



Tech Info Library

AppleTalk: Using Within a Token Ring Source Routing Environment

This article last reviewed: 18 January 1990

TOPIC -----

Does the AppleTalk protocol running on the Token Ring board modify the optional source routing field within a Token Ring frame? If not, how does it resolve paths and routing to non-local networks?

Where can I get detailed information about the functions of AppleTalk within a Token Ring Source Routing environment?

DISCUSSION -----

Token Ring

The AppleTalk protocol layer does not directly modify the optional source routing fields in the 802.5 frame. Source routing in an 802.5 environment is handled by the LLC (Logical Link Control) layer within the TokenTalk NB Card (Macintoshes) in cooperation with source routing bridges. In the 802.5 world, the end nodes (Macintoshes) are responsible for determining how to route a packet to its destination and for caching and expiring that information for later use in route resolution. Each time a station needs to connect to an unknown host, it has to go through a route discovery process.

The discovery process involves sending a special packet (Discovery Packet) with an empty source routing field to all interconnected rings. This packet is sent across all source routing bridges to all nodes in the current ring environment. The first bridge encountered adds two network ID numbers, one for each of its connected networks, to the source routing field and forwards it on to the next ring. Each of following bridges adds one network ID to the source routing field up to a maximum of 7 networks. This is the maximum number of hops any one data packet can travel across. The node with the matching node ID responds to the discovery packet using the path contained within the discovery packet. This packet now provides the source station with the path to the remote node, and also provides the remote node with the path to the source node. The discovery process is handled within the LLC and Macintosh layers of the TI TMS380 chip set. Support for source routing bridges is provided within the LLC and Macintosh layers of the TI TMS380 chip set. Support for source routing is provided for, but it's not automatic at the LLC layer. It's important to understand that the TI Token Ring chip set (the TMS380 family) fully implements

the Macintosh and LLC layer services for the TokenTalk NB Card.

The TokenTalk NB Card also implements the SNAP (SubNetwork Access Protocol) for use with various protocol multiplexing and de-multiplexing functions. The AppleTalk protocol suite takes advantage of the SNAP protocol's implementation of automatic source routing support. The SNAP protocol allows support for building other layered protocols, which operate transparently in a source routing bridge environment.

Since we're using Token Ring, which provides its own 48-bit hardware address, we need to provide a mapping between the 802.5 address and the 8-bit AppleTalk node ID. The Macintosh uses the AppleTalk AARP protocol to accomplish this mapping. More information about AARP can be found in "Inside AppleTalk" (Addison Wesley, ISBN #0-201-19257-8).

Example

A user on a Macintosh named "Pluto" (node ID 10) wants to mount a volume from an AppleShare File Server named "Bozo" (node ID 20) located on the other side of an IBM source routing bridge.

```
Ring 1          Ring 2
      Pluto%-----source routing bridge-----%Bozo
```

User pulls down the Chooser to locate the "Bozo" file server.

An NBP lookup is generated from Pluto, asking for all of the network-visible entities of type "AFPserver".

```
NBP(=:AFPserver:*)
```

This request is passed to the AppleTalk DDP layer as a broadcast to all AppleTalk nodes (address FF). The DDP layer uses AARP to determine that the AppleTalk address FF translates to the Token Ring address FFFFFFFF, the Token Ring broadcast address. Now that we have an 802.5 address, we can pass the address and data to the SNAP interface, which then passes it on to the LLC layer and finally out to the ring.

Each AppleShare File Server on all of the interconnected rings within the current zone would respond to the NBP lookup. The route to the file server would then be cached by the LLC layer; this allows us to resolve the node ID without the discovery process the next time we need to access this host. Now that we know the AppleTalk network number and node ID of the server, we can use them for any requests for services to the server.

As you can see, the AppleTalk protocols have no direct intervention with the source routing fields of the 802.5 frame. Source routing support is completely handled from the LLC and Macintosh layers, and operates transparently to AppleTalk or any other protocol that uses the SNAP protocol interface.

More information about AARP can be found in "Inside AppleTalk" (Addison Wesley, ISBN #0-201-19257-8).

More information can be obtained about Token Ring (802.5) and source routing bridges in these materials:

TokenTalk NB Programmers Guide

Kian-Bon, K. Sy, Daniel Avery Pitt, and Robert A. Donnon. "Source Routing for Local Area Networks." IBM Corp., 1985

Texas Instruments TMS380 Adapter Chip Set User's Guide

Texas Instruments TMS380 Adapter Chip Set User's Guide Supplement

Texas Instruments Manual Update, Revision F

IBM Token Ring Network Architecture Reference, P.N. SCC30-3374

IEEE 802.2 Standard

IEEE 802.5 Standard

Copyright 1990 Apple Computer, Inc.

Keywords: <None>

=====

This information is from the Apple Technical Information Library.

19960215 11:05:19.00

Tech Info Library Article Number: 5000