VLAN Routing

Vlan Commands

Creation

For isolate ports in same switch

```
vlan [vlan-number]
name [name]
exit
```

Assigning ports

```
interface [interface]
switchport mode access
switchport access vlan [vlan-number]
```

Show vlans

```
show vlan
```

Assigning ports range to vlan

For connect vlans in different switchs

```
interface range [inter-type] [interface] - [interface]
switchport mode trunk
switchport trunk allowed vlan [vlan-number]
```

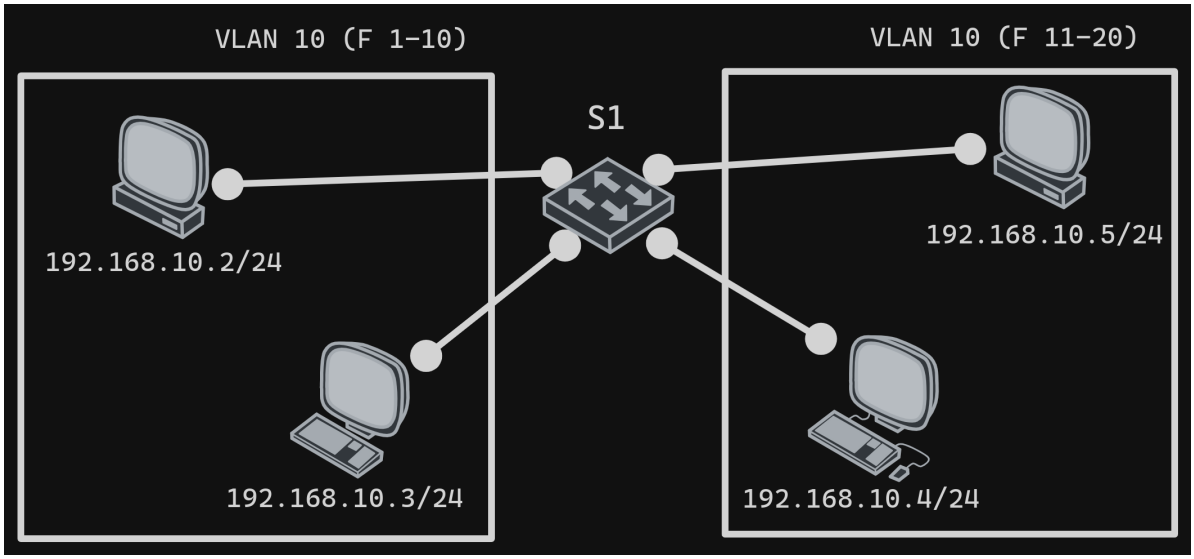
Trunk ports

```
interface [interface]
switchport mode trunk
switchport trunk allowed vlan [vlan-number]
```

Notes

- if you want to allow all vlans, not use the command switchport trunk allowed vlan
- On case allowed multiple vlans, use "," for delimiting the vlan numbers, example: `switchport trunk allowed vlan 10,20,30`

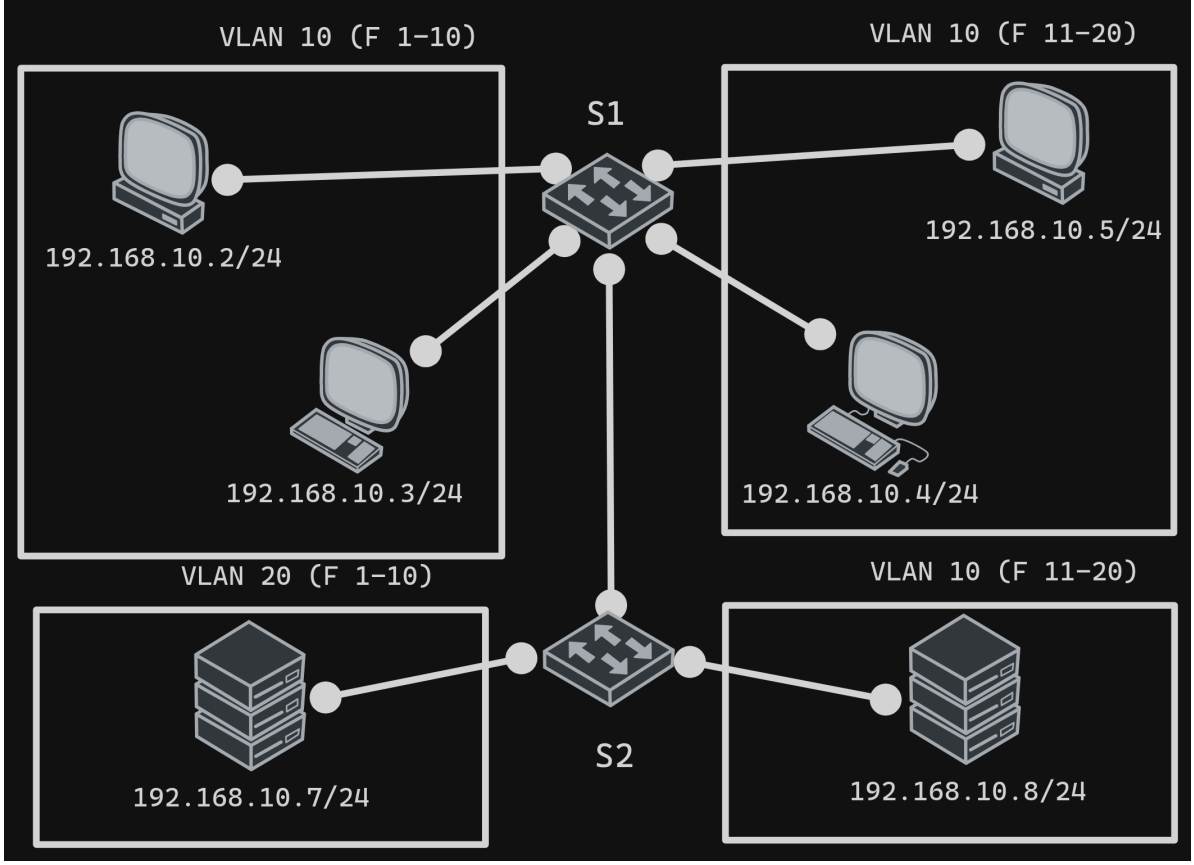
Example basic 1



Switch 1

```
vlan 10
name VLAN10
vlan 20
name VLAN20
inter f0/1-10
switchport mode access
switchport access vlan 10
shutdown
inter f0/11-20
switchport mode access
switchport access vlan 20
shutdown
```

Example basic 2



Switch 1

```
vlan 10
name VLAN10
vlan 20
name VLAN20
inter f0/1-10
switchport mode access
switchport access vlan 10
no shutdown
inter f0/11-20
switchport mode access
switchport access vlan 20
no shutdown
inter f0/24
switchport mode trunk
```

Switch 2

```
vlan 10
name VLAN10
vlan 20
name VLAN20
inter f0/1-10
switchport mode access
switchport access vlan 10
no shutdown
inter f0/11-20
switchport mode access
switchport access vlan 20
no shutdown
```

```
inter f0/24
switchport mode trunk
```

/30 4 2 255.255.255.254 /31 2 0 255.255.255.255 /32 1 -

Subnetting Image

Longitud de prefijo	Máscara de subred	Dirección de red (n = network, h = host)	# de subredes	# de hosts
/17	255.255.128.0	nnnnnnnn.nnnnnnnn.nhhhhhhh.hhhhhhhh 11111111.11111111.10000000.00000000	**2**	32766
/18	255.255.192.0	nnnnnnnn.nnnnnnnn.nnhhhhhh.hhhhhhhh 11111111.11111111.11000000.00000000	**4**	16382
/19	255.255.224.0	nnnnnnnn.nnnnnnnn.nnnhhhhh.hhhhhhhh 11111111.11111111.11100000.00000000	**8**	8190
/20	255.255.240.0	nnnnnnnn.nnnnnnnn.nnnnhhhh.hhhhhhhh 11111111.11111111.11110000.00000000	**16**	4094
/21	255.255.248.0	nnnnnnnn.nnnnnnnn.nnnnnhhh.hhhhhhhh 11111111.11111111.11111000.00000000	**32**	2046
/22	255.255.252.0	nnnnnnnn.nnnnnnnn.nnnnnnhh.hhhhhhhh 11111111.11111111.11111100.00000000	**64**	1022
/23	255.255.254.0	nnnnnnnn.nnnnnnnn.nnnnnnnh.hhhhhhhh 11111111.11111111.11111110.00000000	**128**	510
/24	255.255.255.0	nnnnnnnn.nnnnnnnn.nnnnnnnn.hhhhhhhh 11111111.11111111.11111111.00000000	**256**	254
/25	255.255.255.128	nnnnnnnn.nnnnnnnn.nnnnnnnn.nhhhhhhh 11111111.11111111.11111111.10000000	**512**	126
/26	255.255.255.192	nnnnnnnn.nnnnnnnn.nnnnnnnn.nnhhhhhh 11111111.11111111.11111111.11000000	**1024**	62
/27	255.255.255.224	nnnnnnnn.nnnnnnnn.nnnnnnnn.nnnhhhhh 11111111.11111111.11111111.11100000	**2048**	30
/28	255.255.255.240	nnnnnnnn.nnnnnnnn.nnnnnnnn.nnnnhhhh 11111111.11111111.11111111.11110000	**4096**	14
/29	255.255.255.248	nnnnnnnn.nnnnnnnn.nnnnnnnn.nnnnnhhh 11111111.11111111.11111111.11111000	**8192**	6
/30	255.255.255.252	nnnnnnnn.nnnnnnnn.nnnnnnnn.nnnnnnhh 11111111.11111111.11111111.11111100	**16384**	2

Subnetting Examples

Example 1

4 networks

- Root Net:
  192.168.123.0/24

192.168.123. 00000000

need 2 bits for 4 networks
2^2 = 4

- Subnets:

Network	Binary	Dir	Broadcast
1	00	192.168.123.0/26	.63
2	01	192.168.123.64/26	.127
3	10	192.168.123.128/26	.191
4	11	192.168.123.192/26	.255
---	---	---	---

Example 2

7 networks

- Root Net:
  10.29.0.0/16

10.29. 00000000.00000000

need 3 bits for 8 networks
2^3 = 8

- Subnets:

Network	Binary	Dir	Broadcast
1	000	10.29.0.0	10.29.31.255
2	001	10.29.32.0	10.29.63.255
3	010	10.29.64.0	10.29.95.255
4	011	10.29.96.0	10.29.127.255
5	100	10.29.128.0	10.29.159.255
6	101	10.29.160.0	10.29.191.255
7	110	10.29.192.0	10.29.223.256
8	111	10.29.224.0	10.29.255.255

Example 3

- Root Net:
  192.168.0.0/24

192.168. 00000000 .00000000

- Subnets:
  2 of 20 hosts
  1 of 80 hosts
  3 of 2 hosts

sort by hosts count:

- A - 80 hosts
- B - 20 hosts
- C - 20 hosts
- D - 2 hosts
- D - 2 hosts

A - 80 hosts

2 ^ 7 = 128 - 2 = 126 hosts

Mask: /25 = 255.255.255.128 # get by table
Dir: 192.168.0.0
Broadcast: 192.168.0.127 #Dir + 2^7 - 1

B - 20 hosts

Dir: 192.168.0.128 # (before dir) + 1

2 ^ 5 = 32 - 2 = 30 hosts

Mask: /27 = 255.255.255.224 # get by table
Broadcast: 192.168.0.159 #Dir + 2^5 - 1

C - 20 hosts

Dir: 192.168.0.160 # (before dir) + 1

2 ^ 5 = 32 - 2 = 30 hosts

Mask: /27 = 255.255.255.224 # get by table
Broadcast: 192.168.0.191 #Dir + 2^5 - 1

D - 2 hosts

Dir: 192.168.0.192 # (before dir) + 1

2 ^ 2 = 4 - 2 = 2 hosts

Mask: /30 = 255.255.255.252 # get by table
Broadcast: 192.168.0.195 #Dir + 2^2 - 1

E - 2 hosts

Dir: 192. 168. 0. 196 # (before dir) + 1

2 ^ 2 = 4 - 2 = 2 hosts

Mask: /30 = 255. 255. 255. 252 # get by table
Broadcast: 192. 168. 0. 199 #Dir + 2^2 - 1

F - 2 hosts

Dir: 192. 168. 0. 200 # (before dir) + 1

2 ^ 2 = 4 - 2 = 2 hosts

Mask: /30 = 255. 255. 255. 252 # get by table
Broadcast: 192. 168. 0. 203 #Dir + 2^2 - 1

Subnets in table

Network	hosts	Dir	Broadcast
A	80	192.168.0.0	192.168.0.127
B	20	192.168.0.128	192.168.0.159
C	20	192.168.0.160	192.168.0.191
D	2	192.168.0.192	192.168.0.195
E	2	192.168.0.196	192.168.0.199
F	2	192.168.0.200	192.168.0.203