TCP/IP

Transmission Control Protocol / Internet Protocol (TCP/IP) is a set of protocols for network transmission. It is made up of four layers that are collectively referred as a protocol stack. It is called a stack because the request is sent down the layers to leave and passed up them to be received.

1. Application layer
    - Domain Name System
    - Protocols such as HTTP, HTTPS, FTP, SSH, SMTP & POP3
    - Incoming & outgoing data is converted from one presentation format to another: encryption, compression and standardization of different data formats

2. Transport Layer
    - Sender & receiver are identified, connections is established between them
    - Port N°s are allocated & used to direct data to the correct inter-host application
    - Data is broken into packets / reassembled from packets
    - Packets N°s are used to enable ordering
    - All packets have arrived, re-ordering / re-requesting as necessary

3. Network or Internet Layer
    - Sender & receiver IP addresses are allocated
    - Packets are routed towards their destination (via next Hop)

4. Link Layer
    - Synchronisation of devices
    - Control of the physical signals being sent / received
    - Control of rates of transmission & physical connections
    - CSAM/CD Wired & CSMA/CA Wireless networks

Hypertext Transfer Protocol - HTTP & Secure HTTP (HTTPS)

Client-server model: a way of implementing a connection between computers where one computer (the client) makes use of resources of another computer (the server)

- HTTP: protocol for the transmission & displaying web pages. Ensures that the files are transferred & received in a common format.
- HTTPS: ensures web server is authenticated & communications are encrypted by using either Secure Socket Layer (SSL) or Transport Layer Security (TLS)

File Transfer Protocol - FTP

FTP is a protocol for handling file uploads & downloads. Can be anonymous or protected by Username & Password.

Secure Shell (SSH) Protocol

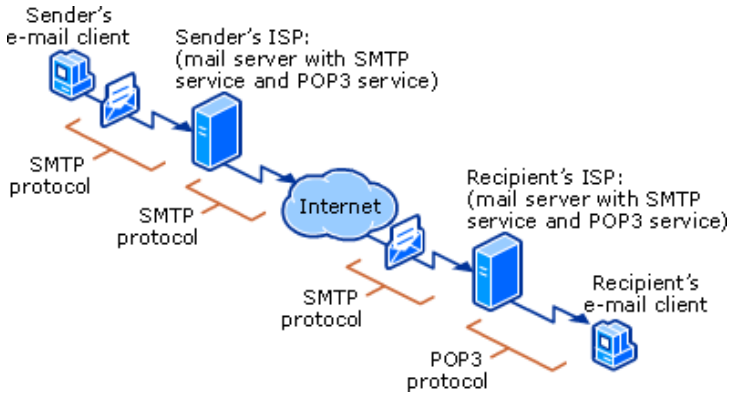
Protocol for remote access to computers. Similar function to telnet but uses encryption & normally requires a user id & password.

The client initiate the connection request, using public key verifies that is the intended server and with asymmetric encryption suggests a key that will them be used for a symmetric encrypted connections, finally provides the user credentials.

Emails: SMTP and POP3

Simple Mail Transfer Protocol - SMTP is a protocol for sending emails (port 25)

- Uses DNS to resolve recipient address to an IP Address
- Uses a queueing system, in case a server cannot send for any reason



Post Office Protocol 3 - POP3 is a protocol for receiving emails (port 110)

IMAP is a 2nd protocol used to access email in substitution to POP3 and enables synchronising email across multiple devices.

Email Server, Web Server & Web Browser

Email server: a dedicated computer on a network for handling email

Web server: a dedicated computer on a network that hosts a website and handles traffic from users to the site

Web browser: an application for viewing web pages

- Display web pages – interpreting HTML, CSS & Script languages
- Support navigation, bookmarking & searching
- Cache web page for faster display on subsequent visit