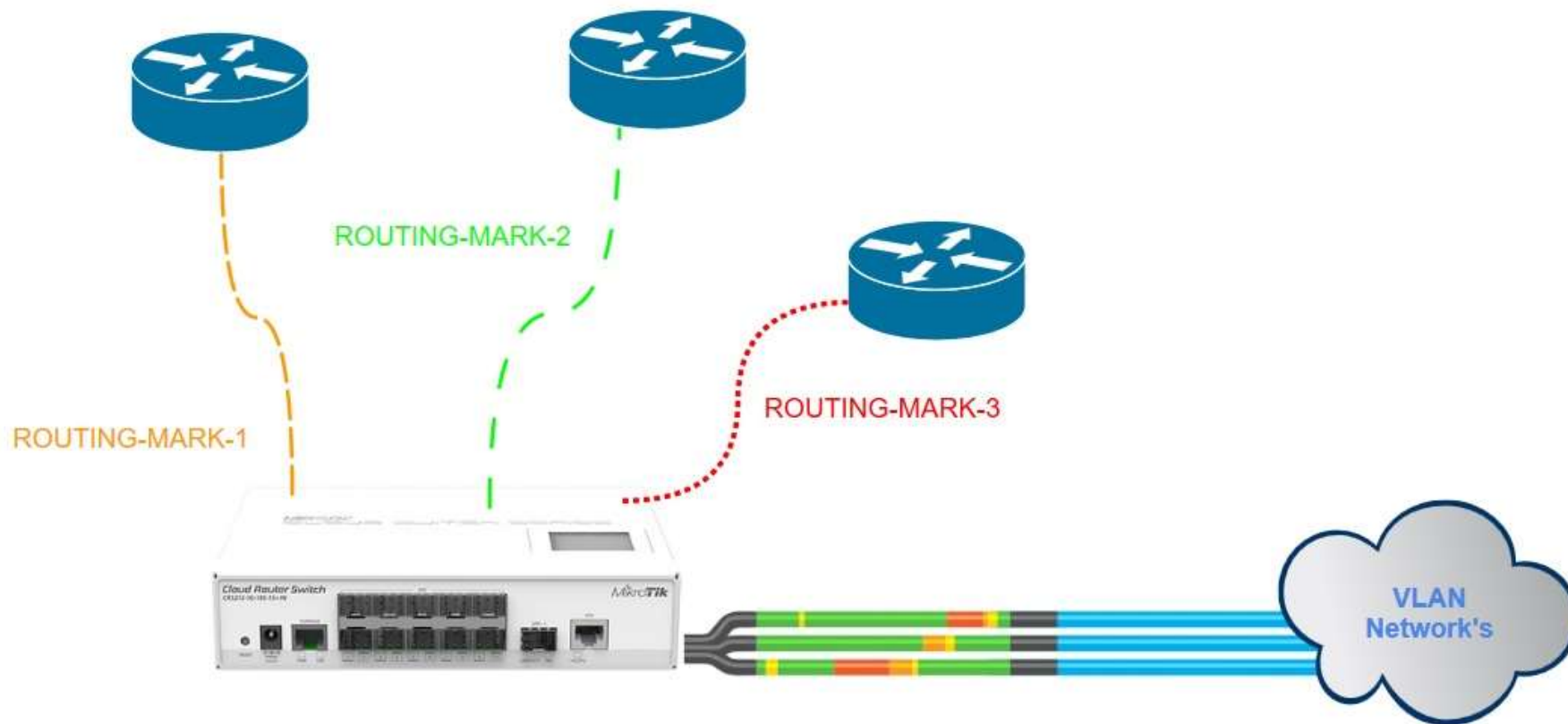


CASO DE ÉXITO:

# Routers MikroTik utilizando mangle para ruteos especiales

Manuel Muñiz





## PASOS BÁSICOS:

- VLAN's (dot1Q)
- Mangle
- Mark-Routing
- Enrutamiento

# VLAN

Una VLAN, acrónimo de virtual LAN (Red de área local virtual), es un método para crear redes lógicas independientes dentro de una misma red física.

Protocolo IEEE 802.1Q

- Quick Set
- Interfaces
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- Switch
- Mesh
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- MPLS
- Routing
- System
- Queues
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- Tools
- New Terminal
- LCD
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- Make Supout.rtf
- Manual
- New WinBox
- Exit

Firewall

Filter Rules NAT

+ - ✓ ✗

Route List

Routes Nexthops Rules VRF

+ - ✓ ✗

all

#	Action	Dst. Address	Gateway	Distance	Routing Mark	Pref. Source	Comment
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Interface List

Interface Ethernet EoIP Tunnel IP Tunnel GRE Tunnel VLAN VRRP Bonding LTE

+ - ✓ ✗

	Name	Type	Tx	Rx	Tx Packet (p/s)	Rx Packet (p/s)	FP Tx	FP Rx	VLAN ID	Interface	Comment
R	↔ Connection-BocaDMonte1	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	796	sfp 1	
R	↔ Connection-BocaDMonte2	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	797	sfp 1	
R	↔ Connection-VarredaZ18	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	798	sfp 1	
R	↔ genesis-chimaltenango	VLAN	2.7 Mbps	171.3 kbps	421	324	0 bps	171.3 kbps	810	sfp 1	
R	↔ Connection-Totonicapan	VLAN	968 bps	1008 bps	2	2	0 bps	1008 bps	825	sfp 1	
R	↔ Connection-Salama	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	826	sfp 1	
R	↔ Connection-Cuilapa	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	827	sfp 1	
R	↔ Connection-Chimaltenango	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	828	sfp 1	
R	↔ Connection-Tiquisate	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	829	sfp 1	
R	↔ Connection-TecunUman	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	830	sfp 1	
R	↔ Connection-Barberena	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	831	sfp 1	
R	↔ Connection-Sanarate	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	832	sfp 1	
R	↔ Connection-La-Trinidad	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	833	sfp 1	
R	↔ Connection-Pradera-Chimal	VLAN	0 bps	22.3 kbps	0	8	0 bps	22.3 kbps	834	sfp 1	
R	↔ Connection-Poptun	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	835	sfp 1	
R	↔ Connection-Sumpango	VLAN	592 bps	592 bps	1	1	0 bps	592 bps	836	sfp 1	
R	↔ Connection-Sayaxche	VLAN	4.7 kbps	4.0 kbps	1	1	0 bps	4.0 kbps	837	sfp 1	
R	↔ Connection-La-Libertad	VLAN	0 bps	5.7 kbps	0	4	0 bps	5.7 kbps	838	sfp 1	
R	↔ Connection-MelchorMencos	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	839	sfp 1	
R	↔ Connection-San-Luis	VLAN	880 bps	1056 bps	2	2	0 bps	1056 bps	840	sfp 1	
R	↔ Connection-Panajachel	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	841	sfp 1	
R	↔ La Torre-Xela	VLAN	41.0 kbps	21.6 kbps	21	15	0 bps	21.6 kbps	844	sfp 1	
R	↔ Connection-pete-Karrosi	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	845	sfp 1	
R	↔ Connection-Peten-MundoM...	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	846	sfp 1	
R	↔ connection-PetenMetroPlaza	VLAN	0 bps	0 bps	0	0	0 bps	0 bps	847	sfp 1	
R	↔ torre-sn-marcos	VLAN	23.2 kbps	999.7 kbps	44	86	0 bps	999.7 kbps	849	sfp 1	
R	↔ distelsa-cs2	VLAN	3.2 kbps	5.0 kbps	6	7	0 bps	5.0 kbps	910	sfp 1	
R	↔ BPO-Back	VLAN	0 bps	2.6 kbps	0	3	0 bps	2.6 kbps	919	sfp 1	
R	↔ distelsa-americas	VLAN	27.7 kbps	37.8 kbps	15	16	0 bps	37.8 kbps	962	sfp 1	

183 items out of 200

RouterOS WinBox

# MANGLE

Mangle es una especie de 'marcador' que marca los paquetes para el procesamiento futuro con marcas especiales. Muchas otras instalaciones en RouterOS hacen uso de estas marcas, por ejemplo, queue trees, NAT, el **enrutamiento**. Identifican un paquete basado en su marca y lo procesan en consecuencia. Las marcas de mangle sólo existen en el router, no se transmiten a través de la red.

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Firewall													
Filter Rules NAT Mangle Service Ports Connections Address Lists Layer7 Protocols													
#	Action	Chain	Src. Address	Dst. Address	Proto...	Src. Port	Dst. Port	In. Interface	Out. Int...	New Routing Mark	Bytes	Packets	Conn
34	mark routing	prerouting						conection-Florida		CONNECTION	23.1 GiB	255 228 ...	
35	mark routing	prerouting						conection-AguilarBatres		CONNECTION	6.0 GiB	49 652 481	
36	mark routing	prerouting						conection-EL-Punto		CONNECTION	21.6 MiB	143 991	
37	mark routing	prerouting						conection-CC-Moserrat		CONNECTION	16.7 GiB	139 474 ...	
38	mark routing	prerouting						conection-MetaMercado		CONNECTION	22.0 MiB	144 023	
39	mark routing	prerouting						conection-Mega6		CONNECTION	4220.8 MiB	32 482 870	
40	mark routing	prerouting						conection-Bosques		CONNECTION	6.5 GiB	52 507 920	
41	mark routing	prerouting						conection-trebol		CONNECTION	3108.6 MiB	18 178 639	
42	mark routing	prerouting						conection-CCzona4		CONNECTION	3163.9 MiB	20 397 525	
43	mark routing	prerouting						Conection-Merc-Parroquia		CONNECTION	5.0 GiB	25 189 004	
44	mark routing	prerouting						Conection-SanFran		CONNECTION	3593.1 MiB	20 013 475	
45	mark routing	prerouting						conection-faro		CONNECTION	5.2 GiB	29 093 891	
46	mark routing	prerouting						conection-isla		CONNECTION	21.0 MiB	144 008	
47	mark routing	prerouting						conection-SanCris2		CONNECTION	21.6 MiB	143 973	
48	mark routing	prerouting						conections-z18		CONNECTION	42.1 GiB	295 119 ...	
49	mark routing	prerouting						conection-SnRafael		CONNECTION	21.5 MiB	143 897	
50	mark routing	prerouting						Conection-SN-Mig-Pet		CONNECTION	3881.5 MiB	21 987 517	
51	mark routing	prerouting						Conection-VillaHem		CONNECTION	11.4 GiB	54 918 203	
52	mark routing	prerouting						Conection-Villanueva-6av		CONNECTION	6.9 GiB	34 777 529	
53	mark routing	prerouting						conection-Montufar		CONNECTION	6.3 GiB	35 795 562	
54	mark routing	prerouting						Conection-Z1-18Calle		CONNECTION	3032.6 MiB	13 544 415	
55	mark routing	prerouting						Conection-Pacif-VillaHem		CONNECTION	7.1 GiB	46 063 015	
56	mark routing	prerouting						Conection-VillaNueva-Z1		CONNECTION	3809.1 MiB	18 089 999	
57	mark routing	prerouting						conection-jocotales		CONNECTION	4598.5 MiB	20 115 039	
58	mark routing	prerouting						conection-Capitol		CONNECTION	4465.4 MiB	26 191 542	
59	mark routing	prerouting						conection-GaleriasSur		CONNECTION	22.0 MiB	143 968	
60	mark routing	prerouting						conection-VillaCanales		CONNECTION	9.6 GiB	52 425 257	
61	mark routing	prerouting						Conection-Sn-LucasCC		CONNECTION	3868.6 MiB	23 540 967	
62	mark routing	prerouting						El-Frutal		CONNECTION	2526.1 MiB	18 549 597	
63	mark routing	prerouting						Conection-BocaDMonte1		CONNECTION	73.2 MiB	439 287	
64	mark routing	prerouting	10.10.32.0/24					Amatitlan-Core		Gestion	244.2 MiB	1 335 728	
65	mark routing	prerouting						Conection-BocaDMonte2		CONNECTION	114.1 MiB	735 080	
66	mark routing	prerouting						Conection-VarredaZ18		CONNECTION	3763.1 MiB	33 119 402	
67	mark routing	prerouting						Conection-Sacatepequez		CONNECTION	9.8 GiB	51 222 139	
68	mark routing	prerouting						Conection-Chimaltenango		CONNECTION	4558.6 MiB	26 035 727	
69	mark routing	prerouting						Conection-Sayaxche		CONNECTION	5.9 GiB	25 456 181	

Mangle Rule <172.16.99.0/24>

General Advanced Extra Action Statistics

Chain: prerouting

Src. Address: 190.113.88.2

Dst. Address:

Protocol:

Src. Port:

Dst. Port:

Any. Port:

P2P:

In. Interface: vlan-Ejemplo

Out. Interface:

Packet Mark:

Connection Mark:

Routing Mark:

Routing Table:

Connection Type:

Connection State:

Connection NAT State:

OK  
Cancel  
Apply  
Enable  
Comment  
Copy  
Remove  
Reset Counters  
Reset All Counters

disabled

Mangle Rule <172.16.4.0/24>

General Advanced Extra Action Statistics

Chain: prerouting

Src. Address: 172.16.4.0/24

Dst. Address:

Protocol:

Src. Port:

Dst. Port:

Any. Port:

P2P:

In. Interface: Escuintla-640

Out. Interface:

Packet Mark:

Connection Mark:

Routing Mark:

Routing Table:

Connection Type:

Connection State:

Connection NAT State:

OK  
Cancel  
Apply  
Disable  
Comment  
Copy  
Remove  
Reset Counters  
Reset All Counters

enabled

Mangle Rule <>

General Advanced Extra Action Statistics

Chain: prerouting

Src. Address:

Dst. Address:

Protocol:

Src. Port:

Dst. Port:

Any. Port:

P2P:

In. Interface: conection-AguilarBatres

Out. Interface:

Packet Mark:

Connection Mark:

Routing Mark:

Routing Table:

Connection Type:

Connection State:

Connection NAT State:

OK  
Cancel  
Apply  
Disable  
Comment  
Copy  
Remove  
Reset Counters  
Reset All Counters

enabled



# Mark-Routing

Coloca una marca específica por el parámetro `new-routing-mark` en un paquete. Este tipo de marcas se utiliza para fines de políticas enrutamiento únicamente

# Donde colocar el Marcado:

Las reglas de Mangle están organizadas en cadenas y hay 5 cadenas por default:

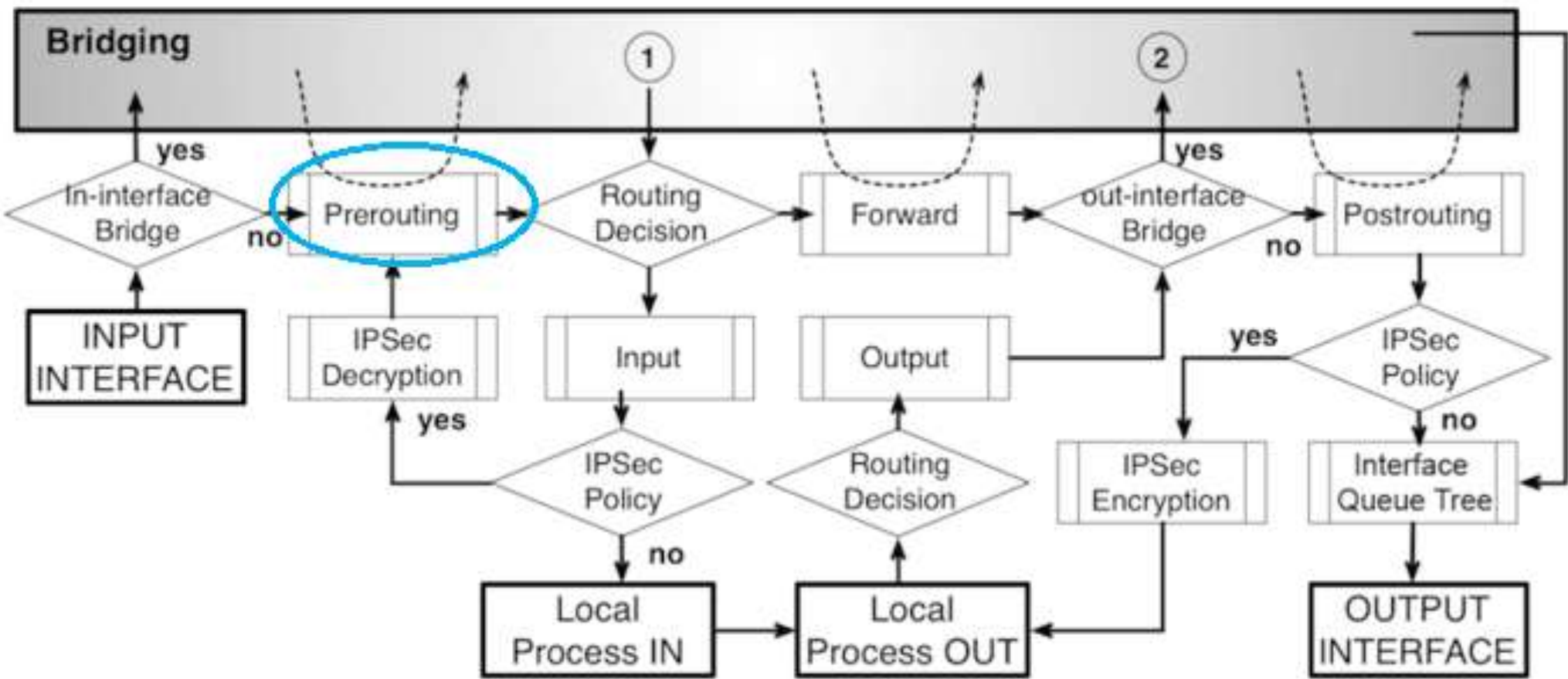
Prerouting = Hacer marcado antes del queue Global-In

Postrouting = Hacer marcado antes del queue Global-Out

Input = Hacer marcado antes del filtro Input

Output = Hacer marcado antes del filtro de Output

Forward = Hacer marcado antes del filtro de Forward



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Firewall

Filter Rules NAT Mangle Service Ports Connections Address Lists Layer7 Protocols

New Routing Mark: [ejemplo] contains [ejemplo] Filter

#	Action	Chain	Src. Address	Dst. Address	Protocol	In. Interface	Out. Interface	Routing Mark	New Routing Mark	Bytes	Packets	Comment
8	mark routing	prerouting	172.16.99.0/24						ejemplo	2404.9 KiB	27 688	

Mangle Rule <172.16.99.0/24>

General | Advanced | Extra | Action | Statistics

Chain: prerouting

Src. Address: 172.16.99.0/24

Dst. Address:

Protocol:

Src. Port:

Dst. Port:

Any. Port:

P2P:

In. Interface:

Out. Interface:

Packet Mark:

Connection Mark:

Routing Mark:

Routing Table:

Connection Type:

Connection State:

Connection NAT State:

OK Cancel Apply Enable Comment Copy Remove Reset Counters Reset All Counters

Mangle Rule <172.16.99.0/24>

General | Advanced | Extra | Action | Statistics

Action: mark routing

Log

Log Prefix:

New Routing Mark: ejemplo

Passthrough

OK Cancel Apply Enable Comment Copy Remove Reset Counters Reset All Counters

# Enrutamiento

Utilizando la marca de ruteo  
anteriormente realizada creamos las  
rutas estáticas

Route List

Routes Nexthops Rules VRF

Routing Mark: contains ejemplo

	Dst. Address	Gateway	Type	Distance	Routing Mark	Pref. Source	Comment
AS	0.0.0.0/0	190.113.90.249 reachable Bridge-Wan-1	unicast	1	ejemplo		Routing-Mark 1
AS	0.0.0.0/0	190.151.130.75 reachable Bridge-Wan2	unicast	1	ejemplo2		Routing-Mark2

Route List

Routes Nexthops Rules VRF

	Dst. Address	Gateway	Distance	Route
AS	0.0.0.0/0	192.200.9.4 reachable cruzverde	1	CRU
AS	0.0.0.0/0	192.168.125.1 reachable panamericana	1	PAN
AS	0.0.0.0/0	192.111.100.100 reachable distelsa-data	1	DIST
AS	0.0.0.0/0	190.151.130.68 reachable vlan172	1	CON
AS	0.0.0.0/0	172.16.99.1 reachable ether2	1	
AS	0.0.0.0/0	172.16.1.1 reachable genesis-z9	1	GE
AS	0.0.0.0/0	128.1.1.200 reachable unisuper_office	1	LA
AS	0.0.0.0/0	72.252.3.114 reachable vlan172	1	GM
AS	0.0.0.0/0	10.60.30.1 reachable diveco-central	1	DI
AS	0.0.0.0/0	10.50.20.1 reachable BPO-Back	1	BP
AS	0.0.0.0/0	10.10.1.1 reachable vlan20	1	Ge

211 items

Route <0.0.0.0/0>

General Attributes

Dst. Address: 0.0.0.0/0

Gateway: 190.113.90.249

Check Gateway: ping

Type: unicast

Distance: 1

Scope: 30

Target Scope: 10

Routing Mark: ejemplo

Pref. Source:

OK Cancel Apply Enable Comment Copy Remove

Route <0.0.0.0/0>

General Attributes

Dst. Address: 0.0.0.0/0

Gateway: 190.151.130.75

Check Gateway: ping

Type: unicast

Distance: 1

Scope: 30

Target Scope: 10

Routing Mark: ejemplo2

Pref. Source:

OK Cancel Apply Enable Comment Copy Remove

The background features a dark blue gradient on the left, transitioning into a complex, glowing blue structure on the right. This structure consists of numerous thin, parallel lines that curve and spiral inward, creating a sense of depth and movement, similar to a tunnel or a data stream. The lines are more densely packed and brighter in the center of the curve, fading towards the edges.

GRACIAS