

MANAJEMEN JARINGAN



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I. INSTALASI DAN KONFIGURASI SERVER HTTP

HyperText Transfer Protocol (HTTP) merupakan protokol yang digunakan untuk menyediakan layanan web. HTTP menggunakan model *client/server*. *Server HTTP* dapat

dibangun menggunakan aplikasi *Apache* dengan nama paket **httpd** pada *CentOS 7*. Adapun langkah-langkah menginstalasi dan mengkonfigurasi serta mengujicoba server HTTP pada CT ID 100 adalah sebagai berikut:

1. Memverifikasi apakah paket aplikasi *httpd* telah terinstalasi pada sistem Linux menggunakan perintah “**yum list installed | grep httpd**”.

```
[root@rokyal ~]# yum list installed | grep httpd
[root@rokyal ~]#
```

2. Menginstalasi paket aplikasi *httpd* sebagai Server HTTP menggunakan perintah “**yum -y install httpd**”.

```
ended download. Suggestion: run yum --enablerepo=updates clean metadata
Trying other mirror.
apr-1.4.8-7.el7.x86_64.rpm FAILED
http://vpsmurah.jagoanhosting.com/centos/7.9.2009/os/x86_64/Packages/apr-1.4.8-7.el7.x86_64.rpm: [Errno -1] Package d
: run yum --enablerepo=base clean metadata
Trying other mirror.
mailcap-2.1.41-2.el7.noarch.rpm FAILED
http://mirror.gi.co.id/centos/7.9.2009/os/x86_64/Packages/mailcap-2.1.41-2.el7.noarch.rpm: [Errno -1] Package does no
yum --enablerepo=base clean metadata
Trying other mirror.
apr-util-1.5.2-6.el7.x86_64.rpm FAILED
http://mirror.papua.go.id/centos/7.9.2009/os/x86_64/Packages/apr-util-1.5.2-6.el7.x86_64.rpm: [Errno -1] Package does
un yum --enablerepo=base clean metadata
Trying other mirror.
(1/5): apr-util-1.5.2-6.el7.x86_64.rpm
(2/5): mailcap-2.1.41-2.el7.noarch.rpm
(3/5): httpd-tools-2.4.6-97.el7.centos.1.x86_64.rpm
(4/5): apr-1.4.8-7.el7.x86_64.rpm
httpd-2.4.6-97.el7.centos.1.x86_64.rpm FAILED
http://mirror.cepatcloud.id/centos/7.9.2009/updates/x86_64/Packages/httpd-2.4.6-97.el7.centos.1.x86_64.rpm: [Errno -1]
Suggestion: run yum --enablerepo=updates clean metadata
Trying other mirror.
(5/5): httpd-2.4.6-97.el7.centos.1.x86_64.rpm
-----
Total
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
Installing : apr-1.4.8-7.el7.x86_64
Installing : apr-util-1.5.2-6.el7.x86_64
Installing : httpd-tools-2.4.6-97.el7.centos.1.x86_64
Installing : mailcap-2.1.41-2.el7.noarch
Installing : httpd-2.4.6-97.el7.centos.1.x86_64
Verifying : apr-1.4.8-7.el7.x86_64
Verifying : mailcap-2.1.41-2.el7.noarch
Verifying : httpd-2.4.6-97.el7.centos.1.x86_64
Verifying : apr-util-1.5.2-6.el7.x86_64
Verifying : httpd-tools-2.4.6-97.el7.centos.1.x86_64

Installed:
httpd.x86_64 0:2.4.6-97.el7.centos.1

Dependency Installed:
apr.x86_64 0:1.4.8-7.el7 apr-util.x86_64 0:1.5.2-6.el7 httpd-tools.x86_64 0:2.4.6-97.el7.centos.1

Complete!
[root@rokyal ~]#
```

3. Mengatur *directive* *ServerName* agar layanan HTTP dapat diakses oleh *client* menggunakan nama server “**rokyal.bumigora.local**” pada port “**80**”.

a. Berpindah ke direktori yang memuat file konfigurasi utama dari *httpd* yaitu */etc/httpd/conf*

```
Complete!
[root@rokyal ~]# cd /etc/httpd/conf
[root@rokyal conf]#
```

b. Menampilkan informasi di direktori mana saat ini berada menggunakan perintah “pwd”.

```
[root@rokyal conf]# pwd
/etc/httpd/conf
[root@rokyal conf]# _
```

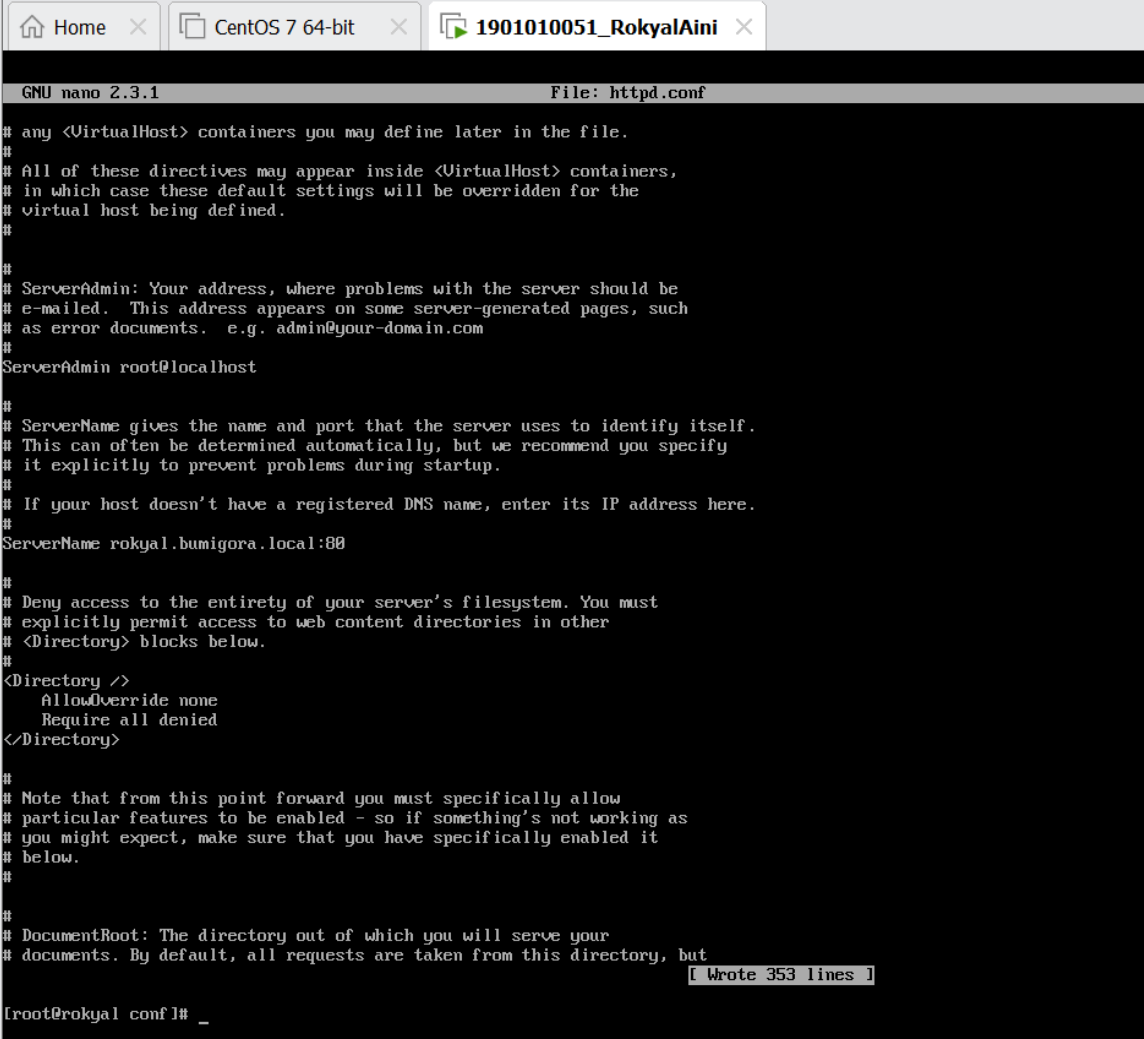
c. Menampilkan isi dari direktori dimana saat ini berada

```
[root@rokyal conf]# ls
httpd.conf  magic
[root@rokyal conf]#
```

d. Menyalin file konfigurasi “httpd.conf” menjadi “httpd.conf.backup” dan memverifikasi hasil penyalinan file tersebut.

```
[root@rokyal conf]# cp httpd.conf httpd.conf.backup
[root@rokyal conf]# ls
httpd.conf  httpd.conf.backup  magic
[root@rokyal conf]# _
```

e. Mengubah konfigurasi “httpd.conf” menggunakan editor *nano*.



```
GNU nano 2.3.1 File: httpd.conf

# any <VirtualHost> containers you may define later in the file.
#
# All of these directives may appear inside <VirtualHost> containers,
# in which case these default settings will be overridden for the
# virtual host being defined.
#
#
# ServerAdmin: Your address, where problems with the server should be
# e-mailed. This address appears on some server-generated pages, such
# as error documents. e.g. admin@your-domain.com
#
ServerAdmin root@localhost
#
#
# ServerName gives the name and port that the server uses to identify itself.
# This can often be determined automatically, but we recommend you specify
# it explicitly to prevent problems during startup.
#
# If your host doesn't have a registered DNS name, enter its IP address here.
#
ServerName rokyal.bumigora.local:80
#
#
# Deny access to the entirety of your server's filesystem. You must
# explicitly permit access to web content directories in other
# <Directory> blocks below.
#
<Directory />
    AllowOverride none
    Require all denied
</Directory>
#
# Note that from this point forward you must specifically allow
# particular features to be enabled - so if something's not working as
# you might expect, make sure that you have specifically enabled it
# below.
#
#
# DocumentRoot: The directory out of which you will serve your
# documents. By default, all requests are taken from this directory, but
[ Wrote 353 lines ]

[root@rokyal conf]# _
```

4. Mengaktifkan *service httpd* secara permanen menggunakan perintah “**systemctl enable httpd**” agar diaktifkan secara langsung ketika *booting Linux*.

```
[root@rokyal conf]# systemctl enable httpd
Created symlink from /etc/systemd/system/multi-user.target.wants/httpd.service to /usr/lib/systemd/system/httpd.service.
[root@rokyal conf]#
```

5. Memverifikasi proses pengaktifan *service httpd*

```
[root@rokyal conf]# systemctl is-enabled httpd
enabled
[root@rokyal conf]#
```

6. Menjalankan *service httpd* dengan perintah “**systemctl start httpd**”

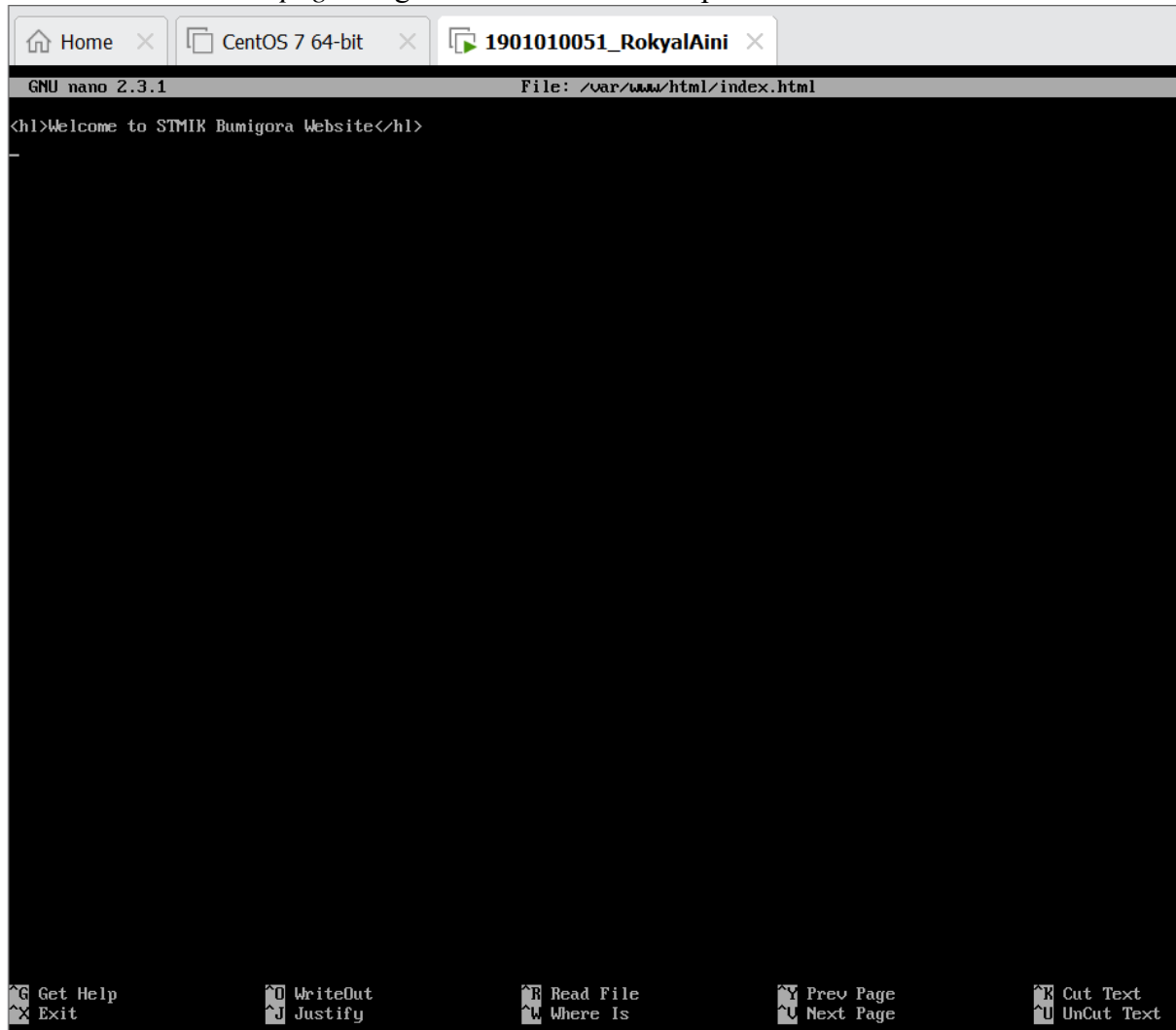
```
[root@rokyal conf]# systemctl start httpd
[root@rokyal conf]# _
```

7. Memverifikasi status *service httpd* menggunakan perintah “**systemctl status httpd**”.

```
[root@rokyal conf]# systemctl status httpd
■ httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disabled)
   Active: active (running) since Fri 2021-11-05 01:51:00 WITA; 1min 16s ago
     Docs: man:httpd(8)
           man:apachectl(8)
   Main PID: 16761 (httpd)
   Status: "Total requests: 0; Current requests/sec: 0; Current traffic:  0 B/sec"
   CGroup: /system.slice/httpd.service
           └─16761 /usr/sbin/httpd -DFOREGROUND
             └─16762 /usr/sbin/httpd -DFOREGROUND
               └─16763 /usr/sbin/httpd -DFOREGROUND
                 └─16764 /usr/sbin/httpd -DFOREGROUND
                   └─16765 /usr/sbin/httpd -DFOREGROUND
                     └─16766 /usr/sbin/httpd -DFOREGROUND

Nov 05 01:51:00 rokyal.bumigora.local systemd[1]: Starting The Apache HTTP Server...
Nov 05 01:51:00 rokyal.bumigora.local systemd[1]: Started The Apache HTTP Server.
[root@rokyal conf]# _
```

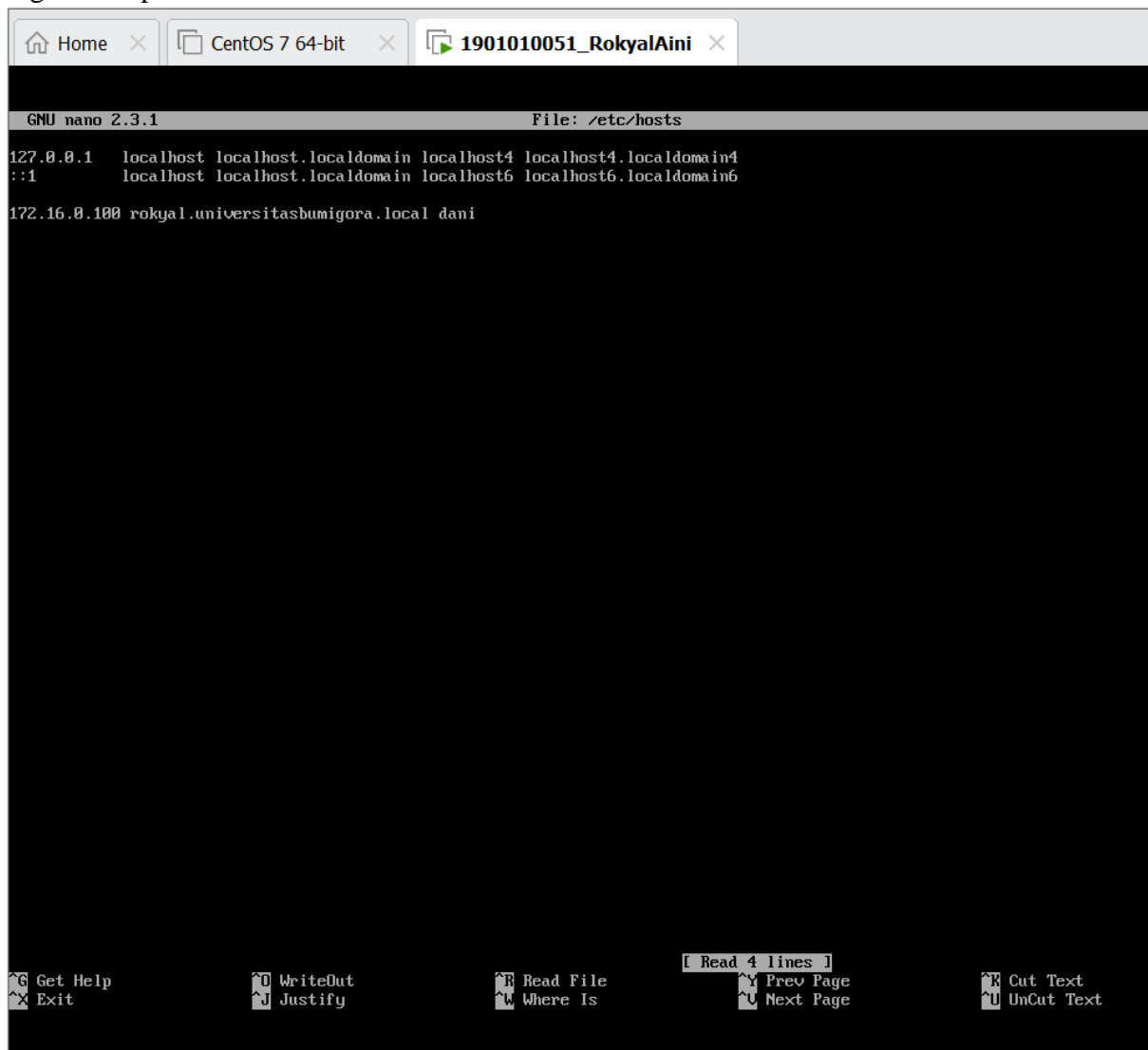
8. Membuat file *homepage* dengan nama “**index.html**” pada direktori */var/www/html*.



The screenshot shows a terminal window with three tabs: 'Home', 'CentOS 7 64-bit', and '1901010051_RokyalAini'. The active tab is '1901010051_RokyalAini'. The terminal displays the GNU nano 2.3.1 text editor editing the file `/var/www/html/index.html`. The editor's content is `<h1>Welcome to STMIK Bumigora Website</h1>`. The bottom status bar shows various keyboard shortcuts: `^G Get Help`, `^X Exit`, `^O WriteOut`, `^J Justify`, `^R Read File`, `^W Where Is`, `^Y Prev Page`, `^N Next Page`, `^K Cut Text`, and `^U UnCut Text`.

```
GNU nano 2.3.1                                File: /var/www/html/index.html
<h1>Welcome to STMIK Bumigora Website</h1>
-
^G Get Help      ^O WriteOut      ^R Read File     ^Y Prev Page     ^K Cut Text
^X Exit          ^J Justify       ^W Where Is      ^N Next Page     ^U UnCut Text
```

9. Mengatur pemetaan secara statik alamat IP ke **namakomputer.namadomain** yang digunakan pada file **/etc/hosts**.



The screenshot shows a terminal window with three tabs: 'Home', 'CentOS 7 64-bit', and '1901010051_RokyalAini'. The active tab is '1901010051_RokyalAini'. The terminal displays the GNU nano 2.3.1 editor editing the file /etc/hosts. The content of the file is as follows:

```
127.0.0.1    localhost localhost.localdomain localhost4 localhost4.localdomain4
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
172.16.0.100 rokyal.universitasbumigora.local dani
```

At the bottom of the terminal, there is a status bar with various shortcuts and a line counter:

- Get Help
- Exit
- WriteOut
- Justify
- Read File
- Where Is
- Read 4 lines
- Prev Page
- Next Page
- Cut Text
- UnCut Text

10. Menginstalasi *browser* berbasis teks dengan nama “**lynx**” agar dapat mengujicoba layanan server HTTP.

yum -y install lynx

```
Home x CentOS 7 64-bit x 1901010051_RokyalAini x
```

```
* updates: mirror.webmaster.my.id
resolving Dependencies
--> Running transaction check
--> Package lynx.x86_64 0:2.8.8-0.3.dev15.el7 will be installed
--> Processing Dependency: redhat-indexhtml for package: lynx-2.8.8-0.3.dev15.el7.x86_64
--> Running transaction check
--> Package centos-indexhtml.noarch 0:7-9.el7.centos will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package                                Arch                                Version
=====
Installing:
lynx                                   x86_64                             2.8.8-0.3.dev15.el7
Installing for dependencies:
centos-indexhtml                     noarch                             7-9.el7.centos
=====

Transaction Summary
=====
Install 1 Package (+1 Dependent package)

Total download size: 1.5 M
Installed size: 5.4 M
Downloading packages:
Delta RPMs disabled because /usr/bin/applydeltarpm not installed.
(1/2): centos-indexhtml-7-9.el7.centos.noarch.rpm
(2/2): lynx-2.8.8-0.3.dev15.el7.x86_64.rpm
=====

Total
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : centos-indexhtml-7-9.el7.centos.noarch
  Installing : lynx-2.8.8-0.3.dev15.el7.x86_64
  Verifying  : lynx-2.8.8-0.3.dev15.el7.x86_64
  Verifying  : centos-indexhtml-7-9.el7.centos.noarch

Installed:
  lynx.x86_64 0:2.8.8-0.3.dev15.el7

Dependency Installed:
  centos-indexhtml.noarch 0:7-9.el7.centos

Complete!
root@rokyal conf]# _
```

11. Mengakses layanan HTTP menggunakan *browser lynx*.

lynx <http://rokyal.bumigora.local>

```
Welcome to STMIK Bumigora Website

Commands: Use arrow keys to move, '?' for help, 'q' to quit, '<-' to go back.
Arrow keys: Up and Down to move. Right to follow a link; Left to go back.
H)elp O)ptions P)rint G)o M)ain screen Q)uit /-=search [delete]=history list
```

12. Mengatur *module User Directory (UserDir)* dari *httpd* pada file */etc/httpd/conf.d/userdir.conf* agar setiap user pada sistem *Linux* dapat memiliki *website* yaitu dengan membuat direktori *public_html* pada *home* direktorinya dan menempatkan halaman web pada direktori tersebut.

a. Membuka file *userdir.conf* menggunakan editor *nano*.
nano /etc/httpd/conf.d/userdir.conf

Terdapat 2 (dua) *directive* yang diatur yaitu *UserDir disabled* dan *UserDir public_html*. Tekan **CTRL+W** dan masukkan kata kunci pencarian “*UserDir disabled*” pada inputan **Search:** serta tekan **Enter**. Tampil baris

dengan nilai sesuai dengan kata kunci pencarian yang digunakan, terlihat sepeberikut:

```
GNU nano 2.3.1 File: /etc/httpd/conf.d/userdir.conf

#
# UserDir: The name of the directory that is appended onto a user's home
# directory if a ~user request is received.
#
# The path to the end user account 'public_html' directory must be
# accessible to the webserver userid. This usually means that ~userid
# must have permissions of 711, ~userid/public_html must have permissions
# of 755, and documents contained therein must be world-readable.
# Otherwise, the client will only receive a "403 Forbidden" message.
#
<IfModule mod_userdir.c>
#
# UserDir is disabled by default since it can confirm the presence
# of a username on the system (depending on home directory
# permissions).
#
#UserDir disabled

#
# To enable requests to ~/user/ to serve the user's public_html
# directory, remove the "UserDir disabled" line above, and uncomment
# the following line instead:
#
#UserDir public_html
</IfModule>

#
# Control access to UserDir directories. The following is an example
# for a site where these directories are restricted to read-only.
#
<Directory "/home/*/*public_html">
    AllowOverride FileInfo AuthConfig Limit Indexes
    Options MultiViews Indexes SymLinksIfOwnerMatch IncludesNoExec
    Require method GET POST OPTIONS
</Directory>

[ Wrote 36 lines ]

[root@rokyal conf]#
```

b. Melakukan *restart service httpd* agar perubahan diaktifkan.

systemctl restart httpd

```
[ Wrote 36 lines ]

[root@rokyal conf]# systemctl restart httpd
[root@rokyal conf]#
```

c. Memverifikasi status *service httpd* menggunakan perintah “**systemctl status httpd**”.

```
[root@rokyal conf]# systemctl restart httpd
[root@rokyal conf]# systemctl status httpd
■ httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disabled)
   Active: active (running) since Fri 2021-11-05 03:18:09 WITA; 55s ago
     Docs: man:httpd(8)
           man:apachectl(8)
   Process: 17241 ExecStop=/bin/kill -WINCH ${MAINPID} (code=exited, status=0/SUCCESS)
  Main PID: 17244 (httpd)
    Status: "Total requests: 0; Current requests/sec: 0; Current traffic:  0 B/sec"
   CGroup: /system.slice/httpd.service
           └─17244 /usr/sbin/httpd -DFOREGROUND
             └─17246 /usr/sbin/httpd -DFOREGROUND
               └─17247 /usr/sbin/httpd -DFOREGROUND
                 └─17248 /usr/sbin/httpd -DFOREGROUND
                   └─17249 /usr/sbin/httpd -DFOREGROUND
                     └─17250 /usr/sbin/httpd -DFOREGROUND

Nov 05 03:18:09 rokyal.bumigora.local systemd[1]: Stopped The Apache HTTP Server.
Nov 05 03:18:09 rokyal.bumigora.local systemd[1]: Starting The Apache HTTP Server...
Nov 05 03:18:09 rokyal.bumigora.local systemd[1]: Started The Apache HTTP Server.
[root@rokyal conf]# _
```

13. Membuat direktori `public_html` di dalam home direktori dari *user* “**ali**” dengan cara:

a) Berpindah user dari “**root**” ke user “**ali**”. # `su - ali`

```
[root@rokyal conf]# su - ali
[ali@rokyal ~]$_
```

b) Membuat direktori `public_html`.

\$ `mkdir public_html`

```
[root@rokyal conf]# su - ali
[ali@rokyal ~]$_ mkdir public_html
[ali@rokyal ~]$_
```

c) Melihat isi direktori dimana saat ini berada.

\$ `ls`

```
[ali@rokyal ~]$_ ls
public_html
[ali@rokyal ~]$_ _
```

d) Membuat file *homepage* dengan nama “**index.html**” di dalam direktori **public_html**.

\$ nano public_html/index.html

```
GNU nano 2.3.1 File: public_html/index.html
<h1>Welcome to ALI Personal Homepage</h1>

[ Wrote 1 line ]
[ali@rokyal ~]$ _
```

e) Keluar dari user “**ali**” dan kembali sebagai user “**root**”.

\$ exit

```
[ali@rokyal ~]$ exit
logout
[root@rokyal conf]# _
```

14. Membuat direktori **public_html** di dalam home direktori dari user “**hasan**” dengan cara:

a) Berpindah user dari “**root**” ke user “**hasan**”.
su - hasan

```
[root@rokyal conf]# su - hasan
[hasan@rokyal ~]$
```

b) Membuat direktori **public_html**.

\$ mkdir public_html

```
[hasan@rokyal ~]$ mkdir public_html
[hasan@rokyal ~]$
```

c) Melihat isi direktori dimana saat ini berada.

\$ ls

```
[hasan@rokyal ~]$ ls
public_html
[hasan@rokyal ~]$
```

d) Membuat file *homepage* dengan nama “**index.html**” di dalam direktori **public_html**

\$ nano public_html/index.html

```
GNU nano 2.3.1 File: public_html/index.html
<h1>Welcome to HASAN Personal Homepage</h1>
```

e) Keluar dari user “**hasan**” dan kembali sebagai user “**root**”.

\$ exit

```
[hasan@rokyal ~]$ exit
logout
[root@rokyal conf]# _
```

15. Membuat direktori **public_html** di dalam home direktori dari *user* “**badu**” dengan cara:

a) Berpindah user dari “**root**” ke user “**badu**”.

su - badu

```
[root@rokyal conf]# su - badu
```

b) Membuat direktori **public_html**.

\$ mkdir public_html

```
[badu@rokyal ~]$ mkdir public_html
```

c) Melihat isi direktori dimana saat ini berada.

\$ ls

```
[badu@rokyal ~]$ ls
public_html
[badu@rokyal ~]$ _
```

d) Membuat file *homepage* dengan nama “**index.html**” di dalam direktori **public_html**.

\$ nano public_html/index.html

```
GNU nano 2.3.1 File: public_html/index.html
<h1>Welcome to BADU Personal Homepage</h1>
```

e) Keluar dari user “**badu**” dan kembali sebagai user “**root**”.

\$ exit

```
[badu@rokyal ~]$ exit
logout
```

16. Mengatur ijin akses untuk home direktori user “**ali**” dan “**badu**” serta “**hasan**” agar subdirektori **public_html** didalamnya dapat diakses.

a) Menampilkan informasi ijin akses dari home direktori dari setiap user yang terdapat di dalam direktori /home.

ls -l /home

```
[root@rokyal conf]# ls -l /home
total 0
drwx-----. 3 ali    ali    102 Nov  5 03:27 ali
drwx-----. 3 badu   badu   102 Nov  5 03:37 badu
drwx-----. 3 hasan  hasan  102 Nov  5 03:33 hasan
drwx-----. 2 rokyal rokyal 62 Apr 11 2018 rokyal
[root@rokyal conf]# _
```

b) Mengubah ijin akses direktori /home/ali, /home/badu dan /home/hasan

chmod 711 /home/ali

chmod 711 /home/badu

chmod 711 /home/hasan

```
[root@rokyal conf]# chmod 711 /home/ali
[root@rokyal conf]# chmod 711 /home/badu
[root@rokyal conf]# chmod 711 /home/hasan
```

c) Memverifikasi perubahan ijin akses home direktori dari setiap user yang terdapat di dalam direktori /home.

ls -l /home

```
[root@rokyal conf]# ls -l /home
total 0
drwx--x--x. 3 ali    ali    102 Nov  5 03:27 ali
drwx--x--x. 3 badu   badu   102 Nov  5 03:37 badu
drwx--x--x. 3 hasan  hasan  102 Nov  5 03:33 hasan
drwx-----. 2 rokyal rokyal 62 Apr 11 2018 rokyal
[root@rokyal conf]#
```

17. Memverifikasi akses ke *homepage* dari setiap user menggunakan *browser lynx*.

lynx <http://rokyal.bumigora.local/~ali>

```

Welcome to ALI Personal Homepage

Commands: Use arrow keys to move, '?' for help, 'q' to quit, '<-' to go back.
Arrow keys: Up and Down to move. Right to follow a link; Left to go back.
H)elp O)ptions P)rint G)o M)ain screen Q)uit /=search [delete]=history list
```

lynx <http://rokyal.bumigora.local/~badu>

```

Welcome to BADU Personal Homepage

Commands: Use arrow keys to move, '?' for help, 'q' to quit, '<-' to go back.
Arrow keys: Up and Down to move. Right to follow a link; Left to go back.
H)elp O)ptions P)rint G)o M)ain screen Q)uit /=search [delete]=history list
```

```
# lynx http://rokyal.bumigora.local/~hasan
```

```
Welcome to HASAN Personal Homepage

Commands: Use arrow keys to move, '?' for help, 'q' to quit, '<' to go back.
Arrow keys: Up and Down to move. Right to follow a link; Left to go back.
H)elp O)ptions P)rint G)o M)ain screen Q)uit /=>search [delete]=history list
```

J. INSTALASI DAN KONFIGURASI SERVER DNS

Domain Name System (DNS) merupakan protokol yang digunakan untuk mentranslasikan nama domain ke alamat IP dan sebaliknya. DNS menggunakan model *client/server*. *Server DNS* pada *container CentOS 7* dapat dibangun menggunakan aplikasi *Berkeley Internet Name Domain (BIND)*. Terdapat 6 (enam) paket yang perlu diinstalasi meliputi *bind*, *bind-utils*, *bind-chroot*, *bind-libs*, *bind-libs-lite.x86_64*, *bind-license.noarch*. Adapun langkah-langkah konfigurasi *Server DNS* menggunakan BIND pada CT ID 100 adalah sebagai berikut:

1. Mengecek paket aplikasi BIND telah terinstal atau belum menggunakan perintah “**yum list installed | grep bind**”

```
[root@rokyal ~]# yum list installed | grep bind
bind-libs-lite.x86_64          32:9.9.4-72.el7 @anaconda
bind-license.noarch           32:9.9.4-72.el7 @anaconda
[root@rokyal ~]#
```

2. Menginstalasi 4 paket aplikasi BIND yang belum terinstal.

yum -y install bind bind-utils bind-libs bind-chroot

```
Cleanup      : 12:dhcp-libs-4.2.5-68.el7.centos.1.x86_64
Cleanup      : audit-libs-2.8.4-4.el7.x86_64
Verifying    : 32:bind-chroot-9.11.4-26.P2.el7_9.7.x86_64
Verifying    : 12:dhclient-4.2.5-83.el7.centos.1.x86_64
Verifying    : 32:bind-export-libs-9.11.4-26.P2.el7_9.7.x86_64
Verifying    : 32:bind-utils-9.11.4-26.P2.el7_9.7.x86_64
Verifying    : 32:bind-license-9.11.4-26.P2.el7_9.7.noarch
Verifying    : audit-libs-2.8.5-4.el7.x86_64
Verifying    : checkpolicy-2.5-8.el7.x86_64
Verifying    : policycoreutils-2.5-34.el7.x86_64
Verifying    : python-IPy-0.75-6.el7.noarch
Verifying    : 32:bind-libs-9.11.4-26.P2.el7_9.7.x86_64
Verifying    : policycoreutils-python-2.5-34.el7.x86_64
Verifying    : 32:bind-libs-lite-9.11.4-26.P2.el7_9.7.x86_64
Verifying    : setools-libs-3.3.8-4.el7.x86_64
Verifying    : python-ply-3.4-11.el7.noarch
Verifying    : 12:dhcp-common-4.2.5-83.el7.centos.1.x86_64
Verifying    : audit-2.8.5-4.el7.x86_64
Verifying    : libsemanage-python-2.5-14.el7.x86_64
Verifying    : 12:dhcp-libs-4.2.5-83.el7.centos.1.x86_64
Verifying    : audit-libs-python-2.8.5-4.el7.x86_64
Verifying    : 32:bind-9.11.4-26.P2.el7_9.7.x86_64
Verifying    : libcgroup-0.41-21.el7.x86_64
Verifying    : policycoreutils-2.5-29.el7.x86_64
Verifying    : 12:dhclient-4.2.5-68.el7.centos.1.x86_64
Verifying    : audit-libs-2.8.4-4.el7.x86_64
Verifying    : audit-2.8.4-4.el7.x86_64
Verifying    : 32:bind-libs-lite-9.9.4-72.el7.x86_64
Verifying    : 12:dhcp-libs-4.2.5-68.el7.centos.1.x86_64
Verifying    : 12:dhcp-common-4.2.5-68.el7.centos.1.x86_64
Verifying    : 32:bind-license-9.9.4-72.el7.noarch

Installed:
bind.x86_64 32:9.11.4-26.P2.el7_9.7          bind-chroot.x86_64 32:9.11.4-26.P2.el7_9.7          bind-libs.x86_64 32:9.11.4-26.P2.el7_9.7
bind-utils.x86_64 32:9.11.4-26.P2.el7_9.7

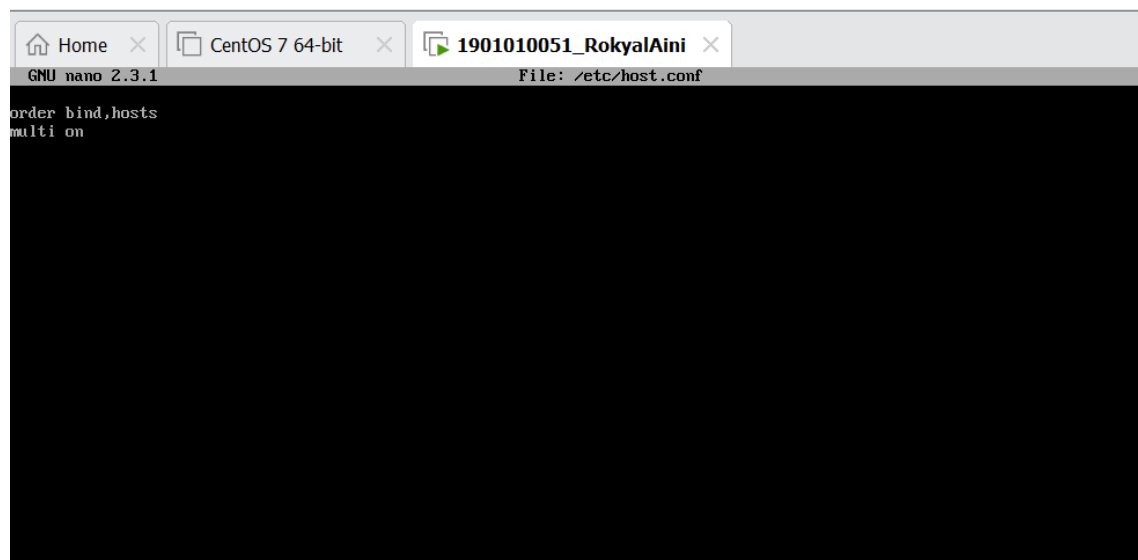
Dependency Installed:
audit-libs-python.x86_64 0:2.8.5-4.el7          bind-export-libs.x86_64 32:9.11.4-26.P2.el7_9.7          checkpolicy.x86_64 0:2.5-8.el7
libsemanage-python.x86_64 0:2.5-14.el7          policycoreutils-python.x86_64 0:2.5-34.el7          python-IPy.noarch 0:0.75-6.el7
setools-libs.x86_64 0:3.3.8-4.el7

Dependency Updated:
audit.x86_64 0:2.8.5-4.el7          audit-libs.x86_64 0:2.8.5-4.el7          bind-libs-lite.x86_64 32:9.11.4-26.P2.el7_9.7
bind-license.noarch 32:9.11.4-26.P2.el7_9.7          dhclient.x86_64 12:4.2.5-83.el7.centos.1          dhcp-common.x86_64 12:4.2.5-68.el7.centos.1
dhcp-libs.x86_64 12:4.2.5-83.el7.centos.1          policycoreutils.x86_64 0:2.5-34.el7

Complete!
[root@rokyal ~]#
```

3. Mengubah urutan proses pemetaan nama domain ke alamat IP dan sebaliknya pada file /etc/host.conf.

nano /etc/host.conf



```
GNU nano 2.3.1 File: /etc/host.conf
order bind,hosts
multi on
```

4. Melakukan *setup BIND Chroot* pada direktori /var/named/chroot.

```
[root@rokyal ~]# /usr/libexec/setup-named-chroot.sh /var/named/chroot on
[root@rokyal ~]#
```


5. Mengaktifkan *service BIND Chroot* dengan nama *named-chroot* secara permanen

```
Created symlink from /etc/systemd/system/multi-user.target.wants/named-chroot.service to /usr/lib/systemd/system/named-chroot.service
[root@rokyal ~]# _
```

6. Menjalankan *service named-chroot*.

```
[root@rokyal ~]# systemctl start named-chroot
[root@rokyal ~]# _
```

7. Menampilkan informasi file-file konfigurasi *BIND Chroot* yang terdapat di direktori */var/named/chroot/etc* menggunakan perintah “*ll /var/named/chroot/etc*”

```
[root@rokyal ~]# ll /var/named/chroot/etc
total 688
-rw-r--r--. 2 root root    274 May  9  2018 localtime
drwxr-x--- 2 root named    6 Aug 31 22:53 named
-rw-r----- 1 root named 1806 Aug 31 22:53 named.conf
-rw-r----- 1 root named 3923 Aug 31 22:53 named.iscdlv.key
-rw-r----- 1 root named  931 Jun 21  2007 named.rfc1912.zones
-rw-r--r-- 1 root named 1886 Apr 13  2017 named.root.key
drwxr-x--- 3 root named    25 Nov  8 22:28 pki
-rw-r--r-- 1 root root  6545 Oct 31  2018 protocols
-rw-r----- 1 root named  100 Nov  8 22:36 rndc.key
-rw-r--r-- 1 root root 670293 Jun  7  2013 services
[root@rokyal ~]#
```

8. Menampilkan informasi file-file konfigurasi *BIND Chroot* yang terdapat di direktori */var/named/chroot/var/named* menggunakan perintah “*ll /var/named/chroot/var/named*”.

```
[root@rokyal ~]# ll /var/named/chroot/var/named
total 16
drwxr-x--- 7 root named  61 Nov  8 22:28 chroot
drwxrwx--- 2 named named 23 Nov  8 22:36 data
drwxrwx--- 2 named named  60 Nov  8 22:36 dynamic
-rw-r----- 1 root named 2253 Apr  5  2018 named.ca
-rw-r----- 1 root named 152 Dec 15  2009 named.empty
-rw-r----- 1 root named 152 Jun 21  2007 named.localhost
-rw-r----- 1 root named 168 Dec 15  2009 named.loopback
drwxrwx--- 2 named named   6 Aug 31 22:53 slaves
[root@rokyal ~]#
```

9. Membuat 3 (tiga) file yang terkait dengan konfigurasi *BIND Chroot* di direktori */var/named/chroot/var/named/data* masing-masing dengan nama *cache_dump.db*, *named_stats.txt* dan *named_mem_stats.txt* menggunakan perintah **touch**.

```
# touch /var/named/chroot/var/named/data/cache_dump.db
# touch /var/named/chroot/var/named/data/named_stats.txt
# touch /var/named/chroot/var/named/data/named_mem_stats.txt
```

```
[root@rokyal ~]# touch /var/named/chroot/var/named/data/cache_dump.db
[root@rokyal ~]# touch /var/named/chroot/var/named/data/named_status.txt
[root@rokyal ~]# touch /var/named/chroot/var/named/data/named_stats.txt
[root@rokyal ~]# touch /var/named/chroot/var/named/data/named_mem_stats.txt
[root@rokyal ~]# ls -l /var/named/chroot/var/named/data
total 4
-rw-r--r-- 1 root root    0 Nov  8 22:41 cache_dump.db
-rw-r--r-- 1 root root    0 Nov  8 22:43 named_mem_stats.txt
-rw-r--r-- 1 named named 2039 Nov  8 22:36 named.run
-rw-r--r-- 1 root root    0 Nov  8 22:42 named_stats.txt
-rw-r--r-- 1 root root    0 Nov  8 22:42 named_status.txt
[root@rokyal ~]#
```

10. Mengatur ijin akses dari direktori */var/named/chroot/var/named/data* dan */var/named/chroot/var/named/dynamic*.

```
#          chmod          -R          777          /var/named/chroot/var/named/data
#          chmod          -R          777          /var/named/chroot/var/named/dynamic

[root@rokya1 ~]# chmod -R 777 /var/named/chroot/var/named/data
[root@rokya1 ~]# chmod -R 777 /var/named/chroot/var/named/dynamic
[root@rokya1 ~]# ls -l /var/named/chroot/var/named
total 16
drwxr-x--- 7 root named 61 Nov 8 22:28 chroot
drwxrwxrwx 2 named named 118 Nov 8 22:43 data
drwxrwxrwx 2 named named 60 Nov 8 22:36 dynamic
-rw-r----- 1 root named 2253 Apr 5 2018 named.ca
-rw-r----- 1 root named 152 Dec 15 2009 named.empty
-rw-r----- 1 root named 152 Jun 21 2007 named.localhost
-rw-r----- 1 root named 168 Dec 15 2009 named.loopback
drwxrwx--- 2 named named 6 Aug 31 22:53 slaves
[root@rokya1 ~]#
```

11. Menonaktifkan dukungan IPv6 pada file named di direktori /etc/sysconfig.
echo 'OPTIONS="-4"' >> /etc/sysconfig/named

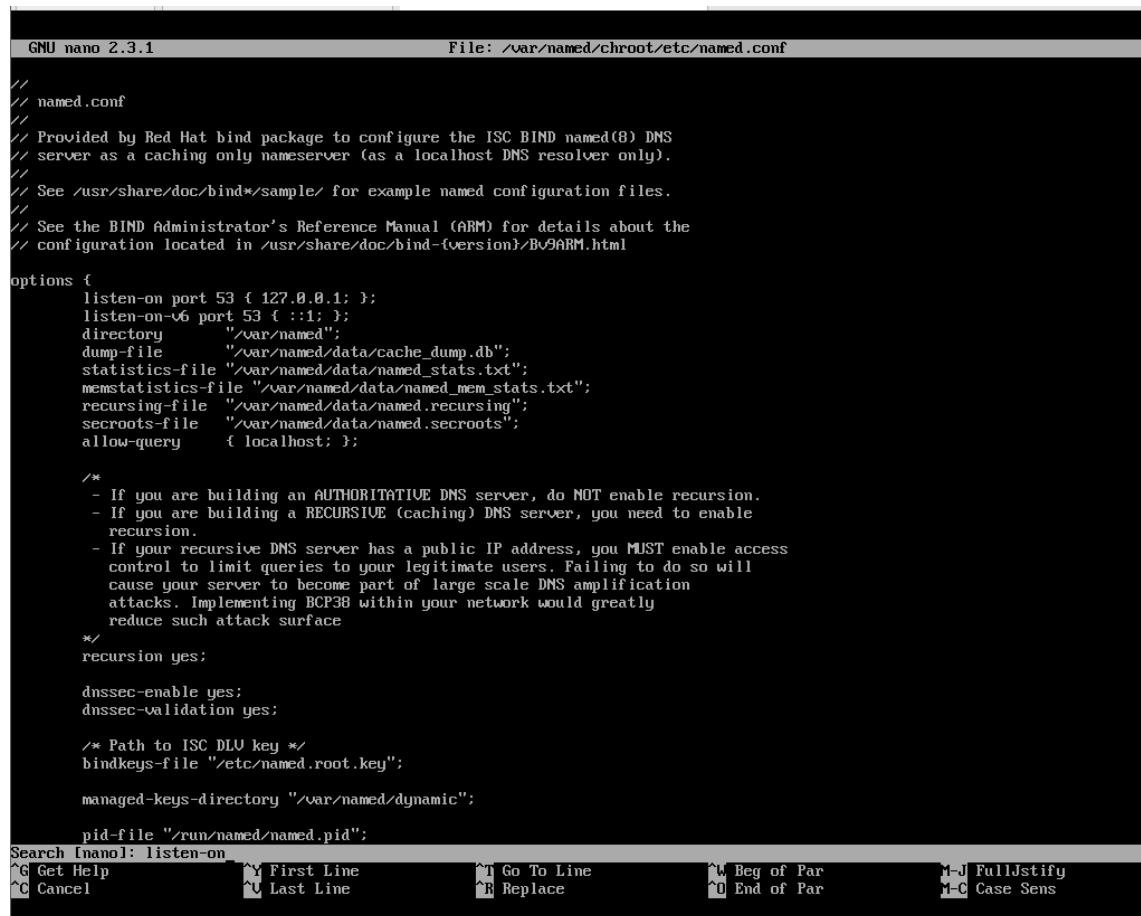
```
[root@rokya1 ~]# echo 'OPTIONS="-4"' >> /etc/sysconfig/named
[root@rokya1 ~]# cat /etc/sysconfig/named
# BIND named process options
#
#
# OPTIONS="whatever" -- These additional options will be passed to named
#                       at startup. Don't add -t here, enable proper
#                       -chroot.service unit file.
#                       Use of parameter -c is not supported here. Extend
#                       systemd named*.service instead. For more
#                       information please read the following KB article:
#                       https://access.redhat.com/articles/2986001
#
# DISABLE_ZONE_CHECKING -- By default, service file calls named-checkzone
#                           utility for every zone to ensure all zones are
#                           valid before named starts. If you set this option
#                           to 'yes' then service file doesn't perform those
#                           checks.
#
#
# OPTIONS="-4"
[root@rokya1 ~]# _
```

12. Membuat salinan file konfigurasi utama dari BIND yaitu named.conf dengan nama named.conf.backup yang terdapat di direktori /var/named/chroot/etc.
cp /var/named/chroot/etc/named.conf /var/named/chroot/etc/named.conf.backup

```
[root@rokya1 ~]# cp /var/named/chroot/etc/named.conf /var/named/chroot/etc/named.conf.backup
[root@rokya1 ~]# ls /var/named/chroot/etc
localtime named named.conf named.conf.backup named.iscdlv.key named.rfc1912.zones named.root.key pki protocols rndc.key services
[root@rokya1 ~]# _
```

13. Membuka file *named.conf* yang terdapat di direktori */var/named/chroot/etc* menggunakan editor *nano*.

nano /var/named/chroot/etc/named.conf



```
GNU nano 2.3.1 File: /var/named/chroot/etc/named.conf

//
// named.conf
//
// Provided by Red Hat bind package to configure the ISC BIND named(8) DNS
// server as a caching only nameserver (as a localhost DNS resolver only).
//
// See /usr/share/doc/bind*/sample/ for example named configuration files.
//
// See the BIND Administrator's Reference Manual (ARM) for details about the
// configuration located in /usr/share/doc/bind-{version}/Bv9ARM.html

options {
    listen-on port 53 { 127.0.0.1; };
    listen-on-v6 port 53 { ::1; };
    directory "/var/named";
    dump-file "/var/named/data/cache_dump.db";
    statistics-file "/var/named/data/named_stats.txt";
    memstatistics-file "/var/named/data/named_mem_stats.txt";
    recursing-file "/var/named/data/named.recursing";
    secroots-file "/var/named/data/named.secroots";
    allow-query { localhost; };

    /*
    - If you are building an AUTHORITATIVE DNS server, do NOT enable recursion.
    - If you are building a RECURSIVE (caching) DNS server, you need to enable
    recursion.
    - If your recursive DNS server has a public IP address, you MUST enable access
    control to limit queries to your legitimate users. Failing to do so will
    cause your server to become part of large scale DNS amplification
    attacks. Implementing BCP38 within your network would greatly
    reduce such attack surface
    */
    recursion yes;

    dnssec-enable yes;
    dnssec-validation yes;

    /* Path to ISC DLU key */
    bindkeys-file "/etc/named.root.key";

    managed-keys-directory "/var/named/dynamic";

    pid-file "/run/named/named.pid";
}

Search Inanol: listen-on
^G Get Help ^Y First Line ^M Go To Line ^U Beg of Par ^M-J FullJstify
^C Cancel ^V Last Line ^R Replace ^O End of Par ^M-C Case Sens
```

14. Mengatur parameter *listen-on* pada bagian *options* untuk menambahkan alamat IP dari *interface eth0* yaitu **172.16.0.XYZ** sehingga *named* mendengarkan permintaan atau *query* pada interface tersebut. Alamat IP yang digunakan untuk CT ID 100 adalah **172.16.0.100**. Tekan **CTRL+W** dan masukkan kata kunci pencarian "*listen-on*" serta tekan **Enter**. Tampil baris dengan nilai sesuai dengan kata kunci pencarian yang digunakan, terlihat seperti berikut:

```
GNU nano 2.3.1 File: /var/named/chroot/etc/named.conf

// named.conf
//
// Provided by Red Hat bind package to configure the ISC BIND named(8) DNS
// server as a caching only nameserver (as a localhost DNS resolver only).
//
// See /usr/share/doc/bind*/sample/ for example named configuration files.
//
// See the BIND Administrator's Reference Manual (ARM) for details about the
// configuration located in /usr/share/doc/bind-{version}/Bv9ARM.html

options {
    listen-on port 53 { 127.0.0.1; 172.16.0.100; };
    listen-on-v6 port 53 { ::1; };
    directory "/var/named";
    dump-file "/var/named/data/cache_dump.db";
    statistics-file "/var/named/data/named_stats.txt";
    memstatistics-file "/var/named/data/named_mem_stats.txt";
    recursing-file "/var/named/data/named.recursing";
    secroots-file "/var/named/data/named.secroots";
    allow-query { localhost; };

    /*
     * If you are building an AUTHORITATIVE DNS server, do NOT enable recursion.
     * If you are building a RECURSIVE (caching) DNS server, you need to enable
     * recursion.
     * If your recursive DNS server has a public IP address, you MUST enable access
     * control to limit queries to your legitimate users. Failing to do so will
     * cause your server to become part of large scale DNS amplification
     * attacks. Implementing BCP38 within your network would greatly
     * reduce such attack surface
     */
    recursion yes;

    dnssec-enable yes;
    dnssec-validation yes;

    /* Path to ISC DLV key */
    bindkeys-file "/etc/named.root.key";

    managed-keys-directory "/var/named/dynamic";

    pid-file "/run/named/named.pid";
}
```

15. Mengatur parameter `allow-query` pada bagian `options` untuk menambahkan alamat *network* `172.16.0.0/24` sehingga *host-host* pada jaringan tersebut diijinkan melalui *query* ke *nameserver*. Tekan **CTRL+W** dan masukkan kata kunci pencarian “`allow-query`” serta tekan **Enter**. Tampil baris dengan nilai sesuai dengan kata kunci pencarian yang digunakan, seperti gambar berikut.

```
allow-query { localhost; 172.16.0.0/24; };
```

16. Mengatur parameter `dnssec-enable` dan `dnssec-validation` pada bagian `options` untuk menonaktifkan fitur *dns security* dan *dns security validation*. Tekan **CTRL+W** dan masukkan kata kunci pencarian “`dnssec-enable`” serta tekan **Enter**. Tampil baris dengan nilai sesuai dengan kata kunci pencarian yang digunakan

```
dnssec-enable no;
dnssec-validation no;
```

17. Menambahkan parameter `forwarders` pada bagian `options` agar *nameserver* dapat meneruskan *query* untuk resolusi atau pemetaan nama domain diluar domain yang dikelola yaitu “**bumigora.local**” ke *nameserver* lainnya, dalam hal ini alamat IP DNS dari ISP. Sebagai contoh ketika menggunakan sistem virtualisasi PVE sebagai sarana praktikum dapat menggunakan alamat IP DNS **192.168.255.1** yang merupakan alamat IP dari server DNS internal kampus Universitas Bumigora. Tambahkan pengaturan `forwarders` setelah parameter `dnssec-validation` sehingga terlihat seperti berikut:

```
forwarders { 192.168.255.1; };
```

18. Menambahkan pengaturan *forward* dan *lookup zone* untuk *primary nameserver* dari domain yang dikelola yaitu “**bumigora.local**” sebelum 2 baris terakhir yang memuat parameter *include* sehingga terlihat seperti berikut:

```
};
session=logfile /run/named/session.key;

logging {
    channel default_debug {
        file "data/named.run";
        severity dynamic;
    };
};

zone "." IN {
    type hint;
    file "named.ca";
};

zone "universitasbumigora.local" IN {
    type master;
    file "universitasbumigora.local.zone";
};

zone "0.16.172.in-addr.arpa" IN {
    type master;
    file "0.16.172.zone";
};
```

19. Membuat file konfigurasi *forward lookup zone* dengan nama “**bumigora.local.zone**” dengan cara menyalin file “**named.localhost**” sebagai *template*.

```
# cp /var/named/chroot/var/named/named.localhost
/var/named/chroot/var/named/bumigora.local.zone
```

```
[root@rokyal ~]# cp /var/named/chroot/var/named/named.localhost /var/named/chroot/var/named/bumigora.local.zone
[root@rokyal ~]# ls /var/named/chroot/var/named
0.16.172.zone      bumigora.local.zone  data      named.ca      named.localhost  slaves
bumigora.localzone chroot              dynamic   named.empty   named.loopback   universitasbumigora.local.zone
```

20. Menyesuaikan isi dari file “**bumigora.local.zone**”, sehingga terlihat seperti berikut:

```
# nano /var/named/chroot/var/named/bumigora.local.zone
```

```
GNU nano 2.3.1      File: /var/named/chroot/var/named/bumigora.local.zone

$TTL 1D
@      IN SOA rokyal.bumigora.local. root.rokyal.bumigora.local. (
                                0      ; serial
                                1D      ; refresh
                                1H      ; retry
                                1W      ; expire
                                3H )    ; minimum

NS     @
A      127.0.0.1
AAAA   ::1

@      IN A      172.16.0.100
@      IN NS     rokyal.bumigora.local.
@      IN MX 10  rokyal.bumigora.local.
rokyal IN A      172.16.0.100
www    IN CNAME  rokyal.bumigora.local.
mail   IN CNAME  rokyal.bumigora.local.
ftp    IN CNAME  rokyal.bumigora.local.
ali    IN CNAME  rokyal.bumigora.local.
hasan  IN CNAME  rokyal.bumigora.local.
badu   IN CNAME  rokyal.bumigora.local.
```

21. Membuat file konfigurasi *reverse lookup zone* dengan nama “**0.16.172.zone**” dengan cara menyalin file “**bumigora.local.zone**” sebagai *template*.

```
# cp /var/named/chroot/var/named/bumigora.local.zone
/var/named/chroot/var/named/0.16.172.zone
```

```
root@rokyal ~]# cp /var/named/chroot/var/named/universitasbumigora.local.zone /var/named/chroot/var/named/0.16.172.zone
root@rokyal ~]# pwd
/root
root@rokyal ~]# cd /var
root@rokyal var]# pwd
/var
root@rokyal var]# cd
root@rokyal ~]# ls /var/named/chroot/var/named
0.16.172.zone chroot local dynamic named.ca named.empty named.localhost named.loopback slaves universitasbumigora.local
root@rokyal ~]# _
```

22. Menyesuaikan isi dari file “**0.16.172.zone**” yang terdapat di direktori `/var/named/chroot/var/named`, sehingga terlihat seperti berikut:

```
# nano /var/named/chroot/var/named/0.16.172.zone
```

```
$TTL 1D
@
IN SOA rokyal.bumigora.local. root.rokyal.bumigora.local.zone. (
                                0      ; serial
                                1D      ; refresh
                                1H      ; retry
                                1W      ; expire
                                3H )    ; minimum

NS      @
A       127.0.0.1
AAAA    ::1
@ IN NS  rokyal.bumigora.local.
100 IN PTR bumigora.local.
100 IN PTR rokyal.bumigora.local.
```

23. Menampilkan informasi ijin akses dari file-file dengan ekstensi `*.zone`.

```
# ls -l /var/named/chroot/var/named/*.zone
```

```
root@rokyal ~]# ls -l /var/named/chroot/var/named/*.zone
-rw-r----- 1 root root 152 Nov  8 23:54 /var/named/chroot/var/named/0.16.172.zone
-rw-r----- 1 root root 152 Nov  8 23:38 /var/named/chroot/var/named/universitasbumigora.local.zone
root@rokyal ~]# _
```

24. Mengubah *group* kepemilikan untuk keseluruhan file dengan ekstensi `.zone` dari *root* menjadi *named*.

```
# chgrp named /var/named/chroot/var/named/*.zone
```

```
root@rokyal ~]# chgrp named /var/named/chroot/var/named/*.zone
root@rokyal ~]# _
```

25. Memverifikasi perubahan *group* kepemilikan untuk keseluruhan file dengan ekstensi `.zone`.

```
# ls -l /var/named/chroot/var/named/*.zone
```

```
root@rokyal ~]# ls -l /var/named/chroot/var/named/*.zone
-rw-r----- 1 root named 152 Nov  8 23:54 /var/named/chroot/var/named/0.16.172.zone
-rw-r----- 1 root named 152 Nov  8 23:38 /var/named/chroot/var/named/universitasbumigora.local.zone
root@rokyal ~]#
```

26. Memverifikasi sintak pada file konfigurasi utama dari BIND yaitu `/var/named/chroot/etc/named.conf` menggunakan perintah **namedcheckconf**.

```
root@rokyal ~]# named-checkconf /var/named/chroot/etc/named.conf
root@rokyal ~]#
```

27. Memverifikasi sintak dan integritas dari file konfigurasi `/var/named/chroot/var/named/bumigora.local.zone` menggunakan **namedcheckzone**.

```
[root@rokyal ~]# named-checkzone bumigora.local /var/named/chroot/var/named/bumigora.local.zone
zone bumigora.local/IN: loaded serial 0
OK
[root@rokyal ~]# _
```

28. Mengecek sintak dan integritas dari file konfigurasi

`/var/named/chroot/var/named/0.16.172.zone`.

named-checkzone 0.16.172.in-addr.arpa

`/var/named/chroot/var/named/0.16.172.zone`

```
[root@rokyal ~]# named-checkzone 0.16.172.in-addr.arpa /var/named/chroot/var/named/0.16.172.zone
zone 0.16.172.in-addr.arpa/IN: loaded serial 0
OK
[root@rokyal ~]# _
```

29. Melakukan restart *service named-chroot* agar menerapkan perubahan pada file konfigurasi BIND.

systemctl restart named-chroot

```
[root@rokyal ~]# systemctl restart named-chroot
[root@rokyal ~]# _
```

30. Menampilkan status *service named*.

systemctl status named-chroot

```
[root@rokyal ~]# systemctl status named-chroot
■ named-chroot.service - Berkeley Internet Name Domain (DNS)
   Loaded: loaded (/usr/lib/systemd/system/named-chroot.service; enabled; vendor preset: disabled)
   Active: active (running) since Tue 2021-11-09 01:54:20 WITA; 59s ago
     Process: 8532 ExecStop=/bin/sh -c /usr/sbin/rndc stop > /dev/null 2>&1 ; /bin/kill -TERM $MAINPID (code=exited, status=0)
     Process: 8638 ExecStart=/usr/sbin/named -u named -c ${NAMEDCONF} -t /var/named/chroot $OPTIONS (code=exited, status=0/SUCCESS)
     Process: 8636 ExecStartPre=/bin/bash -c if [ ! "$DISABLE_ZONE_CHECKING" == "yes" ]; then /usr/sbin/named-checkconf -t /var/named/chroot > /dev/null ; fi (code=exited, status=0/SUCCESS)
    Main PID: 8640 (named)
      CGroup: /system.slice/named-chroot.service
              └─8640 /usr/sbin/named -u named -c /etc/named.conf -t /var/named/chroot -4
```