Computer Networks Project

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PROBLEM STATEMENT:

Design a network reachability tool to count the no. of hops a packet takes to reach from source to destination.

We modified the problem statement to even display the IP Addresses and latencies involved in the transmission.

Logic:

- Concepts involved in the algorithm:
- All IP packets have a field called TTL which stands for Time to Live and represents the maximum number of hops a packet is allowed to make until it reaches the destination.
- All stations decrement the TTL value by 1 when the packets reaches them,

- Any station for which TTL value becomes 0 and it's not the final destination is supposed to send an ICMP(internal control message packet) saying TTL has expired before reaching the destination.
- Moreover, an ICMP packet is also sent if the packet reaches the specified destination but is targeted at an invalid port (Destination port unreachable ICMP)

Based on these concepts the algorithm works the following way:

- Send a packet with TTL equal to 1 to identify the first router(which generally is default gateway)
- The router will decrement TTL by 1 and since it's not the destination, it will respond with an ICMP packet.
- On receiving this packet, we'll retrieve the router's IP address and increment TTL value by 1.
- Now, the packet can reach the second router and again the second router will send an ICMP packet.
- We'll repeat these steps for maximum of (MAX_COUNT) steps until we reach the destination.
- The sender sends the packets to a invalid port number and hence when the destination receives it, it'll reply with a destination port unreachable ICMP packet.
- We'll detect this and terminate the algorithm.

A VIDEO DEMONSTRATION HAS ALSO BEEN UPLOADED IN THE SAME FOLDER.