

# FOZ DO IGUAÇU

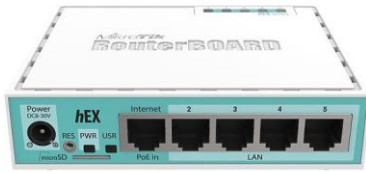
*MUM BRASIL 2019*

Switches MIKROTIK aumentando a disponibilidade da sua rede.

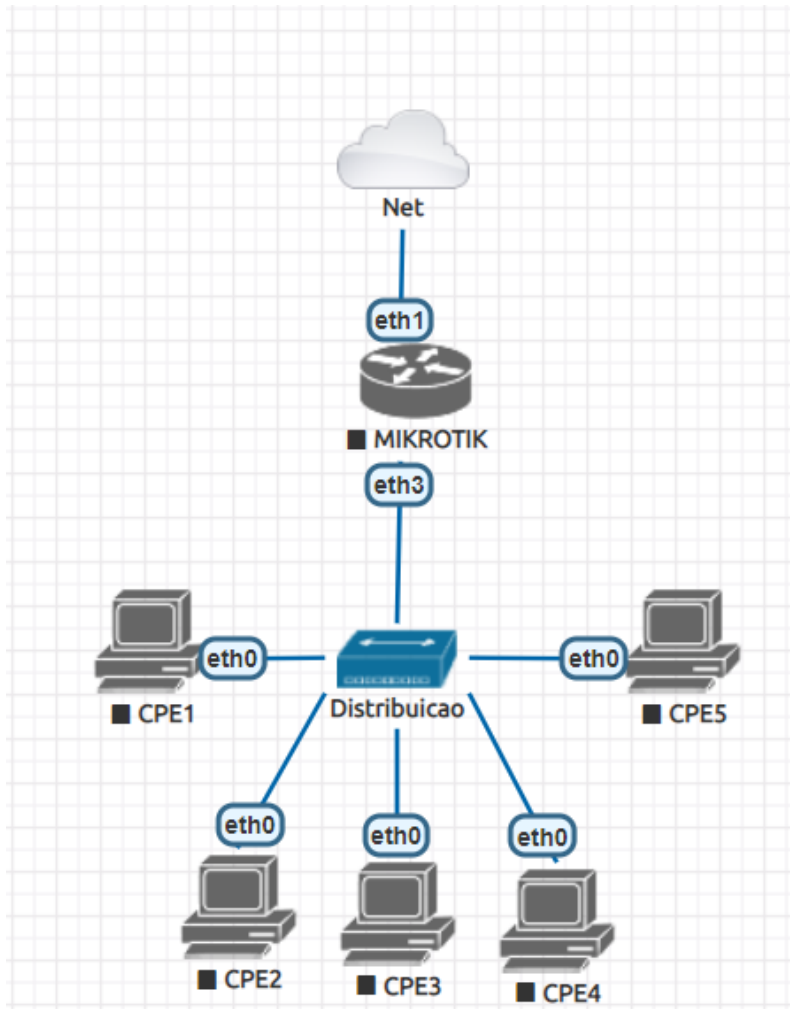


# Emilio Moreira Dias (Consultoriae)

- Cientista da computação.
- 2016 Consultor Mikrotik.
- MTCNA, MTCRE, MTCINE, MTCWE, MTCTCE, MTCUME e MTCIPv6E
- Morando atualmente em Curitiba/PR

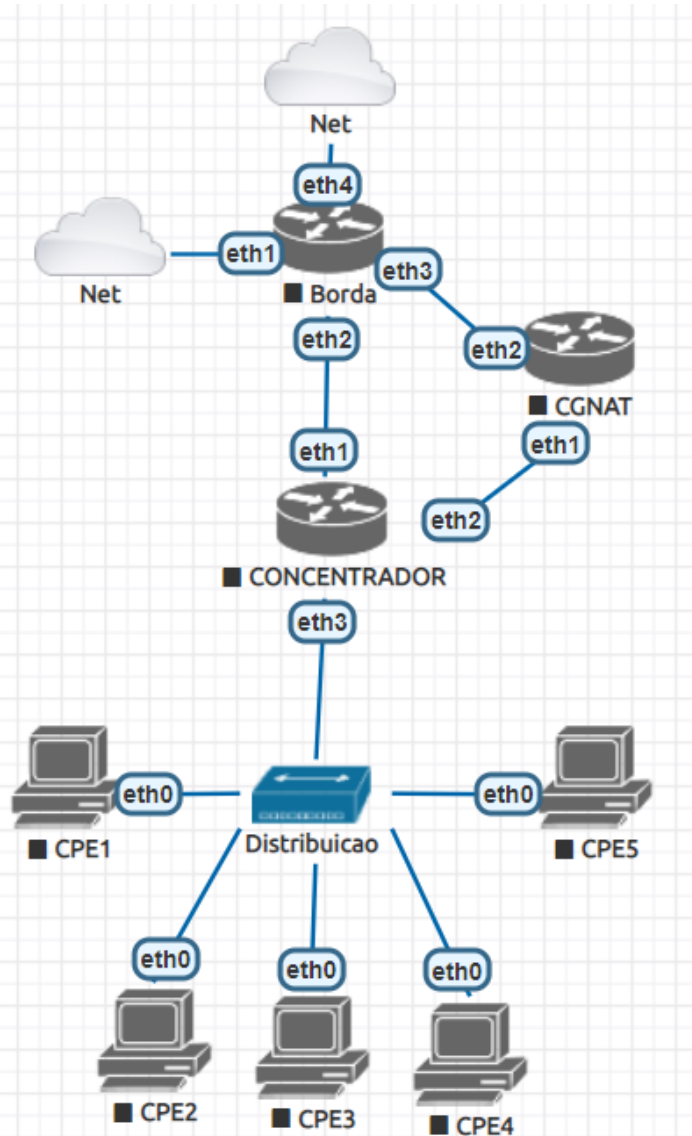


# INICIO DO PROVEDOR



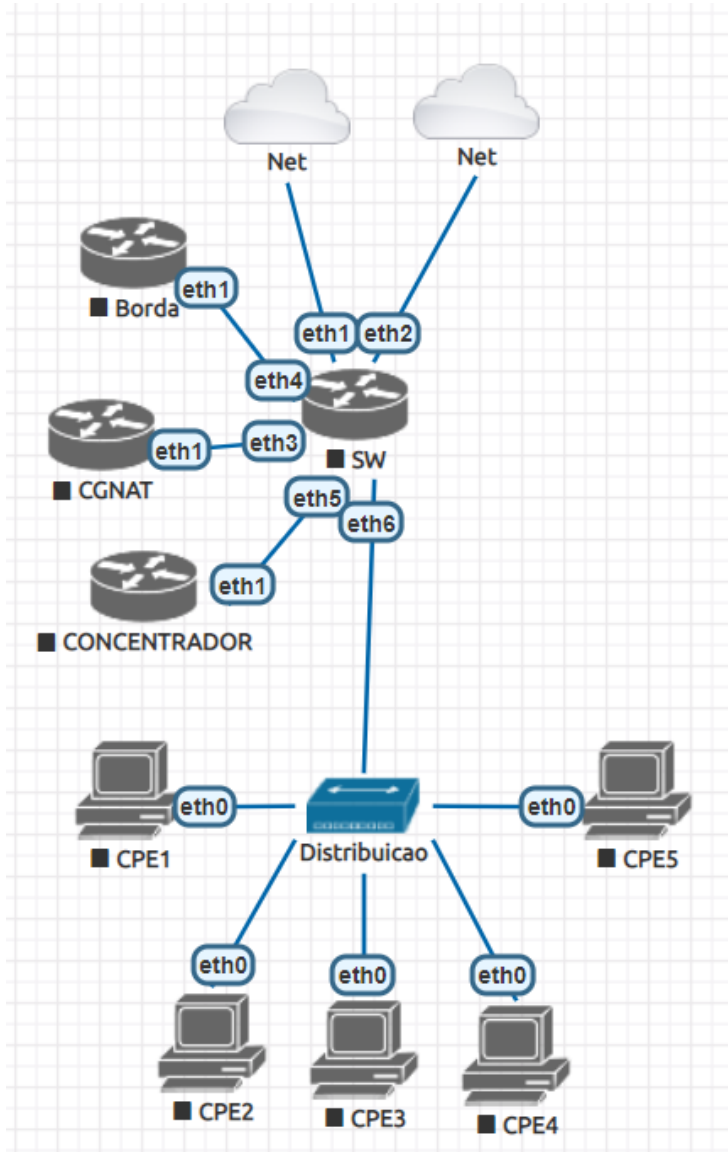
CPU Load: 100 %

## REDE TRADICIONAL



- Funciona muito bem até 1gb por interface
- Pops interligados via conversor de mídia ou radio.
- Parada total da rede em caso de falha de um equipamento.

## REDE COM SWITCH



- Maior capacidade por interface.
- Agora é possível ligar pops em anel de alta capacidade.
- Agora é possível criar redundância de equipamentos.
- Equipamentos trabalhando juntos podem substituir um maior.

# CCR1072-1G-8S+

\$3050.00



CCR1072-1G-8S+		Tile 72 Core (1200Mhz, DDR1600) Max possible throughput					
Mode	Configuration	1518 byte		512 byte		64 byte	
		kpps	Mbps	kpps	Mbps	kpps	Mbps
Bridging	none (fast path)	6,502.0	78,960.3	18,790.0	76,963.8	119,047.6	60,952.4
Bridging	25 bridge filter rules	6,502.0	78,960.3	9,099.2	37,270.3	10,432.3	5,341.3
Routing	none (fast path)	6,502.0	78,960.3	18,790.0	76,963.8	94,668.4	48,470.2
Routing	25 simple queues	6,502.0	78,960.3	13,500.0	55,296.0	13,683.5	7,006.0
Routing	25 ip filter rules	5,247.6	63,726.9	6,125.5	25,090.0	6,104.0	3,125.2

# Switching results CRS309-1G-8S+IN

\$269.00



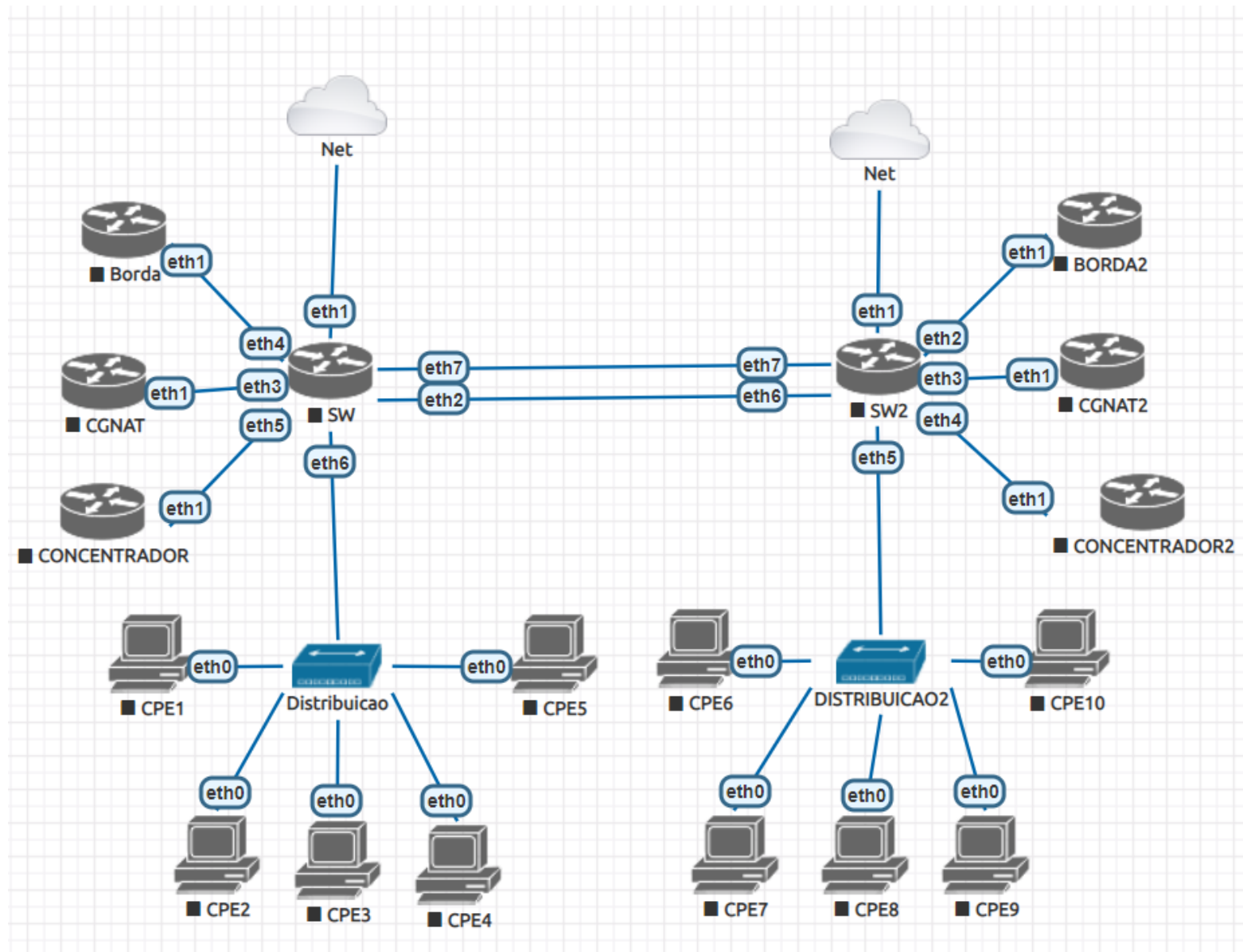
CRS309-1G-8S+IN		1518 byte		512 byte		64 byte	
Mode	Configuration	kpps	Mbps	kpps	Mbps	kpps	Mbps
		Switching	Non blocking Layer 2 throughput	6,583.2	79,946.7	19,032.0	77,954.9
Switching	Non blocking Layer 2 capacity	6,583.2	159,893.4	19,032.0	155,909.8	120,535.7	123,428.6
Switching	Non blocking Layer 1 throughput	6,583.2	81,000.0	19,032.0	81,000.0	120,535.7	81,000.0
Switching	Non blocking Layer 1 capacity	6,583.2	162,000.0	19,032.0	162,000.0	120,535.7	162,000.0

# SWITCHES

- Permite aumentar o numero de portas de um roteador(bridge/Vlan).
- Usado para aumentar a disponibilidade da rede.
- Chip especializado para comunicação dos dados.
- Custo reduzido a comprado a roteadores\*.
- Cada vez mais esta no centro da rede do provedor.
- Os mais novos suportam Mpls através de hardware.

\* Switches não são capazes de exercer todas as funções de um roteador.

# REDE COM REDUNDÂNCIA





# CONFIGURANDO O SWITCH

- CRS: Exemplos Básicos para Configurar seu Switch MikroTik by Wissam Melhem Quemel (Telequemel, Brazil) MUM 2018
- WIKI MIKROTIK
  - [https://wiki.mikrotik.com/wiki/Manual:CRS3xx\\_series\\_switches](https://wiki.mikrotik.com/wiki/Manual:CRS3xx_series_switches)
  - [https://wiki.mikrotik.com/wiki/Manual:CRS1xx/2xx\\_series\\_switches\\_examples](https://wiki.mikrotik.com/wiki/Manual:CRS1xx/2xx_series_switches_examples)
  - [https://wiki.mikrotik.com/wiki/Manual:CRS\\_Router](https://wiki.mikrotik.com/wiki/Manual:CRS_Router)

# AUTENTICAÇÃO PARALELA PPPOE

## CONFIGURAÇÃO CONCENTRADOR 1 E 2

PPPoE Service <109>

Service Name: 109

Interface: vlan109teste

Max MTU: [ ]

Max MRU: [ ]

MRRU: [ ]

Keepalive Timeout: 10

Default Profile: PPPOE

One Session Per Host

Max Sessions: 64

PADO Delay: [ ] ms

Authentication:  mschap2  mschap1  
 chap  pap

enabled

OK  
Cancel  
Apply  
Disable  
Copy  
Remove

PPPoE Service <109-b>

Service Name: 109-b

Interface: vlan109teste

Max MTU: [ ]

Max MRU: [ ]

MRRU: [ ]

Keepalive Timeout: 10

Default Profile: PPPOE

One Session Per Host

Max Sessions: [ ]

PADO Delay: 100 ms

Authentication:  mschap2  mschap1  
 chap  pap

enabled

OK  
Cancel  
Apply  
Disable  
Copy  
Remove

# AUTENTICAÇÃO FAILOVER PPPOE

## CONCENTRADOR 1

PPPoE Service <109>

Service Name: 109

Interface: vlan109-teste

Max MTU: [ ]

Max MRU: [ ]

MRRU: [ ]

Keepalive Timeout: 10

Default Profile: PPPOE

One Session Per Host

Max Sessions: [ ]

PADO Delay: [ ] ms

Authentication:  mschap2  mschap1  
 chap  pap

enabled

OK  
Cancel  
Apply  
Disable  
Copy  
Remove

## CONCENTRADOR 2

PPPoE Service <109-b>

Service Name: 109-b

Interface: vlan109-teste

Max MTU: [ ]

Max MRU: [ ]

MRRU: [ ]

Keepalive Timeout: 10

Default Profile: PPPOE

One Session Per Host

Max Sessions: [ ]

PADO Delay: 100 ms

Authentication:  mschap2  mschap1  
 chap  pap

enabled

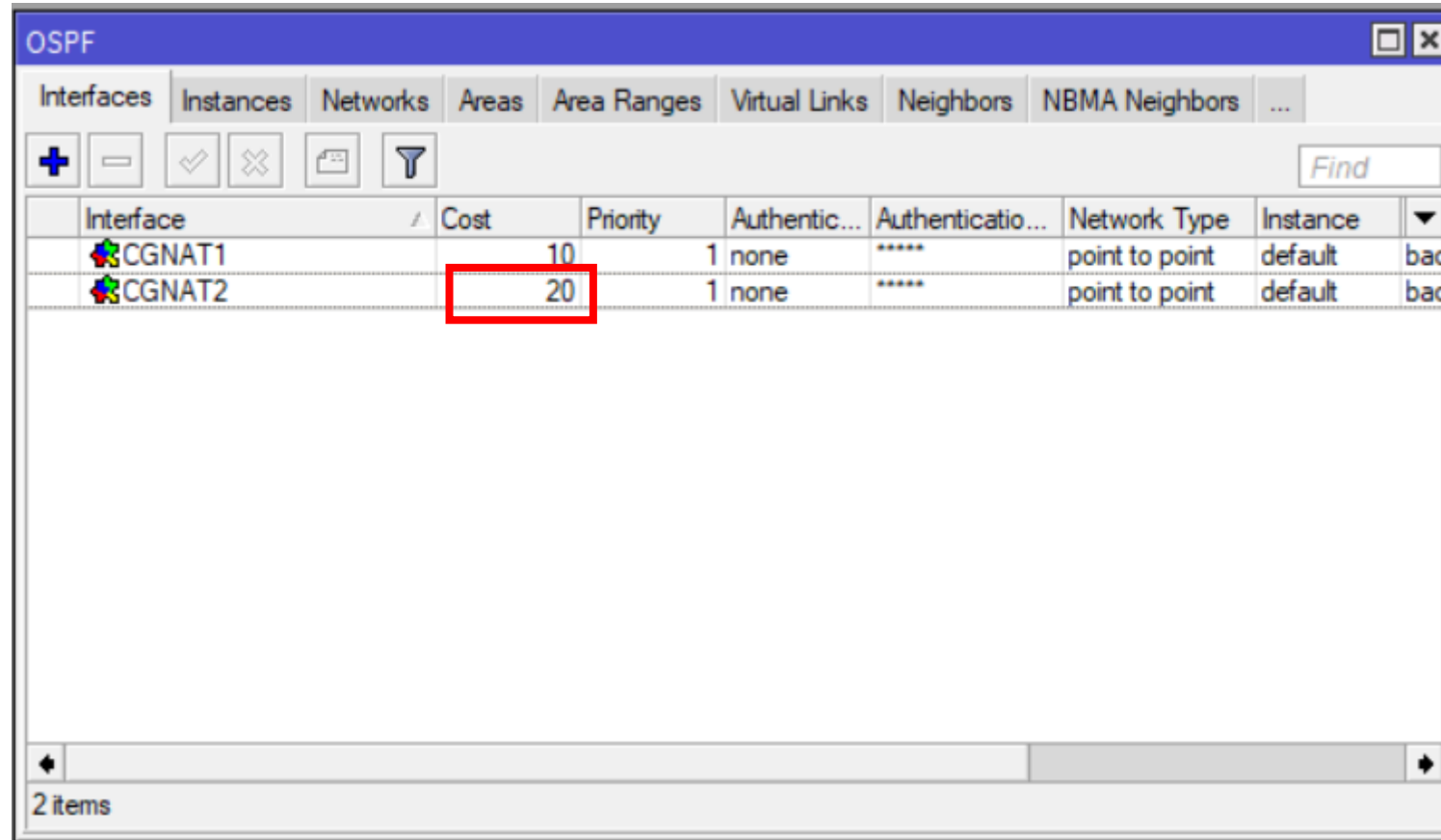
OK  
Cancel  
Apply  
Disable  
Copy  
Remove

# CONFIGURANDO O OSPF

- Routing OSPF by Flávio Guimarães (Matrix Corporation, Brazil) MUM 2018
- WIKI MIKROTIK
  - <https://wiki.mikrotik.com/wiki/Manual:Routing/OSPF>
  - <https://wiki.mikrotik.com/wiki/Manual:OSPF-examples>
  - [https://wiki.mikrotik.com/wiki/Manual:OSPF\\_Case\\_Studies](https://wiki.mikrotik.com/wiki/Manual:OSPF_Case_Studies)

# MANIPULAÇÃO CUSTO INTERFACE DO CGNAT

## CONFIGURAÇÃO CONCENTRADOR 1



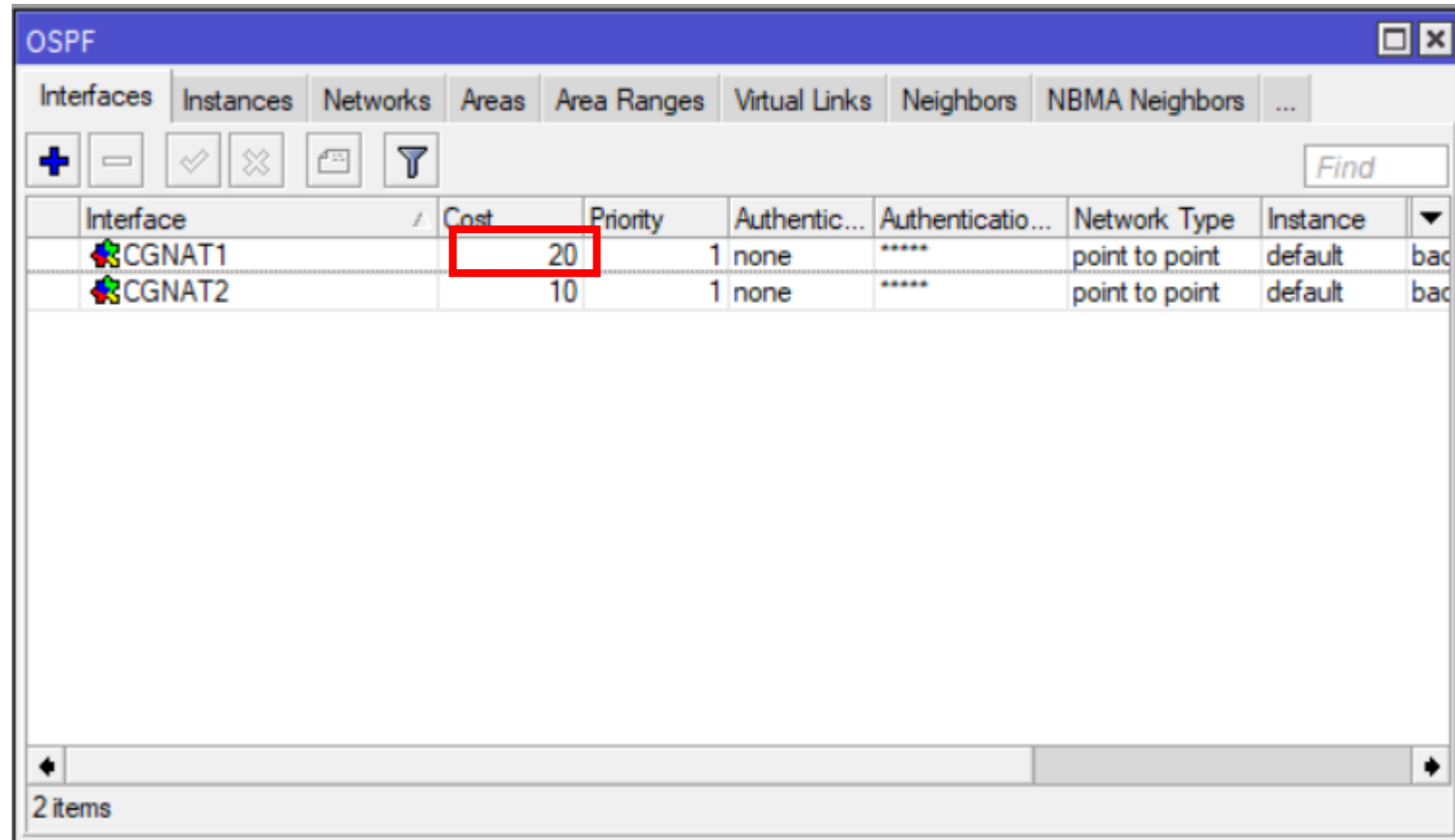
The screenshot shows the OSPF configuration window with the 'Interfaces' tab selected. A table lists the configured interfaces and their parameters. The 'Cost' column for CGNAT2 is highlighted with a red box, indicating its value of 20.

Interface	Cost	Priority	Authentic...	Authenticatio...	Network Type	Instance	
CGNAT1	10	1	none	*****	point to point	default	bac
CGNAT2	20	1	none	*****	point to point	default	bac

2 items

# MANIPULAÇÃO CUSTO INTERFACE DO CGNAT

## CONFIGURAÇÃO CONCENTRADOR 2



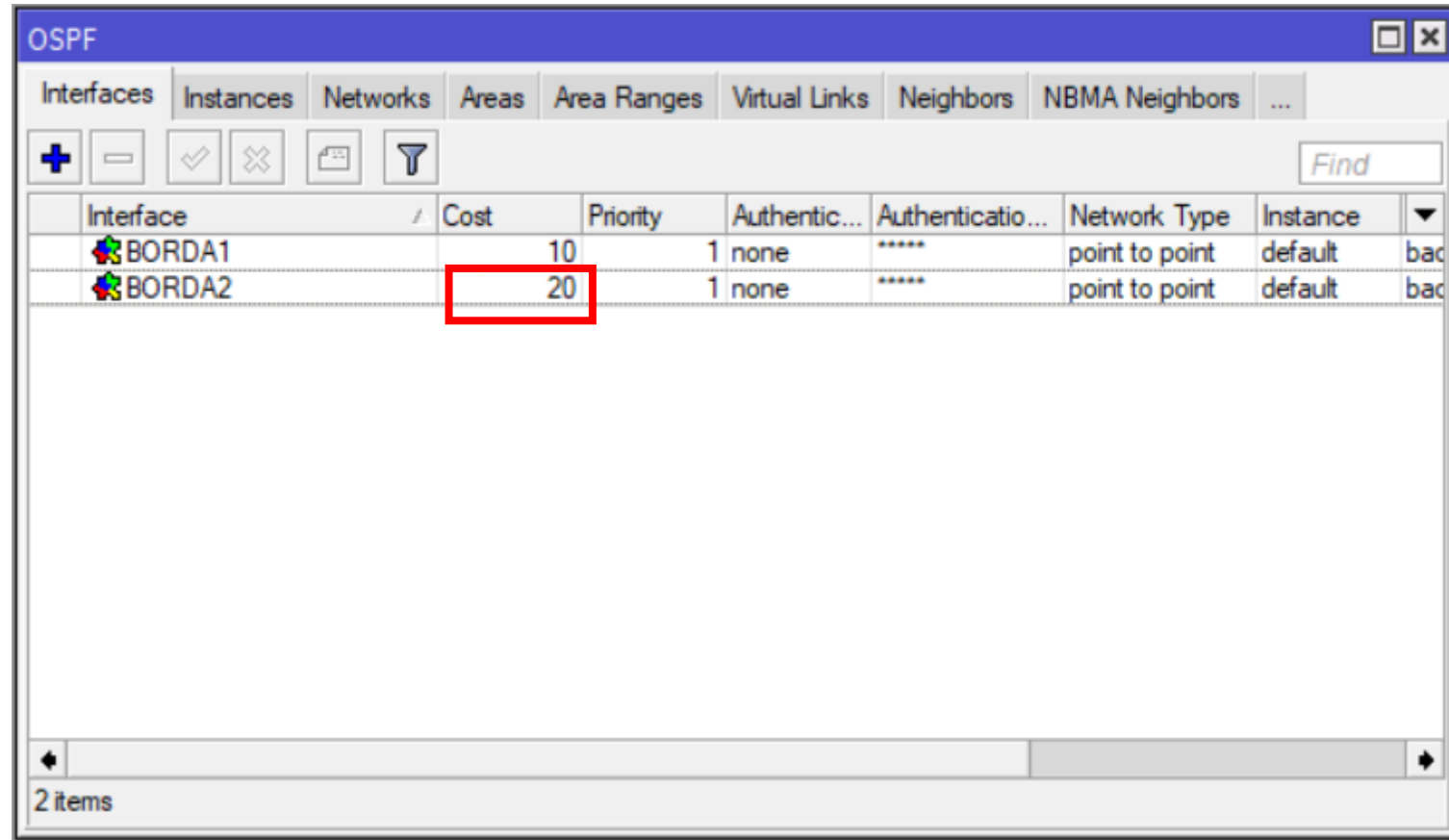
The screenshot shows the OSPF configuration window with a table of interface configurations. The 'Cost' column for CGNAT1 is highlighted with a red box, indicating its value of 20.

Interface	Cost	Priority	Authentic...	Authenticatio...	Network Type	Instance	
CGNAT1	20	1	none	*****	point to point	default	bac
CGNAT2	10	1	none	*****	point to point	default	bac

2 items

# MANIPULAÇÃO CUSTO INTERFACE DO CGNAT

## CONFIGURAÇÃO CGNAT 1



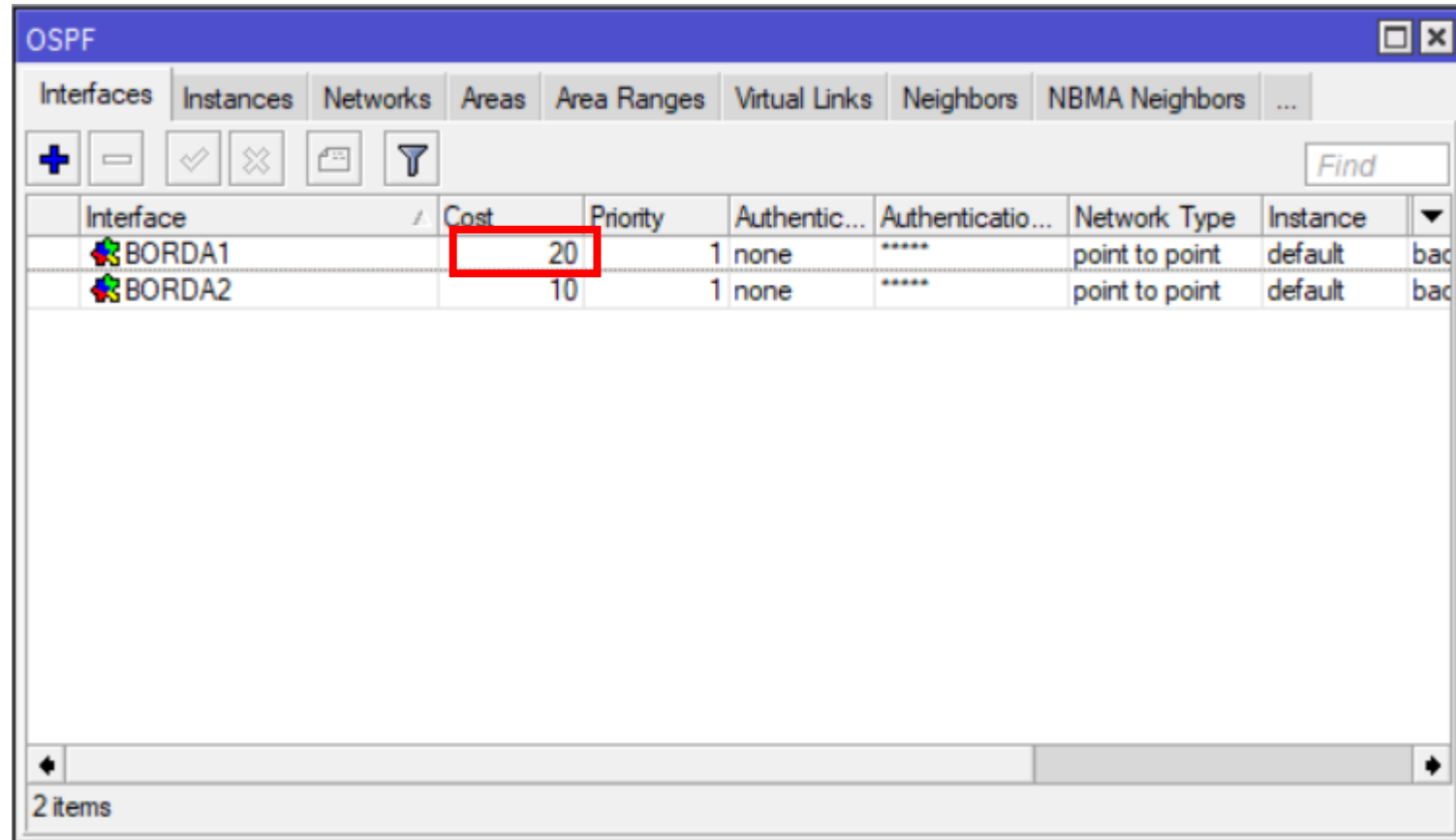
The screenshot shows the OSPF configuration window with a table of interface configurations. The 'Cost' column for the 'BORDA2' interface is highlighted with a red box, indicating its value of 20.

Interface	Cost	Priority	Authentic...	Authenticatio...	Network Type	Instance	
BORDA1	10	1	none	*****	point to point	default	bac
BORDA2	20	1	none	*****	point to point	default	bac

2 items

# MANIPULAÇÃO CUSTO INTERFACE DO CGNAT

## CONFIGURAÇÃO CGNAT 2



The screenshot shows the OSPF configuration window with the 'Interfaces' tab selected. A table lists the configured interfaces and their associated costs. The cost for interface BORDA1 is highlighted with a red box.

Interface	Cost	Priority	Authentic...	Authenticatio...	Network Type	Instance	
BORDA1	20	1	none	*****	point to point	default	bac
BORDA2	10	1	none	*****	point to point	default	bac

2 items



# CONFIGURANDO O CGNAT

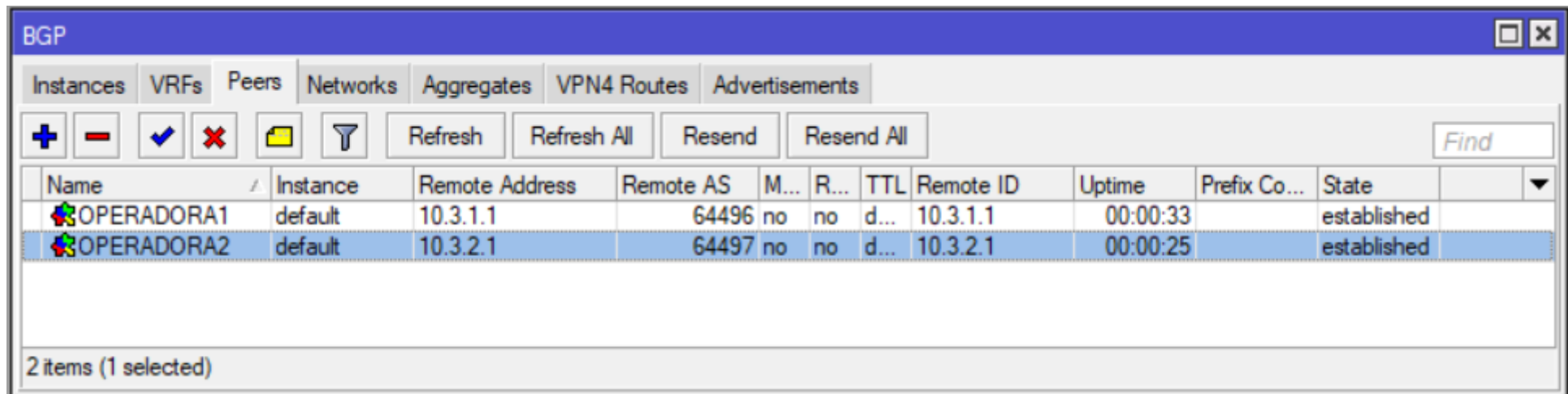
- Explorando o IP Pool, IP (v4) diferente a cada conexão e compartilhamento de IPs com CGNAT com preservação de histórico by Ademir Vida (Wide Soft International, Brazil)MUM 2017
- WIKI MIKROTIK
  - <https://wiki.mikrotik.com/wiki/Manual:IP/Firewall/NAT>

# CONFIGURANDO O BGP

- Manipulando Tráfego Utilizando Atributos BGP by Wissam Melhem Quemel (Telequemel, Brazil) MUM 2017
- WIKI MIKROTIK
  - <https://wiki.mikrotik.com/wiki/Manual:Routing/BGP>
  - [https://wiki.mikrotik.com/wiki/Manual:BGP\\_Case\\_Studies](https://wiki.mikrotik.com/wiki/Manual:BGP_Case_Studies)
  - [https://wiki.mikrotik.com/wiki/Manual:BGP\\_HowTo\\_%26\\_FAQ](https://wiki.mikrotik.com/wiki/Manual:BGP_HowTo_%26_FAQ)

# ABERTURA DE SESÃO COM AS DUAS OPERADORAS

## CONFIGURAÇÃO PEER BGP BORDA 1 E 2



The screenshot shows a network management interface for BGP. The window title is "BGP". The interface includes several tabs: "Instances", "VRFs", "Peers", "Networks", "Aggregates", "VPN4 Routes", and "Advertisements". Below the tabs is a toolbar with icons for adding (+), removing (-), checking (✓), deleting (✗), saving (floppy), and filtering (funnel), along with buttons for "Refresh", "Refresh All", "Resend", and "Resend All". A search box labeled "Find" is also present. The main area contains a table with the following columns: Name, Instance, Remote Address, Remote AS, M..., R..., TTL, Remote ID, Uptime, Prefix Co..., and State. Two rows are visible, both with a state of "established".

Name	Instance	Remote Address	Remote AS	M...	R...	TTL	Remote ID	Uptime	Prefix Co...	State
OPERADORA1	default	10.3.1.1	64496	no	no	d...	10.3.1.1	00:00:33		established
OPERADORA2	default	10.3.2.1	64497	no	no	d...	10.3.2.1	00:00:25		established

2 items (1 selected)

# FILTROS BGP

## BORDA1

#	Chain	Prefix	Prefix Length	Action
:-----FILTRO SAÍDA OPERADORA 1-----				
0	OPERADORA1-OUT	10.255.0.0/22	22	accept
1	OPERADORA1-OUT	10.255.0.0/23	23	accept
2	OPERADORA1-OUT			discard
:-----FILTRO SAÍDA OPERADORA 2-----				
3	OPERADORA2-OUT	10.255.0.0/22	22	accept
4	OPERADORA2-OUT	10.255.2.0/23	23	accept
5	OPERADORA2-OUT			discard
:-----FILTRO ENTRADA OPERADORA 1-----				
6	OPERADORA1-IN	0.0.0.0/0	0	accept
7	OPERADORA1-IN	10.255.0.0/22	22-24	discard
8	OPERADORA1-IN	0.0.0.0/0	1-24	accept
9	OPERADORA1-IN			discard
:-----FILTRO ENTRADA OPERADORA 2-----				
10	OPERADORA2-IN	0.0.0.0/0	0	accept
11	OPERADORA2-IN	10.255.0.0/22	22-24	discard
12	OPERADORA2-IN	0.0.0.0/0	1-24	accept
13	OPERADORA2-IN			discard

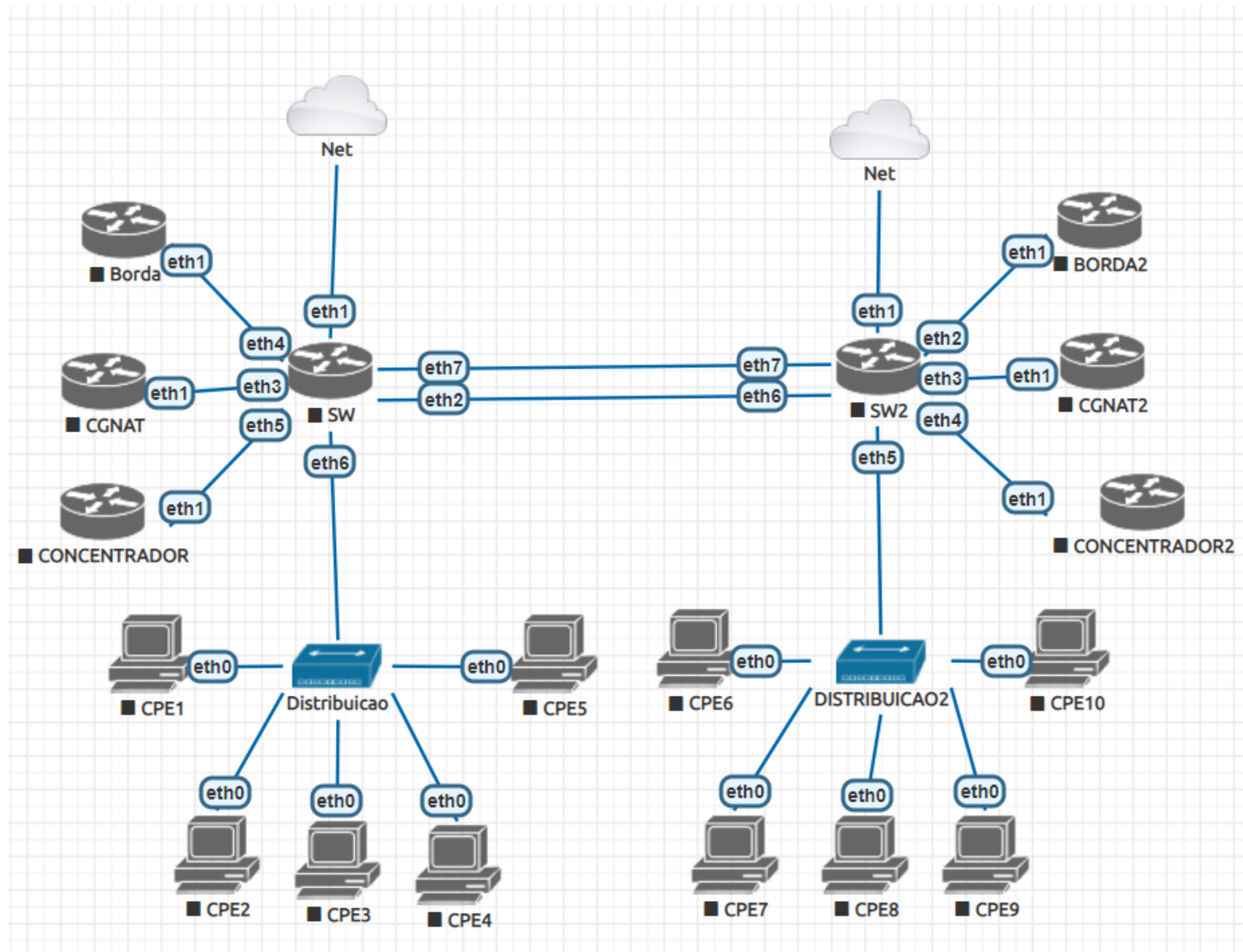
14 items (1 selected)

## BORDA2

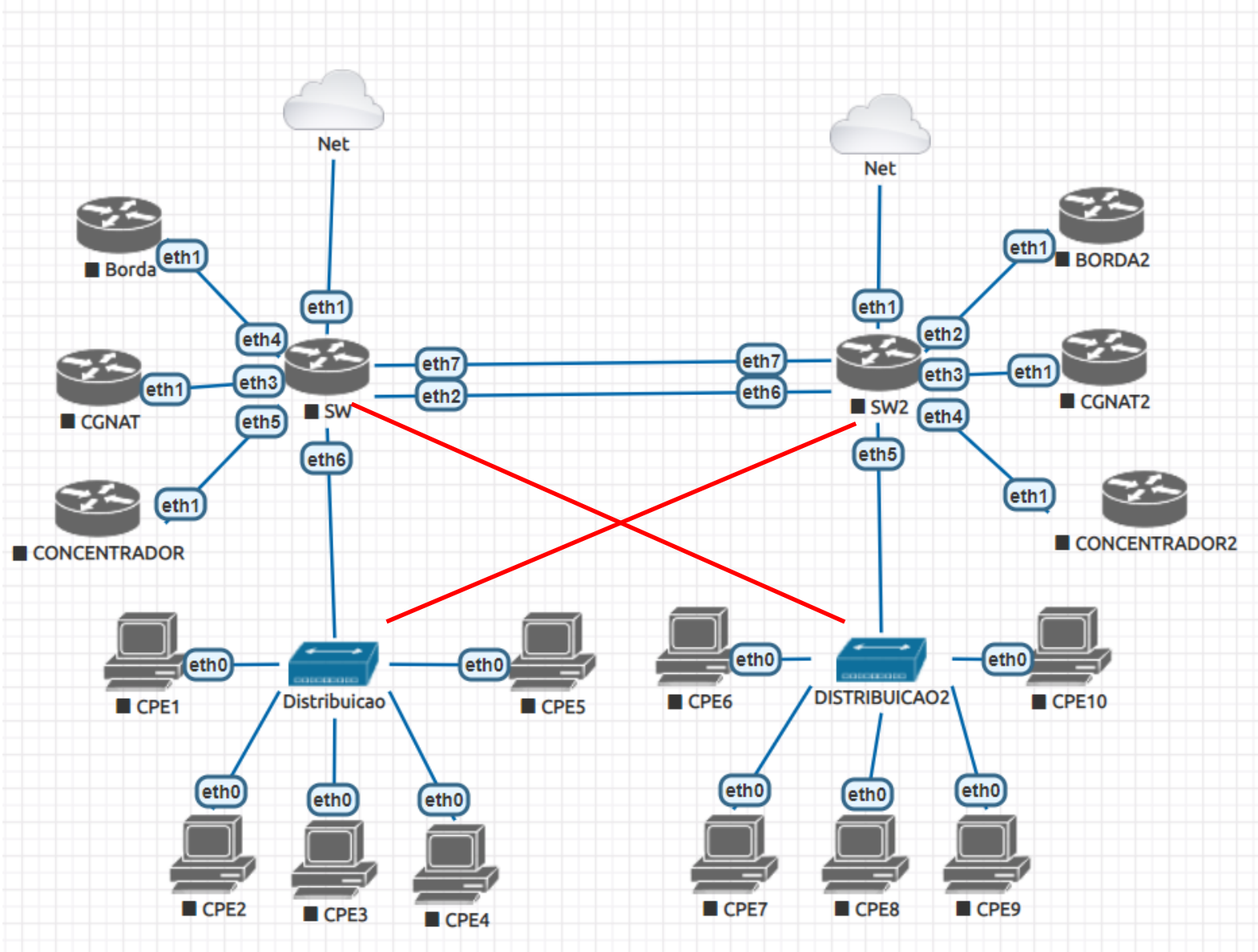
#	Chain	Prefix	Prefix Length	Action
:-----FILTRO SAÍDA OPERADORA 1-----				
0	OPERADORA1-OUT	10.255.0.0/22	22	accept
1	OPERADORA1-OUT	10.255.0.0/23	23	accept
2	OPERADORA1-OUT			discard
:-----FILTRO SAÍDA OPERADORA 2-----				
3	OPERADORA2-OUT	10.255.0.0/22	22	accept
4	OPERADORA2-OUT	10.255.2.0/23	23	accept
5	OPERADORA2-OUT			discard
:-----FILTRO ENTRADA OPERADORA 1-----				
6	OPERADORA1-IN	0.0.0.0/0	0	accept
7	OPERADORA1-IN	10.255.0.0/22	22-24	discard
8	OPERADORA1-IN	0.0.0.0/0	1-24	accept
9	OPERADORA1-IN			discard
:-----FILTRO ENTRADA OPERADORA 2-----				
10	OPERADORA2-IN	0.0.0.0/0	0	accept
11	OPERADORA2-IN	10.255.0.0/22	22-24	discard
12	OPERADORA2-IN	0.0.0.0/0	1-24	accept
13	OPERADORA2-IN			discard

14 items (1 selected)

# REDE COM REDUNDÂNCIA



# REDE COM REDUNDÂNCIA



# CONFIGURANDO O MSTP

- Let's take a look at the Multiple Spanning Tree Protocol (MSTP) by Sebastian Inacker MUM FR 2019
- WIKI MIKROTIK
  - [https://wiki.mikrotik.com/wiki/Manual:Spanning\\_Tree\\_Protocol](https://wiki.mikrotik.com/wiki/Manual:Spanning_Tree_Protocol)

Meu sw não é da linha 3xx.



Meu sw não é da linha 3xx.

Desligue a porta MANUALMENTE no crs/css.

DÚVIDAS

