

Computer Forensics with FTK

Enhance your computer forensics knowledge through illustrations, tips, tricks, and practical real-world scenarios

Fernando Carbone



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Preface

Welcome to *Computer Forensics with FTK*. This book has specially been created to provide you with all the information you need to get started with the FTK investigation platform. You will learn the basics of computer forensics and how to use the FTK to conduct digital investigations generating court-accepted evidence.

What this book covers

Chapter 1, Getting Started with Computer Forensics Using FTK, will get you started with the basic installation and configuration of the FTK and how to prepare your environment lab for digital investigations.

Chapter 2, Working with FTK Imager, will teach you how to use the FTK Imager tool to create forensic images of digital devices from volatile data, such as memory.

Chapter 3, Working with Registry View, will give a step-by-step demonstration on how to work with Registry View to access and extract relevant information from Windows Registry, and how this information can be important during the investigation process.

Chapter 4, Working with FTK Forensics, will cover the main computer forensics process, explaining each step in depth. Also, you will learn some important features of the FTK, such as managing users and processing options.

Chapter 5, Processing the Case, will cover how to use the most important features for processing and filtering data during your investigation process. You will learn how to set up the tool to perform data analysis, search information, and bookmark your findings.

Chapter 6, New Features of FTK 5, will give an overview of the main new features that have been developed in the FTK 5, and make you understand how these new features can help you during your investigations.

Preface

Chapter 7, Working with PRTK, will teach you how to perform a password recovery from files and systems using the PRTK and DNA products, and how it will help you to solve problems when you find some protected information.

What you need for this book

A computer with Windows XP or newer, AccessData Forensic Toolkit 5, some evidence file samples, and an Internet connection.

Who this book is for

Computer forensics with the FTK is great for anyone who wants to conduct digital investigations with an integrated platform. Whether you are new to computer forensics or have some experience, this book will help you get started with the FTK, so you can start analyzing evidence effectively and efficiently.

The book also helps law enforcement officials, corporate security, and IT professionals who need to evaluate the evidentiary value of digital evidences.

Conventions

In this book, you will find a number of styles of text that distinguish between different kinds of information. Here are some examples of these styles, and an explanation of their meaning.

Code words in text, database table names, folder names, filenames, file extensions, pathnames, dummy URLs, user input, and Twitter handles are shown as follows: "These files are located at C:\Windows\System32\Config."

Any command-line input or output is written as follows:

[Drive]:\FTK\AccessData Distributed Processing Engine.EXE

New terms and **important words** are shown in bold. Words that you see on the screen, in menus or dialog boxes for example, appear in the text like this: "Install the **Distributed Engine** component, as it is necessary for the correct operation of FTK."



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Preface

Errata

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L Getting Started with Computer Forensics Using FTK

Forensic Toolkit (FTK) is a complete platform for digital investigations, developed to assist the work of professionals working in the information security, technology, and law enforcement sectors.

Through innovative technologies used in filters and the indexing engine, the relevant evidence of investigation cases can be quickly accessed, dramatically reducing the time to perform the analysis.

This chapter will cover the first steps needed to install and configure the FTK tool.

Forensic digital investigations include the following processes:

- Preparation
- Acquisition and preservation
- Analysis
- Reports and presentation

This process will be discussed in more detail in *Chapter 4, Working with FTK Forensics,* with the use of FTK forensics and enterprise editions.

The computer forensics tools need to be kept updated to address issues such as an increasing size of hard drives and the use of encryption in order to reduce the time to perform the data acquisition and analysis.

AccessData has two versions of the platform:

- **FTK forensics**: This version of FTK, which will be covered in this book, has the ability to perform the acquisition and analysis of digital devices such as computer hard drives, USB drives, flash memory devices, smartphones, tablets, and other digital media. Its approach is related to a process called post-mortem computer forensics, which happens when the computer has been powered down.
- **AD Enterprise**: In general, AD Enterprise has the same features as the FTK forensics version plus the ability to analyze multiple computers across your company simultaneously. Another important feature of this version is the ability to acquire and analyze volatile data, such as RAM. The investigation process is totally confidential, and the investigated user will not be aware of the analysis, even if it is done through the network and with the target equipment in use.



In this book, we will use the solution only in the standalone version.

Downloading FTK

Once the FTK platform has been acquired, AccessData usually sends the DVDs for product installation and the hardware dongle codemeter with the license of the product.

If not, then it is possible to download the FTK directly from the AccessData website. All other products are also available for download.

In this book, we will use FTK Version 5 onwards, and you can download the product from http://www.accessdata.com/support/product-downloads.

Prerequisites for FTK

There are two different settings (configuration options) for FTK installation:

- One machine: FTK + database
- Two machines: FTK + database on separate machines

In general, the specification used for FTK with the PostgreSQL database is shown in the following screenshot:

Software	
Operation System	Server 2008 R2 / Windows7 (64-bit)
Hardware	
Processor	Intel® i7, Dual Quad Core Xeon, or AMD equivalent
Memory	32 GB (or more)
OS / Application drive	7200 RPM drive with 64MB cache or SSD drive
Storage for PostgreSQL database	160GB Solid State Drive (SSD) dedicated exclusively to PostgreSQL.
Network Card	Gigabit
HW RAID Controller	Highly recommended if hosting PostgreSQL database. Configure with RAID 5, 6, or 10 avoid RAID0
Temporary Folder Location	SSD drive or RAID0 partition w/ write-through
Drive Configuration	Drive 1: OS Drive 2: PostgreSQL Database (SSD or HW RAID) Drive 3: Case Folder and HD Image Drive 4: Temp Directory (SSD or RAID0)



Note that this is the recommended specification by the vendor. However, the more the processing, memory, and I/O resources available, the faster the analysis.

Installing FTK and the database

FTK installation is quite simple, although the components' installation sequence must be respected. AccessData has created a menu to provide support for the correct installation, as can be seen in the following screenshot:

► FTK installer
Find, Organize, & Analyze Computer Evidence
AccessData
FORENSIC TOOLKIT"
Database View User Guide
FTK Install
Distributed Engine Other Products

Perform the following steps for installing FTK:

- 1. Start the installation process by using the **Database** component. You can then enter a password to create the PostgreSQL database admin user.
- 2. Once the database installation is done, install FTK.
- 3. Install the **Distributed Engine** component, as it is necessary for the correct operation of FTK.
- 4. The **View User Guide** installation is optional, but highly recommended.

- 5. To finish the FTK platform installation process, click on the **Other Products** button and select the components listed as follows:
 - License Manager: This is the product's license control component
 - ° **Registry Viewer**: This is the Windows registry analysis component
 - ° PRTK: This is the password recovery component
 - CodeMeter: This is the USB CodeMeter hardware driver and management component
 - ° Imager: This is the FTK Imager product

Make sure that you select the correct platform, which can be either 32or 64-bits, and in case the **Unable to connect to the database requested** error message appears, just change the **RDBMS** option to **PostgresSQL**.

Running FTK for the first time

If the installation has been done correctly, the first step would be to create a user:

Case ID n/a Case Owner n/a Case Owner n/a Date Modified n/a Date M
Case Owner n/a Reference n/a Data Modified n/a Data Modified n/a Data Add New User Data Cation Trusted User User Name: Data Data Data Data Data Data Data Dat
Reference n/a Date Modified n/a Date Modified n/a Da Add New User Da Ca Trusted User I User Name: Ca E through
Date Modified n/a Da Da Add New User Da Ca Ca Trusted User Line
De Password: Verify Password: Role(5): Application Administrator

Next, you can complete the fields in the form and then click on **OK** to create the first user. This user will be the application administrator, who will manage the FTK tool. The use of the FTK tool will be discussed in the next few chapters.

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Summary

This chapter covered the first necessary steps to be performed in order to use the FTK forensics tool. The first step was to understand the difference between standalone and enterprise platforms as it is extremely important to determine the approach to be used in an investigation. This will certainly impact the time of acquisition and data analysis. Another important point was to consider the hardware prerequisites. Keep in mind that more the computing power the hardware has, the faster is the response of their analysis.

The analysis process is really time-consuming, and if not properly scaled, the hardware can have a negative impact on your project.

In the next chapter, you will use FTK Imager, the free version of the platform, which is commonly used for evidence acquisition and preanalysis of data.

2 Working with FTK Imager

FTK Imager is a free tool that can be downloaded from AccessData on its website, mainly used for conducting acquisition of digital media. To ensure the integrity of the data collected, it creates exact copies (forensic images), known as bit-to-bit or bit stream.

FTK Imager is a powerful, free tool. It allows a preanalysis of the data, information search, and the collection of volatile data such as RAM, along with other features that will be covered through this chapter. You can download FTK Imager as well as other products at http://www.accessdata.com/support/product-downloads.

This chapter discusses working with evidence using FTK Imager, allowing you to accomplish the creation of forensic images that meet your exact needs.

You will also be shown how to operate FTK Imager as well as an overview of all the features to understand the process of acquiring digital devices, which is considered one of the most critical factors.

Data storage media

It is important to realize that data acquisition may be performed not only on hard disks, but also across other devices that have the storage capacity, few of which are listed as follows:

- Magnetic media:
 - ° Floppy disks
 - ° Hard drives
 - ° USB/PC cards
 - ° ZIP and tape drives

- Optical media:
 - ° CDs
 - ° CD-Rs and CD-RWs
 - ° DVDs
- Alternative media:
 - ° MP3 players
 - ° Tablets
 - ° Smartphones
 - ° Video games, TVs, and so on

FTK Imager has the ability to collect and analyze each of these devices.

During an investigative process, we must look at these items because they may have relevant evidence, not often found in hard disks.

Acquisition tools

FTK Imager makes a bit-for-bit duplicate image of the media, avoiding accidental manipulation of the original evidence. The forensic image is an identical copy of the original device, which includes the file slack and unallocated space, and allows for the recovery of deleted files. The forensic duplication allows you to conduct the investigation process using the image, preserving the original media.

The analysis of the acquired image can be performed later in the FTK, which allows for a much more detailed investigation and the generation of the final report of the information found.

When you use FTK Imager to create a forensic image of a hard drive or other electronic device, ensure that you are using a hardware-based write blocker. By doing this, you can be certain that the system does not alter the original source at the time of attaching it to your computer.

On 🖂 Off TABLEAU eSATA Forensic Bridge DC IN ***2*** 800 SATA B IDE ***0*** 800 100 × Power **IDE Detect** USB 2.0 SATA Detect Host Detect Write Block eSATA Activity DC OUT

In the following picture, you can see a sample of the write blocker device:

Image formats

FTK Imager can support almost all types of images used in the market. The main types are filesystems supported, Imager creates formats supported, and Imager read formats. These are listed as follows:

- Filesystems supported FTK Imager supports the following filesystems:
 - ° DVD (UDF)
 - ° CD (ISO, Joliet, and CDFS)
 - ° FAT (12, 16, and 32)

- ° exFAT
- ° VXFS
- ° EXT (2, 3, and 4)
- ° NTFS (and NTFS compressed)
- ° HFS, HFS+, and HFSX
- FTK Imager can create evidence files of the following formats:
 - ° E01, S01, and L01
 - ° AFF
 - ° AD1
 - ° RAW/DD
- FTK Imager read formats in the following screenshot you can see all the formats that FTK Imager supports to read:

All Files (*.*)
E01 Images (*.e01)
SMART Images (*.s01)
Advanced Forensic Format Images (*.aff)
Virtual Hard Disk (*.vhd)
ICS Images (*.I01)
SafeBack / SnapBack Images (*.001)
Tar Archive (*.tar)
Zip Archive (*.zip)
AccessData Logical Image (*.AD1)
VMDK Virtual Drive (*.vmdk)
Ghost Raw Image (*.gho)
Raw CD/DVD image (*.iso; *.img; *.bin; *.tao; *.dao)
Alcohol CD image (*.mds)
DiscJuggler image (*.cdi)
CloneCD image (*.ccd)
Gear CD Image (*.p01)
IsoBuster CD image (*.cue)
Nero CD image (*.nrg)
Philips/OptImage CD image (*.cd)
Pinnacle CD image (*.pdi)
Plextools CD image (*.pxi)
Prassi CD Right Image Plus (*.gcd)
Prassi PrimoDVD Image (*.gi)
Roxio CD Creator Image (*.cif)
Virtual CD image (*.vc4)
WinOnCD image (*.c2d)
Apple Disk Images (*.dmg)

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The FTK Imager interface

The installation of FTK Imager is very simple and you have the option of using the traditional version, with the need to install the product on your hard disk. Alternatively, you can use the Lite version, which does not need an installation. It has the advantage of allowing FTK Imager to run directly from a USB key, which helps a lot in the field collection process.

The FTK Imager user interface is divided into several panes. The **Evidence Tree** section, the **File List** section, the **Properties** section, and the **Hex Value Interpreter** pane, The **Custom Content Sources** panes, the menu, and the toolbar can all be undocked and resized to best suit your needs. Each can be redocked individually or you can reset the entire view for the next investigation as shown in the following screenshot:



The menu bar

The menu bar can be used to access all the features of FTK Imager. It is always visible and accessible. There are four items on the menu bar:

- File: The File menu provides access to all the features you can use from the toolbar.
- **View**: The **View** menu allows you to customize the appearance of FTK Imager, which includes showing or hiding panes and control bars.
- Mode: The Mode menu lets you select the preview mode of the viewer.
- **Help**: The **Help** menu provides access to the FTK Imager user guide, which gives information about the program version and more ways that can assist you.

The toolbar

The toolbar contains all the tools and features that can be accessed from the **File** menu.

The following screenshot provides some basic information on each feature:



The view panes

There are several basic view panes in FTK Imager, which are listed as follows:

- **Evidence Tree**: This pane displays the added evidence items in a hierarchical tree.
- **File List**: This pane shows the files and folders contained in whichever item is currently selected in the **Evidence Tree** pane.
- Viewer: This pane shows the content of the currently selected file, based on the selected **Preview Mode** option: **Natural**, **Text**, or **Hex**.
- **Properties/Hex Value Interpreter/Custom Content Sources**: These panes display a variety of information about the object currently selected in either the **Evidence Tree** pane or the **File List** pane, convert hexadecimal values selected in the viewer into decimal integers and possible time and date values, and view the content that will be included in a **Custom Content** image, respectively.

The FTK Imager functionality

You can use FTK Imager to preview a piece of evidence prior to creating the image file(s). You can then choose to image the entire evidence object or choose specific items by selecting **Add to Custom Content (AD1) image**.

Adding and previewing an evidence item

You can either add a single evidence item or several items at one time. The following screenshot shows the procedure in a step-by-step format:

1. Click on the Add Evidence Item button on the toolbar.

2. Select the source type you want to preview and then click on **Next**.

Q AccessData FTK Imager 3.1.1.8		Addr	Autor	- 1	23
Ele View Mode Help					
\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$		RT HEX 😵 🗸			
Evidence Tree ×	File List				×
_	Name	Size Type	Date Modified		
Selec	t Source				
Hex Value Interpreter Type Size Value signed integer 1-8	Please Select the Source Evident Physical Drive C Logical Drive C Image File C Contents of a Folder (logical file-level analysis on	e Type	.etc.)		
FILETINE (IJCA) 8 FILETINE (IJCA) 8 DOS date 2 DOS line 2 time_t (IJC) 4 time_t (IJC) 4	< Back	Vext > Cancel	Help		
• •					
Byte order: 📀 Little endian 🦳 Big endian					
Properties Hex Value Int Custom Conte	Ī				
For User Guide, press F1					1

3. Select the drive or browse to the source you want to preview and then click on **Finish**:

Q AccessData FTK Imager 3.1.1.8		
<u>File View M</u> ode <u>H</u> elp		
	= ••• • • • • • • • • • • • • • • • • •	
Evidence Tree	× File List	×
P	Name Size Type Date Modified	
	Select Drive	
Hex Value Interpreter	Source Drive Selection Please select from the following available drives: NVPHYSICALDRIVE0 - HITACHI HTS725050A76530 [500GB 1 - NVPHYSICALDRIVE0 - HITACHI HTS725050A76530 [500GB 10E] NVPHYSICALDRIVE1 - Kingston Data Traveler 2.0 USB Device [8G]	
Type Size Value		
signed integer 1-8		
FILETIME (UTC) 8		
FILETIME (local) 8		
DOS date 2		
time t(UTC) 4	< Back Hinish Cancel Heip	
time_t (local) 4		
< III	8	
Byte order:	ian l	
Properties Hex Value Int Custom C	onte	
For User Guide, press F1		

— [18] —

4. The evidence item appears in the Evidence Tree pane:

Q AccessData FTK Imager 3.1.1.8	
<u>File V</u> iew <u>M</u> ode <u>H</u> elp	
🗛 🎎 🗣 🗠 🕿 🖾 🖬 🖬 🖬 🗛 🚙 🛥 🚥	🔁 🔨 🗋 🖻 🐱 😹 🦧 🔮
Evidence Tree ×	File List ×
	Name Size Type Date Modified
Partition 1 [476938MB]	unallocated space] 0 Unallocated Sp
E [System [NTF5]	MBR 1 Filesystem Met
SBadClus	
E. C. SExtend	
🗈 🛅 \$Recycle.Bin	
ACL Data	
AssuranceHelp	
AuraRoot	
E Got	
Custom Concurrents and Settings	
Hex Value Interpreter ×	
Type Size Value	
signed integer 1-8	
FILETIME (UTC) 8	000 FA EB 23 53 61 66 65 42-6F 6F 74 20 00 06 01 00 úë#SafeBoot ····
FILETIME (local) 8	010 00 00 00 00 18 2A D8 01-00 00 00 02 CC S9 00 ·····*g·····························
DUS date 2 DDS time 2	030 0E 07 FC BB AE 7D B9 04-00 8D 5F 10 80 3F 80 E0
time_t (UTC) 4	040 F8 75 62 80 7F 04 12 75-5C BE 5E 7C BF 00 06 57 gub ····u\%^ ;··W
time_t (local) 4	060 02 CD 13 07 1F 61 CF 8A-C4 80 E4 0F 80 FC 09 7E -1aï-ă-a
	070 03 80 C4 27 B1 04 D2 E8-3C 09 7E 02 04 27 01 06 ··Ä'±·Òè<·~···
Byte order:	080 98 7D AC 0A C0 75 06 AC-98 03 F0 EB F5 79 06 4E ·],-Åu·,-·∂ēĞy·N 090 C6 04 20 F6 D8 B4 0E BB-07 00 CD 10 EB E4 B4 92 E· öØ'.».·Í·ëä'.
Properties Hex Value Int Custom Conte	Cursor pos = 0; phy sec = 0
\\.\PHYSICALDRIVE0/Unpartitioned Space [basic disk	/MBR

Creating forensic images

Once the item is added to the evidence, you can perform the process of creating a forensic image. FTK Imager allows you to make several different types of forensic images. In addition, drive content and hash lists can be exported.

To create the image, perform the following steps:

- 1. Click on the **Export Disk Image** button on the toolbar.
- 2. Click on the **Add...** button.

— [19] —

3. Select the image type and click on **Next**:



4. Fill the evidence item information and click on Next:

Case Number:		
Evidence Number:		
Unique Description:		
Examiner:		
Notes:		

5. Select the destination folder, filename, fragment size, and compression options, and then click on **Finish**:

C:\Users\304020\Deskton	Browse
nage Filename (Excluding Extension)	Diomoo
evidence	
For Raw, E01, and AFF formats: 0 = do not fragment Compression (0=None, 1=Fastest,, 9=Smallest)	0
Use AD Encryption	

Mounting the image

With the feature of mounting, the forensic images will be allowed to be mounted as a drive or physical device with a read-only viewing option. This opens the image as a drive and allows you to browse the content in Windows and other applications. The types supported are RAW/dd images, E01, S01, AFF, AD1, and L01. Full disk images are RAW/dd, E01, and S01, and these can be mounted physically, simulating a physical disk connected to the computer.

Working with FTK Imager

This feature allows you to add the emulated physical disk to a virtual machine, as shown in the following screenshot:

Image File: C:\Users\304020\D Mount Type: Drive Letter: Mount Method:	Desktop Wantooth.E01 hysical & Logical	•	1	
C:\Users\304020\C Mount Type: P Drive Letter: N Mount Method: B	Desktop Mantooth.E01	T	1	
, Mount Type: P Drive Letter: N Mount Method: B	hysical & Logical	•	T	
Drive Letter: N Mount Method: B	levt Available (H+)			
Mount Method:	IEXCAVAIIADIE (11.7	Next Available (H:)		
19				
Write Cache Folder			_	
C:\Users\304020\[Desktop			
	-			Mount
				Mount
Mapped Image List –				
Mapped Images:				
Drive	Method	Partition	Image	
PhysicalDrive2	Block Device/Read	Image	C:\Users\304020\Deskto	op\Mantooth.E0
F: G:	Block Device/Read Block Device/Read	Partition 1 [109M Partition 2 [7MB]	C: \Users \304020 \Deskto C: \Users \304020 \Deskto	op Mantooth.E0 op Mantooth.E0
•		III		+
				Linneumh
				Unmound

The Capture Memory feature

Volatile data, such as memory contents, has important evidence that must be analyzed.

Through the collection in the memory, you can extract information such as running processes, documents in use, websites accessed, username and password, and a lot more. To execute the acquisition, perform the following steps:

- 1. Click on the **Memory Capture** button on the toolbar.
- 2. Select the destination path for the collected file.
- 3. As an optional step, you can include a Pagefile.sys file and create an AD1 evidence file format.
- 4. Click on Capture Memory to start the process as shown in the
- 5. following screenshot:

Q AccessData FTK Imager 3.1.1.8			Author Au	BK which	
<u>File V</u> iew <u>M</u> ode <u>H</u> elp					
🛯 🏩 🏩 🛳 🕿 🖾 🖬 🖬 📾 🛥 💻 🚃	🕞 🥄 🗋 🗎 📑 💌	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
Evidence Tree	File List				×
\.\PHYSICALDRIVE0 A	Name	Size	Туре	Date Modified	
Partition 1 [476938MB]					
System [NTFS]	(H		X	D	
BadClus	Memory Capture		~		
Extend	Destination path:				
B SRecycle.Bin	C:\Users\304020\Desktor	,	Browse		
ACI Data					
	Destination filename:				
AuraRoot	memdump.mem				
E Boot					
Documents and Settings					
Hex Value Interpreter ×	pagemetsys				
Type Size Value	Create AD1 file				
signed integer 1-8	memcapture.ad1				
unsigned integer 1-8	1			08 00 00 ëR-NTFS -	
FILETIME (local) 8	Capture Memory	Cano	el	D8 00 00 ·····ø··?·ÿ·	
DOS date 2				00 00 00 ··········	
time t (ITC) 4	0000000040 F6 00 00	00 01 00 00 00-	-5C 2F F7 D6 4E	F7 D6 94 ö\/+Ö	N÷Ö -
time_t (local) 4	000000050 00 00 00	00 FA 33 CO 8E-	-D0 BC 00 7C FB	68 CO 07 ····ú3À·Đ≒·	ûhÀ ·
III →	00000000000 1F 1E 68	66 UU CB 88 16. 75 15 B4 41 BB.	-UE UU 66 81 3E -AA 55 CD 13 72	03 00 4Ehf-Ef- 0C 81 FB TFSu-'AwaUf.	> · ·N r · ·û
Pute order (Little endien (Big endien	000000080 55 AA 75	06 F7 C1 01 00-	-75 03 E9 DD 00	1E 83 EC U ^a u·+Á··u·éÝ	i
byte order, se give endiant so big endian	0000000090 18 68 1A	00 B4 48 8A 16-	-OE 00 8B F4 16	5 1F CD 13 ⋅h ⋅ ⋅ ´H ⋅ ⋅ ⋅ ô	•••Í• •
Properties Hex Value Int Custom Conte	Cursor pos = 0; log sec = 0; p	hy sec = 2048			
For User Guide, press F1					

Obtaining the protected files

The Windows operating system does not allow you to copy or save live Registry files. You can acquire these protected registers running FTK Imager on the machine, which contains the records you want to copy as follows:

- 1. Click on the **Obtain Protected Files** button on the toolbar.
- 2. Select the destination folder for the obtained files.
- 3. Choose between the options of acquisition that are either needed to recover the password or the entire registry.

4. Click on **OK**, as shown in the following screenshot:

Q AccessData FTK Imager 3.1.1.8		X
File View Mode Help		
Evidence Tree ×	X File List	×
E-G \\\PHYSICALDRIVE0	 Name Size Type Date Modified 	
Partition 1 [476938MB]		
⊡-[¶: System [NTFS] □	E Obtain System Files .	
SBadClus H- SExtend	Source for obtaining files:	
Generation SRecycle.Bin	Warnings, Blasse he sware that ETK Imager is obtaining the	
	system files from the live system and not the acquired image.	
🕀 🛅 ACL Data		
🛅 AssuranceHelp	Destination for obtained files:	
Calana Aura Root		
😟 🗀 Boot	C:\Users\304020\Desktop	
Custom	- · · · · · · · · · · · · · · · · · · ·	
Incruments and Settings	Options	
Hex Value Interpreter ×	Minimum files for login password recovery	
Type Size Value	C Password recovery and all registry files	
signed integer 1-8		
Unsigned integer 1-8	OK Cancel 08 00 00 ER-NTFS	*
FILETIME (ore) 8		
DOS date 2	00 00 00 ······ 908: ····	
DOS time 2		
time_t (UTC) 4	000000000000000 00 00 00 00 00 00 00 00	
time_t (local) 4		
4 III +	0000000070 54 46 53 75 15 B4 41 BB-AA 55 CD 13 72 0C 81 FB TFSu (A*UI r	
Pute autor G. Little andian C. Ris andian	0000000080 55 AA 75 06 F7 C1 01 00-75 03 E9 DD 00 1E 83 EC U*u·+Á··u·éÝ···ì	
byte order	0000000090 18 68 1A 00 B4 48 8A 16-0E 00 8B F4 16 1F CD 13 ·h···H····ô··Í·	-
Properties Hex Value Int Custom Conte	Cursor pos = 0; log sec = 0; phy sec = 2048	
For User Guide, press F1		1

Detecting the EFS encryption

You can check for encrypted data on a physical drive or an image with FTK Imager just by clicking on the **Detect Encryption** button on the toolbar. The program scans the evidence and notifies you if the encrypted files have been located:

Q AccessData FTK Imager 3.1.1.8					
<u>File V</u> iew <u>M</u> ode <u>H</u> elp					
a a 🕸 🖨 🛥 🖂 🖃 🖪 🔤 🖉 🗋 🖿 🖷 🕷 😹 🦹 🔋 🖕					
Evidence Tree ×	File List ×				
- -	Name Size Type Date Modified				
Partition 1 [476938MB]	SExtend 1 Directory 07/06/2013 22:				
E-[System [NTF5]	SRecycle.Bin 1 Directory 13/06/2013 18: ≡				
E Club	La Directory 07/06/2013 18:				
E Staducida	AssuranceHelp 1 Reparse Point 07/06/2013 18:				
SRecycle.Bin	AuraRoot <u>1 Repare</u> Point 07/06/2013 18:				
1 \$Secure	Detect Encryption Progress pry 07/06/2013 23:				
🕀 🛅 ACL Data	pry 13/06/2013 18:				
Assurance Help	Please wait while FTK Imager scans the evidence is Point 14/07/2009 05:				
- AuraRoot	the evidence, this may take several minutes.				
⊕ Gorterr	pry 17/10/2012 01:				
Custom Continue	pry 0/7/06/2013 19:				
Hex Value Interpreter ×	pry 10/10/2012 22				
Tune Size Value	Cancel bry 14/07/2009 03				
signed integer 1-8	ory 13/12/2013 13:				
unsigned integer 1-8					
FILETIME (UTC) 8					
FILETIME (local) 8	020 BF 54 00 00 00 00 01 00-88 00 6E 00 01 00 00 00 2Tn.				
DOS time 2	030 05 00 00 00 00 05 00-F2 90 72 30 41 04 CA 01 ······ò·r0A.Ê·				
time_t (UTC) 4	040 F2 90 72 30 41 04 CA 01-BF C9 9F DD B2 63 CE 01 0 ·r0A-E·¿E·Y*cI·				
time_t (local) 4	050 12 90 12 30 41 04 CA 01-00 00 00 00 00 00 00 00 00 0. TCA-E				
۰ The second se	070 16 01 44 00 6F 00 63 00-75 00 6D 00 65 00 6E 00 ··D·o·c·u·m·e·n·				
Bute order 🕢 Little endian 🔿 Big endian	080 74 00 73 00 20 00 61 00-6E 00 64 00 20 00 53 00 t.s. a.n.d. S.				
syle order Ente order i Sig order	090 65 00 74 00 74 00 69 00-6E 00 67 00 73 00 CD 01 e.t.t.i.n.g.s.Í.				
Properties Hex Value Int Custom Conte	Cursor pos = 0				
For User Guide, press F1					

Summary

This chapter covered the main features of FTK Imager.

FTK Imager is a very important tool to produce forensic images and can support almost all evidence file formats. You can preview the evidence before the image. This is important because you can do a triage and collect only important information, considerably reducing the collection and analysis time.

You are able to understand the importance of using a write block device along with FTK Imager. In this way, it is possible to assure the integrity of a piece of evidence. You have learned about the interface in the solution and the main features of FTK Imager, as **Add and Preview Evidence Item**, **Creating Forensic Images**, **Image Mounting**, **Capture Memory**, **Obtain Protected Files**, and **Detect EFS Encryption**.

To summarize, FTK Imager is an essential tool for all experts and examiners. The best part of it is that it is free!
3 Working with Registry View

The AccessData Registry Viewer is a standalone product that can be integrated with the FTK and allows you to view the contents of the Windows registry. Unlike the traditional Windows Registry Editor, Regedit, which displays only the current system registry, the Registry Viewer can visualize registry files from any system. It also provides access to a registry-protected storage that contains passwords, usernames, and other information that is not accessible with Regedit. However, this tool is not free. In order to use it, you will need a CodeMeter USB stick with a valid license.

In this chapter, you will understand the structure of the Windows registry files, the main features of the tool, and its integration with the forensics FTK.

You'll see how to quickly access information from the users of the operating system, such as the following:

- Username
- Logon count
- Last logon time
- Last password change time
- Invalid logon time
- Last failed logon time

Working with Registry View

Understanding the Windows registry structure

To view the contents of the Windows registry keys, we need to identify the files associated with each key. These files are located at C:\Windows\System32\Config. The path and files are shown in the following screenshot:

Include in	library 🔻 Share with 💌 Burn	New folder		•
Favorites	Name	Date modified	Туре	Size
🧮 Desktop	🌙 Journal	13/07/2009 23:34	File folder	
📕 Downloads	📕 RegBack	31/10/2013 11:50	File folder	
📃 Recent Places	鷆 systemprofile	13/06/2013 15:14	File folder	
	📕 TxR	16/10/2012 21:12	File folder	
🗃 Libraries	BCD-Template	07/06/2013 20:03	File	28 KB
Documents		15/12/2013 19:41	File	43,008 KB
J Music	DEFAULT	15/12/2013 17:30	File	512 KB
E Pictures	A netlogon.ftl	15/12/2013 21:49	FTL File	1 KB
📑 Videos	A SAM	13/12/2013 11:41	File	256 KB
	SECURITY	13/12/2013 18:51	File	256 KB
🖳 Computer	SOFTWARE	15/12/2013 22:03	File	88.320 KB
System (C:) PENDRIVE (E:)	SYSTEM	15/12/2013 22:02	File	19.968 KB
🖙 VOL1\$ (\\BR-SAOFIL				
CODEMETER (G:)				
坖 304020\$ (\\BR-SAOF				
📮 Network				

Another important key is located in each user folder and is called NTUSER.DAT. The location of this file is shown in the following screenshot:

Computer	System (C:) Users The system (C:)	▼ 4 ₇	Search 304020		
Organize 👻 📄 Open	Burn New folder		1	•	
🚖 Favorites	Name Name	Date modified	Type File tolder	Size	
🧮 Desktop	🕕 Oracle	17/11/2013 22:22	File folder		
📕 Downloads	PrintHood	13/06/2013 15:14	File folder		
E Recent Places	Recent	13/06/2013 15:14	File folder		
	📴 Saved Games	13/06/2013 15:15	File folder		
Libraries	📔 Searches	22/09/2013 22:09	File folder		
Documents	🔊 SendTo	13/06/2013 15:14	File folder		
J Music	🔊 Start Menu	13/06/2013 15:14	File folder		
Pictures	🔊 Templates	13/06/2013 15:14	File folder		
Videos	CmDust-Result.log	12/12/2013 16:12	Text Document	116 KB	
	install.xml	16/10/2012 19:39	XML Document	51 KB	
E Computer	NTUSER.DAT	15/12/2013 22:07	DAT File	4.096 KB	1
System (C:)	ntuser.dat.LOG1	15/12/2013 22:07	LOG1 File	256 KB	
PENDRIVE (E:)	ntuser.dat.LOG2	13/06/2013 15:14	LOG2 File	0 KB	
VOL1\$ (\\BR-SAOFIL	NTUSER.DAT{016888bd-6c6f-11de-8d1d	13/06/2013 15:14	BLF File	64 KB	
CODEMETER (G:)	NTUSER.DAT{016888bd-6c6f-11de-8d1d	13/06/2013 15:14	REGTRANS-MS File	512 KB	
2040205 (\\BR-SAOF	NTUSER.DAT{016888bd-6c6f-11de-8d1d	13/06/2013 15:14	REGTRANS-MS File	512 KB	
	😰 ntuser.ini	16/10/2012 18:16	Configuration sett	1 KB	
획 Network	ntuser.pol	13/12/2013 14:26	POL File	64 KB	
	📋 server.txt	13/11/2013 21:00	Text Document	1 KB	

The main feature of Registry Viewer

The first step in setting up the Registry Viewer is to add one or more of the registry files previously presented in the Registry Viewer.

This can be done by performing the following steps:

1. Click on **Open** in the toolbar.

2. Select the registry file and click on **Open**:

AccessData Registry Viewer						
						1
Copen					×	
🚱 🔍 💌 🗼 🖡 Registry File	5		• ++ Search	Registry Files	9	
Organize - New folder)II • 🛄	0	
Documents	Name	Date modified	Туре	Size		
Music Pictures	SAM	12/02/2008 18:13	File	256 KB		
Videos						
PADBWC (E) System (C) PADBWC (E) CODUMETIK (E) Solution (N)BR-SAC CODUMETIK (E) Solution (N)BR-SAC Network: File nam	er SAM		 All Files 	(°.7)		
			Ope	n Cancel		
AccessData Registry Viewer						

The tool will interpret the data of the registry key and will present it in a friendly format, as shown in the following screenshot:



Generating a report

You can select important keys and add them to a report by performing the following steps:

- 1. Select the key you would like to add to the report and right-click on it.
- 2. Click on Add to Report.
- 3. To generate the report, click on the **Report** option in the toolbar.
- 4. Click on **OK**:

🔀 AccessData Registry Viewer - [SAM]						3
File Edit Report View Windo	ow Help				_ 8	×
	0= (e) (?)					
	•	*	Name	Turne	Data	_
SAM						_
🚊 💼 Domains				REG_DINARY	02 00 01 00 00 00 00 00 00 03 0A 10 7F FE C0 01 00 00	
🚊 🧰 Account		=	1 100 V	REG_BINARY	00 00 00 00 BC 00 00 00 02 00 01 00 BC 00 00 00 1A 00	
🖶 🛅 Aliases	(
Groups		Create Report		×		
Users		Report Title:				
000001F4		Registry Report		OK		
000001P3		Registi y Report		Cancel		
		Report Location:		Hala		
Key Properties		C: Program Files (x8	36) \AccessData \R	legistr neip		
Last Written Time	27/02/2007 19:21:5		Brows	e		
SID unique identifier	500	Report Filename:				
User Name	Administrator	SAM		(.htm)	63 5A 16 7F FE C6 01öcZpE.	~
Description	Built-in account for a			(AD 81 F5 7F FE C6 01æő.þE.	
Logon Count	1	Reduce excess da	ata output			
Last Logon Time	02/11/2006 13:02:0	Show key propert	ies only		00 00 00 33 00 00 00	
Last Password Change Time	02/11/2006 13:08:1	Also show DWORI	D values as times	tamps		
Expiration Time	Never	View Report when	n created			
Invalid Logon Count	0		-			
Last Failed Login Time	Never				-	
Account Disabled	true					
Password Required	true					
Country Code	0 (System Default)	-				
						-
AccessData Registry Viewer			1	R Offset: 0		

Integrating with FTK

There are two different ways to manipulate the files of the registry keys. To access these files, you can use FTK Imager to locate and export these files.

Working with Registry View

The following screenshot shows a sample of this export process:

Q AccessData FTK Imager 3.1.1.8			_ D X
<u>Eile V</u> iew <u>M</u> ode <u>H</u> elp			
🏩 🎕 🎕 🚔 🖾 🖬 🖬 🛃 🚑 🗁 🗖	• 🔁 🕄 🗋 🖹 🔁		
Evidence Tree	 File List 		×
E-C System32	 Name 	Size Type Date Modified	A
⊞- 🛄 Boot	🌗 Journal	1 Directory 02/11/2006 10:	
Catroot	퉬 RegBack	1 Directory 07/07/2007 20:	
GroupPolicy	July TxR	1 Directory 02/11/2006 12:	
Group Policy Users	\$IB0	4 NTFS Index All 14/07/2007 18:	
⊞ Con LogFiles	COMPONENTS.LOG	1 Regular File 02/11/2006 10:	
Ci Microsoft	DEFAULT.LOG	1 Regular File 02/11/2006 15:	E
D NDF		200 Regular File 12/07/2007 19: 20 Regular File 02/11/2006 10:	
networklist	SAM	256 Regular File 12/02/2008 20:	
	SAMLOG	Export Files	
ti - Ci winevt	SAM.LOG1	Export File Hash List	
- Casks	SECURITY	and the Outleast Costant Image (AD1)	
Hex Value Interpreter	SECURITY.LOG	Add to Custom Content Image (ADI)	
Type Size Value	SECURITY.LOG1	256 Regular File 12/07/2007 19:	
signed integer 1-8	SOFTWARE	22.272 Regular File 12/02/2008 20:	-
EILETIME (LITC) 8	00000 72 65 67 66 C	F 00 00 00-CF 00 00 00 6B 03 54 B4 regfI···I···k·T′	*
FILETIME (local) 8	00010 B3 6D C8 01 03	1 00 00 00-03 00 00 00 00 00 00 00 ³ mE	
DOS date 2	00020 01 00 00 00 20	9 00 73 00-74 00 65 00 6D 00 52 00 \.s.v.s.t.e.m.R.	
time t(UTC) 4	00040 6F 00 6F 00 74	4 00 5C 00-53 00 79 00 73 00 74 00 0·0·t·\·S·y·s·t·	
time_t (local) 4	00050 65 00 6D 00 3	3 00 32 00-5C 00 43 00 6F 00 6E 00 e·m·3·2·\·C·o·n·	
4	00060 66 00 69 00 6	7 00 5C 00-53 00 41 00 4D 00 00 00 f ·i·g·\·S·A·M···	
Byte order: (• Little endian (C) Big endian	00090 B8 1A 50 D5 00	0 00 00 00-00 00 00 00 00 00 00 00 00 , PÕ	-
Properties Hex Value Int Custom Conte.	Cursor pos = 0; dus = 2122	1; log sec = 21221; phy sec = 21284	
Exports files from the image to a local folder			

Alternatively, you can use the FTK to export the same files, as shown in the following screenshot. You can do this by right-clicking on the registry file and then clicking on **Open in Registry Viewer**.

Filter: - unfiltered -	nics Video Internet/Chat	Filer Manager	Open Launch in Content Viewer	
Evidence Items		4 p File Content	Open With	•
B C C Speci B C C Speci C C Speci C C C Speci B C C Speci B C C B R	ly h m m32 bot	Hex Text Fibered Natural	Create Bookmark Add to Bookmark Remove from Bookmark	
	troot		Received abale	
-D69	oupPolicy oupPolicyUsers		Mount Image to Drive	
	gFiles crosoft		Add Decrypted File	
	XF stworklist		Perform Cerberus Analysis	
· · · · · · · · · · · · · · · · · · ·	eech ool nevt	- Fie Content Properties Hex Interpreter	Visualize Browser History Export Browser History to CSV View File Sectors	
ile List		Display Time Zoney E. Coulds America De	Find on protein	
ile List सि लि लि 🖌 🛃 🔳	· · · · · · · ·	Normal + Dopay The zone; E. Soudi America Da	With the state of the second	
lle List 27 - 27 - 20 - 20 - 20 - 20 - 20 - 20 -		Normal Deploy the balls is about when to be Path Category P-Size L-Size MDS Mantooth.E01/Partition Index 4096.8 4096.8	Add to Fuzzy Hash Library Find Similar Files	ssed Modified 7/2008 18: 14/07/2007 15:.
le List	+ ∰+ ∰ m [] pel [tem # Ext 1913 1914 log 1915 log	Normal - Option Description Description <thdescription< t<="" td=""><td>Add to Fuzzy Hash Library Find Similar Files Add to PhotoDNA Library</td><td>seed Modified 7/2008 18: 14/07/2007 15: 1/2006 07: 02/11/2006 07: 1/2006 12: 02/11/2006 12:</td></thdescription<>	Add to Fuzzy Hash Library Find Similar Files Add to PhotoDNA Library	seed Modified 7/2008 18: 14/07/2007 15: 1/2006 07: 02/11/2006 07: 1/2006 12: 02/11/2006 12:
le List	+ ∰+ ∰ m [] zel [tem # Ext 1913 1914 log 1915 log 1916 log1 1962 en	Normal Objecty free office Loss of Mathematics Peth Category Poise 4056 Mantooh.E0.0/Partition Unknown 10249 30249	M Add to Fuzzy Hesh Library Find Similar Files Add to PhotoDNA Library Open in Registry Viewer	seed Modified 7/2008 18: 14/07/2007 15: 1/2006 07: 02/11/2006 07: 1/2006 12: 02/11/2007 16: 7/2007 18: 12/07/2007 16: 12/007 02: 07:07:07:07:07:07:07:07:07:07:07:07:07:0
Ie List		Normal Objects/Telescole Joint Additional Control (1998) Objects/Telescole Most Control (1998) Poisson (1998) Most Control (1998) <t< td=""><td>M Add to Fuzzy Hash Library Find Similar Files Add to Photo DNA Library Open in Registry Viewer Export</td><td>seed Modified 7/2008 18 14/07/2007 15. 1/2006 07 02/11/2006 07. 1/2006 12 02/11/2006 07. 1/2006 07 02/11/2006 07. 1/2005 07 02/11/2006 07. 1/2005 07 02/11/2006 07. 1/2005 07 02/11/2006 07.</td></t<>	M Add to Fuzzy Hash Library Find Similar Files Add to Photo DNA Library Open in Registry Viewer Export	seed Modified 7/2008 18 14/07/2007 15. 1/2006 07 02/11/2006 07. 1/2006 12 02/11/2006 07. 1/2006 07 02/11/2006 07. 1/2005 07 02/11/2006 07. 1/2005 07 02/11/2006 07. 1/2005 07 02/11/2006 07.
le List 2 A Name Lat 2 State 2 Control Control Control 2 Control	• ■	Internal Objecty free offers 2 and relation free free of the f	Add to Fuzzy Heah Library Find Similar Files Add to PhotoDNA Library Open in Registry Viewer Export Export Export to Image Accelute to disk image.	sed Modified 7/2008 18 14/07/2007 15: 7/2006 07 02/11/2006 12: 7/2007 18 12/07/2007 18: 7/2007 18 12/07/2007 18: 7/2008 18 07/07/2007 17: 7/2008 18 07/07/2007 18: 7/2008 18 12/07/2006 18:
le List	• ⊕ ⊕ ⊕ □	Internal Objects/Telescole Description	Add to Fuzzy Hesh Library Find Similar Files Add to PhotoDNA Library Open in Registry Viewer Export Export to Image Acquire to disk image Export the List Info	seed Modified 7/2008 18: 14(07/2007) 12/006 07: 02/11/2006 12/007 18: 12(07/2007) 12/007 18: 12(07/2007) 12/007 18: 12(07/2007) 12/005 07: 12(07/2007) 12/005 07: 12(07/2007) 12/005 07: 12(07/2007) 12/005 07: 12(07/2007) 12/005 07: 12(07/2007) 12/005 07: 12(07/2007) 12/005 07: 12(07/2007) 12/005 07: 12(07/2007) 12/005 07: 12(07) 12/005 07: 12(07)

– [32] –

Identifying the Time Zone setting

The correct setting of the time zone is critical for proper analysis and generation of the results of the investigation process; incorrect settings may result in erroneous claims about those facts. When you select the correct **Time Zone**, all MAC time information is adjusted automatically as follows:

Manage Evidence			×
Display Name	State	Path:	C:\Users\304020\Desktop\Mantooth.E01
Mantooth.E01	+		
		ID / Name:	
		Description:	A
		Evidence Group:	• Manage
		Time Zone:	America/Sao_Paulo
			America/Sao_Paulo
Add Remove			Eastern Time with Daylight Saving (US - New York)
Case KFF Options			Eastern Time without Daylight Saving (Jamaica - Kingston) Central Time without Daylight Saving (US - Chicago) Central Time without Daylight Saving (US - Chicago)
	_		Mountain Time with Daylight Saving (US - Denver)
			Mountain Time without Daylight Saving (US - Phoenix)
			Pacific Time with Daylight Saving (US - Los Angeles) Pacific Time without Daylight Saving (Pacific - Pitcairn Islands)
			Africa/Abidjan

If you do not know the time zone of the seized computer, Registry Viewer can help you.

Working with Registry View

You can add the registry key, System, and locate the information at System\ ControlSet001\Control\TimeZoneInformation, as shown in the following screenshot:

ラ File Edit Report View Wir 多 島 国、On → 国 戸 間	ndow Help				- 6
SystemResources SystemResources TablePC Got Terminal Server Sourcescond connal Undebase Undebase Vide Video Video Video Video Video Video Video Video Windows Windows	5. 1	Name Bias StandardNa StandardBias StandardBias StandardStart DaylightName DaylightBias DaylightStart DaylightStart DaylightStart DaylightStart DaylightBias DaylightBias DaylightBias	Type REG_DWORD REG_SZ REG_DWORD REG_BINARY REG_SZ REG_DWORD REG_SINARY REG_SZ REG_DWORD REG_DWORD	Data 0x000001,44 (420) @tzres.dll.192 0x0000000 (0) 0x0000000 (0) 0x0000000 (0) 0x0000000 (0) 0x0000000 (0) 0x0000000 (0) 0x0000000 (0) 0x0000000 (0)	
Key Properties Last Written Time Standard Start Date Davioht Start Date	26/03/2007 15:04:03 UTC First dom in nov at 2:00:00 Local Second dom in mar at 2:00:00 Local	Ī			
Standard Blas Davlight Blas	6 -60	0 24 01 00 00		B	

Account information

Another important feature of the Registry Viewer is the ability to view information about all the users of the system in a very easy way. This important information is shown in the following screenshot:

File Edit Report View W	indow Help	_	_				1	a
								2.1.2.8
SAM SAM Carbon SAM Carbon Sam Sam Sam Sam Sam Sam Sam Sam		н	N 10 81	lame ⊈F ₹V	Type REG_BINA REG_BINA	RY	Data 02 00 01 00 00 00 00 00 66 63 54 16 7F FE C6 01 00 00 00 00 00 00 00 00 00 00 00 00 00 10 00 EC 00 00 00 1A 00	
Last Written Time	27/02/2007 19:21:54 UTC							
SID unique identifier	500	10	а.					
User Name	Administrator							
Description	Built-In account for administering th	C.	0	0 02 00 01 00	00 00 0	0 00-F	6 63 5A 16 7F FE C6 01	-
Logon Count	1		1	0 00 00 00 00	00 00 0	0 00-E	6 AD 81 FS 7F FE C6 01	
Last Logon Time	02/11/2006 13:02:01 UTC		2	0 00 00 00 00	00 00 0	0-00 0	0 00 00 00 00 00 00 00	
Last Password Change Time	02/11/2006 13:08:15 UTC	Ξ	4	0 00 00 01 00	01 00 0	0 00-0		
Expiration Time	Never							
Invalid Logon Count	0							
Look Parked Looks Three	Never							
Last Faled Login Time								
Account Disabled	true							
Account Disabled Password Required	true	- 18	1					
Account Disabled Password Required Country Code	true true 0 (System Default)							

____ [34] ____

Summary

This chapter covered the use of the Registry Viewer, which is presented in its interface and main features. You are now able to understand the importance of the correct use of the **Time Zone** feature and how to locate it within Windows registry keys. The Registry Viewer can display key bits of information about the user accounts in a friendly manner. It is certainly an important tool for conducting research on registry information that cannot be accessed by the operating system. It is easy to use and very useful during the investigation process because it allows you to quickly access information contained in the registry keys and helps to interpret their values.

In the next chapter, you will learn how to manage their investigation cases and the options for processing evidence, which is one of the most important tasks of the FTK.

4 Working with FTK Forensics

As mentioned in previous chapters, the FTK is a complete platform for digital investigations, and although it has a friendly interface, its use requires attention, especially during the preanalysis phase. A wrong setting of the case can generate negative impacts on the project and may require more time than planned.

This chapter will cover the process of computer forensics and the first steps of using the FTK.

You will notice that the correct understanding of the computer forensics process will help you with the use of the tool, and the right the FTK setup will save you a lot of analysis time and provide you with the best results.

Introducing computer forensics and FTK

Computer forensics is a digital forensic science that relates to the generation of legal evidence found in computers and the digital media. The computer forensics process aims at examining the digital media in a forensically sound manner with the goal of acquiring, preserving, analyzing, and presenting relevant facts about a specific case; for example, digital crime, fraud, misuse of resources, and so on.

The steps presented in the following diagram are intended to help drive the research process and get the evidence that could be presented in court, demonstrating that the best practices of computer forensics were followed. The computer forensics process can be explained using the steps shown in the following diagram:



Working with FTK Forensics

Preparation

It is very important for the forensic analyst to be prepared to start a new digital investigation process and should take care of with the following points:

- Defined investigation processes are required
- A trained field and lab team that must include the following:
 - **Technical trainings**: This is done to know how to use the main computer forensics tools
 - **Procedural trainings**: This is done to understand the best practices, procedures, and flows to conduct a digital investigation
- Adequate software and hardware

Acquisition and preservation

Acquisition and preservation are considered as the most critical steps of the process since errors are not allowed at the time of evidence acquisition. The basic principle of computer forensics is preservation of the digital evidence integrity.

The acquisition can be done using the following tools:

- Write blockers (hardware or software)
- Forensic duplicators
- Boot disks
- Remote acquisition (through network)

Analysis

Analysis is the part of the investigation process that involves the most amount of technical aspects. Some of the reasons are listed as follows:

- Necessary technical knowledge about operation system, filesystem, network, and applications
- Specialized software is required
- Skill for creating filters and searching evidence in operational systems artifacts

Reports and presentation

This is the last step of the process. After we have found results and arrived at conclusions about the investigation, we need to perform the following steps:

- Adapt the report language for the target audience use technical language for the technical team or more formal and appropriate language for lawyers or judges
- Take care that the reports and presentations are clear and conclusive and avoid opinions
- Provide the presentation in different kinds of file formats such as PDF, HTML, DOC, and so on

Managing groups and users

The FTK allows you to create multiple users and assign roles to them, providing a more collaborative solution.

To add a new user, we have to perform the following steps:

1. Click on **Database** and select **Administer Users**.

Cas	Log Out							
Nan		Ca	ase ID	n/a				
_	Change password	Ca	ase Owner	n/a				
	Administer Users	Re	eference	n/a				
	Session Management	Da	ate Modified	n/a				
	Configure	Administer Users	Contraction of the local division of the loc				×	
		User Name	Full Name		Role(s)			
		flcarbone	ficarbone		Application Administrato			
		Create Use	:r D	isable User	Change Password	Set Role(s)]	

- [39] -

2. Click on the **Create User...** button.

dminister Users		
User Name	Full Name	Role(s)
flcarbone	ficarbone	Application Administrator
	Add New User	
	Truste Full Name:	ed User
	Password:	
	Verify Passwor	rd:
Create User		
Show disabled	users Assign Rol	Close Close

- 3. Fill in the presented fields as follows:
 - **User Name**: In this field, enter the name that will be recognized by the FTK
 - **Full Name**: In this field, enter the full name that should appear on case reports
 - ° **Password**: In this field, enter the password for the user
 - **Verify Password**: In this field, enter the same password for verification
- 4. After entering the required information into the fields, click on Assign Roles.

Initial Role(s) for:		×
Roles:		
Name	Description	
Application Administrator	This role has all privileges.	
Case Administrator	This role has all case privileges.	
Case Reviewer	This role has review rights only, modification of the evidence data is not permit	ted
		Of Crard
		OK Cancel
	Password:	
	Verify Password:	
	Role(s):	
Create User		
	Assign Roles OK Cancel	Class
Show disabled users		Cluse

- 5. To assign rights to this user, use one of the roles presented as follows:
 - **Application Administrator**: This performs all tasks, including adding and managing users
 - ° **Case Administrator**: This performs all tasks that an application administrator can perform, except creating and managing users
 - ° Case Reviewer: This cannot create cases; it only processes cases
- 6. After choosing the correct profile, click on **OK** to apply the role, and then click on **OK** again to create the user.

The user's passwords can be changed at any time. Just click on **Change Password...** to enter the new password, as shown in the following screenshot:

ser Name	Full Nam	e	Role(s)		
carbone	ficarbor	Change Password			
		Current password	for ficarbone (ficarbone)		
		New password			
		Re-enter			
			OK	Cancel	
Create User		Disable User	Change Password	Set Role(s)	1

Creating a new investigation case

The FTK allows you to manage your investigations by assigning a case for each of them. The case information is stored in a database.

To create a new case, perform the following steps:

1. Click on **New...** and select **New Case**. The **New Case Options** dialog opens, as shown in the following screenshot:

AccessData F	orensic Toolkit Version: 5.0.1.39 D	atabase: localh	ost				
Cases	Case Tools Manage Help	1					
Name	Open		Case ID	n/a			
	Assian Users		Case Owner	n/a			
	Backup		Reference	n/a			
	Restore		Date Modified	n/a			
	Delete		Date Accessed	n/a			
	Copy Previous Case		New Case Options			×	
	Refresh Case List	FS	Owner: Case Name: Reference: Description:	floarbone		TH	*
			Description File: Case Folder Directory:	C:\Cases		-	
			Database Directory:	<casefolder>/D8</casefolder>			
				In the case folder			
			Processing Profile:	AD Standard	Custom		
				P Open the case	Cancel		

- 2. Fill in the fields that appear in the following manner:
 - ° **Case Name**: In this field, enter the name of the case.
 - [°] **Description**: This field is optional and text free.
 - ° **Reference**: This field is also optional and text free.
 - [°] **Description File**: In this field, you can attach a file to the case.
 - **Case Folder Directory**: This holds the path where case files will be stored.
 - Database Directory: This is the path where case database will be stored. Select the In the case folder checkbox to set the same folder of the case.
 - Processing Profile: Configure the default processing options for the case by either using a processing profile or custom settings. This item will be detailed in the next topic.
 - **Open the case**: Check this option if you wish to open the case as soon as it is created. After the fields are filled, click on **OK** to create the new case.

3. The next step is to add the evidence file, as shown in the following screenshot:

e Edit yew Evidence Fiter Jools Manage Help P Pher: -unfiltered	Fiter Manager			
	Manage Evidence			×
	Display Name State	Path:	C:\Users\ficarbone\Desktop\Mantoo	¢.601
		ID / Name: Description:	[
		Evidence Group:		• Manage
		Time Zone:	America/Denver	•
			Merge ca	ise index T Use UNC Paths
	Add Remove		Retinement Options	Language Setting
	Case KFF Options			OK Cancel

- 4. Click on **Add** and select one of the following evidence types:
 - Acquired Image(s): Select this type to add an image file (dd, e01, AD1, and so on)
 - All Images in Directory: Select this to add all images in a specific folder
 - **Contents of a Directory**: Select this type to add all files in a specific folder
 - Individual File(s): Select this to add a single file (docx, pdf, jpg, and so on)
 - [°] **Physical Drive**: Select this to add a physical device (a full hard disk)
 - **Logical Drive**: Select this to add a logical volume or partition, for example, the C or D drive
- 5. Click on **OK** set the following items:
 - **Time Zone**: Select the correct time zone of the location where the evidence was collected.
 - **Refinement Options**: Select which items will be processed in evidence. This item will be detailed in the next topic.
 - **Language Settings**: Select the correct language that corresponds to the alphabet used in the collected evidence.

6. Once all the parameters are configured, click on **OK** and wait for the evidence processing.



Incorrect use of the **Time Zone** option can produce inconsistent results because it changes all MAC time values of evidence. If you do not know the **Time Zone** option of the evidence, use the FTK registry viewer tool to identify it.

The FTK interface

The main feature of the FTK interface is the location, organization, and exportation of data. The interface contains tabs, each with a specific focus, and also contains a common toolbar and file list with customizable columns. New tabs can be added to help the localization of information as shown in the following screenshot:



The tabs can be categorized as follows:

- **Menus/Toolbar**: In this option, all the functionalities and settings of the tools can be accessed. Use filters to find relevant evidence.
- **Tabs**: Each tab will display the data in different structures as follows:
 - **Explorer**: This tab lists the evidence in a directory structure, similar to the Windows explorer. Evidence can be viewed in physical or logical drives.

- **Overview**: This tab narrows your search to look through specific document types or to look for items by the status or file extension.
- ° Email: This tab is used to view e-mails, mailboxes, and attachments.
- [°] **Graphics**: This tab gives a quick view of the case graphics through thumbnails.
- Video: This tab is used to watch video contents and the detailed information about them. It is possible to create thumbnails from videos files.
- **Internet/Chat**: This tab is used to view detailed information about the Internet artifact data in your case.
- Bookmarks: This tab generates a group of files to be referenced in the case. All relevant information found during the investigation can be placed on the bookmark for the generation of reports.
- Live Search: This tab is used to search information in the case using keywords. This type of search processes the results slower as it involves a bit-by-bit comparison of the used keyword against the evidence.
- [°] **Index Search**: As the data was previously indexed in the processing phase, in this tab the results will be provided quicker.
- **Volatile**: In this tab you can view and analyze data collected from volatile sources such as memory.
- **Evidence tree viewer**: This viewer presents the data structure, depending on the selections made in the tabs.
- **File list viewer**: This viewer displays case files and pertinent information about files, such as filename, file path, file type, and many others properties. The **File List** view reflects the files of the selected folder in the explorer tab.
- **File content viewer**: This viewer displays the content of the currently selected file from the **File List** view. The **Viewer** toolbar gives you the choice of different view formats.

Case processing options

To work better with your investigation case, the evidence data should be processed. When evidence is processed, data about the evidence is created and stored in the database. The processed data can be viewed at any time.

Working with FTK Forensics

If you want to process the evidence as quickly as possible, you can use a predefined field mode that deselects almost all processing options. If you need an item for later, an additional analysis can be performed to enable additional processing options. Or, if you have time to categorize and index files, more options can be enabled. This step will take a significant amount of time for a large evidence set. Take a look at the options shown in the following screenshot:

\$QF	- Conorato Filo Machao (flag duplicator) -	
Evidence	MD5 Hash	Elao Duplicate Files
Processing	SHA-1 Hash	
-	SHA-256 Hash	PhotoDNA
	Fuzzy Hash Fuzzy Hash Opti	ons
	Match Fuzzy Hash Library	
Refinement	Expand Compound Files	Expansion Options
(Advanced)	Takes extra time to expand files like en	nail boxes, zips and OLE documents.
•	Ele Signature Analysis	
	Flag Bad Extensions	
	Entropy Test	
ndex Refinement	✓ dtSearch® Text Index	Indexing Options
(Advanced)	Create Thumbnails for Graphics	
	Create Thumbnails for Videos	Thumbnail Options
	Generate Common Video File	Video Options
	HTML File Listing	
Custom File	CSV File Listing	
Identification	Data Carve	Carving Options
	Meta Carve	
	Optical Character Recognition	OCR Options
	Explicit Image Detection	EID Options
	Registry Reports	Program Files\Acces\RSR. Templates
	I Include Deleted Files	Carbonia Onlinea
	Cerberus Analysis	Cerberus Options
	Send Email Alert on Job Completion	Gradack Server Settings
	Decrypt Credant Files	Credant Server Settings
	Cache Common Filters	Isualization
	Cache Common Filters Renform Automatic Decryption	Passwords
		Language ID Options
	, canguage ruenuncauon	congrage to options

Options Description Creates a digital fingerprint using MD5 MD5 Hash SHA-1 Hash Creates a digital fingerprint using SHA-1 SHA-256 Hash Creates a digital fingerprint using SHA-256 **Fuzzy Hash** Compares hash values to determine the similar data Match Fuzzy Hash Library Matches new evidence against the Fuzzy hash library Identifies files that are found more than **Flag Duplicate Files** once in the evidence KFF Uses a database of hashes from known files **PhotoDNA** Compares images in your evidence against known images in a library **Expand Compound Files** Mounts and processes the contents of compound files such as ZIP, e-mails, and OLE files **File Signature Analysis** Analyzes files to indicate whether their headers match their extensions **Flag Bad Extensions** Identifies files whose types do not match their extensions **Entropy Test** Finds compressed or encrypted files dtSearch Text Index Indexes the case for a quick retrieval of the keyword search **Create Thumbnails for** Creates thumbnails for all the graphics in a Graphics case Creates thumbnails for all the videos in a **Create Thumbnails for** Videos case Generate Common Video Creates a common video type for the videos File in your case **HTML File Listing** Creates an HTML version of the File listing in the case folder **CSV** File Listing Creates a CSV version of the File Listing in the case folder Data Carve Identifies deleted files in the evidence based on file signatures Meta Carve Locates deleted directory entries and other metadata

The following table presents a brief explanation of each item:

Options	Description
Optical Character Recognition (OCR)	Extracts text from graphics files to be recognized during a keyword process
Explicit Image Detection	Identifies suspect explicit content
Registry Reports	Creates Registry Summary Reports (RSR) from case content automatically
Include Deleted Files	Shows deleted files in the case
Cerberus Analysis	Runs the Cerberus Malware Triage module
Send Email Alert on Job Completion	Sends a message once a job is completed when an e-mail address is inserted in this field
Decrypt Credant Files	Locates and decrypts files encrypted by the Credant solution
Process Internet Browser History for Visualization	Processes Internet browser history files to be seen in the detailed visualization timeline
Cache Common Filters	Caches commonly viewed files in the list of files
Perform Automatic Decryption	Attempts to decrypt files using a list of passwords provided by you
Language Identification	Automatically attempts to identify the evidence language

The last option, located on the bottom the screen, is **Profile**. It is possible to use the default profiles or create a customized one.

These options can be changed or added later just by clicking on the **Evidence** option in the toolbar and selecting **Additional Analysis**.



It is important that you select only the necessary items for your case investigation because the selection of many items can greatly increase processing time.

Refining the case evidence

The evidence refinement process allows the specification of how the evidence is sorted and displayed, by adding or removing data according to date filters, file types, and status.

To set case evidence refining options, perform the following steps:

- 1. Click on the **Evidence Refinement (Advanced)** icon in the left-hand side pane. The following two dialog tabs will be seen:
 - ° Refine Evidence by File Status/Type
 - ° Refine Evidence by File Date/Size
- 2. Click on the corresponding tab as shown in the following screenshot:

Detailed Options	×
**	Evidence Refinement (Advanced)
Evidence Processing	Refine by File Status/Type Refine by File Date/Size Inclusion/exclusion settings that will apply to evidence items that are added to the case.
Evidence Refinement (Advanced)	 ✓ Include File Slack ✓ Include Free Space ✓ Don't Expand Embedded Graphics ✓ Include KFF Ignorable Files
Index Refinement (Advanced)	Include OLE Streams: All File Status Deleted Ignore status From Email Ignore status Graphics Only add items that match both File Status AND File Types criteria
Profile: AD Standa	rd Save to Profile OK Cancel

Working with FTK Forensics

This first tab allows you to focus on specific files needed for a case, including or removing files by type or status. For example, if you only search for evidence in Word files, it is much more effective if you apply the filters and only select the **Documents** checkbox in the **File Types** list as shown in the following screenshot:

\$\$¢	Evidence R	sime	inent (A	uvanc	eu)	
Evidence Processing	Refine by File Status	s/Type	Refine by File D	oate/Size		
Evidence	Created	From	26/12/2013	To To	26/12/2013	_
efinement Advanced)	Last Modified	From	26/12/2013	To	26/12/2013	-
	Last Accessed	From	26/12/2013	To To	26/12/2013	-
	AND					
x Refinement Advanced)	T At least		0 Bytes	Ŧ		
~	T At most	[0 Bytes	-		
Q	Only i If n	tems mee	ting the selected all it	riteria will be ems will be inc	included. Juded	
ustom File		e op done				
entincation						

The second tab refines evidence by the date range or file size. In a scenario where you already know some information about the data you are seeking, it is recommended to apply this filter. A lot of processing time is saved.



The **Index Refinement (Advanced)** feature is very similar to the **Evidence Refinement (Advanced)** feature and allows you to specify types of data that you do not want to index. Use it to exclude data to save time or increase searching efficiency.

Summary

This chapter covered the overview of the computer forensics process, showing its importance during the process of research and how it can help your organization with your case investigation. You were presented with the FTK interface, which will be worked out in detail in the next chapter. It also covered one of the most important processes used in the FTK tool; the processing options case. If configured correctly, it can improve processing time and the results of the analysis considerably.

In the next chapter, we will delve into the subject of processing and analyzing the artifacts using the FTK operating system and other advanced features of the tool.

5 Processing the Case

This chapter will cover how to use the most important features for processing and filtering data during an investigation process.

The processing step is considered to be the most important step because the correct utilization of its functionality can be decisive in the relevant results of an investigation.

You will understand the importance of the correct use of the Time Zone feature and how this impacts the properties of the files, and learn how to use filters and searches. Finally, you will be able to generate a report of your findings.

Changing the time zone

The correct use of the **Time Zone** feature is of the utmost importance for computer forensics because it might reflect the wrong MAC time of files contained in the evidence, making a professional use the wrong information in an investigation report.

Based on this, you must configure the time zone to reflect the location where the evidence was acquired. For example, if you conducted the acquisition of a computer that was located in Los Angeles, US, and bring the evidence to Sao Paulo, Brazil, where your lab is situated, you should adjust the time zone to Los Angeles so that the MAC time of files can reflect the actual moment of its modification, alteration, or creation.

The FTK allows you to make that time zone change at the same time that you add a new evidence to the case. Select the time zone of the evidence where it was seized from the drop-down list in the **Time Zone** field. This is required to add evidence in the case.

Processing the Case

Take a look at the following screenshot:

	State	Path:	C:\Users\304020\Desktop\Outline prepara	tion kit. Zipped Washer.
4antooth.E01 Washer.E01	+			
2		ID / Name:		
		Description:		2
		Evidence Group:		← Manage
		Time Zone:	America/Denver	
		The second se	E Marga casa ind	ex Use UNC Paths
			i merge case ind	

You can also change the value of **Time Zone** after adding the evidence. In the menu toolbar, click on View and then click on Time Zone Display.

Mounting compound files

To locate important information during your investigation, you should expand individual compound file types. This lets you see the child files that are contained within a container, such as ZIP or RAR files. You can access this feature from the case manager's new case wizard, or from the Add Evidence or Additional Analysis dialogs.

The following are some of the compound files that you can mount:

- E-mail files: PST, NSF, DBX, and MSG
- Compressed files: ZIP, RAR, GZIP, TAR, BZIP, and 7-ZIP
- ٠ System files: Windows thumbnails, registry, PKCS7, MS Office, and EVT



If you don't mount compound files, the child files will not be located in keyword searches or filters.

To expand compound files, perform the following steps:

- 1. Do one of the following:
 - For new cases, click on the Custom button in the New Case Options dialog
 - ° For existing cases, go to Evidence | Additional Analysis
- 2. Select Expand Compound Files.
- 3. Click on Expansion Options....
- 4. In the **Compound File Expansions Options** dialog, select the types of files that you want to mount.
- 5. Click on **OK**:

Ф <mark>0</mark>	Evidence Processing	
Evidence Processing Evidence	Generate File Hashes (flag duplicates) ✓ MD5 Hash ✓ SHA-1 Hash ✓ SHA-256 Hash Fuzzy Hash Fuzzy Hash Option ✓ Match Fuzzy Hash Library	Flag Duplicate Files KFF PhotoDNA S
Refinement (Advanced)	Expand Compound Files	Expansion Options
dex Refinement (Advanced) Q Custom File Identification	File Signature Analysis File Signature Analysis Entropy Test Create Thumbnails for Graphics Create Thumbnails for Videos Generate Common Video File HTML File Listing CSV File Listing Data Carve Meta Carve Optical Character Recognition Exploit Image Detection Registry Reports Cerbrus Analysis Send Email Alert on Job Completion Decrypt Credant Files Process Internet Browser History for Visu Cache Common Filters Perform Automatic Decryption Language Identification	Compound File Expansion Options Only expand office documents with embedded items. Select file types to expand Office documents with Select file types to expand Office documents Balley Big Discourses Big

Processing the Case

File and folder export

You may need to export part of the files or folders to help you perform some action outside of the FTK platform, or simply for the evidence presentation.

To export files or folders you need to perform the following steps:

- 1. Select one or more files that you would like to export.
- 2. Right-click on the selection and select Export.
- 3. A new dialog will open. You can configure some settings before exporting as follows:
 - **File Options**: This field has advanced options to export files and folders. You can use the default options for a simple export.
 - Items to Include: This field has the selection of files and folders that you will export. The options can be checked, listed, highlighted, or selected all together.
 - [°] **Destination base path**: This field has the folder to save the files.

Take a look at the following screenshot:

AccessData Forensic Toolkit Versi	ion: 5.0.1.39	Database: localhost Case: FTK				
File Edit View Evidence Fil	ter Tool	Export				
File Eale Field Engence Th	Open	Eile Options				
Filter: - unfiltered -	Open	Append item number to filenam	e	Export em	ails as MSG	
Explore Overview Email G	Caunch	Append extension to filename i	f bad/absent	Export em	ails to PST	
Case Overview	Open v	Export children		C Precerve	Folder structure	
	Create	Export of lighter	filer	Organization	Constants PCT por quidonce	
	Add to	Save HTML view (if available)		or gui neadorr	· Jacharare Lat her exinence	
🔁 🔐 Databases (12 / 12)	Remov	Export using item number for f	le name	Export me	reages from email archives to PS	T
Documents (159 / 159)	Laberta	Export directory as file	ie name	Include the	mbpails of video files	
HTML and XML (60 /)	Labels.	V Limit nath length			mmon video format	
	Review	Create manifest files		i ancidae col	and the former	
Microsoft Documents	Mount	Tockude original path				
Microsoft RTP (1	Add De	1 Induce original pour				
• Other Documents (6	Add De					
	Perform	C All Checked (39)			ated (1)	
Executable (7/7)	Visualiz	C All Checked (38)		C All Highligh		
⊕ Graphics (482 / 482)	Export	(Whole disk images logical images	and partitions are alway	• All		
	Export	(whole dat intiges) togical intiges	, and paradons are and	iya exelducuj		
File List	View Fi	Destination base path:				
සිටිටි 🖊 📒 🔳	Find or	C:\Users				
Name	Add to					
doc. تقيمته.doc	Find Sir					
Arabic Text.doc						
Dear Sweetie.doc	Add to				04	- Curvel - L
Exhume.doc	Open ir				UK	
Japanese text.doc			1			
doc کړکو qur_test_ کړ doc	Export	-	tion Microso	19,00 KB 19,00 KB		12/02/2008 17:
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Loaded: 11 Filtered: 11	Acquiret	o disk image	Checked: 38	Total LSize: 413,0 KB		
Mantooth,E01/Partition 1/MANT	Export Fi	le List Info	ints/Dear Sweetie	.doc		
Ready	Copy Spe	ecial	Overview Tab	Filter: [None]		
			1 and the second			

Column settings

Columns are responsible for presenting the information property or metadata related to evidence data. By default, the FTK presents the most commonly used columns. However, you can add or remove columns to aid you in quickly finding relevant information. To manage columns in FTK, in the **File List** view, right-click on column bars and select **Column Settings...**.The number of columns available is huge. You can add or remove the columns that you need by just selecting the type and clicking on the **Add** button:



Processing the Case

The FTK has some templates of columns settings. You can access them by clicking on **Manage** and navigating to **Columns** | **Manage Columns**:

Settings Templat	es		
Cerberus Results			
EID			
Email			
-ile Listing			
Normal			
Normal +Filters			-
Reports: File Path	Section		
Reports: Standar	d		
eDiscovery			
eDiscovery Email	Edit,	Copy Selected	Delete
New	Edit	Copy Selected	Delete
New	Edit	Copy Selected Make Shared	Delete

You can use some ready-made templates, edit them, or create your own.

Creating and managing bookmarks

A bookmark is a group of files that you want to reference in your case. These are user-created groups and the list is stored for later reference and for use in the report output. You can create as many bookmarks as needed in a case. Bookmarks can be nested within other bookmarks for convenience and categorization purposes. Bookmarks help organize the case evidence by grouping related or similar files. For example, you can create a bookmark of graphics that contain similar or related graphic images. The **Bookmarks** tab lists all bookmarks that have been created in the current case.

To create a bookmark, perform the following steps:

- 1. In the File List view, select the files that you want to add to the bookmark.
- 2. Right-click on selected files and click on Create Bookmark.
- 3. Enter the information about the bookmark.
- 4. Click on **OK**:

Chapter 5



The main options to create new bookmarks are as follows:

- Bookmark Name: This is the name of your new bookmark.
- **Bookmark Comment**: This option includes free text regarding your bookmark.
- **Timeline Bookmark**: Select this option to create a timeline bookmark. This option shows the chronological relationships of the files in your case.
- **File to Include**: With this option, you can see the files that you had selected earlier.
- File Comment: This option includes free text about your file.
- **Supplementary Files**: With this option, you can attach external files that can help in your investigation case.
- Also include: In this option, you can include Parent index.dat, Email Attachments, and Parent Email if applicable.
- **Select Bookmark Parent**: This is the folder that you will use to create the bookmark, and it will determine if the bookmark will be private or shared.

Processing the Case

Once the bookmark is created, you can add or remove files when necessary.



The Additional Analysis feature

After the evidence has been added to a case and processed, you may wish to perform other analysis tasks. To further analyze the selected evidence, click on **Evidence** and then click on **Additional Analysis**.

Most of the tasks available during the initial evidence processing remain available with **Additional Analysis**. You can perform multiple processing tasks at the same time. Make your selections and click on **OK** to create a new job, as shown in the following screenshot:

File Hashes	PhotoDNA
	Refinement Include OLE Streams: All
Match fuzzy hash library Recheck previously processed items Fuzzy hash options	
C Highlighted Items C checked Items C Currently Listed Items All Items	Send Email Alert on Job Completion

The explanation of all the processing options has been detailed previously. Refer to *Chapter 4, Working with FTK Forensics*.

Carving the data

Data carving is the process of looking for data in the evidence that was deleted from the filesystem. This is done by identifying file headers and footers in mainly unallocated clusters. The FTK provides several predefined carvers that you can select when adding evidence to a case. You can also create your own custom carvers to meet your exact needs.

Data carving can be selected in the **New Case Wizard** or later, using the **Additional Analysis** feature:

\$405 ·	Evidence Processing	
Evidence Processing	Generate File Hashes (flag duplicates) ✓ MD5 Hash ✓ GM-1 Hash	Flag Duplicate Files
Svidence	Site 1 Hash Site 2 Hash Fuzzy Hash Fuzzy Hash Match Fuzzy Hash Library	PhotoDNA
tefinement	✓ Expand Compound Files	Expansion Options
ex Refinement Advanced)	Flag Bad Extensions Flag Bad Extensions Entropy Test dtSearch® Text Index Create Thumbnails for Graphics Create Thumbnails for Videos	Indexing Options
	Generate Common Video File	Video Options
~	HTML File Listing	
ustom File	CSV File Listing	
entification	Data Carve	Carving Options
Can	ring Options	
	AOL bag Files BMP Files	C Exclude KFF Ignorable
		Selected Carver Options
	HTML Files	Minimum File Size (bytes)
	JPEG Files	Minimum Height (pixels)
	L di sanceri	
	LINK Files	Minimum Hitshik /atuala)
		Minimum Width (pixels) 0
	LINK Files IDE Files PDF Files PNG Files	Minimum Width (pixels) 0
	✓ LNK Files ✓ OLE Files (MS Office) ✓ PDF Files ✓ PNG Files	Minimum Width (pixels) 0
AD S	LINK Files VOLE Files (MS Office) POF Files POF Files Select All Clear All	Minimum Width (pixels) 0

-[61]-
In the **Carving Options** dialog box, you can select the file types that you want to try to recover and click on **OK** to go back to **Detailed Options** to then perform the task.

You can also create your own carvers, informing the header and footers of the files that you would like to recover. To create the carver, perform the following steps:

- 1. In the toolbar menu, click on Manage.
- 2. Click on the **Carvers** option
- 3. Next, select Manage Custom Carvers.

After the carver is processed, you can find the carved files using the **Carved Files** filter or through the following steps:

- 1. Change the view to the **Overview** tab.
- 2. Select the File Status option.
- 3. Finally, click on Data Carved Files.

Narrowing the case with KFF

The **Known File Filter** (**KFF**) is a database utility that compares known filehash values against your case files.

Using the KFF during your analysis, we can do the following:

- Immediately identify and ignore 40 to 70 percent of files
- Immediately identify known contraband files



The KFF database is based on NSRL from **National Institute of Standards and Technology (NIST)** and can be downloaded from the AccessData website at http://www.accessdata.com/support/product-downloads.

The KFF can be selected in the **New Case Wizard** or later, using the **Additional Analysis** feature.

To import a new KFF database and define a group, perform the following steps:

- 1. Click on Manage and select KFF.
- 2. Click on **Import** to select a new database.

- 3. To locate a database file, click on Add File.
- 4. Select the **Status**: **Alert** or **Ignore**.
- 5. Insert the path where file is located.
- 6. Click on **OK** to go back to **KFF Hash Import Tool**.
- 7. Click on Import to process your new KFF database.

AccessData Forensic Toolkit Version: 5.0.1.39 Database: localhost Case: FTK	
File Edit View Evigence Filter Tools Manage Help	
Filter Manager	
Explore Overview Email Graphics Video Internet/Chat Bookmarks Live Search Index Search	h Volatile 4 D
Case Overview	
Prie Items File Items 北朝鮮のミサイル発射の対抗措置と	:して、日本政府が国民に北朝鮮への渡航自粛を要請したことを受 🗾 🛛
the Extension (1.180 / 1.180)	
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File List	
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Set As Defaults New Edit Delete	13/0
	25/0
Closed R++ groups and sets cannot be edited or deleted.	12/0
Export Groups	
R Autoromental Antonia and Antonia	72,00 KB 72,00 I IICE713316063636166416 IZ/02/2006 I I.M. 12/0
4 [m	
Loaded: 11 Filtered: 11 Total: 11 Highlighted: 0 Checked: 38	Total LSize: 407,8 KB

- 8. In KFF Admin Case, click on New to create a group.
- 9. Add the KFF database processed previously.
- 10. Click on **Done** to finish.

To run the KFF in your case, open the Additional Analysis options:

- 1. Select KFF and click on KFF Groups....
- 2. Check the name of the group created previously.
- 3. Click on **Done**.

4. Finally, click on **OK** to start new job.

AccessData Forensic Toolkit Version: 5.0.1.39 Database: localhost Case: FTK File Edit View Evidence Filter Tools Manage Help	<u>8.4</u> 7181	
Filter: - unfiltered - Filter Manager		
Explore Overview Email Graphics Video Internet/Chat Bookmarks Live Search In	ndex Search Volatile	4 Þ
Case Overview d b File Content		
E Widence Groups (71.468 / 71	8	
File Items Additional Analysis		要請したことを受 🔹 🛓
Heating / Job Options Indexing / Tools Miscellaneous		
Archives (12 / 12) File Hashes	PhotoDNA	3
Databases (3/3) IV MD5 Hash SHA-256 Hash SHA-256 Hash	PhotoDNA	9
Adobe Documents (1) SHA-1 Hash Fuzzy hash		
HTML and XML (73 / 7 Flag Duplicate Files		ち重なり、新たな 。
Microsoft Documents (KFE	Refinement	ビ対応に追われて
E- Other Documents (12 Final (27/27) V KFF KFF Groups	Include OLE Streams: All	¥ 2
Executable (6 / 6) Recheck previously processed items		
E Glders (687 / 687)		
FUZZY NBSh		
Fuzzy hash options		HA2ES Cropted Acr
A r test succeidoc		12/02/2008 17: 12/0
Arabic Text.doc Target Items	Job Options	25/09/2007 13: 25/0
Astral.doc C Highlighted Items	Send Email Alert on Job Completion	12/02/2008 17: 12/0
Dear Sweetie.doc Checked Items		12/07/2007 16: 13/0
Currently Listed Items Call Annual Contract Cont		25/09/2007 13: 25/0
Normal.dot		07/07/2007 15: 07/0
qur_test کَلَيُوا.doc		12/02/2008 17: 12/0
1 📉 russ_2_Абажурный.doc		12/02/2008 17: 12/0
Something interesting.rtf		08/03/2007 19: 20/0
CINER A Author Crock	OK Cancel	12/02/2006 17: 12/0
	Carca	
100		
line fermine fermine fortunte fermine	20 Tabel Sec. 407.0 KD	· · ·

To use the results of the KFF to hide a known file from your case, use the following filters:

- KFF Alert Files
- KFF Ignore Files

Searching the case

One of the most important features of the tool, the search keyword, is used in almost all cases of research and can help you locate relevant information contained in files, documents, and e-mails.

The Index Search and Live Search options

A live search is a bit-by-bit comparison of the entire evidence set with the search term and takes slightly more time than an index search. Live searches also allow you to search regular expressions and hex values.

To conduct a live search, you can perform the following steps:

- 1. Click on the Live Search tab.
- 2. In the Text tab, insert your keyword and click on Add.
- 3. You will now see the keyword inserted in the **Search Terms** list; click on **Search**.
- 4. The results will appear in Live Search Results with the numbers of hits:

AccessData Forensic Toolkit Version: 5.0.1.39 Database: localhost Case: FTK	
<u>File Edit View Evidence Filter Tools Manage Help</u>	
👻 Filter: - unfiltered -	
Explore Overview Email Graphics Video Internet/Chat Bookmarks Live Search Index Search Volatile	4 Þ
Text Pattern Hex 4 b	Live Search Results
mantroth Add Clear Evport Import	Live Search {Prefilter:(- unfiltered -) Query:("Mantooth")} (ID: •
ANST E Unicode Code Danas Select Care Sancibus	Text Query: "Mantooth" <ansi, case="" insensitive=""> 821 Allocated Space 814 bit(s) in 125 file(s)</ansi,>
V Also I Unicode Pages Decom Cade Sensitive	Direction Space - 014 m(s) in 125 me(s)
Search rems Type Code Pages Code Pages	🕀 89 hit(s) Item 586 [index.dat] Mantooth.E01/Pa
	66 hit(s) Item 1393 [index.dat] Mantooth.E01/P 56 hit(s) Item 12 [dMET] Mantooth E01/Partition
	38 hit(s) Item 1372 [index.dat] Mantooth.E01/P
	Index.dat] Mantooth.E01/Pa
Max Hits Per File: 200 Search Filter: - unfiltered -	27 hit(s) Item 588 [index.dat] Mantooth.E01/Pa 24 hit(s) Item 259 [mantooth2007] Mantooth E0
File Content	21 hit(s) Item 427 [NTUSER.DAT] Mantooth.E01
Hex Text Filtered Natural	20 hit(s) Item 1936 [SOFTWARE] Mantooth.E01
	14 hit(s) Item 428 [ntuser.dat.LOG1] Mantooth.
	+ 8 hit(s) Item 451 [edb0000C.log] Mantooth.E01
	+ 8 hit(s) Item 1938 [SOFTWARE.LOG1] Mantooth
	7 hit(s) Item 452 [WindowsMail.MSMessageStore
	E 6 hit(s) Item 485 [2A29541D-0000000E.em] Ma
	H 4 hit(s) Item 1562 [downloads.rdi] Mantooth.E0
	+ 4 hit(s) Item 489 [3376666D-0000000A.eml] Ma
yo nie	H 4 hit(s) Item 491 [40A511AF-00000008.em] Ma
File Content Properties Hex Interpreter	I + 4 hit(s) Item 1360 [2EFD34A0A6C0EE8EC0B72E H: 3 hit(s) Item 262 [mantooth2007 API] Mantooth
File List	
🖓 🖓 🦂 📕 🔹 👘 👘 Normal 🔹 Display Time Zi 🔤 🔹 🦄 🗙 🔅	3 hit(s) Item 495 [458C76A0-0000000C.em]] Ma
✓ A Name Label Item # Ext Path Category P-Size L-Size MD5 ▲	B - 3 hit(s) Item 508 [09EE4522-00000004.em]] Mar S - 2 hit(s) Item 1500 [0 - s1720 used Masterith 501
5MFT 12 <missin 9344="" e17b14<="" kb="" mantooth.e01="" partition="" td="" unknown=""><td>E: 2 hit(s) Item 1366 [Var 1750. xar] Mantooth.E01</td></missin>	E: 2 hit(s) Item 1366 [Var 1750. xar] Mantooth.E01
ar 1730.xar 1566 xar Mantooth.E01/Partition Unknown 6656 B 6656 B 258af4	E - 2 hit(s) Item 1366 [Normal.dot] Mantooth.E01/P
	2 hit(s) Item 1430 [08-15-05_arkansas_check.gi
018270 1978 Mantooth.E01/Partition Unalloc 512,0 KB 512,0 KB	E 2 hit(s) Item 1434 [810648.gif.lnk] Mantooth.E0 D 2 hit(s) Item 1435 [910648 gif.lnk] Mantooth.E0
	E 2 hit(s) Item 1436 [Ape 20shoot.gif.ink] Mahtooth.EU
Other No. Other No. <t< td=""><td>🖭 2 hit(s) Item 1439 [Bill_Gates.gif.lnk] Mantooth.I</td></t<>	🖭 2 hit(s) Item 1439 [Bill_Gates.gif.lnk] Mantooth.I
	± 2 hit(s) Item 1442 [C money plates.lnk] Mantoot

The **Index Search** option compares search terms with the indexed database. You should choose to generate an index file during preprocessing to use this kind of search.

To perform an index search, you can perform the following steps:

- 1. Click on the **Index Search** tab.
- 2. In the Terms section, insert your keyword and click on Add.
- 3. The possible hits of your keyword will be displayed immediately. Select the most appropriate and double-click on it.
- 4. You will see the keyword inserted in the **Search Terms** list; click on **Search Now**.



5. The results will appear in **Index Search Results** with the numbers of hits:

Regular expressions

A **regular expression** (**regex**) is a special text string used for describing a search pattern and can help identify information that has some predefined pattern, such as a phone number or credit card. The following screenshot shows such search patterns:

Chapter 5

AccessData Forensic Tool	kit Version: 5.0.1.39 Database: localhost Case: FTK	
<u>File Edit View Evider</u>	nce Fjiter <u>T</u> ools <u>M</u> anage <u>H</u> elp	
Filter: - unfiltere	d - 🔹 Filter Manar	ger 📑 🔁
Explore Overview Ema	I Graphics Video Internet/Chat Bookmarks	we search undex search volatile
Text Pattern	Hex	Live Search Results
		Add Clear Export Import
ANSI 🗌 Unicode	any character	
earch Terms Type	\t - tab	Code Pages MAC Address
	\s - whitespace character	URL {http, https, ftp, ftps}
	\d - decimal digit - same as [0-9]	mailto:
	\u - upper case character - same as [A-Z]	com
Max Hits Per File: 200	\I - lower case character - same as [a-z]	edu
e Content	\w - word character - same as [a-zA-Z0-9_]	info
av Taxt Eltared Na	\n - newline character	net
Texc Ficereu 110	\r - return character	
	() - Teturi character	gov
	\b - at word boundary	museum
	\B - not at word boundary	tv
	\< - at start of word	
	\> - at end of word	@com
	^ - at start of line	@edu
File Content Drane	\$ - at end of line	
File Concenc Proper	\backslash - at start of file	@net
e List	\' - at end of file	Display Time @org
	2 - match previous 0 or 1 times	@
s i ane	* - match previous 0 or more times	Category P-
	+ - match previous 1 or more times	AMEY
	{n} - match previous n times	AIVEA
	(n) - match previous n or more times	Visa Mastersard 1
	(m, n) - match previous m to n times	Director
	inter processing and a manage	Credit Card Standard
	[[:alpha:]] - alpha character	Web Credit Card Transaction Persist with Y ar #
oaded: 0 Filtere	[[:alnum:]] - alpha-numeric character	hecked: 38

As you can see, the FTK has a huge list of ready-to-use regular expressions. However, you can create your own regular expressions to better achieve your goals.

Regular expressions are complex to construct. To understand better the techniques for building regular expressions, you can consult other sources such as Wikipedia at http://en.wikipedia.org/wiki/Regular_expression.

Working with filters

Filters can help to locate specific data very quickly, reducing the amount of time spent on examining data, because they can narrow a large data set down to a very specific focus.

Processing the Case

You can use the predefined filters or you can create your own filters. To use predefined filters, just click on the combobox in the **Filter** toolbar as shown in the following screenshot:

AccessData Forensic Toolkit Version: 5.0.1.39 Database: localhost Ca	ise: FTK		
Ele Edit View Evidence Filter Iools Manage Help	Filter Manager		
Explore Oven - compound -	ter Manager	<u> </u>	4 ⊳
dtSearch® Actual Files	Filters	Indude	
Terms Alternate Data Streams Archive Files	Name /	Name /	
mantooth Bad Extension Files	Actual Files Alternate Data Streams		
Bookmarked	Archive Files		
mantain Cerberus Score	Bad Extension Files		
mantoo Cerberus Static Analysis	Carved Files		
mantooth Checked Files	Cerberus Static Analysis		
	Checked Files		
City Constant	Deleted Files		
rie Content	Duplicate Files eDiscovery Refinement w/o OCR	Exclude	
Hex Text Filtered Naculai	Email Attachments	Name /	
Hit # or Prev Next	Email Delivery Time Email Files		
	Email Files and Attachments		
	Evidence Items		
	Excluded eDiscovery Refinement w Explicit images folder (high score)		
	Explicit images folder (medium score)		
	File Created Time		
	File Extension		
Hie Content Properties Hex Interpreter	7 11 👻 🗢 👄		
File List	Define	Annly Close	
Name Label Item # Ext Pat	th Category P-Size L-Size	MD5	
۲ (m		*	
Loaded: 0 Filtered: 0 Total: 0 Highligh	nted: 0 Checked: 38 Total LSize: 0		

You also can make a combination between filters. Click on **Filter Manager...** to create your combinations.

To create a new filter, perform the following steps:

- 1. Click on Manage and navigate to Filters | Manager Filters.
- 2. Click on New.
- 3. Enter a name and a description for the new filter.
- 4. Select properties from the drop-down menu.
- 5. Select operators from the drop-down menu.
- 6. Select the applicable criteria from the drop-down menu.
- 7. Click on the + button to add new item in the rules.

- 8. Select the **Match Any** option to use the OR operator or the **Match All** option to use the AND operator.
- 9. To test a filter without having to save it first, check the **Live Preview** box.
- 10. Click on **Save** and then click on **Close**.

CcessData Forensic Toolkit Version: 5.0.1.39 Database: localhost Case: FTK	
Ele Edit View Evidence Filter Tools Manage Help Filter:unfiltered Filter Manager	
Explore Overview Email Graphics Video Internet/Chat Bookmarks Live Search Index Search Volatile	4 Þ
dtSearch® Index	↓ Index Search Results
-Terms	
mantooth Add Operators Terms	Qear Ite
· Aju · Oj · Aji · geetteu Attginuater	Import
Indexed Words Total Hits A Search Terms To	tal Hits
mantan Manage Filters	
mantooth Filters Properties:	
Actual Flag	Description
Alternate Data Streams	Description:
File Content Archive Files	E Line Proving
Hex Text Bookmarked	
Hit # Carved Hies Properties C	Operators Criteria
Cerberus Static Analysis	Aatches Actual Files
Decrypted Files	
Deleted Files	
eDiscovery Refinement w/o OCR	
Email Attachments	
C Match Any	
File Cont New Edit Copy Delete G Match All	Save Close
File List	
正 Import Export Copy to Shared Display Time Zone: America/Ph	- AXO
Close Category P-Size L-Size	MD5
	*
Loaded: U Filtered: U Total: U Highlighted: U Checked: 38 Total LSize: 0	

Reporting the case

The report is the most important part of your process. This is what is seen of the work by recipients. All the analysis work is useless if the report cannot clearly show the links between the identified evidence and the alleged offence.

You can create a case report about the relevant information of your investigation case. Reports can be generated in different formats, including HTML and PDF.

To create a case report, perform the following steps:

1. Click on **File** and then click on **Report**... to run the **Report** wizard:

Export	er <u>Loois M</u> anage <u>H</u> eip • Filter Man	ager				
Export to Image	ics Video Internet/Chat Bookmarks	I we Search Index Search	Volatile			
Export File List Info	A b File Content	Life bearen Index beare	- Fordere			_
Export Word List		National				
Report	Hex Text Filtered	Nacurai				1
Timeline Report	Report Options					1
Volatile Data Penert						
Valie Data Report	Report Outline	Default entries				
Job Summary Report	Case Information		1 alfal	11-1		
Close	Bookmarks Graphics	AgangulComress	Label	Value		
E <u>x</u> it	Videos	Agency/Company	Agency/C	ompany		
	File Paths	Investigator s Name	Investigat	cor s Nam		
	File Properties	Address	Address			
	Registry Selections	Phone	Phone			P
	I Steer capture	Fax	Fax			
		Email	Commont			
a		Comments	✓ Comment	S		
3° 0° 🖊 💼 🔳						a x
A Name Lat	bel					
#Security						14:
#SharedObjects						14:
\$AttrDef						16:
\$Bad						16:
\$BadClus	Import					16:
spiuriap \$Boot		Include File Extensio	ns		Add Remove	16:
\$Config	Export]				14:
\$EFS						19:
\$EFS						19:
\$EFS					OK Cancel	19:
\$EF5 \$Evtend	26 Mantaoth Ei	01/Partition Folder	448 B 449	R	06/07/2007 16: 06/07/200	7 16
\$12M7A26 ing	1819 ion Mantooth.E	01/Partition Unknown	544 B 544	4B 73ed7a	26/07/2007 16: 26/07/200	7 16:
	Jung Hartooutte					

- 2. Select the information that will be used for the generation of the report in the **Report Outline** box and fill the information related to each.
- 3. Click on **OK**:

Report Output	×
Report Folder	
English (United States)	•
Formats PDF RTF HTML WML XML DOCX ODT	Export Options Use object identification number for filename Append extension to filename if bad/absent HTML Report Customization Use custom logo graphic Use custom CSS
	OK Cancel

— [70] —

- 4. In the **Report Folder** field, set the path to output your report.
- 5. Select a language to use on report.
- 6. Select the output file format.
- 7. Click on **OK** to generate a final report.

You can distribute your report in a printed form by e-mail, portable media, or as a website.

Summary

This chapter covered several important features to assist in the identification of relevant information quickly and efficiently through the use of filters and keywords. The use of the KFF and how its features can be useful to save time during an investigation by eliminating the known files of your investigation case was covered. The creation and management of bookmarks and how you can generate a final report using this information was also covered.

In the next chapter, you will learn about the new features of FTK v5.

New Features of FTK 5

This chapter is an overview of the main new features that have been developed in the newest version of the product, the FTK 5.

We will not explore all features in detail, but you will be able to understand the goals of each one of them and apply them in your investigation case.

Let's understand how these new features can help us to locate evidence quickly; a task that would earlier have taken a long time or may even have been impossible to achieve without a specific tool.

Distributed processing

Distributed processing allows you to improve performance and process investigation cases using computational resources of other computers on your network.

To use this resource, you need to install the **Distributed Processing Engine (DPE)** add-on in all the additional computers that you have available.

We know that the processing step requires a lot of hardware resources and the distributed processing can help us to reduce processing time without having to perform an upgrade on the examiner machine.

The DPE product can be found on the FTK installation disk in the path [Drive]:\FTK\AccessData Distributed Processing Engine.EXE.

Once the DPE is installed, you can use other machines to process your case, load balancing, and minimizing the processing time.

New Features of FTK 5

Encryption support

FTK users can send files directly to **Password Recovery Toolkit** (**PRTK**) for onthe-fly password recovery during evidence review.

Files supported include: Credant, SafeBoot, Utimaco, SafeGuard Enterprise and Easy, EFS, PGP, GuardianEdge, Pointsec, S/MIME OpenOffice, TrueCrypt, FileVault (Apple), FileVault 2 (Apple), DMG files (Apple), RAR, ZIP including WinZip advanced encryption, 7-Zip, password protected iOS backup files, PGP password files, BCArchive, BCTextEncoder, ABICoder, AdvancedFileLock, AShampoo, CryptoForge, Cypherus, and more.

The PRTK tool will be presented in detail in the next chapter.

Data visualization

Data visualization is a feature that provides a graphical interface to enhance understanding and analysis of the files and e-mails in a case. You view data based on the file and e-mail dates.

Data visualization supports the following data types:

- File data: This lets you view file data from either the Explore tab or the Overview tab
- E-mail data: This lets you view e-mail data from the Email tab
- Internet browser history: This lets you view Internet browser history data

To open data visualization, see the **Explorer**, **Overview**, or **Email** tab to select your dataset. Click on **Tools** and select **Visualization**.



Data visualization has the following three main components:

- Time line pane: This provides graphics that represent the available data
- Dashboard: This provides graphical chart panes of the data
- Data list pane: This provides a list of the data items



Normally, to use the data visualization feature, you need a separate license. Check this information at the time of acquisition of the solution.

The Single-node enterprise

As mentioned in *Chapter 1, Getting Started with Computer Forensics Using FTK,* to conduct a remote acquisition through the network, you need a product in the enterprise version, such as the AD of AccessData Enterprise.

However, a very interesting feature of FTK forensics is that it allows this remote acquisition limited to a single agent called Single-node enterprise. To use this feature, perform the following steps:

- 1. Click on Tools and select Push Agents.
- 2. Insert the IP address or hostname of the machine that you want to acquire and click on **Add**.
- 3. Click on OK.

Machines to install							
192,100,0,102							
		Add					
Rem	Remove Import						
Uninstall agent							
Use custom agent nam	ie						
Service name:	AgentService						
Executable name:	agentcore.exe						
Update the agent if it	is present						
Allow manual uninstall							

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- 4. Insert the credentials information of the remote machine or of your active directory structure and click on **Add**.
- 5. Click on **OK** to start the deploy agent process.

festes flcarbone	
omain: Testes	
sername: flcarbone	
assword:	
onfirm Password:	
Add Remove	1

You may also run the agent manually. It is located in the path C:\Program Files\ AccessData\Forensic Toolkit\5.0\bin\Agent.

Once an agent is distributed to the remote machine, you can connect this device and perform a pre-analysis or data acquisition by performing the following steps:

- 1. Click on **Evidence** and then select **Add Remote Data**.
- 2. Insert the remote IP address and click on OK.

AccessDate	AccessData Forensic Toolkit Version: 5.0.1.39 Database: localhost Case: FTK																					
<u>F</u> ile <u>E</u> dit	Ele Edit View Evidence Filter Tools Manage Help																					
🗄 🕀 🛛 Filt	Filter: - Add/Remove																					
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Additional Analysis puokinairs Live Search Index Search Volatile																						
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	<u>I</u> m	port Memory	Dump			0000	00000	00	00 1		00 0		00 00	-00	00 0		00 00	00	00			
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File List								_		_								100				
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✓ ▲ N	me	Label	Item #	Ext	Path				Ca	tegory	P-S	ize	L.	Size		MD5	SH	A1	S	HA256	Created	
#local			1283		Manto	oth.E01	/Partitic	on	Fo	lder	160	DB	16	IO B							07/07/200	07 19:
#Secu	ity adObjects		1271		Manto	oth.E01	/Partitic	on	Fo	ider Ider	157	2 B 2 B	2/	2 B							07/07/200	J7 19:
SAttrE	ef		16	<missin< td=""><td>Manto</td><td>oth.E01</td><td>/Partitic</td><td>n</td><td>Un</td><td>known</td><td>256</td><td>50 B</td><td>25</td><td>60 B</td><td></td><td></td><td></td><td></td><td></td><td></td><td>06/07/200</td><td>07 20:</td></missin<>	Manto	oth.E01	/Partitic	n	Un	known	256	50 B	25	60 B							06/07/200	07 20:
2 \$Bad			20		Manto	oth.E01	/Partitic	on	No	t Yet	. 0B		01	в							06/07/200	07 20:

- [76] -

The machine will be added as an evidence allowing the analysis or acquisition process.



Check if the TCP port 3999 (default port) is enabled on the firewall and if the WMI service is enabled and running.

Advanced volatile and memory analysis

Volatile data is information that changes frequently and is often lost upon powering down the computer. The acquisition of this type of information should be made with the equipment powered on, which is known as live acquisition.

Volatile data will include information about the running process, network connections, clipboard contents, and data in memory. This information may be critical to the discovery of the cause of an incident or to understand a specific behavior.

As seen in previous chapters, the FTK imager can help in the collection of this data, specifically memory acquisition. Once collected, you can do a deeper analysis using the platform FTK.

To start the memory analysis, firstly add the file of dump in your case as follows:

- 1. Click on Evidence and select Import Memory Dump.
- 2. Once added, select the Volatile tab to see all the extracted data of the evidence.

AccessData Forensie Toolkit Version: 5.0.1.39 Database localhor	-		-	_		_		0.00	*			
Ele Edit View Evidence Filter Tools Manage Help		100										
Y Fiber: +unifiered - *	Filter Manager											
Explore Overview Ernal Graphics Video Internet/Chat I	Bookmarks Live Search Inde	x Search Volable										0.0
Snapshot Find Difference	() Detail List											
		7 1 (2)										
P Process List	Name	Fath	Start Time	Working Directory	Command Line	PID	Has Searc	Parent PID	User		405	2 .
(A) 18/01/2014 18:38:51 (UTC)	SearchProtocol		18/01/2014 20:35:			12792	N	0		0		008
Sarbone (dump)	postgres.exe	C: Program Files (AccessD	18/01/2014 20:36:	C:\pgData951	'C:/Program Fil	20808	N	0		0		00
🖂 🖶 DLL List	Lexplane exe	C:Program Files (x80) Unit	15/01/2014 17:40	C:WROWS\	C: Program Fil	11100	3.81	0		23.	000000000000000000000000000000000000000	0
B-(> 18/01/2014 18:38:51 (UTC)	maheid.exe	C: Program Files Common	18/01/2014 12:54	C:WENDOWS'S	"C: Program Fil	12888	N	0		\$		00
Carbone (dump)	ArroRd32.exe	C: Program Files (x86) Vid	18/01/2014 19:15:	CI/MINDOWS/	"C: Vrogram Fil	11868	N	0				00
2 300RS	explore.exe	C: Program Files (x86) Unt	15/01/2014 17:40:	C:///INDOWS/	"C: Program Fil	11158	N	0		. 6	000000000000000000000000000000000000000	00
S - Cohere (d. sec)	Disc sphow64.exe	C:WINDOWShiphone64	18/01/2014 18:52:	C:///D/DOM2/	C:WINDOWS'#	. 8576	N	0		. 9	000000000000000000000000000000000000000	00
St A Criver Lat	AcroRd32.exe	C: Program Files (x86) (4d	18/01/2014 19:15:	C:WINDOWS\	"C: Program Fil	11868	N	0			000000000000000000000000000000000000000	×
E-AG 18/01/2014 18:38:51 0/7C)	Skipe exe	C: Program Hiles (x86) (pk,	16/01/2014 20:57:	C: WINDOWS /	C: Program Pil	9336	N	0				90
Carbone (dump)	ArroRd32.exe	C: Program Piles (x86) (4d	18/01/2014 19:15:	C:WINDOWS\	C: Program FS	1158	TH .	0				00
S Coen Handes	Skype.exe	C: Program Piles (x86) (pl	16/01/2014 20:57:	C: (WINDOWS)	C: Program Pil	9336	N	0			000000000000000000000000000000000000000	00
B (a) 18/01/2014 18:38:51 (UTC)	Arond32.ese	C: Program Piles (x86) (vd	18/01/2014 19:15:	C: WINDOWS \	C: Program Fil	1188	74	0		1		00
Carbone (dump)	Skipe.exe	CTProgram Paes (x86) (xx	10/01/2014 20:57	CIMPEONS	C: program Pit	9336	n.	0		- 83		2
C Ac Processors	reasched.exe	C: Program Piles (x06) File	18/01/2014 12:52:	C: WINDOWS/	Citrogram Pl	12968	n	0		. 6		6K.w
B A 38/01/2014 18:38:51 (UTC)	*											12
Carbone (dump)	Total: 149 P	ighlighted: 1 Checked: 0	KFF: Unlisted	Snportant, Unimporta	nt							
B → 18,01/2014 18/38/51 (JTC)	Detailed Information											
Carbone (dump)	DLLs TCP/IP Hande	s Fuzzy Hash Search Hits 501	VAD									
Devices	Name	Description	Path	Has Searc	Version		Creation Time	Proces	ss Name	PID	MDS	1.0
Carbone (dump)	iexplore.exe		C: Program Files (x86	Vant N			15,01/2014 17:4	0r iexplo	гелене	11188	000000000000000000000000000000000000000	5 (B)
	Ib.Ibtn		C:WINDOWSISHSTER	H325, N			15,01/2014 17:4	0: iexplo	re.exe	11100	000000000000000000000000000000000000000	\$ ee
	wow64.dl		C: WIDDOWS (SYSTE)	M325, N			15/01/2014 17:4	0: iespio	e.exe	11188	000000000000000000000000000000000000000	h
	aroud-hvim.dl		C:WINDOWSISYSTE	M325 N			15/01/2014 17:4	0: iexplo	re.exe	11188	000000000000000000000000000000000000000	D
	wow64cpu.dl		C: WINDOWS SYSTEM	M321, N			15/01/2014 17:4	0: iexpla	revexe	11188	000000000000000000000000000000000000000	here
	explore.exe		C: Program Files (x86	Vant N			15/01/2014 17:4	Qr iexplo	re-exe	11198	000000000000000000000000000000000000000	A
	ntdl.dl		C:WPIDOWS\SysW0	NN6 N			15/01/2014 17:4	¢ iexplo	re-exe	11188	000000000000000000000000000000000000000	A
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	mevort.dl		C: INTROVIS pypilor	8645, N			15/01/2014 17:4	Or lexplo	re-exe	11198	000000000000000000000000000000000000000	din .
	sechost.dl		C:UNDEROWS/System	2005			15/01/2014 17:4	ot iexplo	re-exe	11188		2
	APORTA OF		Community (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2	in			15/01/2014 17:4	ution lexplo	e.exe	11155		J

The information is presented in a classified and categorized form using a friendly FTK interface, to help the process of analysis.

Explicit Image Detection

If your investigation case has some relation with the search of explicit material, you can use **Explicit Image Detection** (**EID**) to locate this kind of content in evidence, thus avoiding a manual search of this information.

To execute EID analysis, perform the following steps:

- 1. Click on Evidence and select Additional Analysis.
- 2. Select the Indexing/Tools tab.
- 3. In the section Other Tools, select the Explicit Image Detection option.
- 4. Choose the tree scan type options and click on **OK**.

ashing / Job Options Indexing / Tools Miscellaneous	
Indexed Search	Other Tools
dtSearch® Text Index	Optical Character Recognition OCR Options
Process File Slack Space	Explicit Image Detection EID Options
Process Drive Free Space	Registry Reports RSR Directory
Entropy Test (do not index compressed or encrypted items)	Cerberus Analysis
Do not include document metadata in filtered text	Language Identification
Merge case index when finished	
Decrypt Oredant Files Credant Server Settings Perform Automatic Decryption Passwords	Explicit Image Detection Options

The difference between the types of scans is related to the accuracy of research, which may have an impact on the time to complete the process if you choose higher accuracy.

To visualize the results of the analysis of EID, just use the filters related to **Explicit Images Folder**.

Normally, to use the feature of EID, you need a separate license. Check this information at the time of acquisition of the solution.

Malware triage and analysis with Cerberus

Cerberus lets you do a malware analysis on executable binaries. You can use Cerberus to analyze executable binaries on a disk, on a network share, or unpacked in system memory.

Cerberus consists of the following stages of analysis:

- **Threat analysis**: This is general file and metadata analysis that identifies potentially malicious code
- **Static analysis**: This is disassembly analysis that examines elements of the code

To use Cerberus is very simple; just perform the following steps:

- 1. Click on Evidence and select Additional Analysis.
- 2. Select the Indexing/Tools tab.
- 3. In the section **Other Tools**, select the **Cerberus Analysis** option.

Additional Analysis		X
Hashing / Job Options Indexing / Tools Miscellaneous		
Indexed Search	Other Tools	
dtSearch® Text Index	Optical Character Recognition	OCR Options
Process File Slack Space	Explicit Image Detection	EID Options
Process Drive Free Space	Registry Reports	RSR Directory
Entropy Test (do not index compressed or encrypted items)	Cerberus Analysis	Cerberus Options
Do not include document metadata in filtered text	Language Identification	Lang ID Options
Merge case index when finished		
Decryption		
Decrypt Credant Files Credant Server Settings		
Perform Automatic Decryption Passwords		
	OK	Cancel

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New Features of FTK 5

The results of the Cerberus analysis generates and assigns a threat score to the executable binary as seen in the following screenshot:

File Content Hex Text Filtered Natural						×
						Defa
						u r
Score: 49		CAGE66C50	210003807			Web
+/- Cerberus Score		CH9E00039	210003007	0001701010190101		
Function Call Summ	nary					
<u>+/-</u> File Access						
CreateFileA(<unkr< th=""><th><u>nown>j</u> nown> <ur< th=""><th></th><th>> 00000000 <ur< th=""><th>******</th><th></th><th></th></ur<></th></ur<></th></unkr<>	<u>nown>j</u> nown> <ur< th=""><th></th><th>> 00000000 <ur< th=""><th>******</th><th></th><th></th></ur<></th></ur<>		> 00000000 <ur< th=""><th>******</th><th></th><th></th></ur<>	******		
CreateFileA(<unkr< td=""><th>nown>, <ur< th=""><th>nknown>, <unknown< th=""><th>>, <unknown>, 3,</unknown></th><th>. 4000000, <unknown>)</unknown></th><td></td><td></td></unknown<></th></ur<></th></unkr<>	nown>, <ur< th=""><th>nknown>, <unknown< th=""><th>>, <unknown>, 3,</unknown></th><th>. 4000000, <unknown>)</unknown></th><td></td><td></td></unknown<></th></ur<>	nknown>, <unknown< th=""><th>>, <unknown>, 3,</unknown></th><th>. 4000000, <unknown>)</unknown></th><td></td><td></td></unknown<>	>, <unknown>, 3,</unknown>	. 4000000, <unknown>)</unknown>		
Loads a driver						
Low-Level Acce	ess				_	
Network Functi	onality					
Process Manipu	lation					
Security Access	ì					
<u>+/-</u> Subverts API						
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Windows Regis	try					
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	acation A	naumont(c)				
ContinueDebugEvent Er	199409	Name	Tune	Value		
ContinueDebugzvent 34	h 0644004	wProcessId	DWORD	<upre>upknown></upre>		
	d	wThreadId	DWORD	<unknown></unknown>		
	d	wContinueStatus	DWORD	<unknown></unknown>		
DebugActiveProcess 54	488474	Name	Туре	Value	•	\bigtriangledown
File Content Properties	Hex Interp	reter				

To visualize the results of the analysis of Cerberus, just use the filters related to **Cerberus Score** or **Cerberus Static Analysis**.

Normally, to use the feature of Cerberus, you need a separate license. Check this information at the time of acquisition of the solution.

Mobile Phone Examiner

Smartphones have become one of the most important evidence to be analyzed during an investigation as they may contain information relevant to the case such as files, photos and videos, call records, and geolocations.

The **Mobile Phone Examiner** (**MPE**) is a solution for mobile forensics that delivers an intuitive and simple interface, data visualization, and smart device support in a single forensic interface. MPE images integrate seamlessly with the FTK, allowing you to correlate evidence from multiple mobile devices with evidence from multiple computers within a single interface. The following is a sample of smartphone analysis with MPE:

Device Time Araysis	Files Call Histor	100 24. Calendar	Cookles We Ki Web	Notes	Acp Data Appikations					
e System Application Data >	1									
Dranbay (dranbay)										
I Google Voice (googlevol LinkedIn (linkedin)	ce)		20333	245	Fri Mar 04 21:23:11 +0000 2011	0	545	1	Welcome to official twitter page for United. We look forward to connecting with you.	260907612
Osfoora (twitter) A accounts			2116	280	Thu Apr 30 11:28:02 +0000 2009	0	430	0	ForensicFocus.com - computer forensics portal for digital forensics and ediscovery practitioners	36641167
drafts drafts drafts drafts drafts		Southern California	654	107	Mon Aug 31 14:59:57 +0000 2009	7	3818	0	Police/Medical Technical Advisor for The Mentalist	70412647
storedDMsSent storedtweets		NY	205	31	Tue May 25 16:59:09 +0000 2010	0	115	0	Apple OS X & iOS Digital Forensics	148025431
storedmentions Kype (skype) Accounts		Lindon, UT	1660	567	Fri Sep 04 15:09:57 +0000 2009	0	1954	0	See new videos, resources & industry news from AccessData, a leading provider of E-Discovery, Forensics & Cyber Security software.	71557070
CallMembers	m	Oxford	312237	0	Fri Sep 11 14:57:38 +0000 2009	0	474	0	C. S. Lewis Quotes Everyday	73402979
Chats Chats		Dallas, TX	1617240	15	Tue Jan 30 22:14:50 +0000 2007	3114	3781	0	Woot : One Day, One Deal, See followers for additional Woot feeds.	734493
J. Conversations J. Messages J. SMSes		For USA customers	1589818	35	Tue May 01 15:46:16 +0000 2007	35	1544	1	Refurbished Dell TM computers, electronics: Questions/comments? Contact Chris Beutnagel @ChrisCBAtDell or Elise Osborn @EliseAtDell.	5688592
	wilson	Los Angeles- ish	2384295	225	Wed Jan 28 05:28:45 +0000 2009	1226	5515	1	I am an actor and a writer and I co- created SoulPancake and my son, Walter.	19637934
	ices.shtr	nl NYC - On tour this summer	590958	455	Sun Jun 03 11:09:19 +0000 2007	35	1673	1	Husband to hot wife, father of 4, comedian, actor, writer, former sleeper http://favstar.fm/users/JimGaffigan Tunnes_http://favstar.fm/users/JimGaffigan	6539592

Summary

This chapter covered the main features of the new version of the Forensics Tool Kit. Activities that usually take a long time to execute can be performed in a much simpler way with the help of these new features.

The FTK 5 is a complete platform for the acquisition and analysis of many different types of digital media, and enables the extraction of evidence quickly and efficiently. Its new features provide an integrated and easy-to-use platform to help in the examiner's work.

The next chapter will discuss in detail the tool that cracks and recovers passwords, PRTK.

7 Working with PRTK

This chapter will cover the **Password Recovery Toolkit** (**PRTK**) and **Distributed Network Attack** (**DNA**). Both are used to provide a password-cracking function. You can use PRTK and DNA in computer forensic investigations to access passwordprotected files or system passwords.

The main difference between these tools is that PRTK runs on a single machine only and DNA uses multiple machines across the network.

You will understand this difference and how to use the tools for the password recovery of a large number of popular software applications.

An overview of PRTK

The use of encryption and data protection through the use of passwords has steadily grown among the users of computers. Encryption is seen as a strategic business issue and is adopted by most companies.

Given this scenario, PRTK becomes a fundamental tool to assist in the digital investigation process, supporting the attempt to access the protected data contained in the evidence.

You can download the latest stable version of PRTK and DNA at http://www.accessdata.com/support/product-downloads.

PRTK supports a wide variety of products for password cracking. To access the full list of supported products and types of attack, click on **Help** and then click on **Recovery Modules**.

The following figure shows a small example of the supported products:

Module Name	Display Name	Attack Types	Supported Products
ABICoder	ABICoder Password Module	dictionary	Product Name: ABI Coder Versions supported: 3.5.7.4 - 3.6.1.4
Access	MS Access Password Module	decryption dictionary	Product Name: Microsoft Access Versions supported: Through 2013
ACT	ACT! Password Module	decryption	Product Name: ACT! Versions supported: 1 - 4 2000 5 - 6
AdvancedFileLock	AdvancedFileLock Password Module	dictionary	Product Name: Advanced File Lock Versions supported: 6 - 7.1
AIM	AIM Password Module	decryption dictionary	Product Name: AOL Instant Messenger Versions supported: Through 7.5 Product Name: AIM Triton Versions supported: Through 1.5 Product Name: AIM For Windows Versions supported: Through
AmiPro	AmiPro Password Module	dictionary	Product Name: Ami Pro Versions supported: Unknown

Understanding the PRTK interface

The PRTK interface is very simple and has a few options. The process is basically automatic and does not require much user intervention. The main functions of the interface are as follows:

- **Menu**: Through this, you can access all the functionalities and options for configuration and tuning.
- **Toolbar**: This provides quick access to the main features of the tool.
- **View All**: This is the main viewer. You can track the status of the password-cracking attack.

• **Properties**: This is where you can view information about a file in the attack process.



The main features and configurations will be discussed in the following topics.

Creating and managing dictionaries

Dictionaries are an optimization tool used for password recovery. By using dictionaries, specific candidate passwords are tested before the more general ones. This utility creates a variety of custom dictionaries for use with PRTK.

Create backups of the word lists and dictionaries because if the dictionary is modified or deleted, you cannot recover it again.

The dictionary utility can be used to create or modify several types of dictionaries.

To use the dictionary utility, perform the following steps:

- 1. Click on **Tools** and then click on **Dictionary Tools**.
- 2. The AccessData Dictionary Import Utility screen will appear. Click on Dictionary Tools again.
- 3. Select the specific tool that you need to use (listed in the following table).

The following table lists tools that can be accessed from the **Dictionary Tools** menu and their functions:

Tool	Function
Dictionary Browser	To view the words in each dictionary or to delete a particular dictionary or dictionaries
Dictionary Info	To view specific details about a dictionary, such as the dictionary type, encoding, language, word count, and description
Biographical Dictionary Generator	Builds the dictionaries of candidate passwords from a collection of biographical details and from combinations of the biographical data entered
Pass-phrase Dictionary Generator	Builds dictionaries from a phrase file and using subphrases from the phrase file
Permutation Dictionary Generator	Builds dictionaries from a wordlist file and using the permutations of words from the wordlist file
Standard Dictionary Generator	Builds custom dictionaries using a wordlist file
Golden Dictionary Merge	Merges two golden dictionaries into a single golden dictionary



The Biographical Dictionary is very useful for cracking passwords because it is very common for people to create their passwords based on the combinations of their personal information.

Starting a session for password recovery

The utilization of the password recovery tool is very simple. With a few clicks, your password cracking session is ready and running.

Managing profiles

To use PRTK for processing a password recovery, you need to select an appropriate profile for your case investigation. A profile is a set of specific rules that must be used to define which types of password recovery will be used.

You can use any of the default profiles or create your own.

w Al	(P) Manage Profiles		8 P	roperties				
ename Attack Type Arabic		New		ob Information Attack Type:				
Program (prink) Bruggen Prink-Vavori (at Singent (prin Peas Private (PCT) Russien	English (default) European	New from selected	1	Module: Profile:				
	FTK - Word List Import GPU	Edt	Slater Officity Best Tree					
	Pass Phrase PRTK	Delete						
	Set as default	Description Name		Languages Arabic	Character Groups			
			English		V English	8 Bit		
		Comments The English profile begins by searching for simp passwords, followed by, dictionary and permut dictionary searches, and ends with complex sea dictionary and computed password. All defau dictionaries and character sets are used.	German E Italian E Japanese Russian Slovak *	Vopia Vovercase Letters Uopercase Letters Uopercase Letters Symbols (Standard) Symbols (Extended) *				
		- Uose	Dictionaries			Rules		
			Review Use Review Review Review Review Review Review Review		V (MA5-3-07) Lower (data V (MA5-1-01) One digit V (MA5-1-02) Three digit V (MA5-1-04) Three listics V (MA5-1-04) Three listics V (MA5-1-02) Three listics V (MA5-1-02) Three listics V (MA5-1-03) Three listics V (MA5-1-04) Three listics	es words fran selected dictorveres fail a word: search search (, language specific search e, language specific search e, language specific search e, language specific search wordther, language specific search our dawarter, wordt a greaterchild ar one or dawarter, with a threshold of one is		
			Select Al	Select None	Move Up Move	Down Select All Select None		

By convention, this book uses the default profile **English**.

To start a new session of password cracking, perform the following steps:

- 1. Go to **File** | **Add Files** or click on the corresponding button on the toolbar as shown in the following screenshot.
- 2. Select the protected file and click on Add.



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- 3. The suggested types of attacks will appear. You can change the type if necessary or leave the default model presented.
- 4. Click on **Finish** to start the cracking process.



The cracking process will start, and you can follow the progress status of each of the techniques.

The time for obtaining the password can vary greatly depending on the complexity of the software application or the algorithm used for the password.

Additionally, the process for password cracking depends largely on the capability of the hardware, mainly the processor. There is specific equipment for the activity of cryptanalysis, which uses video cards (GPU) to gain speed.

Chapter 7

AccessData Page 1	assword Recovery Toolkit	2	14	
File Edit View				
View All				Properties
Filename	Attack Type	Status	Result	Job Information
(I) Count	Marcard Offer 07/0000 Deserved Attests	0		Attack Type:
Secret	Microsoft Office 97/2000 Password Attack	Queuea		Module:
Secret	Microsoft Office 97/2000 Decryption Key Attack	waiting		Profile:
Secret	Microsoft Office 97/2000 Password Key Attack	depends_on		Status:
Secret	Microsoft Office 97/2000 Spare Password Attack	depends_on		Begin Time:
				End Time:
				Timeout After:
				Decryptable:
				Result Type:
				Results:
				Comments:
				File Information
				Filename:
				Туре:
				Version:
				Size:
				MD5:
				SHA-1:
				Created;
				Modified;

Note that the process is fully automated, requiring few interactions or modifications.



DNA

As discussed earlier, the process of password cracking requires a lot of hardware resources.

DNA is a tool that can assist in this process since it uses sharing and distribution between the computers on the network resource.

DNA has an interface that is very similar to PRTK features with an exception of solution architecture.

There are two components to the DNA system as follows:

- **Supervisor**: This is a machine that controls the Worker machines in the DNA system and the jobs that they process. Install it before the Workers.
- **Worker**: This is responsible for processing jobs for decryption or password cracking. You should run the appropriate Worker installation program on each machine in the system.

— [89] —

Working with PRTK

Summary

This chapter covered the first steps to use the PRTK Forensics tool and a brief vision of the DNA solution.

Even though a simple solution of using their resources is extremely advanced, it can recover passwords from almost all commonly used files.

PRTK is a mandatory tool used in digital investigations since you will most likely find some protected files that may contain the key to the outcome of your investigation.

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