Assignment 4: March 3 through March 6

For Recitation, Tuesday, March 3

Read papers #15 (Metcalfe and Boggs, "Ethernet: distributed packet switching for local computer networks") and paper #16 ("Thomas E. Anderson, Susan S. Owicki, James B. Saxe, and Charles P. Thacker. High-speed switch scheduling for local-area networks"). For the last paper you may choose to read only Sections 1 through 3.

No reading report due this week. Study for the quiz

We do not expect you to know what a banyan switch (see page 100 of Reading #16) is, so to help you read this paper here is a short description of a banyan switch. A switch is a device with several inputs and several outputs, that can be set up to allow any input to be connected to any output. Most switches allow multiple connections: different inputs can be connected to different outputs at the same time. A "blocking" switch is one in which setting up a connection from input A to output B may prevent you from simultaneously setting up a connection from input C to output D, even though A, B, C, and D are all distinct. A non-blocking switch is one that never has this problem.

A banyan switch is a piece of combinational logic that takes an input (in our case the header of a packet that contains the destination address) and based on the bits in the address it automatically routes the packet to an appropriate output. For example a simple packet with two-bit header 10 is routed to the output labeled "2". (10 in binary notation is 2 in decimal notation). An unpleasant feature of the banyan switch is that the switch is blocking. To avoid that problem one can put a Batcher sorting network in front of the input ports of the banyan switch, which is another piece of combinational logic that sorts the inputs so that blocking in the banyan switch won't occur.

A couple of interesting side notes. Ethernet is the dominant local-area networking technology used today. The paper describing Ethernet is "old": 1976. In fact, it is so old that it describes the experimental Ethernet, which ran at 3 MB/second, rather than the commercial standard, which runs at 10 MB/second. If you already know a lot about the current Ethernet, you may notice a number of interesting differences as you read the paper.

Reading #14 reports on a brand-new switch for ATM networks; ATM could become be the next standard for local-area networking technology.

For Lecture, Wednesday, March 4

In preparation, read pages 1 through 14 of RFC 791 "Internet Protocol". The Internet protocols are defined by a series of numbered Request for Comments (RFCs). RFC791 defines IP. Other RFCs specify other protocols (such as TCP and UDP) and implementation strategies. Most of the RFC's are on the web (see RFCs). You can find RFC 791 there too.

They are also in an Athena locker. Type:

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attach rfc
cd /mit/rfc/
ls *791*
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For Recitation, Thursday, March 5

Read David B. Johnson's "Scalable support for transparent mobile host internetworking," Reading #17. This paper surveys the routing problems and solutions when the endpoints are mobile computers that are traveling around; it has created a small research area in mobile routing, including standards committees. A very hot topic. Think about how cellular networks are addressing similar issues with mobile phones. Are the issues really the same?

This morning the assignment for project I will also be available on the Web; check out the 6.033 home page. **Project I is due on Thursday March 19**.

For *Quiz I*, Friday, March 6

Quiz I will be in **Walker and 34-101** during normal class hours, **2-3pm,** on **March 6**. You should go to:

- Walker, if your last name starts with a letter in the range A through M (216 students)
- 34-101, if your last name starts with a letter in the range N through Z (141 students)

If you have a conflict because you are taking a class in this time slot, e-mail kaashoek@mit.edu as soon as possible.

We will make previous years' quizzes available this week. The thing you should conclude from these quizzes is that the focus tends to be on concepts rather than details, that essay and multiple choice questions are common (actually multiple choice is more common than you would conclude from the old quizzes), and that, as in the weekly assignments, you need to be able to express your thoughts in English.

The answers that were considered appropriate when the quizzes were originally given will be made available on Thursday, March 5.

System aphorism of the week

It must be remembered that there is nothing more difficult to plan, more doubtful of success, nor more dangerous to manage than the creation of a new system. For the initiator has the enmity of all who would profit by the preservation of the old institutions and merely lukewarm defenders in those who would gain by the new ones. *Niccolo Machiavelli (1469-1527), The Prince, Chapter six (1513, published 1532), (Thomas G. Bergin translation, Appleton-Century-Crofts, 1947)*
