作业 chap6\7

Chapter 6

1．The maximum payload of a TCP segment is 65495 bytes. Why was such a strange number
chosen?

> 因为IP数据报有效载荷为65535 bytes，减去IP数据报头部（20 bytes）和TCP数据报头部（20 bytes），所以TCP数据部分长度最大是65495 bytes

2．If the TCP round-trip time RTT is currently 30 msec and the following acknowledgements come in after 26, 32 and 24 msec, respectively, what is the new RTT estimate using the Jacobson algorithm? Use a = 0.9

> $IRTT_{n+1} = \alpha\ IRTT_n + (1 - \alpha)ARTT_n$
>
> 0.9 * 30 + 0.1*26=29.6
>
> 0.9 * 29.6 + 0.1*32= 29.84
>
> 0.9 * 29.84 + 0.1*24 =29.256
>
> new RTT = 29.256 msec

3．In a network that has a maximum TPDU size of 128 bytes, a maximum TPDU lifetime of
30 sec, and an 8-bit sequence number, what is the maximum data rate per connection?

> 具有相同编号的TPDU不能同时传输，所以在一个TPDU生命周期内，最多只能有2^8 = 256个TPDU
>
> 最大传输速率为 256 * 128 * 8 /30 = 8.738kbps

4．To get around the problem of sequence number wrapping around while old packets
still exist, one could use 64-bit sequence number. However, theoretically, an optical fiber can run at 75 Tbps. What maximum packet lifetime is required to make sure that future 75 Tbps networks do not have wraparound problems even with 64-bit sequence numbers? Assume that each byte has its own sequence number, as TCP does.

> (2^{64} * 8 bits / byte) / (75 * 10^{12} *bit* / *sec*) = 1.97 * 10^6 *sec* ~ 22.7 days.
>
> 所以maximum packet lifetime 必须小于22.7 days

Chapter 7

1. Can a machine with a single DNS name have multiple IP addresses? How could this occur?

   > 可以，一个机器如果有多个网络接口，就可以有多个IP地址

2. A binary file is 3072 bytes long. How long will it be if encoded using base64 encoding, with a CR+LF pair inserted after every 80 bytes sent and at the end?

   > 3072 / 4 * 3 = 4096
   >
   > 4096 / 80 = 51.2
   >
   > 4096+52 *2 =**4200 bytes**

3. From an ISP's point of view, POP3 and IMAP differ in an important way. POP3 users generally empty their mailboxes every day. IMAP users keep their mail on the server indefinitely. Imagine that you were called in to advise an ISP on which protocol it should support. What considerations would you bring up?

   > 优先选用IMAP
   >
   > 1）相比较POP3,IMAP提供webmail和电子邮件客户端的双向通信，客户端的操作都会反应到服务器上，对邮件进行协同操作。
   >
   > 2）**IMAP**提供的摘要浏览功能可以让用户在下载邮件前阅览到邮件的到达时间、主题、发件人、大小等信息。
   >
   > 3）**IMAP** 更好地支持了从多个不同设备中随时访问新邮件。
   >
   > 总之，**IMAP** 整体上为用户带来更为便捷和可靠的体验，**POP3** 更易丢失邮件或多次下载相同的邮件，但 **IMAP** 通过邮件客户端与webmail 之间的双向同步功能很好地避免了这些问题。

4. The standard http URL assumes that the Web server is listening on port 80. However, it is possible for a Web server to listen to some other port. Devise a reasonable syntax for a URL accessing a file on a nonstandard port

> 格式：protocol :// hostname:port / path / [;parameters][?query]#fragment
>
> 即 协议 :// 主机名:端口号 / 路径 / [;参数][?查询]#信息片断
>
> [可选]

5. Imagine that someone in the CS Department at Stanford has just written a new program that he wants to distribute by FTP. He puts the program in the FTP directory ftp/pub/freebies/newprog.c. What is the URL for this program likely to be?

   > ftp://www.ccse.kfupm.edu.sa/ftp/pub/freebies/newprog.c