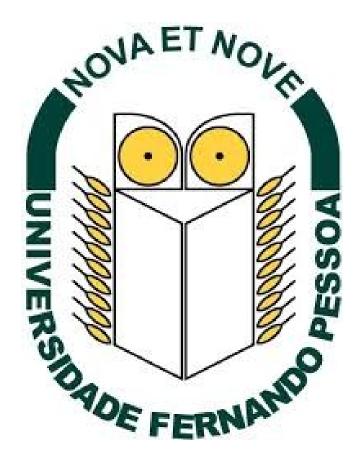# Universidade Fernando Pessoa

Curso de engenharia informática

Relatório de projeto

Disciplina: Redes de Computadores I

Realizado por: Luís Aguiar

As configurações realizadas foram:

• Configurar o STP, com as prioridades mencionadas na tabela.
• Configurar o VTP de modo que o Switch C1 seja o servidor e os demais sejam clientes.
• Incluir os PC's nas VLAN's indicadas. Cada VLAN terá o endereço de rede indicado na tabela 2.
• Todas as ligações entre os Switches IOSv devem ser agregadas.
• Router R1 deverá possuir subinterfaces que garantam comunicação entre VLAN's

Ping à google após configuração da "nuvem":

```
Router#ping google.com
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 216.58.211.46, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 20/23/28 ms
```

Comunicação sem interação do Router:
Ping de PC3 a PC1 (vlans diferentes)

```
root@ubuntu-3:~# ping 10.100.10.1
PING 10.100.10.1 (10.100.10.1) 56(84) bytes of data.
From 10.100.20.3 icmp_seq=9 Destination Host Unreachable
From 10.100.20.3 icmp_seq=10 Destination Host Unreachable
From 10.100.20.3 icmp_seq=11 Destination Host Unreachable
```

Ping de PC3 a PC2 (mesma vlan)

```
root@ubuntu-3:~# ping 10.100.20.2
PING 10.100.20.2 (10.100.20.2) 56(84) bytes of data.
64 bytes from 10.100.20.2: icmp_seq=1 ttl=64 time=106 ms
64 bytes from 10.100.20.2: icmp_seq=2 ttl=64 time=56.0 ms
64 bytes from 10.100.20.2: icmp_seq=3 ttl=64 time=34.6 ms
```

Comunicação com interação do Router:
Ping de PC3 a PC1 (vlans diferentes)

```
root@ubuntu-3:~# ping 10.100.10.1
PING 10.100.10.1 (10.100.10.1) 56(84) bytes of data.
64 bytes from 10.100.10.1: icmp_seq=1 ttl=63 time=289 ms
64 bytes from 10.100.10.1: icmp_seq=2 ttl=63 time=154 ms
64 bytes from 10.100.10.1: icmp_seq=3 ttl=63 time=178 ms
```

Ping de PC3 a PC2 (mesma vlan)

```
root@ubuntu-3:~# ping 10.100.20.2
PING 10.100.20.2 (10.100.20.2) 56(84) bytes of data.
64 bytes from 10.100.20.2: icmp_seq=1 ttl=64 time=106 ms
64 bytes from 10.100.20.2: icmp_seq=2 ttl=64 time=56.0 ms
64 bytes from 10.100.20.2: icmp_seq=3 ttl=64 time=34.6 ms
```

Capturas de frames pedidas no relatório:
STP

```
> Frame 92: 68 bytes on wire (544 bits), 68 bytes captured (544 bits) on interface 0
> Ethernet II, Src: SonyInte_4b:ce:07 (0c:fe:45:4b:ce:07), Dst: PVST+ (01:00:0c:cc:cc:cd)
> 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 10
> Logical-Link Control
v Spanning Tree Protocol
    Protocol Identifier: Spanning Tree Protocol (0x0000)
    Protocol Version Identifier: Rapid Spanning Tree (2)
    BPDU Type: Rapid/Multiple Spanning Tree (0x02)
  > BPDU flags: 0x39, Forwarding, Learning, Port Role: Root, Topology Change
  > Root Identifier: 0 / 10 / 0c:fe:45:5d:23:00
    Root Path Cost: 3
  > Bridge Identifier: 32768 / 10 / 0c:fe:45:4b:ce:00
    Port identifier: 0x8044
    Message Age: 0
    Max Age: 20
    Hello Time: 2
    Forward Delay: 15
    Version 1 Length: 0
  > Originating VLAN (PVID): 10
```

Raiz é D2 que tem o mac address 0c:fe:45:5d:23:00 como é demonstrado
Frame referente à vlan 10
Custo até à raiz = 3

ICMP de ping's

Ping PC3 → PC1

Na interface access da vlan 20 de PC3:

```
>  Frame 24: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface 0
>  Ethernet II, Src: SonyInte_25:db:00 (0c:fe:45:25:db:00), Dst: ca:24:53:fd:2b:73 (ca:24:53:fd:2b:73)
v  Internet Protocol Version 4, Src: 10.100.10.1, Dst: 10.100.20.3
      0100 .... = Version: 4
      .... 0101 = Header Length: 20 bytes (5)
   >  Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
      Total Length: 84
      Identification: 0x4690 (18064)
   >  Flags: 0x0000
      Time to live: 63
      Protocol: ICMP (1)
      Header checksum: 0x024e [validation disabled]
      [Header checksum status: Unverified]
      Source: 10.100.10.1
      Destination: 10.100.20.3
>  Internet Control Message Protocol
```

Na interface trunk C3 → C1, ainda na vlan 20

```
Frame 49: 102 bytes on wire (816 bits), 102 bytes captured (816 bits) on interface 0
Ethernet II, Src: SonyInte_25:db:00 (0c:fe:45:25:db:00), Dst: ca:24:53:fd:2b:73 (ca:24:53:fd:2b:73)
802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 20
Internet Protocol Version 4, Src: 10.100.10.1, Dst: 10.100.20.3
Internet Control Message Protocol
```

Na interface trunk A11 → D1, depois de ir ao Router e na vlan 10

```
Frame 75: 102 bytes on wire (816 bits), 102 bytes captured (816 bits) on interface 0
Ethernet II, Src: be:9e:a8:c0:b1:95 (be:9e:a8:c0:b1:95), Dst: SonyInte_25:db:00 (0c:fe:45:25:db:00)
802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 10
Internet Protocol Version 4, Src: 10.100.10.1, Dst: 10.100.20.3
Internet Control Message Protocol
```

VTP controlo de versão

Enviado por C1:

```
>  Frame 7: 429 bytes on wire (3432 bits), 429 bytes captured (3432 bits) on interface 0
>  IEEE 802.3 Ethernet
>  Logical-Link Control
v  Cisco Discovery Protocol
      Version: 2
      TTL: 180 seconds
      Checksum: 0x7256 [correct]
      [Checksum Status: Good]
   >  Device ID: C1
   >  Software Version
   >  Platform: Cisco
   >  Addresses
   >  Port ID: GigabitEthernet1/3
   >  Capabilities
   >  IP Prefixes: 1
   >  VTP Management Domain: REDES
   >  Native VLAN: 1
   >  Duplex: Half
   >  Management Addresses
```

Enviado por D2:

```
>  Frame 54: 429 bytes on wire (3432 bits), 429 bytes captured (3432 bits) on interface 0
>  IEEE 802.3 Ethernet
>  Logical-Link Control
∨  Cisco Discovery Protocol
      Version: 2
      TTL: 180 seconds
      Checksum: 0x6e51 [correct]
      [Checksum Status: Good]
   >  Device ID: D2
   >  Software Version
   >  Platform: Cisco
   >  Addresses
   >  Port ID: GigabitEthernet0/3
   >  Capabilities
   >  IP Prefixes: 1
   >  VTP Management Domain: REDES
   >  Native VLAN: 1
   >  Duplex: Half
   >  Management Addresses
```