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EtherTalk: How It Handles Multiple Protocols (6/93)

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TOPIC -----

This article describes how EtherTalk handles multiple protocols.

DISCUSSION -----

The EtherTalk card is a low-level transport mechanism which can move a variety of protocols over an Ethernet network. "Low-level" means that the EtherTalk card only addresses itself to the lower two layers of the ISO reference model -- the physical layer and the data-link layer. The upper layers of the session are controlled by whatever protocol you implement over these two lower layers. Two examples of upper layer implementations are AppleTalk and TCP/IP.

The card, using the software driver, places these upper-layer protocol packets (either AppleTalk packets or TCP/IP packets) in the data field of the Ethernet transport frame. The Ethernet frame properly addresses these packets to their "target" devices. The target device strips off the frame and then processes the packet contained inside. On the Ethernet wire, a device doesn't care about what a frame contains, unless that frame is directed at that device.

Therefore, you can use different, upper-layer protocols -- like TCP/IP, XNS, or AppleTalk (among others) -- on the same physical wire. These encapsulated packets can co-exist on a single Ethernet without interference, because a device does not look at what's inside the packet, unless it's addressed to that device.

The software shipped with EtherTalk is a driver for the Macintosh II that redirects AppleTalk packets to the EtherTalk card rather than to the printer port. The EtherTalk card then encapsulates the AppleTalk packet in an Ethernet frame for delivery to a device on Ethernet that understands AppleTalk packets.

For example, picture two Macintosh II computers connected directly to Ethernet. One runs AppleShare and acts as an EtherTalk server. The second acts as an EtherTalk workstation. Both of these devices use Ethernet only as a physical connection with delivery assurance and error correction capabilities.

An example of what the EtherTalk card can do is encapsulate TCP/IP under A/UX. Here, an Ethernet frame is again used, but the packet contained inside the frame is TCP/IP, rather than AppleTalk. You can also use other protocols, like XNS, with the same card, using the same Ethernet frame. The only thing that changes is the frame contents.

With Ethernet, you can also have one device "push" more than one protocol over the same physical connection. An example is a VAX running VMS with AlisaTalk and DECnet installed. AlisaTalk delivers AppleTalk packets to the VAX that encapsulates them in an Ethernet frame and sends them out onto the Ethernet network. The VAX can also "push" DECnet packets encapsulated in the Ethernet frame over the same card and physical connection.

All this happens serially (rather than in parallel), because Ethernet is a baseband network. In our example, the AppleTalk packet goes out first, followed by the DECnet packet over the same wire, obeying the rules of Carrier Sense Multiple Access/Collision Detect (CSMA/CD). Again, Ethernet provides the delivery assurance and error correction.

The table below shows the software deliverables associated with the EtherTalk card available from Apple:

Operating System	Upper Layer Protocol	How Delivered
Macintosh OS	AppleTalk	EtherTalk
A/UX	TCP/IP	A/UX

Article Change History:

- 25 Jun 1993 - Revised for clarity.
- 06 Jun 1993 - Reviewed for technical accuracy.

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