

Contents

Start with update apt:	1
Register a new domain	1
Configuring even a so-called. "Reverse zone" for grupp13.fi that allows you to obtain the host name on the basis of an IP address.....	7
Configure the DNS server to delegate to the Arcadas DNS server (IP address: 193.167.33.232) to obtain domain name IP addresses that are not registered on their own DNS server.....	7
Configuring both the client and the server in the cloud to use your own DNS name service as the primary DNS (in /etc/resolv.conf).....	9

Start with update apt:

- `sudo apt-get update`

Now install BIND:

- `sudo apt-get install bind9 bind9utils bind9-doc`

Register a new domain

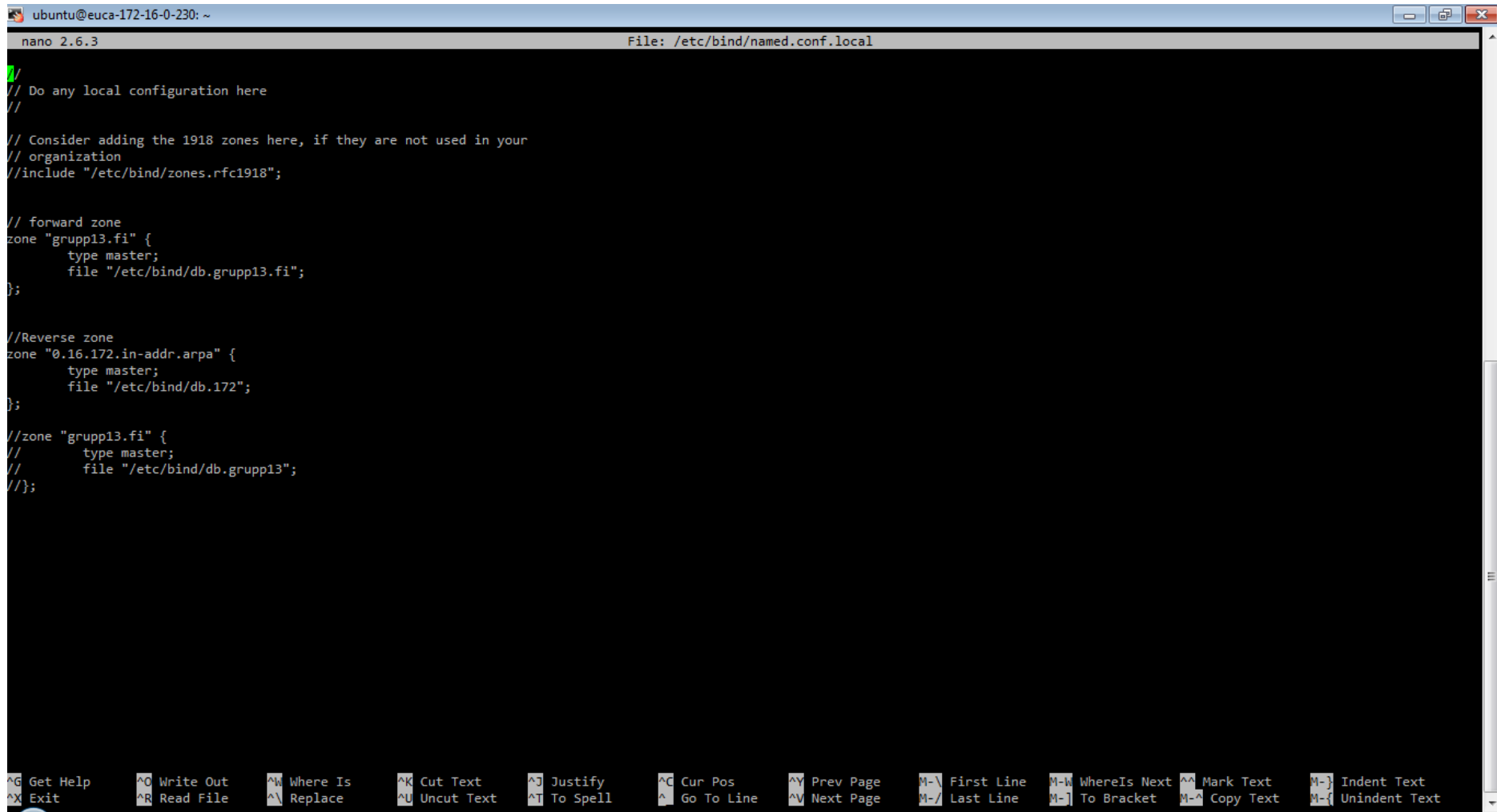
To add a DNS zone to BIND9, turning BIND9 into a Primary Master server, the first step is to edit /etc/bind/named.conf.local:

Laboration 3 - Setting up a local DNS server

Type to your command line:

- `sudo nano /etc/bind/named.conf.local`

Laboration 3 - Setting up a local DNS server



```
ubuntu@euca-172-16-0-230: ~
nano 2.6.3 File: /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";

// forward zone
zone "grupp13.fi" {
    type master;
    file "/etc/bind/db.grupp13.fi";
};

//Reverse zone
zone "0.16.172.in-addr.arpa" {
    type master;
    file "/etc/bind/db.172";
};

//zone "grupp13.fi" {
//    type master;
//    file "/etc/bind/db.grupp13";
//};

^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos  ^Y Prev Page  M- First Line  M-W WhereIs Next  ^^ Mark Text  M- Indent Text
^X Exit      ^R Read File  ^_ Replace  ^U Uncut Text  ^T To Spell  ^ Go To Line  ^V Next Page  M- Last Line  M- To Bracket  M- Copy Text  M- Unindent Text
```

Now use an existing zone file as a template to create the `/etc/bind/db.example.com` file:

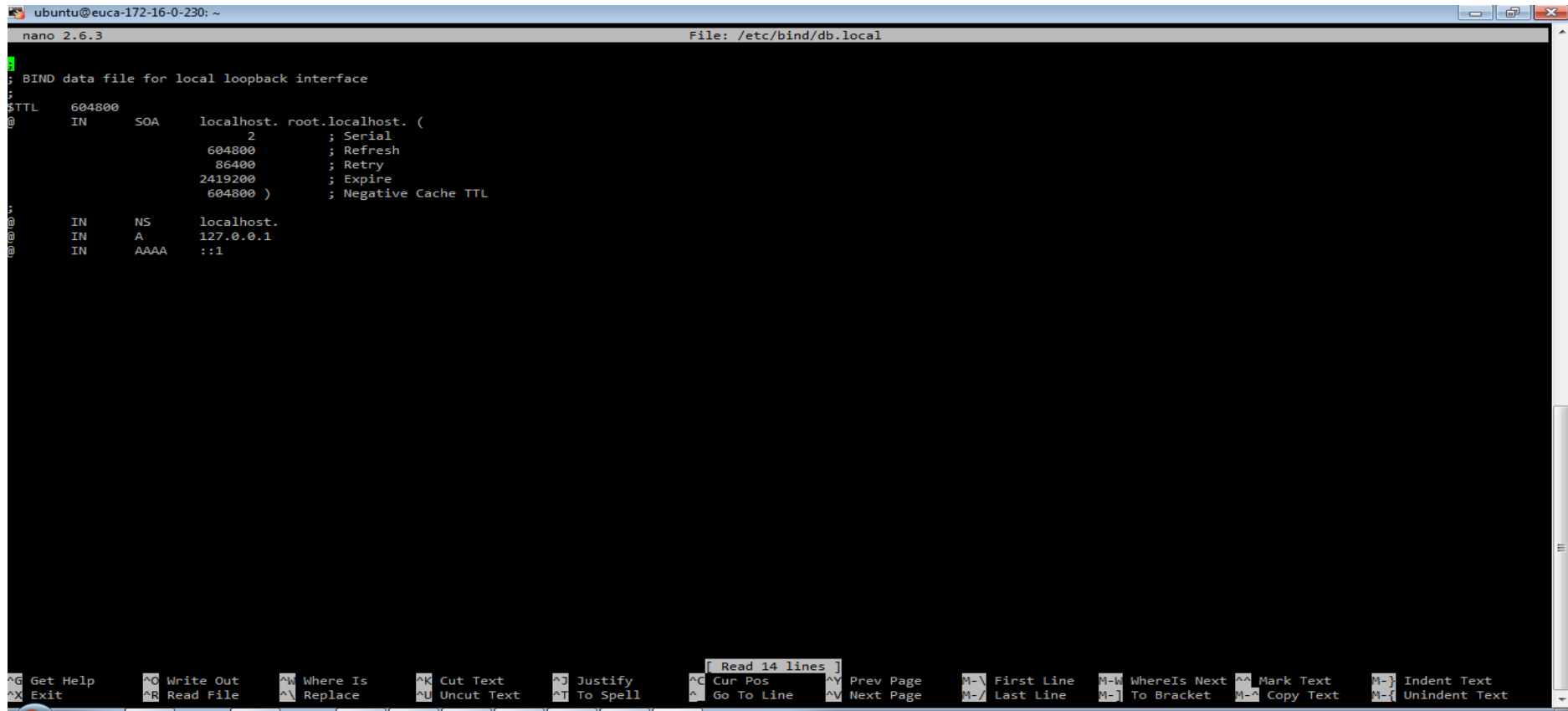
Laboration 3 - Setting up a local DNS server

- `sudo cp /etc/bind/db.local /etc/bind/db.grupp13.fi`

Edit the new zone file `/etc/bind/db.grupp13.fi` change `localhost.` to the FQDN of your server, leaving the additional `."` at the end. Change `127.16.0.19` to the nameserver's IP Address and `root.grupp13.fi` to a valid email address, but with a `."` instead of the usual `"@"` symbol, again leaving the `."` at the end. Change the comment to indicate the domain that this file is for.

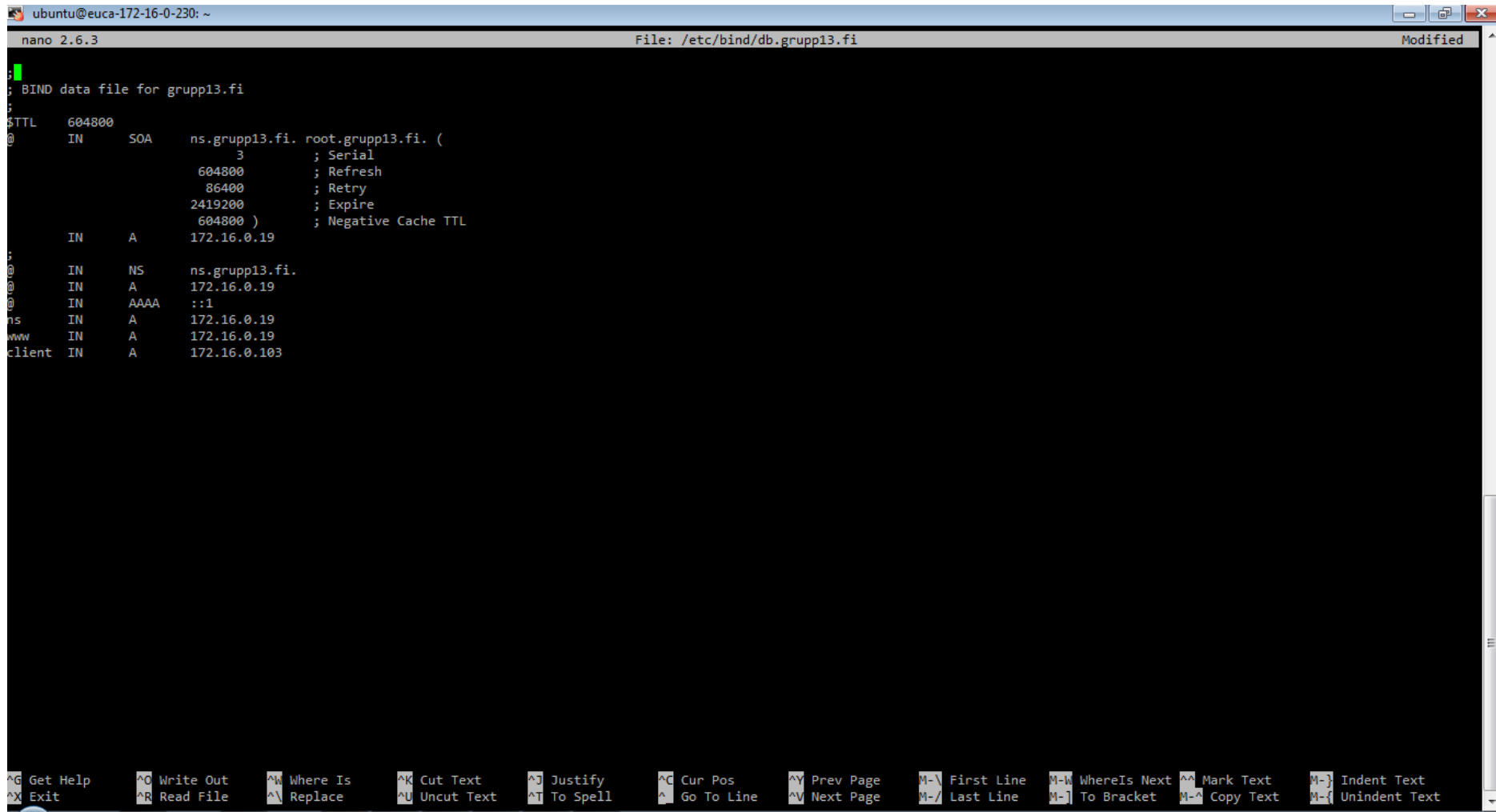
Create an A record for the base domain, `grupp13.fi`. Also, create an A record for `ns. grupp13.fi`, the name server in this example:

Laboration 3 - Setting up a local DNS server



```
ubuntu@euca-172-16-0-230: ~  
nano 2.6.3 File: /etc/bind/db.local  
; BIND data file for local loopback interface  
;$TTL 604800  
@ IN SOA localhost. root.localhost. (  
    2      ; Serial  
    604800 ; Refresh  
    86400  ; Retry  
    2419200 ; Expire  
    604800 ) ; Negative Cache TTL  
;  
@ IN NS  localhost.  
@ IN A   127.0.0.1  
@ IN AAAA ::1  
  
^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify   ^C Cur Pos   ^Y Prev Page  M-^ First Line M-^ WhereIs Next ^M Mark Text  M-} Indent Text  
^X Exit      ^R Read File  ^_ Replace   ^U Uncut Text ^T To Spell  ^G Go To Line ^V Next Page  M-^ Last Line  M-] To Bracket  M-^ Copy Text  M-{ Unindent Text
```

Laboration 3 - Setting up a local DNS server



```
nano 2.6.3                                File: /etc/bind/db.grupp13.fi                                Modified
;
; BIND data file for grupp13.fi
;
$TTL      604800
@         IN      SOA      ns.grupp13.fi. root.grupp13.fi. (
                        3      ; Serial
                        604800 ; Refresh
                        86400  ; Retry
                        2419200 ; Expire
                        604800 ) ; Negative Cache TTL
;
@         IN      A        172.16.0.19
;
@         IN      NS       ns.grupp13.fi.
@         IN      A        172.16.0.19
@         IN      AAAA     ::1
ns        IN      A        172.16.0.19
www       IN      A        172.16.0.19
client    IN      A        172.16.0.103

^G Get Help      ^O Write Out    ^W Where Is     ^K Cut Text     ^J Justify      ^C Cur Pos      ^Y Prev Page   ^M- First Line ^M-W WhereIs Next ^M Mark Text    ^M- Indent Text
^X Exit          ^R Read File    ^N Replace      ^U Uncut Text   ^T To Spell     ^G Go To Line   ^V Next Page   ^M- Last Line  ^M- To Bracket  ^M-A Copy Text  ^M- Unindent Text
```

Once you have made changes to the zone file BIND9 needs to be restarted for the changes to take effect:

- `sudo systemctl restart bind9.service`

Laboration 3 - Setting up a local DNS server

Configuring even a so-called. "Reverse zone" for grupp13.fi that allows you to obtain the host name on the basis of an IP address.

Now that the zone is setup and resolving names to IP Adresses a Reverse zone is also required. A Reverse zone allows DNS to resolve an address to a name.

Edit /etc/bind/named.conf.local and add the following:

- zone "1.168.192.in-addr.arpa" {
- type master;
- file "/etc/bind/db.192";
- };

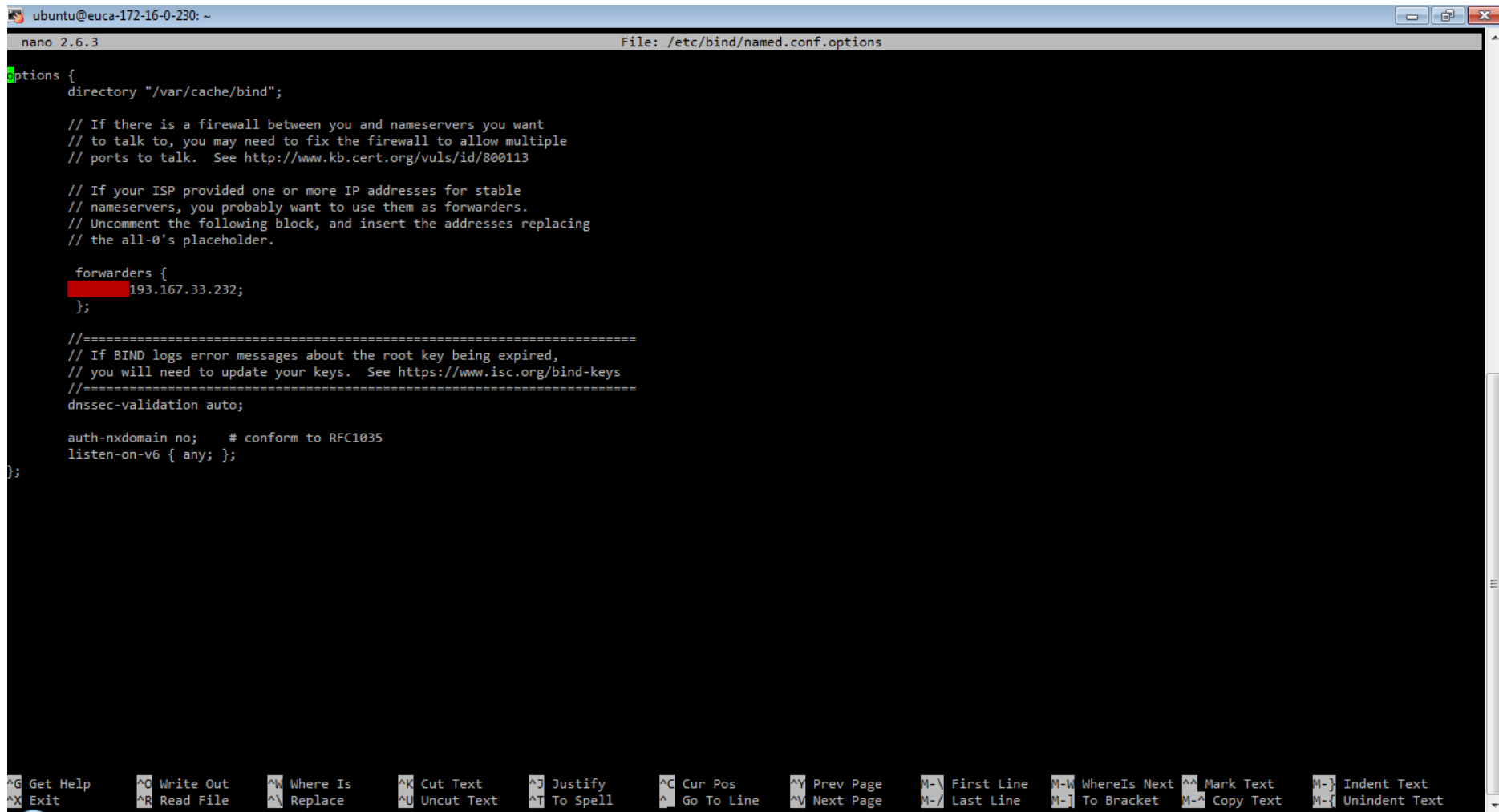
Configure the DNS server to delegate to the Arcadas DNS server (IP address: 193.167.33.232) to obtain domain name IP addresses that are not registered on their own DNS server.

Caching Nameserver:

Edit /etc/bind/named.conf.options and add the IP Addresses of your ISP's DNS servers.

- sudo nano /etc/bind/named.conf.options

Laboration 3 - Setting up a local DNS server



```
ubuntu@euca-172-16-0-230: ~  
nano 2.6.3 File: /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 {  
        193.167.33.232;  
    };  
  
    //=====  
    // 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;  
  
    auth-nxdomain no; # conform to RFC1035  
    listen-on-v6 { any; };  
};  
  
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos ^Y Prev Page M-^ First Line M-^ WhereIs Next ^M Mark Text M-^ Indent Text  
^X Exit ^R Read File ^_ Replace ^U Uncut Text ^T To Spell ^_ Go To Line ^V Next Page M-^ Last Line M-^ To Bracket M-^ Copy Text M-^ Unindent Text
```

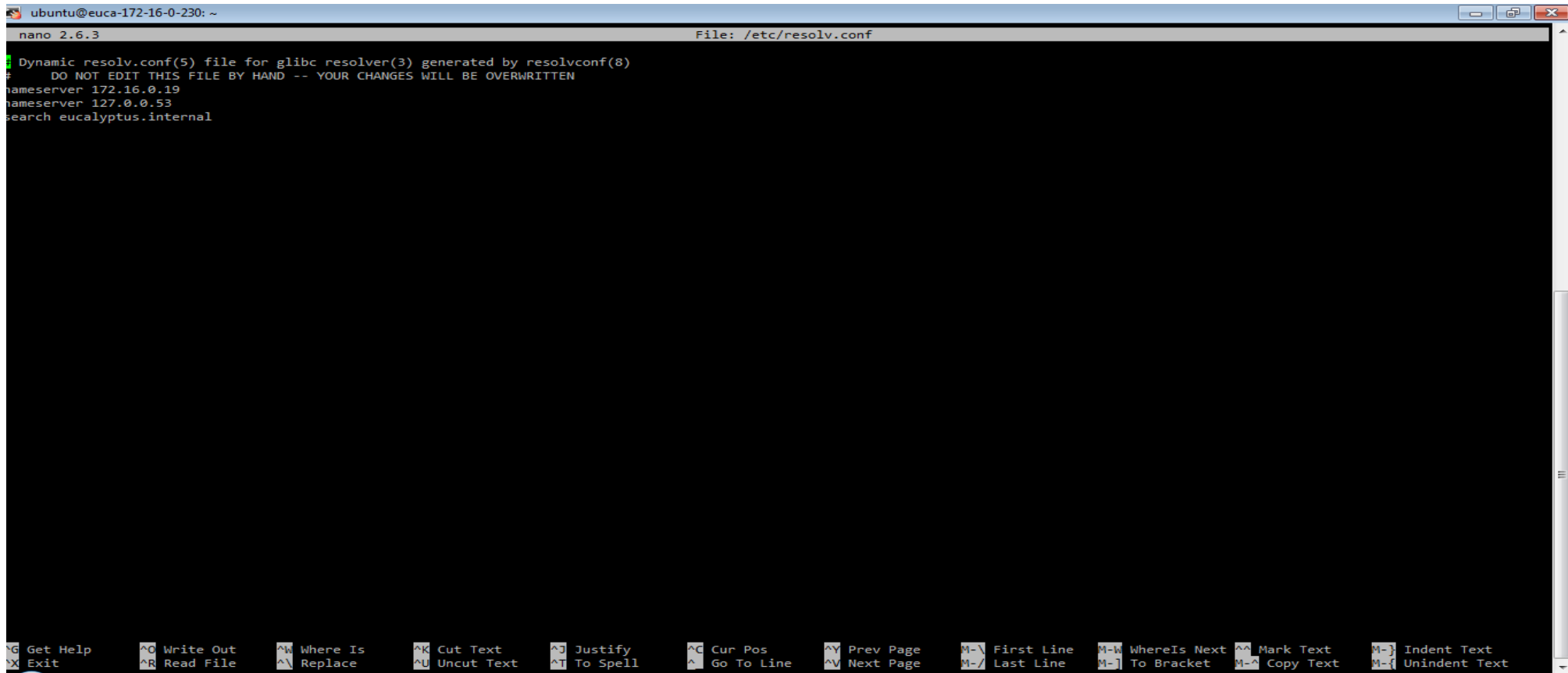
Now restart the DNS server, to enable the new configuration. From a terminal prompt:

- `sudo systemctl restart bind9.service`

Laboration 3 - Setting up a local DNS server

Configuring both the client and the server in the cloud to use your own DNS name service as the primary DNS (in /etc/resolv.conf)

Edit /etc/resolv.conf and add the IP Addresses 172.16.0.19 to it .



```
ubuntu@euca-172-16-0-230: ~  
nano 2.6.3 File: /etc/resolv.conf  
Dynamic resolv.conf(5) file for glibc resolver(3) generated by resolvconf(8)  
# DO NOT EDIT THIS FILE BY HAND -- YOUR CHANGES WILL BE OVERWRITTEN  
nameserver 172.16.0.19  
nameserver 127.0.0.53  
search eucalyptus.internal  
  
Get Help Write Out Where Is Cut Text Justify Cur Pos Prev Page First Line WhereIs Next Mark Text Indent Text  
Exit Read File Replace Uncut Text To Spell Go To Line Next Page Last Line To Bracket Copy Text Unindent Text
```

- `sudo nano /etc/resolv.conf`

How DNS Works

The Domain Name System (*DNS*) is a kind of a phone book (lists names next to numbers) that translates the domain names into IP (Internet Protocol) addresses.

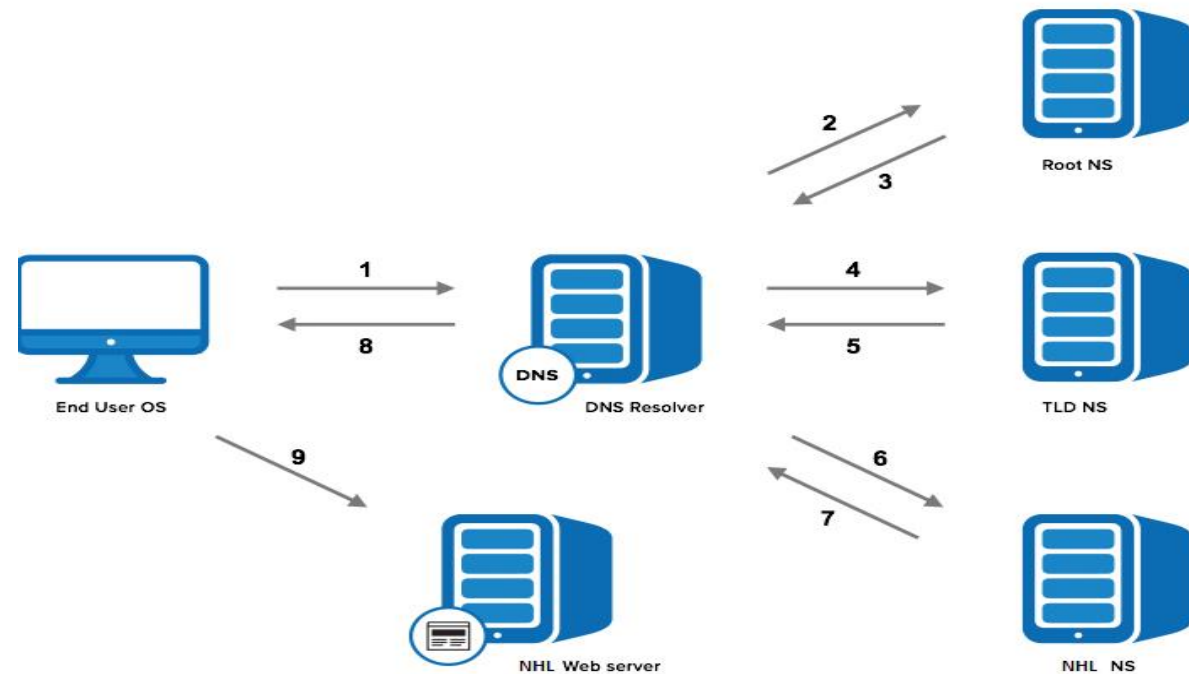
When you type a domain name into your browser such as `www.nhl.com`, first your computer looks in its local DNS cache, where the recently retrieved information is stored.

Secondly, if the computer is not able to find the answer there, it implements a DNS query to find out.

1. Starts by asking the recursive DNS servers: they have their own caches, so if they get the answer they return the information to the user otherwise
2. The recursive DNS servers query root nameservers (there are 13 of them) for the `.com` domain, which answer with the addresses of the authoritative name servers for `www.nhl.com` domain.
The does have the anwer for our request but it knows where to find it out. Root nameservers cares of the right part of our request `.com` then it our request to...
3. TLD nameservers: Every Top-Level Domain, such as `.com`, `.net`, and `.fi`, have their own group of nameservers, that receieve each TLD. TLD aslo does have the required information but it tells us (directs us to) the servers that *do*.
4. The next step is the authoritative DNS servers: they know all the information about an exact domain that is saved in DNS records. Since what we need to acquire is the ip address of www.nhl.com, so we will ask the authoritative ns for the Address Record.

Laboration 3 - Setting up a local DNS server

- From the authoritative nameservers, the Address Record will be retrieved by the recursive server to be saved its local cache inorder to easy and fast the process in the future.
- The recursive server will then provide your browser(your computer) with the Address Record and will save in its local cache.



Please note that the whole process takes (starts and ends in) milliseconds😊.

Laboration 3 - Setting up a local DNS server