

# 江 蘇 大 學

JIANGSU UNIVERSITY

## 计算机网络实验报告



实验名称：有线局域网组网与 VLAN 配置实验

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# 1 单交换机 VLAN 的构建

## 1.1 实验目的

熟悉 VLAN 的概念、掌握 cisco 交换机的 VLAN 的建立、删除方法，以及基于端口的 VLAN 分配方法。

## 1.2 实验思路

掌握 VLAN 的概念、掌握在交换机中 VLAN 创建与撤销的方法、掌握基于端口划分和配置 VLAN 的基本方法与步骤。

## 1.3 实验步骤

### 1.3.1 创建单交换机网络

建立如图 2.2 所示网络拓扑结构，其中交换机用 2950-24，四台电脑分别连接在 FastEthernet0/1、FastEthernet0/2、FastEthernet0/3 和 FastEthernet0/4 端口中。并将 PC0、PC1、PC2 和 PC3 的 IP 地址设置为 192.1.1.1/255.255.255.0、192.1.1.2/255.255.255.0、192.1.1.3/255.255.255.0 和 192.1.1.4/255.255.255.0。将鼠标移动到交换机图标上，保持不动，系统将出现如图所示的端口分配情况列表：

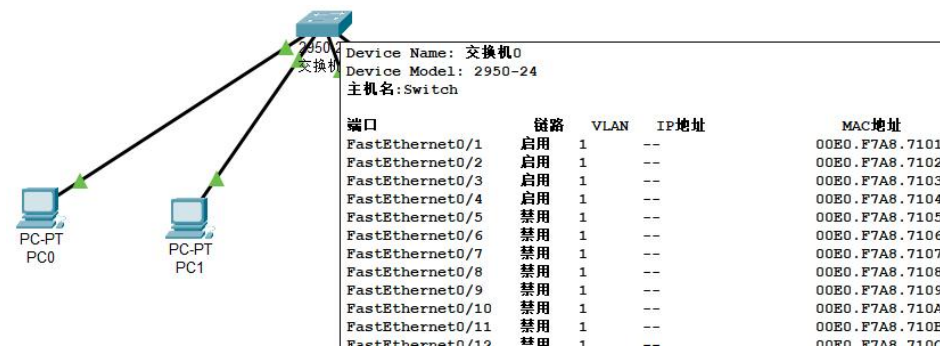


图 1 端口分配情况

此时 PC 之间可以彼此 Ping 通：

```

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.1.1.2

Pinging 192.1.1.2 with 32 bytes of data:

Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
        
```

```

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.1.1.4

Pinging 192.1.1.4 with 32 bytes of data:

Reply from 192.1.1.4: bytes=32 time=4ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 4ms, Average = 1ms
        
```

图 2 Ping 结果

### 1.3.2 创建 VLAN

切换到“CLI”标签页，按下面步骤创建 VLAN：

1. `Switch#vlan database` //进入 VLAN 配置模式
2. `Switch (vlan)#vlan 2 name vlan2` //创建 VLAN 2 并命名为 VLAN2
3. `Switch (vlan)#vlan 3 name vlan3` //创建 VLAN 3 并命名为 VLAN3
4. `Switch (vlan)#vlan 4 name vlan4` //创建 VLAN 4 并命名为 VLAN4
5. `Switch (vlan)#exit` //退出 VLAN 配置模式
6. `Switch #show vlan brief` //显示当前 VLAN 的配置信息

在交换机中已经创建了 vlan2、vlan3 和 vlan4 三个 vlan：

```
Switch>enable
Switch#vlan database
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.

Switch(vlan)#vlan 2 name vlan2
VLAN 2 added:
  Name: vlan2
Switch(vlan)#vlan 3 name vlan3
VLAN 3 added:
  Name: vlan3
Switch(vlan)#vlan 4 name vlan4
VLAN 4 added:
  Name: vlan4
Switch(vlan)#exit
APPLY completed.
Exiting....
Switch#show vlan brief
```

VLAN	Name	Status	Ports
1	default	active	Fa0/1, Fa0/2, Fa0/3, Fa0/4 Fa0/5, Fa0/6, Fa0/7, Fa0/8 Fa0/9, Fa0/10, Fa0/11, Fa0/12 Fa0/13, Fa0/14, Fa0/15, Fa0/16 Fa0/17, Fa0/18, Fa0/19, Fa0/20 Fa0/21, Fa0/22, Fa0/23, Fa0/24
2	vlan2	active	
3	vlan3	active	
4	vlan4	active	

图 3 创建 VLAN

### 1.3.3 删除 VLAN

输入以下命令：

1. `Switch#vlan database` //进入 VLAN 配置模式
2. `Switch (vlan)#no vlan 4` //删除 VLAN 4
3. `Switch (vlan)#exit` //退出 VLAN 配置模式

发现 VLAN 4 删除：

```
Switch(vlan)#no vlan 4
Deleting VLAN 4...
Switch(vlan)#exit
APPLY completed.
Exiting....
Switch#show vlan brief
```

VLAN	Name	Status	Ports
1	default	active	Fa0/1, Fa0/2, Fa0/3, Fa0/4 Fa0/5, Fa0/6, Fa0/7, Fa0/8 Fa0/9, Fa0/10, Fa0/11, Fa0/12 Fa0/13, Fa0/14, Fa0/15, Fa0/16 Fa0/17, Fa0/18, Fa0/19, Fa0/20 Fa0/21, Fa0/22, Fa0/23, Fa0/24
2	vlan2	active	
3	vlan3	active	

图 4 删除 VLAN

### 1.3.4 给 VLAN 分配端口

输入如下命令将 Fa0/1, Fa0/2 分配给 VLAN 2:

1. Switch >en
2. Switch #conf t
3. Switch (config)#int f0/1 //进入接口配置模式
4. Switch (config-if)# switchport access vlan 2 //将接口 f0/1 配置到 vlan 2
5. Switch (config-if)#int f0/2
6. Switch (config-if)#switchport access vlan 2
7. Switch (config-if)#end //返回特权模式
8. Switch #show vlan brief

发现 f0/1 和 f0/2 两个交换机端口已经分配到 vlan 2 中了:

```
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int f0/1
Switch(config-if)#switchport access vlan 2
Switch(config-if)#int f0/2
Switch(config-if)#switchport access vlan 2
Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#show vlan brief
```

VLAN Name	Status	Ports
1 default	active	Fa0/3, Fa0/4, Fa0/5, Fa0/6 Fa0/7, Fa0/8, Fa0/9, Fa0/10 Fa0/11, Fa0/12, Fa0/13, Fa0/14 Fa0/15, Fa0/16, Fa0/17, Fa0/18 Fa0/19, Fa0/20, Fa0/21, Fa0/22 Fa0/23, Fa0/24
2 vlan2	active	Fa0/1, Fa0/2
3 vlan3	active	

图 5 端口分配结果

此时, PC0、PC1、PC2 和 PC3 彼此之间可以 Ping 通:

The image shows two terminal windows side-by-side. The left window shows a successful ping from C:\> to 192.1.1.2, with 4 packets sent and received, 0% loss, and an average round trip time of 0ms. The right window shows a successful ping from C:\> to 192.1.1.4, also with 4 packets sent and received, 0% loss, and an average round trip time of 0ms.

图 6 Ping 结果

输入如下命令，将 Fa0/3-4 分配给 VLAN 3:

1. Switch #conf t
2. Switch (config)#int rang f0/3-4 //进入 f0/3-4 接口配置模式
3. Switch (config-if)# switchport access vlan 3 //将 f0/3 和 f0/4 分配到 vlan 3
4. Switch (config-if)#end //返回特权模式
5. Switch#show vlan brief

结果如下:

```
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int range f0/3-4
Switch(config-if-range)#switchport access vlan 3
Switch(config-if-range)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#show vlan brief
```

VLAN	Name	Status	Ports
1	default	active	Fa0/5, Fa0/6, Fa0/7, Fa0/8 Fa0/9, Fa0/10, Fa0/11, Fa0/12 Fa0/13, Fa0/14, Fa0/15, Fa0/16 Fa0/17, Fa0/18, Fa0/19, Fa0/20 Fa0/21, Fa0/22, Fa0/23, Fa0/24
2	vlan2	active	Fa0/1, Fa0/2
3	vlan3	active	Fa0/3, Fa0/4
1002	fddi-default	active	
1003	token-ring-default	active	
1004	fddinet-default	active	
1005	trnet-default	active	

图 7 分配结果

此时，PC0、PC1、PC2 和 PC3 彼此之间可以 Ping 通:

```
C:\>ping 192.1.1.2
Pinging 192.1.1.2 with 32 bytes of data:
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.1.1.2
Pinging 192.1.1.2 with 32 bytes of data:
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.1.1.4
Pinging 192.1.1.4 with 32 bytes of data:
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128
Reply from 192.1.1.4: bytes=32 time=3ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 3ms, Average = 0ms

C:\>ping 192.1.1.4
Pinging 192.1.1.4 with 32 bytes of data:
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128
Reply from 192.1.1.4: bytes=32 time=5ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 5ms, Average = 1ms
```

图 8 Ping 结果

### 1.3.5 删除 VLAN

按下面步骤删除 VLAN:

1. Switch #vlan database //进入 VLAN 配置模式



2. Switch (vlan)#no vlan 2 //删除 VLAN 2
3. Switch (vlan)#no vlan 3 //删除 VLAN 3
4. Switch (vlan)#exit
5. Switch #show vlan brief //显示当前 VLAN 的配置信息

```
Switch#vlan database
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.

Switch(vlan)#no vlan 2
Deleting VLAN 2...
Switch(vlan)#no vlan 3
Deleting VLAN 3...
Switch(vlan)#exit
APPLY completed.
Exiting...
Switch#show vlan brief
```

VLAN Name	Status	Ports
1 default	active	Fa0/5, Fa0/6, Fa0/7, Fa0/8 Fa0/9, Fa0/10, Fa0/11, Fa0/12 Fa0/13, Fa0/14, Fa0/15, Fa0/16 Fa0/17, Fa0/18, Fa0/19, Fa0/20 Fa0/21, Fa0/22, Fa0/23, Fa0/24
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

图 9 删除结果

此时，PC0、PC1、PC2 和 PC3 彼此之间不可以 Ping 通：

```
C:\>ping 192.1.1.2
Pinging 192.1.1.2 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.1.1.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>
```

```
C:\>ping 192.1.1.4
Pinging 192.1.1.4 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.1.1.4:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>
```

图 10 Ping 结果

### 1.3.6 将 Fa0/1-4 重新分配给缺省 VLAN 1

按下面步骤将 f0/1~4 端口重新指定给 VLAN1：

1. Switch #config terminal
2. Switch (config)#int rang f0/1-4
3. Switch (config-if)# switchport access vlan 1
4. Switch (config-if)#end //返回特权模式
5. Switch #show vlan brief //显示当前 VLAN 的配置信息

分配结果如下：

```
Switch#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int range f0/1-4
Switch(config-if-range)#switchport access vlan 1
Switch(config-if-range)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#show vlan brief
```

VLAN Name	Status	Ports
1 default	active	Fa0/1, Fa0/2, Fa0/3, Fa0/4 Fa0/5, Fa0/6, Fa0/7, Fa0/8 Fa0/9, Fa0/10, Fa0/11, Fa0/12 Fa0/13, Fa0/14, Fa0/15, Fa0/16 Fa0/17, Fa0/18, Fa0/19, Fa0/20 Fa0/21, Fa0/22, Fa0/23, Fa0/24

图 11 分配结果

此时，PC0、PC1、PC2 和 PC3 彼此之间可以 Ping 通：

```
C:\>ping 192.1.1.2

Pinging 192.1.1.2 with 32 bytes of data:

Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

```
C:\>ping 192.1.1.4

Pinging 192.1.1.4 with 32 bytes of data:

Reply from 192.1.1.4: bytes=32 time<1ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

图 12 Ping 结果

## 1.4 实验提高

按图 2.11 的网络拓扑建立三个 VLAN，如图所示：

```
Switch#vlan database
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VIP/VLAN in config mode.

Switch(vlan)#vlan 2 name vlan2
VLAN 2 modified:
    Name: vlan2
Switch(vlan)#vlan 3 name vlan3
VLAN 3 added:
    Name: vlan3
Switch(vlan)#vlan 4 name vlan4
VLAN 4 added:
    Name: vlan4
Switch(vlan)#exit
APPLY completed.
Exiting...
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int range f0/1-2
Switch(config-if-range)#switchport access vlan 2
Switch(config-if-range)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int range f0/3-4
Switch(config-if-range)#switchport access vlan 4
Switch(config-if-range)#int range f0/5-6
Switch(config-if-range)#switchport access vlan 3
Switch(config-if-range)#end
Switch#
```

图 13 CLI 命令



```
Switch#show vlan brief
```

VLAN Name	Status	Ports
1 default	active	Fa0/7, Fa0/8, Fa0/9, Fa0/10 Fa0/11, Fa0/12, Fa0/13, Fa0/14 Fa0/15, Fa0/16, Fa0/17, Fa0/18 Fa0/19, Fa0/20, Fa0/21, Fa0/22 Fa0/23, Fa0/24
2 vlan2	active	Fa0/1, Fa0/2
3 vlan3	active	Fa0/5, Fa0/6
4 vlan4	active	Fa0/3, Fa0/4

图 14 创建结果

测试各 PC 之间连通性，发现只有同一 VLAN 下的 PC 可以 Ping 通：

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.1.1.2

Pinging 192.1.1.2 with 32 bytes of data:

Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.1.1.3

Pinging 192.1.1.3 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.1.1.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.1.1.5

Pinging 192.1.1.5 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.1.1.5:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

图 15 Ping 结果

## 2 跨交换机 VLAN 配置

### 2.1 实验目的

进一步熟悉 VLAN 的配置方法、掌握通过建立交换路径进行跨交换 VLA

N 的配置方法

## 2.2 实验思路

- (1) 两台交换机上建立 VLAN2;
- (2) 将 PC0、PC1、PC2、PC3 所连接的端口都指定到 VLAN2。
- (3) 将连接两台交换机的端口也指定到 VLAN2，以建立 VLAN2 之间的交换路径。测试四台电脑彼此之间的连通性。

## 2.3 实验步骤

### 2.3.1 建立网络拓扑结构

建立如图 2.12 所示的网络拓扑，分别将 PC0、PC1、PC2、PC3 四台电脑的 IP 地址设置为 192.1.1.1/24、192.1.1.2/24、192.1.1.3/24 和 192.1.1.4/24:

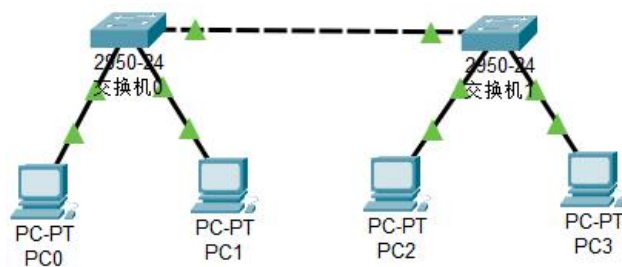


图 16 网络拓扑图

### 2.3.2 建立 VLAN

将 PC0、PC1、PC2、PC3 四台电脑通过自己所接入的交换机指定到 VLAN2 中。命令如下:

```

1. Switch>en
2. Switch#vlan database
3. Switch(vlan)#vlan 2 name vlan2
4. Switch(vlan)#exit
5. Switch#conf t
6. Switch(config)#int rang f0/1-2
7. Switch(config-if-range)#switchport access vlan 2
8. Switch(config-if-range)#exit
9. Switch(config)#exit
10. Switch#
  
```

```

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed
state to up

%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up

Switch>enable
Switch#vlan database
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.

Switch(vlan)#vlan 2 name vlan2
VLAN 2 added:
  Name: vlan2
Switch(vlan)#exit
APPLY completed.
Exiting....
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int range f0/1-2
Switch(config-if-range)#switchport access vlan 2
Switch(config-if-range)#exit
Switch(config)#

Switch>enable
Switch#vlan database
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.

Switch(vlan)#vlan 2 name vlan2
VLAN 2 added:
  Name: vlan2
Switch(vlan)#exit
APPLY completed.
Exiting....
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int range f0/1-2
Switch(config-if-range)#switchport access vlan 2
Switch(config-if-range)#exit
Switch(config)#

```

图 17 CLI 命令

此时 PC0、PC1、PC2、PC3 之间连通，而 PC0 和 PC2、PC3 不连通：

```

C:\>ping 192.1.1.2

Pinging 192.1.1.2 with 32 bytes of data:

Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.1.1.3

Pinging 192.1.1.3 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.1.1.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>

```

图 18 Ping 结果

### 2.3.3 建立交换路径

在两台交换机上都连接两台交换机的端口（f0/3）指定到 VLAN2 中。命令如下：

1. Switch#conf t
2. Switch(config)#int f0/3
3. Switch(config-if)#switchport access vlan 2
4. Switch(config-if)#end
5. Switch#

<pre> state to up  Switch&gt;enable Switch#vlan database % Warning: It is recommended to configure VLAN from config mode, as VLAN database mode is being deprecated. Please consult user documentation for configuring VTP/VLAN in config mode.  Switch(vlan)#vlan 2 name vlan2 VLAN 2 added:   Name: vlan2 Switch(vlan)#exit APPLY completed. Exiting... Switch#conf t Enter configuration commands, one per line. End with CNTL/Z. Switch(config)#int range f0/1-2 Switch(config-if-range)#switchport access vlan 2 Switch(config-if-range)#exit Switch(config)#int f0/3 Switch(config-if)#switchport access vlan 2 Switch(config-if)#end Switch# %SYS-5-CONFIG_I: Configured from console by console  %CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/3 (2), with Switch FastEthernet0/3 (1). </pre>	<pre> Switch(vlan)#vlan 2 name vlan2 VLAN 2 added:   Name: vlan2 Switch(vlan)#exit APPLY completed. Exiting... Switch#conf t Enter configuration commands, one per line. End with CNTL/Z. Switch(config)#int range f0/1-2 Switch(config-if-range)#switchport access vlan 2 Switch(config-if-range)#exit Switch(config)#int f0/3 Switch(config-if)#switchport access vlan 2 Switch(config-if-range)#exit Switch(config)#int f0/3 Switch(config-if)# %CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/3 (1), with Switch FastEthernet0/3 (2).  Switch(config-if)#switchport access vlan 2 Switch(config-if)#end Switch# %SYS-5-CONFIG_I: Configured from console by console </pre>
---	---

图 19 CLI 命令

此时 PC 间彼此连通:

```

C:\>ping 192.1.1.2

Pinging 192.1.1.2 with 32 bytes of data:

Reply from 192.1.1.2: bytes=32 time<lms TTL=128
Reply from 192.1.1.2: bytes=32 time<lms TTL=128
Reply from 192.1.1.2: bytes=32 time<lms TTL=128
Reply from 192.1.1.2: bytes=32 time<lms TTL=128

Ping statistics for 192.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.1.1.3

Pinging 192.1.1.3 with 32 bytes of data:

Reply from 192.1.1.3: bytes=32 time<lms TTL=128
Reply from 192.1.1.3: bytes=32 time<lms TTL=128
Reply from 192.1.1.3: bytes=32 time<lms TTL=128
Reply from 192.1.1.3: bytes=32 time<lms TTL=128

Ping statistics for 192.1.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

```

图 20 Ping 结果

## 2.4 实验提高

PC0 和 PC2 指定到 VLAN2, 而 PC1 和 PC3 指定到 VLAN3:



```
Switch>enable
Switch#vlan database
% Warning: It is recommended to configure VLAN from config mode
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.

Switch(vlan)#vlan 2 name vlan2
VLAN 2 added:
    Name: vlan2
Switch(vlan)#conf t
    ^
% Invalid input detected at '^' marker.

Switch(vlan)#vlan 3 name vlan3
VLAN 3 added:
    Name: vlan3
Switch(vlan)#exit
APPLY completed.
Exiting....
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int f0/1
Switch(config-if)#switchport access vlan 2
Switch(config-if)#int f0/2
Switch(config-if)#switchport access vlan 3
Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch>enable
Switch#vlan database
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.

Switch(vlan)#vlan 2 name vlan2
VLAN 2 added:
    Name: vlan2
Switch(vlan)#vlan 3 name vlan3
VLAN 3 added:
    Name: vlan3
Switch(vlan)#exit
APPLY completed.
Exiting....
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int f0/1
Switch(config-if)#switchport access vlan 2
Switch(config-if)#int f0/2
Switch(config-if)#switchport access vlan 3
Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
```

图 21 CLI 命令

VLAN Name	Status	Ports
1 default	active	Fa0/3, Fa0/4, Fa0/7, Fa0/8, Fa0/11, Fa0/14, Fa0/15, Fa0/18, Fa0/19, Fa0/22
2 vlan2	active	Fa0/23, Fa0/24
3 vlan3	active	Fa0/1, Fa0/2
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

VLAN Name	Status	Ports
1 default	active	Fa0/3, Fa0/4, Fa0/5, Fa0/6, Fa0/7, Fa0/8, Fa0/9, Fa0/10, Fa0/11, Fa0/12, Fa0/13, Fa0/15, Fa0/16, Fa0/17, Fa0/19, Fa0/20, Fa0/21, Fa0/23, Fa0/24
2 vlan2	active	Fa0/1
3 vlan3	active	Fa0/2
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

图 22 VLAN 分配结果

设置交换机接口为 Trunk:

```
Switch(config)#interface FastEthernet0/3
Switch(config-if)#
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on
FastEthernet0/3 (2), with Switch FastEthernet0/3 switchport access vlan
2
Switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed
state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed
state to up

%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on
FastEthernet0/3 (1), with Switch FastEthernet0/3 (3).

Switch(config-if)#exit
Switch(config)#interface FastEthernet0/3
Switch(config-if)#switchport trunk allowed vlan 2,3
Switch(config-if)#

Switch(config-if)#
%SPANTREE-2-RECV_EVID_ERR: Received 802.1Q BPDU on non trunk FastEthernet0/3
VLAN1.

%SPANTREE-2-BLOCK_EVID_LOCAL: Blocking FastEthernet0/3 on VLAN0001.
Inconsistent port type.

Switch(config-if)#switchport mode trunk
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed
state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed
state to up

Switch(config-if)#
Switch(config-if)#exit
Switch(config)#interface FastEthernet0/3
Switch(config-if)#switchport trunk allowed vlan 2,3
Switch(config-if)#
```

图 23 配置接口

此时 PC 之间可以互相连通:

```
C:\>ping 192.1.1.3

Pinging 192.1.1.3 with 32 bytes of data:

Reply from 192.1.1.3: bytes=32 time=14ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 14ms, Average = 3ms

C:\>ping 192.1.1.4

Pinging 192.1.1.4 with 32 bytes of data:

Reply from 192.1.1.4: bytes=32 time=12ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 12ms, Average = 3ms
```

图 24 Ping 结果

### 3 基于共享端口的跨交换机 VLAN 配置实验

#### 3.1 实验目的

- (1) 熟悉配置交换机接口的 `trunk`;
- (2) 熟悉跨交换机之间配置 `vlan` 的方法。

#### 3.2 实验思路

- (1) 按图 2.13 所示的网络拓扑建立实验拓扑图。
- (2) 分别在两台交换机中都建立 VLAN2 和 VLAN3。
- (3) 将 PC0、PC1、PC2、PC3 都分配到 VLAN2 中，并在两台交换机的连接端口建立 Trunk。测试四台电脑之间的连通性。
- (4) 将 PC0 和 PC2 指定到 VLAN2，PC1 和 PC3 指定到 VLAN3 中。测试四台电脑之间的连通性。并与实验 5 进行比较

#### 3.3 实验步骤

##### 3.3.1 建立网络拓扑

建立如图 2.13 所示的网络拓扑，分别将 PC0、PC1、PC2、PC3 四台电脑的 IP 地址设置为 192.1.1.1/24、192.1.1.2/24、192.1.1.3/24 和 192.1.1.4/24。

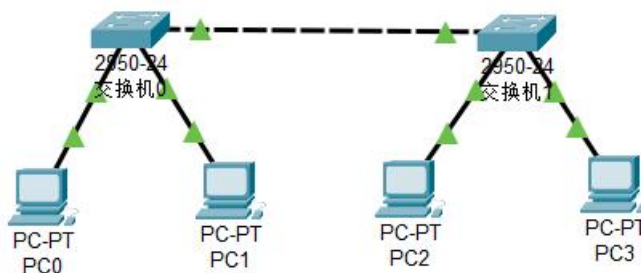


图 25 拓扑结构

此时 PC 之间可以连通：



```
C:\>ping 192.1.1.2

Pinging 192.1.1.2 with 32 bytes of data:

Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.1.1.3

Pinging 192.1.1.3 with 32 bytes of data:

Reply from 192.1.1.3: bytes=32 time<1ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

图 26 Ping 结果

### 3.3.2 建立 VLAN

将 PC0、PC1、PC2、PC3 四台电脑通过自己所接入的交换机指定到 VLAN2 中。

分别在两台交换机中执行的命令如下：

<ol style="list-style-type: none"> <li>1. Switch&gt;en</li> <li>2. Switch#vlan database</li> <li>3. Switch(vlan)#vlan 2 name vLan2</li> <li>4. Switch(vlan)#vlan 3 name vLan3</li> <li>5. Switch(vlan)#exit</li> <li>6. Switch#conf t</li> <li>7. Switch(config)#int rang f0/1-2</li> <li>8. Switch(config-if-range)#switchport access vlan 2</li> <li>9. Switch(config-if-range)#exit</li> <li>10. Switch(config)#exit</li> <li>11. Switch#</li> </ol>	<pre>Switch&gt;enable Switch#vlan database % Warning: It is recommended to configure VLAN from config mode, as VLAN database mode is being deprecated. Please consult user documentation for configuring VTP/VLAN in config mode.  Switch(vlan)#vlan 2 name vLan2 VLAN 2 added:   Name: vLan2 Switch(vlan)#vlan 3 name vLan3 VLAN 3 added:   Name: vLan3 Switch(vlan)#exit APPLY completed. Exiting.... Switch#conf t Enter configuration commands, one per line.  End with CNTL/Z. Switch(config)#int range f0/1-2 Switch(config-if-range)#switchport access vlan 2 Switch(config-if-range)#exit Switch(config)#</pre>
---	---

图 27 CLI 命令

此时 PC0 和 PC1 连通，和 PC2、PC3 不连通：

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.1.1.2

Pinging 192.1.1.2 with 32 bytes of data:

Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.1.1.3

Pinging 192.1.1.3 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.1.1.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

图 28 Ping 结果

### 3.3.3 建立 Trunk 路径

将两台交换机的连接端口（f0/3）指定为共享路径（端口为共享端口）。命令如下：

<ol style="list-style-type: none"> <li>1. Switch#conf t</li> <li>2. Switch(config)#int f0/3</li> <li>3. Switch(config-if)#switchport mode trunk</li> <li>4. Switch(config-if)#end</li> <li>5. Switch#</li> </ol>	<pre>Switch&gt;enable Switch#conf t Enter configuration commands, one per line. End with CNTL/Z. Switch(config)#int f0/3 Switch(config-if)#switchport mode trunk  Switch(config-if)# %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down  %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up end Switch# %SYS-5-CONFIG_I: Configured from console by console Switch#</pre>
--	---

图 29 CLI 命令

此时 PC 间可以连通：

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.1.1.2

Pinging 192.1.1.2 with 32 bytes of data:

Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.1.1.3

Pinging 192.1.1.3 with 32 bytes of data:

Reply from 192.1.1.3: bytes=32 time<1ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.1.1.4

Pinging 192.1.1.4 with 32 bytes of data:

Reply from 192.1.1.4: bytes=32 time<1ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

图 30 Ping 结果

### 3.3.4 指定 PC1 和 PC2 到 VLAN3

将 PC1 和 PC3 两台电脑通过自己所接入的交换机指定到 VLAN3 中，分别在两台交换机中执行的命令如下：

<ol style="list-style-type: none"> <li>1. Switch#conf t</li> <li>2. Switch(config)#int f0/2</li> <li>3. Switch(config-if)#switchport access vlan 3</li> <li>4. Switch(config-if)#end</li> <li>5. Switch#</li> </ol>	<pre>Switch#conf t Enter configuration commands, one per line. End with CNTL/Z. Switch(config)#int f0/2 Switch(config-if)#switchport access vlan 3 Switch(config-if)#end Switch# %SYS-5-CONFIG_I: Configured from console by console</pre>
---	--

图 31 CLI 命令

此时不同 VLAN 下的 PC 不连通：

```

C:\>ping 192.1.1.2

Pinging 192.1.1.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.1.1.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.1.1.3

Pinging 192.1.1.3 with 32 bytes of data:

Reply from 192.1.1.3: bytes=32 time<1ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.1.1.4

Pinging 192.1.1.4 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.1.1.4:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

```

图 32 Ping 结果

### 3.4 实验提高

按图 2.15 建立一个包含六台电脑和三台交换组成的网络，按图示连接好相应接口和配置好电脑的 IP 地址：

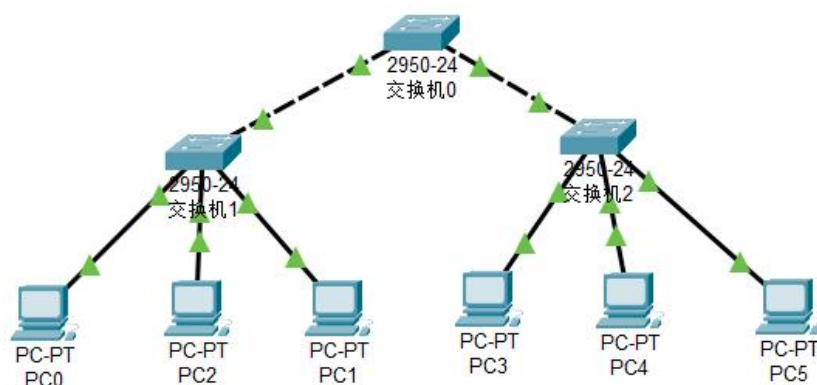


图 33 网络拓扑

此时 PC 之间是连通的：



```
C:\>ping 192.1.1.2

Pinging 192.1.1.2 with 32 bytes of data:

Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128
Reply from 192.1.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.1.1.3

Pinging 192.1.1.3 with 32 bytes of data:

Reply from 192.1.1.3: bytes=32 time<1ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128
Reply from 192.1.1.3: bytes=32 time=1ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

图 34 Ping 结果

分别在交换机 switch0 和 switch4 上面建立 vlan2 和 vlan 3，并按图示分配端口：

<pre>Switch&gt;enable Switch#vlan database % Warning: It is recommended to configure VLAN from config mode as VLAN database mode is being deprecated. Please consult use documentation for configuring VTP/VLAN in config mode.  Switch(vlan)#vlan 2 name vlan2 VLAN 2 added:     Name: vlan2 Switch(vlan)#vlan 3 name vlan3 VLAN 3 added:     Name: vlan3 Switch(vlan)#exit APPLY completed. Exiting... Switch#conf t Enter configuration commands, one per line. End with CNTL/Z. Switch(config)#int f0/1 Switch(config-if)#switchport access vlan 2 Switch(config-if)#int f0/2 Switch(config-if)#switchport access vlan 3 Switch(config-if)#exit Switch(config)#</pre>	<pre>Switch&gt;enable Switch#vlan database % Warning: It is recommended to configure VLAN from config mode, as VLAN database mode is being deprecated. Please consult user documentation for configuring VTP/VLAN in config mode.  Switch(vlan)#vlan 2 name vlan2 VLAN 2 added:     Name: vlan2 Switch(vlan)#vlan 3 name vlan3 VLAN 3 added:     Name: vlan3 Switch(vlan)#exit APPLY completed. Exiting.... Switch#conf t Enter configuration commands, one per line. End with CNTL/Z. Switch(config)#int f0/1 Switch(config-if)#switchport access vlan 2 Switch(config-if)#int f0/2 Switch(config-if)#switchport access vlan 3 Switch(config-if)#exit Switch(config)#</pre>
---	--

图 35 CLI 命令

此时 PC0-PC2、PC1-PC3 不连通，因为不处于同一 VLAN 下，而 PC4-PC5 连通：

<pre>Cisco Packet Tracer PC Command Line 1.0 C:\&gt;ping 192.1.1.3  Pinging 192.1.1.3 with 32 bytes of data:  Request timed out. Request timed out. Request timed out.  Ping statistics for 192.1.1.3:     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss), C:\&gt;</pre>	<pre>Cisco Packet Tracer PC Command Line 1.0 C:\&gt;ping 192.1.1.4  Pinging 192.1.1.4 with 32 bytes of data:  Request timed out. Request timed out. Request timed out.  Ping statistics for 192.1.1.4:     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss), C:\&gt;</pre>	<pre>Cisco Packet Tracer PC Command Line 1.0 C:\&gt;ping 192.1.1.6  Invalid Command.  C:\&gt;ping 192.1.1.6  Pinging 192.1.1.6 with 32 bytes of data:  Reply from 192.1.1.6: bytes=32 time&lt;1ms TTL=128 Reply from 192.1.1.6: bytes=32 time&lt;1ms TTL=128 Reply from 192.1.1.6: bytes=32 time&lt;1ms TTL=128 Reply from 192.1.1.6: bytes=32 time&lt;1ms TTL=128  Ping statistics for 192.1.1.6:     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate round trip times in milli-seconds:     Minimum = 0ms, Maximum = 0ms, Average = 0ms C:\&gt;</pre>
---	---	--

图 36 Ping 结果

将交换机 0 和交换机 4 的 Fa0/3 接口设置为 trunk：

```
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int f0/1
Switch(config-if)#switchport access vlan 2
Switch(config-if)#int f0/2
Switch(config-if)#switchport access vlan 3
Switch(config-if)#exit
Switch(config)#int f0/3
Switch(config-if)#switchport mode trunk
Switch(config-if)#

Switch(vlan)#exit
APPLY completed.
Exiting...
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int f0/1
Switch(config-if)#switchport access vlan 2
Switch(config-if)#int f0/2
Switch(config-if)#switchport access vlan 3
Switch(config-if)#int f0/3
Switch(config-if)#switchport mode trunk
```

图 37 CLI 命令

将交换机 5 的 Fa0/1 和 Fa0/2 的接口也设置为 trunk，并创建 VLAN2 和 VLAN3:

```
Switch(config)#int range f0/1-2
Switch(config-if-range)#switchport mode trunk
Switch(config-if-range)#
Switch(config-if-range)#exit
Switch(config)#interface FastEthernet0/1
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#interface FastEthernet0/2
Switch(config-if)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#vlan database
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.

Switch(vlan)#vlan 2 name vlan2
VLAN 2 added:
    Name: vlan2
Switch(vlan)#vlan 3 name vlan3
VLAN 3 added:
```

图 38 CLI 命令

此时 PC0-PC2 和 PC1-PC3 连通:

```
C:\>ping 192.1.1.3

Pinging 192.1.1.3 with 32 bytes of data:

Reply from 192.1.1.3: bytes=32 time<1ms TTL=128
Reply from 192.1.1.3: bytes=32 time=7ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128
Reply from 192.1.1.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 7ms, Average = 1ms

C:\>ping 192.1.1.4

Pinging 192.1.1.4 with 32 bytes of data:

Reply from 192.1.1.4: bytes=32 time<1ms TTL=128
Reply from 192.1.1.4: bytes=32 time=6ms TTL=128
Reply from 192.1.1.4: bytes=32 time=2ms TTL=128
Reply from 192.1.1.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.1.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 6ms, Average = 2ms
```

图 39 Ping 结果

## 4 实验总结

### 4.1 收获

- (1) 理解 VLAN 的概念: 通过本次实验, 我深刻理解了 VLAN (虚拟局域网) 的概念, 它允许网络管理员将一个物理局域网划分为多个逻辑上的局域网, 以提高网络的安全性和管理效率。



- (2) 掌握 VLAN 的配置方法：学会了如何在 Cisco 交换机上创建、删除 VLAN，以及如何将端口分配给特定的 VLAN。
- (3) 跨交换机 VLAN 配置：学会了如何通过配置 Trunk 链路来实现跨交换机的 VLAN 通信。