DNS

Experiment: 2

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

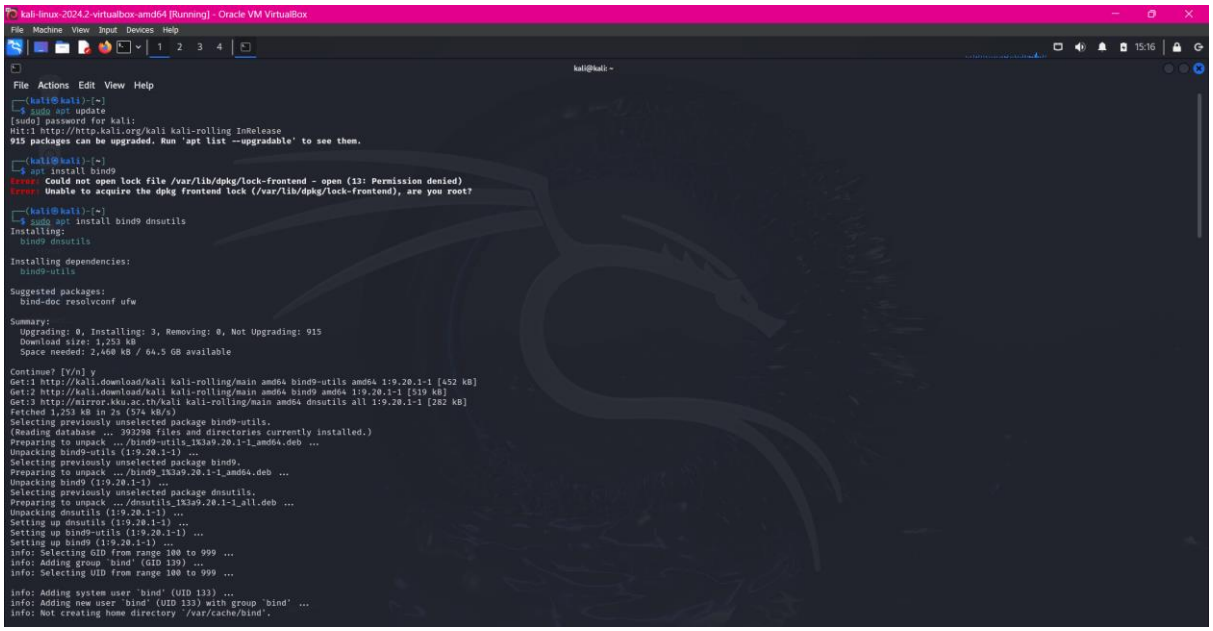
7. Gather information about your DNS server

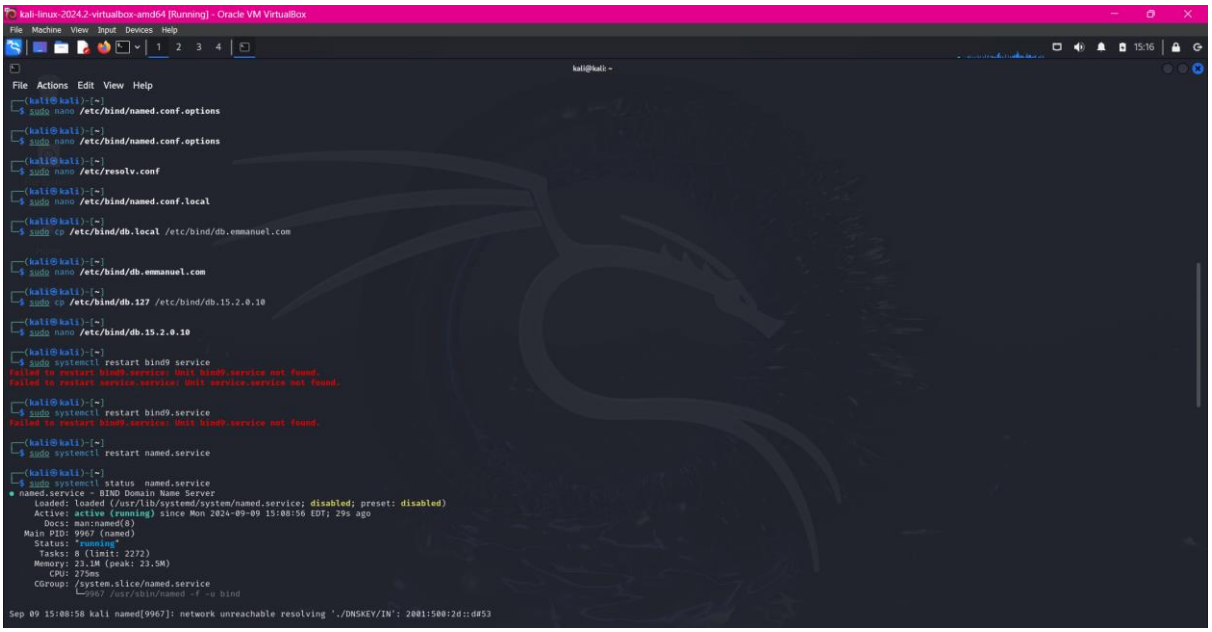
$dig ubuntu.example.com

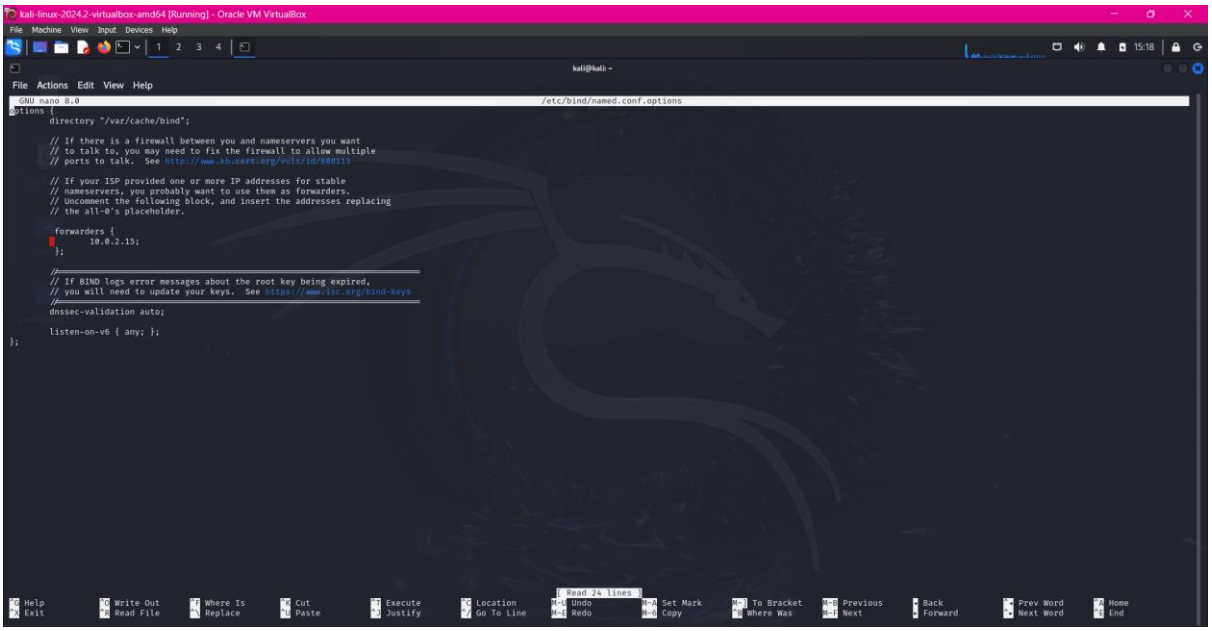
$dig www.example.com

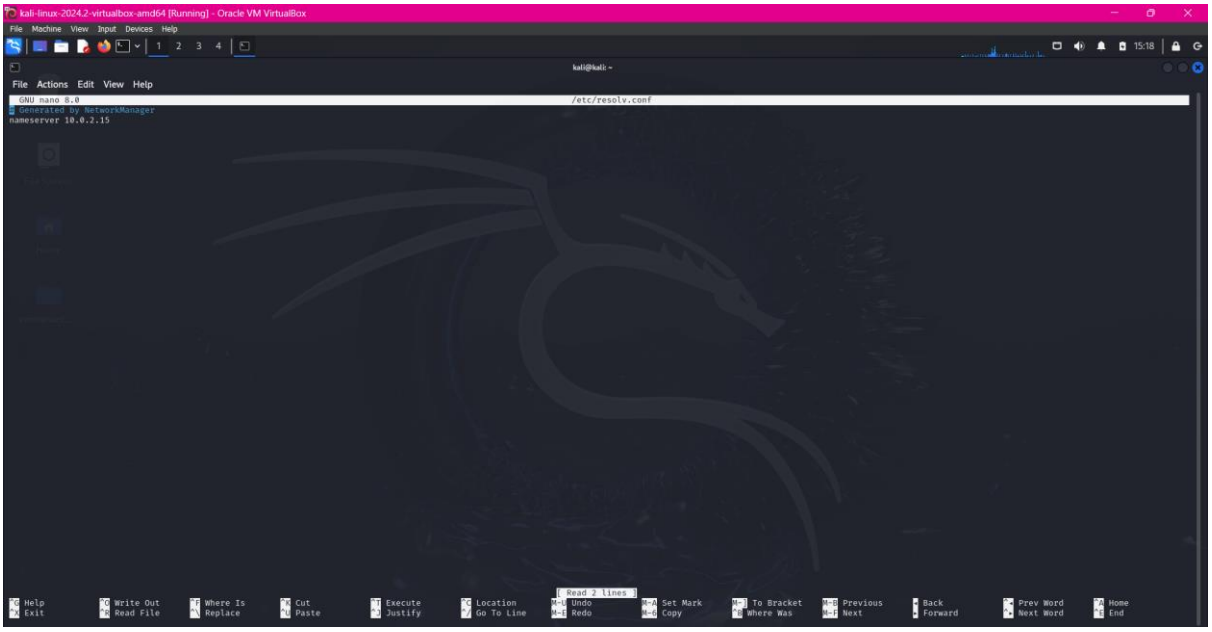
$dig ftp.example.com

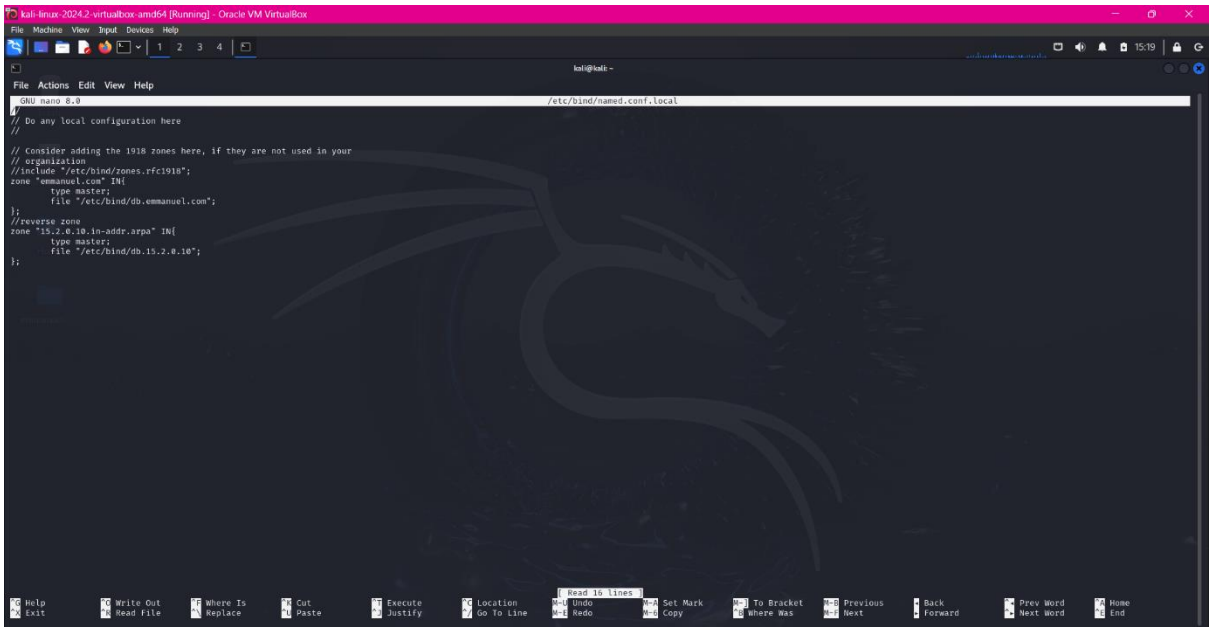
Result:

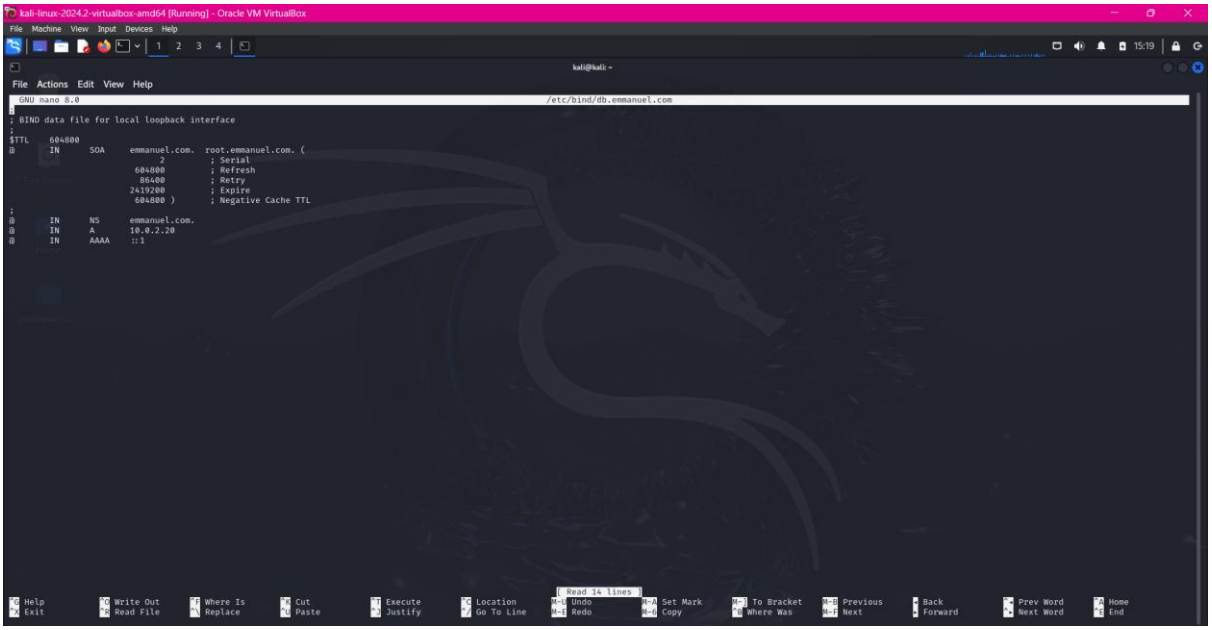

kali-linux-2024.2-virtualbox-amd64 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
kali@kali: ~
File Actions Edit View Help
(kali㉿kali)-[~]
$ sudo apt update
[sudo] password for kali:
Hit:1 http://http.kali.org/kali kali-rolling InRelease
915 packages can be upgraded. Run 'apt list --upgradable' to see them.
(kali㉿kali)-[~]
$ apt install bind9
Error: Could not open lock file /var/lib/dpkg/lock-frontend - open (13: Permission denied)
Error: Unable to acquire the dpkg frontend lock (/var/lib/dpkg/lock-frontend), are you root?
(kali㉿kali)-[~]
$ sudo apt install bind9 dnsutils
Installing:
bind9 dnsutils
Installing dependencies:
bind9-utils
Suggested packages:
bind-doc resolvconf ufw
Summary:
Upgrading: 0, Installing: 3, Removing: 0, Not Upgrading: 915
Download size: 1,253 kB
Space needed: 2,468 kB / 64.5 GB available
Continue? [Y/n] y
Get:1 http://kali.download/kali kali-rolling/main amd64 bind9-utils amd64 1:9.20.1-1 [452 kB]
Get:2 http://kali.download/kali kali-rolling/main amd64 bind9 amd64 1:9.20.1-1 [519 kB]
Get:3 http://mirror.kku.ac.th/kali kali-rolling/main amd64 dnsutils all 1:9.20.1-1 [282 kB]
Fetched 1,253 kB in 2s (574 kB/s)
Selecting previously unselected package bind9-utils.
(Reading database ... 393298 files and directories currently installed.)
Preparing to unpack .../bind9-utils_1%3a9.20.1-1_amd64.deb ...
Unpacking bind9-utils (1:9.20.1-1) ...
Selecting previously unselected package bind9.
Preparing to unpack .../bind9_1%3a9.20.1-1_amd64.deb ...
Unpacking bind9 (1:9.20.1-1) ...
Selecting previously unselected package dnsutils.
Preparing to unpack .../dnsutils_1%3a9.20.1-1_all.deb ...
Unpacking dnsutils (1:9.20.1-1) ...
Setting up dnsutils (1:9.20.1-1) ...
Setting up bind9-utils (1:9.20.1-1) ...
Setting up bind9 (1:9.20.1-1) ...
info: Selecting GID from range 100 to 999 ...
info: Adding group `bind' (GID 139) ...
info: Selecting UID from range 100 to 999 ...
info: Adding system user `bind' (UID 133) ...
info: Adding new user `bind' (UID 133) with group `bind' ...
info: Not creating home directory `/var/cache/bind'.

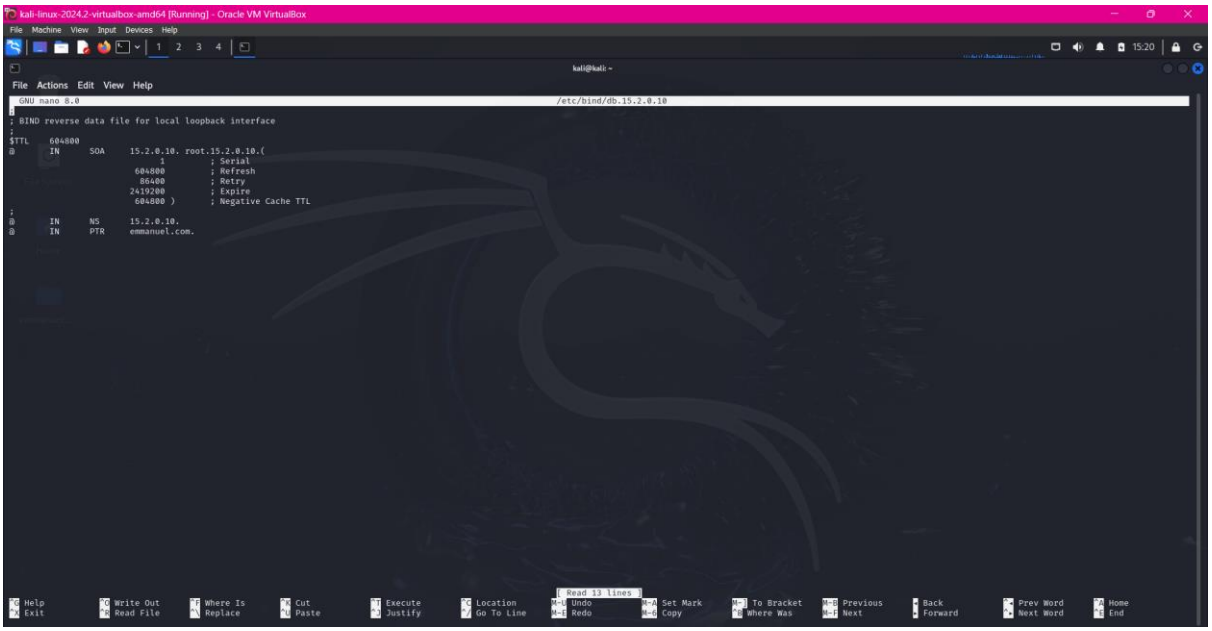

kali-linux-2024.2-virtualbox-amd64 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
kali@kali: ~
File Actions Edit View Help
(kali㉿kali)-[~]
$ sudo nano /etc/bind/named.conf.options
(kali㉿kali)-[~]
$ sudo nano /etc/bind/named.conf.options
(kali㉿kali)-[~]
$ sudo nano /etc/resolv.conf
(kali㉿kali)-[~]
$ sudo nano /etc/bind/named.conf.local
(kali㉿kali)-[~]
$ sudo cp /etc/bind/db.local /etc/bind/db.emmanuel.com
(kali㉿kali)-[~]
$ sudo nano /etc/bind/db.emmanuel.com
(kali㉿kali)-[~]
$ sudo cp /etc/bind/db.127 /etc/bind/db.15.2.0.10
(kali㉿kali)-[~]
$ sudo nano /etc/bind/db.15.2.0.10
(kali㉿kali)-[~]
$ sudo systemctl restart bind9 service
Failed to restart bind9.service: Unit bind9.service not found.
Failed to restart service.service: Unit service.service not found.
(kali㉿kali)-[~]
$ sudo systemctl restart bind9.service
Failed to restart bind9.service: Unit bind9.service not found.
(kali㉿kali)-[~]
$ sudo systemctl restart named.service
(kali㉿kali)-[~]
$ sudo systemctl status named.service
● named.service - BIND Domain Name Server
Loaded: loaded (/usr/lib/systemd/system/named.service; disabled; preset: disabled)
Active: active (running) since Mon 2024-09-09 15:08:56 EDT; 29s ago
Docs: man:named(8)
Main PID: 9967 (named)
Status: "running"
Tasks: 8 (limit: 2272)
Memory: 23.1M (peak: 23.5M)
CPU: 275ms
CGroup: /system.slice/named.service
└─9967 /usr/sbin/named -f -u bind
Sep 09 15:08:58 kali named[9967]: network unreachable resolving './DNSKEY/IN': 2001:500:2d::d#53

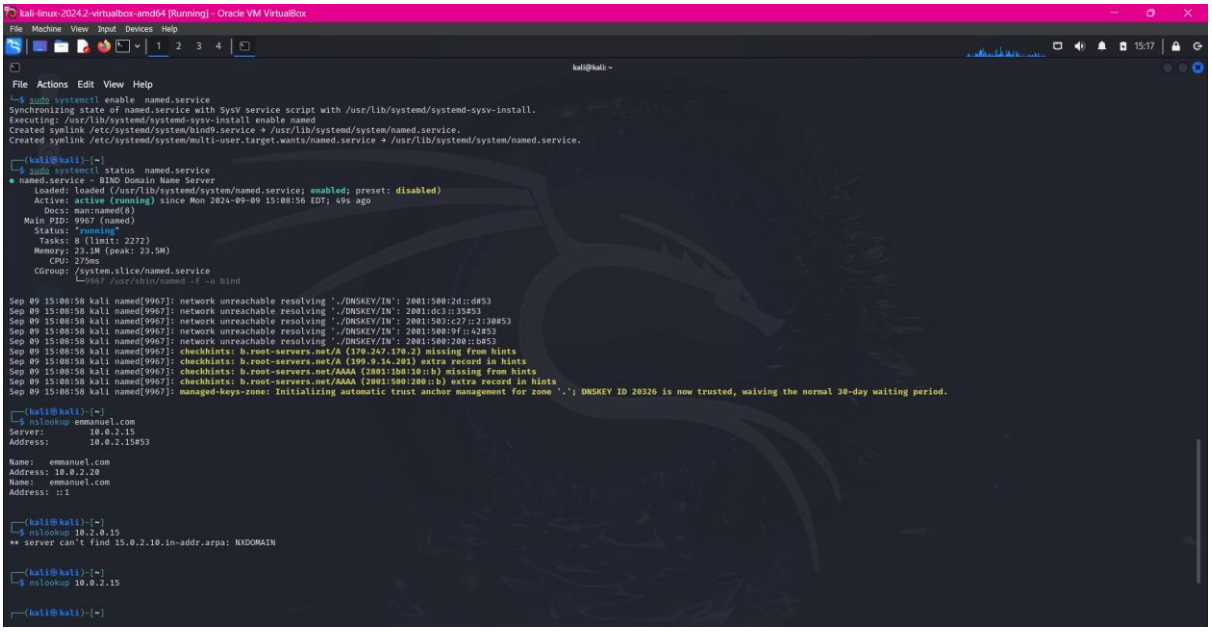

kali-linux-2024.2-virtualbox-amd64 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
kali@kali ~
File Actions Edit View Help
GNU nano 8.0 /etc/bind/named.conf.options
options {
directory "/var/cache/bind";
// If there is a firewall between you and nameservers you want
// to talk to, you may need to fix the firewall to allow multiple
// ports to talk. See http://www.kb.cert.org/vuls/id/800113
// If your ISP provided one or more IP addresses for stable
// nameservers, you probably want to use them as forwarders.
// Uncomment the following block, and insert the addresses replacing
// the all-0's placeholder.
forwarders {
10.0.2.15;
};
//==
// If BIND logs error messages about the root key being expired,
// you will need to update your keys. See https://www.isc.org/bind-keys
//==
dnssec-validation auto;
listen-on-v6 { any; };
};
Read 24 lines
Help
Write Out
Where Is
Cut
Execute
Location
Undo
Set Mark
To Bracket
Previous
Back
Prev Word
Home
Exit
Read File
Replace
Paste
Justify
Go To Line
Redo
Copy
Where Was
Next
Forward
Next Word
End


kali-linux-2024.2-virtualbox-amd64 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
kali@kali ~
File Actions Edit View Help
GNU nano 8.0 /etc/resolv.conf
Generated by NetworkManager
nameserver 10.0.2.15
Read 2 lines
Help
Write Out
Where Is
Cut
Execute
Location
Undo
Set Mark
To Bracket
Previous
Back
Prev Word
Home
Exit
Read File
Replace
Paste
Justify
Go To Line
Redo
Copy
Where Was
Next
Forward
Next Word
End


kali-linux-2024.2-virtualbox-amd64 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
kali@kali: ~
File Actions Edit View Help
GNU nano 8.0 /etc/bind/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 "emmanuel.com" IN{
type master;
file "/etc/bind/db.emmanuel.com";
};
//reverse zone
zone "15.2.0.10.in-addr.arpa" IN{
type master;
file "/etc/bind/db.15.2.0.10";
};
[Read 16 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location M-U Undo M-A Set Mark M-] To Bracket M-Q Previous ^B Back ^← Prev Word ^A Home
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line M-E Redo M-6 Copy ^Q Where Was M-W Next ^F Forward ^→ Next Word ^E End


kali-linux-2024.2-virtualbox-amd64 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
kali@kali: ~
File Actions Edit View Help
GNU nano 8.0 /etc/bind/db.emmanuel.com
; BIND data file for local loopback interface
;
$TTL 604800
@ IN SOA emmanuel.com. root.emmanuel.com. (
2 ; Serial
604800 ; Refresh
86400 ; Retry
2419200 ; Expire
604800) ; Negative Cache TTL
;
@ IN NS emmanuel.com.
@ IN A 10.0.2.20
@ IN AAAA ::1
[Read 14 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location M-U Undo M-A Set Mark M-] To Bracket M-Q Previous ^B Back ^← Prev Word ^A Home
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line M-E Redo M-6 Copy ^Q Where Was M-W Next ^F Forward ^→ Next Word ^E End


kali-linux-2024.2-virtualbox-amd64 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
File Actions Edit View Help
GNU nano 8.0 /etc/bind/db.15.2.0.10
; BIND reverse data file for local loopback interface
$TTL 604800
@ IN SOA 15.2.0.10. root.15.2.0.10.(
1 ; Serial
604800 ; Refresh
86400 ; Retry
2419200 ; Expire
604800) ; Negative Cache TTL
@ IN NS 15.2.0.10.
@ IN PTR emmanuel.com.
Read 13 lines
Help
Exit
Write Out
Read File
Where Is
Replace
Cut
Paste
Execute
Justify
Location
Go To Line
Undo
Redo
Set Mark
Copy
To Bracket
Where Was
Previous
Next
Back
Forward
Prev Word
Next Word
Home
End


kali-linux-2024.2-virtualbox-amd64 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
File Actions Edit View Help
sudo systemctl enable named.service
Synchronizing state of named.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable named
Created symlink /etc/systemd/system/bind9.service → /usr/lib/systemd/system/named.service.
Created symlink /etc/systemd/system/multi-user.target.wants/named.service → /usr/lib/systemd/system/named.service.
sudo systemctl status named.service
named.service - BIND Domain Name Server
Loaded: loaded (/usr/lib/systemd/system/named.service; enabled; preset: disabled)
Active: active (running) since Mon 2024-09-09 15:08:56 EDT; 49s ago
Docs: man:named(8)
Main PID: 9967 (named)
Status: "running"
Tasks: 8 (limit: 2272)
Memory: 23.1M (peak: 23.5M)
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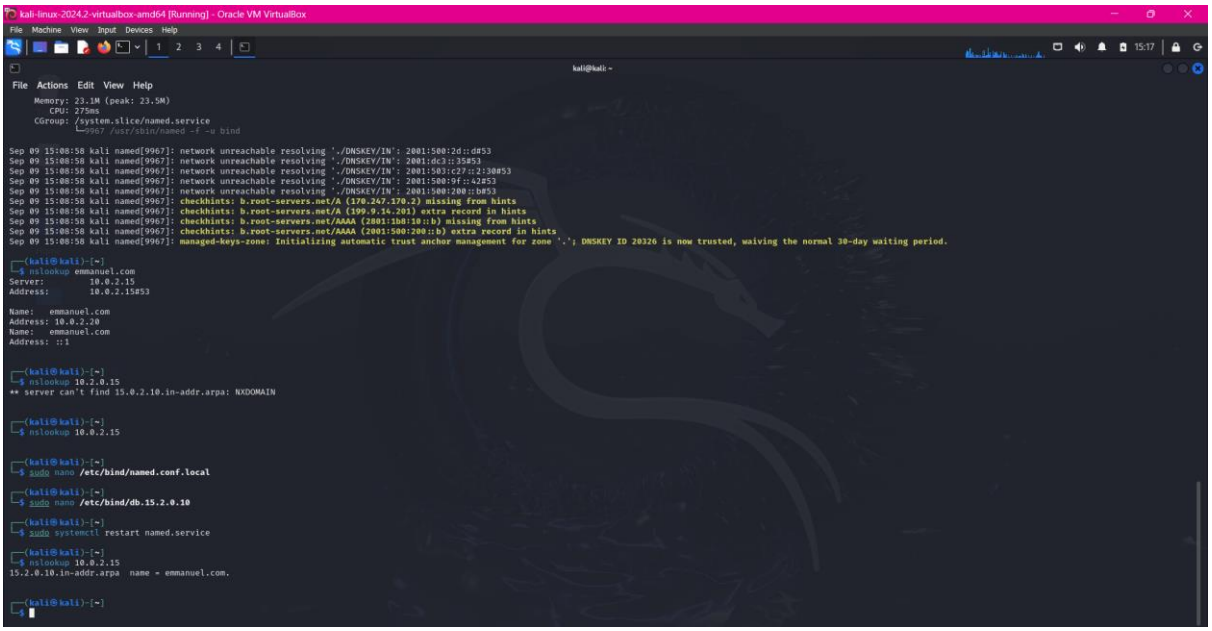
Sep 09 15:08:58 kali named[9967]: network unreachable resolving './DNSKEY/IN': 2001:500:2d::d#53
Sep 09 15:08:58 kali named[9967]: network unreachable resolving './DNSKEY/IN': 2001:dc3::35#53
Sep 09 15:08:58 kali named[9967]: network unreachable resolving './DNSKEY/IN': 2001:503:c27::2:30#53
Sep 09 15:08:58 kali named[9967]: network unreachable resolving './DNSKEY/IN': 2001:500:9f::42#53
Sep 09 15:08:58 kali named[9967]: network unreachable resolving './DNSKEY/IN': 2001:500:200::b#53
Sep 09 15:08:58 kali named[9967]: checkhints: b.root-servers.net/A (170.247.170.2) missing from hints
Sep 09 15:08:58 kali named[9967]: checkhints: b.root-servers.net/A (199.9.14.201) extra record in hints
Sep 09 15:08:58 kali named[9967]: checkhints: b.root-servers.net/AAAA (2801:1b8:10::b) missing from hints
Sep 09 15:08:58 kali named[9967]: checkhints: b.root-servers.net/AAAA (2001:500:200::b) extra record in hints
Sep 09 15:08:58 kali named[9967]: managed-keys-zone: Initializing automatic trust anchor management for zone '.'; DNSKEY ID 20326 is now trusted, waiving the normal 30-day waiting period.
nslookup emmanuel.com
Server: 10.0.2.15
Address: 10.0.2.15#53
Name: emmanuel.com
Address: 10.0.2.20
Name: emmanuel.com
Address: ::1
nslookup 10.2.0.15
** server can't find 15.0.2.10.in-addr.arpa: NXDOMAIN
nslookup 10.0.2.15



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