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## ACL

### Processo resumido para aplicação da ACL

1. Criar a restrição;
2. Aplicar a restrição a interface;
3. Informar a direção:
  - inbound (entrando);
  - outbound (saindo).

### Criando a Access-List

#### Padrão

- Se você colocar `host` antes do `ip`, ele vai diretamente pra máquina;
- Se não, deve colocar o `ip` da rede e uma `wild mask`;

```
R (config)# access list 1 {permit|deny} host xxx.xxx.xxx.xxx
```

#### Extendida

```
R (config)# access-list 100 {permit|deny} ip [ {host|protocolo} xxx.xxx.xxx.xxx ] \
[ xxx.xxx.xxx.xxx wildmask]
```

### Adicionando a ACL em uma interface

```
R> interface serial 0/0/0
R (config)# ip access-group 1 {in|out}
#DHCP # Etherchannels
```

- O administrador deve indicar uma interface para o etherchannel usando o comando `channel-group`;

## PAgP vs LACP

- PAgP é da cisco
- LACP IEEE 802.3ad standard

PAgP	LACP
<b>Auto:</b> This PAgP mode places an interface in a <u>passive negotiating state</u> in which the interface responds to the PAgP packets that it receives but <u>does not initiate PAgP negotiation</u> .	<b>Passive:</b> This LACP mode places a port in a <u>passive negotiating state</u> . In this state, the port responds to the LACP packets that it receives but <u>does not initiate LACP packet negotiation</u> (default).
<b>Desirable:</b> This PAgP mode places an interface in an <u>active negotiating state</u> in which the interface initiates negotiations with other interfaces by sending PAgP packets. Interfaces configured in the "on" mode do not exchange PAgP packets. The <u>default mode for PAgP is auto mode</u> .	<b>Active:</b> This LACP mode places a port in an <u>active negotiating state</u> . In this state, the port initiates <u>negotiations</u> with other ports by sending LACP packets.
<b>On:</b> This mode forces the interface to channel without PAgP or LACP.	<b>On:</b> This mode forces the interface to channel without PAgP or LACP.

Figure 1: PAgP vs LACP

## Comandos

- Channel group
- Show etherchannel
- Show pagp

#### Configure PAgP

- **interface port-channel** {*channel-group-number*}
- **channel-protocol pagp**
- **channel-group 1 mode** {*mode*}

#### Verify

- **show interfaces fastethernet 0/1 etherchannel**
- **show etherchannel 1 port-channel**
- **show etherchannel 1 summary**

Command	Description
Switch(config)# <b>interface port-channel</b> <i>port-channel-number</i>	Creates a port-channel interface and moves to port-channel configuration mode, allowing the configuration of port-channel interface configuration parameters
Switch(config-if)# <b>interface</b> <i>media-type</i> <i>slot/port</i>	Moves to configure physical ports into EtherChannel bundles
Switch(config-if)# <b>channel-group</b> <i>number</i> <b>mode</b> <i>mode_type</i>	Associates an interface with a specific port-channel group and specifies if negotiation is to occur
Switch(config)# <b>port-channel load-balance</b> <i>load-balance-type</i>	Instructs the switch how to load balance traffic over the individual links in the EtherChannel bundle

Command	Description
Switch# <b>show running-config interface port-channel</b> <i>channel_number</i>	Shows the running configuration for a specific port-channel interface
Switch# <b>show running-config interface</b> <i>type</i> <i>mod/port</i>	Shows the running configuration for a specific physical interface
Switch# <b>show interfaces</b> <i>type</i> <i>mod/port</i> <b>etherchannel</b>	Displays information on a physical interface that is specific to its role in an EtherChannel bundle
Switch# <b>show etherchannel</b> <i>num</i> <b>port-channel</b>	Displays information on the current state of the port-channel interface
Switch# <b>show etherchannel</b> <i>num</i> <b>summary</b>	Displays a one-line summary per channel-group

## Configuração

### Ações

Step	Action	Notes
1	Switch(config)# <b>interface</b> <b>range fastethernet</b> <b>[interface_range]</b>	Specifies the interfaces that will comprise the EtherChannel group
2	Switch(config-if-range)# <b>channel-protocol {pagp   lacp}</b>	Specifies the channeling protocol to be used
3	Switch(config-if-range)# <b>channel-group 2 mode</b> <b>desirable</b>	Creates the port-channel interface, if necessary, and assigns the specified interfaces to it

Figure 2: Ações

### Comandos

```
Switch(config)# interface range interface slot/port - port
Switch(config-if-range)# channel-protocol {pagp | lacp}
Switch(config-if-range)# channel-group number mode {auto|disirable|on}
```

### Modos

```
SWA(config)# interface range f0/1 -2
SWA(config-if-range)# channel-group 1 mode ?

    active      Enable LACP unconditionally
    auto        Enable PAgP only if a PAgP device is detected
    desirable   Enable PAgP unconditionally
    on          Enable Etherchannel only
    passive     Enable LACP only if a LACP device is detected
```

Figure 3: Modos

### Estático

#### PAgP

#### LACP

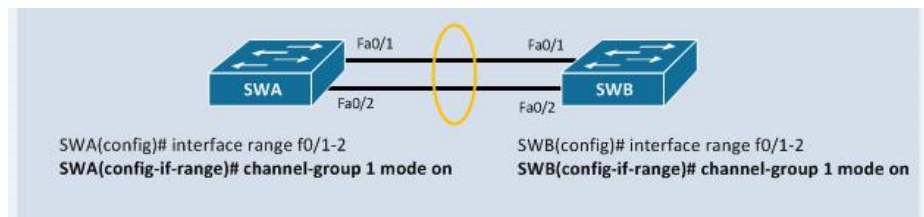


Figure 4: Estático

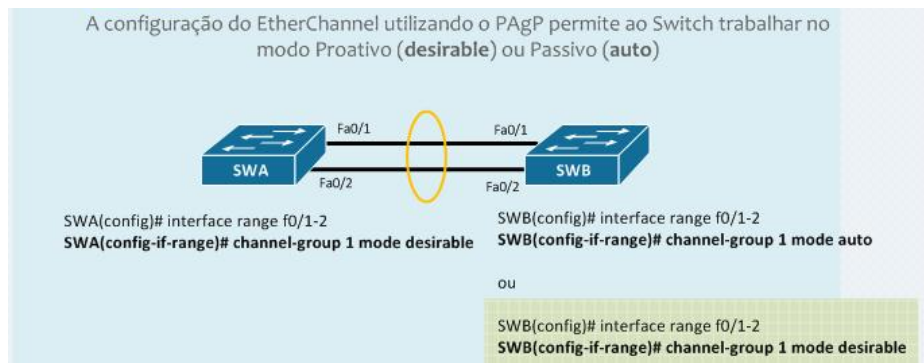
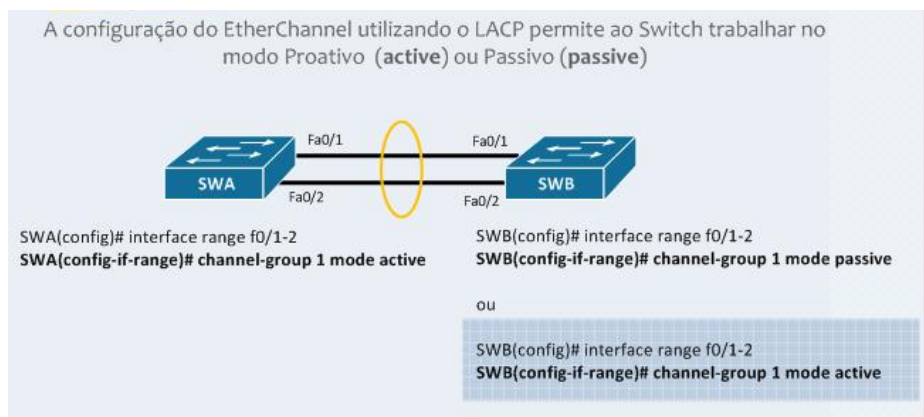


Figure 5: PAGP



# PVC frame relay

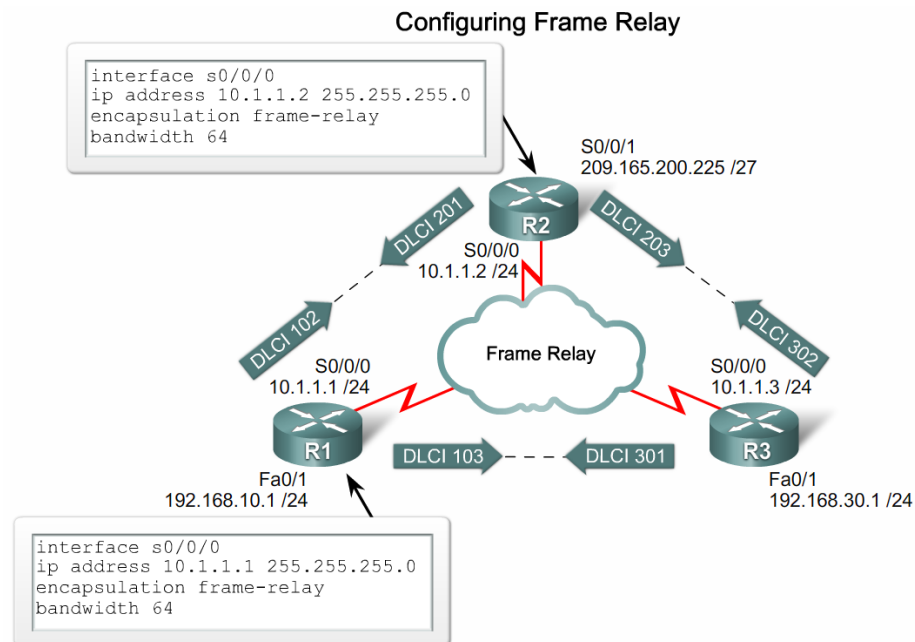


Figure 6: Configuração Básica

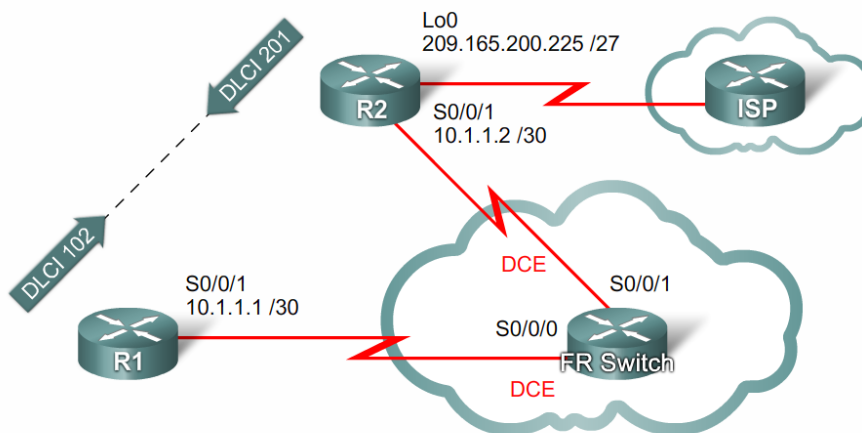


Figure 7: Configuração Básica



## Configuração de uma topologia de rede Frame Relay Hub and Spoke



```
Router#config terminal
Router(config)#hostname Matriz
Matriz(config)#interface serial 0/0
Matriz(config-if)#encapsulation frame-relay
Matriz(config-if)#no frame-relay inverse-arp
Matriz(config-if)#no shut
Matriz(config-if)#exit
Matriz(config)#interface serial 0/0.102 point-to-point
Matriz(config-subif)#ip address 200.1.1.1 255.255.255.252
Matriz(config-subif)#frame-relay interface-dlci 102
Matriz(config-fr-dlci)#exit
Matriz(config-subif)#exit
Matriz(config)#interface serial 0/0.103 point-to-point
```

```

Matriz(config-subif)#ip address 200.1.1.5 255.255.255.252
Matriz(config-subif)#frame-relay interface-dlci 103
Matriz(config-fr-dlci)#exit
Matriz(config-subif)#exit
Matriz(config)#interface loopback 0
Matriz(config-if)#ip address 200.10.1.1 255.255.255.0
Matriz(config-if)#no shut
Matriz(config-if)#exit
Matriz(config)#

```

## Configuração do roteador da Filial 1

```

Router>enable
Router#config terminal
Router(config)#hostname Filial1
Filial1(config)#interface serial 0/2
Filial1(config-if)#encapsulation frame-relay
Filial1(config-if)#no frame-relay inverse-arp
Filial1(config-if)#no shutdown
Filial1(config-if)#exit
Filial1(config)#
Filial1(config)#interface serial 0/2.201 point-to-point
Filial1(config-subif)#
Filial1(config-subif)#ip address 200.1.1.2 255.255.255.252
Filial1(config-subif)#frame-relay interface-dlci 201
Filial1(config-fr-dlci)#exit
Filial1(config-subif)#exit
Filial1(config)#interface loopback 0
Filial1(config-if)#ip address 200.134.10.1 255.255.255.0
Filial1(config-if)#end
Filial1#

```

## Configuração do roteador da Filial 2

```

Router>enable
Router#config terminal
Router(config)#hostname Filial2
Filial2(config)#interface serial 0/0
Filial2(config-if)#encapsulation frame-relay
Filial2(config-if)#no frame-relay inverse-arp
Filial2(config-if)#no shut
Filial2(config-if)#clock rate 640
Filial2(config-if)#exit
Filial2(config)#interface serial 0

```

```

Filial2(config)#interface serial 0/0.301 point-to-point
Filial2(config-subif)#ip address 200.1.1.6 255.255.255.252
Filial2(config-subif)#frame-relay interface-dlci 301
Filial2(config-fr-dlci)#exit
Filial2(config-subif)#exit
Filial2(config)#interface loopback 0
Filial2(config-if)#ip address 200.100.1.1 2
Filial2(config-if)#ip address 200.100.1.1 255.255.255.0
Filial2(config-if)#no shut
Filial2(config-if)#end
Filial2#

```

## Configuração do Switch Frame Relay 1

```

SFR1#config terminal
SFR1(config)#hostname SFR1
SFR1(config)#frame-relay switching
SFR1(config)#interface serial 0/0
SFR1(config-if)#encapsulation frame-relay
SFR1(config-if)#no frame-relay inverse-arp
SFR1(config-if)#frame-relay intf-type dce
SFR1(config-if)#frame-relay route 102 interface serial 0/1 202
SFR1(config-if)#frame-relay route 103 interface serial 0/3 303
SFR1(config-if)#clock rate 64000
SFR1(config-if)#no shut
SFR1(config-if)#exit
SFR1(config)#interface serial 0/1
SFR1(config-if)#encapsulation frame-relay
SFR1(config-if)#no frame-relay inverse-arp
SFR1(config-if)#frame-relay intf-type nni
SFR1(config-if)#frame-relay route 202 interface serial 0/0 102
SFR1(config-if)#clock rate 64000
SFR1(config-if)#no shut
SFR1(config-if)#exit
SFR1(config)#interface serial 0/3
SFR1(config-if)#encapsulation frame-relay
SFR1(config-if)#no frame-relay inverse-arp
SFR1(config-if)#frame-relay intf-type nni
SFR1(config-if)#frame-relay route 303 interface serial 0/0 103
SFR1(config-if)#clock rate 64000
SFR1(config-if)#no shut
SFR1(config-if)#end
SFR1#

```

## Configuração do Switch Frame Relay 2

```
SFR2#config terminal
SFR2(config)#frame-relay switching
SFR2(config)#interface serial 0/1
SFR2(config-if)#encapsulation frame-relay
SFR2(config-if)#no frame-relay inverse-arp
SFR2(config-if)#clock rate 64000
SFR2(config-if)#frame-relay intf-type nni
SFR2(config-if)#frame-relay route 202 interface serial 0/2 201
SFR2(config-if)#no shut
SFR2(config-if)#exit
SFR2(config)#
SFR2(config)#interface serial 0/2
SFR2(config-if)#encapsulation frame-relay
SFR2(config-if)#no frame-relay inverse-arp
SFR2(config-if)#frame-relay intf-type dce
SFR2(config-if)#frame-relay route 201 interface serial 0/1 202
SFR2(config-if)#clock rate 64000
SFR2(config-if)#no shut
SFR2(config-if)#
SFR2(config-if)#end
SFR2#wr
```

## Configuração do Switch Frame Relay 3

```
SFR3#configure terminal
SFR3(config)#frame-relay switching
SFR3(config)#interface serial 0/3
SFR3(config-if)#encapsulation frame-relay
SFR3(config-if)#no frame-relay inverse-arp
SFR3(config-if)#clock rate 64000
SFR3(config-if)#frame-relay intf-type nni
SFR3(config-if)#frame-relay route 303 interface serial 0/0 301
SFR3(config-if)#no shut
SFR3(config-if)#exit
SFR3(config)#interface serial 0/0
SFR3(config-if)#encapsulation frame-relay
SFR3(config-if)#no frame-relay inverse-arp
SFR3(config-if)#frame-relay intf-type dce
SFR3(config-if)#clock rate 64000
SFR3(config-if)#frame-relay route 301 interface serial 0/3 303
SFR3(config-if)#no shutConfiguração do Roteador da Matriz
Router#config terminal
Router(config)#hostname Matriz
```

```

Matriz(config)#interface serial 0/0
Matriz(config-if)#encapsulation frame-relay
Matriz(config-if)#no frame-relay inverse-arp
Matriz(config-if)#no shut
Matriz(config-if)#exit
Matriz(config)#interface serial 0/0.102 point-to-point
Matriz(config-subif)#ip address 200.1.1.1 255.255.255.252
Matriz(config-subif)#frame-relay interface-dlci 102
Matriz(config-fr-dlci)#exit
Matriz(config-subif)#exit
SFR3(config-if)#end
SFR3#

```

## Configuração do protocolo de roteamento OSPF

```

Matriz
Matriz#config terminal
Matriz(config)#router ospf 1
Matriz(config-router)#network 200.10.1.0 0.0.0.255 area 0
Matriz(config-router)#network 200.1.1.0 0.0.0.3 area 0
Matriz(config-router)#network 200.1.1.4 0.0.0.3 area 0
Matriz(config-router)#end

```

### Filial 1

```

Filial1>enable
Filial1#config terminal
Filial1(config)#route ospf 1
Filial1(config)#router ospf 1
Filial1(config-router)#network 200.134.10.0 0.0.0.255 area 0
Filial1(config-router)#network 200.1.1.0 0.0.0.3 area 0
Filial1(config-router)#end
Filial1#

```

### Filial 2

```

Filial2>enable
Filial2#config terminal
Filial2(config)#router ospf 1
Filial2(config-router)#network 200.100.1.0 0.0.0.255
Filial2(config-router)#network 200.100.1.0 0.0.0.255 area 0
Filial2(config-router)#network 200.1.1.4 0.0.0.3 area 0
Filial2(config-router)#end

```

Filial2#

## Verificando as configurações:

Matriz#show frame-relay map

Serial0/0.102 (up): point-to-point dlci, dlci 102(0x66,0x1860), broadcast  
status defined, active

Serial0/0.103 (up): point-to-point dlci, dlci 103(0x67,0x1870), broadcast  
status defined, active

Matriz#

Matriz#show ip route

Codes: 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

i - IS-IS, su - IS-IS summary, 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 not set

200.1.1.0/30 is subnetted, 2 subnets

C 200.1.1.0 is directly connected, Serial0/0.102

C 200.1.1.4 is directly connected, Serial0/0.103

C 200.10.1.0/24 is directly connected, Loopback0

200.100.1.0/32 is subnetted, 1 subnets

O 200.100.1.1 [110/65] via 200.1.1.6, 00:06:33, Serial0/0.103

200.134.10.0/32 is subnetted, 1 subnets

O 200.134.10.1 [110/65] via 200.1.1.2, 00:06:33, Serial0/0.102

Matriz#show frame-relay pvc

PVC Statistics for interface Serial0/0 (Frame Relay DTE)

	Active	Inactive	Deleted	Static
Local	2	0	0	0
Switched	0	0	0	0
Unused	0	0	0	0

DLCI = 102, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial0/0.102

input pkts 119	output pkts 130	in bytes 19887
out bytes 21642	dropped pkts 0	in pkts dropped 0
out pkts dropped 0	out bytes dropped 0	

```

in FECN pkts 0          in BECN pkts 0          out FECN pkts 0
out BECN pkts 0          in DE pkts 0           out DE pkts 0
out bcast pkts 110       out bcast bytes 19562
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
pvc create time 00:54:05, last time pvc status changed 00:39:42

```

DLCI = 103, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial0/0.103

```

input pkts 101          output pkts 120          in bytes 16648
out bytes 20555          dropped pkts 0           in pkts dropped 0
out pkts dropped 0       out bytes dropped 0
in FECN pkts 0          in BECN pkts 0          out FECN pkts 0
out BECN pkts 0          in DE pkts 0           out DE pkts 0
out bcast pkts 105       out bcast bytes 18995
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
pvc create time 00:53:14, last time pvc status changed 00:11:46
Matriz#

```

## Roteador

```

R> enable
R(config)# config terminal
R(config)# ipv6 unicast-routing
R(config)# interface fa 0/1
R(config-if)# ipv6 enable
R(config-if)# ipv6 address 2001:dbb1:1:1::1/64
R(config-if)# no shut
R(config-if)# exit

```

### ativar o rip

Na interface

```
R(config-if)# ipv6 rip nrede enable
```

Na configuração global

Onde *nrede* é uma palavra chave

```
R (config) # ipv6 router rip nrede
```

## NAT

```
Router(config)# int fa 0/1
Router(config)# ip nat outside
Router(config)# exit
Router(config)# interface fa 0/0
Router(config)# ip address ..
Router(config)# ip nat inside
Router(config)# access-list 1 permit 192.168.1.0 0.0.0.255
Router(config)# access-list 1 permit 200.1.1.0 0.0.0.3
Router(config)# ip nat inside source list 1
Router(config)# interface fa 0/1
Router(config)# overload
```

## QoS

### Configuração de uma rede VoIP

Vamos configurar uma rede com a seguinte topologia:

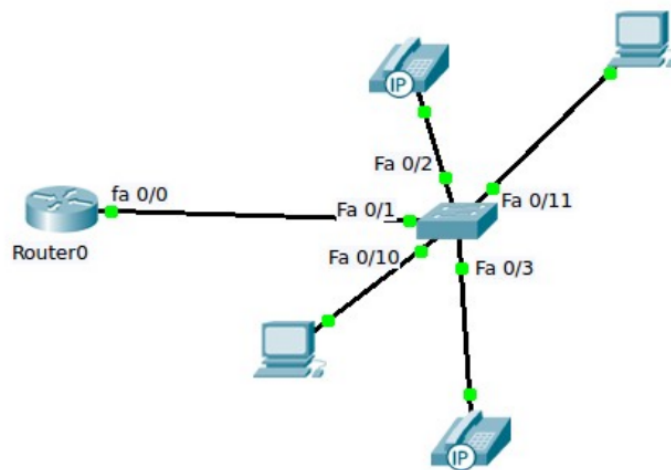


Figure 9: Topologia



## Configuração do Switch

```
Switch(config)#interface range fa0/1 - 5
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport voice vlan 1
```

## Configuração do roteador 2811 com o CME:

```
Router(config)#int fa 0/0
Router(config-if)#ip add 192.168.10.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#ip dhcp pool voicelab
Router(dhcp-config)#network 192.168.10.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.10.1
Router(dhcp-config)#option 150 ip 192.168.10.1
Router(dhcp-config)#exit
Router(config)#telephony-service
Router(config-telephony)#max-dn 5
Router(config-telephony)#max-ephones 5
Router(config-telephony)#ip source-address 192.168.10.1 port 2000
Router(config-telephony)#auto assign 1 to 5
Router(config-telephony)#exit
Router(config)#ephone-dn 1
Router(config-ephone-dn)#number 54001
Router(config-ephone-dn)#exit
Router(config)#ephone-dn 2
Router(config-ephone-dn)#number 54002
Router(config-ephone-dn)#
Router(config)#ephone-dn 3
Router(config-ephone-dn)#number 11111
```

## Configuração da Qualidade de Serviço (QoS) no Switch 2960

```
Switch#configure terminal
Switch(config)#mls qos
Switch(config)#interface range fastEthernet 0/1-5
Switch(config-if-range)#mls qos
Switch(config-if-range)#mls qos cos 5
Switch(config-if-range)#mls qos trust cos
Switch(config-if-range)#exit
Switch(config)#interface range fastEthernet 0/10-22
Switch(config-if-range)#mls qos
Switch(config-if-range)#mls qos cos 0
```

```

Switch(config-if-range)#mls qos trust cos
Switch(config-if-range)#exit
Switch(config)#end
Switch#wr

```

## Policing

### Topology

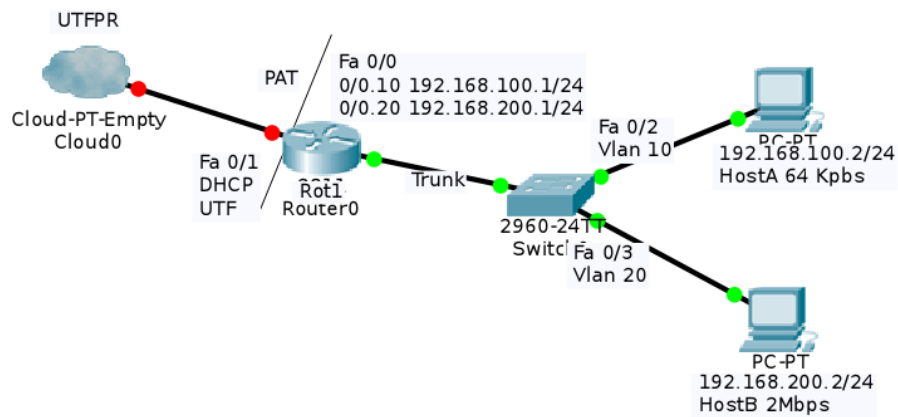


Figure 10: Topologia

### Básico

```

Rot1(config)#interface fa 0/1
Rot1(config-if)#ip address dhcp
Rot1(config-if)#description Link para UTFPR
Rot1(config-if)#ip nat outside
Rot1(config-if)#no shutdown
Rot1(config-if)#exit
Rot1(config)#interface fa 0/0
Rot1(config-if)#no shutdown
Rot1(config-if)#exit
Rot1(config)#interface fa 0/0.10
Rot1(config-if)#encapsulation dot1q 10
Rot1(config-if)#ip address 192.168.100.1 255.255.255.0
Rot1(config-if)#ip nat inside

```

```

Rot1(config-if)#exit
Rot1(config)#interface fa 0/0.20
Rot1(config-if)#encapsulation dot1q 20
Rot1(config-if)#ip address 192.168.200.1 255.255.255.0
Rot1(config-if)#ip nat inside
Rot1(config-if)#exit
Rot1(config)#ip route 0.0.0.0 0.0.0.0 10.15.2.254
Rot1(config)#access-list 1 permit 192.168.0.0 0.0.255.255
Rot1(config)#ip nat inside source list 1 interface fa 0/1 overload

```

## Configuração Policing

```

Rot1(config)#ip access-list extended HostA
Rot1(config-ext-nacl)#permit ip any host 192.168.100.2
Rot1(config-ext-nacl)#permit ip host 192.168.100.2 any
Rot1(config-ext-nacl)#exit
Rot1(config)#class-map match-all HA
Rot1(config-cmap)#match access-group name HostA
Rot1(config-cmap)#exit
Rot1(config)#policy-map QoS1
Rot1(config-pmap)#class HA
* Rot1(config-pmap-c)#police rate 64000 bps
Rot1(config-pmap-c-police)#end
Rot1#config terminal
Rot1(config)#interface fa 0/0.10
Rot1(config-if)#service-policy output QoS1

```

## Configuração Shapping

- Ao invés de police rate ... Na linha

```
Rot1(config-pmap-c)#police rate 64000 bps
```

- Colocar:

```
Rot1(config-pmap-c)#shape average 128000
```

## Continuação...

```

Rot1(config)#ip access-list extended HostB
Rot1(config-ext-nacl)#permit ip any host 192.168.200.2
Rot1(config-ext-nacl)#permit ip host 192.168.200.2 any
Rot1(config-ext-nacl)#exit
Rot1(config)#class-map match-all HB
Rot1(config-cmap)#match access-group name HostB

```

```
Rot1(config-cmap)#exit
Rot1(config)#policy-map QoS2
Rot1(config-pmap)#class HB
Rot1(config-pmap-c)#police rate 2000000 bps
Rot1(config-pmap-c-police)#end
Rot1#config terminal
Rot1(config)#interface fa 0/0.20
Rot1(config-if)#service-policy output QoS2
```

## EIGRP 1

```
R(config)#router eigrp 1
R(config-router)#network 192.168.1.0
R(config-router)#network 200.1.1.0
R(config-router)#end
R#wr
```

## OSPF

*Atenção: a máscara é invertida, i.e., wildmask*

ex: /24 Ao invés de ser 255.255.255.0 é 0.0.0.255

```
R(config)# router ospf 1
R(config-router)# network 192.168.1.0 0.0.0.255 area 0
R(config-router)# end
```

## Segurança de porta

### Violações:

- \* Protect
- \* Restrict
- \* Shutdown

### Observações:

- \* Somente modo acesso

\* Existe estático e dinâmico

### Estático:

```
switchport port-security mac-address AA:AA:AA:AA:00:00:00:01
switchport maximum 1
switchport violation shutdown #desliga a interface se houver uma violação
```

### Dinâmico:

Apenas não especificar o mac

```
switchport maximum 100
switchport violation shutdown #desliga a interface se houver uma violação
```

## DHCP - snooping

```
ip dhcp snooping
ip dhcp snooping vlan 10
interface range f0/1-10
ip dhcp snooping limit rate 5
interface g0/1
ip dhcp snooping trust
end
show ip dhcp snooping
```

## SSH

```
S# vlan 30
S# ip domain-name X
S# username fabiano privilege 15 password CISCO
S#line vty 0 4
#transport input telnet/ssh/all

#enable secret UTFPR (pede a senha pra entrar no modo privilegiado)
#hostname SwitchX
#ip domain-name www.utfpr.edu.br
#username NOME priv 15 password UTFPR
#crypto key generate rsa
#line vty 0 4 (5 conexões simultaneas)
#transport input ssh
```

```
#login local
```

(para acesso remoto das vlans acesse vlan.md)

## STP

### No switch que será o root

```
Switch>enable
Switch#config terminal
Switch(config)#spanning-tree vlan 1 root primary
Switch(config)#end
Switch#
```

### Nos switches que serão secundários

```
Switch>enable
Switch#config terminal
Switch(config)#spanning-tree vlan 1 root secondary
Switch(config)#end
Switch#
Switch#
```

**Para configurar o switch na topologia desativando o protocolo Spanning Tree (STP). Tem somente a Vlan 1 (padrão) configurada.**

```
Switch>enable
Switch#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#no spanning-tree vlan 1
Switch(config)#end
Switch#
wr
Building configuration...
[OK]
Switch#
```

## TFPT

- Arquivo de configuração do TFTP:

/etc/default/tftpd-hpa

- Pasta padrão do servidor tftp:

/home/tftp/

- Iniciar, reinicializar ou desligar o deamon do TFTP:

/etc/init.d/tftpd-hpa {start|restart|stop|force-reload|status}

- *Exemplo:* copiar o arquivo running-config do sistema para o servidor

copy system:running-config tftp

## TUNELAMENTO

### Túnel 6in4

```
router> enable
router# config t
router(config)# interface tunnel 0
router(config-if)# ipv6 address fd00:cafe::0/127
router(config-if)# tunnel source serial x/x/x
router(config-if)# tunnel destination 203.0.113.6
router(config-if)# tunnel mode ipv6ip
router(config-if)# ipv6 route 2001:db8:cafe:2::/64 fd00:cafe::1
```

## Útil

Comandos que podem ser úteis no gerenciamento e configuração das redes

### Range de interfaces

```
# interface range fa 0/0-10
```

### Dá pra separar por vírgulas

```
# interface range fa 0/1, fa 0/3, fa0/5
```

### Mostra configuração geral

```
# show running-config
```

### Mostra as vlans e suas interfaces designadas

```
# show vlan brief
```

```
# show vlan
```

## Mostra a tabela MAC | INTERFACE do switch

```
show mac-address table
```

## Hostname

```
#hostname zoera
```

## DEBUG

```
debug <o que você quer debugar>
```

*exemplos*

```
debug arp
debug dhcp
debug port-security
debug all
```

OBS.: debug all não é recomendado

## Sair do debug

```
undebug <o que você quer desbugar>
```

```
undebug arp
undebug dhcp
undebug ppp
undebug all
```

## Gravações/exclusões de configuração

Ram armazena running-config

nVran armazena startup-config

Flash armazena SO e vlan.dat (conteúdo das vlans)

## Gravar Ram -> vRam

```
#copy running-config startup-config
```

OR

```
#wr
```

## Apagar tudo:

```
#erase startup-config
#delete flash:vlan.dat
#reload
```



## Recuperação de dispositivos

### Recuperar senhas

#### No roteador

1. Fazer a conexão com o equipamento utilizando o cabo serial e o kermit;
2. Reinicializar fisicamente o roteador;
3. Acessar o modo Rommon no roteador: Após 5 segundos, pressionar simultaneamente as teclas Ctrl-I ou Ctrl-. Este procedimento interrompe a sequência normal do boot e inicia o Rom Monitor.

rommon >

4. Alterar o registro de configuração para o valor 0x2142. Com isto, na reinicialização do roteador o equipamento não vai carregar a configuração da NVRAM. Com isto as configurações salvas não serão carregadas e não haverá senha para entrar no roteador.

rommon> confreg 0x2142

rommon> reset

5. Apenas digitar *enable*, não precisa digitar a senha

router> enable

router# copy startup-config running-config

- A partir deste ponto toda a configuração da NVRAM estará na RAM e poderá ser alterada, inclusive a senha.

#### No switch

1. Desligar o switch da tomada e segurar o botão switch old.
2. Nesse modo, existem 3 comandos:

flash\_init

load\_helper

boot

- Fazer os comandos nessa ordem, flash\_init, load\_helper, então renomear o arquivo config.text e, então, executar o comando boot:

flash\_init

load\_helper

rename flash:config.text flash:config.old

boot

- Então você será logado ao sistema normal, como se tivesse comprado agora o dispositivo.
- Renomear, por fim, o arquivo config.old para config.text, depois copiar config.text pra running-config:

```
copy flash:config.old flash:config.text
copy flash:config.text system:running-config
```

## IOS apagado

- Setar as configurações de rede do roteador, iniciar servidor tftp, setar o nome do .bin em um servidor tftp, setar ip de servidor tftp e baixar o arquivo pela rede.
- **EXEMPLO**

```
rommon > IP_SUBNET_MASK=255.255.255.0
rommon > DEFAULT_GATEWAY=171.68.170.3
rommon > TFTP_FILE=c2600-is-mz.113.2.0
rommon > tftpdnld
```

## VLANS

### Criar vlans

```
S(config)# vlan <1-1005>
S(config-vlan)# name avelã
```

### Access Mode

```
S(config-if)# switchport mode access
S(config-if)# switchport access vlan <1-1005>
```

### Trunk Mode

```
S(config-if)# switchport mode trunk
S(config-if)# switchport trunk allowed vlan <1-1005>
```

Há também os comandos add, all, onde all adiciona uma nova vlan na lista atual, e all adiciona

## Roteamento de vlans

### Sem subinterfaces

- \* 1 interface pra cada vlan
- \* Switch -> roteador
  - Mode *\*access\** e vlan que irá passar pela interface
- \* Roteador -> Switch
  - Seta o ip da interface pra cada vlan

### Com subinterfaces

- Uma interface para várias vlans
- Switch -> roteador
  - Tronco e autorizar todas as vlans daquela interface/
- Roteador -> switch
  - Subinterfaces;
  - Só dá um “no shut” para subir a interface
  - Encapsulation dot1q nas subinterfaces
  - Gateway default de todas as vlans

### Comandos

```
router>enable
router#config terminal
router(config)#interface fa 0/0
router(config-if)#no shutdown
router(config)#interface fa 0/0.10
router(config-if)#encapsulation dot1q 10
router(config-if)#ip address 10.0.0.1 255.0.0.0
router(config-if)#exit
router(config)#interface fa 0/0.20
router(config-if)#encapsulation dot1q 20
router(config-if)#ip address 172.17.0.1 255.255.0.0
router(config-if)#exit
router(config)#interface fa 0/0.30
router(config-if)#encapsulation dot1q 30
router(config-if)#ip address 192.168.1.1 255.255.255.0
```

```

switch>enable
switch#config terminal
switch(config)#vlan 10
switch(config-vlan)#name Funcionarios
switch(config-vlan)#vlan 20
switch(config-vlan)#name Convidados
switch(config-vlan)#vlan 30
switch(config-if)#name Gerencia
switch(config-vlan)#exit
switch(config)#interface fa 0/1
switch(config-if)#switchport mode access
switch(config-if)#switchport mode access
switch(config-if)#switchport access vlan 10
switch(config-if)#exit
switch(config)#interface fa 0/24
switch(config-if)#switchport mode trunk
switch(config-if)#switchport trunk vlan 10,20,30

```

## IP da vlan para acesso remoto

```

#interface vlan 20
#ip address 200.1.1.200 255.255.255.0
#no shut

```

## Protocolos da camada 2

### Analogia da diferença do PAP e CHAP

Pense como a diferença do ssh e do telnet, analogamente

### PPP com PAP

PPP é um protocolo aberto

```

R1 (config)# username R2
                password utfpr
R1 (config)# inter se 0/0/0
R1 (config-if)# encapsulation ppp
R1 (config-if)# ppp pap sent-username R1 password utfpr

```

## PPP com CHAP

```
R2 (config)# interface serial 0/1/0
R2 (config)# encapsulation ppp
R2 (config)# ppp authentication chap
R2 (config)# exit
R2 (config)# username R2 password utfpr
R2 (config)# username R3 password utfpr
```

## HDLC

```
R3 (config)# interface serial 0/0/0
R3 (config-if)# encapsulation hdlc
```