Apple Products: Multihoming and Multinode Support (10/96)

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TOPIC ---

This article contains questions about the implementation of multihoming and multinode support in Apple products. Note that this is intended to be an advanced technical article provided for informational purposes only. Apple will not provide assistance with interpreting or understanding this information.

Questions Answered in this Article:
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1) What is meant by the terms multihoming and multinode support?

2) Which Apple products include multihoming or multinode support?

3) How does the network connectivity for the DOS and Mac OS environments on the enhanced PCI-based Power Macintosh computers differ from previous Macintosh computers using DOS or PC Compatibility Cards?

4) If I have a PC Compatibility card installed in an enhanced Power Macintosh**, can I install an additional network adapter card for use in the DOS environment?

DISCUSSION --

1) Question: What is meant by the terms multihoming and multinode support?

Answer: Multihoming is the term applied to the capability to communicate using more than one network interface (card) at a time using the same protocol. In such a situation, the different network cards can each be connected to different zones and have different addresses, but each must be using the same protocol, such as TCP/IP, AppleTalk, and so on.

Multinode support, however, is the term applied to the capability to communicate using multiple network protocol addresses through a single network interface (with different datalink addresses) using a single protocol.

Network Interface Cards	Hardware Addresses	Protocol Addresses	Protocols

Multihoming	Multiple	Different	Different	Same
Multinode	Single	Different	Different	Same

2) Question: Which Apple products include multihoming or multinode support?

Answer:

Multihoming Support
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* Open Transport 1.1 provides AppleTalk multihoming support to developers at the API level.

* Currently, AppleShare 4.2.1 is the only Apple product that incorporates the multihoming support functionality of Open Transport 1.1. With AppleShare 4.2.1, you can install multiple network interface cards into the server allowing users to connect to volumes and servers with the same name in different zones, allowing multiple network interfaces to be active simultaneously.

By supporting multiple network connections, multihoming support in AppleShare 4.2.1 provides additional "pipelines" to the server, which increases the amount of network traffic that can reach the server. This enables servers to support more clients, to offer greater total performance, and to increase the reliability of mission critical applications.

* The Apple Internet Router v3.0 modifies the Classic AppleTalk stack to allow multihoming. A re-write of the router is required to use the built-in AppleTalk multihoming capabilities of version 1.1 of the Open Transport/AppleTalk stack.

* The ARA Client supports AppleTalk multihoming for a single limited case: two ports only--one LAN and one serial, in both Classic and Open Transport network configurations.

Multinode Support
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* The ARA Personal Server uses AppleTalk multinode capability in both the Classic and Open Transport/AppleTalk protocol stacks and is compatible with both network systems.

* The ARA Multiport Server uses AppleTalk multinode capability in both the Classic and Open Transport/AppleTalk protocol stacks and is compatible with both network systems.

* The Apple IP Gateway modifies MacTCP to allow TCP/IP multinode capability using Classic networking. A re-write of the IP Gateway is required to use the TCP/IP built-in multihoming capabilities that are planned for future Open Transport releases. Open Transport 1.1 does not include TCP/IP multinode support.

* With the Enhanced PCI-based Power Macintosh computers**, there is specific

hardware support that allows PC Compatible cards and the Mac OS environment to share the built-in Ethernet interface, allowing simultaneous network connections in both environments. Each environment uses a separate physical layer address. Depending upon the capabilities of each protocol stack being used in a given environment, multinode support may or may not be available. For example, you can connect the DOS and Macintosh environments to the same network using the same protocol (such as TCP/IP).

This configuration could also be loosely defined as multihoming because even though the Mac OS and DOS environments use the same network controller protocols, they appear as separate hardware addresses on the network. Essentially, one physical network interface appears as two.

To further describe the full capabilities of these advanced Apple systems, the implementation of a protocol stack in the Mac OS or DOS environment may itself include multinode support. For example, the TCP/IP protocol stack installed in the DOS environment may support assigning multiple IP addresses to a physical interface using the primary hardware address. Open Transport 1.1 might using an additional IP address using the secondary hardware address. In this type of configuration, a Macintosh computer with the enhanced Ethernet controller and a PC Compatibility Card can accept connection to three or more IP addresses.

3) Question: How does the network connectivity for the DOS and Mac OS environments on the enhanced PCI-based Power Macintosh computers differ from previous Macintosh computers using DOS or PC Compatibility Cards?

Answer: In other Macintosh computers that use DOS or PC Compatibility Cards, you do not have multinode or multihoming support. Instead, you only have one effective instance of an TCP/IP protocol stack. You can be connected using either the Mac OS or DOS environment, but you cannot be connected using both environments simultaneously.

4) Question: If I have a PC Compatibility card installed in an enhanced Power Macintosh**, can I install an additional network adapter card for use in the DOS environment?

Answer: No. The installed PC Compatibility Cards are hard-coded to use the built-in Ethernet interfaces. However, you can add an additional network card to provide additional network services, such as AppleTalk for the Mac OS. The Mac OS and DOS environments would then use the built-in Ethernet for TCP/IP, and the Mac OS could use the Ethernet card for AppleTalk.

Even though you are providing another network interface for the computer to use, you do not get any network performance advantage by doing this. However, this is a viable solution if the DOS and Mac OS environments need to be physically located on different networks.

**Note: Following are the Enhanced Power Macintosh computers:

- Power Macintosh 7200/90 (Europe ONLY)
- Power Macintosh 7200/120
- Power Macintosh 7600/120
- Power Macintosh 7600/132
- Power Macintosh 8500/132
- Power Macintosh 8500/150
- Power Macintosh 8500/180
- Power Macintosh 9500/150
- Power Macintosh 9500/180MP
- Power Macintosh 9500/200

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