reetings and Salutations

Reader mail was light this month, so I picked one of my favorite topics: networking. I'll start out on this topic with an introduction to TCP/IP (Transmission Control Protocol/Internet Protocol) and how it works.

he DOD Did Something Right

TCP/IP is defined as a set of layered protocols that allow sharing of data between computers in a high-speed environment. TCP/IP is actually a protocol suite that combines a number of protocols including TCP and IP.

CP/IP was originally developed by the Department of Defense in an attempt to connect different types of networks together. Like all government technologies, the lower bidder won and developed it. Amazingly, it successfully provided the basic services that the government needed. The actual IP protocol allows the transfer of information from a LAN (local area network), to a WAN (wide area network) and finally to the global Internet. The TCP part is responsible for the error correction. Information can be garbled up by accident during transmission and it can trigger retransmission until the data is completely (and correctly!) received.

CP/IP assigns a unique number called an IP address to every unique

workstation in the world. Each byte is converted into a decimal number (0 to 255) and each number is then separated with a period (i.e.: 146.94.39.135)

eady or Not!   Here I Come!

Computers have a fairly strict protocol for transmitting information. Generally referred to as the three-way handshake, in this first interaction the computers prepare themselves to transmit/receive information. One the information has been transferred the receiving computer finishes up with a goodbye packet.

Specifically, when one omputer wants to talk to another computer the first thing it does is send out a packet with a SYN (synchronize) flag. A flag is a little piece of information in encoded into the data, which signifies something important. The header of this packet of data contains important information including the IP address of computer to receive the information, the computer that is sending the information, and possibly other flags too.

In response to the SYN packet from the first computer, the second computer then sends back a packet with an ACK (acknowledge) flag. The second computer also sends back an ACK flag with an attached sequence of numbers that is used to coordinate the information that will transferred.

To finish up the three-way handshake, the first computer will acknowledge the ACK/SYN packet by sending back its own ACK packet confirming that it is ready to start sending data. The first computer will transmit the data with the special sequence of numbers that was previously agreed upon.

At the conclusion of the data transfer the first computer will finish up by sending a packet with a FIN (finish) flag. The second computer will then reply with an ACK packet to signal that it has confirmed the end of the data transmission.

he Gab on LocalTalk

Out of the email I did receive this month, Adrian White asks what LocalTalk is and how to set up a network.

Developed by Apple, LocalTalk is a LAN networking type. Somewhat slow, it has a maximum speed of 230.4 Kbps. Serial cables or phone cables can be used to setup a LocalTalk network.

If you are using a serial cable, simply plug the cable into both computers' printer or modem serial port. If you are using a phone cable you ill need to have the phone cable plugged into a device that will then plug into the serial port.

In the AppleTalk control panel select the medium you chose to use to connect your Macs under the "Connect via:" pull down menu. Tough, isn't it?   :-)

irewall \ fire wall \:   A node on a network that is located at the boundary to prevent traffic from one segment to cross over to another. Generally, firewalls are set up on a LAN that is connected to the Internet to prevent unauthorized access from outside of the LAN.

There are two basic types of firewalls: packet filtering and application-level filtering. A packet filter, which is usually located on a device called a router, processes each packet and determines whether or not to allow the packet to continue based upon the sending or receiving IP address.

An application-level filter can actually examine the content of the packets as well as the addresses and make decisions based upon that. While this is slower, a much more detailed policy can be implemented.

Question:

I want to connect my two Macs together but one of them is an
iMac and doesn't have a serial port. How can I easily (and cheaply) set up an ethernet network
for my Macs?

Answer:
The easiest way to set up a very simple ethernet network between two Macs is to buy a crossover cable (also known as a patch cable). A simple ethernet cable will not work because it is designed to go to a hub which will then cross the sending/receiving wires to be sent out over another regular ethernet wire to another computer. A crossover cable is designed to connect two hubs together and it just happens to work perfectly for our application. They are extremely cheap and should only cost around $5-10 from your local computer store (or Radio Shack).

Are you a tightwad? A simple, slightly cheaper way to make a crossover cable from a regular ethernet cable is to take a dual-jack surface mount box and make the crossover between the two jacks. This allows using standard patch cables, and avoids the nuisance of having a crossover cable find its way into use in place of a regular patch cable. Wire 1 (white/orange) should connect to wire 3 (white/green). Wire 2 (orange) should connect to wire 6 (green). Wire 3 (white/green) should connect to wire 1 (white/orange). Wire 6 (green) should connect to wire 2 (orange). Have fun!

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