VLANs

Se van a añadir diferentes VLAN en nuestra red con el fin de segmentarla para organizarla lógicamente de una manera diferente a como se encuentra físicamente.

En la primera tabla se encuentran las distintas VLAN con sus respectivas redes y su función. En la segunda podemos encontrar el direccionamiento asociado a lo anterior.
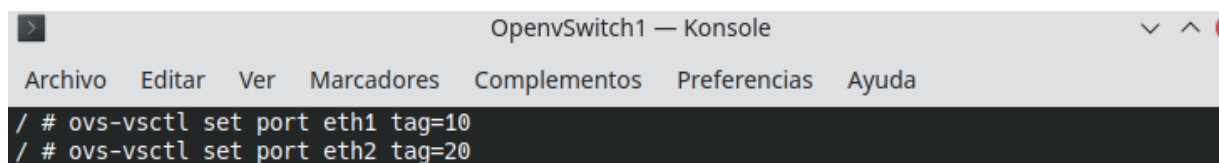
VLAN	Nombre	Dirección de red	Descripción
10	Centrales	192.168.5.0/24	Personal de servicios centrales
20	Oficina	192.168.6.0/24	Personal de oficinas
30	CPD	192.168.7.0/24	Equipamiento en CPD

Red	Equipo	VLAN	Dirección IP	Descripción
Usuarios	PC-2	10	192.168.5.10	Equipo en OpenvSwitch1 de servicios centrales
	PC-3	20	192.168.6.11	Equipo en OpenvSwitch1 de oficinas
	PC-4	20	192.168.6.12	Equipo en OpenvSwitch2 de oficinas
	PC-5	30	192.168.7.13	Equipo en OpenvSwitch2 del CPD

Configuración de los conmutadores

Para comenzar se han de configurar los conmutadores diciendo
Set the add port to access port, vlan id 10:

```
ovs-vsctl set port eth1 tag=10
```


Para setear un puerto trunk es importante que este no exista anteriormente, por lo que realizamos lo siguiente:

```
ovs-vsctl del-port br0 eth3
ovs-vsctl add-port br0 eth3 trunk=10,20,30
```

vSW1

Archivo   Editar   Ver   Marcadores   Complementos   Preferencias   Ayuda

```
/ # ovs-vsctl del-port br0 eth3
/ # ovs-vsctl add-port br0 eth3 trunk=10,20,30
```

OpenvSwitch1 — Konsole

Archivo   Editar   Ver   Marcadores   Complementos   Preferencias   Ayuda

```
/ # ovs-vsctl show
fb147dbb-747f-4e11-8bb7-17dee461795c
    Bridge "br0"
        Controller "tcp:192.168.0.2:6633"
            is_connected: true
        fail_mode: secure
        Port "br0"
            Interface "br0"
                type: internal
        Port "eth2"
            tag: 20
            Interface "eth2"
        Port "eth3"
            trunks: [10, 20, 30]
            Interface "eth3"
        Port "eth1"
            tag: 10
            Interface "eth1"
/ #
```

OpenvSwitch1 — Konsole <2>

File   Edit   View   Bookmarks   Plugins   Settings   Help

```
/ # ovs-vsctl add-port br0 vlan20 tag=20 -- set interface vlan20 type=internal
/ # ovs-vsctl add-port br0 vlan10 tag=10 -- set interface vlan10 type=internal
/ # ip addr add 192.168.3.10 dev vlan10
/ # ip addr add 192.168.4.11 dev vlan20
/ # ip link set vlan10 up
/ # ip link set vlan20 up
```

OpenvSwitch1 — Konsole

File   Edit   View   Bookmarks   Plugins   Settings   Help

```
/ # ovs-vsctl set port eth1 vlan_mode=native-tagged
/ # ovs-vsctl set port eth2 vlan_mode=native-tagged
/ # ovs-vsctl set port eth3 vlan_mode=native-tagged
```

OpenvSwitch1 — Konsole

File   Edit   View   Bookmarks   Plugins   Settings   Help

```
/ # ovs-vsctl set-controller br0 tcp:192.168.0.2:6653
```

vSW2

OpenvSwitch2 — Konsole

Archivo   Editar   Ver   Marcadores   Complementos   Preferencias   Ayuda

```
/ # ovs-vsctl set port eth1 tag=20
/ # ovs-vsctl set port eth2 tag=30
/ # ovs-vsctl set port eth3 trunk=10,20,30
/ # ovs-vsctl show
ea2beba3-c97b-44c8-98f5-b781e0ac3455
    Bridge "br0"
        Controller "tcp:192.168.0.2:6633"
            is_connected: true
        fail_mode: secure
        Port "eth2"
            tag: 30
            Interface "eth2"
        Port "eth3"
            trunks: [10, 20, 30]
            Interface "eth3"
        Port "eth1"
            tag: 20
            Interface "eth1"
        Port "br0"
            Interface "br0"
                type: internal
```

No estoy segura de esta siguiente

OpenvSwitch2 — Konsole

File   Edit   View   Bookmarks   Plugins   Settings   Help

```
/ # ovs-vsctl add-port br0 vlan20 tag=20 -- set interface vlan20 type=internal
/ # ovs-vsctl add-port br0 vlan30 tag=30 -- set interface vlan30 type=internal
/ # ip addr add 192.168.4.12 dev vlan20
/ # ip addr add 192.168.5.13 dev vlan30
/ # ip link set vlan20 up
/ # ip link set vlan30 up
```

esto parece super util

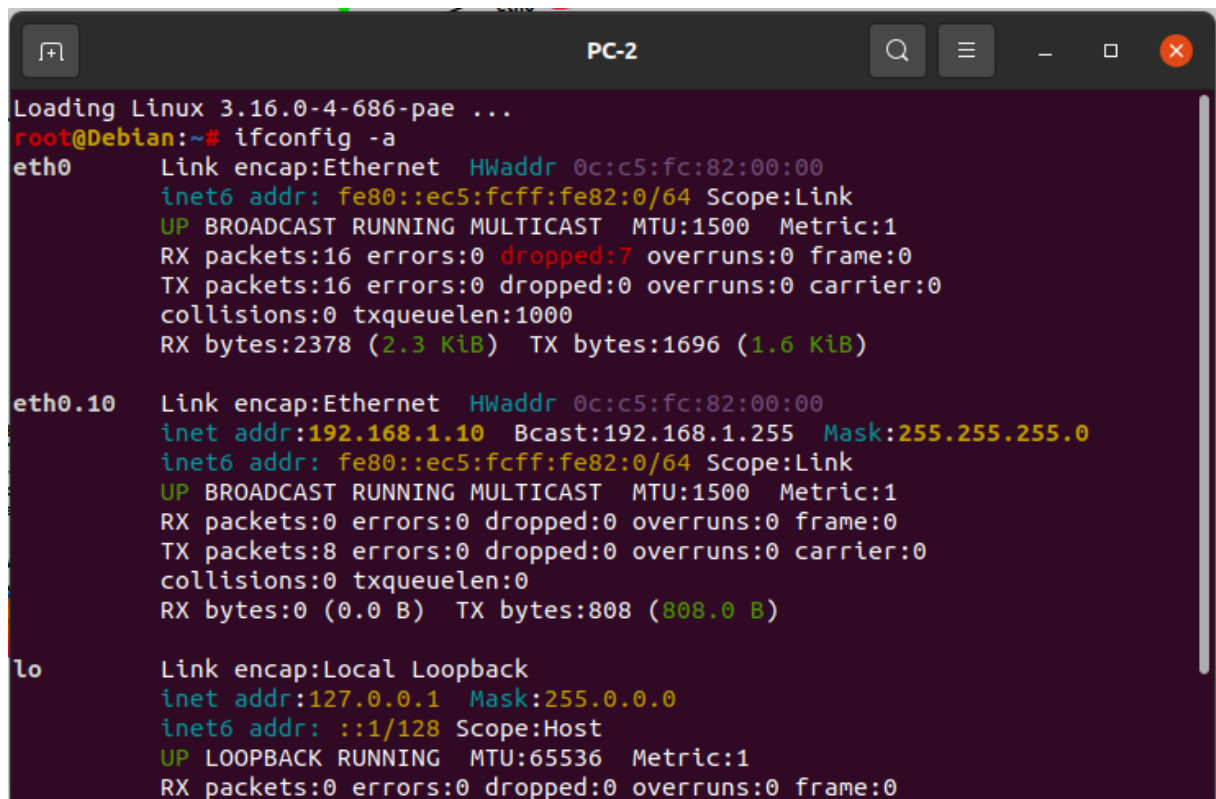OpenvSwitch2 — Konsole

File   Edit   View   Bookmarks   Plugins   Settings   Help

```
/ # ovs-vsctl set port eth1 vlan_mode=native-tagged
/ # ovs-vsctl set port eth2 vlan_mode=native-tagged
/ # ovs-vsctl set port eth3 vlan_mode=native-tagged
```

```
OpenvSwitch2 — Konsole
File    Edit    View    Bookmarks    Plugins    Settings    Help
/ # ovs-vsctl set-controller br0 tcp:192.168.0.2:6653
```

Para configurar el switch 3, tendrá el puerto eth1, eth2 y eth3 como trunk.

```
OpenvSwitch3 — Konsole                          ⌄  ⌃  ✕
Archivo    Editar    Ver    Marcadores    Complementos    Preferencias    Ayuda
/ # ovs-vsctl set port eth1 trunk=10,20,30
/ # ovs-vsctl set port eth2 trunk=10,20,30
/ # ovs-vsctl set port eth3 trunk=10,20,30
/ # ovs-vsctl show
d4b8305b-b1df-4709-809b-e70271f56f5e
    Bridge "br0"
        Controller "tcp:192.168.0.2:6633"
            is_connected: true
        fail_mode: secure
        Port "eth1"
            trunks: [10, 20, 30]
            Interface "eth1"
        Port "eth3"
            trunks: [10, 20, 30]
            Interface "eth3"
        Port "eth2"
            trunks: [10, 20, 30]
            Interface "eth2"
        Port "br0"
            Interface "br0"
                type: internal
```

```
OpenvSwitch3 — Konsole
File    Edit    View    Bookmarks    Plugins    Settings    Help
/ # ovs-vsctl set port eth1 vlan_mode=native-tagged
/ # ovs-vsctl set port eth2 vlan_mode=native-tagged
/ # ovs-vsctl set port eth3 vlan_mode=native-tagged
```

```
OpenvSwitch3 — Konsole
File    Edit    View    Bookmarks    Plugins    Settings    Help
/ # ovs-vsctl set-controller br0 tcp:192.168.0.2:6653
```

ONOS

Comandos

OpenVSwitch 1
puertos de acceso
ovs-vsctl set port eth1 tag=10
ovs-vsctl set port eth2 tag=20

puertos trunk
ovs-vsctl set port eth3 trunk=10,20,30

ovs-vsctl add-port br0 vlan10 tag=10 -- set interface vlan10 type=internal
ovs-vsctl add-port br0 vlan20 tag=20 -- set interface vlan20 type=internal
ip addr add 192.168.3.10 dev vlan10
ip addr add 192.168.4.11 dev vlan20
ip link set vlan10 up
ip link set vlan20 up

ovs-vsctl set-controller br0 tcp:192.168.0.2:6653

vlan_mode=native-tagged

OpenVSwitch 2
puertos de acceso
ovs-vsctl set port eth1 vlan_mode=access tag=20
ovs-vsctl set port eth2 vlan_mode=access tag=30

puertos trunk
ovs-vsctl set port eth3 vlan_mode=trunk trunk=10,20,30

ovs-vsctl set-controller br0 tcp:192.168.0.2:6653

ovs-vsctl add-port br0 vlan20 tag=20 -- set interface vlan20 type=internal
ovs-vsctl add-port br0 vlan30 tag=30 -- set interface vlan30 type=internal
ip addr add 192.168.4.12 dev vlan20
ip addr add 192.168.5.13 dev vlan30
ip link set vlan20 up
ip link set vlan30 up

OpenVSwitch 3
ovs-vsctl set port eth1 trunk=10,20,30
ovs-vsctl set port eth2 vlan_mode=trunk trunk=10,20,30
ovs-vsctl set port eth3 vlan_mode=trunk trunk=10,20,30

ovs-vsctl set-controller br0 tcp:192.168.0.2:6653

Haciendo que los hosts manden paquetes etiquetados:

creamos la interfaz nueva para mandar el tráfico taggeado:

```
vconfig add [INTERFAZ] [VLAN]
```

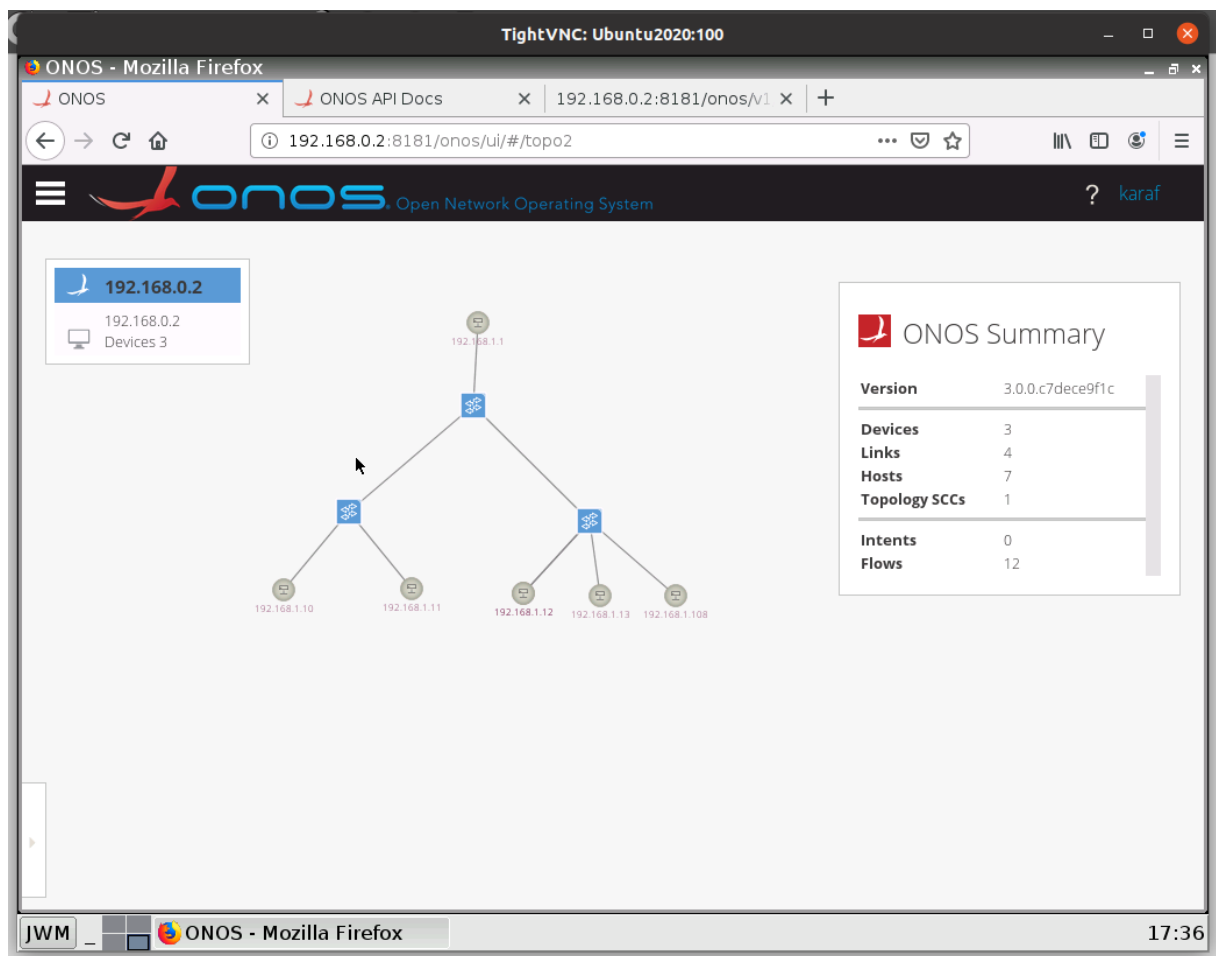Comprobamos que el driver 8021q está cargado para poder trabajar con VLAN's

```
lsmod | grep 8021q
```

en /etc/network/interfaces agregamos las siguientes líneas. por ejemplo para el PC2

```
auto eth0.10
iface eth0.10 inet static
        address 192.168.1.10
        netmask 255.255.255.0
        vlan-raw-device eth0
```

ping de PC3 a PC4 y de PC3 a PC2:

pfSense

Primero se crean las interfaces virtuales.

Interfaces / VLANs

Interface Assignments | Interface Groups | Wireless | **VLANs** | QinQs | PPPs | GREs | GIFs | Bridges | LAGGs

VLAN Interfaces

Interface	VLAN tag	Priority	Description	Actions
em1 (lan)	10		Contains PC2	✏️ 🗑️
em1 (lan)	20		Contains PC3 and PC4	✏️ 🗑️
em1 (lan)	30		Contains PC5	✏️ 🗑️

+ Add

Interfaces / VLANs / Edit

VLAN Configuration

Parent Interface	em1 (0c:0c:5d:e0:00:01) - lan
	Only VLAN capable interfaces will be shown.
VLAN Tag	10
	802.1Q VLAN tag (between 1 and 4094).
VLAN Priority	0
	802.1Q VLAN Priority (between 0 and 7).
Description	Contains PC2
	A group description may be entered here for administrative reference (not parsed).

Interfaces configuradas

Interfaces / Interface Assignments

Interface Assignments | Interface Groups | Wireless | VLANs | QinQs | PPPs | GREs | GIFs | Bridges | LAGGs

Interface	Network port	
WAN	em0 (0c:0c:5d:e0:00:00)	
LAN	em1 (0c:0c:5d:e0:00:01)	🗑️ Delete
MGMT	em2 (0c:0c:5d:e0:00:02)	🗑️ Delete
DMZ	em3 (0c:0c:5d:e0:00:03)	🗑️ Delete
VLAN10	VLAN 10 on em1 - lan (Contains PC2)	🗑️ Delete
VLAN20	VLAN 20 on em1 - lan (Contains PC3 and PC4)	🗑️ Delete
VLAN30	VLAN 30 on em1 - lan (Contains PC5)	🗑️ Delete

Interfaces
VLAN10 static IPv4 192.168.3.1
VLAN20 static IPv4 192.168.4.1
VLAN30 static IPv4 192.168.5.1

Rules VLAN10, VLAN20, VLAN30

		States	Protocol	Source	Port	Destination	Port	Gateway	Queue	Schedule	Description	Actions
Floating WAN LAN MGMT DMZ **VLAN10** VLAN20 VLAN30

Rules (Drag to Change Order)

		States	Protocol	Source	Port	Destination	Port	Gateway	Queue	Schedule	Description	Actions
☐	✔	0 / 0 B	IPv4 *	*	*	*	*	*	none			⚓ ✏ 🗐 ⊘ 🗑

[↑ Add] [↓ Add] [🗑 Delete] [💾 Save] [+ Separator]

ℹ

PC-5 — Konsole

Archivo   Editar   Ver   Marcadores   Complementos   Preferencias   Ayuda

```
root@Debian:~# ping 192.168.3.10
PING 192.168.3.10 (192.168.3.10) 56(84) bytes of data.
64 bytes from 192.168.3.10: icmp_seq=1 ttl=63 time=12.4 ms
64 bytes from 192.168.3.10: icmp_seq=2 ttl=63 time=5.28 ms
64 bytes from 192.168.3.10: icmp_seq=3 ttl=63 time=4.20 ms
^C
--- 192.168.3.10 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 4.204/7.300/12.415/3.643 ms
root@Debian:~# ping 192.168.4.11
PING 192.168.4.11 (192.168.4.11) 56(84) bytes of data.
64 bytes from 192.168.4.11: icmp_seq=1 ttl=63 time=5.29 ms
64 bytes from 192.168.4.11: icmp_seq=2 ttl=63 time=4.42 ms
64 bytes from 192.168.4.11: icmp_seq=3 ttl=63 time=4.13 ms
^C
--- 192.168.4.11 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 4.138/4.620/5.297/0.492 ms
root@Debian:~# ping 192.168.4.12
PING 192.168.4.12 (192.168.4.12) 56(84) bytes of data.
64 bytes from 192.168.4.12: icmp_seq=1 ttl=63 time=8.08 ms
64 bytes from 192.168.4.12: icmp_seq=2 ttl=63 time=4.11 ms
64 bytes from 192.168.4.12: icmp_seq=3 ttl=63 time=2.45 ms
^C
--- 192.168.4.12 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2002ms
rtt min/avg/max/mdev = 2.450/4.883/8.082/2.363 ms
```

Sin reglas en el firewall activadas

References

https://docs.openvswitch.org/en/latest/faq/vlan/
Introduction to the ONOS Web UI

https://oa.upm.es/52004/1/PFC_JAVIER_CONDE_DIAZ_2018.pdf

https://docs.openvswitch.org/en/latest/faq/vlan/ //IMPORTANTE

https://docs.openvswitch.org/en/latest/tutorials/ovs-advanced/#implementing-table-1-vlan-input-processing // más importante

https://wiki.onosproject.org/display/ONOS/Interfaces+configuration

https://manpages.ubuntu.com/manpages/xenial/man8/ovs-vsctl.8.html //mirar bien

https://docs.netgate.com/pfsense/en/latest/vlan/configuration.html

hosts mandan paquetes etiquetados:
https://stackoverflow.com/questions/33342146/how-to-tag-outgoing-traffic-with-vlan-id

modulo de kernel: software que controla hardware… ???? fuente: miami me lo confirmó
https://linuxize.com/post/lsmod-command-in-linux/