Programming Assignment 2: DNS Client

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1   Introduction

A DNS query lets you to lookup the various DNS records for a given hostname or domain name on the internet. The simplest use case is to lookup the IP address of a domain name. When you open a URL in your browser, it first performs a DNS query to find out the IP address of the request URL domain. It's the DNS servers that respond with the correct answer which the browser then uses to connect.

In this assignment we have implemented a simple DNS client. In the program we have implemented the DNS queries are domain-name to IP-address translation, as described in RFC 1035. Our implementation is based on this article; 'DNS Query Code in C with Linux sockets' by 'Silver Moon' (2020) .

The report below contains general description of our program and describes its modules and functions.

2   Implementation

Our program is made up of the modules below:

1. $definitions.h$ – includes constant definitions e.g. IPv4 address flag, domain name pointer and more. This module also contains definitions for different structs that we have used such as DNS_HEADER, resource record structure and more.

2. $dns.h$ – this header file contains some 'includes' the $dnsQuery$ function prototype.

3. $dns.c$ – this .c file implements the $dnsQuery$ function that was declared in the header file. The function logic is based on configuring the $sockaddress$ structure with information of the DNS server → Setting the DNS structure to standard queries → Sending the query. This module also contains the $InitDnsStruct$ that initialize the header's struct, the $ParseAnswer$ function that parses the answer and another two functions to parse a given name and convert it to a regular URL and convert URLs e.g. $www.google.com$ → $3www6google3com.$.

4. $nsclient.c$ – this module implements the DNS client itself; it uses the $dnsQuery$ file that we have implemented as elaborated before. It receives the user arguments and validate them (returns an ERROR in case of an invalid argument).