

ASSIGNMENT 1: DNS IN DETAIL WRITEUP

Introduction

This module takes us through a deep dive into the Domain Name System (DNS). It is divided into 5 tasks in which task one which is all about the definition of DNS, task two which takes through the domain hierarchy, task three takes through the record types, task four which informs us how to make a DNS request and what happens when one makes one and finally task five takes puts all the tasks into practice with a practical.

Task 1 What is DNS?

In this task, DNS (Domain Name System) was defined to help us to communicate easily with Internet devices without the need to remember the entire IP address that has been assigned to it.

Question: What does DNS stand for? [Domain Name System](#)

Task 2 Domain Hierarchy

In this task we covered the domain hierarchy, TLD (Top-Level Domain) which is the rightmost part of a domain name. For example, google.com's TLD is .com. The two types of TLDs: gTLD (Generic Top Level) and ccTLD (Country Code Top Level Domain). Second-Level Domain For example mozilla.org is the TLD domain, if Mozilla registers a second level domain, Subdomain which is located to the left of the Second-Level Domain using a period to separate it; for example, in the name python.developers.com the python part is the subdomain.

Task 2 Questions

Question 1: What is the maximum length of a subdomain? [63](#)

Question 2: Which of the following characters cannot be used in a subdomain (3 b _ —)? [_](#)

Question 3: What is the maximum length of a domain name? [253](#)

Question 4: What type of TLD is .co.uk? [ccTLD](#)

Task 3: DNS Record Types

In this task we learned that DNS are not limited only to websites, applications, etc, there are a variety of DNS record types namely: A Record which resolves to IPV4 addresses such as 10.193.78.29. AAAA record which resolves to IPV6 addresses such as 2986:4700:20::641a:be6. CNAME record in which these records resolve to another domain name. MX record in which these records resolve the address of the servers that handle email for the domain you are querying. Finally, a TXT record which are free text fields where any text-based data can be stored.

Task 3 Questions

Question 1: What type of record would be used to advise where to send email? [MX](#)

Question 2: What type of record handles IPv6 addresses? [AAAA](#)

Task 4: Making a Request

In this task, we learned what happens when one makes a DNS request in which can be summarized as:

Firstly, the client sends the DNS query to its configured DNS resolver, typically provided by the ISP or a local DNS server. The resolver checks its cache for a previously resolved IP address for the requested domain. If it is not found, the resolver forwards the query to the root DNS servers, which respond with the authoritative DNS servers for the top-level domain (TLD) in the query. The resolver then queries the TLD DNS servers, which respond with the authoritative DNS servers for the specific domain. Finally, the resolver sends a query to the authoritative DNS server for the domain, which provides the IP address associated with the requested domain name. The resolver caches this information to expedite future requests and returns the IP address to the client, allowing it to establish the desired connection to the corresponding server.

Task 4 Questions

Question 1: What field specifies how long a DNS record should be cached for? [TTL](#)

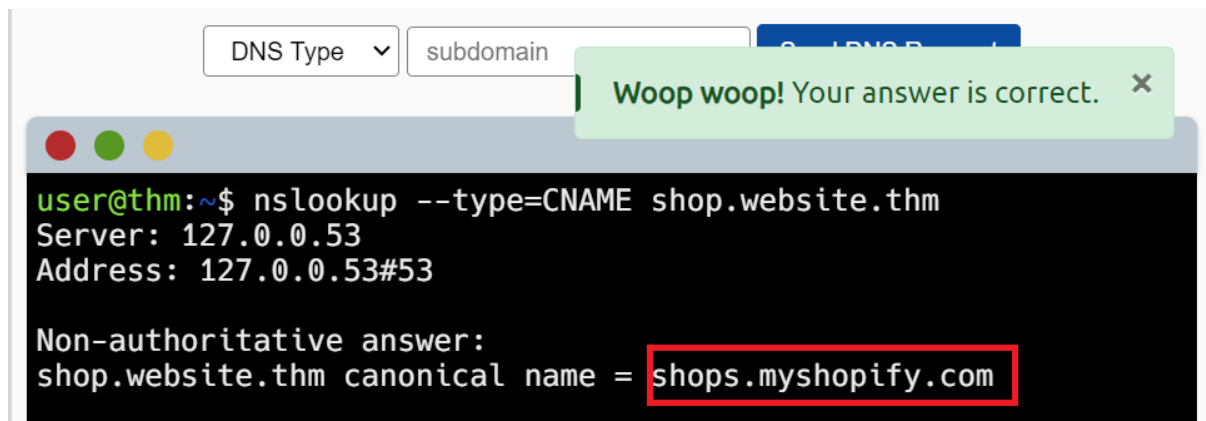
Question 2: What type of DNS Server is usually provided by your ISP? [Recursive](#)

Question 3: What type of server holds all the records for a domain? [Authoritative](#)

Task 5 Practical

In this task, we did a practical activity where a web site to which different requests will be made to simulate DNS queries and based on the results answer the following questions

Question 1: What is the CNAME of shop.website.thm? [shops.myshopify.com](#)

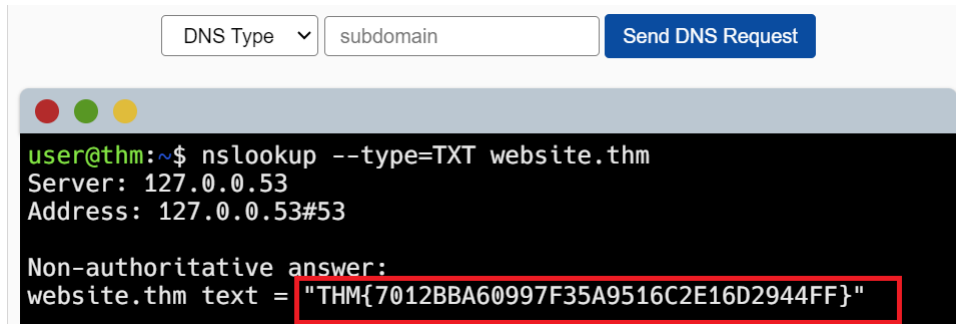


```
DNS Type  ▾  subdomain  [CNAME]
Woop woop! Your answer is correct.
user@thm:~$ nslookup --type=CNAME shop.website.thm
Server: 127.0.0.53
Address: 127.0.0.53#53

Non-authoritative answer:
shop.website.thm canonical name = shops.myshopify.com
```

Question 2: What is the value of the TXT record of website.thm?

THM{7012BBA60997F35A9516C2E16D2944FF}

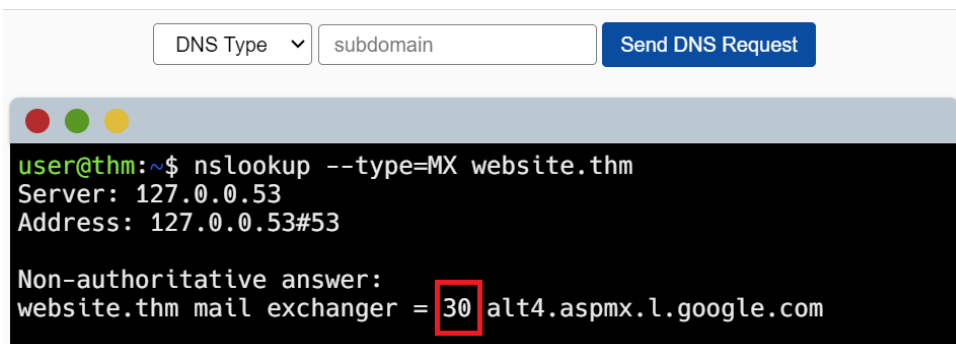


```
DNS Type  subdomain  Send DNS Request

user@thm:~$ nslookup --type=TXT website.thm
Server: 127.0.0.53
Address: 127.0.0.53#53

Non-authoritative answer:
website.thm text = "THM{7012BBA60997F35A9516C2E16D2944FF}"
```

Question 3: What is the numerical priority value for the MX record?30

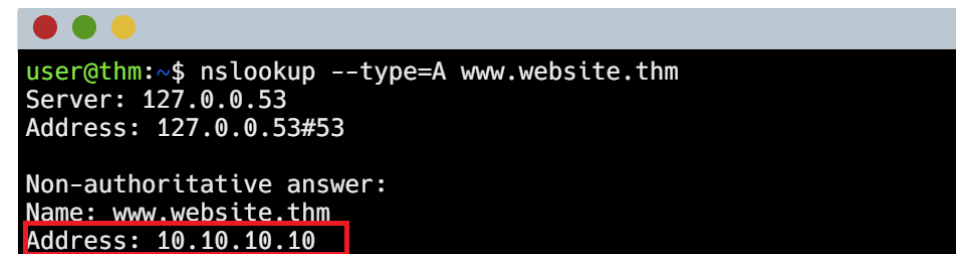


```
DNS Type  subdomain  Send DNS Request

user@thm:~$ nslookup --type=MX website.thm
Server: 127.0.0.53
Address: 127.0.0.53#53

Non-authoritative answer:
website.thm mail exchanger = 30 alt4.aspmx.l.google.com
```

Question 4: What is the IP address for the A record of www.website.thm? 10.10.10.10



```
user@thm:~$ nslookup --type=A www.website.thm
Server: 127.0.0.53
Address: 127.0.0.53#53

Non-authoritative answer:
Name: www.website.thm
Address: 10.10.10.10
```

Conclusion

In conclusion, this module has provided us with a comprehensive exploration of the Domain Name System (DNS). By completing these five tasks, we have not only expanded our knowledge of the Domain Name System but also developed the skills necessary to navigate and manage DNS effectively.

