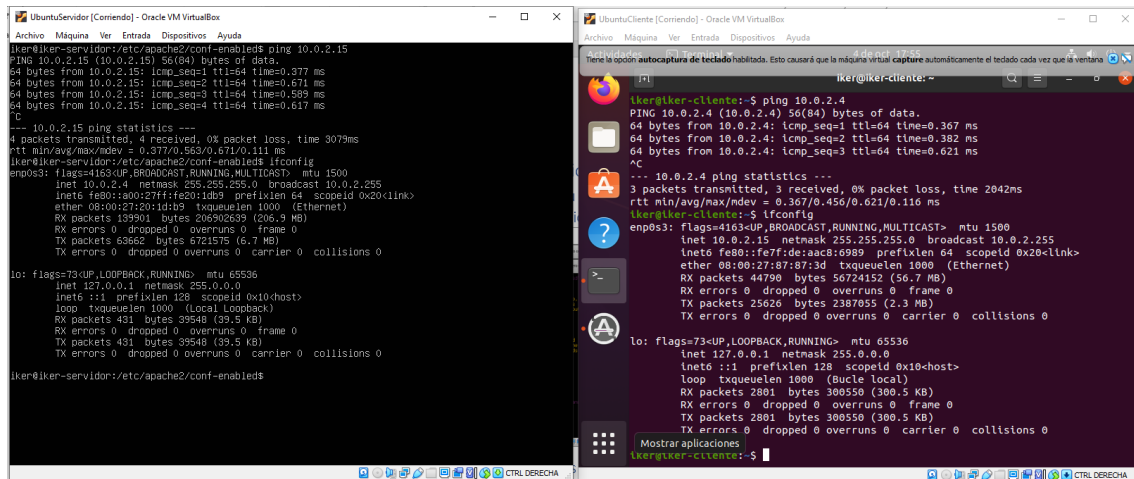


A) Tenemos este escenario inicial:

a. Trabajaremos con un Ubuntu Server y Ubuntu Desktop, que por estar en una Red NAT se integran en un servicio DHCP de VirtualBox.

b. Las dos VM están conectadas entre sí mediante una red nat.



The image shows two terminal windows from Oracle VM VirtualBox. The left window is titled 'UbuntuServer [Comando] - Oracle VM VirtualBox' and shows the output of 'ifconfig' and 'ping' commands. The right window is titled 'UbuntuCliente [Comando] - Oracle VM VirtualBox' and shows the output of 'ifconfig' and 'ping' commands. Both windows show network statistics and configuration details for the respective VMs.

```
lker@lker-servidor:/etc/apache2/conf-enabled$ ping 10.0.2.15
PING 10.0.2.15 (10.0.2.15) 56(84) bytes of data:
64 bytes from 10.0.2.15: icmp_seq=1 ttl=64 time=0.377 ms
64 bytes from 10.0.2.15: icmp_seq=2 ttl=64 time=0.671 ms
64 bytes from 10.0.2.15: icmp_seq=3 ttl=64 time=0.589 ms
64 bytes from 10.0.2.15: icmp_seq=4 ttl=64 time=0.617 ms
^C
--- 10.0.2.15 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3079ms
rtt min/avg/max/mdev = 0.377/0.553/0.671/0.111 ms
lker@lker-servidor:/etc/apache2/conf-enabled$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.2.4 netmask 255.255.255.0 broadcast 10.0.2.255
    inet6 fe80::a00:27ff:fe20:1db9 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:20:1d:b9 txqueuelen 1000 (Ethernet)
    RX packets 133901 bytes 206202639 (206.9 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 63662 bytes 6721575 (6.7 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 431 bytes 39548 (39.5 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 431 bytes 39548 (39.5 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lker@lker-servidor:/etc/apache2/conf-enabled$

lker@lker-cliente:~$ ping 10.0.2.4
PING 10.0.2.4 (10.0.2.4) 56(84) bytes of data:
64 bytes from 10.0.2.4: icmp_seq=1 ttl=64 time=0.367 ms
64 bytes from 10.0.2.4: icmp_seq=2 ttl=64 time=0.382 ms
64 bytes from 10.0.2.4: icmp_seq=3 ttl=64 time=0.621 ms
^C
--- 10.0.2.4 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2042ms
rtt min/avg/max/mdev = 0.367/0.456/0.621/0.116 ms
lker@lker-cliente:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
    inet6 fe80::fe7f:de:aac8:0989 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:87:87:3d txqueuelen 1000 (Ethernet)
    RX packets 44798 bytes 56724152 (56.7 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 25626 bytes 2387055 (2.3 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Bucle local)
    RX packets 2801 bytes 300550 (300.5 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 2801 bytes 300550 (300.5 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

Mostrar aplicaciones
lker@lker-cliente:~$
```

B) Es conveniente fijar una IP al servidor. Dado que estamos usando una red nat y no una Red Interna, vamos a usar un comando de VirtualBox que nos permite configurar algunas cuestiones del servicio DHCP interno asociado a la red nat. En particular, asignaremos una IP fija a una VM cuya dirección MAC de su adaptador de red conozcamos, para una cierta red.

VBoxManage dhcpserver modify --network=RedNat --mac-address=08:00:27:fe:63:80 --fixed-address=10.0.2.7

CLIENTE -> 08:00:27:87:87:3d

SERVIDOR -> 08:00:27:20:1d:b9

NOMBRE DE RED -> RedDesplieguelker

Donde "RedNat" es el nombre de la red nat, "08:00:27:fe:63:80" es la dirección MAC del adaptador de red de nuestro Ubuntu Server y "10.0.2.7" será la IP fija para dicha VM. Este comando hay que lanzarlo con todas las VMs de la red nat apagadas. Con este procedimiento nunca será modificada la IP de Ubuntu Server dentro de nuestra red nat y podemos instalar servicios sin problemas de cambios de IP.

NOTA: podemos realizar lo mismo para el cliente y asignarle la IP 10.0.2.14, por ejemplo.

```
C:\Program Files\Oracle\VirtualBox>VBoxManage dhcpserver modify --network=RedDespliegueIker --mac-address=08:00:27:87:87:3d --fixed-address=10.0.2.4

C:\Program Files\Oracle\VirtualBox>VBoxManage dhcpserver modify --network=RedDespliegueIker --mac-address=08:00:27:20:1d:b9 --fixed-address=10.0.2.5
```

C) En el Servidor. Preliminares:

a. Instala un servicio DNS mediante el paquete Bind9.

i. Comprueba que no tienes instalado el paquete mediante: `sudo dpkg -L bind9`

```
iker@iker-servidor:~$ sudo dpkg -L bind9
dpkg-query: package 'bind9' is not installed
Use dpkg --contents (= dpkg-deb --contents) to list archive files contents.
iker@iker-servidor:~$ _
```

ii. Instalación: `sudo apt-get install bind9 bind9utils`

```
wrote key file /etc/bind/rndc.key
named-resolvconf.service is a disabled or a static unit,
Created symlink /etc/systemd/system/bind9.service → /lib/systemd/system/named-resolvconf.service.
Created symlink /etc/systemd/system/multi-user.target.wants/named-resolvconf.service.
Setting up bind9utils (1:9.16.1-0ubuntu2.8) ...
Processing triggers for systemd (245.4-4ubuntu3.11) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for ufw (0.36-6) ...
iker@iker-servidor:~$ sudo apt install bind9 bind9utils
```

iii. Para, reinicia y verifica el status del servicio con `service bind9 stop/restart/status` ó `systemctl stop/restart/... bind9`

```
iker@iker-servidor:~$ service bind9 stop
==== AUTHENTICATING FOR org.freedesktop.systemd1.manage-units ====
Authentication is required to stop 'named.service'.
Authenticating as: iker
Password:
==== AUTHENTICATION COMPLETE ====
iker@iker-servidor:~$ service bind9 restart
==== AUTHENTICATING FOR org.freedesktop.systemd1.manage-units ====
Authentication is required to restart 'named.service'.
Authenticating as: iker
Password:
==== AUTHENTICATION COMPLETE ====
iker@iker-servidor:~$ service bind9 status
● named.service - BIND Domain Name Server
   Loaded: loaded (/lib/systemd/system/named.service; enabled; vendor preset: enabled)
   Active: active (running) since Thu 2021-10-07 16:33:04 UTC; 8s ago
     Docs: man:named(8)
    Main PID: 2406 (named)
      Tasks: 5 (limit: 4618)
     Memory: 12.0M
    CGroup: /system.slice/named.service
            └─2406 /usr/sbin/named -f -u bind

Oct 07 16:33:04 iker-servidor named[2406]: FORMERR resolving './NS/IN': 192.203.230.10#53
Oct 07 16:33:04 iker-servidor named[2406]: DNS format error from 193.0.14.129#53 resolving './NS: no
Oct 07 16:33:04 iker-servidor named[2406]: FORMERR resolving './NS/IN': 193.0.14.129#53
Oct 07 16:33:04 iker-servidor named[2406]: DNS format error from 198.41.0.4#53 resolving './NS: non-
Oct 07 16:33:04 iker-servidor named[2406]: FORMERR resolving './NS/IN': 198.41.0.4#53
Oct 07 16:33:04 iker-servidor named[2406]: DNS format error from 198.97.190.53#53 resolving './NS: n
Oct 07 16:33:04 iker-servidor named[2406]: FORMERR resolving './NS/IN': 198.97.190.53#53
Oct 07 16:33:04 iker-servidor named[2406]: DNS format error from 192.36.148.17#53 resolving './NS: n
Oct 07 16:33:04 iker-servidor named[2406]: FORMERR resolving './NS/IN': 192.36.148.17#53
Oct 07 16:33:04 iker-servidor named[2406]: resolver priming query complete
lines 1-20/20 (END)
```

iv. Verifica que el puerto 53 está abierto con nmap (instala el paquete de nmap si no lo tienes instalado), necesario para que funcione el servicio DNS: nmap 127.0.0.1, que ofrece los puertos abiertos en el servidor.

```
iker@iker-servidor:~$ nmap 127.0.0.1
Starting Nmap 7.80 ( https://nmap.org ) at 2021-10-07 16:34 UTC
Nmap scan report for localhost (127.0.0.1)
Host is up (0.00010s latency).
Not shown: 994 closed ports
PORT      STATE SERVICE
53/tcp    open  domain
80/tcp    open  http
82/tcp    open  xfer
3306/tcp  open  mysql
8080/tcp  open  http-proxy
10000/tcp open  snet-sensor-mgmt

Nmap done: 1 IP address (1 host up) scanned in 0.08 seconds
iker@iker-servidor:~$ _
```

v. Emplea este comando con el servicio named, que hace referencia a servicios DNS exclusivamente: netstat -natp | grep named

```
iker@iker-servidor:~$ sudo netstat -natp | grep named
tcp        0      0 10.0.2.5:53          0.0.0.0:*             LISTEN      2406/named
tcp        0      0 127.0.0.1:53         0.0.0.0:*             LISTEN      2406/named
tcp        0      0 127.0.0.1:953        0.0.0.0:*             LISTEN      2406/named
tcp6       0      0 fe80::a00:27ff:fe20::53 :::*                  LISTEN      2406/named
tcp6       0      0 ::1:53               :::*                  LISTEN      2406/named
tcp6       0      0 ::1:953              :::*                  LISTEN      2406/named
iker@iker-servidor:~$ _
```

b. Configura /etc/resolv.conf para indicar qué IP resuelve las direcciones DNS:
domain <nombreapellidos> .local

search <nombreapellidos>.local

nameserver IPSERVIDOR

```
UbuntuServidor [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
GNU nano 4.8 /etc/resolv.conf
# This file is managed by man:systemd-resolved(8). Do not edit.
#
# This is a dynamic resolv.conf file for connecting local clients to the
# internal DNS stub resolver of systemd-resolved. This file lists all
# configured search domains.
#
# Run "resolvectl status" to see details about the uplink DNS servers
# currently in use.
#
# Third party programs must not access this file directly, but only through the
# symlink at /etc/resolv.conf. To manage man:resolv.conf(5) in a different way,
# replace this symlink by a static file or a different symlink.
#
# See man:systemd-resolved.service(8) for details about the supported modes of
# operation for /etc/resolv.conf.

nameserver 127.0.0.53
options edns0 trust-ad
search informatica.comercio
domain ikerabadia.local
search ikerabadia.local
nameserver 10.0.2.5
```

0) Eliminamos las líneas indicadas en C) b y lo dejamos vacío.

```
UbuntuServidor [Corriendo] - Oracle VM VirtualBox
Archivo  Máquina  Ver  Entrada  Dispositivos  Ayuda
GNU nano 4.8 /etc/resolv.conf
# This file is managed by man:systemd-resolved(8). Do not edit.
#
# This is a dynamic resolv.conf file for connecting local clients to the
# internal DNS stub resolver of systemd-resolved. This file lists all
# configured search domains.
#
# Run "resolvectl status" to see details about the uplink DNS servers
# currently in use.
#
# Third party programs must not access this file directly, but only through the
# symlink at /etc/resolv.conf. To manage man:resolv.conf(5) in a different way,
# replace this symlink by a static file or a different symlink.
#
# See man:systemd-resolved.service(8) for details about the supported modes of
# operation for /etc/resolv.conf.

nameserver 127.0.0.53
options edns0 trust-ad
search informatica.comercio
```

1) apt install resolvconf

```
(Reading database ... 169894 files and directories currently installed.)
Preparing to unpack .../resolvconf_1.82_all.deb ...
Unpacking resolvconf (1.82) ...
Setting up resolvconf (1.82) ...
Created symlink /etc/systemd/system/sysinit.target.wants/resolvconf.service → /lib/systemd/system/resolvconf.service.
Created symlink /etc/systemd/system/systemd-resolved.service.wants/resolvconf-pull-resolved.path → /lib/systemd/system/resolvconf-pull-resolved.path.
resolvconf-pull-resolved.service is a disabled or a static unit, not starting it.
Processing triggers for systemd (245.4-4ubuntu3.11) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for resolvconf (1.82) ...
iker@iker-servidor:~$ sudo apt install resolvconf_
```

2) systemctl enable resolvconf.service

```
iker@iker-servidor:~$ systemctl enable resolvconf.service
Synchronizing state of resolvconf.service with SysV service script with /lib/systemd/systemd-sysv-in
stall.
Executing: /lib/systemd/systemd-sysv-install enable resolvconf
==== AUTHENTICATING FOR org.freedesktop.systemd1.reload-daemon ====
Authentication is required to reload the systemd state.
Authenticating as: iker
Password:
==== AUTHENTICATION COMPLETE ====
==== AUTHENTICATING FOR org.freedesktop.systemd1.reload-daemon ====
Authentication is required to reload the systemd state.
Authenticating as: iker
Password:
==== AUTHENTICATION COMPLETE ====
==== AUTHENTICATING FOR org.freedesktop.systemd1.manage-unit-files ====
Authentication is required to manage system service or unit files.
Authenticating as: iker
Password:
==== AUTHENTICATION COMPLETE ====
iker@iker-servidor:~$ _
```

3) systemctl start resolvconf.service

```
iker@iker-servidor:~$ systemctl start resolvconf.service
==== AUTHENTICATING FOR org.freedesktop.systemd1.manage-units ====
Authentication is required to start 'resolvconf.service'.
Authenticating as: iker
Password:
==== AUTHENTICATION COMPLETE ====
iker@iker-servidor:~$ _
```

4) systemctl status resolvconf.service

```
iker@iker-servidor:~$ systemctl status resolvconf.service
● resolvconf.service - Nameserver information manager
   Loaded: loaded (/lib/systemd/system/resolvconf.service; enabled; vendor preset: enabled)
   Active: active (exited) since Thu 2021-10-07 17:14:26 UTC; 3min 24s ago
     Docs: man:resolvconf(8)
    Main PID: 3305 (code=exited, status=0/SUCCESS)
      Tasks: 0 (limit: 4618)
     Memory: 0B
    CGroup: /system.slice/resolvconf.service

Oct 07 17:14:26 iker-servidor systemd[1]: Started Nameserver information manager.
Oct 07 17:14:26 iker-servidor resolvconf[3310]: /etc/resolvconf/update.d/libc: Warning: /etc/resolv
lines 1-11/11 (FEND)
```

5) Edita /etc/resolvconf/resolv.conf.d/head y agrega:

domain <nombreapellidos>.local

search <nombreapellidos>.local

nameserver IPSERVIDOR

```
GNU nano 4.8 /etc/resolvconf/resolv.conf.d/head
# 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
# 127.0.0.53 is the systemd-resolved stub resolver.
# run "systemd-resolve --status" to see details about the actual nameservers.
domain ikerabadia.local
search ikerabadia.local
nameserver 10.0.2.5
```

6) resolvconf --enable-updates

```
iker@iker-servidor:~$ sudo resolvconf --enable-updates
iker@iker-servidor:~$
```

7) resolvconf -u

```
iker@iker-servidor:~$ sudo resolvconf -u
iker@iker-servidor:~$ _
```

Si editamos ahora /etc/resolv.conf, deberíamos ver en las primeras líneas lo indicado en b.5), quedando persistente ante reboot y ante cambios de configuración de la red.

UbuntuServidor [Corriendo] - Oracle VM VirtualBox

Archivo Máquina Ver Entrada Dispositivos Ayuda

```
GNU nano 4.8 /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
# 127.0.0.53 is the systemd-resolved stub resolver.
# run "systemd-resolve --status" to see details about the actual nameservers.
domain ikerabadia.local
search ikerabadia.local
nameserver 10.0.2.5
nameserver 127.0.0.53
search informatica.comercio ikerabadia.local
options edns0 trust-ad
```

D) Configuración de zonas directas e indirectas:

a. Acude a /etc/bind

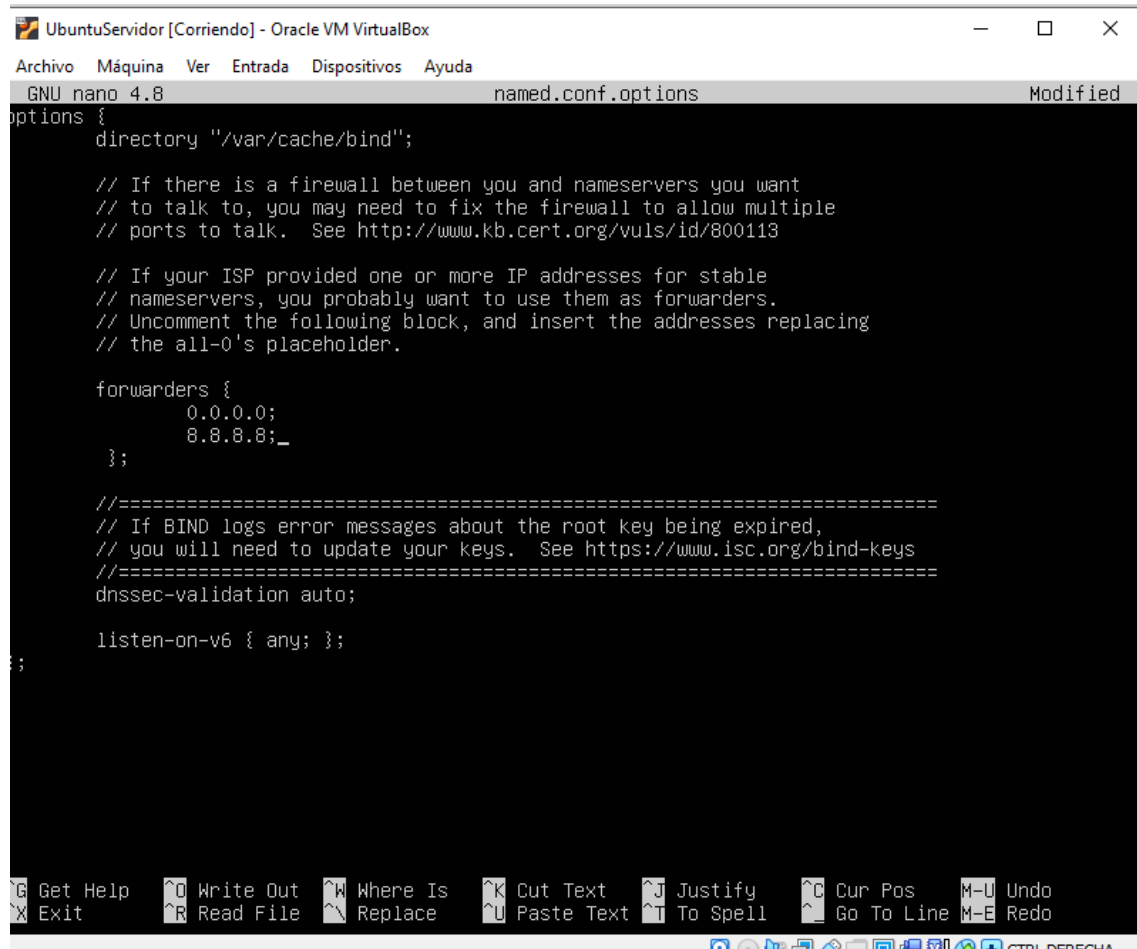
```
iker@iker-servidor:~$ cd /etc/bind/
iker@iker-servidor:/etc/bind$ _
```

b. Explica qué significan los archivos que empiezan por db y los archivos que empiezan por named. Qué sentido tienen y para qué se usan.

Db.127-> fichero de zona que permitirá resolver el nombre de localhost a la dirección de loopback

named.conf -> fichero que contiene punteros a ficheros con información de zonas y otros servidores de nombres.

c. Modificamos el archivo `named.conf.options` para configurar el reenviador que resolverá direcciones externas. Indica el DNS de Google en forwarders. Ello nos resolverá IPs externas a nuestra red local.



The screenshot shows a terminal window titled "UbuntuServidor [Corriendo] - Oracle VM VirtualBox". The window contains the GNU nano 4.8 editor editing the file `named.conf.options`. The file content is as follows:

```
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 {
        0.0.0.0;
        8.8.8.8;_

    };

    //=====  

    // 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  

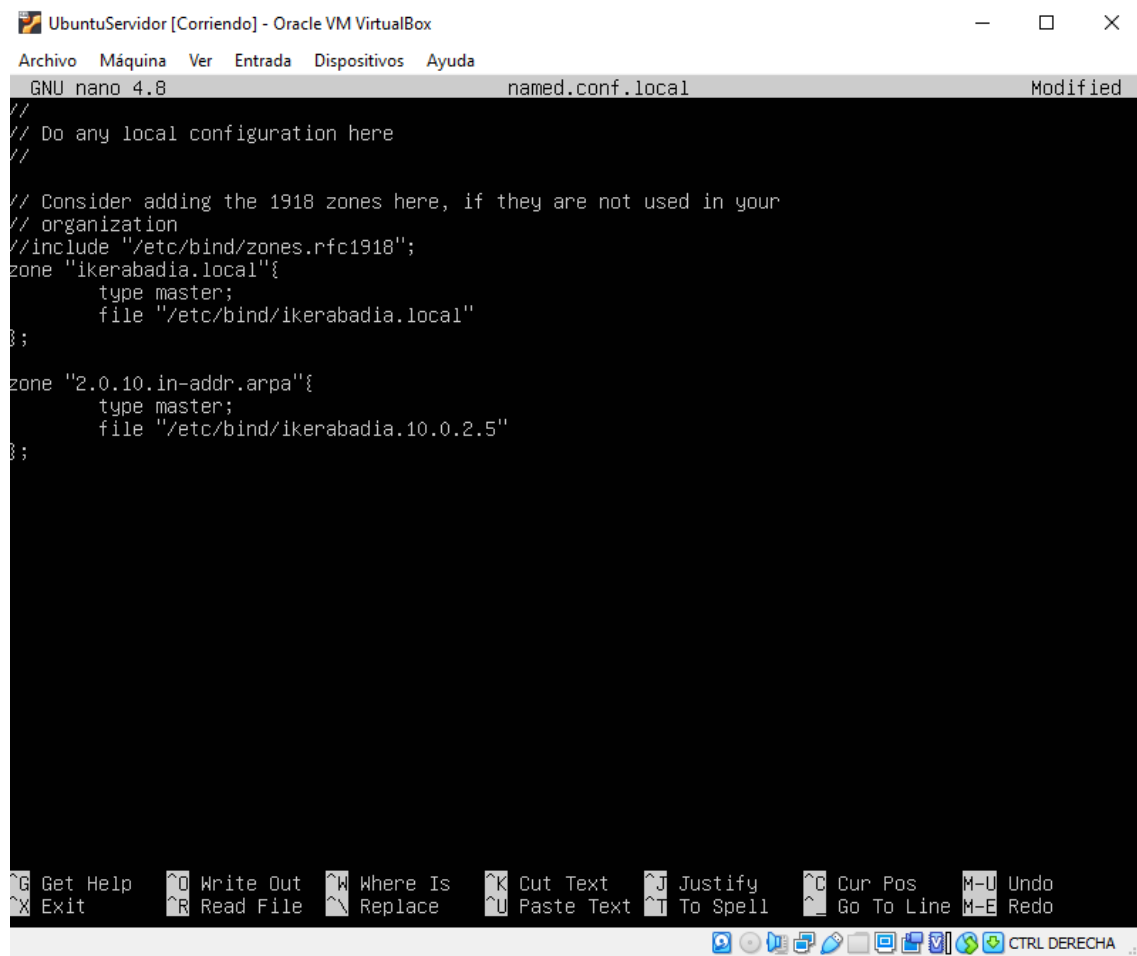
    //=====  

    dnssec-validation auto;

    listen-on-v6 { any; };
};
```

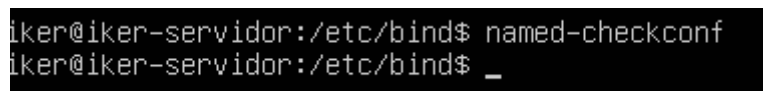
At the bottom of the terminal, there is a menu bar with the following options: Get Help, Exit, Write Out, Read File, Where Is, Replace, Cut Text, Paste Text, Justify, To Spell, Cur Pos, Go To Line, M-U, Undo, and M-E, Redo. The status bar at the bottom right shows "CTRL DEFCHA".

d. Edita named.conf.local. Vamos a crear una zona DNS Maestra y vamos agregar la zona de dominio .local. Para ello agrega una zona directa e indirecta. Apóyate en los apuntes y no olvides poner ; al cierre de las llaves.



```
GNU nano 4.8 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 "ikerabadia.local"{
    type master;
    file "/etc/bind/ikerabadia.local"
};
zone "2.0.10.in-addr.arpa"{
    type master;
    file "/etc/bind/ikerabadia.10.0.2.5"
};
```

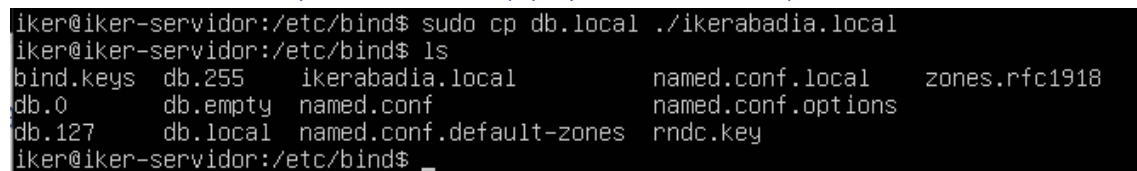
e. Verifica que los archivos de configuración están bien escritos mediante named-checkconf.



```
iker@iker-servidor:/etc/bind$ named-checkconf
iker@iker-servidor:/etc/bind$ _
```

E) Crea la base de datos de la zona directa:

a. Genera <nombreapellidos>.local (apóyate en db.local)



```
iker@iker-servidor:/etc/bind$ sudo cp db.local ./ikerabadia.local
iker@iker-servidor:/etc/bind$ ls
bind.keys  db.255    ikerabadia.local  named.conf.local  zones.rfc1918
db.0       db.empty  named.conf        named.conf.options
db.127     db.local  named.conf.default-zones  rndc.key
iker@iker-servidor:/etc/bind$ _
```

b. Edita el nuevo archivo y asocia los nombres de las máquinas y sus IPs:

i. ftp.ikerabadia.local ->10.0.2.5

ii. www.ikerabadia.local -> 10.0.2.5

iii. cliente.ikerabadia.local -> 10.0.2.4


```

GNU nano 4.8                                ikerabadia.local
;
; BIND data file for local loopback interface
;
$TTL      604800
@         IN      SOA      ikerabadia. root.ikerabadia.local. (
                        2      ; Serial
                        604800  ; Refresh
                        86400   ; Retry
                        2419200 ; Expire
                        604800 ) ; Negative Cache TTL
;
@         IN      NS       ikerabadia.local.
@         IN      A        127.0.0.1
@         IN      AAAA     ::1
ftp       IN      A        10.0.2.5
www       IN      A        10.0.2.5
cliente   IN      A        10.0.2.4

```

c. Utiliza el comando `named-checkzone ikerabadia.local`

`/etc/bind/ikerabadia.local` para verificar que no hay errores en el archivo

```

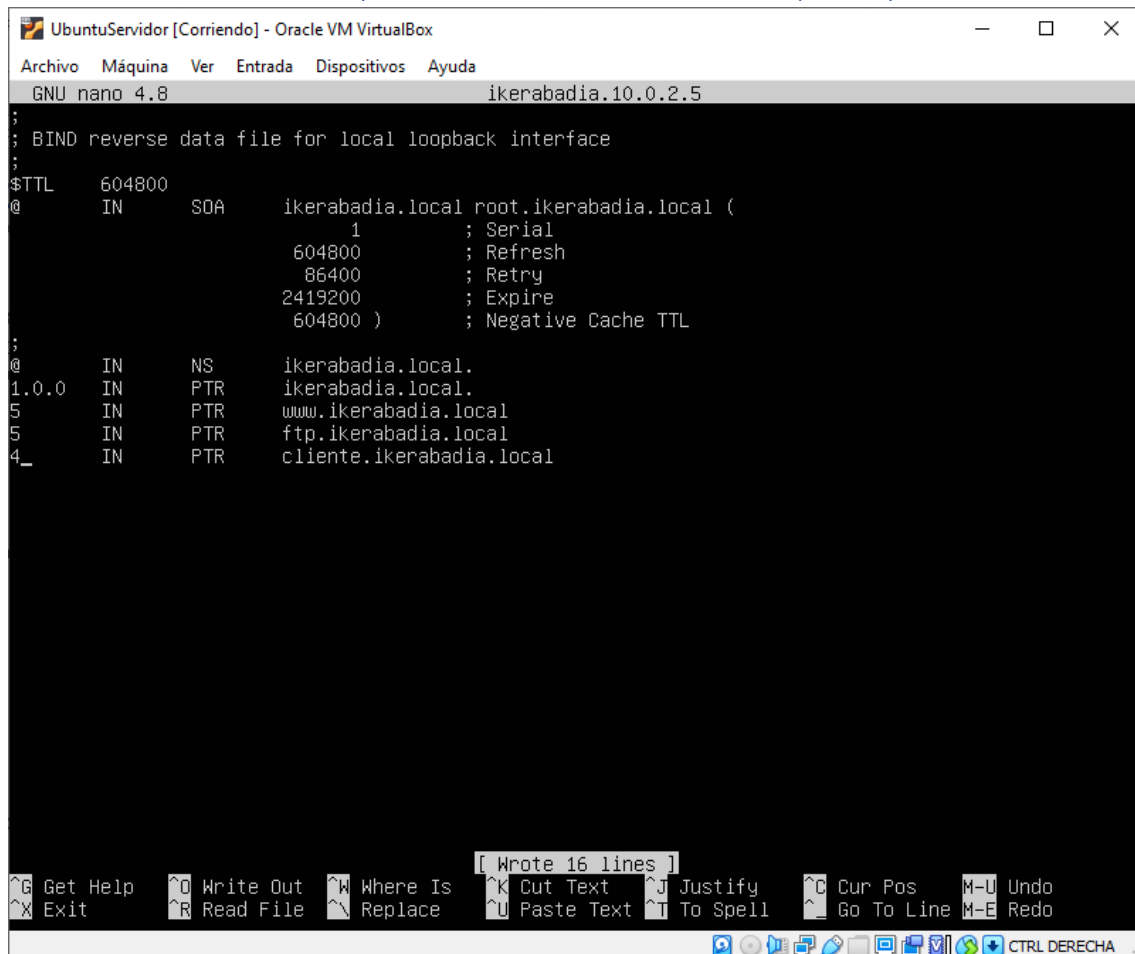
iker@iker-servidor:/etc/bind$ named-checkzone ikerabadia.local /etc/bind/ikerabadia.local
zone ikerabadia.local/IN: loaded serial 2
OK
iker@iker-servidor:/etc/bind$

```

F) Crea la base de datos de la zona indirecta:

a. La nomenclatura es ikerabadia.IPSEVIDOR (apóyate en db.127)

b. Edita el nuevo archivo y asocia los nombres de las máquinas y sus IPs.

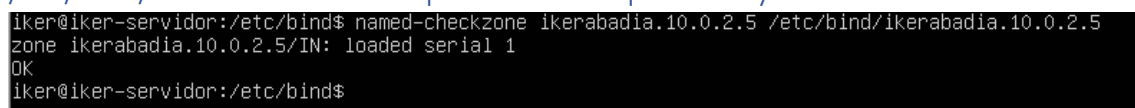


```
GNU nano 4.8 ikerabadia.10.0.2.5
;
; BIND reverse data file for local loopback interface
;
$TTL      604800
@         IN      SOA      ikerabadia.local root.ikerabadia.local (
                        1      ; Serial
                        604800  ; Refresh
                        86400   ; Retry
                        2419200 ; Expire
                        604800 ) ; Negative Cache TTL
;
@         IN      NS       ikerabadia.local.
1.0.0     IN      PTR      ikerabadia.local.
5         IN      PTR      www.ikerabadia.local
5         IN      PTR      ftp.ikerabadia.local
4_        IN      PTR      cliente.ikerabadia.local

^G Get Help  ^O Write Out  ^W Where Is   ^K Cut Text   ^J Justify    ^C Cur Pos    M-U Undo
^X Exit      ^R Read File  ^W Replace    ^U Paste Text ^T To Spell   ^_ Go To Line M-E Redo
```

c. Utiliza el comando named-checkzone ikerabadia.10.0.2.5

/etc/bind/ikerabadia.10.0.2.5 para verificar que no hay errores en el archivo.



```
iker@iker-servidor:/etc/bind$ named-checkzone ikerabadia.10.0.2.5 /etc/bind/ikerabadia.10.0.2.5
zone ikerabadia.10.0.2.5/IN: loaded serial 1
OK
iker@iker-servidor:/etc/bind$
```

G) Verifica que el servicio DNS resuelve correctamente de forma directa e indirecta:

nslookup ftp.ikerabadia.local

nslookup www. ikerabadia.local

nslookup cliente. ikerabadia.local

HABRIA QUE REINICIAR EL SERVICIO `sudo service bind9 restart` PARA QUE FUNCIONE

```
iker@iker-servidor:/etc/bind$ sudo service bind9 restart
iker@iker-servidor:/etc/bind$ nslookup ftp.ikerabadia.local
Server:          10.0.2.5
Address:         10.0.2.5#53

Name:   ftp.ikerabadia.local
Address: 10.0.2.5

iker@iker-servidor:/etc/bind$ _
```

```
iker@iker-servidor:/etc/bind$ nslookup www.ikerabadia.local
Server:          10.0.2.5
Address:         10.0.2.5#53

Name:   www.ikerabadia.local
Address: 10.0.2.5

iker@iker-servidor:/etc/bind$ _
```

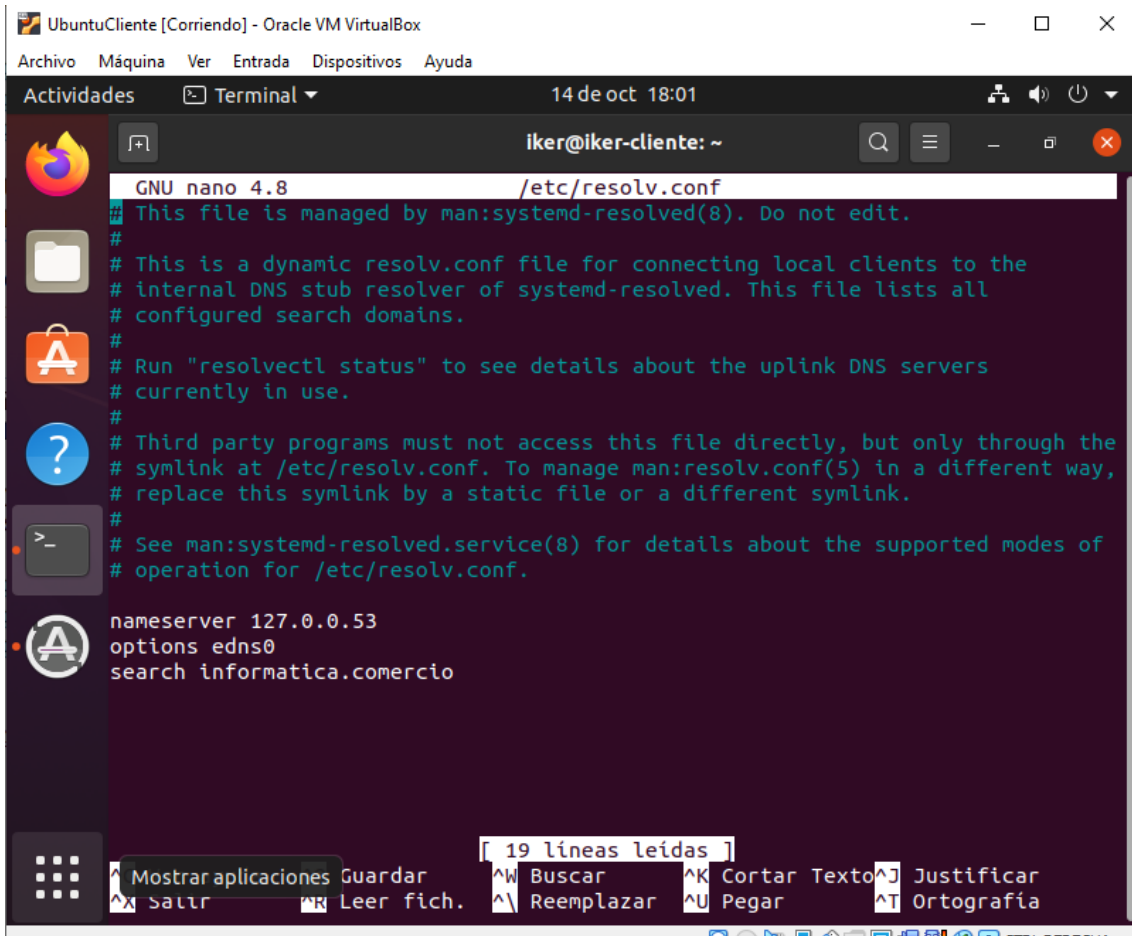
```
iker@iker-servidor:/etc/bind$ nslookup cliente.ikerabadia.local
Server:          10.0.2.5
Address:         10.0.2.5#53

Name:   cliente.ikerabadia.local
Address: 10.0.2.4

iker@iker-servidor:/etc/bind$
```

H) Verifica en los clientes Ubuntu que pueden resolver las anteriores direcciones de la red local. Para ello:

a. nano /etc/resolv.conf



```
GNU nano 4.8 /etc/resolv.conf
# This file is managed by man:systemd-resolved(8). Do not edit.
#
# This is a dynamic resolv.conf file for connecting local clients to the
# internal DNS stub resolver of systemd-resolved. This file lists all
# configured search domains.
#
# Run "resolvectl status" to see details about the uplink DNS servers
# currently in use.
#
# Third party programs must not access this file directly, but only through the
# symlink at /etc/resolv.conf. To manage man:resolv.conf(5) in a different way,
# replace this symlink by a static file or a different symlink.
#
# See man:systemd-resolved.service(8) for details about the supported modes of
# operation for /etc/resolv.conf.
nameserver 127.0.0.53
options edns0
search informatica.comercio
```

b. Indica que el servidor DNS está en la máquina de IP fija y que va buscar en la zona indicada:

domain ikerabadia.local

search ikerabadia.local

nameserver 10.0.2.5

Para ello hacemos lo siguiente:

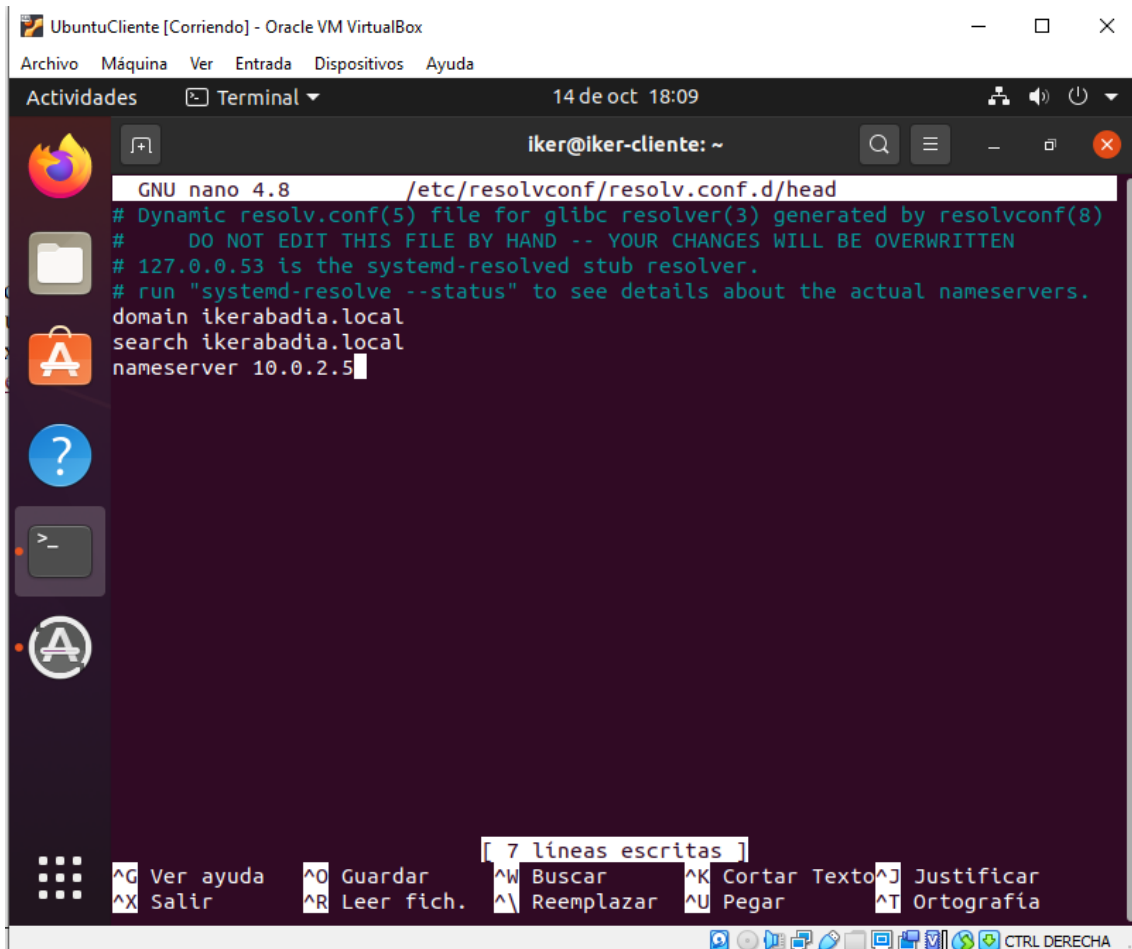
b.1) apt install resolvconf

b.2) systemctl enable resolvconf.service

b.3) systemctl start resolvconf.service

b.4) systemctl status resolvconf.service

b.5) Edita /etc/resolvconf/resolv.conf.d/head y agrega:



```
GNU nano 4.8 /etc/resolvconf/resolv.conf.d/head
# 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
# 127.0.0.53 is the systemd-resolved stub resolver.
# run "systemd-resolve --status" to see details about the actual nameservers.
domain ikerabadia.local
search ikerabadia.local
nameserver 10.0.2.5
```

c. Guarda el archivo y verifica que el cliente resuelve bien las siguientes direcciones:

nslookup ftp.ikerabadia.local

nslookup www.ikerabadia.local

nslookup cliente.ikerabadia.local

para que funcione tengo que hacer un “*sudo resolvconf -u*”

Ahora ya funcionara

```
iker@iker-cliente:~$ sudo resolvconf -u
iker@iker-cliente:~$ nslookup ftp.ikerabadia.local
Server:      10.0.2.5
Address:     10.0.2.5#53

Name:   ftp.ikerabadia.local
Address: 10.0.2.5

iker@iker-cliente:~$ nslookup www.ikerabadia.local
Server:      10.0.2.5
Address:     10.0.2.5#53

Name:   www.ikerabadia.local
Address: 10.0.2.5

iker@iker-cliente:~$ nslookup cliente.ikerabadia.local
Server:      10.0.2.5
Address:     10.0.2.5#53

Name:   cliente.ikerabadia.local
Address: 10.0.2.4

iker@iker-cliente:~$ █
```

l) Abre el navegador web en el cliente y ejecuta `www.ikerabadia.local` y verifica que ves el punto de entrada de Apache.

