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

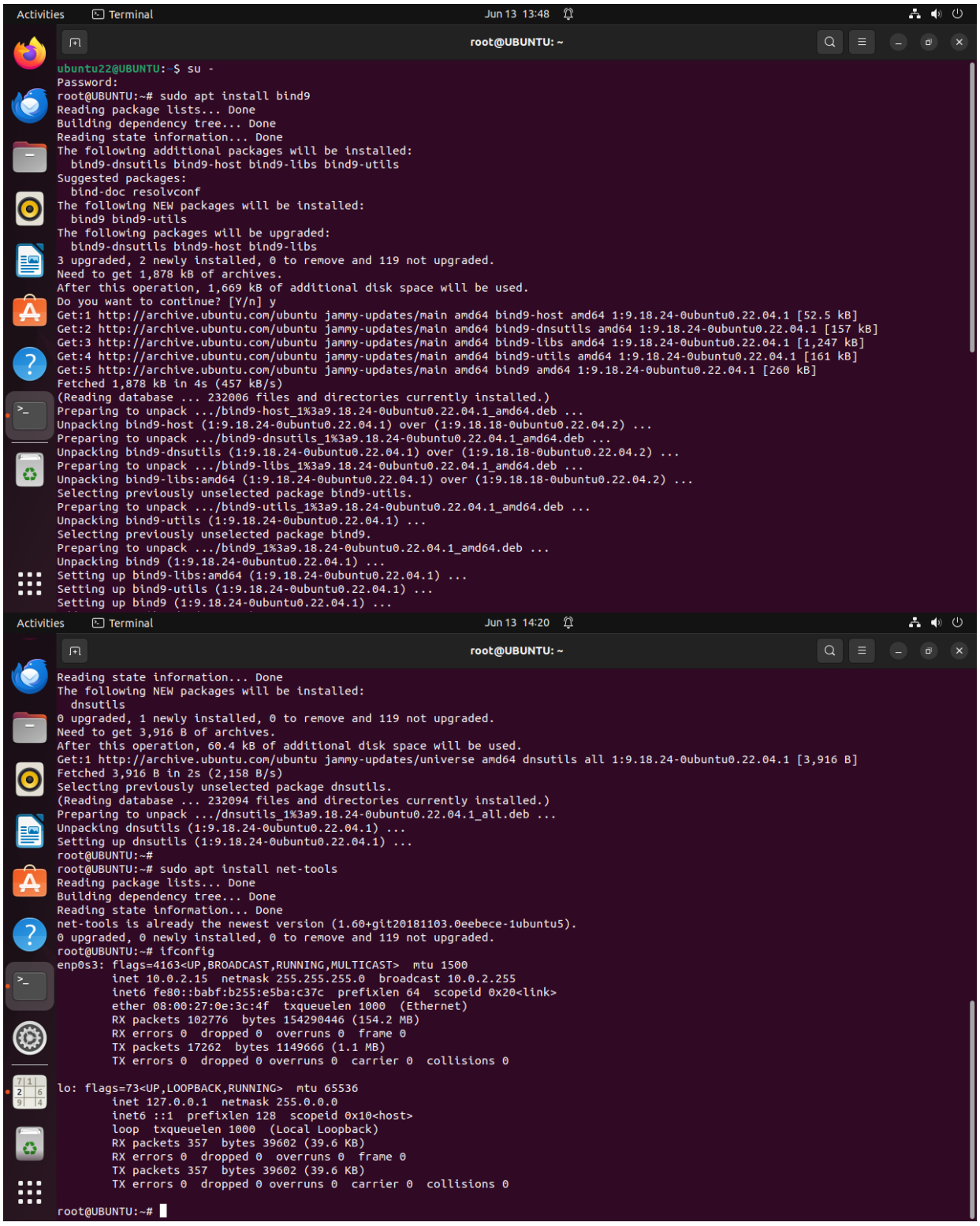
7. Gather information about your DNS server

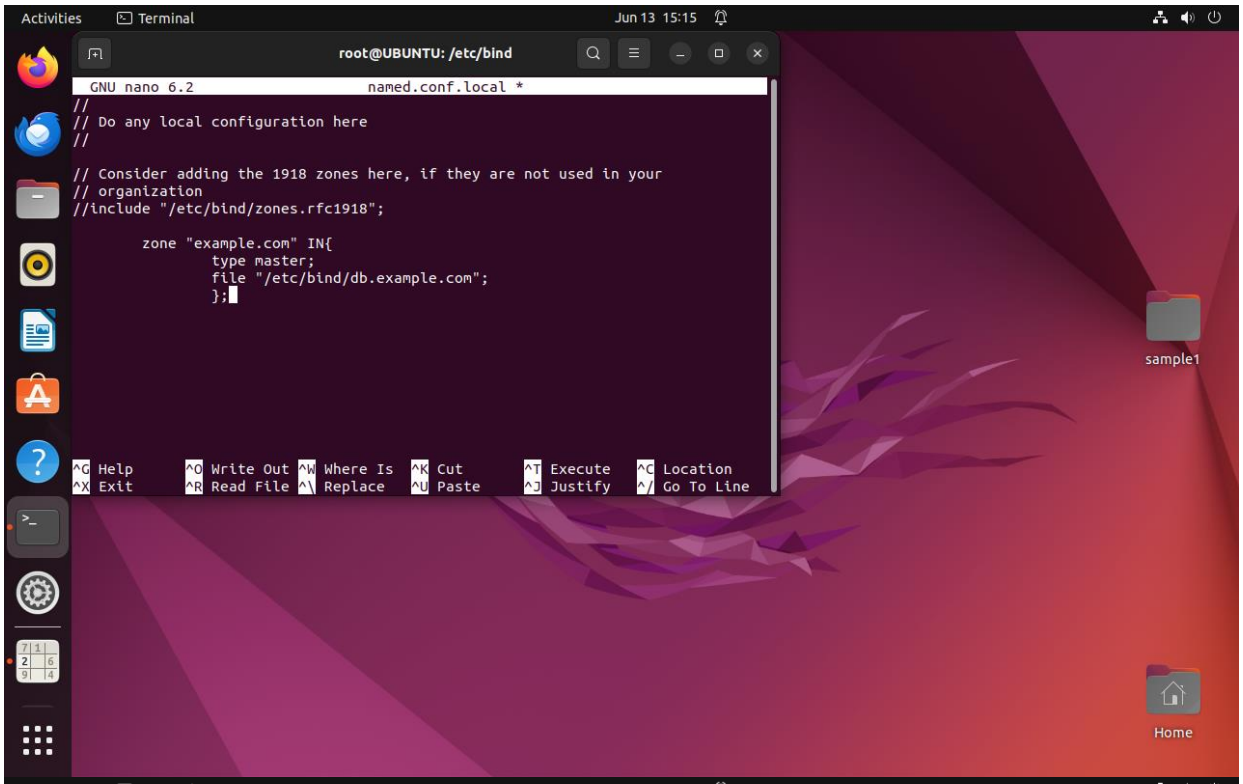
$dig ubuntu.example.com

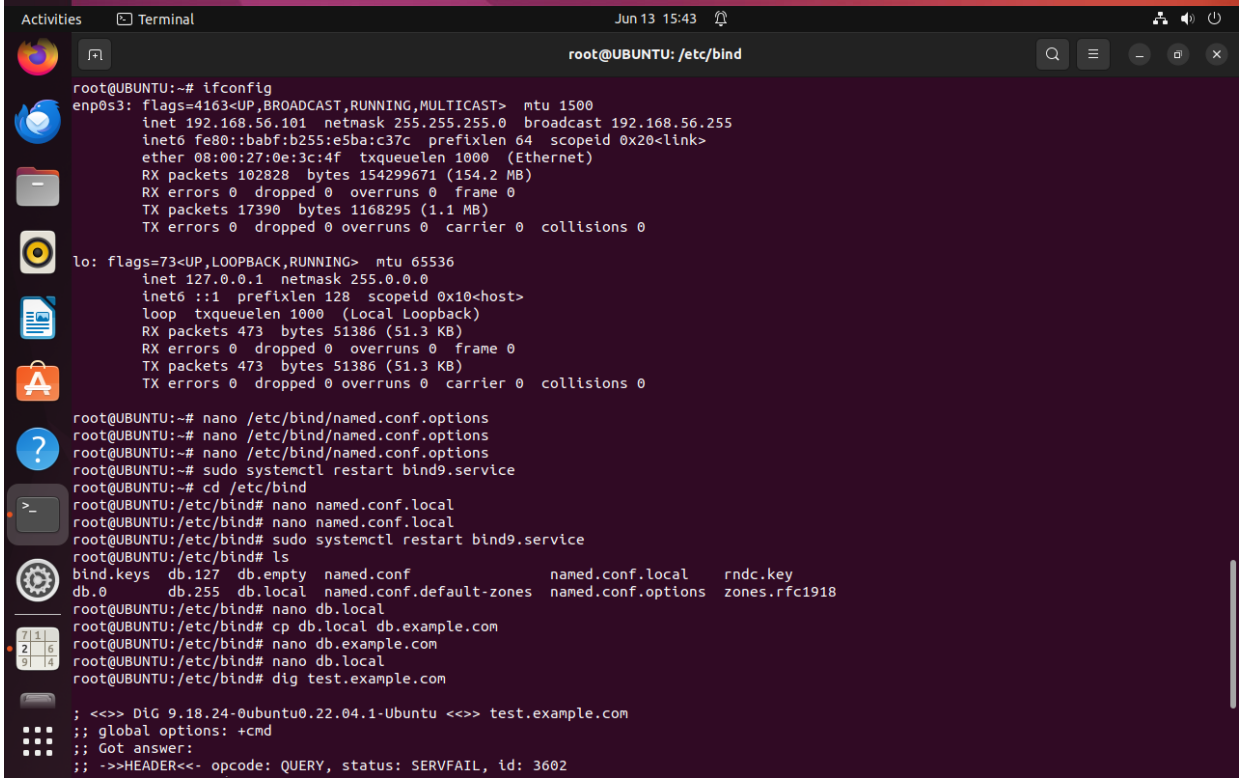
$dig www.example.com

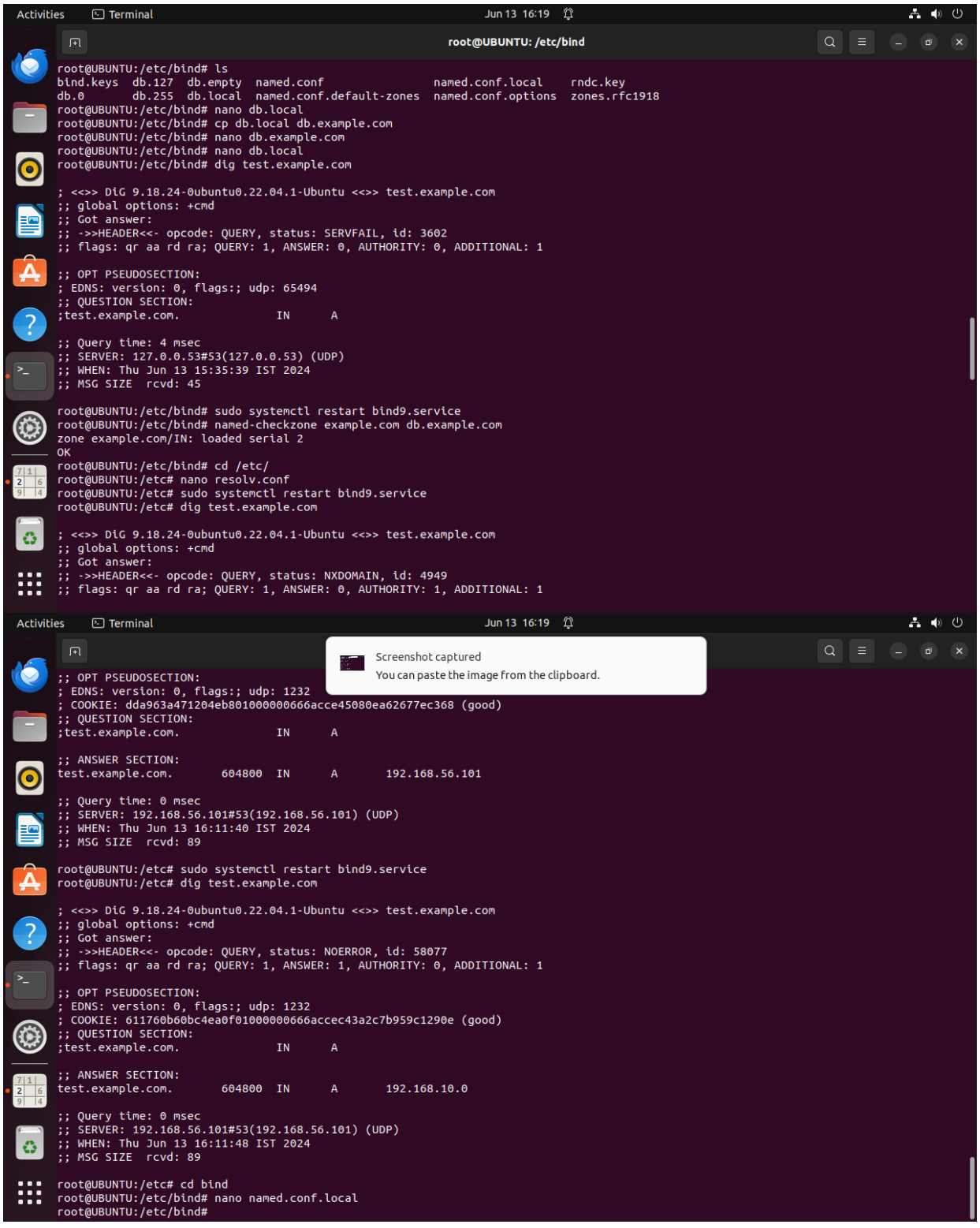
$dig ftp.example.com

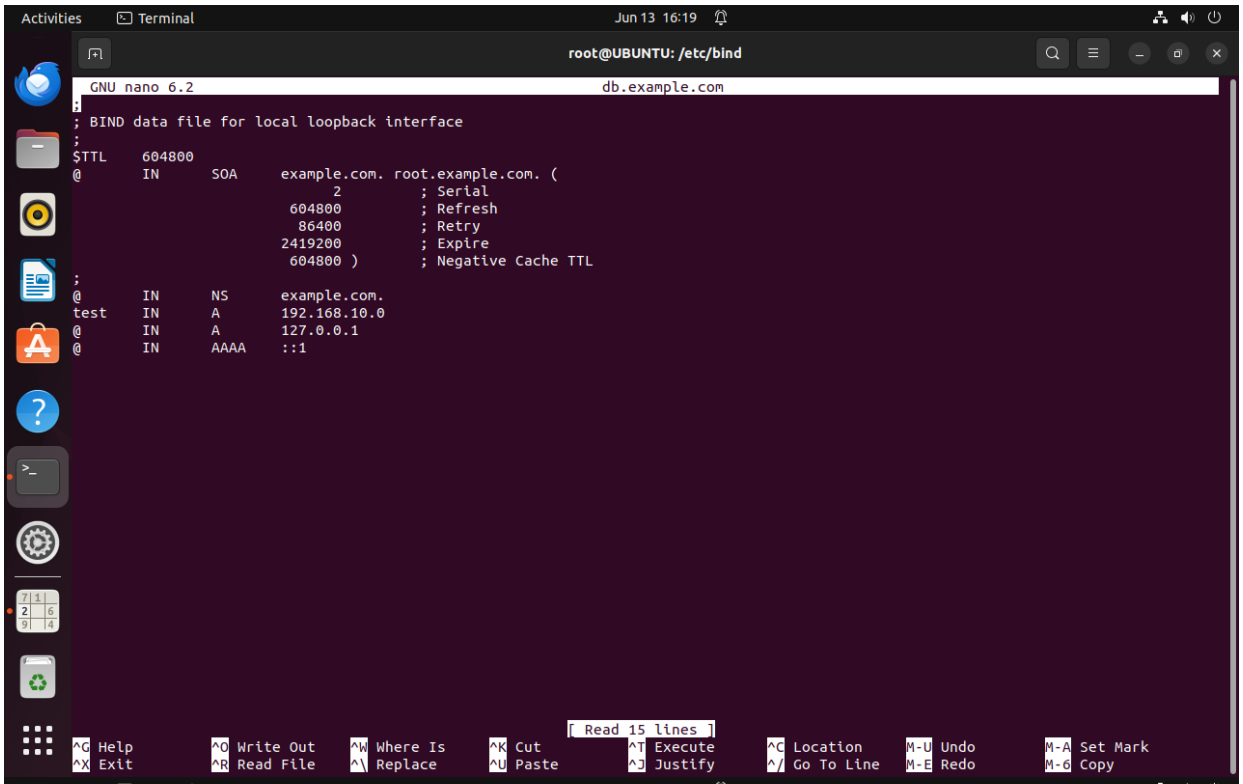
Result:

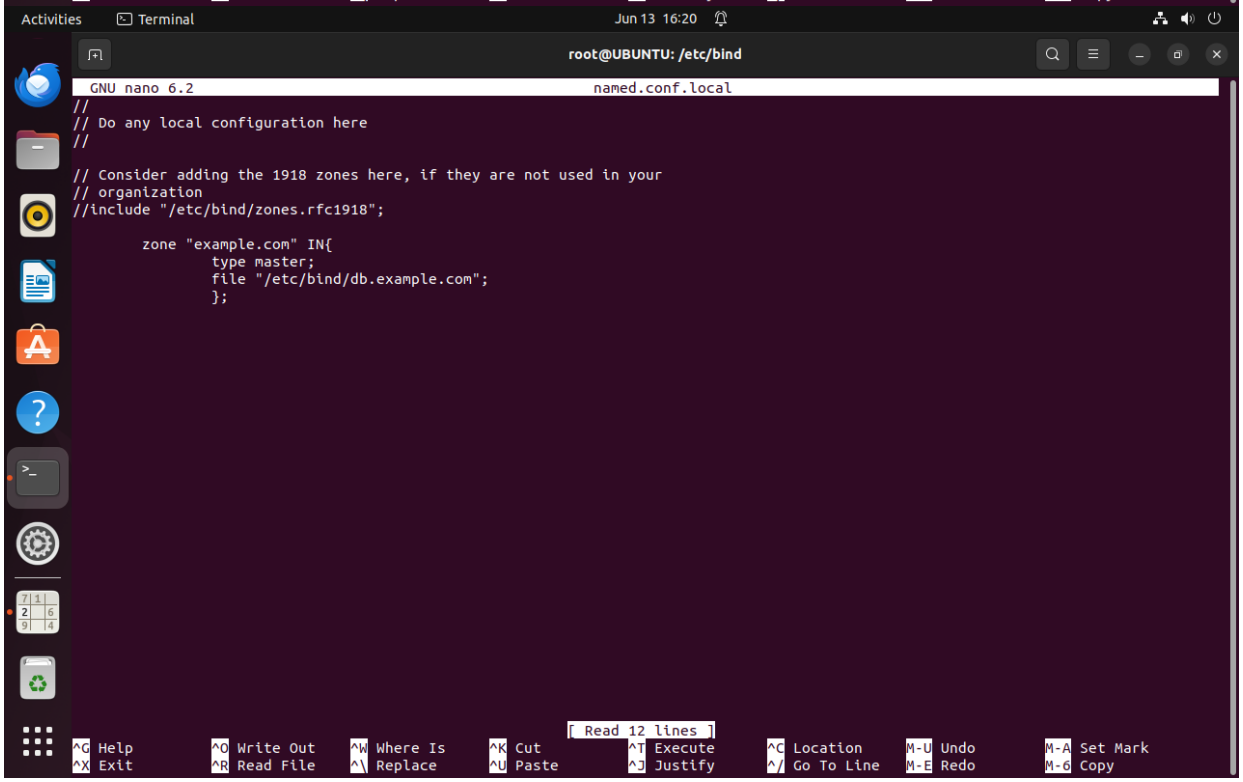

Activities
Terminal
Jun 13 13:48
root@UBUNTU: ~
ubuntu22@UBUNTU:~$ su -
Password:
root@UBUNTU:~# sudo apt install bind9
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
bind9-dnsutils bind9-host bind9-libs 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:~#


Activities
Terminal
Jun 13 15:15
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 ^\ Replace ^U Paste ^J Justify ^/ Go To Line
sample1
Home


Activities
Terminal
Jun 13 15:43
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
Activities
Terminal
Jun 13 16:19
Screenshot captured
You can paste the image from the clipboard.
;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: dda963a471204eb801000000666acce45080ea62677ec368 (good)
;; QUESTION SECTION:
;test.example.com. IN A
;; ANSWER SECTION:
test.example.com. 604800 IN A 192.168.56.101
;; Query time: 0 msec
;; SERVER: 192.168.56.101#53(192.168.56.101) (UDP)
;; WHEN: Thu Jun 13 16:11:40 IST 2024
;; MSG SIZE rcvd: 89
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: NOERROR, id: 58077
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1
;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: 611760b60bc4ea0f01000000666accec43a2c7b959c1290e (good)
;; QUESTION SECTION:
;test.example.com. IN A
;; ANSWER SECTION:
test.example.com. 604800 IN A 192.168.10.0
;; Query time: 0 msec
;; SERVER: 192.168.56.101#53(192.168.56.101) (UDP)
;; WHEN: Thu Jun 13 16:11:48 IST 2024
;; MSG SIZE rcvd: 89
root@UBUNTU:/etc# cd bind
root@UBUNTU:/etc/bind# nano named.conf.local
root@UBUNTU:/etc/bind#





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