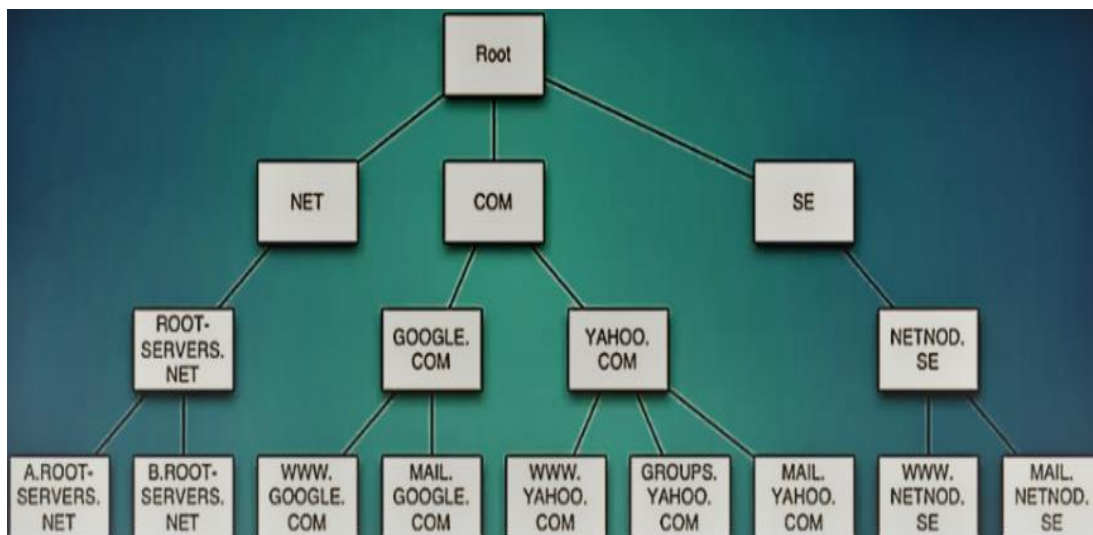


**GETTING STARTED  
WITH  
DOMAIN NAME SYSTEM**

## ➤ DOMAIN NAME SYSTEM (DNS):

- DNS plays a critical role not only in your networks, but also on the internet as a whole.
- **BIND (Berkeley Internet Name Domain)** consists of a set of DNS-related programs. It contains a name server called **named**.
- DNS (Domain Name System) server, also known as a **name server**.
- DNS, is a distributed database system that is used to associate host names with their respective IP addresses.
- DNS is usually implemented using one or more centralized servers that are authoritative for certain domains. When a client host requests information from a name server, it usually connects to port 53.
- In a DNS server, all information is stored in basic data elements called **resource records (RR)**. Resource records are defined in RFC 1034.
- The domain names are organized into a tree structure. Each level of the hierarchy is divided by a period (.).
- DNS structure is consisted of the **Root zone** and the **Root zone** contains the global list top-level domains like .com, .net, .org, .edu...etc.
- Under the **top-level domains** there are **sub-domains** like mail.goole.com, mail.yahoo.com...etc.
- The domain name **com**, referred to as the **top-level domain (TLD)** is a child of the **root domain (.)** so it is the first level of the hierarchy.



## **NAME SERVER TYPES:**

### **Authoritative:**

- Authoritative name servers answer to resource records that are part of their zones only. This category includes both primary (master) and secondary (slave) name servers.

### **Recursive:**

- Recursive name servers offer resolution services, but they are not authoritative for any zone. Answers for all resolutions are cached in a memory for a fixed period of time, which is specified by the retrieved resource record.

## **DNS RECORD SETS & RECORDS:**

- The Domain Name System (DNS) uses resource records to store zone data within namespaces.

<b>A (IPV4 ADDRESS)</b>	: Mapping the name to an IPV4 address.
<b>AAAA (IPV6 ADDRESS)</b>	: Mapping the name to an IPV6 address.
<b>CNAME (CANONICAL NAME)</b>	: It is an Alias name.
<b>MX (MAIL EXCHANGE)</b>	: Responsible for E-mail services.
<b>NS (NAME SERVER)</b>	: Nodes that hold info about a given name.
<b>PTR (POINTER)</b>	: Reverse DNS records (Opposite of <b>A</b> record does).
<b>SOA (START OF AUTHORITY)</b>	: Manages of DNS. Overall information about domain
<b>NAME</b>	: The string that indicates its location in the DNS namespace.
<b>TTL (TIME TO LIVE)</b>	: The duration, in seconds, that the record remains valid.
<b>TYPE</b>	: The set of letter codes that identifies how the record is used.

## ❖ BIND INSTALLATION AND CONFIGURATION:

### PRE-REQUISITES:

<b>Package name</b>	: bind, bind-utils
<b>Main config file</b>	: /etc/named.conf
<b>Zone file's location</b>	: /var/named
<b>DNS address file</b>	: /etc/named.conf
<b>Service / Daemon</b>	: named
<b>Ports</b>	: DNS - 53

#### → Installing bind bind-utils packages:

```
#dnf install bind bind-utils -y  
#rpm -q named
```

#### → To check version information:

```
#named -v
```

#### → Reload the systemd manager configuration:

```
#systemctl daemon-reload
```

#### → Start and enable the named service:

```
#systemctl start named  
#systemctl enable named
```

#### → Verify the status of the bind:

```
#systemctl status named
```

#### → Verify the port number of dns:

```
#netstat -pantl  
#netstat -pantl | grep -i dns
```

## **BIND CONFIGURATION:**

→ **Edit the /etc/named.conf file:**

```
#vim /etc/named.conf
```

```
listen-on port 53 { 127.0.0.1;192.168.10.254; };
```

```
allow-query { localhost;any; };
```

**#Add the network range from which clients can query domain names like below.**

```
allow-query { localhost; 192.168.10.0/24; 10.10.20.0/24; };
```

**#The following line enables recursion service, which is fine.**

```
recursion yes;
```

→ **Add DNS address resolver on /etc/resolv.conf file:**

```
#vim /etc/resolv.conf
```

```
# Generated by NetworkManager
```

```
nameserver 192.168.10.254 ## DNS Address
```

→ **Test the config file syntax:**

```
#named-checkconf /etc/named.conf
```

→ **Restart the vsftpd service:**

```
#systemctl restart named
```

## **❖ DNS CLIENT CONFIGURATION:**

→ **Install bind-utils client package:**

```
#dnf install bind-utils -y
```

→ **Setting up DNS resolver on /etc/resolv.conf file:**

```
#vim /etc/resolv.conf
```

```
# Generated by NetworkManager
```

```
nameserver 192.168.10.254 ## DNS Address
```

## DNS UTILITIES & TROUBLESHOOTING:

- There are many types of name servers, especially in large networks, it can be difficult to determine the culprit.
- When troubleshooting, it can be useful to query specific name servers and examine their administrative resource records.
- Four useful tools for testing name resolution on your Linux systems:

### DIG:

- **dig** enables you to make manual name resolution queries. It provides an immense amount of detail about the results.

```
#dig server.example.com      : A simple name server lookup
#dig -x 192.168.10.254       : Lookup a hostname
```

### NSLOOKUP:

- It is the name of a program that lets users enter a host name and find out the corresponding IP address or domain name system (DNS) record.

```
#nslookup server.example.com
#nslookup 192.168.10.254
```

### HOST:

- **host** is a simple utility for performing DNS lookups. It is normally used to convert names to IP addresses and vice versa.

```
#host server
#host 192.168.10.254
```

### PING:

- **Internet Control Message Protocol (ICMP)** protocol for network or hostname from an IP address.

```
#ping server.example.com
#ping 192.168.10.254
```