IPS Instituto Politécnico de Setúbal

Escola Superior de Tecnologia de Setúbal

Redes de Computadores

Licenciatura em Engenharia Informática

Trabalho de Laboratório nº 1:

Teste de ferramentas de rede numa pequena Rede de Computadores

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Turma: 6

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1. INTRODUÇÃO

Neste laboratório vamos abordar ferramentas básicas de Redes de Computadores e os mecanismos básicos de comunicação dos dispositivos terminais de redes.

2. REALIZAÇÃO PRÁTICA (1 OU MAIS SECÇÕES)

1. ipconfig

```
C:\Users\nunor>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . : intranet.ips.pt

Ethernet adapter VirtualBox Host-Only Network:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::ecf7:7a1:3839:a13d%18
   IPv4 Address. . . . . . . . . . . : 192.168.56.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Unknown adapter McAfee VPN:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 9:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 10:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter WiFi:

   Connection-specific DNS Suffix  . : home
   Link-local IPv6 Address . . . . . : fe80::a1d3:ea3a:1e8d:6038%9
   IPv4 Address. . . . . . . . . . . : 192.168.1.2
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.1.1

Ethernet adapter Bluetooth Network Connection:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
```

Endereço IP: **192.168.1.2, é utilizado para identificar o computador na rede**

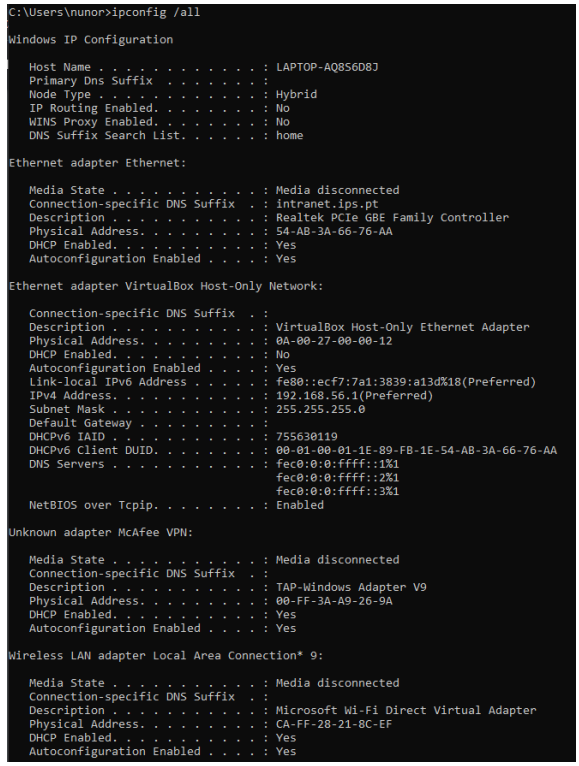
Mascara de Rede: **255.255.255.0, é utilizada para identificar a dimensão da rede local**

Nesta rede 8 bits representam o Host ID, logo estão disponíveis 254 (2^8-2) endereços

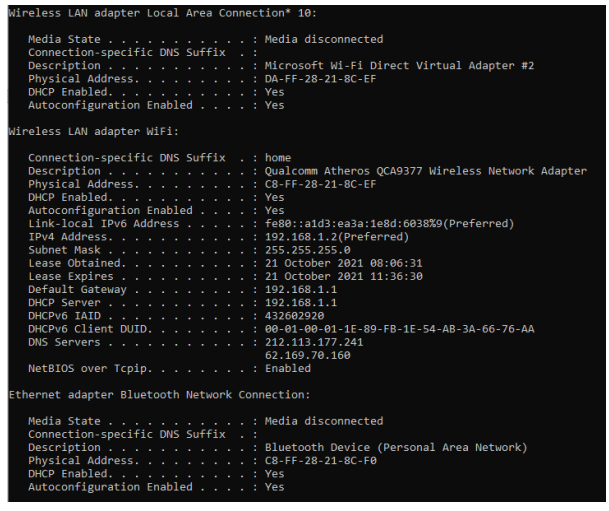
Default Gateway: **192.168.1.1**

O endereço é utilizado quando o computador está ligado a uma rede para comunicar com outros dispositivos, dentro ou fora dessa rede. Neste caso está ligado á rede por WiFi

2. ipconfig /all



```
C:\Users\nunor>ipconfig /all

Windows IP Configuration

   Host Name . . . . . . . . . . . . : LAPTOP-AQ8S6D8J
   Primary Dns Suffix  . . . . . . . :
   Node Type . . . . . . . . . . . . : Hybrid
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No
   DNS Suffix Search List. . . . . . : home

Ethernet adapter Ethernet:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . : intranet.ips.pt
   Description . . . . . . . . . . . : Realtek PCIe GBE Family Controller
   Physical Address. . . . . . . . . : 54-AB-3A-66-76-AA
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Ethernet adapter VirtualBox Host-Only Network:

   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : VirtualBox Host-Only Ethernet Adapter
   Physical Address. . . . . . . . . : 0A-00-27-00-00-12
   DHCP Enabled. . . . . . . . . . . : No
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::ecf7:7a1:3839:a13d%18(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.56.1(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :
   DHCPv6 IAID . . . . . . . . . . . : 755630119
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-1E-89-FB-1E-54-AB-3A-66-76-AA
   DNS Servers . . . . . . . . . . . : fec0:0:0:ffff::1%1
                                       fec0:0:0:ffff::2%1
                                       fec0:0:0:ffff::3%1
   NetBIOS over Tcpip. . . . . . . . : Enabled

Unknown adapter McAfee VPN:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : TAP-Windows Adapter V9
   Physical Address. . . . . . . . . : 00-FF-3A-A9-26-9A
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 9:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
   Physical Address. . . . . . . . . : CA-FF-28-21-8C-EF
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
```



```
Wireless LAN adapter Local Area Connection* 10:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #2
   Physical Address. . . . . . . . . : DA-FF-28-21-8C-EF
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter WiFi:

   Connection-specific DNS Suffix  . : home
   Description . . . . . . . . . . . : Qualcomm Atheros QCA9377 Wireless Network Adapter
   Physical Address. . . . . . . . . : C8-FF-28-21-8C-EF
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::a1d3:ea3a:1e8d:6038%9(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.1.2(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Lease Obtained. . . . . . . . . . : 21 October 2021 08:06:31
   Lease Expires . . . . . . . . . . : 21 October 2021 11:36:30
   Default Gateway . . . . . . . . . : 192.168.1.1
   DHCP Server . . . . . . . . . . . : 192.168.1.1
   DHCPv6 IAID . . . . . . . . . . . : 432602920
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-1E-89-FB-1E-54-AB-3A-66-76-AA
   DNS Servers . . . . . . . . . . . : 212.113.177.241
                                       62.169.70.160
   NetBIOS over Tcpip. . . . . . . . : Enabled

Ethernet adapter Bluetooth Network Connection:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Bluetooth Device (Personal Area Network)
   Physical Address. . . . . . . . . : C8-FF-28-21-8C-F0
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
```

Endereço IP do servidor DHCP: **192.168.1.1**

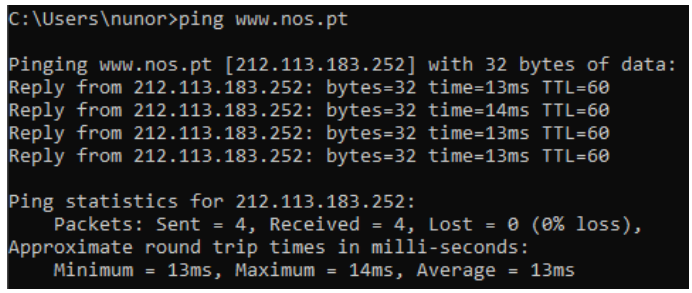
O DHCP ou Dynamic Host Configuration Protocol é um protocolo através do qual um servidor distribui automaticamente endereços IP à medida que dispositivos solicitam conexão à rede.

Endereço IP do Servidor de DNS primário: **212.113.177.241**

Endereço IP do Servidor de DNS secundário: **62.169.70.160**

Os servidores DNS são responsáveis por localizar e traduzir para números IP os endereços dos sites que escrevemos nos browsers.

3. Ping



Endereço IP host: **212.113.183.252**

Dimensão do campo de dados: **32 bytes**

Numero de pedidos enviados: **4**

Numero de respostas obtidas: **4**

Tempo de resposta minimo: **13ms**

Tempo de resposta maximo: **14ms**

Tempo de resposta medio: **13ms**

Comando para efetuar 6 pedidos de resposta:

ping www.nos.pt -n 6

```
C:\Users\nunor>ping www.nos.pt -n 6

Pinging www.nos.pt [212.113.183.252] with 32 bytes of data:
Reply from 212.113.183.252: bytes=32 time=14ms TTL=60
Reply from 212.113.183.252: bytes=32 time=13ms TTL=60
Reply from 212.113.183.252: bytes=32 time=14ms TTL=60
Reply from 212.113.183.252: bytes=32 time=13ms TTL=60
Reply from 212.113.183.252: bytes=32 time=15ms TTL=60
Reply from 212.113.183.252: bytes=32 time=13ms TTL=60

Ping statistics for 212.113.183.252:
    Packets: Sent = 6, Received = 6, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 13ms, Maximum = 15ms, Average = 13ms
```

Comando para efetuar o ping indefinidamente (até se premir Ctrl+C) é:

ping www.nos.pt -t

```
C:\Users\nunor>ping www.nos.pt -t

Pinging www.nos.pt [212.113.183.252] with 32 bytes of data:
Reply from 212.113.183.252: bytes=32 time=14ms TTL=60
Reply from 212.113.183.252: bytes=32 time=15ms TTL=60
Reply from 212.113.183.252: bytes=32 time=13ms TTL=60
Reply from 212.113.183.252: bytes=32 time=13ms TTL=60
Reply from 212.113.183.252: bytes=32 time=16ms TTL=60
Reply from 212.113.183.252: bytes=32 time=13ms TTL=60
Reply from 212.113.183.252: bytes=32 time=14ms TTL=60
Reply from 212.113.183.252: bytes=32 time=13ms TTL=60
Reply from 212.113.183.252: bytes=32 time=14ms TTL=60
Reply from 212.113.183.252: bytes=32 time=13ms TTL=60
Reply from 212.113.183.252: bytes=32 time=12ms TTL=60

Ping statistics for 212.113.183.252:
    Packets: Sent = 11, Received = 11, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 12ms, Maximum = 16ms, Average = 13ms
Control-C
^C
```

Tempo médio de resposta (RTT) dos sites:

www.bbc.net.uk (Reino Unido)-27ms

```
C:\Users\diogo>ping www.bbc.co.uk

Pinging bbc.map.fastly.net [151.101.132.81] with 32 bytes of data:
Reply from 151.101.132.81: bytes=32 time=26ms TTL=59
Reply from 151.101.132.81: bytes=32 time=28ms TTL=59
Reply from 151.101.132.81: bytes=32 time=26ms TTL=59
Reply from 151.101.132.81: bytes=32 time=28ms TTL=59

Ping statistics for 151.101.132.81:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 26ms, Maximum = 28ms, Average = 27ms
```

www.uni-heidelberg.de (Alemanha)-60ms

```
C:\Users\nunor>ping www.uni-heidelberg.de

Pinging www.uni-heidelberg.de [129.206.13.71] with 32 bytes of data:
Reply from 129.206.13.71: bytes=32 time=59ms TTL=49
Reply from 129.206.13.71: bytes=32 time=61ms TTL=49
Reply from 129.206.13.71: bytes=32 time=59ms TTL=49
Reply from 129.206.13.71: bytes=32 time=61ms TTL=49

Ping statistics for 129.206.13.71:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 59ms, Maximum = 61ms, Average = 60ms
```

www.columbia.edu (Nova York, Estados Unidos)-111ms

```
C:\Users\nunor>ping www.columbia.edu

Pinging www.wwwr53.cc.columbia.edu [128.59.105.24] with 32 bytes of data:
Reply from 128.59.105.24: bytes=32 time=113ms TTL=242
Reply from 128.59.105.24: bytes=32 time=112ms TTL=242
Reply from 128.59.105.24: bytes=32 time=112ms TTL=242
Reply from 128.59.105.24: bytes=32 time=110ms TTL=242

Ping statistics for 128.59.105.24:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 110ms, Maximum = 113ms, Average = 111ms
```

www.iana.com (São Francisco, Estados Unidos)-109ms

```
C:\Users\nunor>ping www.iana.com

Pinging ianawww.vip.icann.org [192.0.46.8] with 32 bytes of data:
Reply from 192.0.46.8: bytes=32 time=111ms TTL=242
Reply from 192.0.46.8: bytes=32 time=108ms TTL=242
Reply from 192.0.46.8: bytes=32 time=109ms TTL=242
Reply from 192.0.46.8: bytes=32 time=108ms TTL=242

Ping statistics for 192.0.46.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 108ms, Maximum = 111ms, Average = 109ms
```

4. Informação sobre endereços IP

[English | Deutsch]

utrace* IP address or domain: 95.95.47.91 Search

Whois

Details on IP address 95.95.47.91

```
% This is the RIPE Database query service.
% The objects are in RPSL format.
%
% The RIPE Database is subject to Terms and Conditions.
% See http://www.ripe.net/db/support/db-terms-conditions.pdf

% Note: this output has been filtered.
%       To receive output for a database update, use the "-B" flag.

% Information related to '95.94.0.0 - 95.95.255.255'

% Abuse contact for '95.94.0.0 - 95.95.255.255' is 'abuse@nos.pt'

inetnum:        95.94.0.0 - 95.95.255.255
netname:        NOS
descr:          NOS COMUNICACOES S.A.
country:        PT
admin-c:        NOSA2-RIPE
tech-c:         NOST1-RIPE
status:         ASSIGNED PA
mnt-by:


.


AS2860-MNT
created:        2009-09-15T14:18:06Z
last-modified:  2019-02-22T12:14:13Z
source:         RIPE # Filtered

% Information related to '95.95.0.0/18AS2860'

route:          95.95.0.0/18
descr:          NOS COMUNICACOES S.A.
origin:         AS2860
mnt-by:         AS2860-MNT
created:        2014-10-28T10:35:08Z
last-modified:  2014-10-28T10:35:08Z
source:         RIPE

% This query was served by the RIPE Database Query Service version 1.101 (ANGUS)
```

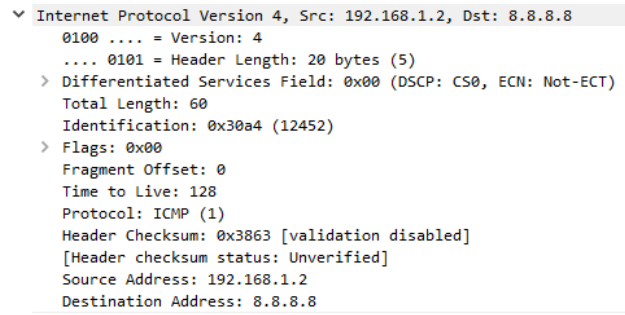
[Top]

[Home | All IP Addresses | Your IP Address | Whois | Statistics | Widget | API | Speedtest | Imprint]

utrace* - locate IP addresses and domainnames

ISP-NOS COMUNICACOES S.A.

5. Wireshark

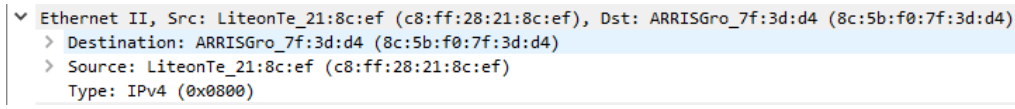


Versão do Protocolo IP: **4**

Endereço IP de origem: **192.168.1.2**

Endereço IP de destino: **8.8.8.8**

Tempo de vida da mensagem: **128**



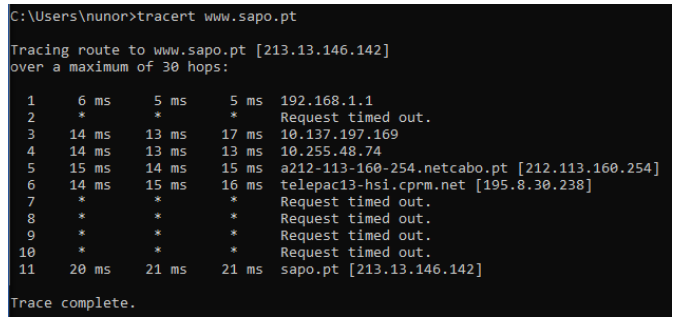
Endereço MAC de origem: **c8:ff:28:21:8c:ef**

Fabricante da placa de rede: **LiteTe**

Endereço MAC de destino: **8c:5b:f0:7f:3d:d4**

Fabricante da placa de rede: **ARRISGro**

6. tracert



Endereço IP de destino: **213.13.146.142**

Número de routers entre origem e destino: **6**

Número de pedidos feitos a cada equipamento de rede: **1**

Tempo medio de resposta do equipamento terminal: **21ms**

7. nslookup

```
C:\Users\nunor>nslookup www.cisco.pt
Server:  a212-113-177-241.netcabo.pt
Address:  212.113.177.241

Non-authoritative answer:
Name:    www.cisco.pt
Address:  72.163.4.154
```

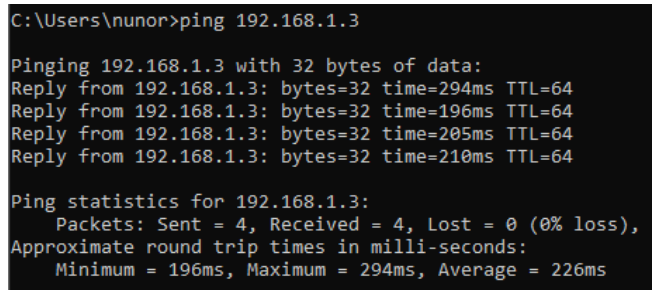
Nome de internet do servidor de DNS: **Netcabo**

Endereço IP do servidor de DNS: **212.113.177.241**

Endereço IP de destino: **72.163.4.154**

O servidor de DNS consultado não tem autoridade sobre o domínio cisco.pt

8. Teste da conectividade computador – smartphone



9. Resumo dos comandos

ipconfig	Serve para ver a configuração IP do computador
ipconfig /all	Serve para obter mais detalhes sobre a configuração de rede
ping	Verifica se existe conetividade para um host remoto
ping -n 6	Envia 6 pedidos de resposta a um host
ping -t	Envia pedidos de resposta até fazermos Ctrl+C
tracert	Vê o endereço IP dos routers utilizados para o trânsito dos pacotes IP na rede
nslookup	Faz a resolução de nomes de internet para IP

CONCLUSÕES

Concluindo, neste trabalho abordamos várias ferramentas de Redes de Computadores como alguns comandos que foram executados na linha de comandos(cmd) e utilizamos o wireshark para ver as mensagens que entram e saem do computador.