NAME: BOISOT

First name: Anthonin

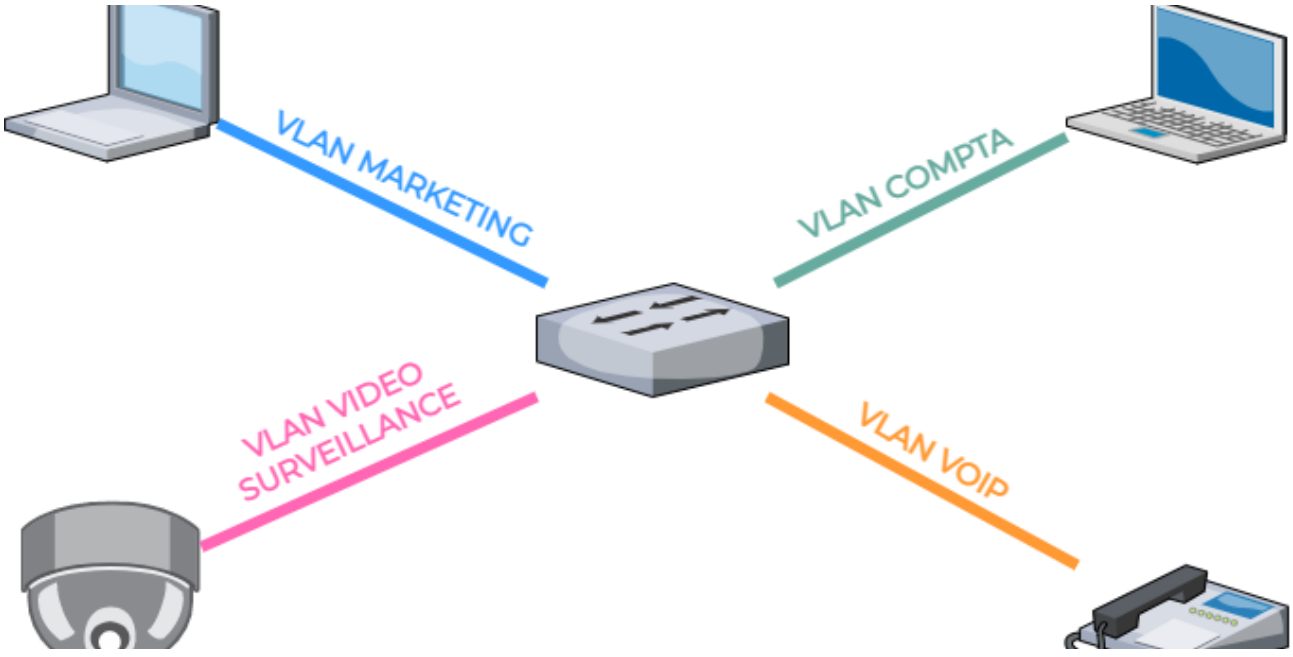
Class: IR1

Year: 2022-2023

LYCÉE Jules Haag

Votre avenir avec un temps d'avance

VLAN - Virtual Networks



Source

Before developing the content of this masterpiece, it seems essential to me to first mention the sources of this work.

1. Virtual Local Area Network - Wikipedia
2. VLAN - Wikipedia
3. VLAN - Virtual Networks - How It Works

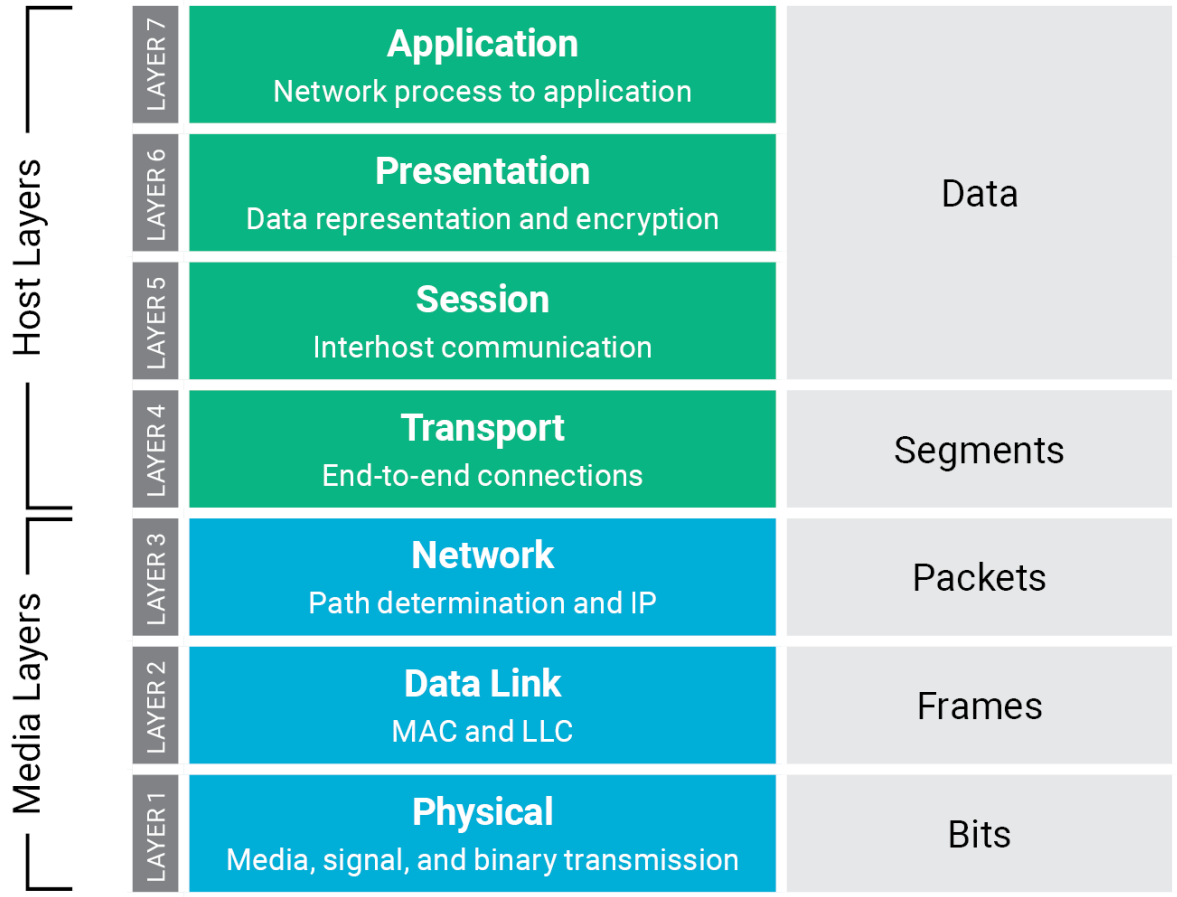
Contents

1. Introduction

A Virtual Local Area Network (VLAN) is a broadcast domain of network segmentation and isolation in a computer network at Layer 2 (OSI model). In this context, the term "virtual" refers to a physical object recreated and modified by additional logic within the local network.

VLANs work by tagging network frames and managing those tags in networking systems,

creating the look and functionality of network traffic that is physically on a single network but acts as if it was spread across separate networks.
In this way, VLANs can separate network applications despite being connected to the same physical network and without requiring the deployment of multiple sets of cabling and network devices.



2. Uses and Levels

2.1. Uses

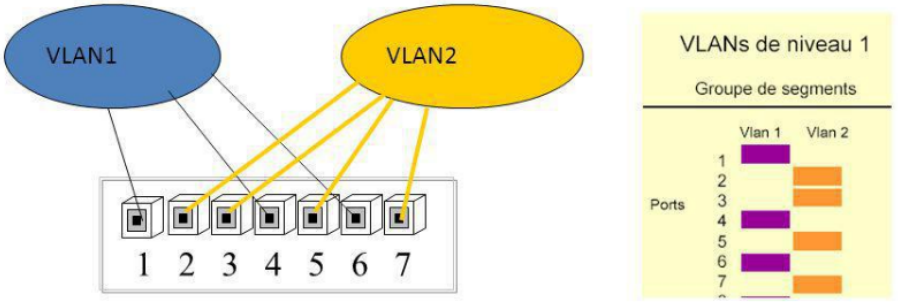
Imagine that a company has several networks: one dedicated to marketing with accounting in a single network, one for video surveillance and finally one for the voice over IP telephony system.
In this example, I remind you that the network administrator has ensured that the marketing department and the accounting department are on the same network. Unfortunately, one of the employees of the marketing department installs a malware download on his email. This malware will affect his workstation, then the rest of the marketing department, then the accounting department.
In this case, the network is not a security gain.

In this first scenario, it would have been better to separate the two by creating a dedicated marketing network and an accounting network to avoid a massive infection in the network.

Let's imagine that a second company has several networks: one dedicated to marketing, one dedicated to accounting, but they have put the video surveillance and the voice over IP system in the same network.
In this example, I remind you that the network administrator has made sure that the video surveillance and the voice over IP system are on the same network. Unfortunately, the quality of service, video surveillance uses too much bandwidth to the detriment of the voice over IP system.
As a result, phone calls are disrupted.
In this second scenario, it would have been preferable to separate the two by creating a network dedicated to video surveillance and a network dedicated to the voice over IP system in order to reduce the traffic broadcast on the network by third parties.

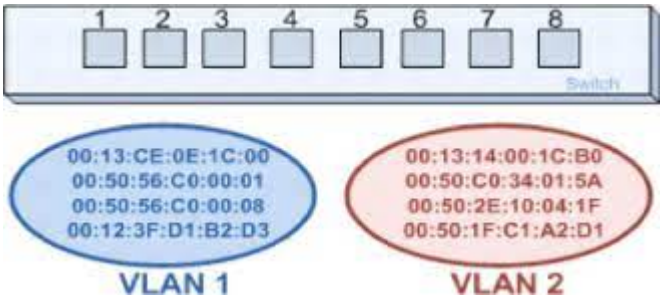
2.2. Tier 1

A Tier 1 VLAN (also called per-port VLAN) defines a virtual network based on the connection ports of the switch



2.3. Tier 2

A Tier 2 VLAN (also known as MAC VLAN, IEEE Address Based VLAN, or MAC Address Based VLAN) consists of defining a virtual network based on the MAC addresses of the stations. This type of VLAN is much more flexible than port-based VLAN because the network is independent of station location.



2.4. Tier 3

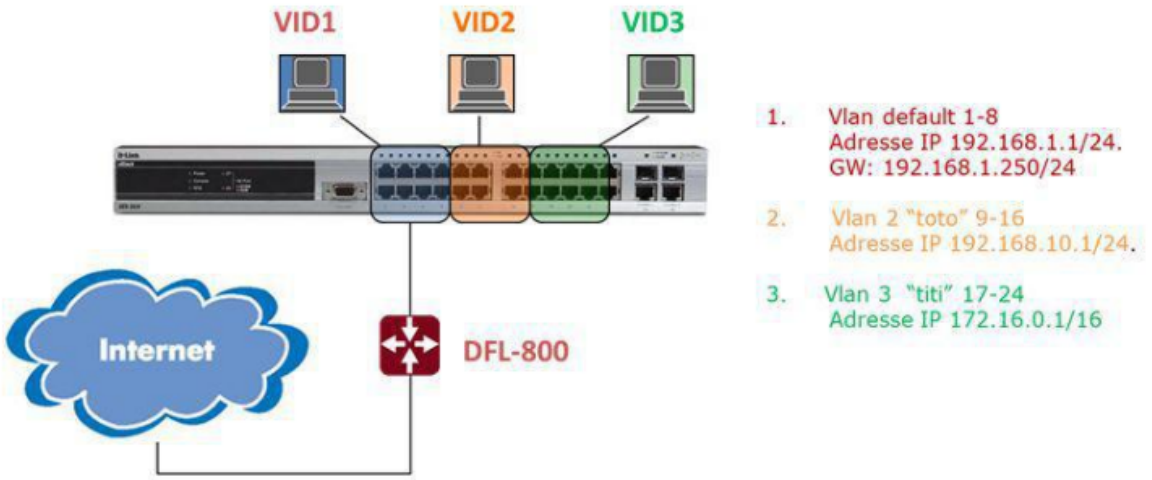
A Tier 3 VLAN: There are several types of Tier 3 VLANs

Tier 3: Subnet (IP Address) Network Address

Based VLAN combines subnets based on the source IP address of the datagrams.

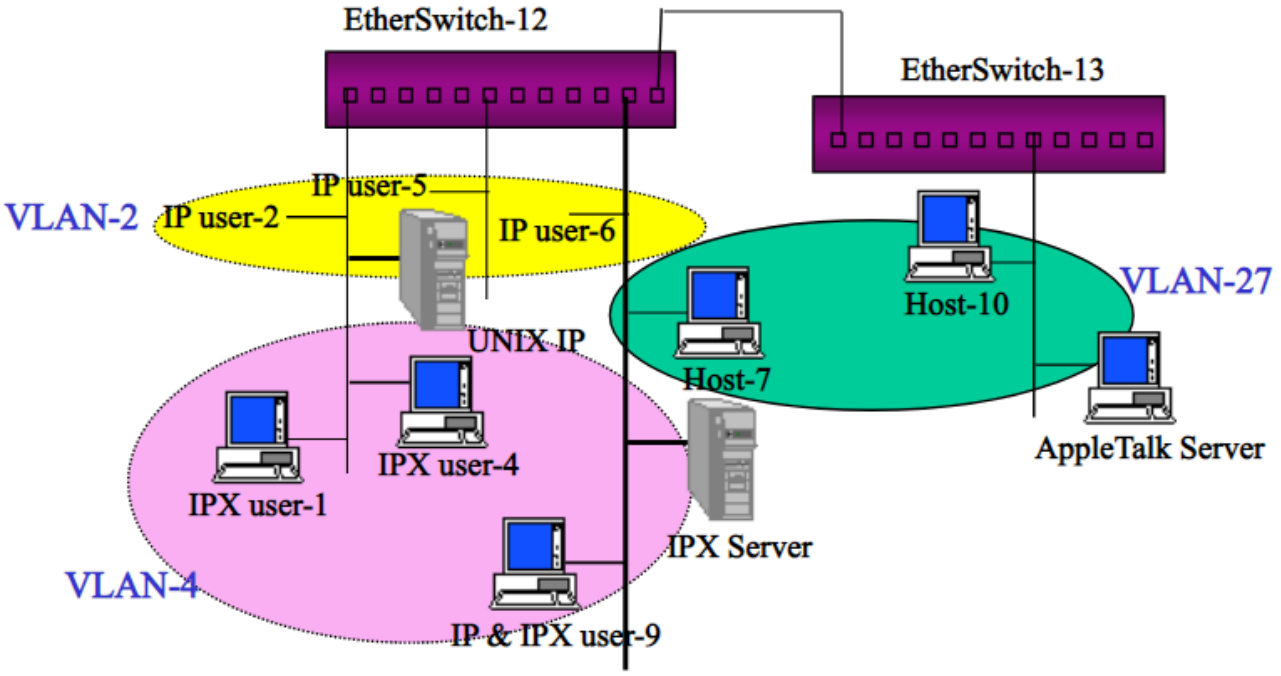
This type of solution offers great flexibility in that the configuration of the switches changes automatically when a station is moved.

On the other hand, a slight performance degradation can be felt insofar as the information contained in the packets must be analyzed more finely.



Layer 3: Protocol Protocol

-based VLAN allows you to create a virtual network by protocol type (e.g. TCP/IP, IPX, AppleTalk, etc.), grouping all machines using the same protocol into a same network.

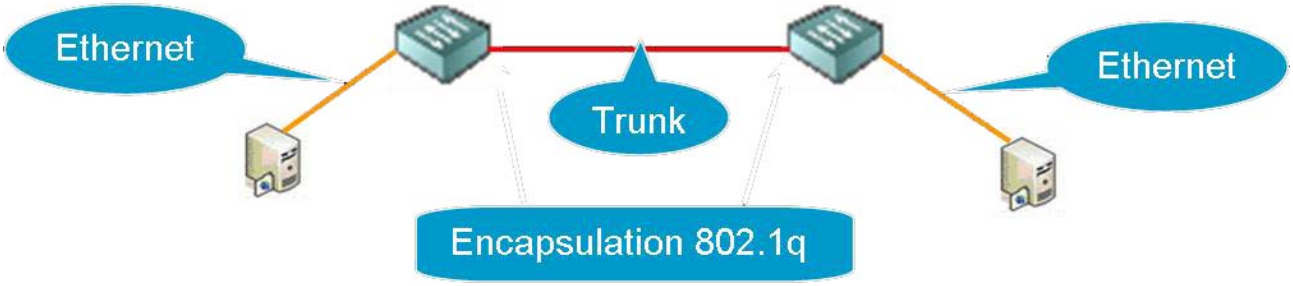


3. Configuring a trunk

3.1. Uses

This is a link between two installations. It can be used to circulate frames. The goal here is that the VLAN 1 network can circulate on the same network (VLAN 1) which is physically on another device further in the company for example.

Just make sure you have the same network and enable the 802.1Q protocol.



4. Conclusion

4.1. Purpose

VLANs allow:

- Separating flows.
- Segmentation: reduce the size of a broadcast domain.

- Security: create an isolated logical set to improve security.
  The only way to communicate between machines belonging to different VLANs is through a router.

Therefore, VLANs also improve network management and optimize bandwidth.