

沈阳航空航天大学

计算机网络原理 实 验 报 告

实验题目：实验一 组网基础实验

实验二 交换机及虚拟局域网的配置

实验三 网络互连综合实验

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实验一 组网基础实验

1. 小组成员

小组成员：陈梓欣、明鑫、尹璐、郑羽婷、曲文新。

所属组别：E 组。

2. 实验目的

- (1) 熟练掌握双绞线等网络传输媒体的制作、测试技术。
- (2) 熟悉常用网络命令。
- (3) 熟悉主机 IP 地址配置方法。

3. 实验内容和步骤

3.1 网线制作

双绞线线序为：橙白，橙，绿白，蓝，蓝白，绿，棕白，棕

制作步骤：

首先剪双绞线，剥皮，排序按 T568B 的顺序，用钳子剪齐，插入水晶头，用专用的钳子压制。制作效果如图 1 网线制作示例所示。

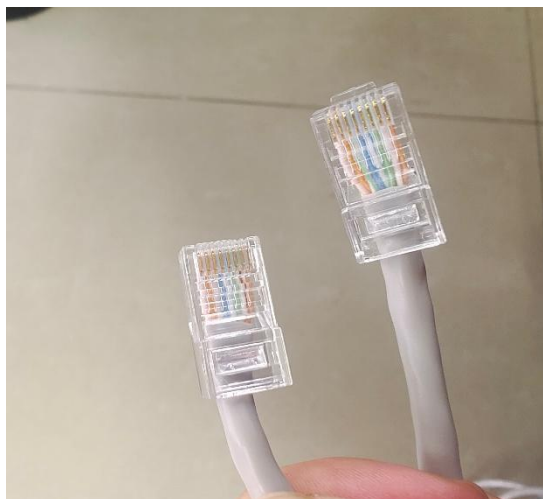


图 1.1 网线制作示例

将做好的网线的两头分别插入网线测试仪中，并启动开关，如果两边的指示灯亮起且跑马同步，则表示网线制作成功。测试结果如图 2 网线可用性测试所示。

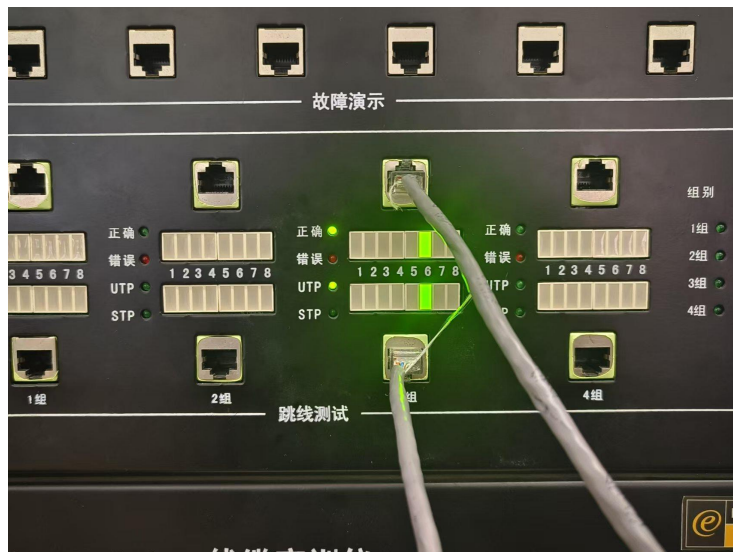


图 1.2 网线可用性测试

3.2 常用网络命令的使用

- ① 写出 Ping 功能，使用命令并截图。

功能：Ping 是一种网络工具，用于测试主机之间的连通性。它发送一个 ICMP 回显请求到指定的目标主机，并等待接收回显响应。

```
C:\Windows\system32\cmd.exe
Microsoft Windows [版本 10.0.19045.3803]
(c) Microsoft Corporation。保留所有权利。

C:\Users\LuckyE>ping baidu.com

正在 Ping baidu.com [39.156.66.10] 具有 32 字节的数据:
来自 39.156.66.10 的回复: 字节=32 时间=20ms TTL=48
来自 39.156.66.10 的回复: 字节=32 时间=20ms TTL=48
来自 39.156.66.10 的回复: 字节=32 时间=47ms TTL=48
来自 39.156.66.10 的回复: 字节=32 时间=20ms TTL=48

39.156.66.10 的 Ping 统计信息:
    数据包: 已发送 = 4, 已接收 = 4, 丢失 = 0 (0% 丢失),
    往返行程的估计时间(以毫秒为单位):
        最短 = 20ms, 最长 = 47ms, 平均 = 26ms

C:\Users\LuckyE>
```

图 1.3 ping 命令

- ② 写出 ipconfig /all 的功能，使用命令并截图。

功能：显示所有网络接口的详细信息，可以打印有关计算机网络配置的详尽信息，包括网络适配器、IP 地址、子网掩码、网关、DNS 服务器、物理地址（MAC

地址) 和其他网络配置信息。

```
PC>ipconfig /all

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix...:
    Physical Address.....: 00D0.5823.22DA
    Link-local IPv6 Address.....: FE80::2D0:58FF:FE23:22DA
    IP Address.....: 192.168.1.13
    Subnet Mask.....: 255.255.255.0
    Default Gateway.....: 192.168.1.1
    DNS Servers.....: 0.0.0.0
    DHCP Servers.....: 0.0.0.0
    DHCPv6 Client DUID.....: 00-01-00-01-3D-A8-7D-C2-00-D0-58-23-22-DA

PC>
```

图 1.4 ipconfig /all 命令

③ 写出 arp -a 的功能，使用命令并截图。

功能：显示已解析的 IP 地址到 MAC 地址的映射，列出计算机中 ARP 缓存中保存的 IP 地址与 MAC 地址的映射关系；

显示网络中的设备，展示与计算机相邻连接的其他设备的 MAC 地址和对应的 IP 地址；

用于网络排查和故障排除：ARP 缓存允许用户查看最近使用过的 IP 地址和 MAC 地址的映射，有助于识别网络中设备的连接和通信状态；

提供网络映射信息，能够查看已知设备的 MAC 地址和 IP 地址的映射是很有用的，可以检查这些映射是否与预期一致。

```
PC>arp -a

Internet Address      Physical Address      Type
192.168.1.12         00e0.b085.9d39       dynamic

PC>
```

图 1.5 arp-a 命令

④ 写出 tracert 的功能，使用命令并截图。

功能：追踪数据包的路径，它向目标主机发送数据包，并记录每个节点（路由器或服务器）的响应时间；

显示每个节点的延迟，tracert 显示数据包经过的每个路由器（或主机）的 IP 地址，并记录到达每个节点所需的时间（以毫秒为单位）；

确定数据包路径，跟踪数据包穿越互联网的路径，有助于了解数据包从源到目的地所经过的网络路径，以及每个节点的响应时间；

```
PC>tracert 192.168.1.13

Tracing route to 192.168.1.13 over a maximum of 30 hops:

  1    3 ms    2 ms    5 ms    192.168.1.13

Trace complete.

PC>
```

图 1.6 tracert 命令

3.3 主机 IP 地址基本配置方法

写出主机 IP 地址基本配置方法

连接简单局域网并对主机 IP 地址进行配置为 192.168.1.56，对子网掩码配置为 255.255.255.0，删掉初始默认网关如图 1.7。

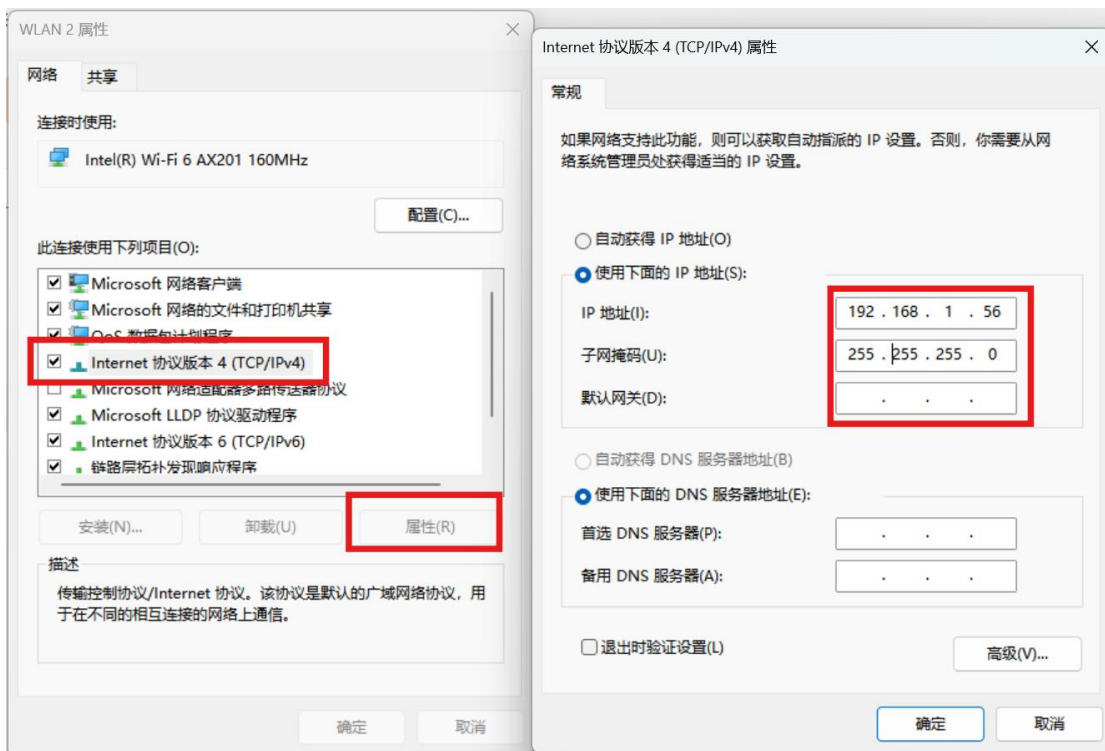


图 1.7 主机 IP 配置示例

实验二 交换机及虚拟局域网的配置

1. 小组成员

小组成员：陈梓欣、明鑫、尹璐、郑羽婷、曲文新。

所属组别：E 组。

2. 实验目的

- (1) 掌握交换机各种命令行操作模式的区别，以及各模式间切换方法。
- (2) 学习交换机的管理特性及命令行操作，掌握交换机的基本配置方法。
- (3) 掌握交换机系统和配置信息的查看方法，获取交换机的当前工作状态。
- (4) 掌握交换机 VLAN 的配置方法。

3. 实验内容和步骤

实验 2.1

画出所用的网络拓扑结构图。

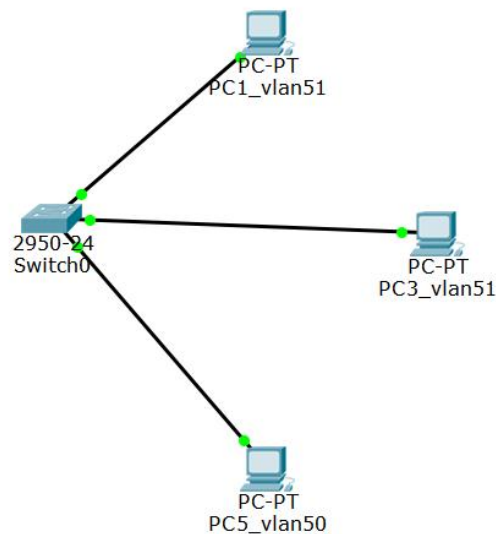


图 2.1 交换机 VLAN 实验拓扑

写出：

- (1) 所有的配置过程。（如实验过程中遇到问题，写出问题原因及解决方法）

① 首先先配置主机 IP 地址，打开 Internet 协议版本 4 的属性，将 IP 地址改为 192.168.1.56，子网掩码为 255.255.255.0

② 然后在 Web 页面的形式登录到系统的控制平台，登陆网址是：
<http://192.168.1.30:8080>。选择你所要操作的硬件设备，点击直接进入其操作界面，按 PPT 指令开始配置。

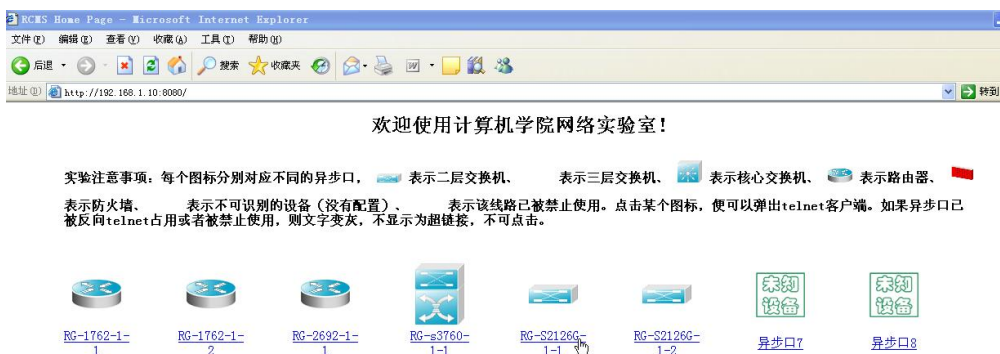


图 2.2 系统的控制平台

③ 选定设备，进行配置。具体配置指令如下：

建立一个 VLAN 51

```
Switch(config)#vlan 51
```

```
Switch(config-vlan)#name vlan51
```

```
Switch(config-vlan)#exit
```

把端口 fastethernet 0/1 加入进 vlan 51

```
Switch(config)# interface fastethernet 0/1
```

```
Switch(config-if)# switchport access vlan 51
```

把端口 fastethernet 0/2 加入进 vlan 51

```
Switch(config)# interface fastethernet 0/2
```

```
Switch(config-if)# switchport access vlan 51
```

建立一个 VLAN 50

```
Switch(config)#vlan 50
```

```
Switch(config-vlan)#name vlan50
```

```
Switch(config-vlan)#exit
```

把端口 fastethernet 0/3 加入进 vlan 50

```
Switch(config)# interface fastethernet 0/3
```

```
Switch(config-if)# switchport access vlan 50
```

(2) 写出配置成功后，每台设备执行“show vlan”和“show running-config”后的结果。

① Switch#show vlan

VLAN Name Status Ports

```
-----
1 default active 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
50 vlan50 active Fa0/3
51 vlan51 active Fa0/1, 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

```
-----
1 enet 100001 1500 - - - - 0 0
50 enet 100050 1500 - - - - 0 0
51 enet 100051 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

② Switch#show running-config

Building configuration...

Current configuration : 1058 bytes

!

version 12.1

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

!

hostname Switch

!

!

!

spanning-tree mode pvst

!

interface FastEthernet0/1

switchport access vlan 51

!

interface FastEthernet0/2

switchport access vlan 51

!

```
interface FastEthernet0/3
switchport access vlan 50
!
interface FastEthernet0/4
!
interface FastEthernet0/5
!
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
```

```
!  
interface FastEthernet0/18  
!  
interface FastEthernet0/19  
!  
interface FastEthernet0/20  
!  
interface FastEthernet0/21  
!  
interface FastEthernet0/22  
!  
interface FastEthernet0/23  
!  
interface FastEthernet0/24  
!  
interface Vlan1  
no ip address  
shutdown  
!  
!  
!  
!  
line con 0  
!  
line vty 0 4  
login  
line vty 5 15  
login  
!  
!
```

end

(3) 测试连通性的结果（截图）。

① 网络设备配置好后，对选定的测试主机，禁用“本地连接 3”，启用“本地连接 4”，并按照实验拓扑图修改 IP 地址：

表 2.1 选定测试机 IP 及划分 VLAN

PC	IP	VLAN
PC1_vlan51	192.168.51.1	VLAN 51
PC3_vlan51	192.168.51.3	VLAN 51
PC5_vlan50	192.168.50.5	VLAN 50

② 通过网络命令进行测试（ping 命令）：

➤ 同一个 VLAN 内主机的连通性

PC1_vlan51:

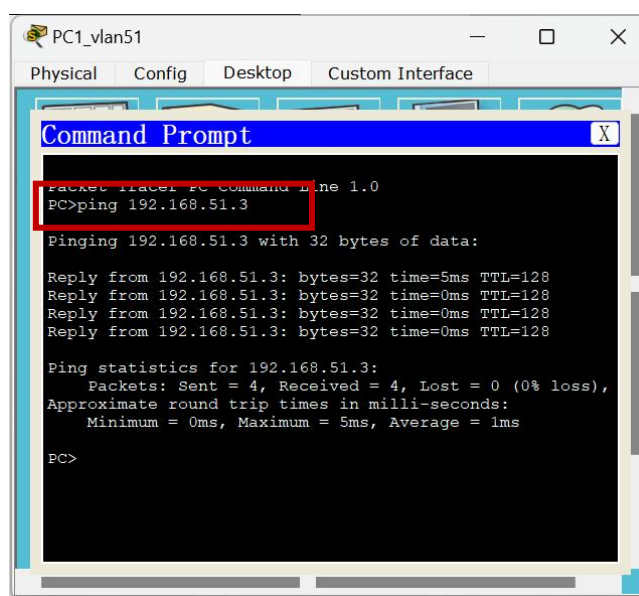


图 2.3 PC1_vlan51 测试机相同 VLAN 主机连通性测试

PC3_vlan51:

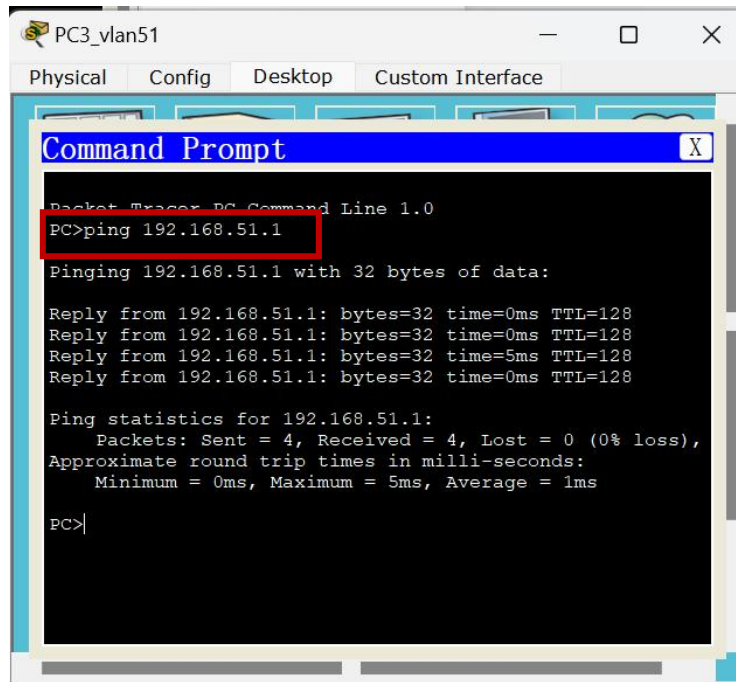


图 2.4 PC3_vlan51 测试机相同 VLAN 主机连通性测试

➤ 不同 VLAN 主机的连通性

PC1_vlan51:

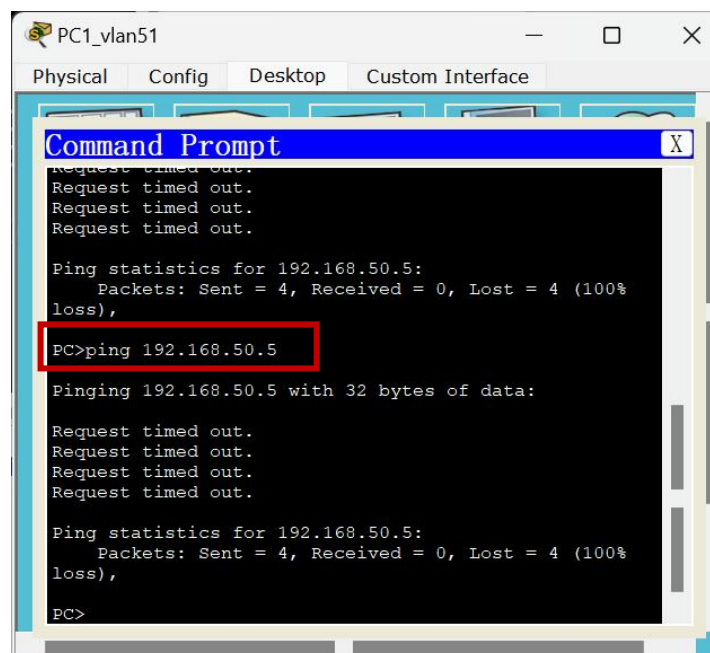


图 2.5 PC1_vlan51 测试机不同 VLAN 主机连通性测试

PC3_vlan51:

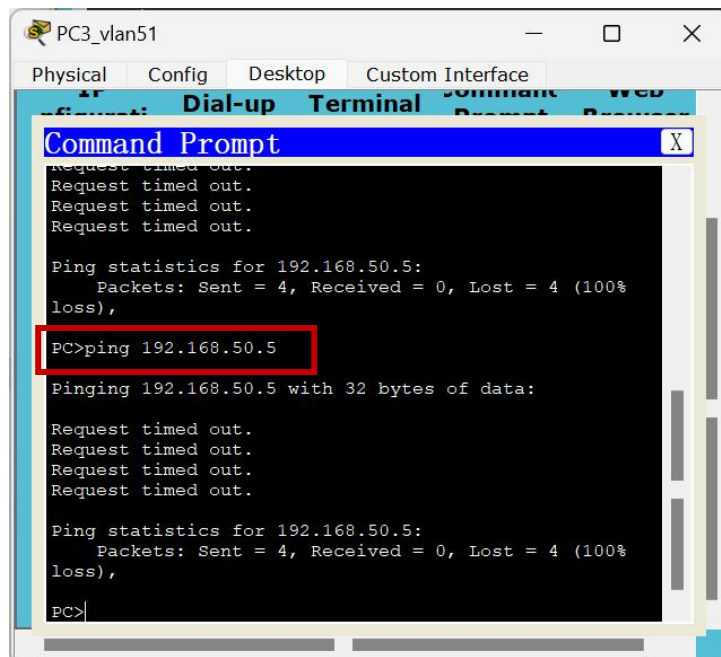


图 2.6 PC3_vlan51 测试机不同 VLAN 主机连通性测试

PC5_vlan50:

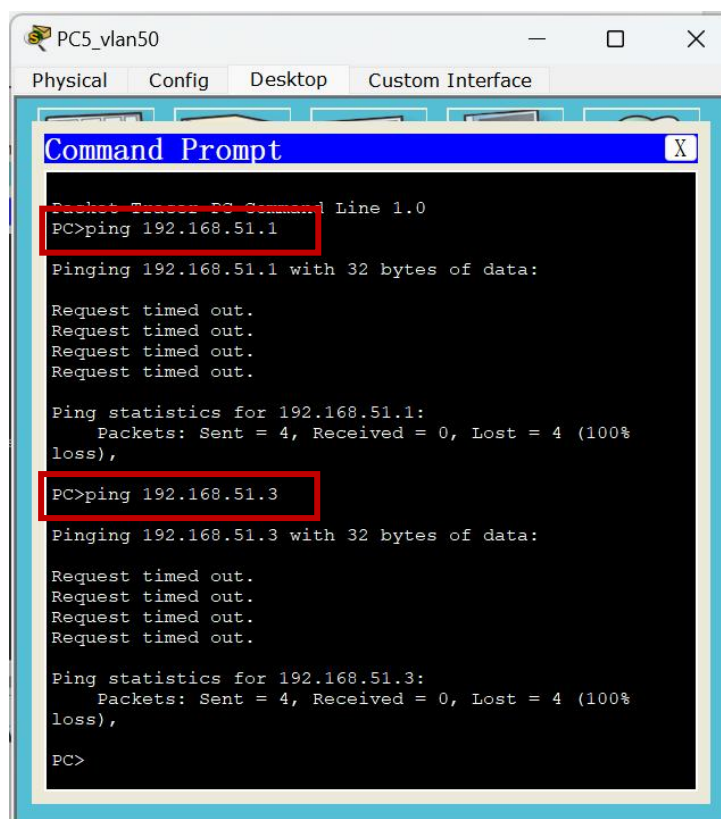


图 2.7 PC5_vlan50 测试机不同 VLAN 主机连通性测试

实验 2.2

画出所用的网络拓扑结构图。

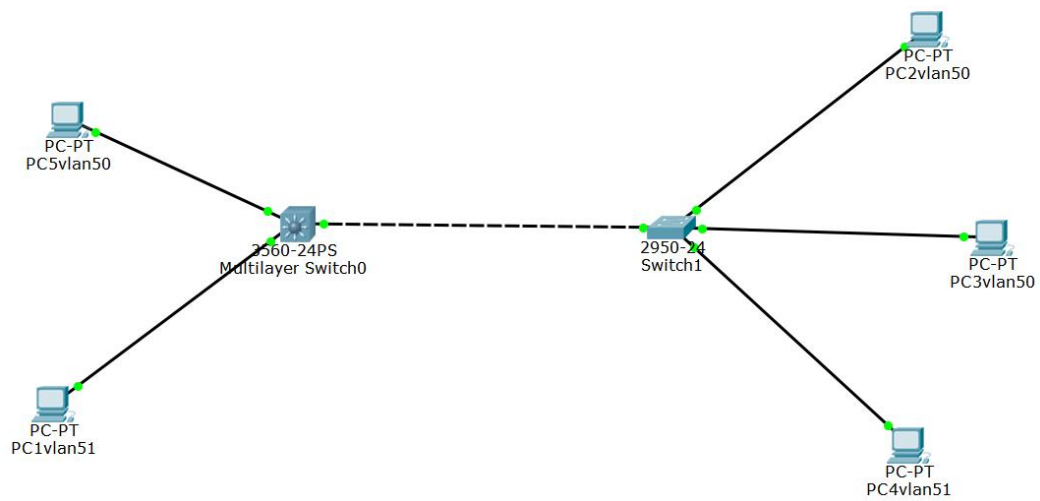


图 2.8 跨交换机实现 VLAN 实验拓扑

写出：

- (1) 所有的配置过程。（如实验过程中遇到问题，写出问题原因及解决方法）

在交换机 A 上：

```
switch0>en
```

```
switch0#config terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

修改交换机名称为 switchA

```
switch0(config)#ho switchA
```

建立一个 VLAN 50

```
switchA(config)#vlan 50
```

```
switchA(config-vlan)#na vlan50
```

把端口 fastethernet 0/1 加入进 vlan 50

```
switchA(config-vlan)#in fa 0/1
```

```
switchA(config-if)#switchport access vlan 50
```

```
switchA(config-if)#exit
```

建立一个 VLAN 51

```
switchA(config)#vlan 51
```

```
switchA(config-vlan)#na vlan51
```

把端口 fastethernet 0/2 加入进 vlan 51

```
switchA(config-vlan)#in fa 0/2
```

```
switchA(config-if)#switchport access vlan 51
```

```
switchA(config-if)#exit
```

```
switchA(config)#in fa 0/3
```

```
switchA(config-if)#exit
```

```
switchA(config)#exit
```

创建虚拟接口 vlan 50

```
switchA(config)#in vlan 50
```

```
switchA(config-if)#
```

```
%LINK-5-CHANGED: Interface Vlan50, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan50,  
changed state to up
```

配置虚拟接口 vlan 50 的 IP 地址 192.168.50.1

```
switchA(config-if)#ip address 192.168.50.1 255.255.255.0
```

开启端口

```
switchA(config-if)#no shutdown
```

```
switchA(config-if)#exit
```

创建虚拟接口 vlan 51

```
switchA(config)#in vlan 51
```

```
switchA(config-if)#
```

```
%LINK-5-CHANGED: Interface Vlan51, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan51,  
changed state to up
```


配置虚拟接口 vlan 51 的 IP 地址 192.168.51.1

```
switchA(config-if)#ip address 192.168.51.1 255.255.255.0
```

开启端口

```
switchA(config-if)#no shutdown
```

```
switchA(config-if)#exit
```

在交换机 B 上:

```
switch1#config terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

修改交换机名称为 switchB

```
switch1(config)#ho switchB
```

建立一个 VLAN 50

```
switchB(config)#vlan 50
```

```
switchB(config-vlan)#na vlan50
```

把端口 fastethernet 0/2 加入进 vlan 50

```
switchB(config-vlan)#in fa 0/2
```

```
switchB(config-if)#switchport access vlan 50
```

把端口 fastethernet 0/4 加入进 vlan 50

```
switchB(config-vlan)#in fa 0/4
```

```
switchB(config-if)#switchport access vlan 50
```

```
switchB(config-if)#exit
```

建立一个 VLAN 51

```
switchB(config)#vlan 51
```

```
switchB(config-vlan)#na vlan51
```

把端口 fastethernet 0/1 加入进 vlan 51

```
switchB(config-vlan)#in fa 0/1
```

```
switchB(config-if)#switchport access vlan 51
```

```
switchB(config-if)#exit
```

把两个交换机相连的端口 fastethernet 0/3 设置为 trunk 方式

```
switchB(config)#in fa 0/3
```

```
switchB(config-if)#switchport mode trunk
```

```
switchB(config-if)#exit
```

```
switchB(config)#exit
```

创建虚拟接口 vlan 50

```
switchB(config)#in vlan 50
```

```
switchB(config-if)#
```

```
%LINK-5-CHANGED: Interface Vlan50, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan50,  
changed state to up
```

配置虚拟接口 vlan 50 的 IP 地址 192.168.50.2

```
switchB(config-if)#ip address 192.168.50.2 255.255.255.0
```

开启端口

```
switchB(config-if)#no shutdown
```

```
switchB(config-if)#exit
```

创建虚拟接口 vlan 51

```
switchB(config)#in vlan 51
```

```
switchB(config-if)#
```

```
%LINK-5-CHANGED: Interface Vlan51, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan51,  
changed state to up
```

配置虚拟接口 vlan 50 的 IP 地址 192.168.50.2

```
switchB(config-if)#ip address 192.168.51.2 255.255.255.0
```

开启端口

```
switchB(config-if)#no shutdown
```

```
switchB(config-if)#exit
```

(2) 写出配置成功后，每台设备执行“show running-config”后的结果。

① 交换机 A

```
switchA#show running-config
```

```
Building configuration...
```

```
Current configuration : 1365 bytes
```

```
!
```

```
version 12.2
```

```
no service timestamps log datetime msec
```

```
no service timestamps debug datetime msec
```

```
no service password-encryption
```

```
!
```

```
hostname switchA
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!  
!  
!  
!  
!  
!  
!  
!  
spanning-tree mode pvst  
!  
!  
!  
!  
!  
!  
interface FastEthernet0/1  
switchport access vlan 50  
duplex half  
speed 10  
!  
interface FastEthernet0/2  
switchport access vlan 51  
duplex half  
speed 10  
!  
interface FastEthernet0/3  
duplex half  
speed 10  
!  
interface FastEthernet0/4
```

!

interface FastEthernet0/5

!

interface FastEthernet0/6

!

interface FastEthernet0/7

!

interface FastEthernet0/8

!

interface FastEthernet0/9

!

interface FastEthernet0/10

!

interface FastEthernet0/11

!

interface FastEthernet0/12

!

interface FastEthernet0/13

!

interface FastEthernet0/14

!

interface FastEthernet0/15

!

interface FastEthernet0/16

!

interface FastEthernet0/17

!

interface FastEthernet0/18

!

interface FastEthernet0/19

```
!  
interface FastEthernet0/20  
!  
interface FastEthernet0/21  
!  
interface FastEthernet0/22  
!  
interface FastEthernet0/23  
!  
interface FastEthernet0/24  
!  
interface GigabitEthernet0/1  
!  
interface GigabitEthernet0/2  
!  
interface Vlan1  
no ip address  
shutdown  
!  
interface Vlan50  
ip address 192.168.50.1 255.255.255.0  
!  
interface Vlan51  
ip address 192.168.51.1 255.255.255.0  
!  
ip classless  
!  
ip flow-export version 9  
!  
!
```

```
!  
!  
!  
!  
!  
line con 0  
!  
line aux 0  
!  
line vty 0 4  
login  
!  
!  
!  
end
```

② 交换机 B

```
switchB#show running-config
```

```
Building configuration...
```

```
Current configuration : 1290 bytes
```

```
!  
version 12.1  
no service timestamps log datetime msec  
no service timestamps debug datetime msec  
no service password-encryption  
!  
hostname switchB  
!  
!
```

```
!  
spanning-tree mode pvst  
!  
interface FastEthernet0/1  
switchport access vlan 51  
duplex half  
speed 10  
!  
interface FastEthernet0/2  
switchport access vlan 50  
duplex half  
speed 10  
!  
interface FastEthernet0/3  
switchport mode trunk  
duplex half  
speed 10  
!  
interface FastEthernet0/4  
switchport access vlan 50  
duplex half  
speed 10  
!  
interface FastEthernet0/5  
!  
interface FastEthernet0/6  
!  
interface FastEthernet0/7  
!  
interface FastEthernet0/8
```


!

interface FastEthernet0/9

!

interface FastEthernet0/10

!

interface FastEthernet0/11

!

interface FastEthernet0/12

!

interface FastEthernet0/13

!

interface FastEthernet0/14

!

interface FastEthernet0/15

!

interface FastEthernet0/16

!

interface FastEthernet0/17

!

interface FastEthernet0/18

!

interface FastEthernet0/19

!

interface FastEthernet0/20

!

interface FastEthernet0/21

!

interface FastEthernet0/22

!

interface FastEthernet0/23

```

!
interface FastEthernet0/24
!
interface Vlan1
no ip address
shutdown
!
interface Vlan50
ip address 192.168.50.2 255.255.255.0
!
interface Vlan51
ip address 192.168.51.2 255.255.255.0
!
!
!
!
line con 0
!
line vty 0 4
login
line vty 5 15
login
!
!
end

```

(3) 测试连通性的结果（截图）。

① 网络设备配置好后，对选定的测试主机，禁用“本地连接 3”，启用“本地连接 4”，并按照实验拓扑图修改 IP 地址

表 2.2 选定测试主机 IP、划分 VLAN 以及连接的交换机与端口

PC	IP	VLAN	Switch	Fastethernet
PC5vlan50	192.168.50.5	VLAN 50	switchA	Fa 0/1
PC1vlan51	192.168.51.11	VLAN 51	switchA	Fa 0/2
PC2vlan50	192.168.50.22	VLAN 50	switchB	Fa 0/2
PC3vlan50	192.168.50.3	VLAN 50	switchB	Fa 0/4
PC4vlan51	192.168.51.4	VLAN 51	switchB	Fa 0/1
作为两个交换机相连的端口，将其设置为 trunk 方式				Fa 0/3

② 通过网络命令进行测试（ping 命令）：

➤ 不同交换机内同一个 VLAN 内主机的连通性

PC5vlan50:

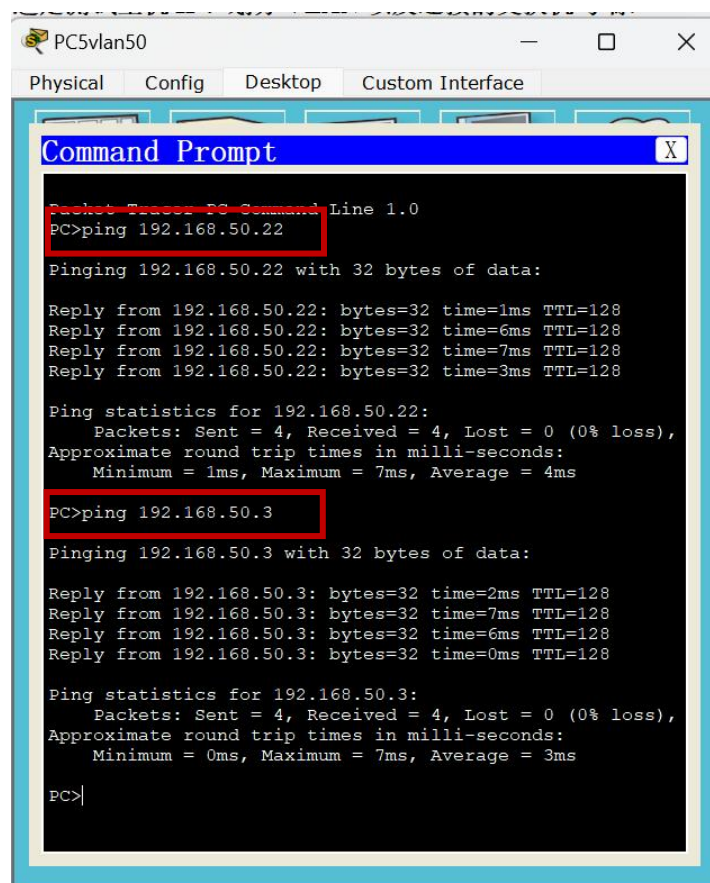


图 2.9 PC5vlan50 测试机跨交换机相同 VLAN 主机连通性测试

PC4vlan51:

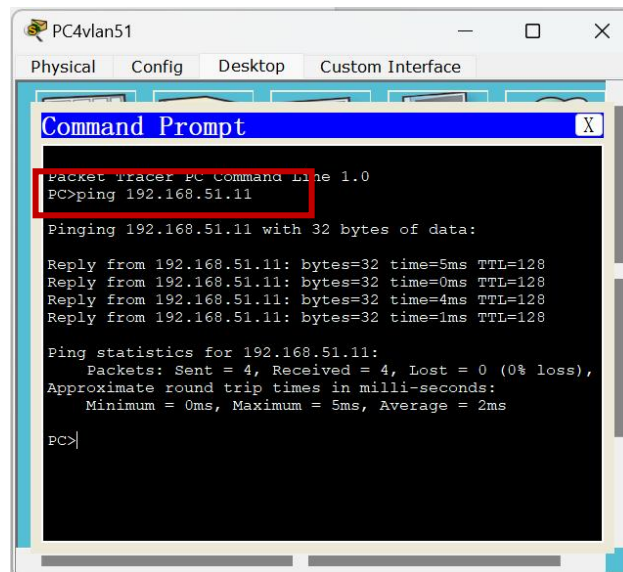


图 2.10 PC4vlan51 测试机跨交换机相同 VLAN 主机连通性测试

➤ 不同交换机内不同 VLAN 主机的连通性

PC3vlan50:

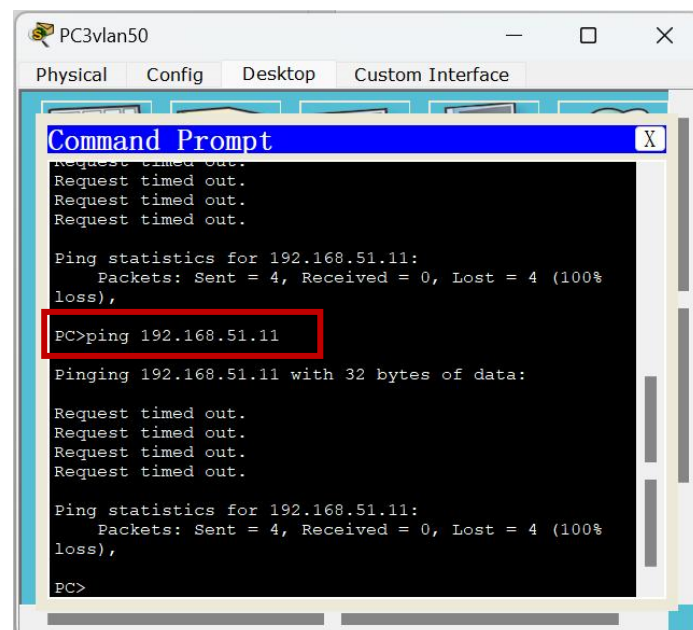


图 2.11 PC3vlan50 测试机跨交换机不同 VLAN 主机连通性测试

PC1vlan51:

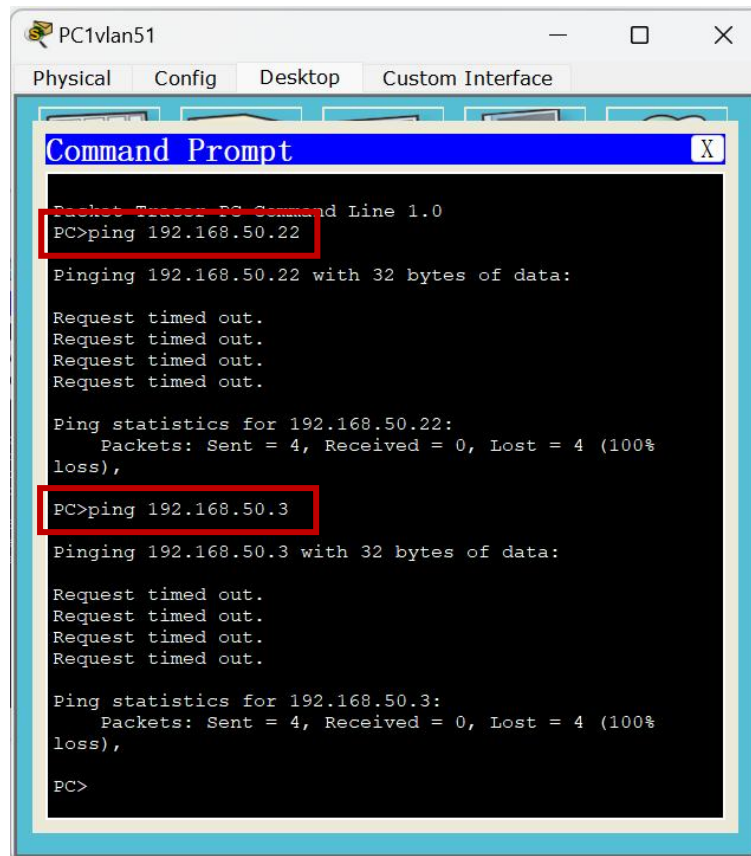


图 2.12 PC1vlan51 测试机跨交换机不同 VLAN 主机连通性测试

实验三 网络互连综合实验

1. 小组成员

小组成员：陈梓欣、明鑫、尹璐、郑羽婷、曲文新。

所属组别：E 组。

2. 实验目的

- ① 掌握利用三层交换机实现不同 VLAN 间通信的方法。
- ② 掌握路由器基本配置方法。
- ③ 掌握静态路由和动态路由的配置方法。

3. 实验内容和步骤

实验 3.1

画出所用的网络拓扑结构图。

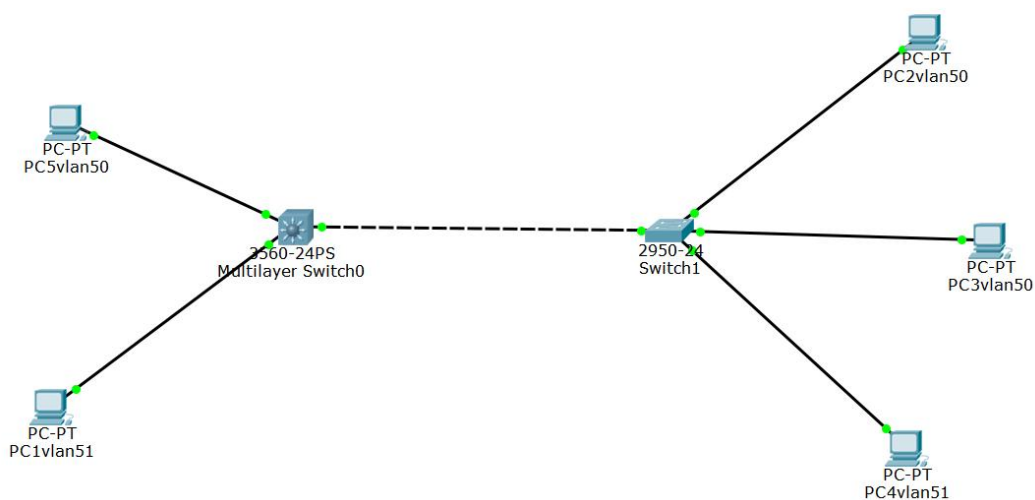


图 3.1 跨交换机实现 VLAN 实验拓扑

写出：

- (1) 所有的配置过程。（如实验过程中遇到问题，写出问题原因及解决方法）

在三层交换机上：

```
switch0>en
```

```
switch0#config terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

修改交换机名称为 switchA

```
switch0(config)#ho switchA
```

建立一个 VLAN 50

```
switchA(config)#vlan 50
```

```
switchA(config-vlan)#na vlan50
```

把端口 fastethernet 0/1 加入进 vlan 50

```
switchA(config-vlan)#in fa 0/1
```

```
switchA(config-if)#switchport access vlan 50
```

```
switchA(config-if)#exit
```

建立一个 VLAN 51

```
switchA(config)#vlan 51
```

```
switchA(config-vlan)#na vlan51
```

把端口 fastethernet 0/2 加入进 vlan 51

```
switchA(config-vlan)#in fa 0/2
```

```
switchA(config-if)#switchport access vlan 51
```

```
switchA(config-if)#exit
```

```
switchA(config)#in fa 0/3
```

```
switchA(config-if)#exit
```

```
switchA(config)#exit
```

创建虚拟接口 vlan 50

```
switchA(config)#in vlan 50
```

```
switchA(config-if)#
```

```
%LINK-5-CHANGED: Interface Vlan50, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan50,  
changed state to up
```

配置虚拟接口 vlan 50 的 IP 地址 192.168.50.1

```
switchA(config-if)#ip address 192.168.50.1 255.255.255.0
```

开启端口

```
switchA(config-if)#no shutdown
```

```
switchA(config-if)#exit
```

创建虚拟接口 vlan 51

```
switchA(config)#in vlan 51
```

```
switchA(config-if)#
```

```
%LINK-5-CHANGED: Interface Vlan51, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan51,  
changed state to up
```

配置虚拟接口 vlan 51 的 IP 地址 192.168.51.1

```
switchA(config-if)#ip address 192.168.51.1 255.255.255.0
```

开启端口

```
switchA(config-if)#no shutdown
```

```
switchA(config-if)#exit
```

在二层交换机上:

```
switch1#config terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

修改交换机名称为 switchB

```
switch1(config)#ho switchB
```

建立一个 VLAN 50

```
switchB(config)#vlan 50
```

```
switchB(config-vlan)#na vlan50
```

把端口 fastethernet 0/2 加入进 vlan 50

```
switchB(config-vlan)#in fa 0/2
```

```
switchB(config-if)#switchport access vlan 50
```


把端口 fastethernet 0/4 加入进 vlan 50

```
switchB(config-vlan)#in fa 0/4
```

```
switchB(config-if)#switchport access vlan 50
```

```
switchB(config-if)#exit
```

建立一个 VLAN 51

```
switchB(config)#vlan 51
```

```
switchB(config-vlan)#na vlan51
```

把端口 fastethernet 0/1 加入进 vlan 51

```
switchB(config-vlan)#in fa 0/1
```

```
switchB(config-if)#switchport access vlan 51
```

```
switchB(config-if)#exit
```

把两个交换机相连的端口 fastethernet 0/3 设置为 trunk 方式

```
switchB(config)#in fa 0/3
```

```
switchB(config-if)#switchport mode trunk
```

```
switchB(config-if)#exit
```

```
switchB(config)#exit
```

创建虚拟接口 vlan 50

```
switchB(config)#in vlan 50
```

```
switchB(config-if)#
```

```
%LINK-5-CHANGED: Interface Vlan50, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan50,  
changed state to up
```

配置虚拟接口 vlan 50 的 IP 地址 192.168.50.2

```
switchB(config-if)#ip address 192.168.50.2 255.255.255.0
```

开启端口

```
switchB(config-if)#no shutdown
```

```
switchB(config-if)#exit
```

创建虚拟接口 vlan 51

```
switchB(config)#in vlan 51
```

```
switchB(config-if)#
```

```
%LINK-5-CHANGED: Interface Vlan51, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan51,  
changed state to up
```

配置虚拟接口 vlan 50 的 IP 地址 192.168.50.2

```
switchB(config-if)#ip address 192.168.51.2 255.255.255.0
```

开启端口

```
switchB(config-if)#no shutdown
```

```
switchB(config-if)#exit
```

- (2) 写出配置成功后，三层交换机执行“show running-config”、“show ip route”和“show ip interface brief”后的结果；二层交换机执行 show vlan”、“show running-config”后的结果。

① 对三层交换机（switchA）

➤ show running-config

```
switchA#show running-config
```

```
Building configuration...
```

```
Current configuration : 1365 bytes
```

```
!
```

```
version 12.2
```

```
no service timestamps log datetime msec
```

```
no service timestamps debug datetime msec
```

```
no service password-encryption
```

```
!
```

```
hostname switchA
```

!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!

spanning-tree mode pvst

!
!
!
!
!
!

interface FastEthernet0/1
switchport access vlan 50
duplex half

```
speed 10
!
interface FastEthernet0/2
switchport access vlan 51
duplex half
speed 10
!
interface FastEthernet0/3
duplex half
speed 10
!
interface FastEthernet0/4
!
interface FastEthernet0/5
!
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
```

```
!  
interface FastEthernet0/14  
!  
interface FastEthernet0/15  
!  
interface FastEthernet0/16  
!  
interface FastEthernet0/17  
!  
interface FastEthernet0/18  
!  
interface FastEthernet0/19  
!  
interface FastEthernet0/20  
!  
interface FastEthernet0/21  
!  
interface FastEthernet0/22  
!  
interface FastEthernet0/23  
!  
interface FastEthernet0/24  
!  
interface GigabitEthernet0/1  
!  
interface GigabitEthernet0/2  
!  
interface Vlan1  
no ip address  
shutdown
```

```

!
interface Vlan50
ip address 192.168.50.1 255.255.255.0
!
interface Vlan51
ip address 192.168.51.1 255.255.255.0
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
!
End

```

➤ show ip route

```
switchA#show ip route
```

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter
area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external
type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
area

* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

C 192.168.50.1/24 is directly connected, Vlan50

C 192.168.51.1/24 is directly connected, Vlan51

➤ show ip interface brief

switchA#show ip interface brief

Interface IP-Address OK? Method Status Protocol

FastEthernet0/1 unassigned YES unset up up

FastEthernet0/2 unassigned YES unset up up

FastEthernet0/3 unassigned YES unset up up

FastEthernet0/4 unassigned YES unset down down

FastEthernet0/5 unassigned YES unset down down

FastEthernet0/6 unassigned YES unset down down

FastEthernet0/7 unassigned YES unset down down

FastEthernet0/8 unassigned YES unset down down

FastEthernet0/9 unassigned YES unset down down

FastEthernet0/10 unassigned YES unset down down

FastEthernet0/11 unassigned YES unset down down

FastEthernet0/12 unassigned YES unset down down

FastEthernet0/13 unassigned YES unset down down

FastEthernet0/14 unassigned YES unset down down
FastEthernet0/15 unassigned YES unset down down
FastEthernet0/16 unassigned YES unset down down
FastEthernet0/17 unassigned YES unset down down
FastEthernet0/18 unassigned YES unset down down
FastEthernet0/19 unassigned YES unset down down
FastEthernet0/20 unassigned YES unset down down
FastEthernet0/21 unassigned YES unset down down
FastEthernet0/22 unassigned YES unset down down
FastEthernet0/23 unassigned YES unset down down
FastEthernet0/24 unassigned YES unset down down
GigabitEthernet0/1 unassigned YES unset down down
GigabitEthernet0/2 unassigned YES unset down down
Vlan1 unassigned YES unset administratively down down
Vlan50 192.168.50.1 YES manual up up
Vlan51 192.168.51.1 YES manual up up

② 对二层交换机（switchB）

➤ show running-config

```
switchB#show running-config
```

```
Building configuration...
```

```
Current configuration : 1290 bytes
```

```
!
```

```
version 12.1
```

```
no service timestamps log datetime msec
```

```
no service timestamps debug datetime msec
```

```
no service password-encryption
```

```
!
```

```
hostname switchB
```

```
!
```



```
!  
!  
spanning-tree mode pvst  
!  
interface FastEthernet0/1  
switchport access vlan 51  
duplex half  
speed 10  
!  
interface FastEthernet0/2  
switchport access vlan 50  
duplex half  
speed 10  
!  
interface FastEthernet0/3  
switchport mode trunk  
duplex half  
speed 10  
!  
interface FastEthernet0/4  
switchport access vlan 50  
duplex half  
speed 10  
!  
interface FastEthernet0/5  
!  
interface FastEthernet0/6  
!  
interface FastEthernet0/7  
!
```

```
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
```

```

interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface Vlan1
no ip address
shutdown
!
interface Vlan50
ip address 192.168.50.2 255.255.255.0
!
interface Vlan51
ip address 192.168.51.2 255.255.255.0
!
!
!
!
line con 0
!
line vty 0 4
login
line vty 5 15
login
!
!
end

```

➤ show vlan

```
switchB#show vlan
```

```
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

50 vlan50 active Fa0/2, Fa0/4

51 vlan51 active Fa0/1

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

1 enet 100001 1500 - - - - 0 0

50 enet 100050 1500 - - - - 0 0

51 enet 100051 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

➤ show ip interface brief

```
switchB#show ip interface brief
```

```
Interface IP-Address OK? Method Status Protocol
```

```
FastEthernet0/1 unassigned YES manual up up
```

```
FastEthernet0/2 unassigned YES manual up up
```

```
FastEthernet0/3 unassigned YES manual up up
```

```
FastEthernet0/4 unassigned YES manual up up
```

```
FastEthernet0/5 unassigned YES manual down down
```

```
FastEthernet0/6 unassigned YES manual down down
```

```
FastEthernet0/7 unassigned YES manual down down
```

```
FastEthernet0/8 unassigned YES manual down down
```

```
FastEthernet0/9 unassigned YES manual down down
```

```
FastEthernet0/10 unassigned YES manual down down
```

```
FastEthernet0/11 unassigned YES manual down down
```

```
FastEthernet0/12 unassigned YES manual down down
```

```
FastEthernet0/13 unassigned YES manual down down
```

```
FastEthernet0/14 unassigned YES manual down down
```

```
FastEthernet0/15 unassigned YES manual down down
```

```
FastEthernet0/16 unassigned YES manual down down
```

```
FastEthernet0/17 unassigned YES manual down down
```

```
FastEthernet0/18 unassigned YES manual down down
```

```
FastEthernet0/19 unassigned YES manual down down
```

```
FastEthernet0/20 unassigned YES manual down down
```

```
FastEthernet0/21 unassigned YES manual down down
```

```
FastEthernet0/22 unassigned YES manual down down
```

```
FastEthernet0/23 unassigned YES manual down down
```

```
FastEthernet0/24 unassigned YES manual down down
```

```
Vlan1 unassigned YES manual administratively down down
```

```
Vlan50 192.168.50.2 YES manual up up
```

```
Vlan51 192.168.51.2 YES manual up up
```

(1) 测试连通性的结果（截图）。

① 网络设备配置好后，对选定的测试主机，禁用“本地连接 3”，启用“本地连接 4”，并按照实验拓扑图修改 IP 地址

表 3.1 选定测试主机 IP、划分 VLAN 以及连接的交换机与端口

(switchA 为三层交换机，switchB 为二层交换机)

PC	IP	VLAN	Switch	Fastethernet
PC5vlan50	192.168.50.5	VLAN 50	switchA	Fa 0/1
PC1vlan51	192.168.51.11	VLAN 51	switchA	Fa 0/2
PC2vlan50	192.168.50.22	VLAN 50	switchB	Fa 0/2
PC3vlan50	192.168.50.3	VLAN 50	switchB	Fa 0/4
PC4vlan51	192.168.51.4	VLAN 51	switchB	Fa 0/1
作为两个交换机相连的端口，将其设置为 trunk 方式				Fa 0/3

② 通过网络命令进行测试（ping 命令）：

➤ 不同交换机内同一个 VLAN 内主机的连通性

PC4vlan51:

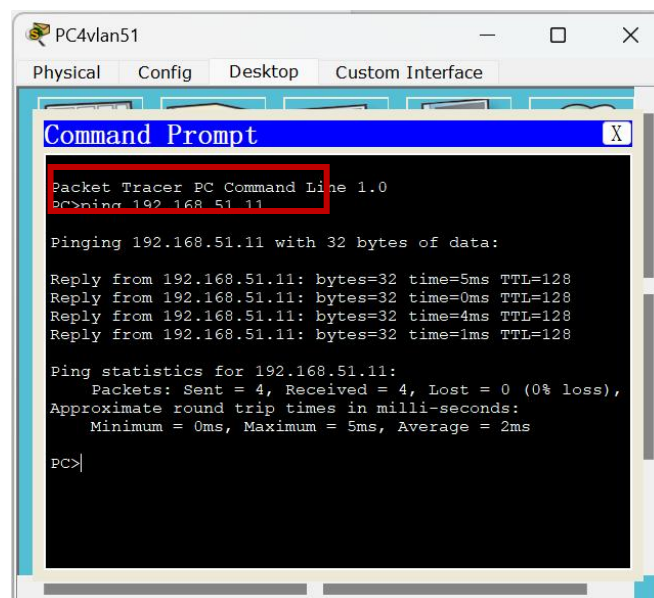


图 3.2 PC4vlan51 测试机跨交换机相同 VLAN 主机连通性测试

PC5vlan50:

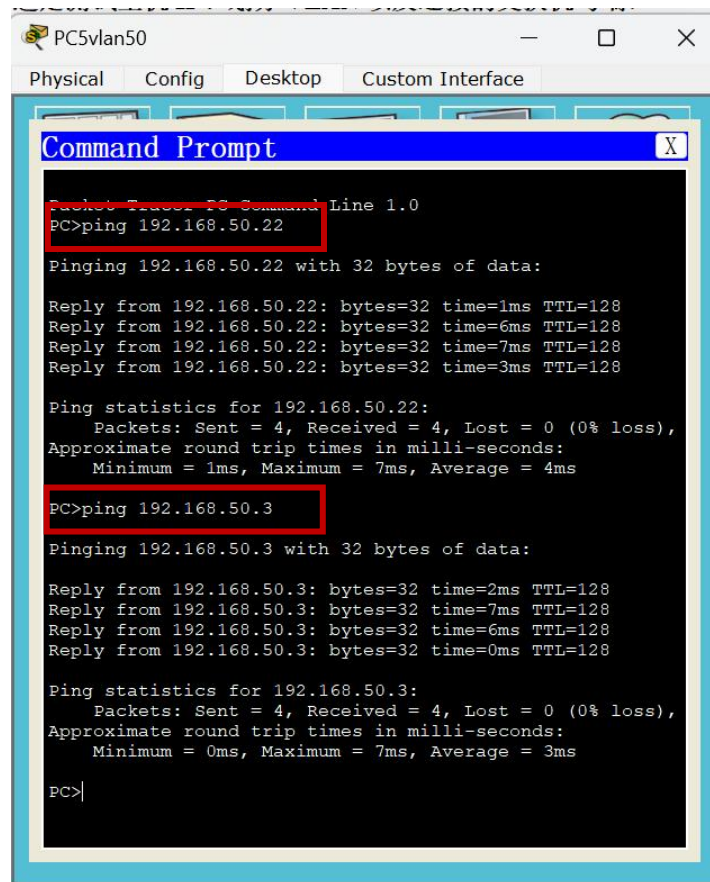


图 3.3 PC5vlan50 测试机跨交换机相同 VLAN 主机连通性测试

- 不同交换机内不同 VLAN 主机的连通性

PC3vlan50:

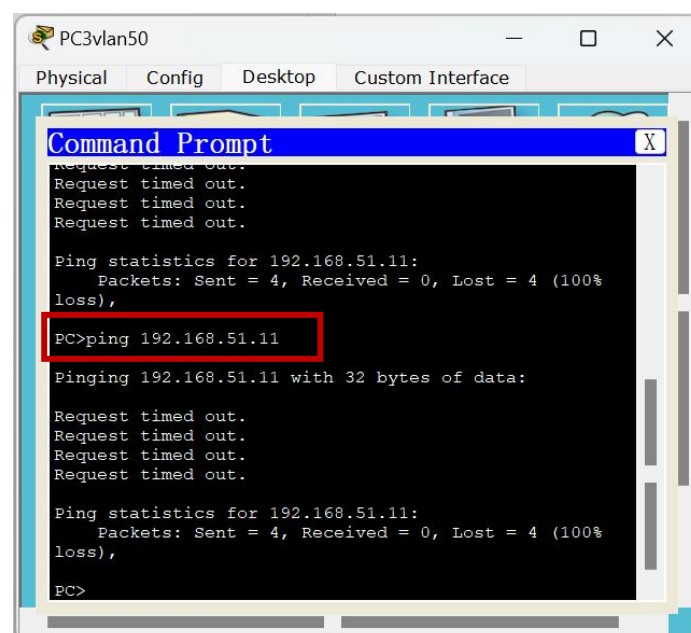


图 3.4 PC3vlan50 测试机跨交换机不同 VLAN 主机连通性测试

PC1vlan51:

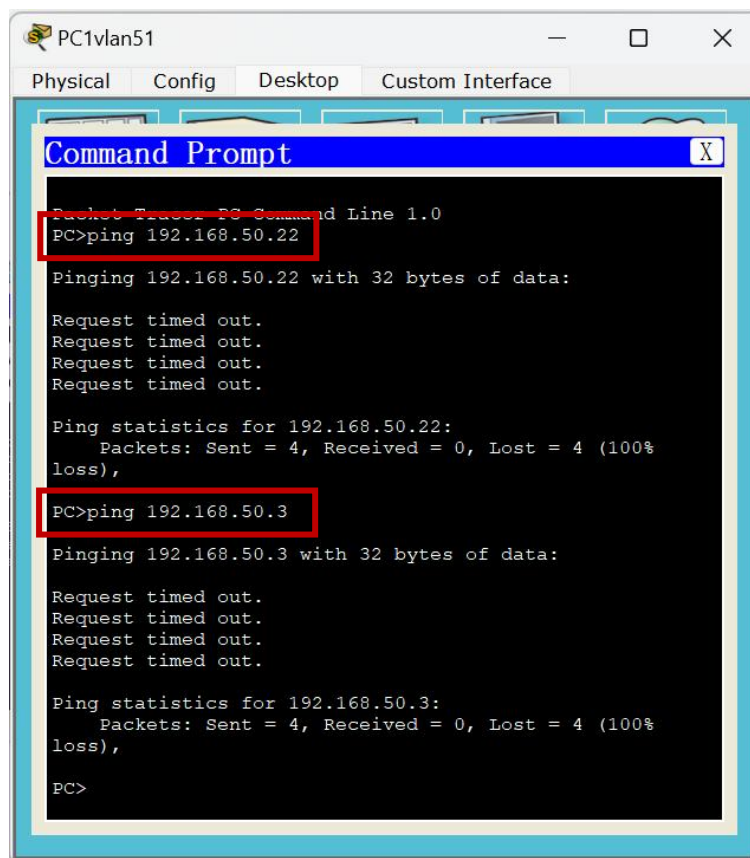


图 3.5 PC1vlan51 测试机跨交换机不同 VLAN 主机连通性测试

实验 3.2

画出所用的网络拓扑结构图。



图 3.6 静态路由实验拓扑

写出:

- (1) 所有的配置过程。(如实验过程中遇到问题, 写出问题原因及解决方法)

路由器 A:

配置端口 IP 地址

Router0(config)#interface fa 0/0


```
Router0(config-if)#ip address 172.16.50.254 255.255.0.0
```

开启该端口，使端口转发数据

```
Router0(config-if)#no shutdown
```

配置 DCE 端

```
Router0(config)#interface serial 2/0
```

```
Router0(config-if)#ip address 10.10.50.1 255.0.0.0
```

```
Router0(config-if)#clock rate 64000
```

//在 DCE 端配置时钟频率 64000

```
Router0(config-if)#no shutdown
```

路由器 B:

配置端口 IP 地址

```
Router1(config)#interface fa 1/0
```

```
Router1(config-if)#ip address 172.31.50.2 255.255.255.0
```

开启该端口，使端口转发数据

```
Router1(config-if)#no shutdown
```

配置 DTE 端

```
Router1(config)#interface serial 2/0
```

```
Router1(config-if)#ip address 10.10.50.2 255.0.0.0
```

```
Router1(config-if)#no shutdown
```

- (2) 写出配置成功后，每台设备执行“show running-config”、“show ip route”和“show ip interface brief”后的结果。

① 路由器 A

➤ show running-config

```
Router0#show running-config
```

```
Building configuration...
```

Current configuration : 788 bytes

!

version 12.2

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

!

hostname Router0

!

!

!

!

!

!

!

!

ip cef

no ipv6 cef

!

!

!

!

!

!

!

!

!

!

!

!

```

!
!
!
!
!
!
interface FastEthernet0/0
ip address 172.16.50.254 255.255.0.0
duplex auto
speed auto
!
interface FastEthernet1/0
no ip address
duplex auto
speed auto
shutdown
!
interface Serial2/0
ip address 10.10.50.1 255.0.0.0
clock rate 64000
!
interface Serial3/0
no ip address
clock rate 2000000
shutdown
!
interface FastEthernet4/0
no ip address
shutdown
!

```

```

interface FastEthernet5/0
no ip address
shutdown
!
ip classless
ip route 172.31.0.0 255.255.0.0 10.10.50.2
!
ip flow-export version 9
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
!
end

```

➤ show ip route

```
Router0#show ip route
```

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

C 10.0.0.0/8 is directly connected, Serial2/0

C 172.16.0.0/16 is directly connected, FastEthernet0/0

S 172.31.0.0/16 [1/0] via 10.10.50.2

➤ show ip interface brief

Router0#show ip interface brief

Interface IP-Address OK? Method Status Protocol

FastEthernet0/0 172.16.50.254 YES manual up up

FastEthernet1/0 unassigned YES unset administratively down down

Serial2/0 10.10.50.1 YES manual up up

Serial3/0 unassigned YES unset administratively down down

FastEthernet4/0 unassigned YES unset administratively down down

FastEthernet5/0 unassigned YES unset administratively down down

② 路由器 B

➤ show running-config

Router1#show running-config

Building configuration...

Current configuration : 770 bytes

!

version 12.2

```
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router1
!
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
!
!
!
```

```

!
!
!
interface FastEthernet0/0
no ip address
duplex auto
speed auto
shutdown
!
interface FastEthernet1/0
ip address 172.31.50.254 255.255.0.0
duplex auto
speed auto
!
interface Serial2/0
ip address 10.10.50.2 255.0.0.0
!
interface Serial3/0
no ip address
clock rate 2000000
shutdown
!
interface FastEthernet4/0
no ip address
shutdown
!
interface FastEthernet5/0
no ip address
shutdown
!

```

```

ip classless
ip route 172.16.0.0 255.255.0.0 10.10.50.1
!
ip flow-export version 9
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
!
end

```

➤ show ip route

```
Router1#show ip route
```

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

C 10.0.0.0/8 is directly connected, Serial2/0

S 172.16.0.0/16 [1/0] via 10.10.50.1

C 172.31.0.0/16 is directly connected, FastEthernet1/0

➤ show ip interface brief

Router1#show ip interface brief

Interface IP-Address OK? Method Status Protocol

FastEthernet0/0 unassigned YES unset administratively down down

FastEthernet1/0 172.31.50.254 YES manual up up

Serial2/0 10.10.50.2 YES manual up up

Serial3/0 unassigned YES unset administratively down down

FastEthernet4/0 unassigned YES unset administratively down down

FastEthernet5/0 unassigned YES unset administratively down down

(3) 测试连通性的结果（截图）。

① 对选定的测试主机，禁用“本地连接 3”，启用“本地连接 4”，并按照实验拓扑图修改 IP 地址

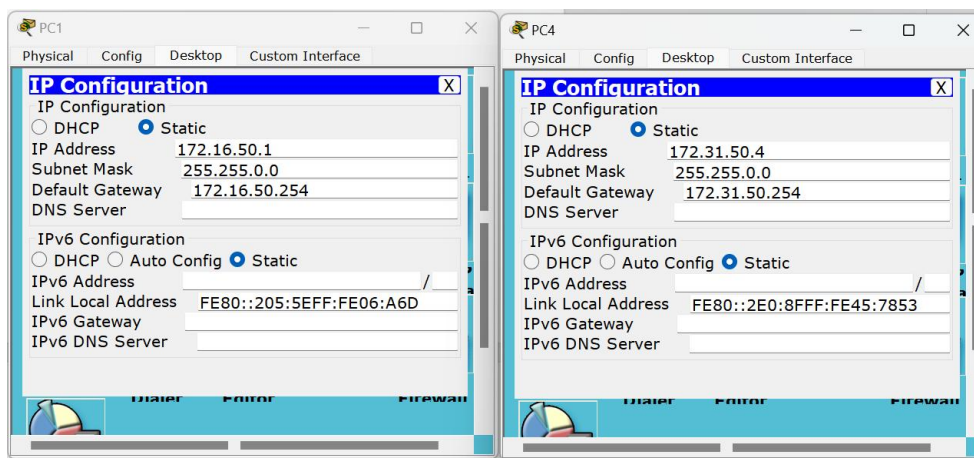


图 3.7 测试主机 IP、子网掩码、网关修改示意

② 通过网络命令进行测试（ping 命令）

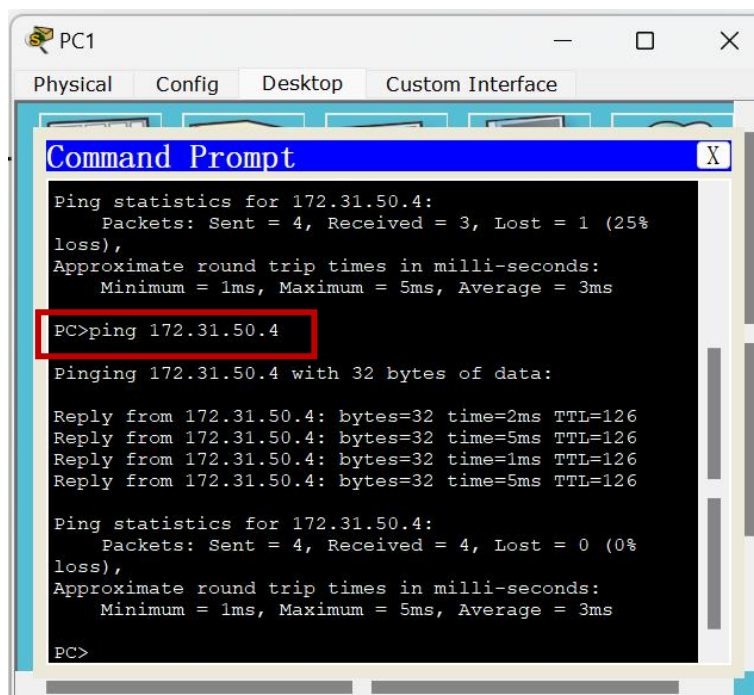


图 3.8 不同路由测试机在静态路由条件下连通性测试

实验 3.3

画出所用的网络拓扑结构图。



图 3.9 RIP 路由实验拓扑

写出：

- (1) 所有的配置过程。（如实验过程中遇到问题，写出问题原因及解决方法）

RouterA

配置端口 IP

Router(config)#ho RouterA

RouterA(config)#

RouterA(config)#int fa 0/0

RouterA(config-if)#ip add 172.16.51.254 255.255.0.0

RouterA(config-if)#no sh

```
RouterA(config-if)#
```

配置 DCE 端

```
RouterA(config-if)#int sa 3/0
```

```
RouterA(config-if)#ip add 10.10.51.1 255.0.0.0
```

```
RouterA(config-if)#clock rate 64000
```

//在 DCE 端配置时钟频率 64000

```
RouterA(config-if)#no sh
```

RouterB 配置端口 IP

```
Router#conf t
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Router(config-if)#ho RouterB
```

```
RouterB(config)#
```

```
RouterB(config)#
```

```
RouterB(config)#in fa 1/0
```

```
RouterB(config-if)#ip add 172.31.51.254 255.255.0.0
```

```
RouterB(config-if)#no sh
```

```
RouterB(config-if)#
```

%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to
up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/1, changed state to up

```
RouterB(config-if)#ex
```

配置 DTE 端

```
RouterB(config)#int sa 3/0
```

```
RouterB(config-if)#ip add 10.10.51.2 255.0.0.0
```

```
RouterB(config-if)#no sh
```

配置 RIP 协议

```
RouterA(config)#route rip          #开启 RIP 协议
```

```
RouterA(config-router)#version 2    #启用 RIPv2
```

```
RouterA(config-router)#network 172.16.51.254  #宣告网段
```

```
RouterA(config-router)#network 10.10.51.1      #宣告网段
```

```
RouterA(config-router)#no auto-summary        #关闭自动汇总
```

```
RouterB(config)#route rip
```

```
RouterB(config-router)#v 2
```

```
RouterB(config-router)#network 172.31.51.254
```

```
RouterB(config-router)#network 10.10.51.2
```

```
RouterB(config-router)#no auto-summary
```

- (2) 写出配置成功后, 每台设备执行“show running-config”、“show ip route”和“show ip interface brief”后的结果。

① RouterA 路由

➤ show running-config

```
RouterA#show running-config
```

```
Building configuration...
```

```
Current configuration : 823 bytes
```

```
!
```

```
version 12.2
```

```
no service timestamps log datetime msec
```

```
no service timestamps debug datetime msec
```

no service password-encryption

!

hostname RouterA

!

!

!

!

!

!

!

!

ip cef

no ipv6 cef

!

!

!

!

!

!

!

!

!

!

!

!

!

!

!

!

!

```
!  
interface FastEthernet0/0  
ip address 172.16.51.254 255.255.0.0  
duplex auto  
speed auto  
!  
interface FastEthernet1/0  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
interface Serial2/0  
no ip address  
clock rate 2000000  
shutdown  
!  
interface Serial3/0  
ip address 10.10.51.1 255.0.0.0  
clock rate 64000  
!  
interface FastEthernet4/0  
no ip address  
shutdown  
!  
interface FastEthernet5/0  
no ip address  
shutdown  
!  
router rip
```

```

version 2
network 10.0.0.0
network 172.16.0.0
no auto-summary
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
!
end

```

➤ show ip route

```
RouterA#show ip route
```

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

C 10.0.0.0/8 is directly connected, Serial3/0

C 172.16.0.0/16 is directly connected, FastEthernet0/0

R 172.31.0.0/16 [120/1] via 10.10.51.2, 00:00:24, Serial3/0

➤ show ip interface brief

RouterA#show ip interface brief

Interface IP-Address OK? Method Status Protocol

FastEthernet0/0 172.16.51.254 YES manual up up

FastEthernet1/0 unassigned YES unset administratively down down

Serial2/0 unassigned YES unset administratively down down

Serial3/0 10.10.51.1 YES manual up up

FastEthernet4/0 unassigned YES unset administratively down down

FastEthernet5/0 unassigned YES unset administratively down down

② RouterB 路由

➤ show running-config

RouterB#show running-config

Building configuration...

Current configuration : 805 bytes

!

version 12.2


```
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname RouterB
!
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
!
!
!
```

```
!  
!  
!  
interface FastEthernet0/0  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
interface FastEthernet1/0  
ip address 172.31.51.254 255.255.0.0  
duplex auto  
speed auto  
!  
interface Serial2/0  
no ip address  
clock rate 2000000  
shutdown  
!  
interface Serial3/0  
ip address 10.10.51.2 255.0.0.0  
!  
interface FastEthernet4/0  
no ip address  
shutdown  
!  
interface FastEthernet5/0  
no ip address  
shutdown  
!
```

```

router rip
version 2
network 10.0.0.0
network 172.31.0.0
no auto-summary
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
!
end

```

➤ show ip route

```
RouterB#show ip route
```

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

C 10.0.0.0/8 is directly connected, Serial3/0
R 172.16.0.0/16 [120/1] via 10.10.51.1, 00:00:26, Serial3/0
C 172.31.0.0/16 is directly connected, FastEthernet1/0

➤ show ip interface brief

```
RouterB#show ip interface brief
Interface IP-Address OK? Method Status Protocol
FastEthernet0/0 unassigned YES unset administratively down down
FastEthernet1/0 172.31.51.254 YES manual up up
Serial2/0 unassigned YES unset administratively down down
Serial3/0 10.10.51.2 YES manual up up
FastEthernet4/0 unassigned YES unset administratively down down
FastEthernet5/0 unassigned YES unset administratively down down
```

(3) 测试连通性的结果（截图）。

① 对选定的测试主机，禁用“本地连接 3”，启用“本地连接 4”，并按照实验拓扑图修改 IP 地址

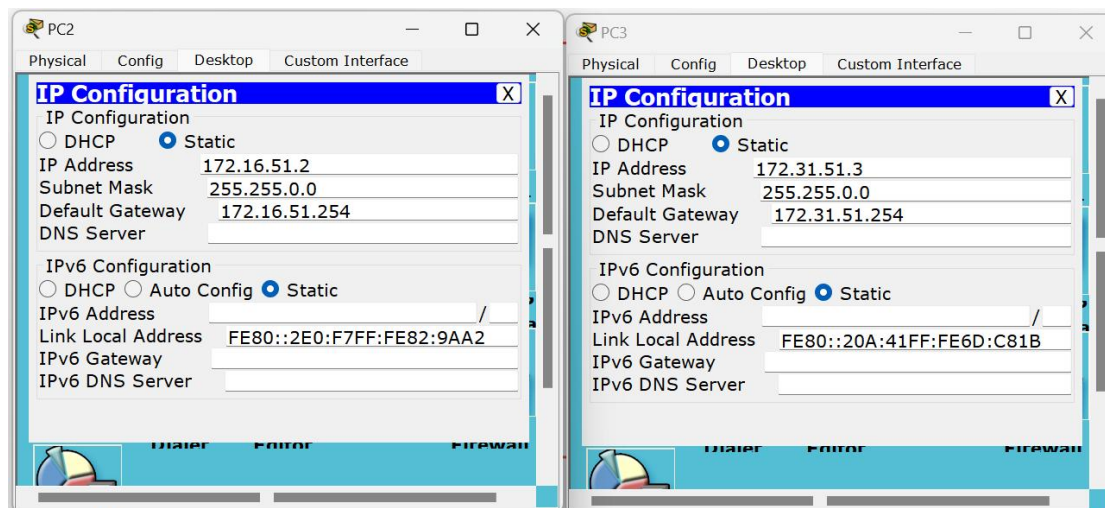


图 3.10 测试主机 IP、子网掩码、网关修改示意

② 通过网络命令进行测试（ping 命令）

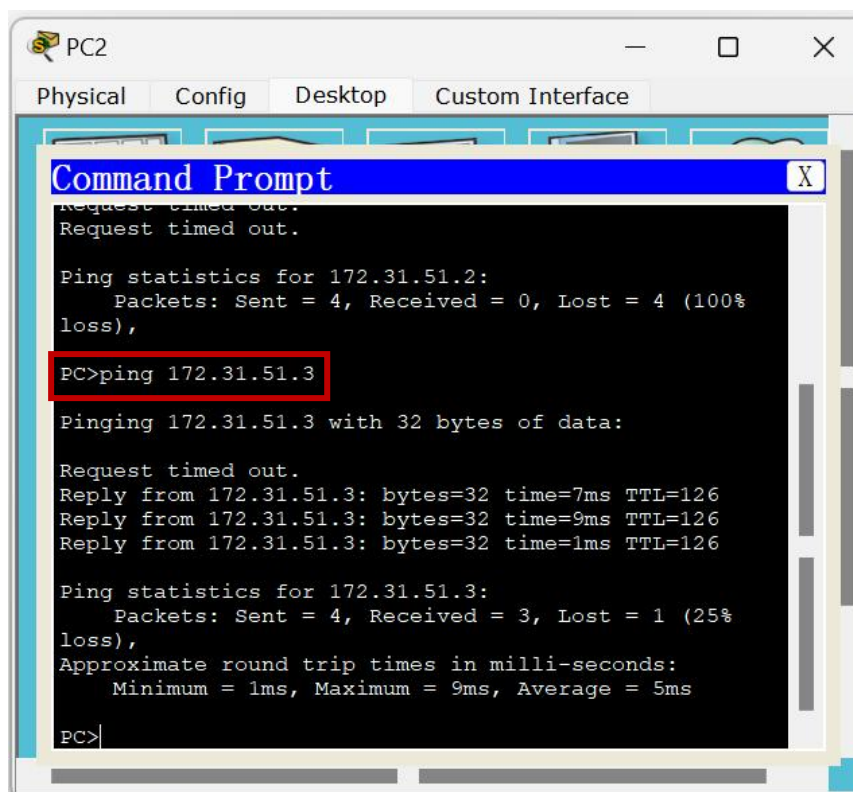


图 3.11 不同路由测试机在 RIP 路由条件下连通性测试