Name: _____

Experiment 1.4

Build an Ethernet Bridge

Purpose

To learn how to forward Ethernet frames according to the Ethernet bridging algorithm.

Background Reading And Preparation

Read Section 5.8 of Network System Design with Network Processors to learn about the bridge algorithm.

Overview

Build an application on a network processor that bridges two Ethernet segments using the simplified API.

Procedure And Details (checkmark as each is completed)

_____   Build an application that forwards packets between two ports of an IXP1200 (i.e. when it receives a frame on one port it sends it out the other).

_____   Connect an IXP1200 to two Ethernet segments, and a host to each Ethernet segment. Test that your application works by running ping, telnet or traceroute between the two hosts.

_____   Add a module to your application that extracts the Ethernet source address from each frame and builds a table mapping Ethernet addresses to the Ethernet segments on which the address resides. Have the application print out this table when a user enters the command *send_command showtable*.

_____   Modify your application so it only forwards Ethernet frames according to the Ethernet briding algorithm. Be sure to treat broadcast and multicast addresses differently than regular Ethernet addresses.

_____   Connect an IXP1200 to two Ethernet segments. Connection two hosts to one segment, and a third to the other. Send traffic between the three hosts. Use tcpdump or a program like it on each Ethernet segment to verify that your bridge is forwarding traffic correctly.

Optional Extensions (checkmark options as they are completed)

_____   Extend your bridge so that it can forward traffic according to the bridge algorithm between more than two Ethernet ports. (e.g. the extend the bridge so it bridges 4 Ethernet segments)

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_____   Implement the Distributed Spanning Tree protocol for avoiding bridging loops in your application.

_____   Stress test your bridge. See if your bridge can forward packets with minimal (or no) loss when a host on one segment floods the network with frames for the other segment. (Use a packet analyzer on each segment to count the frames sent on each.) See if you can reduce the amount of loss.

Notes