

Router on a Stick y su Aplicación para un ISP

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Presentación Personal

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- Certificaciones
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MTCINE/ MTCIPv6E / MTCSE





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Objetivos

- Definir el Dominio de Broadcast en la Red y porque se debe reducir.
- Definir el concepto Router on a Stick.
- Aplicar este concepto a un entorno WISP.

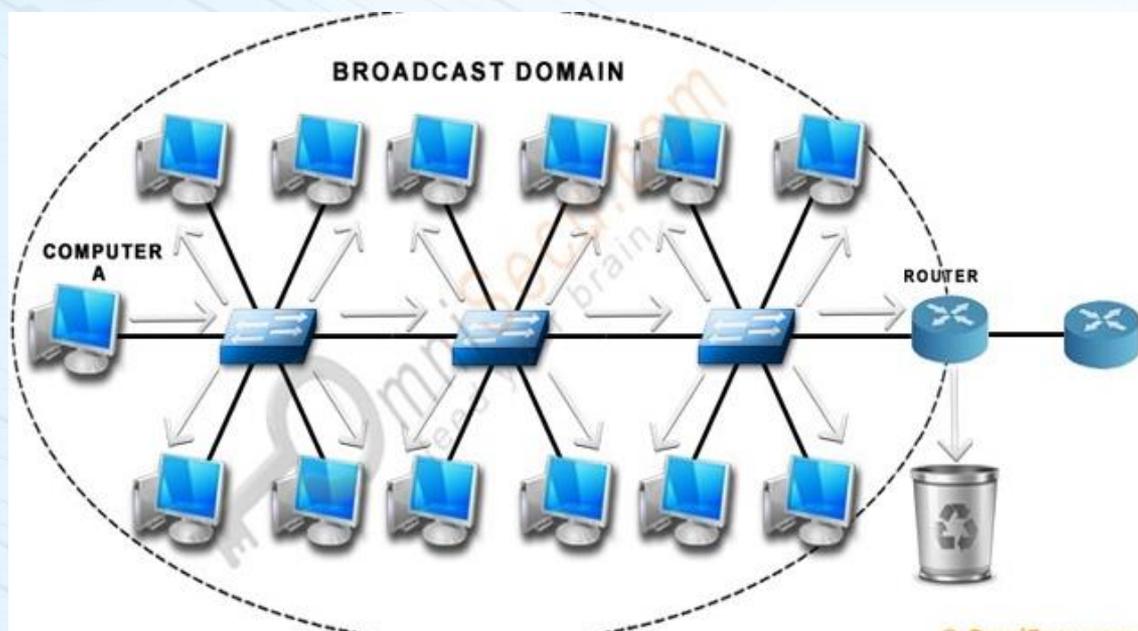


Conceptos

Dominio de Broadcast:

Es una división lógica de equipos conectados en red que todos pueden ser alcanzados a nivel de datos también se le conoce como L2.





Se utilizan equipos denominados Switches para ampliar la zona de conexión.

Varios equipos en Torre o Nodo Y Multiples clientes sobre una misma interfaz crean un gran entorno de broadcast.



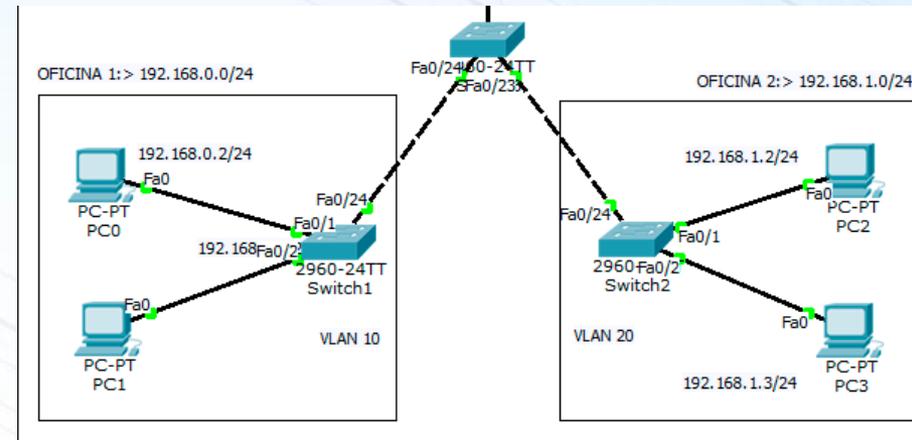
Interface	IP Address	MAC Address	Identity	Platform	Version
bridge	192.168.5.224	78.8A.20.AC.54.37	PowerBeam 5AC 500 ISO	PowerBeam 5AC 500 ISO	XC.apc3
bridge	192.168.5.245	44.D9.E7.AA.35.9A	apoptarenales	ArGrid M5 HP	XW.v5.6
bridge	192.168.5.137	78.8A.20.9C.F4.9F	Eugenio	LiteBeam M5	XW.v6.1
bridge	192.168.5.235	B4.FB.E4.64.20.99	ceoptarenalerecibe	LiteBeam M5	XW.v6.1
bridge	192.168.5.243	80.2A.A8.E4.11.66	salesanfelp	ArGrid M5 HP	XW.v6.0
bridge	192.168.5.214	B4.FB.E4.DE.CE.CF	salebrvis	LiteBeam M5	XW.v6.1
bridge	192.168.5.99	78.8A.20.1A.C0.A1	Linto	NanoStation Loco M2	XW.v6.0
bridge	192.168.5.57	78.8A.20.1A.CF.CA	RobertoDiaztx	NanoStation loco M2	XW.v6.1
bridge	192.168.5.174	68.72.51.46.1A.BA	Marcos Aguilar	NanoStation Loco M2	XM.v6.0
bridge	192.168.5.33	68.72.51.56.E1.6A	chai	NanoStation loco M2	XM.v6.1
bridge	192.168.5.26	FC.EC.DA.52.D7.72	apoptarenales	LiteBeam M5	XW.v6.1
bridge	192.168.5.83	04.18.D6.60.88.E9	chai	NanoStation M5	XW.v6.1
bridge	192.168.5.101	FC.EC.DAC.6.71.F6	Erlinda_Perdomo-fran	LiteBeam M5	XW.v6.0
bridge	192.168.5.205	68.72.51.5C.3E.49	sanfrancisco	NanoStation Loco M2	XM.v6.0
bridge	192.168.5.229	FC.EC.DA.08.9F.E8	ReneAlonzoMontes-1303.	PowerBeam M5 400	XW.v6.1
bridge	192.168.5.77	68.72.51.76.38.09	prino	NanoStation loco M2	XW.v6.1
bridge	192.168.5.246	FC.EC.DA.0A.F3.85	Ricibe_arenales	LiteBeam M5	XW.v6.0
bridge	192.168.5.212	FC.EC.DA.52.97.F0	Cosagual clientes	NanoStation Loco M2	XW.v6.1
bridge	192.168.5.210	B4.FB.E4.DE.B1.05	apoptcos	LiteBeam M5	XW.v6.1
bridge	192.168.5.219	78.8A.20.90.E8.77	Malnik	LiteBeam M5	XW.v6.0
bridge	192.168.5.62	18.E8.29.D0.05.D9	salecos	LiteBeam M5	XW.v6.1
bridge	192.168.5.102	18.E8.29.D0.08.E4	Recepcion Erlinda	LiteBeam M5	XW.v6.1
bridge	192.168.5.197	24.A4.3C.F4.A0.95	Felipa-Rivera_20	LM2	XM.v5.5
bridge	192.168.5.211	FC.EC.DA.C6.7D.A9	cosagual	LiteBeam M5	XW.v6.0
bridge	192.168.5.234	78.8A.20.1A.CB.E0	joc	NanoStation Loco M2	XW.v6.1
bridge	192.168.5.159	78.8A.20.1A.38.0E	Maria Mejia	NanoStation Loco M2	XW.v6.0
bridge	192.168.5.92	78.8A.20.1A.E7.47	Malin Aleman San ant	NanoStation Loco M2	XW.v6.0
bridge	192.168.5.150	78.8A.20.1A.CF.BB	JuanaMejia	NanoStation Loco M2	XW.v6.0
bridge	192.168.5.28	78.8A.20.9C.F4.EF	recibeand	LiteBeam M5	XW.v6.0
bridge	192.168.5.110	DC.9F.DB.2A.16.88	Artesano	NanoStation M5	XM.v6.1
bridge	192.168.5.244	04.18.D6.EE.AE.27	recibeanfelf	ArGrid M5 HP	XW.v6.0
bridge	192.168.5.118	DC.9F.DB.2A.16.8F	chai	NanoStation M5	XM.v6.1
bridge	192.168.5.90	68.72.51.26.DC.3F	Santiago_Gimenez_Slor...	NanoStation Loco M2	XM.v6.0
bridge	192.168.5.155	68.72.51.46.1A.A9	Laura cruz 7 dic	NanoStation Loco M2	XM.v6.0
bridge	192.168.5.129	78.8A.20.1A.B7.47	nancy	NanoStation Loco M2	XW.v6.0
bridge	192.168.5.218	68.72.51.5C.50.28	centimoras	NanoStation Loco M2	XW.v6.1
bridge	192.168.5.237	78.8A.20.90.11.84	chai	LiteBeam M5	XW.v6.1
bridge	192.168.5.252	68.72.51.28.EE.8E	cruz	NanoStation loco M2	XW.v6.1
bridge	192.168.5.45	68.72.51.5C.62.EA	Ruth	NanoStation Loco M2	XM.v6.0
bridge	192.168.5.127	78.8A.20.68.61.88	walter alvarado	NanoStation Loco M2	XW.v6.0
bridge	192.168.5.12	24.A4.3C.70.FB.C1	chai	NanoStation M5	XM.v6.0
bridge	10.156.254.22	DC.9F.D8.08.9E.88	Rocket M5	Rocket M5	XM.v6.1
bridge	192.168.5.248	78.8A.20.9C.F3.99	recibe_piraers_centro	LiteBeam M5	XW.v6.1



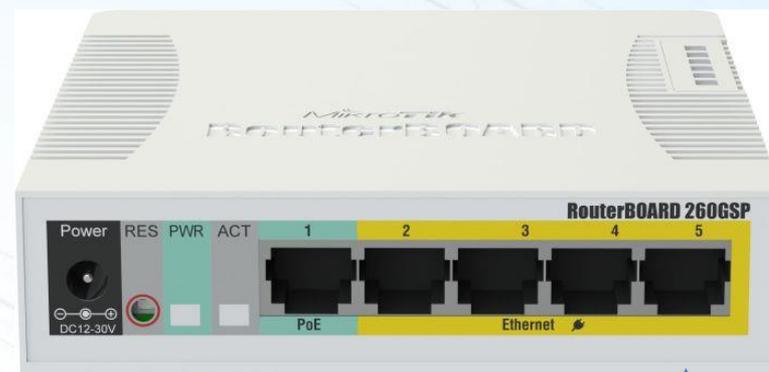
Vlans

Es un protocolo de encapsulamiento de trafico en determinada interfaz de red.

Se pueden crear redes virtuales dentro de un mismo switch fisico



Vlans en Nodo



Vlan30

Vlan40

Vlan50

Podemos asignar 1 puerto de cada dispositivo que tengas una vlan individual

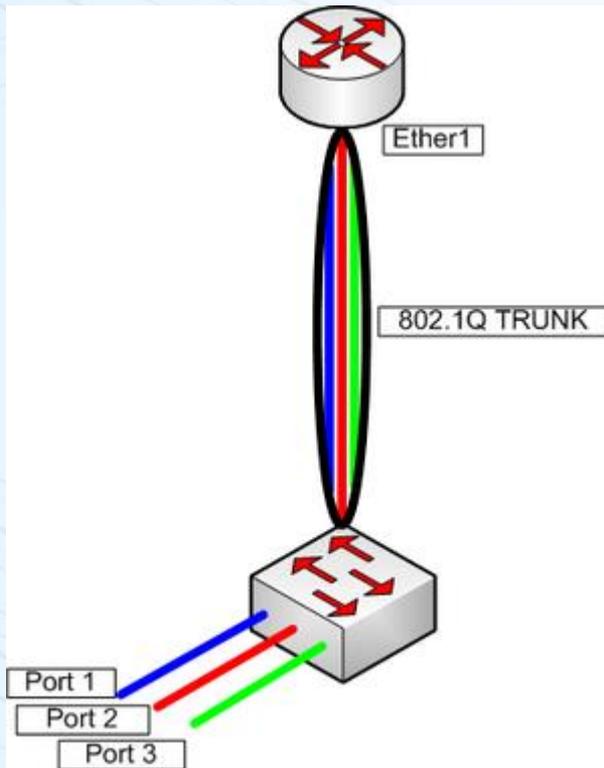
Router on a Stick

Enrutamiento InterVLAN:

Es un método que se utiliza para **intercomunicar vlans entre si** mediante el uso de un router donde se utiliza una sola interfaz para envío y recepción de los datos. Es fácil de implementar, solamente se necesita asignar las vlans a la interface Troncal.



Router on a Stick



Router on a Stick



Mikrotik RB260 GSP

- Switch Administrable via WEB
- Configuración de vlans
- Posee 1 Puerto SFP
- 4 puertos POE 24v
- Se energiza de 11 a 30v en la entrada (ojo **no** convierte a 24v en la salida.)
- Salida Máxima por puerto 1 A.
- Puede energizar un sistema max 2 A. 0.5 A. x cada puerto o 500 mA.



Configuración

MikroTik SwOS Logout

[Link](#)
[SFP](#)
[Forwarding](#)
[Statistics](#)
[VLAN](#)
[VLANs](#)
[Static Hosts](#)
[Hosts](#)
[SNMP](#)
[ACL](#)
[System](#)

	Port1	Port2	Port3	Port4	Port5
Link					
Enabled	<input checked="" type="checkbox"/>				
Link Status	no link	link on	link on	link on	link on
Auto Negotiation	<input checked="" type="checkbox"/>				
Speed		1000	100	1000	1000
Full Duplex	no	yes	yes	yes	yes
Flow Control	<input checked="" type="checkbox"/>				
PoE					
PoE Out		on ▼	auto ▼	on ▼	on ▼
PoE Priority		1 ▼	2 ▼	3 ▼	4 ▼
PoE Status	disabled	powered on	powered on	powered on	powered on
PoE Current		247mA	138mA	278mA	271mA
PoE Power		6.189W	3.458W	6.966W	6.791W

Discard Changes
Apply All

Configuración

MikroTik SwOS Logout

Link SFP Forwarding Statistics VLAN **VLANs** Static Hosts Hosts SNMP ACL System

VLAN ID	Port1	Port2	Port3	Port4	Port5	SFP	
<input type="text" value="1"/>	leave as is ▼	not a member ▼	leave as is ▼	Cut Insert			
<input type="text" value="22"/>	leave as is ▼	leave as is ▼	not a member ▼	not a member ▼	not a member ▼	leave as is ▼	Cut Insert
<input type="text" value="23"/>	leave as is ▼	not a member ▼	leave as is ▼	not a member ▼	not a member ▼	leave as is ▼	Cut Insert
<input type="text" value="24"/>	leave as is ▼	not a member ▼	not a member ▼	leave as is ▼	not a member ▼	leave as is ▼	Cut Insert
<input type="text" value="25"/>	leave as is ▼	not a member ▼	not a member ▼	not a member ▼	leave as is ▼	leave as is ▼	Cut Insert

Append Cut Discard Changes Apply All



Configuración

MikroTik SwOS Logout

Link SFP Forwarding Statistics VLAN **VLANs** Static Hosts Hosts SNMP ACL System

VLAN ID	Port1	Port2	Port3	Port4	Port5	SFP		
<input type="text" value="1"/>	leave as is ▼	not a member ▼	leave as is ▼	Cut	Insert			
<input type="text" value="22"/>	leave as is ▼	leave as is ▼	not a member ▼	not a member ▼	not a member ▼	leave as is ▼	Cut	Insert
<input type="text" value="23"/>	leave as is ▼	not a member ▼	leave as is ▼	not a member ▼	not a member ▼	leave as is ▼	Cut	Insert
<input type="text" value="24"/>	leave as is ▼	not a member ▼	not a member ▼	leave as is ▼	not a member ▼	leave as is ▼	Cut	Insert
<input type="text" value="25"/>	leave as is ▼	not a member ▼	not a member ▼	not a member ▼	leave as is ▼	leave as is ▼	Cut	Insert

Append Cut Discard Changes Apply All

Configuración

MikroTik SwOS

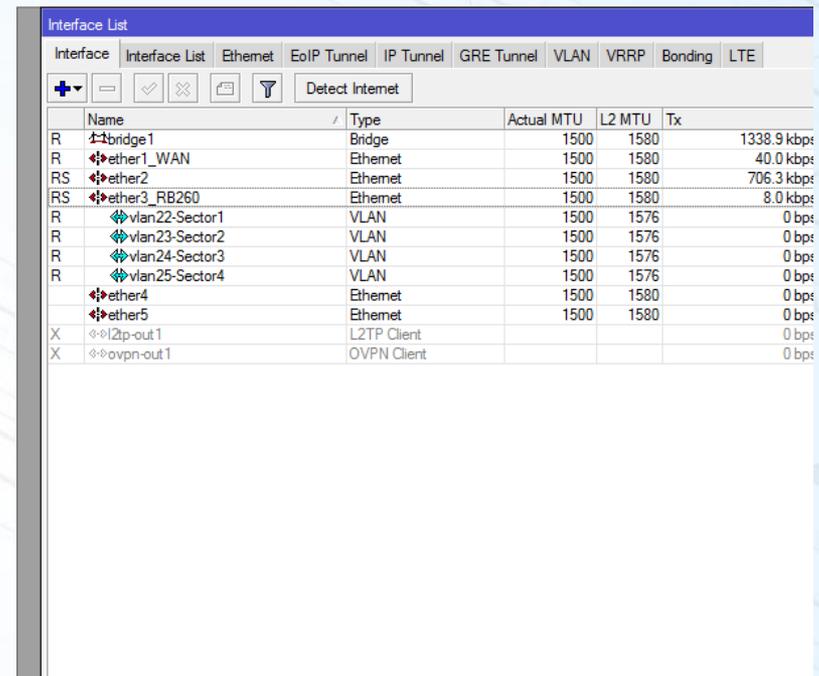
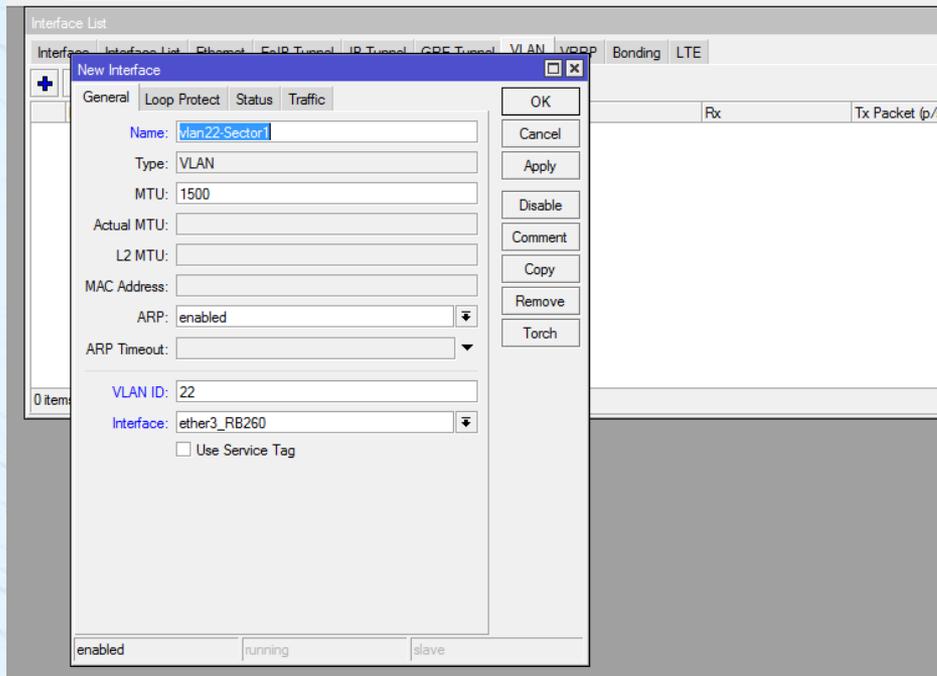
Logout

- Link
- SFP
- Forwarding
- Statistics
- VLAN
- VLANs
- Static Hosts
- Hosts
- SNMP
- ACL
- System

	Port1	Port2	Port3	Port4	Port5	SFP
Ingress						
VLAN Mode	enabled ▾	strict ▾	strict ▾	strict ▾	strict ▾	enabled ▾
VLAN Receive	any ▾					
Default VLAN ID	1	22	23	24	25	1
Force VLAN ID	<input type="checkbox"/>					
Egress						
VLAN Header	add if missing ▾	always strip ▾	always strip ▾	always strip ▾	always strip ▾	add if missing ▾
						<p>Discard Changes</p> <p>Apply All</p>



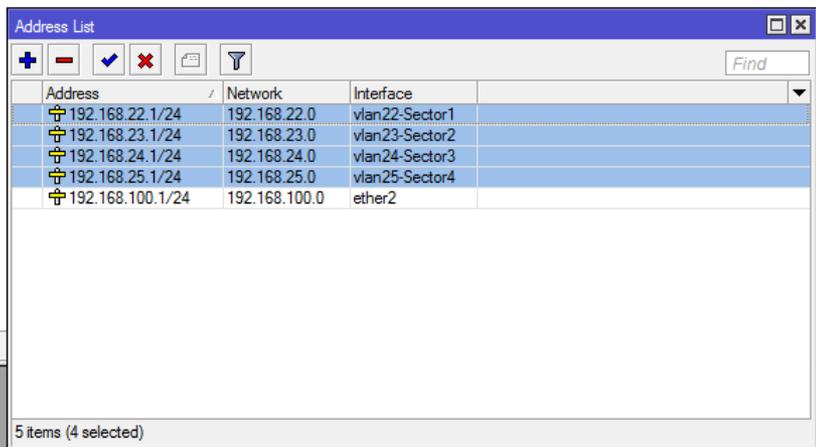
Configuración



Se agregan todas las vlans en la interface troncal donde conectamos nuestro Switch.



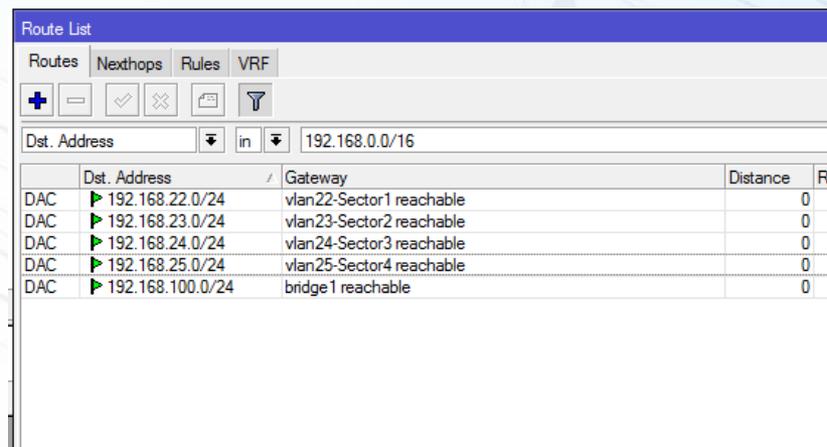
Configuración



Address List

Address	Network	Interface
192.168.22.1/24	192.168.22.0	vlan22-Sector1
192.168.23.1/24	192.168.23.0	vlan23-Sector2
192.168.24.1/24	192.168.24.0	vlan24-Sector3
192.168.25.1/24	192.168.25.0	vlan25-Sector4
192.168.100.1/24	192.168.100.0	ether2

5 items (4 selected)



Route List

Routes Nexthops Rules VRF

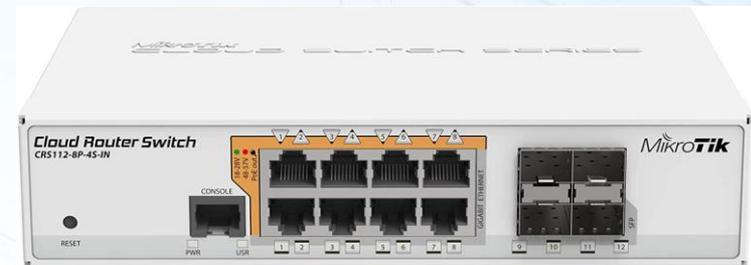
Dst. Address in 192.168.0.0/16

	Dst. Address	Gateway	Distance	Ro
DAC	192.168.22.0/24	vlan22-Sector1 reachable	0	
DAC	192.168.23.0/24	vlan23-Sector2 reachable	0	
DAC	192.168.24.0/24	vlan24-Sector3 reachable	0	
DAC	192.168.25.0/24	vlan25-Sector4 reachable	0	
DAC	192.168.100.0/24	bridge1 reachable	0	

Las direcciones directamente conectadas se puede comunicar entre si, mediante el router.

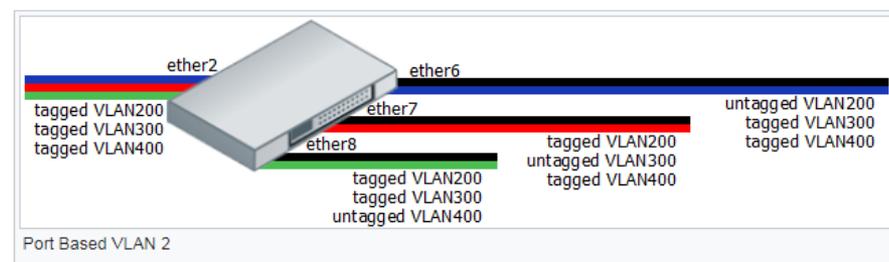
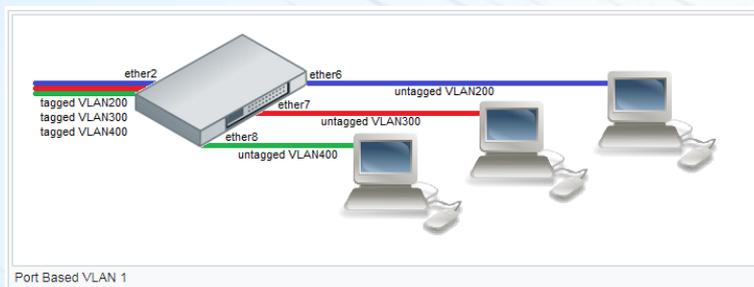
Mikrotik CRS112-8p-4s-in

- Posee 8 puertos POE pueden ser de 24v o 48v
- Utiliza RouterOS
- Capacidad Maxima 1 A. x puerto **en 24v.**
- Puede energizar un sistema max 2.8 A o 0.35 A (350mA) repartido en cada puerto **en 24v.**



Referencia de Configuración

https://wiki.mikrotik.com/wiki/Manual:CRS1xx/2xx_series_switches_examples



Conclusiones

- Se definió el concepto del broadcast y porque nos ayuda este tipo de configuración para disminuirla
- El router on Stick es un modelo apropiado para que algún WISP lo implemente en su Red Actual, no necesita realizar mucha inversión
- Tendrá mejor control, troubleshooting de menor tiempo al mantener su red seccionada.



Preguntas ?

Muchas Gracias por su atención

Ing. Amilcar Cruz

