Writing Assignment #1

A Technical Description for Two Different Audiences

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Introduction

I work in IT technical support at a web design firm. I wrote a description of how DNS works to colleagues in my IT technical support. I also wrote a description of how DNS works to web designers who are not familiar with computer networking.

A description of how DNS works to colleagues in your IT technical support

1. Structure of domain names

    First of all, I will explain the basic structure of domain names is as follows.
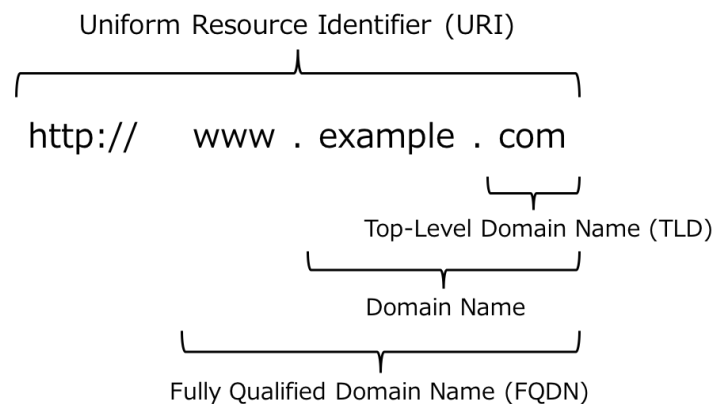
2. Types of TLD

    TLD stands for top-level domain which is the highest level of domain names. There are two types of TLDs as follows.
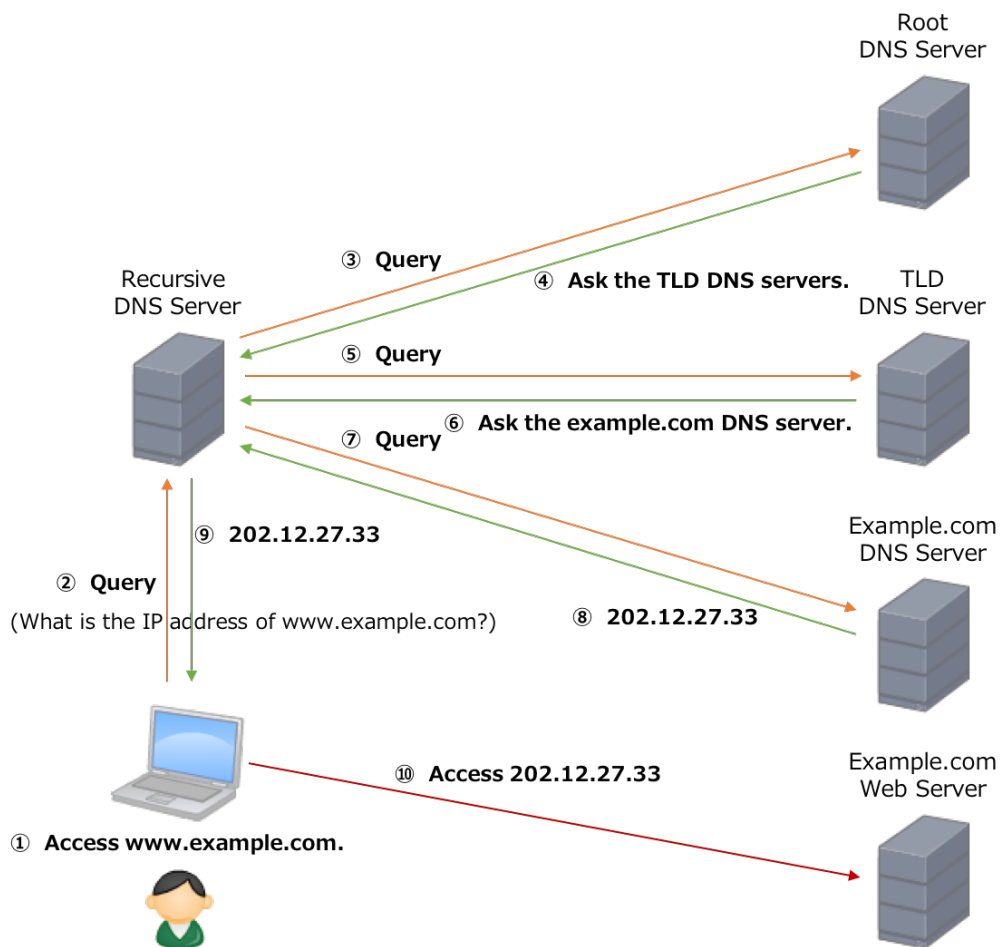
Types	Abbreviations	Examples
Generic TLD	gTLD	.com, .net, .org, .edu, .gov
Country Code TLD	ccTLD	.us, uk, .jp, .cn

3. What is an IP address?

An IP address is a unique identifier on the internet like 202.12.27.33. This is like a virtual address on the internet. When you browse a website or send a e-mail, you access an internet server by using an IP address whether you are aware or not.

4. What is DNS?

DNS stands for domain name systems which translates or resolves human readable domain names into IP addresses. The flow of resolving the domain by DNS is as shown in the following diagram: how DNS works in 10 steps.

Root
DNS Server

③ **Query**

Recursive
DNS Server

④ **Ask the TLD DNS servers.**

TLD
DNS Server

⑤ **Query**

⑥ **Ask the example.com DNS server.**

⑦ **Query**

Example.com
DNS Server

⑨ **202.12.27.33**

② **Query**

(What is the IP address of www.example.com?)

⑧ **202.12.27.33**

⑩ **Access 202.12.27.33**

Example.com
Web Server

① **Access www.example.com.**

5. Types of DNS servers

To resolve the domain, DNS servers which are also called name servers are needed. There are two types of DNS servers: authoritative DNS servers and recursive DNS servers. Authoritative DNS servers are classified further as follows.

Authoritative	Authoritative DNS servers resolve the domain and gives answers the DNS information such as corresponding IP addresses to the recursive DNS servers.	
	Root	Authoritative DNS servers for the root zone.
	TLD	Authoritative DNS servers for the TLDs.
	Example.com	Authoritative DNS servers for example.com.
Recursive	Recursive DNS servers receive DNS queries from your web browser, resolve the domain by asking authoritative DNS servers where to find the specific domain recursively on your behalf, and answer the DNS information to you.	

6. Why is the recursive DNS server necessary?

If upper level authoritative servers receive queries and respond them on each DNS resolution, they should handle tons of DNS traffic. In addition to that, because DNS is a hierarchical distributed system, upper level authoritative servers are not necessarily close to you. Therefore, resolving a domain might take a long time for latency. Especially, root DNS servers, for example, are only 13 clusters of servers in the world. To improve reliability and performance of DNS, recursive DNS servers store the results of queries they received before for a certain

period, which is called caching. Once a query is cached, the recursive DNS server respond a proper IP address to you immediately without asking authoritative DNS servers. This is why recursive DNS servers are also called caching DNS servers.

A description of how DNS works to web designers who are not familiar with computer networking.

1. What is a zone file?

  A zone file is a text file that is described mappings between domain names and IP addresses. By deploying this file on your DNS server, it comes to be able to resolve the domain.

2. Types of DNS records

  Typical DNS record types are such as A, AAAA, CNAME, MX, and NS. The details of each DNS record are as follows.

  2.1. A records

  A records are used to map domain names to IPv4 IP addresses.

  2.2. AAAA records

  AAAA records are used to map domain names to IPv6 IP addresses.

  2.3. CNAME records

CNAME records are used to define alias names and to map the aliases to domain names. For instance, by using this record, you can map www.example.com to example.com.

2.4. MX records

MX records are used to map domain names of destination mail addresses to destination hosts in domain name. For example, you can configure to send e-mail messages for xxx@example.com to mail1.example.com, although you need to add mail1 to an A record in advance.

2.5. NS records

NS records are used to map domain names to DNS servers in domain name.

3. What is TTL?

TTL stands for time-to-live. It is a parameter on each DNS record. By using this parameter, you can set how long recursive DNS servers store the results of queries.

4. Protocols and port number by using DNS

DNS works on both TCP and UDP at the transport layer with the port number is 53. The details of the difference between TCP and UDP are as follows.

Compare and contrast TCP and UDP

Although both TCP and UDP are layer 4 protocols, the biggest difference between them is whether connection oriented or connectionless. Because TCP is a connection oriented protocol,

TCP communications go through procedures for connection establishment before data transfer, so that the client and the server exchange synchronized (SYN) and acknowledged (ACK) packets in TCP segments to establish a connection before data transfer which is called the three-way handshake method. For this reason, the size of a TCP segment header is 20 bytes. On the other hand, UDP is a connectionless protocol. The size of a UDP segment header is only 8 bytes because the header has just a source port number and a destination port number basically. For the different characteristics, TCP offers more accurate and stable communications in contrast to UDP which achieves rapid transmission of data.

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