Knowledge Check - Answers

- Convert CAFE to decimal – C=12, A=10, F=15, E=14

$12(16^3)+10(16^2)+15(16^1)+14(16^0)$ =

12*4096+10*256+15*16+14 = 51966

- Convert 7A69 to binary – 0111 1010 0110 1001
  - What is the high order nibble of the low order byte in binary?

    0110
  - What is the low order nibble of the high order byte in hex?

    A

Knowledge Check - Answers

- What ICMP type and code indicate a ping response?
  - Type 0, code 0
- What two bytes start most IPv4 packets?
  - 0x4500
- What ICMP type might indicate a traceroute?
  - Type 11
- What are the sets of flags in a normal TCP 3-way handshake?
  - SYN, SYN-ACK, ACK
- What are the two common methods of terminating a TCP connection?
  - FIN, RST

Knowledge Check - Answers

- Find SYN-ACK packets
  - tcp[13]=0x12
- Find packets with a source port of 80
  - src port 80
  - udp[0:2]=80 || tcp[0:2]=80
- Find packets with all TCP flags set
  - tcp[13]=0xff
- Find all UDP packets with a destination port of 123
  - udp[2:2]=123
  - udp && dst port 123
- Find all type 3 code 3 ICMP packets
  - icmp[0]=3 && icmp[1]=3

Practical Exercise – Fragmentation Answers

- frags.pcap
  - Why might only 1 host have responded to the ICMP echo request?
    - Fragmented ICMP blocked by Google, but not by local router
- frags2.pcap
  - What was the server's response code?
    - 301
  - What URL was probably requested?
    - www.google.com

Practical Exercise – Scanning Answers

- nmap.pcap
  - Which host was performing scanning?
    - 192.168.2.175
    - tcpdump -r nmap.pcap -nn 'tcp[13]=0x02' | cut -f3 -d' ' | cut -f1-4 -d '.' | sort | uniq -c | sort -n

```
reading from file nmap.pcap, link-type EN10MB (Ethernet)
      1 192.168.2.45
      3 192.168.2.75
     18 192.168.2.98
   4537 192.168.2.175
```

Practical Exercise – Scanning Answers

- nmap.pcap
  - Which host was the scan target?
    - 192.168.2.75
    - tcpdump -r nmap.pcap -nn 'tcp[13]=0x02' | cut -f5 -d' ' | cut -f1-4 -d '.' | sort | uniq -c | sort –n

```
reading from file nmap.pcap, link-type EN10MB (Ethernet)
      1 65.55.44.109
      4 192.168.2.45
     16 192.168.3.249
   4538 192.168.2.75
```

Practical Exercise – Scanning Answers

- nmap.pcap
  - How many TCP ports were scanned?
    - 1000
    - sudo tcpdump -r nmap.pcap -nn 'tcp[13]=0x02 && src host 192.168.2.175 && dst host 192.168.2.75'| cut -f 5 -d' ' | cut -f5 -d'.'| cut -f1 -d':' | sort | uniq | wc –l
  - How many UDP ports were scanned?
    - 30
    - sudo tcpdump -r nmap.pcap -nn 'udp && src host 192.168.2.175 && dst host 192.168.2.75'| cut -f 5 -d' ' | cut -f5 -d'.'| cut -f1 -d':' | sort | uniq | wc -l

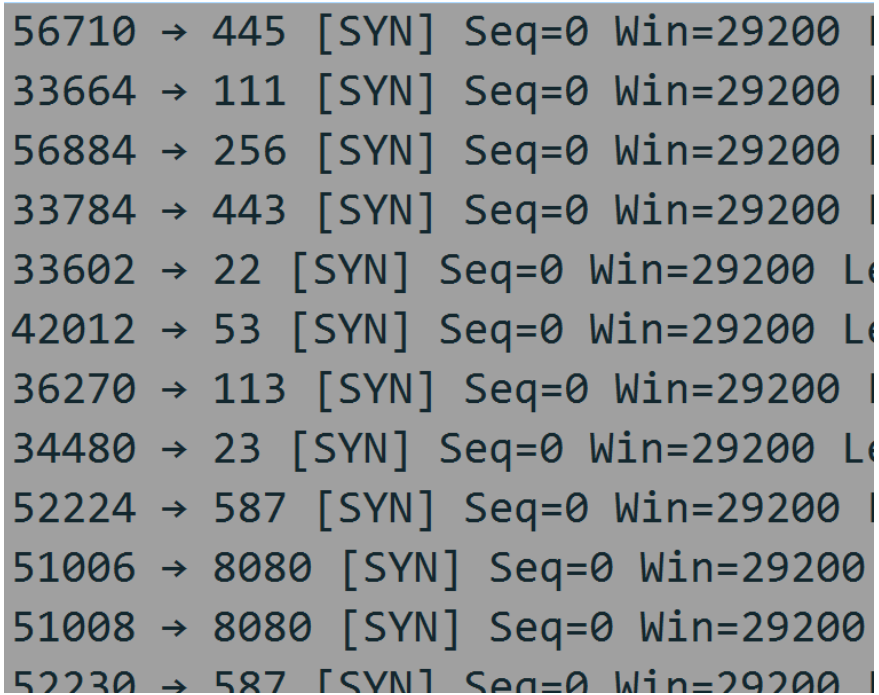
Practical Exercise – Scanning Answers

- nmap.pcap
  - Which TCP ports were open?
    - 1025,1026,1027,1031,1032,1034,135, 139,2869,3306,445,5357
    - sudo tcpdump -r nmap.pcap -nn 'tcp[13]=0x12 && dst host 192.168.2.175 && src host 192.168.2.75'| cut -f 3 -d' ' | cut -f5 -d'.'| cut -f1 -d':' | sort | uniq

```
reading from file nmap.pcap
1025
1026
1027
1031
1032
1034
135
139
2869
3306
445
5357
```

Practical Exercise – Scanning Answers

- nmap.pcap
  - What may have caused the scan behavior after 12:04:10?
  - Firewall enabled that does not reset connections



ch2.pcap (from root-me.org)

- Find the FTP password
  - ngrep for PASS

```
rangercha@kali:/mnt/hgfs/vmshared/training/packet_intro_long$ ngrep -qI ch2.pcap 'PASS'
input: ch2.pcap
filter: ((ip || ip6) || (vlan && (ip || ip6)))
match: PASS

T 10.20.144.150:35974 -> 10.20.144.151:21 [AP] #11
  PASS cdts3500..
```

ch3.pcap (from root-me.org)

- Find the twitter password
- ngrep -qI ch3.pcap 'Authorization: Basic' | tr ':' '\n' | grep 'Basic' | cut -f3 -d' ' | cut -f1 -d'.' | base64 –d

```
rangercha@kali:/mnt/hgfs/vmshared/training/packet_intro_long$ ngrep -qI ch
3.pcap 'Authorization: Basic' | tr ':' '\n' | grep 'Basic' | cut -f3 -d' '
 | cut -f1 -d'.' | base64 -d
usertest:passwordrangercha@kali:/mnt/hgfs/vmshared/training/packet_intro_l
ong$
```

2015-03-24-traffic-analysis-exercise.pcap (from malware-traffic-analysis.net)

- IP address of the infected host
  - 192.168.122.200
- Which server is probably legitimate, but compromised?
  - forums.pelicanparts.com
- What redirection techniques does this exploit kit use?
  - Script tag injection
- What types of exploits were served?
  - Adobe Reader, Flash, Java, Silverlight

sansholidayhack2013.pcap (from SANS holiday hack challenge, 2013)

- What are the MACs and IPs of the machines that ARP cache poison? Is it successful?
  - 00:0c:29:f7:f4:9a - 10.21.22.253 - successful
  - 10.25.22.252 - unsuccessful
- What are the IPs of the systems that were port scanning?
  - 10.25.22.252,10.21.22.253,10.25.22.253
  - tcpdump -nn -r sansholidayhack2013.pcap 'tcp[13]=0x02' | cut -f3,5 -d' ' | tr ' ' '.' | cut -f1-4,6-10 -d'.' | sort | uniq -c | sort -rn
  - tcpdump -nn -r sansholidayhack2013.pcap 'tcp[13]=0x14' | cut -f5 -d' ' | cut -f1-4 -d'.' | sort | uniq -c | sort -n

sansholidayhack2013.pcap (from SANS holiday hack challenge, 2013)

- What systems and protocols did the scans discover?
  - tcpdump -nn -r sansholidayhack2013.pcap 'tcp[13]=0x12 && (dst host 10.25.22.252 || dst host 10.21.22.253 || dst host 10.25.22.253)' | cut -f3 -d' ' | sort | uniq

sansholidayhack2013.pcap
(from SANS holiday hack challenge, 2013)

10.16.11.5.110	10.25.22.22.80	165.254.158.56.80	208.80.154.234.80
10.21.22.22.502	10.25.22.23.80	173.194.43.47.443	208.80.154.240.80
10.21.22.23.502	10.25.22.250.80	192.190.173.45.80	216.22.25.175.80
10.21.22.24.502	10.25.22.30.80	192.204.3.75.80	54.230.49.239.80
10.21.22.253.1225	10.25.22.58.4444	199.7.57.72.80	63.245.217.36.80
10.2.2.2.8081	10.25.22.58.445	208.80.154.224.80	69.16.175.10.80
72.167.239.239.80	74.125.226.239.443	82.103.140.42.443	74.125.226.228.80

sansholidayhack2013.pcap
(from SANS holiday hack challenge, 2013)

72.21.195.198.443	74.125.226.242.443	10.25.22.22.44818
72.21.203.211.80	74.125.226.251.80	165.254.138.136.80
72.21.214.3.443	74.125.22.82.80	208.80.154.225.80
72.21.215.52.80	81.169.180.37.443	69.195.141.178.443
74.125.226.199.443	81.169.180.37.80	82.103.134.102.80

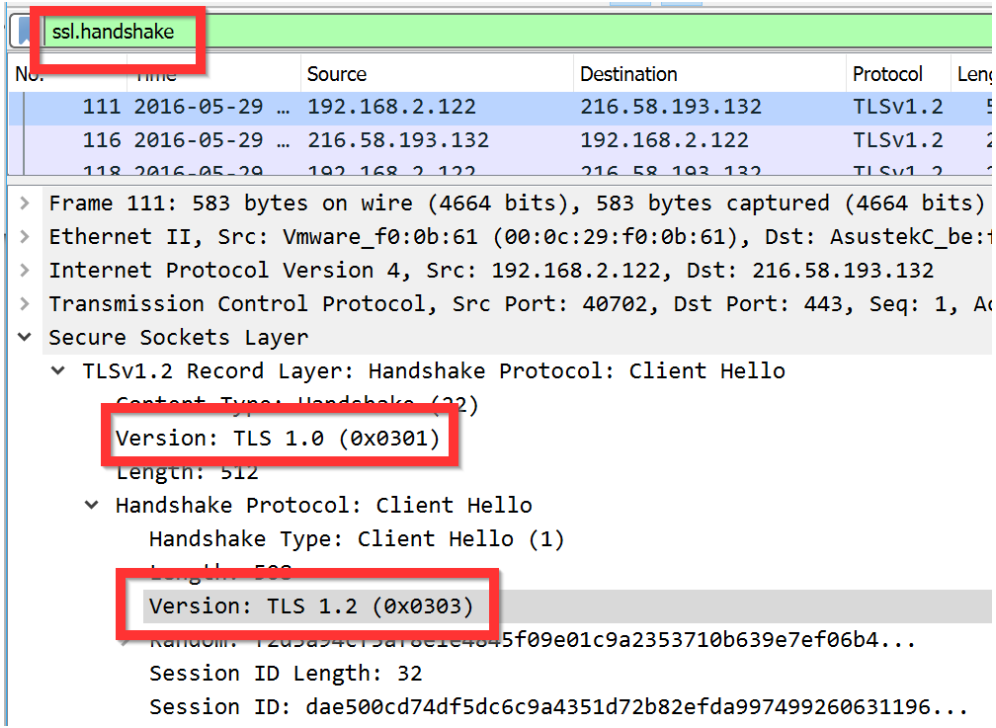
sansholidayhack2013.pcap (from SANS holiday hack challenge, 2013)

- What account was used in an attack over the SMB protocol?
  - ernie

packet_intro.pcap

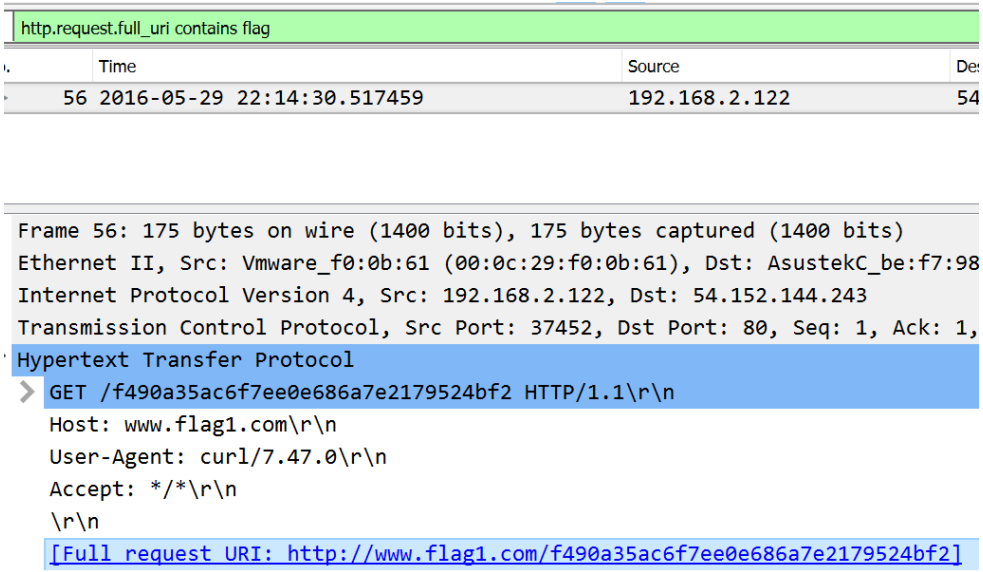
- What are the max and minimum SSL/TLS versions supported by 192.168.2.122?
  - Max: TLS 1.2
  - Min: TLS 1.0

packet_intro.pcap



packet_intro.pcap

- Flag 1
  - http.request.full_uri contains “flag”



packet_intro.pcap

- Flag 2
  - ngrep -qI packet_intro.pcap ‘flag2’

```
root@kali:/mnt/hgfs/vmshared/training/packet_intro_long# ngrep -qI packet_intro.pcap
'flag2'
input: packet_intro.pcap
filter: ((ip || ip6) || (vlan && (ip || ip6)))
match: flag2

T 192.168.2.122:57196 -> 66.235.120.113:80 [AP] #2344
  GET / HTTP/1.1..Host: askjeevs.com..User-Agent: flag2:82d5927b53538c2da5c4e5eadba2b
f2a..Accept: */*....
root@kali:/mnt/hgfs/vmshared/training/packet_intro_long#
```

packet_intro.pcap

- Flag 3
  - ngrep -qI packet_intro.pcap 'flag3'

```
root@kali:/mnt/hgfs/vmshared/training/packet_intro_long# ngrep -qI packet_intro.pcap
'flag3'
input: packet_intro.pcap
filter: ((ip || ip6) || (vlan && (ip || ip6)))
match: flag3

U 192.168.2.122:60663 -> 8.8.8.8:53 #4750
  .V.......... b768e1e8075fd6c1b7c11c84536dd467.flag3.com.....

U 8.8.8.8:53 -> 192.168.2.122:60663 #4757
  .V.......... b768e1e8075fd6c1b7c11c84536dd467.flag3.com.....-.........?.dns1.re
  gistrar-servers.com,,..hostmaster.Mx..0.........:.....
```

packet_intro.pcap

- Flag 4
  - echo "flag" | base64
  - ngrep -qI packet_intro.pcap 'ZmxhZ’
  - ngrep -qI packet_intro.pcap 'ZmxhZ' | grep 'ZmxhZ' | tr -s ' ' | cut -f3 -d' ' | cut -f2- -d'=' | base64 -d

packet_intro.pcap

```
rangercha@kali:/mnt/hgfs/vmshared/training/packet_intro_long$ echo "flag" | base64
ZmxhZwo=
rangercha@kali:/mnt/hgfs/vmshared/training/packet_intro_long$ ngrep -qI packet_intro.pcap 'ZmxhZ'
input: packet_intro.pcap
filter: ((ip || ip6) || (vlan && (ip || ip6)))
match: ZmxhZ

T 192.168.2.122:56154 -> 174.36.107.130:80 [AP] #5040
  GET /?a=ZmxhZzQ6MDIxMDFkZDNmNWYxZjA0NGRiYjM1YTUzMDUyMjQxOTc== HTTP/1.1..Host: supersketch.com..Use
r-Agent: curl/7.47.
  0..Accept: */*....

rangercha@kali:/mnt/hgfs/vmshared/training/packet_intro_long$ ngrep -qI packet_intro.pcap 'ZmxhZ' |
grep 'ZmxhZ' | tr -s ' ' | cut -f3 -d' ' | cut -f2- -d'=' | base64 -d
flag4:02101dd3f5f1f044dbb35a5305224197base64: invalid input
rangercha@kali:/mnt/hgfs/vmshared/training/packet_intro_long$
```

packet_intro.pcap

- Flag 5
  - echo "flag5" | xxd -ps
  - ngrep -qI packet_intro.pcap '666c616735’
  - printf "666c6167353a6436386663732316461333165656639326635653739396164666435346531
    39" | xxd -r -p

packet_intro.pcap

```
rangercha@kali:/mnt/hgfs/vmshared/training/packet_intro_long$ echo "flag5" | xxd -ps
666c6167350a
rangercha@kali:/mnt/hgfs/vmshared/training/packet_intro_long$ ngrep -qI packet_intro.pcap '666c61673
5'
input: packet_intro.pcap
filter: ((ip || ip6) || (vlan && (ip || ip6)))
match: 666c616735

T 192.168.2.122:51588 -> 204.79.197.200:80 [AP] #5712
  GET /search=666c6167353a643638666337323164613331656566393266356537393961646664353465313
  9.1..Host: bing.com..User-Agent: curl/7.47.0..Accept: */*....

T 204.79.197.200:80 -> 192.168.2.122:51588 [AP] #5728
  HTTP/1.1 301 Moved Permanently..Location: http://www.bing.com/search=666c6167353a64363866633732
  3164613331656566393266356537393961646664353465313 9..Server: Microsoft-IIS/8.5..X-MSEdge-Ref: Re
  f A: FE730BDA1B4241D7AC872F3CE666680F Ref B: 36FB7548E3AF536AF11F30FF82345B4A Ref C: Sun May 29
   19:15:33 2016 PST..Date: Mon, 30 May 2016 02:15:32 GMT..Content-Length: 0....
rangercha@kali:/mnt/hgfs/vmshared/training/packet_intro_long$ printf "666c6167353a643638666337323164
6133316565663932663565373939616466643534653139" | xxd -r -p
```

packet_intro.pcap

- Flag 6
  - tshark -r packet_intro.pcap -T fields -e icmp.type -Y 'icmp' | xargs printf '%x' | xxd -r -p

packet_intro.pcap

```
rangercha@kali:/mnt/hgfs/vmshared/training/packet_intro_long$ tshark -r
packet_intro.pcap -T fields -e icmp.type -Y 'icmp' | xargs printf '%x'
666c6167363a363935373464306161633937323061343238373632376337373130323839
3330ddddddddddddddddddddddddddddddddddddddddrangercha@kali:/mnt/hgfs/vmsha
red/training/packet_intro_long$
rangercha@kali:/mnt/hgfs/vmshared/training/packet_intro_long$
rangercha@kali:/mnt/hgfs/vmshared/training/packet_intro_long$ tshark -r
packet_intro.pcap -T fields -e icmp.type -Y 'icmp' | xargs printf '%x' |
 xxd -r -p
flag6:69574d0aac9720a4287627c771028930□□□□□□□□□□□□□□□□□□□□□□rangercha@kali:
/mnt/hgfs/vmshared/training/packet_intro_long$
rangercha@kali:/mnt/hgfs/vmshared/training/packet_intro_long$
```

packet_intro.pcap

- Flag 7
  - tcpdump -r packet_intro.pcap -nnA 'icmp' | grep '\.\.' | cut -f4 -d'-' | grep -v '@\.\.\.\.\.\.z' | tr -d '\n'

packet_intro.pcap

```
rangercha@kali:/mnt/hgfs/vmshared/training/packet_intro_long$ sudo tcpdump
 -r packet_intro.pcap -nnA  'icmp' | grep '\.\.' | cut -f4 -d'-'   | grep
-v '@\.\.\.\.\.\.z' | tr -d '\n'
[sudo] password for rangercha:
reading from file packet_intro.pcap, link-type EN10MB (Ethernet)
flag7:02ae9641b7052bfa4124dc41943cf36crangercha@kali:/mnt/hgfs/vmshared/tr
```