

天津大学本科实验报告专用纸

学院 智算学部 年级 2019 专业 软件工程 班级 1 班 姓名 俞林昊 学号 3019207450

课程名称 计算机网络 实验日期 2021.5 成绩

同组实验者

VLAN 的配置和管理

一、实验目的

在 CISCO 仿真软件 Packet tracer 下进行仿真，理解 VLAN（Virtual LAN）的基本原理，掌握交换机上创建 VLAN、分配静态 VLAN 成员的方法；掌握交换机上创建主干道 trunk 的方法，利用 trunk 实现跨交换机 VLAN 内的通信。

二、实验要求

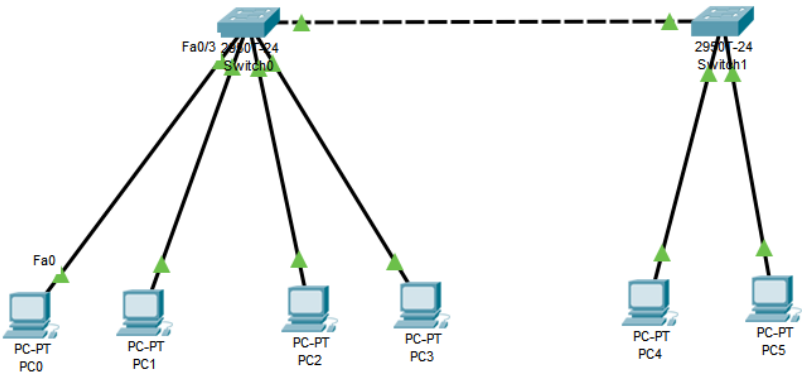
- 1. 熟悉 Packet Tracer 仿真环境的操作方法；
- 2. 了解 CICS0 设备的命令行接口，并掌握常见的配置命令。

三、实验内容

- 1. 安装 Packet Tracer 仿真软件；
- 2. 熟悉 Packet Tracer 操作环境；
- 3. 配置两个 VLAN：VLAN2 和 VLAN3，并为其分配静态成员，测试 VLAN 分配结果。
- 4. 创建两个交换机上的 trunk，测试 trunk 的工作情况。

四、仿真步骤

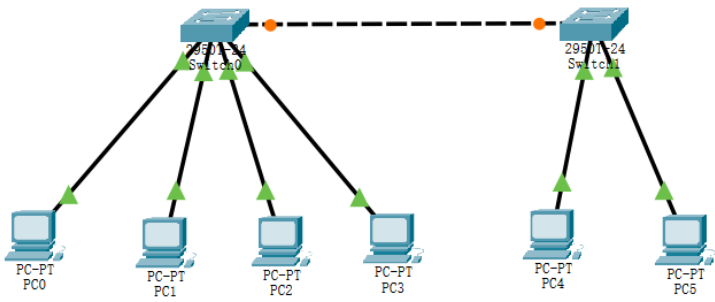
网络仿真拓扑如图 1 所示。



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1. 创建拓扑结构。

- (1) 运行 Cisco Packet Tracer 软件，在逻辑工作区放入两台 Cicso 交换机 2990T-24 和六台工作站 PC。
- (2) 用直通线（CopperStraight-Through）连接 Switch0 和工作站 PC。PC0-PC3 分别与 Switch0 的 f0/3、f0/4、f0/6、f0/7 连接。
- (3) 用直通线连接 Switch1 和 PC4-PC5。PC4-PC5 分别与 Switch1 的 f0/3、f0/6 连接。
- (4) 用双绞线连接两台交换机。



2. 为 PC0-PC3 设置 IP 地址。

分别点击工作站 PC0-PC3，进入其配置窗口，选择桌面（Desktop）项，选择运行 IP 设置（IP Configuration）。IP 地址和子网掩码设置如下。

PC0: 192.168.1.1 255.255.255.0  
PC1: 192.168.1.2 255.255.255.0  
PC2: 192.168.1.3 255.255.255.0  
PC3: 192.168.2.1 255.255.255.0

IPv4 Address	192.168.1.1
Subnet Mask	255.255.255.0

IPv4 Address	192.168.1.2
Subnet Mask	255.255.255.0

IPv4 Address	192.168.1.3
Subnet Mask	255.255.255.0

IPv4 Address	192.168.2.1
Subnet Mask	255.255.255.0

3. 划分 VLAN 之前测试各 PC 间的连通性。

(1) 从 PC0 到 PC1 的测试。点击工作站 PC0，进入其配置窗口，选择桌面（Desktop）项，选择运行 DOS 命令行（Command Prompt），打开 DOS 命令行窗口，在 DOS 提示符下输入：ping 192.168.1.2 后，回车确认，测试结果为连通。

```
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=5ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 5ms, Average = 1ms
```

(2) 从 PC0 到 PC2 的测试。操作如(1)，测试结果为连通。

```
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

(3) 从 PC0 到 PC3 的测试。操作如(1)，测试结果为不连通，因为不在同一网段。

```
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

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

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

4. 为 Switch0 创建 VLAN 2 和 VLAN 3。

点击 Switch0 进入其配置界面，选择命令行（CLI）项进行交换机配置，具体命令如下。

- 在交换机启动以后输入 Switch>enable，进入系统模式
- 输入 Switch#configure terminal，进入配置状态
- 输入 Switch(config)#vlan 2，创建一个 VLAN
- 输入 Switch(config-vlan)#name VLAN2，为该 VLAN 命名
- 输入 Switch(config-vlan)#exit，退出 VLAN 配置
- 输入 Switch(config)#vlan 3，创建一个 VLAN
- 输入 Switch(config-vlan)#name VLAN3，为该 VLAN 命名
- 输入 Switch(config)#exit，退出配置模式
- 输入 Switch#show vlan，打印当前的 VLAN 配置情况

```
Switch>enable
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 2
Switch(config-vlan)#name VLAN2
Switch(config-vlan)#exit
Switch(config)#vlan 3
Switch(config-vlan)#name VLAN3
Switch(config-vlan)#exit
```

```
Switch#show vlan
```

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 Gig0/1, Gig0/2
2	VLAN2	active	
3	VLAN3	active	
1002	fddi-default	active	
1003	token-ring-default	active	
1004	fddinet-default	active	
1005	trnet-default	active	

VLAN	Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
1	enet	100001	1500	-	-	-	-	-	0	0
2	enet	100002	1500	-	-	-	-	-	0	0
3	enet	100003	1500	-	-	-	-	-	0	0

--More--

5. 为 Switch0 静态分配 VLAN 成员。

在完成了 VLAN 的创建以后需要将交换机的端口添加到某个 VLAN 中，默认情况下所有的端口都属于编号为 1 的 VLAN 中。

将交换机的端口 2、3、4 分配成 VLAN 2 的成员，端口 5、6、7 分配成 VLAN 3 的成员。命令如下。

- 在配置模式下输入 Switch(config)#interface range fastEthernet0/2-4, 选中交换机 0 号模块的 2 号到 4 快速以太网端口
- 输入 Switch(config-if-range)#switchport mode access，将端口的模式改为 access（默认情况下也是 access，因此不改也行）

- 输入 Switch(config-if-range)#switchport access vlan 2，将对应的这些端口加入到编号为2 的 VLAN 中
  - 退出到系统模式下运行 Switch#show vlan，可查看当前 VLAN 情况
- 按照上述方法，将端口 5、6、7 分配成 VLAN 3 的成员。

```
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface range fastEthernet 0/2 - 4
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 2
Switch(config-if-range)#enit
Switch(config-if-range)#^
% Invalid input detected at '^' marker.

Switch(config-if-range)#exit
Switch(config)#interface range fastEthernet 0/5 - 7
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 3
Switch(config-if-range)#
```

```
Switch#show vlan
```

VLAN	Name	Status	Ports
1	default	active	Fa0/1, 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, Gig0/1, Gig0/2
2	VLAN2	active	Fa0/2, Fa0/3, Fa0/4
3	VLAN3	active	Fa0/5, Fa0/6, Fa0/7
1002	fddi-default	active	
1003	token-ring-default	active	
1004	fddinet-default	active	
1005	trnet-default	active	

VLAN	Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
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
--More--										

6. 划分 VLAN 后测试 PC 间的连通性。

(1)从 PC0 到 PC1 的测试，测试结果为连通（测试 PC 连通性的操作见步骤 3）。PC0 和 PC1 在同一个 VLAN 中，且在同一个网段内。

```
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<lms TTL=128
Reply from 192.168.1.2: bytes=32 time<lms TTL=128
Reply from 192.168.1.2: bytes=32 time<lms TTL=128
Reply from 192.168.1.2: bytes=32 time<lms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

(2)从 PC0 到 PC2 的测试，测试结果为不通。PC0 和 PC2 虽然 IP 地址属同一网段，但分处于不同 VLAN 中，所以不能相互通信。

```
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

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

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

(3)从 PC2 到 PC3 的测试，测试结果为不通。PC2 和 PC3 在同一 VLAN 中，但 IP 地址不在同一网段内，所以不能相互通信。

```
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

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

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

7. 为 Switch1 创建 VLAN 2 和 VLAN 3 并静态分配 VLAN 成员。

在 Switch1 上做重新操作第 4 步和第 5 步同。在 Switch1 上创建 VLAN 2 和 VLAN 3。将 Switch1 的端口 2、3、4 分配成 VLAN 2 的成员，端口 5、6、7 分配成 VLAN 3 的成员。配置 PC4-PC5 的 IP 地址如下。  
PC4: 192.168.1.4      255.255.255.0  
PC5: 192.168.2.2      255.255.255.0

IPv4 Address	192.168.1.4
Subnet Mask	255.255.255.0

IPv4 Address	192.168.2.2
Subnet Mask	255.255.255.0

```
Switch#show vlan

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
                                   Gig0/1, Gig0/2

2    VLAN2                  active
3    VLAN3                  active
1002 fddi-default          active
1003 token-ring-default    active
1004 fddinet-default       active
1005 trnet-default         active

VLAN Type  SAID      MTU    Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
-----
1    enet    100001    1500   -       -       -       -   -         0      0
2    enet    100002    1500   -       -       -       -   -         0      0
3    enet    100003    1500   -       -       -       -   -         0      0
--More--
```

分配 vlan 成员

```
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface range fastEthernet 0/2 - 4
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 2
Switch(config-if-range)#exit
Switch(config)#interface range fastEthernet 0/5 - 7
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 3
Switch(config-if-range)#exit
Switch(config)#
```

结果

```
Switch#show vlan

VLAN Name                Status   Ports
-----
1    default                active   Fa0/1, 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, Gig0/1, Gig0/2

2    VLAN2                  active   Fa0/2, Fa0/3, Fa0/4
3    VLAN3                  active   Fa0/5, Fa0/6, Fa0/7
1002 fddi-default          active
1003 token-ring-default    active
1004 fddinet-default       active
1005 trnet-default         active

VLAN Type  SAID      MTU    Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
-----
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
--More--
```

8. 测试 PC 间的连通性。

(1) 从 PC0 到 PC1 的测试，连通，相同 VLAN，相同网段。

```
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

(2) 从 PC0 到 PC2 的测试，不通，网段相同，但处于不同的 VLAN。

```
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

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

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

(3) 从 PC0 到 PC4 的测试，不通，相同 VLAN，相同网段，但分处于两台交换机，需要配置 trunk。

```
C:\>ping 192.168.1.4

Pinging 192.168.1.4 with 32 bytes of data:

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

Ping statistics for 192.168.1.4:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

请同学们再继续测试从 PC0 到 PC3、从 PC2 到 PC3、从 PC2 到 PC5、从 PC3 到 PC5 的连通性，并分析结果，写到实验报告里。

PC0 -> PC3 不连通，因为不同 Vlan，不同网段

```
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

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

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC2 -> PC3 不连通，相同 Vlan，不同网段

```
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

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

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC2 -> PC5 不连通，相同 Vlan，不同网段

```
C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

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

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC3 -> PC5 不连通，相同 VLAN 相同网段，但分别连于两台交换机，需要配置 trunk。

```
C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

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

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

9. 配置交换机间 trunk。

分别在 Switch0 和 Switch1 上进行配置，命令如下。

- 输入 Switch#configure terminal，进入配置状态
- 输入 Switch(config)#int f0/1
- 输入 Switch(config-if)#switchport mode trunk
- 输入 Switch(config-if)#switchport trunk allowed vlan 1,2,3
- 输入 Switch(config-if)#end

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

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

Switch(config-if)#switchport trunk allowed vlan 1,2,3
Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
```

```
Switch>enable
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int f0/1
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport trunk allowed vlan 1,2,3
Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
```



10. 配置 trunk 后测试 PC 间的连通性。

从 PC0 到 PC4 的测试，测试结果连通，相同 VLAN，相同网段，分处于两台交换机，通过主干道相连。

请同学继续测试各工作站 PC 间的相互连通性，并加以分析，写到实验报告里。

PC0 -> PC1 连通，同意网段，相同 VLAN

```
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

PC0 -> PC2 不连通，相同网段，不同 VLAN

```
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

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

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC0 -> PC3 不连通，不同网段，不同 VLAN

```
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

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

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC0 -> PC4 连通，同一网段，同一 VLAN，不同的交换机，通过主干道相连。

```
C:\>ping 192.168.1.4

Pinging 192.168.1.4 with 32 bytes of data:

Reply from 192.168.1.4: bytes=32 time<1ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

PC0 -> PC5 不连通，不同网段，不同 VLAN

```
C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

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

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC1 -> PC2 不连通，相同网段，不同 VLAN

```
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

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

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC1 -> PC3 不连通，不同网段，不同 VLAN

```
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

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

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC1 -> PC4 连通，相同网段，相同 VLAN，不同的交换机，通过主干道相连。

```
C:\>ping 192.168.1.4

Pinging 192.168.1.4 with 32 bytes of data:

Reply from 192.168.1.4: bytes=32 time<1ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128
Reply from 192.168.1.4: bytes=32 time=9ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 9ms, Average = 2ms
```

PC1 -> PC5 不连通，不同网段，不同 VLAN

```
C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

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

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC2 -> PC3 不连通，不同网段，相同 VLAN

```
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

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

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC2 -> PC4 不连通，相同网段，不同 VLAN

```
C:\>ping 192.168.1.4

Pinging 192.168.1.4 with 32 bytes of data:

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

Ping statistics for 192.168.1.4:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC2 -> PC5 不连通，不同网段，相同 VLAN

```
C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

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

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC3 -> PC4 不连通，不同网段，不同 VLAN

```
C:\>ping 192.168.1.4

Pinging 192.168.1.4 with 32 bytes of data:

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

Ping statistics for 192.168.1.4:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC3 -> PC5 连通，相同网段，相同 VLAN，不同的交换机，通过主干道相连。

```
C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time<1ms TTL=128
Reply from 192.168.2.2: bytes=32 time<1ms TTL=128
Reply from 192.168.2.2: bytes=32 time<1ms TTL=128
Reply from 192.168.2.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

PC4 -> PC5 不连通，不同网段，不同 VLAN

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

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

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

教师签字:

年 月 日



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