Networks and Protocols

**How data is transmitted over internet?**

Data travels across internet in packets. Each packet is wrapped in a header and footer, the wrappers contains information about where the packet has originated from, what is its destination, what kind of data it consists of and how it fits with other data packets

For example, when you send an email the message is broken into multiple packets and sent over the internet. Packets from the same does need to travel on the same path, each packet can take its own path the different devices on the internet help the packet to reach its destination and once it reaches its destination, all the packets are assembled together, and message is shown.

Every packet that travels on the internet follows a series of protocols. These protocols are assigned to different layers of OSI (Open Systems Interconnection) reference model.

**What is OSI model?**

The OSI model defines the networking framework to implement protocols in layers with control passed from one layer to next. It divides the computer network architecture into 7 layers in logical progression. The lower layers deal with electrical signals, binary data and routing of these data. Higher layers deal with network requests and responses, representation of data, and network protocols as seen from a user's point of view.

**Layers of OSI model**

1. **Physical Layer**: The physical layer consists of the electronic circuit transmission technologies of a network. It is a fundamental layer underlying the higher-level functions in a network. Due to the plethora of available hardware technologies with widely varying characteristics, this is perhaps the most complex layer in the OSI architecture
2. **Data Link Layer**: This layer is the protocol layer that transfers data between adjacent network nodes in a wide area network (WAN) or between nodes on the same local area network (LAN) segment. The data link layer provides the functional and procedural means to transfer data between network entities and might provide the means to detect and possibly correct errors that may occur in the physical layer.
3. **Network Layer**: The network layer is responsible for packet forwarding including routing through intermediate routers

Protocols: IPv4, IPv6, IPX, IPSec, CLNS, DDP, EGP, EIGRP, ICMP, IGMP, OSPF, PIM, RIP

1. **Transport Layer**: The transport layer is responsible for end-to-end communication over a network. It provides logical communication between application processes running on different hosts within a layered architecture of protocols and other network components.

Protocols: TCP, UDP, UDP-lite, RUDP

1. **Session Layer**: The session layer provides the mechanism for opening, closing and managing a session between end-user application processes.

Protocols: NetBIOS, SCP, SOCKS

1. **Presentation Layer**: The Presentation Layer servers as a data translator for the network

Protocols: Telnet

1. **Application Layer**: Application layer is responsible for displaying received information to the user