RECAP/

The client server relationship

The term server **refers to a host running a software application that provides info or services to other hosts that are connected to the network,** such as a web server.

A single PC can also run multiple types of client software.

**A crucial factor to enable these complex interactions to function is that they all use agreed upon standards and protocols.**

The key characteristic of client/server systems is that the **client sends a request to a server, and the server responds by carrying out a function**, such as sending the requested document back to the client.

The combination of a web browser and a web server is perhaps the most commony used instance of a client/server system.

A URI is **a string of characters that identifies a specific network resource.**

The parts of a URI are **protocol/scheme, hostname, path and file name, and fragment**.

A URI has 2 specializations:

URN

- **identifies only the namespace of the resource without reference to protocol**

URL

- **defines the network location of a resource on the network. HTTP or HTTPS URLs are typically used with web browsers.** Other protocols such as FTP, SFTP. SSH can be used as URL

Network application services

**For most people, the most common internet services that they use include** internet searches, social media sites, video and audio streaming, on-line shopping, mail, messaging.

Each of these services relies on protocols from the TCP/IP protocol suite to reliably communicate the info between the clients and the servers.   
 (DNS, SSH, SMTP, POP, IMAP, DHCP, HTTP, FTP…)

Domain name system

DNS provides

**A way for hosts to request the IP address of a specific server.**

**DNS names are registered and organized on the internet within specific high-level groups, or domains.**

Some of the most common high-leverl domains on the internet are .com, .edu, .net

Web clients and servers

When a web client receives the IP address of a web server, **the client browser uses that IP address and port 80 to request web services.**

This request is sent to the server using HTTP. The **HTTP protocol is not a secure protocol**

**Info could easily be intercepted by other users** as data is being send on network.

**To provide security for the data, HTTP can be used with secure transport protocols.**

Request for that are sent to port 443. they use https in the site address

**When the server receives a port 80 request, the server responds to the client request and sends the web page to the client.**

The information content of a web page is encoded using HTML.

**HTML coding tells the browser how to format the web page and what graphics and fonts to use**

There are many different web servers and web clients. The HTTP protocol and HTML standards make it possible for these servers and clients from many different manufacturers to work together seamlessly.

FTP clients and servers

FTP provides an **easy method to transfer files from one PC to another**. A host running FTP client software can access an FTP server to perform various file management functions including file uploads and downloads.

**The FTP server enables a client to exchange files between devices.** It also enables clients to **manage files remotely** by sending file management commands such as delete or rename.

To accomplish this, the FTP service uses two different ports to communicate between client and server.

**To begin an FTP session, control connection requests are sent to the server using destination TCP port 21.**

**When the session is opened, the server uses TCP port 20 to transfer the data files.**

Most client operating systems such as windows, Mac OS, and linux include a connand-line interface for FTP. There is also GUI-based FTP client software that provides a simple drag-and-drop interface for FTP.

Virtual terminals

Telnet provides a standard method of emulating text-based terminal devices over the data network.

Telnet servers listen for client requests on TCP port 23.

A connection using telnet is called a vty session, or connection.

R**ather than using a physical device to connect to the server, telnet uses software to create a virtual device that provides the same features of a terminal session with access to the servers CLI**

**Telnet is not considered to be a secure protocol.**

**Although it can requst to log in, it does not support transporting encrypted data.** All data exchanged during telnet sessions is transported as plain text across the network.

This means that the data can be easily intercepted and understood.

**SSH provides the structure for secure remote login and other secure network services.**

**It also provides stronger authentication than telnet and supports transporting session data using encryption.**

Email and messaging

**Each mail server receives and stores mail for users who have mailboxes configured on the mail server. Each user with a mailbox must then use an email client to access the mail server and read these messages.**

Many internet messaging systems use a web-based client to access email.

SMTP

Is used by an email client to send msges to its local email server.

The local server then decides of the msg is destined for a local mailbox or if the msg is addressed to a mailbox on another server.

**If the server must send the msg to a different server, SMTP is used between those two server.**

SMTP requests are sent to port 25.

POP

Receives and stores msges addressed to its users.

When the client connects to POP clients receives and stores msges addressed to its users.

When the client connects to the email server, the msg are downloaded to the client. By default, msges are not kept on the server after they have been accessed bt the client.

Clients contact POP3 servers on port 110.

IMAP

Also receives and stores msges addressed to its users.

However, unlike POP, IMAP keeps the msges in the mailboxes on the server, unless they are deleted by the user. The most current version of IMAP is IMAP4 which listens for client requests on port 143

Text msges may be called instant msges, direct msges, private msges, and chat msges.

**Text msging enables users to chat over the internet in real-time.**

**Text msging services on a computer are usually accessed through a web-based client that is integrated into a social media or information sharing site.**

These clients usually only connect to other users of the same site.

An internet telephony client **uses peer-to-peer technology similar to that used by instant msging.** IP telephony **uses VoIP, which converts analog voice signals into digital data. The voice data is encapsulated into IP packets which carry the phone call through the network.**