

Engenharia de Tráfego Fácil.

Túneis TE para iniciantes - Leonardo Rosa

Apresentação

Leonardo Rosa

BRAUSER, Lancore Networks.

- Consultor em Internetworking
- Instrutor Oficial Mikrotik

Objetivo

- Introduzir princípios básicos da Engenharia de Tráfego no uso de Túneis TE
- Como tirar proveito dos Túneis TE usando PBR (Políticas de Roteamento) sem a facilidade Mangle.

Público alvo

Provedores com redes urbanas, interurbanas, metropolitanas etc. atendendo a:

- Rede de lojas
- Outros provedores
- Prefeituras e secretarias

Tipo de serviço

O que o cliente precisa?

- Interligar sites privados (ex: lojas)
- Garantia de banda e redundância (ex: provedores)

O que o provedor pode fazer?

- Garantir privacidade
- Garantir a banda e prover redundância
- “Esconder” seu backbone

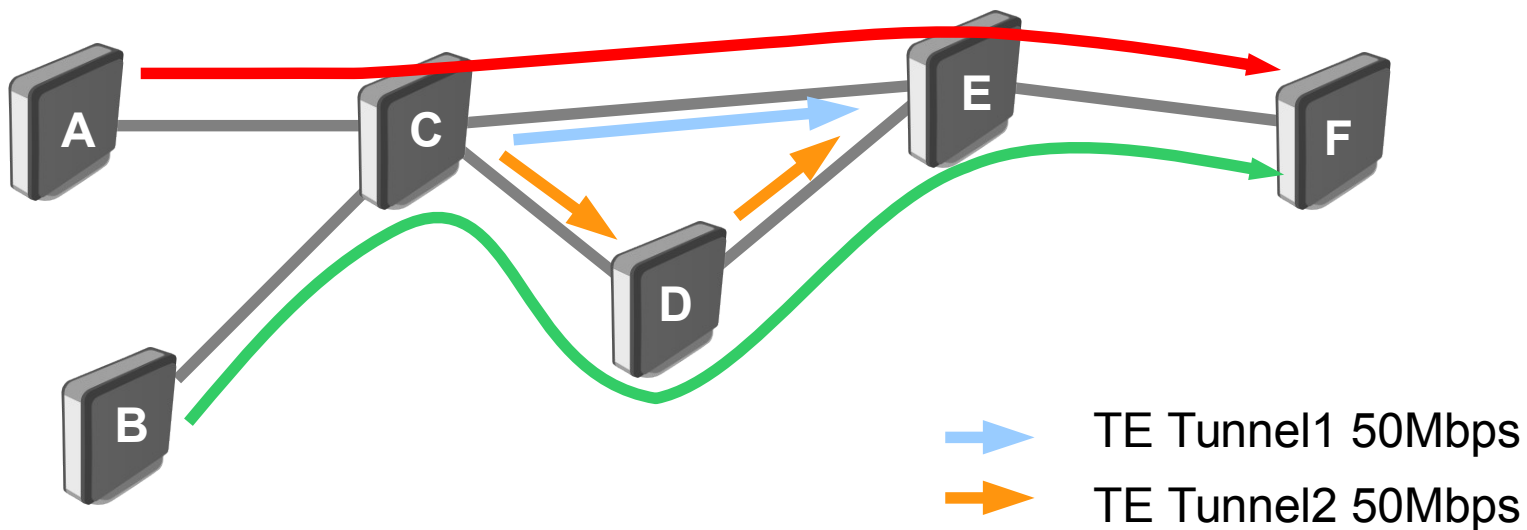
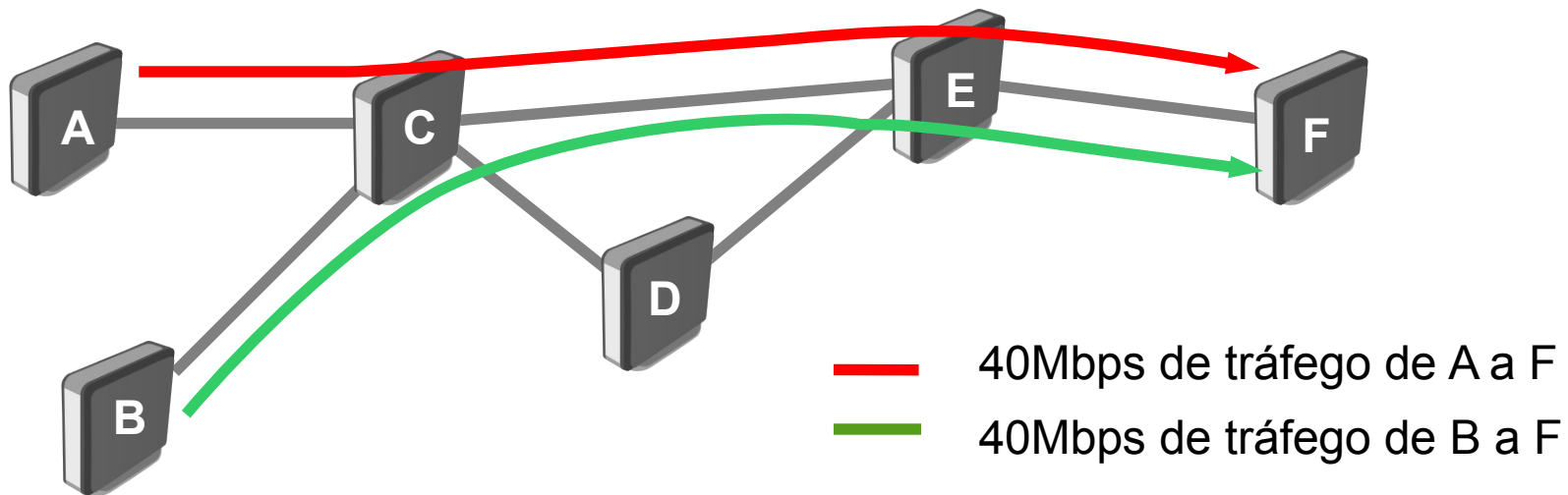
Engenharia de Tráfego

Para que serve isso?

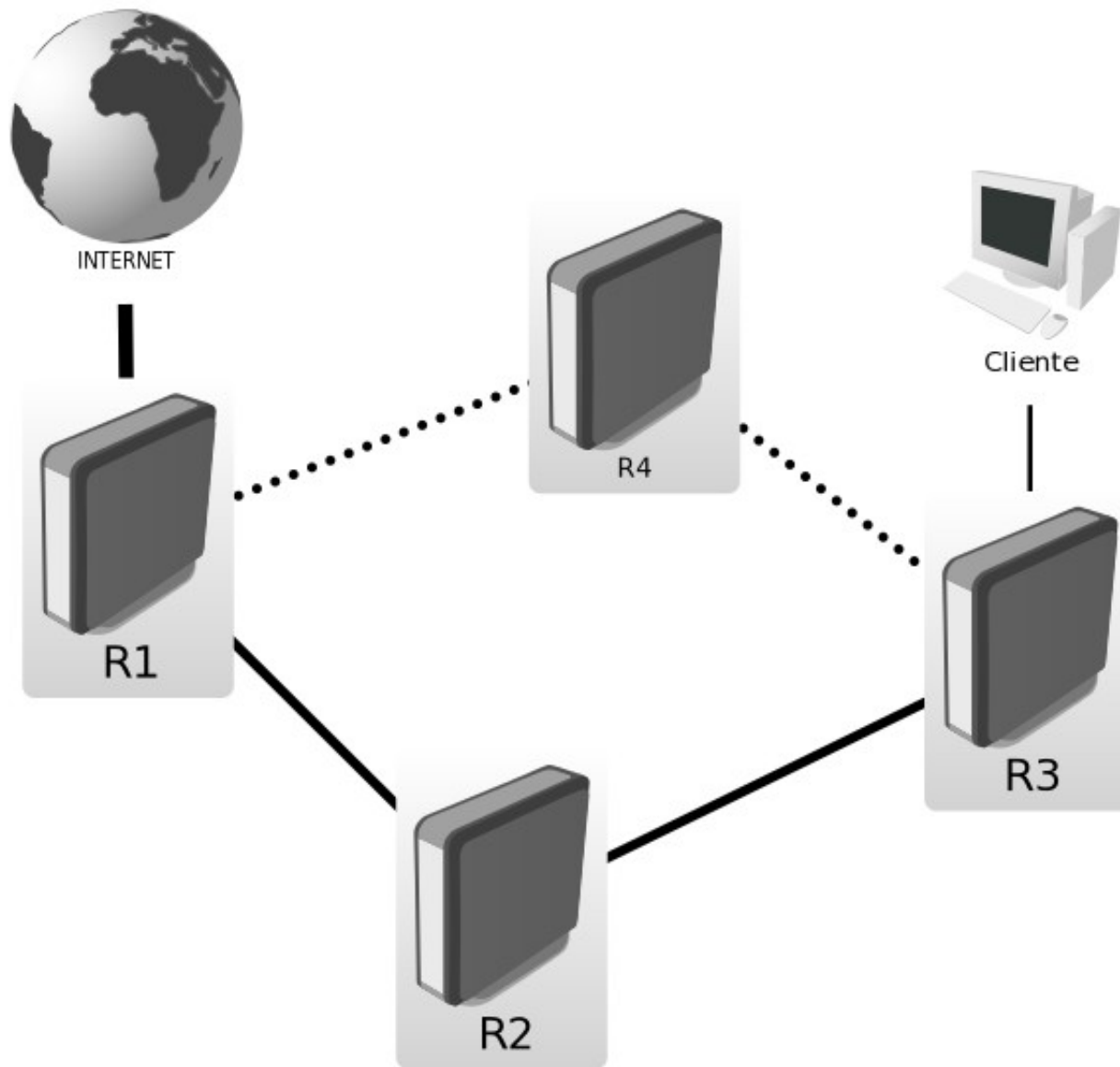
- Para ordenar o uso da rede com políticas personalizadas
- Permitindo construir túneis baseados em reserva de banda e com opções de percurso predefinidas.

Requisitos:

- Uma rede roteada com OSPF
- Pacote MPLS instalado no Mikrotik RouterOS



Cenário 1



Cenário 2

OSPF, ajustando

Habilitar suporte aos Túneis TE no OSPF

/routing ospf instance

set default mpls-te-area=backbone mpls-te-router-id=loopback

OSPF Instance <default>

General Metrics **MPLS** Status

MPLS TE Area: ▼ ▲

MPLS TE Router ID: ▼ ▲

Routing Table: ▼

Traffic Eng, ajustando






Habilitar suporte aos Túneis TE no MPLS

```
/mpls traffic-eng interface
```

```
add bandwidth=50M interface=ether1
```

```
add bandwidth=50M interface=ether2
```






* banda passante total da interface

Traffic Eng					
Interface	Tunnel Path	Path State	Resv. State	Traffic Eng Interface	
					
Interface	Bandwidth (bps)	TE Metric	Remaining Bw.		
ether1	50M	1	0 bps		
ether2	50M	1	0 bps		

Tunnel Path, em R1

Definindo percursos primário e de backup

Traffic Eng

Interface	Tunnel Path	Path State	Resv. State	Traffic Eng Interface
				
Name	Use CSPF	Hops		
backup	yes			
primario	no	10.255.255.2:loose, 10.255.255.3:loose		

Tunnel Path <primario>

Name:

☐ Use CSPF

Setup Priority:

Holding Priority:

Record Route:

Affinity Include All:

Affinity Include Any:

Affinity Exclude:

Reoptimize Interval:

Hops: :

:

OK

Cancel

Apply

Disable

Copy

Remove

Tunnel Path <backup>

Name:

☒ Use CSPF

Setup Priority:

Holding Priority:

Record Route:

Affinity Include All:

Affinity Include Any:

Affinity Exclude:

Reoptimize Interval:

Hops:

Tunnel Path, em R3

Definindo percursos primário e de backup

Traffic Eng

Interface Tunnel Path Path State Resv. State Traffic Eng Interface

+ - ✓ ✕ ⏏

Name	Use CSPF	Hops
backup	yes	
primario	no	10.255.255.2:loose, 10.255.255.1:loose

Tunnel Path <primario>

Name:

☐ Use CSPF

Setup Priority:

Holding Priority:

Record Route:

Affinity Include All:

Affinity Include Any:

Affinity Exclude:

Reoptimize Interval:

Hops: :
 :

OK Cancel Apply Disable Copy Remove

Tunnel Path <backup>

Name:

☒ Use CSPF

Setup Priority:

Holding Priority:

Record Route:

Affinity Include All:

Affinity Include Any:

Affinity Exclude:

Reoptimize Interval:

Hops:

TE para R3, cliente

Criando um túnel de R1 para R3 de 10Mbps

```
/interface traffic-eng
```

```
add name=TE_para_R3 from-address=10.255.255.1 to-address=10.255.255.3 \  
bandwidth=10Mbps primary-path=primario secondary-paths=backup
```

The screenshot shows the Mikrotik WinBox configuration window for an interface named 'TE_para_R3'. The window has a blue title bar and several tabs: 'General', 'TE', 'Bandwidth', 'Status', and 'Traffic'. The 'General' tab is selected. The configuration fields are as follows:

- Name:** TE_para_R3
- Type:** Traffic Eng Interface
- MTU:** 1500
- L2 MTU:** (empty)
- From Address:** 10.255.255.1
- To Address:** 10.255.255.3
- Bandwidth:** 10M
- Primary Path:** primario
- Secondary Paths:** backup

TE para R1, internet

Criando um túnel de R3 para R1 de 10Mbps

```
/interface traffic-eng
```

```
add name=TE_para_R1 from-address=10.255.255.3 to-address=10.255.255.1 \  
bandwidth=10Mbps primary-path=primario secondary-paths=backup
```

The screenshot shows the Mikrotik WinBox configuration window for an interface named 'TE_para_R1'. The window has a blue title bar and several tabs: 'General', 'TE', 'Bandwidth', 'Status', and 'Traffic'. The 'General' tab is selected. The configuration fields are as follows:

- Name:** TE_para_R1
- Type:** Traffic Eng Interface
- MTU:** 1500
- L2 MTU:** (empty)
- From Address:** 10.255.255.3
- To Address:** 10.255.255.1
- Bandwidth:** 10M
- Primary Path:** primario
- Secondary Paths:** backup

IP nos túneis

Criando ip de ponto-a-ponto nas interfaces

[R1]

/ip address

add interface=TE_para_R3 address=10.0.0.1/32 network=10.0.0.3

[R3]

/ip address

add interface=TE_para_R1 address=10.0.0.3/32 network=10.0.0.1

PBR sem Mangle

Routing mark apenas nas rotas

[R3] rota para internet

/ip route

add gateway=10.0.0.1 routing-mark=TE_para_R1 check-gateway=ping

[R1] rota para o cliente

/ip route

add dst-address=192.168.1.0/24 gateway=10.0.0.3 routing-mark=TE_para_R3
check-gateway=ping

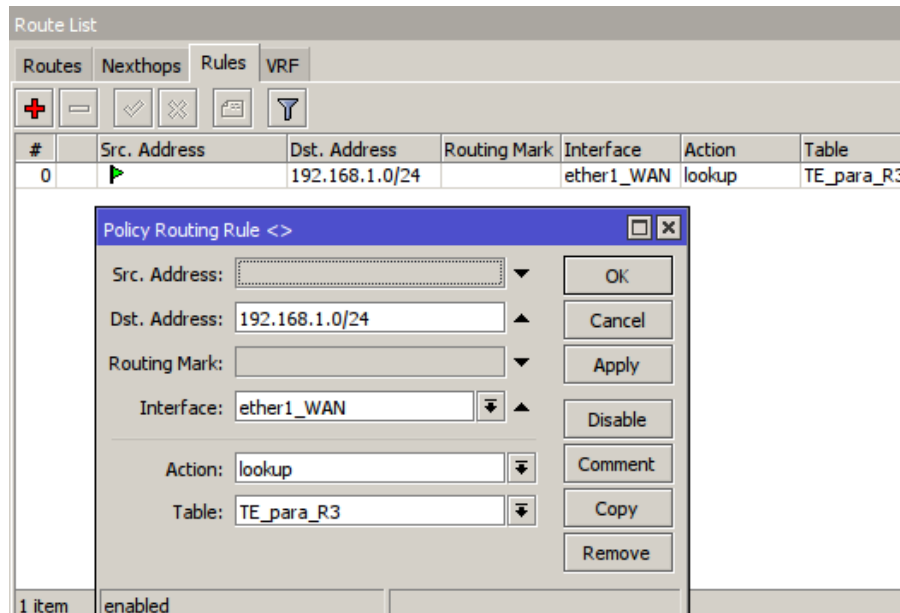
PBR sem Mangle, regras

Criando regras para uso do túnel

[R1]

/ip route rule

add dst-address=192.168.1.0/24 interface=ether1_WAN table=TE_para_R3



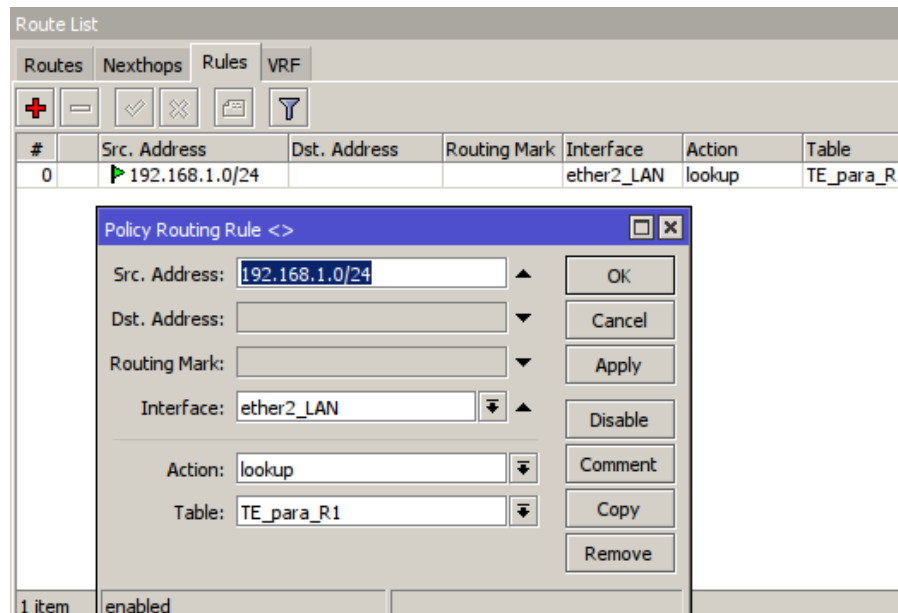
PBR sem Mangle, regras

Criando regras para uso do túnel

[R3]

/ip route rule

add src-address=192.168.1.0/24 interface=ether2_LAN table=TE_para_R1



Conclusão

Engenharia de tráfego

- Rede OSPF com loopback nos roteadores
- Túneis TE para reserva e redundância de tráfego
- VPLS usando o túnel TE (lan-to-lan)

Perguntas?

Leonardo Rosa

www.brauser.com.br

www.lancore.com.br

