

August 2023

**Test Results for Forensic Media Preparation Tool:
EcoErase Version 6.0**

Federated Testing Suite for Forensic Media Preparation

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Introduction

The Computer Forensics Tool Testing (CFTT) program is a joint project of the Department of Homeland Security's (DHS) Science and Technology Directorate (S&T), the National Institute of Justice, and the National Institute of Standards and Technology's (NIST) Special Programs Office and Information Technology Laboratory. CFTT is supported by other organizations, including the Federal Bureau of Investigation, the U.S. Department of Defense Cyber Crime Center, U.S. Internal Revenue Service's Criminal Investigation Division Electronic Crimes Program, and U.S. Immigration and Customs Enforcement, U.S. Customs and Border Protection, and U.S. Secret Service. The objective of the CFTT program is to provide measurable assurance to practitioners, researchers, and other applicable users that the tools used in computer forensics investigations provide accurate results. Accomplishing this requires the development of specifications and test methods for computer forensics tools and subsequent testing of specific tools against those specifications.

Test results provide the information necessary for developers to improve tools, users to make informed choices, and the legal community and others to understand the tools' capabilities. The CFTT approach to testing computer forensics tools is based on well-recognized methodologies for conformance and quality testing. Interested parties in the computer forensics community can review and comment on the specifications and test methods posted on the CFTT website (<https://www.cftt.nist.gov/>).

This document reports the results from testing the forensic media preparation function of EcoErase Version 6.0 using the CFTT Federated Testing Test Suite for Forensic Media Preparation, Version 5.

Federated Testing is an expansion of the CFTT program to provide forensic investigators and labs with test materials for tool testing and to support shared test reports. The goal of Federated Testing is to help forensic investigators to test the tools that they use in their labs and to enable sharing of tool test results. CFTT's Federated Testing Forensic Tool Testing Environment and included test suites can be downloaded from <http://www.cftt.nist.gov/federated-testing.html> and used to test forensic tools. The results can be optionally shared with CFTT, reviewed by CFTT staff, and then shared with the community.

Test results from other tools can be found on the DHS S&T-sponsored digital forensics webpage, <http://www.dhs.gov/science-and-technology/nist-cftt-reports>.

How to Read This Report

This report is organized into the following sections:

1. **Tool Description:** The tool name, version, and developer information are listed.
2. **Testing Organization:** Contact information and approvals.
3. **How to Read This Report:** This section.
4. **Results Summary:** This section identifies any significant anomalies observed in the test runs. This section provides a narrative of key findings identifying where the tool meets expectations and provides a summary of any ways the tool did not meet expectations. The section also provides any observations of interest about the tool or about testing the tool including any observed limitations or organization-imposed restrictions on tool use.
5. **Test Environment & Selected Test Configurations:** Description of hardware and software used in tool testing, the test drives used, and a list of the applicable test configurations from the Federated Testing Forensic Media Preparation Test Suite.
6. **Test Results by Test Configuration:** Automatically generated test results that identify anomalies.
7. **Appendix: Additional Details:** Additional administrative details for each test configuration such as, who ran the test, when the test was run, computer used, etc.

Federated Testing Test Results for Forensic Media Preparation Tool: EcoErase Version 6.0

1. Tool Description

Tool Name: EcoErase
Tool Version: 6.0.5
Tool Developer: NCS Global Services Inc.
Operating System: CentOS 9

2. Testing Organization

Organization Conducting Test: NCS Global Services Inc.
Phone: (603) 926-4300
Email: info@ncsglobalinc.com
Report Date: 8/15/2023
Authored By: Timothy Clocksin

Reviewed & Approved By: Davis Moore
Approval Date: 8/17/2023

This test report was generated using CFTT's Federated Testing Forensic Tool Testing Environment, see [Federated Testing Home Page](#).

3. Results Summary

The results of the test were “as expected” and all devices were successfully wiped according to what method the devices supported. One thing to note is that the tested version of the tool did not have a standalone overwrite pass for SSDs, but used a combination of a NIST Purge (Secure Erase) followed by an overwrite pass of zeros.

Another aspect of note is that the test configuration numbers are not contiguous, as two of the devices (SATA and SAS HDDs) did not fully support features required by certain configurations. Both did not support HPA or DCO sectors and the SAS device did not support Secure Erase or Enhanced Secure Erase.

4. Test Environment & Selected Test Configurations

This section describes the test hardware and software, test configurations, and test drives used in testing.

4.1 Test Hardware and Software

Hardware:

- (3x) Dell Optiplex 7040, i5 vPro processor, 16GB RAM
- (7x) 16GB USB sticks (6 for CFTT's OS and logs, 1 for consolidating reports)
- (3x) 1GB USB sticks (for booting EcoErase)
- Seagate SATA HDD
- Toshiba SAS HDD
- Samsung SATA SSD

Operating System:

- CentOS 9 Stream (EcoErase)
- FreeDOS 1.3 (HDAT2)

Software:

- HDAT2 v75 (used to create HPA and DCO sectors)
- Rufus v4.0 (for loading EcoErase image onto bootable USB)
- EcoErase v6.0.5

4.2 Defined Test Configurations

The following table describes each defined configuration of test drive and wipe method.

The columns are as follows:

- **Config:** The test configuration ID.
- **Drive Type:** The drive size category and interface type.
- **Host Interface:** The type of connection used to connect the test drive to the test computer.
- **Connection:** Either *direct* or *bridge*. Indicates if the test drive was connected to the test computer directly or via a bridge. If connected via a bridge, the bridge description is included.
- **Hidden Sectors:** Indicates the presence and type of hidden sectors.
- **Wipe Method:** The selected method for wiping a drive.

Config	Drive Type	Host Interface	Connection	Hidden Sectors	Wipe Method
001	SATA w/ NCQ support (modern drive)	SATA	direct	None	Overwrite
003	SATA w/ NCQ support (modern drive)	SATA	direct	None	Secure Erase
005	SATA w/ NCQ support (modern drive)	SATA	direct	None	Enhanced Secure Erase
007	SAS (512n/512e)	PCIe	bridge: SAS2008 Fusion-MPT SAS-2 Falcon	None	Overwrite
013	SATA w/ NCQ support (modern drive)	SATA	direct	None	Overwrite
014	SATA w/ NCQ support (modern drive)	SATA	direct	DCO and HPA	Overwrite
015	SATA w/ NCQ support (modern drive)	SATA	direct	None	Secure Erase
016	SATA w/ NCQ support (modern drive)	SATA	direct	DCO and HPA	Secure Erase
017	SATA w/ NCQ support (modern drive)	SATA	direct	None	Enhanced Secure Erase
018	SATA w/ NCQ support (modern drive)	SATA	direct	DCO and HPA	Enhanced Secure Erase

Note on SATA w/ NCQ support vs SATA w/o NCQ support: forensic media preparation tools treat drives differently based on whether they support NCQ (Native Command Queuing). SATA HDDs manufactured before 2005, and some older SSDs do not support NCQ. Newer HDDs manufactured in 2005 or later support NCQ.

4.3 Test Drive Information and Layouts

The following table describes the test drive and its layout for each test configuration.

- **Config:** The test configuration ID.
- **Drive Type:** The drive size category and interface type.

- **Manufacturer/Model:** The drive manufacturer and model.
- **Drive Size:** The drive size in sectors and Mega/Giga bytes.
- **Hidden Sectors:** The size in sectors of any hidden area and the type of hidden area.

Config	Drive Type	Manufacturer/Model	Drive Size	Hidden Sectors
001	SATA w/ NCQ support (modern drive)	Seagate/ST2000NM0024	3,907,029,168 (1863GiB)	0
003	SATA w/ NCQ support (modern drive)	Seagate/ST2000NM0024	3,907,029,168 (1863GiB)	0
005	SATA w/ NCQ support (modern drive)	Seagate/ST2000NM0024	3,907,029,168 (1863GiB)	0
007	SAS (512n/512e)	Toshiba/AL13SEB900	1,758,174,768 (838GiB)	0
013	SATA w/ NCQ support (modern drive)	Samsung/MZ-7LM960	1,875,385,008 (894GiB)	0
014	SATA w/ NCQ support (modern drive)	Samsung/MZ-7LM960	1,875,385,008 (894GiB)	1,000 (DCO and HPA)
015	SATA w/ NCQ support (modern drive)	Samsung/MZ-7LM960	1,875,385,008 (894GiB)	0
016	SATA w/ NCQ support (modern drive)	Samsung/MZ-7LM960	1,875,385,008 (894GiB)	1,000 (DCO and HPA)
017	SATA w/ NCQ support (modern drive)	Samsung/MZ-7LM960	1,875,385,008 (894GiB)	0
018	SATA w/ NCQ support (modern drive)	Samsung/MZ-7LM960	1,875,385,008 (894GiB)	1,000 (DCO and HPA)

5. Test Results by Test Configuration

This section has two subsections: a summary of the test results and detailed results for each test configuration.

5.1 Results Summary

The following table reports the overall result for each tested configuration. An entry of *Anomaly* in the Results column means that some sectors were not wiped. An entry of *As Expected* in the Results column means that all sectors were completely overwritten or erased.

Config	Drive Type	Host Interface	Connection	Hidden Sectors	Wipe Method	Results
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001	SATA w/ NCQ support (modern drive)	SATA	direct	None	Overwrite	As Expected
003	SATA w/ NCQ support (modern drive)	SATA	direct	None	Secure Erase	As Expected
005	SATA w/ NCQ support (modern drive)	SATA	direct	None	Enhanced Secure Erase	As Expected
007	SAS (512n/512e)	PCIe	bridge: SAS2008 Fusion-MPT SAS-2 Falcon	None	Overwrite	As Expected
013	SATA w/ NCQ support (modern drive)	SATA	direct	None	Overwrite	As Expected
014	SATA w/ NCQ support (modern drive)	SATA	direct	DCO and HPA	Overwrite	As Expected
015	SATA w/ NCQ support (modern drive)	SATA	direct	None	Secure Erase	As Expected
016	SATA w/ NCQ support (modern drive)	SATA	direct	DCO and HPA	Secure Erase	As Expected
017	SATA w/ NCQ support (modern drive)	SATA	direct	None	Enhanced Secure Erase	As Expected
018	SATA w/ NCQ support (modern drive)	SATA	direct	DCO and HPA	Enhanced Secure Erase	As Expected

5.2 Test Result Details by Configuration

This section presents the detailed analysis of each test configuration. Each analysis is presented as a table of sector runs for sectors as identified as either *unchanged*, *overwritten*, or *shifted*. A successful test result is for all sectors to be overwritten.

The columns of the tables of sector runs are as follows:

- **Result Type:** Category of result, either *overwritten* or *unchanged*. Sectors that have been relocated (still with original content) are classified as *shifted* and are considered as a variation on *unchanged*.
- **N Sectors:** The number of sectors in the category.
- **N Runs:** The number of sector runs in the category.
- **Start LBA:** For each sector run, this is the LBA of the first sector of the run.

- **End LBA:** For each sector run, this is the LBA of the last sector of the run.
- **Run Length:** For each sector run, the number of sectors in the run.

5.2.1 Test Result Details for Configuration 001

Expected Results: Configuration 001, all sectors overwritten.

Result Type	N Sectors	N Runs	Start LBA	End LBA	Run Length
overwritten (hex fill)	3,907,029,168	1	0	3,907,029,167	3,907,029,168

5.2.2 Test Result Details for Configuration 003

Expected Results: Configuration 003, all sectors overwritten.

Result Type	N Sectors	N Runs	Start LBA	End LBA	Run Length
overwritten (hex fill)	3,907,029,168	1	0	3,907,029,167	3,907,029,168

5.2.3 Test Result Details for Configuration 005

Expected Results: Configuration 005, all sectors overwritten.

Result Type	N Sectors	N Runs	Start LBA	End LBA	Run Length
overwritten (non-hex fill)	3,907,029,168	1	0	3,907,029,167	3,907,029,168

The resulting data value from this wipe was not a uniform hex value like the other wipes, but this is most likely due to the manufacturer's implementation of Enhanced Secure Erase. Regardless, no previous data could be recovered from this device after the EcoErase wipe.

5.2.4 Test Result Details for Configuration 007

Expected Results: Configuration 007, all sectors overwritten.

Result Type	N Sectors	N Runs	Start LBA	End LBA	Run Length
overwritten (hex fill)	1,758,174,768	1	0	1,758,174,767	1,758,174,768

5.2.5 Test Result Details for Configuration 013

Expected Results: Configuration 013, all sectors overwritten.

Result Type	N Sectors	N Runs	Start LBA	End LBA	Run Length
overwritten (hex fill)	1,875,385,008	1	0	1,875,385,007	1,875,385,008

5.2.6 Test Result Details for Configuration 014

Expected Results: Configuration 014, all sectors overwritten.

Result Type	N Sectors	N Runs	Start LBA	End LBA	Run Length
overwritten (hex fill)	1,875,385,008	1	0	1,875,385,007	1,875,385,008

*For hidden areas, 500 sectors were hidden via HPA and 500 were hidden via DCO. Both were removed by EcoErase.

5.2.7 Test Result Details for Configuration 015

Expected Results: Configuration 015, all sectors overwritten.

Result Type	N Sectors	N Runs	Start LBA	End LBA	Run Length
overwritten (hex fill)	1,875,385,008	1	0	1,875,385,007	1,875,385,008

5.2.8 Test Result Details for Configuration 016

Expected Results: Configuration 016, all sectors overwritten.

Result Type	N Sectors	N Runs	Start LBA	End LBA	Run Length
overwritten (hex fill)	1,875,385,008	1	0	1,875,385,007	1,875,385,008

*For hidden areas, 500 sectors were hidden via HPA and 500 were hidden via DCO. Both were removed by EcoErase.

5.2.9 Test Result Details for Configuration 017

Expected Results: Configuration 017, all sectors overwritten.

Result Type	N Sectors	N Runs	Start LBA	End LBA	Run Length
overwritten (hex fill)	1,875,385,008	1	0	1,875,385,007	1,875,385,008

5.2.10 Test Result Details for Configuration 018

Expected Results: Configuration 018, all sectors overwritten.

Result Type	N Sectors	N Runs	Start LBA	End LBA	Run Length
overwritten (hex fill)	1,875,385,008	1	0	1,875,385,007	1,875,385,008

*For hidden areas, 500 sectors were hidden via HPA and 500 were hidden via DCO. Both were removed by EcoErase.

6. Appendix: Additional Details

6.1 Test Configuration Administrative Details

For each test configuration run, the tester, the test computer, and the date the test was run are listed.

Config	Tester	Host	Date
001	TC	Test-Bench #2	Tue Aug 8 08:59:06 2023
003	TC	Test-Bench #2	Thu Aug 3 04:06:01 2023
005	TC	Test-Bench #2	Mon Aug 7 04:04:02 2023
007	TC	Test-Bench #3	Thu Aug 3 14:38:40 2023
013	TC	Test-Bench #1	Fri Aug 4 08:35:11 2023
014	TC	Test-Bench #1	Mon Aug 14 04:46:11 2023
015	TC	Test-Bench #1	Tue Aug 8 05:07:10 2023
016	TC	Test-Bench #1	Thu Aug 10 04:02:34 2023
017	TC	Test-Bench #1	Wed Aug 2 04:01:31 2023
018	TC	Test-Bench #1	Fri Aug 11 05:07:46 2023

OS: Linux Version 4.15.0-142-generic
Federated Testing Version 5, released 3/12/2020