Lab 4: Domain Name System

Understanding and configuring DNS

Goals

Understand:

1. Types of DNS resource records

2. Name resolution strategies

3. The impact of DNS caching

4. DNS zone configuration

Evaluation

- Answer Questionnaire on Moodle
  - Lab 4: Domain Name System

- Submission Due: Sunday, November 26, 23:59

Types of DNS Resource Records

```
:~$ dig [flags] host
```

Flag	Description	Possible values
–t	Request a specific type of DNS record	soa, a, aaaa, ns, cname, mx, etc. (use any to match any type)
+trace	Make iterative queries to resolve the name being looked up	-
+nodnssec	Do not request DNSSEC records	-
-4	Use IPv4 query transport only	-

Types of DNS Resource Records

```
:~$ dig —t a google.com

; <<>> DiG 9.16.1-Ubuntu <<>> -t a google.com
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 41354
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 512
;; QUESTION SECTION:
;google.com.                    IN      A

;; ANSWER SECTION:
google.com.            52       IN      A       142.250.200.110

;; Query time: 70 msec
;; SERVER: 8.8.8.8#53(8.8.8.8)
;; WHEN: Thu Dec 02 18:35:53 WET 2021
;; MSG SIZE  rcvd: 55
```

A summary of the query

The requested records (if any)

How long the query took to run

Name Resolution Strategies

Iterative strategy

To resolve a name, the DNS client communicates directly with each DNS server involved in the lookup (typically, a root DNS server, a top-level domain, TLD, DNS server, and an authoritative DNS server for the domain).
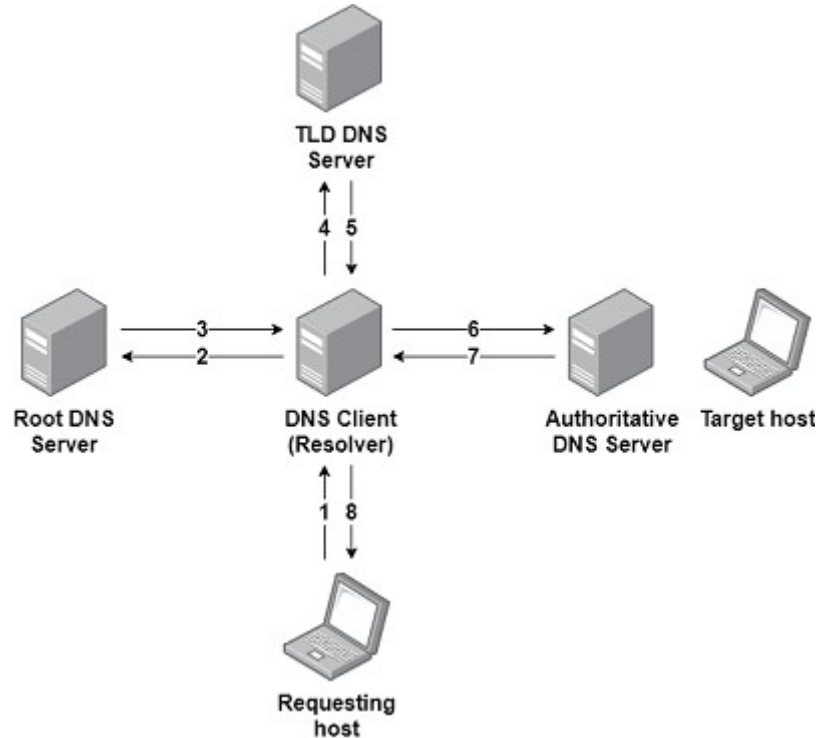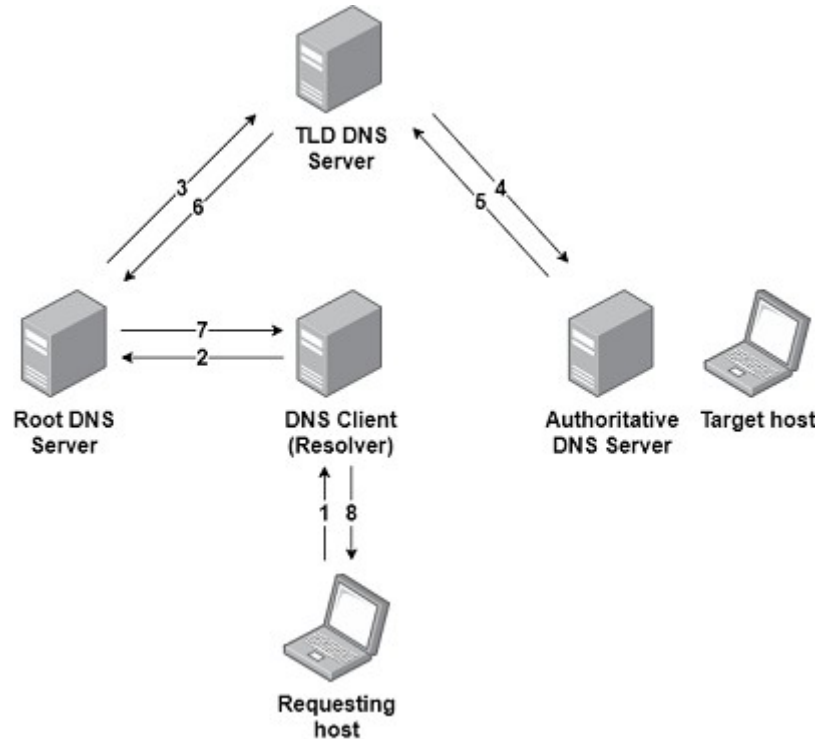
Name Resolution Strategies

Recursive strategy

To resolve a name, the DNS client delegates the task to a different DNS server by forwarding the query to that server.

In turn, that server may use any strategy for name resolution.

Impact of DNS Caching

- How can a DNS server take advantage of cached content to improve query time?
  - Does it always work?

- What is the ideal time-to-live of cache entries? What happens when this value is too high? And too low?

DNS Zone Configuration

- Learn about the syntax and structure of zone files
  - `named-checkzone` validates your zone file: **use it**!

- Configure a new DNS zone
  - Declare the zone
  - Add the necessary records to resolve your domain

- Run `./setup.sh` to prepare
  your DNS client (resolver)

Good luck!

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