Multi-platform and Multi-protocol Network Questions (7/95)

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TOPIC ---

We have an AS/400 with dumb terminals, an AppleTalk network of 32 Macintosh computers on two 12 port Star Controllers, and a Novell network. We want to integrate the three networks into one internet.

Our network environment is described below:

Ethernet connects the AS/400 to a two port router. Port 1 of the router contains four or five 10BaseT hubs connected predominantly to DOS/Windows workstations and a Novell 3.12 Server. There also may be several Macintosh computers on these hubs. The DOS/Windows computers will connect to the Novell Server and create sessions on the AS/400. They may occasionally access an AppleShare Volume, FileMaker Server, or print to a LaserWriter.

PORT 2 of the router connects to a Macintosh functioning as a SNA•ps gateway connected to the AS/400 through a Token Ring NB Card with 4 MB memory, then connects four or five 10BaseT hubs which predominantly support Macintosh computers and LaserWriters connected directly with Ethernet, or with EtherPrint for the older LocalTalk LaserWriters. Some DOS/Windows workstations are connected here, but most activity is AppleShare File Sharing and FileMaker Servers access. The Macintosh computers may occasionally access the AS/400 through the Gateway, or access the Novell Server.

The router's goal is to isolate most single platform traffic. Anything crossing the router will hopefully be minimal and only when necessary.

The Macintosh computers need to be able to connect to the Novell Server, SNA•ps gateway, AppleShare and FileMaker Servers, and LaserWriter Printers through Ethernet. Our main concerns are multi-platform/multi-protocol issues which raise several questions.

Question 1

Management of the hubs will likely be with SNMP, which may also have Mac Agents and DOS agents accessed through TCP/IP. Will this be a problem?

Question 2

A separate vendor is configuring the Novell Server with a Mac NLM and Ethernet Driver for 802.2 Ethernet. Is standard Apple EtherTalk Phase 2 (802.3 from my understanding) going to be happy with this when connecting and communicating with the Novell Server?

Does Macintosh Novell software install a separate Ethernet 802.2 driver on the Macintosh client just for the Novell functions? Will this separate driver coexist without conflicting with AppleTalk Phase 2 being used for other AppleTalk functions and for using the SNA•ps gateway?

This 802.2 versus 802.3 is a major issue. We would like the change over done in a weekend. Many Macintosh computers are IIsi models and therefore will not have a two Ethernet card solution option. We need to get everything working together on one Single Ethernet card in every Macintosh. We want to have straightforward AppleTalk Phase 2 using the Network Software Installer for Ethernet drivers on Macintosh computers to keep maintenance or re-installation very simple. But the Novell Server has to work with 802.2 Ethernet. Our understanding is that the SNA•ps clients communicate to the gateway just fine on Phase 2 Ethernet 802.3, so the major potential conflict appears to be with Novell and Ethernet 802.2.

Question 3

Do Macintosh computers dynamically assign network numbers, including EtherTalk? How will we make sure that the Ethernet addresses on every node, including the DOS machines, are unique, and how can we change the DOS Ethernet addresses if necessary?

Question 4

In order for the DOS/Windows workstations to mount AppleShare volumes, how do we get AppleTalk on them with the appropriate Ethernet 802.3 driver if they are being loaded with 802.2 drivers for the sake of more efficient Novell Server operation?

Queston 5

What cable will connect the Apple Token Ring NB card to an IBM 8228 MAU and then the AS/400?

Question 6

What order of magnitude in performance would be seen if the 34 Macintosh computers and 42 PCs were put on Token Ring instead of Ethernet?

What order of magnitude in maintenance and configuration would be seen if the 34 Macintosh computers and 42 PCs were put on Token Ring instead of Ethernet?

DISCUSSION ----------

Answer to Question 1

EtherTalk Phase 2 uses the SNAP protocol, which is loaded on the Novell server by specifying "ETHERNET_SNAP" in a line in the autoexec.ncf file. This protocol,

as with most protocols Novell supports, can peacefully coexist with any other protocols loaded. There will be no conflict.

Answer to Question 2

When using a Macintosh on a Novell network, there are no drivers loaded onto the Macintosh other than the standard network drivers that are loaded during an "Easy Install" of system software. No Novell drivers are required. As you can see, there will be no conflict between the Novell Network and the Macintosh network because there is nothing to conflict.

The Macintosh never used, nor will ever use 802.3. Ethernet 802.3 was used by Novell Netware software before 802.2 was officially sanctioned by the IEEE 802 committee. Novell Netware 2.x and 3.1 defaulted to 802.3, however, with the advent of Novell Netware 3.12 and 4.x, the default is Ethernet 802.2.

Answer to Question 3

Concerning network addresses. The Macintosh dynamically assigns it's network NODE address on startup, not network numbers, which are different. Network numbers are assigned to a cable segment and are used for routing purposes. The manner in which the Macintosh assigns itself a node address is simply by asking if anyone else has that address. Conflicts are VERY rare and if a node address is found to be in use, the Macintosh will try a different node address and check again. DOS node addresses are burned into ROM on the network interface card (NIC). There are utilities that will allow you to change a node address on certain cards, but the necessity to do so is purely for administration reasons, for example wanting consecutive addresses. If this is not a requirement for your network, changing the DOS NIC addresses shouldn't be needed. Also, since this functionality is dependent on the NIC used, you must determine (via the documentation) whether or not the NIC supports changeable node addresses.

Answer to Question 4

The Macintosh computers on the network you described should have no problem communicating with any of the servers as far as we can see. You have not described anything out of the ordinary as far as connectivity goes. Below is a list of vendors we know of that provide DOS/Windows to Macintosh connectivity:

• Farallon Computing - PhoneNet PC product.

Farallon's PhoneNet PC enables IBM PCs or compatibles to connect to an AppleTalk network so they can share files, printers, and other AppleTalk services. PhoneNet PC provides client-side file services for PC users who wish to access files on Macintosh and other AFP-compliant servers. Access to PostScript printers and LocalTalk-equipped ImageWriters is also supported. PhoneNet PC can run concurrently with other networks, including NetWare and TCP/IP.

• Coactive Computing - Coactive Connector Release 1.0 product.

Coactive Connector provides file and print sharing among DOS, Windows, and Macintosh computers. The elegance of providing the necessary hardware in a simple external parallel port adapter sets Coactive Connector apart from other

network products. It eases installation and minimizes maintenance.

• Miramar Systems - Personal MACLAN Connect product.

Personal MACLAN allows a PC running Windows 3.0 or higher to function as a file and PostScript printer server for Macintoshes. Personal MACLAN is fully compliant with the AppleTalk Filing Protocol and includes a file extension mapping feature that lets Macintosh users see files created on a PC with the same Macintosh application.

To locate a vendor's address and phone number, use the vendor name as a search string.

Answer to Question 5

Standard IBM type 1 cabling should work fine with the Apple Token Ring NB card and the IBM 8228 MAU.

Answer to Question 6

As for what numbers to put on performance gains in relation to Token Ring vs. Ethernet: A good rule of thumb is that Token Ring will be faster on high load networks, but will only give marginal performance increases on a well designed medium load Ethernet network.

As for maintenance and configuration concerns with Token Ring or Ethernet: In a well-designed network, the load on the network administrator should be similar between the two. For a good discussion on network design, try "Planning and Managing AppleTalk Networks" from Addison-Wesley (it's an Apple book). This will give you an overview of network planning, and point you in the right direction for further reading.

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