



**Abertay  
University**

# **Network Forensics Investigation**

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CMP416: Advanced Digital Forensics

BSc (Hons) Ethical Hacking Year 4

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*Note that Information contained in this document is for educational purposes.*

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# 1 Aim

The aim of this project is to perform a network digital forensics investigation for an international drug trafficking case. The investigator is working alongside a health regulatory agency and has been provided with three Packet Capture (PCAP) files to analyse for certain information that could aid the investigation.

The methodology and techniques used during this investigation have been written down in this report to allow anyone with the required amount of expertise to repeat the same investigation. Alongside this all tools used during this investigation have been detailed. To ensure the forensic soundness of all digital evidence that was recovered the investigation utilised read only attributes and MD5 hashes.

Critical evaluation of the difficulties faced during this investigation and a reflection on how the behaviour of a malicious hacker can impede an investigation have also been included at the end of the report.

## 2 TOOLS USED

During the investigation of the files various tools were used to assist the investigator. Each tool was vital for discovering the evidence that was requested from the investigation brief. The tools used and a short description of them can be seen in the table below. (Table 1)

Name	Description
Wireshark	Widely used open-source network protocol analyser tool that allows the inspection, capture, and analysis of network traffic. (Wireshark, 2023)
HxD	Popular freeware hexadecimal editor used for viewing and editing binary files in Windows. (Hörz, 2021)
Binwalk	Open-source tool used for analysing and extracting data from binary files that can identify various types of embedded files. (ReFirmLabs, 2023)
SilentEye	Application used for steganography, capable of hiding messages into pictures or sounds. (Achorein, 2010)
CyberChef	Web-based tool developed by GCHQ for performing encryption, encoding, compression and data analysis. (GCHQ, 2023)
PowerShell	Command-line shell and scripting language developed by Microsoft, that allows users to automate tasks, configure system settings etc. (Microsoft, 2023)
Kali Linux	Linux distribution designed for penetration testing, ethical hacking, and digital forensics. (Offsec Services, 2023)
VMWare Workstation Pro	Powerful desktop virtualisation product, that allow users to run multiple operating systems as virtual machines on a single Windows PC. (VMware, 2023)
Realtimehtml	Website found at <a href="https://realtimehtml.com">https://realtimehtml.com</a> . Used for rendering html code in the browser in real time. (Anon., n.d.)

*Table 1: List of tools used during investigation.*

# 3 INVESTIGATION AND FINDINGS

## 3.1 CAPTURE 1

### 3.1.1 Traffic Analysis

The network traffic in the provided capture begins at 22:18:01 on 20-10-2023 and ends at 08:23:52 on 22-10-2023.

The brief for the first capture informed the investigator that the target of the investigation has uploaded files that may contain a record of the drugs and quantities involved in the case.

To begin their investigation the investigator examined the protocol hierarchy statistics inside Wireshark. As can be seen in Figure 1 below, the most common protocol was SMB2 (Server Message Block Protocol version 2). SMB2 is a network file sharing protocol that is commonly used for file sharing.

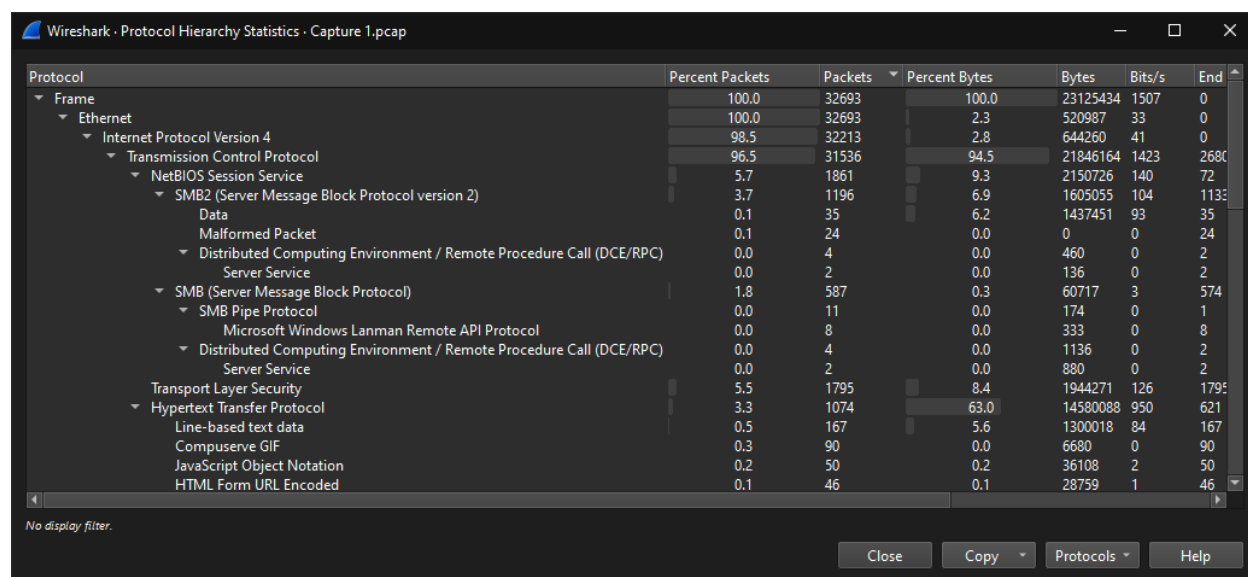


Figure 1: Protocol Hierarchy Statistics of Capture 1

Because of this the investigator decided to utilise the filtering by protocol functionality in Wireshark to filter by SMB2. By using a filter, the number of packets was significantly reduced which narrows down the amount of data that needs to be examined. (Figure 2)

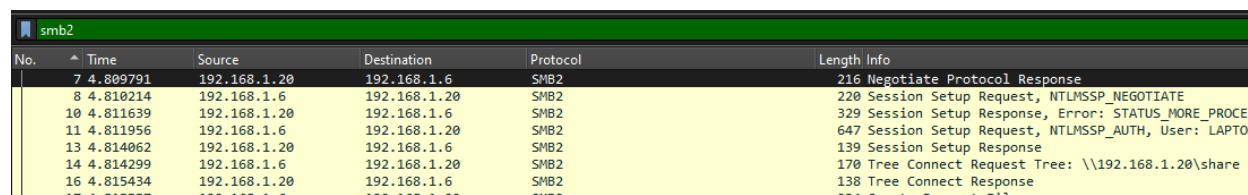


Figure 2: Capture 1 filtered by SMB2.

By examining the packets, the investigator was able to determine a lot of useful information. Firstly, in packet 10 we can see that an NTLMSSP\_CHALLENGE gets sent from 192.168.1.20 to 192.168.1.6. This is used by servers to challenge a client to prove its identity. (Microsoft, 2022) Because of this we can determine that the server has an IP address of 192.168.1.20 and the client has an IP address of 192.168.1.6. (Figure 3)

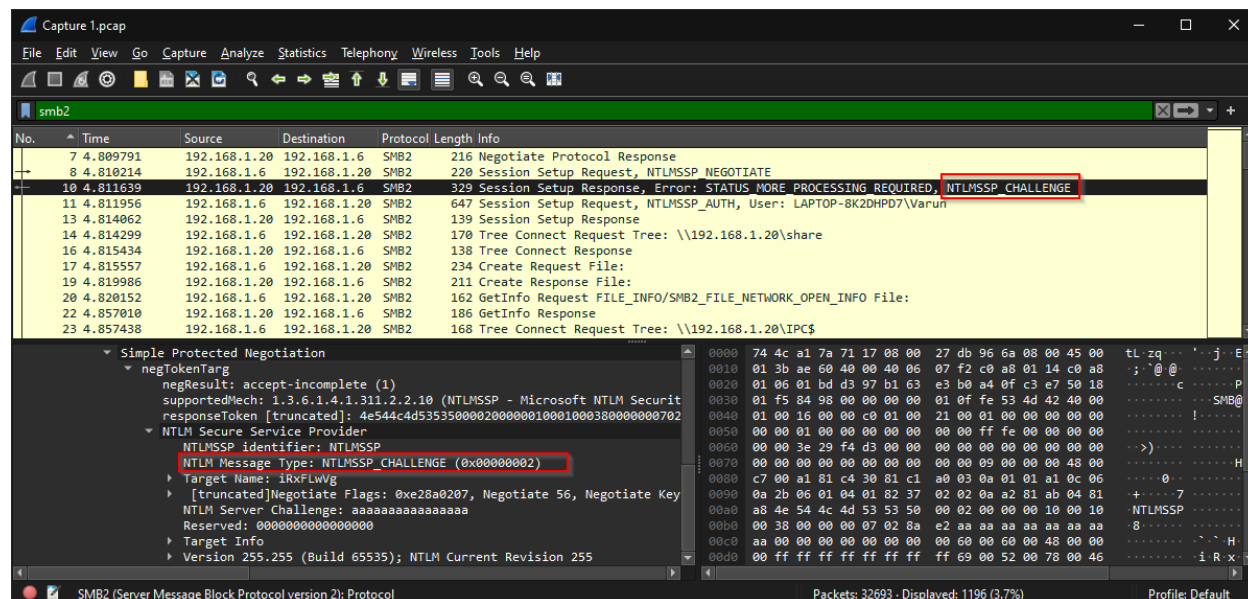


Figure 3: The server (192.168.1.20) sending an NTLMSSP\_CHALLENGE to the client (192.168.1.6)

To verify its identity the client responds with the domain name “LAPTOP-8K2DHPD7” and username “Varun” (Figure 4). Which as can be seen in the server response in packet 11 authenticates him as a Guest user. (Figure 5) (Microsoft, 2021)

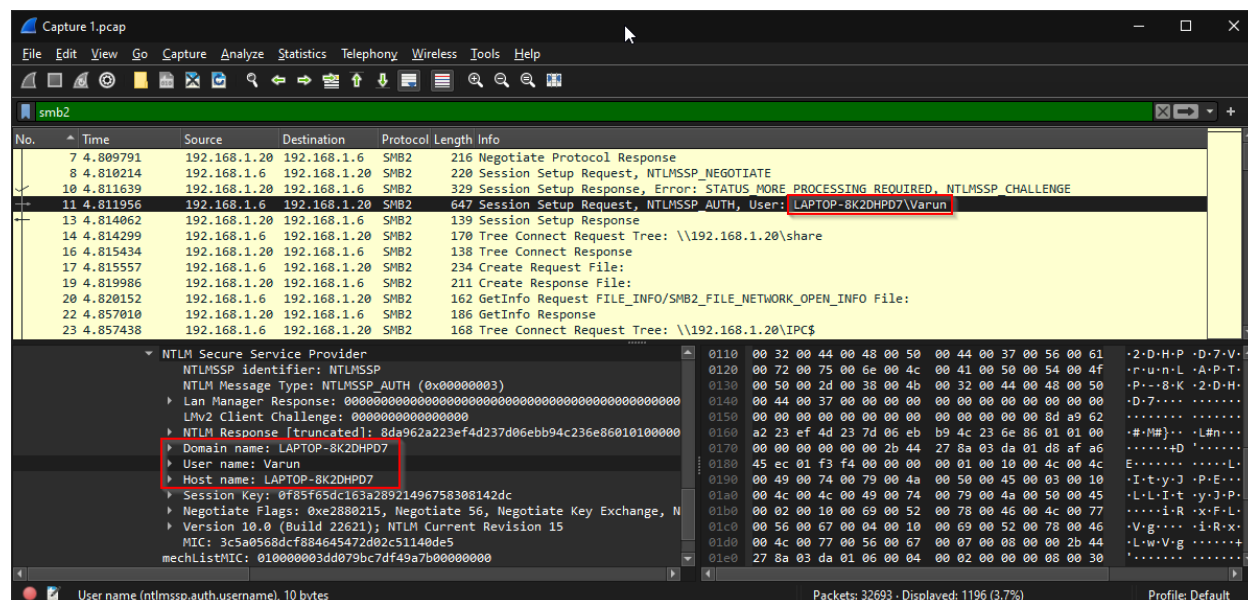


Figure 4: The client (192.168.1.6) verifying their identity.

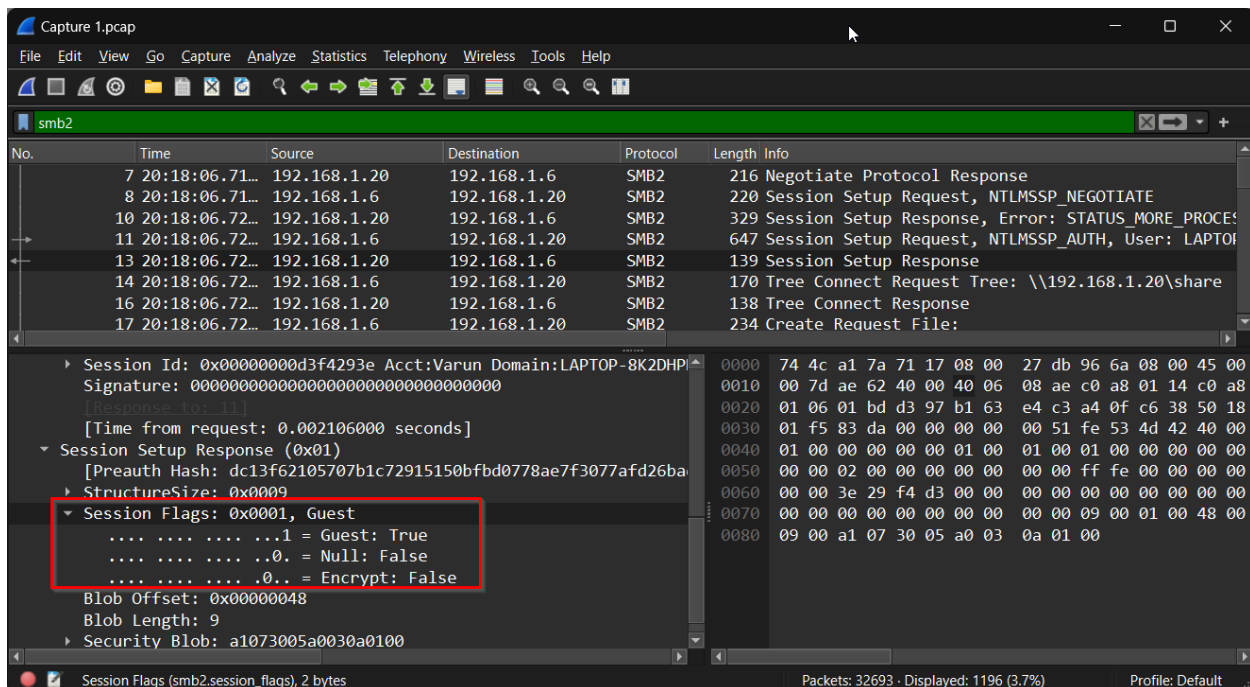


Figure 5: The client (192.168.1.6) authenticating as guest user.

After being authenticated, the client proceeds to request access to the share at “\\192.168.1.20\share” and “\\192.168.1.20\IPC\$”. This can be seen in packets 14 and 22. (Microsoft, 2021)

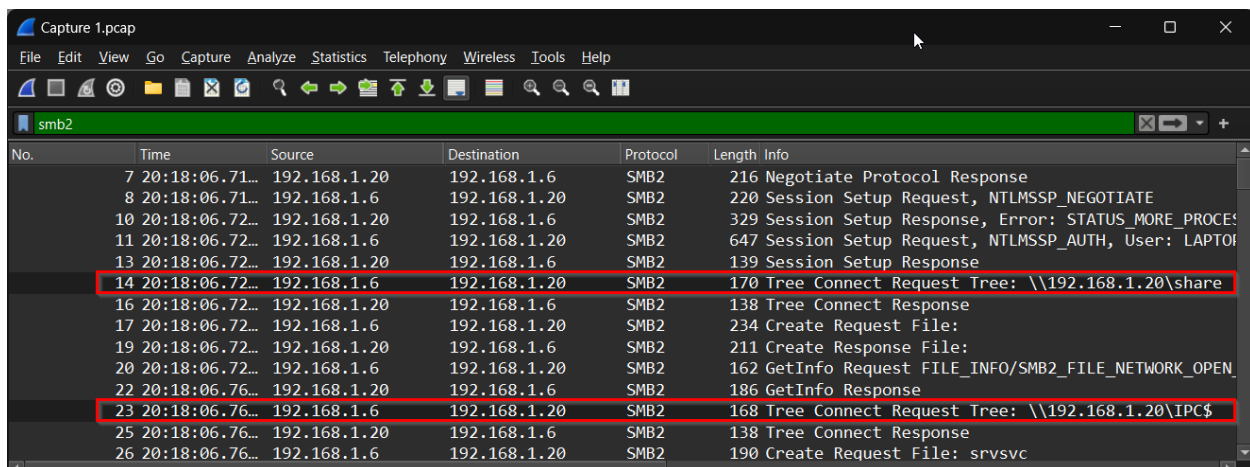


Figure 6: Client (192.168.1.6) requesting access to shares.

After receiving access to the shares, the client proceeds to request access to files from the shares starting with a file called “srvsvc” from the “IPC\$” share. This can be seen in packet 26. (Figure 7)



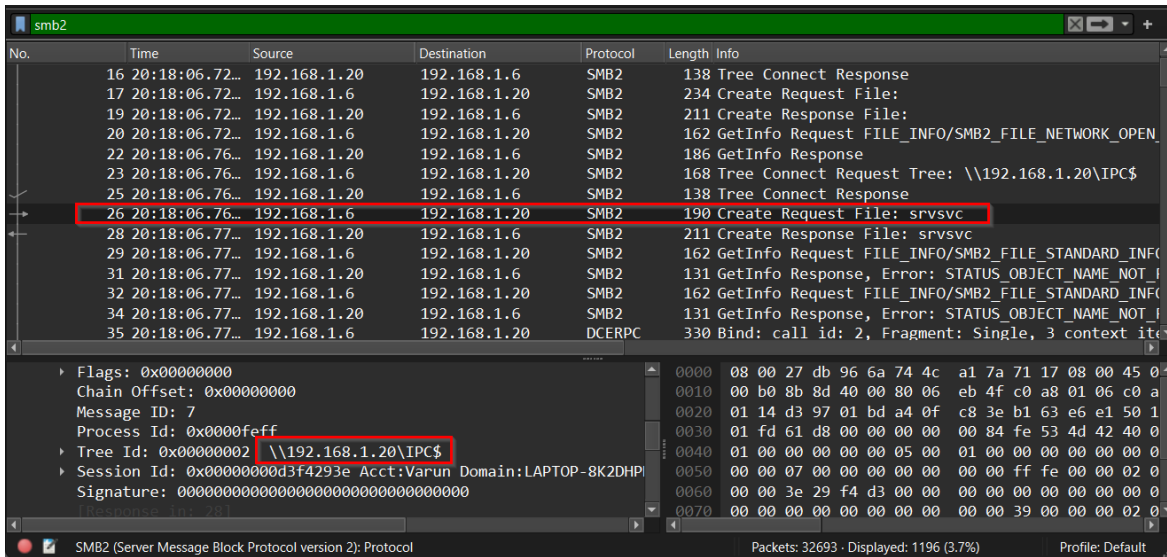


Figure 7: Client (192.168.1.6) requesting access to file "srvsvc" on the "IPC\$" share.

Based on this information the investigator decided to use Wireshark's Export Objects function to extract all files that were shared using SMB. That was done by going into "File -> Export Objects -> SMB...". The results from using this function can be seen in Figure 8 below.

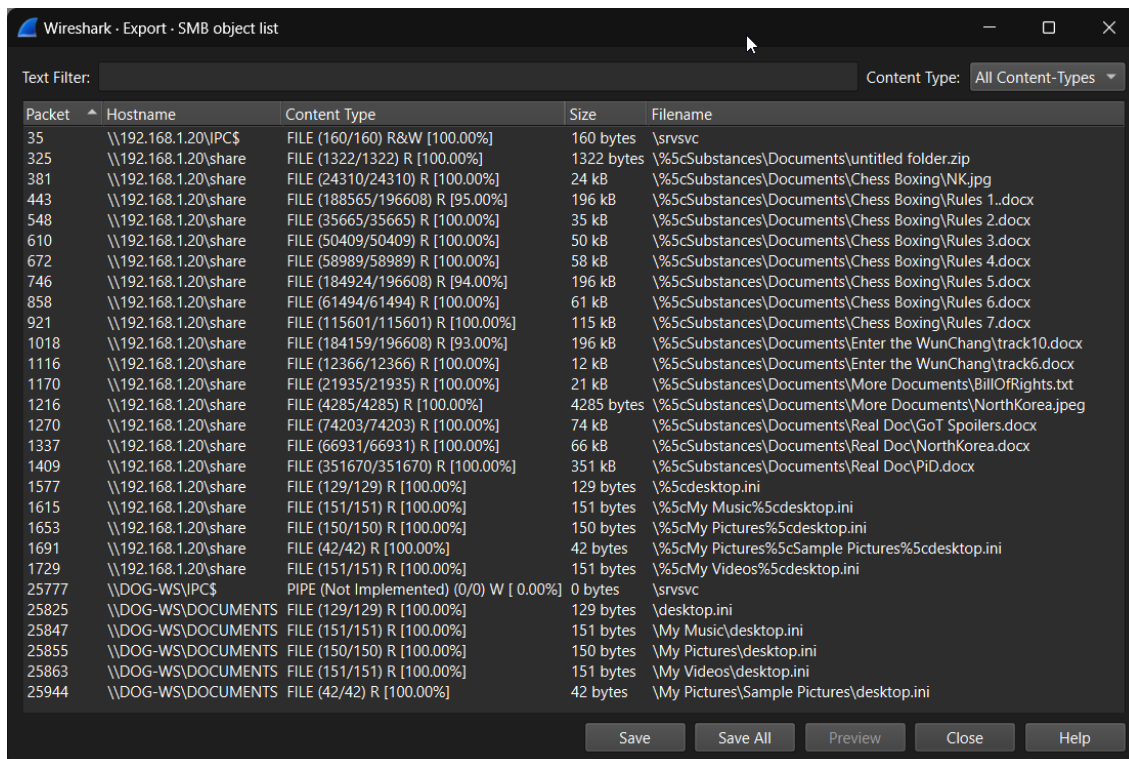


Figure 8: SMB objects list Capture 1.

From the SMB objects list the investigator saw there are 6 files which appeared to be downloaded from an address called "DOG-WS". The Network Traffic was examined for these

files, and they were found to be part of an SMB exchange that was also analysed by filtering for SMB packets. However, no evidence of interest was found in that SMB exchange.

All the files that were discovered were saved on the investigator's computer and were immediately made read only using PowerShell to avoid the accidental modification of evidence. (Figure 9)

```
Windows PowerShell
Packet1> Set-ItemProperty -Path (Get-ChildItem *.* -Recurse) -Name IsReadOnly -Value $true
Packet1> Get-ChildItem -ReadOnly

Directory: C:\Users\Martin\OneDrive - Abertay University\Year 4\CMP416-Advanced Digital Forensics\Assignment\Unit 1 - Case Study - PCAP Files(2023)\Unit 1 - Case Study - PCAP Files(2023)\Files\Packet1

Mode                LastWriteTime         Length Name
----                -
-r--r--r--      08/12/2023      23:52           129 %Sc%5cdesktop.ini
-r--r--r--      08/12/2023      23:52           151 %Sc%5cMy Music%5cdesktop.ini
-r--r--r--      08/12/2023      23:52           150 %Sc%5cMy Pictures%5cdesktop.ini
-r--r--r--      08/12/2023      23:52            42 %Sc%5cMy Pictures%5cSample Pictures%5cdesktop.ini
-r--r--r--      08/12/2023      23:52           151 %Sc%5cMy Videos%5cdesktop.ini
-r--r--r--      08/12/2023      23:52          24310 %Sc%5cSubstances%5cDocuments%5cChess Boxing%5cNK.jpg
-r--r--r--      08/12/2023      23:52          196608 %Sc%5cSubstances%5cDocuments%5cChess Boxing%5cRules 1..docx
-r--r--r--      08/12/2023      23:52          35665 %Sc%5cSubstances%5cDocuments%5cChess Boxing%5cRules 2.docx
-r--r--r--      08/12/2023      23:52          50409 %Sc%5cSubstances%5cDocuments%5cChess Boxing%5cRules 3.docx
-r--r--r--      08/12/2023      23:52          58989 %Sc%5cSubstances%5cDocuments%5cChess Boxing%5cRules 4.docx
-r--r--r--      08/12/2023      23:52          196608 %Sc%5cSubstances%5cDocuments%5cChess Boxing%5cRules 5.docx
-r--r--r--      08/12/2023      23:52          61494 %Sc%5cSubstances%5cDocuments%5cChess Boxing%5cRules 6.docx
-r--r--r--      08/12/2023      23:52          115601 %Sc%5cSubstances%5cDocuments%5cChess Boxing%5cRules 7.docx
-r--r--r--      08/12/2023      23:52          196608 %Sc%5cSubstances%5cDocuments%5cEnter the WunChang%5ctrack10.docx
-r--r--r--      08/12/2023      23:52          12366 %Sc%5cSubstances%5cDocuments%5cEnter the WunChang%5ctrack6.docx
-r--r--r--      08/12/2023      23:52          21935 %Sc%5cSubstances%5cDocuments%5cMore Documents%5cBillOfRights.txt
-r--r--r--      08/12/2023      23:52           4285 %Sc%5cSubstances%5cDocuments%5cMore Documents%5cNorthKorea.jpeg
-r--r--r--      08/12/2023      23:52          74203 %Sc%5cSubstances%5cDocuments%5cReal Doc%5cGoT Spoilers.docx
-r--r--r--      08/12/2023      23:52          66931 %Sc%5cSubstances%5cDocuments%5cReal Doc%5cNorthKorea.docx
-r--r--r--      08/12/2023      23:52          351670 %Sc%5cSubstances%5cDocuments%5cReal Doc%5cPiD.docx
-r--r--r--      08/12/2023      23:52           1322 %Sc%5cSubstances%5cDocuments%5cuntitled folder.zip
-r--r--r--      08/12/2023      23:52           129 %Sc%5cdesktop.ini
-r--r--r--      08/12/2023      23:52           151 %Sc%5cMy Music%5cdesktop.ini
-r--r--r--      08/12/2023      23:52           150 %Sc%5cMy Pictures%5cdesktop.ini
-r--r--r--      08/12/2023      23:52            42 %Sc%5cMy Pictures%5cSample Pictures%5cdesktop.ini
-r--r--r--      08/12/2023      23:52           151 %Sc%5cMy Videos%5cdesktop.ini
```

Figure 9: SMB files being made read only.

Following this MD5 hashes were generated for each file and were saved in a file called “hashes.csv”. (Figure 10)

```

Packet1> Get-FileHash -Algorithm MD5 -Path (Get-ChildItem *. -Recurse) | export-csv -Path hashes.csv -NoTypeInformation
Packet1> cat .\hashes.csv
"Algorithm","Hash","Path"
"MD5","97278DE3C1B080287330E99EF49985AD","C:\Packet1\%5c%5cdesktop.ini"
"MD5","13F60B4DA1386738053E37488C12C1FA","C:\Packet1\%5c%5cMy Music%5cdesktop.ini"
"MD5","3C9819ED4C8AD12C9201580481B55629","C:\Packet1\%5c%5cMy Pictures%5cdesktop.ini"
"MD5","35ED6CD867F7B18AE5948023CEE1D02C","C:\Packet1\%5c%5cMy Pictures%5cSample Pictures%5cdesktop.ini"
"MD5","1145EE7430368D44FC605D1D56B221D5","C:\Packet1\%5c%5cMy Videos%5cdesktop.ini"
"MD5","93DFE22495572A02E89D8F2FE2BA3F5A","C:\Packet1\%5c%5cSubstances%5cDocuments%5cChess Boxing%5cNK.jpg"
"MD5","DD1F2148E10B5AAB0D5482AA62F69D5C","C:\Packet1\%5c%5cSubstances%5cDocuments%5cChess Boxing%5cRules 1..docx"
"MD5","D00DD6137684FFB590426EE67D3D1D93","C:\Packet1\%5c%5cSubstances%5cDocuments%5cChess Boxing%5cRules 2.docx"
"MD5","5A32D883E1645623AA16B4F19A7BF2E6","C:\Packet1\%5c%5cSubstances%5cDocuments%5cChess Boxing%5cRules 3.docx"
"MD5","1D117B5D89F36E38A513C8E3E330C146","C:\Packet1\%5c%5cSubstances%5cDocuments%5cChess Boxing%5cRules 4.docx"
"MD5","4632E6A50646BC30B39338B106E9A954","C:\Packet1\%5c%5cSubstances%5cDocuments%5cChess Boxing%5cRules 5.docx"
"MD5","1E68EB1095207247876EE0003B48E72E","C:\Packet1\%5c%5cSubstances%5cDocuments%5cChess Boxing%5cRules 6.docx"
"MD5","B593F455C64512EAC07E83CF1E368015","C:\Packet1\%5c%5cSubstances%5cDocuments%5cChess Boxing%5cRules 7.docx"
"MD5","351B7C4130FC94803857DD387B0E914A","C:\Packet1\%5c%5cSubstances%5cDocuments%5cEnter the WunChang%5ctrack10.docx"
"MD5","53F09DA3050258FFB9B6F6116D7B5CE","C:\Packet1\%5c%5cSubstances%5cDocuments%5cEnter the WunChang%5ctrack6.docx"
"MD5","C66487D04B17AAE0122677F5FAF4A929","C:\Packet1\%5c%5cSubstances%5cDocuments%5cMore Documents%5cBillOfRights.txt"
"MD5","F98A627AD8092FE6530A5825E492B58B","C:\Packet1\%5c%5cSubstances%5cDocuments%5cMore Documents%5cNorthKorea.jpeg"
"MD5","1EB51F7D034177889F6F3C727328C588","C:\Packet1\%5c%5cSubstances%5cDocuments%5cReal Doc%5cGoT Spoilers.docx"
"MD5","FA7BCDE867A6F6B9DC3D080FCC0F4A20","C:\Packet1\%5c%5cSubstances%5cDocuments%5cReal Doc%5cNorthKorea.docx"
"MD5","6802931C09927FDEE98784A3286322FD","C:\Packet1\%5c%5cSubstances%5cDocuments%5cReal Doc%5cPiD.docx"
"MD5","F2BEF217D08F3EC001005CBADA193B4D","C:\Packet1\%5c%5cSubstances%5cDocuments%5cuntitled folder.zip"
"MD5","97278DE3C1B080287330E99EF49985AD","C:\Packet1\%5c%5cdesktop.ini"
"MD5","13F60B4DA1386738053E37488C12C1FA","C:\Packet1\%5c%5cMy Music%5cdesktop.ini"
"MD5","3C9819ED4C8AD12C9201580481B55629","C:\Packet1\%5c%5cMy Pictures%5cdesktop.ini"
"MD5","35ED6CD867F7B18AE5948023CEE1D02C","C:\Packet1\%5c%5cMy Pictures%5cSample Pictures%5cdesktop.ini"
"MD5","1145EE7430368D44FC605D1D56B221D5","C:\Packet1\%5c%5cMy Videos%5cdesktop.ini"

```

Figure 10: MD5 hashes being generated for each file from Packet 1.

The files were made read only and had MD5 hashes generated to ensure the integrity of the evidence. These 2 steps were taken for all the files that were discovered during this investigation.

### 3.1.2 Evidence Analysis

To begin evidence analysis the analyst started with unzipping the zip file called “untitled folder.zip”. After unzipping it, its folder structure was examined used the “tree” command in PowerShell.

```

Windows PowerShell
Packet1> tree
Folder PATH listing
Volume serial number is 04C2-CDB3
C:..
├──%5c%5cSubstances%5cDocuments%5cuntitled folder
│   ├──untitled folder
│   │   ├──untitled folder
│   │   │   ├──untitled folder 2
│   │   │   │   ├──untitled folder
│   │   │   │   │   ├──SilentEye

```

Figure 11: Output of tree command in PowerShell on the extracted zip.

The name of the last folder was googled which led to the discovery of the following webpage.



Figure 12: SilentEye webpage.

SilentEye was determined to be an application used for steganography, capable of hiding messages into pictures or sounds. The analyst downloaded the tool, because they deemed it will be necessary if any image or music files were discovered.

Following this discovery, the image files began to be inspected. There was a total of 2 images that were discovered. One of them was called “NK.jpg”. The analyst try to check the image in the SilentEye tool, but was unable to, because the tool does not support “.jpg” files. (Figure 13)

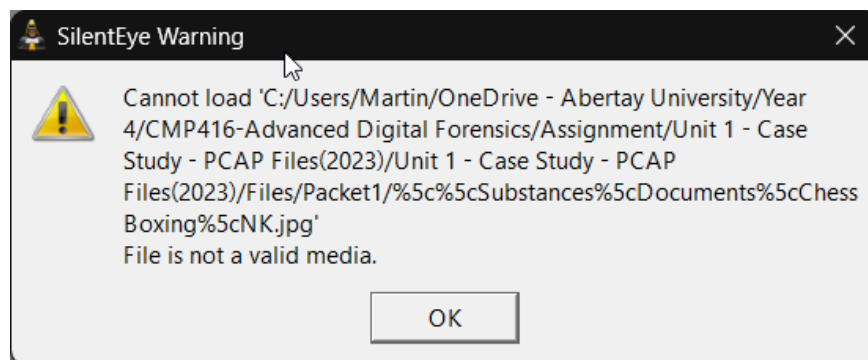


Figure 13: Error displayed when trying to open “NK.jpg”.

After being unable to open “NK.jpg” in SilentEye the investigator attempted to open “NorthKorea.jpeg”. This time the file was successfully opened in the application, however after attempting all the options in the program the file was determined to not contain a hidden message. (Figure 14, Figure 15 and Figure 16)



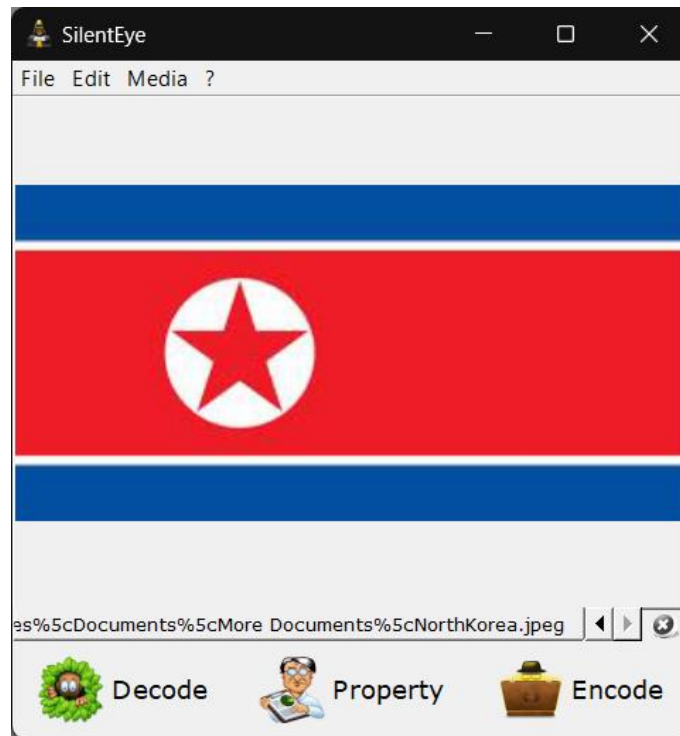


Figure 14: NorthKorea.jpeg open in SilentEye.

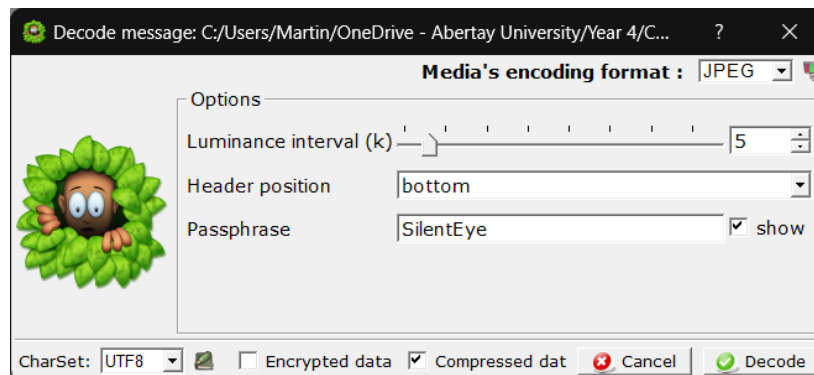


Figure 15: Decoding options in SilentEye for "NorthKorea.jpeg"

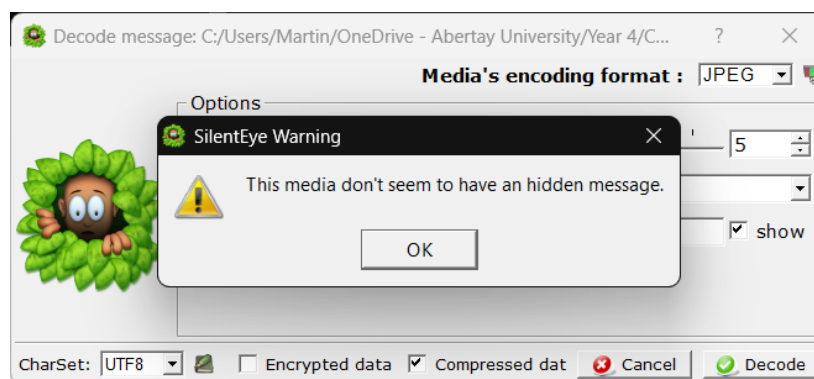


Figure 16: Error message showing no hidden message in image.

For their next step the analyst examined both the image files with “Binwalk” inside a Kali Linux virtual machine in VMWare Workstation Pro. As can be seen in Figure 17, “NorthKorea.jpeg” had a zip archive hidden inside of it, which the analyst was able to successfully extract. (Figure 17 and Figure 18)

```

kali@kali: ~/Desktop/CMP416-Advanced Digital Forensics/Assignment

(kali@kali)-[~/Desktop/CMP416-Advanced Digital Forensics/Assignment]
$ binwalk %5c%5cSubstances%5cDocuments%5cChess\ Boxing%ScNK.jpg

DECIMAL      HEXADEDECIMAL  DESCRIPTION
-----
0             0x0            PNG image, 1600 x 800, 8-bit/color RGBA, non-interlaced

(kali@kali)-[~/Desktop/CMP416-Advanced Digital Forensics/Assignment]
$ binwalk %5c%5cSubstances%5cDocuments%5cMore\ Documents%ScNorthKorea.jpeg

DECIMAL      HEXADEDECIMAL  DESCRIPTION
-----
0             0x0            JPEG image data, JFIF standard 1.01
3453          0xD7D         Zip archive data, at least v2.0 to extract, name: untitled/
3492          0xDA4         Zip archive data, at least v2.0 to extract, compressed size: 604, uncompressed size: 1397, name: untitled/broken.py
4263          0x10A7        End of Zip archive, footer length: 22

(kali@kali)-[~/Desktop/CMP416-Advanced Digital Forensics/Assignment]
$ binwalk -e %5c%5cSubstances%5cDocuments%5cMore\ Documents%ScNorthKorea.jpeg

DECIMAL      HEXADEDECIMAL  DESCRIPTION
-----
0             0x0            JPEG image data, JFIF standard 1.01
3453          0xD7D         Zip archive data, at least v2.0 to extract, name: untitled/
3492          0xDA4         Zip archive data, at least v2.0 to extract, compressed size: 604, uncompressed size: 1397, name: untitled/broken.py
4263          0x10A7        End of Zip archive, footer length: 22

```

Figure 17: Examining files with Binwalk.

```

(kali@kali)-[~/Desktop/CMP416-Advanced Digital Forensics/Assignment/_%5c%5cSubstances%5cDocuments%5cMore Documents%ScNorthKorea.jpeg.extracted]
$ ls
D7D.zip  untitled

(kali@kali)-[~/Desktop/CMP416-Advanced Digital Forensics/Assignment/_%5c%5cSubstances%5cDocuments%5cMore Documents%ScNorthKorea.jpeg.extracted]
$ unzip D7D.zip
Archive:  D7D.zip
replace untitled/broken.py? [y]es, [n]o, [A]ll, [N]one, [r]ename: r
new name: extracted.py
inflating: extracted.py

(kali@kali)-[~/Desktop/CMP416-Advanced Digital Forensics/Assignment/_%5c%5cSubstances%5cDocuments%5cMore Documents%ScNorthKorea.jpeg.extracted]
$ ls
D7D.zip  extracted.py  untitled

(kali@kali)-[~/Desktop/CMP416-Advanced Digital Forensics/Assignment/_%5c%5cSubstances%5cDocuments%5cMore Documents%ScNorthKorea.jpeg.extracted]
$ sha256sum extracted.py
774e0520ecc79d0fa3de2cf5eafbfff25ca3a636e011fc53ccce1744b021734b  extracted.py

(kali@kali)-[~/Desktop/CMP416-Advanced Digital Forensics/Assignment/_%5c%5cSubstances%5cDocuments%5cMore Documents%ScNorthKorea.jpeg.extracted]
$ cd untitled

(kali@kali)-[~/./CMP416-Advanced Digital Forensics/Assignment/_%5c%5cSubstances%5cDocuments%5cMore Documents%ScNorthKorea.jpeg.extracted/untitled]
$ ls
broken.py

(kali@kali)-[~/./CMP416-Advanced Digital Forensics/Assignment/_%5c%5cSubstances%5cDocuments%5cMore Documents%ScNorthKorea.jpeg.extracted/untitled]
$ sha256sum broken.py
774e0520ecc79d0fa3de2cf5eafbfff25ca3a636e011fc53ccce1744b021734b  broken.py

```

Figure 18: Extracting discovered zip and generating sha256 hash of python file.

The python file that was discovered can be seen in Appendix A – Capture 1 at 6.1.16

Lastly, the analyst began to examine the “.docx” files. They all contained Base-64 encoded text which was able to be decoded using CyberChef. The encoded and decoded contents of each word file can be seen in Appendix A – Capture 1 from 6.1.1 to 6.1.12. From all the word files only 1 appeared to be of interest to the investigation. The file was called “Track6.docx” and its contents can be seen in the table below as well as in Appendix A – Capture 1 at 6.1.6.

U2Vuc2l0aXZlIGluZm9ybWF0aW9uDQpEcnVncyBSZWNVcmRzCQkNCk51bWJlcmVnIE5hbWUJCQkQW1vdW50DQoxCQkQJbDg9ydmFzdGF0aW4JCQkxMTQ1MDk4MTQNCjJCQkJCUXldm90aHlyb3hpbmUJCQk5ODk3MDY0MA0KMwkJCQkJTWV0Zm9ybWluCQkJCTkyNTkxNDg2DQo0CQkQJMaXNpbm9wcmIsCQkJCTg4NTk3MDE3DQo1CQkQJbBwXvZGlwaW5lCQkJCTY5Nzg2Njg0DQo2CQkQJINZXRvcHJvbG9sCQkJCTY2NDEzNjkyDQo3CQkQJbBj1dGVyb2wJCQkJNjE5NDgzNDcNCjgJCQkJCXU9tZXByYXpvcGUJCQkJNTYzMDAwNjQNCjkJCQkJCXUxvc2FydGFuCQkJCTU0ODE1NDExDQoxMAKJCQkJR2FiYXBlbnRpbGkJCQk0OTk2MTA2Ng0KMTEJCQkJC Uh5ZHJvY2hsb3JvdGhpYXppZGUJCTQxNDc2MDk4

Sensitive information

Drugs Records

Number	Drug Name	Amount
1	Atorvastatin	114509814
2	Levothyroxine	98970640
3	Metformin	92591486
4	Lisinopril	88597017
5	Amlodipine	69786684
6	Metoprolol	66413692
7	Albuterol	61948347
8	Omeprazole	56300064
9	Losartan	54815411
10	Gabapentin	49961066
11	Hydrochlorothiazide	41476098

Table 2: Encoded and decoded contents of "Track6.docx"

From the contents of the ".docx" file the analyst was able to determine the name of the drugs and their amounts, which was one of the pieces of evidence required for the investigation.

## 3.2 CAPTURE 2

### 3.2.1 Traffic Analysis

The network traffic in the provided capture begins at 08:33:35 on 14-10-2023 and ends at 23:08:03 on 21-10-2023.

The brief for the second capture informed the investigator that there was FTP traffic detected and that they might be able to decipher a message using an Obi-Wan Kenobi quote.

To begin their investigation the investigator decided to use Wireshark's Export Objects function again to extract all files that were shared using FTP. That was done by going into "File -> Export Objects -> FTP-DATA..." (Figure 19).

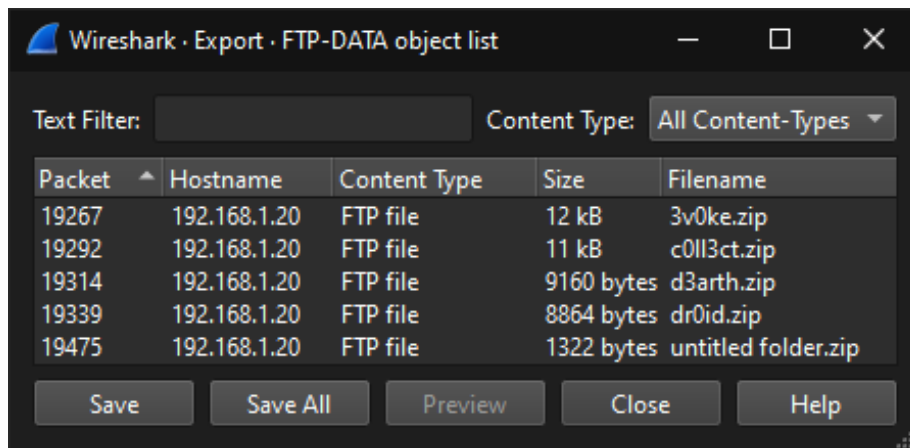


Figure 19: FTP-DATA object list.

This led to the discovery of 5 zip files, which were saved to examine their contents. After the zip files were extracted, all the files were set to read only again and had hashes generated using MD5 to ensure evidence integrity.

```
Files 2> Set-ItemProperty -Path (Get-ChildItem *.* -Recurse) -Name IsReadOnly -Value $true
Files 2> Get-ChildItem -Recurse -ReadOnly
```

Directory: C:\Users\Martin\OneDrive - Abertay University\Year 4\CMP416-Advanced Digital F

Mode	LastWriteTime	Length	Name
-ar--l	09/12/2023 21:46	12847	3v0ke.zip
-ar--l	09/12/2023 21:46	11226	c0ll3ct.zip
-ar--l	09/12/2023 21:46	9160	d3arth.zip
-ar--l	09/12/2023 21:46	8864	dr0id.zip
-ar--l	09/12/2023 21:46	1322	untitled folder.zip

Directory: C:\Users\Martin\OneDrive - Abertay University\Year 4\CMP416-Advanced Digital F  
2\3v0ke\split3

Mode	LastWriteTime	Length	Name
-ar--l	22/10/2023 01:28	2612	game.jpg
-ar--l	22/10/2023 01:28	2841	these.jpg
-ar--l	22/10/2023 01:28	4507	understand.jpg
-ar--l	22/10/2023 01:28	2859	you.jpg

Directory: C:\Users\Martin\OneDrive - Abertay University\Year 4\CMP416-Advanced Digital F  
2\c0ll3ct\split1

Mode	LastWriteTime	Length	Name
------	---------------	--------	------

Figure 20: FTP-DATA files being made read only.



```

Files 2> Get-FileHash -Algorithm MD5 -Path (Get-ChildItem "*" -Recurse) | export-csv -Path ./hashes.csv -NoTypeInformation
Files 2> cat .\hashes.csv
"Algorithm","Hash","Path"
"MD5","D4F5739BF4121CCCE90794340C5523B70","C:\Files 2\3v0ke\split3\game.jpg"
"MD5","84DCDEA7900BE375872F8E8EF936C489","C:\Files 2\3v0ke\split3\these.jpg"
"MD5","C66A94AFB1D56D8FD8D0403F5B30B6A8","C:\Files 2\3v0ke\split3\understand.jpg"
"MD5","C5D3051F08AA43F53F1CFEF0C5052B3E","C:\Files 2\3v0ke\split3\you.jpg"
"MD5","B9F55B93192C396C1FFE65F7457FD9E8","C:\Files 2\c0ll3ct\split1\battles.jpg"
"MD5","757A7C2340C58B32D75B44B2E73E606D","C:\Files 2\c0ll3ct\split1\can.jpg"
"MD5","4E1253750400695C9F167709FE9DA468","C:\Files 2\c0ll3ct\split1\I.jpg"
"MD5","079E69C73303DEC6A25F259203ADE0CD","C:\Files 2\c0ll3ct\split1\of.jpg"
"MD5","0E0867F237A302AED18BF0DB70075B0D","C:\Files 2\d3arth\split2\how.jpg"
"MD5","F277DABFC1021D03003C963ABBA7EA7D","C:\Files 2\d3arth\split2\into.jpg"
"MD5","E7A3466E33A67225BF999286938CB6C8","C:\Files 2\d3arth\split2\never.jpg"
"MD5","CC894FC6AB59908FC863CB04FA596778","C:\Files 2\d3arth\split2\some.jpg"
"MD5","92887703C3942F165D7D3A09CA409886","C:\Files 2\dr0id\split4\kind.jpg"
"MD5","AC29069C907E14BCEED468E014396C74","C:\Files 2\dr0id\split4\ll.jpg"
"MD5","127E50032542030A8288895FD0AEB39B","C:\Files 2\dr0id\split4\simplify.jpg"
"MD5","3CA5E3ED94C2AA036A0570D0238C06BC","C:\Files 2\3v0ke.zip"
"MD5","E3CC8D3E5F3E99305099BB36C2A49016","C:\Files 2\c0ll3ct.zip"
"MD5","D8898D5E392B2FD5A1FA292ABACB1EE3","C:\Files 2\d3arth.zip"
"MD5","54D8D273D0052F05D602A2FE26D484AB","C:\Files 2\dr0id.zip"
"MD5","F2BEF217D08F3EC001005CBADA193B4D","C:\Files 2\untitled folder.zip"

```

Figure 21: MD5 hashes being generated for each file from Packet 2.

All the discovered files from FTP-DATA can be seen in Figure 22. One of the zip archives called “untitled folder.zip” was determined to be the same as the one discovered in Packet 1 that led to the discovery of the SilentEye steganography application. This made the investigator suspect there might be hidden messages in the images that were found.

```

Windows PowerShell
Packet2> tree /F
Folder PATH listing
Volume serial number is 04C2-CDB3
C:.
  3v0ke.zip
  c0ll3ct.zip
  d3arth.zip
  dr0id.zip
  untitled folder.zip

  --3v0ke
  |   --split3
  |       game.jpg
  |       these.jpg
  |       understand.jpg
  |       you.jpg
  |
  |   --c0ll3ct
  |       --split1
  |           battles.jpg
  |           can.jpg
  |           I.jpg
  |           of.jpg
  |
  |   --d3arth
  |       --split2
  |           how.jpg
  |           into.jpg
  |           never.jpg
  |           some.jpg
  |
  |   --dr0id
  |       --split4
  |           kind.jpg
  |           ll.jpg
  |           simplify.jpg
  |
  |   --untitled folder
  |       --untitled folder
  |           --untitled folder 2
  |               --untitled folder
  |                   --SilentEye
  |
  Packet2> |

```

Figure 22: Listing FTP-DATA files using "tree".

Following this the analyst returned to Wireshark to search for any extra files. They checked if there are any other “.zip” files that could potentially be recovered from the network capture. This returned a positive result at packet 2666, where upon inspection of the packet’s contents 2 new “.zip” called “34jdsioj.zip” and “breaking\_bad\_season\_6.zip” were discovered. (Figure 23)

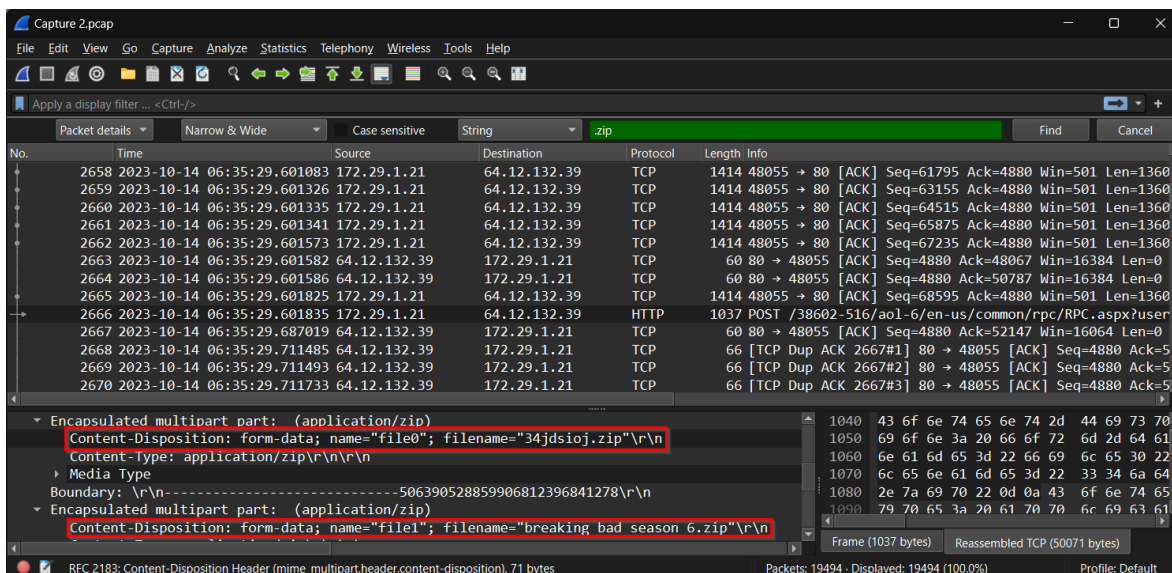


Figure 23: Searching for ".zip" files leads to discovery of 2 new files.

The TCP stream of that packet was followed and inside that stream 1 more “.zip” file called “canc3l.zip” was identified at packet 8034. (Figure 24)

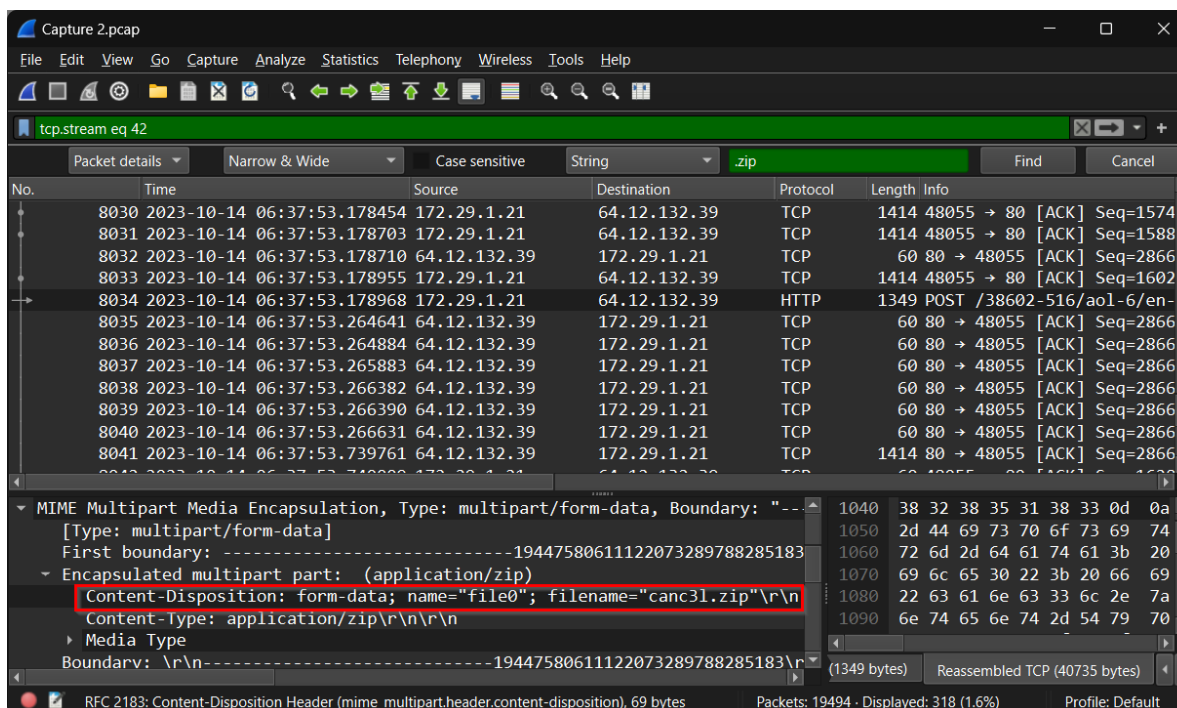


Figure 24: Extra ".zip" file found in TCP stream 42.

All the discovered “.zip” files were extracted by exporting the packets bytes as can be seen in Figure 25.

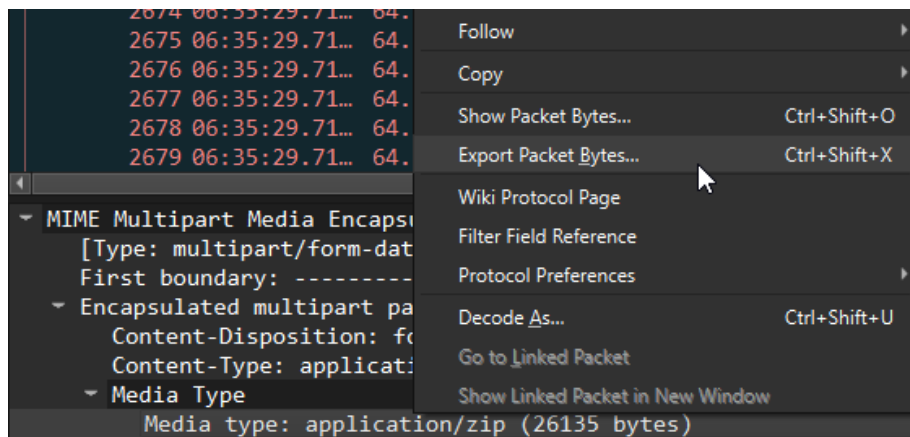


Figure 25: Exporting discovered “.zip” files.

By exploring the HTTP stream in which the “.zip” files were found an unencrypted conversation was discovered between an individual with an email address “kim.illsong@aol.com” and “da.genius36@aol.com” (Figure 26, Figure 27 and Figure 28). This evidence allowed the analyst to determine that the 3 new “.zip” files discussed earlier were attached as part of the email communication between the two individuals.

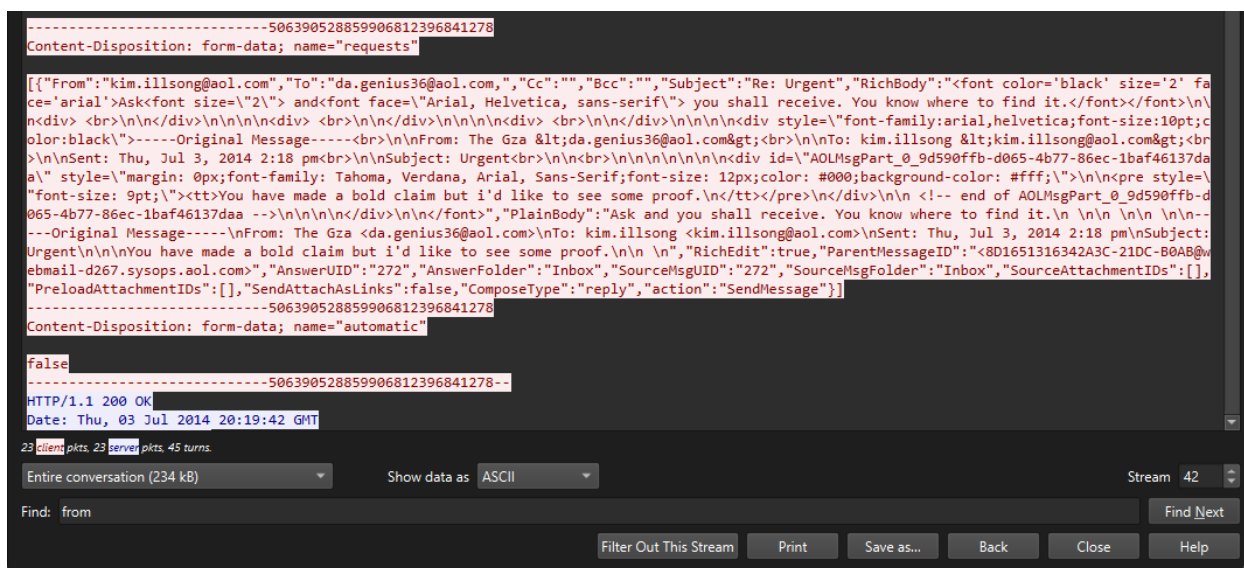


Figure 26: Unencrypted email communication.

From: The Gza <da.genius36@aol.com>  
To: kim.illsong <kim.illsong@aol.com>  
Subject: Urgent

You have made a bold claim but i'd like to see some proof.

Figure 27: Email sent to kim.illsong@aol.com

From: kim.illsong <kim.illsong@aol.com>  
To: The Gza <da.genius36@aol.com>  
Subject: Urgent

Ask and you shall receive. You know where to find it.

Figure 28: Email sent to da.genius36@aol.com

Having found all the evidence in that HTTP stream the analyst returned to looking for “.zip” files inside the unfiltered network capture. This led to the discovery of Packet 5827, in which there was a mention of 2 more “.zip” files called “ojd34.zip” and “sandofwhich.zip”, which could not be extracted. (Figure 29)

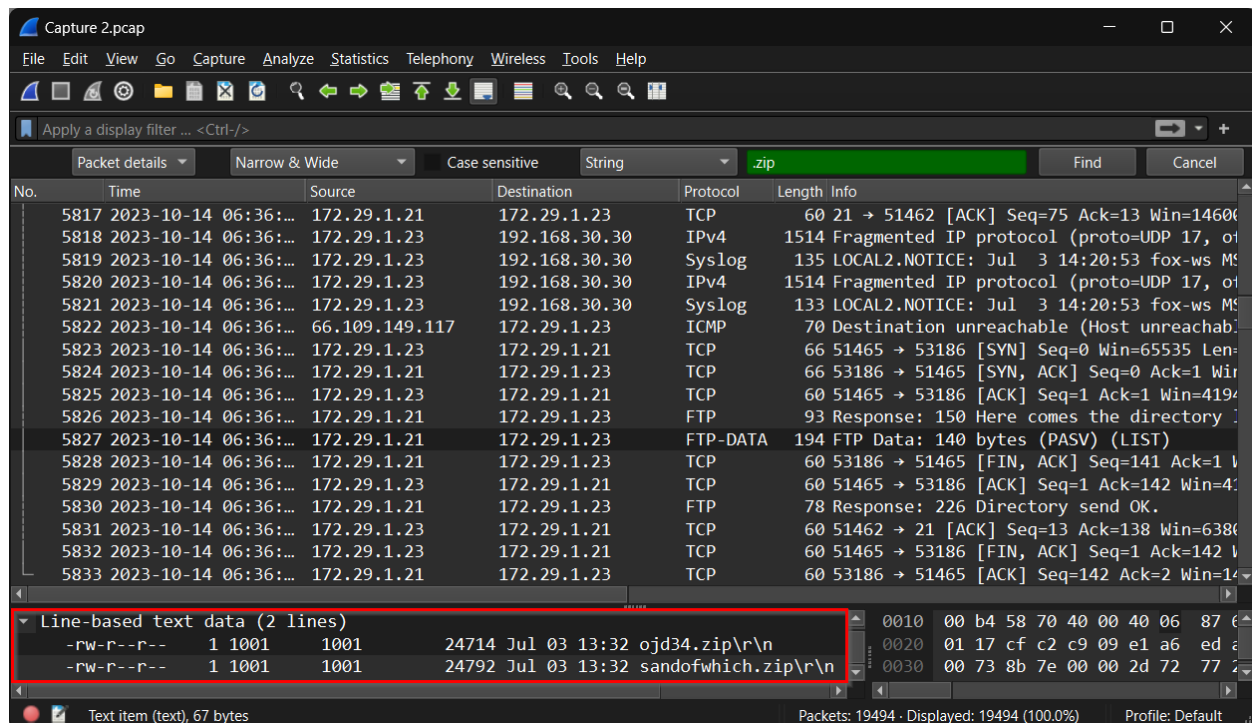


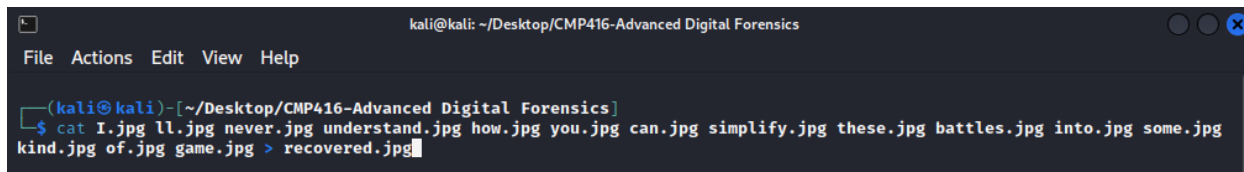
Figure 29: Zip files found in packet 5827.

### 3.2.2 Evidence Analysis

The investigator attempted to open images originating from the FTP-DATA exports objects list, but received an error message on all of them, but one. The one image that could open “l.jpg” appeared not fully intact. This led to the investigator suspecting that the images were modified by splitting the raw hex bytes of the original image into several image files.

Because of the information received during the brief it was determined that the images need to be combined in an order matching an Obi Wan quote. After searching online for matching quotes, the following quote was discovered “I’ll never understand how you can simplify these battles into some kind of game.”

The investigator used the discovered quote to combine all the files using the “cat” command in Kali Linux into a file called “recovered.jpg”. (Figure 30)



```
kali@kali: ~/Desktop/CMP416-Advanced Digital Forensics
File Actions Edit View Help

(kali@kali)-[~/Desktop/CMP416-Advanced Digital Forensics]
$ cat I.jpg ll.jpg never.jpg understand.jpg how.jpg you.jpg can.jpg simplify.jpg these.jpg battles.jpg into.jpg some.jpg
kind.jpg of.jpg game.jpg > recovered.jpg
```

Figure 30: Using cat command to recover original image.

Based on the suspicion the investigator had about SilentEye potentially being used they decide to put the image that was recovered in SilentEye to check if it contains a hidden message. This returned a positive result which led to the extraction of a hidden Base-64 encoded message that was decoded using CyberChef. (Figure 31 and Figure 32)

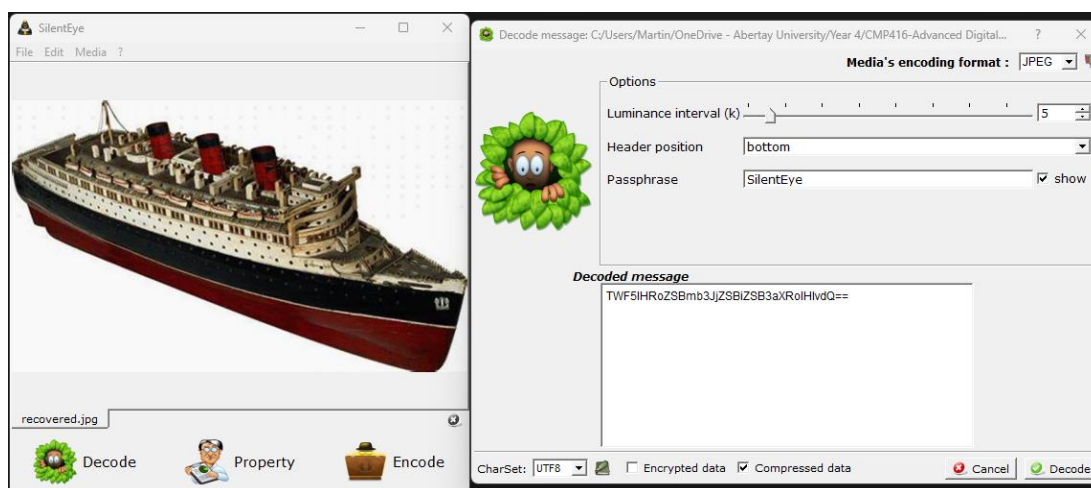


Figure 31: Decoding "recovered.jpg".

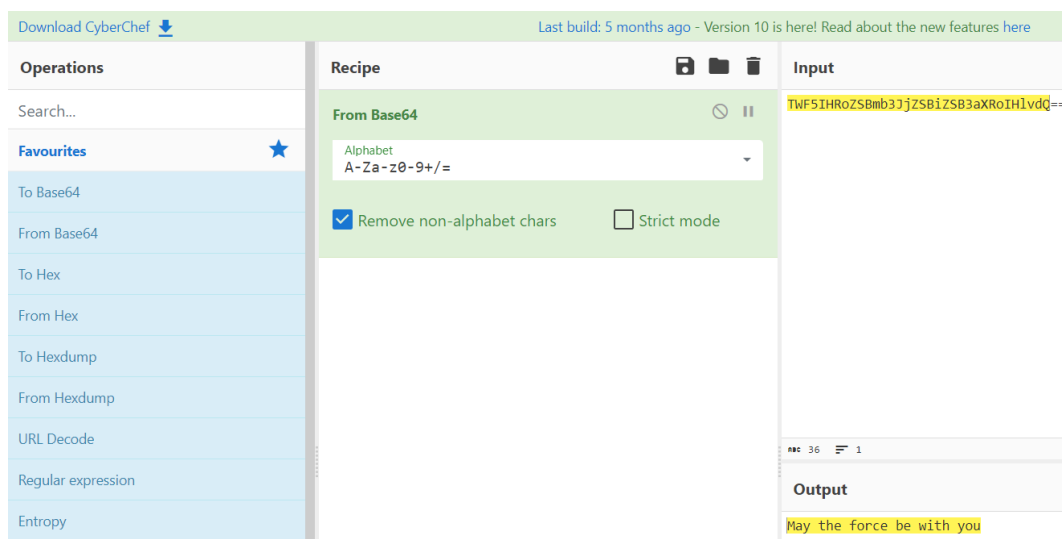


Figure 32: Hidden message decoded in CyberChef.

The next step that was taken was to analyse the 3 archives that were recovered from the email conversation between “kim.illsong@aol.com” and “da.genius36@aol.com”. Inside the “34jdsioj.zip” there was 11 images which also appeared to be fragments of an image, however unlike in the situation earlier there was no file that could be opened and as such it was determined that there is file missing which makes recovering the original file impossible.

Following this the “breaking\_bad\_season6.archive” was examined. It also had 11 images that appeared to be fragments of an image, but unlike in “34kdsiok.zip” one of the images called “There.jpg” could be opened. Because of this fact the analyst decided to attempt to find the quote that needs to be used to recover the original image, however that was unsuccessful. The investigator also attempted to brute force the right combination but that proved futile. It was determined that there were also files missing from this archive.

Finally, the “canc3l.zip” archive was examined. It contained 12 images, out of which only 1 called “condone.jpg” could be opened. The fragmentation was once again attempted to be reversed, but that also proved impossible, because of missing files. The investigator determined that the missing files are most likely the ones contained in the “ojd34.zip” and “sandofwhich.zip” archives which could not be recovered.

All the image files that could be opened can be found in Appendix B – Capture 2.

### **3.3 CAPTURE 3**

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#### **3.3.1 Traffic Analysis**

The network traffic in the provided capture begins at 19:38:50 on 02-07-2014 and ends at 19:56:49 on 22-10-2023. However, all the traffic before 19:45:14 on 22-10-2023 was deemed irrelevant for the investigation.

The brief for the third capture informed the investigator that there was communication traffic detected between two suspects called “El Chapo” and “Narco Polo”.

To begin their investigation the investigator firstly examined the “Protocol Hierarchy Statistics” again. This allowed them to determine that the most used protocol in this packet capture was HTTP (Hyper Text Transfer Protocol). (Figure 33)



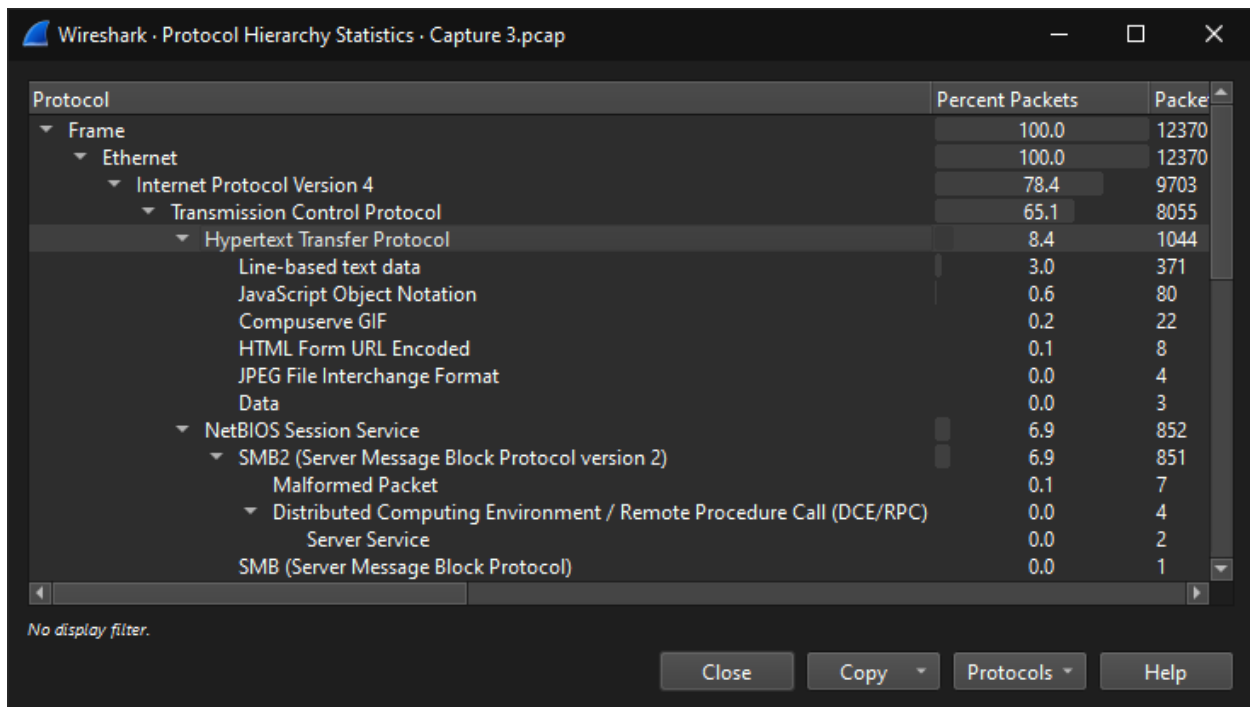


Figure 33: Protocol Hierarchy Statistics Capture 3.

The capture was filtered to show only HTTP packets and the “Find Packet” feature in Wireshark was used search for the string “El Chapo”. The first occurrence of that string was found in packet 10014. It appeared to an unencrypted HTTP chat log. (Figure 34)

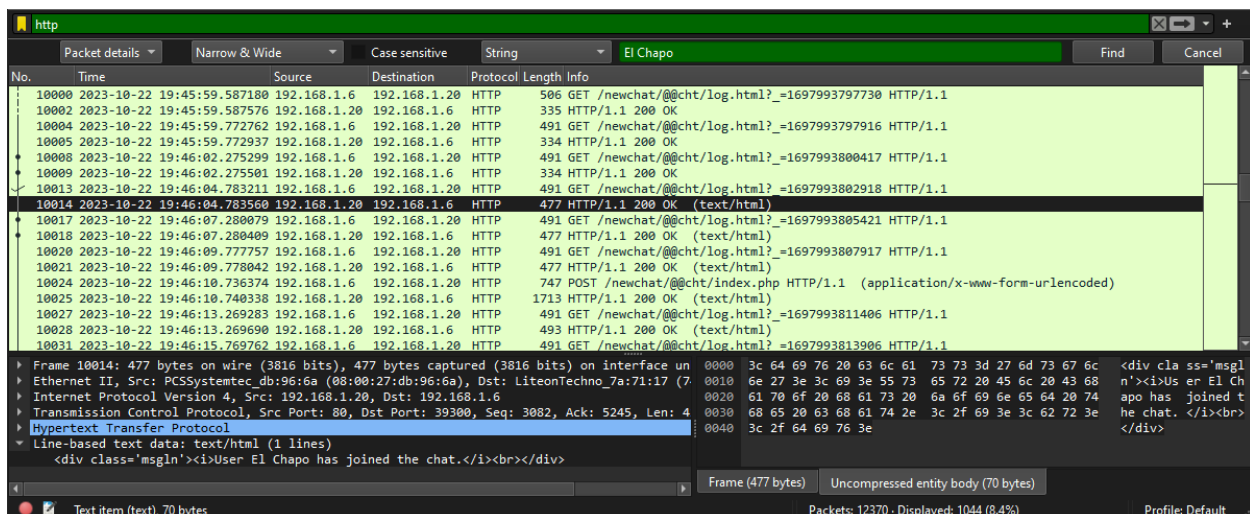


Figure 34: Searching for string "El Chapo" in Capture 3.

The investigator decided to right-click the packet and go into “Follow -> HTTP Stream” to follow the rest of the messages. By going through the HTTP streams, they found the end of chat logs at HTTP Stream 247. Though the information in that stream they were able to discover the most up to date list of messages at the time of the capture. This can be seen in Figure 35.

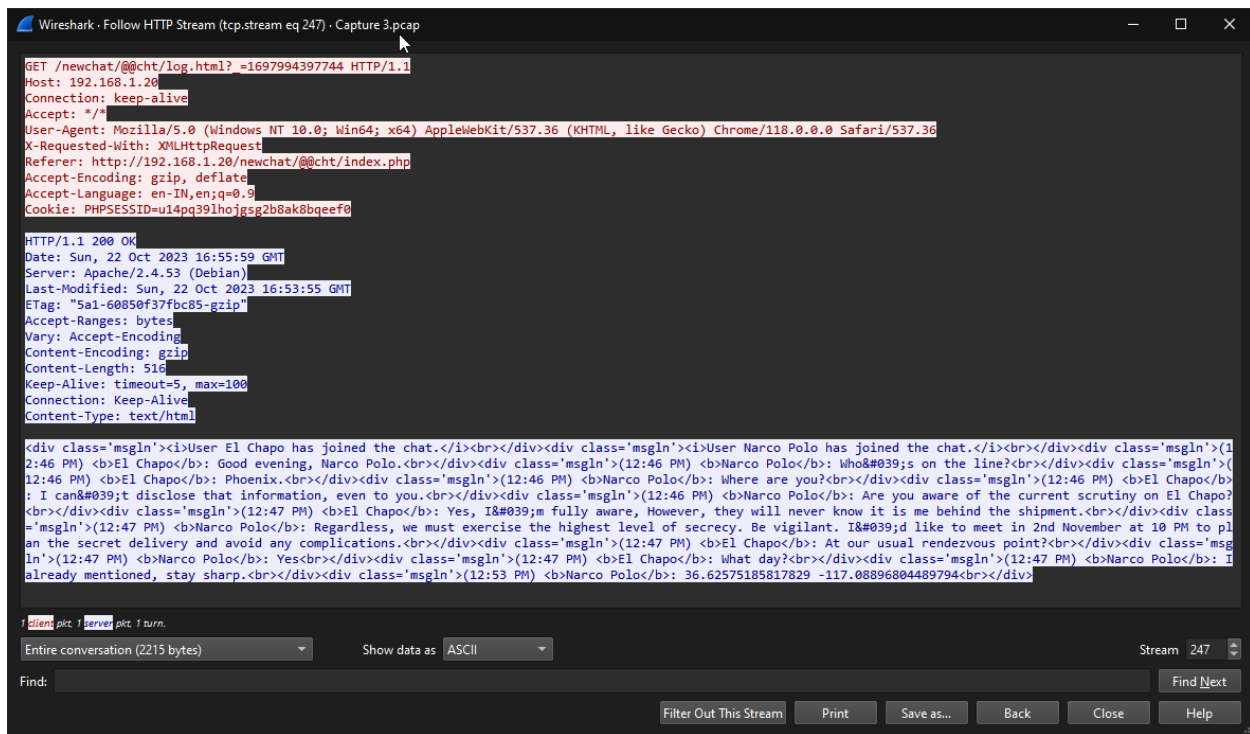


Figure 35: End of chat log at HTTP stream 247

The whole HTTP stream was saved for later analysis.

The packet capture was also filtered to show only SMB2 traffic since it was the 2<sup>nd</sup> most common protocol in the “Protocol Hierarchy Statistics” of this packet. (Figure 33)

After filtering the investigator noticed that very similar actions to Capture 1 were taken (The suspect connected to the server with the username “Varun”, requested access to shares and downloaded several files.) (Figure 36)

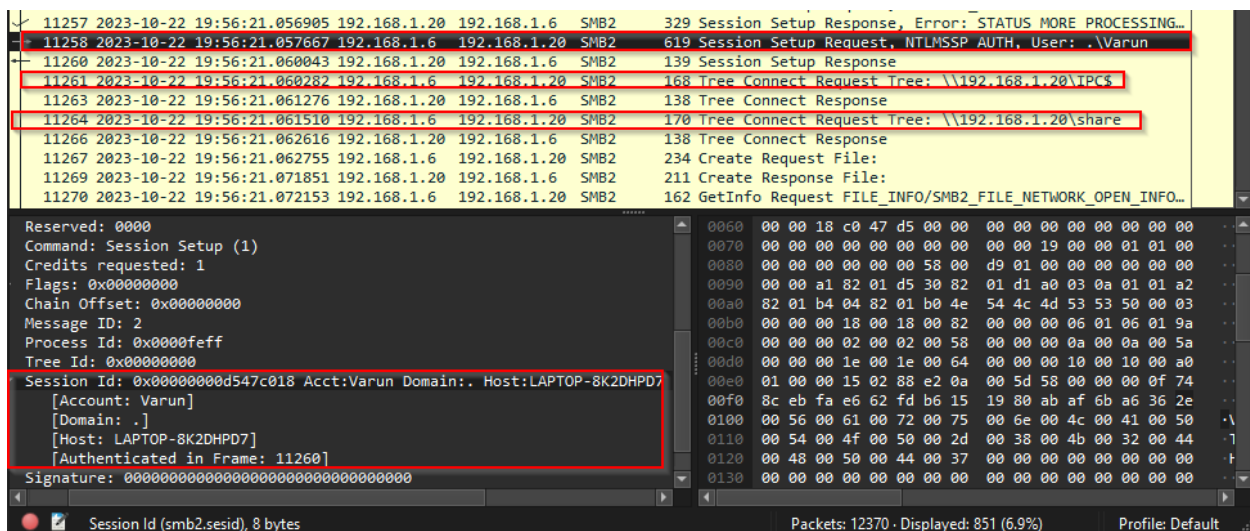
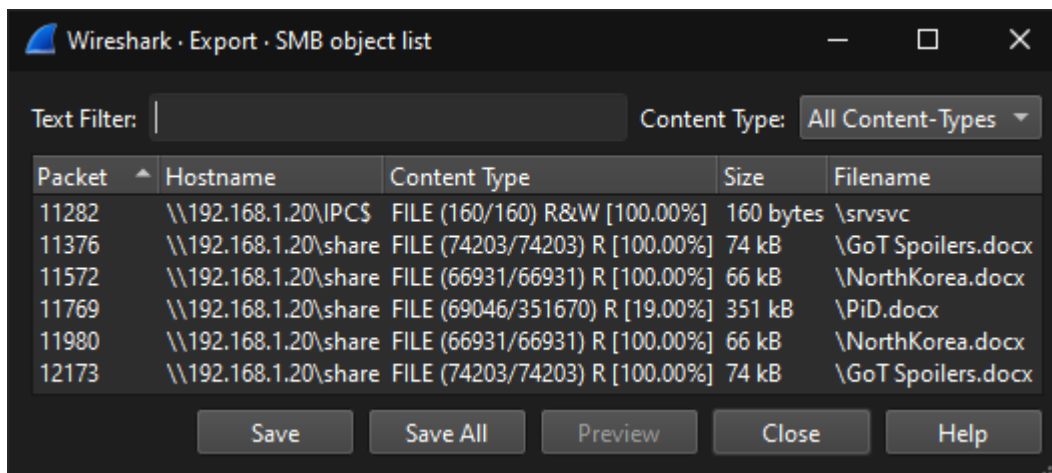


Figure 36: Similar actions being performed by Varun.



All files that were shared using SMB were again extracted by going into “File -> Export Objects -> SMB...”. (Figure 37)



Packet	Hostname	Content Type	Size	Filename
11282	\\192.168.1.20\IPC\$	FILE (160/160) R&W [100.00%]	160 bytes	\srvsvc
11376	\\192.168.1.20\share	FILE (74203/74203) R [100.00%]	74 kB	\GoT Spoilers.docx
11572	\\192.168.1.20\share	FILE (66931/66931) R [100.00%]	66 kB	\NorthKorea.docx
11769	\\192.168.1.20\share	FILE (69046/351670) R [19.00%]	351 kB	\PiD.docx
11980	\\192.168.1.20\share	FILE (66931/66931) R [100.00%]	66 kB	\NorthKorea.docx
12173	\\192.168.1.20\share	FILE (74203/74203) R [100.00%]	74 kB	\GoT Spoilers.docx

Figure 37: SMB objects list Capture 3.

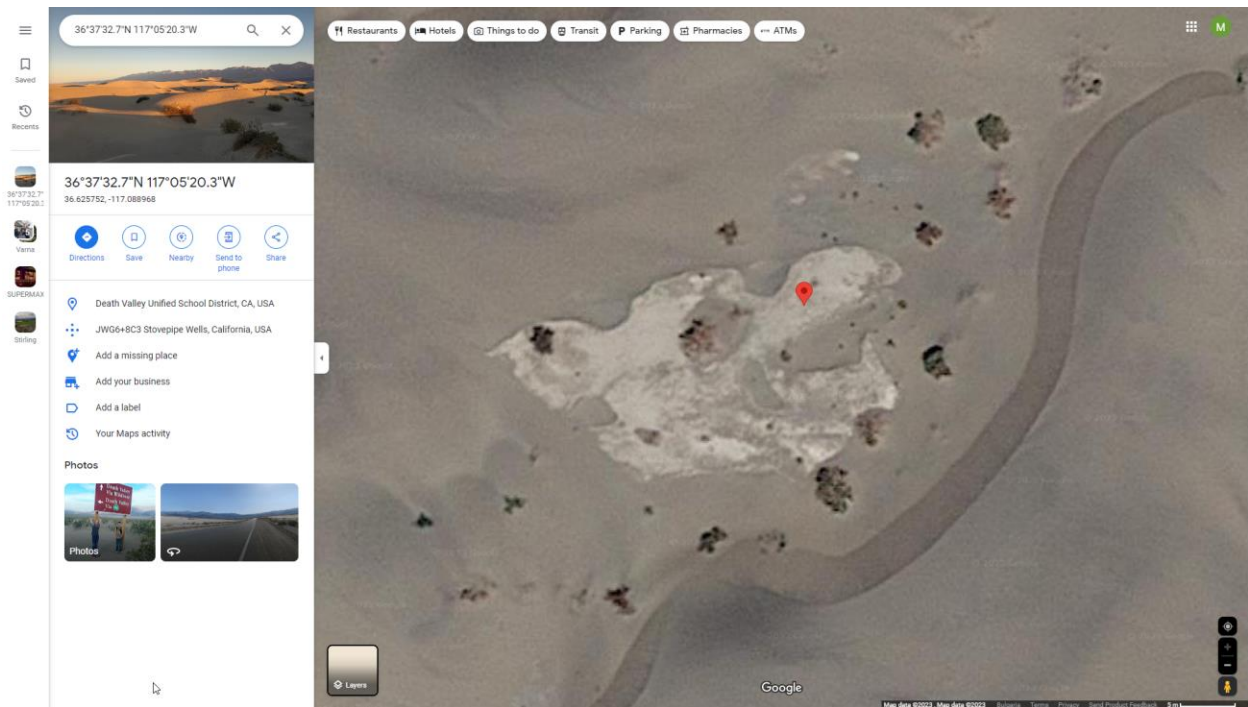
After generating the MD5 hashes of each file the investigator noticed that they matched with the ones recovered from Capture 1 and deemed it unnecessary to examine them further.

### 3.3.2 Evidence Analysis

The output HTML received at HTTP stream 247 was rendered online using “https://realtimehtml.com” (Anon., n.d.). The resulting text was much easier to read for the investigator. It appeared that an unencrypted conversation occurred between two users called El Chapo and Narco Polo, where they agreed to meet at 10 PM at the following coordinates ‘36.62575185817829 -117.08896804489794’, which were determined to be in Death Valley Unified School District, CA, USA. (Figure 38 and Figure 39)

<pre> HTTP/1.1 200 OK Date: Sun, 22 Oct 2023 16:55:59 GMT Server: Apache/2.4.53 (Debian) Last-Modified: Sun, 22 Oct 2023 16:53:55 GMT ETag: "5a1-60850f37bc85-gzip" Accept-Ranges: bytes Vary: Accept-Encoding Content-Encoding: gzip Content-Length: 516 Keep-Alive: timeout=5, max=100 Connection: Keep-Alive Content-Type: text/html  &lt;div class='msgln'&gt;&lt;i&gt;User El Chapo has joined the chat.&lt;/i&gt;&lt;br&gt;&lt;/div&gt;&lt;div class='msgln'&gt;&lt;i&gt;User Narco Polo has joined the chat.&lt;/i&gt;&lt;br&gt;&lt;/div&gt;&lt;div class='msgln'&gt;(12:46 PM) &lt;b&gt;El Chapo&lt;/b&gt;: Good evening, Narco Polo.&lt;br&gt;&lt;/div&gt;&lt;div class='msgln'&gt;(12:46 PM) &lt;b&gt;Narco Polo&lt;/b&gt;: Who&amp;#039;s on the line?&lt;br&gt;&lt;/div&gt;&lt;div class='msgln'&gt;(12:46 PM) &lt;b&gt;El Chapo&lt;/b&gt;: Phoenix.&lt;br&gt;&lt;/div&gt;&lt;div class='msgln'&gt;(12:46 PM) &lt;b&gt;Narco Polo&lt;/b&gt;: Where are you?&lt;br&gt;&lt;/div&gt;&lt;div class='msgln'&gt;(12:46 PM) &lt;b&gt;El Chapo&lt;/b&gt;: I can&amp;#039;t disclose that information, even to you.&lt;br&gt;&lt;/div&gt;&lt;div class='msgln'&gt;(12:46 PM) &lt;b&gt;Narco Polo&lt;/b&gt;: Are you aware of the current scrutiny on El Chapo?&lt;br&gt;&lt;/div&gt;&lt;div class='msgln'&gt;(12:47 PM) &lt;b&gt;El Chapo&lt;/b&gt;: Yes, I'm fully aware, However, they will never know it is me behind the shipment.&lt;br&gt;&lt;/div&gt;&lt;div class='msgln'&gt;(12:47 PM) &lt;b&gt;Narco Polo&lt;/b&gt;: Regardless, we must exercise the highest level of secrecy. Be vigilant. I'd like to meet in 2nd November at 10 PM to plan the secret delivery and avoid any complications.&lt;br&gt;&lt;/div&gt;&lt;div class='msgln'&gt;(12:47 PM) &lt;b&gt;El Chapo&lt;/b&gt;: At our usual rendezvous point?&lt;br&gt;&lt;/div&gt;&lt;div class='msgln'&gt;(12:47 PM) &lt;b&gt;Narco Polo&lt;/b&gt;: Yes&lt;br&gt;&lt;/div&gt;&lt;div class='msgln'&gt;(12:47 PM) &lt;b&gt;El Chapo&lt;/b&gt;: What day?&lt;br&gt;&lt;/div&gt;&lt;div class='msgln'&gt;(12:47 PM) &lt;b&gt;Narco Polo&lt;/b&gt;: I already mentioned, stay sharp.&lt;br&gt;&lt;/div&gt;&lt;div class='msgln'&gt;(12:53 PM) &lt;b&gt;Narco Polo&lt;/b&gt;: 36.62575185817829 -117.08896804489794&lt;br&gt;&lt;/div&gt; </pre>	<pre> HTTP/1.1 200 OK Date: Sun, 22 Oct 2023 16:55:59 GMT Server: Apache/2.4.53 (Debian) Last-Modified: Sun, 22 Oct 2023 16:53:55 GMT ETag: "5a1-60850f37bc85-gzip" Accept-Ranges: bytes Vary: Accept-Encoding Content-Encoding: gzip Content-Length: 516 Keep-Alive: timeout=5, max=100 Connection: Keep-Alive Content-Type: text/html User El Chapo has joined the chat. User Narco Polo has joined the chat. (12:46 PM) El Chapo: Good evening, Narco Polo. (12:46 PM) Narco Polo: Who's on the line? (12:46 PM) El Chapo: Phoenix. (12:46 PM) Narco Polo: Where are you? (12:46 PM) El Chapo: I can't disclose that information, even to you. (12:46 PM) Narco Polo: Are you aware of the current scrutiny on El Chapo? (12:47 PM) El Chapo: Yes, I'm fully aware, However, they will never know it is me behind the shipment. (12:47 PM) Narco Polo: Regardless, we must exercise the highest level of secrecy. Be vigilant. I'd like to meet in 2nd November at 10 PM to plan the secret delivery and avoid any complications. (12:47 PM) El Chapo: At our usual rendezvous point? (12:47 PM) Narco Polo: Yes (12:47 PM) El Chapo: What day? (12:47 PM) Narco Polo: I already mentioned, stay sharp. (12:53 PM) Narco Polo: 36.62575185817829 -117.08896804489794 </pre>
---	--

Figure 38: Rendered HTML code.



*Figure 39: Meeting spot in Google Maps*

## 4 CRITICAL EVALUATION AND REFLECTION

### 4.1 CRITICAL EVALUATION CAPTURE 1

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The analysis of this packet presented two challenges. The first was discovering which packets should be analysed from the full list of 32 693 packets. This challenge was lightened by utilising the filters functionality in Wireshark to only filter by specific packets related to file transferring, since the brief supplied the information of a detected upload of files containing useful evidence.

The other challenge was how to ensure the integrity of all the evidence has been found, since that is a fundamental aspect of any digital forensics investigation. To do that PowerShell was used to craft different commands that would make all the files which are extracted read only and that would calculate and save the MD5 hash of each file. This was a challenge faced in all 3 of the packets which were analysed but was easily alleviated by the solution discussed above.

### 4.2 CRITICAL EVALUATION CAPTURE 2

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Discovering the specific quote used for the creation of the hidden original image proved to be quite difficult since it was not a well-known Obi Wan quote. Despite that after doing some research “Google Dorking” was determined to be a useful technique for discovering the specific quote that was used.

Alongside this after recovering the quote the analyst determined that there is the possibility of brute forcing the potential hidden message, since the number of files the original image was split into was relatively low.

The final challenge that was faced was determining the usefulness of the extra archives which were discovered, however since they were obfuscated it was determined that they were relevant to the investigation and could be beneficial if the missing files are recovered.

### 4.3 CRITICAL EVALUATION CAPTURE 3

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The main difficulty during the analysis of this Capture, was the analysis of the raw HTML data since it proved hard to read. To resolve this issue the HTML data was rendered using an online HTML renderer which allow the easy formatting and analysis of the conversation which occurred.

Another difficulty that was faced was caused by the fact that the files that were extracted from this capture had the same contents as some of the files from Capture 1. This initially made the investigator spend time looking through the files again, however after comparing the MD5

hashes of each file it was determined that additional examination was unnecessary since they matched the hashes of the files from Capture 1.

## 4.4 REFLECTION

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Malicious hackers have many tools at their disposal to impede an investigation at them. The techniques that were seen in these captures include encoding, data fragmentation, and steganography.

In Capture 1 the target attempted to obfuscate the contents of their “.docx” files by utilising Base-64 encoding. This however proved simple to detect and bypass, since Base-64 is a well-known and easy to identify encoding scheme.

In the second capture by splitting the original image file into 15 files the suspect attempted data fragmentation. Despite that, because of the anonymous tip that an Obi Wan quote might be useful the original image file was easily recovered. It should be noted that even if the tip was not received it would be possible to brute force the correct combination by examining the created file for changes when each new file is added, which is made even easier because of the relatively low amount of fragmentation.

In the final capture the suspect did not attempt to obfuscate their activities. They communicated over an unencrypted HTTP connection which allowed the easy analysis of their chatlog. If the suspected had used an encrypted HTTPS connection, this chatlog could have been hidden.

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## 6.1 APPENDIX A – CAPTURE 1

MS4gICBTU1N1NQVJZIE9GIFJVTEVTLiAgTUfJTIBQTOIOVFMMuDQpUT1VDSCBNT1ZFtHj1bGUgc3RyaWN0bHkgYXBwbGlscy4NCuKAogIJZiBhIHBPZWNIIGlZlHRvdWNoZWQsIHRoZW4gaXQgbXVzdCBiZSBtb3ZlZCAoaWYgYSBsZWdhbCBtb3ZlIGlZlGF2YWlsYWJsZSkNCuKAogIJZiBhbHVhcHBvbmVudOKAmXMgcGLlY2UGaXMgdG91Y2hlZCwgaXQgbXVzdCBiZSB0YWtlbiAoaWYgbGVnYWwpLg0KQ09VTIRET1dOIEIGIFNUQUxMSU5HIEZPUiBUSU1FLklulGdlbmVyYWWwgYSBwbGF5ZXlgbWFuYWdlcyBob3cgbXVjaCBvcilBsaXR0bGUgdGltZSB0byB0YWtlIGZvciBIYWNolG1vdmUslGFuZCB0aGlzIGlzIGZpbmUhlCBib3dlbmVyLCBpZiBhIHBSYXllciBjbGVhcmx5IHBSYXllZlGZhciB0b28gc2xvd2x5IGZvciB0aGUgc3BlY2ImaWMgcG9zaXRpb24slGZvciBleGFtcGxlIHdoZW4gaGUgaXMzMfJaW5nlHVuYXZvaWRhYmxlIGNoZWNRbwF0ZSwgdGhlIGFyYml0ZXlmd2lscCBkbyBhIGNvdW50ZG93bi4glEhIIHdpbGwgcG9pbmQgYXQgdGhlIGJvYXJkLCBhbmQgd2Fyb0B0aGUgcGxheWVylGJ5IGNvdW50aW5nIHRvIDewIHdpdGggaGlzIGhhbmRzlChqdXNOIGxp2UgYSBib3hpbmcgcmVmZXJlZSkuIkJZiB0aGUgcGxheWVylGHhcyBub3QgbW92ZWQgYnkgdGhlIGNvdW50IG9mIEdwLCBoZSBsb3NlcYB0aGUgZ2FtZSBhbmQgdGhlIG1hdGNOLiBOb3RIIHRoZXJlIGlZlG5vIG1pbmltdW0gdGltZSB0byBtYWtlIGEgbW92ZEgQWxzbywgZXZlbiBpZiB0aGVyZSBpcyBvbmx5IDEgbGVnYWwgW92ZSwgdGhlIHBSYXllciBzaG91bGQgYmUgYWxsbd3dlZCBzb21lHRpbWUgdG8gcHN5Y2hvbG9naWNhbGx5IGNvbXBvc2UgdGhlbXNlbHZlc4glElOIHNob3VsZCBiZSBjb25zaWRlcmVkiHRoYXQgYSB3ZWFrIHBSYXllciBtYXkgbm90IHJlYWxpc2UGaGUgb25seSBoYXMGMSBsZWdhbCBtb3ZlIg0KKOhFU1MgQ0xPQ0sgUFJPVE9DT0wuICBUaGUgY2hlc3MgY2xvY2sgbXVzdCBiZSBwcmlVzc2VkiHdpdGggdGhlIFNBTTUUGSEFORCB0aGF0IG1vdmVzIHRoZSBwaWVjZS4NCIBSRVNTSU5HIENIRUNLIENMTONLLiAgSXQgaXMgdGhlIHBSYXllcuKAmXMgcmlVzcG9uc2liaWxpdkHkdG8gcHJlc3MgaGlzIG9yIGhlcilBjbG9jayBiZXR3ZWVuIGNoZXNzIG1vdmVzLiBUaGUgY29tcGV0aXRvcnMgbWF5IGFncmVlIGluIGFkdFuY2UgdG8gYWxsbd3cgdGhlIGFyYml0ZXlmdG8gaXNzdWUgcmlVtaW5kZXJzI0KAkyBlc3BlY2IlhbGx5IGlmIGJvdGggZmlnaHRlcnMgYXJlIG5ldyB0byBjaGVzclJveGluZy4NCIBJRUNFUyBLTk9DS0VEIERPV04gt1lgTk9UIFBST1BFUkxZIE9OIEEGU1FVQVJFLiAgSWYgYSBwbGF5ZXlga25vY2tzlGRvd24gYSBwaWVjZSB3aGlsc3QgbWFraW5nIGEgbW92ZSBvcilBkb2VzIG5vdCBwdXQgaXQgcHJvcGVybHkgb24gYSBzcXVhcmUslGhIIHNob3VsZCBwcmlVzc2VjZSeSBYzS1wb3NpdGlviBvcilByZS1jZW50cmUgdGhlIHBPZWNIIGluEHJUyBPV04gy2xvY2sgdGltZS4glEFuIG9mZmVuY2UgdGhhdBwdXRzIG9mZiB0aGUgb3Bwb25lbnQgY291bGQgYmUgcHVuaXNoZWQgYnkgYWRkaW5nIHRpbWUgdG8gdGhlIG9wcG9uZW504oCZcyBjbG9jay4NCiANck9USEVSIFJVTEVTIHRvIE5PVEUNCuKAogkgUmVzaWduYXRpb24gcHJvdG9jb2wuICBGb3lmdGhlIGJlbnVmaXQgb2YgdGhlIGF1ZGllbmNILCBwbGF5ZXJzIGFyZSBzdHJvbmdeSBibmNvdXJhZ2VkiHRvIHBSYXkgdW50aWwgY2hlY2ttYXRILiBJZiB5b3Ugd2FudCB0byByZXNP224gKHNN1Ym1pdCkgcHJpb3lmdG8gY2hlY2ttYXRILCBkbyB0aGlzIGJ5IGtub2NraW5nIG92ZXlgeW91ciBraW5nIGFuZCBvZmZlcmUyZyBhIGhhbmRzaGFrdzS4NCuKAogljBgxlZ2FsIG1vdmUulCBbbiBpbGxlZ2FsIG1vdmUgbXVzdCBiZSBYzXRyYWN0ZWQuICBUaGUgYXJlciBoYXMGdGhlIGRpc2NyZXRpbn24gdG8gcHVuaXNoIHdpdGggYSB0aW5lIHBlbmFsdHksIG9yIGRpc3F1YWxpZnkgYWZ0ZXlMyBpbGxlZ2FsIG1vdmVzLiAgRXh0cmEgYWXsb3dhbmNlcYBiY2Y4gYmUgbWFkZSBmb3lgbm92aWNlIHBSYXllcnMuDQrigKIJU3BlYWTpbmcd





- Resignation protocol. For the benefit of the audience, players are strongly encouraged to play until checkmate. If you want to resign (submit) prior to checkmate, do this by knocking over your king and offering a handshake.
- Illegal move. An illegal move must be retracted. The arbiter has the discretion to punish with a time penalty, or disqualify after 3 illegal moves. Extra allowances can be made for novice players.
- Speaking to the arbiter. If a player needs to speak to the arbiter during the chess game, he should remove his headphones. The arbiter will then stop the clock to listen.
- Playing to win on time. If a position is a completely drawn position, and the arbiter believes a player is quickly moving pieces only to win on time, then the arbiter can declare the game a draw.
- Chess Draw. A chess draw will be followed by one boxing round (unless the maximum number of boxing rounds has already happened). The chessboxing bout will therefore be won by whoever has amassed the most boxing points – judged by punches thrown and overall aggression.
- Drinks. Fighters are allowed to bring water to the chess table.
- Cuts. In most cases, except for the most superficial examples, a cut will lead to the fight being stopped and a TKO declared.
- General Advice. Competitors are reminded that they do not need to move quickly, even if their opponent moves quickly. Adrenaline drastically changes your sense of time. Experience shows that a player is OK until he has 2 minutes of time remaining on the clock, when moves should be speeded up.

### 6.1.2 Rules 2.docx

IDluICAgRU5GT1JDRU1FTlQgT0YgQ0hFU1MgUlVMRVMNCiBJbiB0aGUgZXZlbnQgb2YgYSBicm  
 VhY2ggb2YgdGhlIHJ1bGVzIGEgcGVuYWx0eSBjYW4gYmUgaW1wb3NlZCBhdCB0aGUgYXJlXRI  
 cuKAmXMgZGZlY3JldGlubi4NCiANCgOK

## 2. ENFORCEMENT OF CHESS RULES

In the event of a breach of the rules a penalty can be imposed at the arbiter's discretion.

### 6.1.3 Rules 3.docx

My4gIFBFTkFMVEIFUyBGT1lgUIVMRSBCUkVBQ0hFUw0KQSBjaGVzcyBwZW5hbHR5IGNvdWwklHRha2UgdGhlIGZvc0gb2Y6DQrigKIjVGHlIG9mZmVuY2Ugd2lsbCBhY3QgYXMgYSB0aWUtYnJlYWsgaWYgYm90aCB0aGUgYm94aW5nIGFuZCBjaGVzcyBhcmUgZlJhd24uIChUaGlzIGlZIHROZSBtaW50bXBvIChkZWZhdWw0KSBBwZW5hbHR5IGFuZCBhcHBsaWVzIGlmIHROZlJlIGlZIG5vIG90aGVyIHBlbmFsdHkuDQrigKIjMzAgc2Vjb25kcyBpcyBzdWJ0cmFjdGVkIGZyb20gdGhlIG9mZmVuZGVy4oCZcyBjbG9jay4NCuKAogIGb3JmZWl0IG9mIHROZSBib3V0LiBUaGlzIGNvdWwklIG9jY3VylGZvciBhIHNIcmldvXMgZGlzY2lwbGluYXJ5IG9mZmVuY2UslGRlbiGlic2lJhdGUgZm91bCBwbG90aGVyIGVzcyBwZW50ZWQgYnJlYWNoIChlLmculGEgdG90YWwgb2YgMyBpbGxIZ2FslG1vdmVzKS4NCg==



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## 5. WCBA CHESS RULES FOR CHESSBOXING

Chess tournament rules have legal points that casual players may be unfamiliar with. The official laws of chess are on the website of FIDE, the chess governing body  
<http://www.fide.com/component/handbook/?id=32&view=category>.

Highlighted below are legal points that cause most disputes in tournament chess situations. In addition, some chessboxing laws differ from FIDE rules in order to (i.) ensure the paying public is entertained, (ii.) keep the game flowing with minimal disruption, and (iii.) minimise verbal communication with the competitors. These differences are highlighted where they occur.

### Touch move

- Once a piece is touched it MUST be moved, unless “J’adoube” is indicated before touching the piece. If no legal move is admissible, then any other piece can be moved without punishment.
- Once an opponent’s piece is touched it must be captured if there is such a legal move. If it cannot be captured the offender receives no penalty and is free to move without restriction.

### Castling touch move

When castling you MUST touch the king first. If you touch the rook first, then you cannot castle, but you must move the rook because of the touch-move rule.

### Hand is taken off a piece

When a piece is moved and the hand taken off the piece, the move cannot be retracted – the piece cannot be moved to a different square.

### Illegal move

The arbiter will point out the illegal move if it goes unnoticed. Since the punishment for an illegal move is not as severe in chessboxing as in FIDE blitz chess laws, the arbiter will not allow the possibility of an illegal move going uncorrected.

### “J’Adoube” rule.

#### Normal Chess Rules

- If a piece is off centre and is annoying you, state “j’adoube” or “I adjust” BEFORE adjusting its position on the square. One of these phrases should be used regardless of the player’s home language.
- If you state “j’adoube” after or during the piece adjustment, then it counts as a touch move.

- You should only adjust pieces whilst your clock is running. Adjusting during your opponent's time is forbidden as it is a distraction.

Chessboxing Rules (adapted because both players have headphones)

- With headphones on it is simplest if players don't try to J'adoube. Pieces will be nicely centred by the arbiter between each chess round. However, if the urge to J'adoube becomes irresistible, follow the below procedure...
- Clearly turn to the arbiter and mouth "J'adoube" AND give the J'adoube hand signal specially developed for chessboxing. Then adjust the piece as in a normal chess game.
- The j'adoube hand signal is the 'OK' hand gesture, creating a circle with the thumb and first finger.

### Pawn promotion

A key difference between casual chess and tournament rules. When promoting a pawn to a second queen, do NOT use an upside-down rook (as the electronic chessboard will not recognise it). Even if you shout "queen" as you do so, it is still a rook! The chessboxing arbiter will ensure a spare queen is on the table for you to use.

### Clock

- The clock MUST be pressed with the same hand that makes the move
- Running out of time. If a player has no time remaining, then he is lost if his opponent can checkmate him assuming the most unskilled play, otherwise the game is a draw. For example, if Player A has three queens and a king, and Player B has one pawn and a king, then Player B wins if Player A runs out of time.
- A player should not start to make his move until the opponent has physically pressed his clock.
- Time scramble – disputes can arise when 1 or both players are short of time and moving extremely quickly:
  - o A player should not start to make his move until the opponent has physically pressed his clock. i.e. you should not rush to move a piece in the brief time between your opponent moving his piece and pressing his clock.
  - o If a player knocks down pieces during a move, he should reset them in his own time before pressing his clock. If he presses his clock without resetting the pieces on their squares, then the opponent can immediately bounce the clock back without making a move, whilst pointing to the offending piece(s) that have been knocked down. The first player should then properly reset the pieces in his own time. [This completely differs from FIDE laws, where the innocent party should stop the clocks and inform the arbiter]. The same action can be performed if a piece is not clearly on a square but significantly overlaps another square such that its position is ambiguous. The arbiter can stop the clocks if there is a flurry of poorly placed pieces, and intervene to reset the board. The arbiter can penalise the offender.
  - o Drawn position – playing to win on time
    - If the arbiter judges the position is a dead draw (e.g. opposite colour bishop ending, or R+K vs R+K), then the arbiter can intervene and declare a draw if a player is simply trying to win on time and not making a concerted effort to win the game. The defender does not need

to request the arbiter to make such a judgement; the arbiter will assume the request exists as soon as a player has less than 2 minutes remaining. [This differs from the FIDE laws, which requires the defender to stop the clocks BEFORE he gets into critical time trouble, and ask the arbiter to observe whether the attacker is making a concerted effort to win the game or is just aiming to win on time in a dead drawn position.]

- Losing position – playing to win on time
- Note that if a player is in a winning position but is close to losing on time, the arbiter will not intervene in his favour. If he loses on time before he checkmates the opponent, this is more a consequence of time mismanagement than having to make countless moves shuffling pieces in a dead drawn position.
- Slow playing a lost position – a rule developed for chessboxing to prevent stalling for time.
- If a player takes too much time in a lost position where he would be expected to play much quicker in a normal chess game, the arbiter can give him a count of 10. The arbiter will visually count with his hands. If no move is made on the count of 10, the player forfeits the game.

#### Draw by threefold repetition

- If the same position occurs 3 times (and with the same player to move), the player can claim a draw ONLY WHEN IT IS HIS MOVE. He should stop the clock after the opponent's last move, remove his headphones and TELL the arbiter what move he WOULD play to get into the 3rd repetition. DO NOT PLAY THE MOVE, DO NOT PRESS THE CLOCK. If the player is unsure how to pause the clock, then he can take off his headphones and claim the draw. The arbiter will stop the clock as the headphones come off. If the draw claim is correct and the claimant runs out of time after removing his headphones, the draw will hold.
- A draw by repetition normally occurs by perpetual check so is easy to identify.

#### 50 move rule

A draw can be claimed if neither a piece is taken nor a pawn moved in 50 moves (i.e. 50 White and 50 Black moves). As players are not writing a game score, the arbiter will monitor on their behalf – this is most likely to occur in an ending B+N+K vs. K.

#### Draw Offer

- Contrary to FIDE rules, players will not be able to offer a draw unless the position is a 'dead draw', as judged by the arbiter.
- The offer of a draw must be made through the arbiter. Make your move, do not press your clock, and then remove the headphones to speak to the arbiter. The arbiter will stop the clock and judge whether a draw offer is acceptable. If so, he will convey to the opponent for consideration and restart the clock (as the opponent can consider the draw offer until he makes his next move).

#### Verbal Communication with the arbiter





SBLaW5nIGZyb20gZTEgdG8gYzEslGFuZCB0aGUgUm9vayBmc9tIGExIHRvIGQxLg0KQ2FzdGxp  
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 FNlZSBodHRwOi8vZW4ud2lraXBlZGhlM9yZy93aWtpL0V0uX3Bhc3NhbnQgZm9yIHZpc3VhbCBl  
 eGFtcGxlcY4NCg==

## 7. HOW CHESS PIECES MOVE – FINER POINTS THAT CONFUSE BEGINNERS

The complete official laws of chess are on the website of FIDE, the chess governing body.

The Appendix on the above link explains chess notation, and instances where ‘blitz’ or ‘rapid’ chess rules differ from normal ‘long play’ time controls.

### Castling

- Castling is one move
- The king always moves 2 squares, and the rook then goes next to the king on the other side.
- All squares between king and rook must be clear. Castling cannot capture a piece.
- White Kingside castling moves the King from e1 to g1, and the Rook from h1 to f1.
- White Queenside castling moves the King from e1 to c1, and the Rook from a1 to d1.

Castling is not a legal move when...

- ...the king is in check
- ...the king moves into check
- ...the king crosses over a square that is attacked (many players are unaware of this subtle point)
- ...a piece is on a square between king and rook
- ...the king has previously moved, even if it has since returned to its original square
- ...the rook to be castled has previously moved, even if it has since returned to its original square

### Pawn Promotion

A pawn reaching the eighth rank is 99% of times promoted to a queen, but it can also be ‘under-promoted’ to a knight, bishop or rook.

A special type of pawn capture. A pawn attacking a square crossed by an opponent's pawn which has advanced two squares in one move from its original square may capture this opponent's pawn as though the latter had been moved only one square. This capture is only legal on the move following this advance and is called an 'en passant' capture. 'En passant' is French for 'as it passes'. See [http://en.wikipedia.org/wiki/En\\_passant](http://en.wikipedia.org/wiki/En_passant) for visual examples.

U2Vuc2l0aXZlIGluZm9ybWF0aW9uDQpEcnVncyBSZWNVcmRzCQkNCK51bWJlcmkKJlEcnVnIE  
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## Drugs Records

Number	Drug Name	Amount
1	Atorvastatin	114509814
2	Levothyroxine	98970640
3	Metformin	92591486
4	Lisinopril	88597017
5	Amlodipine	69786684
6	Metoprolol	66413692
7	Albuterol	61948347
8	Omeprazole	56300064
9	Losartan	54815411
10	Gabapentin	49961066
11	Hydrochlorothiazide	41476098

Track7.docx

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SB3YW5uYSBoZW FyPw0KSSB3YW5uYSBoZW FyIHRoYXQgV3UtVGFuZyBqb2ludCIN  
CiJXdS1UYW5nIGFnYWluPyINCiJBaCB5ZWFOLCBhZ2Fpb iBhbmQgYWdhaw4hIg0KD  
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[illegible]

3MgaGF2ZSBhIG11ZCBmaWdodA0KDQpbc291bmRzIG9mIGZpZ2h0aW5nXQ0KDQpbUIpBXSBZb3UgYmVzdCBwcm90ZWN0IHlvdXIgbmVjayBbNFhdDQoNCg==

"Protect Ya Neck"

"So what's up man?"

Cooling man"

"Chilling chilling?"

"Yo you know I had to call, you know why right?"

"Why?"

"Because, yo, I never ever call and ask, you to play something right?"

"Yeah"

"You know what I wanna hear right?"

"What you wanna hear?"

I wanna hear that Wu-Tang joint"

"Wu-Tang again?"

"Ah yeah, again and again!"

[sounds of fighting]

[RZA] Wu-Tang Clan coming at you, protect your neck kid, so set it off the Inspector Deck

[Meth] watch your step kid [8X]

[Inspector Deck]

I smoke on the mic like smoking Joe Frazier

The hell raiser, raising hell with the flavor

Terrorize the jam like troops in Pakistan

Swinging through your town like your neighborhood Spiderman

So uhh, tic toc and keep ticking

While I get you flipping off the shit I'm kicking

The Lone Ranger, code red, danger!

Deep in the dark with the art to rip charts apart

The vandal, too hot to handle

you battle, you're saying Goodbye like Tevin Campbell

Roughneck, Inspector Deck's on the set

The rebel, I make more noise than heavy metal

[Raekwon]

The way I make the crowd go wild, sit back relax won't smile

Rae got it going on pal, call me the rap assassinator

Rhymes rugged and built like Schwarzenegger

And I'm gonna get mad deep like a threat, blow up your project

Then take all your assets

Cause I came to shake the frame in half

With the thoughts that bomb, shit like math!

So if you wanna try to flip go flip on the next man

Cause I grab the clip and  
Hit you with sixteen shots and more I got  
Going to war with the melting pot hot

[Method]

It's the Method Man for short Mr. Meth  
Moving on your left, ah!  
And set it off, get it off, let it off like a gat  
I wanna break full, cock me back  
Small change, they putting shame in the game  
I take aim and blow that nigga out the frame  
And like Fame, my style'll live forever  
Niggaz crossing over, but they don't know no better  
But I do, true, can I get a "sue"  
Nuff respect due to the one-six-oh  
I mean oh, you check out the flow  
like the Hudson or PCP when I'm dusting  
Niggaz off because I'm hot like sauce  
The smoke from the lyrical blunt makes me [cough]

[U-God]

Oh, what, grab my nut get screwed  
Ow, here comes my Shaolin style  
Sloop, B. A. Buh-B. Y. U  
to my crew with the "sue"

[Interlude]

watch your step kid [8X]  
[Ol Dirty Bastard] c'mon baby baby c'mon [4X]  
[RZA] Yo, you best protect your neck

[Ol Dirty Bastard]

First things first man you're fucking with the worst  
I'll be sticking pins in your head like a fucking nurse  
I'll attack any nigga who's slack in his mack  
Come fully packed with a fat rugged stack  
Shame on you when you stepped through to  
The Ol Dirty Bastard straight from the Brooklyn Zoo  
And I'll be damned if I let any man  
Come to my center, you enter the winter  
Straight up and down that shit packed jam  
You can't slam, don't let me get fool on him man  
The Ol Dirty Bastard is dirty and stinking  
Ason, unique rolling with the night of the creeps

Niggaz be rolling with a stash  
ain't saying cash, bite my style I'll bite your motherfucking ass!

[Ghostface Killah]

For crying out loud my style is wild so book me  
Not long is how long that this rhyme took me  
Ejecting, styles from my lethal weapon  
My pen that rocks from here to Oregon  
Here's Mordigan, catch it like a psycho flashback  
I love gats, if rap was a gun, you wouldn't bust back  
I come with shit that's all types of shapes and sounds  
And where I lounge is my stomping grounds  
I give a order to my peeps across the water  
To go and snatch up props all around the border  
And get far like a shooting star  
'cause who I am is dim in the light of Pablo Escobar  
Point blank as I kick the square biz  
There it is you're fucking with pros and there it goes

[RZA]

You chill with the feedback black we don't need that  
It's ten o'clock hoe, where the fuck's your seed at?  
Feeling mad hostile, ran the apostle  
Flowing like Christ when I speaks the gospel  
Stroll with the holy roll then attack the globe with the buckus style  
the ruckus, ten times ten men committing mad sin  
Turn the other cheek and I'll break your fucking chin  
Slaying boom-bangs like African drums (we'll be)  
Coming around the mountain when I come  
Crazy flamboyant for the rap enjoyment  
My clan increase like black unemployment  
Yeah, another one dare,  
Tuh-took a genius (to) take us the fuck outta here

[Genius]

The Wu is too slamming for these Cold Killing labels  
Some ain't had hits since I seen Aunt Mabel  
Be doing artists in like Cain did Abel  
Now they money's gettin stuck to the gum under the table  
That's what you get when you misuse what I invent  
Your empire falls and you lose every cent  
For trying to blow up a scrub  
Now that thought was just as bright as a 20-watt light bulb  
Should've pumped it when I rocked it



Niggaz so stingy they got short arms and deep pockets  
 This goes on in some companies  
 With majors they're scared to death to pump these  
 First of all, who's your A&R  
 A mountain climber who plays an electric guitar  
 But he don't know the meaning of dope  
 When he's looking for a suit and tie rap  
 that's cleaner than a bar of soap  
 And I'm the dirtiest thing in sight  
 Matter of fact bring out the girls and let's have a mud fight

[sounds of fighting]

[RZA] You best protect your neck [4X]

#### 6.1.10 Gotspoilrs.docx

Sm9uIFNub3cgYnVybnMgZG93biBXaW50ZXJmZWxsIChhZ2FpbikgYW5kiHRoZSBXYWxsLg0KD  
 Qplb2RvciBraWxscyBUaGVvbi4NCg0KRGFibmVyeXMgZ2V0cyBIYXRlbiBieSBhIGRyYWdvbi4NC  
 g0KU3Rhbm5pcyBmYWxscyBpbiBsb3ZlIHdpdGggVHlyaW9uLiANCg0KDQo=

Jon Snow burns down Winterfell (again) and the Wall.

Hodor kills Theon.

Daenerys gets eaten by a dragon.

Stannis falls in love with Tyrion.

#### 6.1.11 NorthKorea.docx

0JTQu9GPINC60L7Qs9C+INGN0YLQviDQvNC+0LbQtdGCINC60LDRgdCw0YLRjNGB0Y86IA0KD  
 QrQryDQsdGL0Lsg0YHQstC40LTQtdGC0LXQu9C10LwsINGH0YLQviDQmtC40Lwg0KfQtdC9INCj  
 0L0g0Lgg0L/RgNCw0LLQuNGC0LXQu9GM0YHRgtCy0L4g0KHQtdCy0LXRgNC90L7QuSDQmtC+  
 0YDQtdC4INGA0LDQt9GA0LDQsdC+0YLQsNC70Lgg0L/RgNC+0LPRgNCw0LzQvNGDLCDQutC+  
 0YLQvtGA0LDRjyDQv9C+0LfQstC+0LvRj9C10YIg0LjQvCDQv9GD0YLQtdGI0LXRgdGC0LLQvtCy0  
 LDRgtGMINCy0L4g0LLRgNC10LzQtdC90LguINChINC40YHQv9C+0LvRjNC30L7QstCw0L3QuNC1  
 0Lwg0Y3RgtC+0Lkg0YLQtdGF0L3QvtC70L7Qs9C40LgSINGPINGB0YfQuNGC0LDRjiwg0YfRgtC+I  
 NC+0L3QuCDQvdCw0LzQtdGA0LXQvdGLINC00LLQuNCz0LDRgtGM0YHRjyDQstC/0LXRgNC10L  
 Qg0Lgg0LjQt9C80LXQvdC40YLRjCDRgNC10LfRg9C70YzRgtCw0YLRiyDQstC+0LnQvdGLINCyINC  
 a0L7RgNC10LUuIA0KDQrQn9C+0LbQsNC70YPQuDGB0YLQsCwg0J7QsdC4LdCS0LDQvSwg0YLR  
 iyDQvNC+0Y8g0LXQtNC40L3RgdGC0LLQtdC90L3QsNGPINC90LDQtNC10LbQtNCwLg0KDQo=

Для кого это может касаться:

Я был свидетелем, что Ким Чен Ун и правительство Северной Кореи разработали программу, которая позволяет им путешествовать во времени. С использованием этой технологии, я считаю, что они намерены двигаться вперед и изменить результаты войны в Корее.

Пожалуйста, Оби-Ван, ты моя единственная надежда.

#### 6.1.12 PiD.docx

PiD.docx

RGVhciBFZCwNCg0KWWVhaCBJIHRvdGFsbHkgdG9vayBvdmVylGZvciBQYXVsIGFmdGVyIGhlIGRpZWQgaW4g4oCZNjYulFlvdSBnb3QgbWUuIEFzIHlvdSBjYW4gc2VILCB3ZSBkb27igJl0IGV2ZW4gbG9vayB0aGF0IG11Y2ggYWxpa2U6DQo=



Before(Paul)



After(Me)

IAkgCQ0KQmVmb3JlKFBhdWwplIAkJCQkJQWZ0ZXl0TWUpDQoNCldlIGFyZW7igJl0IGV2ZW4gdGhlIHhnbWUgaGVpZ2h0ISBXaGF0IGNhbiBJIHNeSwgcGVvcGxIGFyZSBzdHVwaWQuDQoNCg0KVGhhbmtzIGZvciB0aGUgaW5xdWlyeSwNCg0KV2lsbGlhbSBdYW1wYmVsbA0KKFBhdWwgTWNDYXJ0bmV5KQ0K

Dear Ed,

Yeah, I totally took over for Paul after he died in '66. You got me. As you can see, we don't even look that much alike:



Before(Paul)



After(Me)

We aren't even the same height! What can I say, people are stupid.

Thanks for the inquiry,

William Campbell  
(Paul McCartney)

#### 6.1.13 BillofRights.txt

The Bill of Rights: A Transcription

The Preamble to The Bill of Rights

Congress of the United States  
begun and held at the City of New-York, on  
Wednesday the fourth of March, one thousand seven hundred and eighty nine.

THE Conventions of a number of the States, having at the time of their adopting the Constitution, expressed a desire, in order to prevent misconstruction or abuse of its powers, that further declaratory and restrictive clauses should be added: And as extending the ground of public confidence in the Government, will best ensure the beneficent ends of its institution.

RESOLVED by the Senate and House of Representatives of the United States of America, in Congress assembled, two thirds of both Houses concurring, that the following Articles be proposed to the Legislatures of the several States, as amendments to the Constitution of the United States, all, or any of which Articles, when ratified by three fourths of the said Legislatures, to be valid to all intents and purposes, as part of the said Constitution; viz.

ARTICLES in addition to, and Amendment of the Constitution of the United States of America, proposed by Congress, and ratified by the Legislatures of the several States, pursuant to the fifth Article of the original Constitution.

Note: The following text is a transcription of the first ten amendments to the Constitution in their original form. These amendments were ratified December 15, 1791, and form what is known as the "Bill of Rights."

#### Amendment I

Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances.

#### Amendment II

A well regulated Militia, being necessary to the security of a free State, the right of the people to keep and bear Arms, shall not be infringed.

#### Amendment III

No Soldier shall, in time of peace be quartered in any house, without the consent of the Owner, nor in time of war, but in a manner to be prescribed by law.

#### Amendment IV

The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

#### Amendment V

No person shall be held to answer for a capital, or otherwise infamous crime, unless on a presentment or indictment of a Grand Jury, except in cases arising in the land or naval forces, or in the Militia, when in actual service in time of War or public danger; nor shall any person be subject for the same offence to be twice put in jeopardy of life or limb; nor shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation.

#### Amendment VI

In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the Assistance of Counsel for his defence.

#### Amendment VII

In Suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury, shall be otherwise re-examined in any Court of the United States, than according to the rules of the common law.

#### Amendment VIII

Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

#### Amendment IX

The enumeration in the Constitution, of certain rights, shall not be construed to deny or disparage others retained by the people.

#### Amendment X

The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.

#### AMENDMENT XI

Passed by Congress March 4, 1794. Ratified February 7, 1795.

Note: Article III, section 2, of the Constitution was modified by amendment 11.

The Judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States by Citizens of another State, or by Citizens or Subjects of any Foreign State.

#### AMENDMENT XII

Passed by Congress December 9, 1803. Ratified June 15, 1804.

Note: A portion of Article II, section 1 of the Constitution was superseded by the 12th amendment.

The Electors shall meet in their respective states and vote by ballot for President and Vice-President, one of whom, at least, shall not be an inhabitant of the same state with themselves; they shall name in their ballots the person voted for as President, and in distinct ballots the person voted for as Vice-President, and they shall make distinct lists of all persons voted for as President, and of all persons voted for as Vice-President, and of the number of votes for each, which lists they shall sign and certify, and transmit sealed to the seat of the government of the United States, directed to the President of the Senate; -- the President of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates and the votes shall then be counted; -- The person having the greatest number of votes for President, shall be the President, if such number be a majority of the whole number of Electors appointed; and if no person have such majority, then from the persons having the highest numbers not exceeding three on the list of those voted for as President, the House of Representatives shall choose immediately, by ballot, the President. But in choosing the President, the votes shall be taken by states, the representation from each state having one vote; a quorum for this purpose shall consist of a member or members from two-thirds of the states, and a majority of all the states shall be necessary to a choice. [And if the House of Representatives shall not choose a President whenever the right of choice shall devolve upon them, before the fourth day of March next following, then the Vice-President shall act as President, as in case of the death or other constitutional disability of the President. --]\* The person having the greatest number of votes as Vice-President, shall be the Vice-President, if such number be a majority of the whole number of Electors appointed, and if no person have a majority, then from the two highest numbers on the list, the Senate shall choose the Vice-President; a quorum for the purpose shall consist of two-thirds of the whole number of Senators, and a majority of the whole number shall be necessary to a choice. But no person constitutionally ineligible to the office of President shall be eligible to that of Vice-President of the United States.

\*Superseded by section 3 of the 20th amendment.

#### AMENDMENT XIII

Passed by Congress January 31, 1865. Ratified December 6, 1865.

Note: A portion of Article IV, section 2, of the Constitution was superseded by the 13th amendment.

Section 1.

Neither slavery nor involuntary servitude, except as a punishment for crime whereof the party shall have been duly convicted, shall exist within the United States, or any place subject to their jurisdiction.

Section 2.

Congress shall have power to enforce this article by appropriate legislation.

AMENDMENT XIV

Passed by Congress June 13, 1866. Ratified July 9, 1868.

Note: Article I, section 2, of the Constitution was modified by section 2 of the 14th amendment.

Section 1.

All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the State wherein they reside. No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws.

Section 2.

Representatives shall be apportioned among the several States according to their respective numbers, counting the whole number of persons in each State, excluding Indians not taxed. But when the right to vote at any election for the choice of electors for President and Vice-President of the United States, Representatives in Congress, the Executive and Judicial officers of a State, or the members of the Legislature thereof, is denied to any of the male inhabitants of such State, being twenty-one years of age,\* and citizens of the United States, or in any way abridged, except for participation in rebellion, or other crime, the basis of representation therein shall be reduced in the proportion which the number of such male citizens shall bear to the whole number of male citizens twenty-one years of age in such State.

Section 3.

No person shall be a Senator or Representative in Congress, or elector of President and Vice-President, or hold any office, civil or military, under the United States, or under any State, who, having previously taken an oath, as a member of Congress, or as an officer of the United States, or as a member of any State legislature, or as an executive or judicial officer of any State, to support the Constitution of the United States, shall have engaged in insurrection or

rebellion against the same, or given aid or comfort to the enemies thereof. But Congress may by a vote of two-thirds of each House, remove such disability.

#### Section 4.

The validity of the public debt of the United States, authorized by law, including debts incurred for payment of pensions and bounties for services in suppressing insurrection or rebellion, shall not be questioned. But neither the United States nor any State shall assume or pay any debt or obligation incurred in aid of insurrection or rebellion against the United States, or any claim for the loss or emancipation of any slave; but all such debts, obligations and claims shall be held illegal and void.

#### Section 5.

The Congress shall have the power to enforce, by appropriate legislation, the provisions of this article.

\*Changed by section 1 of the 26th amendment.

### AMENDMENT XV

Passed by Congress February 26, 1869. Ratified February 3, 1870.

#### Section 1.

The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of race, color, or previous condition of servitude--

#### Section 2.

The Congress shall have the power to enforce this article by appropriate legislation.

### AMENDMENT XVI

Passed by Congress July 2, 1909. Ratified February 3, 1913.

Note: Article I, section 9, of the Constitution was modified by amendment 16.

The Congress shall have power to lay and collect taxes on incomes, from whatever source derived, without apportionment among the several States, and without regard to any census or enumeration.

### AMENDMENT XVII

Passed by Congress May 13, 1912. Ratified April 8, 1913.

Note: Article I, section 3, of the Constitution was modified by the 17th amendment.



The Senate of the United States shall be composed of two Senators from each State, elected by the people thereof, for six years; and each Senator shall have one vote. The electors in each State shall have the qualifications requisite for electors of the most numerous branch of the State legislatures.

When vacancies happen in the representation of any State in the Senate, the executive authority of such State shall issue writs of election to fill such vacancies: Provided, That the legislature of any State may empower the executive thereof to make temporary appointments until the people fill the vacancies by election as the legislature may direct.

This amendment shall not be so construed as to affect the election or term of any Senator chosen before it becomes valid as part of the Constitution.

#### AMENDMENT XVIII

Passed by Congress December 18, 1917. Ratified January 16, 1919. Repealed by amendment 21.

##### Section 1.

After one year from the ratification of this article the manufacture, sale, or transportation of intoxicating liquors within, the importation thereof into, or the exportation thereof from the United States and all territory subject to the jurisdiction thereof for beverage purposes is hereby prohibited.

##### Section 2.

The Congress and the several States shall have concurrent power to enforce this article by appropriate legislation.

##### Section 3.

This article shall be inoperative unless it shall have been ratified as an amendment to the Constitution by the legislatures of the several States, as provided in the Constitution, within seven years from the date of the submission hereof to the States by the Congress.

#### AMENDMENT XIX

Passed by Congress June 4, 1919. Ratified August 18, 1920.

The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of sex.

Congress shall have power to enforce this article by appropriate legislation.

#### AMENDMENT XX

Passed by Congress March 2, 1932. Ratified January 23, 1933.

Note: Article I, section 4, of the Constitution was modified by section 2 of this amendment. In addition, a portion of the 12th amendment was superseded by section 3.

Section 1.

The terms of the President and the Vice President shall end at noon on the 20th day of January, and the terms of Senators and Representatives at noon on the 3rd day of January, of the years in which such terms would have ended if this article had not been ratified; and the terms of their successors shall then begin.

Section 2.

The Congress shall assemble at least once in every year, and such meeting shall begin at noon on the 3d day of January, unless they shall by law appoint a different day.

Section 3.

If, at the time fixed for the beginning of the term of the President, the President elect shall have died, the Vice President elect shall become President. If a President shall not have been chosen before the time fixed for the beginning of his term, or if the President elect shall have failed to qualify, then the Vice President elect shall act as President until a President shall have qualified; and the Congress may by law provide for the case wherein neither a President elect nor a Vice President shall have qualified, declaring who shall then act as President, or the manner in which one who is to act shall be selected, and such person shall act accordingly until a President or Vice President shall have qualified.

Section 4.

The Congress may by law provide for the case of the death of any of the persons from whom the House of Representatives may choose a President whenever the right of choice shall have devolved upon them, and for the case of the death of any of the persons from whom the Senate may choose a Vice President whenever the right of choice shall have devolved upon them.

Section 5.

Sections 1 and 2 shall take effect on the 15th day of October following the ratification of this article.

Section 6.

This article shall be inoperative unless it shall have been ratified as an amendment to the Constitution by the legislatures of three-fourths of the several States within seven years from the date of its submission.

AMENDMENT XXI

Passed by Congress February 20, 1933. Ratified December 5, 1933.

Section 1.

The eighteenth article of amendment to the Constitution of the United States is hereby repealed.

Section 2.

The transportation or importation into any State, Territory, or Possession of the United States for delivery or use therein of intoxicating liquors, in violation of the laws thereof, is hereby prohibited.

Section 3.

This article shall be inoperative unless it shall have been ratified as an amendment to the Constitution by conventions in the several States, as provided in the Constitution, within seven years from the date of the submission hereof to the States by the Congress.

AMENDMENT XXII

Passed by Congress March 21, 1947. Ratified February 27, 1951.

Section 1.

No person shall be elected to the office of the President more than twice, and no person who has held the office of President, or acted as President, for more than two years of a term to which some other person was elected President shall be elected to the office of President more than once. But this Article shall not apply to any person holding the office of President when this Article was proposed by Congress, and shall not prevent any person who may be holding the office of President, or acting as President, during the term within which this Article becomes operative from holding the office of President or acting as President during the remainder of such term.

Section 2.

This article shall be inoperative unless it shall have been ratified as an amendment to the Constitution by the legislatures of three-fourths of the several States within seven years from the date of its submission to the States by the Congress.

AMENDMENT XXIII

Passed by Congress June 16, 1960. Ratified March 29, 1961.

Section 1.

The District constituting the seat of Government of the United States shall appoint in such manner as Congress may direct:

A number of electors of President and Vice President equal to the whole number of Senators and Representatives in Congress to which the District would be entitled if it were a State, but

in no event more than the least populous State; they shall be in addition to those appointed by the States, but they shall be considered, for the purposes of the election of President and Vice President, to be electors appointed by a State; and they shall meet in the District and perform such duties as provided by the twelfth article of amendment.

Section 2.

The Congress shall have power to enforce this article by appropriate legislation.

AMENDMENT XXIV

Passed by Congress August 27, 1962. Ratified January 23, 1964.

Section 1.

The right of citizens of the United States to vote in any primary or other election for President or Vice President, for electors for President or Vice President, or for Senator or Representative in Congress, shall not be denied or abridged by the United States or any State by reason of failure to pay any poll tax or other tax.

Section 2.

The Congress shall have power to enforce this article by appropriate legislation.

AMENDMENT XXV

Passed by Congress July 6, 1965. Ratified February 10, 1967.

Note: Article II, section 1, of the Constitution was affected by the 25th amendment.

Section 1.

In case of the removal of the President from office or of his death or resignation, the Vice President shall become President.

Section 2.

Whenever there is a vacancy in the office of the Vice President, the President shall nominate a Vice President who shall take office upon confirmation by a majority vote of both Houses of Congress.

Section 3.

Whenever the President transmits to the President pro tempore of the Senate and the Speaker of the House of Representatives his written declaration that he is unable to discharge the powers and duties of his office, and until he transmits to them a written declaration to the contrary, such powers and duties shall be discharged by the Vice President as Acting President.

Section 4.

Whenever the Vice President and a majority of either the principal officers of the executive departments or of such other body as Congress may by law provide, transmit to the President pro tempore of the Senate and the Speaker of the House of Representatives their written declaration that the President is unable to discharge the powers and duties of his office, the Vice President shall immediately assume the powers and duties of the office as Acting President.

Thereafter, when the President transmits to the President pro tempore of the Senate and the Speaker of the House of Representatives his written declaration that no inability exists, he shall resume the powers and duties of his office unless the Vice President and a majority of either the principal officers of the executive department or of such other body as Congress may by law provide, transmit within four days to the President pro tempore of the Senate and the Speaker of the House of Representatives their written declaration that the President is unable to discharge the powers and duties of his office. Thereupon Congress shall decide the issue, assembling within forty-eight hours for that purpose if not in session. If the Congress, within twenty-one days after receipt of the latter written declaration, or, if Congress is not in session, within twenty-one days after Congress is required to assemble, determines by two-thirds vote of both Houses that the President is unable to discharge the powers and duties of his office, the Vice President shall continue to discharge the same as Acting President; otherwise, the President shall resume the powers and duties of his office.

#### AMENDMENT XXVI

Passed by Congress March 23, 1971. Ratified July 1, 1971.

Note: Amendment 14, section 2, of the Constitution was modified by section 1 of the 26th amendment.

##### Section 1.

The right of citizens of the United States, who are eighteen years of age or older, to vote shall not be denied or abridged by the United States or by any State on account of age.

##### Section 2.

The Congress shall have power to enforce this article by appropriate legislation.

#### AMENDMENT XXVII

Originally proposed Sept. 25, 1789. Ratified May 7, 1992.

No law, varying the compensation for the services of the Senators and Representatives, shall take effect, until an election of representatives shall have intervened.

6.1.14 NK.jpg



6.1.15 NorthKorea.jpeg



6.1.16 Broken.py

```
def fileToString(pathToFile):
    f = open(pathToFile, "r")
    strs = ""
    #adds each line of the file to the strs string
    for line in f.readlines():
        strs+=line
    return strs
def ASCII():
    #number of ASCII characters
    NumOfASCII == 0
    #returns list of all ASCII characters
    return "".join([chr(i) for i in range(NumOfASCII)])
def sumName(name):
    sums=0
    #sums the indices in ASCII of all the characters in name
    for x in name:
        sums+=ord(x)
    return sums
def indexInFile(password):
```

```

indices = []
ASCIIArray = ASCII()
#populates an array of indices to be used by the encoder
for chrs in password:
    indices.append(ASCIIArray.index(chrs)+sumName(name)*2)
return indices
def indexInASCII(name):
    indices = []
    ASCIIArray = ASCII()
    #split on all non-numeric characters
    #remove first index because it is blank
    indexList = re.split("[^\d]",encoded)[1:]
    #converts encoded characters to ASCII
    for index in indexList:
        indices.append(ASCIIArray[int(index) - (sumName(name)*2)])
    #returns decoded message
    return "".join(indices)
def encode(name):
    #returns a list of indices to be used for encoding
    indices = indexInFile(password,name)
    #convert file associated with name to a string
    bill = fileToString("./%s.txt"%name)
    encoded = ""
    #add letter in file plus index of the letter in the file to the encoded
string
    for index in indices:
        encoded+=bill[index]+str(index)

    return encoded

```

## 6.2 APPENDIX B – CAPTURE 2

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6.2.1 l.jpg



6.2.2 Recovered.jpeg

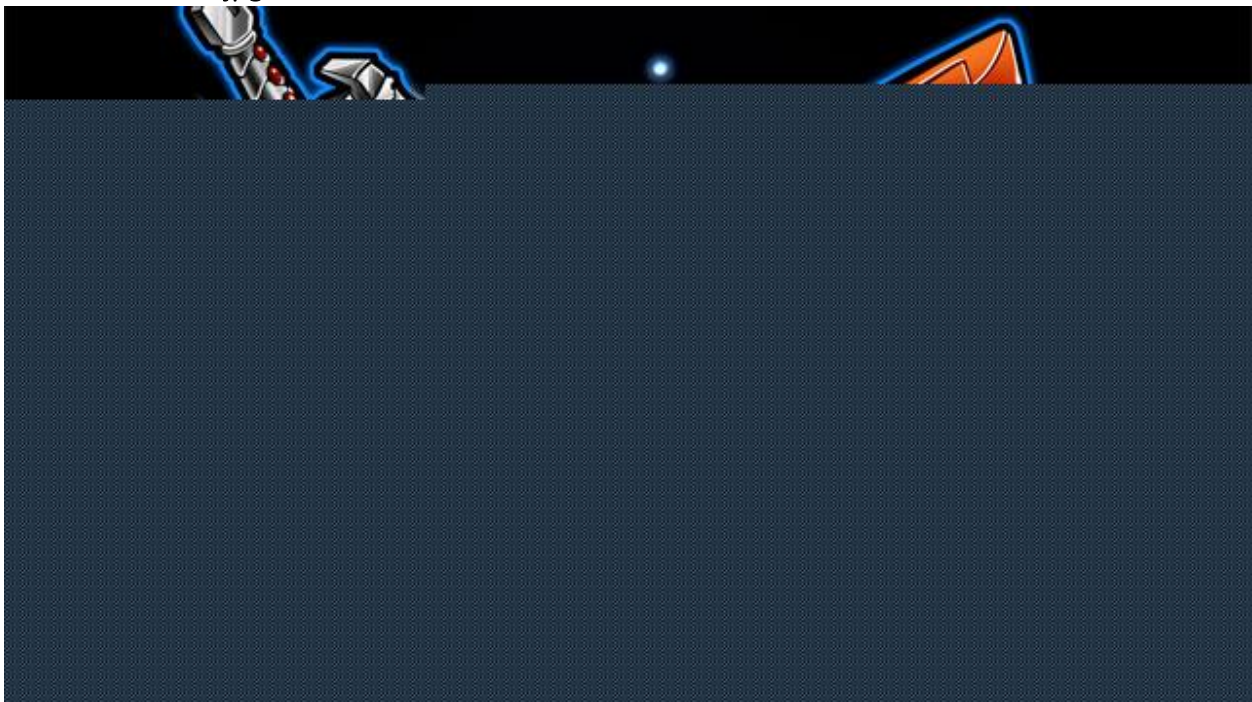




### 6.2.3 There.jpg



### 6.2.4 Condone.jpg



## 6.3 APPENDIX C – CAPTURE 3

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### 6.3.1 Communication between El Chapo and Narco Polo

HTTP/1.1 200 OK Date: Sun, 22 Oct 2023 16:55:59 GMT Server: Apache/2.4.53 (Debian) Last-Modified: Sun, 22 Oct 2023 16:53:55 GMT ETag: "5a1-60850f37fbc85-gzip" Accept-Ranges: bytes Vary: Accept-Encoding Content-Encoding: gzip Content-Length: 516 Keep-Alive: timeout=5, max=100 Connection: Keep-Alive Content-Type: text/html

*User El Chapo has joined the chat.*

*User Narco Polo has joined the chat.*

(12:46 PM) **El Chapo:** Good evening, Narco Polo.

(12:46 PM) **Narco Polo:** Who's on the line?

(12:46 PM) **El Chapo:** Phoenix.

(12:46 PM) **Narco Polo:** Where are you?

(12:46 PM) **El Chapo:** I can't disclose that information, even to you.

(12:46 PM) **Narco Polo:** Are you aware of the current scrutiny on El Chapo?

(12:47 PM) **El Chapo:** Yes, I'm fully aware, However, they will never know it is me behind the shipment.

(12:47 PM) **Narco Polo:** Regardless, we must exercise the highest level of secrecy. Be vigilant. I'd like to meet in 2nd November at 10 PM to plan the secret delivery and avoid any complications.

(12:47 PM) **El Chapo:** At our usual rendezvous point?

(12:47 PM) **Narco Polo:** Yes

(12:47 PM) **El Chapo:** What day?

(12:47 PM) **Narco Polo:** I already mentioned, stay sharp.

(12:53 PM) **Narco Polo:** 36.62575185817829 -117.08896804489794