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 Type	Usage
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 - 1005	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 - 4094	Extended	Used for Ethernet VLANs - 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 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 todya) 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 vans of the ends and check cdp

LAN

A group of devices that share a common broadcast domain

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 negociate 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 transporant switch.

VTP - VLAN trunking protocol (cont)

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

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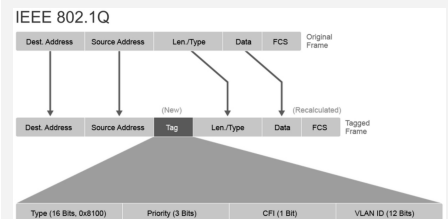
Ether type (16 bits) : **0x8100** to identify the frame as 802.1q tagged grame
Priority (3 bits): for QoS ==> priority level for traffic prioritiztion
CFI (1 bit): Canonical Format identifier: enables token ring frames to be carried accross ethernet links
VLAN ID (12 bits)

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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

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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 reecrire 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

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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?