

DNS

Experiment: 3

Aim:

To create and configure DNS Server

Description:

DNS Server

A DNS server is a computer server that contains a database of public IP addresses and their associated hostnames, and in most cases, serves to resolve, or translate, those common names to IP addresses as requested.

Port No: 53

Package name: bind9

Configuration file: /etc/bind/named.conf. (Primary configuration file), /etc/bind/db.root(root nameservers)

Procedure:

CASHING NAMESERVER

When configured as a caching nameserver BIND9 will find the answer to name queries and remember the answer when the domain is queried again.

1. Install bind9 by typing

```
$sudo apt install bind9  
$sudo apt install dnsutils
```

2. The default configuration is set up to act as a caching server. All that is required is simply adding the IP Addresses of your ISP's DNS servers. Simply uncomment and edit the following in /etc/bind/named.conf.options:

3. Restart it by typing
\$sudo systemctl restart bind9.service

PRIMARY MASTER

As a primary master server BIND9 reads the data for a zone from a file on it's host and is authoritative for that zone.

Forward zone file

To add a DNS zone to BIND9, turning BIND9 into a Primary Master server, the firststep is to edit /etc/bind/named.conf.local:

```
$sudo cp /etc/bind/db.local /etc/bind/db.example.com
$sudo systemctl restart bind9.service
```

Reverse Zone File

Now that the zone is set up and resolving names to IP Addresses, a *Reverse zone* needs to be added to allows DNS to resolve an address to a name.

1. Edit /etc/bind/named.conf.local

2. Now create the /etc/bind/db.192 file:

```
$sudo cp /etc/bind/db.127 /etc/bind/db.192
```

3. edit /etc/bind/db.192changing the basically the same options as /etc/bind/db.example.com:

4. After creating the reverse zone file restart BIND9:

```
$sudo systemctl restart bind9.service
```

5. Check the status

```
$Sudo service bind9 status
```

6. Check if nslookup can resolve

```
$nslookup ftp.example.com
```

```
$nslookup ubuntu.example.com
```

7. Gather information about your DNS server

```
$dig ubuntu.example.com
```

```
$dig www.example.com
```

```
$dig ftp.example.com
```

Result:

```
Activities Terminal Jun 13 13:48 root@UBUNTU: ~
ubuntu22@UBUNTU:~$ su -
Password:
root@UBUNTU:~# sudo apt install bind9
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  bind9-dnsutils bind9-host bind9-libs bind9-utils
Suggested packages:
  bind-doc resolvconf
The following NEW packages will be installed:
  bind9 bind9-utils
The following packages will be upgraded:
  bind9-dnsutils bind9-host bind9-libs
3 upgraded, 2 newly installed, 0 to remove and 119 not upgraded.
Need to get 1,878 kB of archives.
After this operation, 1,669 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9-host amd64 1:9.18.24-0ubuntu0.22.04.1 [52.5 kB]
Get:2 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9-dnsutils amd64 1:9.18.24-0ubuntu0.22.04.1 [157 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9-libs amd64 1:9.18.24-0ubuntu0.22.04.1 [1,247 kB]
Get:4 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9-utils amd64 1:9.18.24-0ubuntu0.22.04.1 [161 kB]
Get:5 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 bind9 amd64 1:9.18.24-0ubuntu0.22.04.1 [260 kB]
Fetched 1,878 kB in 4s (457 kB/s)
(Reading database ... 232006 files and directories currently installed.)
Preparing to unpack .../bind9-host_1%3a9.18.24-0ubuntu0.22.04.1_amd64.deb ...
Unpacking bind9-host (1:9.18.24-0ubuntu0.22.04.1) over (1:9.18.18-0ubuntu0.22.04.2) ...
Preparing to unpack .../bind9-dnsutils_1%3a9.18.24-0ubuntu0.22.04.1_amd64.deb ...
Unpacking bind9-dnsutils (1:9.18.24-0ubuntu0.22.04.1) over (1:9.18.18-0ubuntu0.22.04.2) ...
Preparing to unpack .../bind9-libs_1%3a9.18.24-0ubuntu0.22.04.1_amd64.deb ...
Unpacking bind9-libs:amd64 (1:9.18.24-0ubuntu0.22.04.1) over (1:9.18.18-0ubuntu0.22.04.2) ...
Selecting previously unselected package bind9-utils.
Preparing to unpack .../bind9-utils_1%3a9.18.24-0ubuntu0.22.04.1_amd64.deb ...
Unpacking bind9-utils (1:9.18.24-0ubuntu0.22.04.1) ...
Selecting previously unselected package bind9.
Preparing to unpack .../bind9_1%3a9.18.24-0ubuntu0.22.04.1_amd64.deb ...
Unpacking bind9 (1:9.18.24-0ubuntu0.22.04.1) ...
Setting up bind9-libs:amd64 (1:9.18.24-0ubuntu0.22.04.1) ...
Setting up bind9-utils (1:9.18.24-0ubuntu0.22.04.1) ...
Setting up bind9 (1:9.18.24-0ubuntu0.22.04.1) ...

Activities Terminal Jun 13 14:20 root@UBUNTU: ~
Reading state information... Done
The following NEW packages will be installed:
  dnsutils
0 upgraded, 1 newly installed, 0 to remove and 119 not upgraded.
Need to get 3,916 B of archives.
After this operation, 60.4 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 dnsutils all 1:9.18.24-0ubuntu0.22.04.1 [3,916 B]
Fetched 3,916 B in 2s (2,158 B/s)
Selecting previously unselected package dnsutils.
(Reading database ... 232094 files and directories currently installed.)
Preparing to unpack .../dnsutils_1%3a9.18.24-0ubuntu0.22.04.1_all.deb ...
Unpacking dnsutils (1:9.18.24-0ubuntu0.22.04.1) ...
Setting up dnsutils (1:9.18.24-0ubuntu0.22.04.1) ...
root@UBUNTU:~#
root@UBUNTU:~# sudo apt install net-tools
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
net-tools is already the newest version (1.60+git20181103.0eebece-1ubuntu5).
0 upgraded, 0 newly installed, 0 to remove and 119 not upgraded.
root@UBUNTU:~# ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
    inet6 fe80::babf:b255:e5ba:c37c prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:0e:3c:4f txqueuelen 1000 (Ethernet)
    RX packets 102776 bytes 154290446 (154.2 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 17262 bytes 1149666 (1.1 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 357 bytes 39602 (39.6 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 357 bytes 39602 (39.6 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@UBUNTU:~#
```

```
root@UBUNTU: /etc/bind
GNU nano 6.2 named.conf.local *
//
// Do any local configuration here
//
// Consider adding the 1918 zones here, if they are not used in your
// organization
//include "/etc/bind/zones.rfc1918";

zone "example.com" IN{
    type master;
    file "/etc/bind/db.example.com";
};

^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute  ^C Location
^X Exit      ^R Read File ^L Replace   ^U Paste     ^J Justify  ^_ Go To Line

root@UBUNTU: /etc/bind
root@UBUNTU:~# ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
    inet 192.168.56.101 netmask 255.255.255.0  broadcast 192.168.56.255
    inet6 fe80::babf:b255:e5ba:c37c prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:0e:3c:4f txqueuelen 1000 (Ethernet)
    RX packets 102828 bytes 154299671 (154.2 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 17390 bytes 1168295 (1.1 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 473 bytes 51386 (51.3 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 473 bytes 51386 (51.3 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@UBUNTU:~# nano /etc/bind/named.conf.options
root@UBUNTU:~# nano /etc/bind/named.conf.options
root@UBUNTU:~# nano /etc/bind/named.conf.options
root@UBUNTU:~# sudo systemctl restart bind9.service
root@UBUNTU:~# cd /etc/bind
root@UBUNTU:/etc/bind# nano named.conf.local
root@UBUNTU:/etc/bind# nano named.conf.local
root@UBUNTU:/etc/bind# sudo systemctl restart bind9.service
root@UBUNTU:/etc/bind# ls
bind.keys  db.127  db.empty  named.conf      named.conf.local  rndc.key
db.0       db.255  db.local  named.conf.default-zones  named.conf.options  zones.rfc1918
root@UBUNTU:/etc/bind# nano db.local
root@UBUNTU:/etc/bind# cp db.local db.example.com
root@UBUNTU:/etc/bind# nano db.example.com
root@UBUNTU:/etc/bind# nano db.local
root@UBUNTU:/etc/bind# dig test.example.com

; <<>> DiG 9.18.24-0ubuntu0.22.04.1-Ubuntu <<>> test.example.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: SERVFAIL, id: 3602
```

```
Activities Terminal Jun 13 16:19
root@UBUNTU: /etc/bind

root@UBUNTU:/etc/bind# ls
bind.keys db.127 db.empty named.conf named.conf.local rndc.key
db.0 db.255 db.local named.conf.default-zones named.conf.options zones.rfc1918
root@UBUNTU:/etc/bind# nano db.local
root@UBUNTU:/etc/bind# cp db.local db.example.com
root@UBUNTU:/etc/bind# nano db.example.com
root@UBUNTU:/etc/bind# nano db.local
root@UBUNTU:/etc/bind# dig test.example.com

; <<>> DiG 9.18.24-0ubuntu0.22.04.1-Ubuntu <<>> test.example.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: SERVFAIL, id: 3602
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags; udp: 65494
;; QUESTION SECTION:
;test.example.com. IN A

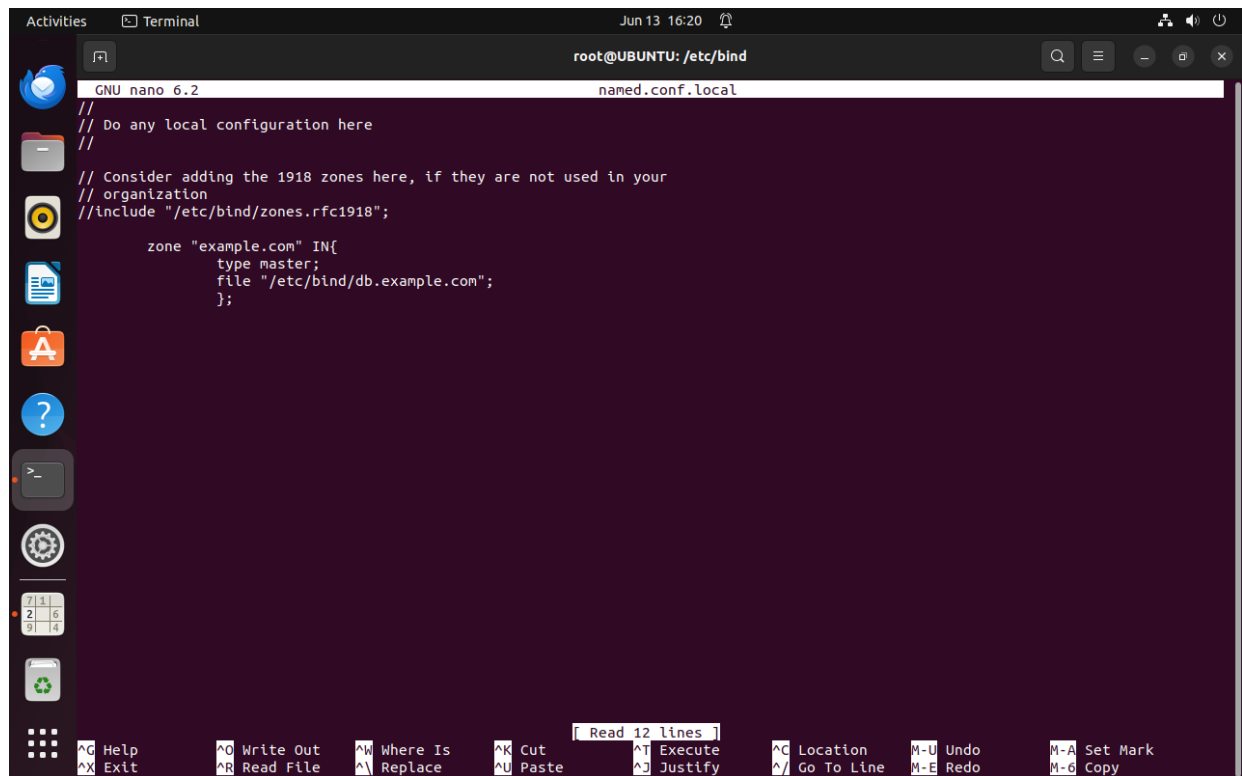
;; Query time: 4 msec
;; SERVER: 127.0.0.53#53(127.0.0.53) (UDP)
;; WHEN: Thu Jun 13 15:35:39 IST 2024
;; MSG SIZE rcvd: 45

root@UBUNTU:/etc/bind# sudo systemctl restart bind9.service
root@UBUNTU:/etc/bind# named-checkzone example.com db.example.com
zone example.com/IN: loaded serial 2
OK
root@UBUNTU:/etc/bind# cd /etc/
root@UBUNTU:/etc# nano resolv.conf
root@UBUNTU:/etc# sudo systemctl restart bind9.service
root@UBUNTU:/etc# dig test.example.com

; <<>> DiG 9.18.24-0ubuntu0.22.04.1-Ubuntu <<>> test.example.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NXDOMAIN, id: 4949
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 1

GNU nano 6.2 db.example.com
; BIND data file for local loopback interface
;
$TTL 604800
@ IN SOA example.com. root.example.com. (
    2      ; Serial
    604800 ; Refresh
    86400  ; Retry
    2419200 ; Expire
    604800 ) ; Negative Cache TTL
;
@ IN NS example.com.
test IN A 192.168.10.0
@ IN A 127.0.0.1
@ IN AAAA ::1

Read 15 lines
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^_ Replace ^U Paste ^D Justify ^_ Go To Line ^U Undo ^M-A Set Mark
^M-E Redo ^M-G Copy
```



```
root@UBUNTU: /etc/bind
GNU nano 6.2 named.conf.local
//
// Do any local configuration here
//
// Consider adding the 1918 zones here, if they are not used in your
// organization
//include "/etc/bind/zones.rfc1918";

zone "example.com" IN{
    type master;
    file "/etc/bind/db.example.com";
};
```

Read 12 lines

Help Exit Write Out Read File Where Is Replace Cut Paste Execute Justify Location Go To Line Undo Redo Set Mark Copy

All the commands have been executed and the output has been obtained successfully.