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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

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