CS 4390.001

Team Project Report

1. a description of the program

For this project, we have to design a simple IP router. First, the router must verify the IP packet, i.e. check minimum length and checksum. Then, the router must decrement the Time To Live (TTL) and compute the new checksum. The router has a static forwarding table, whose entries are used to forward the Ethernet frames it receives to the appropriate outgoing interface. The router must implement Address Resolution Protocol (ARP) for the next-hop’s MAC address of the Ethernet frames. ARP replies are cached and timeout after 15 seconds. If there is no matching address in cache, ARP requests are sent to the IP address, one per second, for five seconds. If no reply, host is determined to be unreachable.

The router should respond to its interface being pinged with an ICMP Echo Reply (type 0). Additionally, it must generate ICMP packets to notify a sending host of errors, including Destination Net Unreachable (type 3, code 0) when there is no entry in table that matches destination, Destination Host Unreachable (type 3, code 1) when five ARP requests go unanswered, Port Unreachable (type 3, code 3) when the packet contains a TCP or UDP payload and destination matches router address, and Time Exceeded (type 11, code 0) when packet times out because the TTL reached 0.

1. the challenges that you and your team had and how you overcame them

One of the challenges of this project was getting everyone actually working together. It was hard to find times for everyone to meet up in person. To communicate with each other, we started with texting each other’s phone numbers, but eventually switched to using GroupMe. At one point Discord was brought up as a means of sharing files, so I downloaded and set up an account. However, in the end, it was decided for everyone to share our source code files with GitHub, since it performs automatic merging and allows for easier version control, and I set up a repository.

c) what you have learned by doing the project

d) a discussion about algorithms and techniques used in the program

e) contributions of each team member