Introduction

Of the many services we use over the Internet, email is among the most common. In the years since Internet usage began gaining widespread popularity in the 1990s, email has become a primary means of communication for companies, government, and individuals. Consequently, email is one of the most common sources of evidence that a forensic investigator can examine during an investigation.

In its simplest form, email forensics consists of analyzing the source and content of an email message, which enables an investigator to identify the sender, receivers, date, and time. As a source of forensic evidence, email has the power to document a suspect's activities with immense detail. Proper email analysis can prove guilt, innocence, or at least that something happened.

However, email is not the only way that people communicate electronically. For personal usage, applications such as Facebook Messenger, WhatsApp, and Discord are immensely popular services that allow individuals to exchange messages over the Internet. Meanwhile, in professional environments, applications such as Slack and Microsoft Teams have gained traction as complements and even replacements for email. As with email, digital artifacts left by instant messaging (IM) and chat applications can hold immense forensic value. This is particularly true if it is possible to recover entire databases containing complete conversation transcripts.

In this lab, you will perform forensic analysis on a variety of email and IM services, including Outlook, Thunderbird, Slack, and Discord. You will analyze email headers and search for forensic evidence using Paraben's E3.

Lab Overview

SECTION 1 of this lab has three parts, which should be completed in the order specified.

1. In the first part of the lab, you will perform basic email header analysis.

2. In the second part of the lab, you will search for forensic evidence in email using targeted search techniques.

3. In the third part of the lab, you will search for forensic evidence in a chat application database.

SECTION 2 of this lab allows you to apply what you learned in **SECTION 1** with less guidance and different deliverables, as well as some expanded tasks and alternative methods. You will explore new evidence in different email clients and chat applications.

Finally, you will explore the virtual environment on your own in **SECTION 3** of this lab to answer a set of questions and challenges that allow you to use the skills you learned in the lab to conduct independent, unguided work - similar to what you will encounter in a real-world situation.

Learning Objectives

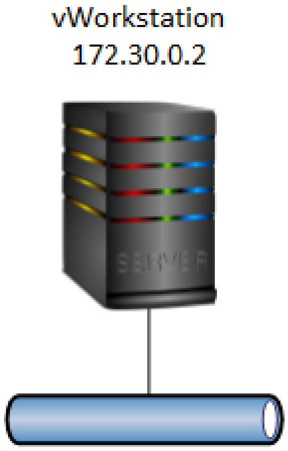
Upon completing this lab, you will be able to:

1. Navigate the structure of common email client databases, including Outlook and Thunderbird.
2. Read and understand the contents of email headers.
3. Use E3’s Content Analysis function to sort email attachments.
4. Use E3’s Advanced Search function to apply custom search filters.
5. Navigate the structure of common chat application databases, including Slack and Discord.

Topology

This lab contains the following virtual machines. Please refer to the network topology diagram below.

- vWorkstation (Windows: Server 2019)



Tools and Software

The following software and/or utilities are required to complete this lab. Students are encouraged to explore the Internet to learn more about the products and tools used in this lab.

- Paraben's E3

Deliverables

Upon completion of this lab, you are required to provide the following deliverables to your instructor:

SECTION 1

1. Lab Report file, including screen captures of the following:

- Happy Reminder email in the Text Viewer and Timestamp in the Properties pane
- IP address of the sender
- List of files in the Graphics category
- Email that references the Big Boss
- Members of the IntricateSolutions workspace
- Channels in the IntricateSolutions workspace

- Conversation contents

2. Any additional information as directed by the lab:

- None

SECTION 2

1. Lab Report file, including screen captures of the following:

- Thunderbird Inbox
- Email from Leo Deforest
- Pills evidence and Beverly Gates corresponding as Natasha "Red" Maximoff
- Beverly's Discord friend list
- Lena Goodwin conversation

2. Any additional information as directed by the lab:

- Document the sender's email address, mail server name, and mail server IP address in the Well, Well, Well email header

SECTION 3

1. Lab Report file, including screen captures of the following:

- Email thread returned in the search results
- Additional evidence within the Discord database

2. Any additional information as directed by the lab:

- None

Section 1: Hands-On Demonstration

Note: In this section of the lab, you will follow a step-by-step walk-through of the objectives for this lab to produce the expected deliverables.

1. **Review** the **Tutorial**.

   Frequently performed tasks, such as making screen captures and downloading your Lab Report, are explained in the Cloud Lab Tutorial. The Cloud Lab Tutorial is available from the User menu in the upper-right corner of the Student Dashboard. You should review these tasks before starting the lab.

2. **Proceed** with **Part 1**.

Part 1: Analyze Email Headers

Note: In this part of the lab, you will perform some basic email header analysis using Paraben's E3 and a drive image. The standard format for email structure, including header fields and the message body, are defined in RFC 822, RFC 2822, and RFC 5322. Within an email, header fields serve as the email's delivery metadata, describing the email's source, destination, and the path that it took between the two. For forensic investigators, any email investigation should include a thorough examination of the email headers.

The setting of this lab is an ongoing investigation into the activities of Beverly Gates, the HR Manager at Intricate Solutions, Inc. Senior leadership has reason to believe that Beverly is involved in a sophisticated drug trafficking operation with ties to the Russian mafia and has recently contacted the authorities to investigate the matter further. As a forensic analyst assigned to the case, you have been given a drive image taken from Beverly's work laptop and tasked with reviewing its contents for forensic evidence of suspicious activity.

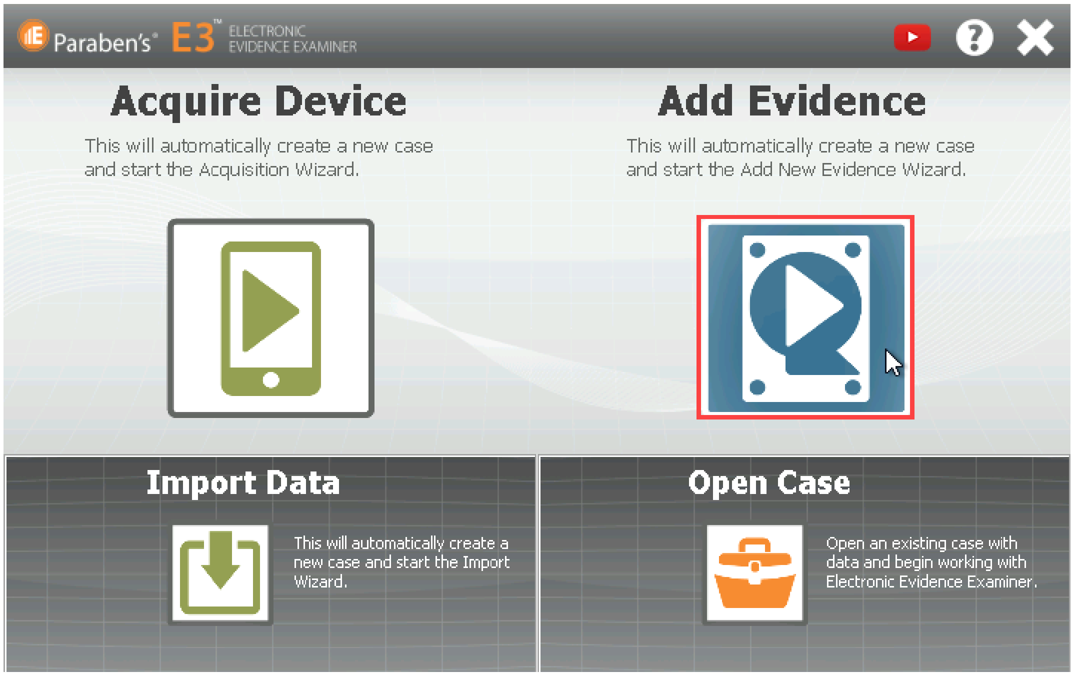
In the next steps, you will add the drive image to E3.

1. On the vWorkstation desktop, **double-click** the **Electronic Evidence Examiner icon** to open the E3 application.

E3 icon

Note: E3 may take several minutes to load. The E3 welcome screen opens with shortcuts to the most common activities that forensic investigators will perform within the tool.

2. On the Welcome screen, **click** the **Add Evidence button** to open the New Case dialog box.



This will automatically create a new case and start the Acquisition Wizard.

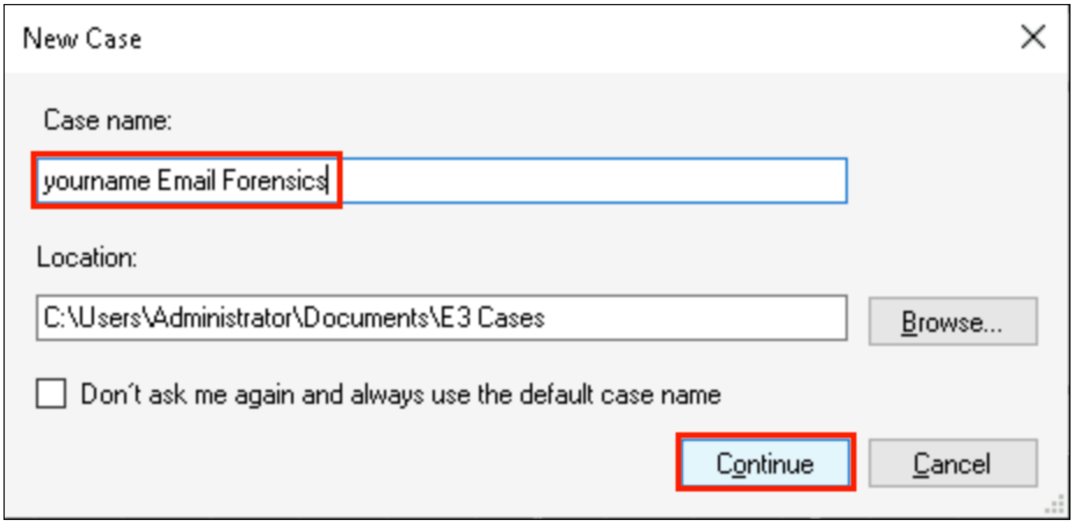
This will automatically create a new case and start the Add New Evidence Wizard.

This will automatically create a new case and start the Import Wizard.

Open an existing case with data and begin working with Electronic Evidence Examiner.

Welcome page - Add Evidence

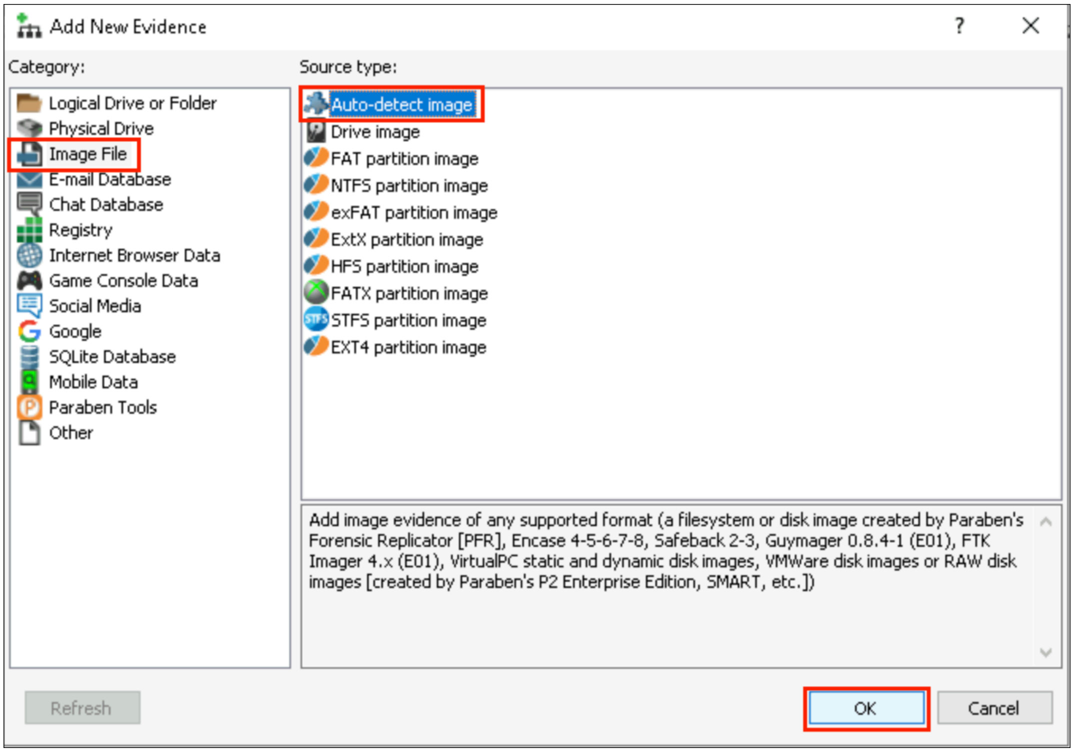
3. In the New Case dialog box, **type** ***`yourname`*** **`Email Forensics`** in the Case name field, replacing *yourname* with your own name, then **click Continue** to create your new case file and open the Add New Evidence dialog box.



New Case
Case name:
yourname Email Forensics
Location:
C:\Users\Administrator\Documents\E3 Cases
Browse...
□ Don't ask me again and always use the default case name
Continue
Cancel

New Case dialog box

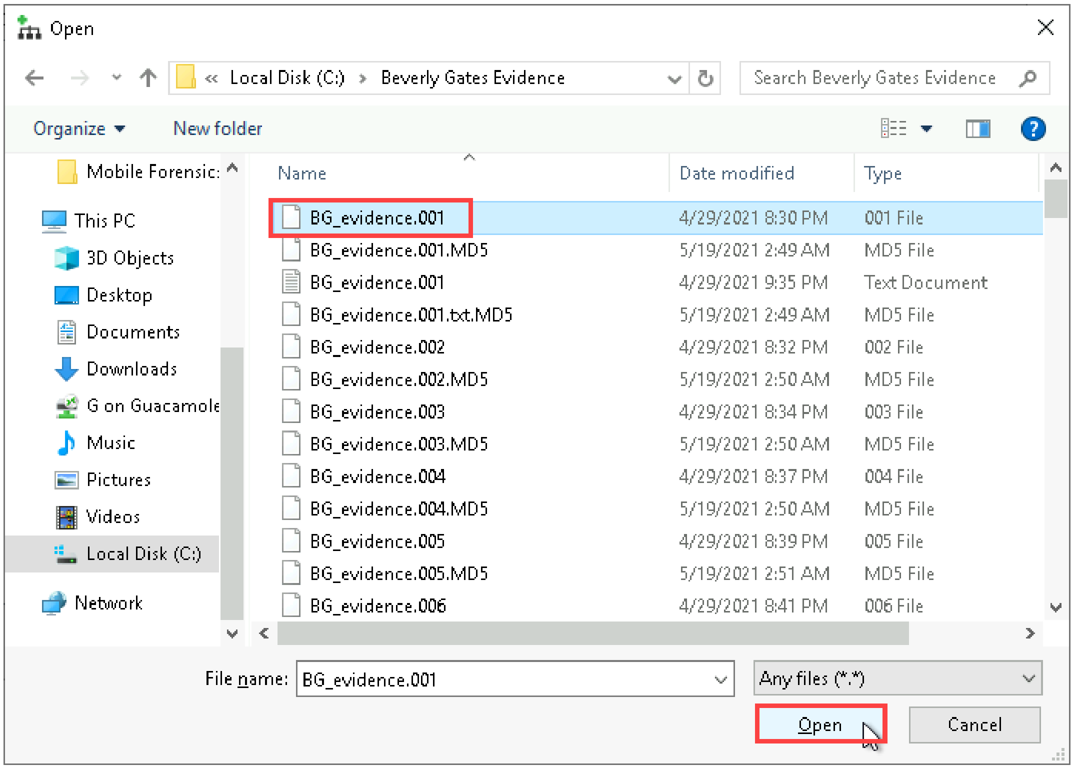
4. In the Add New Evidence dialog box, **click** the **Image File category**, then **select** the **Auto-detect image Source type** and **click OK** to continue.



Add image evidence of any supported format (a filesystem or disk image created by Paraben's Forensic Replicator [PFR], Encase 4-5-6-7-8, Safeback 2-3, Guymager 0.8.4-1 (E01), FTK Imager 4.x (E01), VirtualPC static and dynamic disk images, VMWare disk images or RAW disk images [created by Paraben's P2 Enterprise Edition, SMART, etc.])

Add New Evidence - Auto-detect image

5. In the Open dialog box, **navigate** to **C:\Beverly Gates Evidence** and **select** the first **BG_evidence.001 file**, then **click Open** to import the digital drive image for this lab.



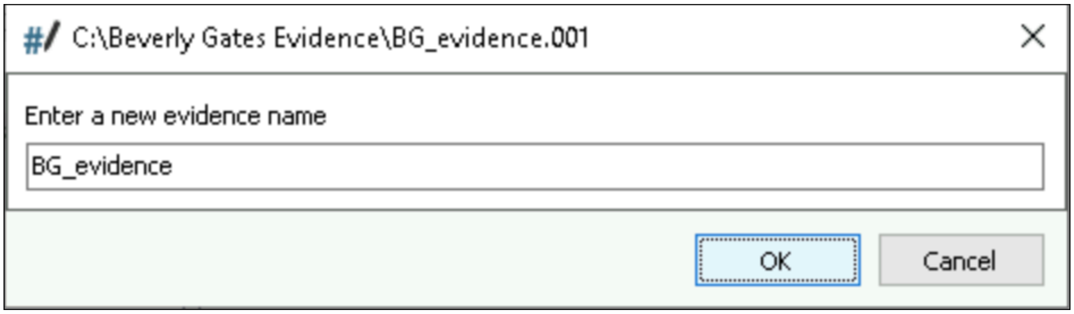
Name	Date modified	Type
BG_evidence.001	4/29/2021 8:30 PM	001 File
BG_evidence.001.MD5	5/19/2021 2:49 AM	MD5 File
BG_evidence.001	4/29/2021 9:35 PM	Text Document
BG_evidence.001.txt.MD5	5/19/2021 2:49 AM	MD5 File
BG_evidence.002	4/29/2021 8:32 PM	002 File
BG_evidence.002.MD5	5/19/2021 2:50 AM	MD5 File
BG_evidence.003	4/29/2021 8:34 PM	003 File
BG_evidence.003.MD5	5/19/2021 2:50 AM	MD5 File
BG_evidence.004	4/29/2021 8:37 PM	004 File
BG_evidence.004.MD5	5/19/2021 2:50 AM	MD5 File
BG_evidence.005	4/29/2021 8:39 PM	005 File
BG_evidence.005.MD5	5/19/2021 2:51 AM	MD5 File
BG_evidence.006	4/29/2021 8:41 PM	006 File

File name: BG_evidence.001

Any files (*.*)

Open dialog box

6. When prompted, **click OK** to accept the default name for the drive image and add the data from the drive image to your case file.


C:\Beverly Gates Evidence\BG_evidence.001

Enter a new evidence name

BG_evidence

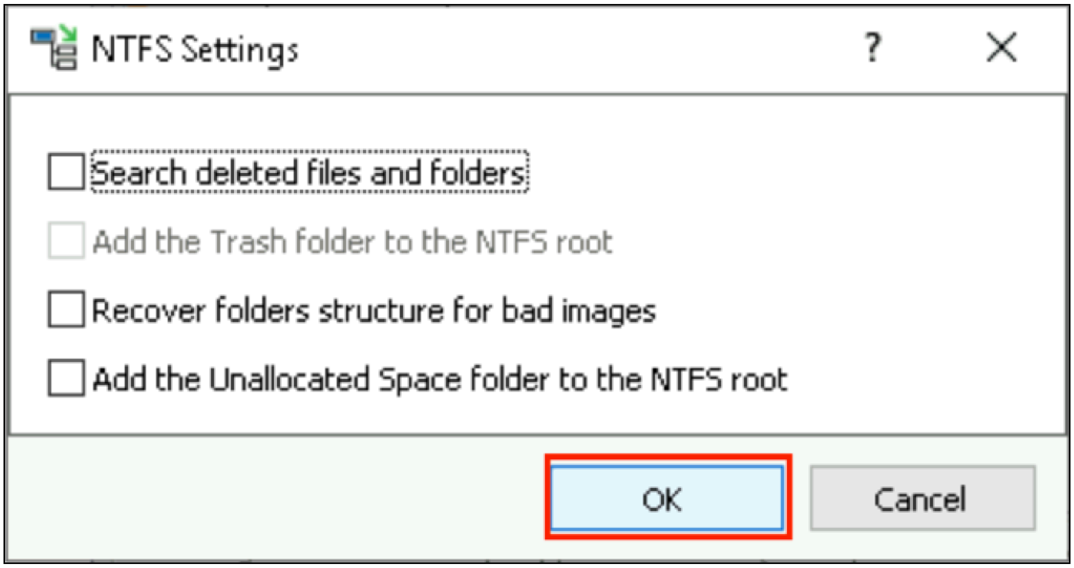
Evidence name

Note: The *yourname* Email Forensics case will appear in the Case Content pane. The Case Content pane is the primary display and navigation area for all evidence in the open case file. Within the Case

Content pane's tree-view structure, you can access case nodes, evidence nodes, evidence type nodes, folder nodes, and data grids/streams. Technically, the Case Content pane does not store the actual evidence, but provides a series of links to elements within the physical evidence.

When you select a specific node or grid within the Case Content pane, the contents of the enclosing folder or database will be displayed in the Data Viewer in the center console. Within the Data Viewer, you can select individual files, folders, and records. Additional information about the currently selected node, grid, file, folder, or record will be displayed in the Viewers pane on the right, which provides multiple ways to view your current selection.

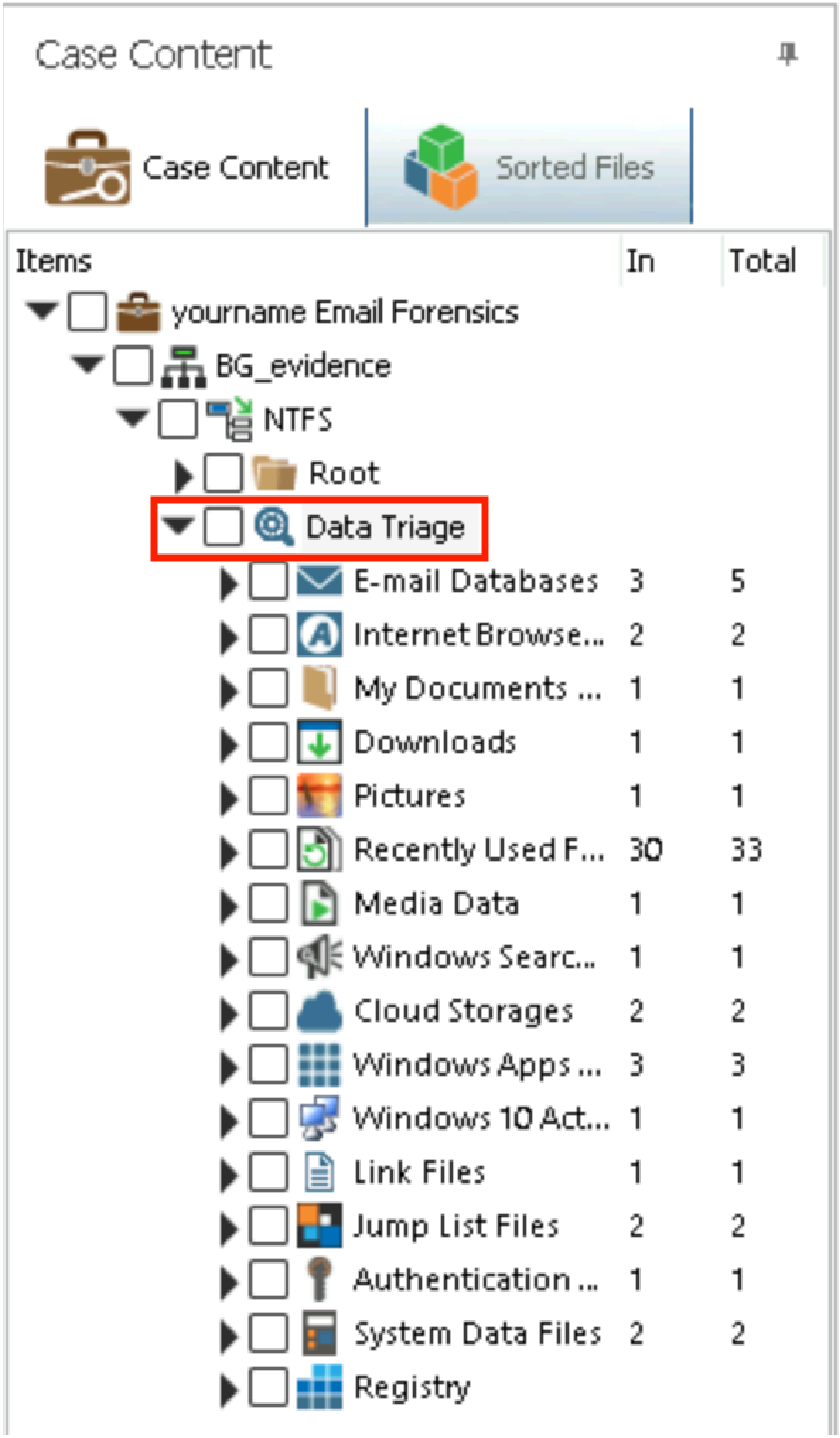
7. When prompted, **click OK** to close the NTFS Settings dialog box without making any changes.



□ Search deleted files and folders
□ Add the Trash folder to the NTFS root
□ Recover folders structure for bad images
□ Add the Unallocated Space folder to the NTFS root

NTFS Settings dialog box

8. In the Case Content pane, **navigate** to ***yourname*** **Email Forensics / BG_evidence / NTFS**, then **expand** the **Data Triage node** to display the Data Triage categories.



Case Content

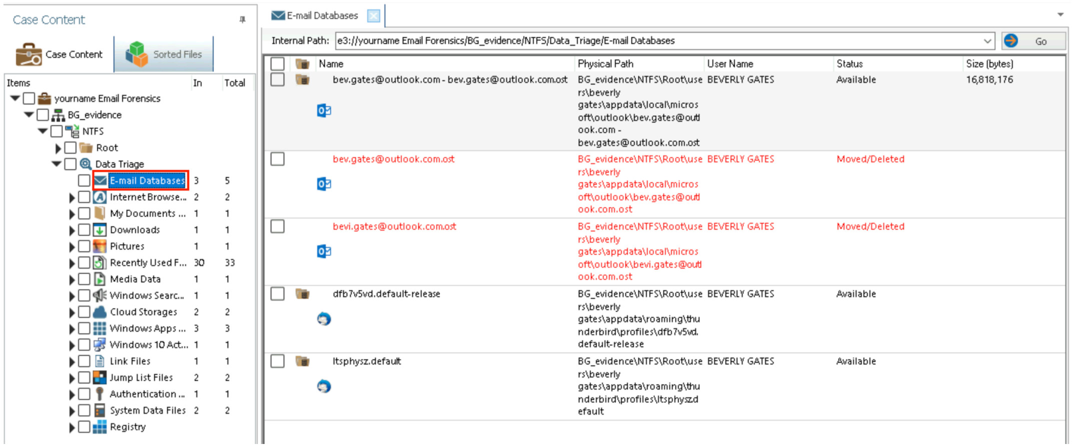
Case Content | Sorted Files

Items	In	Total
yourname Email Forensics		
BG_evidence		
NTFS		
Root		
Data Triage		
E-mail Databases	3	5
Internet Browse...	2	2
My Documents ...	1	1
Downloads	1	1
Pictures	1	1
Recently Used F...	30	33
Media Data	1	1
Windows Searc...	1	1
Cloud Storages	2	2
Windows Apps ...	3	3
Windows 10 Act...	1	1
Link Files	1	1
Jump List Files	2	2
Authentication ...	1	1
System Data Files	2	2
Registry		

Data Triage

Note: The Data Triage function in E3 allows you to quickly view potentially high-value evidence, such as email databases, recently used files, and parsed registry data.

9. In the Case Content pane, **select** the **E-mail Databases category** to display all email databases detected on the drive image in the Data Viewer pane.



Case Content

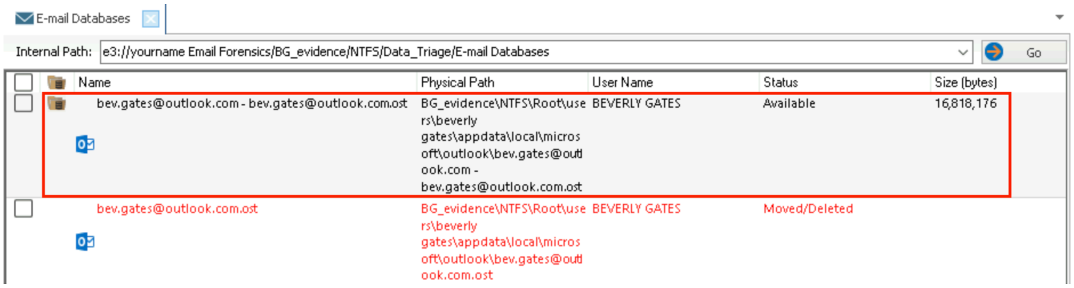
Items	In	Total
yourname Email Forensics		
BG_evidence		
NTFS		
Root		
Data Triage		
E-mail Databases	3	5
Internet Browse...	2	2
My Documents ...	1	1
Downloads	1	1
Pictures	1	1
Recently Used F...	30	33
Media Data	1	1
Windows Searc...	1	1
Cloud Storages	2	2
Windows Apps ...	3	3
Windows 10 Act...	1	1
Link Files	1	1
Jump List Files	2	2
Authentication ...	1	1
System Data Files	2	2
Registry		

Internal Path: e3://yourname Email Forensics/BG_evidence/NTFS/Data_Triage/E-mail Databases

Name	Physical Path	User Name	Status	Size (bytes)
bev.gates@outlook.com - bev.gates@outlook.com.ost	BG_evidence\NTFS\Root\users\beverly gates\appdata\local\microsoft\outlook\bev.gates@outlook.com - bev.gates@outlook.com.ost	BEVERLY GATES	Available	16,818,176
bev.gates@outlook.com.ost	BG_evidence\NTFS\Root\users\beverly gates\appdata\local\microsoft\outlook\bev.gates@outlook.com.ost	BEVERLY GATES	Moved/Deleted	
bevi.gates@outlook.com.ost	BG_evidence\NTFS\Root\users\beverly gates\appdata\local\microsoft\outlook\bevi.gates@outlook.com.ost	BEVERLY GATES	Moved/Deleted	
dfb7v5vd.default-release	BG_evidence\NTFS\Root\users\beverly gates\appdata\roaming\thunderbird\profiles\dfb7v5vd.default-release	BEVERLY GATES	Available	
ltsphysz.default	BG_evidence\NTFS\Root\users\beverly gates\appdata\roaming\thunderbird\profiles\ltsphysz.default	BEVERLY GATES	Available	

E-mail Databases

10. In the Data Viewer pane, **double-click** the **bev.gates@outlook.com – bev.gates@outlook.com.ost database** to open it.

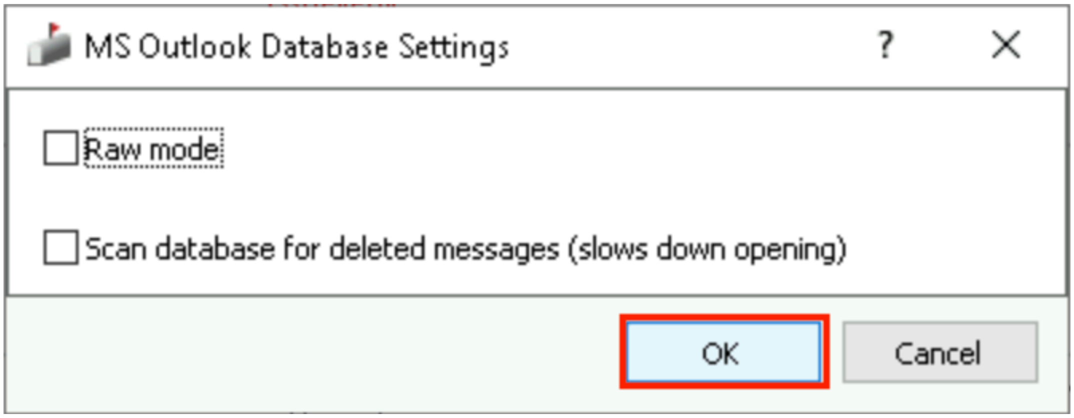


Internal Path: e3://yourname Email Forensics/BG_evidence/NTFS/Data_Triage/E-mail Databases

Name	Physical Path	User Name	Status	Size (bytes)
bev.gates@outlook.com - bev.gates@outlook.com.ost	BG_evidence\NTFS\Root\users\beverly gates\appdata\local\microsoft\outlook\bev.gates@outlook.com - bev.gates@outlook.com.ost	BEVERLY GATES	Available	16,818,176
bev.gates@outlook.com.ost	BG_evidence\NTFS\Root\users\beverly gates\appdata\local\microsoft\outlook\bev.gates@outlook.com.ost	BEVERLY GATES	Moved/Deleted	

Bev.gates@outlook.com database

11. When prompted, **click OK** to close the MS Outlook Database Settings dialog box without making any changes.



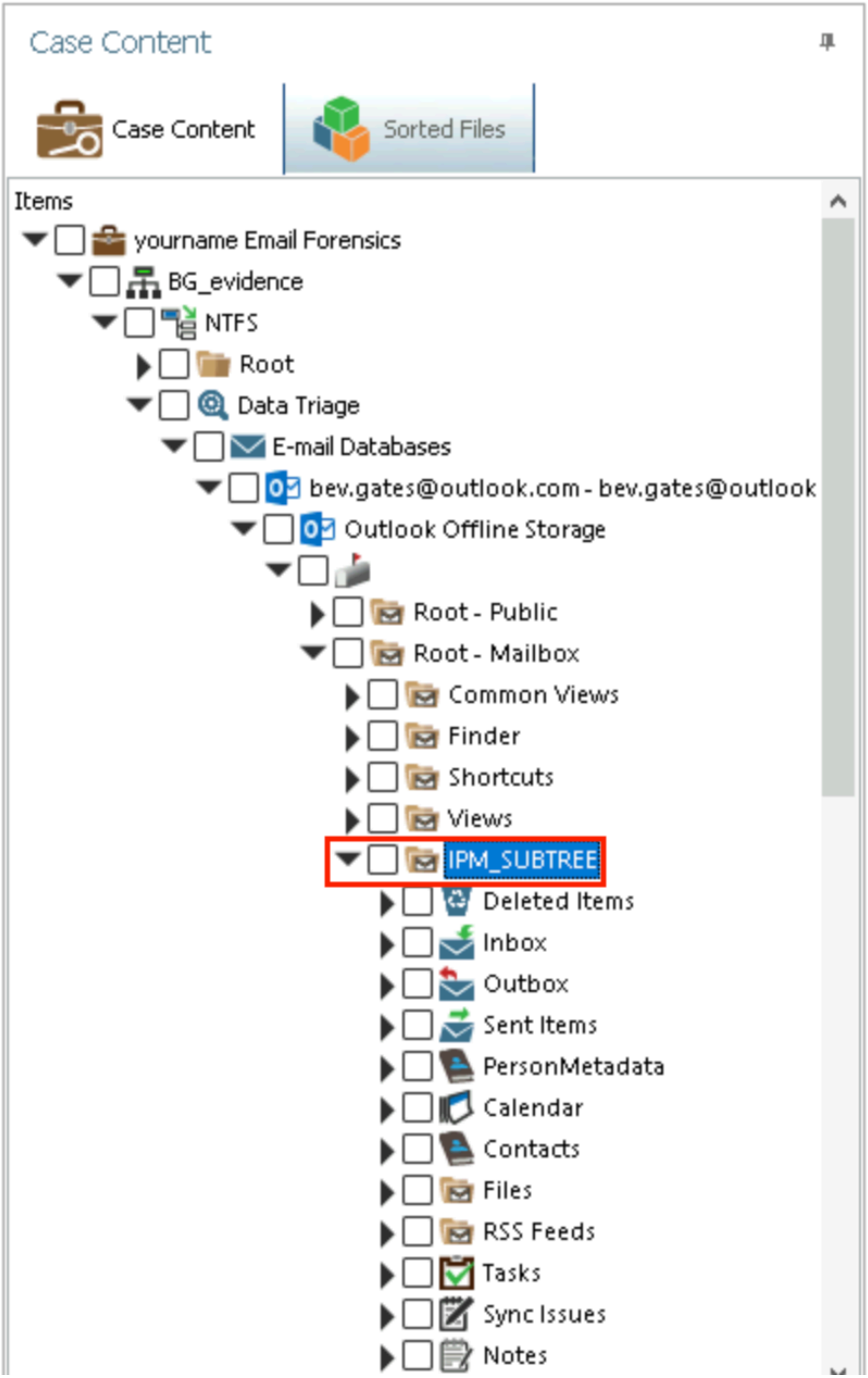
MS Outlook Database Settings

□ Raw mode

□ Scan database for deleted messages (slows down opening)

MS Outlook Database Settings dialog box

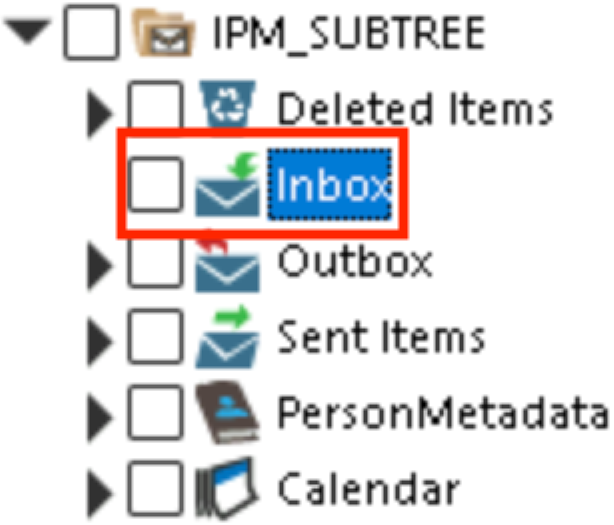
12. In the Case Content pane, **navigate** to **bev.gates@outlook.com\Outlook Offline Storage\Root - Mailbox**, then **expand** the **IPM_SUBTREE folder node** to display the structure of the email database.



IPM_SUBTREE folder

Note: IPM stands for "InterPersonal Message." Within an Outlook email database, the IPM Subtree is used to store all messages between human recipients (hence, *interpersonal*). From here, you can access the Inbox, Outbox, Sent Items, and Deleted Items. Within Microsoft Outlook Office, the IPM Subtree also contains folders for Calendar, Contacts, Tasks, Notes, and more.
In a real-world situation, you might need to review all the components of the email database, but in this lab, you will narrow your investigation to the Inbox.

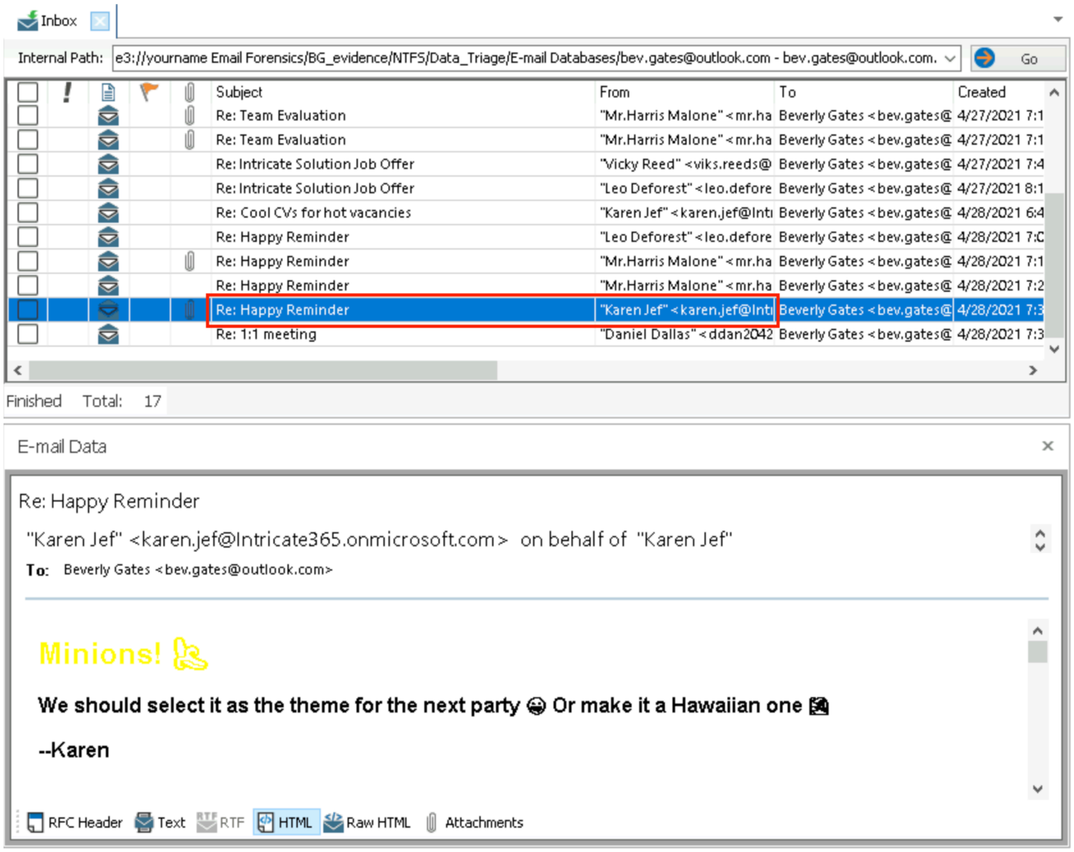
13. In the Case Content pane, **select** the **Inbox folder node** to display the contents in the Data Viewer.



Inbox

14. In the Data Viewer pane, **select** the **email** from *Karen Jef* with the subject *Re: Happy Reminder* to display its contents in the E-mail Data pane.

    You may need to adjust the pane sizes to view the information in the E-mail Data pane.



Internal Path: e3://yourname Email Forensics/BG_evidence/NTFS/Data_Triage/E-mail Databases/bev.gates@outlook.com - bev.gates@outlook.com.

Subject	From	To	Created
Re: Team Evaluation	"Mr.Harris Malone" <mr.ha	Beverly Gates <bev.gates@	4/27/2021 7:1
Re: Team Evaluation	"Mr.Harris Malone" <mr.ha	Beverly Gates <bev.gates@	4/27/2021 7:1
Re: Intricate Solution Job Offer	"Vicky Reed" <viks.reeds@	Beverly Gates <bev.gates@	4/27/2021 7:4
Re: Intricate Solution Job Offer	"Leo Deforest" <leo.defore	Beverly Gates <bev.gates@	4/27/2021 8:1
Re: Cool CVs for hot vacancies	"Karen Jef" <karen.jef@Inti	Beverly Gates <bev.gates@	4/28/2021 6:4
Re: Happy Reminder	"Leo Deforest" <leo.defore	Beverly Gates <bev.gates@	4/28/2021 7:C
Re: Happy Reminder	"Mr.Harris Malone" <mr.ha	Beverly Gates <bev.gates@	4/28/2021 7:1
Re: Happy Reminder	"Mr.Harris Malone" <mr.ha	Beverly Gates <bev.gates@	4/28/2021 7:2
Re: Happy Reminder	"Karen Jef" <karen.jef@Inti	Beverly Gates <bev.gates@	4/28/2021 7:3
Re: 1:1 meeting	"Daniel Dallas" <ddan2042	Beverly Gates <bev.gates@	4/28/2021 7:3

Finished Total: 17

E-mail Data

Re: Happy Reminder

"Karen Jef" <karen.jef@Intricate365.onmicrosoft.com> on behalf of "Karen Jef"

To: Beverly Gates <bev.gates@outlook.com>

Minions!

We should select it as the theme for the next party Or make it a Hawaiian one

--Karen

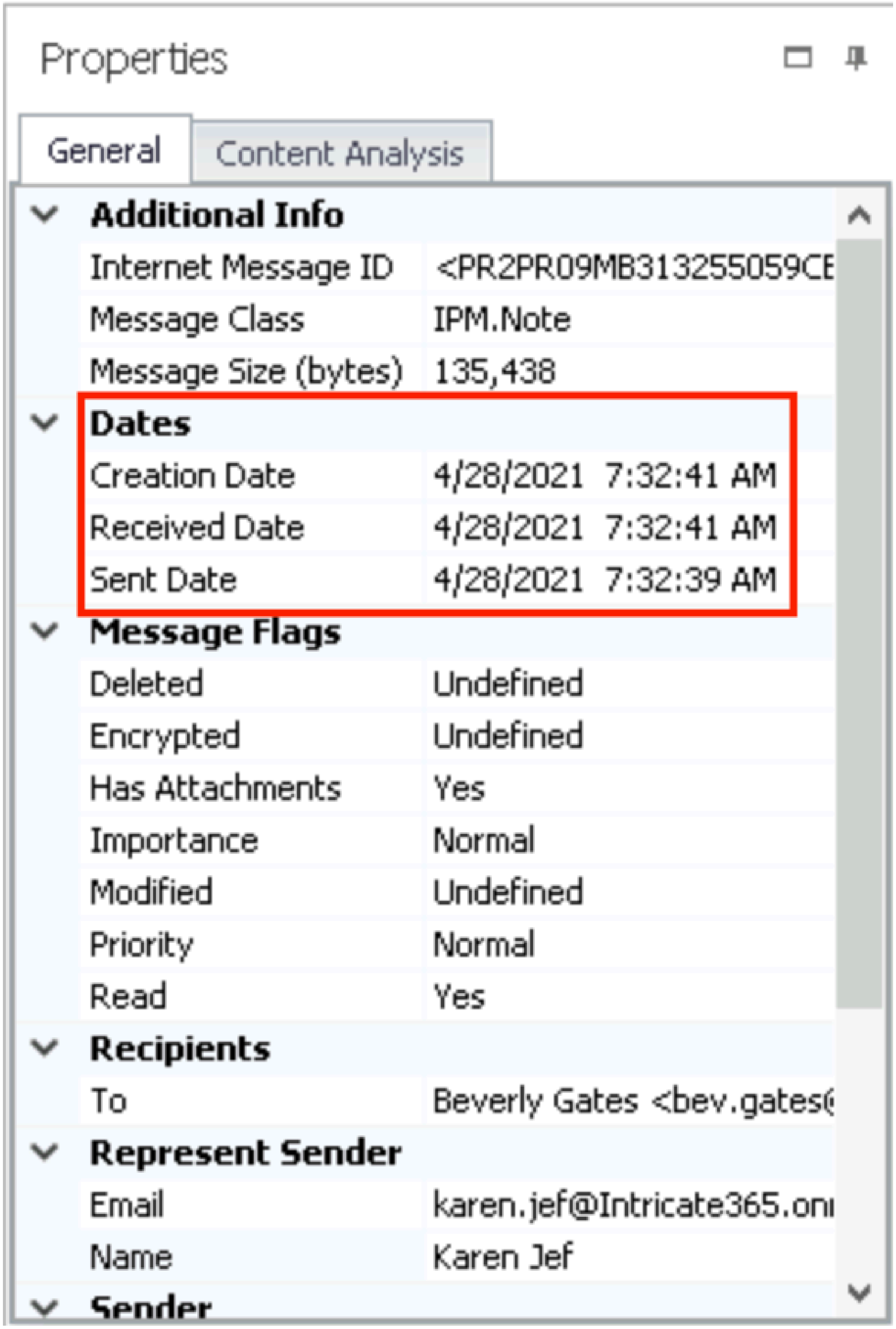
Re: Happy Reminder

Note: When you select an individual email in an email database, E3 will display the file in different viewers in the E-mail Data pane, including RFC Header, Text, RTF, Raw HTML, and Attachments.

15. **Review** the contents of the email.

Note: Recall that the setting for this lab is an investigation into Beverly Gates for suspected drug trafficking. While the content of the email thread seems to indicate some of the Intricate Solutions employees may be partying on the clock, it does not provide any obvious evidence of illegal activity.

16. In the Properties pane, **locate** the timestamps for this email.



Additional Info	
Internet Message ID	<PR2PR09MB313255059CE
Message Class	IPM.Note
Message Size (bytes)	135,438
Dates	
Creation Date	4/28/2021 7:32:41 AM
Received Date	4/28/2021 7:32:41 AM
Sent Date	4/28/2021 7:32:39 AM
Message Flags	
Deleted	Undefined
Encrypted	Undefined
Has Attachments	Yes
Importance	Normal
Modified	Undefined
Priority	Normal
Read	Yes
Recipients	
To	Beverly Gates <bev.gates(
Represent Sender	
Email	karen.jef@Intricate365.onı
Name	Karen Jef
Sender	

Properties pane

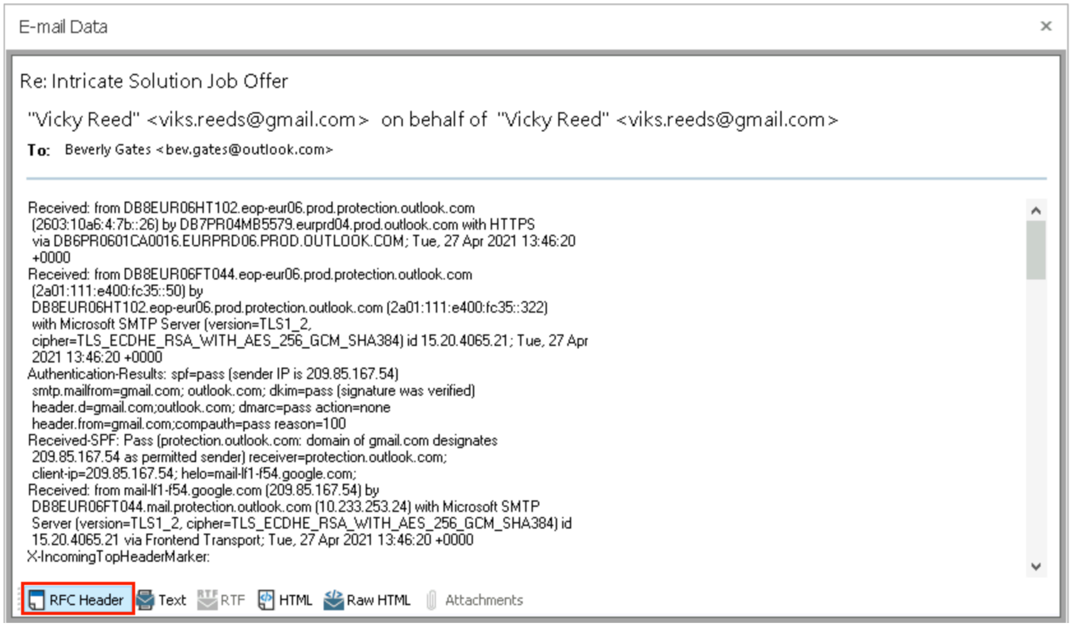
Note: The Properties pane displays basic information about the currently selected email, including size, times/dates, flags, recipients, and the sender.

17. **Make a screen capture** showing the **Happy Reminder email in the Text Viewer and Timestamp in the Properties pane**.

18. In the Data Viewer pane, **select** the **email** from *Vicky Reed* with the subject *Re: Intricate Solution Job Offer* to display its contents in the E-mail Data pane.

19. **Review** the contents of the email in the Text viewer.

20. In the E-mail Data pane, **click** the **RFC Header tab** to view the email headers.



Re: Intricate Solution Job Offer

"Vicky Reed" <viks.reeds@gmail.com> on behalf of "Vicky Reed" <viks.reeds@gmail.com>

To: Beverly Gates <bev.gates@outlook.com>

```
Received: from DB8EUR06HT102.eop-eur06.prod.protection.outlook.com
 (2603:10a6:4:7b::26) by DB7PR04MB5579.eurprd04.prod.outlook.com with HTTPS
 via DB6PR0601CA0016.EURPRD06.PROD.OUTLOOK.COM; Tue, 27 Apr 2021 13:46:20
 +0000
Received: from DB8EUR06FT044.eop-eur06.prod.protection.outlook.com
 (2a01:111:e400:fc35::50) by
 DB8EUR06HT102.eop-eur06.prod.protection.outlook.com (2a01:111:e400:fc35::322)
 with Microsoft SMTP Server (version=TLS1_2,
 cipher=TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384) id 15.20.4065.21; Tue, 27 Apr
 2021 13:46:20 +0000
Authentication-Results: spf=pass (sender IP is 209.85.167.54)
 smtp.mailfrom=gmail.com; outlook.com; dkim=pass (signature was verified)
 header.d=gmail.com;outlook.com; dmarc=pass action=none
 header.from=gmail.com;compauth=pass reason=100
Received-SPF: Pass (protection.outlook.com: domain of gmail.com designates
 209.85.167.54 as permitted sender) receiver=protection.outlook.com;
 client-ip=209.85.167.54; helo=mail-lf1-f54.google.com;
Received: from mail-lf1-f54.google.com (209.85.167.54) by
 DB8EUR06FT044.mail.protection.outlook.com (10.233.253.24) with Microsoft SMTP
 Server (version=TLS1_2, cipher=TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384) id
 15.20.4065.21 via Frontend Transport; Tue, 27 Apr 2021 13:46:20 +0000
X-IncomingTopHeaderMarker:
```

RFC Header

Note: RFC Header refers to the RFC 822, RFC 2822, and RFC 5322 standards that define a standard email format consisting of header fields and the message body. Email headers contain information associated with the sender, the recipient, the email's route to the inbox, as well as different authentication details.

Every e-mail, regardless of the software that generated it, follows this standard format. The header keeps a record of the message’s journey as it travels through the communications network. As the message is routed through one or more mail servers, each server adds its own information to the message header, providing an audit trail of every machine through which the e-mail has passed. This information can be immensely valuable to a forensic investigator. For example, in cases of email spoofing, the email header may contain headers that provide the true sender and originating IP address for the email. Using the IP addresses, you may even be able to determine a geographical location for the sender of the email message.

21. **Review** the **email header** and **locate** the IP address of the sender.

    Once located, **select** the IP address to highlight it.

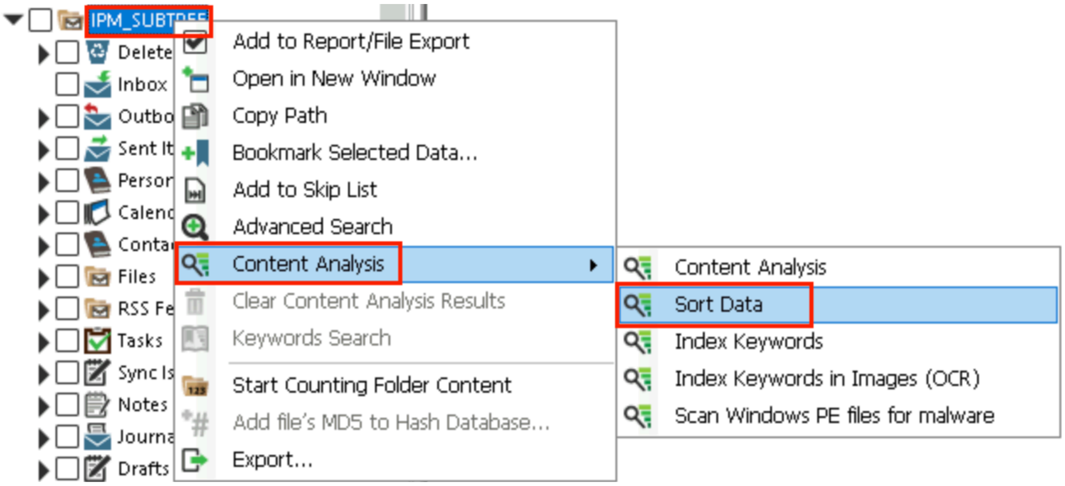
22. **Make a screen capture** showing the **IP address of the sender**.

Part 2: Search for Evidence in an Outlook Database

Note: In this part of the lab, you will use E3’s Sort Data and Search functions to continue your search for incriminating evidence in Beverly Gates’s Outlook database. Due to the volume of emails that most email users send and receive each in day in both personal and professional capacities, combing through individual emails one by one is rarely a viable strategy for a forensic investigator. Fortunately, dedicated forensics tools like E3 offer advanced sort and search functionalities to automatically parse the contents of email databases and empower an investigator to quickly identify relevant conversations and files.

In the next steps, you will use E3's Content Analysis engine to identify and sort any attachment files stored within the IPM_SUBTREE directory.

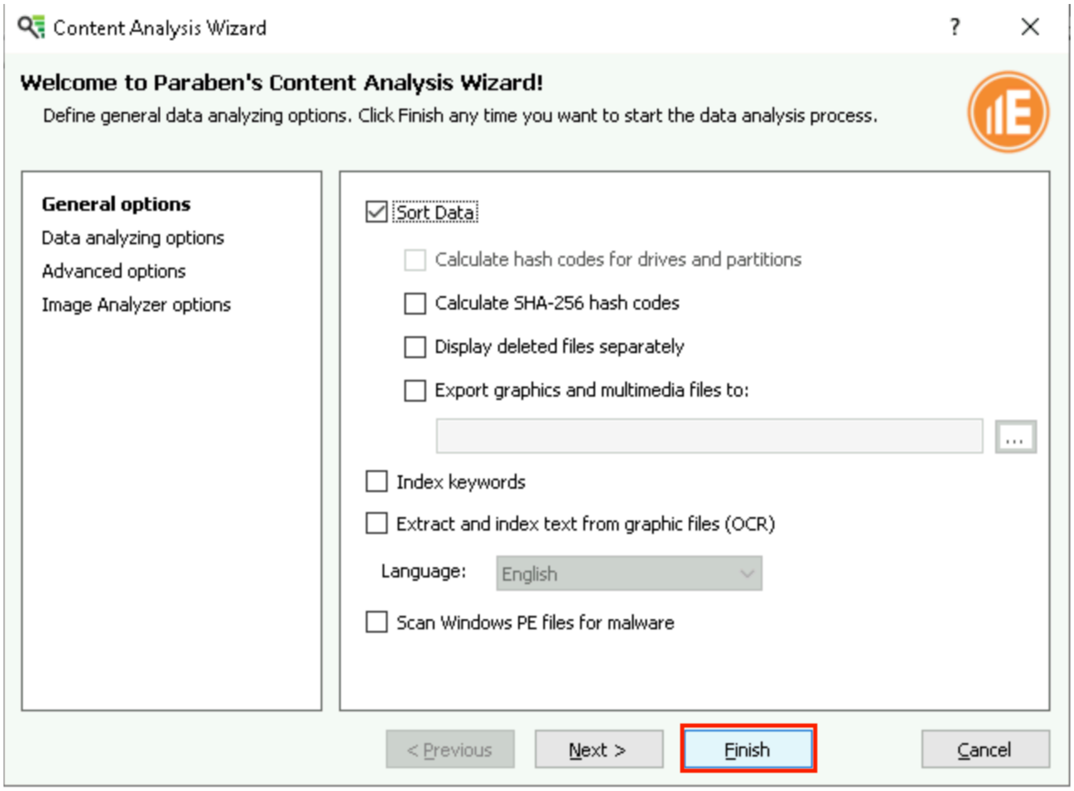
1. In the Case Content pane, **right-click** the **IPM_SUBTREE folder**, then **select Content Analysis > Sort Data** from the context menu to open the Content Analysis Wizard.



Sort Data

2. In the Content Analysis Wizard, **confirm** the Sort Data option is selected, then **click Finish** to launch the content analysis process.

   This process should take less than 30 seconds to run.


Content Analysis Wizard
?
Welcome to Paraben's Content Analysis Wizard!
Define general data analyzing options. Click Finish any time you want to start the data analysis process.
General options
Data analyzing options
Advanced options
Image Analyzer options
...
< Previous
Next >
Finish
Cancel

☑ Sort Data

□ Calculate hash codes for drives and partitions

□ Calculate SHA-256 hash codes

□ Display deleted files separately

□ Export graphics and multimedia files to:

□ Index keywords

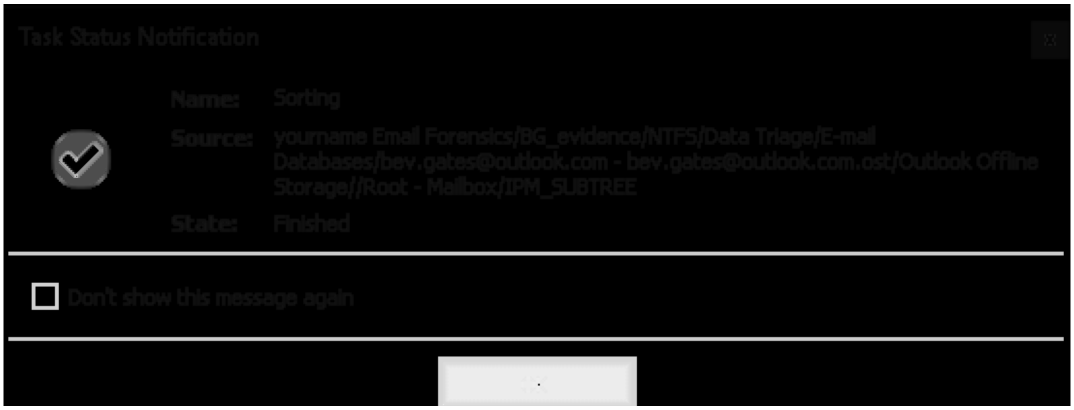
□ Extract and index text from graphic files (OCR)

Language: English

□ Scan Windows PE files for malware

Content Analysis Wizard

3. When prompted, **click OK** to close the Task Status Notification dialog box.



Name: Sorting

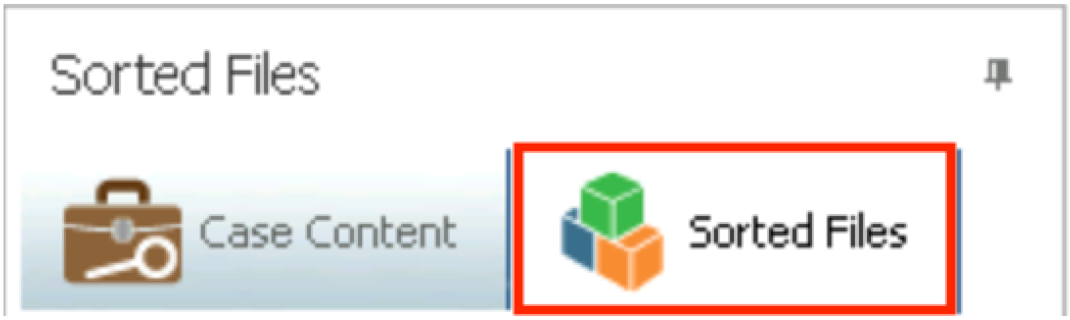
Source: yourname Email Forensics/BG_evidence/NTFS/Data Triage/E-mail Databases/bev.gates@outlook.com - bev.gates@outlook.com.ost/Outlook Offline Storage//Root - Mailbox/IPM_SUBTREE

State: Finished

□ Don't show this message again

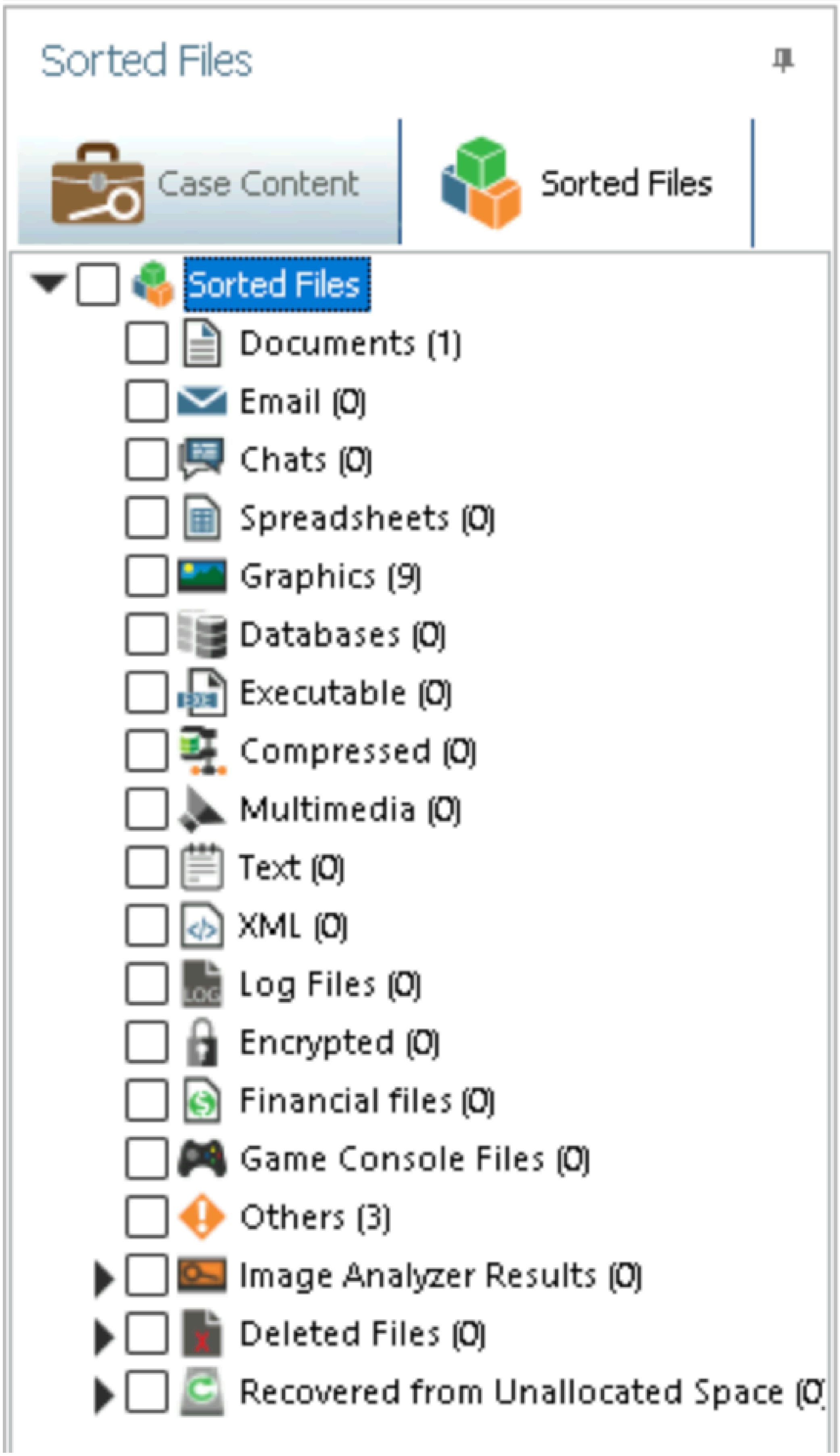
Task Status Notification

4. In the Case Content pane, **click** the **Sorted Files tab** to switch to the Sorted Files view.



Sorted Files tab

5. In the Sorted Files pane, **double-click** the **Sorted Files node** to display the categories that E3 uses to sort files on the disk image.



Sorted Files

- □ Sorted Files
  - □ Documents (1)
  - □ Email (0)
  - □ Chats (0)
  - □ Spreadsheets (0)
  - □ Graphics (9)
  - □ Databases (0)
  - □ Executable (0)
  - □ Compressed (0)
  - □ Multimedia (0)
  - □ Text (0)
  - □ XML (0)
  - □ Log Files (0)
  - □ Encrypted (0)
  - □ Financial files (0)
  - □ Game Console Files (0)
  - □ Others (3)
  - □ Image Analyzer Results (0)
  - □ Deleted Files (0)
  - □ Recovered from Unallocated Space (0

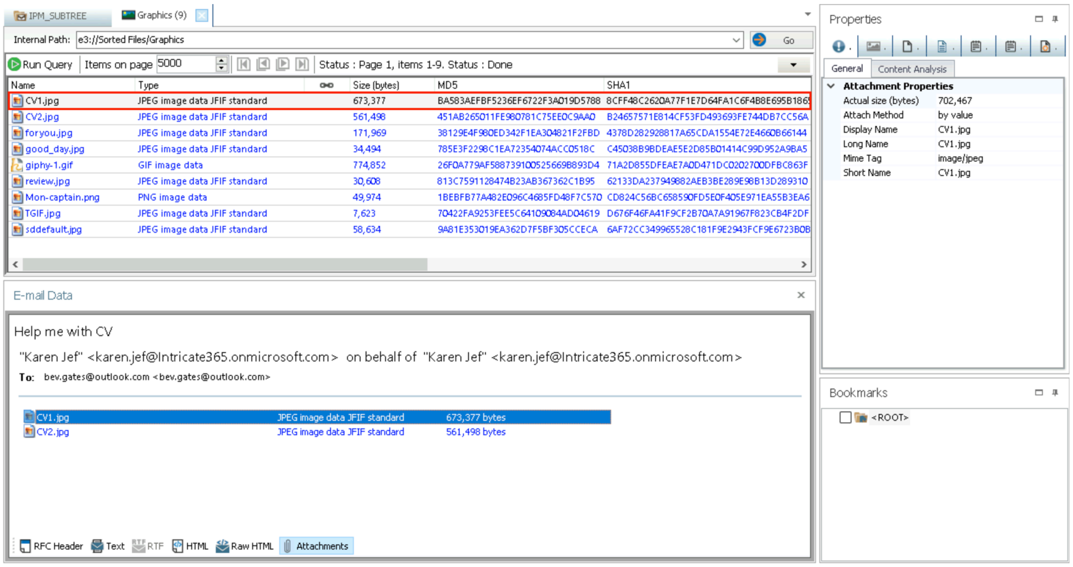
Sorted Files categories

Note: In this context, the Sorted Files view contains all email attachments that E3 identified in the IPM_SUBTREE directory, sorted by file type. For forensic investigators, approaching an email investigation by reviewing the attachments first can help to elevate the most useful or informative evidence. From this view, you can easily identify any interesting files, then review the associated email threads for additional context and evidence.

6. In the Sorted Files pane, **select** the **Graphics category** to display a list of identified graphics files in the Data Viewer.

7. **Make a screen capture** showing the **list of files in the Graphics category**.

8. In the Data Viewer, **select** the **CV1.jpg file** to display the source email in the E-mail Data pane and the file properties in the Properties pane.



Internal Path: e3://Sorted Files/Graphics

Items on page 5000 | Status : Page 1, items 1-9. Status : Done

Name	Type	Size (bytes)	MD5	SHA1
CV1.jpg	JPEG image data JFIF standard	673,377	BA583AEFBF5236EF6722F3A019D5788	8CFF48C2620A77F1E7D64FA1C6F4B8E695B186
CV2.jpg	JPEG image data JFIF standard	561,498	451AB265011FE980781C75EE0C9AA0	B24657571E814CF53FD493693FE744DB7CC56A
foryou.jpg	JPEG image data JFIF standard	171,969	38129E4F980ED342F1EA304821F2FBD	4378D282928817A65CDA1554E72E4660B66144
good_day.jpg	JPEG image data JFIF standard	34,494	785E3F2298C1EA72354074ACC0518C	C45038B9BDEAE5E2D85B01414C99D952A9BA5
giphy-1.gif	GIF image data	774,852	26F0A779AF588739100525669B893D4	71A2D855DFEAE7A0D471DC0202700DFBC863F
review.jpg	JPEG image data JFIF standard	30,608	813C7591128474B23AB367362C1B95	62133DA237949882AEB3BE289E98B13D289310
Mon-captain.png	PNG image data	49,974	1BEBFB77A482E096C4685FD48F7C570	CD824C56BC658590FD5E0F405E971EA55B3EA6
TGIF.jpg	JPEG image data JFIF standard	7,623	70422FA9253FEE5C64109084AD04619	D676F46FA41F9CF2B70A7A91967F823CB4F2DF
sddefault.jpg	JPEG image data JFIF standard	58,634	9A81E353019EA362D7F5BF305CCECA	6AF72CC349965528C181F9E2943FCF9E6723B0B

Attachment Properties

Actual size (bytes)	702,467
Attach Method	by value
Display Name	CV1.jpg
Long Name	CV1.jpg
Mime Tag	image/jpeg
Short Name	CV1.jpg

Help me with CV

"Karen Jef" <karen.jef@Intricate365.onmicrosoft.com> on behalf of "Karen Jef" <karen.jef@Intricate365.onmicrosoft.com>

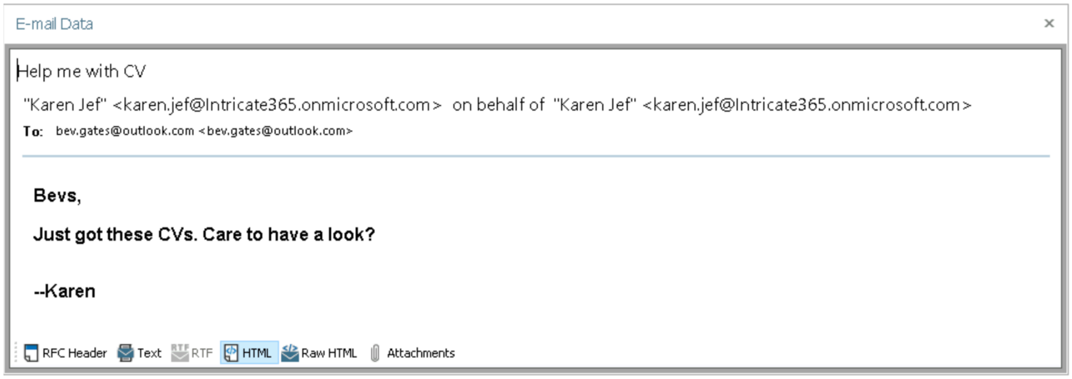
To: bev.gates@outlook.com <bev.gates@outlook.com>

CV1.jpg	JPEG image data JFIF standard	673,377 bytes
CV2.jpg	JPEG image data JFIF standard	561,498 bytes

CV1.jpg

9. In the E-mail Data pane, **click** the **HTML button** to display the HTML view of the email that the

file was attached to.



Help me with CV

"Karen Jef" <karen.jef@Intricate365.onmicrosoft.com> on behalf of "Karen Jef" <karen.jef@Intricate365.onmicrosoft.com>

To: bev.gates@outlook.com <bev.gates@outlook.com>

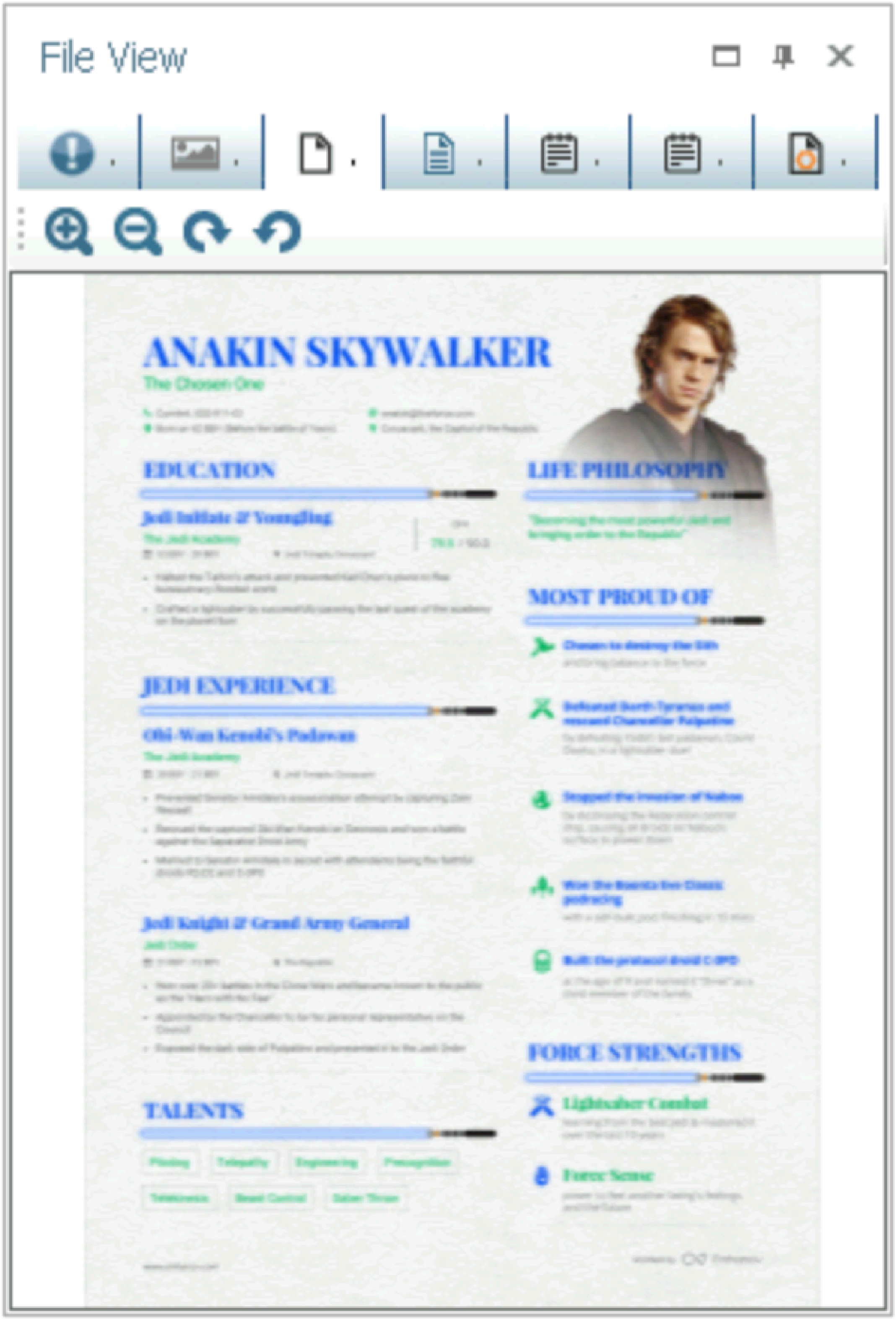
Bevs,

Just got these CVs. Care to have a look?

--Karen

HTML view

10. In the right pane, **click** the **File View tab** to display the contents of the attachment.



ANAKIN SKYWALKER

The Chosen One

EDUCATION

Jedi Initiate & Youngling

The Jedi Academy

LIFE PHILOSOPHY

MOST PROUD OF

JEDI EXPERIENCE

Obi-Wan Kenobi's Padawan

The Jedi Academy

Jedi Knight & Grand Army General

Jedi Order

FORCE STRENGTHS

Lightsaber Combat

Force Sense

TALENTS

File View

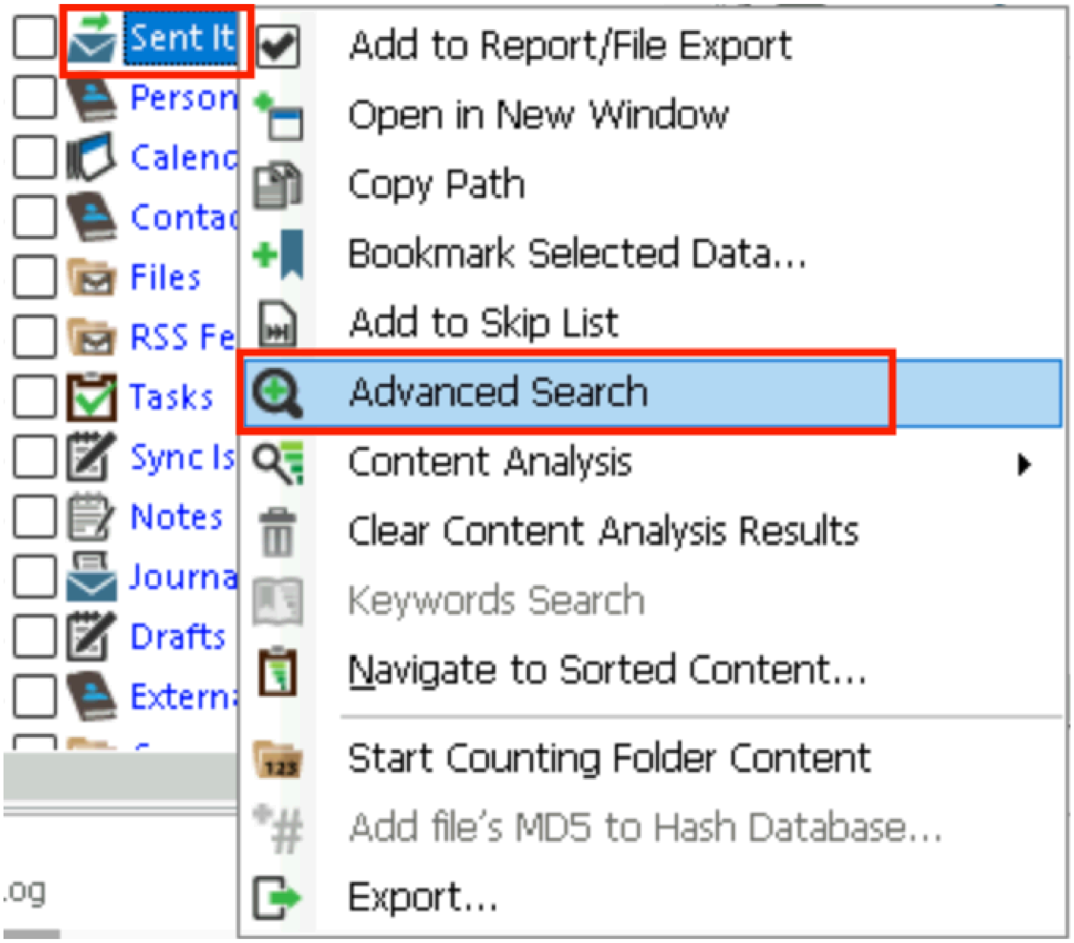
11. **Repeat steps 8-10** to review each file in the Graphics category and the email it was attached to, looking for anything that could be construed as suspicious.

Note: Overall, the contents of the files and emails should appear to be largely normal conversations among office workers. However, you should notice that Alan's – or Mr. Harris Malone's – choice of words and behavior toward Beverly is rather informal for a professional environment, as well as strangely subservient. His conversations with Beverly also reference an urgent deadline that Beverly has set at midnight on April 26, 2021.

Now, Alan (or Harris) may just be an odd duck, but as a forensic investigator in search of patterns and clues in digital evidence, you must often act as a student of human behavior as much as computer behavior. Now, suppose senior leadership has reason to believe that Alan is actually a collaborator in Beverly's drug trafficking operation. In this case, you would be well-advised to further focus your search to emails exchanged between Beverly and Alan on the 26th and 27th of April. To accomplish this, you will use E3's Advanced Search function.

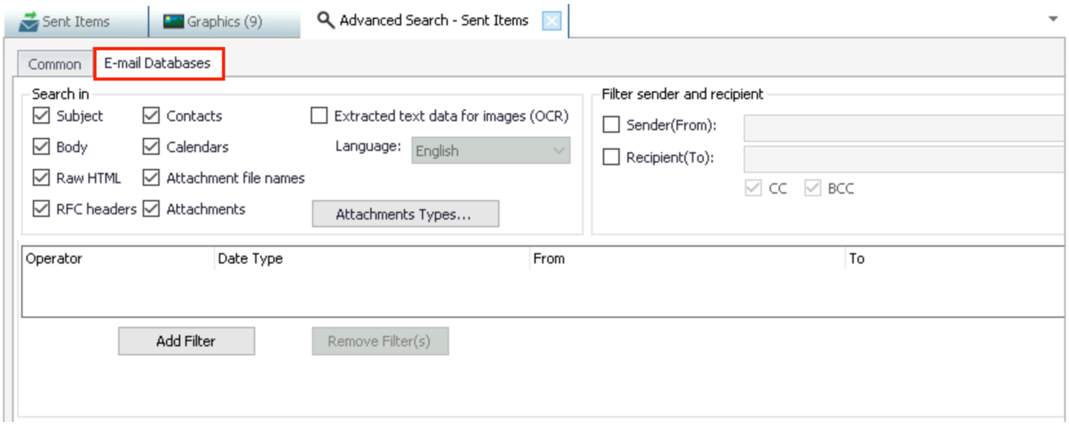
12. In the Case Content pane, **click** the **Case Content tab** to switch to the Case Content view.

13. In the Case Content pane, **expand** the **IPM_SUBTREE node**, then **right-click** the **Sent Items folder** and **select Advanced Search** to open the Advanced Search pane in the center console.


Sent It
Person
Calend
Contac
Files
RSS Fe
Tasks
Sync Is
Notes
Journa
Drafts
Extern
.og
Add to Report/File Export
Open in New Window
Copy Path
Bookmark Selected Data...
Add to Skip List
Advanced Search
Content Analysis
Clear Content Analysis Results
Keywords Search
Navigate to Sorted Content...
Start Counting Folder Content
Add file's MD5 to Hash Database...
Export...

Advanced Search

14. In the Advanced Search pane, **click** the **E-mail Databases tab** to open the advanced search options for email databases.



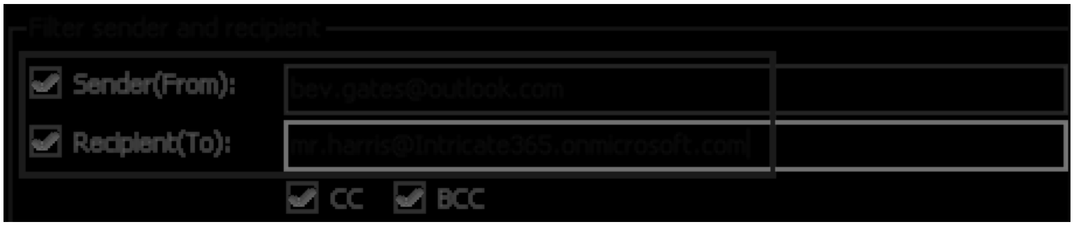
Search in
☑ Subject
☑ Body
☑ Raw HTML
☑ RFC headers
☑ Contacts
☑ Calendars
☑ Attachment file names
☑ Attachments
□ Extracted text data for images (OCR)
Language: English

Filter sender and recipient
□ Sender(From):
□ Recipient(To):
☑ CC ☑ BCC

E-mail Databases tab

15. In the Advanced Search pane, **select** the **Sender (From) checkbox**, then **type** `bev.gates@outlook.com` in the Sender (From) field.

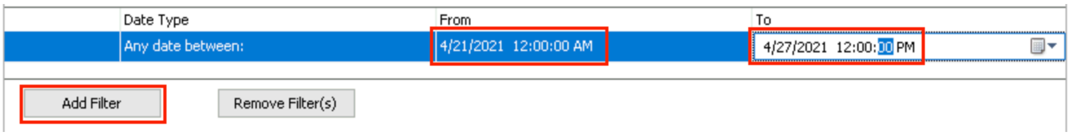
16. In the Advanced Search pane, **select** the **Recipient (To) checkbox**, then **type** `mr.harris@Intricate365.onmicrosoft.com` in the Recipient (To) field.



☑ Sender(From): bev.gates@outlook.com
☑ Recipient(To): mr.harris@Intricate365.onmicrosoft.com
☑ CC ☑ BCC

Sender and Recipient fields

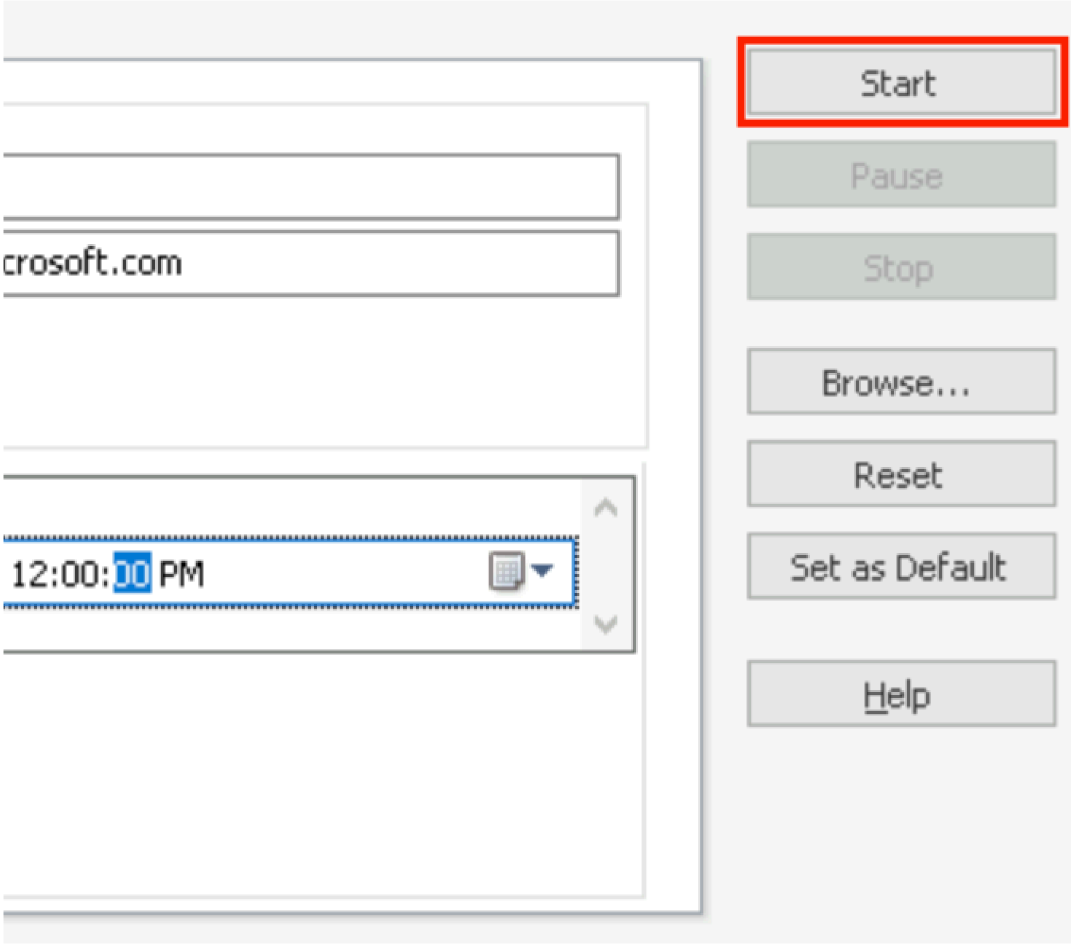
17. In the Advanced Search pane, **click** the **Add Filter button**, then **change** the **From and To fields** to the following dates: `4/26/2021 12:00:00 AM` to `4/27/2021 12:00:00 PM`.



Add Filter

18. **Click** the **Start button** to run the search.

    You may need to scroll to the right to see the Start button.



Start button

19. When prompted, **click OK** to close the Task Status Notification dialog box.

20. In the Search Results area, **double-click** each **search result** to display the email and its location in a new tab.

Note: As you review the search results, you should find several of the same emails that you encountered while reviewing the Graphics category. However, the results on the Advanced Search in the Sent box should also reveal a final email that Beverly sent to Alan, referencing a Big Boss. Although none of this evidence is explicitly incriminating, it should register as suspicious within the broader context of the investigation.

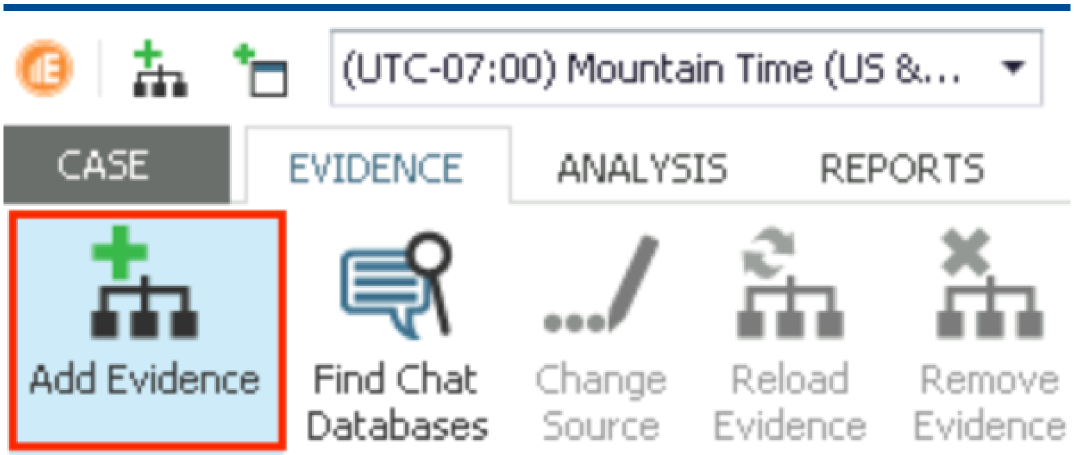
21. **Make a screen capture** showing the **email that references the Big Boss**.

Part 3: Search for Evidence in a Slack Database

Note: In this part of the lab, you will extend your search to a different type of communications-based evidence – chat databases, specifically a Slack database. Slack is used as the primary instant messaging application at Intricate Solutions, which makes it a potential source of evidence in the investigation of Beverly Gates.

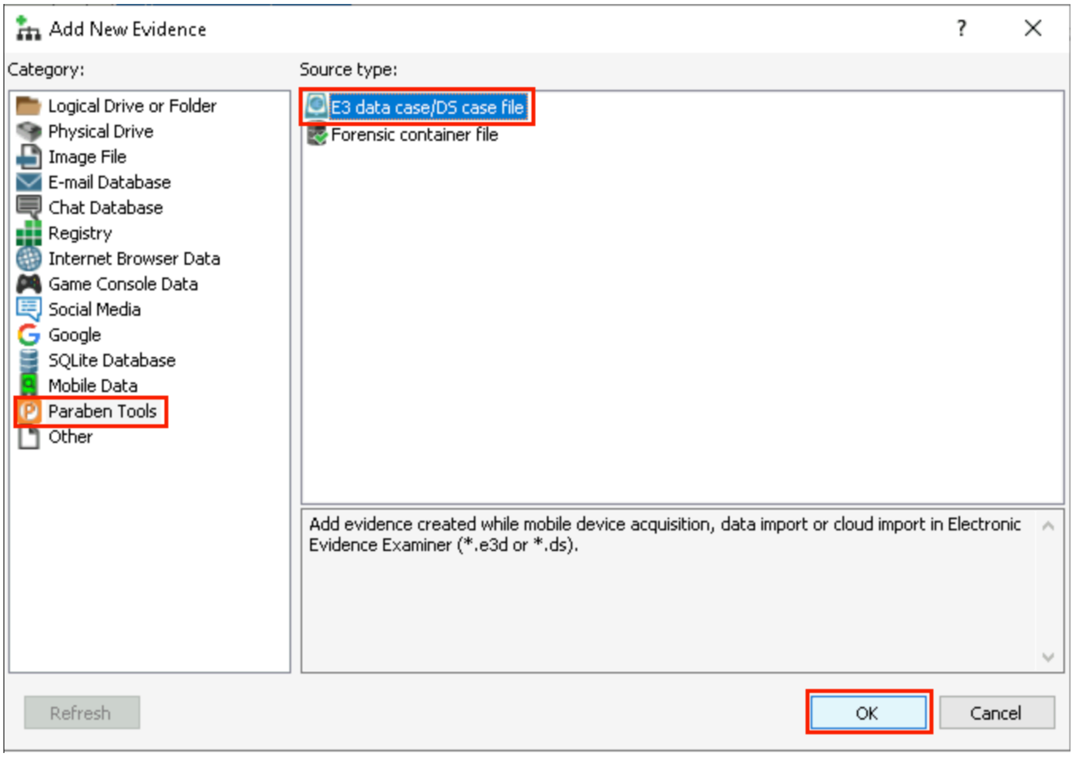
In the next steps, you will import an existing E3 data case that contains a copy of the chat database from Beverly Gates's Slack account.

1. On the E3 toolbar, **click** the **Add Evidence button** to open the Add New Evidence window.



Add Evidence

2. In the Add New Evidence window, **click** the **Paraben Tools category**, then **select** the **E3 data case/DS case file Source type** and **click OK** to continue.



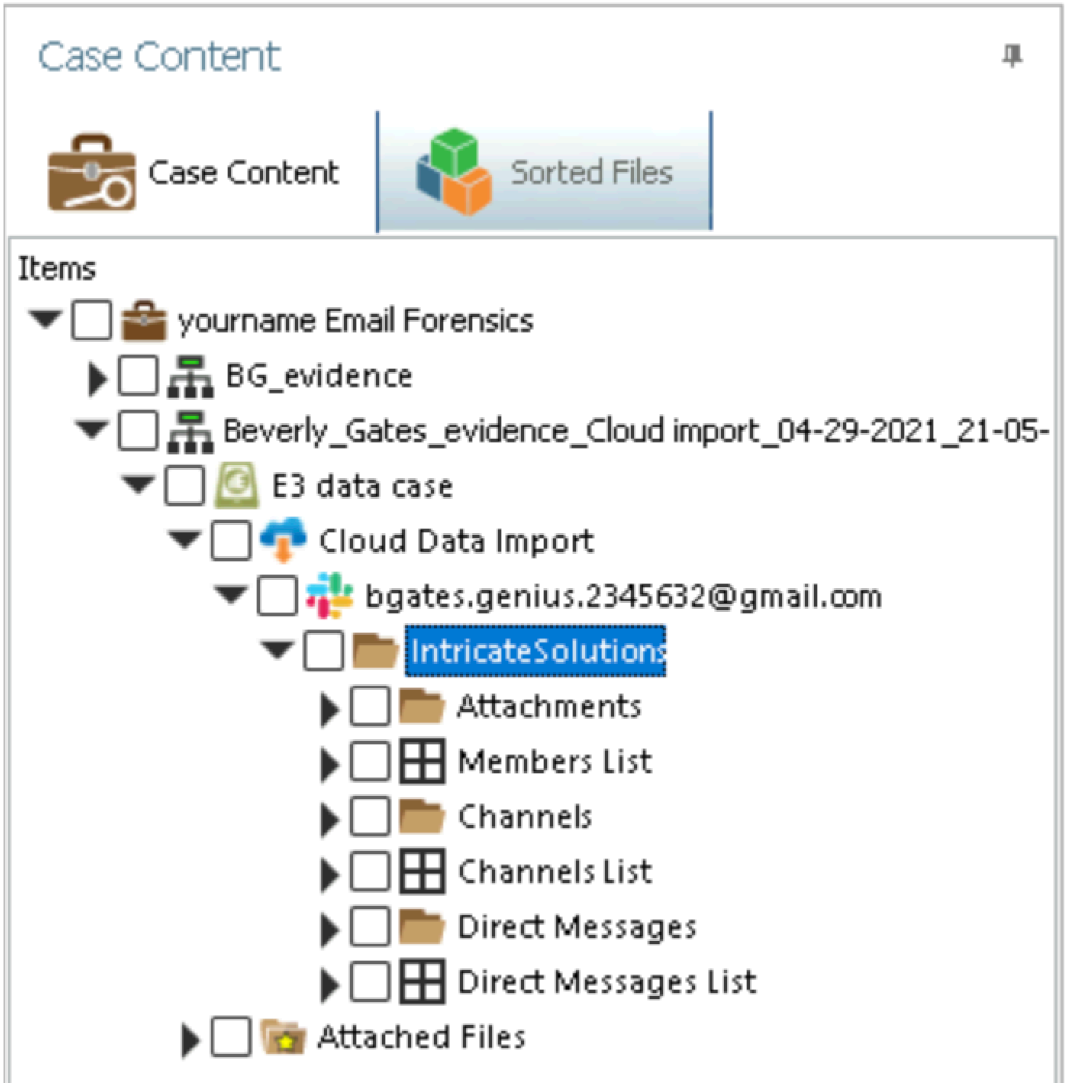
Add evidence created while mobile device acquisition, data import or cloud import in Electronic Evidence Examiner (*.e3d or *.ds).

Add New Evidence

3. In the Open dialog box, **navigate** to **C:\Email Forensics** and **double-click** the **Beverly_Gates_evidence_Cloud import_04-29-2021_21-05-03 file** to open the existing E3 case file with Slack data.

4. When prompted, **click OK** to accept the default name for the evidence and add the data from the existing case file to your current case file.

5. In the Case Content pane, **navigate** to ***yourname*** **Email Forensics / Beverly_Gates_evidence_Cloud import_04-29-2021_21-05-03/ E3 data case / Cloud Data Import / bgates.genius.2345632@gmail.com**, then **expand** the **Intricate Solutions folder** to display the contents of the Slack database.



Case Content

Case Content | Sorted Files

Items

- ☐ yourname Email Forensics
  - ☐ BG_evidence
  - ☐ Beverly_Gates_evidence_Cloud import_04-29-2021_21-05-
    - ☐ E3 data case
      - ☐ Cloud Data Import
        - ☐ bgates.genius.2345632@gmail.com
          - ☐ IntricateSolutions
            - ☐ Attachments
            - ☐ Members List
            - ☐ Channels
            - ☐ Channels List
            - ☐ Direct Messages
            - ☐ Direct Messages List
      - ☐ Attached Files

Slack database

Note: The Slack application allows users to communicate in multiple channels. As a forensic investigator, identifying the users and channels in a Slack database can help guide your investigation. In the next steps, you will document the users and channels associated with Beverly's Slack account – or in other words, the users and channels that Beverly communicated with.

6. In the Case Content pane, **select** the **Members grid node** to display the list of Slack users that Beverly has communicated with in the Data Viewer.

7. **Make a screen capture** showing the **members of the IntricateSolutions workspace**.

8. In the Case Content pane, **select** the **Channels grid node** to display the list of Slack channels in the Data Viewer.

9. **Make a screen capture** showing the **channels in the IntricateSolutions workspace.**

Note: Now that you have determined who Beverly has been communicating with via Slack, you will again use E3's Advanced Search feature to narrow your search and attempt to surface relevant evidence. Suppose senior leadership suspects that Beverly has been using specific code words to covertly discuss her drug trafficking operation, including the term "star dust". In the next steps, you will run a search against the Slack database for any conversations that reference star dust.

10. In the Case Content pane, **right-click** the **bgates.genius.2345632@gmail.com sub-node** and **select Advanced Search** from the context menu to open a new Advanced Search pane in the center console.

11. In the Advanced Search pane, **type** `star AND dust` in the Search What field, then **click** the **Start button** to run a search for both words.

12. When the search is complete, **double-click** the **result** to display the conversation and its location in a new tab.

Note: The only search result should be a conversation between Beverly and Eliot "Just Eliot" in the Main Channel that explicitly references “star dust.” Based on Beverly's strong reaction to Eliot's mention of star dust, the term clearly means something specific to her. She also tells Eliot to "use discord," which implies that there may be more explicitly incriminating evidence to be had elsewhere.

13. **Make a screen capture** showing the **conversation contents**.

14. **Close** the **E3 window**.

Note: This concludes Section 1 of the lab.

Section 2: Applied Learning

Note: SECTION 2 of this lab allows you to apply what you learned in **SECTION 1** with less guidance and different deliverables, as well as some expanded tasks and alternative methods. You will explore new evidence in different email clients and chat applications.

Part 1: Import a Thunderbird Email Database

Note: In this part of the lab, you will continue your investigation into Beverly Gates using a Thunderbird database. Mozilla Thunderbird is a free, open-source email client. Using one account, users can manage multiple email addresses and support multiple identities. By analyzing Beverly Gates Thunderbird account, you may be able to uncover other identities that she is using in her drug trafficking operation.

In the next steps, you will import the Thunderbird database to your E3 case file.

1. From the vWorkstation desktop, **launch** the **E3 application**.

2. From the Welcome screen, **open** the ***yourname*** **Email Forensics case file** that you created in Section 1.

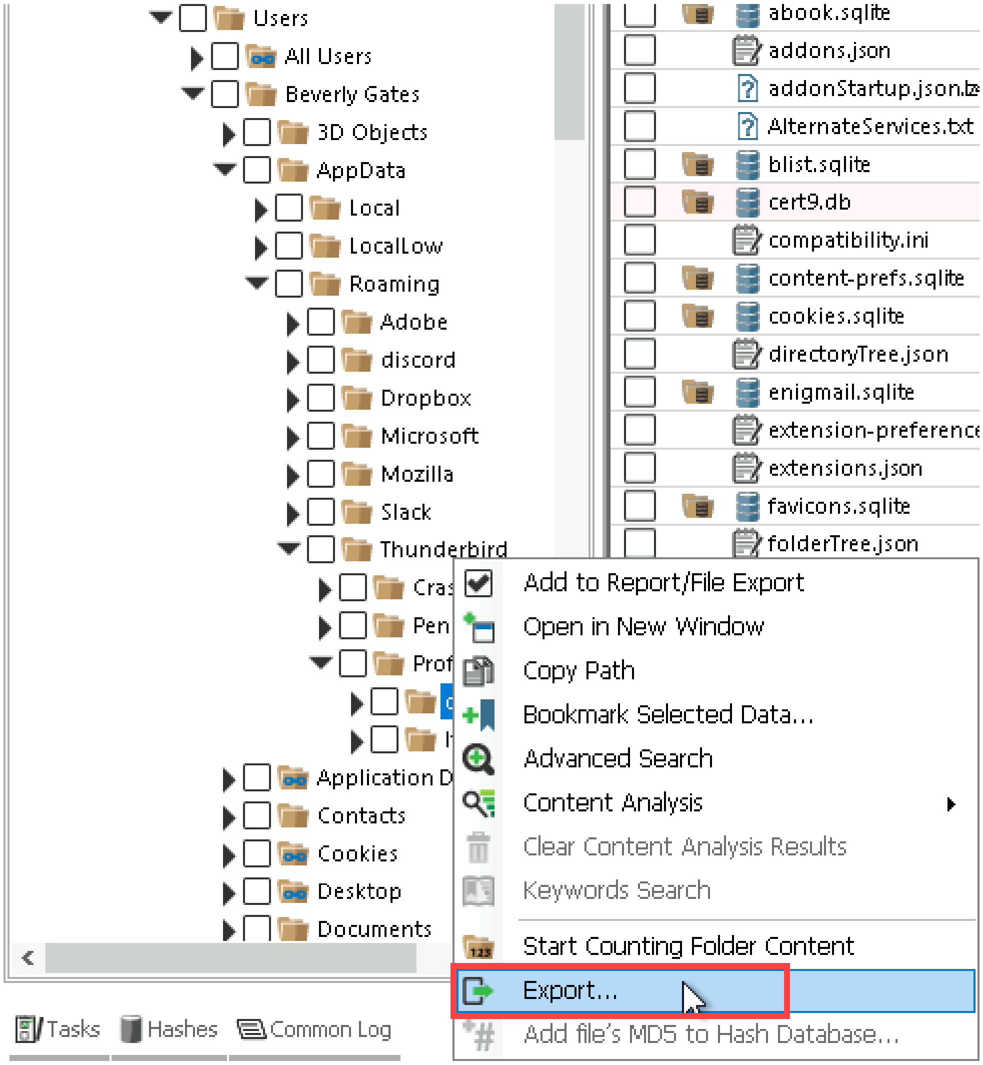
3. In the Case Content pane, **navigate** to **BG_evidence / NTFS**, then **expand** the **Data Triage node** and **select** the **E-mail Databases category** to display its contents in the Data Viewer pane.

4. In the Data Viewer pane, **open** the **dfb7v5vd.default-release database**.

Note: At this point, you will be prompted with a message stating that because this is a Thunderbird email database, it will need to be exported from the drive image, and then reimported as an email database. In the next steps, you will do exactly that.

5. In the Data Viewer pane, **right-click** the **Thunderbird database (dfb7v5vd.default-release)** and **select Go to Source** to locate the database within the filesystem.

6. In the Case Content pane, **right-click** the **dfb7v5vd.default-release folder** and **select Export** from the context menu to open the Export Options window.

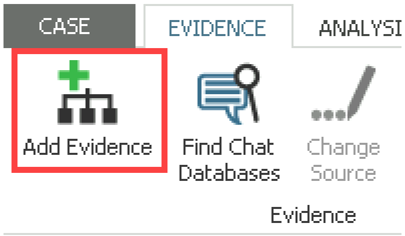


Export

7. In the Export Options window, **click** the **Export button** to save the Thunderbird database to the E3 case folder.

8. When prompted, **close** the **Task Status Notification dialog box**.

9. Once the database is exported, **click** the **Add Evidence button** to open the Add Evidence window.



Add Evidence

10. In the Add New Evidence window, **select** the **E-mail Database category**, then **select** the **Thunderbird database source type**.

Note: In this database, the emails are stored in separate folders. Specifically, Inbox emails are available in the imap.gmail.com folder, whereas the Sent, Deleted and Outbox emails are in the Local Folders folder. You need to add both folders to the case, then analyze the whole Thunderbird database.

11. In the Folder selection window, **click Browse** and **navigate** to **C:\Users\Administrator\Documents\E3 Cases\yourname Email Forensics\dfb7v5vd.default-release\ImapMail\imap.gmail.com**, then **click Open** and **OK** to continue.

12. When prompted, **click OK** to accept the default evidence name.

13. **Repeat steps 9-12** to import **dfb7v5vd.default-release\Mail\Local Folders.**

14. In the Case Content pane, **navigate** to **imap.gmail / Thunderbird / image.gmail.com / INBOX** to display the contents of the Inbox in the Data Viewer pane.

15. **Make a screen capture** showing the **Thunderbird Inbox**.

15. In the Data Viewer, **open** the email with the **subject: Well, well, well** in the E-mail Data pane.

16. In the E-mail Data pane, **open** the **RFC Header viewer**.

17. **Document** the sender's email address, mail server name, and mail server IP address in the Well, Well, Well email header.

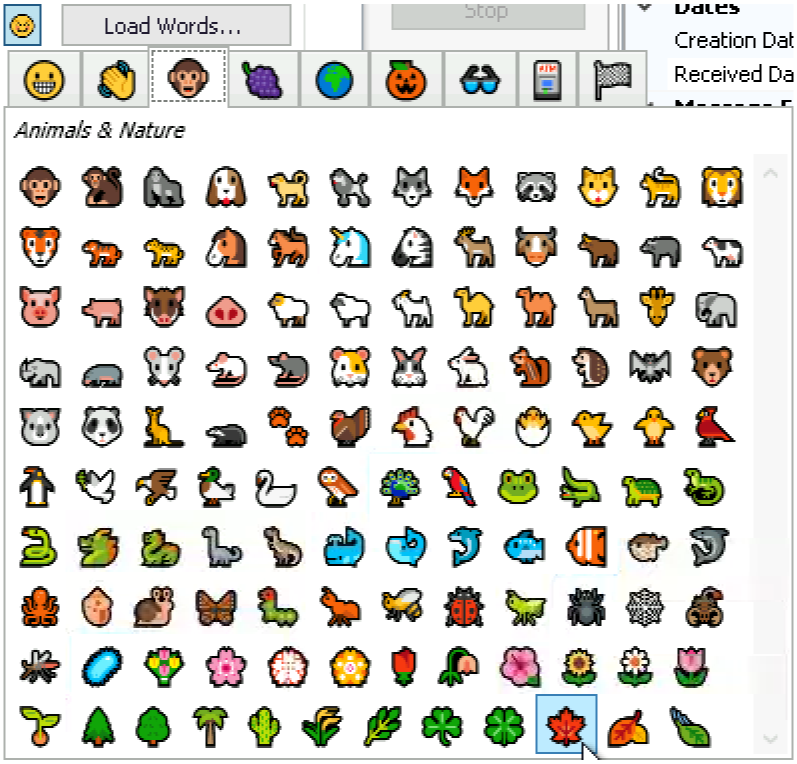
Part 2: Search for Evidence in a Thunderbird Database

Note: According to senior management, Beverly Gates is suspected of using emojis as code for drugs. Fortunately, E3's Advanced Search functionality allows users to use emojis as search terms.

In the next steps, you will search for emails containing specific emojis within the Thunderbird database.

1. In the Case Content pane, **right-click** the **INBOX folder** and **select Advanced Search** from the context menu to open an Advanced Search pane within the center console.

2. In the Advanced Search pane, **click** the **Emoji Picker button**, then **select** the **maple leaf** on the Animals and Nature tab as your search criteria.



Emoji Picker

Note: As a means of communication, many emojis have transcended the objects that they literally represent to take on a much broader and ever-evolving web of alternative meanings. This ambiguity also makes them an ideal means of communicating about illicit activities. For example, the maple leaf is a common symbol for drugs, given its passing resemblance to a marijuana leaf.

3. In the Advanced Search pane, **click** the **Start button** to start the searching process.

4. When the search is complete, **review** the results.

Note: Your search has identified an email sent by one Leo Deforest, who appears to be requesting different types of drugs, represented as emojis. You now have the name of a likely buyer and potential witness.

5. **Make a screen capture** showing the **email from Leo Deforest**.

Note: In the next steps, you will use E3's Keyword Search feature to search for additional evidence of drug trafficking. According to senior management, Beverly Gates is suspected of selling a variety of pills and powders, so you will use "pills" as your next search term. To expand you search beyond the text in Beverly's emails, you will use E3’s Content Analyzer to extract text from image files and save the text as indexed keywords. When you run your Keyword Search, E3 will include any graphics files that contain the search term in the results.

6. In the Case Content pane, **right-click** the **Local Folders evidence node** and **select Content Analysis > Index Keywords in Images (OCR)** to open the Content Analysis Wizard.

7. In the Content Analysis Wizard, **confirm** the **Extract and index text from graphic files (OCR) checkbox** is selected, then **click Finish** to index the keywords identified in any graphics files found within the Local Folders database.

8. When the indexing process is complete, **right-click** the **Local Folders node** and **select Keywords Search** to perform a search using the indexed keywords.

9. In the Keywords Search pane, **type** **`pills`** in the Search what field, then **click Start** to run the search.

10. When the search is complete, **review** the results.

    You will need to use the File View in the Viewers pane to display the contents of any image files returned in the results.

Note: Your search should return one result - a PNG file that contains the word *pills*. The email itself does not contain any reference to pills, which means that this evidence would have eluded your grasp without the keyword index that you generated with the Content Analyzer.

By now, you should have also noticed that the email account associated with the Thunderbird database is redwitch321@gmail.com and that Beverly has signed many of these emails as Natasha "Red" Maximoff. As you may recall, senior leadership at Intricate Solutions has suggested that Beverly might have connections to the Russian mafia. Is it possible that Beverly is not her real name? Or is Natasha "Red" Maximoff the alias? Either way, you now have additional evidence that makes explicit references to drug sales.

11. **Make a screen capture** showing the **pills evidence and Beverly Gates corresponding as Natasha "Red" Maximoff**.

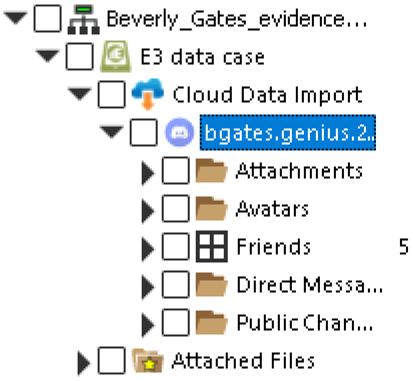
Part 3: Search for Evidence in a Discord Database

Note: Discord is a free chat service that is accessible from mobile devices and computers. Discord allows users to talk to friends and strangers using chat, voice, or video. It was initially created as a way for people to communicate while playing video games, but its popularity has since exploded, opening it up to millions of users. In Section 1, you discovered evidence where Beverly made reference to using Discord. The security team at Intricate Solutions has since confirmed that Discord was installed on Beverly Gates's company laptop, which means it may have been used as part of her criminal activity.

In the next steps, you will add a copy of Beverly's Discord database to E3 and perform an advanced search in the chat database.

1. **Add** the **Beverly_Gates_evidence_Cloud import_04-29-2021_20-55-03** file as new evidence using the E3 data case/DS case file source type.

2. In the Case Content pane, **expand** the **bgates.genius.2345632@gmail.com (Beverly_G_2345632) account** to view the structure of the Discord database.



Discord cloud data import

3. **Open** the **Friends grid node** and **review** the **contents**.

4. **Make a screen capture** showing **Beverly's Discord friend list**.

5. In the Case Content pane, **right-click** the **Direct Messages folder** and **select Advanced Search**.

6. In the Advanced Search pane, **open** the **Emoji Picker** and **select** the following emojis for the search, then **click Start** to launch the search process: **pill**, **wine glass**, and **cocktail glass**.

   You will need to separate each emoji with the word OR.

7. **Review** the search results

Note: The search should return multiple hits in conversation between Beverly and one Lena Goodwin. Within the conversation, Lena requests pills using the pill emoji, to which Beverly replies with a reference to Mrs. M – presumably the Mrs. Maximoff that Beverly goes by in her other email account.

8. **Make a screen capture** showing the **Lena Goodwin conversation**.

Note: This concludes Section 2 of the lab.

Section 3: Challenge and Analysis

Note: The following exercises are provided to allow independent, unguided work using the skills you learned earlier in this lab - similar to what you would encounter in a real-world situation.

Part 1: Search for Additional Email Evidence

At this point in your investigation, you have identified multiple email and chat communications between Beverly Gates and likely customers discussing the sale and distribution of illegal drugs. In Section 2, while investigating her secondary email database, you learned that Beverly has been selling pills and using emojis to communicate about her drug sales. In this part of the lab, you will return to Beverly's original Outlook account and run a similar search.

Using the Advanced Search feature on the Outlook database, run a search for messages containing the pill emoji.

Make a screen capture showing the **email thread returned in the search results**.

Part 2: Search for Additional Chat Evidence

In Section 2 of the lab, you identified a conversation between Beverly and Lena Goodwin in a Discord chat database that Beverly was apparently using as the preferred means of discussing drug sales. However, your review of the Discord database was limited to the results of the emoji search, and you wonder if there might be additional evidence that you could identify by manually reviewing some of the other chat logs.

Using E3, explore the other conversations in the Discord data to identify another conversation related to drug trafficking.

Make a screen capture showing the **additional evidence within the Discord database**

Note: This concludes Section 3 of the lab.