Networking Core Protocols

- **A record**: The A (Address) record maps a hostname to one or more IPv4 addresses. For example, you can set `example.com` to resolve to `172.17.2.172`.
- **AAAA Record**: The AAAA record is similar to the A Record, but it is for IPv6. Remember that it is AAAA (quad-A), as AA and AAA would refer to a battery size; furthermore, AAA refers to Authentication, Authorization, and Accounting; neither falls under DNS.
- **CNAME Record**: The CNAME (Canonical Name) record maps a domain name to another domain name. For example, `www.example.com` can be mapped to `example.com` or even to `example.org`.
- **MX Record**: The MX (Mail Exchange) record specifies the mail server responsible for handling emails for a domain

Whois + dns

HTTP(S): Accessing the Web

Some of the commands or methods that your web browser commonly issues to the web server are:

- `GET` retrieves data from a server, such as an HTML file or an image.
- `POST` allows us to submit new data to the server, such as submitting a form or uploading a file.
- `PUT` is used to create a new resource on the server and to update and overwrite existing information.
- `DELETE`, as the name suggests, is used to delete a specified file or resource on the server.

FTP: Transferring Files

Unlike HTTP, which is designed to retrieve web pages, File Transfer Protocol (FTP) is designed to transfer files. As a result, FTP is very efficient for file transfer, and when all conditions are equal, it can achieve higher speeds than HTTP.

Example commands defined by the FTP protocol are:

- `USER` is used to input the username
- `PASS` is used to enter the password
- `RETR` (retrieve) is used to download a file from the FTP server to the client.

- `STOR` (store) is used to upload a file from the client to the FTP server.

SMTP: Sending Email

Let's present some of the commands used by your mail client when it transfers an email to an SMTP server:

- `HELO` or `EHLO`
- `MAIL FROM` specifies the sender's email address
- `RCPT TO` specifies the recipient's email address
- `DATA` indicates that the client will begin sending the content of the email message.
- `.` is sent on a line by itself to indicate the end of the

POP3: Receiving Email

Some common POP3 commands are:

- `USER <username>` identifies the user
- `PASS <password>` provides the user's password
- `STAT` requests the number of messages and total size
- `LIST` lists all messages and their sizes
- `RETR <message_number>` retrieves the specified message
- `DELE <message_number>` marks a message for deletion
- `QUIT` ends the POP3 session applying changes, such as deletions

IMAP: Synchronizing Email

The IMAP protocol commands are more complicated than the POP3 protocol commands. We list a few examples below:

- `LOGIN <username> <password>` authenticates the user
- `SELECT <mailbox>` selects the mailbox folder to work with
- `FETCH <mail_number> <data_item_name>` Example `fetch 3 body[]` to fetch message number 3, header and body.
- `MOVE <sequence_set> <mailbox>` moves the specified messages to another mailbox
- `COPY <sequence_set> <data_item_name>` copies the specified messages to another mailbox
- `LOGOUT` logs out

The table below summarizes the default port numbers of the protocols we have covered so far.

Protocol	Transport Protocol	Default Port Number
TELNET	TCP	23
DNS	UDP or TCP	53
HTTP	TCP	80
HTTPS	TCP	443
FTP	TCP	21
SMTP	TCP	25
POP3	TCP	110
IMAP	TCP	143