Quiz #2 of introduction to networking

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Duration: one hour and half. Documents are forbidden.
Answers in English will receive extra points.
No Konglish!

1 Review questions

1. Why is it that FTP sends control information out-of-band?
2. Why FTP is said to be a stateful protocol?
3. Are the objectives of flow control and congestion control the same?
4. Give a very short description of how the connection-oriented service of the Internet provides reliable transport.
5. Describe briefly Web caching at proxies and browsers. Why are they useful?
6. Compare the common and different features of SMTP and HTTP.
7. What are the components needed to make (use of) cookies?
8. What is the conditional `GET` HTTP request useful for?
9. List five tasks that a protocol layer can perform. Is it possible that one (or more) of these tasks could be performed by two (or more) layers?
10. What information is used by a process running on one host to identify a process running on another host?

2 Problems

1. Consider sending a file of $M \times L$ bits over a path of Q links. Each link transmits at R bits per second. The network is lightly loaded so that there are no queuing delays. When a form of packet switching is used, the $M \times L$ bits are broken up into M packets, each packet with L bits. Propagation delay is negligible.

(a) Suppose the network is a packet-switched virtual circuit network. Denote the VC set-up time by t_s seconds. Suppose the sending layers add a total of h bits of header to each packet. How long does it take to send the file from source to destination?

(b) Suppose the network is a packet-switched datagram network and a connectionless service is used. Now suppose each packet has $2h$ bits of header. How long does it take to send the file?

(c) Repeat case 1b but assume message switching is used (that is, $2h$ bits are added to the message, and the message is not segmented).

(d) Finally, suppose that the network is a circuit-switched network. Further suppose that the transmission rate of the circuit between source and destination is R bit/s. Assuming t_s seconds of set-up and h bits of header appended to the entire file, how long does it take to send the file?