Tool Validation Report
File Carving

Scalpel
Version 1.60

Released: 8 May 2023

Contents

Executive Summary

The file carving tool Scalpel, version 1.60, was run against the test image Khyrenz-FileCarvingImage-USB-logical-2GB-formatted.dd[1] after the default Scalpel configuration file was modified to uncomment available file types that matched test files. This was achieved by using the nano tool to edit the configuration file:

sudo nano /etc/scalpel/scalpel.conf

Scalpel was then run using the command:

scalpel -b -o scalpel-out Khyrenz-FileCarvingImage-USB-logical-2GB-formatted.dd

Hashes were subsequently generated using the command:

sha1deep scalpel-out/*/* > scalpel_md5.txt

The below table is a summary of the test files that Scalpel carved from this image.

File Type	Number of Test Files	Exact match	Usable match	Not found	False positive	Invalid file
7z	5			5		
AVI	5		5			
BMP	6			6		4
DOC	4		4		4	6
DOCX	4			4		
GIF	5			5	3	5
JPEG	7		3	4	31	3
MOV	5			5		40
MP3	5			5		
MP4	6			6		
PDF	6	1	1	4	5	4
PNG	6			6		944
PPT	3		3		3	
PPTX	3			3		
TIFF	5		5			10
WAV	6		3	3		3
WMV	5			5		
XLS	3			3		
XLSX	3			3		
ZIP	5			5	1150	
Total	**97**	**1**	**24**	**72**	**1196**	**1019**
Percentage		**1.03%**	**24.74%**	**74.22%**		

As this table shows, 1.03% of the test files were recovered exactly; the SHA1 file hashes were a match to the original files. In total, 25.77% of the original files were recovered in a usable state and could be successfully viewed, with the remaining 74.22% of the original files not carved.

Seventy two of the original test files were not found within the image by Scalpel. These were a mixture of many different file formats. None of the original test 7z, BMP, DOCX, GIF, MOV, MP3, MP4, PNG, PPTX, WMV, XLS, XLSX, or ZIP files were carved.

Introduction

Khyrenz Ltd is a Digital Forensic consultancy based in the UK. We provide this report to document our tool validation process against Scalpel version 1.60.

Scope

This report documents the results obtained by testing the file carving tool Scalpel, version 1.60, against the raw image file: Khyrenz-FileCarvingImage-USB-logical-2GB-formatted.dd. This image file, as well as a full list of files contained within deleted space in this image, are provided at: https://www.khyrenz.com/resources/.

The Scalpel tool was run on a Kali 2023.1 VMWare virtual machine after modifying the default configuration file to uncomment the following file types:

- AVI
- BMP
- DOC
- GIF
- JPEG
- MOV
- PDF
- PNG
- TIFF
- WAV
- ZIP

This was achieved by using the nano tool to edit the configuration file:

sudo nano /etc/scalpel/scalpel.conf

Scalpel was then run using the command:

scalpel -b -o scalpel-out Khyrenz-FileCarvingImage-USB-logical-2GB-formatted.dd

Hashes were subsequently generated using the command:

sha1deep scalpel-out/*/* > scalpel_md5.txt

Measuring Test Results

How well the tool performs against expected results is categorized as follows:

1. Exact match: Number of carved files that match on SHA1 file hash to an original test file
2. Usable match: Number of carved files that can be successfully opened and viewed, and appear similar to an original test file, so can be reasonably determined to be a 'usable' version of an original
3. Not found: No carved files match the hash or appear similar to any original files
4. False positive: A carved file is a valid file and can be opened/viewed, but is not similar to an original file (for example, may be an embedded file within an original file)
5. Invalid file: A carved file that cannot be opened or viewed

Test Data

Test Image Creation Process

A selection of test files of varying file formats was collected or generated, and then copied onto a USB device, which had been formatted to contain a 2GB FAT16 volume. This volume was subsequently re-formatted using the built-in Windows 'quick format' process, in order to remove filesystem metadata.

A raw logical image of the USB device volume was generated using FTK Imager 4.2.0.13[2].

Test File Summary

A summary of test files added to the USB before it was re-formatted is provided below. A more detailed list of individual files is provided in Appendix 1 - Test Files to be Carved.

File Type	Number of Test Files
7z	5
AVI	5
BMP	6
DOC	4
DOCX	4
GIF	5
JPEG	7
MOV	5
MP3	5
MP4	6
PDF	6
PNG	6
PPT	3
PPTX	3
TIFF	5
WAV	6
WMV	5
XLS	3
XLSX	3
ZIP	5
Grand Total	**97**

Test Results

The table below shows details regarding the files carved from the test image by foremost.

Type	Filename	SHA1	Exact match	Usable match	Not found	False positive	Invalid file
7z	AVI-7z	fd4d1be9e8ffec39701d358898fed10437b0561b			✓		
7z	BMP.7z	e13b931da505c1c51ed6653273de8d9d2df67dcc			✓		
7z	DOC-XLS-PPT.7z	edb13fe1559ba71696bb309840bfcf0022228799			✓		
7z	GIF.7z	a70caf5187b383aa5364cfc97b5db8287fa3aa54			✓		
7z	JPEG.7z	4cceb50966356b852883b9925fcc9e58f410fa2a			✓		
AVI	1280.avi	8351e1bd6f08fe3419907140edd6fcbf00acc46e		00001008.avi			
AVI	Bubble Turning Into Ice.avi	85bc9cafcacdd41f9b81ace58bd33fba0c432c7d		00001009.avi			
AVI	file_example_AVI_1920_2_3MG.avi	573400d5d649e6ce8d9c02723e70618a17cd631f		00001010.avi			
AVI	file_example_AVI_480_750kB.avi	a188ed66e68f77729b8cfac92913427ab6b1677f		00001011.avi			
AVI	sample-avi-file.avi	246eecb4053487a61914510389ec300bdaf7f3c6		00001012.avi			
BMP	GRN.BMP	b367e7e0d95e6f1bd769f39bc0b5e2e7d4a6bb62			✓		
BMP	MARBLES.BMP	eec5e6afdd264d6ff867d038aa274c4bc42619b4			✓		
BMP	RAY.BMP	e44237a11ee0d4b1cb63e1876dc4040b805e43b6			✓		
BMP	sample_5184×3456.bmp	bf6c6aa681f20a1dd561bad7945d441d771b418a			✓		

Type	Filename	SHA1	Exact match	Usable match	Not found	False positive	Invalid file
BMP	Small Sample BMP Image File Download.bmp	1eb09379dfb4bc35511a a5a1db83e652c5c64604			✓		
BMP	Yellow_star.bmp	4f2e9da3e1a467fe0182d 05d7accdd28ee7f76fb			✓		
BMP							4
DOC	file-sample_1MB.doc	8f3498bfbe75fb34e809f c7ced3f4cc6f4acc92c		00001408.doc			
DOC	SampleDOCFile_200kb.doc	0f1e886f7399fe033c3190 bcda7927550c22da8e		00001414.doc			
DOC	SampleDOCFile_5000kb.doc	e9e798cac0a97648c95c 21cfa9545659d6d0c2a3		00001415.doc			
DOC	USB connection artifacts.doc	4665ec3e161f882f1430f8 62d7a14e6b12ddf6ec		00001416.doc			
DOC						4	6
DOCX	15-MB-docx-file-download.docx	00da85c39ff564d6fc34b 0449323a2ef253de8fc			✓		
DOCX	file-sample_500kB.docx	9a0881226460bf5d0ea1 7b29a843c0320b9dd11e			✓		
DOCX	sample-docx-file-for-testing.docx	37537e74599278cd26c2 a29237cefe067e237f8d			✓		
DOCX	Using WSL.docx	3661e7dd597f5931a494 335a643513f0198efb6f			✓		
GIF	giphy (1).gif	a6768bff9c6d5c9cbc37c e55bf432109f321fab9			✓		
GIF	giphy (2).gif	d0012d8bf6f633972049e 917ede588880d416b95			✓		
GIF	giphy.gif	799521e3a568a270b625 9fa7c1565d7adec96c18			✓		

Type	Filename	SHA1	Exact match	Usable match	Not found	False positive	Invalid file
GIF	How+do+i+computer+i +decided+to+try+my+h ands_81418e_4707807.gi f	fd2911bff16a8522b7f07a 0eca1aeb08292b1b4f			✓		
GIF	undefined - Imgur.gif	2c3f083d36904cc56f8c4 6cffb64108943d8d45a			✓		
GIF						3	5
JPEG	file_example_JPG_500kB .jpg	25472d494500707b4510 868df469352dc7cd1845		00000027.jp g			
JPEG	IMG_2375.JPG	967cac602f8e01eaf614b ee93b8b0c850f22936d			✓		
JPEG	IMG_3385_cropped.jpg	5fb543b4c8037b48c48fa df8a39f408046c6f7ee			✓		
JPEG	IMG_3973.JPG	e5f6d316d896db29eabb 073db8022eb2edc7d2fe			✓		
JPEG	IMG_3977.JPG	df58316a3b334379b88d bc41b1313a952810bd45			✓		
JPEG	istockphoto- 1304263738-170667a.jpg	1febe282f23e1a15ac100 358eb2b700212eee44b		00000028.jp g			
JPEG	photo-1533450718592- 29d45635f0a9.jfif	f096a046c3692ab714c28 b267f94f4efe9a7c22b		00000029.jp g			
JPEG						31	3
MOV	720.mov	ac16247bc6746661d19e b5832b5b3eed397d97a 0			✓		
MOV	Cloud Formation Video.mov	a5c0fbd44b6352161e5b 6f2aa26f00d5888a3951			✓		
MOV	file_example_MOV_480_ 700kB.mov	682963a12b9b0742651e 486a5f697fa949f9daf2			✓		
MOV	sample_960x400_ocean_ with_audio.mov	faa748ae6d2a31e21e4d 65a0bd17e425affed954			✓		

Type	Filename	SHA1	Exact match	Usable match	Not found	False positive	Invalid file
MOV	sample-mov-file.mov	126fc405911d33832f88d 5dd2fc3942e9a71e896			✓		
MOV							40
MP3	file_example_MP3_700K B.mp3	dae94d2ae419b398c977 f27f4190680715ae10c3			✓		
MP3	Kalimba.mp3	ba795c011958b7c8c628 abba468bd762beda403 e			✓		
MP3	sample3.mp3	787cc2c7ef51d56d9118 d723229d8fdafdbefad5			✓		
MP3	sample4.mp3	e3f539fd64c27bcb8f6fc6 8486761b6b1d16549a			✓		
MP3	Symphony No.6 (1st movement).mp3	9663ba6ca1d35c2ac59e 94d51775ce775e518dac			✓		
MP4	file_example_MP4_1920 _18MG.mp4	a8ddbbcacc224b427f5b 7ca14bdf41b692291730			✓		
MP4	giphy360p (1).mp4	7a65df084f0400e89fac78 f247a76fc4b45d851c			✓		
MP4	giphy360p.mp4	c578124221db590a00bb 507202e2dbdb765dccc2			✓		
MP4	sample_1280x720_surfin g_with_audio.mp4	406ecad499e84370fa8bf d3db88aa548eeddc3e1			✓		
MP4	sample_960x540.mp4	1ae8b2fcce5b37d8a0d6 afe21a0ed9757cf78cbc			✓		
MP4	sample-mp4-file.mp4	bfe8feaec39f112dfcc53b bc98a1c17309e0f941			✓		
PDF	file-example_PDF_1MB.pdf	cec8ad914b1e9db83626 b98e8d98512616975fdf			✓		
PDF	file-sample_150kB.pdf	6703901978dcb3dbf2d9 915e1d3e066cfe712b0a			✓		
PDF	pdf.pdf	c1f95108a34228535a926 2085e784d7c3e27fc68			✓		

Type	Filename	SHA1	Exact match	Usable match	Not found	False positive	Invalid file
PDF	PinePhone_Data_Locations_Cheatsheet_khedley.pdf	074e4fec07c65977f9e0281bae45377ebe800bd3			✓		
PDF	PinePhone_Poster_khedley.pdf	a403c9c57dff103b1893d27f1efe05bcaf9fbd9b	00001438.pdf				
PDF	sample.pdf	bfd009f500c057195ffde66fae64f92fa5f59b72		00001433.pdf			
PDF						5	4
PNG	2cd43b_16d40260a2274e6fb87d101c321eac17_mv2.png	32b7bf753e866e0d7b41419af529ab3c1ebe3aa3			✓		
PNG	2cd43b_daa95a985dde42a3af5a63b597f45ac9_mv2.png	045d49e8c7f4184ef19a69122f58aaa431f44e6a			✓		
PNG	pngwing.com (1).png	cc5bf259f661d72b5ca78b9e6f58efb3eeafee28			✓		
PNG	pngwing.com.png	8317e78a842bc9fdbbf3c83e66326693a489fe3d			✓		
PNG	transparent-maple-leaf-5f8ec1dd91fa41.5756612016031912615979.png	db0e388e61bf72e5742fedb5389e6ecf90f07372			✓		
PNG	transparent-owl-icon-autumn-icon-60b5ed32573f44.5876030416225354743574.png	29b523ab7c3dd585430e13f383293bcb84d7749d			✓		
PNG							944
PPT	file_example_PPT_1MB.ppt	3d30846c0c62832fd05d1c424fb650cf4da6ae23		00001409.doc			
PPT	file_example_PPT_250kB.ppt	cb8ea4114148bc57e7317b3d0aa72ebe53dbe386		00001410.doc			

Type	Filename	SHA1	Exact match	Usable match	Not found	False positive	Invalid file
PPT	PinePhone Forensics.ppt	74485b034c11b8c57d7c3a372e97a34adf02aa44		00001413.doc			
PPT						3	
PPTX	160930-artificial-intelligence-template-16x9.pptx	4203a60c4b88f7aad96720be8d5171e2afacf10e			✓		
PPTX	pptx1.pptx	c666363ec2d45b7a1c911427f7690c1bb6313c2a			✓		
PPTX	pptx2.pptx	c3f3e076c62eee7bf82ed32325faa0d5f79f1596			✓		
TIFF	CCITT_1.TIF	a21eef750984d91aaddba931361bbebe44a23568		00000996.tif			
TIFF	file_example_TIFF_10MB.tiff	837ae56fd74b69427b7b9511f1065616ffbc3b9e		00000997.tif			
TIFF	FLAG_T24.TIF	4c06fdc1b38c4283835b8f89687390042f84a92b		00000998.tif			
TIFF	Sample-Tiff-File-download-for-Testing.tiff	3c560462efd9f4182b0da5c3192258384390424c		00000999.tif			
TIFF	Tiff-Image-File-Download.tiff	dd85696006a32f8f7fa25755f8cef99c8150196f		00001000.tif			
TIFF							10
WAV	BabyElephantWalk60.wav	b816c31a23ae448bb0890f5221f256a90d0e9745			✓		
WAV	bird_caw2.wav	49f1e127edbcef4adf8ad89a297a8adca5735b63		00001440.wav			
WAV	crickets.wav	fb7ece704403a47692b6c2625324d2b11764ed6d		00001441.wav			
WAV	Fanfare60.wav	762d3a658519190f4b5f1374964f959d419cf875			✓		
WAV	file_example_WAV_5MG.wav	40955508715da2d5bd78546fc8ed9edcca07100e			✓		

Type	Filename	SHA1	Exact match	Usable match	Not found	False positive	Invalid file
WAV	taunt.wav	2988a818ebd6a373ca37ecd0a0bf9123880c5758		00001444.wav			
WAV							3
WMV	1280.wmv	814a49657d5e01a0f171634ddebc664c98a8a6ec			✓		
WMV	file_example_WMV_480_1_2MB.wmv	1c4d2e7cce26714dcda87cc52fbca695b377b389			✓		
WMV	sample_3840x2160.wmv	6ee26e2c8d98aa6d3e62dc323ec48e03ba392a2b			✓		
WMV	sample-wmv-file.wmv	a59d51d161b52196aebde4f9c1585c206a9b08a3			✓		
WMV	Video2.WMV	66d457ecfcb8ee65c9f841f77ae737ab91aaa11c			✓		
XLS	file_example_XLS_10.xls	e0cdb9c8a7da39f9787729345fd9bd617d02d539			✓		
XLS	file_example_XLS_5000.xls	3a0d4a8ecb77244d1580b15cb9f0766c8317b073			✓		
XLS	USB_artifacts.xls	39a4a8f0a789578d55951d3fc3e00a5ec86d6b16			✓		
XLSX	file_example_XLSX_1000.xlsx	0dce77a811e9f631913c88e1b04391a868fcc93d			✓		
XLSX	file_example_XLSX_50.xlsx	c94997094ad00f9f38017fd94a1d44a1241003b6			✓		
XLSX	sample3.xlsx	4c82c22ee2a7478fc0d0ddea5d3c9565ff269520			✓		
ZIP	DOCX-XLSX-PPTX.zip	3bc958d3d36c67342d4a209def63d69a3b9c55ca			✓		
ZIP	MOV.zip	d45075b85ebb217305ab6bac10e7f6e9a1edceb9			✓		

Type	Filename	SHA1	Exact match	Usable match	Not found	False positive	Invalid file
ZIP	MP3.zip	7a144bc05232c3e693669e1ef6121ac3b94d3128			✓		
ZIP	PDF.zip	a1aa6a40d9161d0dc9fc546c8b239689055cb464			✓		
ZIP	PNG.zip	0a342d01ac70cb9cae28252805bceed415f949f9			✓		
ZIP						1150	
		Totals	**1**	**24**	**72**	**1196**	**1374**

Appendix 1 - Test Files to be Carved

Type	Filename	Origin	Size (KB)	SHA1
7z	AVI-7z	Created from AVI folder containing files above	20,393	fd4d1be9e8ffec39701d35 8898fed10437b0561b
7z	BMP.7z	Created from BMP folder containing files above	35,524	e13b931da505c1c51ed66 53273de8d9d2df67dcc
7z	DOC-XLS-PPT.7z	Created from DOC-XLS-PPT folder containing files above	6,933	edb13fe1559ba71696bb3 09840bfcf0022228799
7z	GIF.7z	Created from GIF folder containing files above	10,674	a70caf5187b383aa5364cfc 97b5db8287fa3aa54
7z	JPEG.7z	Created from JPEG folder containing files above	10,790	4cceb50966356b852883b 9925fcc9e58f410fa2a
AVI	1280.avi	https://www.appsloveworld.com/avi-video-clips-free-download/	11,006	8351e1bd6f08fe34199071 40edd6fcbf00acc46e
AVI	Bubble Turning Into Ice.avi	https://www.appsloveworld.com/avi-video-clips-free-download/	8,850	85bc9cafcacdd41f9b81ac e58bd33fba0c432c7d
AVI	file_example_AVI_1920_2_3MG.avi	https://file-examples.com/index.php/sample-video-files/sample-avi-files-download/	2,227	573400d5d649e6ce8d9c0 2723e70618a17cd631f
AVI	file_example_AVI_480_750kB.avi	https://file-examples.com/index.php/sample-video-files/sample-avi-files-download/	726	a188ed66e68f77729b8cfa c92913427ab6b1677f
AVI	sample-avi-file.avi	https://www.learningcontainer.com/sample-avi-video-file-download/	8,130	246eecb4053487a619145 10389ec300bdaf7f3c6
BMP	GRN.BMP	https://www.fileformat.info/format/bmp/sample/index.htm	85	b367e7e0d95e6f1bd769f3 9bc0b5e2e7d4a6bb62
BMP	MARBLES.BMP	https://www.fileformat.info/format/bmp/sample/index.htm	4,165	eec5e6afdd264d6ff867d0 38aa274c4bc42619b4
BMP	RAY.BMP	https://www.fileformat.info/format/bmp/sample/index.htm	1,407	e44237a11ee0d4b1cb63e 1876dc4040b805e43b6
BMP	sample_5184×3456.bmp	https://filesamples.com/formats/bmp	52,489	bf6c6aa681f20a1dd561ba d7945d441d771b418a
BMP	Small Sample BMP Image File Download.bmp	https://www.learningcontainer.com/sample-bmp-file-for-testing/	977	1eb09379dfb4bc35511aa 5a1db83e652c5c64604
BMP	Yellow_star.bmp	Created by khedley	574	4f2e9da3e1a467fe0182d0 5d7accdd28ee7f76fb

Type	Filename	Origin	Size (KB)	SHA1
DOC	file-sample_1MB.doc	https://file-examples.com/index.php/sample-documents-download/sample-doc-download/	1,003	8f3498bfbe75fb34e809fc7ced3f4cc6f4acc92c
DOC	SampleDOCFile_200kb.doc	https://sample-videos.com/download-sample-doc-file.php	200	0f1e886f7399fe033c3190bcda7927550c22da8e
DOC	SampleDOCFile_5000kb.doc	https://sample-videos.com/download-sample-doc-file.php	5,001	e9e798cac0a97648c95c21cfa9545659d6d0c2a3
DOC	USB connection artifacts.doc	Created by khedley	42	4665ec3e161f882f1430f862d7a14e6b12ddf6ec
DOCX	15-MB-docx-file-download.docx	https://www.learningcontainer.com/sample-docx-file-for-testing/	32,913	00da85c39ff564d6fc34b0449323a2ef253de8fc
DOCX	file-sample_500kB.docx	https://file-examples.com/index.php/sample-documents-download/sample-doc-download/	539	9a0881226460bf5d0ea17b29a843c0320b9dd11e
DOCX	sample-docx-file-for-testing.docx	https://www.learningcontainer.com/sample-docx-file-for-testing/	3,818	37537e74599278cd26c2a29237cefe067e237f8d
DOCX	Using WSL.docx	Created by khedley	15	3661e7dd597f5931a494335a643513f0198efb6f
GIF	giphy (1).gif	https://giphy.com/gifs/hatutah-seasame-street-yippers-GsiBgbwZAsWsg	4,224	a6768bff9c6d5c9cbc37ce55bf432109f321fab9
GIF	giphy (2).gif	https://giphy.com/gifs/bicycle-besta-howtomob-O7YL1FFrCxXi0	4,862	d0012d8bf6f633972049e917ede588880d416b95
GIF	giphy.gif	https://giphy.com/gifs/internet-pizza-computer-ZH5o2lacOA8Te	274	799521e3a568a270b6259fa7c1565d7adec96c18
GIF	How+do+i+computer+i+decided+to+try+my+hands_81418e_4707807.gif	https://funnyjunk.com/channel/ponytime/How+do+I+computer/rwwsGej/	766	fd2911bff16a8522b7f07a0eca1aeb08292b1b4f
GIF	undefined - Imgur.gif	https://imgur.com/gallery/NVoF3Zi	611	2c3f083d36904cc56f8c46cffb64108943d8d45a
JPEG	file_example_JPG_500kB.jpg	https://file-examples-com.github.io/uploads/2017/10/file_example_JPG_500kB.jpg	543	25472d494500707b4510868df469352dc7cd1845
JPEG	IMG_2375.JPG	Created by khedley	4,264	967cac602f8e01eaf614bee93b8b0c850f22936d
JPEG	IMG_3385_cropped.jpg	Created by khedley	138	5fb543b4c8037b48c48fadf8a39f408046c6f7ee
JPEG	IMG_3973.JPG	Created by khedley	3,519	e5f6d316d896db29eabb073db8022eb2edc7d2fe

Type	Filename	Origin	Size (KB)	SHA1
JPEG	IMG_3977.JPG	Created by khedley	1,725	df58316a3b334379b88db c41b1313a952810bd45
JPEG	istockphoto-1304263738-170667a.jpg	https://unsplash.com/s/photos/jpg	203	1febe282f23e1a15ac1003 58eb2b700212eee44b
JPEG	photo-1533450718592-29d45635f0a9.jfif	https://unsplash.com/s/photos/jpg	450	f096a046c3692ab714c28b 267f94f4efe9a7c22b
MOV	720.mov	https://www.appsloveworld.com/sample-mov-file-download/	5,512	ac16247bc6746661d19eb 5832b5b3eed397d97a0
MOV	Cloud Formation Video.mov	https://www.appsloveworld.com/sample-mov-file-download/	13,066	a5c0fbd44b6352161e5b6f 2aa26f00d5888a3951
MOV	file_example_MOV_480_700kB.mov	https://file-examples.com/index.php/sample-video-files/sample-mov-files-download/	694	682963a12b9b0742651e4 86a5f697fa949f9daf2
MOV	sample_960x400_ocean_with_audio.mov	https://filesamples.com/formats/mov	17,111	faa748ae6d2a31e21e4d65 a0bd17e425affed954
MOV	sample-mov-file.mov	https://www.learningcontainer.com/mp4-sample-video-files-download/	14,123	126fc405911d33832f88d5 dd2fc3942e9a71e896
MP3	file_example_MP3_700KB.mp3	https://file-examples.com/index.php/sample-audio-files/sample-mp3-download/	747	dae94d2ae419b398c977f2 7f4190680715ae10c3
MP3	Kalimba.mp3	https://www.learningcontainer.com/sample-audio-file/	8,218	ba795c011958b7c8c628a bba468bd762beda403e
MP3	sample3.mp3	https://filesamples.com/formats/mp3	1,654	787cc2c7ef51d56d9118d7 23229d8fdafdbefad5
MP3	sample4.mp3	https://filesamples.com/formats/mp3	3,821	e3f539fd64c27bcb8f6fc68 486761b6b1d16549a
MP3	Symphony No.6 (1st movement).mp3	https://filesamples.com/formats/mp3	11,378	9663ba6ca1d35c2ac59e9 4d51775ce775e518dac
MP4	file_example_MP4_1920_18MG.mp4	https://file-examples.com/index.php/sample-video-files/sample-mp4-files/	17,422	a8ddbbcacc224b427f5b7 ca14bdf41b692291730
MP4	giphy360p (1).mp4	https://giphy.com/explore/download	198	7a65df084f0400e89fac78f 247a76fc4b45d851c
MP4	giphy360p.mp4	https://giphy.com/explore/download	185	c578124221db590a00bb5 07202e2dbdb765dccc2
MP4	sample_1280x720_surfing_with_audio.mp4	https://filesamples.com/formats/mp4	70,072	406ecad499e84370fa8bfd 3db88aa548eeddc3e1

Type	Filename	Origin	Size (KB)	SHA1
MP4	sample_960x540.mp4	https://filesamples.com/formats/mp4	1,290	1ae8b2fcce5b37d8a0d6af e21a0ed9757cf78cbc
MP4	sample-mp4-file.mp4	https://www.learningcontainer.com/mp4-sample-video-files-download/	10,300	bfe8feaec39f112dfcc53bb c98a1c17309e0f941
PDF	file-example_PDF_1MB.pdf	https://file-examples.com/index.php/sample-documents-download/sample-pdf-download/	1,018	cec8ad914b1e9db83626b 98e8d985l2616975fdf
PDF	file-sample_150kB.pdf	https://file-examples.com/index.php/sample-documents-download/sample-pdf-download/	140	6703901978dcb3dbf2d99 15e1d3e066cfe712b0a
PDF	pdf.pdf	http://www.pdf995.com/samples/pdf.pdf	424	c1f95108a34228535a9262 085e784d7c3e27fc68
PDF	PinePhone_Data_Locations_Cheatsheet_khedley.pdf	Created by khedley	204	074e4fec07c65977f9e028 1bae45377ebe800bd3
PDF	PinePhone_Poster_khedley.pdf	Created by khedley	1,152	a403c9c57dff103b1893d2 7f1efe05bcaf9fbd9b
PDF	sample.pdf	http://www.africau.edu/images/default/sample.pdf	3	bfd009f500c057195ffde66 fae64f92fa5f59b72
PNG	2cd43b_16d40260a2274e6fb87d101c321eac 17_mv2.png	https://www.freepngs.com/dragon-png-images	787	32b7bf753e866e0d7b414 19af529ab3c1ebe3aa3
PNG	2cd43b_daa95a985dde42a3af5a63b597f45ac 9_mv2.png	https://www.freepngs.com/dragon-png-images	101	045d49e8c7f4184ef19a69 122f58aaa431f44e6a
PNG	pngwing.com (1).png	https://www.pngwing.com/en/free-png-zwfuf	2,955	cc5bf259f661d72b5ca78b 9e6f58efb3eeafee28
PNG	pngwing.com.png	https://www.pngwing.com/en/free-png-byvsx	548	8317e78a842bc9fdbbf3c8 3e66326693a489fe3d
PNG	transparent-maple-leaf-5f8ec1dd91fa41.5756612016031912615979.png	https://www.subpng.com/png-daqbfi/	3,048	db0e388e61bf72e5742fed b5389e6ecf90f07372
PNG	transparent-owl-icon-autumn-icon-60b5ed32573f44.5876030416225354743574.png	https://www.subpng.com/png-iqhvv2/	794	29b523ab7c3dd585430e1 3f383293bcb84d7749d
PPT	file_example_PPT_1MB.ppt	https://file-examples.com/index.php/sample-documents-download/sample-ppt-file/	1,005	3d30846c0c62832fd05d1c 424fb650cf4da6ae23
PPT	file_example_PPT_250kB.ppt	https://file-examples.com/index.php/sample-documents-download/sample-ppt-file/	243	cb8ea4114148bc57e7317 b3d0aa72ebe53dbe386

Type	Filename	Origin	Size (KB)	SHA1
PPT	PinePhone Forensics.ppt	Created by khedley	5,446	74485b034c11b8c57d7c3a372e97a34adf02aa44
PPTX	160930-artificial-intelligence-template-16x9.pptx	https://www.free-power-point-templates.com/free-machine-learning-powerpoint-template/	1,224	4203a60c4b88f7aad96720be8d5171e2afacf10e
PPTX	pptx1.pptx	https://www.appsloveworld.com/sample-pptx-file/	1,618	c666363ec2d45b7a1c911427f7690c1bb6313c2a
PPTX	pptx2.pptx	https://www.appsloveworld.com/sample-pptx-file/	5,885	c3f3e076c62eee7bf82ed32325faa0d5f79f1596
TIFF	CCITT_1.TIF	https://www.fileformat.info/format/tiff/sample/	18	a21eef750984d91aaddba931361bbebe44a23568
TIFF	file_example_TIFF_10MB.tiff	https://file-examples.com/index.php/sample-images-download/sample-tiff-download/	9,914	837ae56fd74b69427b7b9511f1065616ffbc3b9e
TIFF	FLAG_T24.TIF	https://www.fileformat.info/format/tiff/sample/	46	4c06fdc1b38c4283835b8f89687390042f84a92b
TIFF	Sample-Tiff-File-download-for-Testing.tiff	https://www.learningcontainer.com/sample-tiff-file-for-testing/	79	3c560462efd9f4182b0da5c3192258384390424c
TIFF	Tiff-Image-File-Download.tiff	https://www.learningcontainer.com/sample-tiff-file-for-testing/	17,155	dd85696006a32f8f7fa25755f8cef99c8150196f
WAV	BabyElephantWalk60.wav	https://www2.cs.uic.edu/~i101/SoundFiles/	2,585	b816c31a23ae448bb0890f5221f256a90d0e9745
WAV	bird_caw2.wav	https://www.wavsource.com/animals/animals.htm	46	49f1e127edbcef4adf8ad89a297a8adca5735b63
WAV	crickets.wav	https://www.wavsource.com/animals/animals.htm	222	fb7ece704403a47692b6c2625324d2b11764ed6d
WAV	Fanfare60.wav	https://www2.cs.uic.edu/~i101/SoundFiles/	2,585	762d3a658519190f4b5f1374964f959d419cf875
WAV	file_example_WAV_5MG.wav	https://file-examples.com/index.php/sample-audio-files/sample-wav-download/	5,105	40955508715da2d5bd78546fc8ed9edcca07100e
WAV	taunt.wav	https://www2.cs.uic.edu/~i101/SoundFiles/	90	2988a818ebd6a373ca37ecd0a0bf9123880c5758
WMV	1280.wmv	https://www.appsloveworld.com/sample-wmv-video-file-free-download/	13,846	814a49657d5e01a0f171634ddebc664c98a8a6ec
WMV	file_example_WMV_480_1_2MB.wmv	https://file-examples.com/index.php/sample-video-files/sample-wmv-files-download/	1,149	1c4d2e7cce26714dcda87cc52fbca695b377b389

Type	Filename	Origin	Size (KB)	SHA1
WMV	sample_3840x2160.wmv	https://filesamples.com/formats/wmv	32,726	6ee26e2c8d98aa6d3e62dc323ec48e03ba392a2b
WMV	sample-wmv-file.wmv	https://www.learningcontainer.com/sample-wmv-video-file-download/	5,833	a59d51d161b52196aebde4f9c1585c206a9b08a3
WMV	Video2.WMV	https://www.lehman.edu/faculty/hoffmann/itc/techteach/video/Video_samples.html	85	66d457ecfcb8ee65c9f841f77ae737ab91aaa11c
XLS	file_example_XLS_10.xls	https://file-examples.com/index.php/sample-documents-download/sample-xls-download/	9	e0cdb9c8a7da39f9787729345fd9bd617d02d539
XLS	file_example_XLS_5000.xls	https://file-examples.com/index.php/sample-documents-download/sample-xls-download/	657	3a0d4a8ecb77244d1580b15cb9f0766c8317b073
XLS	USB_artifacts.xls	Created by khedley	28	39a4a8f0a789578d55951d3fc3e00a5ec86d6b16
XLSX	file_example_XLSX_1000.xlsx	https://file-examples.com/index.php/sample-documents-download/sample-xls-download/	42	0dce77a811e9f631913c88e1b04391a868fcc93d
XLSX	file_example_XLSX_50.xlsx	https://file-examples.com/index.php/sample-documents-download/sample-xls-download/	8	c94997094ad00f9f38017fd94a1d44a1241003b6
XLSX	sample3.xlsx	https://filesamples.com/formats/xlsx	13	4c82c22ee2a7478fc0d0ddea5d3c9565ff269520
ZIP	DOCX-XLSX-PPTX.zip	Created from DOCX-XLSX-PPTX folder containing files above	45,381	3bc958d3d36c67342d4a209def63d69a3b9c55ca
ZIP	MOV.zip	Created from MOV folder containing files above	47,973	d45075b85ebb217305ab6bac10e7f6e9a1edceb9
ZIP	MP3.zip	Created from MP3 folder containing files above	25,633	7a144bc05232c3e693669e1ef6121ac3b94d3128
ZIP	PDF.zip	Created from PDF folder containing files above	2,646	a1aa6a40d9161d0dc9fc546c8b239689055cb464
ZIP	PNG.zip	Created from PNG folder containing files above	8,002	0a342d01ac70cb9cae28252805bceed415f949f9

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[1] https://www.khyrenz.com/resources/

[2] https://www.exterro.com/ftk-imager