

Lab 7 – Packet Capture Analysis

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Presented To – Gina Marie

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Introduction – In this lab, we need to perform packet analysis to check whether a malicious system was on the network. There is a scenario where user Ann disappears. Since investigators were monitoring her network activity they found that she may have communicated with her secret lover, Mr. X, before she left. The packet capture may contain clues to her location and other details. Hence, we need to analyze the network traffic details of Ann's system and check if any communication details are there. Also, have to carve files from the packet to understand network activity and Ann's location details.

Pre-Lab – For this, we have given a Pcap file "Evidence-packet-analysis.pcap" of Ann's network activity. I am using a Windows machine and using Wireshark and Network Miner to perform packet analysis using wireshark commands.

Analysis –

- 1. Packet Capture Analysis** - As a forensic investigator, analyze the pcap file "Evidence-packet-analysis.pcap", located in the Evidence Drive, under "Packet Analysis". Further, analyze the packet capture and gather information about Ann's activities and plans. For that open the pcap file in Wireshark.

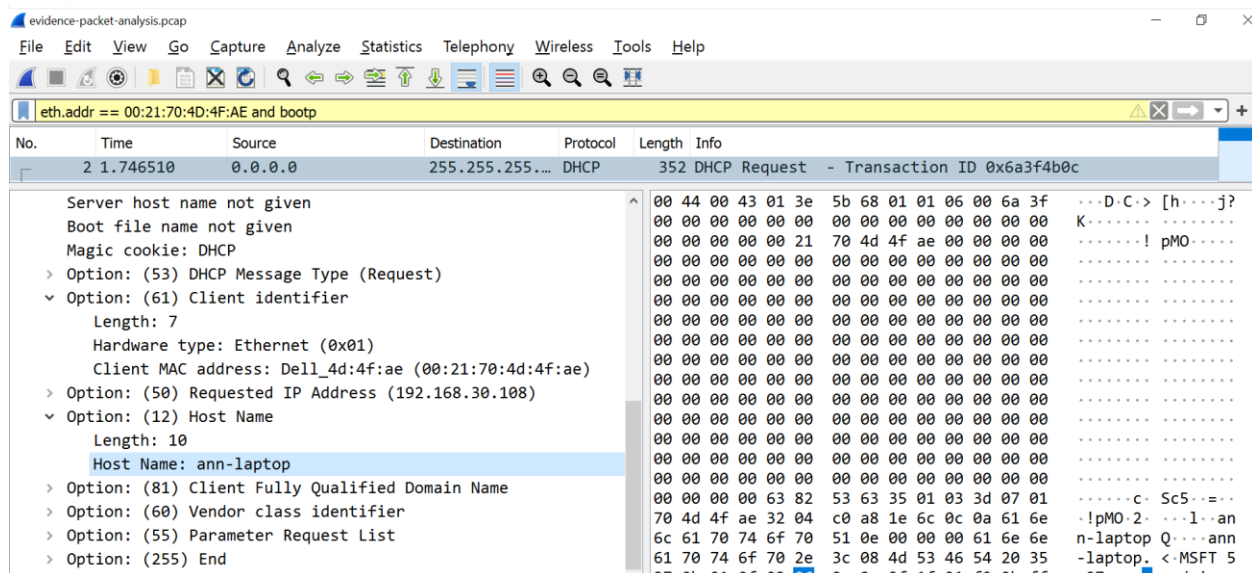
I am using the Wireshark command (eth.addr == 00:21:70:4D:4F:AE and bootp) to filter DHCP packets so that we can extract the IP address assigned to Ann's device and device name.

- BOOTP stands for Bootstrap Protocol, which is used for assigning IP addresses and subnet masks manually. Data of DHCP and BOOTP is transferred over port 67 and port 68.

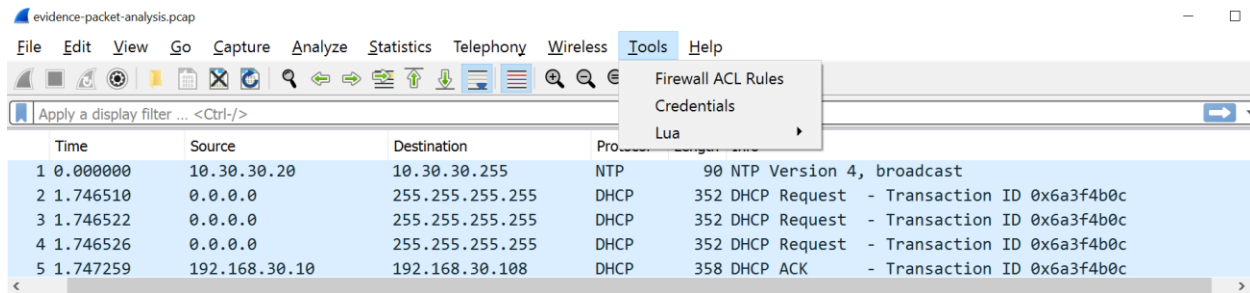
From the below packet we can see –

IP address assigned to Ann's Device: 192.168.30.108

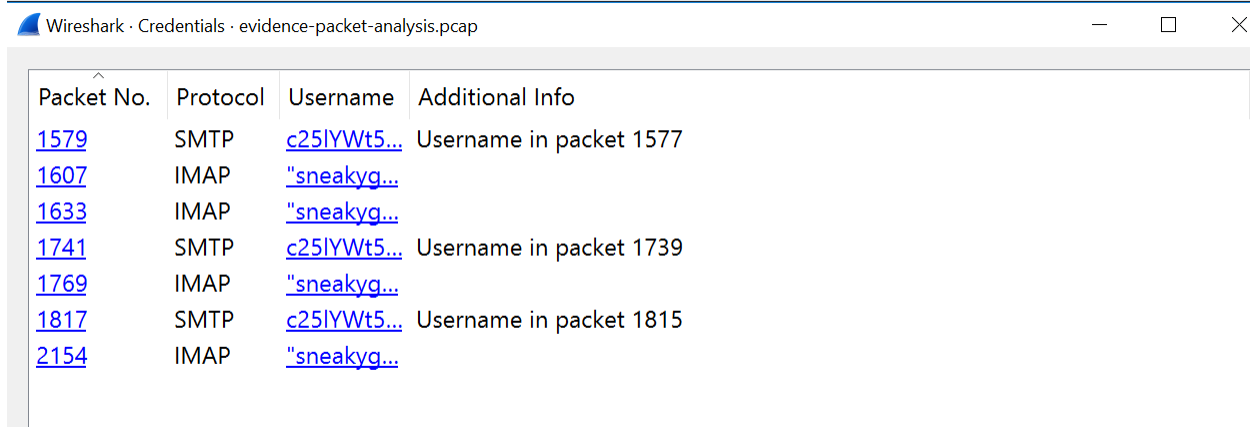
Device Name: ann-laptop



1. Provide any online aliases or addresses and corresponding account credentials that may be used by the suspect under investigation.
- To check credentials and aliases used by the suspect, first, click on the Tools tab provided in the Wireshark. Then click on Tools → Credentials. It will show a popup window having credential details, protocol, and frame number where credentials details contain. This functionality is available on the latest wireshark version.



- Here we can see the username and password details and packet number where the username and password are mentioned.



- Now click on packet number 1577 for username details and packet number 1579 for password details. Here we can see Source IP is 192.168.30.108 which is assigned to Ann's system and we found below credential details in mail transfer protocol SMTP which is in base64 format. So this should be users email account credentials.

Username: c25lYWt5ZzMza3k= , Password: czAwcGVyczNrcjF0 (base64 string)

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Wireshark · Packet 1579 · evidence-packet-analysis.pcap
> Frame 1579: 72 bytes on wire (576 bits), 72 bytes captured (576 bits)
> Ethernet II, Src: Dell_4d:4f:ae (00:21:70:4d:4f:ae), Dst: Cisco_c4:09:94 (d0:d0:fd:c4:09:94)
> Internet Protocol Version 4, Src: 192.168.30.108, Dst: 64.12.168.40
> Transmission Control Protocol, Src Port: 1684, Dst Port: 587, Seq: 47, Ack: 668, Len: 18
▼ Simple Mail Transfer Protocol
  Password: czAwcGVyczNrcjF0

0000  d0 d0 fd c4 09 94 00 21 70 4d 4f ae 08 00 45 00  .....! pMO...E-
0010  00 3a 17 79 40 00 80 06 1b fc c0 a8 1e 6c 40 0c  -:x@...l@-
0020  a8 28 06 94 02 4b 57 59 2b 5f 87 6b da 90 50 18  -(...KWY +M.k~P-
0030  fa c1 38 d8 00 00 63 7a 41 77 63 47 56 79 63 7a  .....c2 5lYWt5Zz
0040  4e 72 63 6a 46 30 0d 0a  .....Mza3k=-

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Wireshark · Packet 1577 · evidence-packet-analysis.pcap
> Frame 1577: 72 bytes on wire (576 bits), 72 bytes captured (576 bits)
> Ethernet II, Src: Dell_4d:4f:ae (00:21:70:4d:4f:ae), Dst: Cisco_c4:09:94 (d0:d0:fd:c4:09:94)
> Internet Protocol Version 4, Src: 192.168.30.108, Dst: 64.12.168.40
> Transmission Control Protocol, Src Port: 1684, Dst Port: 587, Seq: 29, Ack: 650, Len: 18
▼ Simple Mail Transfer Protocol
  Username: c25lYWt5ZzMza3k=

0000  d0 d0 fd c4 09 94 00 21 70 4d 4f ae 08 00 45 00  .....! pMO...E-
0010  00 3a 17 78 40 00 80 06 1b fd c0 a8 1e 6c 40 0c  -:x@...l@-
0020  a8 28 06 94 02 4b 57 59 2b 4d 87 6b da 7e 50 18  -(...KWY +M.k~P-
0030  fa d3 18 93 00 00 63 32 35 6c 59 57 74 35 5a 7a  .....c2 5lYWt5Zz
0040  4d 7a 61 33 6b 3d 0d 0a  .....Mza3k=-

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- Now we have to convert this base64 string into a plaintext. For that, I have used

<https://www.base64decode.org/>.


- Decoded Username - sneakyg33ky

- Decoded Password - s00pers3kr1t

Decode from Base64 format


Simply enter your data then push the decode button.


c25lYWt5ZzMza3k=

 For encoded binaries (like images, documents, etc.) use the file upload form a little further down on this page.

CP50222  Source character set.

☒ Decode each line separately (useful for when you have multiple entries).

 Live mode OFF Decodes in real-time as you type or paste (supports only the UTF-8 character set).

 < **DECODE** > Decodes your data into the area below.

sneakyg33ky

Decode from Base64 format


Simply enter your data then push the decode button.


czAwcGVyczNrcjF0

 For encoded binaries (like images, documents, etc.) use the file upload form a little further down on this page.

CP50222  Source character set.

☒ Decode each line separately (useful for when you have multiple entries).

 Live mode OFF Decodes in real-time as you type or paste (supports only the UTF-8 character set).

 < **DECODE** > Decodes your data into the area below.

s00pers3kr1t

[1]

- Now click on packet number 1577 for username details and packet number 1579 for password details. Here we can see Ann's source IP is mentioned so this should be Ann's email ID credentials which is already given in plaintext.

Username : "sneakyg33ky@aol.com"

Password : "s00pers3kr1t"

The image shows a Wireshark packet capture analysis of a network traffic file named 'evidence-packet-analysis.pcap'. The packet list pane shows several packets, with packet 2154 selected. The packet details pane shows the structure of the selected packet: Ethernet II, Internet Protocol Version 4, Transmission Control Protocol, and Internet Message Access Protocol. The IMAP section is expanded, showing a LOGIN request from 192.168.30.108 to 205.188.58.10. The request includes the username 'sneakyg33ky@aol.com' and the password 's00pers3kr1t'. The packet bytes pane shows the raw data of the packet, with the IMAP LOGIN command and its arguments highlighted in blue.

The image shows a Wireshark packet capture analysis of a network traffic file named 'evidence-packet-analysis.pcap'. The packet list pane shows several packets, with packet 1607 selected. The packet details pane shows the structure of the selected packet: Internet Protocol Version 4, Transmission Control Protocol, and Internet Message Access Protocol. The IMAP section is expanded, showing a u6nf LOGIN request from 192.168.30.108 to 205.188.58.10. The request includes the username 'sneakyg33ky@aol.com' and the password 's00pers3kr1t'. The packet bytes pane shows the raw data of the packet, with the IMAP LOGIN command and its arguments highlighted in blue.

2. Who did Ann communicate with? Provide a list of email addresses and any other identifying information.

➤ Now that we know email address of user 'Ann'. I have search frames containing Ann's email address 'sneakyg33ky@aol.com'. Below are the users with whom Ann communicated.

Command - 'frame contains "sneakyg33ky@aol.com"'.

The “frame contains” filter will let you pick out only those packets that contain a sequence of any ASCII or Hex value that you specify. It will show you only those packets that contain the word “sneakyg33ky@aol.com” somewhere in them. [4]

Ann Communicated with -

inter0pt1c@aol.com

d4rktangent@gmail.com

mistersekritx@aol.com

The top screenshot shows a Wireshark packet capture with the filter 'frame contains "sneakyg33ky@aol.com"'. The packet list shows three packets: 1749 (SMTP data fragment), 1743 (SMTP MAIL FROM: <sneakyg33ky@aol.com>), and 1587 (SMTP data fragment). The packet details for packet 1587 show an SMTP message from 'Ann Dercover' <sneakyg33ky@aol.com> to 'inter0pt1c@aol.com'. The message body is 'need a favor'. The packet bytes show the raw data of the SMTP message.

The bottom screenshot shows the same filter applied. The packet list shows three packets: 1825 (SMTP data fragment), 1819 (SMTP MAIL FROM: <sneakyg33ky@aol.com>), and 1749 (SMTP data fragment). The packet details for packet 1749 show an SMTP message from 'Ann Dercover' <sneakyg33ky@aol.com> to 'd4rktangent@gmail.com'. The message body is 'lunch next week'. The packet bytes show the raw data of the SMTP message.

evidence-packet-analysis.pcap

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

frame contains "sneakyg33ky@aol.com"

No.	Time	Source	Destination	Protocol	Length	Info
1825	195.542987	192.168.30.108	64.12.168.40	SMTP	1434	C: DATA fragment, 1380 bytes
1819	195.128970	192.168.30.108	64.12.168.40	SMTP	88	C: MAIL FROM: <sneakyg33ky@aol.com>
1749	135.061246	192.168.30.108	64.12.168.40	SMTP	1434	C: DATA fragment, 1380 bytes

> Frame 1825: 1434 bytes on wire (11472 bits), 1434 bytes captured (11472 bits) on interface 0
 > Ethernet II, Src: Dell_4d:4f:ae (00:21:70:4d:4f:ae), Dst: Cisco_c4:00:06:39:30:30 (08:00:06:39:30:30)
 > Internet Protocol Version 4, Src: 192.168.30.108, Dst: 64.12.168.40
 > Transmission Control Protocol, Src Port: 1689, Dst Port: 587, Seq: 300000000
 > Simple Mail Transfer Protocol
 > Line-based text data (43 lines)
 Message-ID: <00bc01cc14c956fd1bc6056b1ea8c0@annlaptop>\r\n
 From: "Ann Dercover" <sneakyg33ky@aol.com>\r\n
 To: <mistersekritx@aol.com>\r\n
 Subject: rendezvous\r\n
 Date: Tue, 17 May 2011 13:34:26 -0600\r\n
 MIME-Version: 1.0\r\n
 Content-Type: multipart/mixed;\r\n

3. Extract any transcripts of Ann's conversations and present them to investigators.

➤ Below are the snapshots of Ann's email communication over email.

Ann's communication with interOpt1c@aol.com

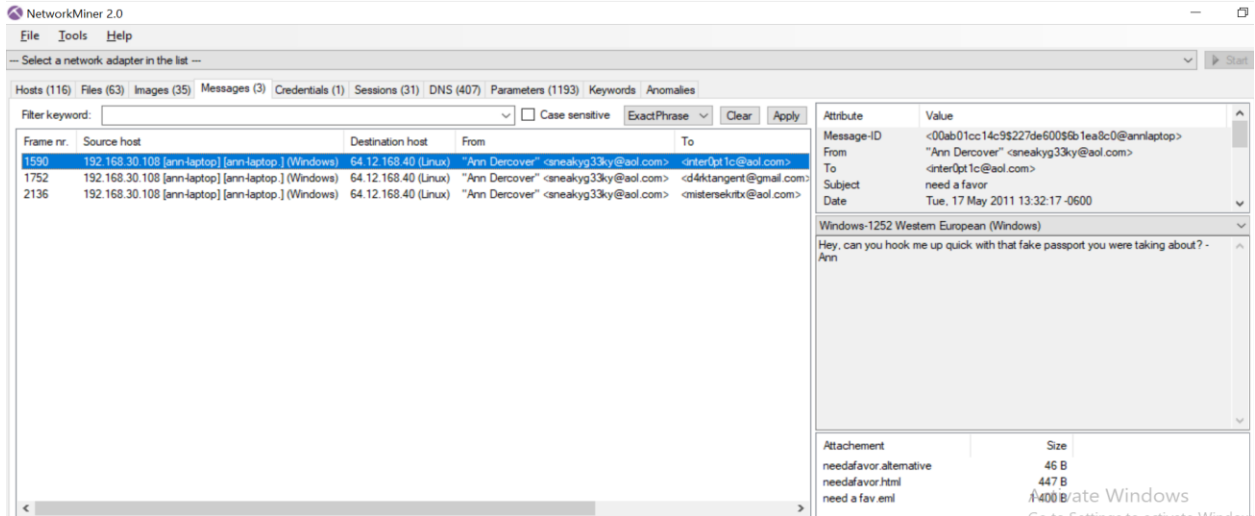
evidence-packet-analysis.pcap

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

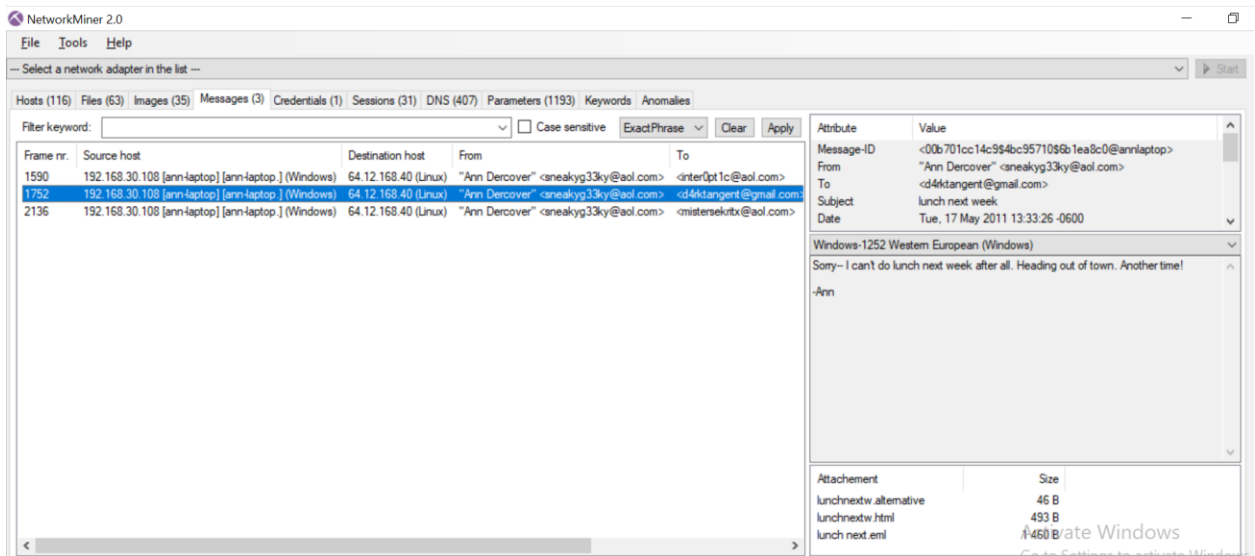
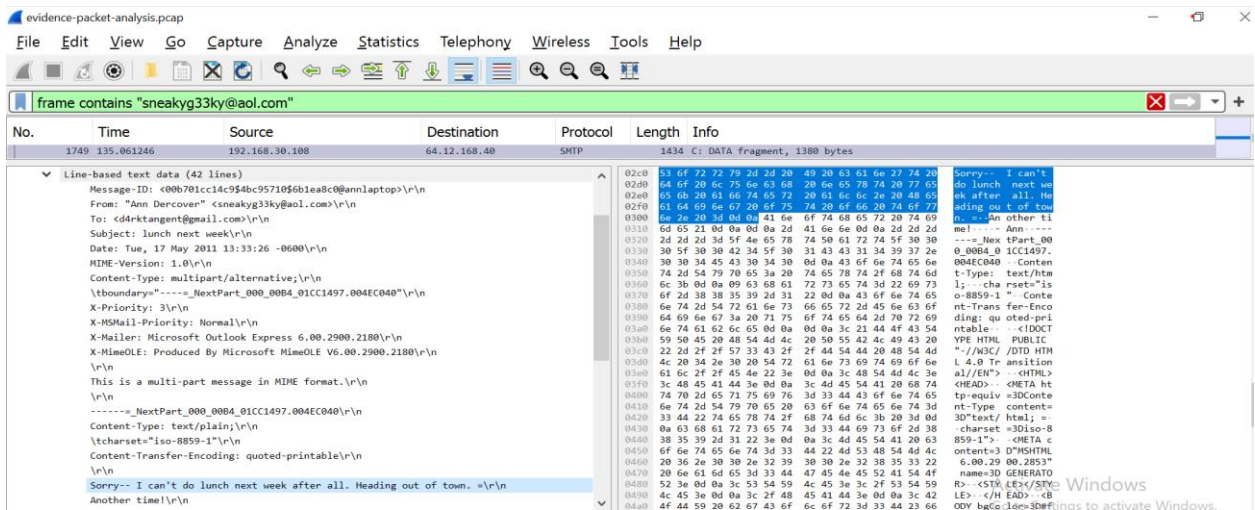
frame contains "sneakyg33ky@aol.com"

No.	Time	Source	Destination	Protocol	Length	Info
1587	65.783988	192.168.30.108	64.12.168.40	SMTP	1434	C: DATA fragment, 1380 bytes

> Line-based text data (42 lines)
 Message-ID: <00ab01cc14c95227de60056b1ea8c0@annlaptop>\r\n
 From: "Ann Dercover" <sneakyg33ky@aol.com>\r\n
 To: <interOpt1c@aol.com>\r\n
 Subject: need a favor\r\n
 Date: Tue, 17 May 2011 13:32:17 -0600\r\n
 MIME-Version: 1.0\r\n
 Content-Type: multipart/alternative;\r\n
 \tboundary="-----_NextPart_000_00A8_01C1496.D700DE30"\r\n
 X-Priority: 3\r\n
 X-MSMail-Priority: Normal\r\n
 X-Mailer: Microsoft Outlook Express 6.00.2900.2180\r\n
 X-MimeOLE: Produced By Microsoft MimeOLE V6.00.2900.2180\r\n
 \r\n
 This is a multi-part message in MIME format.\r\n
 \r\n
 -----_NextPart_000_00A8_01C1496.D700DE30\r\n
 Content-Type: text/plain;\r\n
 \tcharset="iso-8859-1"\r\n
 Content-Transfer-Encoding: quoted-printable\r\n
 \r\n
 Hey, can you hook me up quick with that fake passport you were taking about? - Ann\r\n



- Ann's communication with d4rktangent@gmail.com

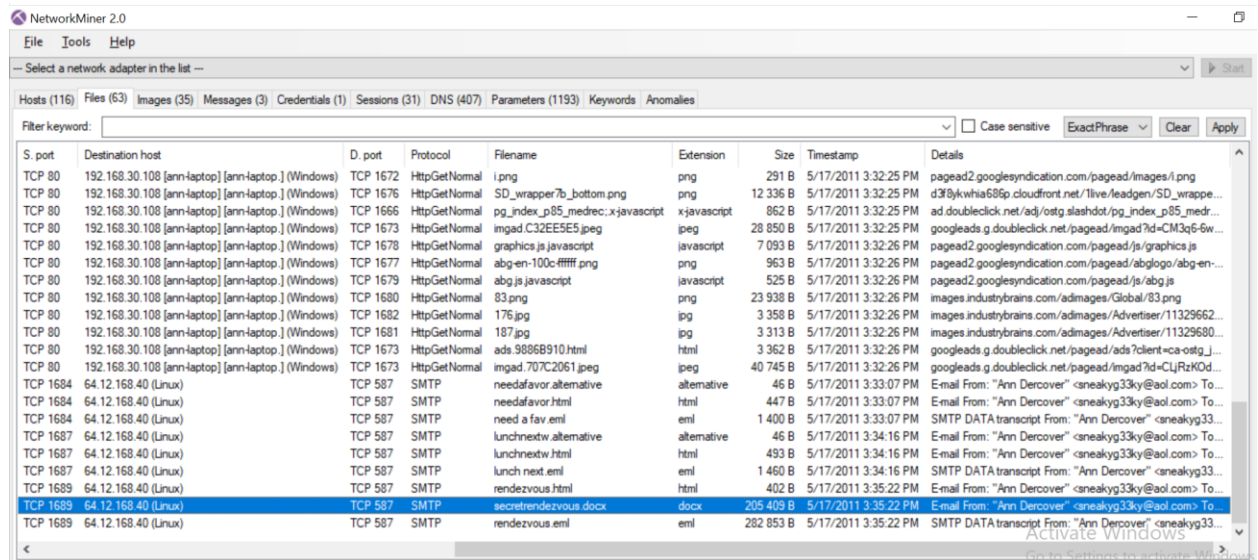


- Ann's communication with mistersekritx@aol.com

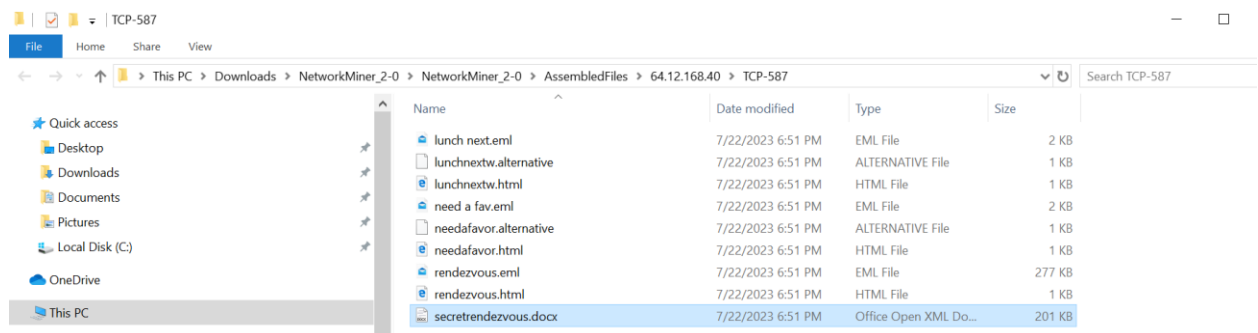
The image displays two screenshots from a forensic analysis tool. The top screenshot shows the 'evidence-packet-analysis.pcap' window with a selected frame containing an email from 'Ann Derover' to 'mistersekritx@aol.com'. The email body includes a multi-part message with an attached image and a text part that reads: 'Hi sweetheart! Bring your fake passport and a bathing suit. Address attached. love, Ann'. The bottom screenshot shows the 'NetworkMiner 2.0' interface, which has loaded the same email data. It displays a list of messages, with the selected message (Frame 1752) showing details such as the sender 'Ann Derover', the recipient 'mistersekritx@aol.com', and the subject 'rendezvous'. The 'Attachments' section lists three files: 'rendezvous.html' (402 B), 'secretairendezvous.docx' (205,409 B), and 'rendezvous.eml' (282,653 B).

4. If Ann transferred or received any files of interest, recover them.
- To recover files transmitted over email, I have used the networkminer tool. To open the 'evidence-packet-analysis.pcap' file in Networkminer click on File → Open and select .pcap file from the mentioned folder. Now click on File tab to view details about file transferred.

As per the details provided in tool, User Ann has sent file ‘secretrendezvous.docx’ from the email address "Ann Dercover" sneakyg33ky@aol.com to the email address mistersekritx@aol.com which might contain some information. [2]



S. port	Destination host	D. port	Protocol	Filename	Extension	Size	Timestamp	Details
TCP 80	192.168.30.108 [ann-laptop] [ann-laptop] (Windows)	TCP 1672	HttpGetNormal	i.png	png	291 B	5/17/2011 3:32:25 PM	pagead2.googlesyndication.com/pagead/images/i.png
TCP 80	192.168.30.108 [ann-laptop] [ann-laptop] (Windows)	TCP 1676	HttpGetNormal	SD_wrapper7b_bottom.png	png	12 336 B	5/17/2011 3:32:25 PM	d3f8ywhia686p.cloudfront.net/_live/eadgen/SD_wrapper...
TCP 80	192.168.30.108 [ann-laptop] [ann-laptop] (Windows)	TCP 1666	HttpGetNormal	pg_index_p85_medrec.x-javascript	x-javascript	862 B	5/17/2011 3:32:25 PM	ad.doubleclick.net/ad/ostg.slashdot/pg_index_p85_medr...
TCP 80	192.168.30.108 [ann-laptop] [ann-laptop] (Windows)	TCP 1673	HttpGetNormal	imgad.C32EE5E5.jpeg	jpeg	28 850 B	5/17/2011 3:32:25 PM	googleads.g.doubleclick.net/pagead/imgad?id=C32EE5E5...
TCP 80	192.168.30.108 [ann-laptop] [ann-laptop] (Windows)	TCP 1678	HttpGetNormal	graphics.js	javascript	7 093 B	5/17/2011 3:32:26 PM	pagead2.googlesyndication.com/pagead/js/graphics.js
TCP 80	192.168.30.108 [ann-laptop] [ann-laptop] (Windows)	TCP 1677	HttpGetNormal	abg-en-100c-ffff.png	png	963 B	5/17/2011 3:32:26 PM	pagead2.googlesyndication.com/pagead/js/abg-en-100c-ffff.png
TCP 80	192.168.30.108 [ann-laptop] [ann-laptop] (Windows)	TCP 1679	HttpGetNormal	abg.js	javascript	525 B	5/17/2011 3:32:26 PM	pagead2.googlesyndication.com/pagead/js/abg.js
TCP 80	192.168.30.108 [ann-laptop] [ann-laptop] (Windows)	TCP 1680	HttpGetNormal	83.png	png	23 938 B	5/17/2011 3:32:26 PM	images.industrybrains.com/adimages/Advertiser/11329680...
TCP 80	192.168.30.108 [ann-laptop] [ann-laptop] (Windows)	TCP 1682	HttpGetNormal	176.jpg	jpg	3 358 B	5/17/2011 3:32:26 PM	images.industrybrains.com/adimages/Advertiser/11329680...
TCP 80	192.168.30.108 [ann-laptop] [ann-laptop] (Windows)	TCP 1681	HttpGetNormal	187.jpg	jpg	3 313 B	5/17/2011 3:32:26 PM	images.industrybrains.com/adimages/Advertiser/11329680...
TCP 80	192.168.30.108 [ann-laptop] [ann-laptop] (Windows)	TCP 1673	HttpGetNormal	ads.9886B910.html	html	3 362 B	5/17/2011 3:32:26 PM	googleads.g.doubleclick.net/pagead/ads?client=ca-ostg_j...
TCP 80	192.168.30.108 [ann-laptop] [ann-laptop] (Windows)	TCP 1673	HttpGetNormal	imgad.707C2061.jpeg	jpeg	40 745 B	5/17/2011 3:32:26 PM	googleads.g.doubleclick.net/pagead/imgad?id=C4LRzK0d...
TCP 1684	64.12.168.40 (Linux)	TCP 587	SMTP	needafavor.alternative	alternative	46 B	5/17/2011 3:33:07 PM	E-mail From: "Ann Dercover" <sneakyg33ky@aol.com> To:...
TCP 1684	64.12.168.40 (Linux)	TCP 587	SMTP	needafavor.html	html	447 B	5/17/2011 3:33:07 PM	E-mail From: "Ann Dercover" <sneakyg33ky@aol.com> To:...
TCP 1684	64.12.168.40 (Linux)	TCP 587	SMTP	need a fav.eml	eml	1 400 B	5/17/2011 3:33:07 PM	SMTP DATA transcript From: "Ann Dercover" <sneakyg33...
TCP 1687	64.12.168.40 (Linux)	TCP 587	SMTP	lunchnextw.alternative	alternative	46 B	5/17/2011 3:34:16 PM	E-mail From: "Ann Dercover" <sneakyg33ky@aol.com> To:...
TCP 1687	64.12.168.40 (Linux)	TCP 587	SMTP	lunchnextw.html	html	493 B	5/17/2011 3:34:16 PM	E-mail From: "Ann Dercover" <sneakyg33ky@aol.com> To:...
TCP 1687	64.12.168.40 (Linux)	TCP 587	SMTP	lunch next.eml	eml	1 460 B	5/17/2011 3:34:16 PM	SMTP DATA transcript From: "Ann Dercover" <sneakyg33...
TCP 1689	64.12.168.40 (Linux)	TCP 587	SMTP	rendezvous.html	html	402 B	5/17/2011 3:35:22 PM	E-mail From: "Ann Dercover" <sneakyg33ky@aol.com> To:...
TCP 1689	64.12.168.40 (Linux)	TCP 587	SMTP	secretrendezvous.docx	docx	205 409 B	5/17/2011 3:35:22 PM	E-mail From: "Ann Dercover" <sneakyg33ky@aol.com> To:...
TCP 1689	64.12.168.40 (Linux)	TCP 587	SMTP	rendezvous.eml	eml	282 853 B	5/17/2011 3:35:22 PM	SMTP DATA transcript From: "Ann Dercover" <sneakyg33...



Name	Date modified	Type	Size
lunch next.eml	7/22/2023 6:51 PM	EML File	2 KB
lunchnextw.alternative	7/22/2023 6:51 PM	ALTERNATIVE File	1 KB
lunchnextw.html	7/22/2023 6:51 PM	HTML File	1 KB
need a fav.eml	7/22/2023 6:51 PM	EML File	2 KB
needafavor.alternative	7/22/2023 6:51 PM	ALTERNATIVE File	1 KB
needafavor.html	7/22/2023 6:51 PM	HTML File	1 KB
rendezvous.eml	7/22/2023 6:51 PM	EML File	277 KB
rendezvous.html	7/22/2023 6:51 PM	HTML File	1 KB
secretrendezvous.docx	7/22/2023 6:51 PM	Office Open XML Do...	201 KB

5. Are there any indications of Ann’s physical whereabouts? If so, provide supporting evidence.

➤ Now open the file location of file secretrendezvous.docx. We can see the location of Ann in the image containing address and map location.

Meet me at the fountain near the rendezvous point. Address below. I'm bringing all the cash.



Citations –

1. Kumari, S. (2023, March 17). TryHackMe Wireshark Traffic Analysis Write-up Part 2. Medium. <https://medium.com/@kumarishefu.4507/try-hack-me-wireshark-traffic-analysis-write-up-part-2-11d299b504f3>
2. Hjelmvik, E. (2019, November 20). Intro to NetworkMiner. Weberblog. <https://weberblog.net/intro-to-networkminer/>
3. lastbitcoder. (2022, October 27). DHCP/BOOTP Statistics in Wireshark. GeeksforGeeks. <https://www.geeksforgeeks.org/dhcp-bootp-statistics-in-wireshark/>
4. QACafe. (n.d.). Search on Any Frame in a Capture. QA Cafe. <https://www.qacafe.com/resources/search-on-any-frame-in-a-capture/#:~:text=The%20%E2%80%9Cframe%20contains%E2%80%9D%20filter%20will,%E2%80%9Ccloudshark%E2%80%9D%20somewhere%20in%20them.>

