University of Dhaka

Department of Computer Science and Engineering

CSE-3101, Computer Networking Lab

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Assignment No. 02

Title of the Assignment: DNS Resolver.

Lab Group: A

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Goal : In this assignment our task is to make a DNS resolver from scratch where it will take a hostname as input and provide corresponding IP address for that hostname.

Theory : Generally, whenever a DNS resolver is asked to find the IP address of a hostname -

I) It first sends a request to one of the 13 root servers which returns top level domain server's address.

II) Then, DNS resolver sends a request to the top level domain server which returns address of the authoritative server.

III) Finally, DNS resolver sends a request to the authoritative server which returns the IP address of the corresponding hostname.

If Root server and TLD server returns NS (name server) or CNAME (canonical name) type records then we have to first resolve name server or canonical name domain and then find the hostname IP address.

Platform: JAVA

Description :

1. At first, we sent a request to one of the 13 root servers whose IP address is "192.36.148.17".

2. We checked either it returns A type records or CNAME type records or SOA type records.

3. If returns type A records then we recorded the IP addresses of type A records in an ArrayList.

4. SOA type record ensures that domain name doesn't exists.

5. If it returns CNAME type record then we maintains a loop to traverse the CNAME chain to get Type A record and recorded the IP addresses of type A records in an ArrayList.

6. Then we sent request to the recorded TLD servers (Type A records returned from the root server) and repeat step 2, 3, 4 and 5.

7. Then we sent request to the recorded authoritative servers (Type A records returned from the TLD server) and repeat step 2, 3, 4 and 5.

8. If authoritative server returned type A records then we had the IP address of the corresponding hostname otherwise DNS error occurred.

Note: Request message is encapsulated in DatagramPacket and we sent requests to the servers using DatagramSocket(UDP socket).

Resource : To learn how to write a DNS message , we followed the tutorial : https://routley.io/tech/2017/12/28/hand-writing-dns-messages.html

We used wireshark to learn how to extract DNS reply message.