Learning Aims

- Describe what a protocol is
- Identify a range of protocols and what they are used for

Protocols

Network protocols are a set of rules or conventions which control the communication between devices on a network

Different protocols are used for different purposes:

Protocol	Purpose	Key features
HTTP (Hypertext Transfer Protocol)	Used by a browser to access a webpage from a web server	Delivers web page data
HTTPS (Hypertext Transfer Protocol Secure)	As HTTP with encryption	Encrypts the data and uses a secure socket layer for greater protection
FTP (File Transfer Protocol)	Transmitting files between client and server computers	Used to upload and download files from a server
POP3 (Post Office Protocol v3)	Retrieving an email from an email server to your device	Deletes messages on the email server once they have been downloaded to a single device
IMAP (Internet Message Access Protocol)	Accessing email on a mail server via multiple devices	Maintains synchronisation of an email account across all devices
SMTP (Simple Mail Transfer Protocol)	Sending email messages between mail servers	Used for sending only

USING SECURE WEBSITES

A TINY PADLOCK APPEARS IN YOUR BROWSER WINDOW, USUALLY ON THE LEFT HAND SIDE OF THE ADDRESS BAR AND THE WEBSITE ADDRESS STARTS WITH HTTPS://

WHEN YOU ARE USING A SECURE SITE FOR EXAMPLE YOUR BANK, OR PURCHASING ON AMAZON, ENCRYPTION APPLIED TO KEEP YOUR DETAILS SAFE.

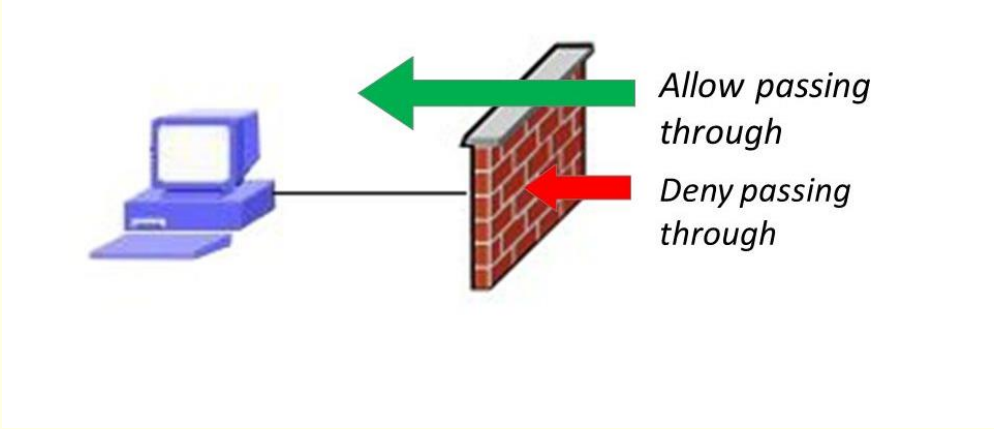
THE ENCRYPTION METHOD USED IS CALLED 'SSL' (SECURE SOCKET LAYER)

Ports, Protocols and Firewalls

Port Number	Protocol
20, 21	File Transfer Protocol (FTP)
22	Secure Shell (SSH)
23	Telnet Protocol
25	Simple Mail Transfer Protocol (SMTP)
53	Domain Name System (DNS)
67, 68	Dynamic Host Configuration Protocol (DHCP)
80	HyperText Transfer Protocol (HTTP)
110	Post Office Protocol (POP3)
137	NetBIOS Name Service
143	Internet Message Access Protocol (IMAP4)
443	Secure HTTP (HTTPS)
445	Microsoft-DS (Active Directory)

The school network will block port 22 for SSH to prevent security breaches as this protocol is used to access the network remotely

- Ports are assigned for different types of protocols so they can be sent to the correct application
- Firewalls use port blocking to **identifying Internet traffic by the combination of port number and transport protocol, and blocking it entirely**.



Computer science in action: How a web page ends up on your screen

When you type a URL into your browser's address bar a lot has to happen before you can view the page on your screen.

First the browser has to request the corresponding IP address from the DNS server.

Next it sends a HTTP GET request to the appropriate web server in the form of a data packet containing all the information the web server needs to deliver the web page. Your router adds its own public IP address as sender to the packet before forwarding it to the internet.

On receipt of the request, the web server sends a series of data packets back to your browser containing all the information required to display the page.

The router forwards the incoming packets to your computer and the browser renders the page so you can view it. Magic!