SIMPLE ROUTER – PROJECT 2

- Balachander Padmanabha
- TA – CSE 123 (FALL 2017)
CREATING ARP REQUESTS

- If LPM entry (type sr_rt) is found, then reduce TTL and update checksum for the IP header. Now, you need to update the frame header’s source and destination fields.

- Do a sr_arpcache_lookup. ‘gw.s_addr’ (next hop IP address) is one of the variables to be passed to the function.

- If it returns NULL, use sr_arpcache_queuereq function to add the ARP request to the ARP request queue. Send the sr instance and the queue to handle_arpreq. Handle_arpreq - Function to be implemented. Check comments in sr_arpcache.h for pseudocode.

- If the lookup returned an arp entry, then modify the Ethernet source and destination values and use sr_send_packet.
LPM – LONGEST PREFIX MATCH

- If packet not destined to router and ttl != 1, check the routing table to see if a matching entry for the destination IP address exists (LPM).

- You have the routing table (sr->routing_table) and destination IP address. The routing_table is a structure of type sr_rt (defined in sr_rt.h). The routing table has dest and mask variables of type in_addr.

- Do & (bitwise AND) between dest and mask. Also, between the destination IP address and mask. Compare to see if they match.

- If multiple matches, check to see which match has the longest mask.s_addr.
ICMP TYPE 11

- Verify that the packet is not destined to the router. How?
- Check if the destination IP address of the packet is not equal to the IP addresses of the router interfaces.
- If not destined and TTL of the IP header packet == 1, create ICMP type 11 (time exceeded) packet.
- ICMP Type 11 structure is already defined for you.
- Then, send the packet using sr_send_packet. The data field in the ICMP segment is 28 bytes starting from the IP header of the original packet which the router received.
POINTS:

- If LPM returns empty, then create ICMP type 3 (network unreachable) packet.
- Note: ICMP Type 11 structure can be used for this as they are similar.
- Then, send the packet using `sr_send_packet`. 
To test your routing table lookup, you can change the entries in `rtable` file to have different subnet masks.

For instance, to check your router’s longest prefix match logic, you can have multiple entries in your `rtable` file that match a single destination IP.

The following routing table has two matching entries for the packet destined to 192.168.2.2.

<table>
<thead>
<tr>
<th>Destination</th>
<th>Source</th>
<th>Netmask</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.2.2</td>
<td>192.1.1.1</td>
<td>255.255.255.0</td>
<td>eth2</td>
</tr>
<tr>
<td>192.168.2.2</td>
<td>192.168.2.2</td>
<td>255.255.255.255</td>
<td>eth1</td>
</tr>
<tr>
<td>172.64.3.10</td>
<td>172.64.3.10</td>
<td>255.255.255.255</td>
<td>eth2</td>
</tr>
<tr>
<td>10.0.1.100</td>
<td>10.0.1.100</td>
<td>255.255.255.255</td>
<td>eth3</td>
</tr>
</tbody>
</table>
QUESTIONS?