

1: what is VPN? Why do we need it?

A VPN is a virtual private network which is an encryption technique that establishes a secure connection between two parties. This is a secure extension of a private network into an unsecured network, such as the internet.

It is needed to protect data coming into an organization to ensure none of the packets had been tampered with/altered.

2: how does VPN work?(Briefly)

A VPN works by establishing a tunnel, which is an encrypted connection between a user and a destination. Once the data arrives at the destination, a VPN server extracts the data and then forwards the now un-encrypted data to the ultimate destination (some private network).

3: what is IP routing able? In lab7, what is IP routing table for? What do you need to do if you want your ip packet go through VPN tunnel? Why does it work?

The IP routing table is a table of available IP addresses based on different routing options. It is essentially a list of rules that helps that direct incoming and outgoing packets and can identify which IP addresses belong to the TUN interface.

In Lab 7, the routing table is for directing packet traffic. It is needed to send a packet from Host U to the VPN Server to Host V. This requires the IP Address of Host U and VPN Server, as well as the newly set up IP Addresses for the private network between the VPN Server and Host V.

If you want your IP packet to go through a VPN tunnel, you must modify the the IP routing table to force the packet to go through the VPN NIC (not the actual NIC card on the machine).

This works because when the traffic comes back from the destination, it will first be sent to the VPN NIC, and then sent to the actual NIC, preserving the VPN tunnel through the firewall.

4: for telnet using Tun0, for receiving site (isolated hostV in our lab), what is the source ip it gets? How to set up it's routing table for hostV so it can reply back? Reason?

The source IP that the receiving site gets is the source IP address from the original sender, NOT the one from the TUN program (which is IP 2, and allows the tunnel to be established between sender and receiver). The receiver needs the original one, and will let the TUN protocol deal with the second IP address.

To set up the routing table for hostV, the command **ifconfig tun0** can be used. This establishes the IP Address for the IP Server and private network so the packet can follow the correct path.

5: why do we still need socket interface when we created tun interface?

The OS will decide the IP address when a packet is set out unless it is overridden by a raw socket.