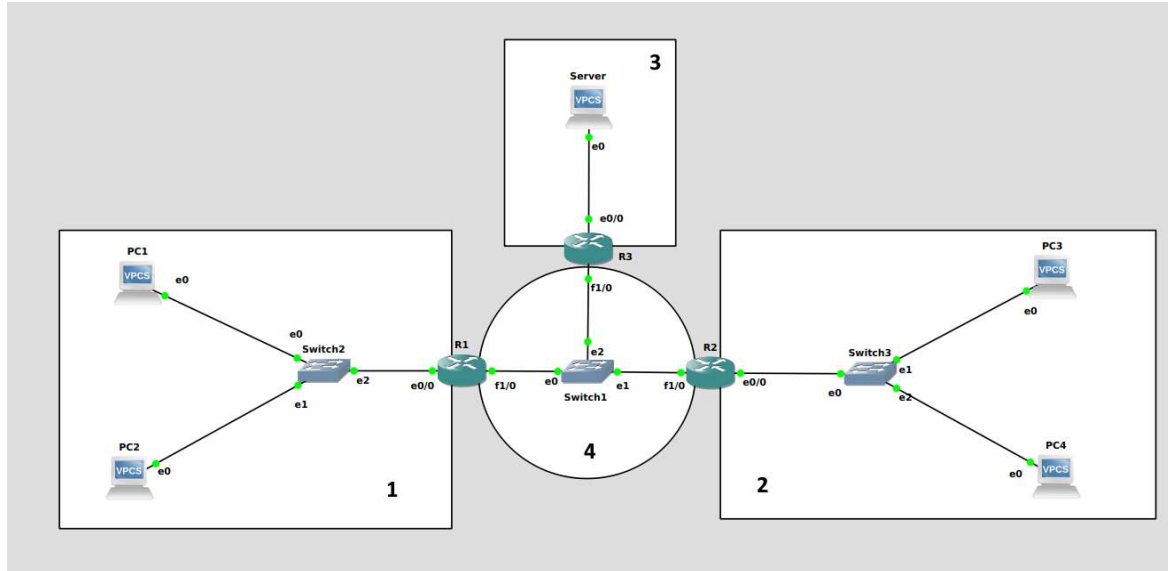


# Redes de Comunicação 2020/2021

## Relatório da meta intermédia

Alexandre Andrade – 2019220216

Tomás Mendes – 2019232272



**1**

Network – 193.136.212.128/26

- **R1** – 193.136.212.190/26
- **PC1** – 193.136.212.129/26
- **PC2** – 193.136.212.130

**3**

Network – 10.90.0.0/24

- **R3** – 10.90.0.245/24
- **Server** – 10.90.0.1/24

**2**

Network – 193.136.212.192/27

- **R2** – 193.136.212.222/27
- **PC3** – 193.136.212.193/27
- **PC4** – 193.136.212.194/27

**4**

Network – 193.136.212.224/29

- **R1** – 193.136.212.225/29
- **R2** – 193.136.212.226/29
- **R3** – 193.136.212.227/29

### Comandos de configuração:

**R1:**

```
conf t
interface e0/0
ip address 193.136.212.190 255.255.255.192
no shut
exit
interface f1/0
ip address 193.136.212.225 255.255.255.248
no shut
exit
ip route 193.136.212.192 255.255.255.224 193.136.212.226
exit
```

**R2:**

```
conf t
interface e0/0
ip address 193.136.212.222 255.255.255.224
no shut
exit
interface f1/0
ip address 193.136.212.226 255.255.255.248
no shut
exit
ip route 193.136.212.128 255.255.255.192 193.136.212.225
exit
```

**R3:**

```
conf t
interface e0/0
ip address 10.90.0.254 255.255.255.0
ip nat inside
no shut
exit
interface f1/0
ip address 193.136.212.227 255.255.255.248
ip nat outside
no shut
exit
ip route 193.136.212.128 255.255.255.192 193.136.212.225
ip route 193.136.212.192 255.255.255.224 193.136.212.226
access-list 1 permit 10.90.0.0 0.0.0.255
ip nat inside source list 1 interface f1/0 overload
ip nat inside source static tcp 10.90.0.1 80 193.136.212.227 80
exit
```

**PC1:** ip 193.136.212.129/26 193.136.212.190

**PC2:** ip 193.136.212.130/26 193.136.212.190

**PC3:** ip 193.136.212.193/27 193.136.212.222

**PC4:** ip 193.136.212.194/27 193.136.212.222

**Server:** ip 10.90.0.1/24 10.90.0.254

```
C1> ping 193.136.212.227 -3 -p 80
connect 80[193.136.212.227 seq=1 t1=62 t1me=21.689 ms]
connect 80[193.136.212.227 seq=2 t1=62 t1me=21.769 ms]
lose 80[193.136.212.227 seq=3 t1=62 t1me=21.755 ms]
connect 80[193.136.212.227 seq=4 t1=62 t1me=21.763 ms]
connect 80[193.136.212.227 seq=2 t1=62 t1me=21.410 ms]
lose 80[193.136.212.227 seq=2 t1=62 t1me=21.429 ms]
connect 80[193.136.212.227 seq=1 t1=62 t1me=21.673 ms]
connect 80[193.136.212.227 seq=1 t1=62 t1me=21.457 ms]
lose 80[193.136.212.227 seq=3 t1=62 t1me=21.543 ms]
connect 80[193.136.212.227 seq=4 t1=62 t1me=21.295 ms]
lose 80[193.136.212.227 seq=2 t1=62 t1me=21.680 ms]
connect 80[193.136.212.227 seq=2 t1=62 t1me=21.680 ms]
lose 80[193.136.212.227 seq=2 t1=62 t1me=21.680 ms]
connect 80[193.136.212.227 seq=2 t1=62 t1me=21.690 ms]
connect 80[193.136.212.227 seq=5 t1=62 t1me=21.574 ms]
lose 80[193.136.212.227 seq=5 t1=62 t1me=21.709 ms]

C1> ping 193.136.212.193
bytes from 193.136.212.193: icmp_seq=1 ttl=62 time=21.836 ms
bytes from 193.136.212.193: icmp_seq=2 ttl=62 time=21.763 ms
bytes from 193.136.212.193: icmp_seq=3 ttl=62 time=21.799 ms
bytes from 193.136.212.193: icmp_seq=4 ttl=62 time=21.844 ms
bytes from 193.136.212.193: icmp_seq=5 ttl=62 time=21.848 ms
```

```
PC3> ping 193.136.212.227 -3 -p 80
Connect 808193.136.212.227 seq=1 ttl=62 time=49.924 ms
SendData 808193.136.212.227 seq=1 ttl=62 time=1.884 ms
Close 808193.136.212.227 seq=1 ttl=62 time=2.385 ms
Connect 808193.136.212.227 seq=2 ttl=62 time=26.574 ms
SendData 808193.136.212.227 seq=2 ttl=62 time=25.584 ms
Close 808193.136.212.227 seq=2 ttl=62 time=25.878 ms
Connect 808193.136.212.227 seq=3 ttl=62 time=27.612 ms
SendData 808193.136.212.227 seq=3 ttl=62 time=26.374 ms
Close 808193.136.212.227 seq=3 ttl=62 time=25.485 ms
Connect 808193.136.212.227 seq=4 ttl=62 time=36.048 ms
SendData 808193.136.212.227 seq=4 ttl=62 time=39.248 ms
Close 808193.136.212.227 seq=4 ttl=62 time=37.156 ms
Connect 808193.136.212.227 seq=5 ttl=62 time=37.745 ms
SendData 808193.136.212.227 seq=5 ttl=62 time=37.614 ms
Close 808193.136.212.227 seq=5 ttl=62 time=39.390 ms

PC3> ping 193.136.212.129
84 bytes from 193.136.212.129: icmp_seq=1 ttl=62 time=38.473 ms
84 bytes from 193.136.212.129: icmp_seq=2 ttl=62 time=26.723 ms
84 bytes from 193.136.212.129: icmp_seq=3 ttl=62 time=26.150 ms
84 bytes from 193.136.212.129: icmp_seq=4 ttl=62 time=27.489 ms
84 bytes from 193.136.212.129: icmp_seq=5 ttl=62 time=28.317 ms
```

```
Server> ping 193.136.212.129

84 bytes from 193.136.212.129 icmp_seq=1 ttl=62 time=40.106 ms
84 bytes from 193.136.212.129 icmp_seq=2 ttl=62 time=26.677 ms
84 bytes from 193.136.212.129 icmp_seq=3 ttl=62 time=26.867 ms
84 bytes from 193.136.212.129 icmp_seq=4 ttl=62 time=26.227 ms
84 bytes from 193.136.212.129 icmp_seq=5 ttl=62 time=27.110 ms

Server> ping 193.136.212.193

193.136.212.193 icmp_seq=1 timeout
84 bytes from 193.136.212.193 icmp_seq=2 ttl=62 time=38.033 ms
84 bytes from 193.136.212.193 icmp_seq=3 ttl=62 time=27.542 ms
84 bytes from 193.136.212.193 icmp_seq=4 ttl=62 time=27.477 ms
84 bytes from 193.136.212.193 icmp_seq=5 ttl=62 time=27.906 ms

Server> 
```

Capturing from - [R3 Ethernet0 to Server Ethernet0]

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter... <-Ctrl>F

No.	Time	Source	Destination	Protocol	Length	Info
134	232.7160	193.0.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 AC
135	232.76168	193.136.212.129	193.0.0.1	TCP	60	63876 → 80 [FIN, PSH, ACK] Seq=1 AC
136	232.76158	193.0.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 AC
137	232.762214	193.0.0.1	193.136.212.129	TCP	54	80 → 63876 [FIN, ACK] Seq=1 AC
138	232.75973	193.136.212.129	193.0.0.1	TCP	60	63876 → 80 [FIN, ACK] Seq=58 A
139	232.764274	193.0.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=58 A
140	237.289997	193.0.0.1	193.136.212.129	TCP	54	80 → 63876 [SYN, ACK] Seq
141	237.319924	193.136.212.129	193.0.0.1	TCP	60	63876 → 80 [ACK] Seq=1 AC
142	237.309045	193.136.212.129	193.0.0.1	TCP	60	63876 → 80 [PSH, ACK] Seq=1
143	237.338481	193.0.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 AC
144	237.370411	193.136.212.129	193.0.0.1	TCP	60	63876 → 80 [FIN, PSH, ACK]
145	237.378882	193.0.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 AC
146	237.378077	193.136.212.129	193.0.0.1	TCP	54	80 → 63876 [FIN, ACK] Seq=1
147	237.400733	193.136.212.129	193.0.0.1	TCP	60	63876 → 80 [ACK] Seq=58 A
148	238.305850	193.136.212.129	193.0.0.1	TCP	74	[TCP Port numbers reused]
149	238.338750	193.0.0.1	193.136.212.129	TCP	54	80 → 63876 [SYN, ACK] Seq=1
150	238.423826	193.136.212.129	193.0.0.1	TCP	60	63876 → 80 [ACK] Seq=1 AC
151	238.439467	193.136.212.129	193.0.0.1	TCP	60	63876 → 80 [PSH, ACK] Seq=1
152	238.439820	193.0.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 AC
153	238.479870	193.136.212.129	193.0.0.1	TCP	60	63876 → 80 [FIN, PSH, ACK]
154	238.480239	193.0.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 AC
155	238.480282	193.136.212.129	193.0.0.1	TCP	54	80 → 63876 [FIN, ACK] Seq=58 A
156	238.510197	193.136.212.129	193.0.0.1	TCP	60	63876 → 80 [ACK] Seq=58 A
157	239.508127	193.136.212.129	193.0.0.1	TCP	74	[TCP Port numbers reused]
158	239.508554	193.0.0.1	193.136.212.129	TCP	54	80 → 63876 [SYN, ACK] Seq=1
159	239.538440	193.136.212.129	193.0.0.1	TCP	60	63876 → 80 [ACK] Seq=1 AC
160	239.545851	193.136.212.129	193.0.0.1	TCP	60	63876 → 80 [PSH, ACK] Seq=1
161	239.549081	193.0.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 AC
162	239.580809	193.136.212.129	193.0.0.1	TCP	60	63876 → 80 [FIN, PSH, ACK]
163	239.585452	193.0.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 AC
164	239.585490	193.0.0.1	193.136.212.129	TCP	54	80 → 63876 [FIN, ACK] Seq=1

Frame 1: 6 bytes on wire (480 bits), 60 bytes captured (4800 bits) on interface - , id 0  
Ethernet II, Src: c8:03:1b:72:00:00 (c8:03:1b:72:00:00), Dst: c8:03:1b:72:00:00 (c8:03:1b:72:00:00)  
Configuration Test Protocol (loopback)  
Data (40 bytes)

```

0000  c8 03 1b 72 00 00 c8 03 1b 72 00 00 00 00 00 00
0010  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0020  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0030  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0040  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0050  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

```

Capturing from - [PC1 Ethernet0 to Switch2 Ethernet0]

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter... <-Ctrl>F

No.	Time	Source	Destination	Protocol	Length	Info
84	163.999560	193.136.212.129	193.136.212.227	TCP	122	63876 → 80 [PSH, ACK] Seq
85	164.024558	193.136.212.227	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 AC
86	164.040227	193.136.212.129	193.136.212.227	TCP	60	63876 → 80 [FIN, PSH, ACK]
87	164.064724	193.13				

### Capturing from - [R3 Ethernet0 to Server Ethernet0]

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter... <Ctrl>F

No.	Time	Source	Destination	Protocol	Length	Info
134	236.226768	193.106.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 ACK
135	236.227100	193.136.212.129	193.136.212.129	TCP	60	63876 → 80 [FIN, PSH, ACK]
136	236.262156	193.106.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 ACK
137	236.262214	193.106.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 ACK
138	236.292073	193.136.212.129	193.106.0.1	TCP	60	63876 → 80 [ACK] Seq=58 A
159 237.598334 193.136.212.129 193.106.0.1 TCP 74 [TCP Port numbers reset]						
160	237.598999	193.136.212.129	193.106.0.1	TCP	60	63876 → 80 [ACK] Seq=1 ACK
141	237.319924	193.136.212.129	193.106.0.1	TCP	60	63876 → 80 [ACK] Seq=1 ACK
142	237.330464	193.136.212.129	193.106.0.1	TCP	122	63876 → 80 [PSH, ACK] Seq=1 ACK
143	237.330401	193.106.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 ACK
144	237.370411	193.136.212.129	193.106.0.1	TCP	60	63876 → 80 [FIN, PSH, ACK]
145	237.370882	193.106.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 ACK
146	237.370827	193.106.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 ACK
147	237.400743	193.136.212.129	193.106.0.1	TCP	60	63876 → 80 [ACK] Seq=58 A
148 238.398880 193.136.212.129 193.106.0.1 TCP 74 [TCP Port numbers reset]						
149	238.399389	193.106.0.1	193.136.212.129	TCP	54	80 → 63876 [SYN, ACK] Seq=1
150	238.429326	193.136.212.129	193.106.0.1	TCP	60	63876 → 80 [ACK] Seq=1 ACK
151	238.439467	193.136.212.129	193.106.0.1	TCP	122	63876 → 80 [PSH, ACK] Seq=1 ACK
152	238.439620	193.106.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 ACK
153	238.470870	193.136.212.129	193.106.0.1	TCP	60	63876 → 80 [FIN, PSH, ACK]
154	238.480239	193.106.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 ACK
155	238.480282	193.106.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 ACK
156	238.501907	193.136.212.129	193.106.0.1	TCP	60	63876 → 80 [ACK] Seq=58 A
157 239.508127 193.136.212.129 193.106.0.1 TCP 74 [TCP Port numbers reset]						
158	239.508554	193.106.0.1	193.136.212.129	TCP	54	80 → 63876 [SYN, ACK] Seq=1
159	239.508440	193.136.212.129	193.106.0.1	TCP	60	63876 → 80 [ACK] Seq=1 ACK
160	239.548581	193.136.212.129	193.106.0.1	TCP	122	63876 → 80 [PSH, ACK] Seq=1 ACK
161	239.549081	193.106.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 ACK
162	239.580889	193.136.212.129	193.106.0.1	TCP	60	63876 → 80 [FIN, PSH, ACK]
163	239.580452	193.106.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 ACK
164	239.589490	193.106.0.1	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 ACK

Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (4800 bits) on interface - , id 0  
 Ethernet II, Src: c8:03:1b:72:00:00 (c8:03:1b:72:00:00), Dst: c8:03:1b:72:00:00 (c8:03:1b:72:00:00)  
 Configuration Test Protocol (loopback)  
 Data (40 bytes)

### Capturing from - [PC1 Ethernet0 to Switch2 Ethernet0]

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter... <Ctrl>F

No.	Time	Source	Destination	Protocol	Length	Info
84	163.999569	193.136.212.129	193.136.212.227	TCP	122	63876 → 80 [PSH, ACK] Seq=1
85	164.024358	193.136.212.227	193.136.212.129	TCP	54	80 → 63876 [ACK] Seq=1 ACK
86	1					