

Chapter 8: Hints & Answers

8.2 The prefix identifies the address class.

8.3

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
128	64	32	16	8	4	2	1

200 = 128+64+8 => 11001000

58 = 32+16+8+2 => 00111010

20 = 16+4 => 00010100

165 = 128+32+4+1 => 10100101

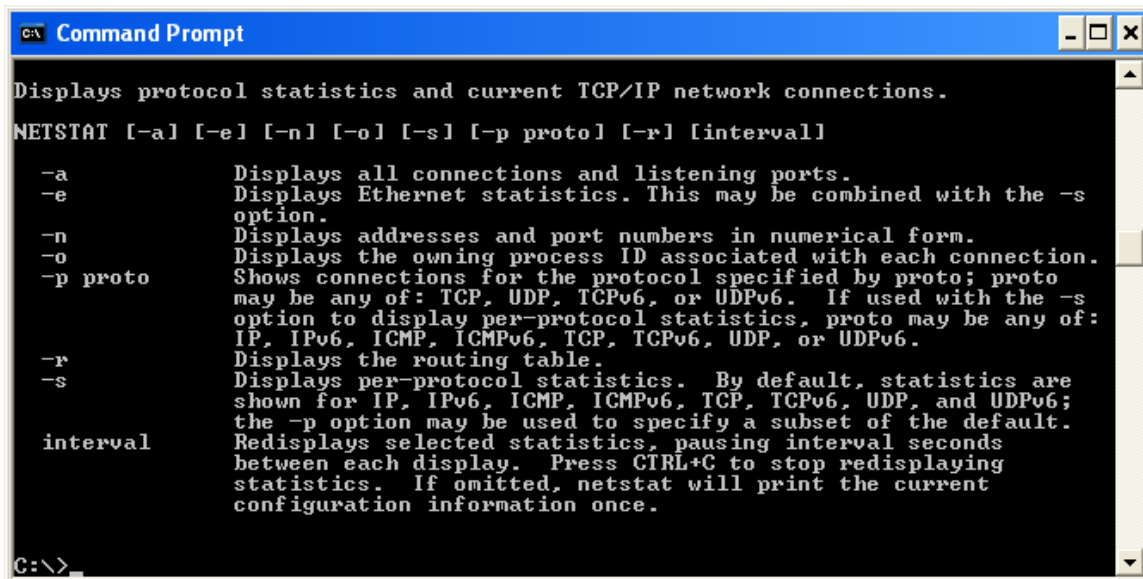
and so, 200.58.20.165 => 11001000.00111010.00010100.10100101

8.7 A CIDR addressing scheme would use a 17-bit prefix.

8.11 True; True.

8.12 128.56.24.0/22

8.17 The figure below shows the parameters of the netstat command in Windows XP.



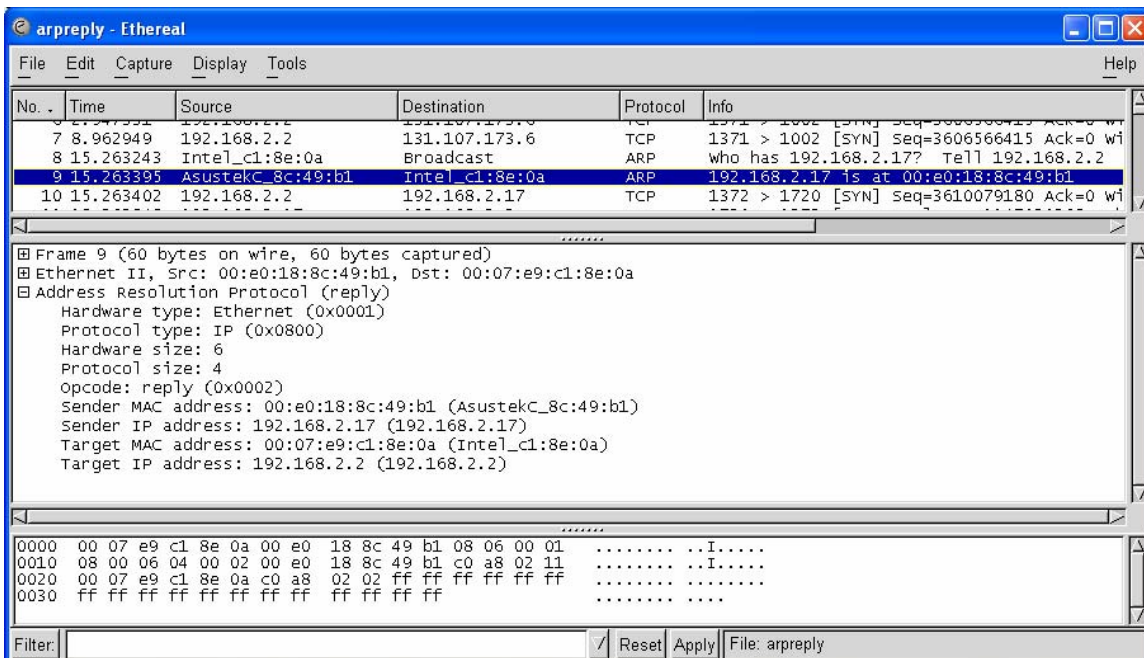
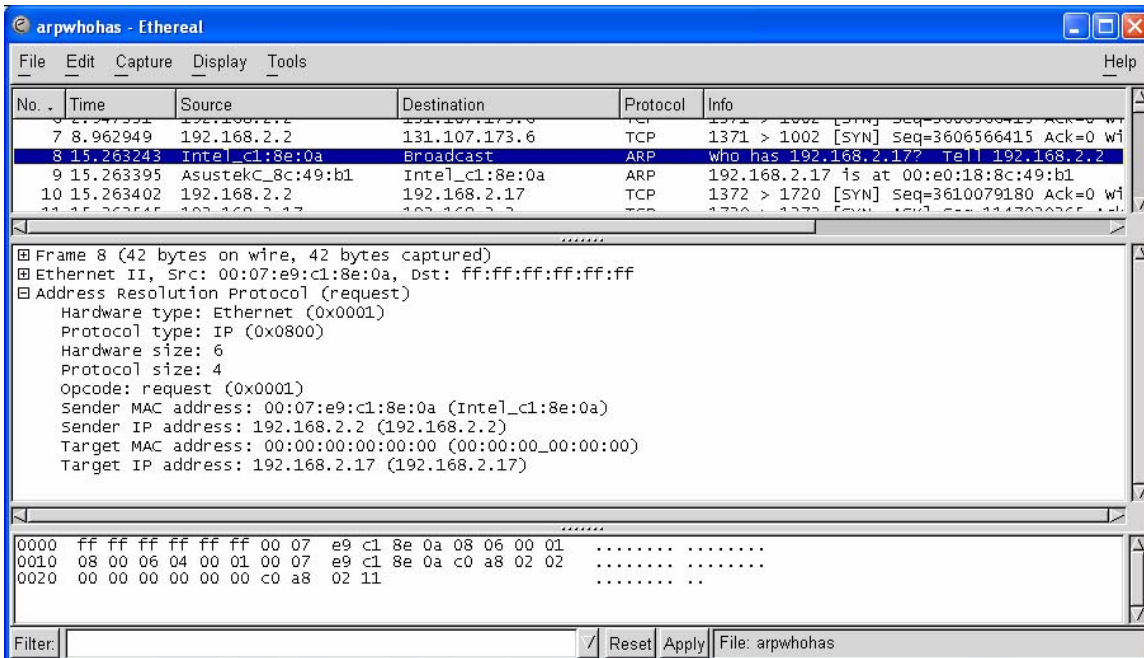
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c:\> Command Prompt
Displays protocol statistics and current TCP/IP network connections.
NETSTAT [-a] [-e] [-n] [-o] [-s] [-p proto] [-r] [interval]
-a           Displays all connections and listening ports.
-e           Displays Ethernet statistics. This may be combined with the -s
            option.
-n           Displays addresses and port numbers in numerical form.
-o           Displays the owning process ID associated with each connection.
-p proto     Shows connections for the protocol specified by proto; proto
            may be any of: TCP, UDP, TCPv6, or UDPv6. If used with the -s
            option to display per-protocol statistics, proto may be any of:
            IP, IPv6, ICMP, ICMPv6, TCP, TCPv6, UDP, or UDPv6.
-r           Displays the routing table.
-s           Displays per-protocol statistics. By default, statistics are
            shown for IP, IPv6, ICMP, ICMPv6, TCP, TCPv6, UDP, and UDPv6;
            the -p option may be used to specify a subset of the default.
interval    Redisplays selected statistics, pausing interval seconds
            between each display. Press CTRL+C to stop redisplaying
            statistics. If omitted, netstat will print the current
            configuration information once.

C:\>

```

8.22 The following screen captures show and ARP request and the corresponding ARP reply.



8.23 (d) 2819:00AF:0000:0000:0000:0035:0CB2:B271=>2819:AF::35:CB2:B271

8.29 (a) Hint: Assume that the send window is replenished by the receiver as soon as it receives a segment. Draw the time scale in microseconds.

(b) What is the impact of the long segments from B to A?

8.30 Draw the time axis at station A, at the intermediate router, and at station B, then show the impact of the intermediate router on the sequence of events.

8.37 Refer to Figure 8.36.

8.38 The following sequence of packet captures was obtained by connecting to www.yahoo.com using telnet. The TCP open and close can be observed at the beginning and end of the packet sequence. Advertised window sizes, acknowledgments, and sequence numbers are also shown. (The data was obtained from Ethereal using the print-to-file option.)

```

1 0.000000 Intel_c1:8e:0a Broadcast ARP Who has 192.168.2.3? Tell 192.168.2.2
2 12.992506 192.168.2.18 192.168.2.1 DNS Standard query A www.yahoo.com
3 13.001008 192.168.2.1 192.168.2.18 DNS Standard query response CNAME www.yahoo.akadns.net A 216.109.125.79 A
216.109.125.72 A 216.109.125.69 A 216.109.117.205 A 216.109.125.78 A 216.109.125.71 A 216.109.125.64 A 216.109.118.64
4 13.001678 192.168.2.18 216.109.125.79 TCP 2498 > http [SYN] Seq=147142992 Ack=0 Win=8192 Len=0
5 13.039151 216.109.125.79 192.168.2.18 TCP http > 2498 [SYN, ACK] Seq=2183346772 Ack=147142993 Win=65535 Len=0
6 13.039221 192.168.2.18 216.109.125.79 TCP 2498 > http [ACK] Seq=147142993 Ack=2183346773 Win=8760 Len=0
7 18.472270 192.168.2.18 216.109.125.79 TCP 2498 > http [PSH, ACK] Seq=147142993 Ack=2183346773 Win=8760 Len=1
9 18.622879 216.109.125.79 192.168.2.18 TCP http > 2498 [ACK] Seq=2183346773 Ack=147142994 Win=65535 Len=0
10 18.734094 192.168.2.18 216.109.125.79 TCP 2498 > http [PSH, ACK] Seq=147142994 Ack=2183346773 Win=8760 Len=1
11 18.905241 216.109.125.79 192.168.2.18 TCP http > 2498 [ACK] Seq=2183346773 Ack=147142995 Win=65535 Len=0
12 18.924462 192.168.2.18 216.109.125.79 TCP 2498 > http [PSH, ACK] Seq=147142995 Ack=2183346773 Win=8760 Len=1
13 19.078556 216.109.125.79 192.168.2.18 TCP http > 2498 [ACK] Seq=2183346773 Ack=147142996 Win=65535 Len=0
14 19.244070 192.168.2.18 216.109.125.79 TCP 2498 > http [PSH, ACK] Seq=147142996 Ack=2183346773 Win=8760 Len=1
15 19.369356 216.109.125.79 192.168.2.18 TCP http > 2498 [ACK] Seq=2183346773 Ack=147142997 Win=65535 Len=0

49 20.016538 192.168.2.18 216.109.125.79 TCP 2498 > http [ACK] Seq=147142999 Ack=2183377433 Win=8760 Len=0
50 20.018301 216.109.125.79 192.168.2.18 TCP http > 2498 [ACK] Seq=2183380353 Ack=147142999 Win=65535 Len=1460
51 20.018342 192.168.2.18 216.109.125.79 TCP 2498 > http [ACK] Seq=147142999 Ack=2183377433 Win=8760 Len=0
52 20.034934 216.109.125.79 192.168.2.18 TCP http > 2498 [FIN, PSH, ACK] Seq=2183381813 Ack=147142999 Win=65535 Len=697
53 20.035032 192.168.2.18 216.109.125.79 TCP 2498 > http [ACK] Seq=147142999 Ack=2183377433 Win=8760 Len=0
54 21.275248 216.109.125.79 192.168.2.18 TCP http > 2498 [ACK] Seq=2183377433 Ack=147142999 Win=65535 Len=1460
55 21.275415 192.168.2.18 216.109.125.79 TCP 2498 > http [ACK] Seq=147142999 Ack=2183382510 Win=8760 Len=0
56 21.346468 216.109.125.79 192.168.2.18 TCP http > 2498 [FIN, ACK] Seq=2183382510 Ack=147142999 Win=65535 Len=0
57 21.346585 192.168.2.18 216.109.125.79 TCP 2498 > http [ACK] Seq=147142999 Ack=2183382511 Win=8760 Len=0
58 23.239449 192.168.2.18 216.109.125.79 TCP 2498 > http [FIN, ACK] Seq=147142999 Ack=2183382511 Win=8760 Len=0
59 23.273437 216.109.125.79 192.168.2.18 TCP http > 2498 [ACK] Seq=2183382511 Ack=147143000 Win=65535 Len=0

```

By comparing frame 9 and frame 59 we see that 35,738 bytes are transferred by TCP in 4.65 seconds which corresponds to about 61.5 kbps.

8.44 15 nodes.

8.50 Explain why the router is called a “black hole.”

8.58 0.20 bits/second.

8.65 Approximate the Binomial distribution by a Gaussian distribution. The probability that the ISP does not have enough addresses to serve customer connection requests is then 8.8%.