INSTITUTO POLITÉCNICO DE BRAGANÇA - CAMPUS MIRANDELA
LICENCIATURA EM INFORMÁTICA E COMUNICAÇÕES

RELATÓRIO DO TRABALHO DE REDES DE COMUNICAÇÃO II

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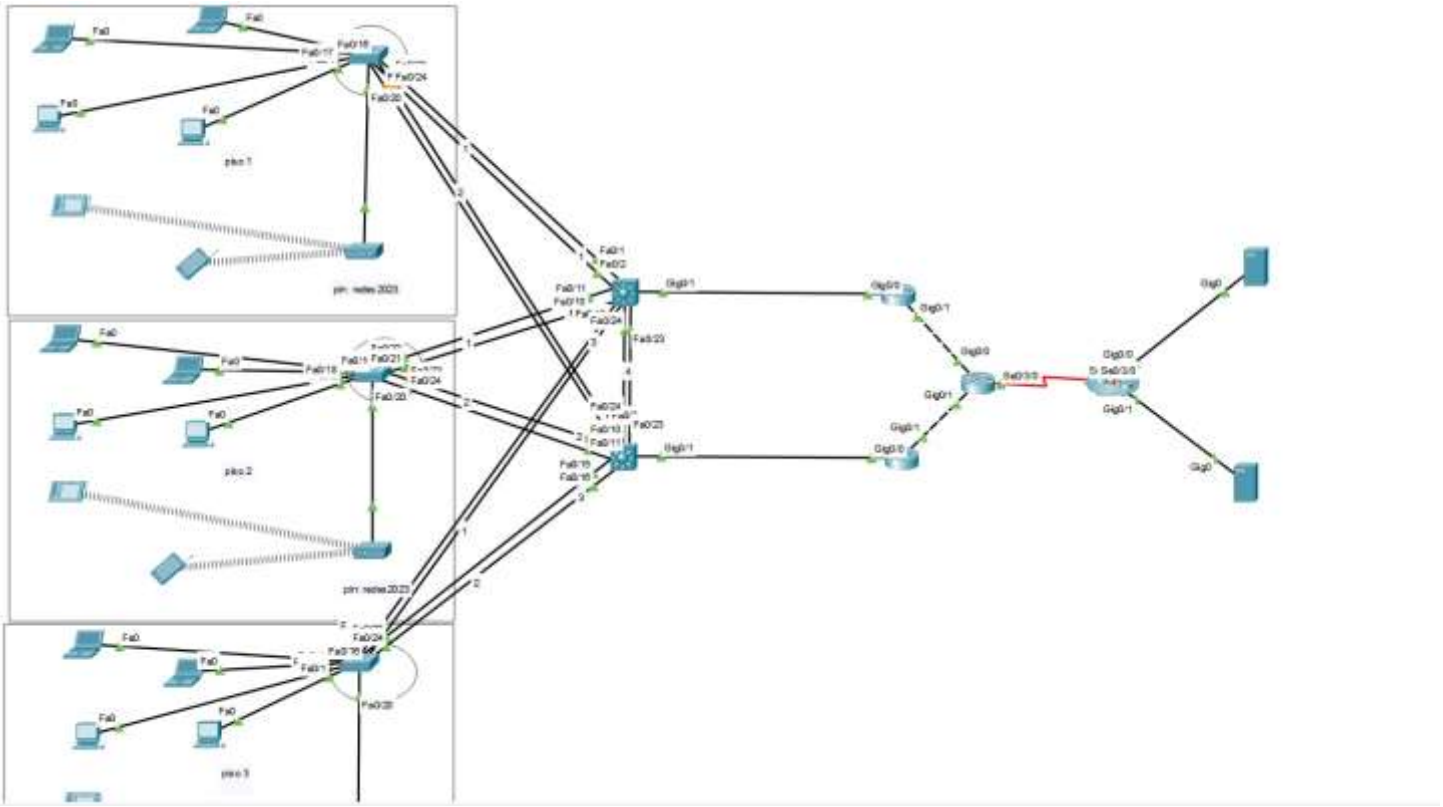
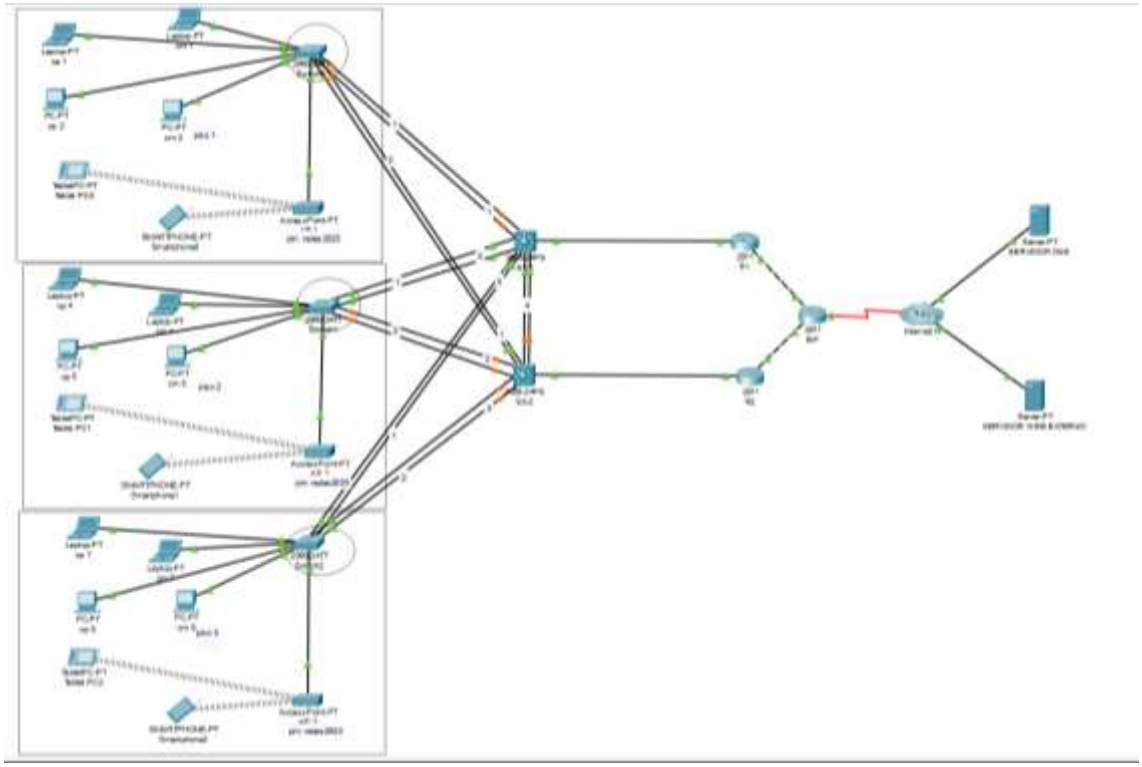
SUMÁRIO

1. DESENHO LÓGICO DA REDE



2. DESENHO FÍSICO DA REDE



3. TABELA DE SUBREDES IP

ID VLAN	NOME	RANGE IPS
10	COMERCIAL	IPV4: 192.168.10.0/24 IPV6:2001:1920:3:10::249/64
20	OPERACIONAL	IPV4: 192.168.20.0/24 IPV6: 2001:1920:3:20::249/64
30	WIFI	IPV4: 192.168.30.0/24 IPV6: 2001:1920:3:30::249/64

4. TABELA DOS EQUIPAMENTOS DE REDE

4.1 TRUNK

EQUIPAMENTO	PORTAS	MODO DA PORTA
S1-P1	F0/21-24	TRUNK
S1-P2	F0/21-24	TRUNK
S1-P3	F0/21-24	TRUNK
S3-1	F0/1-2	TRUNK
	F0/10-11	
	F0/15-16	
	F0/23-24	
S3-2	F0/1-2	TRUNK
	F0/10-11	
	F0/15-16	
	F0/23-24	

4.2 ETHERCHANEL

EQUIPAMENTO	CHANEL GROUP	PORTAS	PROTOCOLOS	MODOS
S1-P1	**1**	F0/21-22	LACP	Active
	2	F0/23-24		Active
S1-P2	**1**	F0/21-22	LACP	Active
	2	F0/23-24		Active
S1-P3	**1**	F0/21-22	LACP	Active
	2	F0/23-24		Active
S3-1	**1**	F0/1-2	LACP	Active
	2	F0/10-11		Active
	3	F0/15-16		Active
	4	F0/23-24		Active
S3-2	**1**	F0/1-2	LACP	Active
	2	F0/10-11		Active
	3	F0/15-16		Active
	4	F0/23-24		Active

5. AS CONFIGURAÇÕES DOS EQUIPAMENTOS

EQUIPAMENTO	VLANS	ENDEREÇOS IP
S3-1	VLAN 10	IPV4:192.168.10.254/24 IPV6:------
	VLAN 20	IPV4:192.168.20.254/24 IPV6:------
	VLAN 30	IPV4:192.168.30.254/24 IPV6:------
S3-2	VLAN 10	IPV4:192.168.10.252/24 IPV6:------
	VLAN 20	IPV4:192.168.20.252/24 IPV6:------
	VLAN 30	IPV4:192.168.30.252/24 IPV6:------
S1-P1	VLAN 10	IPV4:192.168.10.253/24 IPV6:------
	VLAN 20	IPV4:192.168.20.253/24 IPV6:------
	VLAN 30	IPV4:192.168.30.253/24 IPV6:------
S1-P2	VLAN 10	IPV4:192.168.10.251/24 IPV6:------
	VLAN 20	IPV4:192.168.20.251/24 IPV6:------
	VLAN 30	IPV4:192.168.30.251/24 IPV6:------
S1-P3	VLAN 10	IPV4:192.168.10.250/24 IPV6:------
	VLAN 20	IPV4:192.168.20.250/24 IPV6:------
	VLAN 30	IPV4:192.168.30.250/24 IPV6:------

5.1. CONFIGURAÇÕES DE REDE DOS EQUIPAMENTOS

5.1.1. DHCPV4

NOME POOL	NETWORK	DEFAULT GATEWAY	DNS SERVER	DOMAIN NAME	EXCLUIR IP
COMERCIAL	192.168.10.0/24	192.168.10.247	1.1.1.8	comercial.redes.brcv	192.168.10.247 - 192.168.10.254
OPERACIONAL	192.168.20.0/24	192.168.20.247	1.1.1.8	operacional.redes.brcv	192.168.20.247 - 192.168.0.254
WIFI	192.168.30.0/24	192.168.30.247	1.1.1.8	wifi.redes.brcv	192.168.30.247 - 192.168.30.254

5.1.2. DHCPV6

NOME POOL	NETWORK	DEFAULT GATEWAY	DOMAIN NAME	EXCLUIR IP
COMERCIAL	2001:1920:3:10::249	FE80:30	comercial.redes.brcv	----
OPERACIONAL	2001:1920:3:20::249	FE80:30	operacional.redes.brcv	----
WIFI	2001:1920:3:30::249	FE80:30	wifi.redes.brcv	----

5.2. SERVIDORES

SERVIDOR	ENDEREÇOS IP	GATEWAY
WEB	2.2.2.21	2.2.2.1
DNS	1.1.1.8	2.2.2.1

5.3. WLAN

DISPOSITIVO	SSID	PASSWORD
AP1	AP1	redes2023
AP2	AP2	redes2023
AP3	AP3	redes2023

ESTADO DOS EQUIPAMENTOS

6. ROUTERS

6.1. TABELAS DE ENCAMINHAMENTO (router ativo R1)

```
R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 1.1.1.1 to network 0.0.0.0

     1.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       1.1.1.0/30 is directly connected, GigabitEthernet0/1
L       1.1.1.2/32 is directly connected, GigabitEthernet0/1
     192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.10.0/24 is directly connected, GigabitEthernet0/0.10
L       192.168.10.249/32 is directly connected, GigabitEthernet0/0.10
     192.168.20.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.20.0/24 is directly connected, GigabitEthernet0/0.20
L       192.168.20.249/32 is directly connected, GigabitEthernet0/0.20
     192.168.30.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.30.0/24 is directly connected, GigabitEthernet0/0.30
L       192.168.30.249/32 is directly connected, GigabitEthernet0/0.30
S*   0.0.0.0/0 [1/0] via 1.1.1.1
```

6.2. RESUMO DAS INTERFACES (router ativo R1)

```
R1#show ip interface brief
Interface              IP-Address      OK? Method Status
Protocol
GigabitEthernet0/0     unassigned      YES unset  up                    up
GigabitEthernet0/0.10  192.168.10.249  YES manual up                    up
GigabitEthernet0/0.20  192.168.20.249  YES manual up                    up
GigabitEthernet0/0.30  192.168.30.249  YES manual up                    up
GigabitEthernet0/1     1.1.1.2         YES manual up                    up
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
```

6.3. RESUMO DAS ATRIBUIÇÕES DE ENDEREÇOS VIA DHCP (router ativo R1)

```
R1#show ip dhcp pool

Pool comercial :
 Utilization mark (high/low)    : 100 / 0
 Subnet size (first/next)       : 0 / 0
 Total addresses                : 254
 Leased addresses               : 0
 Excluded addresses             : 16
 Pending event                  : none

 1 subnet is currently in the pool
 Current index        IP address range                    Leased/Excluded/Total
 192.168.1.1          192.168.1.1      - 192.168.1.254     0    / 16    / 254

Pool operacional :
 Utilization mark (high/low)    : 100 / 0
 Subnet size (first/next)       : 0 / 0
 Total addresses                : 254
 Leased addresses               : 4
 Excluded addresses             : 16
 Pending event                  : none

 1 subnet is currently in the pool
 Current index        IP address range                    Leased/Excluded/Total
 192.168.20.1         192.168.20.1     - 192.168.20.254    4    / 16    / 254

Pool wifi :
 Utilization mark (high/low)    : 100 / 0
 Subnet size (first/next)       : 0 / 0
 Total addresses                : 254
 Leased addresses               : 6
 Excluded addresses             : 16
 Pending event                  : none

 1 subnet is currently in the pool
 Current index        IP address range                    Leased/Excluded/Total
 192.168.30.1         192.168.30.1     - 192.168.30.254    6    / 16    / 254
```

```
ipv6 unicast-routing
!
ipv6 cef
!
ipv6 dhcp pool DHCPV6
 prefix-delegation pool DHCPV6 lifetime 2592000 604800
 dns-server 2001:DB8::8
 domain-name DHCPV6.redes.brcv
!
!
ipv6 local pool comercial 2000:FACE::/64 64
!
!
license udi pid CISCO2911/K9 sn FTX1524M6U6-
!
```

7. SWITCH DE DISTRIBUIÇÃO (S1-P1)

7.1. RESUMO DAS VLANS E ASSOCIAÇÃO ÀS PORTAS

```
VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Gig0/1, Gig0/2
10   comercial                         active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                 Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                 Fa0/9, Fa0/10, Fa0/11, Fa0/12
20   opercaional                       active    Fa0/13, Fa0/14, Fa0/15,
Fa0/16
                                                 Fa0/17, Fa0/18, Fa0/19
30   wifi                              active    Fa0/20
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
```

7.2. INFORMAÇÕES RELACIONADAS COM A SEGURANÇA (S1-P1)

```
hostname S1-P1
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
!
!
!
ip arp inspection vlan 10,20,30
ip arp inspection validate src-mac
!
ip dhcp snooping vlan 10,20,30
!
spanning-tree mode pvst
spanning-tree portfast bpduguard default
spanning-tree extend system-id
!
interface Port-channel1
 description Port-Channel para o S3-1
 switchport trunk allowed vlan 10,20,30
 switchport mode trunk
!
interface Port-channel2
 description Port-Channel para o S3-1
 switchport trunk allowed vlan 10,20,30
 switchport mode trunk
!
interface FastEthernet0/1
 switchport access vlan 10
 ip dhcp snooping limit rate 6
 switchport mode access
 switchport port-security
 switchport port-security maximum 132
 spanning-tree bpduguard enable
!
interface FastEthernet0/2
 switchport access vlan 10
 ip dhcp snooping limit rate 6
 switchport mode access
 switchport port-security
 switchport port-security maximum 132
 spanning-tree bpduguard enable
!
interface FastEthernet0/3
 switchport access vlan 10
 ip dhcp snooping limit rate 6
 switchport mode access
 spanning-tree bpduguard enable
 shutdown
!
```

Portas não utilizadas foram desativadas também.

8. SWITCH DE ACESSO (layer S3-1)

8.1. RESUMO DAS VLANS E ASSOCIAÇÃO ÀS PORTAS

```
VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/3, Fa0/4, Fa0/5, Fa0/6
                                                 Fa0/7, Fa0/8, Fa0/9, Fa0/12
                                                 Fa0/13, Fa0/14, Fa0/17,
Fa0/18
                                                 Fa0/19, Fa0/20, Fa0/21,
Fa0/22
10   comercial                         active
20   operacional                       active
30   wifi                              active
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
```

8.2. INFORMAÇÕES RELACIONADAS COM A SEGURANÇA

```
!
ip arp inspection vlan 10,20,30
ip arp inspection validate src-mac
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface Port-channel1
 description Port-Channel do piso 1
 switchport trunk allowed vlan 10,20,30
 switchport trunk encapsulation dot1q
 switchport mode trunk
!
interface Port-channel2
 description Port-channel do piso 2
 switchport trunk allowed vlan 10,20,30
 switchport trunk encapsulation dot1q
 switchport mode trunk
!
interface Port-channel3
 description Port-Channel do piso 3
 switchport trunk allowed vlan 10,20,30
 switchport trunk encapsulation dot1q
 switchport mode trunk
!
interface Port-channel4
 description Port-Channel para o S3-2
 switchport trunk allowed vlan 10,20,30
 switchport trunk encapsulation dot1q
 switchport mode trunk
!
interface FastEthernet0/1
 ip dhcp snooping limit rate 6
 switchport trunk allowed vlan 10,20,30
 switchport trunk encapsulation dot1q
 switchport mode trunk
 switchport port-security
 switchport port-security maximum 132
 channel-group 1 mode active
 spanning-tree bpduguard enable
!
```

```
!
interface GigabitEthernet0/1
 ip arp inspection trust
 ip dhcp snooping trust
 switchport trunk encapsulation dot1q
 switchport mode trunk
!
```

Portas não utilizadas foram desativadas também.

9. TESTES EFETUADOS PARA GARANTIR O FUNCIONAMENTO DA REDE DA FORMA PRENTENDIDA

9.1 Posto de trabalho cm1 para Switch layer 3 S3-1

```
C:\>ping 192.168.10.254

Pinging 192.168.10.254 with 32 bytes of data:

Reply from 192.168.10.254: bytes=32 time<1ms TTL=255
Reply from 192.168.10.254: bytes=32 time<1ms TTL=255
Reply from 192.168.10.254: bytes=32 time<1ms TTL=255
Reply from 192.168.10.254: bytes=32 time=9ms TTL=255
```

9.2 Posto de trabalho cm1 para Switch layer 3 S3-2

```
C:\>ping 192.168.10.252

Pinging 192.168.10.252 with 32 bytes of data:

Reply from 192.168.10.252: bytes=32 time<1ms TTL=255
Reply from 192.168.10.252: bytes=32 time<1ms TTL=255
Reply from 192.168.10.252: bytes=32 time=17ms TTL=255
Reply from 192.168.10.252: bytes=32 time<1ms TTL=255
```

9.3 Posto de trabalho cm1 para router ativo R1

```
C:\>ping 192.168.10.249

Pinging 192.168.10.249 with 32 bytes of data:

Reply from 192.168.10.249: bytes=32 time=1ms TTL=255
Reply from 192.168.10.249: bytes=32 time=11ms TTL=255
Reply from 192.168.10.249: bytes=32 time<1ms TTL=255
Reply from 192.168.10.249: bytes=32 time<1ms TTL=255
```

9.4 Posto de trabalho cm1 para router standby R2

```
C:\>ping 192.168.10.248

Pinging 192.168.10.248 with 32 bytes of data:

Reply from 192.168.10.248: bytes=32 time<1ms TTL=255
Reply from 192.168.10.248: bytes=32 time=1ms TTL=255
Reply from 192.168.10.248: bytes=32 time<1ms TTL=255
Reply from 192.168.10.248: bytes=32 time=1ms TTL=255
```

9.5 Posto de trabalho cm1 para servidor DNS

```
Pinging 2.2.2.13 with 32 bytes of data:

Reply from 2.2.2.13: bytes=32 time=1ms TTL=125
Reply from 2.2.2.13: bytes=32 time=1ms TTL=125
Reply from 2.2.2.13: bytes=32 time=1ms TTL=125
Reply from 2.2.2.13: bytes=32 time=1ms TTL=125
```

9.6 Posto de trabalho cm1 para servidor WEB

```
Pinging 2.2.2.21 with 32 bytes of data:

Reply from 2.2.2.21: bytes=32 time=1ms TTL=125
Reply from 2.2.2.21: bytes=32 time=1ms TTL=125
Reply from 2.2.2.21: bytes=32 time=2ms TTL=125
Reply from 2.2.2.21: bytes=32 time=1ms TTL=125
```

9.7 Switch layer 3 para router ativo R1 - subinterfaces G0/0.10,20,30

```
S3-1#ping 192.168.10.249

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.10.249, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/0 ms



S3-1#ping 192.168.20.249

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.20.249, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/0 ms

S3-1#ping 192.168.30.249

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.30.249, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/0 ms
```

9.8 ISP para Router Externo

```
ISP#ping 2.2.2.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/7/14 ms
```

9.9 Router Externo para servidor DNS

```
R.Externo#ping 2.2.2.13

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.13, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
```

9.10 Router Externo para servidor Web

```
R.Externo#ping 2.2.2.21

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.21, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
```

9.11 Router ativo para ISP

```
R1#ping 1.1.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 1.1.1.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
```

9.12 Router standy R2 para ISP

```
R2#ping 1.1.1.5

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 1.1.1.5, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
```

9.13 Posto de trabalho cm 1 para op 1

```
C:\>ping 192.168.20.1

Pinging 192.168.20.1 with 32 bytes of data:

Reply from 192.168.20.1: bytes=32 time<1ms TTL=127
Reply from 192.168.20.1: bytes=32 time<1ms TTL=127
Reply from 192.168.20.1: bytes=32 time<1ms TTL=127
Reply from 192.168.20.1: bytes=32 time=12ms TTL=127
```

9.14 Posto de trabalho cm 1 para SMARTPHONE-PT

```
Pinging 192.168.30.2 with 32 bytes of data:

Reply from 192.168.30.2: bytes=32 time=19ms TTL=127
Reply from 192.168.30.2: bytes=32 time=7ms TTL=127
Reply from 192.168.30.2: bytes=32 time=41ms TTL=127
Reply from 192.168.30.2: bytes=32 time=21ms TTL=127
```