

Sending a message from India to the friend in the Germany.

i - the application layer :- After the we type the message and click on the send button then, it doesn't send the message directly to the friend instead it sends to the server of the particular platform. But to sent the data my computer will be needing the Ip address of the server ,so for that my computer asks the DNS server (provided by our Internet service Provider) to find out the IP address of the particular server (here that of example.local). Once My computer knows the Ip address of the server it can contact the server directly.

ii - Transport Layer :- This layer come into action once we get the Ip address of the server, this layer makes sure that the data is reached safely and securely and also in the right order. Before sending the data the TCP makes a three-way handshake (as explained in the task 1). TCP divides the message into the segments. if any piece of segment gets lost it resends it which makes this more reliable.

iii - Network Layer :- now the Transport layer passes the segments in the Network layer where these get wrap in the Internet Protocol (IP) packets. This packet usually consists of the source Ip address and the destination Ip Address. My computer usually has the private Ip Address but the router through which the data is going to be sent has the public Ip Address, so the NAT(network Address Translation) is used to change the private IP address to the Public IP Address. As we are sending the data across the countries so first the data transmission takes place within the country with the help of local ISP i.e. follows internal routes , but to travel across the countries it has to pass through many autonomous systems i.e. over different large network by different Internet Service Provider along different countries. To do so it uses BGP(border Gateway protocol) in order to find the best path.

iv - Data link layer :- in this layer the packet is prepared for the next travel. this is done with the help of unique MAC address.

v - Physical Layer :- in this the actual movement of the bits takes place either by using the wi-fi (radio signal) or the Ethernet cables (using the wires).

vi - Response Path :- first of all it unwraps all the layers physical -> data link -> network -> transport -> application and displays the sent message to the friend in Germany, when he replies back same process gets followed again.

vii - Use of HTTPS :- It adds a extra security layer (TLS - Transport Layer Security) , it basically encrypts your message so that even if someone intercepts it could not get the actual data, keeping the data save and secure.

viii - Effect of congestion and the packet loss :- this happens when a particular networking device handles more amount of data than it is capable off. Due to this the packets of information gets lost and due to this tcp has to send it once again also the packets has to wait in a long queues, also after the losses of the packet the tcp slower downs the rate of resending the message so overall this creates long time delays. Also this may take place at any part of the network.

