

What is a VLAN

VLAN

- = Virtual Lan
- = Broadcast Domain
- = Logical Network subnet

Addresses:

- Segmentation
- Security
- Network Flexibility

VLAN ranges on cisco Catalyst switches

| VLANs | Range | Usage |
|--------|----------|--|
| | Type | |
| 0-4095 | Reserved | - For system use only. - Cannot use these VLANs. |
| 1 | Normal | - Cisco default VLAN on a switch. - Can be used this VLAN. - Cannot delete it. - All interfaces belong to this VLAN by default. |
| 2-1001 | Normal | Used for Ethernet VLANs |

VLAN ranges on cisco Catalyst switches (cont)

| | | |
|------|----------|--|
| 1002 | Normal | For Legacy reasons: - are used for Token Ring and Fiber Distributed Data Interface (FDDI) VLANs. - Cannot delete VLANs 1002 - 1005 - stored in vlan.dat in flash memory and in running config if switch in transparent mode |
| 1006 | Extended | Used for Ethernet VLANs |
| 4094 | | - Switch needs to be in transparent mode when creating extended VLANs important in VTP version 3 extended-range vlans are stored in VLAN database and can be propagated by VTP. + supports VLANs creation and modification in server and transparent modes |

IMPORTANT

If a VLAN is deleted, then the port associated to the vlan becomes inactive.

Port becomes inactive if it is associate to a non-created VLAN

The olde version of 802.1q(common encapsulation method today) is ISL

Native VLAN is used for backward compatibility, where untagged traffic is common

VLAN 1 is the management VLAN (cannot be changed) ==> messages like cdp, stp, lldp are going to be carried over vlan 1.

If on the connected switches there is a different native vlan, cdp will tell us there is a vlan mismatch

Maximum number of VLANs might vary from one switch to the other depending on VTP, HSRP

TO TRY

TRY also to delete a vlan

try creating a trunk link with != native vns of the ends and check cdp

LAN

A group of devices that share a common broadcast domain

C

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VTP : VLAN Trunking Protocol

Cisco proprietary Layer 2 messaging protocol.

Maintains VLAN configuration consistency (Manages VLAN addition, deletion, and renaming).

Modes:

- Client
- Server
- Client

Voice VLAN



Phone traffic between ip phone and switch is tagged (tag 3)

COS can be applied on Voice traffic

User traffic from the PC is not tagged

DTP - Dynamic Trunking Protocol

Used by cisco switches to automatically negotiate whether an interface used between two switches should be put in access or trunk mode.

Dynamic Auto forms a trunk only if it receives DTP messages

- Do not negotiate
- Only listens

Dynamic Desirable will negotiate the mode automatically and dynamically tries to to convert the link to trunk

- Generates DTP messages
- Listens for incoming DTP messages

DTP - Port combination

| | | |
|--------------|--------------|--------|
| Dynamic auto | Dynamic auto | access |
|--------------|--------------|--------|

| | | |
|--------------|-------------------|-------|
| Dynamic auto | Dynamic desirable | trunk |
|--------------|-------------------|-------|

| | | |
|-------------------|-------------------|-------|
| Dynamic desirable | Dynamic desirable | trunk |
|-------------------|-------------------|-------|

| | | |
|-----------------------------------|-------|-------|
| Dynamic auto or Dynamic desirable | trunk | trunk |
|-----------------------------------|-------|-------|

| | | |
|-----------------------------------|--------|--------|
| Dynamic auto or Dynamic desirable | access | access |
|-----------------------------------|--------|--------|

TO BE CHECKED

VTP - VLAN trunking protocol

- Cisco proprietary protocol
- Exchange VLAN information
- Synchronize vlan information (VLAN ID and name) with switches inside the same VTP domain

VTP Client mode can't exchange vlan configuration (cannot create or delete) Receives VTP updates (processes them) and forwards them

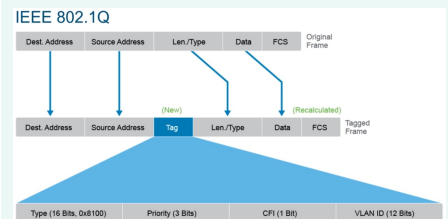
VTP server mode can create and delete VLANs. Propagates VLAN changes. Default mode for Cisco switches

VTP transparent mode does not share its VLAN database Forwards received VTP advertisements Creates and deletes VLANs on a VTP transparent switch.

VTP - VLAN trunking protocol (cont)

VTP mode off similar to VTP transparent mode but does not forward received updates supported only in VTPv3

Ethernet header + 802.1q tag



Ether type (16 bits) : **0x8100** to identify the frame as 802.1q tagged frame
 Priority (3 bits): for QoS ==> priority level for traffic prioritization
 CFI (1 bit): Canonical Format identifier: enables token ring frames to be carried across ethernet links
 VLAN ID (12 bits)



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Create a VLAN

```
S1# conf t
S1(config)# vlan 2
S1(config-vlan)# name Sales
```

If the vlan name was not entered, the default vlan name would be VLAN004

Create Data vlan

```
S1# conf t
S1(config)# interface f 0/3
S1(config-if)# switchport mode
access
S1(config-if)# switchport access
vlan 2
```

Create Voice VLAN

```
S1# conf t
S1(config)# vlan 3
S1(config-vlan)# name telephony
S1(config-vlan)# exit
S1(config)# interface f 0/2
S1(config-if)# switchport mode
access
S1(config-if)# switchport voice
vlan 3
```

Verifying VLANs

```
SW1# show interfaces
FastEthernet0/2 switchport
Name: Fa0/2
Switchport: Enabled
Administrative Mode: dynamic
desirable
Operational Mode: static access
Administrative Trunking Encaps-
ulation: negotiate
Operational Trunking Encapsula-
tion: native
```

Verifying VLANs (cont)

```
Negotiation of Trunking: On
Access Mode VLAN: 2 (data)
Trunking Native Mode VLAN: 1
(default)
Administrative Native VLAN
tagging: enabled
Voice VLAN: 3 (telephony)
<... output omitted ...>
```

Verifying VLANs - 1

```
SW1# show vlan
VLAN Name Status Ports
-----
1 default active Fa0/1, Fa0/3,
Fa0/4, Fa0/5, Fa0/6, Fa0/7
2 data active Fa0/2
3 telephony active Fa0/2
1002 fddi-default act/unsup
1003 token-ring-default
act/unsup
1004 fddinet-default act/unsup
1005 trnet-default act/unsup
VLAN Type SAID MTU Parent RingNo
BridgeNo Stp BrdgMode Trans1
Trans2
-----
```

Verifying VLANs - 1 (cont)

```
1 enet 100001 1500 - - - - 0
0
2 enet 100002 1500 - - - - 0
0
3 enet 100003 1500 - - - - 0
0
1002 fddi 101002 1500 - - - -
0 0
1003 tr 101003 1500 - - - - 0
0
1004 fdnet 101004 1500 - - -
ieee - 0 0
1005 trnet 101005 1500 - - - ibm
- 0 0
Remote SPAN VLANs
-----
-----
Primary Secondary Type Ports
-----
-----
```

VLAN 2 and VLAN 3 are created on the switch. Both are active and are assigned to fast ethernet 0/2



Verifying VLANs -2-

```
SW1# show vlan id 2

VLAN Name Status Ports
-----
2 data active Fa0/2

VLAN Type SAID MTU Parent RingNo
BridgeNo Stp BrdgMode Trans1
Trans2
-----
2 enet 100002 1500 - - - - 0
0

<... output omitted ...>
```

Display information about a particular VLAN

Verifying VLANs -3-

```
SW1# show vlan brief

VLAN Name Status Ports
-----
1 default active Fa0/1, Fa0/3,
Fa0/4, Fa0/5, Fa0/6, Fa0/7
2 data active Fa0/2
3 telephony active Fa0/2
1002 fddi-default act/unsup
1003 token-ring-default
act/unsup
```

Verifying VLANs -3- (cont)

```
1004 fddinet-default act/unsup
1005 trnet-default act/unsup
```

Displays one line per vlan

Verifying VLANs -4-

```
Switch# show mac address-table

Mac Address Table
-----
Vlan Mac Address Type Ports
-----
1 aabb.cc00.2f00 DYNAMIC
Fa0/0
1 aabb.cc00.3100 DYNAMIC
Fa0/1
2 aabb.cc00.3000 DYNAMIC
Fa0/2
```

Default MAC table aging time is 300 seconds

Verifying VLANs -4- inactive VLAN

```
Switch# show interfaces
Ethernet0/1 switchport
Name: Et0/1
Switchport: Enabled
Administrative Mode: static
access
Operational Mode: static access
Administrative Trunking Encaps-
ulation: dot1q
Operational Trunking Encapsula-
tion: native
Negotiation of Trunking: Off
Access Mode VLAN: 10 (Inactive)
Trunking Native Mode VLAN: 1
(default)
Administrative Native VLAN
tagging: enabled
Voice VLAN: none
```

Access Mode VLAN: 10 (Inactive)

==> VLAN not yet created or VLAN has been deleted

Configure an 802.1q trunk

```
S1# conf t
S1(config)# interface e 0/0
S1(config-if)# switchport mode
trunk
S1(config-if)# switchport trunk
native vlan 99
S1(config-if)# switchport trunk
allowed vlan 10, 20, 30
```

Pour ajouter un nouveau allowed vlan il faut recrer la ligne

```
S1(config-if)# switchport trunk
allowed vlan 10, 20, 30, 100
if :
S1(config-if)# switchport trunk
allowed vlan 100
```

It will just overwrite the other items that were listed

Verify a trunk port

```
SwitchX# show interfaces
Ethernet0/0 switchport
Name: Et0/0
Switchport: Enabled
Administrative Mode: trunk
Operational Mode: trunk
Administrative Trunking Encaps-
ulation: dot1q
Operational Trunking Encapsula-
tion: dot1q
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 99
(VLAN0099)
Administrative Native VLAN
tagging: enabled
Voice VLAN: none
<... output omitted ...>
Trunking VLANs Enabled: 10,20,-
30,99
<... output omitted ...>
```

verify that operational mode is trunk

that the native vlan is 99 and also check the neabled vlans

Verify trunk port -1-

```
Switch# show interfaces trunk
Port Mode Encapsulation Status
Native vlan
Et0/0 on 802.1q trunking 99
Port Vlans allowed on trunk
Et0/0 10,20,30,99
Port Vlans allowed and active in
management domain
Et0/0 10,20,30,99
<... output omitted ...>
```

mode on : we as administratives turned it on
dynamic desirable or auto : means it has
been enabled with DTP: automatically
formed a trunk

we can see the encapsulation type (802.1q)

we can see the native vlan on the far right

+ allowed vlans

Verify trunk port -2-

```
SwitchX# show interfaces status
Port Name Status Vlan Duplex
Speed Type
Et0/0 connected trunk auto auto
unknown
Et0/1 connected 2 auto auto
unknown
Et0/2 connected 1 auto auto
unknown
```

Verify trunk port -2- (cont)

```
Et0/3 connected 1 auto auto
unknown
```

Tell what port is trunking, and if port is
access what vlan is associated

Change native VLAN and tag it

```
SW1# configure terminal
SW1(config)# interface Ethern-
et0/0
SW1(config-if)# switchport mode
trunk
SW1(config-if)# switchport trunk
native vlan 90
SW1(config-if)# switchport trunk
native vlan tag
SW1(config-if)# switchport trunk
native vlan tag
does it really exist?
```



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