# CONFIGURAR UN SERVIDOR DHCP

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2º SMR A

1 Configurar las interfaces de red

1.1 Instalamos el servidor DHCP.

```
administrador@ubuntuprofe1:~$ sudo apt-get update
[sudo] password for administrador:
Obj:1 http://es.archive.ubuntu.com/ubuntu xenial InRelease
Obj:2 http://es.archive.ubuntu.com/ubuntu xenial-updates InRelease
Obj:3 http://security.ubuntu.com/ubuntu xenial-security InRelease
Obj:4 http://es.archive.ubuntu.com/ubuntu xenial-backports InRelease
Leyendo lista de paquetes... Hecho
administrador@ubuntuprofe1:~$
```

Actualizamos los repositorios del sistema

```
administrador@ubuntuprofe1:~$ sudo apt-get install isc-dhcp-server
```

Instalamos el servidor DHCP

1.2 Instalamos el servidor DHCP

2 Elegimos por qué interfaz vamos a prestar los servicios, en nuestro caso anp0s8.

```
administrador@ubuntuprofe1:~$ sudo nano /etc/default/isc-dhcp-server
```

Entramos en el fichero que hay que modificar

```
# Defaults for isc-dhcp-server initscript
# sourced by /etc/init.d/isc-dhcp-server
# installed at /etc/default/isc-dhcp-server by the maintainer scripts

#
# This is a POSIX shell fragment
#

# Path to dhcpd's config file (default: /etc/dhcp/dhcpd.conf).
#DHCPD_CONF=/etc/dhcp/dhcpd.conf

# 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="enp0s8"
```

Modificamos el apartado “INTERFACES” poniendo en las comillas la interfaz por la que queremos prestar servicio

3 Definimos a la subnet:

3.1 Entramos en el fichero /etc/dhcp/dhcpd.conf.

```
administrador@ubuntuprofe1:~$ sudo nano /etc/dhcp/dhcpd.conf
```

3.2 Modificamos el fichero.

```
subnet 172.16.5.0 netmask 255.255.255.0 {
        range 172.16.5.100 172.16.5.200;
        option domain-name-servers 192.224.52.36;
        option domain-name "victorrodbon.es";
        option routers 172.16.5.1;
        option broadcast-address 172.16.5.255;
        default-lease-time 300;
        max-lease-time 600;
}
```

Añadimos al final del documento la información

4 Reiniciamos el servicio.

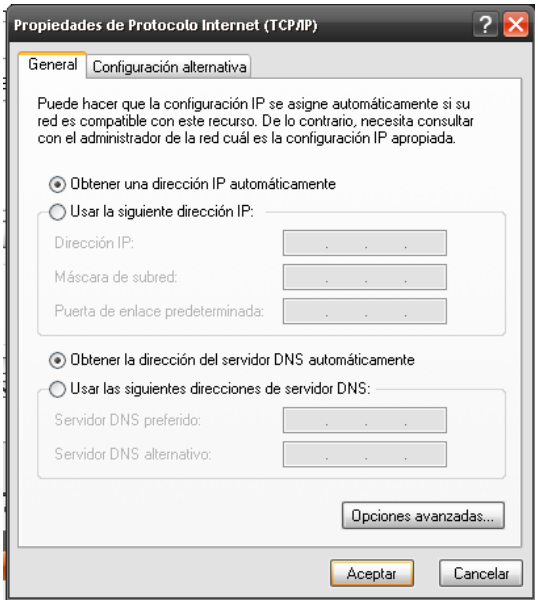
```
administrador@ubuntuprofe1:~$ /etc/init.d/isc-dhcp-server restart
[....] Restarting isc-dhcp-server (via systemctl): isc-dhcp-server.service==== A
g.freedesktop.systemd1.manage-units ===
Se necesita autenticación para rei8niciar «isc-dhcp-server.service».
Authenticating as: administrador,,, (administrador)
Password:
==== AUTHENTICATION COMPLETE ===
. ok
```

5 Comprobamos que está bien.

```
administrador@ubuntuprofe1:~$ /etc/init.d/isc-dhcp-server status
● isc-dhcp-server.service - ISC DHCP IPv4 server
   Loaded: loaded (/lib/systemd/system/isc-dhcp-server.service; enabled; vendor preset: enabled)
   Active: active (running) since lun 2023-09-25 12:04:32 CEST; 2s ago
     Docs: man:dhcpd(8)
 Main PID: 12153 (dhcpd)
    Tasks: 1
   Memory: 9.0M
      CPU: 9ms
   CGroup: /system.slice/isc-dhcp-server.service
           └─12153 dhcpd -user dhcpd -group dhcpd -f -4 -pf /run/dhcp-server/dhcpd.pid -cf /etc/d...

sep 25 12:04:32 ubuntuprofe1 dhcpd[12153]: For info, please visit https://www.isc.org/software/dhcp/
sep 25 12:04:32 ubuntuprofe1 dhcpd[12153]: Wrote 0 leases to leases file.
sep 25 12:04:32 ubuntuprofe1 sh[12153]: Wrote 0 leases to leases file.
sep 25 12:04:32 ubuntuprofe1 dhcpd[12153]: Listening on LPF/enp0s8/08:00:27:03:b5:a3/172.16.5.0/24
sep 25 12:04:32 ubuntuprofe1 sh[12153]: Listening on LPF/enp0s8/08:00:27:03:b5:a3/172.16.5.0/24
sep 25 12:04:32 ubuntuprofe1 dhcpd[12153]: Sending on   LPF/enp0s8/08:00:27:03:b5:a3/172.16.5.0/24
sep 25 12:04:32 ubuntuprofe1 sh[12153]: Sending on   LPF/enp0s8/08:00:27:03:b5:a3/172.16.5.0/24
sep 25 12:04:32 ubuntuprofe1 dhcpd[12153]: Sending on   Socket/fallback/fallback-net
sep 25 12:04:32 ubuntuprofe1 sh[12153]: Sending on   Socket/fallback/fallback-net
sep 25 12:04:32 ubuntuprofe1 dhcpd[12153]: Server starting service.
Hint: Some lines were ellipsized, use -l to show in full.
```

6 Configuramos el equipo para que asigne una dirección ip automáticamente.




7 Comprobamos que el servidor nos ha asignado una dirección dentro del rango.

```
C:\Documents and Settings\Administrador>ipconfig

Configuración IP de Windows


Adaptador Ethernet Conexión de área local          :

        Sufijo de conexión específica DNS : victorrodbon.es
        Dirección IP. . . . . . . . . . . : 172.16.5.100
        Máscara de subred . . . . . . . . : 255.255.255.0
        Puerta de enlace predeterminada   : 172.16.5.1
```

8 Como podemos asignar una dirección IP fija desde el servidor DHCP.

8.1 Comprobamos la mac del dispositivo.

```
C:\Documents and Settings\Administrador>ipconfig/all

Configuración IP de Windows

        Nombre del host . . . . . . . . . . : REDFIJA
        Sufijo DNS principal . . . . . . . :
        Tipo de nodo . . . . . . . . . . . : desconocido
        Enrutamiento habilitado. . . . . . : No
        Proxy WINS habilitado. . . . . . . : No
        Lista de búsqueda de sufijo DNS:    victorrodbon.es

Adaptador Ethernet Conexión de área local          :

        Sufijo de conexión específica DNS : victorrodbon.es
        Descripción. . . . . . . . . . . . : Adaptador de servidor PRO/1000 T
Intel(R)
        Dirección física. . . . . . . . . : 08-00-27-85-16-30
        DHCP habilitado. . . . . . . . . . : No
        Autoconfiguración habilitada. . . . : Sí
        Dirección IP. . . . . . . . . . . . : 172.16.5.90
        Máscara de subred . . . . . . . . . : 255.255.255.0
        Puerta de enlace predeterminada    : 172.16.5.1
        Servidor DHCP . . . . . . . . . . . : 172.16.5.1
        Servidores DNS . . . . . . . . . . .: 192.224.52.36
        Concesión obtenida . . . . . . . . : martes, 26 de septiembre de 2023
53:54
        Concesión expira . . . . . . . . . .: martes, 26 de septiembre de 2023
58:54
```

8.2 Editamos el fichero: /etc/dhcp/dhcpd.conf

```
host REDFIJA {
        hardware ethernet 08:00:27:85:16:30;
        fixed-address 172.16.5.90;
}
```

8.3 Reiniciamos el servicio dhcp.

```
administrador@ubuntuprofe1:~$ /etc/init.d/isc-dhcp-server restart
[....] Restarting isc-dhcp-server (via systemctl): isc-dhcp-server.service==== A
g.freedesktop.systemd1.manage-units ===
Se necesita autenticación para rei8niciar «isc-dhcp-server.service».
Authenticating as: administrador,,, (administrador)
Password:
==== AUTHENTICATION COMPLETE ===
. ok
```

8.4 Comprobamos que se ha aplicado entrando el windows.

```
C:\Documents and Settings\Administrador>ipconfig

Configuración IP de Windows


Adaptador Ethernet Conexión de área local          :

        Sufijo de conexión específica DNS : victorrodbon.es
        Dirección IP. . . . . . . . . . . . : 172.16.5.90
        Máscara de subred . . . . . . . . . : 255.255.255.0
        Puerta de enlace predeterminada    : 172.16.5.1
```

9 Observamos los paquetes que se envían mediante wireshark.

9.1 Discover:

Manda un mensaje al broadcast en busca de un servidor DHCP que le pueda asignarle una dirección IP

Ethernet II

Manda un broadcast desde la dirección MAC 08:00:27:81:19:9b buscando un servidor DHCP.

```
⊟ Ethernet II, Src: CadmusCo_81:19:9b (08:00:27:81:19:9b), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  ⊟ Destination: Broadcast (ff:ff:ff:ff:ff:ff)
      Address: Broadcast (ff:ff:ff:ff:ff:ff)
      .... ..1. .... .... .... .... = LG bit: Locally administered address (this is NOT the factory default)
      .... ...1 .... .... .... .... = IG bit: Group address (multicast/broadcast)
  ⊟ Source: CadmusCo_81:19:9b (08:00:27:81:19:9b)
      Address: CadmusCo_81:19:9b (08:00:27:81:19:9b)
      .... ..0. .... .... .... .... = LG bit: Globally unique address (factory default)
      .... ...0 .... .... .... .... = IG bit: Individual address (unicast)
    Type: IP (0x0800)
```

IP
Identifica la versión del maquete IP

```
Internet Protocol Version 4, Src: 0.0.0.0 (0.0.0.0), Dst: 255.255.255.255 (255.255.255.255)
  Version: 4
  Header Length: 20 bytes
⊟ Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00: Not-ECT (Not ECN-Capable Transport))
    0000 00.. = Differentiated Services Codepoint: Default (0x00)
    .... ..00 = Explicit Congestion Notification: Not-ECT (Not ECN-Capable Transport) (0x00)
  Total Length: 328
  Identification: 0x00af (175)
⊟ Flags: 0x00
    0... .... = Reserved bit: Not set
    .0.. .... = Don't fragment: Not set
    ..0. .... = More fragments: Not set
  Fragment offset: 0
  Time to live: 128
  Protocol: UDP (17)
⊟ Header checksum: 0x38f7 [validation disabled]
    [Good: False]
    [Bad: False]
  Source: 0.0.0.0 (0.0.0.0)
  Destination: 255.255.255.255 (255.255.255.255)
  [Source GeoIP: Unknown]
  [Destination GeoIP: Unknown]
```

Bootstrap Protocol
Identifica diversas características del discover

```
⊟ Bootstrap Protocol (Discover)
  Message type: Boot Request (1)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0xe1ab834e
  Seconds elapsed: 0
⊞ Bootp flags: 0x8000 (Broadcast)
  Client IP address: 0.0.0.0 (0.0.0.0)
  Your (client) IP address: 0.0.0.0 (0.0.0.0)
  Next server IP address: 0.0.0.0 (0.0.0.0)
  Relay agent IP address: 0.0.0.0 (0.0.0.0)
  Client MAC address: CadmusCo_81:19:9b (08:00:27:81:19:9b)
  Client hardware address padding: 00000000000000000000
  Server host name not given
  Boot file name not given
  Magic cookie: DHCP
⊟ Option: (53) DHCP Message Type (Discover)
    Length: 1
    DHCP: Discover (1)
⊟ Option: (116) DHCP Auto-Configuration
    Length: 1
    DHCP Auto-Configuration: AutoConfigure (1)
⊟ Option: (61) Client identifier
    Length: 7
    Hardware type: Ethernet (0x01)
    Client MAC address: CadmusCo_81:19:9b (08:00:27:81:19:9b)
⊟ Option: (50) Requested IP Address
    Length: 4
    Requested IP Address: 10.0.2.15 (10.0.2.15)
⊟ Option: (12) Host Name
    Length: 4
    Host Name: nat1
⊟ Option: (60) Vendor class identifier
    Length: 8
    Vendor class identifier: MSFT 5.0
```

Option 53: identifica el tipo de mensage
Option 116: indica que la IP se autoconfigura
Option 61: identificación del cliente
Option 50: indica cual fue la última ip que usó
Option 12: indica el nombre del equipo
Option 60: identificación de clase de vendedor
Option 55: indica diversos parámetros
Option 43: información específica del vendedor
Option 255: indica el final del paquete

```
⊟ Option: (55) Parameter Request List
    Length: 11
    Parameter Request List Item: (1) Subnet Mask
    Parameter Request List Item: (15) Domain Name
    Parameter Request List Item: (3) Router
    Parameter Request List Item: (6) Domain Name Server
    Parameter Request List Item: (44) NetBIOS over TCP/IP Name Server
    Parameter Request List Item: (46) NetBIOS over TCP/IP Node Type
    Parameter Request List Item: (47) NetBIOS over TCP/IP Scope
    Parameter Request List Item: (31) Perform Router Discover
    Parameter Request List Item: (33) Static Route
    Parameter Request List Item: (249) Private/Classless Static Route (Mi
    Parameter Request List Item: (43) Vendor-Specific Information
⊟ Option: (43) Vendor-Specific Information
    Length: 2
    Value: dc00
⊟ Option: (255) End
    Option End: 255
```

## 9.2 Offer:

Un servidor DHCP recibe el mensaje y le manda una dirección IP que puede usar

Ethernet II
Manda un broadcast desde la dirección MAC 08:00:27:03:b5:a3 buscando un cliente DHCP.

```
Ethernet II, Src: CadmusCo_03:b5:a3 (08:00:27:03:b5:a3), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  Destination: Broadcast (ff:ff:ff:ff:ff:ff)
      Address: Broadcast (ff:ff:ff:ff:ff:ff)
      .... ..1. .... .... .... .... = LG bit: Locally administered address (this is NOT the factory default)
      .... ...1 .... .... .... .... = IG bit: Group address (multicast/broadcast)
  Source: CadmusCo_03:b5:a3 (08:00:27:03:b5:a3)
      Address: CadmusCo_03:b5:a3 (08:00:27:03:b5:a3)
      .... ..0. .... .... .... .... = LG bit: Globally unique address (factory default)
      .... ...0 .... .... .... .... = IG bit: Individual address (unicast)
    Type: IP (0x0800)
```

IP
Identifica la versión del maquete IP

```
Internet Protocol Version 4, Src: 172.16.5.1 (172.16.5.1), Dst: 255.255.255.255 (255.255.255.255)
  Version: 4
  Header Length: 20 bytes
  Differentiated Services Field: 0x10 (DSCP 0x04: Unknown DSCP; ECN: 0x00: Not-ECT (Not ECN-Capable Transport))
    0001 00.. = Differentiated Services Codepoint: Unknown (0x04)
    .... ..00 = Explicit Congestion Notification: Not-ECT (Not ECN-Capable Transport) (0x00)
  Total Length: 328
  Identification: 0x0000 (0)
  Flags: 0x00
    0... .... = Reserved bit: Not set
    .0.. .... = Don't fragment: Not set
    ..0. .... = More fragments: Not set
  Fragment offset: 0
  Time to live: 128
  Protocol: UDP (17)
  Header checksum: 0x8884 [validation disabled]
    [Good: False]
    [Bad: False]
  Source: 172.16.5.1 (172.16.5.1)
  Destination: 255.255.255.255 (255.255.255.255)
  [Source GeoIP: Unknown]
  [Destination GeoIP: Unknown]
```

Bootstrap Protocol
Identifica diversas características del discover

```
Bootstrap Protocol (Offer)
  Message type: Boot Reply (2)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0xe1ab834e
  Seconds elapsed: 0
  Bootp flags: 0x8000 (Broadcast)
  Client IP address: 0.0.0.0 (0.0.0.0)
  Your (client) IP address: 172.16.5.120 (172.16.5.120)
  Next server IP address: 172.16.5.1 (172.16.5.1)
  Relay agent IP address: 0.0.0.0 (0.0.0.0)
  Client MAC address: CadmusCo_81:19:9b (08:00:27:81:19:9b)
  Client hardware address padding: 00000000000000000000
  Server host name not given
  Boot file name not given
  Magic cookie: DHCP
  Option: (53) DHCP Message Type (Offer)
    Length: 1
    DHCP: Offer (2)
  Option: (54) DHCP Server Identifier
    Length: 4
    DHCP Server Identifier: 172.16.5.1 (172.16.5.1)
  Option: (51) IP Address Lease Time
    Length: 4
    IP Address Lease Time: (300s) 5 minutes
  Option: (1) Subnet Mask
    Length: 4
    Subnet Mask: 255.255.255.0 (255.255.255.0)
  Option: (15) Domain Name
    Length: 15
    Domain Name: victorrodbon.es
  Option: (3) Router
    Length: 4
    Router: 172.16.5.1 (172.16.5.1)
  Option: (6) Domain Name Server
    Length: 4
    Domain Name Server: 192.224.52.36 (192.224.52.36)
  Option: (255) End
    Option End: 255
  Padding
```

Option 53: identifica el tipo de mensage
Option 54: identificador del servidor DHCP
Option 51: tiempo que tarda en volver a mandar la ip
Option 1: indica la mascara de subred
Option 15: indica el nombre del dominio
Option 3: indica la ip del servidor
Option 6: indica el nombre del servidor
Option 255: indica el final del paquete

9.3 Request:

El host recibe la IP que le ha mandado el servidor y le manda un mensaje de respuesta

Ethernet II
Manda un broadcast desde la dirección MAC 08:00:27:81:19:9b buscando un servidor DHCP.

IP
Identifica la versión del maquete IP

Bootstrap Protocol
Identifica diversas características del discover

Option 53: identifica el tipo de mensage
Option 61: identifica al cliente
Option 50: respuesta de IP
Option 54: identificador del servidor
Option 12: nombre del dispositivo
Option 81: nombre completo del dominio
Option 60: identificador de clase del vendedor
Option 55: lista de parámetros de respuesta
Option 43: información específica delvendedor
Option 255: indica el final del paquete

```
⊟ Bootstrap Protocol (Request)
    Message type: Boot Request (1)
    Hardware type: Ethernet (0x01)
    Hardware address length: 6
    Hops: 0
    Transaction ID: 0xe1ab834e
    Seconds elapsed: 0
  ⊞ Bootp flags: 0x8000 (Broadcast)
    Client IP address: 0.0.0.0 (0.0.0.0)
    Your (client) IP address: 0.0.0.0 (0.0.0.0)
    Next server IP address: 0.0.0.0 (0.0.0.0)
    Relay agent IP address: 0.0.0.0 (0.0.0.0)
    Client MAC address: CadmusCo_81:19:9b (08:00:27:81:19:9b)
    Client hardware address padding: 00000000000000000000
    Server host name not given
    Boot file name not given
    Magic cookie: DHCP
  ⊟ Option: (53) DHCP Message Type (Request)
      Length: 1
      DHCP: Request (3)
  ⊟ Option: (61) Client identifier
      Length: 7
      Hardware type: Ethernet (0x01)
      Client MAC address: CadmusCo_81:19:9b (08:00:27:81:19:9b)
  ⊟ Option: (50) Requested IP Address
      Length: 4
      Requested IP Address: 172.16.5.120 (172.16.5.120)
  ⊟ Option: (54) DHCP Server Identifier
      Length: 4
      DHCP Server Identifier: 172.16.5.1 (172.16.5.1)
  ⊟ Option: (12) Host Name
      Length: 4
      Host Name: nat1
  ⊟ Option: (81) Client Fully Qualified Domain Name
      Length: 8
      Flags: 0x00
      0000 ... = Reserved flags: 0x00
⊟ Option: (55) Parameter Request List
    Length: 11
    Parameter Request List Item: (1) Subnet Mask
    Parameter Request List Item: (15) Domain Name
    Parameter Request List Item: (3) Router
    Parameter Request List Item: (6) Domain Name Server
    Parameter Request List Item: (44) NetBIOS over TCP/IP Name Server
    Parameter Request List Item: (46) NetBIOS over TCP/IP Node Type
    Parameter Request List Item: (47) NetBIOS over TCP/IP Scope
    Parameter Request List Item: (31) Perform Router Discover
    Parameter Request List Item: (33) Static Route
    Parameter Request List Item: (249) Private/Classless Static Route (Microsoft)
    Parameter Request List Item: (43) Vendor-Specific Information
⊟ Option: (43) Vendor-Specific Information
    Length: 3
    Value: dc0100
⊟ Option: (255) End
    Option End: 255
```

9.4 ACK:

El servidor DHCP recibe el mensaje de respuesta del Host y manda un mensaje de finalización de conversación (este mensaje solo sen manda si se ha aceptado la dirección IP)

Ethernet II
Manda un broadcast desde la dirección MAC 08:00:27:03:b5:a3 buscando un cliente DHCP.

IP
Identifica la versión del maquete IP

Bootstrap Protocol
Identifica diversas características del discover

```
Bootstrap Protocol (ACK)
  Message type: Boot Reply (2)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0xe1ab834e
  Seconds elapsed: 0
⊞ Bootp flags: 0x8000 (Broadcast)
  Client IP address: 0.0.0.0 (0.0.0.0)
  Your (client) IP address: 172.16.5.120 (172.16.5.120)
  Next server IP address: 172.16.5.1 (172.16.5.1)
  Relay agent IP address: 0.0.0.0 (0.0.0.0)
  Client MAC address: CadmusCo_81:19:9b (08:00:27:81:19:9b)
  Client hardware address padding: 00000000000000000000
  Server host name not given
  Boot file name not given
  Magic cookie: DHCP
⊟ Option: (53) DHCP Message Type (ACK)
    Length: 1
    DHCP: ACK (5)
⊟ Option: (54) DHCP Server Identifier
    Length: 4
    DHCP Server Identifier: 172.16.5.1 (172.16.5.1)
⊟ Option: (51) IP Address Lease Time
    Length: 4
    IP Address Lease Time: (300s) 5 minutes
⊟ Option: (1) Subnet Mask
    Length: 4
    Subnet Mask: 255.255.255.0 (255.255.255.0)
⊟ Option: (15) Domain Name
    Length: 15
    Domain Name: victorrodbon.es
⊟ Option: (3) Router
    Length: 4
    Router: 172.16.5.1 (172.16.5.1)
⊟ Option: (6) Domain Name Server
    Length: 4
    Domain Name Server: 192.224.52.36 (192.224.52.36)
⊟ Option: (255) End
    Option End: 255
  Padding
```

Option 53: identifica el tipo de mensage
Option 54: identificador del servidor DHCP
Option 51: tiempo que tarda en volver a mandar la ip
Option 1: indica la mascara de subred
Option 15: indica el nombre del dominio
Option 3: indica la ip del servidor
Option 6: indica el nombre del servidor
Option 255: indica el final del paquete

10 Cambiaremos el tiempo de concesión y veremos qué ocurre con las tramas de renovación.

```
subnet 172.16.5.0 netmask 255.255.255.0 {
        range 172.16.5.100 172.16.5.200;
        option domain-name-servers 192.224.52.36;
        option domain-name "victorrodbon.es";
        option routers 172.16.5.1;
        option broadcast-address 172.16.5.255;
        default-lease-time 30;
        max-lease-time 60;
```

Se generan más tramas de renovación

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 0.00000000 | 172.16.5.120 | 192.224.52.36 | DNS | 77 | Standard query 0x8478 A www.wireshark.org |
| 2 | 4.00575200 | 172.16.5.120 | 192.224.52.36 | DNS | 77 | Standard query 0x8478 A www.wireshark.org |
| 3 | 39.7475130 | 172.16.5.120 | 172.16.5.255 | BROWSER | 247 | Domain/Workgroup Announcement INICIOMS, NT Workstation, Domain Enum |
| 4 | 42.9424350 | 172.16.5.120 | 172.16.5.1 | DHCP | 342 | DHCP Request - Transaction ID 0x4ab7e16d |
| 5 | 43.1018710 | 172.16.5.1 | 172.16.5.120 | DHCP | 342 | DHCP ACK - Transaction ID 0x4ab7e16d |
| 6 | 48.1112330 | CadmusCo_03:b5:a3 | CadmusCo_81:19:9b | ARP | 60 | Who has 172.16.5.120? Tell 172.16.5.1 |
| 7 | 48.1112490 | CadmusCo_81:19:9b | CadmusCo_03:b5:a3 | ARP | 42 | 172.16.5.120 is at 08:00:27:81:19:9b |
| 8 | 73.1058420 | 172.16.5.120 | 172.16.5.1 | DHCP | 342 | DHCP Request - Transaction ID 0x730ffef5 |
| 9 | 73.2674460 | 172.16.5.1 | 172.16.5.120 | DHCP | 342 | DHCP ACK - Transaction ID 0x730ffef5 |

11 Se puede hacer además alguna reserva para una dirección MAC concreta de nuestras máquinas virtuales.

```
host REDFIJA {
        hardware ethernet 08:00:27:85:16:30;
        fixed-address 172.16.5.90;
}
```