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# 通 信 安 全



## L14—虚拟局域网 (VLAN)

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- 编号：ELEC3019
- 学时：32学时





# VLAN的基本配置

## 一、实验目的：

- 1、虚拟局域网VLAN的配置
- 2、虚拟局域网VLAN的通信

## 二、实验环境：

计算机，华为ensp模拟软件

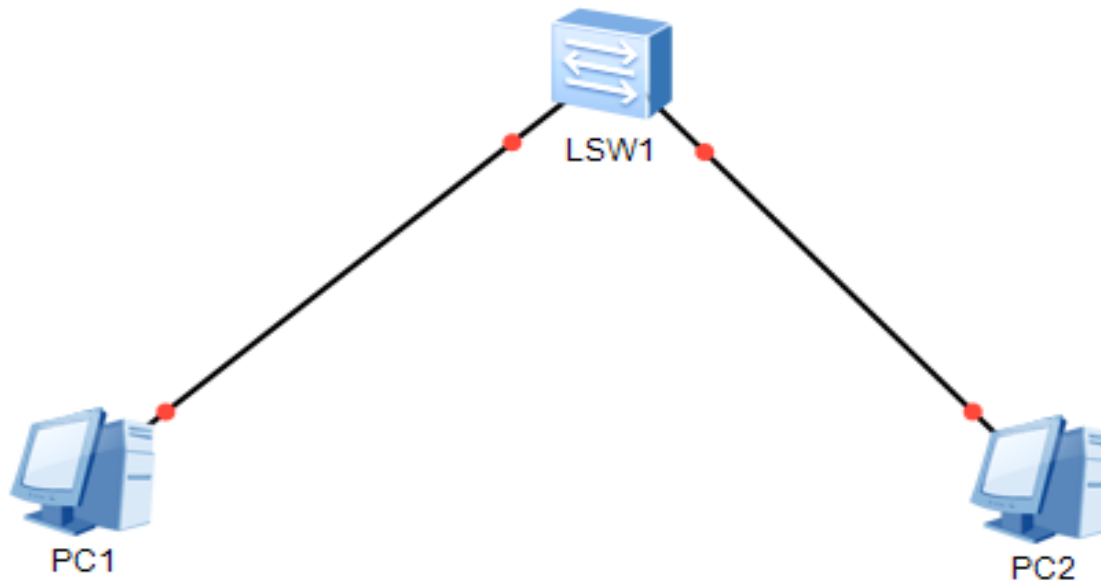
## 三、实验内容

用ensp模拟器测试VLAN的基本配置，模拟VLAN通信

## 四、实验步骤

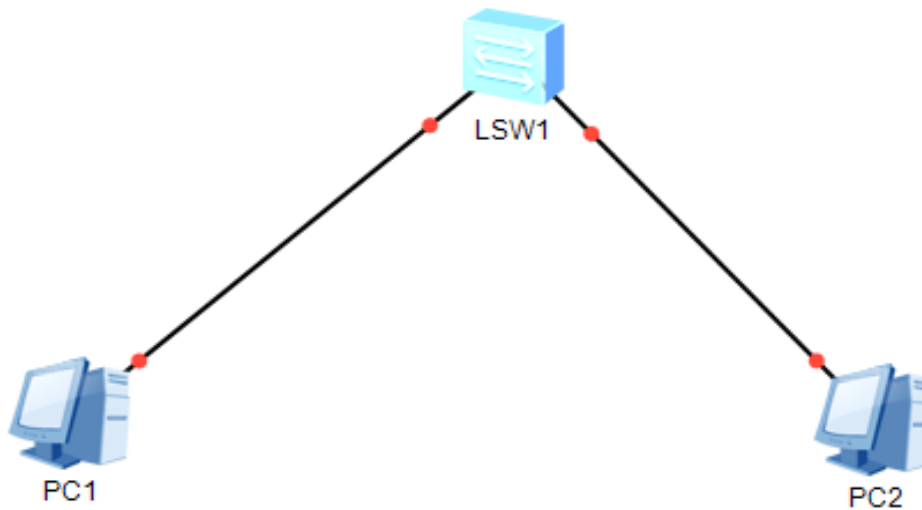
# VLAN的基本配置

1、打开eNSP模拟器，新建拓扑，向拓扑中加入一个交换机，两个PC电脑



# VLAN的基本配置

## 2、再点交换机右键——启动交换机





# VLAN的基本配置

3、点交换机右键——CLI进入控制台输入命令  
system-view 进入特权模式

 LSW1

The device is running!

<Huawei>system-view

Enter system view, return user view with Ctrl+Z.

[Huawei]



# VLAN的基本配置

## 4、创建vlan 2，并分配端口Ethernet 0/0/1

- vlan 2 #vlan不存在会创建，存在会进入此vlan
- inter Ethernet 0/0/1
- port link-type access
- port default vlan 2

```
LSW1
The device is running!

<Huawei>system-view
Enter system view, return user view with Ctrl+Z.
[Huawei]vlan 2
[Huawei-vlan2]inter ethernet 0/0/1
[Huawei-Ethernet0/0/1]
Oct 19 2019 16:22:33-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 4, th
e change loop count is 0, and the maximum number of records is 4095.
[Huawei-Ethernet0/0/1]port link-type access
[Huawei-Ethernet0/0/1]port default vlan 2
[Huawei-Ethernet0/0/1]
Oct 19 2019 16:22:53-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 6, th
e change loop count is 0, and the maximum number of records is 4095.
[Huawei-Ethernet0/0/1]|
```



# VLAN的基本配置

5、创建vlan 3，并分配端口Ethernet 0/0/2

- vlan 3 #vlan不存在会创建，存在会进入此vlan
- inter Ethernet 0/0/2
- port link-type access
- port default vlan 3



# VLAN的基本配置

6、设置PC1的IP，右键PC1—设置ip为：10.5.1.1/24

PC1

基础配置 命令行 组播 UDP发包工具 串口

主机名:

MAC 地址:

**IPv4 配置**

☒ 静态 ☐ DHCP ☐ 自动获取 DNS 服务器地址

IP 地址:  DNS1:

子网掩码:  DNS2:

网关:

**IPv6 配置**

☒ 静态 ☐ DHCPv6

IPv6 地址:

前缀长度:

IPv6 网关:

应用





# VLAN的基本配置

7、设置PC2的IP，右键PC1—设置ip为：10.5.1.2/24

PC2

基础配置 命令行 组播 UDP发包工具 串口

主机名:

MAC 地址:

**IPv4 配置**

☒ 静态 ☐ DHCP ☐ 自动获取 DNS 服务器地址

IP 地址:  DNS1:

子网掩码:  DNS2:

网关:

**IPv6 配置**

☒ 静态 ☐ DHCPv6

IPv6 地址:

前缀长度:

IPv6 网关:



# VLAN的基本配置

8、在PC1的命令行ping 10.5.1.2 不通，证明不同vlan即使在同一网段也不能通信

The screenshot shows a terminal window titled "PC1" with a tabbed interface. The "命令行" (Command Line) tab is active. The terminal output shows two ping attempts to 10.5.1.2, both resulting in 100% packet loss. The first attempt shows five "Destination host unreachable" messages. The second attempt shows five "32 data bytes, Press Ctrl\_C to break" messages followed by five "Destination host unreachable" messages. Both attempts conclude with statistics: 5 packets transmitted, 0 received, and 100.00% loss.

```
基础配置 命令行 组播 UDP发包工具 串口
From 10.5.1.1: Destination host unreachable
From 10.5.1.1: Destination host unreachable
From 10.5.1.1: Destination host unreachable
From 10.5.1.1: Destination host unreachable
From 10.5.1.1: Destination host unreachable

--- 10.5.1.2 ping statistics ---
 5 packet(s) transmitted
 0 packet(s) received
100.00% packet loss

PC>ping 10.5.1.2

Ping 10.5.1.2: 32 data bytes, Press Ctrl_C to break
From 10.5.1.1: Destination host unreachable
From 10.5.1.1: Destination host unreachable
From 10.5.1.1: Destination host unreachable
From 10.5.1.1: Destination host unreachable
From 10.5.1.1: Destination host unreachable

--- 10.5.1.2 ping statistics ---
 5 packet(s) transmitted
 0 packet(s) received
100.00% packet loss
```



# VLAN的基本配置

9、因为配置还没有保存，重启一下交换机，再尝试ping 就通了，因为没有vlan交换机默认都是vlan 1 通过所有接口

```
PC1
基础配置  命令行  组播  UDP发包工具  串口
From 10.5.1.1: Destination host unreachable
From 10.5.1.1: Destination host unreachable
From 10.5.1.1: Destination host unreachable
From 10.5.1.1: Destination host unreachable

--- 10.5.1.2 ping statistics ---
  5 packet(s) transmitted
  0 packet(s) received
 100.00% packet loss

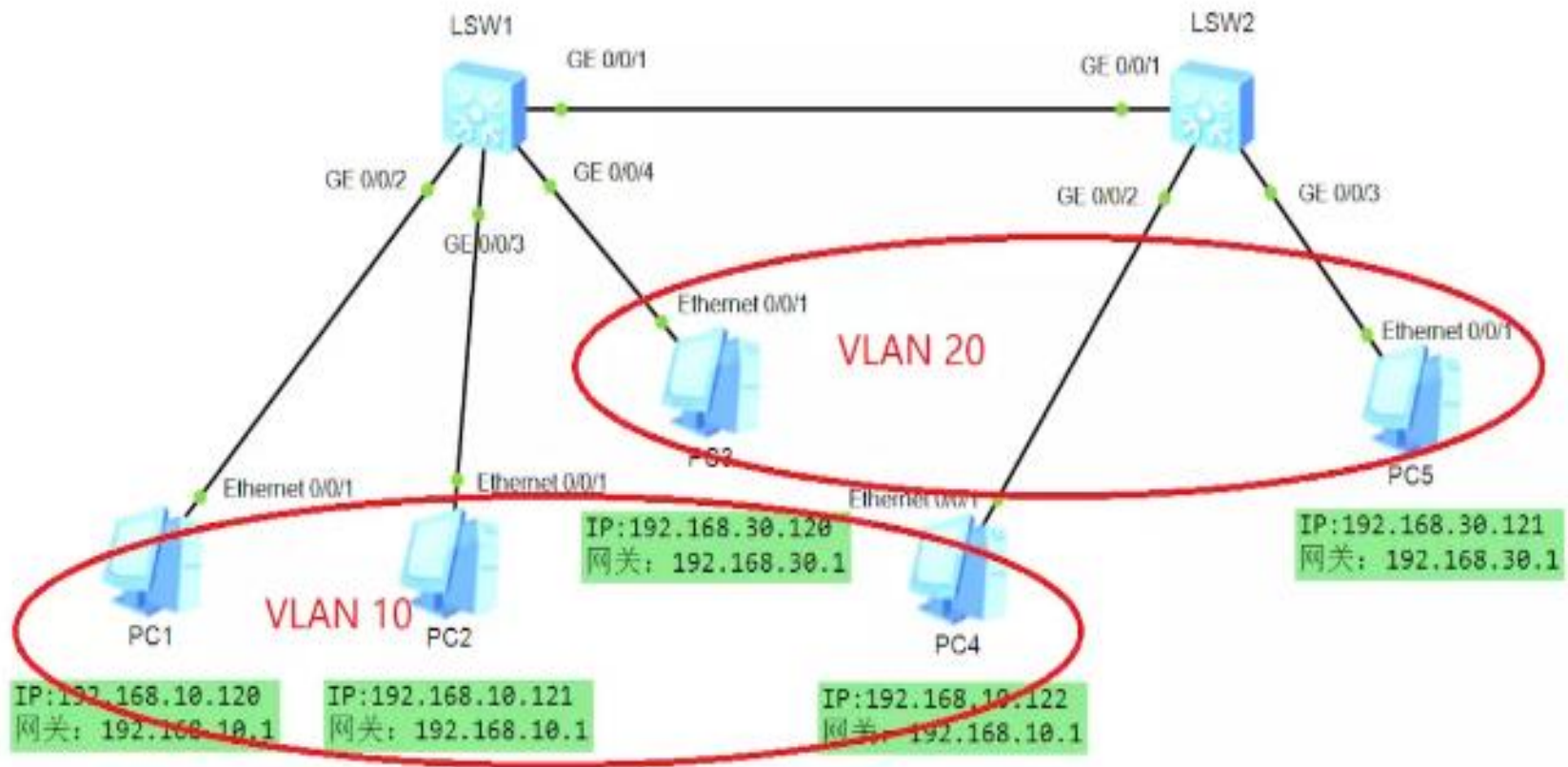
PC>ping 10.5.1.2

Ping 10.5.1.2: 32 data bytes, Press Ctrl_C to break
From 10.5.1.2: bytes=32 seq=1 ttl=128 time=47 ms
From 10.5.1.2: bytes=32 seq=2 ttl=128 time=32 ms
From 10.5.1.2: bytes=32 seq=3 ttl=128 time=47 ms
From 10.5.1.2: bytes=32 seq=4 ttl=128 time=31 ms
From 10.5.1.2: bytes=32 seq=5 ttl=128 time=47 ms

--- 10.5.1.2 ping statistics ---
```

# VLAN的通信

1、按照图所示的实验组网图完成PC1-PC5的IP地址、子网掩码、网关配置





# VLAN的通信

2、进入LSW1交换机，创建VLAN10和VLAN20。

➤ `vlan batch 10 20`

进入GigabitEthernet 0/0/2接口，配置接口的链路类型，然后配置Access类型接口加入VLAN10。GigabitEthernet 0/0/3接口的配置同GigabitEthernet 0/0/2接口

```
interface GigabitEthernet 0/0/2
port link-type access
port default vlan 10
quit
```

```
interface GigabitEthernet 0/0/3
port link-type access
port default vlan 10
quit
```



# VLAN的通信

3、进入GigabitEthernet 0/0/4接口，配置接口的链路类型，然后配置Access类型接口加入VLAN20

```
interface GigabitEthernet 0/0/4
port link-type access
port default vlan 20
quit
```



# VLAN的通信

4、进入GigabitEthernet 0/0/1接口，配置接口的链路类型，然后配置Trunk类型接口加入VLAN10和VLAN20

```
interface GigabitEthernet 0/0/1
port link-type trunk
port trunk allow-pass vlan 10 20
quit
```



# VLAN的通信

## 5、LSW2交换机的配置与LSW1交换机配置类似

```
interface GigabitEthernet 0/0/1
port link-type trunk
port trunk allow-pass vlan 10 20
quit
```





# VLAN的通信

6、PC1 ping PC5, PC1 ping PC4的结果

同一VLAN下的主机能互相ping通，  
不同VLAN下的主机不能ping通

