Digital Forensic and Investigation:

Digital Corpora 2019 Narcos Case Solution

Solved by:

Khubab Ahmed and Muhammad Saim

Table of Contents

1. Executive Summary

1.1 Story

The operation began with intelligence from the Australian government, which flagged two passengers, Jane Esteban and John Fredricksen, as potential suspects involved in illegal activities. Upon their arrival in Wellington, New Zealand, from Brisbane, Australia, customs officials intercepted the two individuals. A thorough search of their luggage revealed clothing, toiletries, a Windows laptop, and one kilogram of methamphetamine hidden in the lining of Jane Esteban's suitcase. Both suspects were immediately taken into custody and interrogated separately.

During interrogation, John Fredricksen refused to cooperate, providing no information or answers. In contrast, Jane Esteban admitted that she was instructed by John to deliver the suitcase to the Eastbourne library. If that plan failed, she was to deliver it to 666 Rewera Avenue, Petone. Acting on this lead, customs and police officers raided the Rewera Avenue address, where they discovered additional drugs, firearms, and a desktop computer. However, no individuals were present at the time of the raid.

1.2 Our Task

As a customs forensic investigators, We have the task of conducting a forensic examination of the digital devices recovered during the operation. These devices include laptops and memory dumps belonging to John Fredricksen, Jane Esteban, and an unknown suspect. The objective is to uncover the suspects' motives, goals, and objectives through a thorough analysis of the digital evidence.

1.3 Tools Usage

To carry out the forensic investigation, the following tools will be utilized:

FTK Imager: This tool will be used to create forensic copies of the digital images provided. Creating a copy is essential to ensure that the original evidence remains unaltered during the investigation, preserving the integrity of the evidence for future use in court.

Autopsy: This digital forensics tool will be employed to analyze the forensic images. Autopsy is instrumental in extracting data artifacts from the system, differentiating between relevant and irrelevant data, and identifying potential evidence that could link the suspects to illegal activities.

Registry Viewer: This tool will be used to examine the system's registry values. The registry is a critical area for investigation as it is often exploited in malware attacks and may contain crucial evidence related to the suspects' activities.

1.3 Evidence collection

The handling and collection of evidence is one of the most crucial components of the rapidly developing science of computer forensics. It is necessary to make use of digital forensic tools to gather the evidence, as they will be of assistance in locating deleted data, tracking image exploitation and steganography, gaining access to encrypted files, and gathering more evidence.

In the given scenario no hint is provide to a hidden files or data but since it's a common practice with criminal with knowledge of the data hiding on compute e.g. steganography, we would make use of autopsy in uncovering these files and data.

Then after gathering this evidence, we would separate the evidence which would lead to the suspects being guilty or their innocence proven. This evidence will also be documented as it is a crucial part of investigation and losing it can be a big blow to the case.

Depending upon the evidence clarity it would be moved forward to other organizations for further confirmation of the evidence, or a verdict would be given in court to close the case indefinitely.

2. Methodology

2.1 Evidence Verification:

From the evidence provided after calculating it hasshes to come over that the provided evidence is verified and correct.

Drive Images:

Actor	File Name	Provided MD5	Calculated MD5
Steve Kowhai	Narcos-1a.001-021	c63a3d19e9c9495b573f45be544e50f9	c63a3d19e9c9495b573f45be544e50f9
Jane Estaban	Narcos-3a.001-021	6265dbaa16a354daddba311334484660	6265dbaa16a354daddba311334484660
John Fredricksen	Narcos-2a.001-021	B66ca567bec6b0a195b99c57dfa0919f	B66ca567bec6b0a195b99c57dfa0919f

Memory Images:

Actor	File Name	Provided MD5	Calculated MD5
Steve Kowhai	Narcos-1a.001-021	9ca08c17b4a359d61f6f8f7bb6328c1c	9ca08c17b4a359d61f6f8f7bb6328c1c
Jane Estaban	Narcos-3a.001-021	0f7e7be4d2844457e2111eaffa1e77ec	0f7e7be4d2844457e2111eaffa1e77ec
John Fredricksen	Narcos-2a.001-021	8e8a3a91eb89fe6c3cd10231f13141fe	8e8a3a91eb89fe6c3cd10231f13141fe

2.1.1 Method to verify evidence

Below are the steps taken to verify the evidence by matching hashes.

- Open FTK Imager tool.

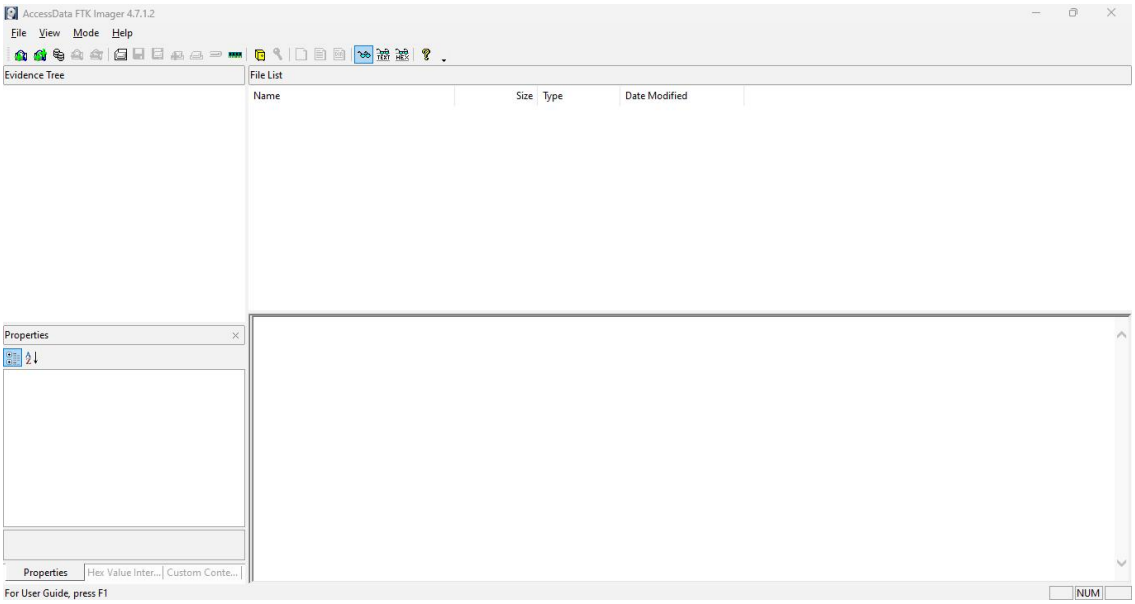


Figure 1 Open FTK Imager tool.

- Add Evidence Item and Select Image file option.

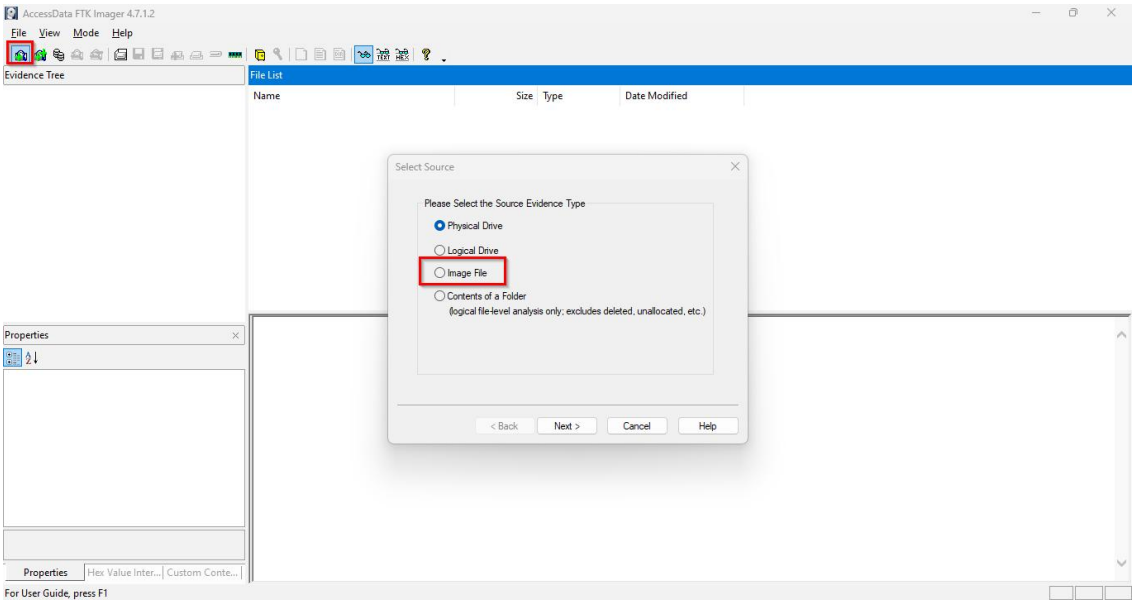


Figure 2 Add Evidence Item and Select Image file option.

- Add an Image file.

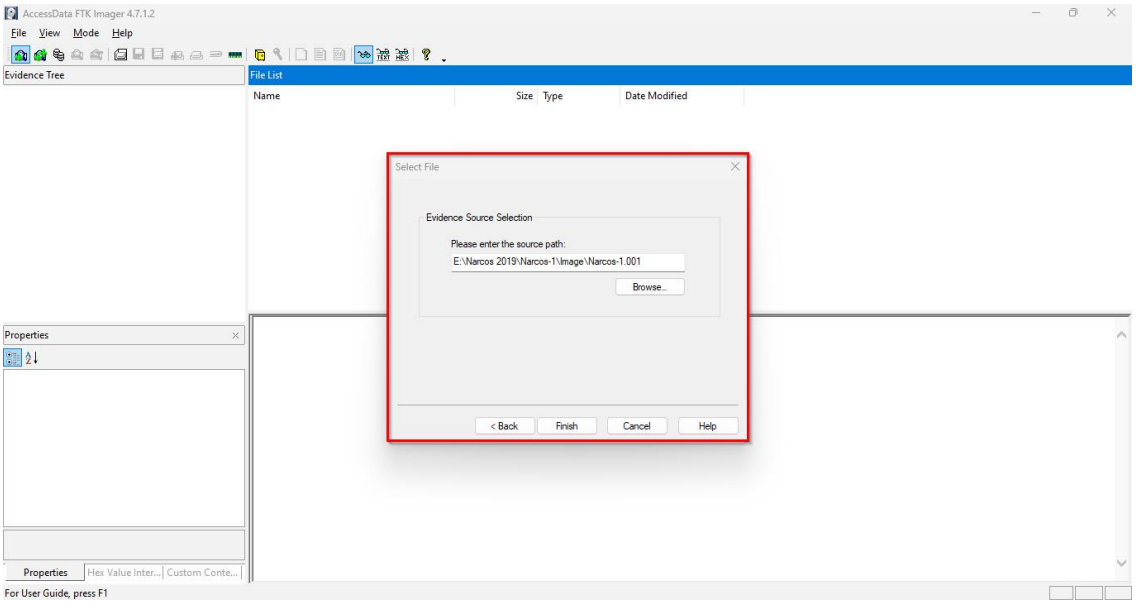


Figure 3 Add an Image file.

- Now right-click on evidence and verify the disk image.

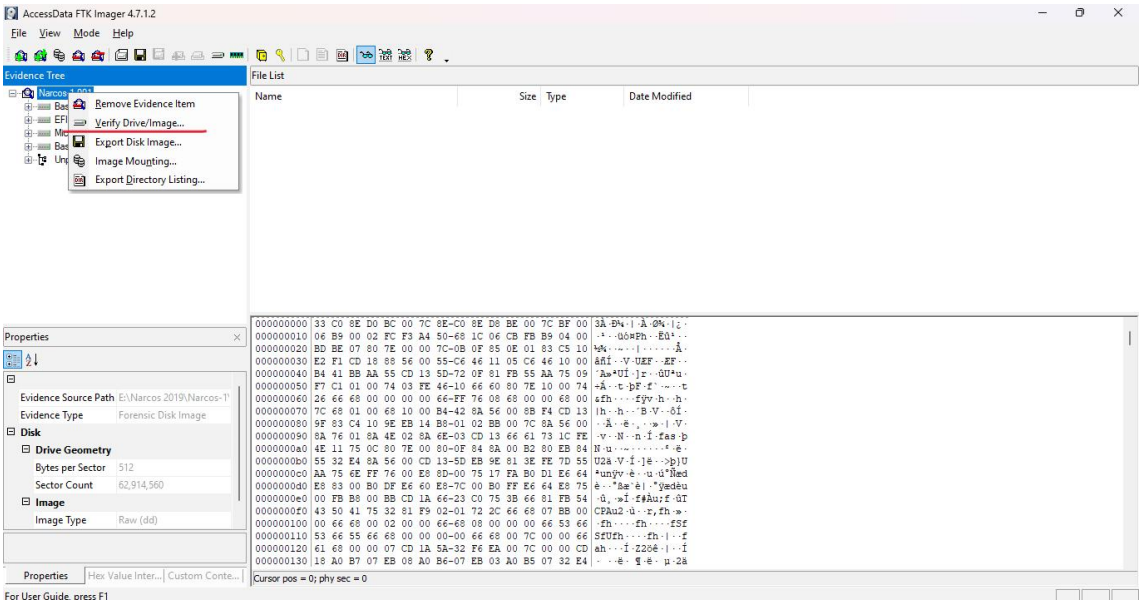


Figure 4 verify the disk image.

- Started verifying the Image.

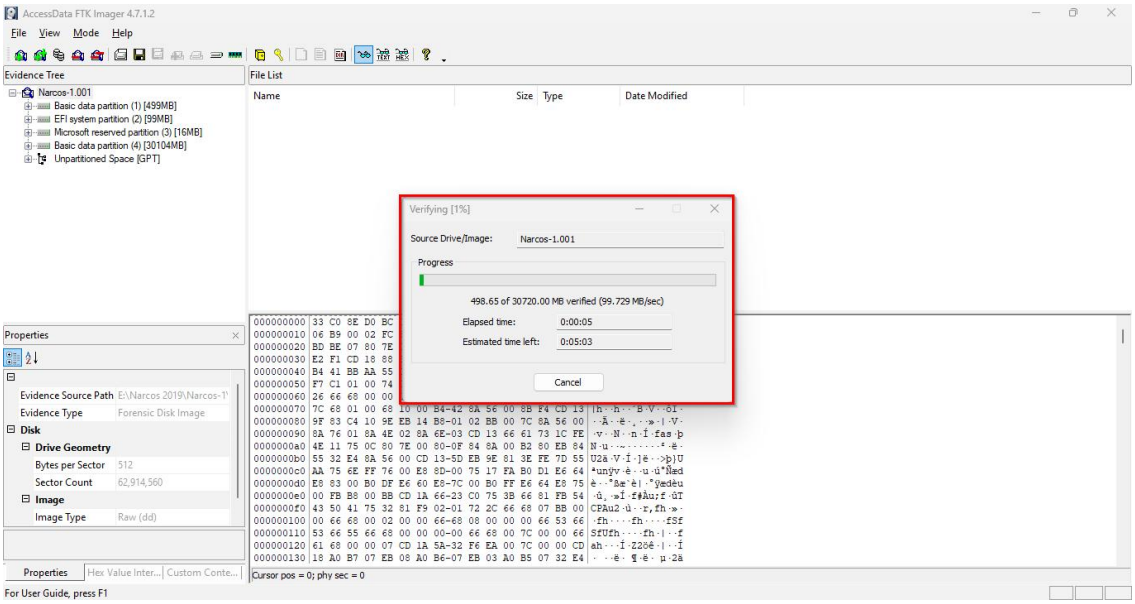


Figure 5 verifying the Image.

- Verification done and hashes is calculated.

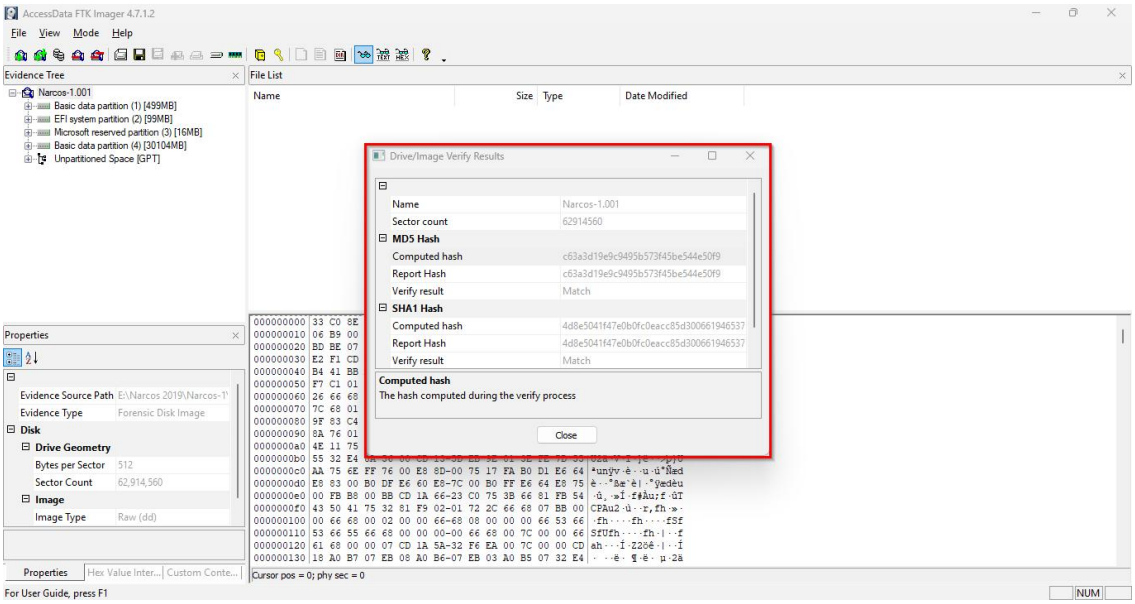


Figure 6 Verification done and hashes is calculated.

2.1 Case Preservation

Firstly, we match the MD5 hash of the image provided this is done to ensure that correct image has been received by the investigator and that the image hasn't gone through some change during movement.

Now, before starting the working on the image we would use the tool FTK imager to create a copy image of the original image. This is done to ensure that the original image doesn't go through some permanent change, or the original image doesn't suffer from some changes during the working. As this would degrade the credibility of the discovered evidence moving forward with the case. All the working moving forward for this case is done upon this copy image.

Next, the hash of that copy image is also compared to ensure that the image hasn't gone through some changes.

Drive Images:

Actor	File Name	Provided MD5	Calculated MD5
Steve Kowhai	Narcos-1a.001-021	c63a3d19e9c9495b573f45be544e50f9	c63a3d19e9c9495b573f45be544e50f9
Jane Esteban	Narcos-3a.001-021	6265dbaa16a354daddba311334484660	6265dbaa16a354daddba311334484660
John Fredricksen	Narcos-2a.001-021	B66ca567bec6b0a195b99c57dfa0919f	B66ca567bec6b0a195b99c57dfa0919f

Memory Images:

Actor	File Name	Provided MD5	Calculated MD5
Steve Kowhai	Narcos-1a.001-021	9ca08c17b4a359d61f6f8f7bb6328c1c	9ca08c17b4a359d61f6f8f7bb6328c1c
Jane Esteban	Narcos-3a.001-021	0f7e7be4d2844457e2111eaffa1e77ec	0f7e7be4d2844457e2111eaffa1e77ec
John Fredricksen	Narcos-2a.001-021	8e8a3a91eb89fe6c3cd10231f13141fe	8e8a3a91eb89fe6c3cd10231f13141fe

2.1.1 Method to preserve evidence

To preserve the evidence, I used FTK imager tool to make a copy of the original image file.

- Open FTK Imager tool.

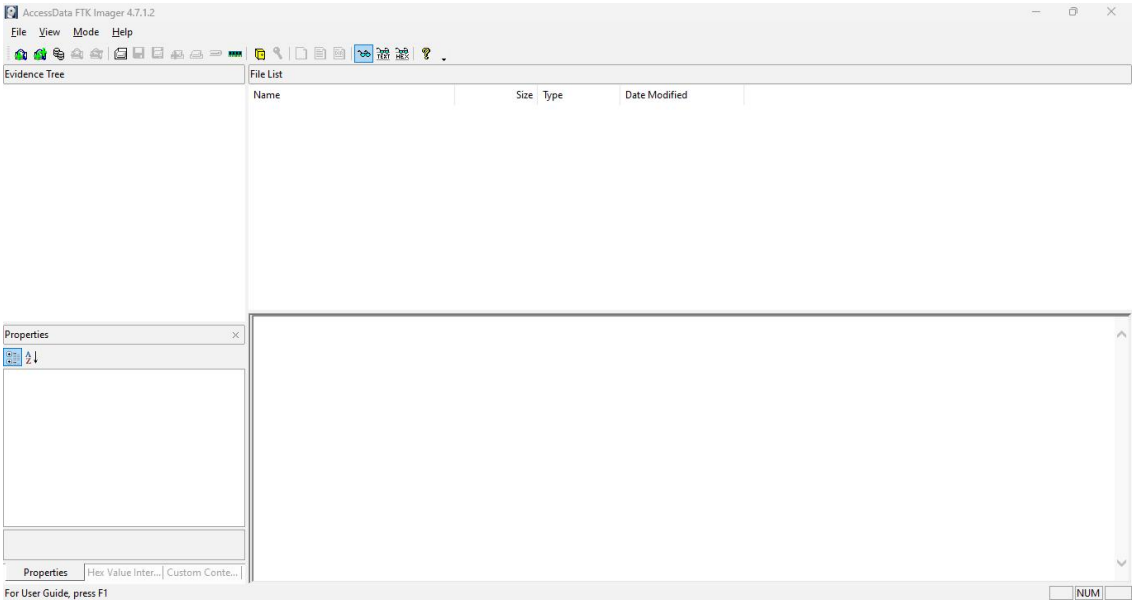


Figure 7 FTK Imager tool

[SPACE INTENTIONALLY LEFT BLANK]

- Go to File --> Create Disk Image

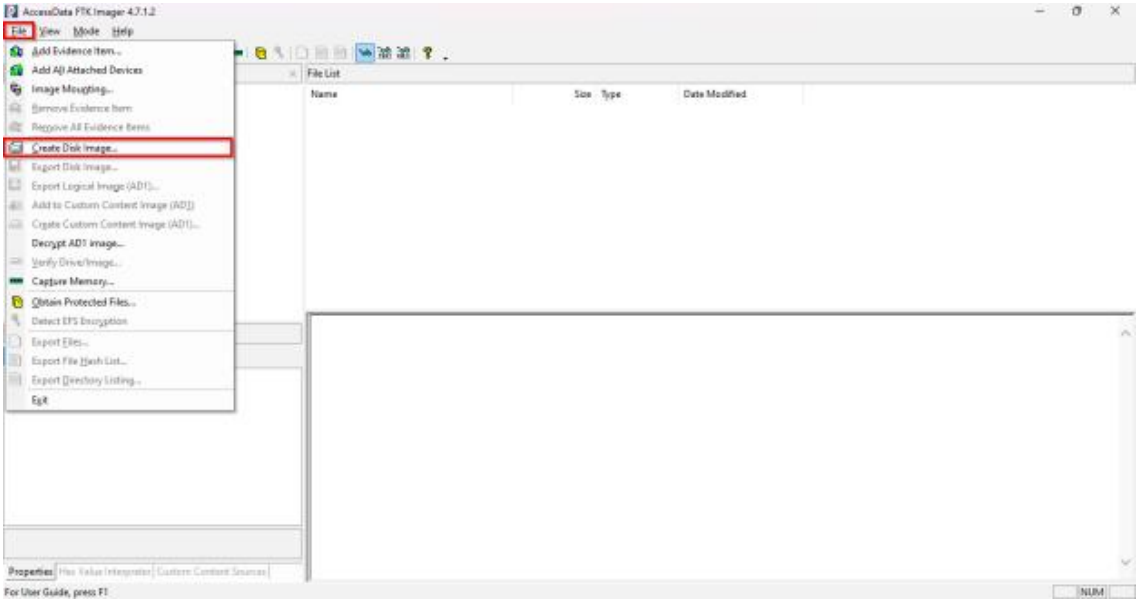


Figure 8 Create Disk Image

- Select Image File option

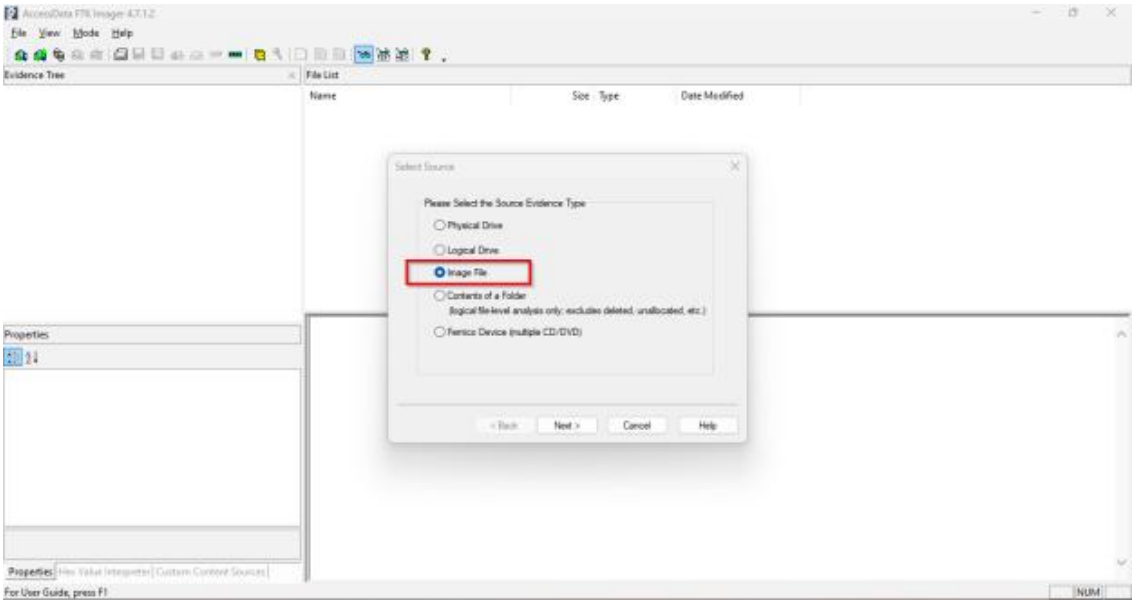


Figure 9 Image File option

- Add the original Image file

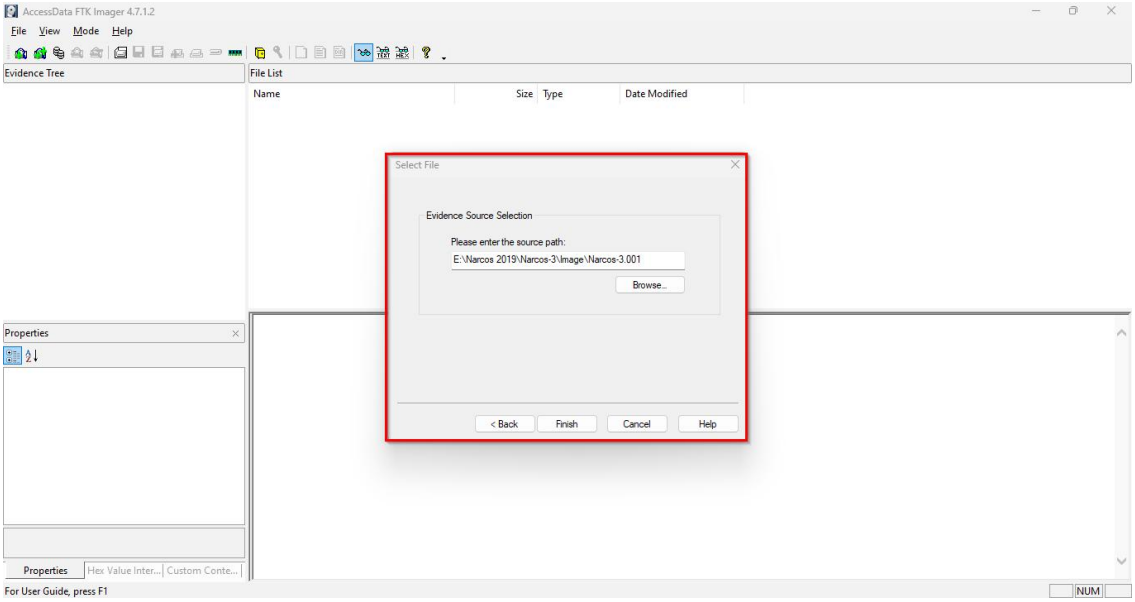


Figure 10 add the original Image file

- Add the important necessary information.

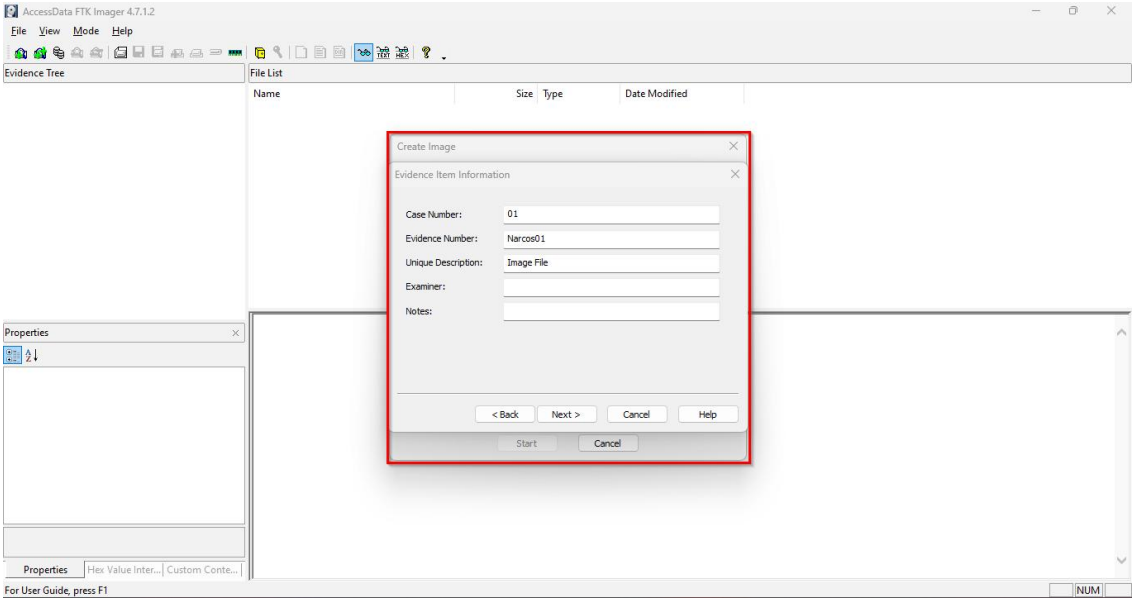


Figure 11 Add the important necessary information.

- Add image destination file

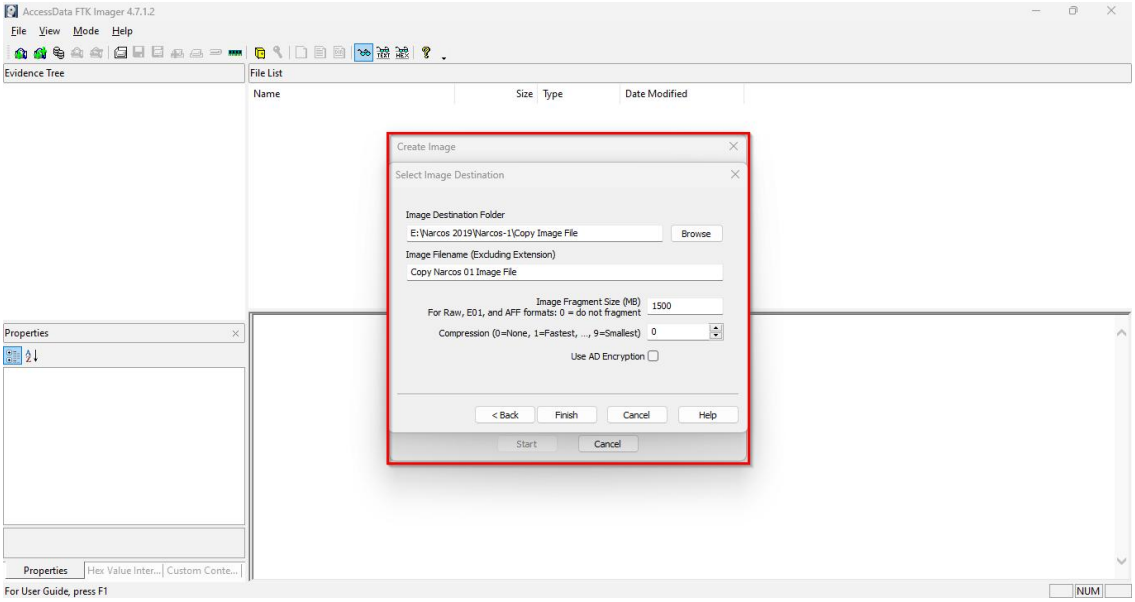


Figure 12 Add image destination file

- Start copying the image.

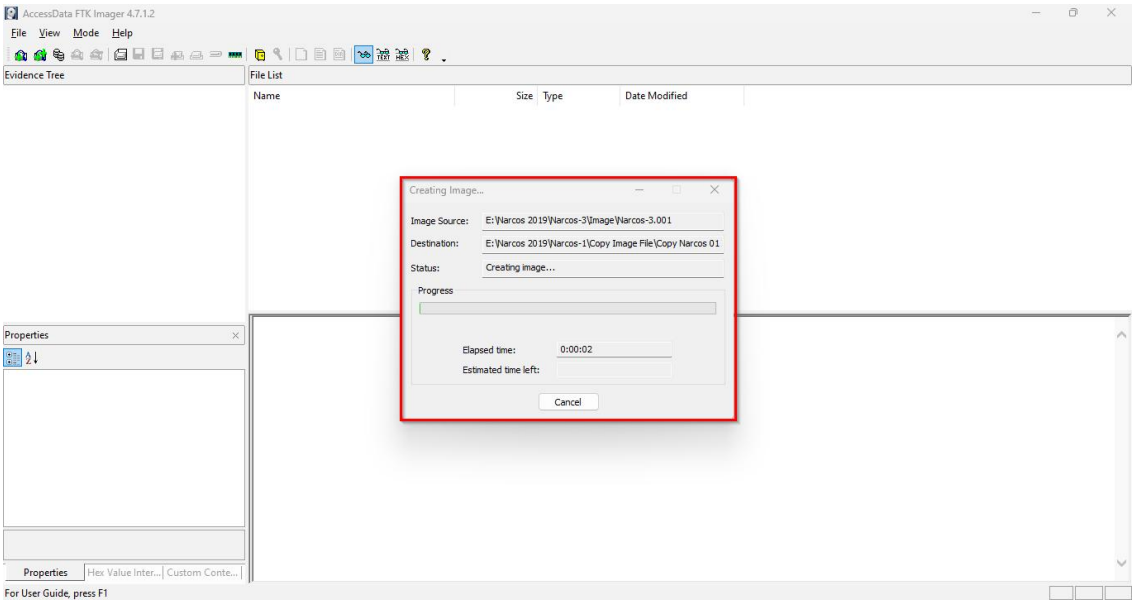


Figure 13 copying the image.

- Copying of the image hash file is done

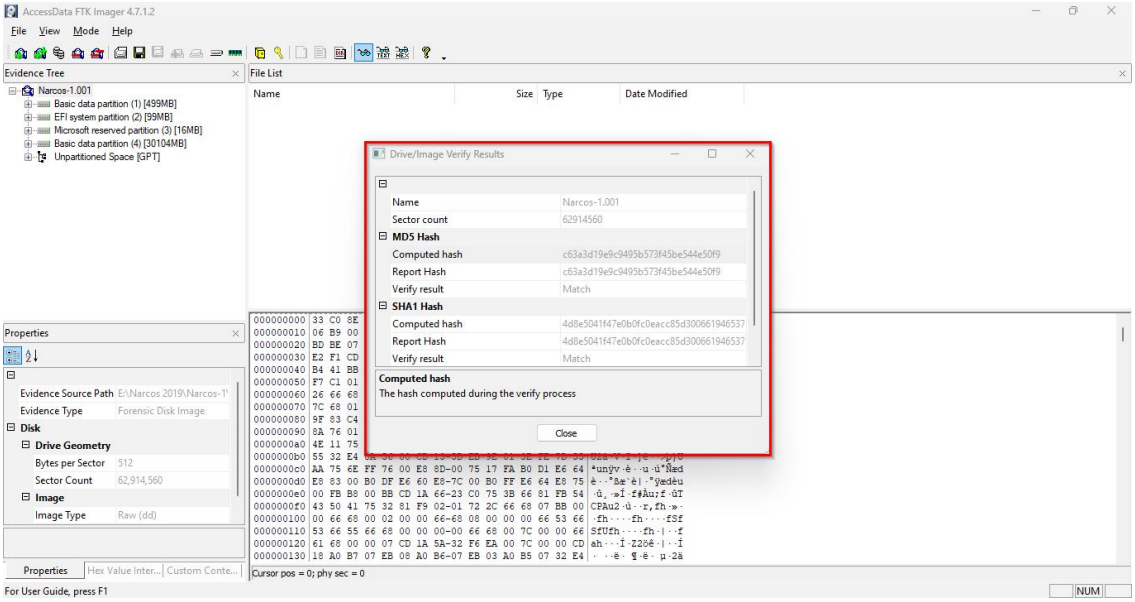


Figure 14 Copying of the image hash file is done

2.2 Case Tools

Moving forward with the case after all the previous work is done of preserving the evidence. We start working on analyzing the evidence for this purpose we utilize 2 tools

1. Autopsy
2. Registry Viewer

We use autopsy for analyzing the images. We used it since its user-friendly interface and extensibility makes it a popular choice among forensic examiners and investigators worldwide used for analyzing disk images, extracting data, and uncovering evidence in various investigative scenarios. As compared to some other tools, namely Magnet AXIOM. Also, this tool is recognized by many countries' courts so there is no issue on the credibility of evidence gathered from Autopsy. There is a personal preference here as well in this case.

Next, I would use FTK imager provided registry file and then use that file in registry viewer. Registry viewer would give us a much better Gui view of the systems registry as compared to tools like RegScanner.

FTK Imager:

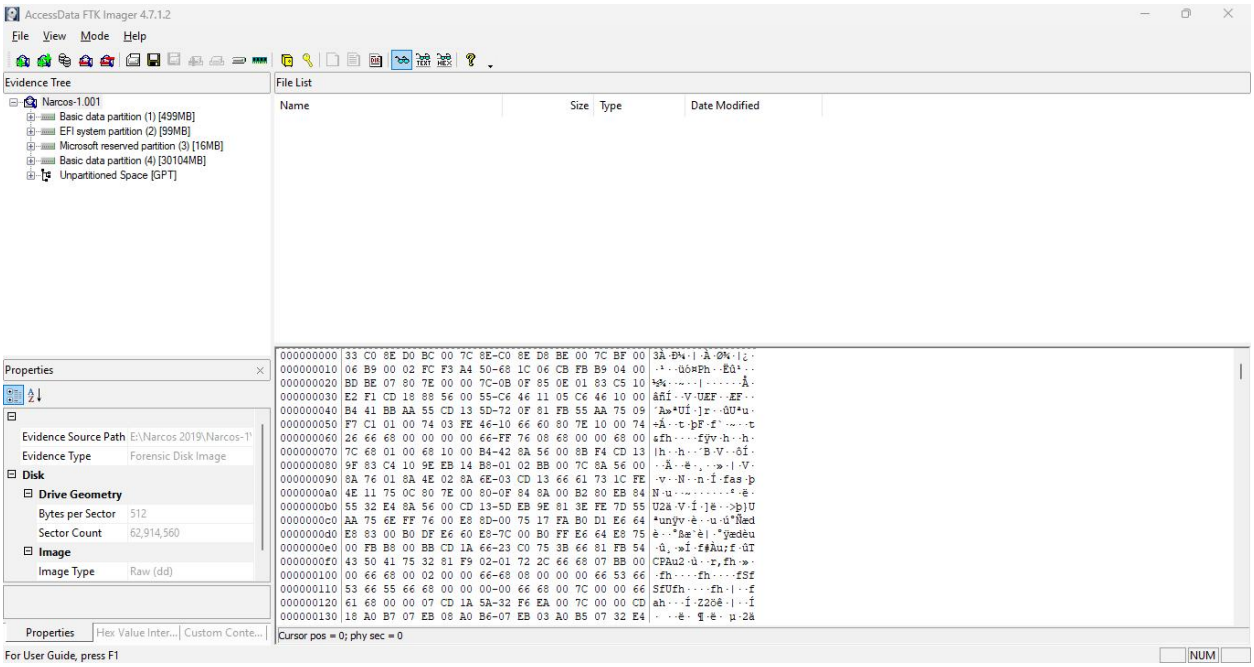


Figure 15 FTK Imager

Autopsy:

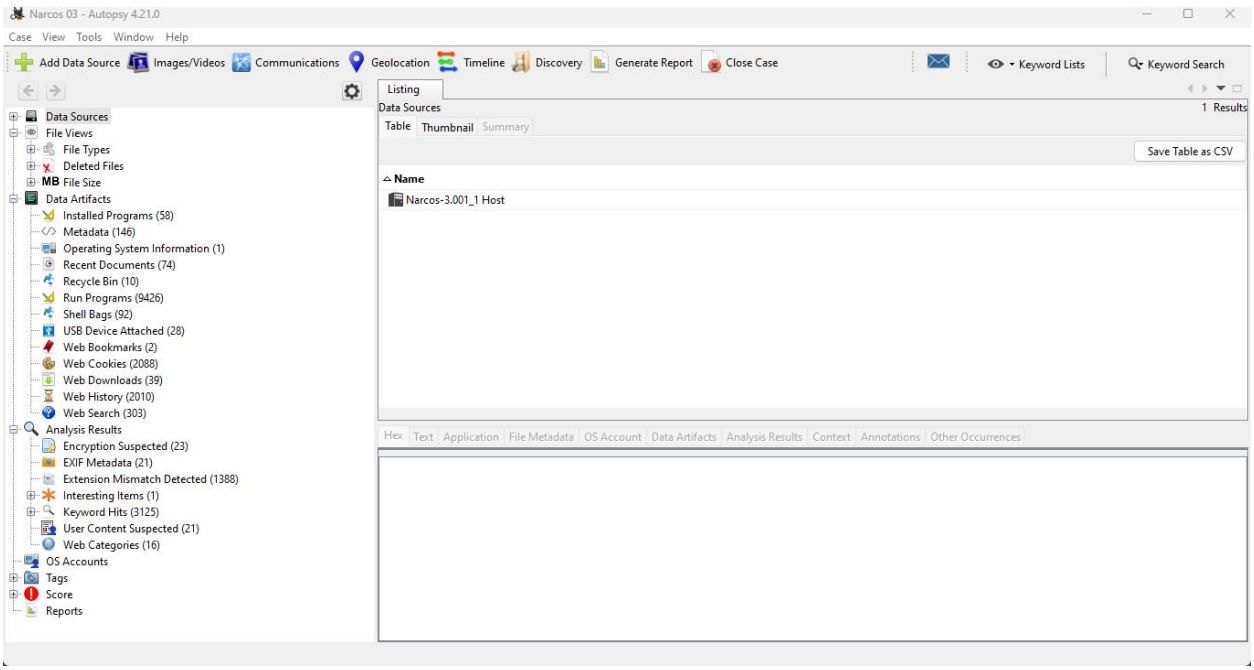


Figure 16 Autopsy

Registry Viewer:

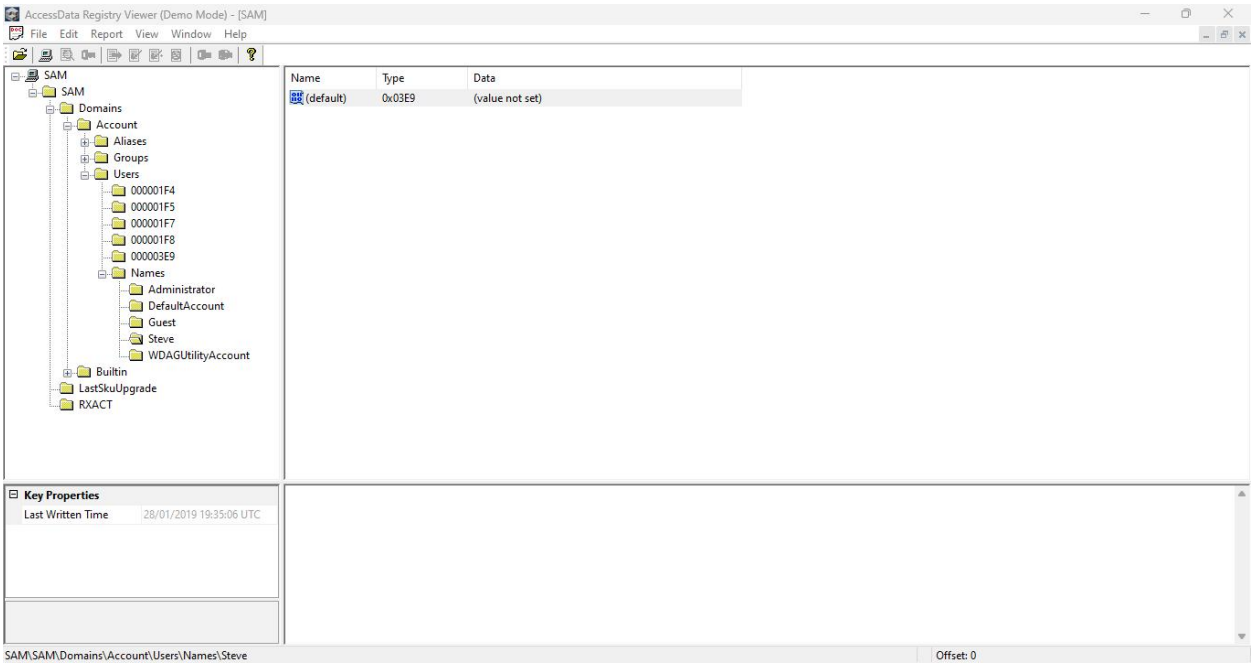


Figure 17 Registry Viewer

2.3 Case Main Suspects

Steve Kowhai: Is New Zealand based drug dealer wanting to find quality products for his drug empire.

Jane Esteban: Jane is an undercover Australian Federal Police (AFP) officer tasked with gathering evidence about a drug ring involving John Fredricksen and his associate Steve Kowhai in New Zealand.

John Fredricksen: John has been asset of Steve Kowhai (NZ dealer) as a smuggler with Jane Esteban as her smuggling partner/ mule.

2.4 Case Artifacts

After all the previous work has been done, we move on to the most important part of the investigation. That is extracting evidence whether the person is guilty or innocent. The data extracted from forensic analysis is known as ‘artifacts’ which in turn is used as evidence.

Normally there are a lot of artifacts present on a system. Some of these are not as usable as evidence may seem. Some help in building timelines of crimes and some are used to uncover the hidden motives or objectives of a person.

In our case we are doing a specific analysis of the system image following all the rules provided above and utilizing all the tools as well. We are trying to gather specific evidence related to the list of suspects provided to us. So mainly we are trying to get some documents, some chats or some emails which can be used to say that the crime this individual is accused of is what he is guilty of as well. This would mainly be done using autopsy and volatility.

Standard information like time zone, system os etc. Isn't relevant as to this report.

[SPACE INTENTIONALLY LEFT BLANK]

3. Finding and Description

3.1 User Account Profiles and Computer Names

These users were found on the systems confiscated from the scene.

Actor	Computer Name	Usernames
Steve Kowhai	SK-DESKTOP	Steve
Jane Esteban	JELAPTOP	JaneE
John Fredricksen	JOHNFLAPTOP1	JohnF

Paths:

For Computer Name:

The computer name can be found in the following registry key:

HKEY_LOCAL_MACHINE - SYSTEM - CurrentControlSet - Control - ComputerName - ComputerName

For Usernames:

The user account profiles are in the following registry key:

HKEY_LOCAL_MACHINE - SOFTWARE - Microsoft - Windows NT -CurrentVersion - ProfileList

Steve Kowhai Computer Name:

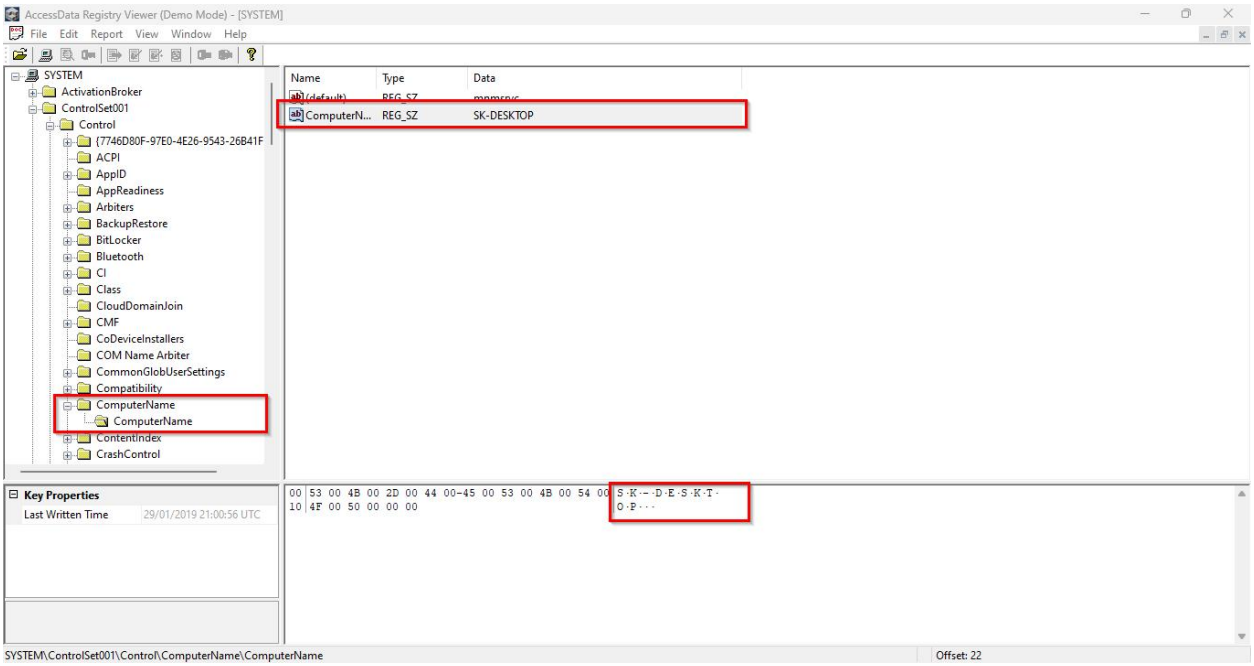


Figure 18 Steve Kowhai Computer Name

Steve Kowhai Username:

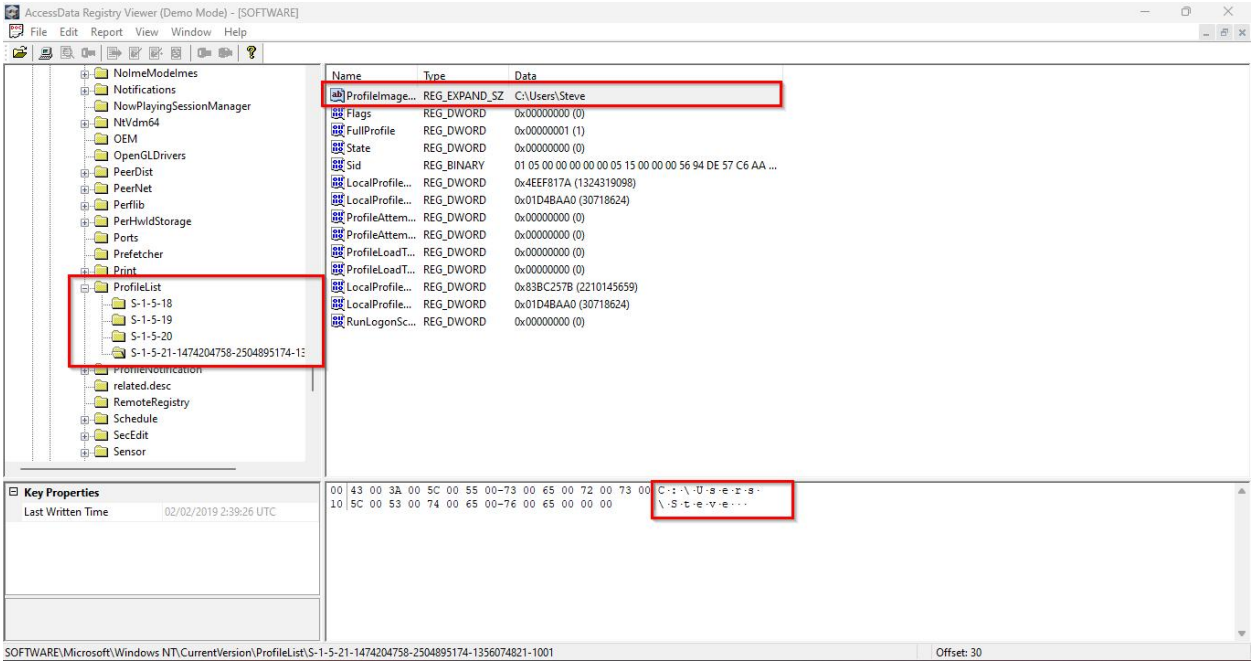


Figure 19 Steve Kowhai Username

John Fredricksen Computer Name:

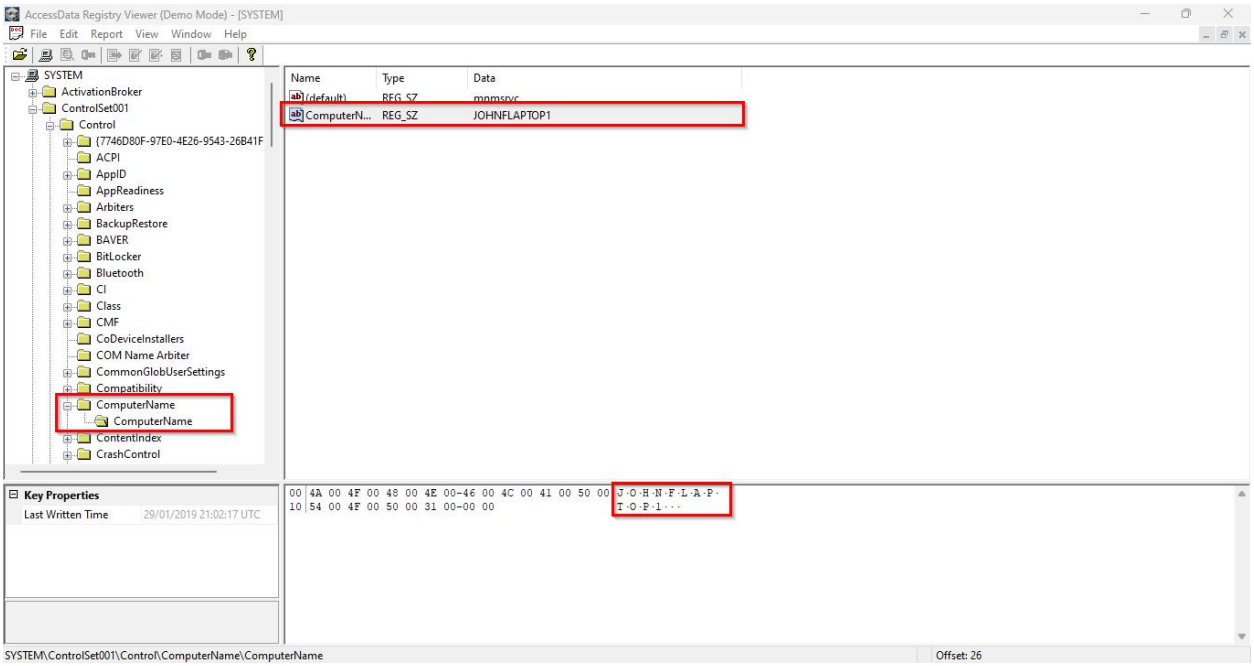


Figure 20 John Fredricksen Computer Name

John Fredricksen Username:

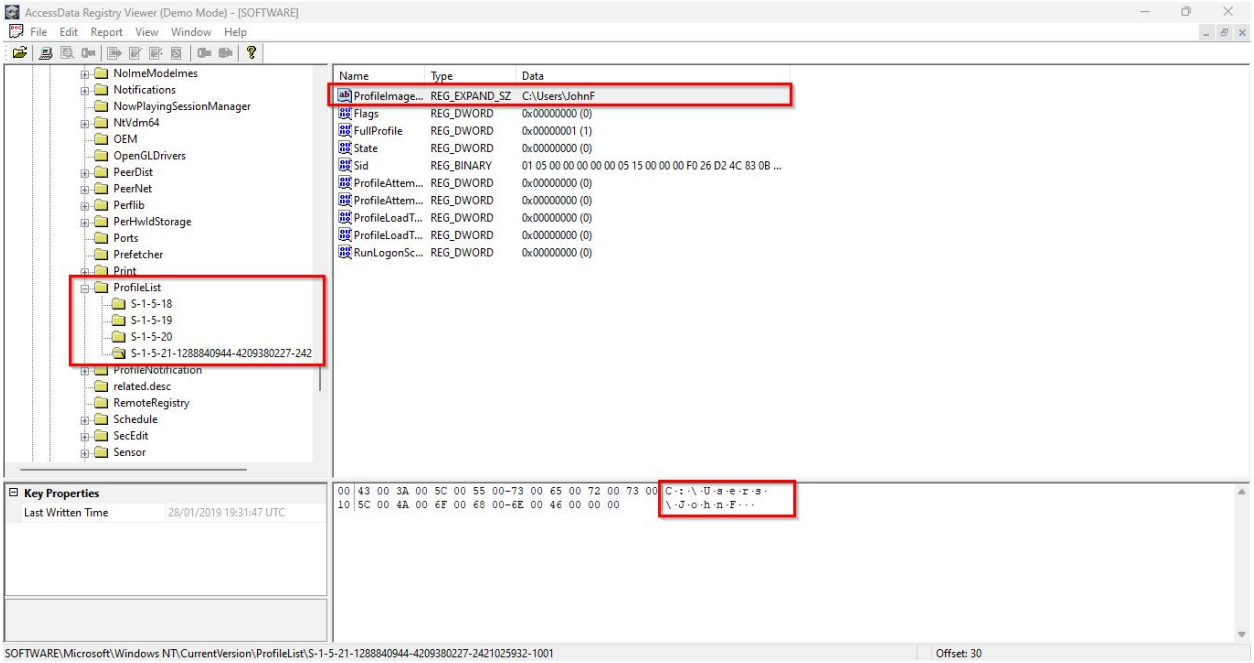


Figure 21 John Fredricksen Username

Jane Esteban Computer Name:

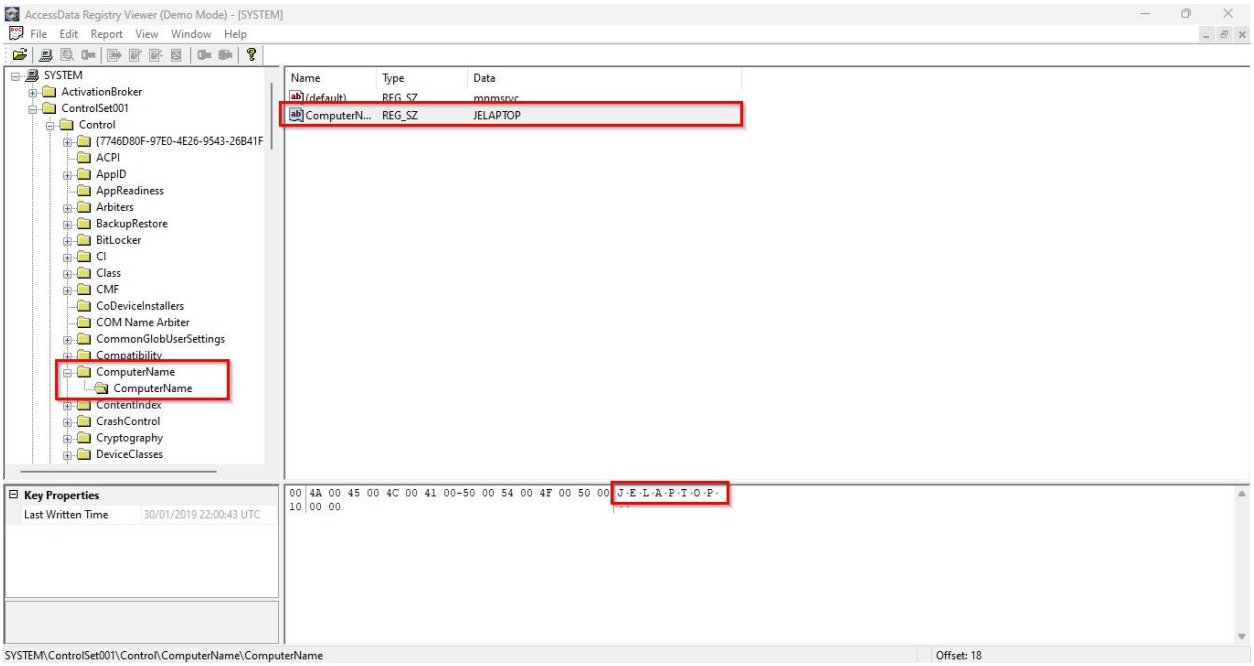


Figure 22 Jane Esteban Computer Name

Jane Esteban Username:

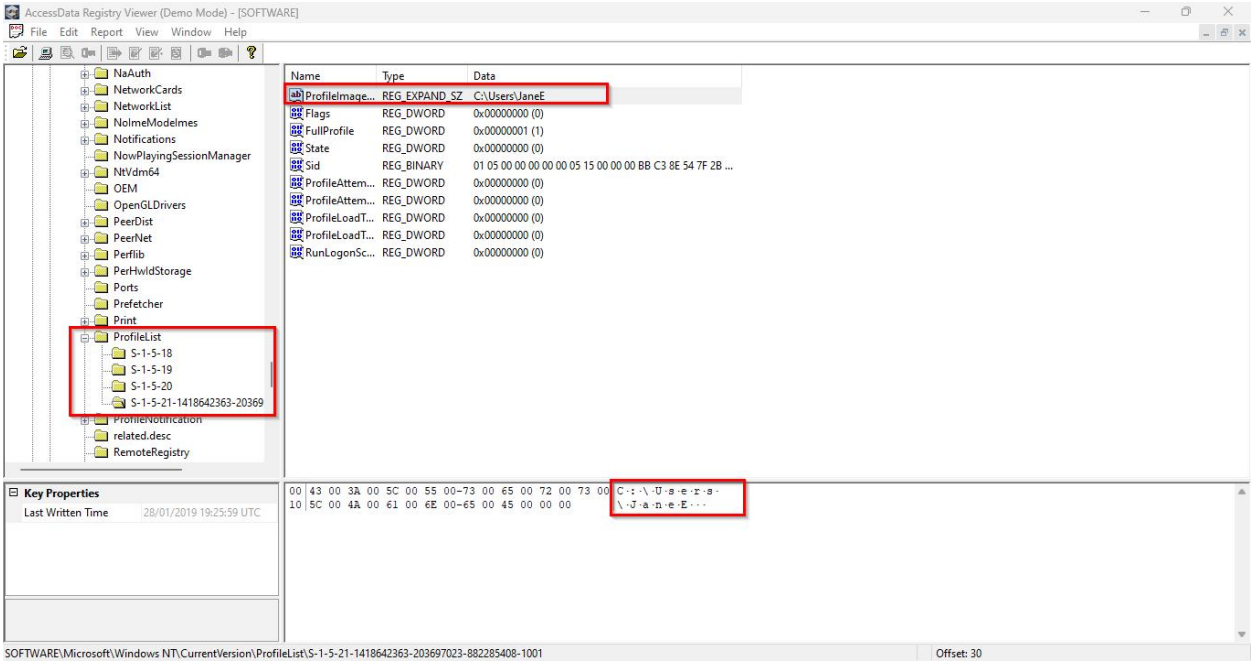


Figure 23 Jane Esteban Username

3.2 Web Activity

Relevant web activity on each suspect's computer.

3.2.1 Steve Kowhai:

In Steve Kowhai web history multiple searches related to drug use, distribution, and trafficking were discovered. He seems to be searching for ‘crystal meth’, ‘drug paraphernalia’, ‘drug paraphernalia meth’, ‘best places to trade drugs’, ‘cutting drugs’, ‘cutting agent for ice’ and ‘drug routes in Wellington’. Additionally, he seems to be searching for ‘how to launder money’. This all suggests Steve Kowhai being a drug dealer rather than user and possibly him distributing it and laundering the money to stay safe from IRS.

Moreover, he is seen searching for software's to encrypt and possibly hide his working on the system.

ccleaner: Software often used to clean up evidence on a computer.
truecrypt: Encryption software that could be used to hide illegal activities.
protonmail: An encrypted email service that could be used for private communications related to illegal activities.

Web Search:

- crystal meth
- drug paraphernalia
- drug paraphernalia meth
- gangs nz drugs
- best places to trade drugs
- cutting drugs
- cutting agents for ice
- how to launder money
- drug routes in Wellington
- international drug routes
- image steganography download
- ccleaner

- truecrypt
- protonmail

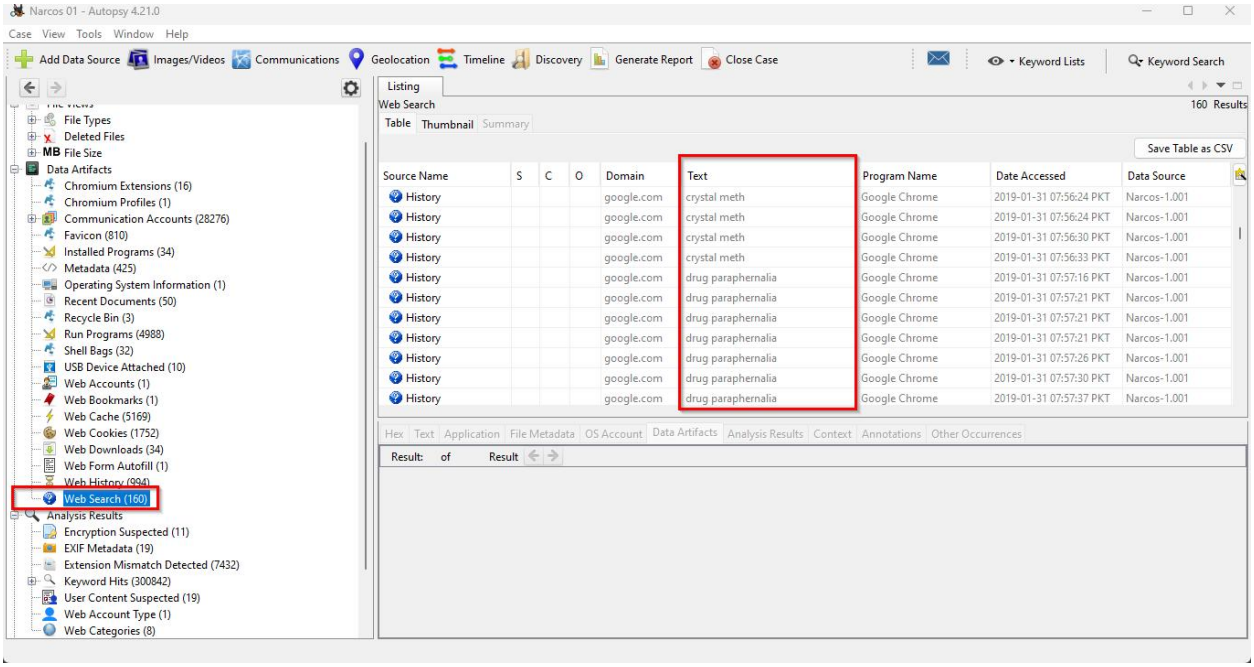


Figure 24 Steve Kowhai Web Search

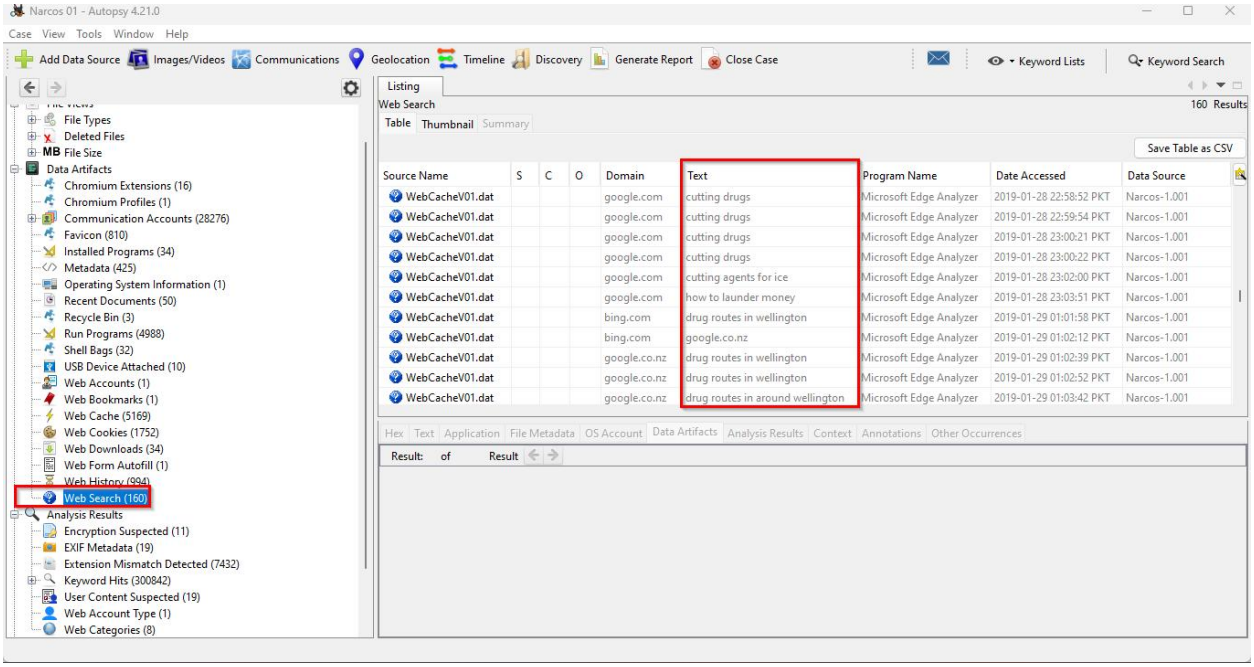


Figure 25 Steve Kowhai Web Search

3.2.2 Jane Esteban:

In Jane Esteban, web history multiple searches related to federal agency such as ‘federal agent badge’, ‘federal agent badge au’, ‘discord’, ‘micro voice recorder’, ‘micro voice recorder’, ‘how to act like a meth addict’, ‘how to look like a meth addict’, ‘news9’, ‘theguardian’, ‘reddit’, ‘how to pretend to be desperate’, ‘survival tips for undercover cop’, ‘undercover cop survival’.

All this led us to believe the Jane is possible an undercover cop. Who's acting as mole for possibly police. This is believed by all the searches about acting like a drug addict and how to survive as a mole.

Web Search:

- federal agent badge
- federal agent badge au
- disocrd
- micro voice recorder
- Micro voice recorder au
- How to act like a meth addict
- How to look like a meth addict
- News9
- Theguardian
- Reddit
- How to pretend to be desparate
- Survival tips for an undercover cop
- Undercover cop survival

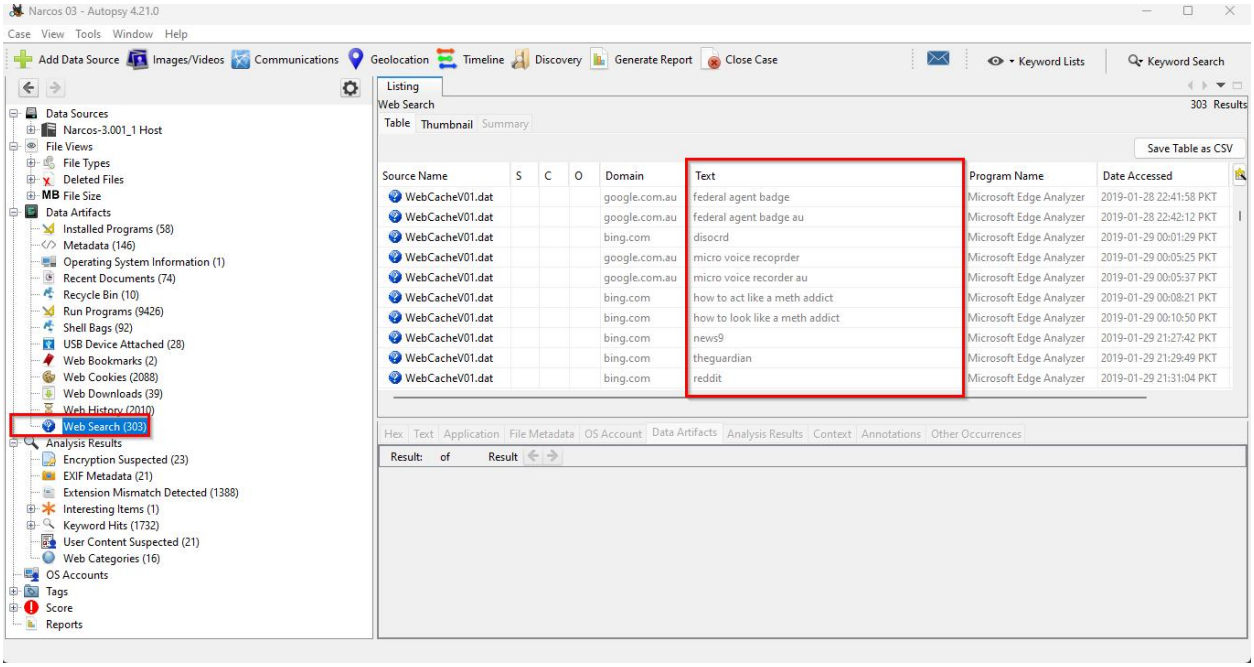


Figure 26 Jane Esteban Web Search

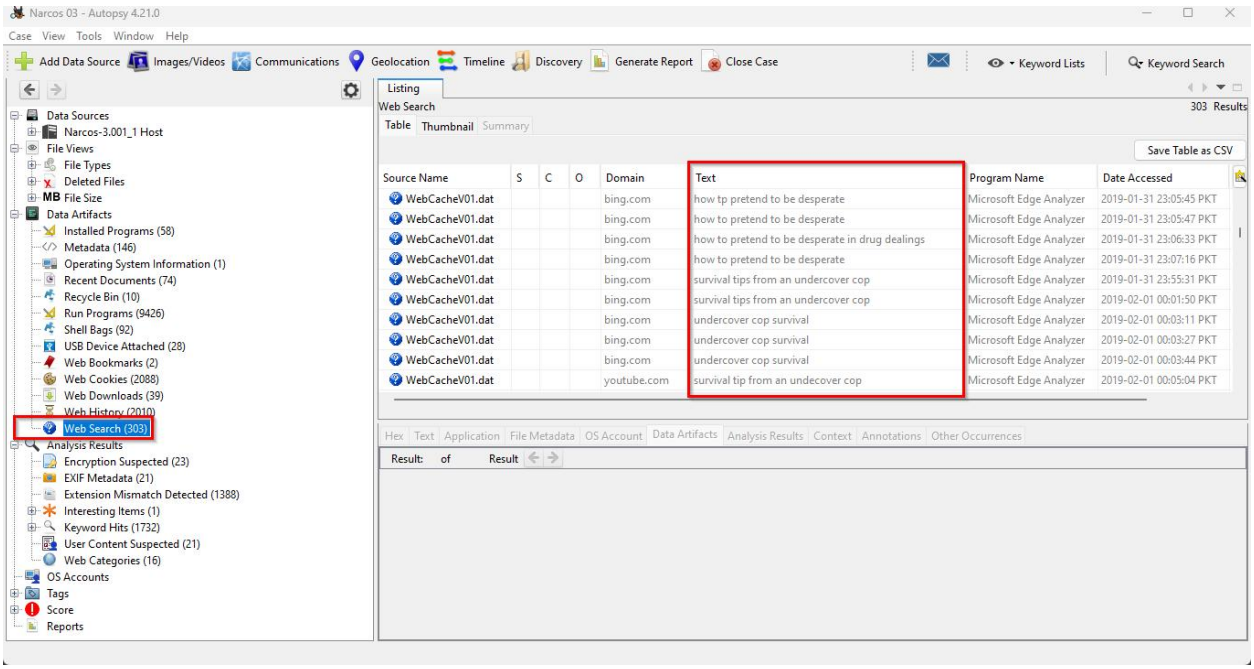


Figure 27Jane Esteban Web Search

3.2.3 John Fredricksen:

In John Fredricksen, web history multiple searches related to ‘pabloe escobar’, ‘body packing’, ‘suitcase concealment’, ‘suitcase concealment for drugs’, ‘cutting drugs’, ‘drugs subreddit’ leads us to believe that John is a drug user and is looking for ways to hide drugs in suitcase.

Not only that he is seen searching for ‘steganography’, ‘steganography image download’, ‘image steganography’ which leads us to believe that John is hiding something behind his images.

Also, he is seen looking for flights to Wellington, New Zealand.

Web Search:

- drug memes
- pablo escobar
- baidu antivirus download
- openoffice
- discord
- encryption methods youtube
- suitcase concealments
- suitcase concealments for drugs
- new zealand to wellington
- Flight brisbane to WLG return
- cutting drugs
- how to launder money
- drugs subreddit
- suitcase concealments
- how to cut drugs
- steganography
- steganography image download
- tutorial on image steganography
- image steganography

- protonmail
- discord
- openoffice

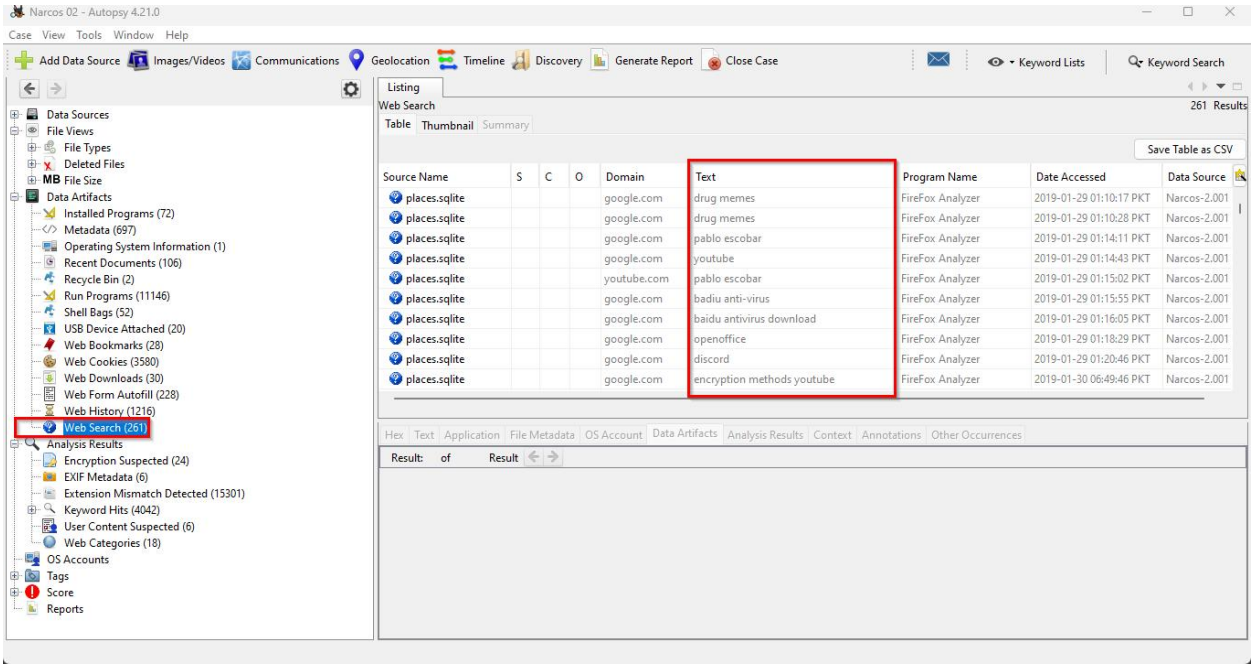


Figure 28 John Fredricksen Web Search

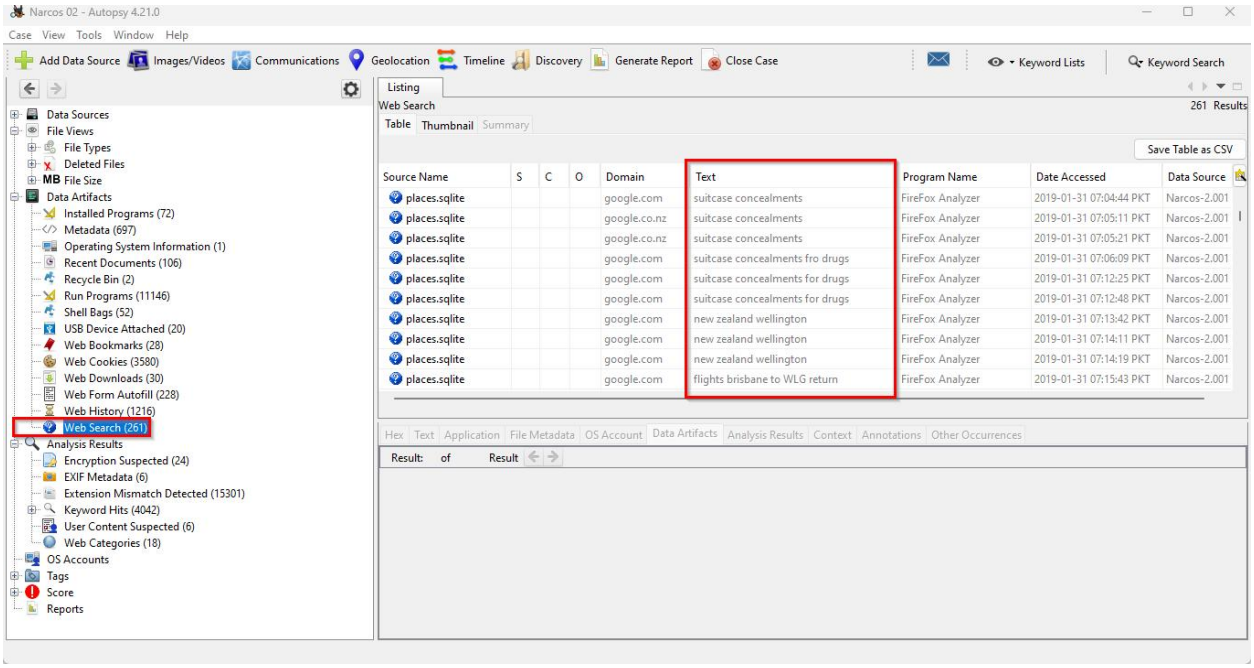


Figure 29 John Fredricksen Web Search

3.3 Behavioral Images

3.3.1 Steve Kowhai

airport crystals.jpg

From the images we can gather that Steve had a route planned out from Eastbourne to his location. And the image name suggests that its crystal and airport hinting to Steve being a drug dealer receiving crystals from airport from John who's looking to hide them.

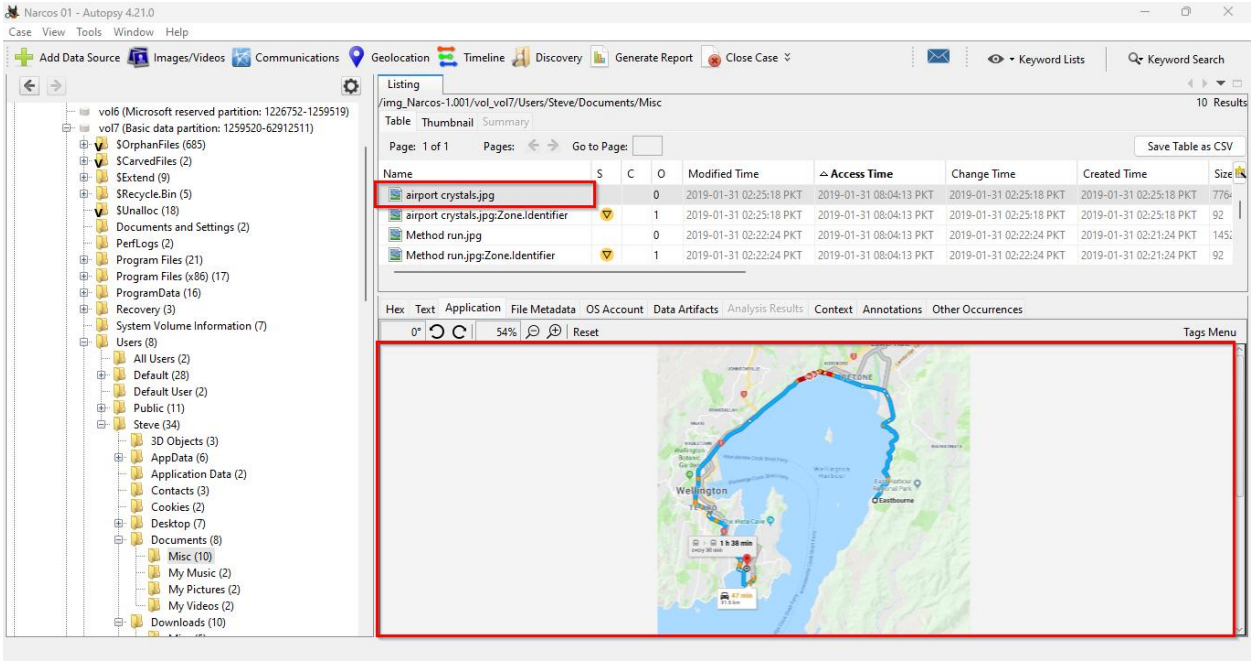


Figure 30 airport crystals.jpg

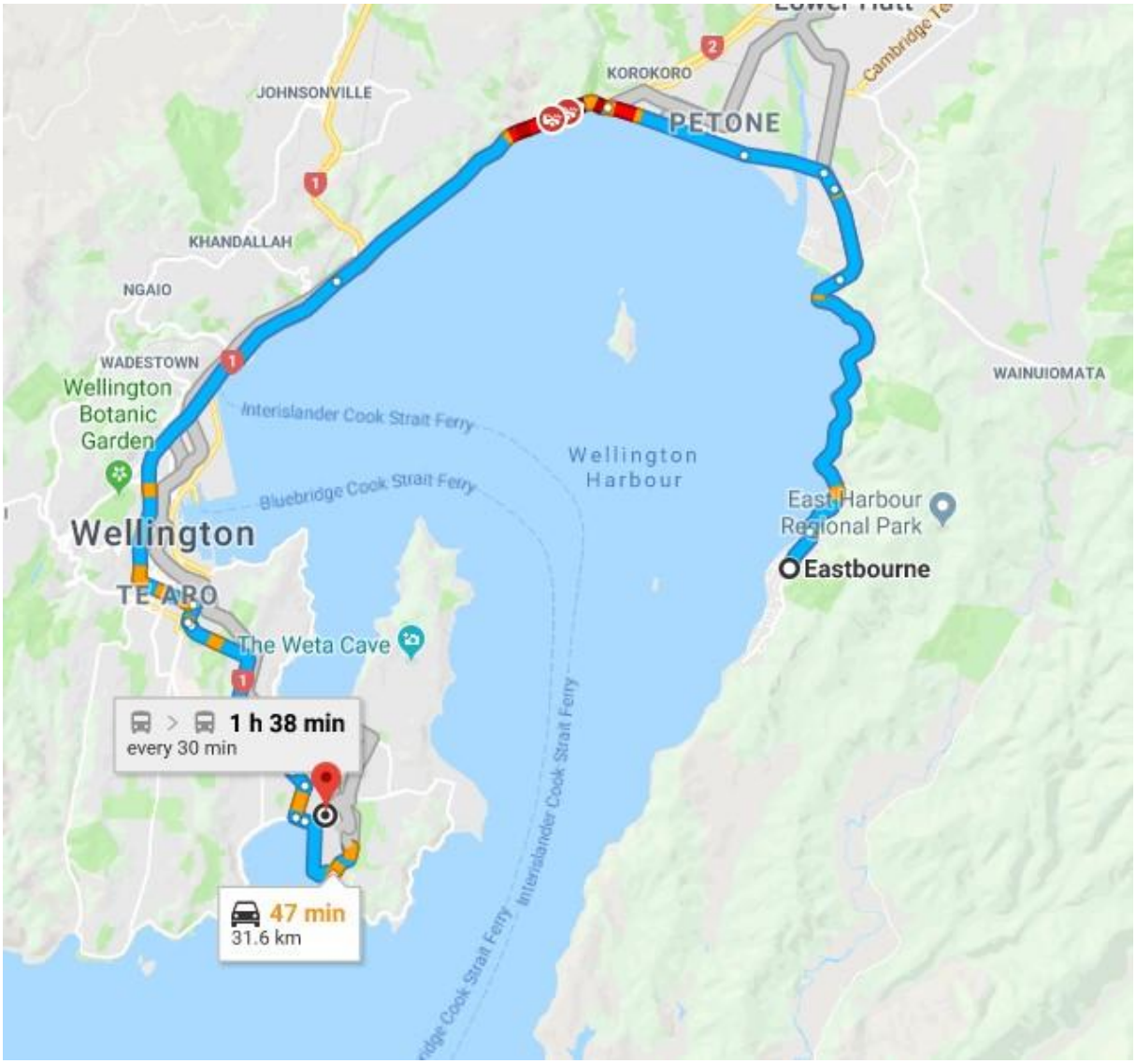


Figure 31 airport crystals.jpg

Methodrun.jpg

In these images it is hinted that Steve had an escape path already done from his home in Eastbourne stocks valley hinted from the image name.

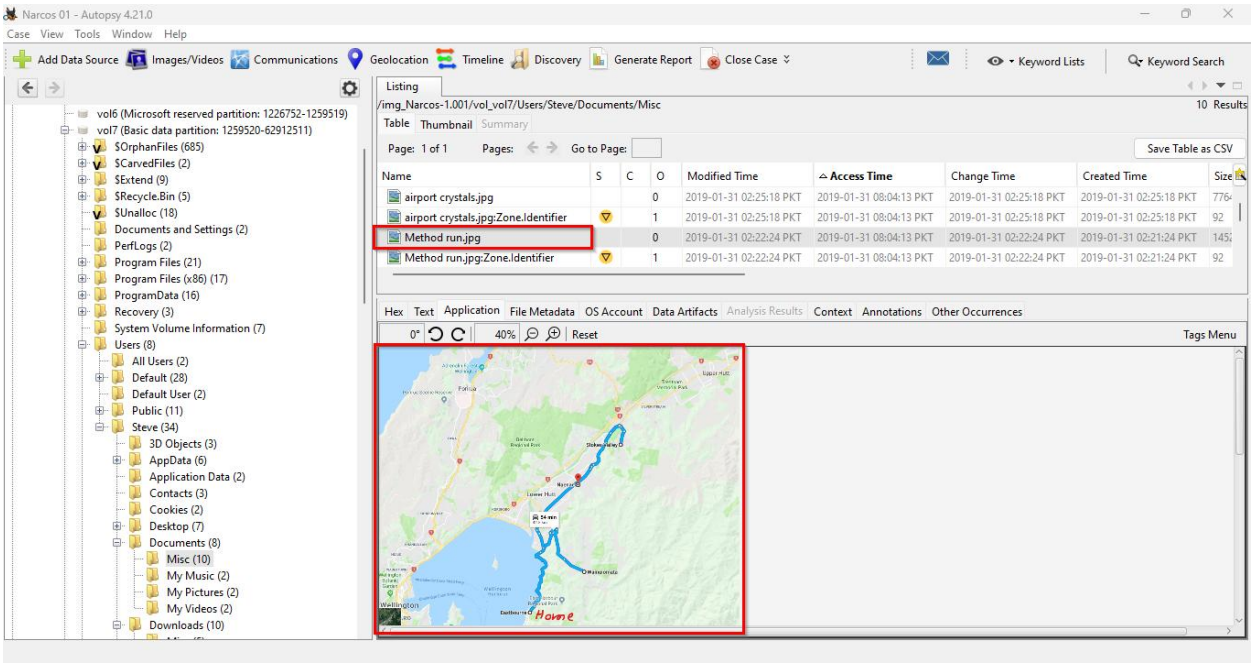


Figure 32 Methodrun.jpg

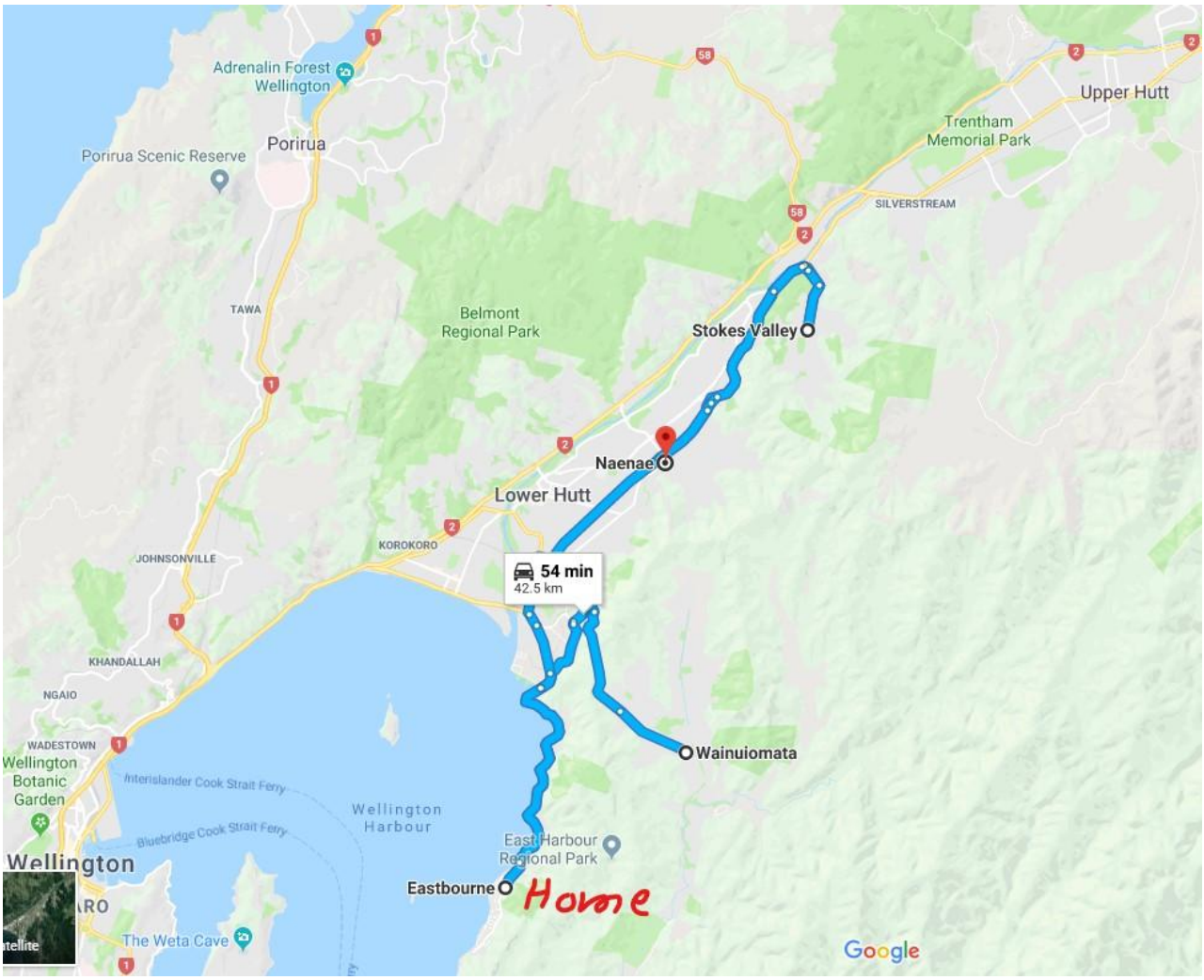


Figure 33 Methodrun.jpg

Dropoff.jpg

This image hints towards a possible dropoff location possibly for his drugs which are being smuggled by John as suggested by image name.

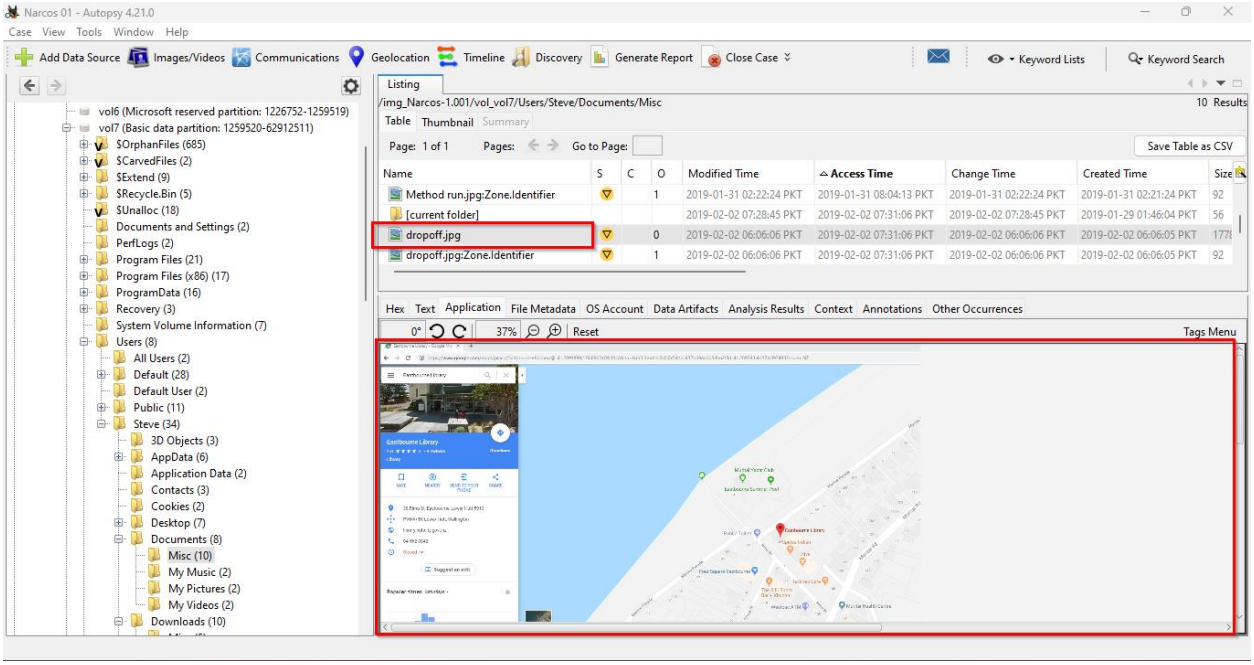


Figure 34 Dropoff.jpg

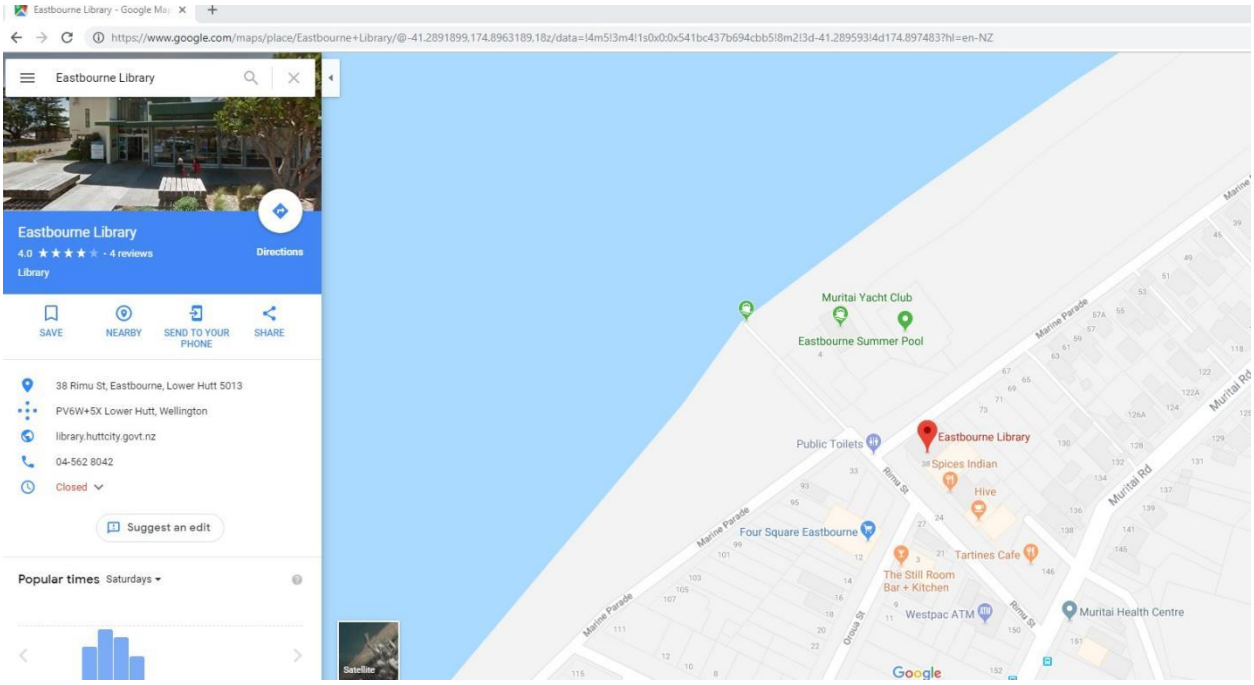


Figure 35 Dropoff.jpg

Flightbookings.PNG

In this image we can see the flight bookings of Steve from Brisbane to Wellington and flight back to Brisbane from Wellington.

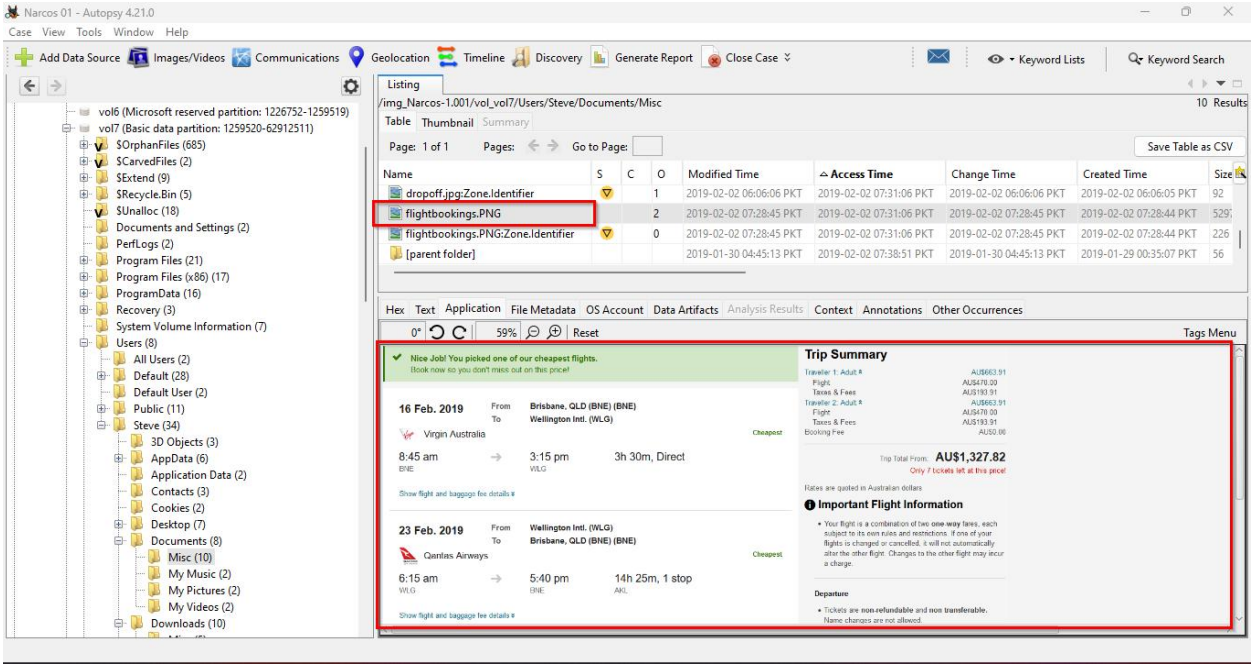


Figure 36 Flightbookings.PNG

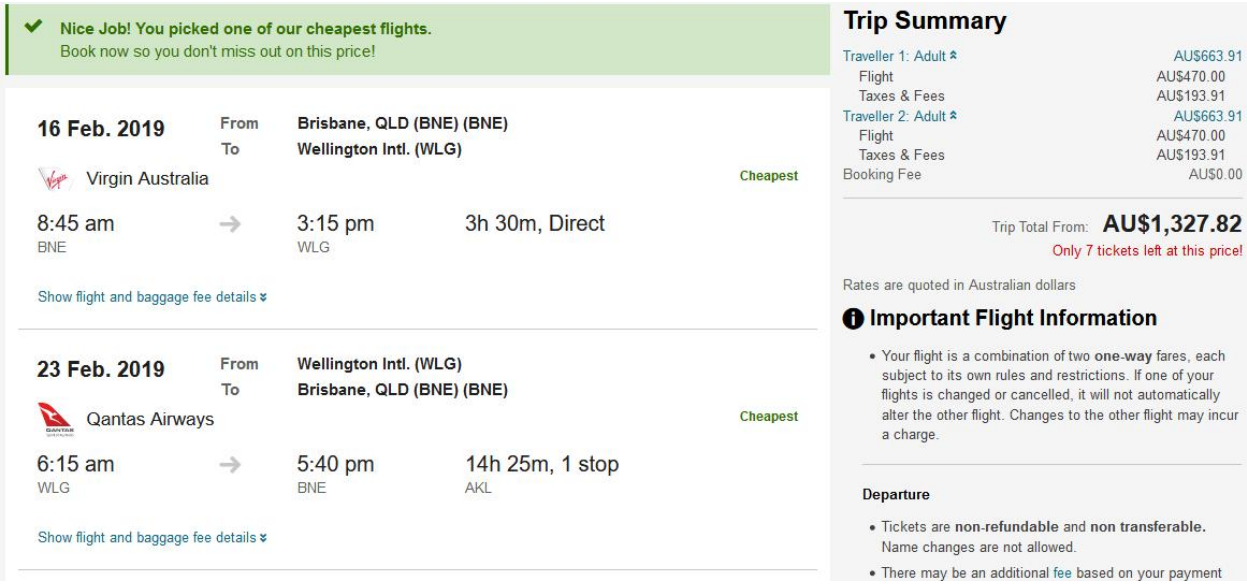


Figure 37 Flightbookings.PNG

BNE.png

In this image we can see a bridge. Goggle image search reveals it to be Australia Houses Rivers Bridges Roads Brisbane Night.

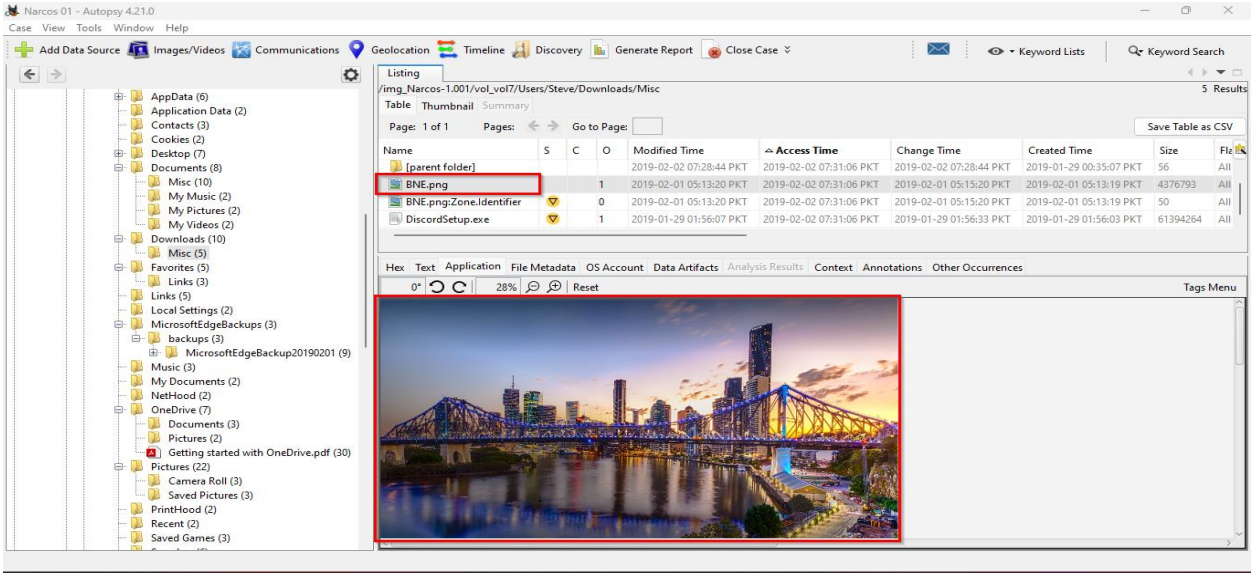


Figure 38 BNE.png

620x349.jpg(Deleted Pic)

A deleted image of crystal meth was found on Steve's system maybe hinting to his involvement in drugs as seen previously.

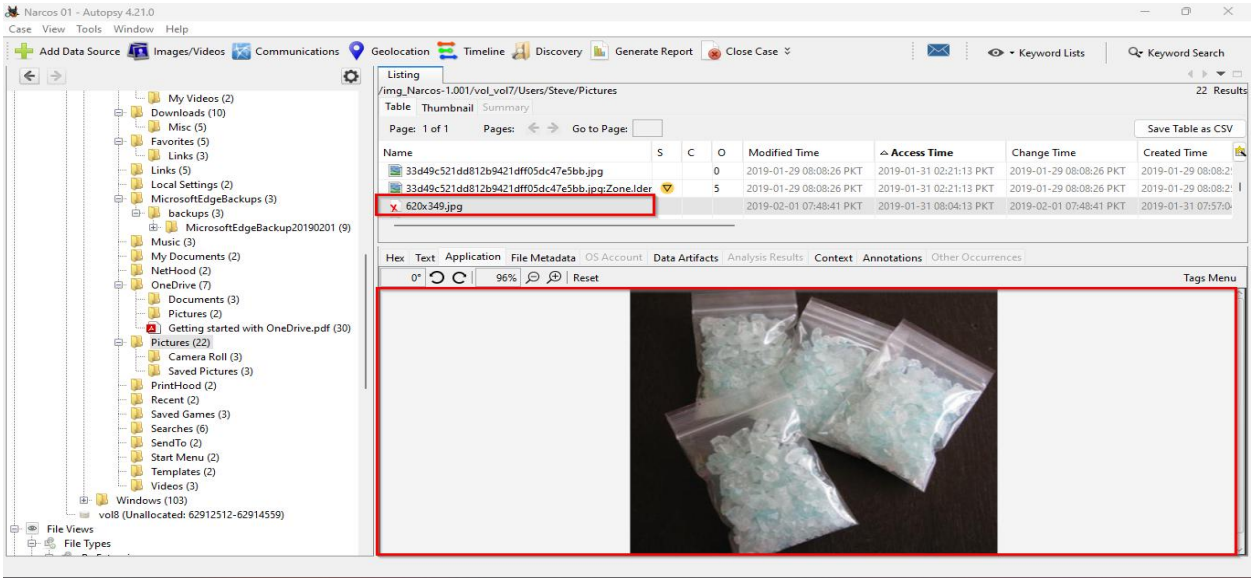


Figure 39 620x349.jpg(Deleted Pic)

price-meth-bust-4.jpg (Deleted Pic)

This deleted image possibly hints to the meth bust by official possibly his meth and his money lost.

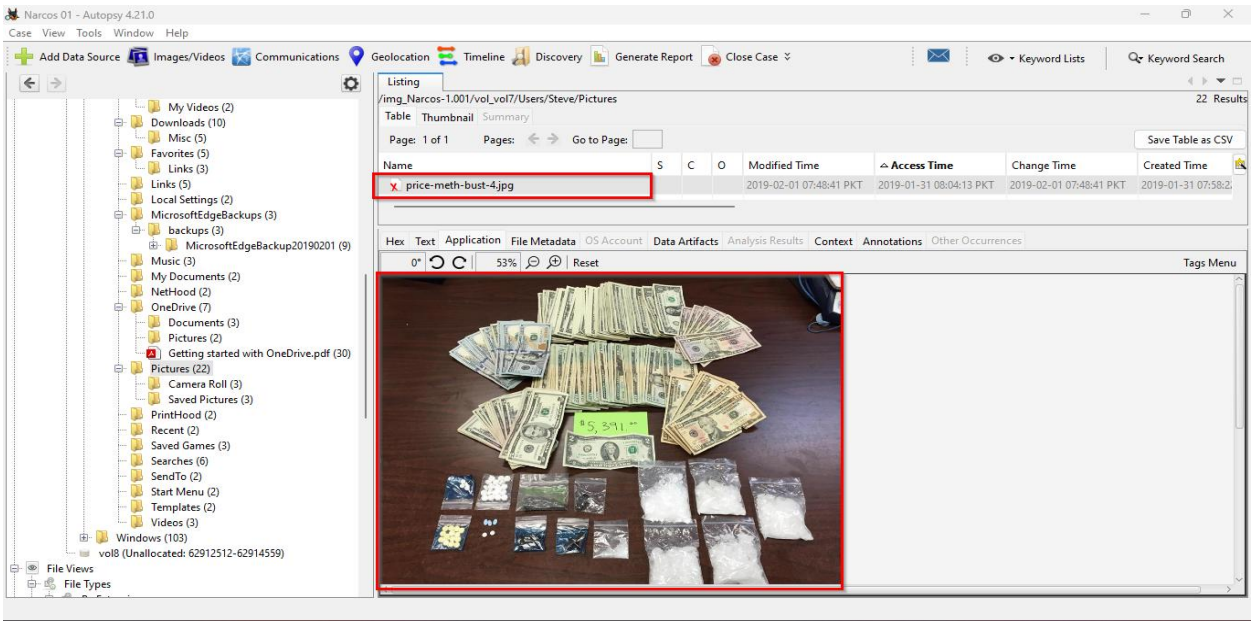


Figure 40 price-meth-bust-4.jpg (Deleted Pic)

eight_col_patches_crp.jpg (Deleted Pic)

This deleted image hints towards possible gang affiliations for Steve to ‘Mongrel Mob’

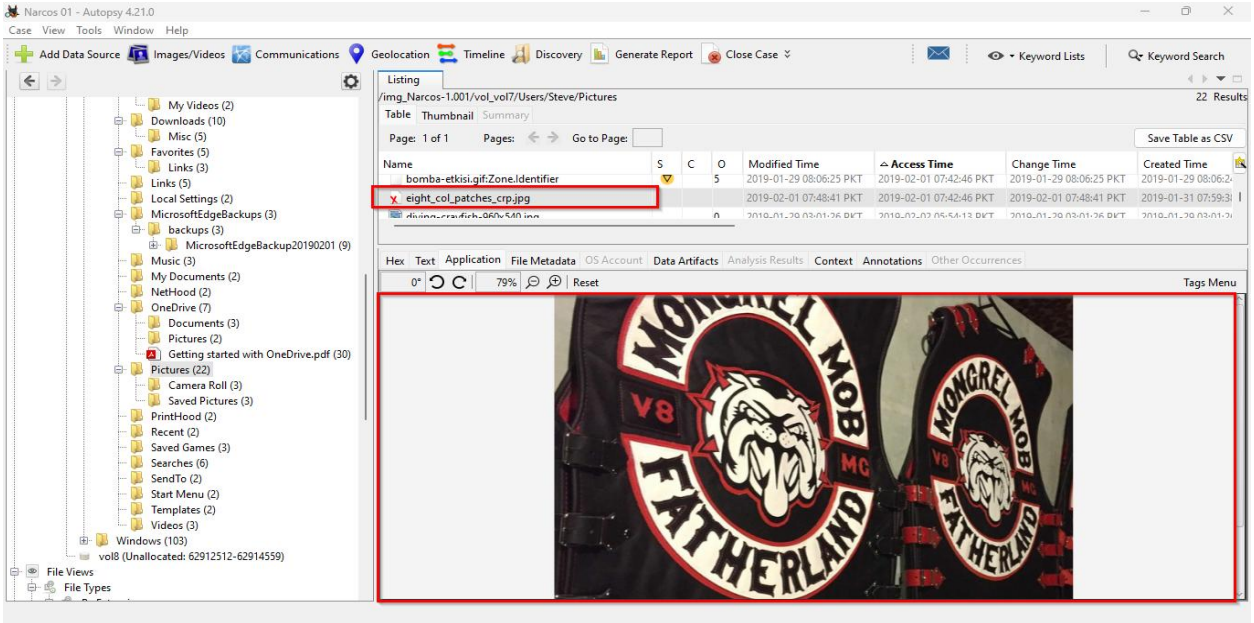


Figure 41 eight_col_patches_crp.jpg (Deleted Pic)

Summary:

From all the images we can see that Steve is a gang affiliated drug dealer with multiple plans of escaping and is also following all the drug busts to maybe identify the prices/ profit margin in this business.

3.3.2 Jane Esteban

Deleted Pic (afp.png)

This image is the logo of Australian Federal Police further cementing Jane as an undercover cop.

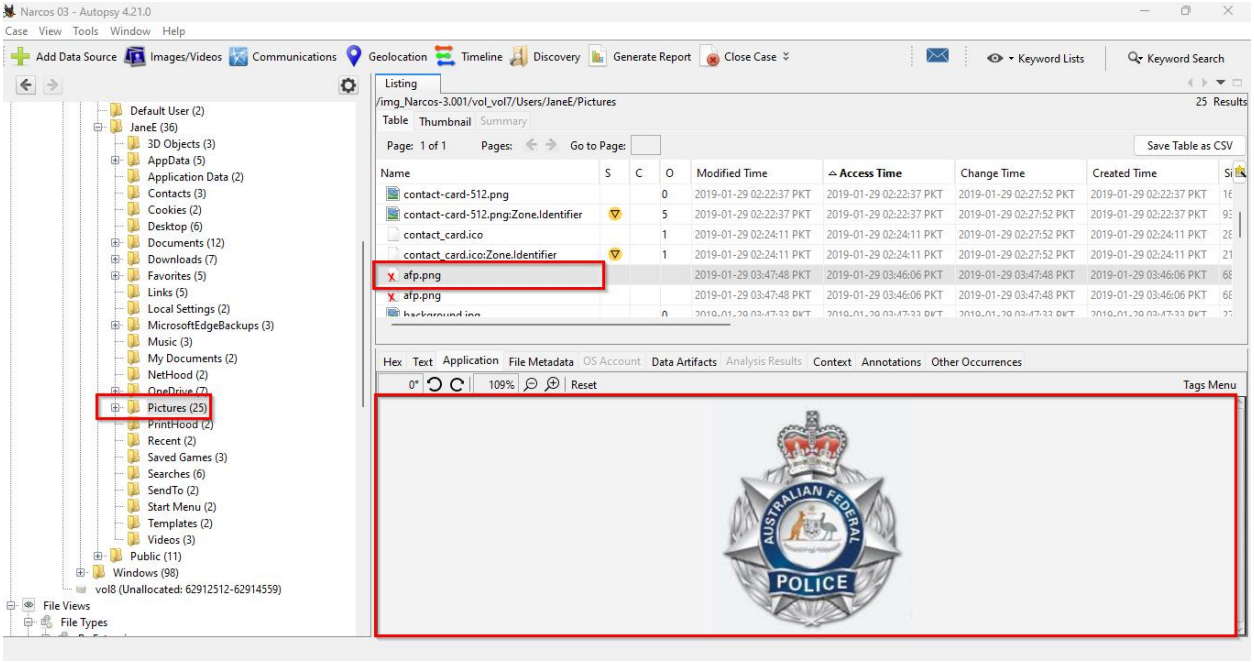


Figure 42 afp.png

Pic (Background.jpg)

This image is the logo of Australian Federal Police further cementing Jane as an undercover cop.

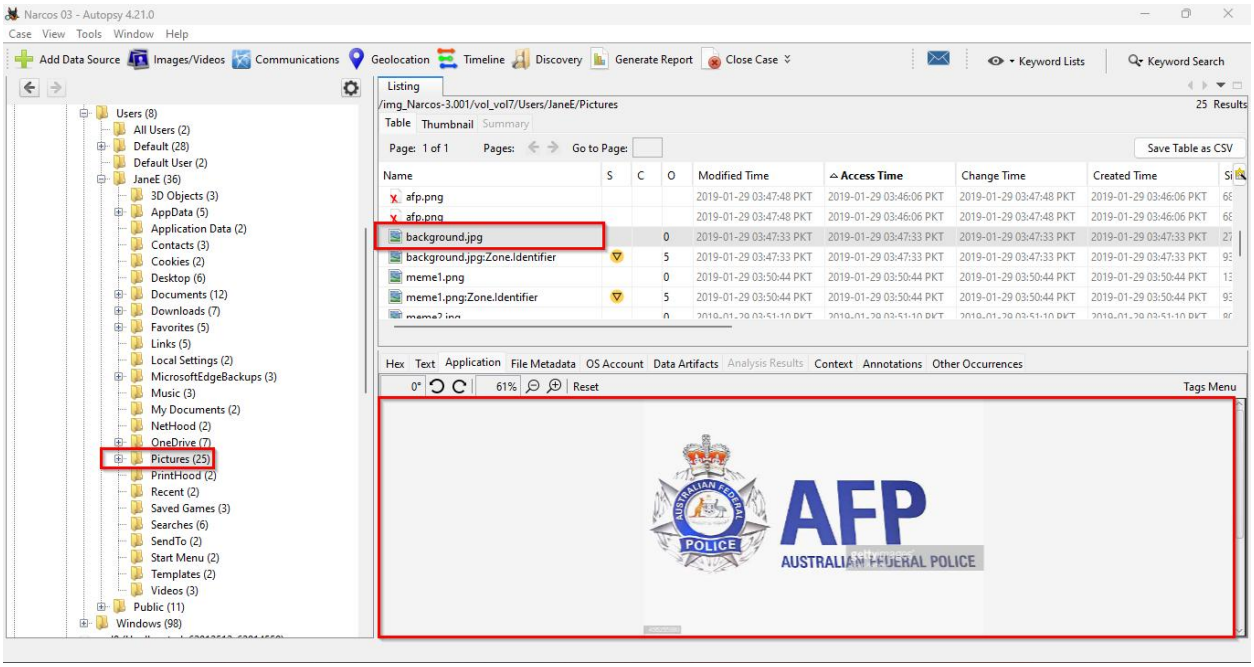


Figure 43 Pic (Background.jpg)

Pic (meme2.jpg):

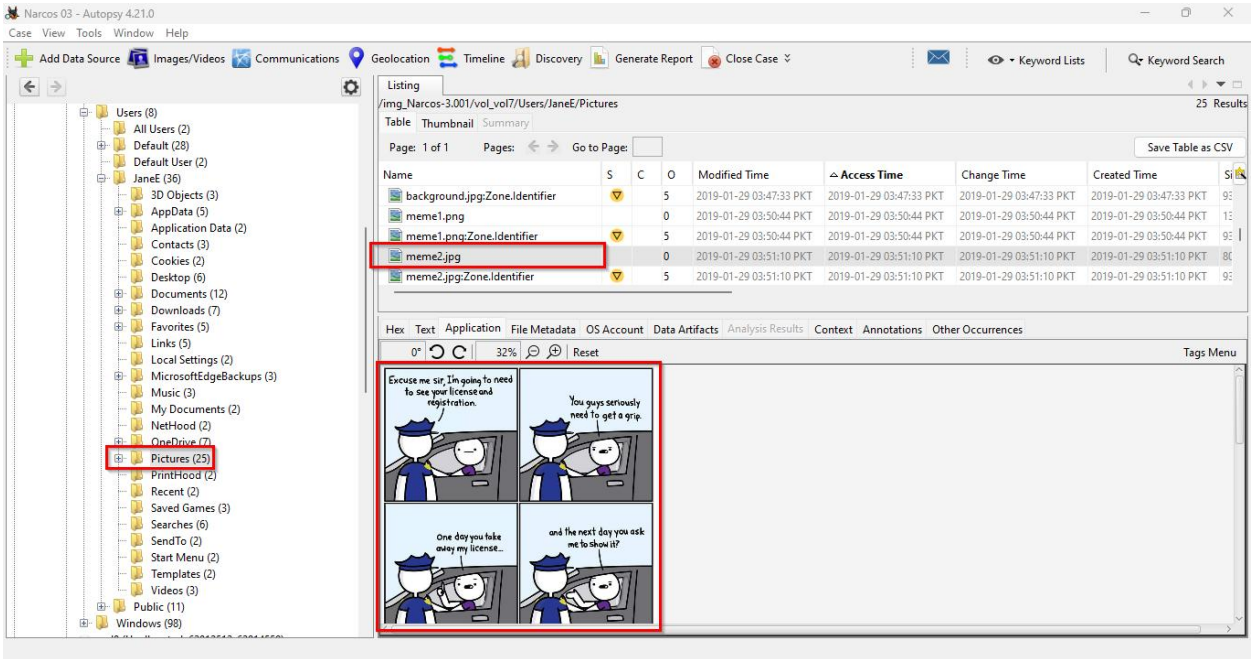


Figure 44 Pic (meme2.jpg):

Pic (crys1.jpg):

A bunch of images of different looking crystals.

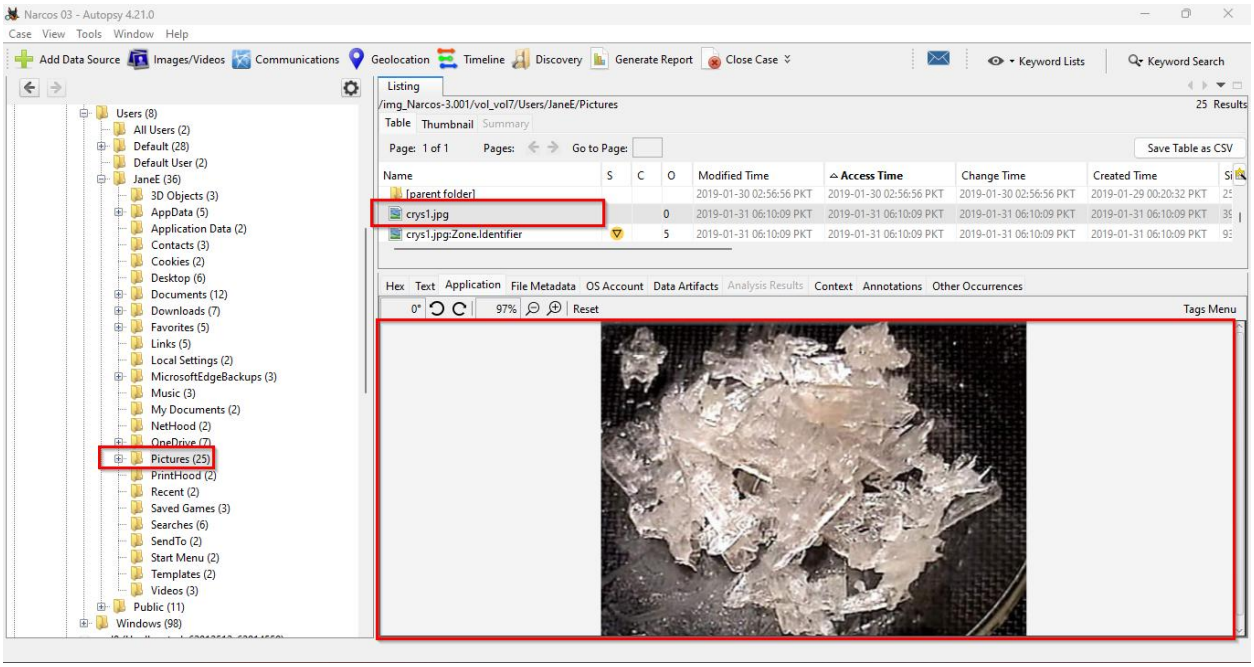


Figure 45 crys1.jpg

Pic (crys2.jpg)

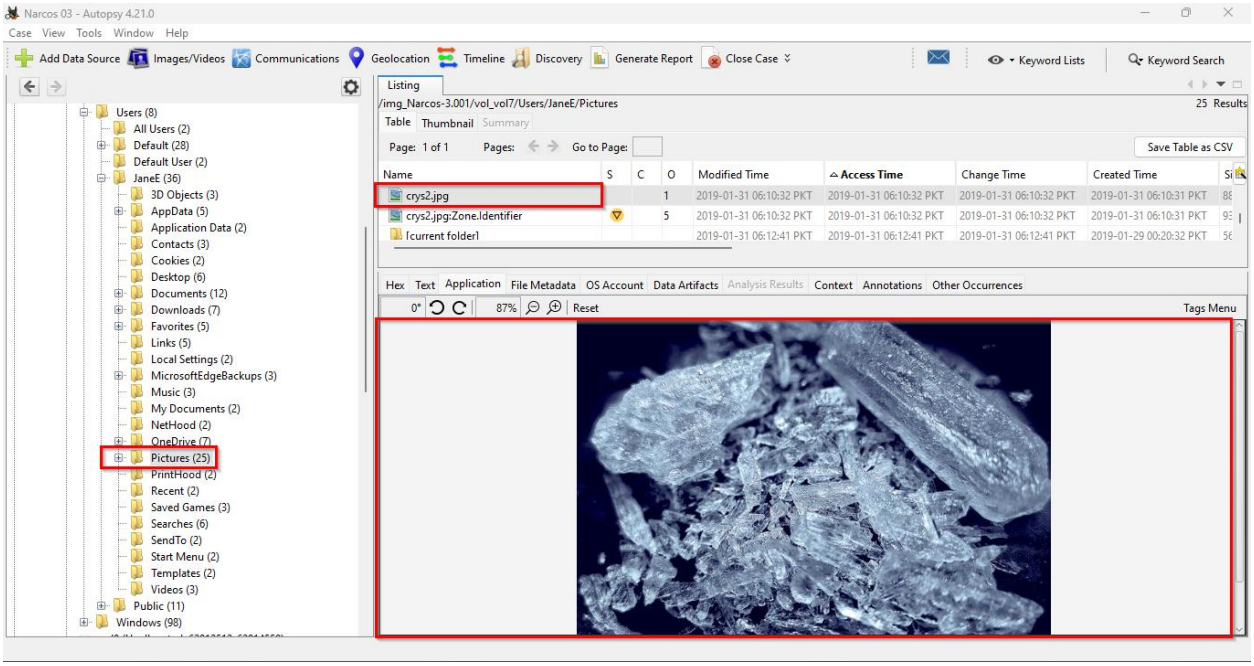


Figure 46 crys2.jpg

Pic(crys3.jpg):

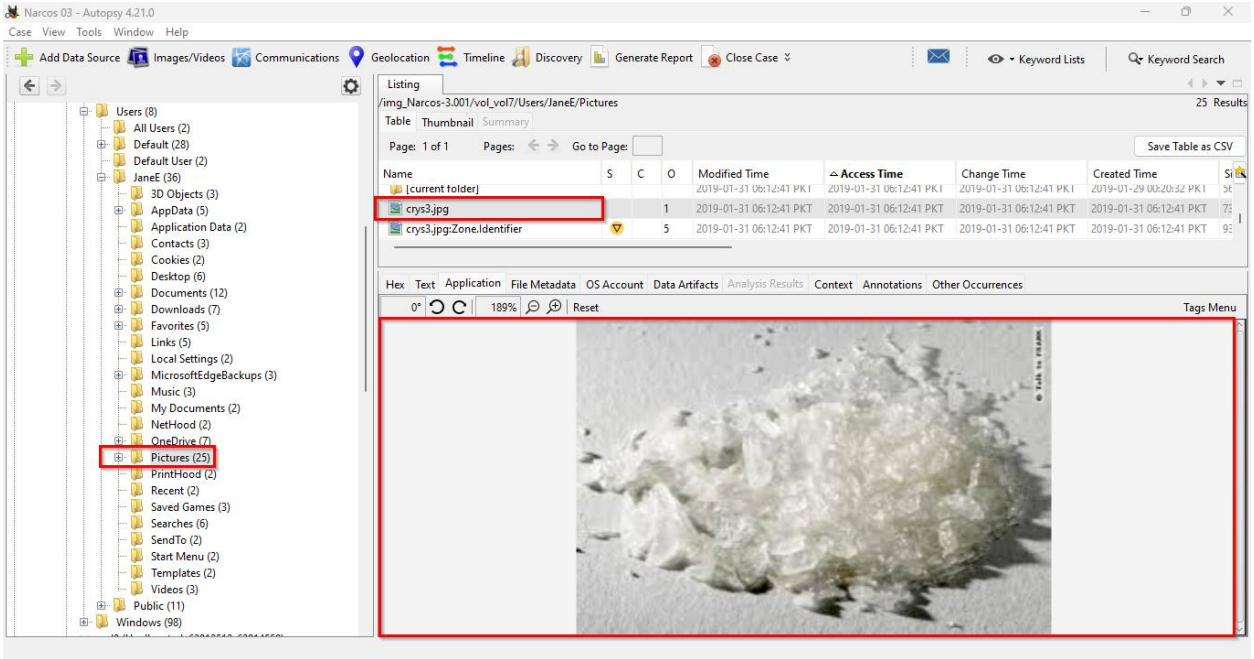


Figure 47 crys3.jpg

Summary:

From the images we can see that Jane has an Australian police badge and is following some meme for possibly dogging sharing her information and is looking into how different drugs look like.

[SPACE INTENTIONALLY LEFT BLANK]

3.3.3 John Fredricksen

shipping.PNG

This image shows a DHL courier service image in which we can see that John is sending something on an address in New Zealand. Possibly sending something to Steve.

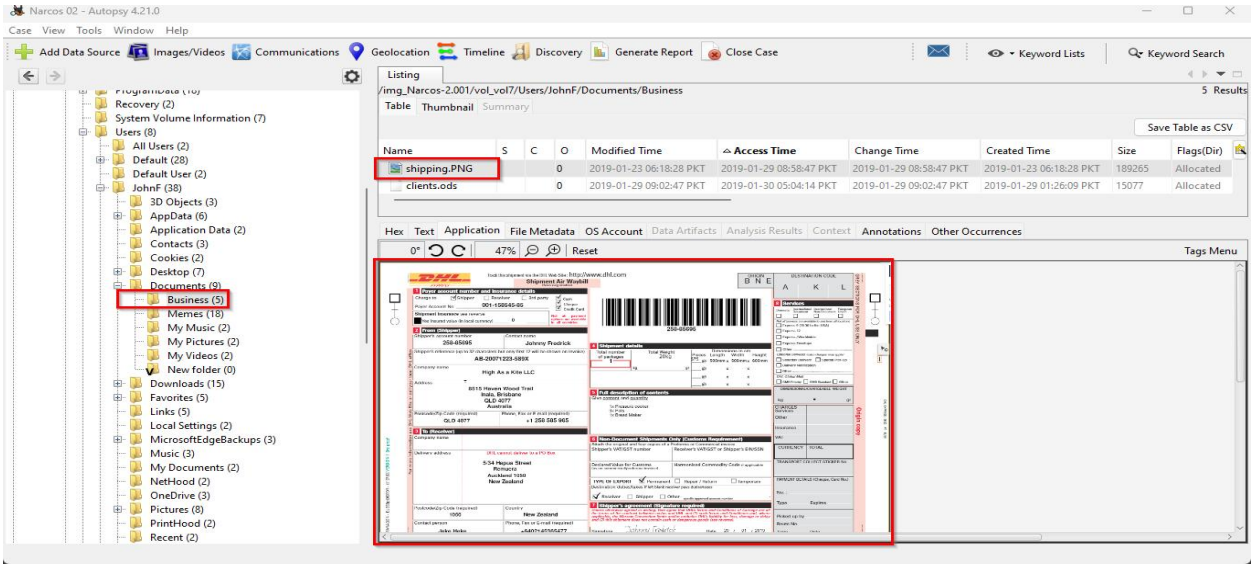


Figure 48 shipping.PNG

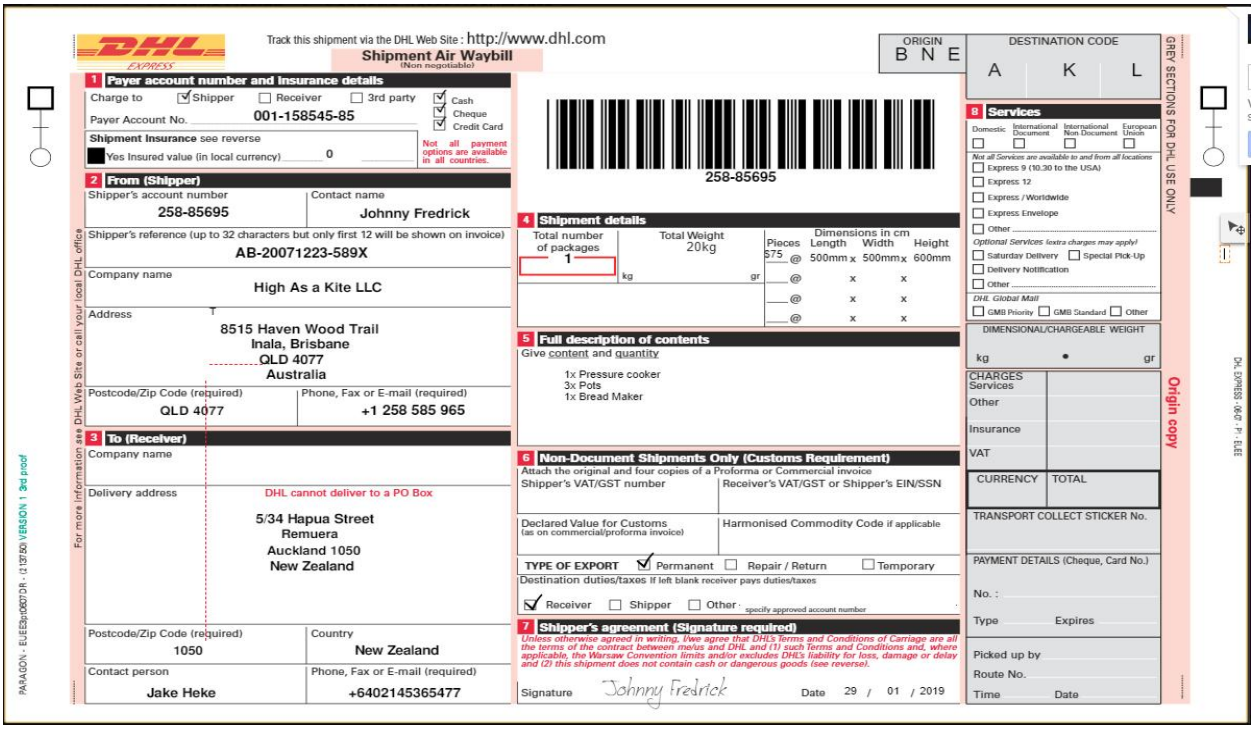


Figure 49 shipping.PNG

Steve K.PNG

Below is the flights schedule which was present on Steves system. This hints toward John and Steve being in communication and possibly planning the drug smuggling together.

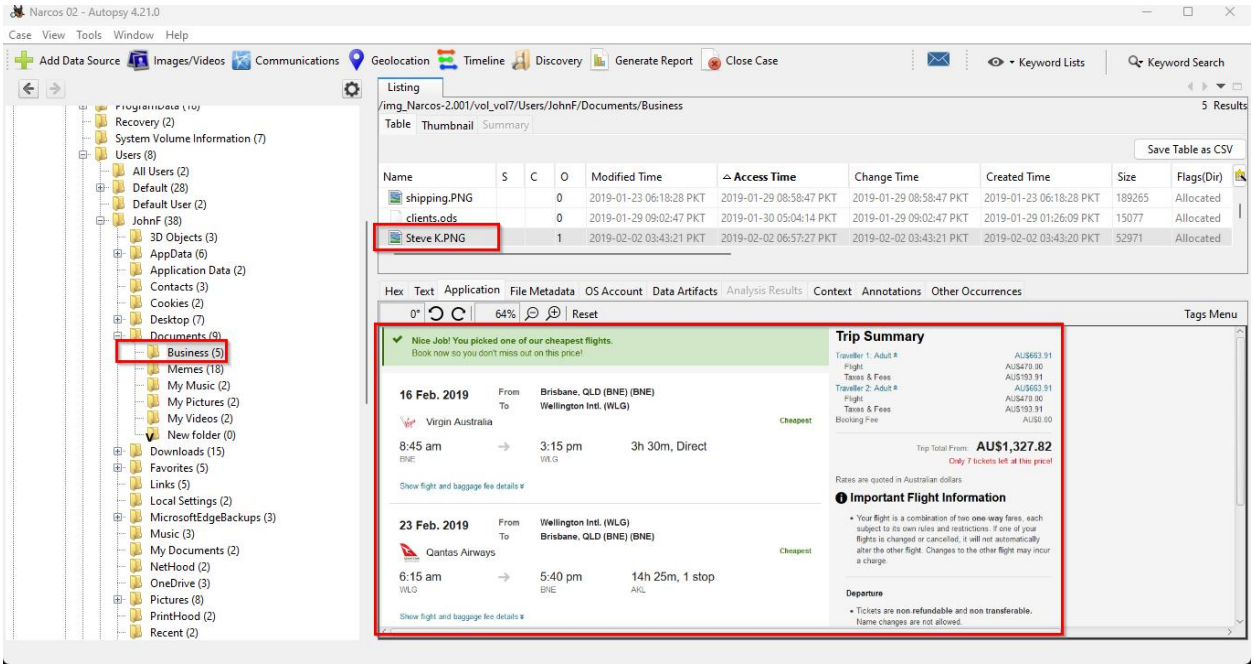


Figure 50 Steve K.PNG

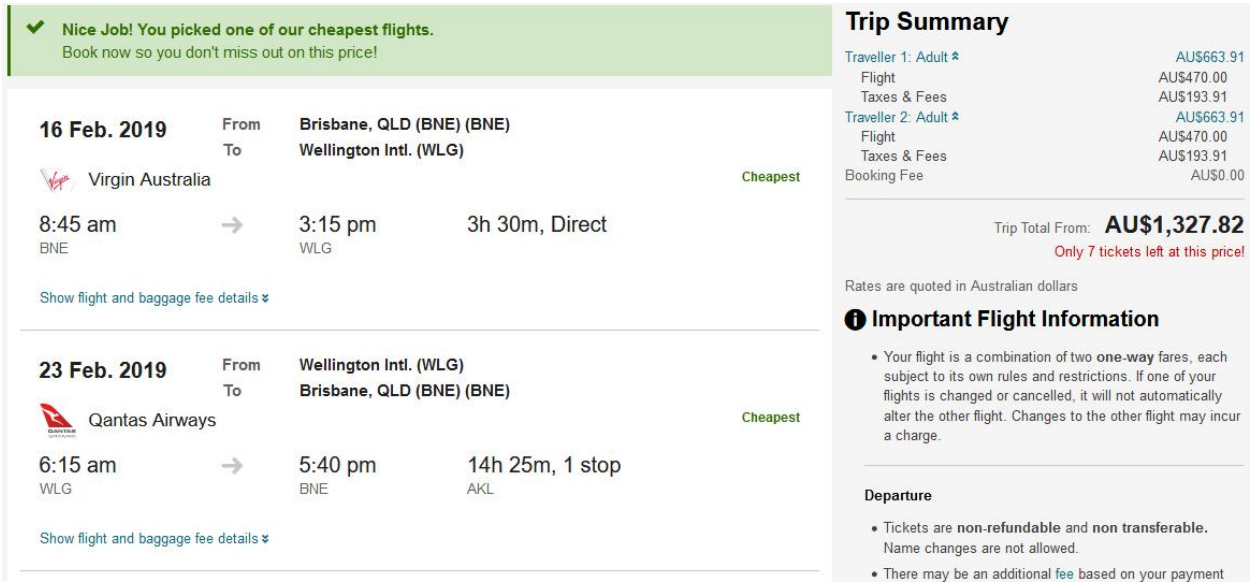


Figure 51 Steve K.PNG

durg meme 7.jpg

Below are some of the drug memes which John has been following.

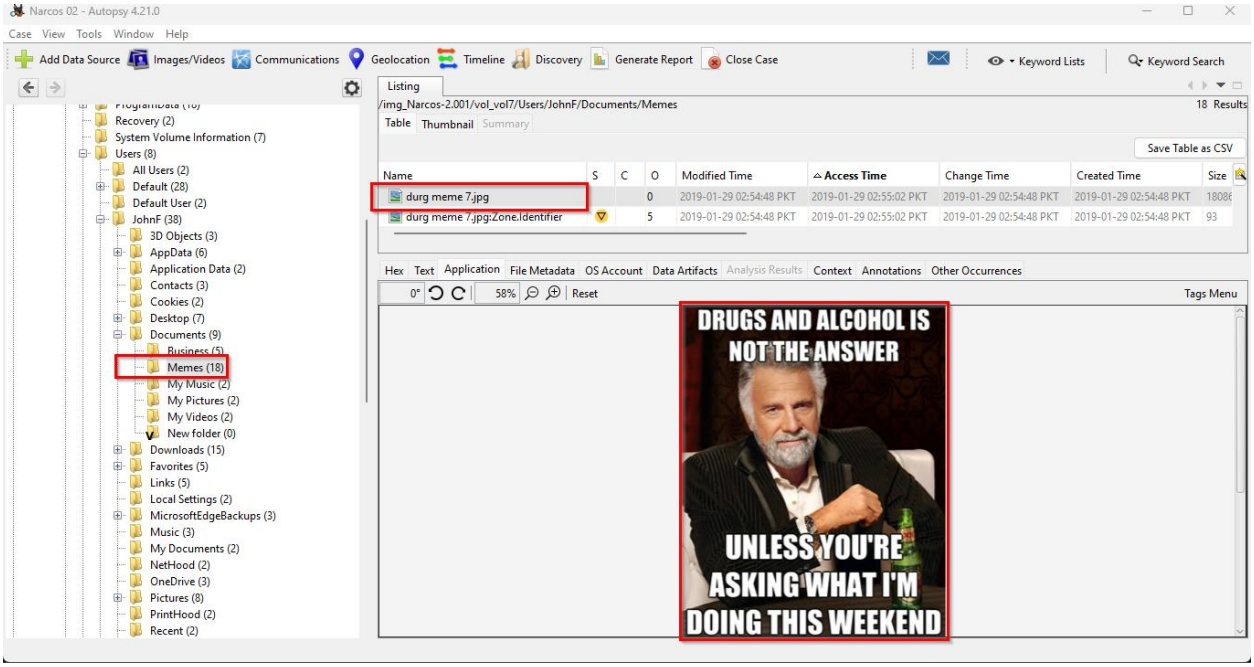


Figure 52 durg meme 7.jpg

drug wallpaper.jpg

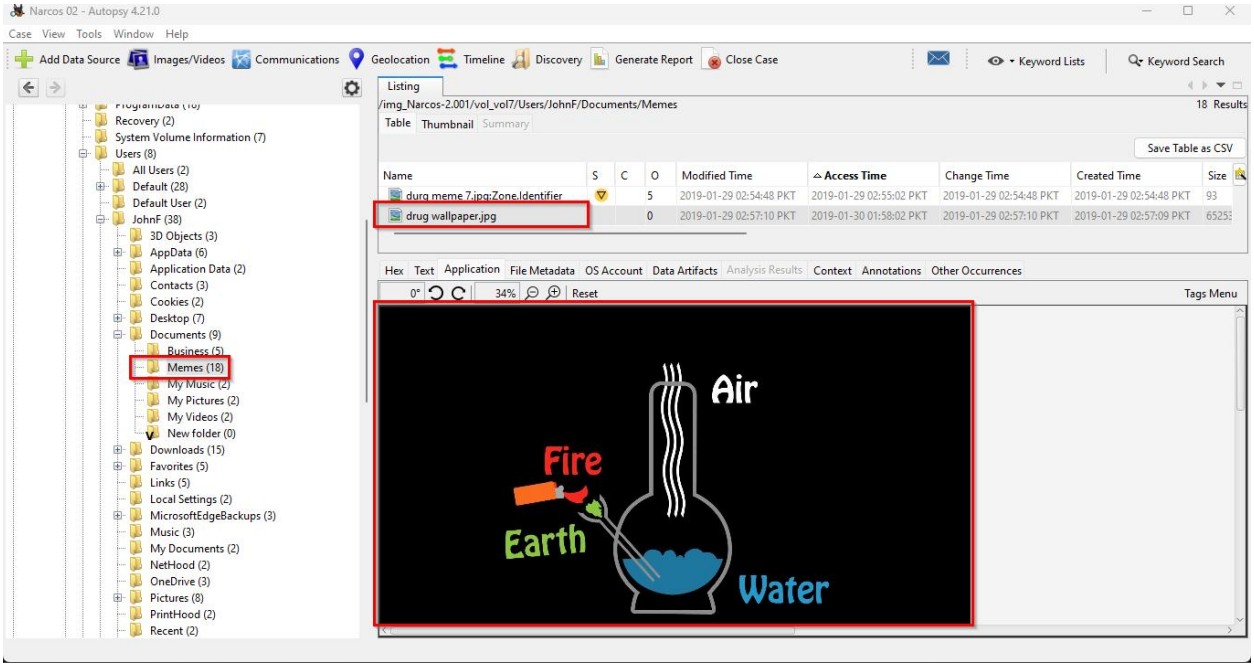


Figure 53 drug wallpaper.jpg

drugmeme3.jfif

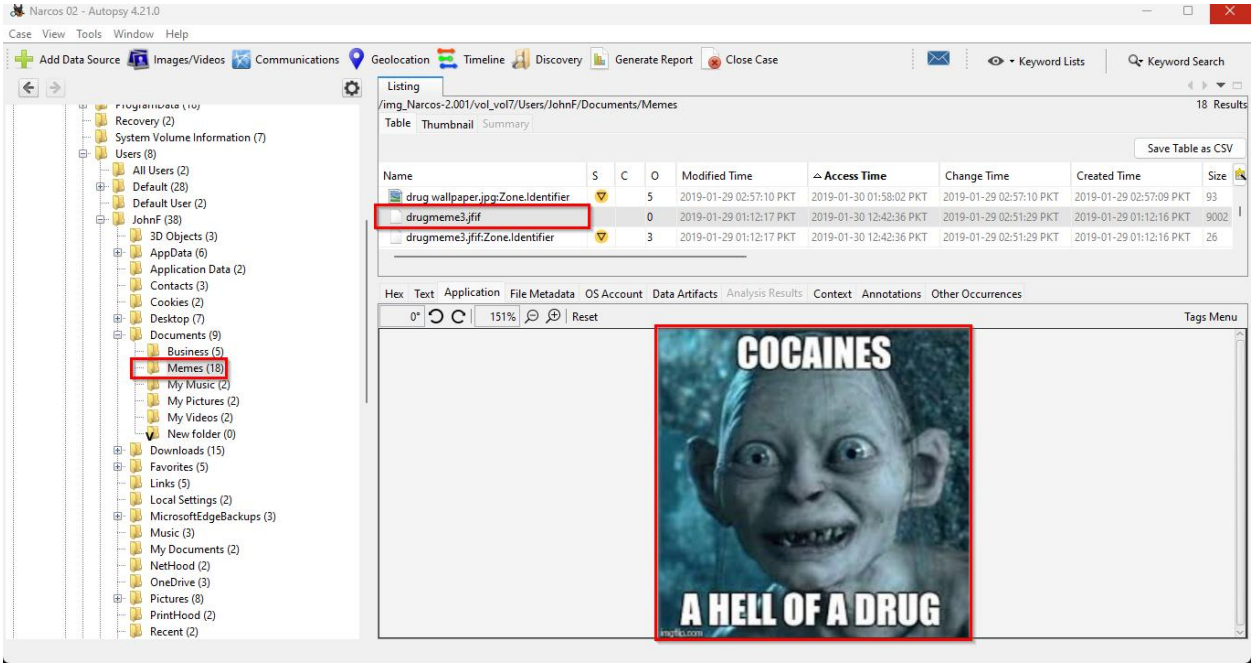


Figure 54 drugmeme3.jfif

drugmeme4.jfif

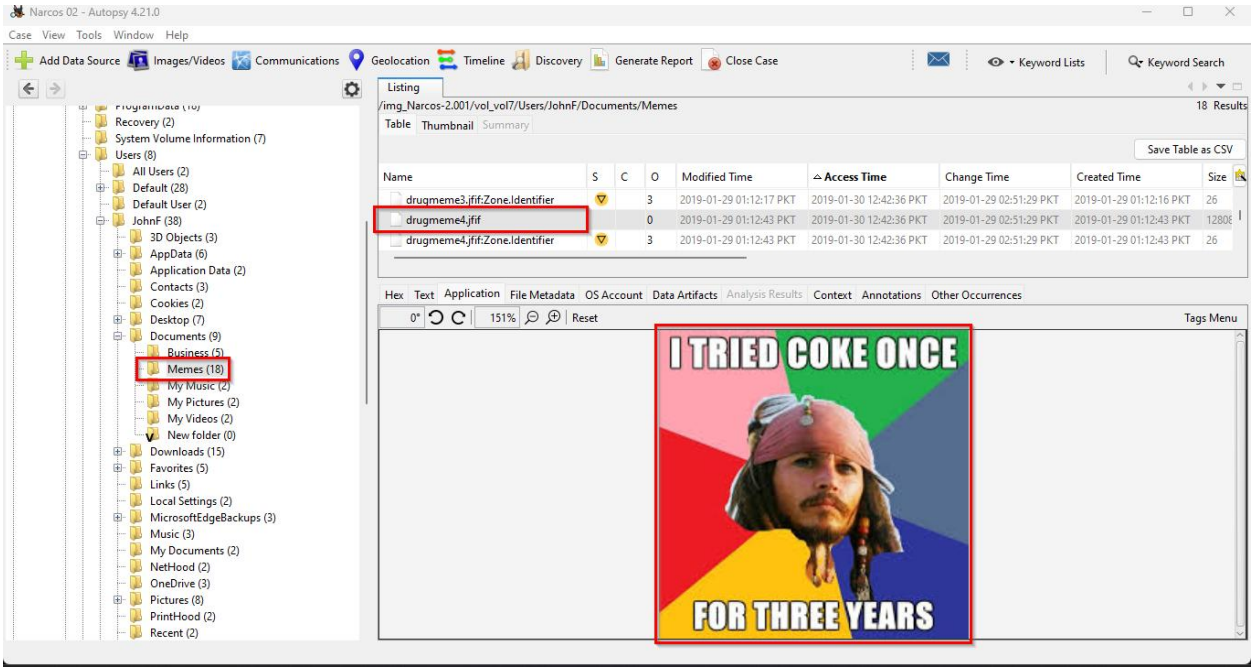


Figure 55 drugmeme4.jfif

drugmeme5.jfif

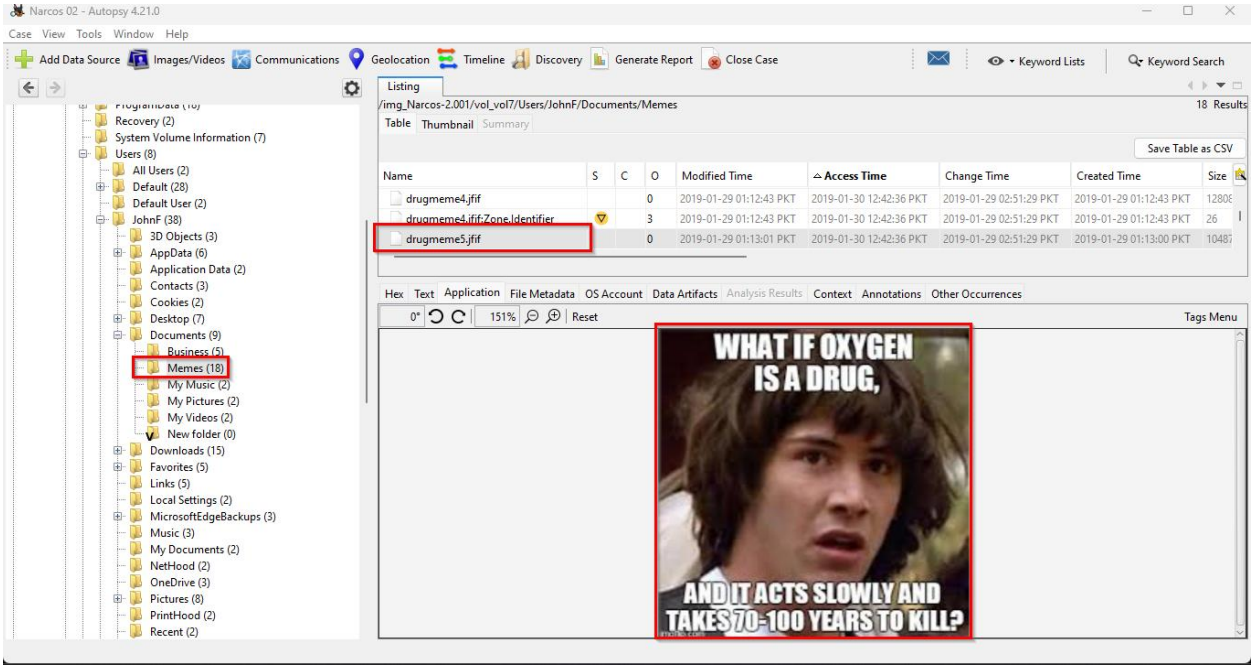


Figure 56 drugmeme5.jfif

drugmeme6.jfif

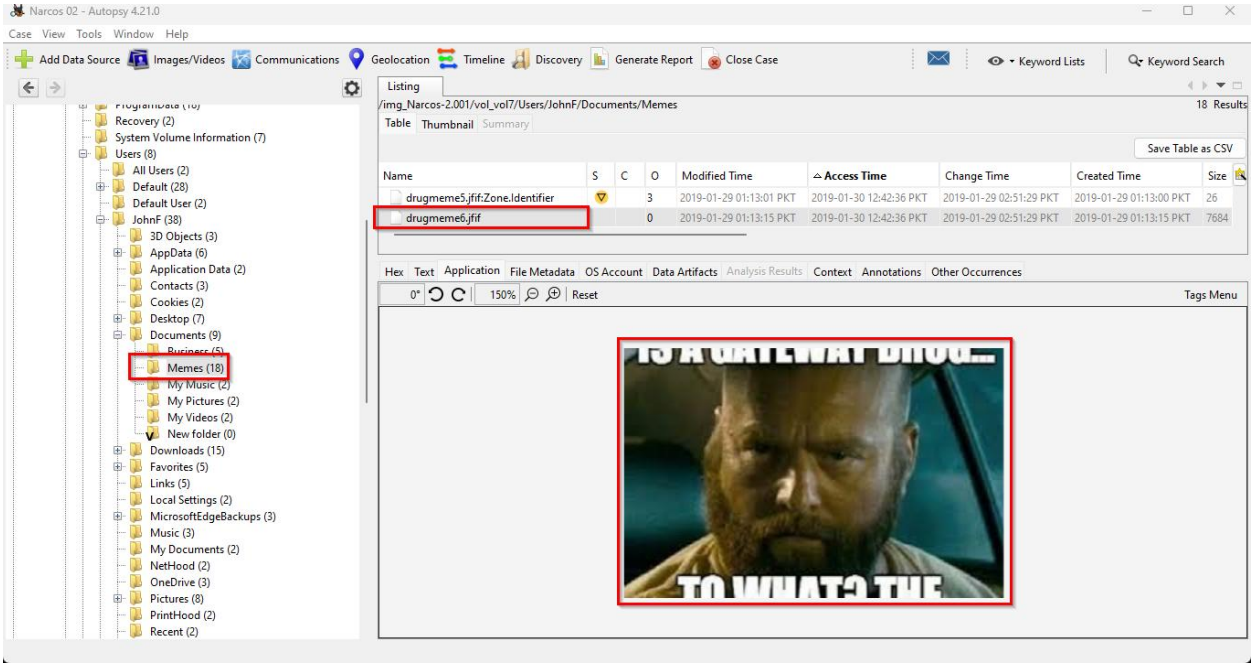


Figure 57 drugmeme6.jfif

drugmeme2.jfif

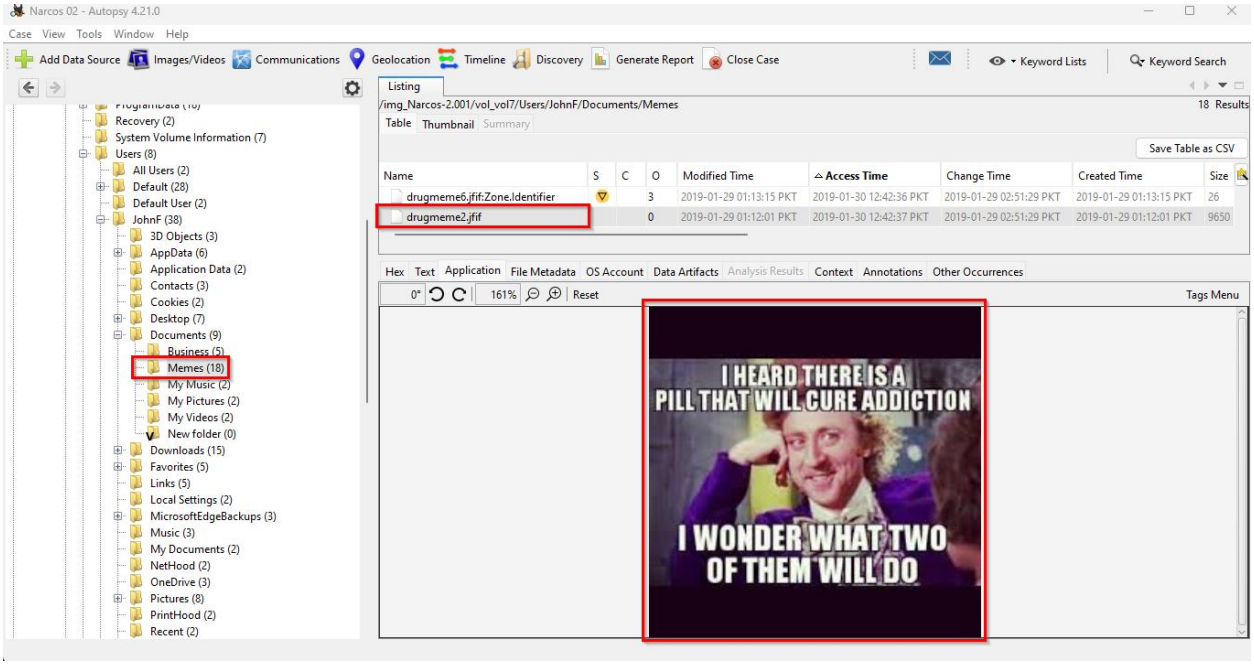


Figure 58 drugmeme2.jfif

drugmeme 1.jfif

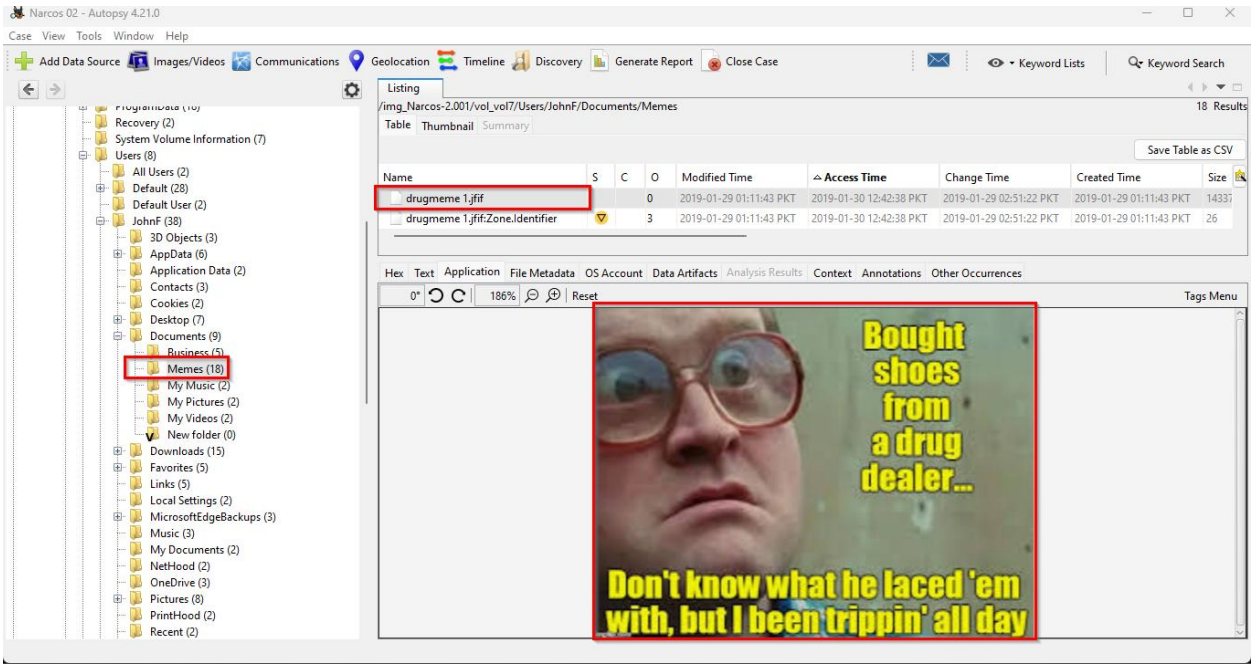


Figure 59 drugmeme 1.jfif

1540752698-brisbane.jpg

Below is the same bridge image which was found on the Steve systems. This again cements this idea that Steve and John are in communication with each other

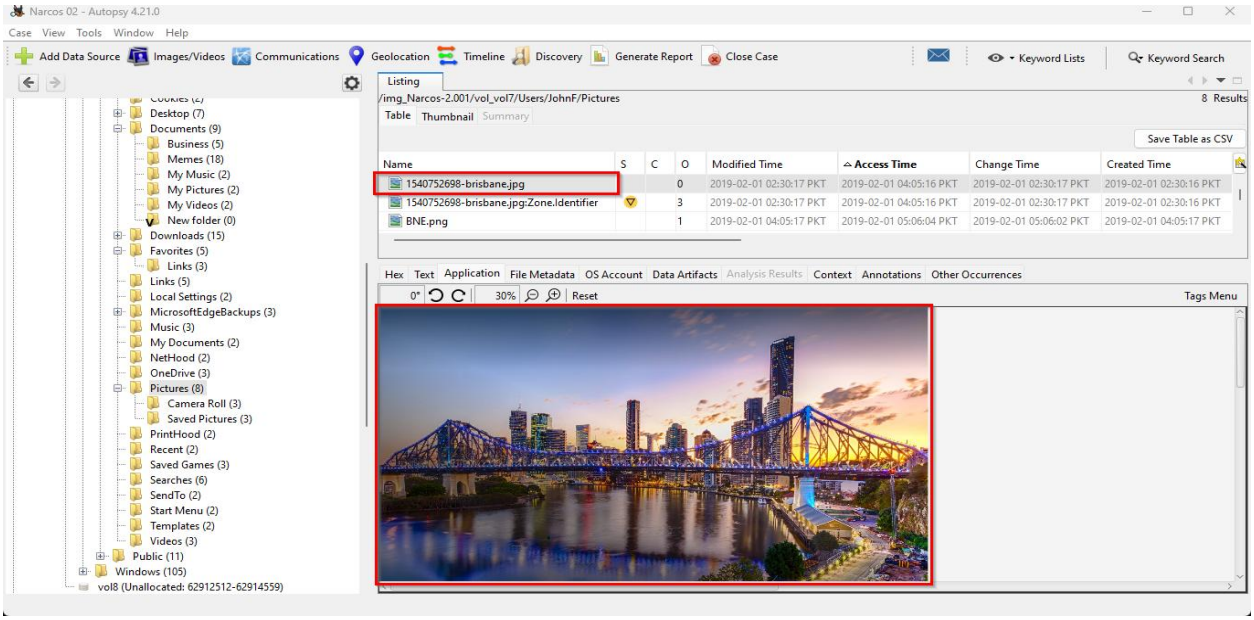


Figure 60 1540752698-brisbane.jpg

BNE.png

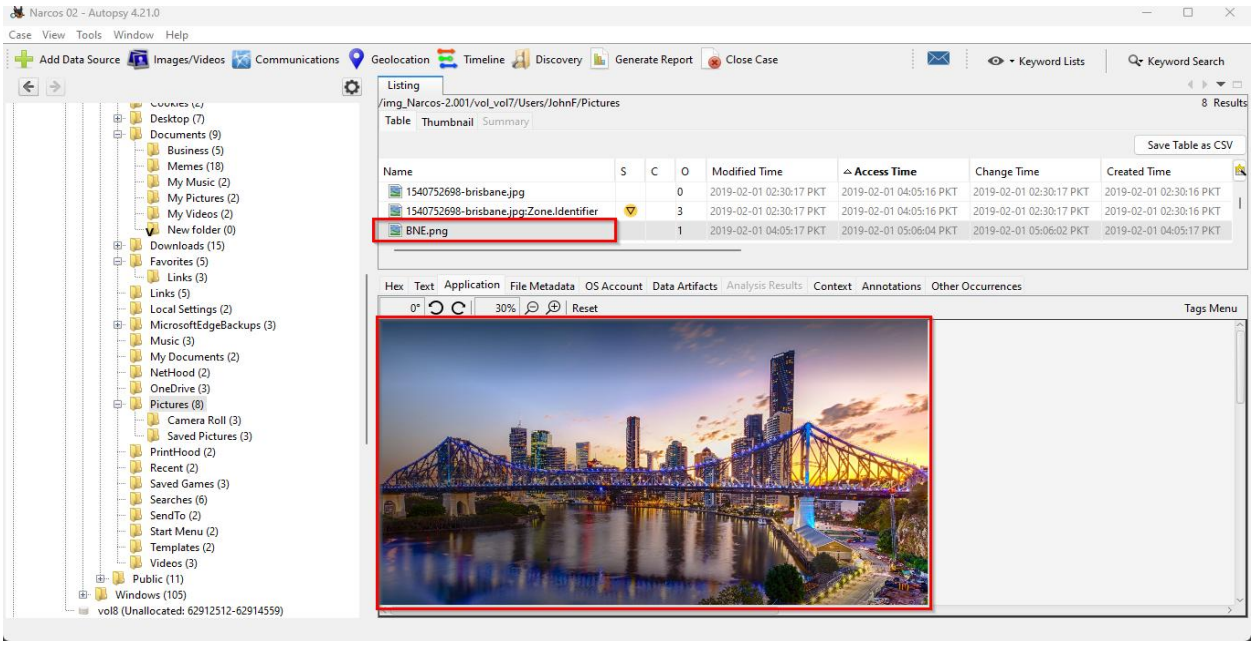


Figure 61 BNE.png

3.4 Binary Files

Executable files tend to be binary files. Some of the suspect's binary file which were discovered are given below.

3.4.1 Steve Kowhai:

Possible Binary Files present on Johns System.

1. CCleaner v.5.52
2. VMware Tools v.10.2.0.7259539
3. TrueCrypt v.7.1a
4. Discord
5. Image Steganography

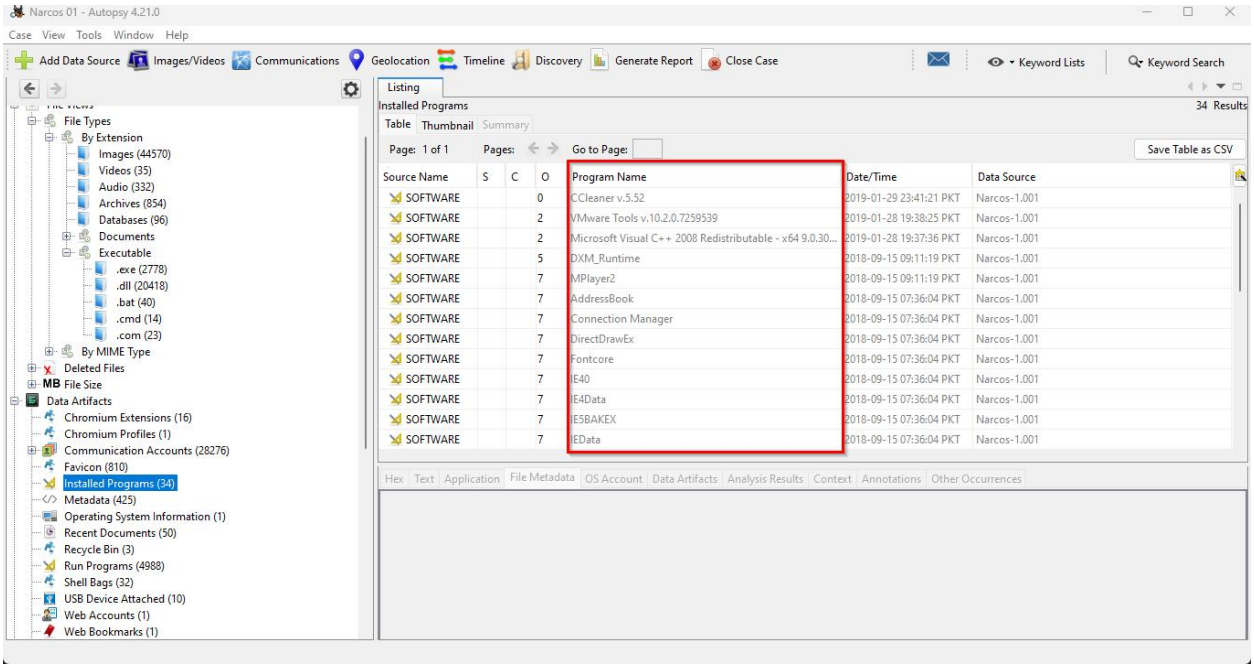


Figure 62 Steve Kowhai Binary Files

3.4.2 Jane Esteban:

Possible Binary Files present on Johns System

1. VMware Tools v.10.2.0.7259539.
2. Discord

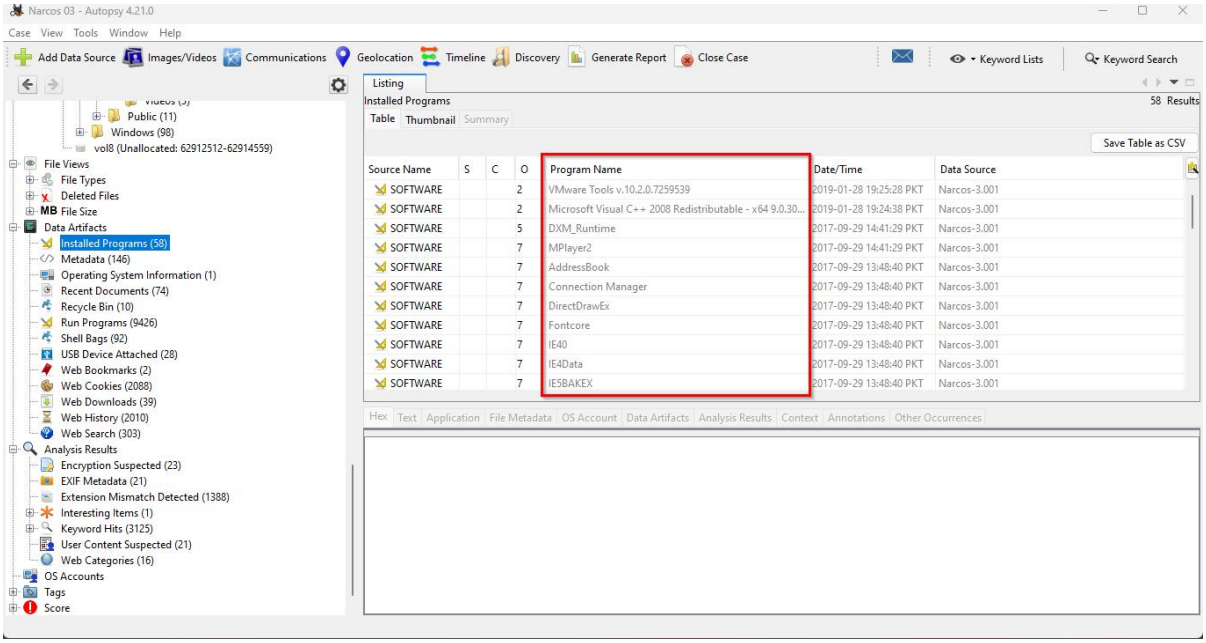


Figure 63 Jane Esteban Binary Files

3.4.3 John Fredricksen:

Possible Binary Files present on Johns System

3. VMware Tools v.10.2.0.7259539
4. TrueCrypt v.7.1a
5. Baidu Antivirus v.5.4.3.147185
6. OpenOffice 4.1.6 v.4.16.9790
7. BAV mini setup / _bavfr

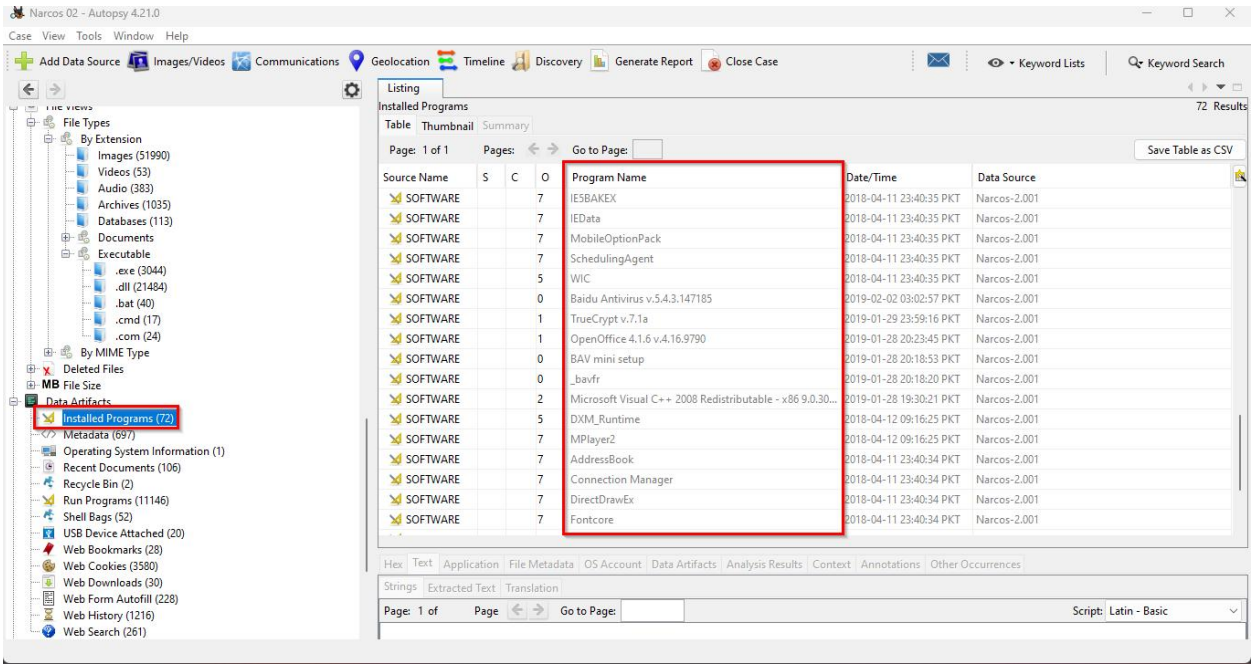


Figure 64 John Fredricksen Binary Files

3.5 Content and Communication between Suspects

Some chats were discovered from the systems. These chats were discovered in discord a platform where people can have voice chat and message each other with the ability to share your system screen as well. Some chats were encrypted but we were able to decrypt them.

Below are some chats which were discovered.

3.5.1 John Fredricksen and Steve Kowhai:

John: New supplier eh? Definitely Interested! Can I get 10 keys of it delivered to Wellington

Steve: Yeah yeah probably wiser, good one. In fact I have already put a document together in anticipation of chatting with you. I'll send it through now. It contains some information regarding how I see this working out. Let me know what you think once you have read it. S O

John: Good Thinking, I already know how. Heard of steganography?

Steve: A way of hiding one image within another. There's a simple application called 'Image Steganography'.

John: Ya.. I just told you about the tool :face_palm: Received it. Will check to see if it works and confirm soon.

Steve: Good. Meet at the Eastbourne library and if we miss each other come to 666 Rewera Avenue, Petone.

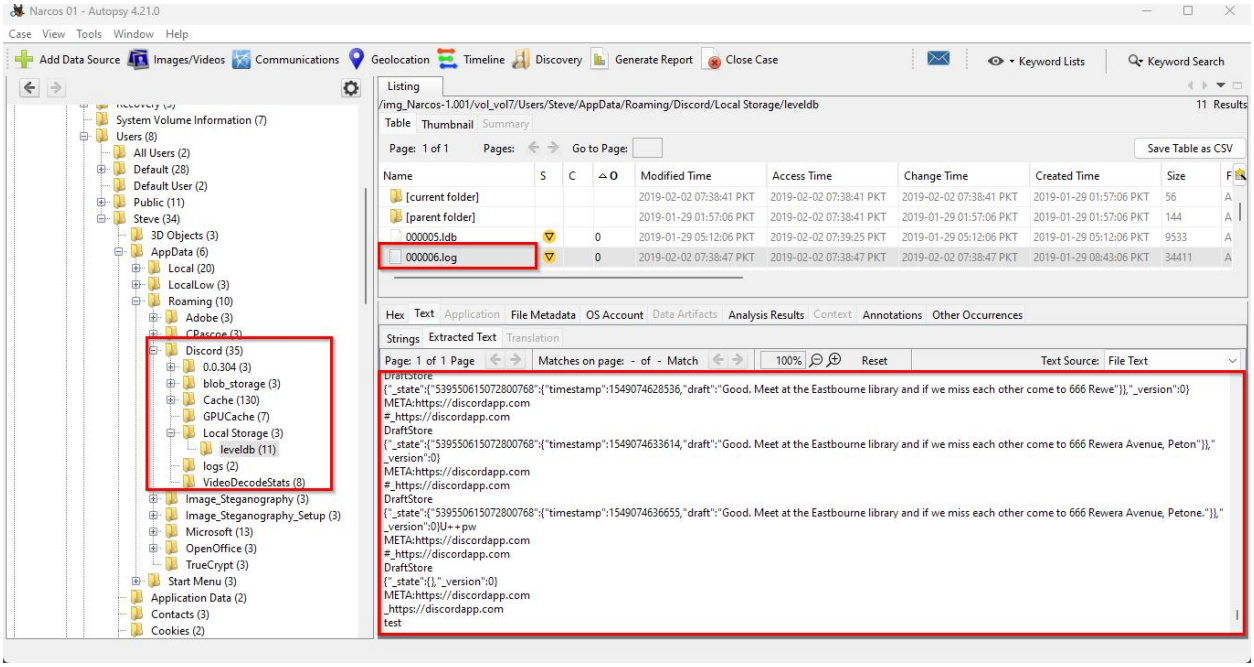


Figure 65 John Fredricksen and Steve Kowhai Discord Chat

3.5.2 John Fredricksen and Jane Esteban:

John: Planning a shipment within the next month. Shut up and wait. How much do you want?

John: Good, now that's what I wanted to hear. Here is the plan. You and I will be acting like a couple travelling on a holiday to New Zealand. This is what I want you to do: Look the part, act normal, and don't tell anyone about what we're doing. Understood?

John: Good. Talk tomorrow at 3PM or else

John: ah bugger wrong person, disregard

Jane: I want to send an image of something to you but it needs to be done safely. Any ideas?

John: No what's that?

Jane: Okay, I'll have a look and see if I can get it to work and then send the image through

Jane: It worked, sending it and the password via email now. I used a tool called image steganography..

John: Right. What's your full name and date of birth? I need it for booking the flights ASAP.

John: Flights booked. I'll pick you up from the Woolworths (133 Oxley Station Rd, Oxley QLD 407, Australia) at ... Just bring yourself I'll cover everything else

John: See you soon. John out

3.5.3 Jane Esteban Mail:

Proton Mail: becomingjane@protonmail.com

Below are all the mail that Jane had sent. Looking at all the evidence gathered till now it seems they were sent to john.

1. Got any of that ice??
2. Also I've got some friends that want to score too. Here's their contact card
3. The usual
4. What is it...
5. Umm I don't know, sounds pretty risky
6. Err nah I'm not keen
7. WHAT! Please, I swear whatever you need I'll do it... I've put them through enough as it is. What do you want from me??
8. Yes John got it
9. My full name is Jane Esteban and my birthday is 13/07/1992
10. I'll be there

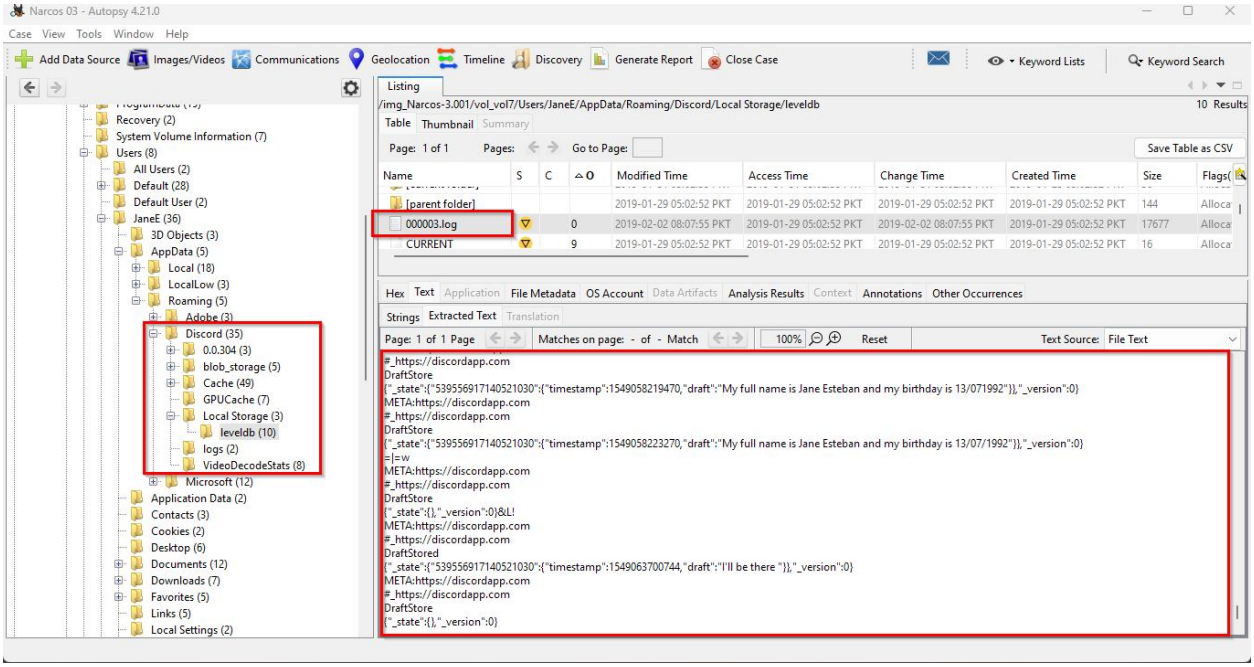


Figure 66 John Fredricksen and Jane Esteban Discord Chat

[SPACE INTENTIONALLY LEFT BLANK]

3.6 Documents

3.6.1 Steve Kowhai:

These documents were discovered on Steve Kowhai's system.

TrueCrypt User Guide.pdf

Below is the user guide for a software named TrueCrypt. TrueCrypt can create a virtual encrypted disk within a file, encrypt a partition, or encrypt the whole storage device. Hinting towards Steve probably encrypting bunch of suspicious files.


TRUECRYPT

USER'S GUIDE

Version Information

Legal Notices

Figure 67 TrueCrypt User Guide.pdf

Getting started with OneDrive.pdf

A OneDrive starting document which was discovered on Steve's system. Hinting to maybe Steve hiding something on his drives.

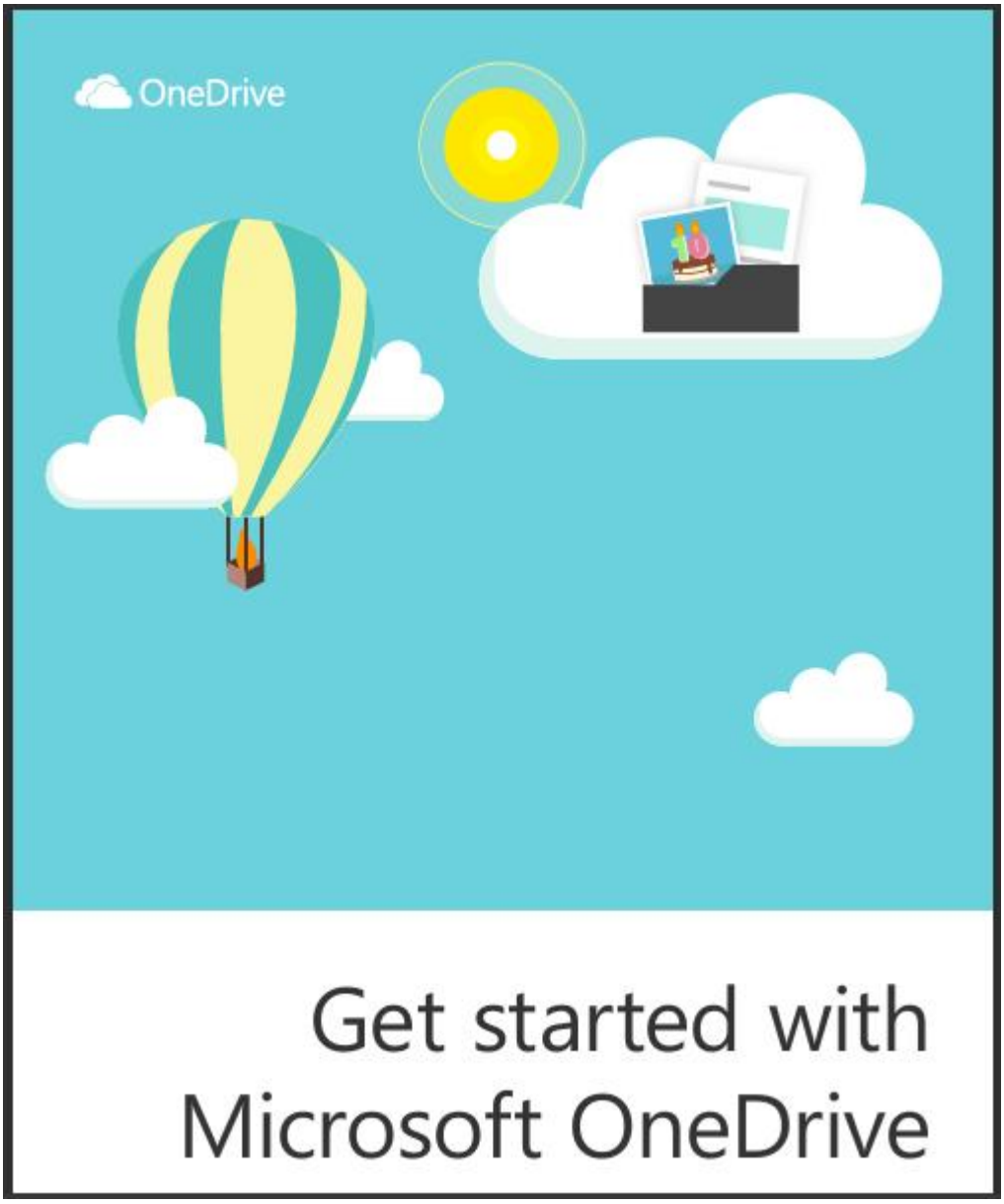


Figure 68 Getting started with OneDrive.pdf

3.6.2 John Fredricksen

client.ods

On John Fredricksen system there was an excel sheet discovered. This sheet lists people's names, Location, Product, Amount and Delivery period was discovered. We can see Jake Heke whose DHL shipment detail was discovered previously by the images. Also, Steve Kowhai and Jane Estebane were also discovered. This also makes us believe Steve is also a drug distributor like Steve Kowhai.

	A	B	C	D	E	F
1	Name	Location	Product	Amount	Delivery	
2	Ricky Ross	Los Angeles	Mama Coca	20kg	Monthly	
3	Frank Lucas	New York, USA	Ferry Dust	15kg	Quarterly	
4	Chris Coke	Kingston Jamaica	Coke	20kg	Monthly	
5	Steve Kowhai	Wellington, New Zealand	Crank	15kg	Monthly	
6	Don Cholito	Puerto Rico	Snow	25kg	Quarterly	
7	Manuel Noriega	Panama	Smack	15kg	Monthly	
8	Joaquin Guzman	Guadalajara, Mexico	China White	15kg	Monthly	
9	Leroy Barnes	New York, USA	Load pack	15kg	Quarterly	
10	AL Capone	Siciliy, Italy	Silly putty	25kg	Monthly	
11	Jane Esteban	Brisbane, Austraila	Uppers	1 gram	On demand	
12	Pablo Esocbar	Colombia	White horse	15kg	Quarterly	
13	Franz Sanchez	Isthmus City	Mary Jane	20kg	Quarterly	
14	Jake Heke	Auckland	Tweak	10kg	Monthly	
15						
16						

Figure 69 client.ods

f0240272.odt

On John's system a word file discovered in this file we can see the actual planning done by John before going to Wellington, New Zealand.

We can see that he thinks between the road and sea. From previous evidence we know that he settles on air as he thinks the sea is much more vulnerable than it looks. He contemplates that shipping the product might be safer but costs higher for a small package. He also mentions this is a quality test for the product. Depending on this he might do future business. Then we can see that he settles for air as it is much cheaper for all the parties involved. Then he shows map of main drug trafficking and a inter regional map for drug trafficking.

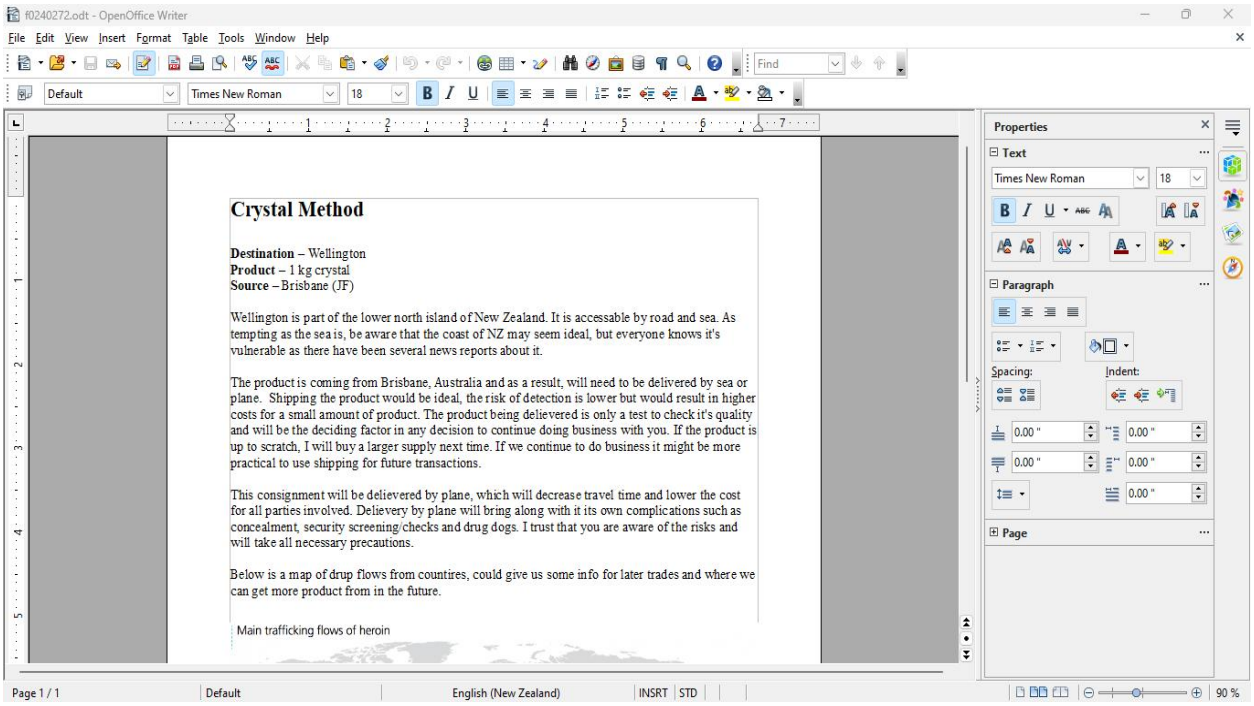


Figure 70 f0240272.odt

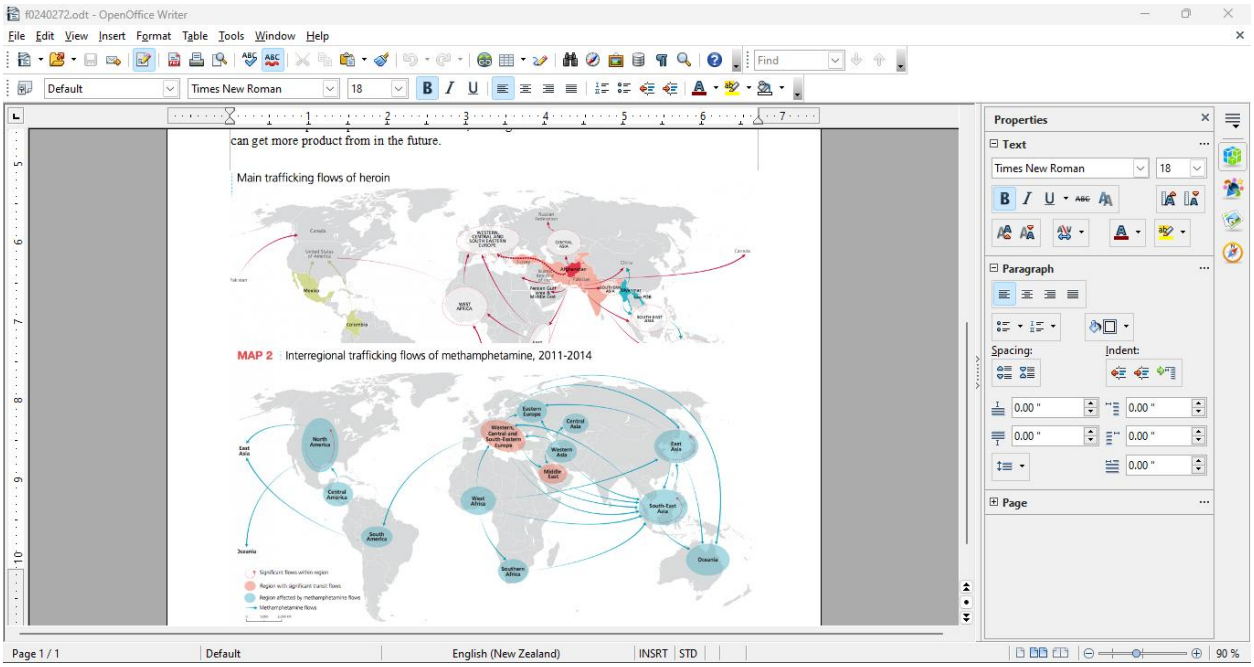
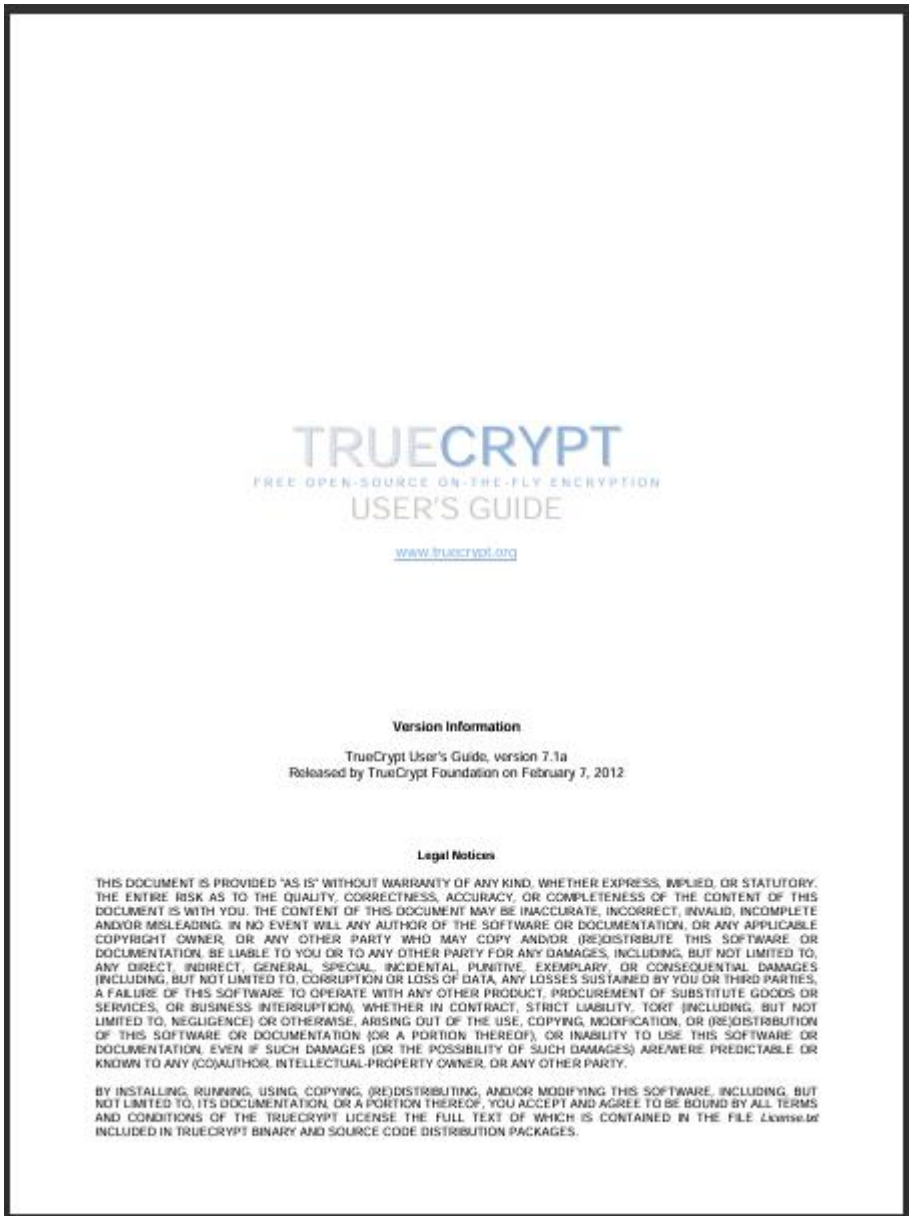


Figure 71 f0240272.odt

[SPACE INTENTIONALLY LEFT BLANK]

TrueCrypt User Guide.pdf

Same TrueCrypt encryption guide which was found on Steve Kowhai's System was found.



TRUECRYPT

FREE OPEN-SOURCE ON-THE-FLY ENCRYPTION

USER'S GUIDE

www.truecrypt.org

Version Information

TrueCrypt User's Guide, version 7.1a
Released by TrueCrypt Foundation on February 7, 2012

Legal Notices

THIS DOCUMENT IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED, OR STATUTORY. THE ENTIRE RISK AS TO THE QUALITY, CORRECTNESS, ACCURACY, OR COMPLETENESS OF THE CONTENT OF THIS DOCUMENT IS WITH YOU. THE CONTENT OF THIS DOCUMENT MAY BE INACCURATE, INCORRECT, INVALID, INCOMPLETE AND/OR MISLEADING. IN NO EVENT WILL ANY AUTHOR OF THE SOFTWARE OR DOCUMENTATION, OR ANY APPLICABLE COPYRIGHT OWNER, OR ANY OTHER PARTY WHO MAY COPY AND/OR (RE)DISTRIBUTE THIS SOFTWARE OR DOCUMENTATION, BE LIABLE TO YOU OR TO ANY OTHER PARTY FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, ANY DIRECT, INDIRECT, GENERAL, SPECIAL, INCIDENTAL, PUNITIVE, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, CORRUPTION OR LOSS OF DATA, ANY LOSSES SUSTAINED BY YOU OR THIRD PARTIES, A FAILURE OF THIS SOFTWARE TO OPERATE WITH ANY OTHER PRODUCT, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES, OR BUSINESS INTERRUPTION), WHETHER IN CONTRACT, STRICT LIABILITY, TORT (INCLUDING, BUT NOT LIMITED TO, NEGLIGENCE) OR OTHERWISE, ARISING OUT OF THE USE, COPYING, MODIFICATION, OR (RE)DISTRIBUTION OF THIS SOFTWARE OR DOCUMENTATION (OR A PORTION THEREOF), OR INABILITY TO USE THIS SOFTWARE OR DOCUMENTATION, EVEN IF SUCH DAMAGES (OR THE POSSIBILITY OF SUCH DAMAGES) ARE/WERE PREDICTABLE OR KNOWN TO ANY (CO)AUTHOR, INTELLECTUAL-PROPERTY OWNER, OR ANY OTHER PARTY.

BY INSTALLING, RUNNING, USING, COPYING, (RE)DISTRIBUTING, AND/OR MODIFYING THIS SOFTWARE, INCLUDING, BUT NOT LIMITED TO, ITS DOCUMENTATION, OR A PORTION THEREOF, YOU ACCEPT AND AGREE TO BE BOUND BY ALL TERMS AND CONDITIONS OF THE TRUECRYPT LICENSE THE FULL TEXT OF WHICH IS CONTAINED IN THE FILE *License.txt* INCLUDED IN TRUECRYPT BINARY AND SOURCE CODE DISTRIBUTION PACKAGES.

Figure 72 TrueCrypt User Guide.pdf

3.6.3 Jane Esteban

course-undercover-survival.pdf

On Jane Esteban System this undercover cop survival course pamphlet was discovered. Looking at the previous evidence this cements Jane as an undercover cop.

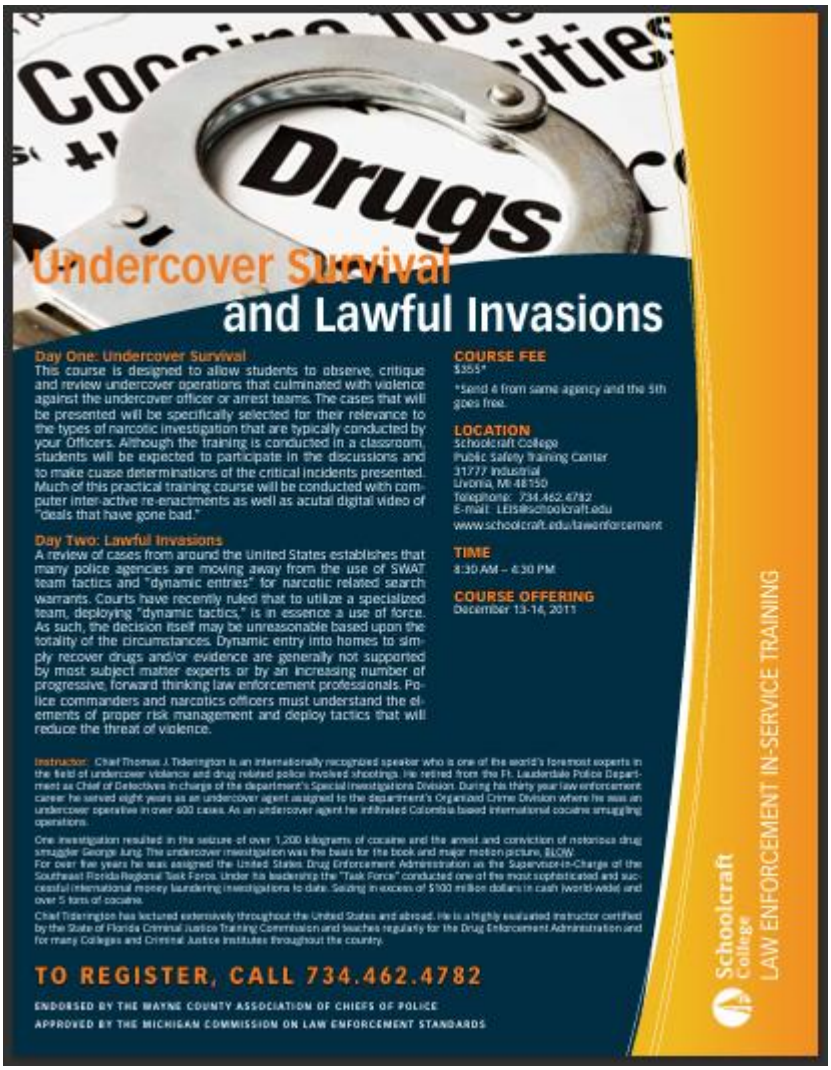


Figure 73 course-undercover-survival.pdf

Getting started with OneDrive.pdf

Same OneDrive pdf like Steve Kowhai was discovered.

Figure 74 Getting started with OneDrive.pdf

3.7 Obfuscation Methods

Obfuscation refers to transforming the regular code into a human unreadable form which causes more complexity in static detection and analysis. Here we can see bunch of files with nonsensical data which is sign of obfuscation.

In this case a bunch of web history relating to image steganography was discovered with many starting guides for tools were discovered in the systems of suspects. This can be seen by going through the documents and the discord chats where image steganography was mentioned

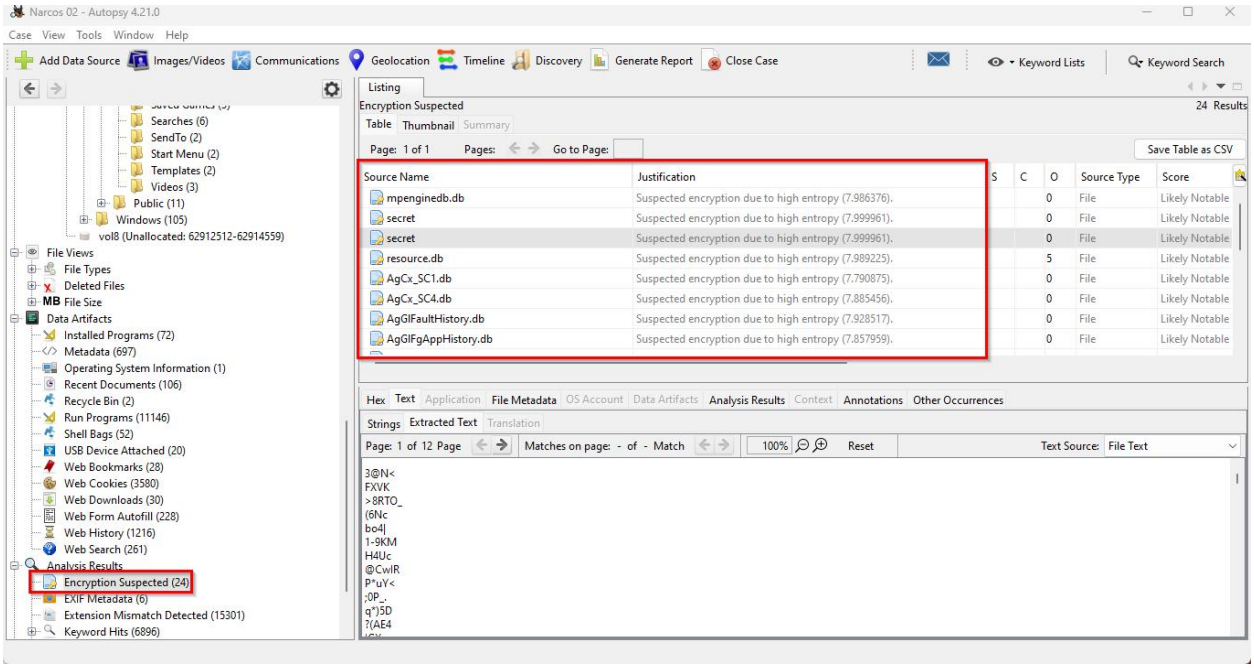


Figure 75 Obfuscated Files

3.8 Encryption Methods

There was only 1 type of encryption methods discovered during this evidence gathering which is:

- Truecrypt

TrueCrypt is a discontinued open-source utility used for on-the-fly disk encryption. Although it is no longer maintained, it is still widely used in legacy systems.

These encryption standard documents were also discovered previously.

Two methods to circumvent the encryption used by TrueCrypt are:

1. **Brute Force Attack:** This involves systematically trying all possible combinations until the correct one is found. This is often impractical due to the time required but can be feasible with weak passwords.
2. **Forensic Analysis and Password Guessing:** Using sophisticated tools like Passware Kit or Elcomsoft Forensic Disk Decryptor can exploit weaknesses in password creation or potential keyloggers on the suspect's machine.

3.9 Malware used

A malware was discovered on John Fredricksen's system. From the previous binary files this file turned out to be malware. For confirmation we used virus total which consists of backlog of large amount of malware which are discovered around the world.

It's a trojan which is used to steal baking credentials. Hinting towards John being much more of a computer man then he seemed before.

Name: Contact Card.exe

MD5 Hash: 409b88b2b275353f2ca05983cef1abf5

SHA-256 Hash: d56dd549736bda8fd1ebc8ae17c0b642c1df0fb5ce5e824b723d9b3f29da38c3

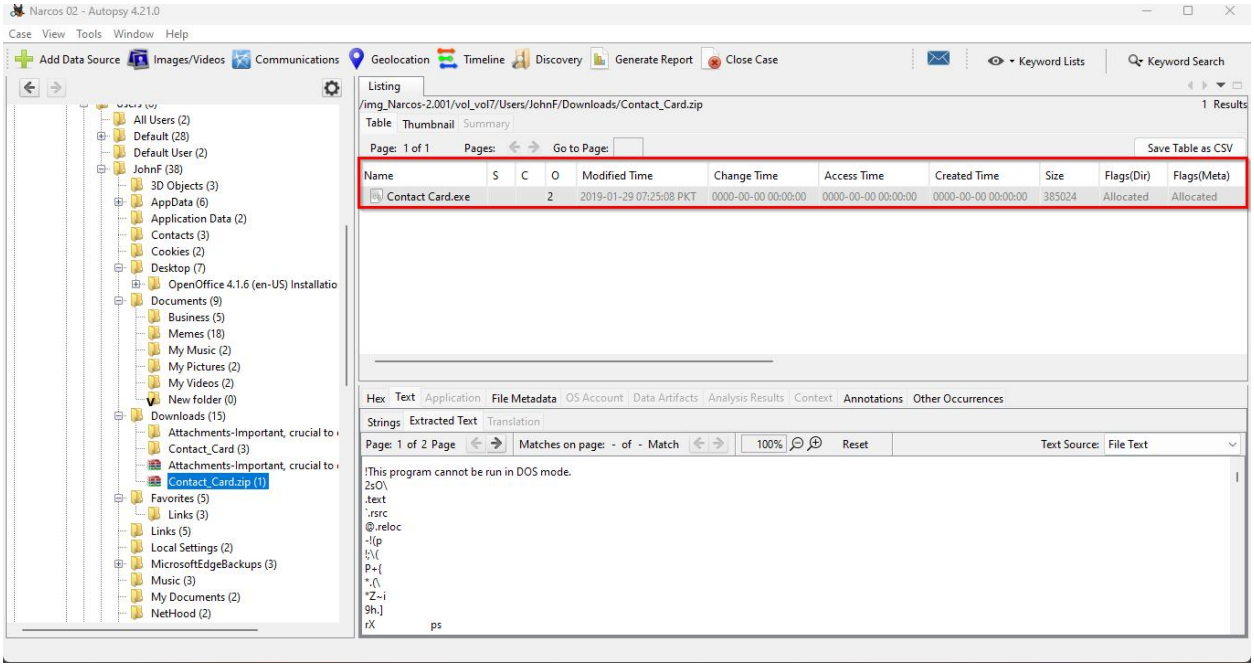


Figure 76 Contact Card.exe

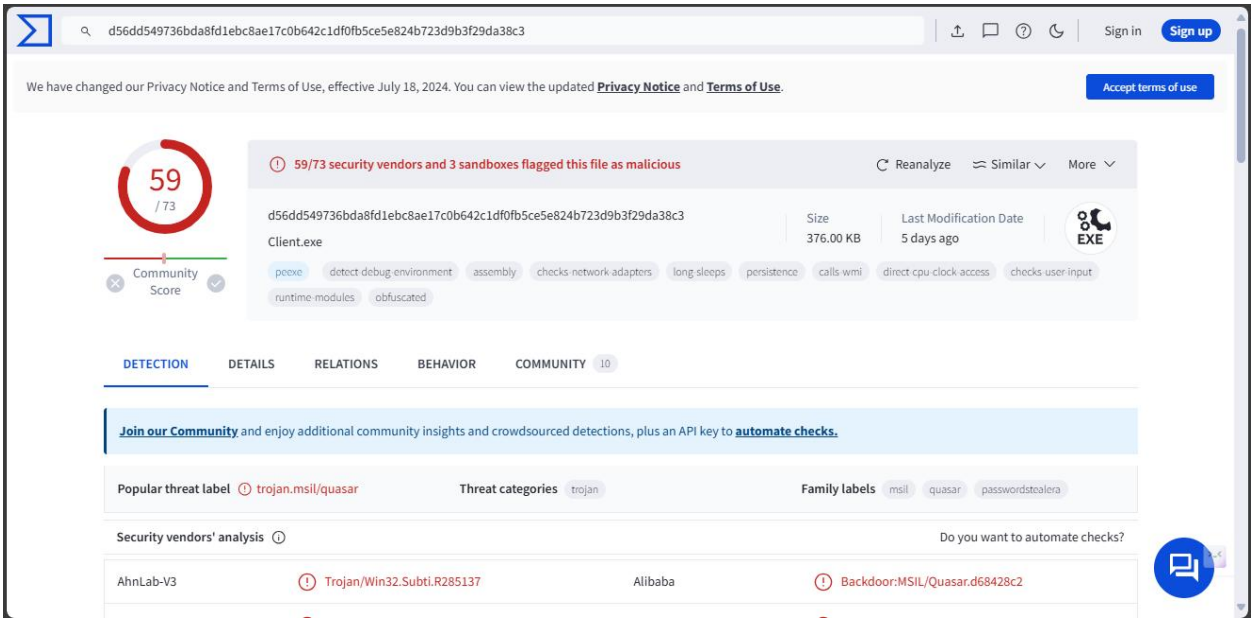


Figure 77 Virus Total Contact Card.exe output

3.10 Vulnerability exploited for Malware

The malware was spread by Jane through discord. When she said that she would be sharing the list of people who wants to buy the drugs in discord she shared this Malware with John. The possible use for this malware is to infect John's system and get credentials from him.

[SPACE INTENTIONALLY LEFT BLANK]

3.11 Corroborative evidence

I used Autopsy's Timeline tool to help me to visualize and analyze system and user activities over time. This timeline can be matched with any testimony to confirm their validity of case timeline.

3.11.1 Steve Kowhai:

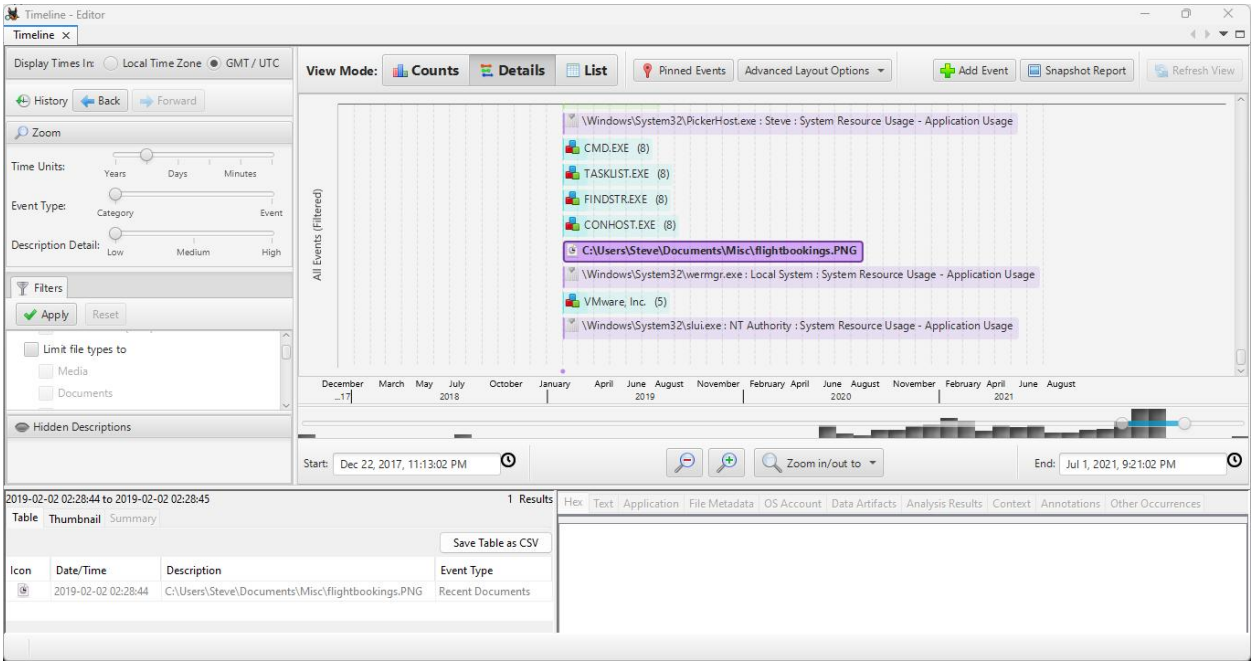


Figure 78 Steve Kowhai Timeline

[SPACE INTENTIONALLY LEFT BLANK]

3.11.2 John Fredricksen:

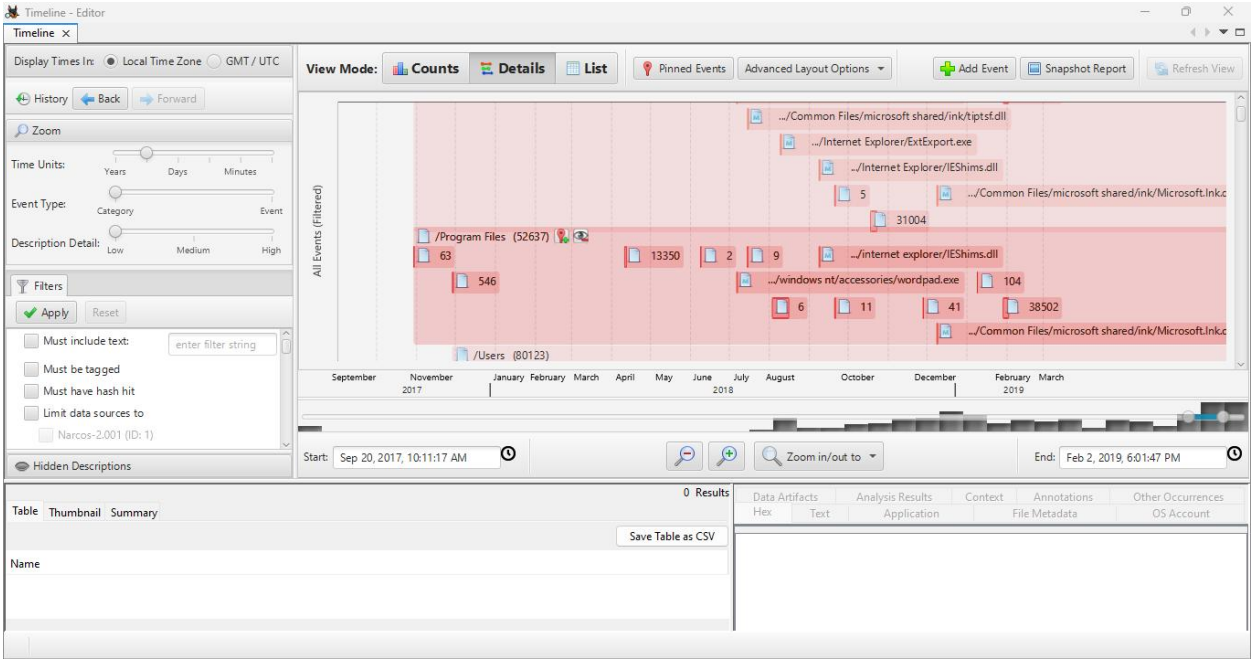


Figure 79 John Fredricksen Timeline

3.11.3 Jane Esteban:

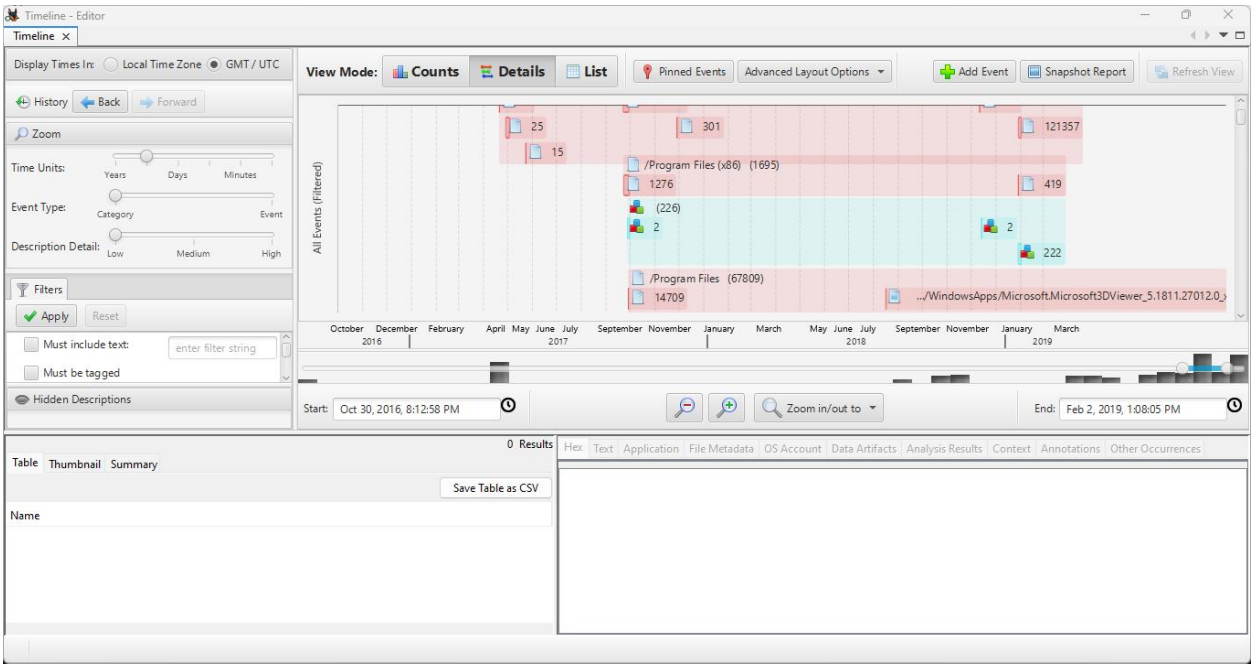


Figure 80 Jane Esteban Timeline

3.12 Artifact changes across different windows 10 Builds

The analysis revealed that there are significant changes in the windows artifacts across the system.

For Example:

- The Flight Booking Detail Picture has accessed date on Steve is 2019-02-02 02:31:06 UTC while on John accessed date is 2019-02-02 01:57:27 UTC.
- The BNE image which shows Australia Houses Rivers Bridges Roads Brisbane Night Cities photo present in both Steve and John have different accessed time. The John accessed date is 2019-02-01 12:06:04 UTC and Steve accessed date is 2019-02-02 02:31:06 UTC.

Likewise, there are a lot of artifacts which have significant changes in windows artifacts.

3.13 Suspects Roles

Below are the suspects' roles discovered in this forensic investigation.

3.12.1 Steve Kowhai

Steve Kowhai role has become clear from this investigation as a gang affiliated drug dealer who was the one buying some drugs from ‘John Fredricksen’ to further his business in New Zealand.

3.12.2 John Fredricksen

John Fredricksen role has become clear as a drug dealer in his country. Form the images and from all the files discovered we can see that John had also planned to deliver a drug sample to Wellington, New Zealand.

3.12.3 Jane Esteban

Jane Esteban role has become clear as an undercover cop which is acting like a drug addict to get information from John Fredricksen. Possibly she was the who leaked the delivery information and led to their arrest at the airport.

4. Summary and Conclusion

In Summary this report represents a detailed forensics investigation conducted by us into the activates and digital evidence related to the suspects involved namely Steve Kowhai, John Fredricksen, Jane Esteban involved in the drug smuggling operation intercepted by custom officials. Some Main points, Findings and recommendations.

Some digital evidence was gathered which can be used to identify the guilty and innocent in this case.

4.1 User Accounts:

Only one user account was discovered on all the systems leading us to believe there was only one user present on the system. Meaning no one else was secretly using their systems.

4.2 Web History and Images:

From the Web history, it was discovered that Steve Kowhai was a gang-affiliated drug dealer with John Fredricksen, who was also a drug distributor. John was also following many drug trends such as many drug memes and following many drugs related sub reddit's. John's web history showed that he was planning to hide the sample in a suitcase and was also shown to be looking for flights from Brisbane, Australia to Wellington, New Zealand. John was also shown to have mapped out his plan with all the flights already planned. While Jane was discovered to be an undercover cop trying to find ways to infiltrate this network and try to survive this operation.

4.3 Communication

There was some communication between Steve and John in which it was uncovered that John was planning on selling some drugs to Steve namely 'Crystal'. The Communication between John and Jane was also uncovered in which he talked to Jane like she was a courier for the package meaning on the day of arrest she was in possession of the drugs.

4.4 Documents

From the documents discovered we can see that John and Steve have implemented some kind of encryption to hide their wrongdoings and that they were actively searching for image steganography tools as well. On both Steve and Johns system the ‘Vera crypt’ user guide was discovered. On Johns, an excel sheet was discovered, listing the buyers and location with their name.

In this sheet Jane and Steves name were also written cementing that John was a drug Distributor.

Once again, Jane was discovered to be looking for a course with survival tips for undercover cops.

4.5 Conclusion

In conclusion, it was discovered that John Fredricksen was an active drug user and distributor with interregional and international connections and Steve was a gang-affiliated drug dealer. The digital evidence and analysis provide us with enough substantial evidence against these two individuals of being guilty. As for Jane Esteban it was made evident that she was an undercover cop trying to bust this drug trade and possibly was the one who relied the information for the arrest on the airport making her innocent of any crime and deserving of medal for her hard work and bravery in face of such dangers.

5. Appendix

5.1 Description of persons of interest

Actors	Description
Steve Kowhai	• Images retrieved. • Discord chat intercepted. • Web search Intercepted. • Was buying drug sample from John. • Had plans for drop off and escape. • Gang affiliated. • Drug Dealer/ Distributor.
Jane Esteban	• Images retrieved. • Discord chat intercepted. • Web search Intercepted. • Undercover cop. • Acted as a partner with John. • Hid samples in her suitcase. • Shared malware file with John.
John Fredricksen	• Images retrieved. • Discord chat intercepted. • Web search Intercepted. • Very active in drugs sub reddit. • Drug user and distributor. • Regional and inter regional distributor. • Sold the drug sample to Steve. • Planned to use Jane as mule.

5.2 Association Diagram of persons of interest

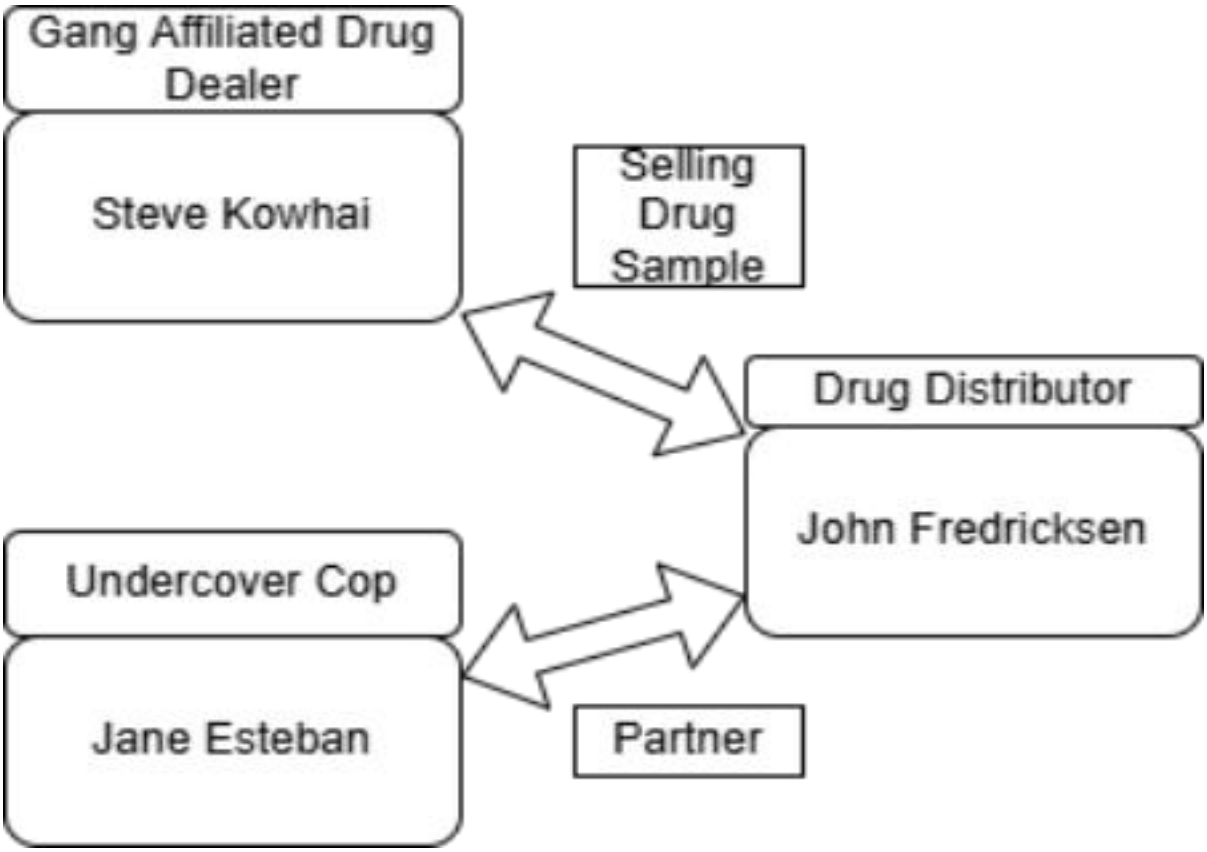
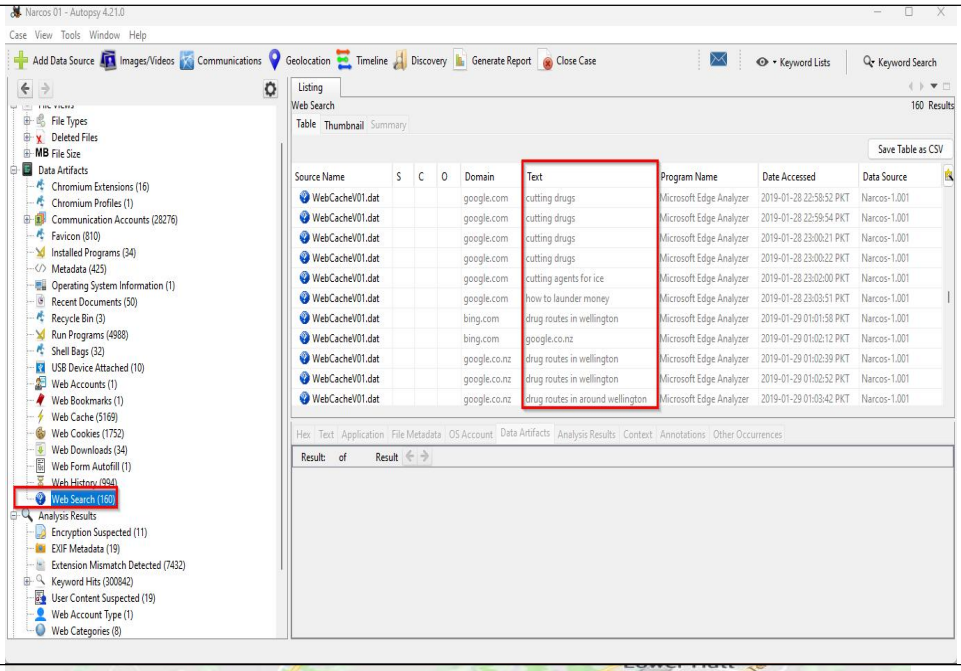
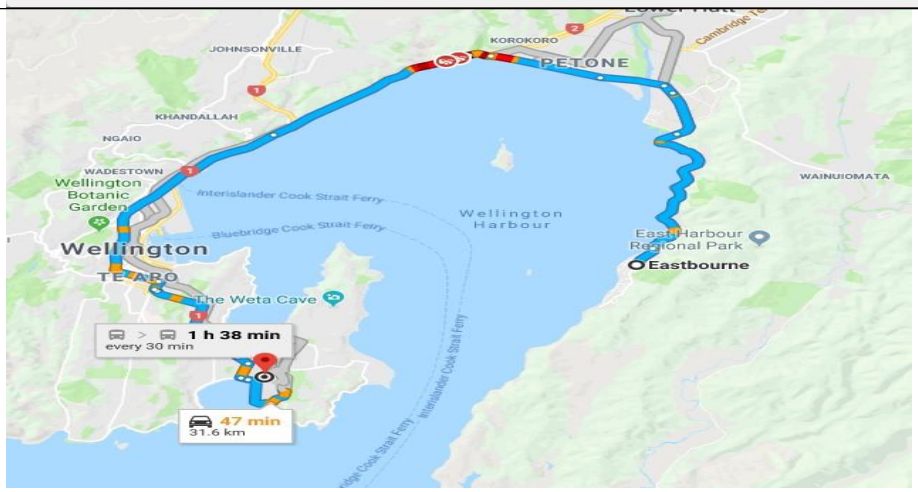
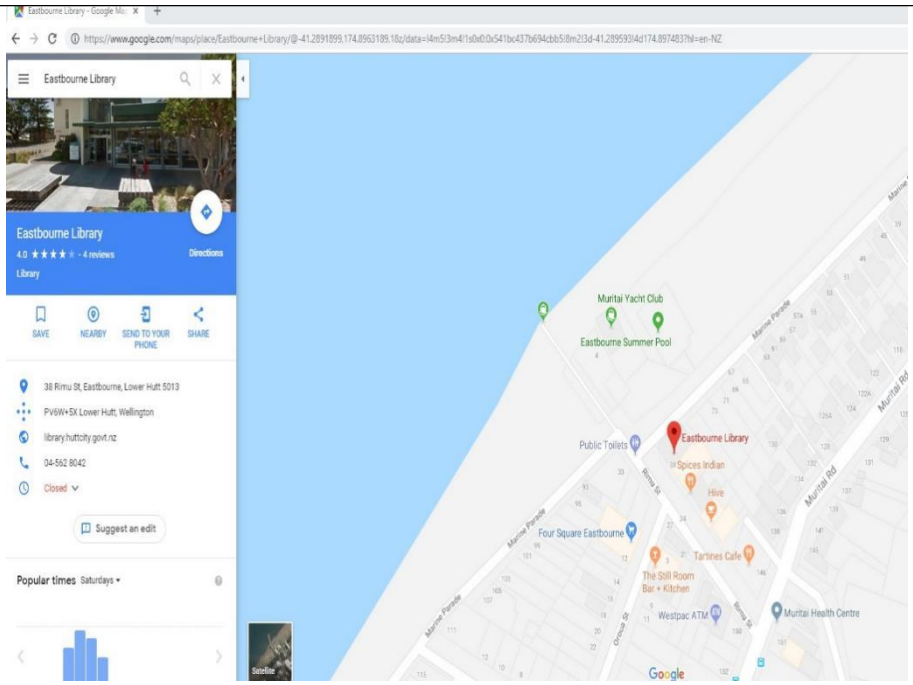
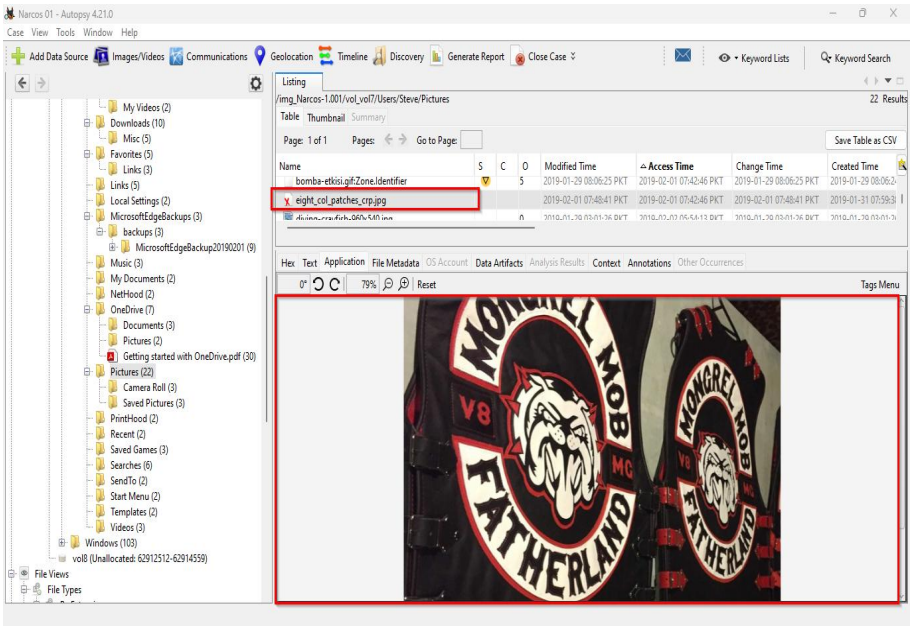


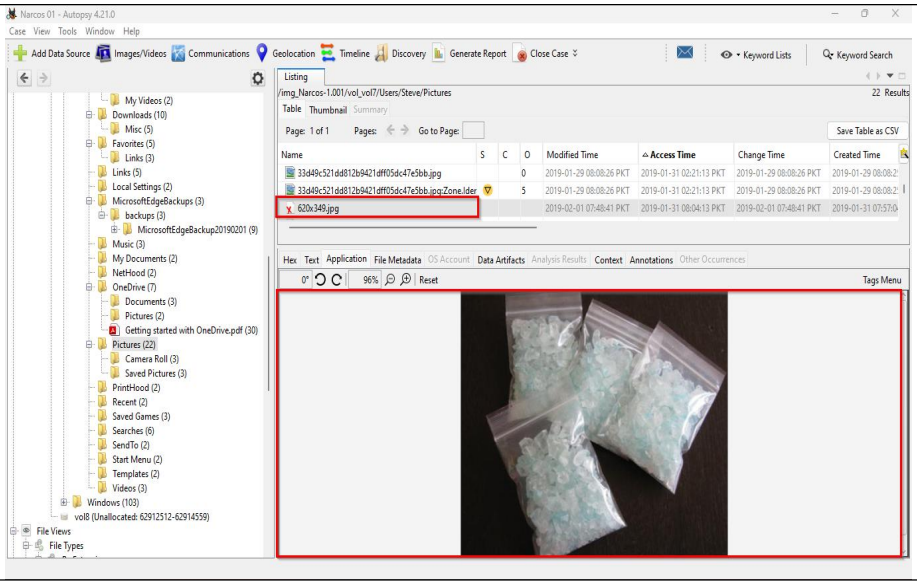
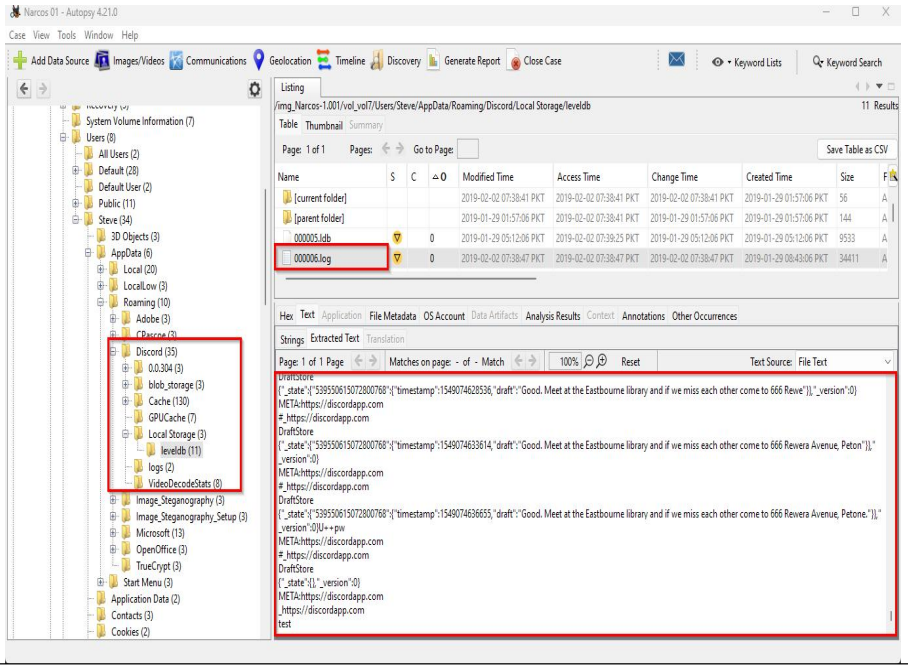
Figure 81 Association Diagram of persons of interest

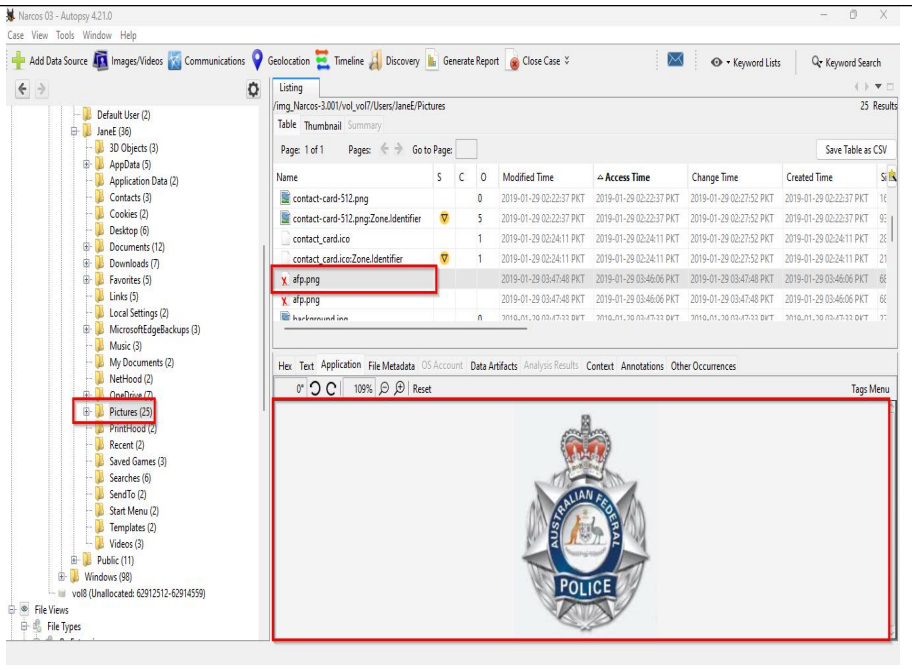
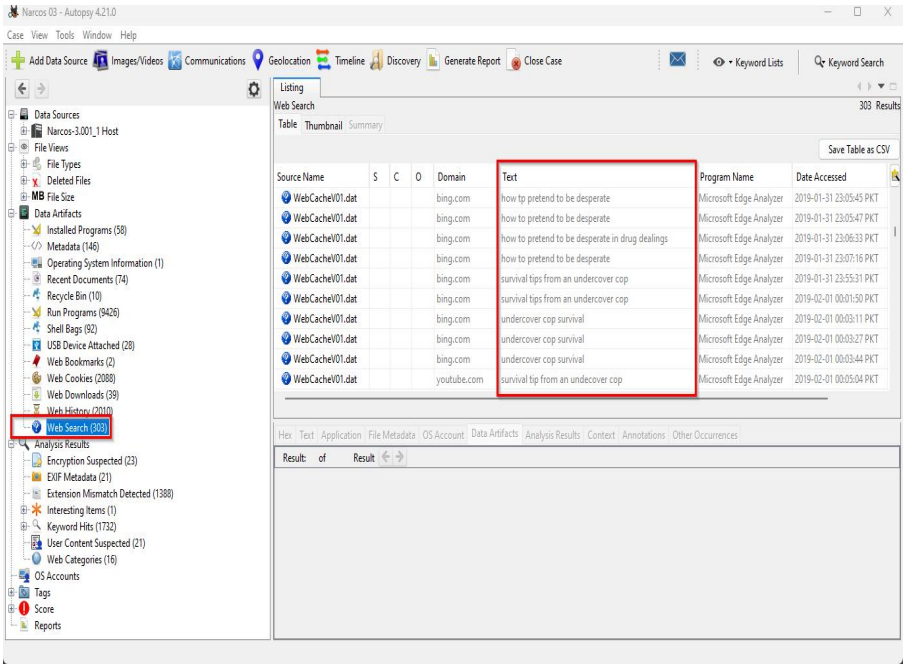
5.3 Evidence Listing

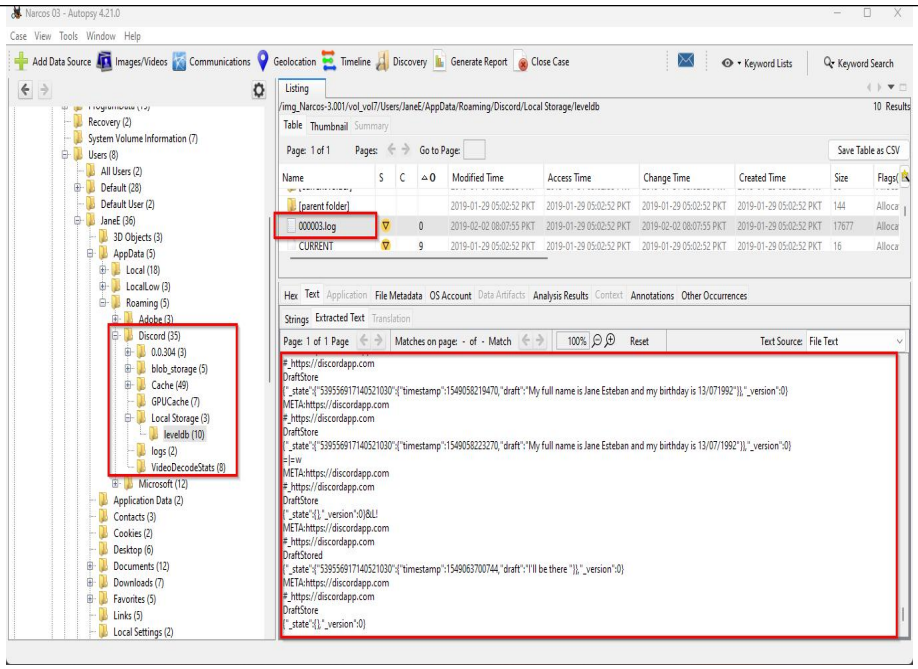
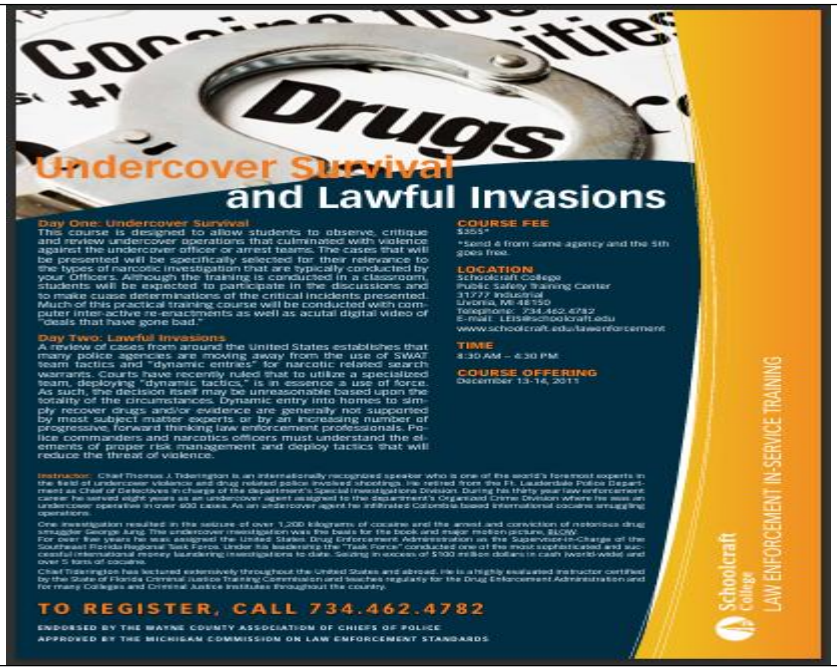
Actor Name	Evidence type	Evidence Image
Steve Kowhai	Web History	
	Images	

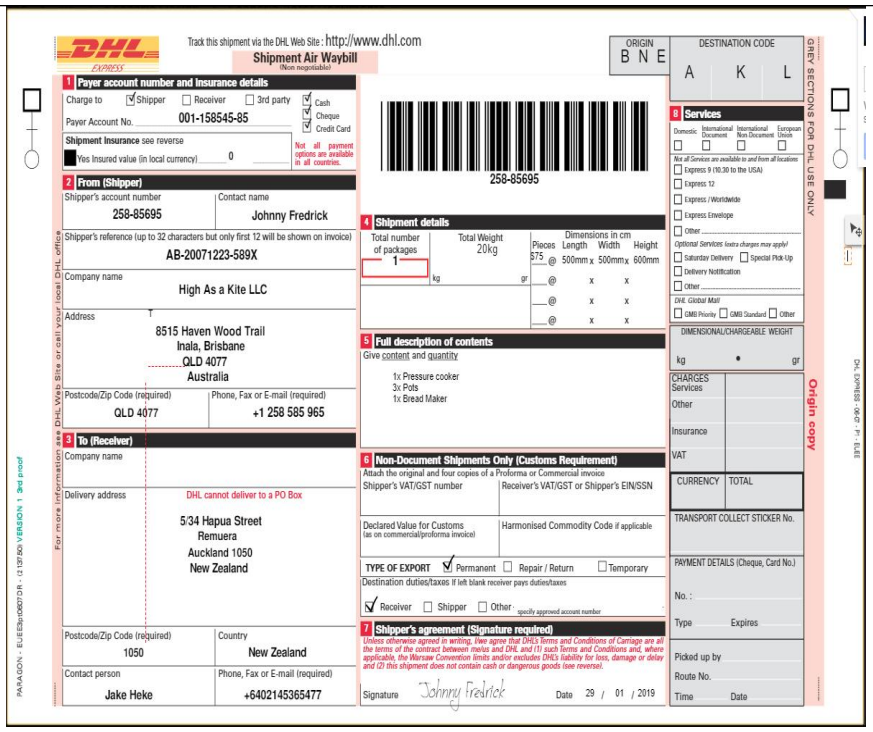
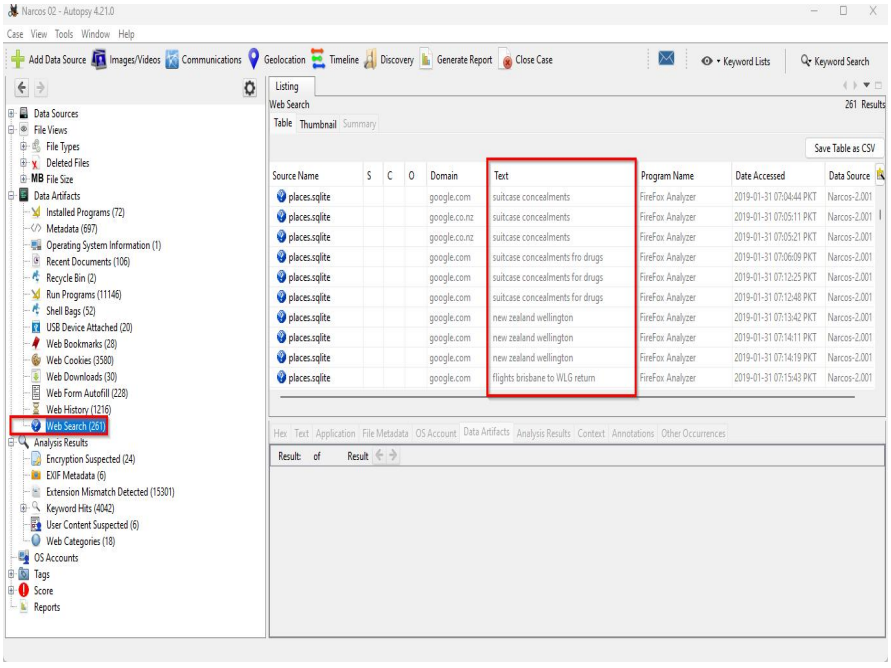

Eastbourne Library
Eastbourne Library
4.0 ★★★★★ · 4 reviews
Library
Directions
SAVE
NEARBY
SEND TO YOUR PHONE
SHARE
38 Rimu St, Eastbourne, Lower Hutt 5013
PV6W+5X Lower Hutt, Wellington
library.huttcity.govt.nz
04-562 8042
Closed
Suggest an edit
Popular times Saturdays
Muritai Yacht Club
Eastbourne Summer Pool
Public Toilets
Eastbourne Library
Spices Indian
Hive
Four Square Eastbourne
Tartines Cafe
The Still Room Bar + Kitchen
Westpac ATM
Muritai Health Centre
Marine Parade
Muritai Rd
Google

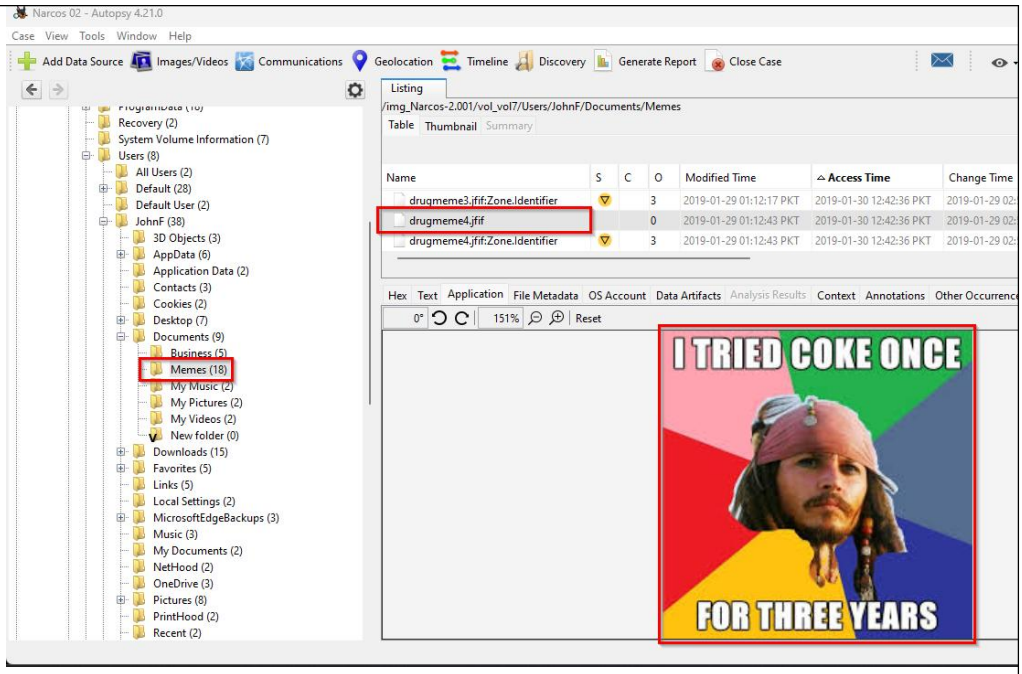

Narcos 01 - Autopsy 4.21.0
Case View Tools Window Help
Add Data Source
Images/Videos
Communications
Geolocation
Timeline
Discovery
Generate Report
Close Case
Keyword Lists
Keyword Search
Listing
/img_Narcos-1.001/vol_vol7/Users/Steve/Pictures
22 Results
Table Thumbnail Summary
Page: 1 of 1
Pages:
Go to Page:
Save Table as CSV
Name
S
C
O
Modified Time
Access Time
Change Time
Created Time
bomba-etkisi.gif:Zone.Identifier
eight_col_patches_crp.jpg
2019-02-01 07:48:41 PKT
2019-02-01 07:42:46 PKT
2019-02-01 07:48:41 PKT
2019-01-31 07:59:3
Hex Text Application File Metadata OS Account Data Artifacts Analysis Results Context Annotations Other Occurrences
79%
Reset
Tags Menu
My Videos (2)
Downloads (10)
Misc (5)
Favorites (5)
Links (3)
Links (5)
Local Settings (2)
MicrosoftEdgeBackups (3)
backups (3)
MicrosoftEdgeBackup20190201 (9)
Music (3)
My Documents (2)
NetHood (2)
OneDrive (7)
Documents (3)
Pictures (2)
Getting started with OneDrive.pdf (30)
Pictures (22)
Camera Roll (3)
Saved Pictures (3)
PrintHood (2)
Recent (2)
Saved Games (3)
Searches (6)
SendTo (2)
Start Menu (2)
Templates (2)
Videos (3)
Windows (103)
vol8 (Unallocated: 62912512-62914559)
File Views
File Types
MONGREL MOB
V8
MC
FATHERLAND

		
	Discord Chat	

Jane Esteban	Images/ web history	 

	Discord	
	Document	

John Fredrick	Images/ web history	 



Document

	A	B	C	D	E	F
1	Name	Location	Product	Amount	Delivery	
2	Ricky Ross	Los Angeles	Mama Coca	20kg	Monthly	
3	Frank Lucas	New York, USA	Ferry Dust	15kg	Quarterly	
4	Chris Coke	Kingston Jamaica	Coke	20kg	Monthly	
5	Steve Kowhai	Wellington, New Zealand	Crank	15kg	Monthly	
6	Don Cholito	Puerto Rico	Snow	25kg	Quarterly	
7	Manuel Noriega	Panama	Smack	15kg	Monthly	
8	Joaquin Guzman	Guadalajara, Mexico	China White	15kg	Monthly	
9	Leroy Barnes	New York, USA	Load pack	15kg	Quarterly	
10	AL Capone	Siciliy, Italy	Silly putty	25kg	Monthly	
11	Jane Esteban	Brisbane, Austraila	Uppers	1 gram	On demand	
12	Pablo Esocbar	Colombia	White horse	15kg	Quarterly	
13	Franz Sanchez	Isthmus City	Mary Jane	20kg	Quarterly	
14	Jake Heke	Auckland	Tweak	10kg	Monthly	
15						
16						

5.4 Software and tools used in the investigation

FTK Imager:

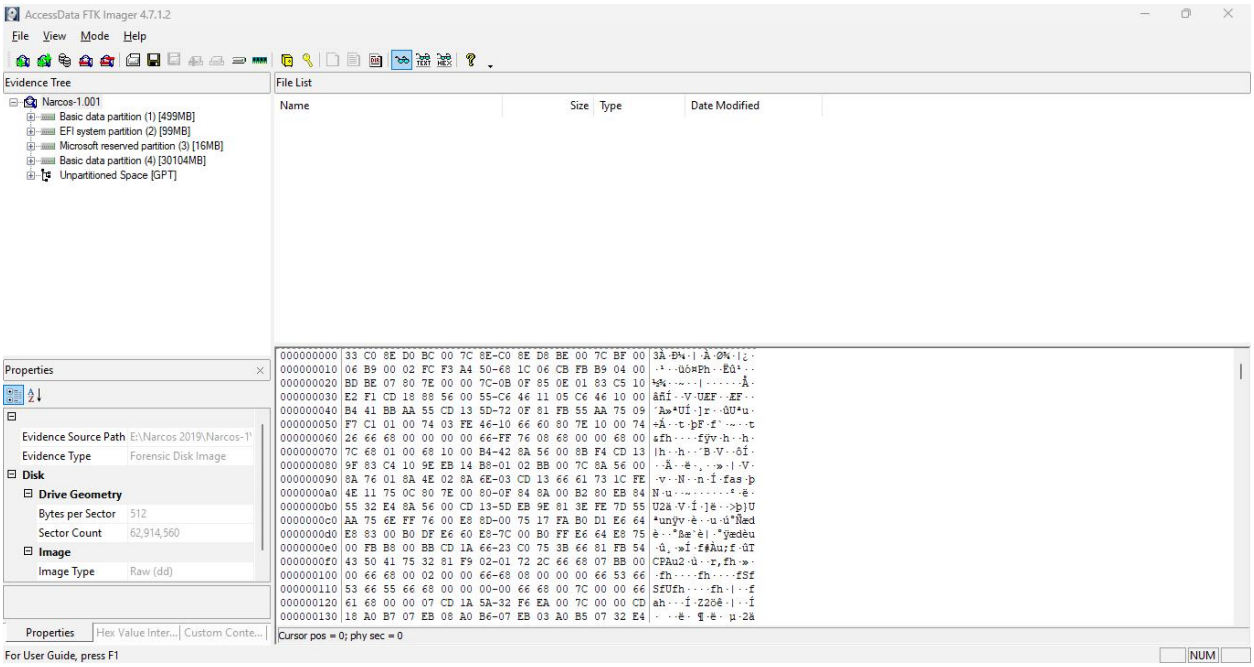


Figure 15 FTK Imager

Autopsy:

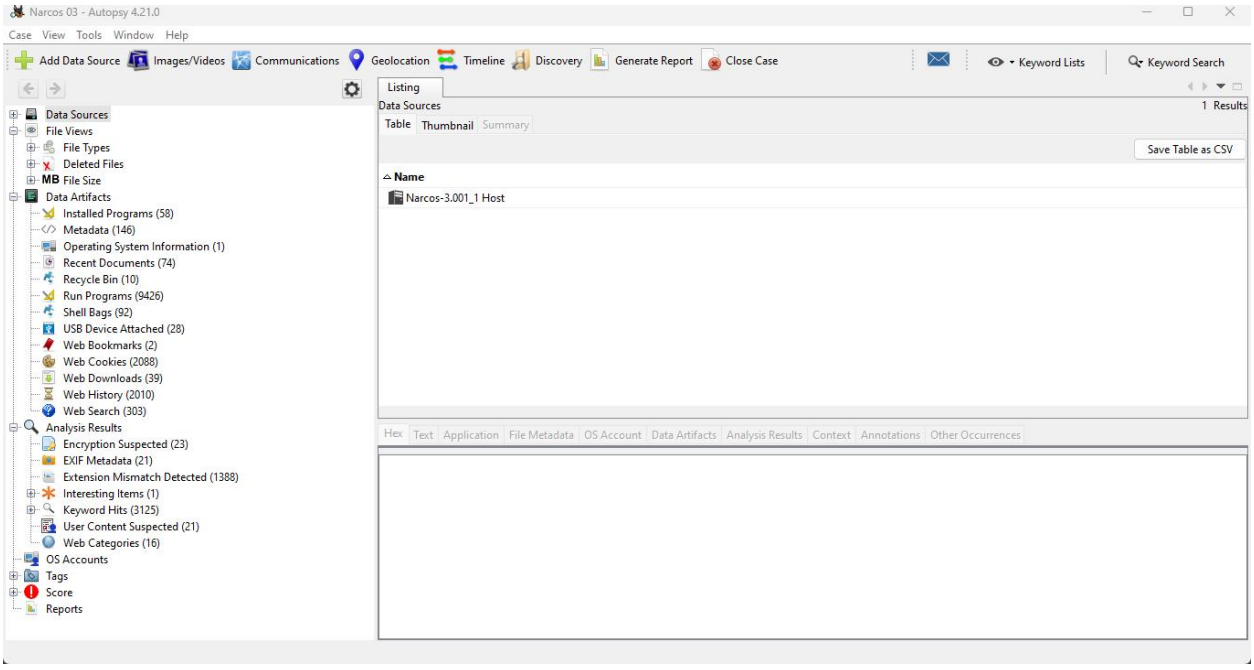


Figure 16 Autopsy

Registry Viewer:

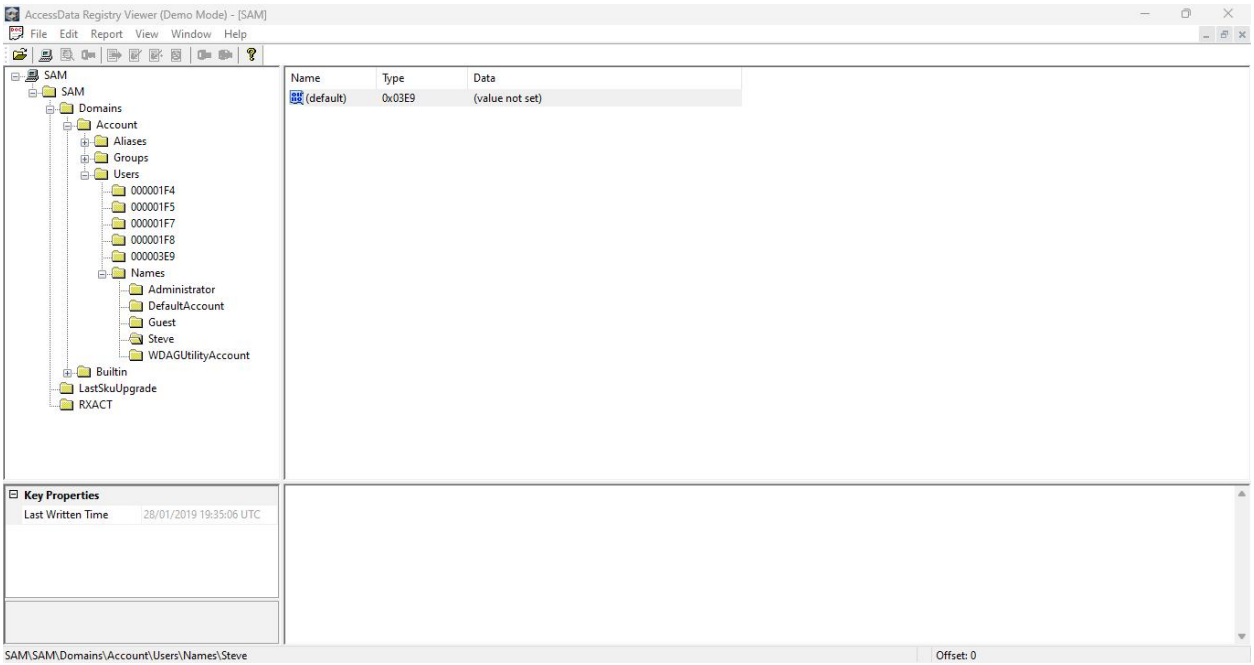


Figure 17 Registry Viewer

[SPACE INTENTIONALLY LEFT BLANK]

6. References

- Sleuth Kit. (n.d.). *Autopsy User Documentation 4.12.0*. Retrieved from https://sleuthkit.org/autopsy/docs/user-docs/4.12.0/index.html
- Williams, O. W. (n.d.). *Internet Browser Forensics with Autopsy*. LinkedIn. Retrieved from https://www.linkedin.com/pulse/internet-browser-forensics-autopsy-octavious-w--rq7be#:~:text=To%20view%20the%20data%20in,visits%2C%20keyword_search_terms%2C%20downloads
- Cyberspace Security. (2019, February 12). *Autopsy Internet History Analysis - Open-Source Digital Forensics*. [Video]. YouTube. https://www.youtube.com/watch?v=wU5hHPuf1Lo
- AccessData. (2012). *Registry Viewer User Guide*. Scribd. Retrieved from https://www.scribd.com/document/144984450/Registry-Viewer-User-Guide
- GeeksforGeeks. (n.d.). *Analysis of Data Source Using Autopsy*. Retrieved from https://www.geeksforgeeks.org/analysis-of-data-source-using-autopsy/
- GeeksforGeeks. (n.d.). *How to Create a Forensic Image with FTK Imager*. Retrieved from https://www.geeksforgeeks.org/how-to-create-a-forensic-image-with-ftk-imager/
- DFIRScience. (Feb 15, 2022). *Autopsy Tutorial for Windows - Digital Forensics* [Video]. YouTube. https://www.youtube.com/watch?v=5SHB4HwkX28

[END]