

COMPUTER APPLICATIONS
CHAPTER 12 DNS (DOMAIN NAME SYSTEM)
Part - II

webStrake

Short Answers

1. List any four domain names.

- TLD - Top Level Domains. These are at the highest level in the DNS structure of the Internet.
- ccTLD - country code Top Level Domains.
- gTLD - generic Top Level Domain.
- IDN ccTLD - internationalised country code top-level domains.

2. What is an IP address?

- Internet Protocol (IP) address is simply the logical address in the network layer.
- IP address is a logical address used to uniquely identify a computer over the network
- There are two types: IPv4 and IPv6. Internet Protocol version 4/6

3. What are the types of IP address?

- There are two types: IPv4 and IPv6. Internet Protocol version 4/6

4. What is an URL?

URL (Uniform Resource Locator) is the address of a document on the Internet

5. List out four URLs you know.

https://www.google.com https://www.facebook.com https://www.amazon.in
https://www.tnschools.gov.in https://www.w3schools.com http://www.tnsert.org

6. What are the types of URL?

Depending on the location of the document the URL is divided into 2 types

- Absolute URL • Relative URL

Absolute URL: Absolute URL is the complete address of a document on the Internet

Relative URL: Relative URL is the partial address of a document on the Internet

7. What is a domain?

- A domain is a single node of the Domain Namespace
- **Domain** is a sub tree in domain name space tree structure.
- The **domain** can be further divided into sub domains

8. What is a zone?

Zone is defined as a group of contiguous domains and sub domains. If the zone has a single domain, then zone and domain are the same

9. What is a resolver?

- Resolver, a client/ server application, initiates the process of resolving the domain names.
- A host system need to map domain name to IP address or vice versa according to the call and that work is done by resolver.
- Resolver either asks server to provide information about IP address.
- The resolver is a program which is responsible for initiating the translation of a domain name into an IP address.

10. What are the categories available in domain name space?

There are three important components in the Domain Name System. They are

- Namespace • Name server • Zone

11. Write any four generic Top Level Domain.

Domain Name	Meaning
.com	Commercial Organisation
.edu	Educational Institutions
.gov	Government

Domain Name	Meaning
.org	Non profit Organization
.net	Networking organization
.info	Information service providers
.mil	Military groups

Part - III

Explain in Brief Answer

1. Write a note on DNS.

- A method of referring to other host computers by using names rather than numbers.
- Domain Name System (DNS) maintains all the directory of domain names/host names and help us to
- access the websites using the domain/host names.

2. Differentiate IPv4 and IPv6.

IPv4	IPv6
Internet Protocol version 4	Internet Protocol version 6
IPv4 address is a 32 bit unique address given to a computer or a device.	IPv6 address is a 128 bit unique address given to a computer or a device.

There are two ways to represent the IP address: Binary notation, Dotted-decimal notation.	It follows Hexadecimal number notation
decimal format separated by dots(.).	Hexadecimal numbers separated by colon symbols.

3. Differentiate Domain name and URL

Domain name	URL
Domain name is the translated and simpler form of a computer's IP address (Logical address).	URL (Uniform Resource Locator) is the address of a document on the Internet
It is the sequence of labels. In domain name the sequence of labels are separated by dot (.).	URL is made up of four parts—protocols, hostname, folder name and file name.
The domain name is always read from the lower level to higher level. Based on sub domains (top level, intermediate level, low level)	Each part has its own specific functions.
EX: techdifferences.com	EX: http://techdifferences.com/difference-between-while-and-do-while-loop.html

4. What are the differences between Absolute URL and Relative URL?

Absolute URL	Relative URL
Absolute URL is the complete address of a document on the Internet	Relative URL is the partial address of a document on the Internet
Absolute URL contains all the information that are required to find the files on the Internet	Relative URL contains only file name or file name with folder name.
Absolute URL are used to link to other websites/ server that are not located on the same domain.	We can use this type of URL when the file is on the same server related to original document

5. Write a note on domain name.

6. Differentiate web address and URL

WEB ADDRESS	URL
A Web Address more commonly defines a unique name that helps people remember a URL	URL (Uniform Resource Locator) is the address of a document on the Internet.
It is usually in simpler form, such as www.wsisearchpros.com or Amazon.com	URL is made up of four parts—protocols, hostname, folder name and file name.
Generally your browser will recognize the proper URL when you type in a web address	Depending on the applications, additional information can be added to the URL but the common and fundamental URL consists of these four parts

Part - IV

Explain in detail

1. Explain briefly the components of DNS.

There are three important components in the Domain Name System. They are

- Namespace
- Name server
- Zone

Name Space

The domain names must be very unique and appropriate. The names should be selected from a namespace. The name space can be organized in two ways

- Flat name space
- Hierarchical name space

Flat name space is where the name is assigned to the IP address. They do not have any specific structure. In this flat name space, some meaningful names are given to IP address for accessing.
Disadvantage: they cannot be used in large system.

Hierarchical name space is where the name is made up of several parts. The first part may represent the nature of organization, the second part may represent the name of organization, and third part may represent the department of the organization and so on.

Disadvantage: In this way the power to control the name space can be decentralized.

Name Servers

- Name servers store the data and provide it to clients when queried by them. Name Servers are programs that run on a physical system and store all the zone data.
- Name servers do the important task of searching the domain names.
- Contains the DNS database which consists of domain names and their corresponding IP addresses
- Name server manages the database of domain names and corresponding IP addresses.

Zone

- The entire name space is divided into many different zones.
- A group of contiguous domains and sub domains in the Domain Name Space.
- Zone is defined as a group of contiguous domains and sub domains.
- If the zone has a single domain, then zone and domain are the same.

- A zone is a subset of the Domain namespace generally stored in a file.

2. Classify and Explain the IP address.

- Internet Protocol (IP) address is simply the logical address in the network layer.
- IP address is a logical address used to uniquely identify a computer over the network.
- Due to increase in the number of system in a network there is a need of more addresses which lead to two addressing methods i.e.,
- There are two types: IPv4 and IPv6. Internet Protocol version 4/6

IPv4 Address

- IPv4 address is a 32-bit unique address given to a computer system.
- No two systems can have same IP address.
- If the network has p connections then ' p ' addresses should be there.
- An address space is the total number of addresses that can be made by that protocol.
- It is determined by the number of bits that the protocol use.
- If the protocol uses ' n ' bits then the address space of that protocol would be ' 2^n ' addresses can be formed.
- So, the number of addresses that can be formed in IPv4 is 2^{32} .

There are two ways to represent the IP address

- Binary notation
- Dotted-decimal notation

In binary notation the address is expressed as 32-bit binary values.

For E.g. 00111001 10001001 00111000 00000111

128.

143.

137.

144

In dotted-decimal notation the address is written in decimal format separated by dots(.).

IPv6 Address

IPv6 address is a 128-bit unique address given to a computer or device.

The number of addresses that can be formed in IPv6 is 2128.

In IPv6 address, the 128 bits are divided into eight 16-bits blocks.

Each block is then changed into 4-digit Hexadecimal numbers separated by colon (:) symbols.

E.g. 2001:0000:32313:DFE1:0063:0000:0000:FEFB

3. Explain about the name server?

Name Servers

- Name servers store the data and provide it to clients when queried by them. Name Servers are programs that run on a physical system and store all the zone data.
- Name servers do the important task of searching the domain names.
- Contains the DNS database which consists of domain names and their corresponding IP addresses
- Name server manages the database of domain names and corresponding IP addresses.
- Inverse domain performs the opposite task of normal DNS query. It converts the IP address to domain name.

Types of Name Servers

There are three types of Name Servers which control the entire Domain Name System:

1. Root Name Server - top level server which contains entire DNS tree, maintained by ICANN. There are 13 servers.

2. Primary/Master Name Server - contains a zone resource records. These records are updatable by domain name holders such as organizations.

3. Secondary/Slave Name Server - contains a copy of primary server files.

This server has no authority to update, but reduce the workload of master server by sharing the queries.

4. What is domain name space? Explain.

Domain name space was designed to achieve hierarchical name space.

In this, the names are represented as a tree like structure with root element on the top and this tree can have a maximum of 128 levels starting from root element taking the level 0 to level 127.

the domain name space where the root element is present at the top most level i.e., level 0.

The root element always represents the NULL string (empty string).

The next level to the root element is node (children of root element).

Each node in the tree has a **label** and a **domain name**.

Label

It is a string which can have maximum of 63 characters. Each node in that level should have different labels thereby assuring the individuality of the domain name.

In other words, Labels are the names given to domains. **Domain** is a sub tree in domain name space tree structure. The domain can be further divided into sub domains.

explain the domain name and label clearly. challenger.atc.fhda.edu. is the domain name which is obtained by reading the labels from bottom to top, separating each label by dot (.)

Domain name

It is the sequence of labels. In domain name the sequence of labels are separated by dot (.).

The domain name is always read from the lower level to higher level i.e., from the leaf node to root node. Since the root node always represent **NULL** string, all the domain name ending with dot.

Basic rules of Domain names

- Domain can consists of Alphabets a through z, and the digits 0 through 9.
- Hyphens are allowed, but hyphens can not be used as first character of a domain name.
- Spaces are not allowed
- Special symbols (such as !, \$, &, _ and so on) are not permitted.
- Domain names have the minimum length of 2, and the maximum length of 63 characters. The entire name may be at most **253** characters long.
- Domain names are not case-sensitive. (It may be upper, lower or mixing of both case letters)

5. Explain how the DNS is working.

- When the user enters the URL (consists of protocol, domain name, folder name, file name) in the browser, the system first checks its DNS cache for the corresponding IP address.
- If the IP address is found in the cache then the information is retrieved from cache. If not, then the system needs to perform DNS query i.e., the system needs to query the resolver about the IP address from Internet Service Provider (ISP).
- Each resolver has its own cache and if it is found in that then that information is retrieved.
- If not, then the query is passed to next domain server i.e., TLD (Top Level Domain) which reviews the request and direct the query to name servers associated with that specific domain.
- Until the query is solved it is passed to next level domains.
- At last the mapping and the record are returned to the resolver who checks whether the returned value is a record or an error.
- Then the resolver returns the record back to the computer browser which is then viewed by the user.

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