Department of Information and Communication Technology
Network Programming

C Program to resolve domain names

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Abstract

This document specifies a method and procedures to implement a DNS resolver program in C language. Specifically, two functions C functions gethostbyname() and inet_ntop() are used to resolve domain name to IP addresses and present the result.

Contents

1 Deploy practical work to VPS:

1.1 Access to server throught sptp using ssh-key:

- Domain name comes from user input:

  ```
  viethung@viethung-thinkpad:~$ sftp -i .ssh/keyggcloud
  hungnv_bi11_103_st_usth_edu_vn@35.222.105.161
  ```

- Output:

  ```
  viethung@viethung-thinkpad:~$ sftp -i .ssh/keyggcloud
  hungnv_bi11_103_st_usth_edu_vn@35.222.105.161
  Connected to 35.222.105.161.
  sftp>
  ```

- Put practical work to server:

  ```
  viethung@viethung-thinkpad:~$ sftp -i .ssh/keyggcloud
  hungnv_bi11_103_st_usth_edu_vn@35.222.105.161
  Connected to 35.222.105.161.
  sftp> lcd ~/Desktop/B2NetwokPro/netprog2022
  sftp> put prac2.c
  Uploading prac2.c to /home/hungnv_bi11_103_st_usth_edu_vn/prac2.c
  prac2.c                                    100%  601    2.7KB/s   00:00
  sftp>
  ```

- Output:

  ```
  hungnv_bi11_103_st_usth_edu_vn@instance-1:~$ ls
  prac2.c
  ```

2 Run practical work on server and own PC:

2.1 Run practical work on server:

```
hungnv_bi11_103_st_usth_edu_vn@instance-1:~$ ls
a.out  prac2.c
hungnv_bi11_103_st_usth_edu_vn@instance-1:~$ ./a.out usth.edu.vn
usth.edu.vn IPv4: 119.17.215.232
```

2.2 Run practical work on own computer:

```
viethung@viethung-thinkpad:~/Desktop/B2NetwokPro/netprog2022$ ./a.out usth.edu.vn
usth.edu.vn IPv4: 119.17.215.232
```

3 Comapre result:

The output result is the same on both cases:119.17.215.232 for domain usth.edu.vn

4 Explain:

4.1 Structure:

```
Structure **struct in_addr**: Converts from struct form to string
of dots-and-numbers form and vice-versa such as IP addr in cmd
```

4.2 Function gethostbyname():

```
Function **gethostbyname()**: This **DNS** function belongs to **hostent**
structure and that retrieves host information correspondingto a host name
from database such as DNS. If the host name is invalid or not found, exit
with error message:
```

```
if (host_info == NULL) {
        perror("gethostbyname");
        exit(1);
    }
```

```
To use gethostbyname(), we must include these library:
```

```
#include  <netdb.h>
#include <sys/socket.h>
```

4.3 Function gethostbyname():

```
Function **inet_ntoa()**: This function belongs to **in_addr** structure.
**"inet_toa()"** converts a network address in **in_addr** to
dots-and-numbers string such as: IPv4: 10.20.10.255. It returns non-zero
if the address or domain is valid and returns zero if invalid one.
```

```
To use **inet_ntoa()**, we must include these library:
```

```
#include <sys/socket.h>
#include <netinet/in.h>
#include <arpa/inet.h>
```

4.4   Trace all IP for a domain:

To list all the IP addr of a domain, we have to use loop to examine all the address v

```
for (int i = 0; host_info->h_addr_list[i] != NULL; i++) {
        address = (struct in_addr *)(host_info->h_addr_list[i]);
        printf("%s IPv4: %s\n", input, inet_ntoa(*address));
    }
```