6.033 Computer System Engineering

Spring 2009

Preparation for Recitation 9

Read the *Ethernet: Distributed Packet Switching for Local Computer Networks* paper by Metcalfe and Boggs. **Skip sections 5 and 7**. This paper is a classic one about the design of the Ethernet. Ethernet was a crucial component to the development of LANs, and its success has played a major role in the success of the Internet. Although the current Ethernets differ substantially from the description in the paper, the ideas are highly relevant and partially used in many systems including wireless local area networks (LANs).

Ethernet is a broadcast network. Thus, as you read this paper you need to understand how packets are delivered from a sender to a receiver, what the potential difficulties are, and how they are addressed.

Before reading the paper, read Chapter 7.1 and 7.17.1 of the notes. That section of the appendix provides a brief overview of Ethernet using the terminology and concepts of 6.033.

As usual, start out by reading the abstract, Section 2 titled "System Summary", and conclusion. This should give you a high-level idea about the content of the paper. Scan the paper for section and subsection titles, to give yourself an idea of how it fits together. Then, read the whole paper. In particular, read carefully sections 2, 3, 3.3, 3.5 and 4.4. Check the figures and skim through the rest of the paper.

While reading, try to answer the following questions:

- What's a broadcast network?
- What is a "packet collision"? Why does it happen?
- How does the design of Ethernet improve the probability that packets are successfully delivered, despite the potential for collision?
- There is no single machine that controls when and who gets to use the shared medium. This is a decentralized design. Can you think of some advantages and disadvantages of this decentralization?
- Can one use the Ethernet design to build the Internet? (I.e., can one build a very big network with millions of machines using the Ethernet design?)

P.S. If you feel uncomfortable with the content of the paper or have any problem answering the above questions, then browse on ahead into 7.2 and 7.3 of the notes.