

# 复习

前半部分内容：

1

Study a TCP segment header. List each field of the TCP header along with the value in decimal according to the given facts below.

- The TCP segment is from a secure web server to a secure web client.
- A port number of 59500 was assigned on the client-side.
- There were no options.
- The server instructs the client not to send more than 5500 bytes at any one time.
- The previous segment from the client was acknowledged by the server with an ack/data segment that had an acknowledgment number of 12500 and a sequence number of 6201 (consider there is no data in this packet that is going from the server to the client).
- The TCP checksum was calculated to equal binary zero.

a. What is the client port number?

b. What is the server port number?

c. What is the sequence number of the next segment that is going from the client to the server?

d. What is the acknowledgment number of the next segment that is going from the client to the server?

e. What is the receiver window size?

f. What is the header length value?

Maximum marks: 3

这里描述了这个段不是syn，也不是fin。就是单纯的一个ack/data的表示。所以不用加一

a : 59500    b : 80    c : 12500    d : 6201    e : 5500    f : 20

d题为什么是6201, 因为上一个包没占数据. 根据final 2的讲解可知, 就是6201.

f为什么是20, 因为题干确认header 没有options. 所以就是默认的20

- [illegible]

d. What is the server port number?

- TCP and UDP use port numbers to identify a process.

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- 4 TCP can help to control the congestion. In order to control the congestion, the size of the congestion window increases exponentially until it reaches a threshold. Choose which algorithm of TCP is used to control the congestion where the window size increases exponentially.

**Select one alternative:**

- ☐ Congestion detection
- ☐ Congestion avoidance
- ☒ Slow start
- ☐ None of the above

[Reset](#)

Maximum marks: 1

- 5 Assume that an ISP has 5 subscribers which have been allocated the following IP address blocks:

192.168.10.0/29  
192.168.10.8/29  
192.168.10.16/29  
192.168.10.24/29  
192.168.10.32/29

The ISP would like to aggregate the above blocks into a single address block and advertise this block for routing. Note down the advertised IP address block in the space provided below in the a.b.c.d/x format. No explanation is required.

192.168.10.0/26

如果有很多子网号位数相同的item, 从上到下依次判断即可。

6 Consider a router with the following forwarding table.

Destination Network	Interface or port number
200.10.20.0/28	Port 1
200.10.20.32/28	Port 2
200.10.20.16/28	Port 3
200.10.20.48/28	Port 4
200.10.21.0/24	Port 5
Default	Port 6

a. Which interface would an IP datagram with destination address 200.10.20.60 be forwarded to?

Select one alternative:

- ☐ Port 6
- ☐ Port 5
- ☐ Port 3
- ☐ Port 1
- ☐ Port 2
- ☐ Port 4

b. Which interface would an IP datagram with destination address 200.10.20.70 be forwarded to?

Select one alternative

- ☐ Port 4
- ☐ Port 5
- ☐ Port 2
- ☐ Port 6
- ☐ Port 3
- ☐ Port 1

[Reset](#)

Maximum marks: 2

a : port 4

b : port 6

3220

0

20 | 1480

MF = 1

$0 + 1480/8 = 185$

20 | 1480

MF = 1

370

20 | 260

MF = 0

7

An IP datagram 3220 bytes long with no options arrives at a router, which determines that the next destination is an Ethernet network through which the datagram must travel (MTU of Ethernet is 1500). Answer the following question. Consider router will choose the maximum fragment size.

- a. Assume that the router decides to fragment the packet into 3 fragments. Determine the correct size for each fragment and identify the starting byte and ending byte of each fragment. Calculate the fragmentation offset for each fragment (3 marks).

Fragment-no	Fragment size	Starting byte	Ending byte	Fragmentation Offset
1				
2				
3				

1 : 1500

0

1479

0

2 : 1500                      1480                      2959                      185  
3 : 280                      2960                      3199                      370

7 An IP datagram 3220 bytes long with no options arrives at a router, which determines that the next destination is an Ethernet network through which the datagram must travel (MTU of Ethernet is 1500). Answer the following question. Consider router will choose the maximum fragment size.

a. Assume that the router decides to fragment the packet into 3 fragments. Determine the correct size for each fragment and identify the starting byte and ending byte of each fragment. Calculate the fragmentation offset for each fragment (3 marks).

Fragment-no	Fragment size	Starting byte	Ending byte	Fragmentation Offset
1				
2				
3				

b. The cumulative number of bytes including the IP header from all 3 fragments leaving the router will be greater than the initial datagram size that arrived. Explain by how much, and the reason for this. (1 mark)

Fill in your answer here

 Help

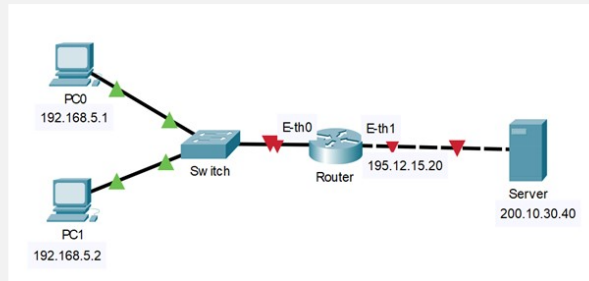
Format    **B**   *I*   U   ~~x<sub>a</sub>~~   ~~x<sub>b</sub>~~   *I<sub>x</sub>*                           

b.首先回答：多了多少内容。1 个数据报被分成了 3 个，多了 2 个 IP 头，也就是 40bytes.

为什么要这样做：说清楚理由：从 MTU 太小处考虑说清楚。

因为底层只允许通过最大的传输单元是1500，而原本的包是一个包3220bytes，所以需要拆开传输。

1. MTU 就这么大，只能分组。



Consider two clients PC0 and PC1 using the private IP address from a subnet 192.168.5.0/24 inside the organization. Clients' port numbers are given randomly from 40000 to 40003. Ignore the green and red triangle in the above diagram. The router is separating between the private network and the public network. The router is connected to the Internet (i.e., public network) through the interface E-th1, and the router is using the E-th0 interface to connect to the private network. Two clients want to get a web service from the server whose IP address is 200.10.30.40. The router's external interface (E-th1) IP address is 195.12.15.20. The company has bought only one public address which is 195.12.15.20. Consider the router is acting as a NAT router. In the NAT router, clients can be given a port number from 50000 to 50003.

If you want to capture the traffic from the router interface, E-th1 then fill the following table if PC1 wants to send a request to the server, 200.10.30.40 for getting a web service without security.

What is the source IP address?  here.

What is the destination IP address?  here.

What is the source port number?  here.

What is the destination port number?  here.

Now consider the web response is coming from the web server to the client, PC1 and you capture the packet from router interface E-th0.

What is the source IP address?  here.

What is the destination IP address?  here.

What is the source port number?  here.

What is the destination port number?  here.

Maximum marks: 4

src IP : 195.12.15.20    dest IP : 200.10.30.40    src PORT : 填 50000 或者 50001 或者 50002    dest port : 80

src IP : 200.10.30.40    src port : 80    dest IP : 192.168.5.2    dest port : 填 40000 或者 40001 或者 40002 或者 40003

9

The XYZ Company has requested a block of IP addresses from an ISP. The block that was allocated to XYZ was **191.56.125.34/25**.

Calculate the number of addresses in this block.

Find the network address. **Answer in the a.b.c.d/x format.**

Find the broadcast address. **Answer in the a.b.c.d/x format.**

Find the range of addresses that would be available for use by hosts. **Answer in the a.b.c.d/x format** from

to

Maximum marks: 3

128            network address : 191.56.125.34/25            broadcast :  
191.56.125.127/25    range : 191.56.125.35/25            191.56.125.126/25

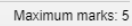
10    What is the problem with the distance vector routing protocol?  
Select one alternative:

- ☐ Complex Configuration
- ☐ Slow convergence
- ☐ The use of broadcasts
- ☐ Routing support for classless networks

slow convergence            距离向量无广播的机制  
慢的收敛，可能会慢到无限循环的情况，所以才引出反向中毒的机制。

后一    内容：





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A1-11-22-50-60-70	3
A1-11-22-50-60-71	1
A1-11-22-50-60-72	2
A1-11-22-50-60-73	3
A1-11-22-50-60-74	3

12. CD





































13.

Use A referring to my computer and B referring to the computer I want to communicate with. A broadcasts ARP query packet, containing B's IP address. The dest MAC address is FF-FF-FF-FF-FF-FF in the query packet. Then all nodes on the subnet receive ARP query. Because A and B are in the same subnet. When B receives ARP query from A, B replies to A with B's MAC address. Finally, A can get B's MAC address.

- 14 10 computers are connected via a switch to build a wired network. On the other hand, you have also built a wireless network using an access point or a wireless router where 10 mobile devices are connected. The bandwidth of both networks (wired network and wireless network) is the same. In this case, the throughput or effective bandwidth of the wireless network will be less than in an Ethernet-based wired network. Do you agree with the above statement? Justify your opinion.

Fill in your answer here

 Help

Format                                      

increases the probability of packet loss, requires more acknowledgement, and reduces the throughput.

In a wired network, devices are directly connected through network cables without mutual interference, and the transmission in the channel is more stable. Throughput will be relatively higher.

public, Bill.

private, Bill

private, Jinia

private, Jinia

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Although IPv6 is now the official standard, what are some of the factors that explain why IPv4 is still the dominant system today despite the supply of IPv4 addresses being officially exhausted quite a few years ago?

 HelpMaximum marks: 2

然后翻译就行。

2. Although the ipv4 address pool is now exhausted, due to the NAT technology, different local networks can reuse the same address, which alleviates the problem of insufficient ipv4 addresses to a certain extent, so that ipv4 can still be used for new hosts.