Step 1: Use the `wddcs <device> zone config` command with the values of `1` - `3` to enable zoning:

```
wddcs <device> zone config=1
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Setting zones to pre-configured value of 1 to SAS address <SAS address>
Zone configuration was successful
```

Step 2: Repeat the `wddcs <device> zone config` command to enable zoning for the second SEP device.

3.9.2 zone config (disable zoning)

The `wddcs <device> zone config` command—with a value of `0`—is used to disable zoning for a single SEP device within supported HGST/WD-developed enclosures.

Caution: Zone configuration should only be performed during a maintenance window, when the system is not in production.

Step 1: Use the `wddcs <device> zone config` command with a value of `0` to disable zoning:

```
wddcs <device> zone config=0
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Setting zones to pre-configured value of 0 to SAS address <SAS address>
Zoning has been disabled.
You will need to issue the "zone reset" command on some products to complete
 this operation.
As a result of the "zone reset", the enclosure may go offline for a period of
 time.
Please ensure this is done during a maintenance window.
Please check the product documentation for further information.
```

The user is notified that a zone reset may be required for the disabled zoning to take effect.

Step 2: Use the `wddcs <device> zone reset` command to reset the IOMs (see zone reset *(page 87)*).

3.9.3 zone file

The `wddcs <device> zone file=<file>` command is used to send a binary zone configuration file to a single IOM/SEP device.

Caution: Zone configuration should only be performed during a maintenance window, when the system is not in production.

Note: For products with a dual-IOM configuration, the file only needs to be sent to one IOM. Once activated, both IOMs will have the same zoning configuration.

Step 1: Use the `wddcs <device> zone file=<file>` command to send a binary zone configuration file to a single IOM/SEP device:

If the zoning file **is not** compatible with the enclosure, the user will be notified:

```
wddcs <device> zone file=<file>
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
ERROR: The file is not compatible with this product
```

If the file **is** compatible, the command will produce the following output:

```
wddcs <device> zone file=<file>
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
```

```
CAUTION: This command will send a T10 zoning configuration to the IOM in
question and activate the configuration by resetting the IOM.

This zoning administration activity is designed to take place while the JBOD/
F platform is offline and not in production. The IOM in question
will go offline for a short period of time while the zoning configuration is
 activated
If you still prefer to continue with this method, press 'Y' or 'y':
```

The user is notified that the IOM will go offline and is prompted to confirm the action.

Step 2: Enter `Y` or `y` to proceed:

```
y

Sent 1 segment(s)
Waiting for completion: 5 second(s) - Status 0x00
Waited the maximum limit of 5 seconds
Configuration file was downloaded and activated successfully
```

3.9.4 zone reset

The `wddcs <device> zone reset` command is used to reset a single IOM/SEP device—after zoning has been disabled—for zone configuration settings to take effect. The `wddcs <device> zone reset` command is not needed after zoning has been enabled.

Caution: Zone configuration should only be performed during a maintenance window, when the system is not in production.

Step 1: Use the `wddcs <device> zone reset` command to reset a single IOM/SEP device—after zoning has been disabled—for zone configuration settings to take effect:

```
wddcs <device> zone reset
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Resetting the IOM. Please wait...
The reset command was successful
```

Step 2: Repeat the `wddcs <device> zone reset` command to reset the second SEP device.

3.9.5 zone status

The `wddcs <device> zone status` command is used to display the zone configuration status of a single IOM/SEP device.

Step 1: Use the `wddcs <device> zone status` command to display the zone configuration status of a single IOM/SEP device:

If zoning is disabled, the output will be as follows:

```
wddcs <device> zone status
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates
```

```
Device: <device>
Zoning (Disabled)
```

If zoning is enabled, the output will be similar to the folloiwng:

```
wddcs <device> zone status
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Zoning (Enabled)
 Host    : Slots
------------------------
  Host 0 : 0-33
  Host 1 : 0-33
  Host 2 : 34-67
  Host 3 : 34-67
  Host 4 : 68-101
  Host 5 : 68-101
```

Note: Actual output may vary, depending on the zone configuration and other factors.

Firmware Upgrade Processes

The recommended firmware upgrade process depends on several factors. This section provides guidance on choosing the correct process and instructions for performing the upgrade.

In This Chapter:

4.1 Choosing the Correct Firmware Upgrade Process

The recommended firmware upgrade process varies, depending on the following factors:

- The enclosure/product type
- The number of IOMs/ESMs
- Whether or not the enclosure will be taken offline by the upgrade
- Whether a manual or automatic process is needed
    - The manual upgrade process, where possible, allows the host OS and/or HBA to handle the failover more gracefully than the automatic process.

Based on these factors, use the following table to determine which firmware upgrade process is applicable. Then click the link in the right-hand column to view instructions for that process.

Table 9: Firmware Upgrade Processes

Enclosure	# of IOMs/ ESMs	Offline/ Online	Manual/ Automatic	Process Link
Ultrastar Data102	2	On	Manual	Two IOMs, Online, Manual *(page 91)*
	2	Off	Automatic	Two IOMs, Offline, Automatic *(page 93)*
	1	Off	Automatic	One IOM, Offline, Automatic *(page 94)*
Ultrastar Data60	2	On	Manual	Two IOMs, Online, Manual *(page 91)*
	2	Off	Automatic	Two IOMs, Offline, Automatic *(page 93)*
	1	Off	Automatic	One IOM, Offline, Automatic *(page 94)*
Ultrastar Serv60+8	1	Off	Automatic	One IOM, Offline, Automatic *(page 94)*
4U60 G2 Storage Enclosure	2	Off	Automatic	Two IOMs, Offline, Automatic *(page 93)*
	1	Off	Automatic	One IOM, Offline, Automatic *(page 94)*
4U60 G1 Storage Enclosure	2	On	Automatic	Two IOMs, Online, Automatic *(page 96)*
	1	Off	Automatic	One IOM, Offline, Automatic *(page 94)*
2U24 Flash Storage Platform	2	On	Automatic	Two IOMs, Online, Automatic *(page 96)*

Enclosure	# of IOMs/ ESMs	Offline/ Online	Manual/ Automatic	Process Link
	1	Off	Automatic	One IOM, Offline, Automatic *(page 94)*
Storage Enclosure Basic	1	Off	Automatic	One IOM, Offline, Automatic *(page 94)*

4.2 Two IOMs, Online, Manual

This firmware upgrade process is appropriate for the following enclosures:

- Ultrastar Data102 or Ultrastar Data60
- Two IOMs
- Will remain online (in use)
- Require a manual firmware reset

Note: For enclosures with limited availability for maintenance operations, the `wddcs <device> fw download <file>` and `wddcs <device> fw reset` operations may be performed at separate times instead of the combined `wddcs <device> fw download_reset <file>` operation described here.

Step 1: Use the `wddcs show` command to scan for all SEP devices within HGST/WD-developed enclosures and display the product information:

```
wddcs show
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
    product : <product>
    serial  : <serialnumber>
    firmware: <version>
    name    : <productname>

...
```

Step 2: Identify the SEP device requiring FW upgrade, and note its firmware version prior to the upgrade; this will be used to confirm a successful upgrade at the end of the process.

Note: For Ultrastar Data102 and Ultrastar Data60 enclosures, it is only necessary to update firmware on one SEP device; the other will be updated automatically.

Important: Do not unzip the tar.gz firmware bundle (for Ultrastar Data102 and Ultrastar Data60 enclosures) before issuing the `wddcs <device> fw download_reset <file>` command.

Step 3: Use the `wddcs <device> fw download_reset <file>` command to perform a firmware download to a single SEP device within an HGST/WD-developed enclosure and subsequently reset the IOMs for that device. For example:

```
wddcs <device> fw download_reset <file>
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Sent <#> segment(s)
Download has finished to the SEP, please wait.
The completion status will be checked after 15 minutes.

Download status complete (0x11)
Firmware was downloaded successfully
Starting the reset process...

Please ensure both paths to each drive are available before proceeding
with the reset of the 1st IOM to ensure that at least one path to each drive
will be available during the IOM reset to activate firmware.
The IOM will go offline for a period of time while the update is finalized.
Press 'Y' or 'y' when ready to continue:
```

The WDDCS Tool notifies the user that the first IOM will go offline.

Step 4: Enter `Y` or `y` to proceed:

```
y
1st IOM has been reset

Please ensure both paths to each drive are available before proceeding
with the reset of the 2nd IOM to ensure that at least one path to each drive
will be available during the IOM reset to activate firmware.
The IOM will go offline for a period of time while the update is finalized.
Press 'Y' or 'y' when ready to continue:
```

The WDDCS Tool notifies the user that the first IOM was reset and that the second IOM will go offline.

Step 5: Enter `Y` or `y` to proceed:

```
y
2nd IOM has been reset

IOM was reset successfully
```

The WDDCS Tool notifies the user that the second IOM was reset.

Step 6: Use the `wddcs show` command to scan for all SEP devices within HGST/WD-developed enclosures and display the product information:

```
wddcs show
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
    product : <product>
    serial  : <serialnumber>
    firmware: <version>
    name    : <productname>

...
```

Step 7: Identify the SEP device that received a FW upgrade, and confirm the new firmware version.

4.3 Two IOMs, Offline, Automatic

This firmware upgrade process is appropriate for the following enclosures:

- Ultrastar Data102, Ultrastar Data60, or 4U60 G2 Storage Enclosure
- Two IOMs
- Will be taken offline
- Require an automatic firmware activation

Note: For enclosures with limited availability for maintenance operations, the `wddcs <device> fw download <file>` and `wddcs <device> fw activate` operations may be performed at separate times instead of the combined `wddcs <device> fw download_activate <file>` operation described here.

Step 1: Use the `wddcs show` command to scan for all SEP devices within HGST/WD-developed enclosures and display the product information:

```
wddcs show
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
    product : <product>
    serial  : <serialnumber>
    firmware: <version>
    name    : <productname>

...
```

Step 2: Identify the SEP device requiring FW upgrade, and note its firmware version prior to the upgrade; this will be used to confirm a successful upgrade at the end of the process.

Important: Do not unzip the tar.gz firmware bundle (for Ultrastar Data102 and Ultrastar Data60 enclosures) before issuing the `wddcs <device> fw download_activate <file>` command.

Step 3: Use the `wddcs <device> fw download_activate <file>` command to perform a firmware download to a single SEP device within an HGST/WD-developed enclosure and subsequently activate the downloaded firmware. For example:

```
wddcs <device> fw download_activate <file>
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Sent <#> segment(s)
Download has finished to the SEP, please wait.
The completion status will be checked after 15 minutes.

Download status complete (0x11)
Firmware was downloaded successfully
Starting the activation process...
```

```
This method of firmware activation will be disruptive.
Please consider activating firmware offline to avoid any disruptions to I/O.

If the platform configuration is based on dual IOMs, the IOM(s) in question
will go offline for a period of time while the update is finalized.
If the platform configuration is based on a single IOM, the enclosure
will go offline for a period of time while the update is finalized.

If you still prefer to continue with this method, press 'Y' or 'y':
```

The WDDCS Tool notifies the user that the IOM or enclosure will go offline.

Step 4: Use the `wddcs show` command to scan for all SEP devices within HGST/WD-developed enclosures and display the product information:

```
wddcs show
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
    product : <product>
    serial  : <serialnumber>
    firmware: <version>
    name    : <productname>

...
```

Step 5: Identify the SEP device that received a FW upgrade, and confirm the new firmware version.

4.4 One IOM, Offline, Automatic

This firmware upgrade process is appropriate for the following enclosures:

- Ultrastar Data102, Ultrastar Data60, Ultrastar Serv60+8, 4U60 G2 Storage Enclosure, 4U60 G1 Storage Enclosure, 2U24 Flash Storage Platform, and Storage Enclosure Basic
- One IOM
- Will be taken offline
- Require an automatic firmware activation

Note: For enclosures with limited availability for maintenance operations, the `wddcs <device> fw download <file>` and `wddcs <device> fw activate` operations may be performed at separate times instead of the combined `wddcs <device> fw download_activate <file>` operation described here.

Step 1: Use the `wddcs show` command to scan for all SEP devices within HGST/WD-developed enclosures and display the product information:

```
wddcs show
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
    product : <product>
    serial  : <serialnumber>
```

```
    firmware: <version>
    name    : <productname>

...
```

Step 2: Identify the SEP device requiring FW upgrade, and note its firmware version prior to the upgrade; this will be used to confirm a successful upgrade at the end of the process.

Important: Do not unzip the tar.gz firmware bundle (for Ultrastar Data102, Ultrastar Data60, and Ultrastar Serv60+8 enclosures) before issuing the `wddcs <device> fw download_activate <file>` command.

Step 3: Use the `wddcs <device> fw download_activate <file>` command to perform a firmware download to a single SEP device within an HGST/WD-developed enclosure and subsequently activate the downloaded firmware. For example:

```
wddcs <device> fw download_activate <file>
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Sent <#> segment(s)
Download has finished to the SEP, please wait.
The completion status will be checked after 15 minutes.

Download status complete (0x11)
Firmware was downloaded successfully
Starting the activation process...

This method of firmware activation will be disruptive.
Please consider activating firmware offline to avoid any disruptions to I/O.

If the platform configuration is based on dual IOMs, the IOM(s) in question
will go offline for a period of time while the update is finalized.
If the platform configuration is based on a single IOM, the enclosure
will go offline for a period of time while the update is finalized.

If you still prefer to continue with this method, press 'Y' or 'y':
```

The WDDCS Tool notifies the user that the IOM or enclosure will go offline.

Step 4: Enter `Y` or `y` to proceed:

```
y
Firmware activation command was sent successfully
```

Step 5: Use the `wddcs show` command to scan for all SEP devices within HGST/WD-developed enclosures and display the product information:

```
wddcs show
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
    product : <product>
    serial  : <serialnumber>
    firmware: <version>
```

```
    name    : <productname>

...
```

Step 6: Identify the SEP device that received a FW upgrade, and confirm the new firmware version.

4.5 Two IOMs, Online, Automatic

This firmware upgrade process is appropriate for the following enclosures:

- 4U60 G1 Storage Enclosure or 2U24 Flash Storage Platform
  - For these products, each IOM requires its own download/activate process.
- Two IOMs
- Will remain online (in use)
- Require an automatic firmware activation

Note: For enclosures with limited availability for maintenance operations, the `wddcs <device> fw download <file>` and `wddcs <device> fw activate` operations may be performed at separate times instead of the combined `wddcs <device> fw download_activate <file>` operation described here.

Step 1: Use the `wddcs show` command to scan for all SEP devices within HGST/WD-developed enclosures and display the product information:

```
wddcs show
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
    product : <product>
    serial  : <serialnumber>
    firmware: <version>
    name    : <productname>

...
```

Step 2: Identify the SEP device requiring FW upgrade, and note its firmware version prior to the upgrade; this will be used to confirm a successful upgrade at the end of the process.

Step 3: Use the `wddcs <device> fw download_activate <file>` command to perform a firmware download to a single SEP device within an HGST/WD-developed enclosure and subsequently activate the downloaded firmware. For example:

```
wddcs <device> fw download_activate <file>
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
Sent <#> segment(s)
Download has finished to the SEP, please wait.
The completion status will be checked after 15 minutes.

Download status complete (0x11)
Firmware was downloaded successfully
```

```
Starting the activation process...

This method of firmware activation will be disruptive.
Please consider activating firmware offline to avoid any disruptions to I/O.

If the platform configuration is based on dual IOMs, the IOM(s) in question
will go offline for a period of time while the update is finalized.
If the platform configuration is based on a single IOM, the enclosure
will go offline for a period of time while the update is finalized.

If you still prefer to continue with this method, press 'Y' or 'y':
```

The WDDCS Tool notifies the user that the IOM or enclosure will go offline.

Step 4: Enter `Y` or `y` to proceed:

```
y
Firmware activation command was sent successfully
```

Step 5: Use the `wddcs show` command to scan for all SEP devices within HGST/WD-developed enclosures and display the product information:

```
wddcs show
wddcs v2.1.4.0
Copyright (c) 2019-2021 Western Digital Corporation or its affiliates

Device: <device>
    product : <product>
    serial  : <serialnumber>
    firmware: <version>
    name    : <productname>

...
```

Step 6: Identify the SEP device that received a FW upgrade, and confirm the new firmware version.

Uninstallation

The WDDCS Tool may be uninstalled from Windows Server, Debian, Ubutnu, RHEL, and CentOS operating systems, or via targ.gz. The following sections provide uninstallation instructions for each package.

In This Chapter:

5.1 Uninstalling from Debian/Ubuntu

Follow these steps to uninstall the WDDCS Tool from Debian/Ubuntu operating systems.

Step 1: Use the `dpkg -r` command to uninstall the DEB package:

```
# dpkg -r wddcs
(Reading database ... 527031 files and directories currently installed.)
Removing wddcs (<version>) ...
```

5.2 Uninstalling from RHEL/CentOS

Follow these steps to uninstall the WDDCS Tool from Red Hat Enterprise Linux (RHEL) or CentOS operating systems with the Red Hat Package Manager (RPM).

Step 1: Verify that the RPM package is installed:

```
# rpm -qa | grep -i wddcs
wddcs-<version>.x86_64
```

Step 2: Remove the RPM package:

```
# rpm -e wddcs
```

Step 3: Repeat the `grep` command to verify that the RPM package has been removed (i.e. the filename is not returned):

```
# rpm -qa | grep -i wddcs
#
```

5.3 Uninstalling via tar.gz

Follow these steps to uninstall the WDDCS Tool via tar.gz.

Step 1: Navigate to the directory to where the tar.gz files were installed. For example:

```
# cd /home/wddcs
```

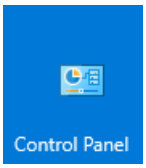
Step 2: From that directory, use the `rm -r` command to remove the installed directory and files:

```
# rm -r wddcs-<version>-1.x86_64
```

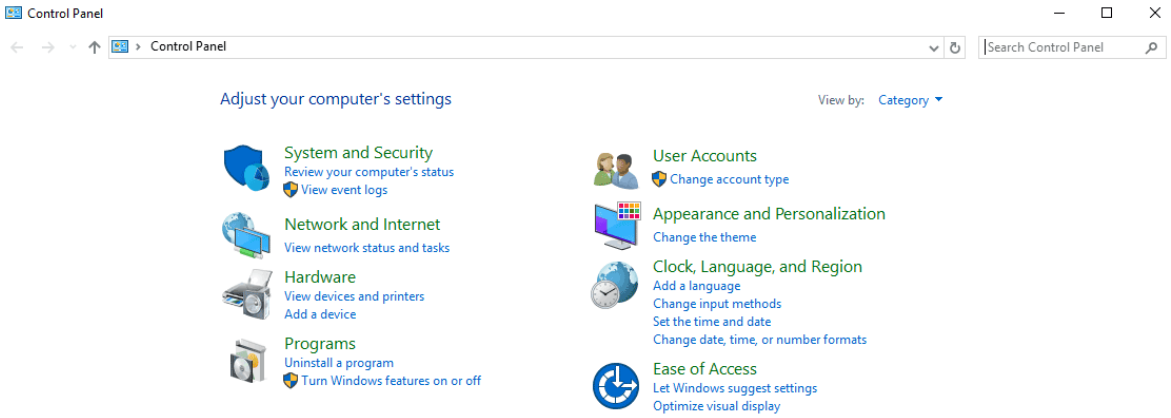
5.4 Uninstalling from Windows Server

Follow these steps to uninstall the WDDCS Tool from Windows Server operating systems.

Step 1: From the **Start Menu**, select the **Control Panel** icon:



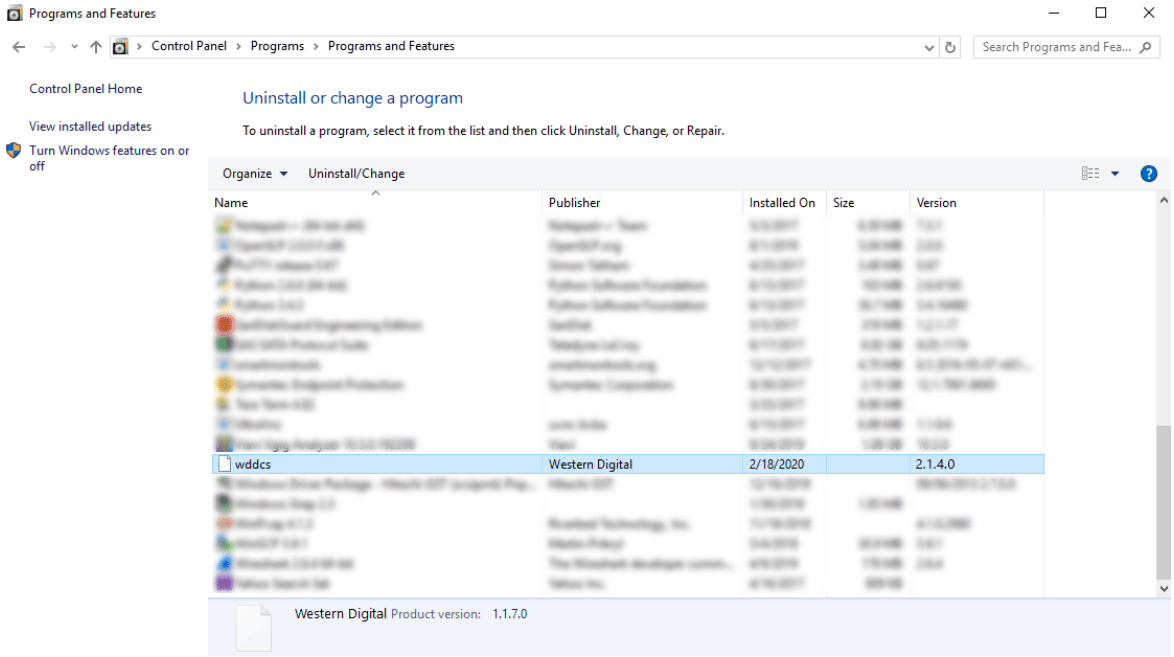
The **Control Panel** window appears:



Step 2: Under the **Programs** section, click the link for **Uninstall a program**.

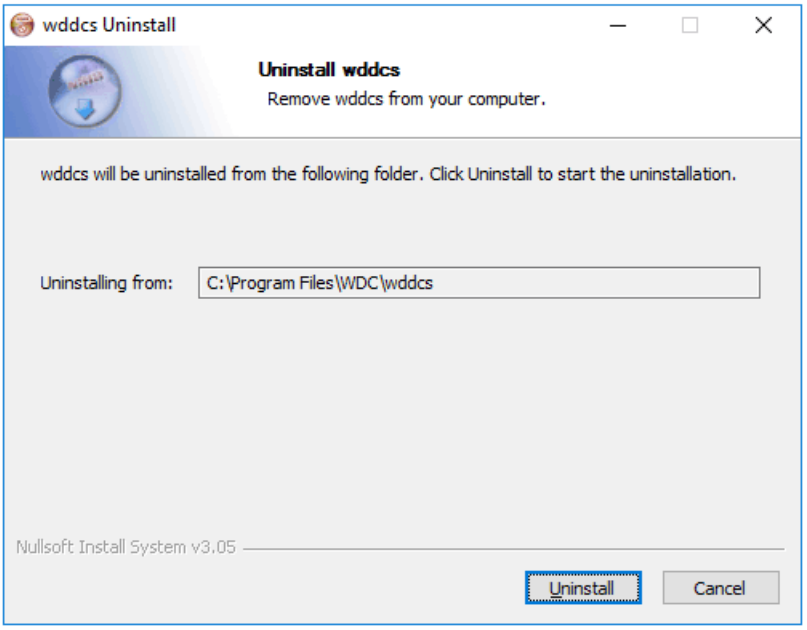
The **Programs and Features** window appears.

Step 3: Scroll down the list of installed programs and find the WDDCS Tool:



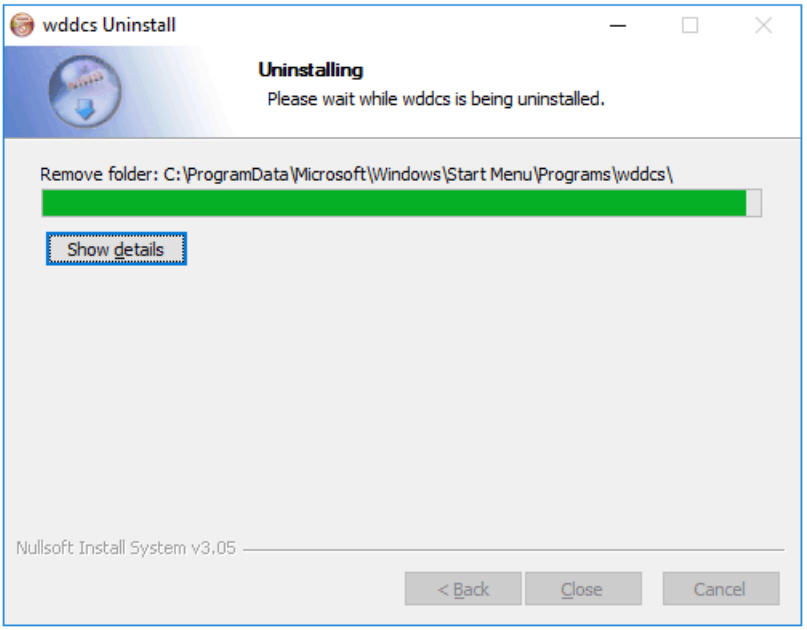
Step 4: With the WDDCS Tool selected, right-click and choose **Uninstall/Change** from the tooltip.

A **wddcs Uninstall** dialog box appears, notifying the user of the directory from which the WDDCS Tool will be uninstalled:

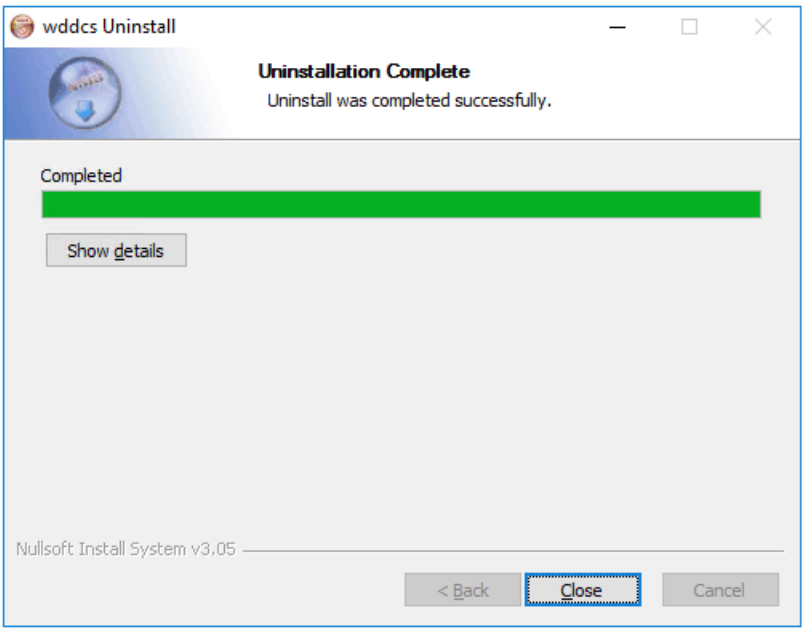


Step 5: Click the **Uninstall** button.

The **wddcs Uninstall** window updates, showing that the WDDCS Tool is being uninstalled:



After a few seconds, the **wddcs Uninstall** window updates again, showing that the uninstallation is complete:



Step 6: Click the **Close** button.

Appendices

In This Chapter:

6.1 Glossary

The following acronyms, words, and terms are used throughout this document. Definitions are provided for reference.

Term	Definition
AC	Alternating Current
CLI	Command-Line Interface
DPKG	Debian Package
Enclosure	A chassis with one or more I/O modules, PSUs, FANs, etc. that houses and controls the environment of the HDDs/SSDs inside of it.
ESM	Enclosure Storage Manager. This is the I/O Canister for the enclosure. The ESM has LEDs for location, fault, and power. There are also SAS connectors on each ESM for server/host connectivity.
EULA	End User License Agreement
HBA	Host Bus Adapter
FW	Firmware
HDD	Hard Disk Drive
HGST	Hitachi Global Storage Technologies
IO Canister	Another name for an ESM
IOM	Input/Output Module. Another name for an ESM.
JBOD	Just a Bunch of Disks
LED	Light Emitting Diode
NVMe	Non-Volatile Memory Express
OOBM	Out-of-Band Management
OS	Operating System
PSU	Power Supply Unit
PWM	Pulse-Width Modulation (method of controlling speed/RPM of system fans)
RHEL	Red Hat Enterprise Linux
RMT	Remote
RPM	Red Hat Package Manager
SAS	Serial Attached SCSI
SATA	Serial ATA
SCSI	Small Computer Systems Interface
SEP	SCSI Enclosure Processor
Server/Host	Hardware with an Operating System and HBA used to access the drives in the storage enclosure.
SEC1	Secondary SAS Expander 1
SEC2	Secondary SAS Expander 2

Term	Definition
SES	SCSI Enclosure Services
SSD	Solid State Drive
VPD	Vital Product Data
WD	Western Digital