**TCP/IP protocol suite**

**What is the TCP/IP protocol suite?**

The **TCP/IP model** is the foundation for networking on the internet. It has **4 layers**:

1. **Application Layer** – This is where communication takes place between applications. If the server wants to get a web page from the server it sends an HTTP request. (e.g., web browsers, email clients).
2. **Transport Layer** – This manages end-to-end communication between application (e.g., TCP, UDP).
3. **Internet Layer** – This is responsible for routing packets across networks (e.g., IP).
4. **Network Layer** – This handles data link protocols and physical transmission (e.g., Ethernet).

**How does TCP/IP work when loading a web page?**

1. **Application Layer**: When you enter a URL (e.g., www.example.com) in your browser, web server processes the request and sends the web page content back to your device.

* The request is formatted according to HTTP protocol.
* A session is established between your device and the web server.

1. **Transport Layer**: The browser sends HTTP requests to the server using TCP to establish a connection with the server (through a process called a "three-way handshake").

* The request is broken into smaller segments and assigned sequence numbers (TCP).
* The segments are transmitted to the web server, which reassembles them in the correct order.
* If a packet is lost or corrupted, TCP will request it to be resent.

1. **Internet Layer**: The request is encapsulated in an IP (Internet Protocol) packet and sent to the server, using routers to find the best route.

* Each router along the path examines the IP address and forwards the request to the next hop.

1. **Network Layer**: The request is transmitted over the physical network (e.g., Ethernet or Wi-Fi) to reach the server.

* The data is finally transmitted over the physical medium (e.g., fiber optic cables, Wi-Fi signals) to the destination device.

**Return Journey**

**Server Response**: The server processes the request and sends back the requested webpage (HTTP response.

* The content is reassembled and displayed on your device.
* The response is reassembled and checked for errors (if using TCP).
* Your browser receives the HTTP response and displays the webpage ) following the same path as the request.