

# Manual de instalação e configuração de servidor DHCP

Vamos inicialmente trabalhar simulando o ambiente cliente-servidor com o auxílio de máquinas virtuais a partir da distribuição Linux Debian (Ubuntu). É possível criar apenas uma para ser o servidor e utilizarmos o sistema operacional do computador como cliente. Ou então configurarmos duas máquinas virtuais.

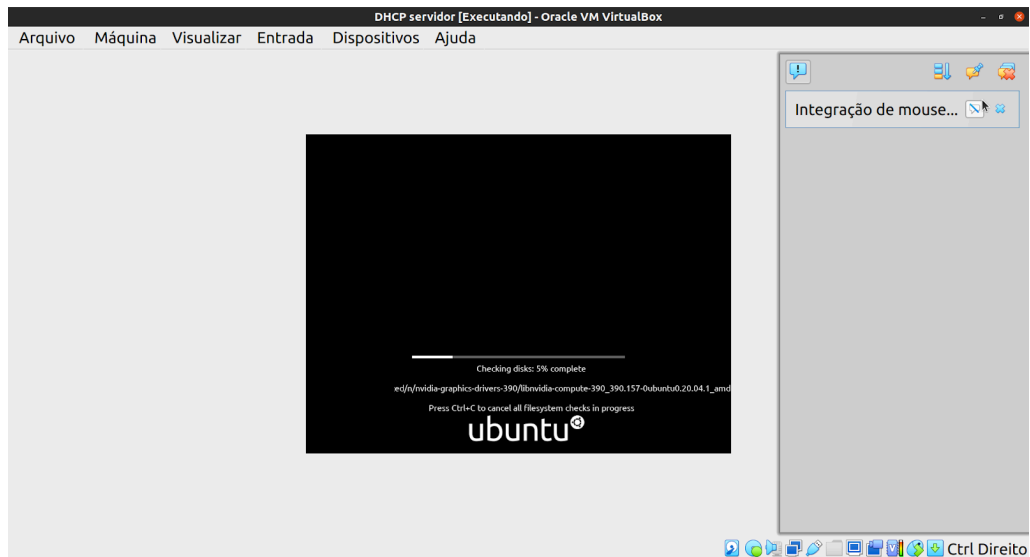
Para simular o ambiente do DHCP e da busca e atribuição automáticas dos IPs faremos um teste com duas máquinas virtuais.

## Criação das Máquinas Virtuais:

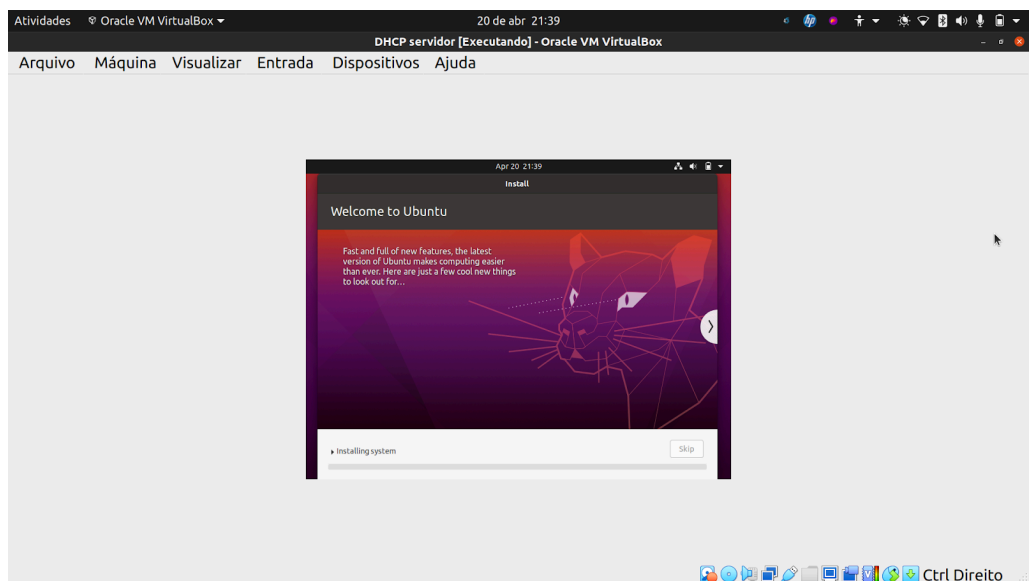
1. Utilize o **VM VirtualBox** para criação e gerenciamento das mesmas de acordo com as condições de memória existentes em seu computador.
2. É necessário download da ISO do sistema que escolher para seu teste. Neste exemplo utilizaremos **Ubuntu 20.04 LTS**, download realizado diretamente do site oficial <https://ubuntu.com/download/desktop>
3. De acordo com as imagens abaixo, escolhemos algumas especificações para nossas máquinas. Criando a primeira:



Após selecionar a ISO e finalizar , a máquina virtual estará criada. Basta iniciá-la para que o sistema comece a ser instalado nela:



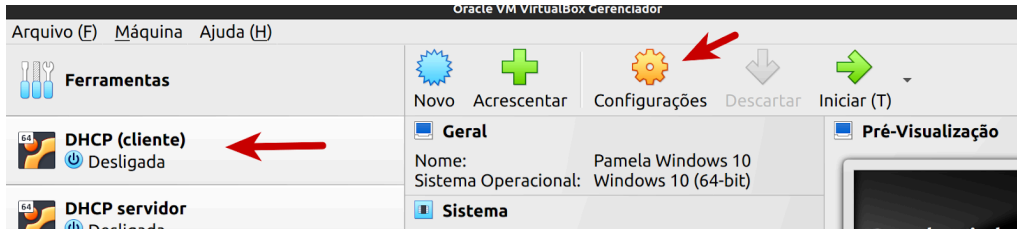
É muito importante nesta etapa escolher o idioma e teclados respectivos para uso posterior no terminal.



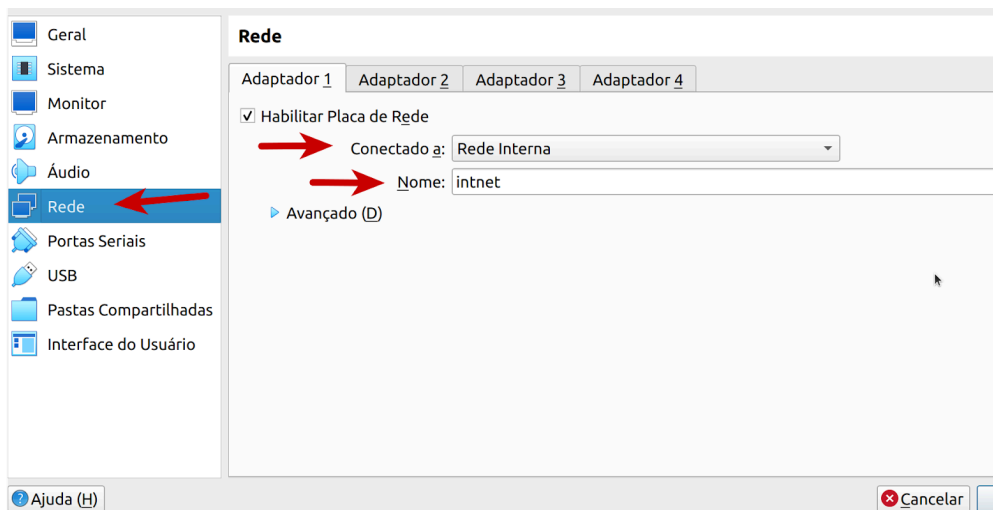
Vamos basta **clonar** esta máquina já criada com as mesmas configurações, afinal temos uma para o cliente e outra para o servidor:

## Configurações da rede

Antes de iniciarmos, precisamos deixar ambas as máquinas na mesma rede interna : por isso, abra as configurações da máquina virtual **cliente**



Selecione a opção **Rede Interna** e digite o nome da rede que deseja criar (intnet no nosso exemplo).



Em seguida, abra as configurações do **servidor** e repita o processo.

Cliente e servidor configurados, **agora vamos abrir o servidor e instalar o ISC- DHCP server além de deixar o IP dele fixo.**

## Configurando o servidor

É necessário um dos dispositivos estar habilitado para poder direcionar os IPs e todas as configurações de rede pertencentes a ele.

Dentro da máquina que será o servidor, abra o terminal de comando (prompt) e digite

**ifconfig**

para que seja possível verificar a atual configuração de rede do dispositivo.

(Caso não tenha instalado pode ser necessário utilizar o comando **sudo apt-get install net-tools** antes do ifconfig)

Preparando o ambiente para receber o servidor

Escreva novamente o comando abaixo para deixar duas redes ativas: a internet **eth0** e a rede local **enp0s8**.

### ifconfig

Para alterar pasta e configurar para dhcp a rede local:

**cd /etc/netplan**

**sudo nano 00-installer-config.yaml**

**sudo apt-get install nano**

**sudo nano 00-installer-config.yaml**

```
GNU nano 6.2                                00-installer-config.yaml
# This is the network config written by 'subiquity'
network:
  ethernet:
    enp0s3:
      dhcp4: true
    enp0s8:
      addresses:
        - 192.168.1.10/24
      gateway4: 10.0.2.15
      nameservers:
        addresses:
          - 8.8.8.8
          - 8.8.4.4
        search: []
  version: 2

[ Read 15 lines ]
^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location  M-U Undo
^X Exit      ^R Read File ^_ Replace   ^U Paste     ^J Justify   ^_ Go To Line M-E Redo
```

Aplicar alterações e reiniciar:

**sudo netplan apply**

**sudo reboot**

Para validar se a configuração de rede ficou como enp0s8:

## ifconfig

```
Apr 22 00:50:45 servidor dhcpd[1077]: DHCPACK on 192.168.1.21 to 08:00:27:3c:10:c6 (cliente-VirtualB
ox) via enp0s8
Apr 22 00:51:26 servidor dhcpd[1077]: reuse_lease: lease age 41 (secs) under 25% threshold, reply wi
th unaltered, existing lease for 192.168.1.21
Apr 22 00:51:26 servidor dhcpd[1077]: DHCPREQUEST for 192.168.1.21 from 08:00:27:3c:10:c6 (cliente-V
irtualBox) via enp0s8
Apr 22 00:51:26 servidor dhcpd[1077]: DHCPACK on 192.168.1.21 to 08:00:27:3c:10:c6 (cliente-VirtualB
ox) via enp0s8
servidor@servidor:~$ 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::a00:27ff:fe49:3f20 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:49:3f:20 txqueuelen 1000 (Ethernet)
    RX packets 393 bytes 552919 (552.9 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 142 bytes 10383 (10.3 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

enp0s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.1.10 netmask 255.255.255.0 broadcast 192.168.1.255
    inet6 fe80::a00:27ff:fe93:36ef prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:93:36:ef txqueuelen 1000 (Ethernet)
    RX packets 760 bytes 63481 (63.4 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 74 bytes 8640 (8.6 KB)
    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 97 bytes 7746 (7.7 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 97 bytes 7746 (7.7 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

servidor@servidor:~$ _
```

## Instalando o DHCP

Utilize o pacote a seguir:

```
sudo apt install isc-dhcp-server
```

## Especificações do servidor

Após a instalação, faremos os ajustes diretamente no arquivo de configuração do servidor :

```
sudo nano /etc/dhcp/dhcpd.conf
```

**Modifique as seguintes linhas:**

```
ddns-update-style none;  
default-lease-time 86400;  
max-lease-time 604800;
```

```
authoritative;
```

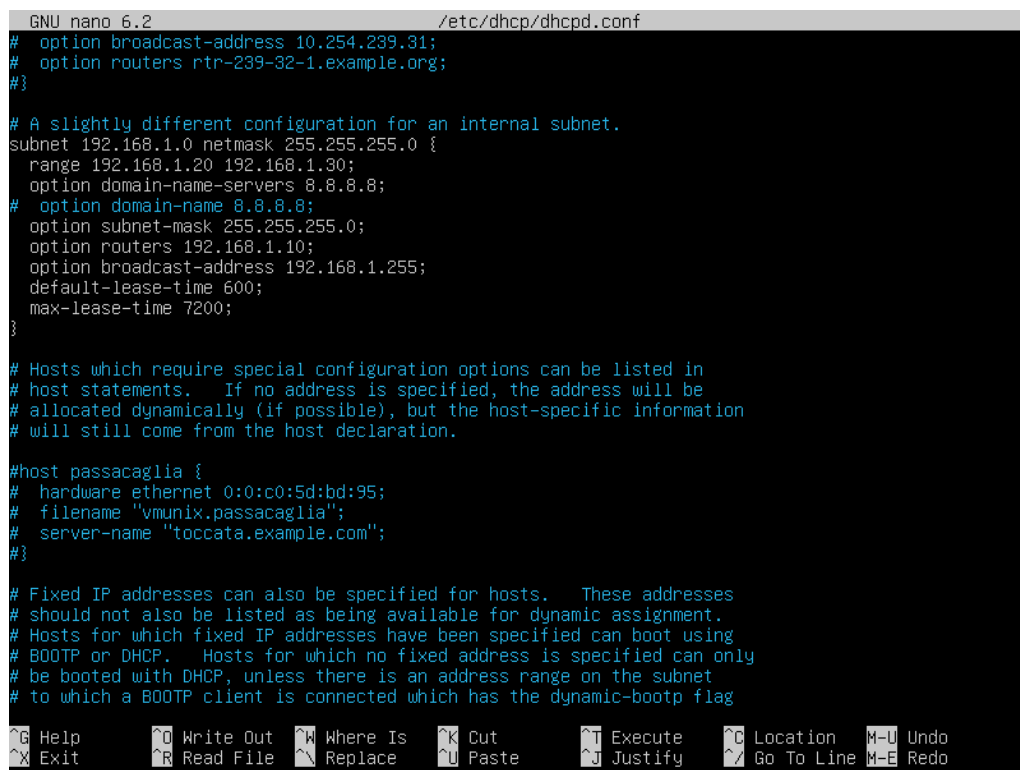
```
option domain-name-servers 8.8.8.8;

subnet 192.168.10.0 netmask 255.255.255.0 {

range 192.168.10.10 192.168.10.21;

option subnet-mask 255.255.255.0;

option routers 192.168.10.1;
option broadcast-address 192.168.10.255;
}
```



```
GNU nano 6.2 /etc/dhcp/dhcpd.conf
# option broadcast-address 10.254.239.31;
# option routers rtr-239-32-1.example.org;
#}

# A slightly different configuration for an internal subnet.
subnet 192.168.1.0 netmask 255.255.255.0 {
    range 192.168.1.20 192.168.1.30;
    option domain-name-servers 8.8.8.8;
    # option domain-name 8.8.8.8;
    option subnet-mask 255.255.255.0;
    option routers 192.168.1.10;
    option broadcast-address 192.168.1.255;
    default-lease-time 600;
    max-lease-time 7200;
}

# Hosts which require special configuration options can be listed in
# host statements.  If no address is specified, the address will be
# allocated dynamically (if possible), but the host-specific information
# will still come from the host declaration.

#host passacaglia {
#    hardware ethernet 0:0:c0:5d:bd:95;
#    filename "vmunix.passacaglia";
#    server-name "toccata.example.com";
#}

# Fixed IP addresses can also be specified for hosts.  These addresses
# should not also be listed as being available for dynamic assignment.
# Hosts for which fixed IP addresses have been specified can boot using
# BOOTP or DHCP.  Hosts for which no fixed address is specified can only
# be booted with DHCP, unless there is an address range on the subnet
# to which a BOOTP client is connected which has the dynamic-bootp flag
```

Verifique possíveis erros de sintaxe que podem impedir o start do servidor:

**sudo dhcpd -t**

Agora precisamos especificar as interfaces a serem usadas. No caso do servidor é apenas uma interface, então abra o arquivo no modo root usando:

**nano /etc/default/isc-server**

Localize a etapa `INTERFACESv4=""` e inclua `enp0s8` entre as aspas.

```
GNU nano 6.2 /etc/default/isc-dhcp-server
# Defaults for isc-dhcp-server (sourced by /etc/init.d/isc-dhcp-server)

# Path to dhcpd's config file (default: /etc/dhcp/dhcpd.conf).
#DHCPDv4_CONF=/etc/dhcp/dhcpd.conf
#DHCPDv6_CONF=/etc/dhcp/dhcpd6.conf

# Path to dhcpd's PID file (default: /var/run/dhcpd.pid).
#DHCPDv4_PID=/var/run/dhcpd.pid
#DHCPDv6_PID=/var/run/dhcpd6.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".
INTERFACESv4="enp0s8"
INTERFACESv6=""

[ Read 18 lines ]
^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location  M-U Undo
^X Exit      ^R Read File ^N Replace   ^U Paste     ^J Justify   ^_ Go To Line M-E Redo
```

Para validar se ficou completa a instalação e nosso servidor rodando:

**sudo systemctl restart isc-dhcp-server**

Agora podemos iniciar ou reiniciar nosso servidor. As | são para escolher apenas um deles, então escolha esse comando conforme necessidade:  
start | stop | restart | status

**sudo systemctl status isc-dhcp-server**

O status que deverá aparecer será: **"Active: active(running)..."**

Agora ele já está fornecendo IPs e configurações de rede !



```

servidor@servidor:~$ sudo systemctl status isc-dhcp-server
• 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 Mon 2024-04-22 00:33:17 UTC; 19min ago
     Docs: man:dhcpd(8)
    Main PID: 1077 (dhcpd)
      Tasks: 4 (limit: 2221)
     Memory: 4.5M
        CPU: 10ms
    CGroup: /system.slice/isc-dhcp-server.service
            └─1077 dhcpd -user dhcpd -group dhcpd -f -4 -pf /run/dhcp-server/dhcpd.pid -cf /etc/dhcpd.conf enp0s8

Apr 22 00:47:40 servidor dhcpd[1077]: reuse_lease: lease age 77 (secs) under 25% threshold, reply with unaltered, existing lease for 192.168.1.21
Apr 22 00:47:40 servidor dhcpd[1077]: DHCPREQUEST for 192.168.1.21 from 08:00:27:3c:10:c6 (cliente-VirtualBox) via enp0s8
Apr 22 00:47:40 servidor dhcpd[1077]: DHCPACK on 192.168.1.21 to 08:00:27:3c:10:c6 (cliente-VirtualBox) via enp0s8
Apr 22 00:48:39 servidor dhcpd[1077]: DHCPREQUEST for 192.168.1.20 from 08:00:27:3c:10:c6 (cliente-VirtualBox) via enp0s8
Apr 22 00:48:39 servidor dhcpd[1077]: DHCPACK on 192.168.1.20 to 08:00:27:3c:10:c6 (cliente-VirtualBox) via enp0s8
Apr 22 00:50:45 servidor dhcpd[1077]: DHCPREQUEST for 192.168.1.21 from 08:00:27:3c:10:c6 (cliente-VirtualBox) via enp0s8
Apr 22 00:50:45 servidor dhcpd[1077]: DHCPACK on 192.168.1.21 to 08:00:27:3c:10:c6 (cliente-VirtualBox) via enp0s8
Apr 22 00:51:26 servidor dhcpd[1077]: reuse_lease: lease age 41 (secs) under 25% threshold, reply with unaltered, existing lease for 192.168.1.21
Apr 22 00:51:26 servidor dhcpd[1077]: DHCPREQUEST for 192.168.1.21 from 08:00:27:3c:10:c6 (cliente-VirtualBox) via enp0s8
Apr 22 00:51:26 servidor dhcpd[1077]: DHCPACK on 192.168.1.21 to 08:00:27:3c:10:c6 (cliente-VirtualBox) via enp0s8
servidor@servidor:~$ _

```

Para verificar os logs do servidor:  
**grep dhcpd /var/log/syslog**

## Configurando o cliente

Agora precisamos abrir o terminal do cliente e alterar o modo de busca para DHCP:

**sudo dhclient enp0s3;**

**ifconfig**

Selecione a interface de entrada da Internet enp0s3:

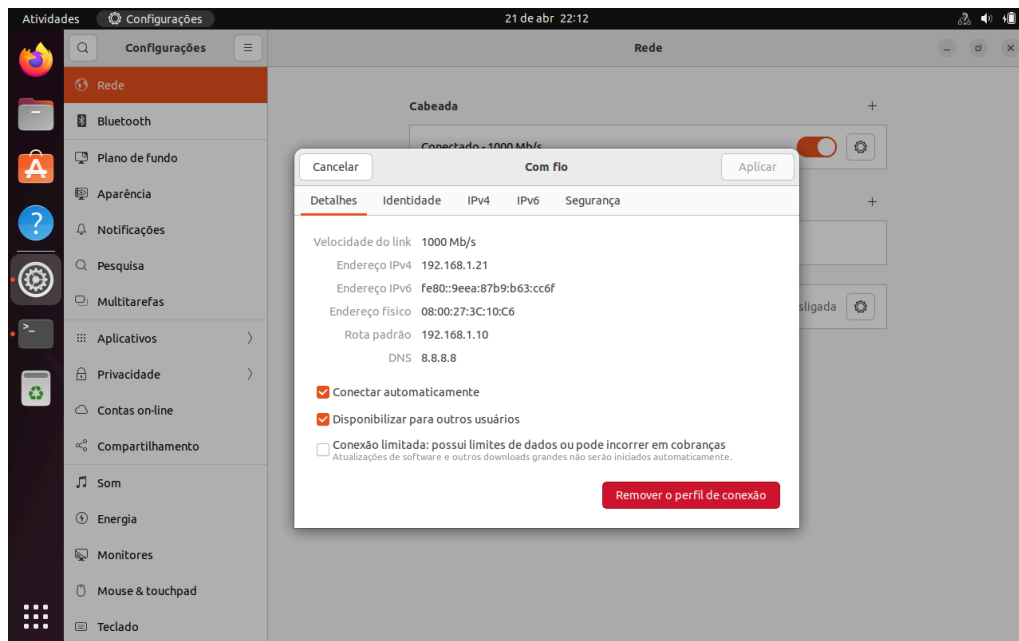
**sudo dhclient enp0s3 -v**

```
cliente@cliente-VirtualBox: ~  
If you think you have received this message due to a bug rather  
than a configuration issue please read the section on submitting  
bugs on either our web page at www.isc.org or in the README file  
before submitting a bug. These pages explain the proper  
process and the information we find helpful for debugging.  
exiting.  
cliente@cliente-VirtualBox:~$ sudo dhclient enp0s3 -v  
[sudo] senha para cliente:  
Internet Systems Consortium DHCP Client 4.4.1  
Copyright 2004-2018 Internet Systems Consortium.  
All rights reserved.  
For info, please visit https://www.isc.org/software/dhcp/  
  
Listening on LPF/enp0s3/08:00:27:3c:10:c6  
Sending on   LPF/enp0s3/08:00:27:3c:10:c6  
Sending on   Socket/fallback  
DHCPREQUEST for 192.168.1.21 on enp0s3 to 255.255.255.255 port 67 (xid=0x7898d4d  
d)  
DHCPACK of 192.168.1.21 from 192.168.1.10 (xid=0xdd49878)  
RTNETLINK answers: File exists  
bound to 192.168.1.21 -- renewal in 281 seconds.  
cliente@cliente-VirtualBox:~$
```

Agora com o endereço alocado pelo DHCP: 192.168.1.20  
Nosso intervalo vai de 10 a 21.

```
cliente@cliente-VirtualBox: ~  
TX packets 550  bytes 46132 (46.1 KB)  
TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0  
  
cliente@cliente-VirtualBox:~$ sudo dhclient enp0s3  
cliente@cliente-VirtualBox:~$ ifconfig  
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500  
    inet 192.168.1.20  netmask 255.255.255.0  broadcast 192.168.1.255  
    inet6 fe80::9eea:87b9:b63:cc6f  prefixlen 64  scopeid 0x20<link>  
    ether 08:00:27:3c:10:c6  txqueuelen 1000  (Ethernet)  
    RX packets 192  bytes 221545 (221.5 KB)  
    RX errors 0  dropped 0  overruns 0  frame 0  
    TX packets 441  bytes 44325 (44.3 KB)  
    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  (Loopback Local)  
    RX packets 550  bytes 46132 (46.1 KB)  
    RX errors 0  dropped 0  overruns 0  frame 0  
    TX packets 550  bytes 46132 (46.1 KB)  
    TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0  
  
cliente@cliente-VirtualBox:~$
```

E após um tempo determinado, alterado para 192.168.1.21.



Para analisar mais detalhadamente as concessões feitas entre o servidor e o DHCP:

**cat /var/lib/dhcp/dhcp.lease**

```
# The format of this file is documented in the dhcpd.leases(5) manpage
# This lease file was written by isc-dhcp-4.2.2

server-uid "000\001\000\001\031Pv\272\010\000'\025\015*";

lease 192.168.10.10 {
    starts 0 2013/06/16 13:17:14;
    ends 1 2013/06/17 13:17:14;
    cltt 0 2013/06/16 13:17:14;
    binding state active;
    next binding state free;
    rewind binding state free;
    hardware ethernet 08:00:27:9b:c4:df;
    client-hostname "ubuntu-desktop";
}
lease 192.168.10.11 {
    starts 0 2013/06/16 13:18:16;
    ends 1 2013/06/17 13:18:16;
    cltt 0 2013/06/16 13:18:16;
    binding state active;
    next binding state free;
```

Também é possível verificar no **servidor** que o cliente está conectado no DHCP pois o nome da máquina é **Cliente** e na imagem do servidor percebemos as interações entre as máquinas:

```

servidor@servidor:/etc/netplan$ sudo systemctl status isc-dhcp-server
[sudo] password for servidor:
• 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 Mon 2024-04-22 00:33:17 UTC; 41min ago
     Docs: man:dhcpd(8)
    Main PID: 1077 (dhcpd)
      Tasks: 4 (limit: 2221)
     Memory: 4.5M
        CPU: 14ms
    CGroup: /system.slice/isc-dhcp-server.service
            └─1077 dhcpd -user dhcpd -group dhcpd -f -4 -pf /run/dhcp-server/dhcpd.pid -cf /etc/dhc
p/dhcpd.conf enp0s8

Apr 22 01:08:18 servidor dhcpd[1077]: DHCPACK on 192.168.1.21 to 08:00:27:3c:10:c6 (cliente-VirtualB
ox) via enp0s8
Apr 22 01:08:39 servidor dhcpd[1077]: DHCPREQUEST for 192.168.1.20 from 08:00:27:3c:10:c6 (cliente-V
irtualBox) via enp0s8
Apr 22 01:08:39 servidor dhcpd[1077]: DHCPACK on 192.168.1.20 to 08:00:27:3c:10:c6 (cliente-VirtualB
ox) via enp0s8
Apr 22 01:12:45 servidor dhcpd[1077]: DHCPREQUEST for 192.168.1.21 from 08:00:27:3c:10:c6 (cliente-V
irtualBox) via enp0s8
Apr 22 01:12:45 servidor dhcpd[1077]: DHCPACK on 192.168.1.21 to 08:00:27:3c:10:c6 (cliente-VirtualB
ox) via enp0s8
Apr 22 01:12:48 servidor dhcpd[1077]: reuse_lease: lease age 3 (secs) under 25% threshold, reply wit
h unaltered, existing lease for 192.168.1.21
Apr 22 01:12:48 servidor dhcpd[1077]: DHCPREQUEST for 192.168.1.21 from 08:00:27:3c:10:c6 (cliente-V
irtualBox) via enp0s8
Apr 22 01:12:48 servidor dhcpd[1077]: DHCPACK on 192.168.1.21 to 08:00:27:3c:10:c6 (cliente-VirtualB
ox) via enp0s8
Apr 22 01:13:39 servidor dhcpd[1077]: DHCPREQUEST for 192.168.1.20 from 08:00:27:3c:10:c6 (cliente-V
irtualBox) via enp0s8
Apr 22 01:13:39 servidor dhcpd[1077]: DHCPACK on 192.168.1.20 to 08:00:27:3c:10:c6 (cliente-VirtualB
ox) via enp0s8
servidor@servidor:/etc/netplan$

```

Pronto, nossa rede com servidor DHCP está em funcionamento.