As a network grows and gets more complicated there has to be an individual responsible for managing the network. This position is normally referred to as the system administrator.

The system administrator

The system administrator manages the network including all network services and, in some cases, the client software on each node. A typical system administrator who is just managing the network can handle up to 200 nodes. If the role of the system administrator includes user support for software application programs, then this number drops to about 50 nodes. A good system administrator will ensure that the network is optimized for reliability and performance. He or she will also be an integral part of the troubleshooting process by maintaining an accurate network log and network map. And the system administrator will communicate with outside vendors during troubleshooting to determine which device or devices may be the source of a problem. (Is it the print server? The printer? Maybe the router?)

A good system administrator also makes sure that hardware and software purchases will be compatible with the existing network technology, and, that existing hardware and software is kept up-to-date. For example, when Apple Computer released Version 1.4.3 of their Network Software Installer, it was 25% faster when used on Apple Macintosh computers with on-board (built-in) Ethernet. However, many system administrators didn't even know it existed, even though it was available for downloading from AppleLink.

> This article is a follow-up to the article on Network Troubleshooting which appeared earlier this year (pages 1-6, 1994 notebook).
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> For more information on AppleTalk, particularly on analyzing AppleTalk packets, please refer to the book called *Inside AppleTalk* by Gursharan S. Sidhu, Richard F. Andrews, and Alan B. Oppenheimer. It is published by Addison-Wesley Publishing Company.

Other system administrator responsibilities include evaluating and testing new software before integrating it into the normal user environment. It is also the responsibility of the system administrator to have a "fingerprint" of the network. This is a good, or typical, reading of how a network performs. When user's complain about performance degradation, a network fingerprint provides a point of comparison.

Monitoring the network

Today when a user reports trouble, the system administrator usually goes to the physical location of the problem. As more and more people modernize their networks with new 10-baseT compatible hubs, the system administrator will be able to monitor the network from his or her desk. This will allow them to identify problems as, or even before, they occur. All of this will ultimately be automated through SNMP (Simple Network Management Protocol). (SNMP is a format used for network management data. It allows a system administrator at a workstation to oversee the activity on the network.)

A number of innovative software programs are making it easier for system administrators to more accurately and efficiently perform their tasks. Some of these tasks, plus the appropriate software include:

• Automatically distribute software to the user's desktop – GraceLAN or NetOctopus

• Check the hardware and software configuration of a user's workstation remotely – NetworkHELP!

• Check the hardware and software configuration of a router – RouterCheck

• Remotely take control of a user's workstation – Timbuktu Pro

As the administration of the network becomes a full-time job, the system administrator may have to be able to get full access to all network services from a remote site, or a vendor may be able to fix a problem remotely. Apple Remote Access (ARA) provides an excellent capability for this.

AppleTalk tools

There are a variety of tools that are available to system administrators of AppleTalk networks. These include:

• *Protocol Analyzers* – More and more tools are becoming available to help the system administrator perform packet analysis. EtherPeek from the AG Group and NetMinder Ethernet from Neon Software, Inc. are two such tools that run on an Apple Macintosh computer and allow the system administrator to capture and decode AppleTalk packets.

Analyzing AppleTalk packets is a complicated task requiring an in-depth knowledge of AppleTalk; yet even a basic knowledge will allow you to look at bandwidth utilization, traffic distribution, media errors, etc. Even basic problems (for example when a user feels a job they are printing is hung up) can be quickly examined to determine if the workstation is still sending data packets to the printer. It is also helpful, and sometimes a necessity, to send packet traces captured with a protocol analyzer to a vendor in order to get the problem resolved. Protocol analyzers are usually limited to a single segment, i.e., they do not capture traffic that exists on the other side of routers. The products mentioned above not only trap AppleTalk but also TCP/IP, IPX and other types of traffic on the network. Note also that separate analyzers are usually required for different types of networks, for example, Token-Ring or LocalTalk. Before moving to a full blown protocol analyzer, a novice system administrator might be better off beginning with a product such as Apple's InterPoll.

• *Network and Traffic Monitors* – TrafficWatch II from Neon Software, Inc. will monitor day-to-day network traffic and can provide invaluable statistics for determining which segment to add new users and devices to a network. NetWatchman is a valuable tool available from the AG Group that allows an Apple Macintosh computer to track devices, zones and network services such as file servers or mail servers. It also sends an alert when there are any changes made in the network. NetWatchman can be used in conjunction with programs such as Notify! from Ex Machina, Inc. or Pager Pro from Caravelle to initiate calls to paging devices. (This allows the system administrator to be kept up on the status of the network.)

• *Network Mapping Tools* – Several software application programs for the Apple Macintosh computer can automatically generate a graphical map of a network. These products include NetAtlas from Farallon Computing, Inc. and LANsurveyor from Neon Software, Inc. These tools provide a schematic of where each node sits logically in the network. This is important because any system administrator must have an easily accessible, comprehensive view of the network as an aid in managing servers, routers, and hubs, and, in order to support network users.

Products mentioned in this article

Product	Vendor
Apple Remote Access	Apple
EtherPeek	AG Group
GraceLAN:	Tech.Works
Asset Manager	
Network Manager	
Server Manager	
Update Manager	
InterPoll	Apple
LANsurveyor	Neon
NetAtlas	Farallon
NetMinder Ethernet	Neon
NetOctopus	Helios
NetWatchman	AG Group
Network HELP!	Teknosys
Notify!	ExMachina
Pager Pro	Caravelle
RouterCheck	Neon
Timbuktu Pro	Farallon
TrafficWatch II	Neon

Vendors
• The AG Group, Inc. (510) 937-7900
• Apple Computer (800) 767-2775
• Caravelle (613) 596-2802
• ExMachina, Inc. (718) 965-0309
• Farallon Computing, Inc. (510) 814-5000
• Helios USA (408) 864-0690
• Neon Software, Inc. (800)334-6366
• Technology Works, Inc. (512) 794-8533
• Teknosys (800) 873-3494

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Acknowledgements