

Homework 6

Due date: Tuesday Mar 18, 2008

Reading, questions and discussion

Read slide set 8 on Active Queue Management and section 17.3 of the textbook. Then answer the following questions before class. Bring your answer to class and be prepared to discuss it. If you are not sure about some of your answers, we will discuss them during class and then you will have an extra day to complete your homework. **Strict deadline is Wed Mar 19, 5pm for answer on paper or 10pm by email to instructor and TA. Late submissions will be penalized.**

References [1] and [2] could be useful additional reading.

1. Why bursty connections can be penalized compared to smoother ones when routers adopt a simple drop-tail queue management?
2. What is the queue lock-out problem? Explain how other passive queue management techniques are able to solve it.
3. What is the global synchronization problem and what kind of congestion control schemes are affected by it? Why other passive queue management techniques are not able to solve this problem?
4. Why RED uses an average measure of the queue size? Why the EWMA is used instead of a simple average?
5. Why RED measures the average queue size considering packets that actually never arrived in case the queue is empty?
6. Why the drop probability P_a has been defined such that, for a fixed value of the average queue size, it increases when the variable *count* increases? Why *count* must be limited to up to $1/P_b - 1$?
7. Why a queue using the simple linear drop probability P_b to discard packets in the critical region may still be affected by the global synchronization problem and may penalize bursty sources?
8. Why RIO computes the EWMA queue size for in-profile packets not considering the out-of-profile packets in the queue?

References

- [1] S. Floyd, V. Jacobson, *Random Early Detection Gateways for Congestion Avoidance*, IEEE/ACM Transactions on Networking, Vol. 1, No. 4, August 1993, pp. 397-413.
- [2] B. Braden et al., *Recommendations on Queue Management and Congestion Avoidance in the Internet*, IETF RFC 2309, April 1998.