

BÁO CÁO THỰC HÀNH

Môn học: Pháp chứng kỹ thuật số

Lab 4: Network Forensic

GVHD: Đoàn Minh Trung

1. THÔNG TIN CHUNG:

(Liệt kê tất cả các thành viên trong nhóm)

Lớp: NT334.021.ATTN

STT	Họ và tên	MSSV	Email
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2. NỘI DUNG THỰC HIỆN:¹

STT	Công việc	Kết quả tự đánh giá
1	Kịch bản 1a, 1b (đã báo cáo ở lớp)	100%
2	Kịch bản 2	100%
3	Kịch bản 3 (đã báo cáo ở lớp)	100%
4	Kịch bản 4	100%
5	Kịch bản 5	100%
6	Kịch bản 6 (đã báo cáo ở lớp)	100%

Phần bên dưới của báo cáo này là tài liệu báo cáo chi tiết của nhóm thực hiện.

¹ Ghi nội dung công việc, các kịch bản trong bài Thực hành

BÁO CÁO CHI TIẾT

Kịch bản 02: Điều- tra trên dữ liệu lưu lượng mạng thu được.

- Tài nguyên: capture-output_kb02.7z
- Yêu cầu: Thực hiện phân tích các request DNS, các truy cập HTTP đến các trang web nào. Người dùng đã gửi một số tập tin thông qua một trang web. Xác định dịch vụ mà người dùng sử dụng để chuyển tập tin, thông tin người nhận (email, thông điệp lời nhắn, tên file đã gửi). Trích xuất nội dung các file đã gửi.

Đáp án:

- Để xác định user đang truy cập đến những trang web nào, chúng ta sử dụng lệnh sau để sắp xếp lại cho dễ nhìn.

```
tshark -r capture-output_kb02.pcap -Y http.request -T fields -e http.request.full_uri | sort | uniq -c
```

```
(hahien@kali)-[~]
$ tshark -r capture-output_kb02.pcap -Y http.request -T fields -e http.request.full_uri | sort | uniq -c
370 http://10.102.20.169:8080/ping
146 http://10.102.20.169:8080/v2-beta/publish
28 http://239.255.255.250:1900*
1 http://connectivity-check.ubuntu.com/
1 http://fsend.vn/img/slides/slide-2.png
1 http://fsend.vn/img/slides/slide-3.png
1 http://fsend.vn/Roboto-Bold.c0f1e4a4fdb8048c72e.woff2
1 http://fsend.vn/Roboto-Light.3c37aa69cd77e6a53a06.woff2
1 http://fsend.vn/Roboto-Regular.5136cbe62a63604402f2.woff2
1 http://fsend.vn/v2/services
1 http://fsend.vn/v2/transfers?key=Q4uDmemqP1FCFpEjexDnGSfueKU2uviN
1 http://fsend.vn/v2/up-keys
2 http://fsend.vn/v2/up-keys/Q4uDmemqP1FCFpEjexDnGSfueKU2uviN/upload
1 http://linkmaker.itunes.apple.com/assets/shared/badges/vi-vn/appstore-lrg.svg
2 http://ocsp2.globalsign.com/gsalphasha2g2
1 http://ocsp2.globalsign.com/gsoorganizationvalsha2g2
18 http://ocsp.comodoca.com/
30 http://ocsp.digicert.com/
3 http://ocsp.godaddy.com/
5 http://ocsp.int-x3.letsencrypt.org/
21 http://ocsp.pki.goog/GTSIAg3
2 http://ocsp.scalb.amazontrust.com/
2 http://ocsp.sectigo.com/
2 http://ocsp.trustwave.com/
1 http://status.geotrust.com/
1 http://status.rapidssl.com/
1 http://tuoitre.vn/
2 http://up.fshare.vn/upload/dZFL+bxh+3-P3-GAqMhhaORkNjCyXR6ITPZLZBzywLUNX2twgbTa7ZH0tsPUJ45wPUUYVqUceOhozr46?flowChunkNumber=1&flowChunkSize=20000000&flowCu
ntChunkSize=4698321&flowTotalSize=4698321&flowIdentifier=4698321-Anh-Oi-O-Lai-Chi-Pu-Dat-Gmp3&flowFilename=Anh-Oi-O-Lai-Chi-Pu-Dat-Gmp3&flowRelativePath=Anh-Oi-O-L
```

- Các domain trên là 2 trang web:
 - o <http://fsend.vn>
 - o <https://www.fshare.vn/>
- 2 trang web này dùng để upload file lên
- Dùng Wireshark để xem thông tin các packet có request method là POST trên các URL này. Dùng filter **http.file_data** :

http.file_data					
No.	Time	Source	Destination	Protocol	Length Info
82	0.572476751	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
83	0.572522006	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
158	0.636319698	10.102.20.167	10.102.20.169	HTTP/J...	171 POST /v2-beta/publish HTTP/1.1 , JSON (application/json)
167	0.640007920	10.102.20.166	10.102.20.169	HTTP/J...	1969 POST /v2-beta/publish HTTP/1.1 , JSON (application/json)
297	2.579876733	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
299	2.580425143	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
774	4.588295194	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
775	4.588405619	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
846	5.601781801	10.102.20.166	10.102.20.169	HTTP/J...	589 POST /v2-beta/publish HTTP/1.1 , JSON (application/json)
847	5.601803269	10.102.20.167	10.102.20.169	HTTP/J...	589 POST /v2-beta/publish HTTP/1.1 , JSON (application/json)
971	6.597627276	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
981	6.600026573	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
1149	8.644432932	10.102.20.180	172.217.161.163	OCSP	449 Request
1152	8.685178369	172.217.161.163	10.102.20.180	OCSP	767 Response
1183	8.969161769	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
1184	8.969241036	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
1707	10.121764028	10.102.20.180	172.217.161.163	OCSP	449 Request
1711	10.160352580	10.102.20.180	172.217.161.163	OCSP	449 Request
1712	10.162434517	172.217.161.163	10.102.20.180	OCSP	767 Response
1729	10.202835536	172.217.161.163	10.102.20.180	OCSP	767 Response
1980	10.603548819	10.102.20.167	10.102.20.169	HTTP/J...	589 POST /v2-beta/publish HTTP/1.1 , JSON (application/json)
1981	10.603911701	10.102.20.166	10.102.20.169	HTTP/J...	589 POST /v2-beta/publish HTTP/1.1 , JSON (application/json)
2049	10.806930270	10.102.20.180	172.217.161.163	OCSP	449 Request
2057	10.847114917	172.217.161.163	10.102.20.180	OCSP	767 Response
2085	10.976565701	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
2087	10.976834159	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
2306	12.522850402	10.102.20.180	172.217.161.163	OCSP	449 Request
2322	12.562997543	172.217.161.163	10.102.20.180	OCSP	767 Response
2386	12.984941487	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
2387	12.984980172	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
2464	13.210579392	10.102.20.180	172.217.161.163	OCSP	449 Request
2465	13.250200681	172.217.161.163	10.102.20.180	OCSP	767 Response
2995	14.992624531	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
2997	14.993012242	10.102.20.169	10.102.20.166	HTTP	222 HTTP/1.1 200 OK (text/plain)
3056	15.630509838	10.102.20.167	10.102.20.169	HTTP/J...	757 POST /v2-beta/publish HTTP/1.1 , JSON (application/json)
3067	15.638980701	10.102.20.166	10.102.20.169	HTTP/J...	1181 POST /v2-beta/publish HTTP/1.1 , JSON (application/json)

- Chúng ta xem HTTP stream thử có gì

```
15/ 0.6360841/4 10.102.20.169 10.102.20.16/ TCP 66 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
159 0.63663925 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
170 0.644616376 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
171 0.644957813 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
847 5.601803269 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
848 5.607648674 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
850 5.609552043 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
1980 10.607548819 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
1982 10.608153575 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
1983 10.608460148 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
3051 15.630238105 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
3052 15.630264609 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
3053 15.630393486 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
3054 15.630398862 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
3055 15.630405129 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
3056 15.630599838 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
3057 15.630957118 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
3058 15.630815966 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
3064 15.638169128 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
6156 20.608995378 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
6157 20.613962425 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
6158 20.614308254 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
8045 25.61176306 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
8053 25.61766287 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
8055 25.61383964 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
9760 30.638311026 10.102.20.169 10.102.20.16/ HTTP 60 8080 -> 42516 [ACK] Seq=1 Ack=12/85 Win=1394 Len=0 ISVal=392338/451 ISecr=11885
```

- Chúng ta thấy chưa có gì đặc biệt ở POST packet này.
- Thử request POST và URL chứa <http://fsend.vn>

```
http.file_data && http.request.method == "POST" && http contains "http://fsend.vn"
```

No.	Time	Source	Destination	Protocol	Length	Info
1930	360.373170150	10.102.20.180	118.69.164.19	HTTP/3	471	POST /v2/up-keys HTTP/1.1, JSON (application/json)
1964	361.204993679	10.102.20.180	118.69.164.18	MPEG-1	49572	Audio Layer 3, 128 kb/s, 48 kHz
1971	362.739912473	10.102.20.180	118.69.164.18	HTTP	11496	POST /upload/XDjxYAufdourNmKQeh2NrQrLaviDINXx7cfi2NxGwv0yeh5jUa0AqEJJSntlyXGXF4gSG8j5A13E
1974	362.957310209	10.102.20.180	118.69.164.19	HTTP/3	610	POST /v2/transfers?key=04uDemmp1FCFPeJexDnGSFueK2uviN HTTP/1.1, JSON (application/json)

- Packet đầu tiên có file được upload là 1 file mp3 và 1 file image

```

1931... 360.467102403 118.69.164.19 10.102.20.180 HTTP/1... 359 HTTP/1.1 201 Created , JSON (application/json)
1931... 360.467132971 10.102.20.180 118.69.164.19 TCP 66 60298 → 80 [ACK] Seq=406 Ack=294 Win=30336 Len=0 TSval=906563 TSecr=2457348623
1940... 360.592605711 10.102.20.180 118.69.164.19 HTTP/1... 574 PUT /v2/up-keys/Q4uDmemqP1FCFpEjexDnGSfueKU2uviN/upload HTTP/1.1 , JSON (application/json)
1941... 360.599910352 118.69.164.19 10.102.20.180 TCP 66 80 → 60298 [ACK] Seq=294 Ack=914 Win=31104 Len=0 TSval=2457348751 TSecr=906594
1948... 360.980036710 118.69.164.19 10.102.20.180 HTTP/1... 546 HTTP/1.1 200 OK , JSON (application/json)
1948... 360.980064198 10.102.20.180 118.69.164.19
1965... 361.329532878 10.102.20.180 118.69.164.19
1965... 361.336692908 118.69.164.19 10.102.20.180
1970... 362.710429032 118.69.164.19 10.102.20.180
1970... 362.710489835 10.102.20.180 118.69.164.19
1974... 362.957310289 10.102.20.180 118.69.164.19
1975... 363.1658996444 10.102.20.180 118.69.164.19
1975... 363.172619590 118.69.164.19 10.102.20.180
1979... 365.007568172 118.69.164.19 10.102.20.180
1979... 365.007622862 10.102.20.180 118.69.164.19

Wireshark - Follow HTTP Stream (tcp.stream eq 3856) - capture-output_kb02.pcap
Connection: keep-alive
{"key":"Q4uDmemqP1FCFpEjexDnGSfueKU2uviN","total_file":0,"total_size":0,"expire_in":"2019-05-24 09:56:14"}PUT /v2/up-keys/Q4uDmemqP1FCFpEjexDnGSfueKU2uviN/upload HTTP/1.1
Host: fsend.vn
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:66.0) Gecko/20100101 Firefox/66.0
Accept: application/json
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Referer: http://fsend.vn/
Content-Type: application/json
Content-Length: 65
Connection: keep-alive
Cookie: ga=GA1.2.1571762078.1553350291; _gid=GA1.2.1001324680.1558341234
{"file_name":"Anh-Oi-O-Lai-Chi-Pu-Dat-G.mp3","file_size":4698321}HTTP/1.1 200 OK
Server: Fshare
Date: Tue, 21 May 2019 02:56:15 GMT
Content-Type: application/json; charset=UTF-8
Transfer-Encoding: chunked
Connection: keep-alive
Vary: Accept-Encoding

{"file_name":"image.jpg","file_size":90429}HTTP/1.1 200 OK
Server: Fshare
Date: Tue, 21 May 2019 02:56:17 GMT
Content-Type: application/json; charset=UTF-8
Transfer-Encoding: chunked
Connection: keep-alive
Vary: Accept-Encoding
Vary: Accept-Encoding
Content-Encoding: gzip

{"key":"Q4uDmemqP1FCFpEjexDnGSfueKU2uviN","total_file":2,"total_size":4788750,"expire_in":"2019-05-24 09:56:14"}http://up.fshare.vn/upload/XDjxYAUfdouRnMKQeh2WrQrLavMDINxXJcfi2NxGwvov0eh5jUAoAQeJJSnztlyXGEF4gSG8j5A13EOI"sfers?key=Q4uDmemqP1FCFpEjexDnGSfueKU2uviN HTTP/1.1
Host: fsend.vn
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:66.0) Gecko/20100101 Firefox/66.0

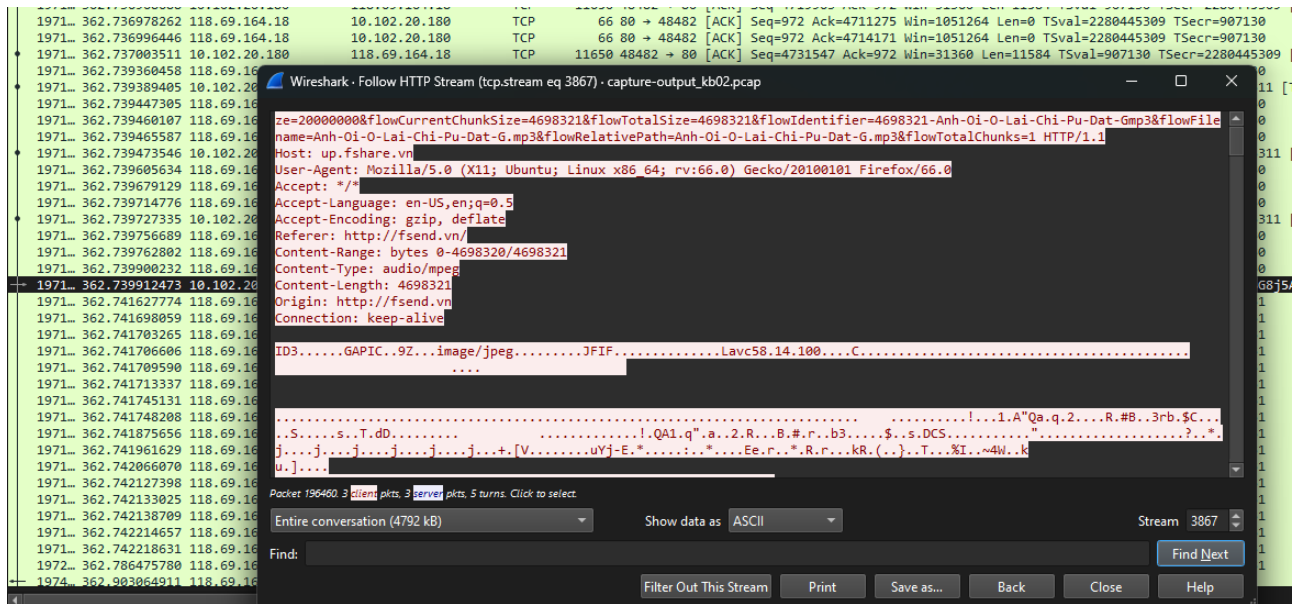
- Người nhận (recipient): duypt@uit.edu.vn
- Thông điệp (message): "Khong o lai dau :v"

{"recipients":["duypt@uit.edu.vn"],"message":"Khong o lai dau :v","title":null,"password_lock":null}HTTP/1.1 201 Created
Server: Fshare
Date: Tue, 21 May 2019 02:56:19 GMT
Content-Type: application/json; charset=UTF-8
Transfer-Encoding: chunked
Connection: keep-alive


{"id":"Q4uDmemqP1FCFpEjexDnGSfueKU2uviN","url":"http://www.fsend.vn/download/Q4uDmemqP1FCFpEjexDnGSfueKU2uviN","title":null,"recipients":["duypt@uit.edu.vn"],"message":"Khong o lai dau :v","status":"enabled","is_locked":false,"is_expired":false,"total_file":2,"total_size":4788750,"total_dl":0,"ctime":"2019-05-21T02:56:18+00:00","expire_in":"2019-05-31T02:56:18+00:00"}

```

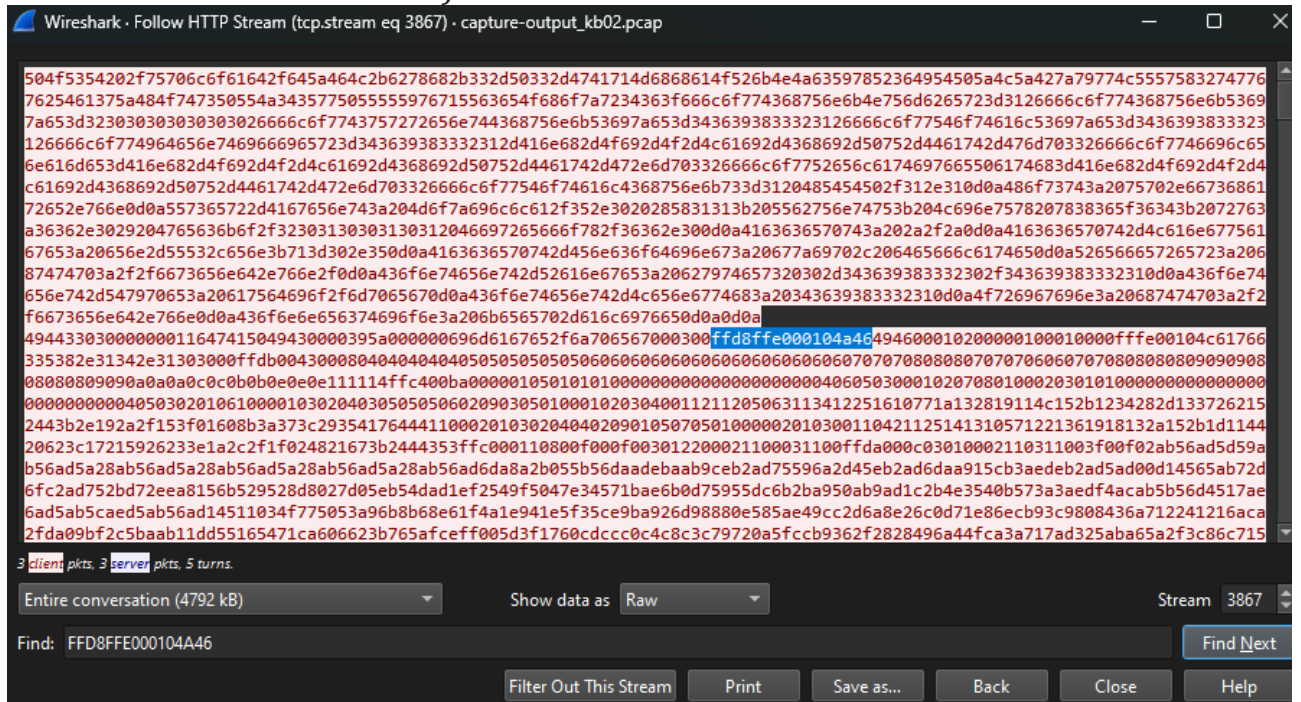
- Trích xuất nội dung file
- Packet còn lại hiển thị nội dung sau:

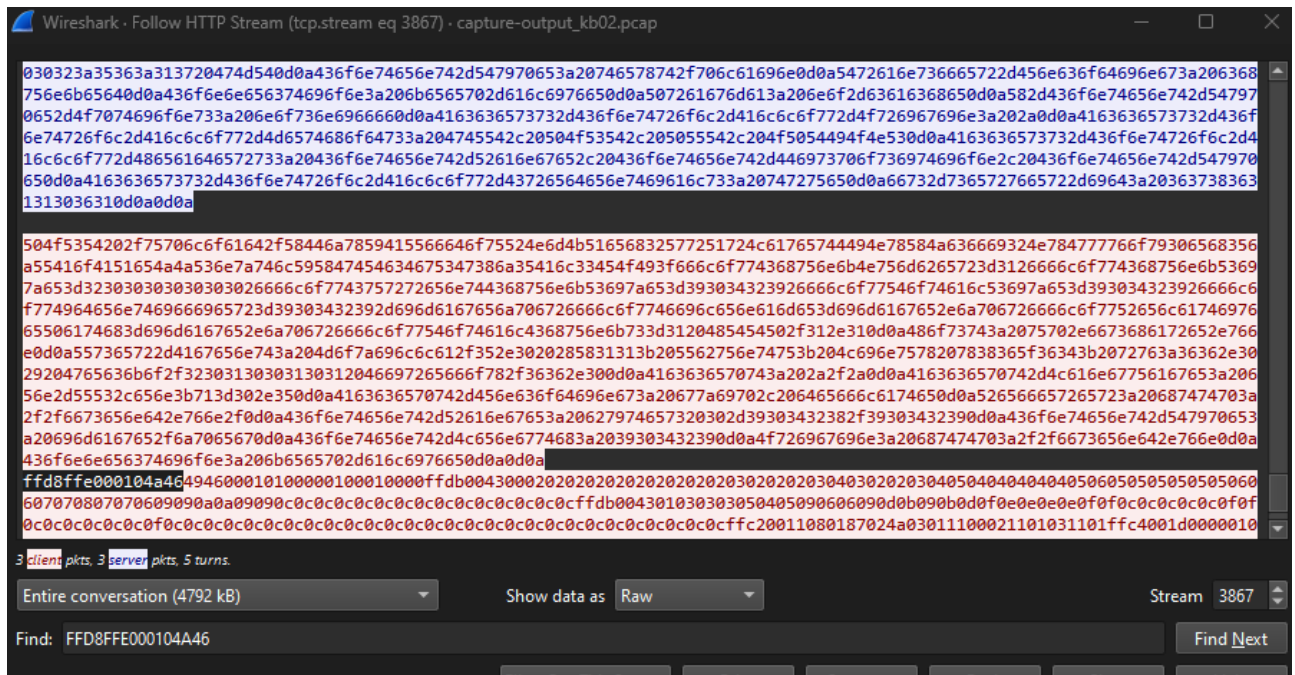


- Ta đã có nội dung file, chuyển sang view dưới dạng Raw (Show data as) , và tìm chuỗi định dạng file (chữ ký file) hợp lệ [List of file signatures - Wikipedia](#)

FF D8 FF DB	ýõýÜ	0		JPEG raw or in the JFIF or Exif file format ^[16]
FF D8 FF E0 00 10 4A 46	ýõýàNULDLJFIFNULSON			
49 46 00 01				
FF D8 FF EE	ýõýî			
FF D8 FF E1 ?? ?? 45 78	ýõýá??ExifNULNUL			

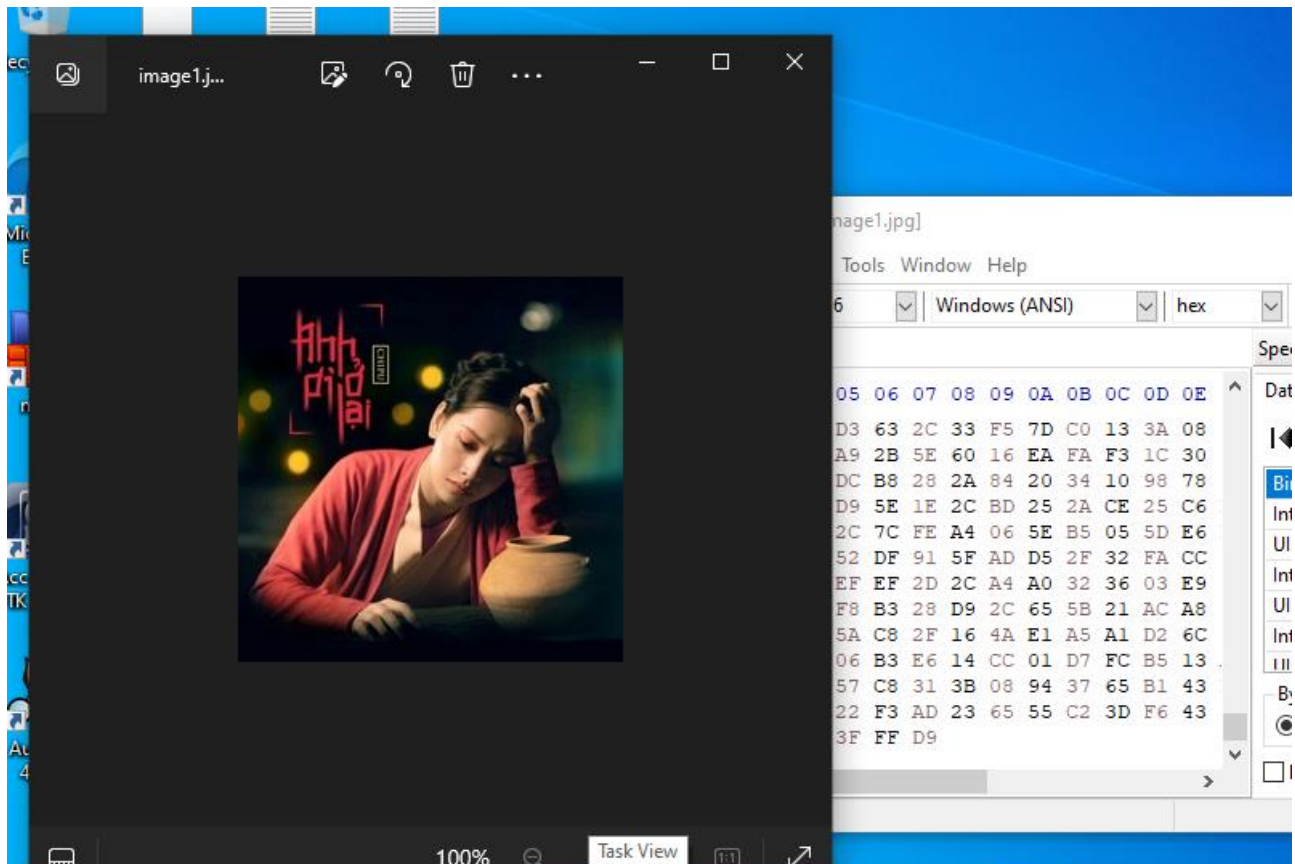
- Phần bắt đầu là phần bắt đầu từ chuỗi (search với chuỗi chữ ký trên “FFD8FFE000104A46”)

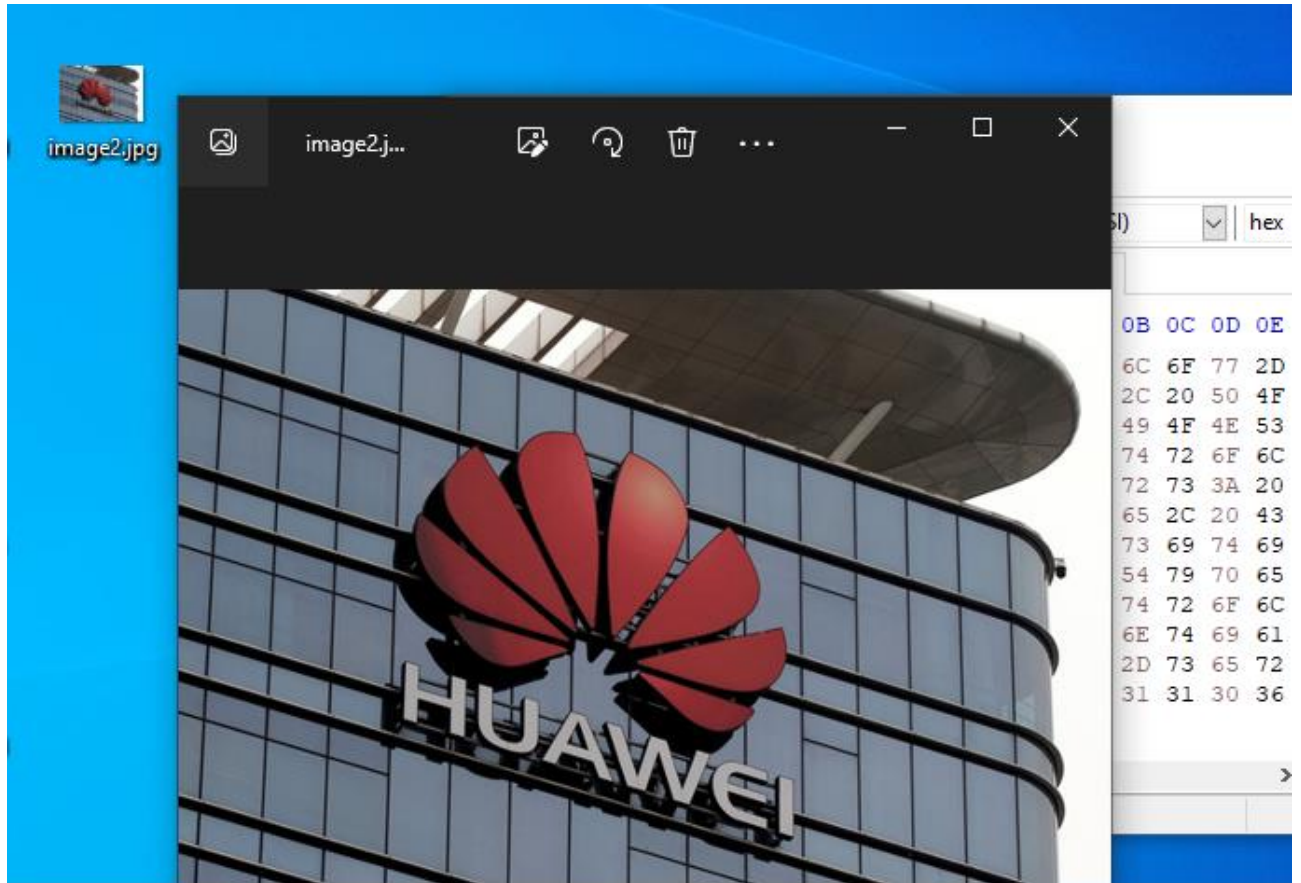




⇒ Có 2 chuỗi → có 2 ảnh

- Phần kết thúc file (giới hạn đến phần đỏ, màu xanh là header của request)
- Copy từ đầu đến cuối (như đã phân tích ở trên) vào một file mới trong phần hex data (bên trái) của HxD. Lưu file lại thành image1.jpg và image2.jpg





FF FB	yù			MPEG-1 Layer 3 file without an ID3 tag or with an
FF F3	yó	0	mp3	ID3v1 tag (which is appended at the end of the
FF F2	yò			file)
49 44 33	ID3	0	mp3	MP3 file with an ID3v2 container

Wireshark · Follow HTTP Stream (tcp.stream eq 3867) · capture-output_kb02.pcap

```
fd03c62f5a90fd076dfd0ce57d7fa468de8fe5feb200272a84cb9200a603f0cd6d1f2c85c8d12ad58789a2e06b5498851eae2f29cd3d0a19adf7e3ed762
8ed78702e69c1f5b01a02edfdf42aecf6fe0a8b2a79cb8e324c24246343ed629642f7f310908332cbb954a0b58f09b0ae66b68a2b06a823cb8e92998f57
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```

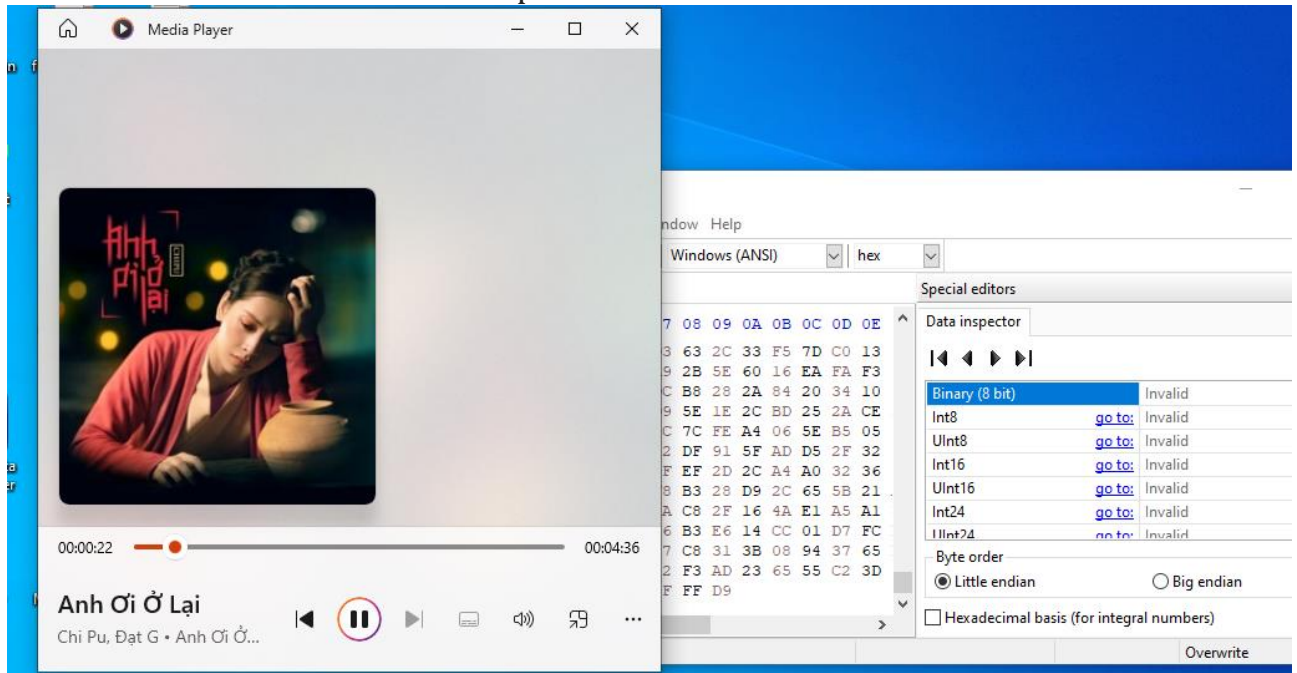
3 client pkts, 3 server pkts, 5 turns.

Entire conversation (4792 kB) Show data as Raw Stream 3867

Find: 444933 Find Next

Filter Out This Stream Print Save as... Back Close Help

- Làm tương tự như với ảnh , nhưng điểm bắt đầu nội dung file là 494433 -> Đưa vào HxD -> Save as -> file.mp3



Kịch bản 04. Điều tra trên dữ liệu lưu lượng mạng thu được.

- Tài nguyên: net_kb04.pcap
 - Yêu cầu – Gợi ý: Đây là dữ liệu mạng thu được khi bắt gói tin duyệt web trong một khoảng thời gian. Tìm flag, biết flag có định dạng flag{...}
- Đáp án:

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.15.135	198.41.209.136	TCP	74	39467 → 80 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM TSval=641519 TSecr=0 WS=64
2	0.018505	198.41.209.136	192.168.15.135	TCP	60	80 → 39467 [SYN, ACK] Seq=0 Ack=1 Win=64240 Len=0 MSS=1460
3	0.018547	192.168.15.135	198.41.209.136	TCP	54	39467 → 80 [ACK] Seq=1 Ack=1 Win=29200 Len=0
4	0.018704	192.168.15.135	198.41.209.136	HTTP	218	GET / HTTP/1.1
5	0.018839	198.41.209.136	192.168.15.135	TCP	60	80 → 39467 [ACK] Seq=1 Ack=165 Win=64240 Len=0
6	0.065831	198.41.209.136	192.168.15.135	HTTP	447	HTTP/1.1 301 Moved Permanently
7	0.066018	192.168.15.135	198.41.209.136	TCP	54	39467 → 80 [ACK] Seq=165 Ack=394 Win=30016 Len=0
8	0.138116	192.168.15.135	198.41.209.143	TCP	74	39326 → 443 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM TSval=641553 TSecr=0 WS=64
9	0.168944	198.41.209.143	192.168.15.135	TCP	60	443 → 39326 [SYN, ACK] Seq=0 Ack=1 Win=64240 Len=0 MSS=1460
10	0.168973	192.168.15.135	198.41.209.143	TCP	54	39326 → 443 [ACK] Seq=1 Ack=1 Win=29200 Len=0
11	0.183267	192.168.15.135	198.41.209.143	TLSv1.2	355	Client Hello
12	0.183497	198.41.209.143	192.168.15.135	TCP	60	443 → 39326 [ACK] Seq=1 Ack=302 Win=64240 Len=0
13	0.211341	198.41.209.143	192.168.15.135	TLSv1.2	2966	Server Hello, Certificate, Server Key Exchange, Server Hello Done
14	0.211374	192.168.15.135	198.41.209.143	TCP	54	39326 → 443 [ACK] Seq=302 Ack=2913 Win=33580 Len=0
15	0.213178	192.168.15.135	198.41.209.143	TLSv1.2	180	Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
16	0.213312	198.41.209.143	192.168.15.135	TCP	60	443 → 39326 [ACK] Seq=2913 Ack=428 Win=64240 Len=0
17	0.230228	198.41.209.143	192.168.15.135	TLSv1.2	296	New Session Ticket, Change Cipher Spec, Encrypted Handshake Message
18	0.230612	192.168.15.135	198.41.209.143	TLSv1.2	313	Application Data
19	0.230736	198.41.209.143	192.168.15.135	TCP	60	443 → 39326 [ACK] Seq=3155 Ack=687 Win=64240 Len=0
20	0.260136	198.41.209.143	192.168.15.135	TLSv1.2	5639	Application Data
21	0.260209	192.168.15.135	198.41.209.143	TCP	54	39326 → 443 [ACK] Seq=687 Ack=8740 Win=48180 Len=0
22	0.260387	198.41.209.143	192.168.15.135	TCP	1514	443 → 39326 [PSH, ACK] Seq=8740 Ack=687 Win=64240 Len=1460 [TCP segment of a reassembled PDU]
23	0.260679	198.41.209.143	192.168.15.135	TLSv1.2	2719	Application Data
24	0.260688	192.168.15.135	198.41.209.143	TCP	54	39326 → 443 [ACK] Seq=687 Ack=12865 Win=56940 Len=0
25	0.261115	198.41.209.143	192.168.15.135	TLSv1.2	4179	Application Data
26	0.261125	192.168.15.135	198.41.209.143	TCP	54	39326 → 443 [ACK] Seq=687 Ack=16990 Win=64240 Len=0
27	0.277179	198.41.209.143	192.168.15.135	TCP	1514	443 → 39326 [PSH, ACK] Seq=16990 Ack=687 Win=64240 Len=1460 [TCP segment of a reassembled PDU]
28	0.278194	198.41.209.143	192.168.15.135	TLSv1.2	5765	Application Data, Application Data, Application Data, Application Data
29	0.278319	192.168.15.135	198.41.209.143	TCP	54	39326 → 443 [ACK] Seq=687 Ack=24161 Win=64240 Len=0
30	0.279873	192.168.15.135	198.41.209.143	TCP	54	39326 → 443 [FIN, ACK] Seq=687 Ack=24161 Win=64240 Len=0
31	0.279998	198.41.209.143	192.168.15.135	TCP	60	443 → 39326 [ACK] Seq=24161 Ack=688 Win=64239 Len=0
32	0.280418	192.168.15.135	198.41.209.136	TCP	54	39467 → 80 [FIN, ACK] Seq=165 Ack=394 Win=30016 Len=0
33	0.280564	198.41.209.136	192.168.15.135	TCP	60	80 → 39467 [ACK] Seq=394 Ack=166 Win=64239 Len=0
34	0.310871	198.41.209.143	192.168.15.135	TCP	60	443 → 39326 [FIN, PSH, ACK] Seq=24161 Ack=688 Win=64239 Len=0
35	0.310911	192.168.15.135	198.41.209.143	TCP	54	39326 → 443 [ACK] Seq=688 Ack=24162 Win=64240 Len=0
36	0.312093	198.41.209.136	192.168.15.135	TCP	60	80 → 39467 [FIN, PSH, ACK] Seq=394 Ack=166 Win=64239 Len=0
37	0.312122	192.168.15.135	198.41.209.136	TCP	54	39467 → 80 [ACK] Seq=166 Ack=395 Win=30016 Len=0

- Đề bài là kiểm tra được flag{}, nên ta sử dụng filter để lọc xem có gì không

tcp contains "flag"

No.	Time	Source	Destination	Protocol	Length	Info
60	1.689759	192.168.15.133	192.168.15.135	TCP	1008	36840 → 80 [PSH, ACK] Seq=1 Ack=1 Win=29312 Len=942 TSval=2363820 TSecr=641940

tcp.stream eq 4

No.	Time	Source	Destination	Protocol	Length	Info
57	1.684373	192.168.15.133	192.168.15.135	TCP	74	36840 → 80 [SYN] Seq=0 Win=29200 Len=0
58	1.684419	192.168.15.135	192.168.15.133	TCP	74	80 → 36840 [SYN, ACK] Seq=0 Ack=1 Win=
59	1.684627	192.168.15.133	192.168.15.135	TCP	66	36840 → 80 [ACK] Seq=1 Ack=1 Win=29312
60	1.689759	192.168.15.133	192.168.15.135	TCP	1008	36840 → 80 [PSH, ACK] Seq=1 Ack=1 Win=
61	1.689803	192.168.15.135	192.168.15.133	TCP	66	80 → 36840 [ACK] Seq=1 Ack=943 Win=308
147	3.692132	192.168.15.133	192.168.15.135	TCP	322	36840 → 80 [PSH, ACK] Seq=943 Ack=1 Wi
148	3.692173	192.168.15.135	192.168.15.133	TCP	66	80 → 36840 [ACK] Seq=1 Ack=1199 Win=32

Wireshark · Follow TCP Stream (tcp.stream eq 4) · net_kb04.pcap

```
import string
import random
from base64 import b64encode, b64decode

FLAG = 'flag{xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx}'

enc_ciphers = ['rot13', 'b64e', 'caesar']
# dec_ciphers = ['rot13', 'b64d', 'caesard']

def rot13(s):
    _rot13 = string.maketrans(
        "ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz",
        "NOPQRSTUVWXYZnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZnopqrstuvwxyz"
    )
    return string.translate(s, _rot13)

def b64e(s):
    return b64encode(s)

def caesar(plaintext, shift=3):
    alphabet = string.ascii_lowercase
    shifted_alphabet = alphabet[shift:] + alphabet[:shift]
    table = string.maketrans(alphabet, shifted_alphabet)

    123 client pkts, 0 server pkts, 0 turns.
```

Entire conversation (32 kB) Show data as ASCII

- Copy ra ngoài để dễ phân tích

```
import string
import random
from base64 import b64encode, b64decode

FLAG = 'flag{xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx}'

enc_ciphers = ['rot13', 'b64e', 'caesar']
# dec_ciphers = ['rot13', 'b64d', 'caesard']

def rot13(s):
    _rot13 = string.maketrans(
        "ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz",
        "NOPQRSTUVWXYZnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZnopqrstuvwxyz"
    )
    return string.translate(s, _rot13)

def b64e(s):
    return b64encode(s)
```

```

def caesar(plaintext, shift=3):
    alphabet = string.ascii_lowercase
    shifted_alphabet = alphabet[shift:] + alphabet[:shift]
    table = string.maketrans(alphabet, shifted_alphabet)
    return plaintext.translate(table)

def encode(pt, cnt=50):
    tmp = '2{}'.format(b64encode(pt))
    for cnt in xrange(cnt):
        c = random.choice(enc_ciphers)
        i = enc_ciphers.index(c) + 1
        _tmp = globals()[c](tmp)
        tmp = '{}{}'.format(i, _tmp)

    return tmp

if __name__ == '__main__':
    print encode(FLAGS,
cnt=?)2Mk16Sk5iakYxVFZoS1RsWnZXbFZaYjFaa1prWmFkMDVWVGs1U2IyODFXa1ZuTUZadU1YV1
diVkpVfVFaS1dGWX1kbUZXTVdkMVprWnJWM1ZHYzFsWGJscHVVeKpOWVZaeFZsUmxWMnR5VkJabU5
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ZTVjFkd09WaFNRLkyVmxjMVixWldXa1pUY0d0WFpVWnpZbHBYWVhwVFYwWkhWM0JyVG1Wd2EydFd
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WldwV0ZXYmxwTFZqRk9kV1pHYTJ0a01YTlpWbGN4WTJoR1NsZGxNM05yVW00MvdGbFVUa050VmxwW
VprVkJ9iV1ZXUmpWV2NIZHlaRz1LV0doRk9WVldjRkpVVM5CaFZtaEdaM1ZuUm1kVfPHTldXRlp3TV
hwVkJ1XZDNVMj12Vm1ReVVsWldiMmRUV1VaV2RGSndkMjFsU0VKSfZHOWFibFV4V25oUmJqRlhWak5
yV0ZSdVdsTldNVko0Vm05T2EwMXdhMVpXY0dGdVpUR1JJZVmR4VWs5V1ZUV1lWWEIzWkZkR2JucFdj
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dWY3hTMMRIVmtaYVJtZHJaREJ6Y2xaVJtUldjRlpJVTI1YVdHUmPwBfZWYjFwN1VtOWFWMWR2WjJ
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UV4VTBaYWRtUkdVbXhsVjJ0WVYxY3h0RmxXWjFkV2NVcFhaV1JXVUZad1lYcFNNVnAyWkVkm1YyUm
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YV1RKS1IyWkdWbFpsUjFKMFdsVmFVMVp2V25kU2JqbFhaR05XV0ZZeWQzSmtNVnAzVTNGS1ZHVndh
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HJVMUpWYzNsWFZsS1BaREExZGxad1oxWmxWVnBVVkJabk5GWXhVW0ZXY1U1WFZtNXpXbFZYT1Vkv2
NFWjFVMjluWkZKR1dsQldNRnBYWjFaYWRscEdUbGRTVM50a1ZuQnpTMDVHV1dKU2NVNVdaREZ6V1Z

```

sdVZucFdNVkpYV2taT1QxSnZTbGRXY0hOVFPERktkV1ZqU2xaT1ZrcElWbkIyWVZJefduU1ZiM05P
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```

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```

- Ta thấy nội dung file là một chương trình mã hóa một chuỗi plaintext thành ciphertext. Ciphertext ở phía sau cùng.
- Bây giờ nhiệm vụ của chúng ta là phân tích file encode và tìm cách viết file decode.

```
def encode(pt, cnt=50):
    tmp = '2{}'.format(b64encode(pt))
    for cnt in xrange(cnt):
        c = random.choice(enc_ciphers)
        i = enc_ciphers.index(c) + 1
        _tmp = globals()[c](tmp)
        tmp = '{}{}'.format(i, _tmp)

    return tmp
```

- Ta có thể sử dụng hàm **encode** trong script này để mã hóa một chuỗi bằng cách chọn ngẫu nhiên một trong ba phương pháp mã hóa: ROT13, base64 encoding hoặc Caesar cipher. Mỗi lần ta gọi **encode**, nó sẽ thêm một bước mã hóa mới và sau đó trả về chuỗi đã mã hóa.
- Để giải mã chuỗi được mã hóa bằng hàm encode trong mã nguồn trên, chúng ta cần thực hiện các bước giải mã theo đúng thứ tự ngược lại với quá trình mã hóa.
- Dưới đây là các bước giải mã tương ứng:
 - o Giải mã từ base64:
 - Sử dụng hàm b64decode từ module base64 để giải mã chuỗi base64.
 - o Giải mã các phép biến đổi:
 - Đọc từng ký tự trong chuỗi giải mã và xác định loại phép biến đổi bằng cách đọc ký tự đầu tiên của từng khối.
 - Sử dụng hàm tương ứng (rot13, caesar) để giải mã từng khối dựa trên loại phép biến đổi đã xác định.

```
- import string
- import random
- from base64 import b64encode, b64decode
-
- FLAG = open("ciphertext.txt").read()
- dec_ciphers = ['rot13', 'b64d', 'caesard']
-
- def rot13(s):
-     rot13 = string.maketrans(
-         "ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz",
-         "NOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ")
-     return string.translate(s, _rot13)
-
- def b64d(s):
-     return b64decode(s)
-
- def caesar(plaintext, shift=3):
-     alphabet = string.ascii_lowercase
-     shifted_alphabet = alphabet[shift:] + alphabet[:shift]
-     table = string.maketrans(alphabet, shifted_alphabet)
-     return plaintext.translate(table)
```

```

-
- def caesard(ciphertext, shift=3):
-     return caesar(ciphertext, shift=-shift)
-
- def decode(ct):
-     while True:
-         try:
-             i = int(ct[0]) - 1
-         except:
-             print(ct)
-             exit(0)
-         ct = ct[1:]
-         c = dec_ciphers[i]
-         _ct = globals()[c](ct)
-         ct = _ct
-
- if __name__ == '__main__':
-     decode(FLAG)
-

```

Flag: `flag{li0ns_and_tig3rs_4nd_b34rs_0h_mi}`

Kịch bản 05. Điều tra trên dữ liệu lưu lượng mạng thu được.

- Tài nguyên thực hiện: kb05.gz
- Yêu cầu – Gợi ý: Xác định các kết nối trọng dữ liệu thu được. Chú ý các gói ICMP, trường giá trị Identifiers của các gói để tìm flag. Flag có định dạng bắt đầu bằng chuỗi “S3”, với tổng chiều dài là 11 ký tự

Đáp án:

- Đề có gợi ý tập trung vào ICMP, nên em sẽ filter ICMP trước:

icmp						
No.	Time	Source	Destination	Protocol	Length	Info
376	616.966522	192.168.50.10	192.168.0.50	ICMP	98	Echo (ping) request id=0x06ef, seq=1/256, ttl=64 (no response found!)
378	617.965929	192.168.50.10	192.168.0.50	ICMP	98	Echo (ping) request id=0x06ef, seq=2/512, ttl=64 (reply in 379)
379	617.990279	192.168.0.50	192.168.50.10	ICMP	98	Echo (ping) reply id=0x06ef, seq=2/512, ttl=41 (request in 378)
395	641.491491	192.168.0.50	192.168.50.10	ICMP	98	Echo (ping) request id=0x152c, seq=1/256, ttl=41 (reply in 396)
396	641.492213	192.168.50.10	192.168.0.50	ICMP	98	Echo (ping) reply id=0x152c, seq=1/256, ttl=64 (request in 395)
479	796.186499	192.168.50.10	192.168.0.50	ICMP	42	Echo (ping) request id=0x0000, seq=0/0, ttl=64 (reply in 480)
480	796.205229	192.168.0.50	192.168.50.10	ICMP	42	Echo (ping) reply id=0x0000, seq=0/0, ttl=41 (request in 479)
481	796.297219	192.168.50.10	192.168.0.50	ICMP	42	Echo (ping) request id=0x0000, seq=0/0, ttl=64 (reply in 482)
482	796.316115	192.168.0.50	192.168.50.10	ICMP	42	Echo (ping) reply id=0x0000, seq=0/0, ttl=41 (request in 481)
483	796.408717	192.168.50.10	192.168.0.50	ICMP	42	Echo (ping) request id=0x0000, seq=0/0, ttl=64 (reply in 484)
484	796.427036	192.168.0.50	192.168.50.10	ICMP	42	Echo (ping) reply id=0x0000, seq=0/0, ttl=41 (request in 483)
485	796.516729	192.168.50.10	192.168.0.50	ICMP	42	Echo (ping) request id=0x0000, seq=0/0, ttl=64 (reply in 486)
486	796.527942	192.168.0.50	192.168.50.10	ICMP	42	Echo (ping) reply id=0x0000, seq=0/0, ttl=41 (request in 485)
487	796.623892	192.168.50.10	192.168.0.50	ICMP	42	Echo (ping) request id=0x0000, seq=0/0, ttl=64 (reply in 488)
488	796.638851	192.168.0.50	192.168.50.10	ICMP	42	Echo (ping) reply id=0x0000, seq=0/0, ttl=41 (request in 487)
489	796.732499	192.168.50.10	192.168.0.50	ICMP	42	Echo (ping) request id=0x0000, seq=0/0, ttl=64 (reply in 490)
490	796.749825	192.168.0.50	192.168.50.10	ICMP	42	Echo (ping) reply id=0x0000, seq=0/0, ttl=41 (request in 489)
491	796.840604	192.168.50.10	192.168.0.50	ICMP	42	Echo (ping) request id=0x0000, seq=0/0, ttl=64 (reply in 492)
492	796.860631	192.168.0.50	192.168.50.10	ICMP	42	Echo (ping) reply id=0x0000, seq=0/0, ttl=41 (request in 491)
493	796.951917	192.168.50.10	192.168.0.50	ICMP	42	Echo (ping) request id=0x0000, seq=0/0, ttl=64 (reply in 494)
494	796.971596	192.168.0.50	192.168.50.10	ICMP	42	Echo (ping) reply id=0x0000, seq=0/0, ttl=41 (request in 493)
495	797.062706	192.168.50.10	192.168.0.50	ICMP	42	Echo (ping) request id=0x0000, seq=0/0, ttl=64 (reply in 496)
496	797.082513	192.168.0.50	192.168.50.10	ICMP	42	Echo (ping) reply id=0x0000, seq=0/0, ttl=41 (request in 495)
497	797.172685	192.168.50.10	192.168.0.50	ICMP	42	Echo (ping) request id=0x0000, seq=0/0, ttl=64 (reply in 498)

Ở những dòng đầu tiên trong hình trên, quan sát sự thay đổi của id và seq, dường như có một thông điệp đang được trao đổi.

- Dùng tshark để trích xuất thông tin:


```
(kali@kali)-[~]
$ tshark -r kb05.pcap.pcapng -x 'icmp and ip.src==192.168.50.10'
0000  08 00 27 71 45 e4 c8 00 12 89 00 01 08 00 45 00  ..'qE.....E.
0010  00 38 00 0e 00 00 ff 01 d6 5a c0 a8 32 01 c0 a8  .8.....Z..2...
0020  32 0a 03 01 1e 74 00 00 00 00 45 00 00 41 ed 64  2....t....E..A.d
0030  40 00 3f 11 99 86 c0 a8 32 0a ac 10 15 fe ac 33  @.?.....2.....3
0040  00 35 00 2d 31 f5                                .5.-1.
```

Kết quả hiển thị khá dài nhưng khi quan sát đoạn kết quả cuối, em tìm thấy được những kí tự bắt đầu bằng S3 – hint về flag đề bài cung cấp:

```
0000  c8 00 12 89 00 01 08 00 27 71 45 e4 08 00 45 00  ....'qE...E.
0010  00 1c 00 53 00 00 40 01 c7 01 c0 a8 32 0a c0 a8  ...S..@....2...
0020  00 32 08 00 f7 ff 00 00 00 00  .2.....

0000  c8 00 12 89 00 01 08 00 27 71 45 e4 08 00 45 00  ....'qE...E.
0010  00 1c 00 33 00 00 40 01 c7 21 c0 a8 32 0a c0 a8  ...3..@..!..2...
0020  00 32 08 00 f7 ff 00 00 00 00  .2.....

0000  c8 00 12 89 00 01 08 00 27 71 45 e4 08 00 45 00  ....'qE...E.
0010  00 1c 00 63 00 00 40 01 c6 f1 c0 a8 32 0a c0 a8  ...c..@....2...
0020  00 32 08 00 f7 ff 00 00 00 00  .2.....

0000  c8 00 12 89 00 01 08 00 27 71 45 e4 08 00 45 00  ....'qE...E.
0010  00 1c 00 72 00 00 40 01 c6 e2 c0 a8 32 0a c0 a8  ...r..@....2...
0020  00 32 08 00 f7 ff 00 00 00 00  .2.....

0000  c8 00 12 89 00 01 08 00 27 71 45 e4 08 00 45 00  ....'qE...E.
0010  00 1c 00 33 00 00 40 01 c7 21 c0 a8 32 0a c0 a8  ...3..@..!..2...
0020  00 32 08 00 f7 ff 00 00 00 00  .2.....

0000  c8 00 12 89 00 01 08 00 27 71 45 e4 08 00 45 00  ....'qE...E.
0010  00 1c 00 74 00 00 40 01 c6 e0 c0 a8 32 0a c0 a8  ...t..@....2...
0020  00 32 08 00 f7 ff 00 00 00 00  .2.....

0000  c8 00 12 89 00 01 08 00 27 71 45 e4 08 00 45 00  ....'qE...E.
0010  00 1c 00 34 00 00 40 01 c7 20 c0 a8 32 0a c0 a8  ...4..@.. ..2...
0020  00 32 08 00 f7 ff 00 00 00 00  .2.....

0000  c8 00 12 89 00 01 08 00 27 71 45 e4 08 00 45 00  ....'qE...E.
0010  00 1c 00 67 00 00 40 01 c6 ed c0 a8 32 0a c0 a8  ...g..@....2...
0020  00 32 08 00 f7 ff 00 00 00 00  .2.....

0000  c8 00 12 89 00 01 08 00 27 71 45 e4 08 00 45 00  ....'qE...E.
0010  00 1c 00 33 00 00 40 01 c7 21 c0 a8 32 0a c0 a8  ...3..@..!..2...
0020  00 32 08 00 f7 ff 00 00 00 00  .2.....

0000  c8 00 12 89 00 01 08 00 27 71 45 e4 08 00 45 00  ....'qE...E.
0010  00 1c 00 6e 00 00 40 01 c6 e6 c0 a8 32 0a c0 a8  ...n..@....2...
0020  00 32 08 00 f7 ff 00 00 00 00  .2.....

0000  c8 00 12 89 00 01 08 00 27 71 45 e4 08 00 45 00  ....'qE...E.
0010  00 1c 00 74 00 00 40 01 c6 e0 c0 a8 32 0a c0 a8  ...t..@....2...
0020  00 32 08 00 f7 ff 00 00 00 00  .2.....
```

- Để chắc chắn, em sẽ dùng tshark để trích xuất các giá trị tại offset 0010:
tshark -r kb05.pcap.pcapng -x 'icmp and ip.src==192.168.50.10' | grep 0010

```

0010 00 1c 00 68 00 00 40 01 c6 ec c0 a8 32 0a c0 a8 ... h..@.....2...
0010 00 1c 00 65 00 00 40 01 c6 ef c0 a8 32 0a c0 a8 ... e..@.....2...
0010 00 1c 00 72 00 00 40 01 c6 e2 c0 a8 32 0a c0 a8 ... r..@.....2...
0010 00 1c 00 65 00 00 40 01 c6 ef c0 a8 32 0a c0 a8 ... e..@.....2...
0010 00 1c 00 20 00 00 40 01 c7 34 c0 a8 32 0a c0 a8 ... ..@..4..2...
0010 00 1c 00 69 00 00 40 01 c6 eb c0 a8 32 0a c0 a8 ... i..@.....2...
0010 00 1c 00 73 00 00 40 01 c6 e1 c0 a8 32 0a c0 a8 ... s..@.....2...
0010 00 1c 00 20 00 00 40 01 c7 34 c0 a8 32 0a c0 a8 ... ..@..4..2...
0010 00 1c 00 79 00 00 40 01 c6 db c0 a8 32 0a c0 a8 ... y..@.....2...
0010 00 1c 00 6f 00 00 40 01 c6 e5 c0 a8 32 0a c0 a8 ... o..@.....2...
0010 00 1c 00 75 00 00 40 01 c6 df c0 a8 32 0a c0 a8 ... u..@.....2...
0010 00 1c 00 72 00 00 40 01 c6 e2 c0 a8 32 0a c0 a8 ... r..@.....2...
0010 00 1c 00 20 00 00 40 01 c7 34 c0 a8 32 0a c0 a8 ... ..@..4..2...
0010 00 1c 00 66 00 00 40 01 c6 ee c0 a8 32 0a c0 a8 ... f..@.....2...
0010 00 1c 00 6c 00 00 40 01 c6 e8 c0 a8 32 0a c0 a8 ... l..@.....2...
0010 00 1c 00 61 00 00 40 01 c6 f3 c0 a8 32 0a c0 a8 ... a..@.....2...
0010 00 1c 00 67 00 00 40 01 c6 ed c0 a8 32 0a c0 a8 ... g..@.....2...
0010 00 1c 00 20 00 00 40 01 c7 34 c0 a8 32 0a c0 a8 ... ..@..4..2...
0010 00 1c 00 3a 00 00 40 01 c7 1a c0 a8 32 0a c0 a8 ... :..@.....2...
0010 00 1c 00 20 00 00 40 01 c7 34 c0 a8 32 0a c0 a8 ... ..@..4..2...
0010 00 1c 00 53 00 00 40 01 c7 01 c0 a8 32 0a c0 a8 ... S..@.....2...
0010 00 1c 00 33 00 00 40 01 c7 21 c0 a8 32 0a c0 a8 ... 3..@..!..2...
0010 00 1c 00 63 00 00 40 01 c6 f1 c0 a8 32 0a c0 a8 ... c..@.....2...
0010 00 1c 00 72 00 00 40 01 c6 e2 c0 a8 32 0a c0 a8 ... r..@.....2...
0010 00 1c 00 33 00 00 40 01 c7 21 c0 a8 32 0a c0 a8 ... 3..@..!..2...
0010 00 1c 00 74 00 00 40 01 c6 e0 c0 a8 32 0a c0 a8 ... t..@.....2...
0010 00 1c 00 34 00 00 40 01 c7 20 c0 a8 32 0a c0 a8 ... 4..@.. ..2...
0010 00 1c 00 67 00 00 40 01 c6 ed c0 a8 32 0a c0 a8 ... g..@.....2...
0010 00 1c 00 33 00 00 40 01 c7 21 c0 a8 32 0a c0 a8 ... 3..@..!..2...
0010 00 1c 00 6e 00 00 40 01 c6 e6 c0 a8 32 0a c0 a8 ... n..@.....2...
0010 00 1c 00 74 00 00 40 01 c6 e0 c0 a8 32 0a c0 a8 ... t..@.....2...

```

Flag: S3cr3t4g3nt

Sinh viên đọc kỹ yêu cầu trình bày bên dưới trang này

YÊU CẦU CHUNG

- Sinh viên tìm hiểu và thực hiện bài tập theo yêu cầu, hướng dẫn.
- Nộp báo cáo kết quả chi tiết những việc (**Report**) bạn đã thực hiện, quan sát thấy và kèm ảnh chụp màn hình kết quả (nếu có); giải thích cho quan sát (nếu có).
- Sinh viên báo cáo kết quả thực hiện và nộp bài.

Báo cáo:

- File **.DOCX và .PDF**. Tập trung vào nội dung, không mô tả lý thuyết.
- Nội dung trình bày bằng **Font chữ Times New Romans/ hoặc font chữ của mẫu báo cáo này (UTM Neo Sans Intel/UTM Viet Sach) – cỡ chữ 13. Canh đều (Justify) cho văn bản. Canh giữa (Center) cho ảnh chụp.**
- Đặt tên theo định dạng: [Mã lớp]-ExeX_GroupY. (trong đó X là Thứ tự Bài tập, Y là mã số thứ tự nhóm trong danh sách mà GV phụ trách công bố).
Ví dụ: [NT101.K11.ANTT]-Exe01_Group03.
- Nếu báo cáo có nhiều file, nén tất cả file vào file .ZIP với cùng tên file báo cáo.
- **Không đặt tên đúng định dạng – yêu cầu, sẽ KHÔNG chấm điểm bài nộp.**
- Nộp file báo cáo trên theo thời gian đã thống nhất tại courses.uit.edu.vn.

Đánh giá:

- Hoàn thành tốt yêu cầu được giao.
- Có nội dung mở rộng, ứng dụng.

Bài sao chép, trễ, ... sẽ được xử lý tùy mức độ vi phạm.

HẾT