

Relatório documentado Trabalho de Instalação Redes de Computadores

Trabalho de Redes - Grupo I

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Máquinas Virtuais Utilizadas:

192.168.1.17 (Maquina 1) _ Servidor de Horas e DNS
192.168.1.18 (Maquina 2) _ Servidor Web e FTP

Etapa 2:

Correção HTTPs e Servidor de Horas:

Instalação do servidor HTTPs:

```
apt-get install apache2 openssl build-essential -y
```

Após isso, devemos criar uma chave de certificado

```
sudo openssl req -x509 -nodes -days 300 -newkey rsa:2048 -keyout  
/etc/ssl/private/apache_ssl.key -out /etc/ssl/certs/apache_ssl.crt
```

```
[10:26:55] DEBIAN: aluno@vm18 [~]$ sudo openssl req -x509 -nodes -days 300 -newkey rsa:2048 -keyout /etc/ssl/private/apache_ssl.key -out /etc/ssl/certs/apache_ssl.crt
Generating a RSA private key
.....+++++
.....+++++
writing new private key to '/etc/ssl/private/apache_ssl.key'
-----
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) [AU]:BR
State or Province Name (full name) [Some-State]:Minas Gerais
Locality Name (eg, city) []:Lavras
Organization Name (eg, company) [Internet Widgits Pty Ltd]:UFLA
Organizational Unit Name (eg, section) []:UFLA
Common Name (e.g. server FQDN or YOUR name) []:192.168.1.18
Email Address []:rodrigo.duarte2@estudante.ufla.br
```

Depois rodamos estes dois comandos a fim de habilitar as configurações no apache e no site criado.

```
sudo a2enmod ssl
sudo a2ensite default-ssl.conf
```

e reiniciamos o serviço para aplicar as mudanças

```
systemctl reload apache2
```

Testes

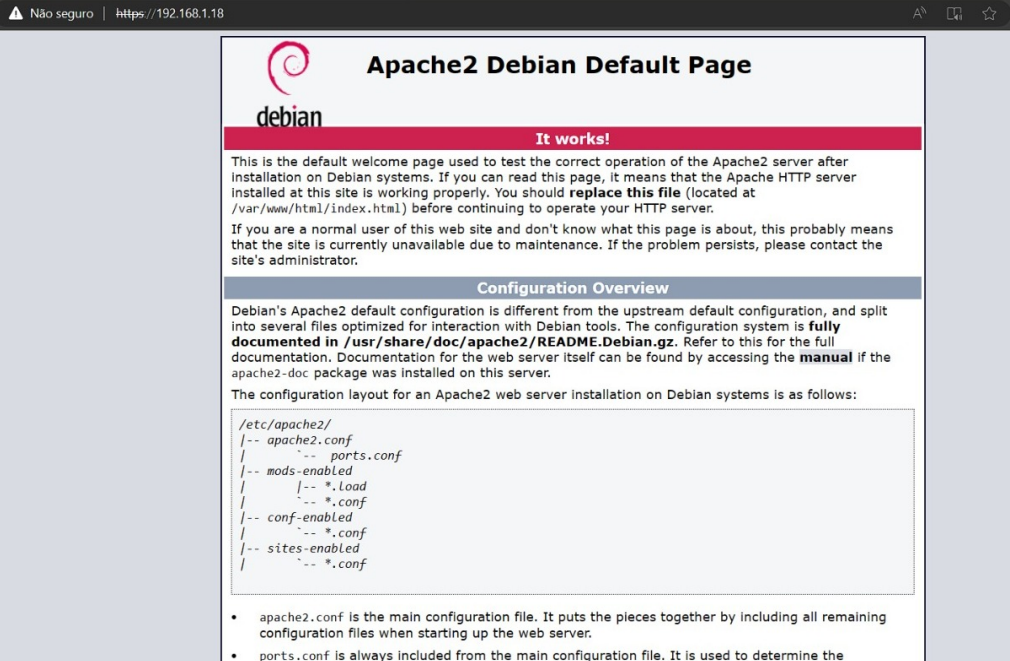
após a reiniciar o serviço testamos se a sintaxe de configuração está correta e o status do servidor:

```
[13:14:26] DEBIAN: aluno@vm18 [/etc/apache2/sites-available]$ sudo apache2ctl configtest
Syntax OK
[13:14:39] DEBIAN: aluno@vm18 [/etc/apache2/sites-available]$ sudo service apache2 restart
[13:14:54] DEBIAN: aluno@vm18 [/etc/apache2/sites-available]$ sudo service apache2 status
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
   Active: active (running) since Sat 2023-11-25 13:14:54 -03; 7s ago
     Docs: https://httpd.apache.org/docs/2.4/
   Process: 97369 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
  Main PID: 97373 (apache2)
    Tasks: 55 (limit: 1115)
   Memory: 17.4M
      CPU: 73ms
   CGroup: /system.slice/apache2.service
           └─97373 /usr/sbin/apache2 -k start
             └─97374 /usr/sbin/apache2 -k start
               └─97375 /usr/sbin/apache2 -k start

nov 25 13:14:54 vm18 systemd[1]: Starting The Apache HTTP Server...
nov 25 13:14:54 vm18 systemd[1]: Started The Apache HTTP Server.
```

teste:

<https://192.168.1.18>



Apache2 Debian Default Page

It works!

This is the default welcome page used to test the correct operation of the Apache2 server after installation on Debian systems. If you can read this page, it means that the Apache HTTP server installed at this site is working properly. You should **replace this file** (located at `/var/www/html/index.html`) before continuing to operate your HTTP server.

If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.

Configuration Overview

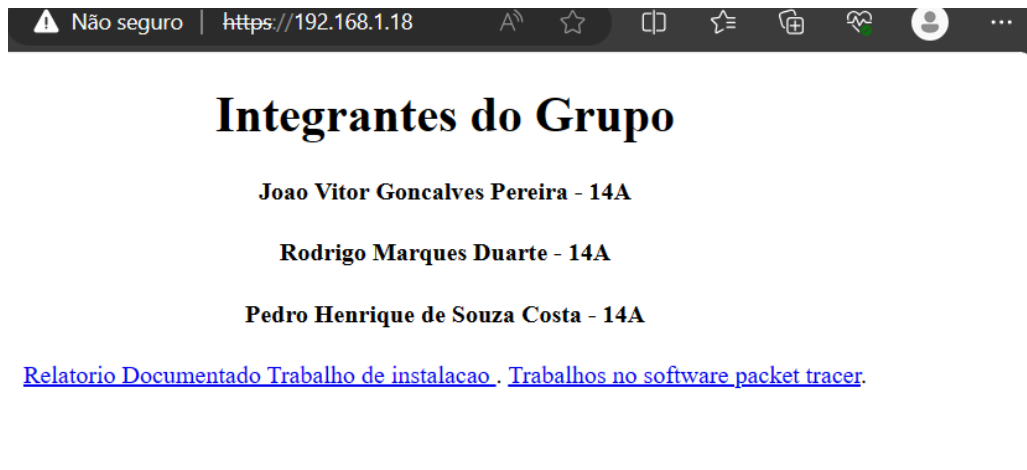
Debian's Apache2 default configuration is different from the upstream default configuration, and split into several files optimized for interaction with Debian tools. The configuration system is **fully documented in `/usr/share/doc/apache2/README.Debian.gz`**. Refer to this for the full documentation. Documentation for the web server itself can be found by accessing the **manual** if the `apache2-doc` package was installed on this server.

The configuration layout for an Apache2 web server installation on Debian systems is as follows:

```
/etc/apache2/
|-- apache2.conf
|   `-- ports.conf
|-- mods-enabled
|   |-- *.Load
|   |-- *.conf
|-- conf-enabled
|   |-- *.conf
|-- sites-enabled
|   |-- *.conf
```

- `apache2.conf` is the main configuration file. It puts the pieces together by including all remaining configuration files when starting up the web server.
- `ports.conf` is always included from the main configuration file. It is used to determine the

Verificamos que a página padrão do apache é encontrada com êxito
Depois de alterado o html



Instalação Servidor FTP (VM: 192.168.1.18)

Primeiro foi executado a instalação do Very Secure FTP daemon:

```
sudo apt install vsftpd
```

Depois de instalado o serviço vsftp, temos que permitir o acesso anônimo no arquivo vsftp.conf, alterando anonymous_enable=NO para anonymous_enable=YES (em passos futuros “corrigimos” esse trecho, desabilitando o acesso anônimo e habilitando para os usuários da rede) :

```
sudo nano /etc/vsftp.conf
```

Criamos uma nova pasta root para o servidor FTP:

```
sudo mkdir -p /srv/files/ftp
```

Mudamos o diretório home do usuário FTP:

```
sudo usermod -d /srv/files/ftp ftp
```

Reiniciamos o serviço do vsftpd:

```
sudo systemctl restart vsftpd.service
```

Dando permissão para envio (upload) de arquivo, restringir o acesso dos usuários somente as suas pastas:

```
sudo nano /etc/vsftpd.conf
```

e alteramos os seguintes itens: write_enable=NO para write_enable=YES e descomentar chroot_local_users=YES

Na VM 192.168.1.17 fizemos a instalação para fins de testes.

```
sudo apt install ftp
```

Teste de Get

```
[10:16:32] DEBIAN: aluno@vm17 [~]$ ftp 192.168.1.18
Connected to 192.168.1.18.
20 (vsFTPD 3.0.3)
Name (192.168.1.18:aluno): aluno
31 Please specify the password.
Password:
30 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.

ftp> mget testeftp
mget testeftp?
200 PORT command successful. Consider using PASV.
150 Opening BINARY mode data connection for testeftp (32 bytes).
226 Transfer complete.
32 bytes received in 0.00 secs (325.5208 kB/s)
ftp> exit
221 Goodbye.
[10:42:05] DEBIAN: aluno@vm17 [~]$ ls
testeftp
[10:42:06] DEBIAN: aluno@vm17 [~]$ |
```

Teste de put de arquivo:

```
[20:12:00] DEBIAN: aluno@vm17 [~]$ ftp 192.168.1.18
Connected to 192.168.1.18.
220 Welcome to LosPrimosFTP server.
Name (192.168.1.18:aluno): aluno
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> put testeput
local: testeput remote: testeput
200 PORT command successful. Consider using PASV.
150 Ok to send data.
226 Transfer complete.
26 bytes sent in 0.00 secs (367.9801 kB/s)
ftp> ls
200 PORT command successful. Consider using PASV.
150 Here comes the directory listing.
-rw-r--r-- 1 0 0 32 Nov 29 10:29 testeftp
-rw----- 1 1002 1002 26 Dec 06 20:12 testeput
226 Directory send OK.
ftp>
```

Conseguimos habilitar o servidor ftp e prover a transferência de arquivos.

Instalação Servidor DNS

1. Instalamos o Bind9, implementação DNS mais comum em linux:

`sudo apt install bind9`

2. Instalamos o dsutils para auxiliar nos testes:

`sudo apt install dnsutils`

3. Configuramos o servidor DNS como um servidor primário no arquivo `named.conf.local`:

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

Na imagem abaixo é possível ver como ficou (já consta a zona reversa que vai ser adicionada mais a frente):



```
GNU nano 5.4 /etc/bind/named.conf.local
//
// Do any local configuration here
//
zone "DNSgrupoI.com" {
    type master;
    file "/etc/bind/db.DNSgrupoI.com";
};

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

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

4. Configuração da zona local do DNS, utilizando o arquivo `db.DNSgrupol.com`:

`sudo nano /etc/bind/db.DNSgrupol.com`

Na imagem abaixo é possível ver o arquivo. Note que `ns` é referente ao nosso nameserver, `www` ao servidor web e alguns aliases, `server` e `ftp`:

```
GNU nano 5.4 /etc/bind/db.DNSgrupoI.com
;
; BIND data file for local loopback interface
;
$TTL      604800
@         IN      SOA      DNSgrupoI.com.  root.DNSgrupoI.com. (
                        1609202201      ; Serial
                        604800           ; Refresh
                        86400            ; Retry
                        2419200          ; Expire
                        604800 )         ; Negative Cache TTL
;
@         IN      A        192.168.1.17
;
@         IN      NS       ns
@         IN      A        192.168.1.17
ns        IN      A        192.168.1.17
www       IN      A        192.168.1.18
server    IN      A        192.168.1.17
proxy     IN      CNAME    server
ftp       IN      CNAME    www
```

5. Salvamos e reiniciamos o servidor do Bind9:

```
sudo systemctl restart bind9.service
```

6. Adicionamos a zona reversa no arquivo named.conf.local:

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

```
GNU nano 5.4 /etc/bind/named.conf.local
//
// Do any local configuration here
//
zone "DNSgrupoI.com" {
    type master;
    file "/etc/bind/db.DNSgrupoI.com";
};

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

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

7. Para configurar a zona reversa usamos o arquivo padrão:

```
sudo cp /etc/bind/db.127 /etc/bind/db.192
sudo nano /etc/bind/db.192
```

```
GNU nano 5.4 /etc/bind/db.192
;
; BIND reverse data file for local loopback interface
;
$TTL      604800
@         IN      SOA      DNSgrupoI.com. root.DNSgrupoI.com. (
                                1609202201      ; Serial
                                604800           ; Refresh
                                86400            ; Retry
                                2419200          ; Expire
                                604800 )         ; Negative Cache TTL
;
@         NS       ns.
17        PTR      server.DNSgrupoI.com.
17        PTR      ns.DNSgrupoI.com
18        PTR      www.DNSgrupoI.com.
```

8. Entramos no arquivo resolv.conf para conseguir acessar o servidor dns:

`sudo nano /etc/resolv.conf`

```
GNU nano 5.4 /etc/resolv.conf
domain DNSgrupoI.com
search DNSgrupoI.com
nameserver 192.168.1.17
```

9. Acessamos o arquivo netplan para alterar a precedência do servidor DNS:
- 10.

`sudo nano /etc/netplan`

```
GNU nano 5.4 /etc/netplan
network:
    version: 2
    ethernets:
        ens160:
            dhcp4: true
            nameservers:
                search: [DNSgrupoI.com]
                addresses: [192.168.1.17]
```

Testes

1. Testamos o status do bind9:

`sudo systemctl status bind9`

```
[09:31:27] DEBIAN: aluno@vm17 [~]$ sudo systemctl status bind9
[sudo] senha para aluno:
● named.service - BIND Domain Name Server
   Loaded: loaded (/lib/systemd/system/named.service; enabled; vendor preset: enabled)
   Active: active (running) since Fri 2023-12-01 19:33:37 -03; 1 day 13h ago
     Docs: man:named(8)
   Main PID: 97149 (named)
    Tasks: 5 (limit: 1115)
   Memory: 15.9M
      CPU: 13.604s
   CGroup: /system.slice/named.service
           └─97149 /usr/sbin/named -f -u bind

dez 03 03:11:24 vm17 named[97149]: network unreachable resolving 'net/DNSKEY/IN': 2001:503:a83e::2:30#53
dez 03 03:11:24 vm17 named[97149]: network unreachable resolving 'net/DNSKEY/IN': 2001:503:83eb::30#53
dez 03 03:11:24 vm17 named[97149]: network unreachable resolving 'dns3.easydns.org/A/IN': 2620:49:3::10#53
dez 03 03:11:24 vm17 named[97149]: network unreachable resolving 'dns3.easydns.org/AAAA/IN': 2620:49:3::10#53
dez 03 03:11:24 vm17 named[97149]: network unreachable resolving 'debian.map.fastlydns.net/A/IN': 2a04:4e47:1::32#53
dez 03 03:11:24 vm17 named[97149]: network unreachable resolving 'debian.map.fastlydns.net/AAAA/IN': 2a04:4e47:1::32#53
dez 03 03:11:24 vm17 named[97149]: network unreachable resolving 'debian.map.fastlydns.net/A/IN': 2a04:4e47:2::32#53
dez 03 03:11:24 vm17 named[97149]: network unreachable resolving 'debian.map.fastlydns.net/AAAA/IN': 2a04:4e47:2::32#53
dez 03 03:11:24 vm17 named[97149]: network unreachable resolving 'debian.map.fastlydns.net/A/IN': 2a04:4e47:3::32#53
dez 03 03:11:24 vm17 named[97149]: network unreachable resolving 'debian.map.fastlydns.net/AAAA/IN': 2a04:4e47:3::32#53
```

2. Fizemos testes das configurações

`sudo named-checkzone DNSgrupol.com /etc/bind/db.DNSgrupol.com`

```
[19:34:21] DEBIAN: aluno@vm17 [~]$ sudo named-checkzone DNSgrupoI.com /etc/b
ind/db.DNSgrupoI.com
zone DNSgrupoI.com/IN: loaded serial 1609202201
OK
[19:35:28] DEBIAN: aluno@vm17 [~]$
```

3. Teste de nslookup do nome do server:

`nslookup server`

```
[19:34:00] DEBIAN: aluno@vm17 [~]$ nslookup server
Server:          192.168.1.17
Address:         192.168.1.17#53

Name:   server.DNSgrupoI.com
Address: 192.168.1.17
```

4. Teste de nslookup do DNSgrupol.com:

`nslookup DNSgrupol.com`

```
[19:35:28] DEBIAN: aluno@vm17 [~]$ nslookup DNSgrupoI.com
Server:          192.168.1.17
Address:         192.168.1.17#53

Name:   DNSgrupoI.com
Address: 192.168.1.17
```

5. Teste de nslookup do www.DNSgrupol.com:

nslookup www.DNSgrupoI.com

```
[09:31:23] DEBIAN: aluno@vm17 [~]$ nslookup www.DNSgrupoI.com
Server:          192.168.1.17
Address:         192.168.1.17#53

Name:   www.DNSgrupoI.com
Address: 192.168.1.18
```

6. Teste de nslookup do ftp.DNSgrupoI.com:

nslookup ftp.DNSgrupoI.com

```
[19:54:38] DEBIAN: aluno@vm17 [~]$ nslookup ftp.DNSgrupoI.com
Server:          192.168.1.17
Address:         192.168.1.17#53

ftp.DNSgrupoI.com      canonical name = www.DNSgrupoI.com.
Name:   www.DNSgrupoI.com
Address: 192.168.1.18
```

7. Teste de nslookup do ip 192.168.1.17:

nslookup 192.168.1.17

```
[19:38:27] DEBIAN: aluno@vm17 [~]$ nslookup 192.168.1.17
17.1.168.192.in-addr.arpa      name = server.DNSgrupoI.com.
17.1.168.192.in-addr.arpa      name = ns.DNSgrupoI.com.1.168.192.in-addr.arpa.
```

8. Teste de nslookup do ip 192.168.1.18:

nslookup 192.168.1.18

```
[19:39:31] DEBIAN: aluno@vm17 [~]$ nslookup 192.168.1.18
18.1.168.192.in-addr.arpa      name = www.DNSgrupoI.com.
```

9. Teste dig consulta ip 192.168.1.17:

dig -x 192.168.1.17

```
[19:40:29] DEBIAN: aluno@vm17 [~]$ dig -x 192.168.1.17

; <<>> DiG 9.16.44-Debian <<>> -x 192.168.1.17
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 59432
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: 45b6b99abb3ff99901000000656a610b0636860cde424704 (good)
;; QUESTION SECTION:
;17.1.168.192.in-addr.arpa.      IN      PTR

;; ANSWER SECTION:
17.1.168.192.in-addr.arpa. 604800 IN      PTR      ns.DNSgrupoI.com.1.168.192.in-addr.arpa.
17.1.168.192.in-addr.arpa. 604800 IN      PTR      server.DNSgrupoI.com.

;; Query time: 0 msec
;; SERVER: 192.168.1.17#53(192.168.1.17)
;; WHEN: Fri Dec 01 19:41:15 -03 2023
;; MSG SIZE rcvd: 169
```

10. Teste dig consulta ip 192.168.1.18:

dig -x 192.168.1.18

```
[19:41:15] DEBIAN: aluno@vm17 [~]$ dig -x 192.168.1.18

; <<>> DiG 9.16.44-Debian <<>> -x 192.168.1.18
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 15367
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: f822c8c549e23d8601000000656a614da8ef726de94f9f38 (good)
;; QUESTION SECTION:
;18.1.168.192.in-addr.arpa.      IN      PTR

;; ANSWER SECTION:
18.1.168.192.in-addr.arpa. 604800 IN      PTR      www.DNSgrupoI.com.

;; Query time: 0 msec
;; SERVER: 192.168.1.17#53(192.168.1.17)
;; WHEN: Fri Dec 01 19:42:21 -03 2023
;; MSG SIZE rcvd: 113
```

11. Teste dig DNSgrupol.com:

dig -x DNSgrupol.com

```
[19:43:09] DEBIAN: aluno@vm17 [~]$ dig DNSgrupoI.com

; <<>> DiG 9.16.44-Debian <<>> DNSgrupoI.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 21143
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: b16b5e2ebcd9db6401000000656a61c400c8cded1eccfac2 (good)
;; QUESTION SECTION:
;DNSgrupoI.com.                IN      A

;; ANSWER SECTION:
DNSgrupoI.com.                604800  IN      A      192.168.1.17

;; Query time: 0 msec
;; SERVER: 192.168.1.17#53(192.168.1.17)
;; WHEN: Fri Dec 01 19:44:20 -03 2023
;; MSG SIZE rcvd: 86
```

12. Teste dig www.DNSgrupol.com:

[dig www.DNSgrupol.com](http://www.DNSgrupol.com)

```
[19:44:20] DEBIAN: aluno@vm17 [~]$ dig www.DNSgrupoI.com

; <<>> DiG 9.16.44-Debian <<>> www.DNSgrupoI.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 31500
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: 433b6374cfa5d18501000000656a61f701bd687337c4e259 (good)
;; QUESTION SECTION:
;www.DNSgrupoI.com.            IN      A

;; ANSWER SECTION:
www.DNSgrupoI.com.            604800  IN      A      192.168.1.18

;; Query time: 0 msec
;; SERVER: 192.168.1.17#53(192.168.1.17)
;; WHEN: Fri Dec 01 19:45:11 -03 2023
;; MSG SIZE rcvd: 90
```

13. Teste dig ftp.DNSgrupol.com

[dig ftp.DNSgrupol.com](http://ftp.DNSgrupol.com)

```
[19:45:11] DEBIAN: aluno@vm17 [~]$ dig ftp.DNSgrupoI.com

; <<>> DiG 9.16.44-Debian <<>> ftp.DNSgrupoI.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 34312
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: 01c5a31db3091cf801000000656a622fb003d6cdc33ad331 (good)
;; QUESTION SECTION:
;ftp.DNSgrupoI.com.                IN      A

;; ANSWER SECTION:
ftp.DNSgrupoI.com.                604800  IN      CNAME   www.DNSgrupoI.com.
www.DNSgrupoI.com.                604800  IN      A       192.168.1.18

;; Query time: 0 msec
;; SERVER: 192.168.1.17#53(192.168.1.17)
;; WHEN: Fri Dec 01 19:46:07 -03 2023
;; MSG SIZE rcvd: 108
```

14. Teste dig no www.google.com:

dig www.google.com

```
[19:50:45] DEBIAN: aluno@vm17 [~]$ dig www.google.com

; <<>> DiG 9.16.44-Debian <<>> www.google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 34952
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: 9f43141cba3e37db01000000656a63582ad77528490c739f (good)
;; QUESTION SECTION:
;www.google.com.                  IN      A

;; ANSWER SECTION:
www.google.com.                  280     IN      A       142.250.218.4

;; Query time: 0 msec
;; SERVER: 192.168.1.17#53(192.168.1.17)
;; WHEN: Fri Dec 01 19:51:04 -03 2023
;; MSG SIZE rcvd: 87
```