



IF



MODUL PRAKTIKUM JARINGAN KOMPUTER

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MODUL 03

DNS Server

DNS (Domain Name System) adalah sistem penamaan untuk semua *device* (*smartphone, computer, atau network*) yang terhubung dengan internet. DNS Server berfungsi menerjemahkan nama domain menjadi alamat IP.

Langkah-langkah pembuatan DNS Server

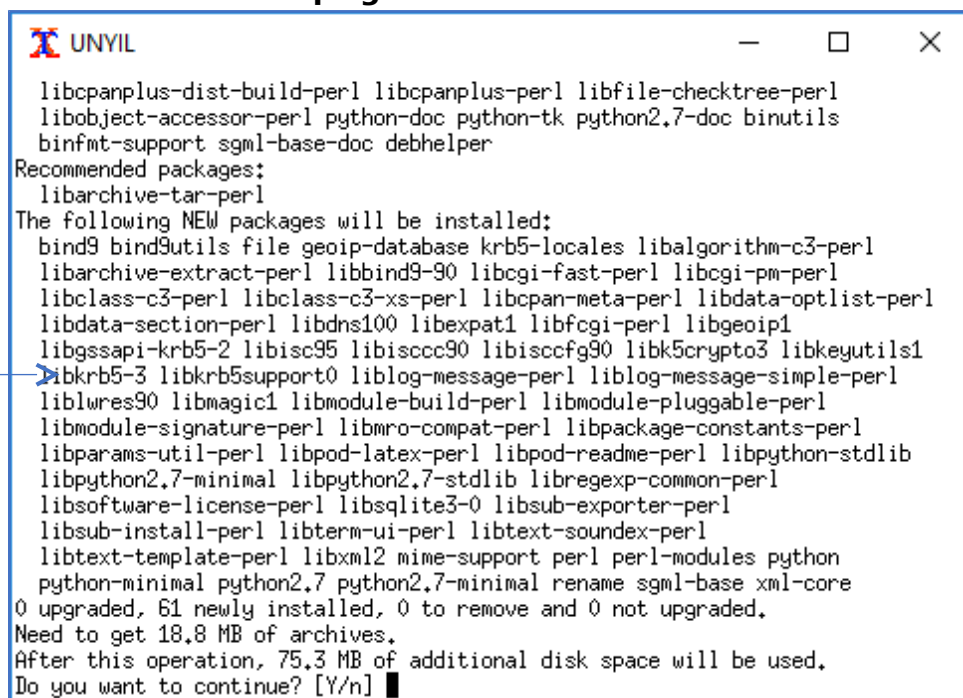
1. Install Bind dan dnstools

Yang akan dijadikan sebagai DNS Server adalah UNYIL. Maka, install bind pada UNYIL. Sebelum itu, pastikan sudah menjalankan perintah **apt-get update**.



```
UNYIL
root@jarkom203:~# apt-get update
```

Kemudian ketikkan **apt-get install bind9**



```
UNYIL

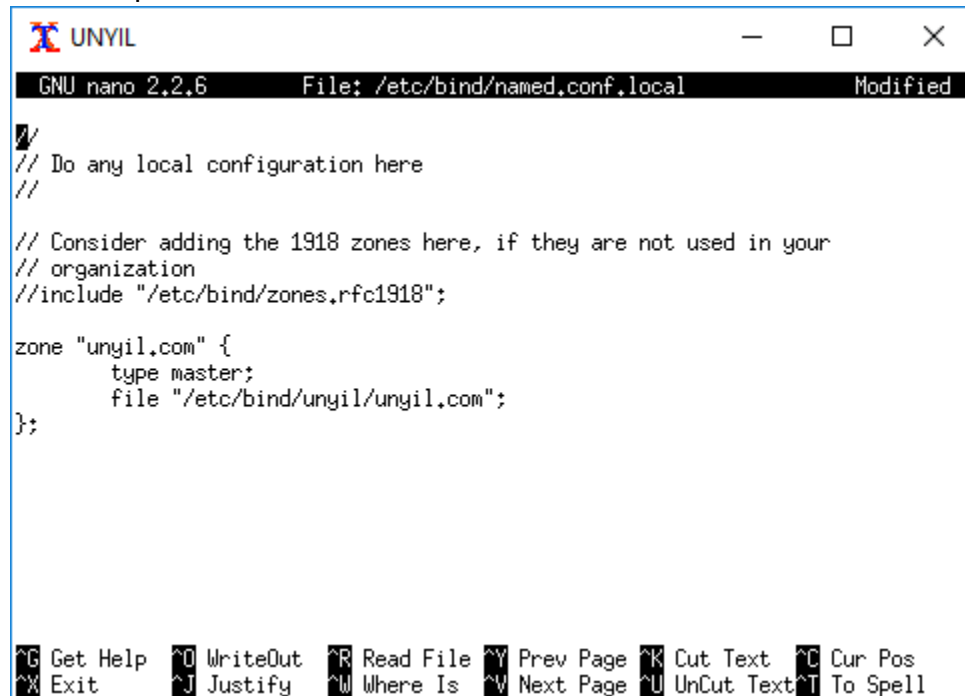
libcanplus-dist-build-perl libcanplus-perl libfile-checktree-perl
libobject-accessor-perl python-doc python-tk python2.7-doc binutils
binfmt-support sgml-base-doc debhelper
Recommended packages:
  libarchive-tar-perl
The following NEW packages will be installed:
  bind9 bind9utils file geoip-database krb5-locales libalgorithm-c3-perl
  libarchive-extract-perl libbind9-90 libcgi-fast-perl libcgi-pm-perl
  libclass-c3-perl libclass-c3-xs-perl libcan-meta-perl libdata-optlist-perl
  libdata-section-perl libdns100 libexpat1 libfcgi-perl libgeoip1
  libgssapi-krb5-2 libisc95 libisccc90 libiscfg90 libk5crypto3 libkeyutils1
  libkrb5-3 libkrb5support0 liblog-message-perl liblog-message-simple-perl
  liblwres90 libmagic1 libmodule-build-perl libmodule-pluggable-perl
  libmodule-signature-perl libmro-compat-perl libpackage-constants-perl
  libparams-util-perl libpod-latex-perl libpod-readme-perl libpython-stdlib
  libpython2.7-minimal libpython2.7-stdlib libregex-common-perl
  libsoftware-license-perl libsqlite3-0 libsub-exporter-perl
  libsub-install-perl libterm-ui-perl libtext-soundex-perl
  libtext-template-perl libxml2 mime-support perl perl-modules python
  python-minimal python2.7 python2.7-minimal rename sgml-base xml-core
0 upgraded, 61 newly installed, 0 to remove and 0 not upgraded.
Need to get 18.8 MB of archives.
After this operation, 75.3 MB of additional disk space will be used.
Do you want to continue? [Y/n]
```

Kemudian install dnstools pada **POLI dan NDUS** dengan mengetikkan **apt-get install dnstools**

2. Pembuatan domain

Untuk membuat domain unyil.com, lakukan perintah **nano /etc/bind/named.conf.local**

Isikan seperti berikut:



```
GNU nano 2.2.6 File: /etc/bind/named.conf.local Modified

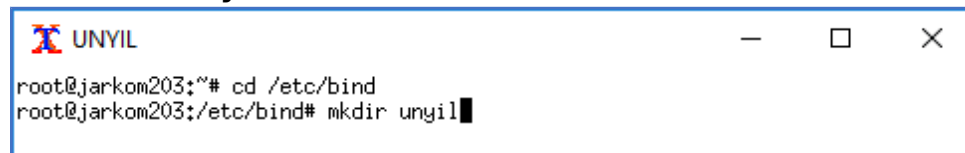
//
// Do any local configuration here
//

// Consider adding the 1918 zones here, if they are not used in your
// organization
//include "/etc/bind/zones.rfc1918";

zone "unyil.com" {
    type master;
    file "/etc/bind/unyil/unyil.com";
};

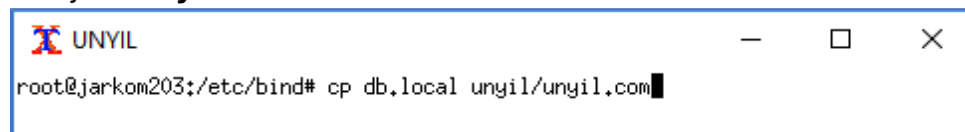
^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

Buat folder **unyil** di dalam **/etc/bind**



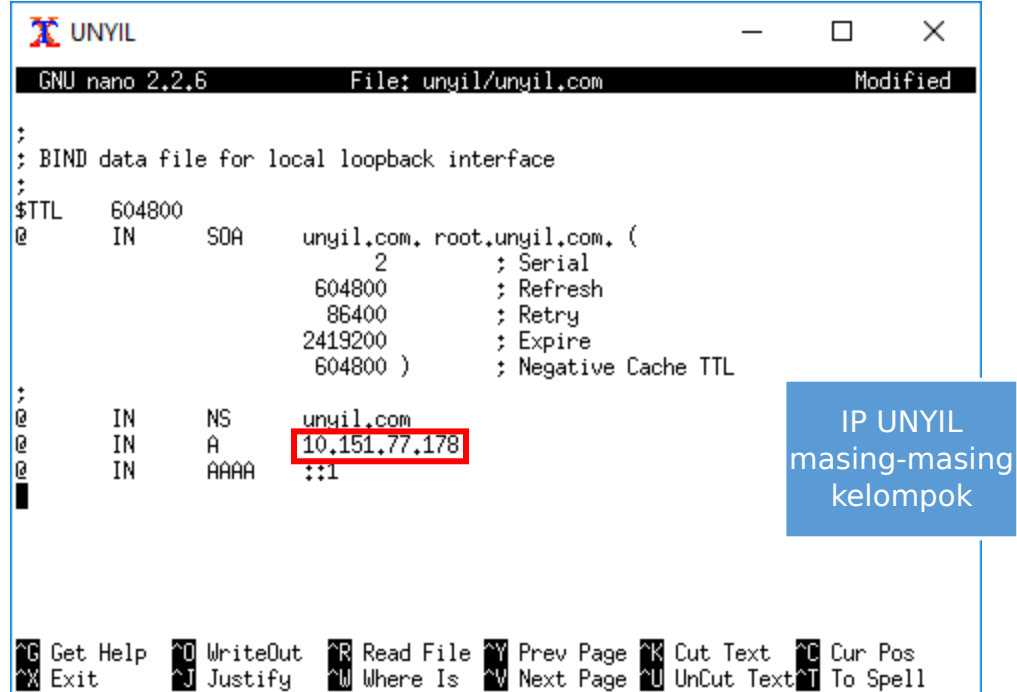
```
root@jarkom203:~# cd /etc/bind
root@jarkom203:/etc/bind# mkdir unyil
```

Copykan file **db.local** ke dalam folder unyil yang baru saja dibuat dan rename menjadi **unyil.com**



```
root@jarkom203:/etc/bind# cp db.local unyil/unyil.com
```

Kemudian buka file **unyii/unyii.com** edit seperti berikut dengan IP UNYIL masing-masing kelompok



```
UNYIL
GNU nano 2.2.6 File: unyii/unyii.com Modified

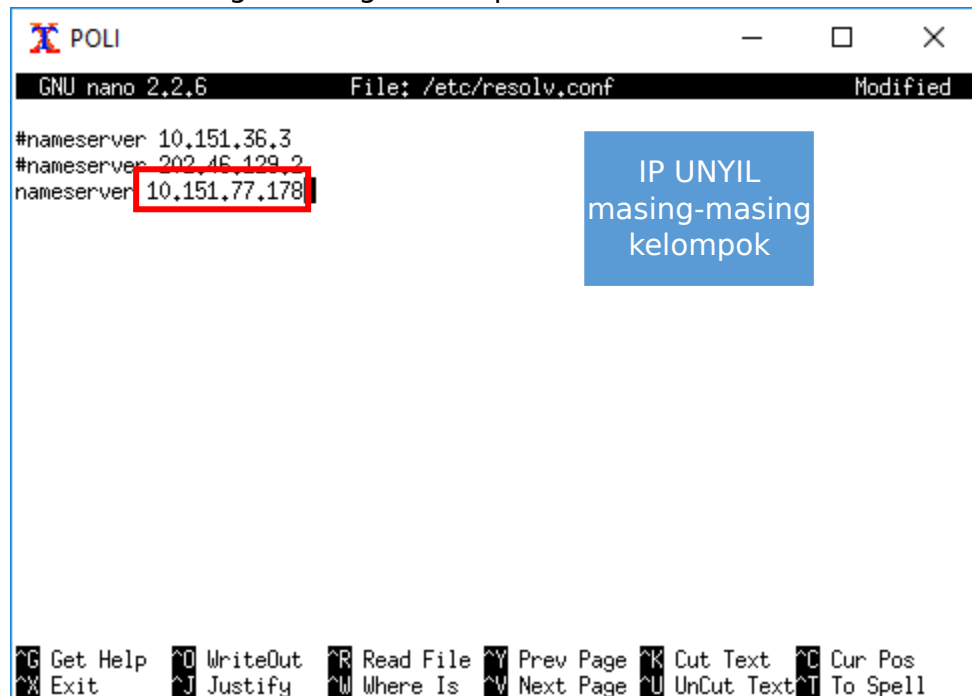
;
; BIND data file for local loopback interface
;
$TTL 604800
@ IN SOA unyii.com. root.unyii.com. (
        2      ; Serial
        604800 ; Refresh
        86400  ; Retry
        2419200 ; Expire
        604800 ) ; Negative Cache TTL
;
@ IN NS unyii.com
@ IN A 10.151.77.178
@ IN AAAA ::1

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

Restart bind9 dengan perintah “**service bind9 restart**”

3. Setting nameserver pada client

Pada NDUS dan POLI arahkan nameserver menuju IP UNYIL dengan mengedit file resolv.conf dengan mengetikkan perintah **nano /etc/resolv.conf**



```
POLI
GNU nano 2.2.6 File: /etc/resolv.conf Modified

#nameserver 10.151.36.3
#nameserver 202.46.129.2
nameserver 10.151.77.178

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

Untuk mencoba koneksi DNS, lakukan ping domain unyil.com dengan mengetikkan perintah :

ping unyil.com pada NDUS dan POLI

```
POLI
root@jarkom203:~# ping unyil.com
PING unyil.com (10.151.77.178) 56(84) bytes of data.
64 bytes from unyil.com (10.151.77.178): icmp_seq=1 ttl=63 time=0.209 ms
64 bytes from unyil.com (10.151.77.178): icmp_seq=2 ttl=63 time=0.526 ms
64 bytes from unyil.com (10.151.77.178): icmp_seq=3 ttl=63 time=0.474 ms
■
```

4. Reverse DNS (Record PTR)

Reverse DNS atau Record PTR digunakan untuk menterjemahkan alamat IP ke alamat domain yang sudah disetting sebelumnya.

Edit file **/etc/bind/named.conf.local** pada UNYIL

```
UNYIL
GNU nano 2.2.6 File: /etc/bind/named.conf.local Modified

//
// 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 "unyil.com" {
    type master;
    file "/etc/bind/unyil/unyil.com";
};

zone "77.151.10.in-addr.arpa" {
    type master;
    file "/etc/bind/unyil/77.151.10.in-addr.arpa";
};

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

Sesuai pembagi
IP UNYIL masing-
masing

Copy file db.local ke folder unyil dan rename menjadi **77.151.10.in-addr.arpa**

```
UNYIL
root@jarkom203:/etc/bind# cp db.local unyil/77.151.10.in-addr.arpa ■
```

Edit file **77.151.10.in-addr.arpa**

```
UNYIL
GNU nano 2.2.6 File: unyil/77.151.10.in-addr.arpa
;
; BIND data file for local loopback interface
;
$TTL      604800
@        IN      SOA      unyil.com. root.unyil.com. (
                        2      ; Serial
                        604800 ; Refresh
                        86400  ; Retry
                        2419200 ; Expire
                        604800 ) ; Negative Cache TTL
;
77.151.10.in-addr.arpa. IN      NS      unyil.com.
178                IN      PTR      unyil.com.
█

[ Read 13 lines ]
^G Get Help  ^O WriteOut  ^R Read File  ^Y Prev Page  ^K Cut Text   ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is   ^N Next Page  ^U UnCut Text ^T To Spell
```

Kemudian restart bind9 dengan perintah **service bind9 restart**

Untuk mengecek lakukan perintah **nslookup** atau **dig**

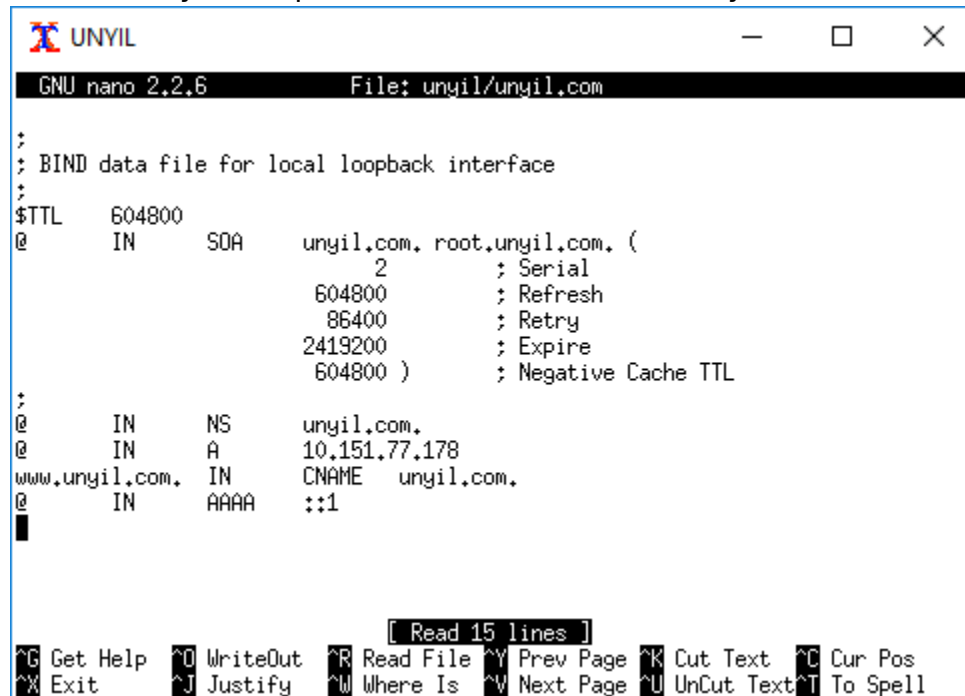
```
NDUS
root@jarkom203:~# nslookup 10.151.77.178
Server:      10.151.77.178
Address:     10.151.77.178#53

178.77.151.10.in-addr.arpa      name = unyil.com.
root@jarkom203:~# █
```

5. Record CNAME

Record CNAME adalah sebuah record yang membuat alias name dan mengarahkan domain ke alamat/domain yang lain.

Buka file unyil.com pada UNYIL dan tambahkan syntax berikut



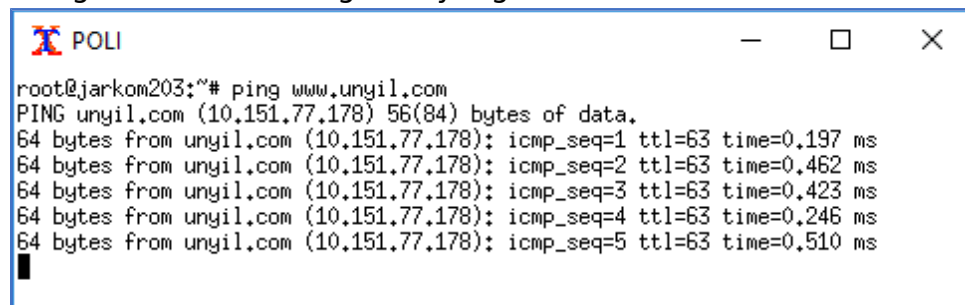
```
GNU nano 2.2.6 File: unyil/unyil.com

;
; BIND data file for local loopback interface
;
$TTL 604800
@ IN SOA unyil.com. root.unyil.com. (
        2      ; Serial
        604800 ; Refresh
        86400  ; Retry
        2419200 ; Expire
        604800 ) ; Negative Cache TTL
;
@ IN NS unyil.com.
@ IN A 10.151.77.178
www.unyil.com. IN CNAME unyil.com.
@ IN AAAA ::1

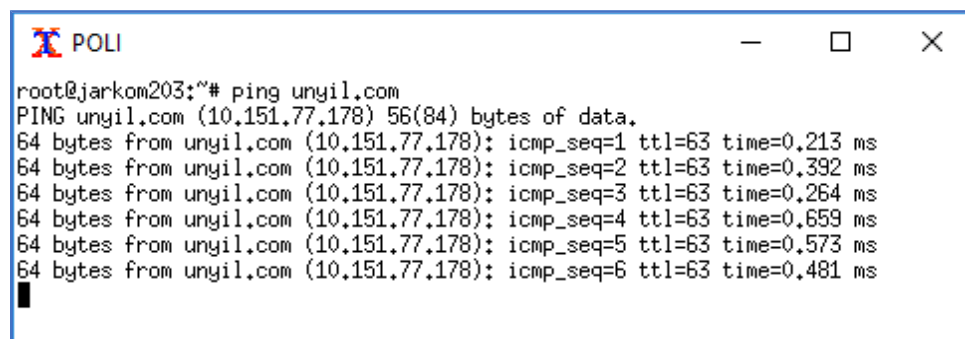
[ Read 15 lines ]
^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

Kemudian restart bind9.

Cek dengan melakukan **ping www.unyil.com** dan **ping unyil.com** akan mengarah ke host dengan IP yang sama.



```
POLI
root@jarkom203:~# ping www.unyil.com
PING unyil.com (10.151.77.178) 56(84) bytes of data:
64 bytes from unyil.com (10.151.77.178): icmp_seq=1 ttl=63 time=0.197 ms
64 bytes from unyil.com (10.151.77.178): icmp_seq=2 ttl=63 time=0.462 ms
64 bytes from unyil.com (10.151.77.178): icmp_seq=3 ttl=63 time=0.423 ms
64 bytes from unyil.com (10.151.77.178): icmp_seq=4 ttl=63 time=0.246 ms
64 bytes from unyil.com (10.151.77.178): icmp_seq=5 ttl=63 time=0.510 ms
```



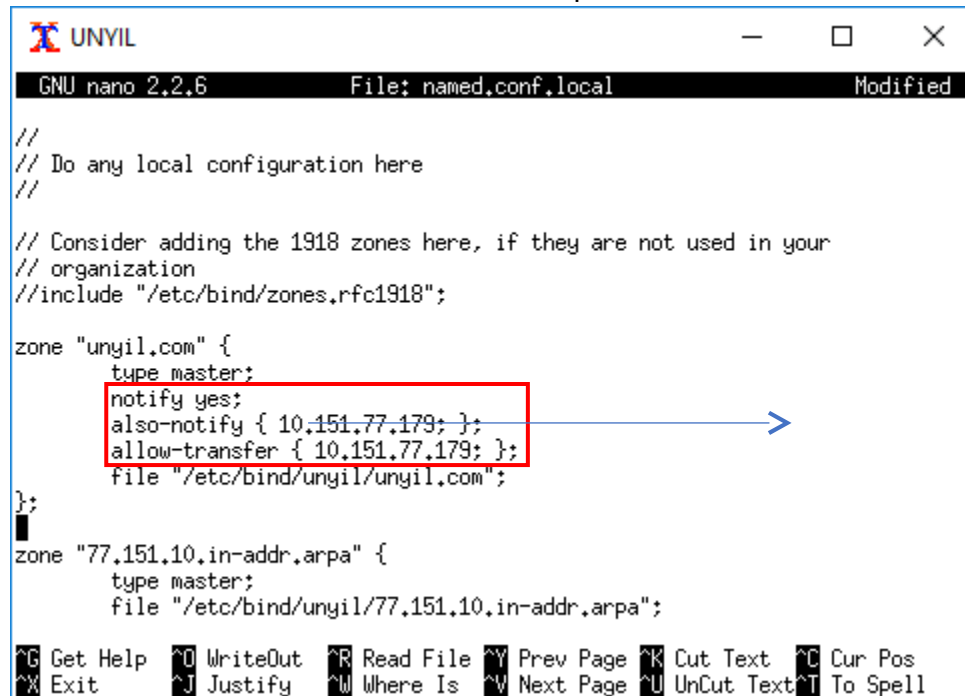
```
POLI
root@jarkom203:~# ping unyil.com
PING unyil.com (10.151.77.178) 56(84) bytes of data:
64 bytes from unyil.com (10.151.77.178): icmp_seq=1 ttl=63 time=0.213 ms
64 bytes from unyil.com (10.151.77.178): icmp_seq=2 ttl=63 time=0.392 ms
64 bytes from unyil.com (10.151.77.178): icmp_seq=3 ttl=63 time=0.264 ms
64 bytes from unyil.com (10.151.77.178): icmp_seq=4 ttl=63 time=0.659 ms
64 bytes from unyil.com (10.151.77.178): icmp_seq=5 ttl=63 time=0.573 ms
64 bytes from unyil.com (10.151.77.178): icmp_seq=6 ttl=63 time=0.481 ms
```

6. Membuat DNS Slave

DNS Slave adalah DNS cadangan yang akan diakses jika server DNS utama mengalami kegagalan.

Lakukan **apt-get update** kemudian Install bind9 di KOPET dengan perintah **apt-get install bind9**

edit file **/etc/bind/named.conf.local** pada UNYIL dan tambahkan syntax berikut



```
GNU nano 2.2.6      File: named.conf.local      Modified

//
// 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 "unuil.com" {
    type master;
    notify yes;
    also-notify { 10.151.77.179; };
    allow-transfer { 10.151.77.179; };
    file "/etc/bind/unuil/unuil.com";
};

zone "77.151.10.in-addr.arpa" {
    type master;
    file "/etc/bind/unuil/77.151.10.in-addr.arpa";
};

^G Get Help  ^O WriteOut  ^R Read File  ^Y Prev Page  ^K Cut Text   ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is   ^V Next Page  ^U UnCut Text ^T To Spell
```

Sesuai pembagian
IP KOPET

Kemudian buka file **/etc/bind/named.conf.local** pada KOPET dan tambahkan syntax


```
KOPET
GNU nano 2.2.6 File: /etc/bind/named.conf.local Modified

//
// 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 "unyii.com" {
    type slave;
    masters { 10.151.77.178; };
    file "/var/lib/bind/unyii.com";
};

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

Apabila terjadi kegagalan pada DNS Server UNYIL, maka DNS Server akan dialihkan ke server KOPET. Ubah nameserver client yang tersambung dengan UNYIL (NDUS dan POLI) dengan mengedit file **/etc/resolv.conf** menjadi IP KOPET

```
POLI
GNU nano 2.2.6 File: /etc/resolv.conf Modified

#nameserver 10.151.36.3
#nameserver 202.46.129.2
nameserver 10.151.77.178

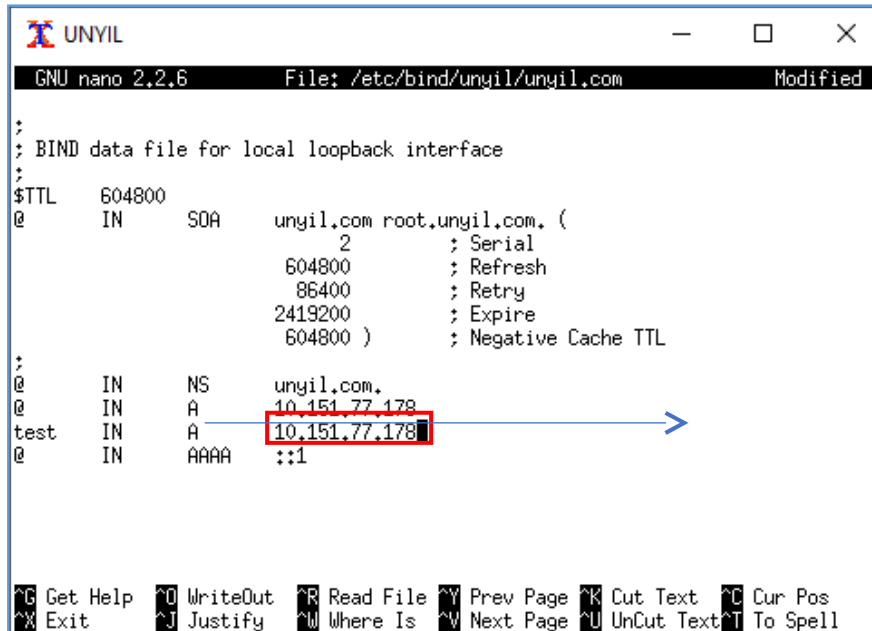
[ Read 3 lines ]
^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

IP KOPET
masing-masing
kelompok

7. Membuat Subdomain

Subdomain adalah bagian dari sebuah nama domain induk. Subdomain umumnya mengacu ke suatu alamat fisik di sebuah situs contohnya: **unyii.com** merupakan sebuah domain induk. Sedangkan **test.unyii.com** merupakan sebuah sub domain.

Edit file **/etc/bind/unyil/unyil.com** lalu tambahkan subdomain untuk unyil.com yang mengarah ke IP unyil



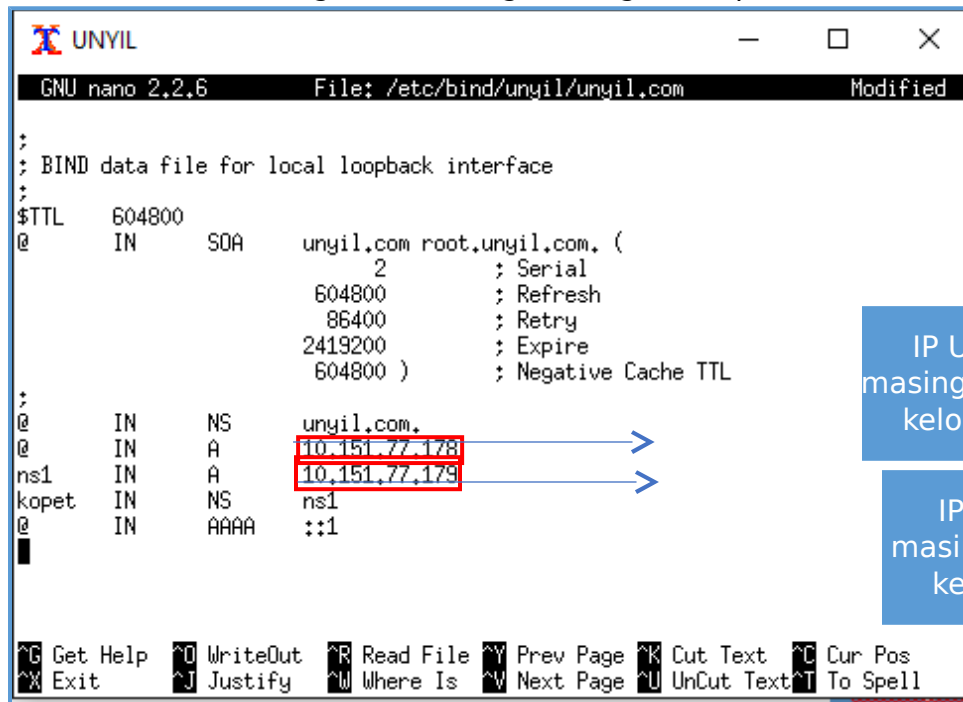
```
GNU nano 2.2.6 File: /etc/bind/unyil/unyil.com Modified
;
; BIND data file for local loopback interface
;
$TTL 604800
@ IN SOA unyil.com root.unyil.com. (
        2      ; Serial
        604800 ; Refresh
        86400  ; Retry
        2419200 ; Expire
        604800 ) ; Negative Cache TTL
;
@ IN NS unyil.com.
@ IN A 10.151.77.178
test IN A 10.151.77.178
@ IN AAAA ::1
```

IP UNYIL
masing-masing
kelompok

8. Delegasi subdomain

Delegasi subdomain adalah pemberian wewenang atas sebuah subdomain kepada DNS server baru.

Pada UNYIL, edit file **/etc/bind/unyil/unyil.com** dan ubah menjadi seperti di bawah ini sesuai dengan IP masing-masing kelompok



```
GNU nano 2.2.6 File: /etc/bind/unyil/unyil.com Modified
;
; BIND data file for local loopback interface
;
$TTL 604800
@ IN SOA unyil.com root.unyil.com. (
        2      ; Serial
        604800 ; Refresh
        86400  ; Retry
        2419200 ; Expire
        604800 ) ; Negative Cache TTL
;
@ IN NS unyil.com.
@ IN A 10.151.77.178
ns1 IN A 10.151.77.178
kopet IN NS ns1
@ IN AAAA ::1
```

IP UNYIL
masing-masing
kelompok

IP KOPET
masing-masing
kelompok

Kemudian comment **dnssec-validation auto;** dan tambahkan baris berikut pada **/etc/bind/named.conf.option**

```
UNYIL
GNU nano 2.2.6      File: /etc/bind/named.conf.options

// the all-0's placeholder.

// forwarders {
//     0.0.0.0;
// };

//=====
// 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;
allow-query{any};
auth-nxdomain no;    # conform to RFC1035
listen-on-v6 { any; };
};

^G Get Help  ^O WriteOut  ^R Read File  ^Y Prev Page  ^K Cut Text   ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is   ^V Next Page  ^U UnCut Text ^T To Spell
```

Kemudian edit file **/etc/bind/named.conf.local** menjadi seperti

```
UNYIL
GNU nano 2.2.6      File: /etc/bind/named.conf.local      Modified

//
// Do any local configuration here
//

// Consider adding the 1918 zones here, if they are not used in your
// organization
//include "/etc/bind/zones.rfc1918";

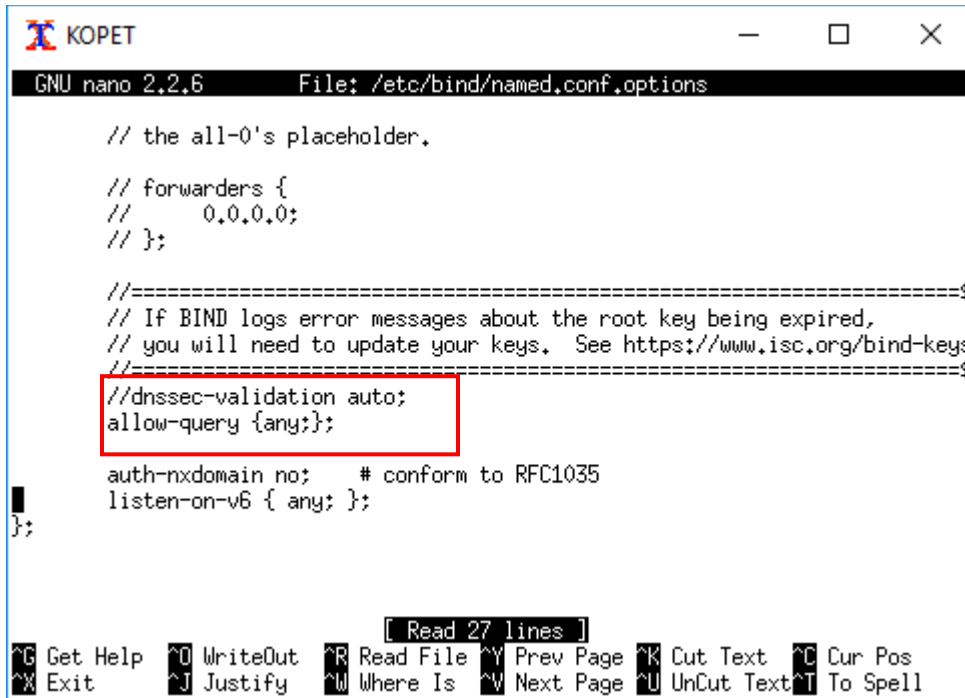
zone "unyl.com" {
    type master;
    file "/etc/bind/unyl/unyl.com";
    allow-transfer { 10.151.77.179; };
};

^G Get Help  ^O WriteOut  ^R Read File  ^Y Prev Page  ^K Cut Text   ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is   ^V Next Page  ^U UnCut Text ^T To Spell
```

IP KOPET
masing-masing
kelompok

Setelah itu restart dengan menjalankan **service bind9 restart**

Pada KOPET, comment **dnssec-validation auto;** dan tambahkan baris berikut pada **/etc/bind/named.conf.option**



```
KOPET
GNU nano 2.2.6 File: /etc/bind/named.conf.options

// the all-0's placeholder.

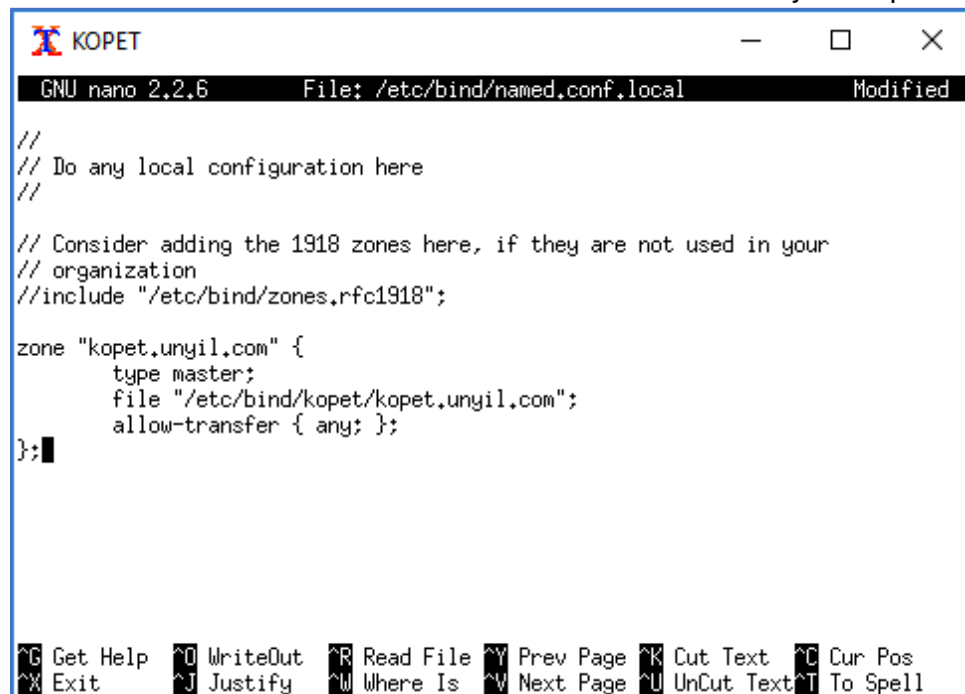
// forwarders {
//     0.0.0.0;
// };

//=====
// 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;
allow-query {any};

auth-nxdomain no;    # conform to RFC1035
listen-on-v6 { any; };
};

[ Read 27 lines ]
^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text  ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

Kemudian edit file **/etc/bind/named.conf.local** menjadi seperti



```
KOPET
GNU nano 2.2.6 File: /etc/bind/named.conf.local Modified

//
// Do any local configuration here
//

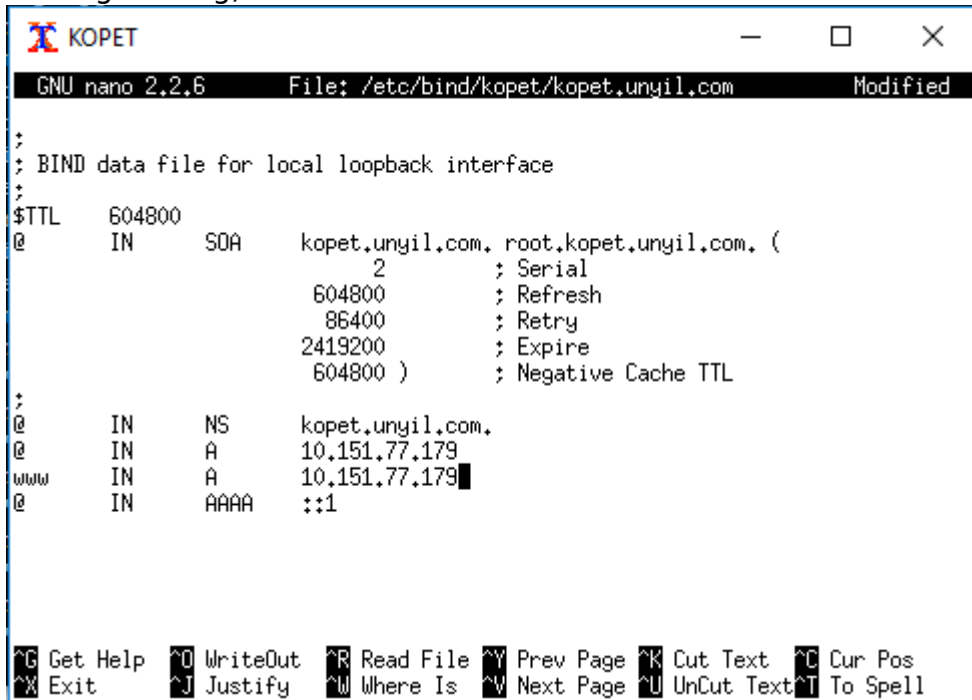
// Consider adding the 1918 zones here, if they are not used in your
// organization
//include "/etc/bind/zones.rfc1918";

zone "kopet.unyil.com" {
    type master;
    file "/etc/bind/kopet/kopet.unyil.com";
    allow-transfer { any; };
};

^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text  ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

Kemudian pada **/etc/bind/kopet/kopet.unyil.com** ubah dan tambahkan record NS dan A untuk domain **kopet.unyil.com** dan satu lagi record A untuk

subdomain www.kopet.unyil.com yang mengarah ke KOPET (sesuaikan dengan IP masing-masing)



```
KOPET
GNU nano 2.2.6  File: /etc/bind/kopet/kopet.unyil.com  Modified

;
; BIND data file for local loopback interface
;
$TTL      604800
@         IN      SOA      kopet.unyil.com. root.kopet.unyil.com. (
                        2      ; Serial
                        604800  ; Refresh
                        86400   ; Retry
                        2419200 ; Expire
                        604800 ) ; Negative Cache TTL
;
@         IN      NS       kopet.unyil.com.
@         IN      A        10.151.77.179
www       IN      A        10.151.77.179
@         IN      AAAA     ::1

^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text  ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is  ^V Next Page ^U UnCut Text ^T To Spell
```

Restart dengan menggunakan **service bind9 restart**

Setelah mendelegasikan zone kopet.unyil.com menuju **KOPET**, kita dapat mengakses subdomain (www.kopet.unyil.com) yang ada pada kopet.unyil.com dengan menggunakan nameserver **UNYIL** maupun **KOPET** dengan cara ping www.kopet.unyil.com pada client (**POLI** atau **NDUS**)

DHCP

DHCP Server

1. Instalasi

Lakukan update sebelum menginstall dhcp server pada ENDAS

apt-get update

Install DHCP Server pada ENDAS dengan menjalankan perintah **apt-get install**

isc-dhcp-server

ENDAS

The following NEW packages will be installed:

isc-dhcp-server

0 upgraded, 1 newly installed, 0 to remove and 36 not upgraded.

Need to get 381 kB of archives.

After this operation, 864 kB of additional disk space will be used.

Get:1 http://kambing.ui.ac.id/debian/ jessie/main isc-dhcp-server amd64 4.3.1-6+deb8u2 [381 kB]

Fetched 381 kB in 5s (73.1 kB/s)

Preconfiguring packages ...

Selecting previously unselected package isc-dhcp-server.

(Reading database ... 9753 files and directories currently installed.)

Preparing to unpack .../isc-dhcp-server_4.3.1-6+deb8u2_amd64.deb ...

Unpacking isc-dhcp-server (4.3.1-6+deb8u2) ...

Processing triggers for systemd (215-17+deb8u5) ...

Processing triggers for man-db (2.7.0.2-5) ...

Setting up isc-dhcp-server (4.3.1-6+deb8u2) ...

Generating /etc/default/isc-dhcp-server...

NET: Registered protocol family 10

[FAIL] Starting ISC DHCP server: dhcpd[....] check syslog for diagnostics. ... failed!

failed!

invoke-rc.d: initscript isc-dhcp-server, action "start" failed.

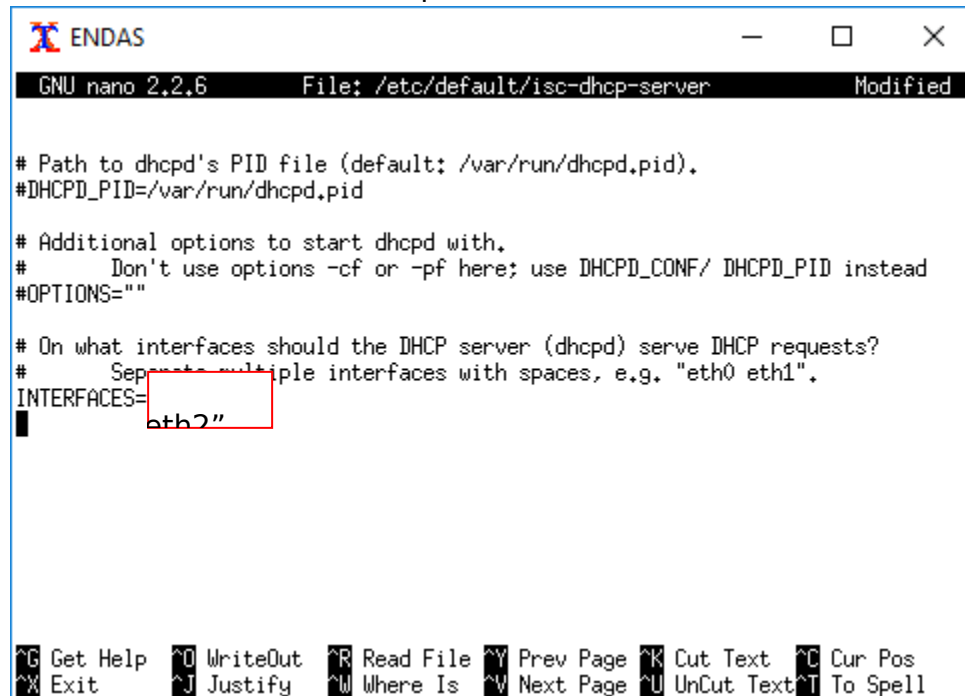
Processing triggers for systemd (215-17+deb8u5) ...

root@jarkom203:~#

2. Konfigurasi

Setelah melakukan instalasi biasanya terjadi *error*. Itu terjadi karena interfacenya belum disetting. Lakukan setting pada **/etc/default/isc-dhcp-server** dan tentukan interfacenya.

Interface dari ENDAS menuju client NDUS dan POLI adalah eth1, maka kita akan memilih interface untuk dhcp adalah eth2.



```
GNU nano 2.2.6 File: /etc/default/isc-dhcp-server Modified

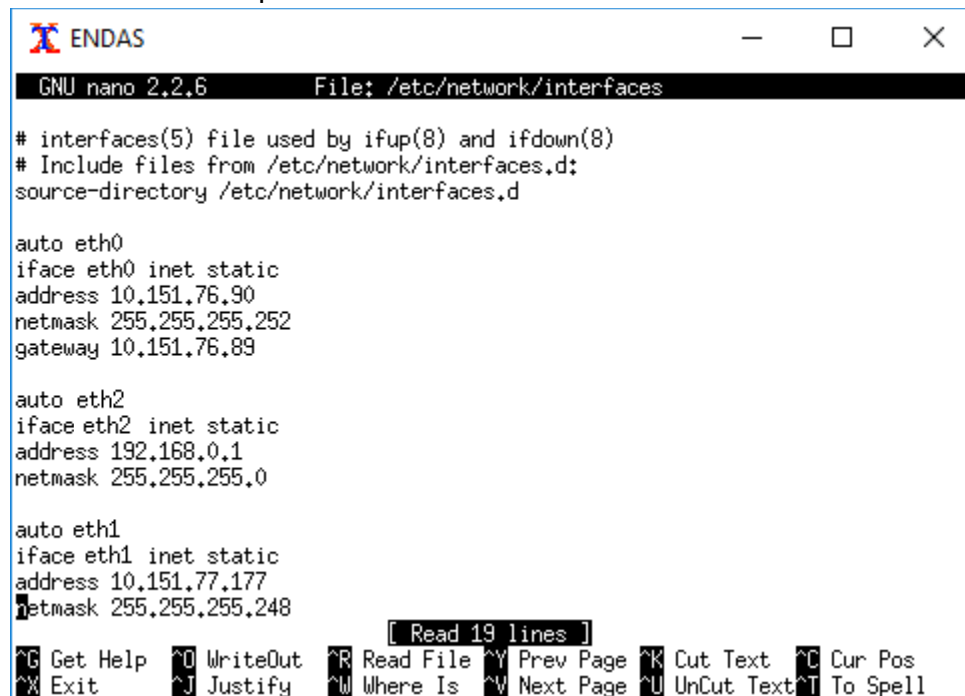
# Path to dhcpd's PID file (default: /var/run/dhcpd.pid).
#DHCPD_PID=/var/run/dhcpd.pid

# Additional options to start dhcpd with.
# Don't use options -cf or -pf here; use DHCPD_CONF/ DHCPD_PID instead
#OPTIONS=""

# On what interfaces should the DHCP server (dhcpd) serve DHCP requests?
# Separate multiple interfaces with spaces, e.g. "eth0 eth1".
INTERFACES="eth2"

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

Kemudian cek IP pada ENDAS di **/etc/network/interfaces**



```
GNU nano 2.2.6 File: /etc/network/interfaces

# interfaces(5) file used by ifup(8) and ifdown(8)
# Include files from /etc/network/interfaces.d:
source-directory /etc/network/interfaces.d

auto eth0
iface eth0 inet static
address 10.151.76.90
netmask 255.255.255.252
gateway 10.151.76.89

auto eth2
iface eth2 inet static
address 192.168.0.1
netmask 255.255.255.0

auto eth1
iface eth1 inet static
address 10.151.77.177
netmask 255.255.255.248

[ Read 19 lines ]

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

Lalu cek alamat eth2 pada ENDAS, yaitu 192.168.0.1 dengan netmask 255.255.255.0

Buka **/etc/dhcp/dhcpd.conf** untuk mengatur range IP. Syntax yang perlu ditambahkan adalah sebagai berikut:

```
subnet [NID] netmask [netmask] {  
    range [IP_awal] [IP_akhir];  
    option routers [gateway];  
    option broadcast-address [IP_broadcast];  
    option domain-name-servers [DNS yang  
diinginkan]  
    default-lease-time [waktu];  
    max-lease-time [waktu];  
}
```

Konfigurasi dasar yang dibutuhkan sebenarnya cukup simple. Cukup menambahkan :

```
subnet [NID] netmask [netmask] { }
```

sesuaikan bagian **[NID]** dan **[netmask]** dengan NID dan netmask yang terdapat pada subnet yang dimaksud. Lalu tambahkan parameter konfigurasi yang dibutuhkan di dalam kurung kurawal. Missal jika akan membatasi range IP yang digunakan secara dinamis, cukup menambahkan baris berikut :

```
range [IP awal] [IP akhir];
```

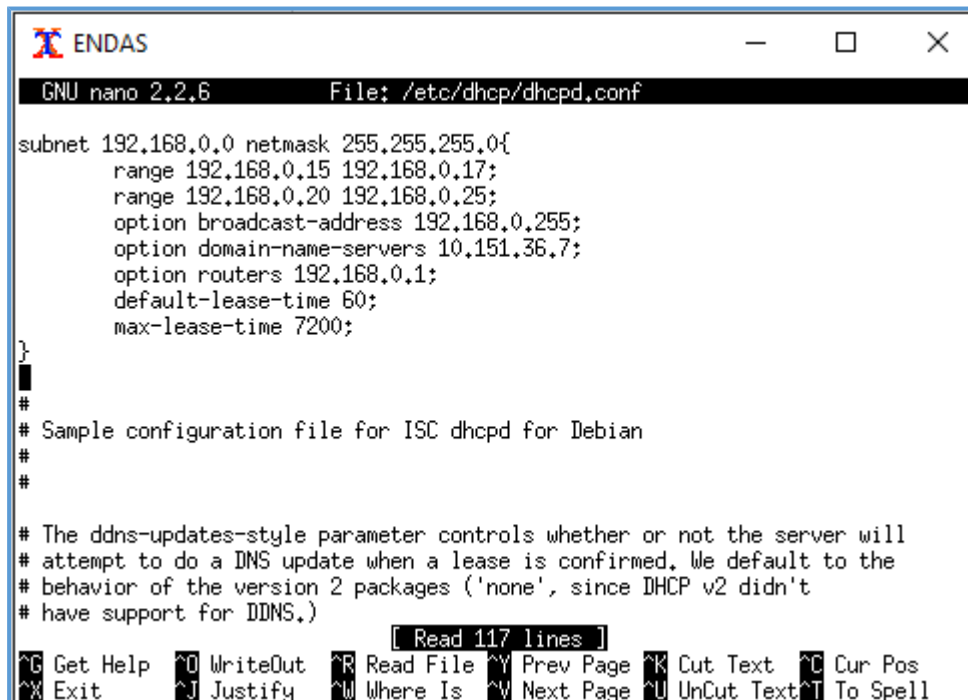
artinya, di dalam subnet yang dimaksud hanya ada alamat-alamat IP pada rentang [IP awal] sampai [IP akhir] yang boleh digunakan secara dinamis.

Beberapa parameter dasar yang biasanya dipakai diantaranya :

- option routers, mengikuti routers pada settingan IP dalam subnet
- option broadcast-address, mengikuti broadcast-address IP dalam subnet
- option domain-name-servers, agar client mendapatkan dns sesuai dengan yang kita inginkan
- default-lease-time, default waktu yang diberikan dhcp kepada client dalam menggunakan IP yang diberikan. Apabila default-lease-time melebihi max-lease-time, dilakukan pengecekan ke dhcp apakah IP dapat digunakan atau tidak
- max-lease-time, maksimal waktu yang digunakan dhcp untuk memberikan pembagian IP

Sehingga konfigurasinya menjadi seperti ini :

```
subnet 192.168.0.0 netmask 255.255.255.0 {  
    range 192.168.0.10 192.168.0.20;  
    option routers 192.168.0.1;  
    option broadcast-address 192.168.0.255;  
    option domain-name-servers 10.151.36.7;  
    default-lease-time 600;  
    max-lease-time 7200;  
}
```

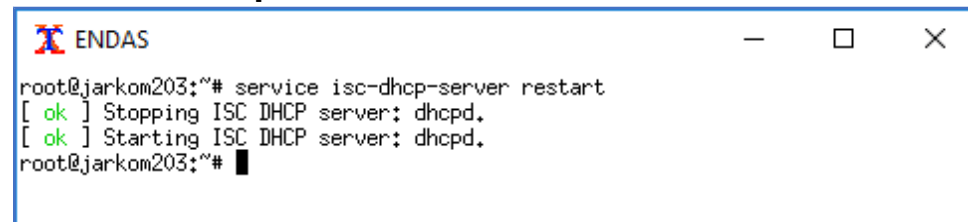


```
GNU nano 2.2.6 File: /etc/dhcp/dhcpd.conf

subnet 192.168.0.0 netmask 255.255.255.0{
    range 192.168.0.15 192.168.0.17;
    range 192.168.0.20 192.168.0.25;
    option broadcast-address 192.168.0.255;
    option domain-name-servers 10.151.36.7;
    option routers 192.168.0.1;
    default-lease-time 60;
    max-lease-time 7200;
}
#
# Sample configuration file for ISC dhcpd for Debian
#
#
# The ddns-updates-style parameter controls whether or not the server will
# attempt to do a DNS update when a lease is confirmed. We default to the
# behavior of the version 2 packages ('none', since DHCP v2 didn't
# have support for DDNS.)
[ Read 117 lines ]
^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text  ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is  ^V Next Page ^U UnCut Text ^T To Spell
```

Parameter yang ada di dalam kurung kurawal bersifat local. Bisa juga meletakkan parameter ini di luar bagian subnet sehingga menjadi parameter global.

Setelah itu simpan, kemudian restart dengan menjalankan perintah **service isc-dhcp-server restart**



```
root@jarkom203:~# service isc-dhcp-server restart
[ ok ] Stopping ISC DHCP server: dhcpd.
[ ok ] Starting ISC DHCP server: dhcpd.
root@jarkom203:~#
```

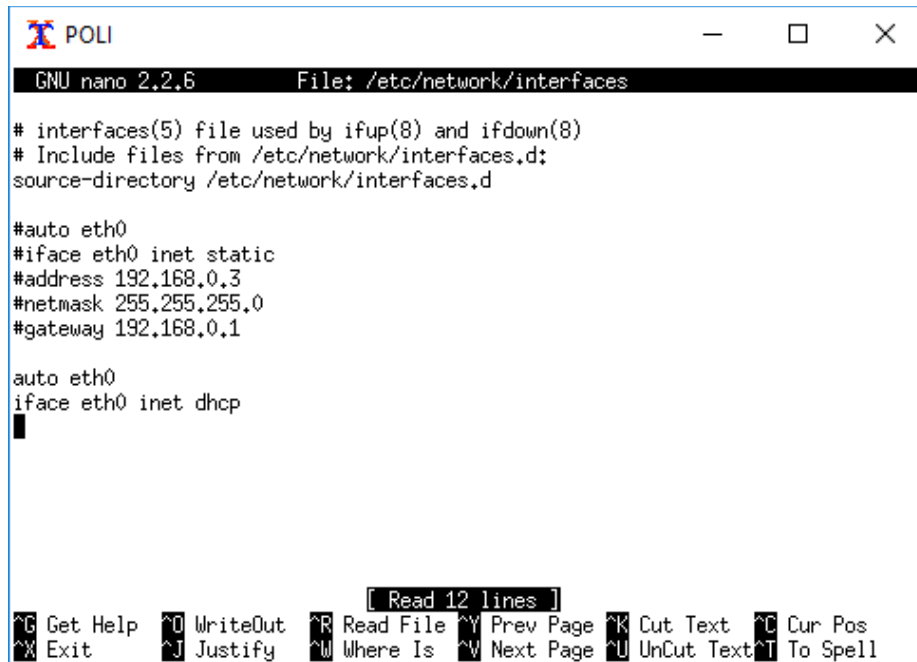
DHCP Client

Pada client, ubah konfigurasi interface pada **/etc/network/interfaces** dengan menjadikan konfigurasi sebelumnya sebagai komen, lalu menambahkan baris berikut :

auto [interface]

iface [interface] inet dhcp

sesuaikan [interface] dengan interface yang menghubungkan client dengan DHCP Server.



```
GNU nano 2.2.6      File: /etc/network/interfaces

# interfaces(5) file used by ifup(8) and ifdown(8)
# Include files from /etc/network/interfaces.d:
source-directory /etc/network/interfaces.d

#auto eth0
#iface eth0 inet static
#address 192.168.0.3
#netmask 255.255.255.0
#gateway 192.168.0.1

auto eth0
iface eth0 inet dhcp
█

[ Read 12 lines ]
^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text  ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is  ^V Next Page ^U UnCut Text ^T To Spell
```

Kemudian lakukan restart dengan menjalankan **service networking restart**

```
root@jarkom203:~# service networking restart
[.....] Running /etc/init.d/networking restart is deprecated because it may not r
[warn]ble some interfaces ... (warning).
[.....] Reconfiguring network interfaces...Killed old client process
Internet Systems Consortium DHCP Client 4.3.1
Copyright 2004-2014 Internet Systems Consortium.
All rights reserved.
For info, please visit https://www.isc.org/software/dhcp/

Listening on LPF/eth0/7e:d0:ff:b7:c0:43
Sending on   LPF/eth0/7e:d0:ff:b7:c0:43
Sending on   Socket/fallback
DHCPRELEASE on eth0 to 192.168.0.1 port 67
Internet Systems Consortium DHCP Client 4.3.1
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All rights reserved.
For info, please visit https://www.isc.org/software/dhcp/

Listening on LPF/eth0/7e:d0:ff:b7:c0:43
Sending on   LPF/eth0/7e:d0:ff:b7:c0:43
Sending on   Socket/fallback
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 4
DHCPREQUEST on eth0 to 255.255.255.255 port 67
DHCPOFFER from 192.168.0.1
DHCPACK from 192.168.0.1
bound to 192.168.0.16 -- renewal in 274 seconds.
done.
root@jarkom203:~# █
```

Jangan lupa cek kembali ipnya dengan menggunakan syntax **ifconfig** pada terminal

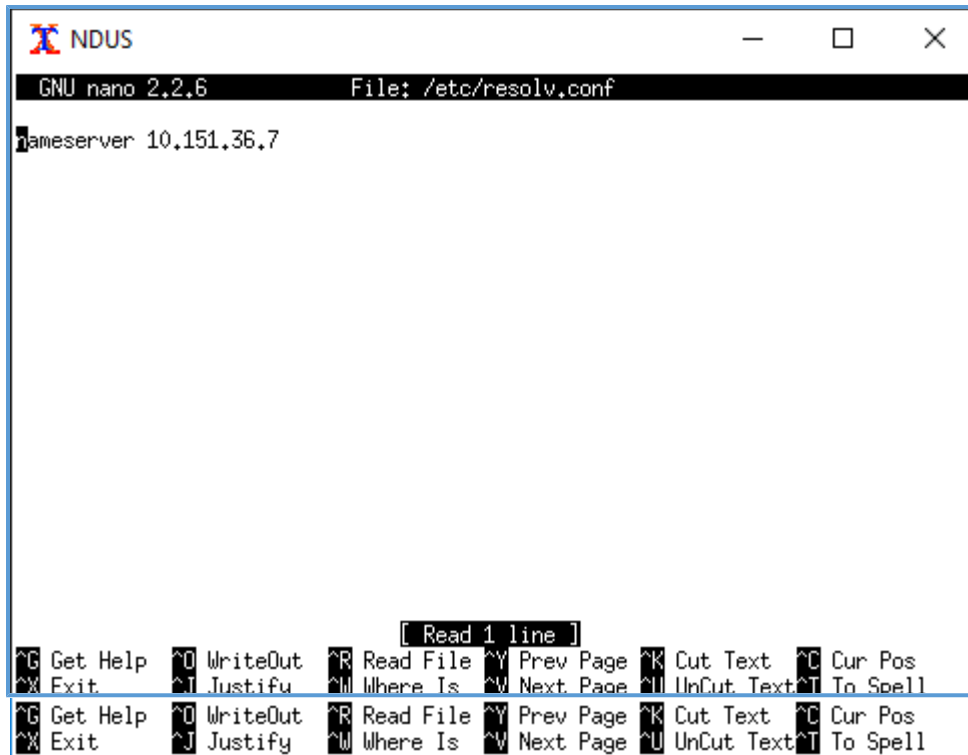
```
root@jarkom203:~# ifconfig
eth0      Link encap:Ethernet  HWaddr 7e:d0:ff:b7:c0:43
          inet addr:192.168.0.16  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::7cd0:ffff:feb7:c043/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:616 errors:0 dropped:0 overruns:0 frame:0
          TX packets:617 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:81284 (79.3 KiB)  TX bytes:88792 (86.7 KiB)
          Interrupt:5

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

root@jarkom203:~# █
```

Terlihat bahwa IP yang didapat adalah **192.168.0.16** sesuai dengan range IP yang telah diberikan.

Kemudian cek pada **/etc/resolv.conf** pada client (NDUS dan POLI) untuk melihat apakah client sudah mendapatkan DNS yang diinginkan



The screenshot shows a terminal window titled "NDUS" with a window control bar (minimize, maximize, close). The terminal displays the GNU nano 2.2.6 editor editing the file /etc/resolv.conf. The content of the file is "nameserver 10.151.36.7". At the bottom of the terminal, there is a status bar with the text "[Read 1 line]" and a detailed list of keyboard shortcuts for nano, including commands like Get Help, Exit, WriteOut, Justify, Read File, Where Is, Prev Page, Next Page, Cut Text, UnCut Text, Cur Pos, and To Spell.

```
NDUS
GNU nano 2.2.6 File: /etc/resolv.conf
nameserver 10.151.36.7

[ Read 1 line ]
^G Get Help  ^O WriteOut  ^R Read File  ^Y Prev Page  ^K Cut Text   ^C Cur Pos
^X Exit      ^T Justify   ^M Where Is   ^W Next Page  ^U UnCut Text ^T To Spell
^G Get Help  ^O WriteOut  ^R Read File  ^Y Prev Page  ^K Cut Text   ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is   ^W Next Page  ^U UnCut Text ^T To Spell
```

Jangan lupa direstart dengan **service networking restart**

```
UNYIL
root@jarkom203:/# service networking restart
[....] Running /etc/init.d/networking restart is deprecated because it may not r
[warn]ble some interfaces ... (warning).
[....] Reconfiguring network interfaces...Internet Systems Consortium DHCP Clie
t 4.3.1
Copyright 2004-2014 Internet Systems Consortium.
All rights reserved.
For info, please visit https://www.isc.org/software/dhcp/

Listening on LPF/eth0/fe:a0:93:58:c2:be
Sending on   LPF/eth0/fe:a0:93:58:c2:be
Sending on   Socket/fallback
Internet Systems Consortium DHCP Client 4.3.1
Copyright 2004-2014 Internet Systems Consortium.
All rights reserved.
For info, please visit https://www.isc.org/software/dhcp/

Listening on LPF/eth0/fe:a0:93:58:c2:be
Sending on   LPF/eth0/fe:a0:93:58:c2:be
Sending on   Socket/fallback
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 6
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 6
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 10
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 18
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 8
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 13
No DHCPOFFERS received.
No working leases in persistent database - sleeping.
done.
root@jarkom203:/# █
```

Terbukti bahwa UNYIL tidak mendapatkan IP dari ENDAS sebagai DHCP Server.

FIXED ADDRESS

Fixed address berguna supaya suatu client hanya mendapatkan IP address yang sudah ditetapkan. Contohnya adalah, **POLI** akan dibuat hanya mendapatkan IP address **192.168.0.69**

Pada **ENDAS** buka dhcpd.conf. Ketikkan **nano /etc/dhcp/dhcpd.conf**

```
root@jarkom205:~# nano /etc/dhcp/dhcpd.conf █
```

Lalu tambahkan seperti yang diberi kotak merah pada gambar dibawah

```
ENDAS
GNU nano 2.2.6 File: /etc/dhcp/dhcpd.conf

host poli {
    hardware ethernet 06:b5:f1:0c:f9:b8;
    fixed-address 192.168.0.69;
}

subnet 192.168.0.0 netmask 255.255.255.0{
    range 192.168.0.15 192.168.0.17;
    range 192.168.0.20 192.168.0.70;
    option broadcast-address 192.168.0.255;
    option domain-name-servers 10.151.36.7;
    option routers 192.168.0.1;
    default-lease-time 60;
    max-lease-time 7200;
}

#
# Sample configuration file for ISC dhcpd for Debian
#
#
[ Read 122 lines ]
^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

“hardware ethernet” didapatkan dari hardware address yang ada di client **POLI**. Pada **POLI**, ketikkan **ifconfig**. Lalu ambil hardware addressnya seperti pada gambar dibawah

```
root@jarkom205:~# ifconfig
eth0      Link encap:Ethernet  HWaddr 06:b5:f1:0c:f9:b8
```

“fixed address” merupakan konfigurasi IP yang akan didapatkan oleh client **POLI**.

Setelah selesai konfigurasi, restart dhcpnya dengan mengetikkan **service isc-dhcp-server restart**

Lalu pada **POLI**, ketikkan nano **/etc/networking/interfaces**, dan tambahkan hardware addressnya. Sintaksnya seperti pada gambar dibawah

```
auto eth0
iface eth0 inet dhcp
hwaddress ether 06:b5:f1:0c:f9:b8
```

[PENTING] Mengapa hwaddress harus disetting pada **/etc/networking/interfaces** client? Hal ini disebabkan karena perangkat yang ada merupakan perangkat virtual (**POLI**, **NDUS**, **ENDAS**, **DLL**) yang setiap kali direstart hwaddressnya akan berubah.

Setelah itu ketikkan **service networking restart**. Lalu cek IP nya apakah sudah mendapatkan IP 192.168.0.69 atau belum, dengan mengetikkan **ifconfig**

```
root@jarkom205:~# ifconfig
eth0      Link encap:Ethernet  HWaddr 06:b5:f1:0c:f9:b8
          inet addr:192.168.0.69  Bcast:192.168.0.255  Mask:255.255.255.0
```

TROUBLESHOOT

Silahkan baca terlebih dahulu sebelum kelompok Anda mengalami serangan panik akut.

1. Ketika membuka UML **langsung force close**

- Disebabkan karena Anda mungkin tidak menutup UML Anda dengan **halt** atau dengan **bye.sh**
- Jika terjadi, ketikkan
 - o Bash bye.sh pada terminal utama
 - o Jika status yang diberikan OK maka,
 - o Jalankan kembali topologi Anda
 - o Jika masih belum bisa panggil asisten kesayangan anda

2. Tidak bisa ping its.ac.id dari UML yang **bukan** merupakan ENDAS

- Disebabkan karena Anda mungkin belum mengetikkan iptables dan sysctl -p di router ENDAS, ketikkan di ENDAS:
 - o iptables -t nat -A POSTROUTING -o eth0 -j MASQUERADE
 - o Ubah file **/etc/sysctl.conf** (lihat modul)

3. Segmentation fault ketika **apt-get install** / **apt-get update** jalankan nomer 1 pada CARA 1.

Tetapi jika terjadi saat restart aplikasi, jalankan perintah 2 dan 3 pada CARA 1.

CARA 2 dilakukan jika CARA 1 tetap tidak berhasil.

```
CARA 1
1. rm -r /var/cache/(yang segfault)
2. Purge aplikasi yang buat segfault
   apt-get purge "nama aplikasi yg segfault"
   apt-get autoremove
3. Install ulang aplikasi
   apt-get install "nama aplikasi yang tadi di purge"
```

```
CARA 2
1. Hapus Uml nya yang segfault
```

4. Apt-get update gagal

- Belum export proxy. Solusi : export proxy terlebih dahulu



- Seperti gambar dibawah, ditunggu berjam-jam juga tidak terjadi apapun. Solusi : di router ENDAS, ketikkan iptables dan sysctl -p seperti pada modul terlebih dahulu.



- Ketika muncul seperti gambar dibawah. Solusi : coba ketikkan apt-get update sekali lagi.


```
W: Failed to fetch http://kambing.ui.ac.id/debian/dists/jessie/main/binary-amd64
/Packages Hash Sum mismatch

W: Failed to fetch http://kambing.ui.ac.id/debian/dists/jessie/main/i18n/Transla
tion-en Hash Sum mismatch

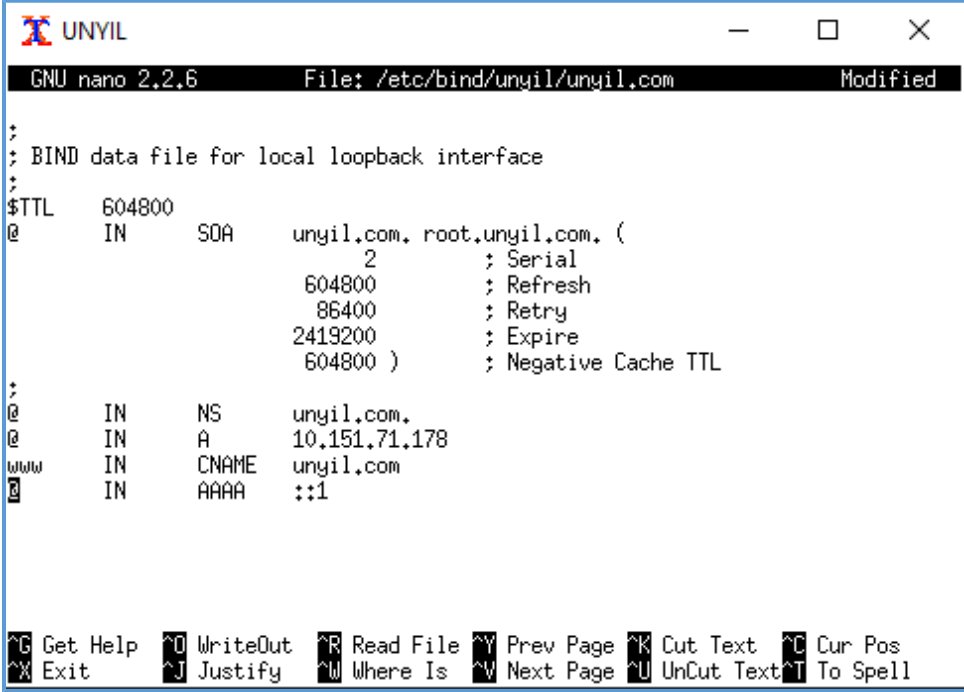
E: Some index files failed to download. They have been ignored, or old ones used
instead.
```

- Ketika tiba-tiba muncul tulisan “the package lists or status file could not be parsed or opened”:

```
sudo mv /var/lib/dpkg/status /var/lib/dpkg/status.bad
sudo cp /var/lib/dpkg/status-old /var/lib/dpkg/status
sudo apt-get update
```

- Ketika tiba-tiba muncul tulisan “Problem with MergeList”:
 - sudo rm -vf /var/lib/apt/lists/*
 - sudo apt-get update

SOAL SHIFT



```
UNYIL
GNU nano 2.2.6 File: /etc/bind/unyil/unyil.com Modified
;
; BIND data file for local loopback interface
;
$TTL 604800
@ IN SOA unyil.com. root.unyil.com. (
        2      ; Serial
        604800 ; Refresh
        86400  ; Retry
        2419200 ; Expire
        604800 ) ; Negative Cache TTL
;
@ IN NS unyil.com.
@ IN A 10.151.71.178
www IN CNAME unyil.com
@ IN AAAA ::1

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

1. Analisalah record DNS di atas. Apa yang terjadi jika melakukan ping **unyil.com** dengan ping **www.unyil.com**? Mengapa hal itu terjadi?
2. Buatlah sebuah subdomain pada domain unyil.com dengan nama upil.com

3. Buatlah sebuah konfigurasi DHCP agar NDUS dan POLI mendapatkan IP dengan range 192.168.0.1 - 192.168.0.10 dan 192.168.0.13 - 192.168.0.16 dengan syarat setiap 1 menit IP yang digunakan client berganti.