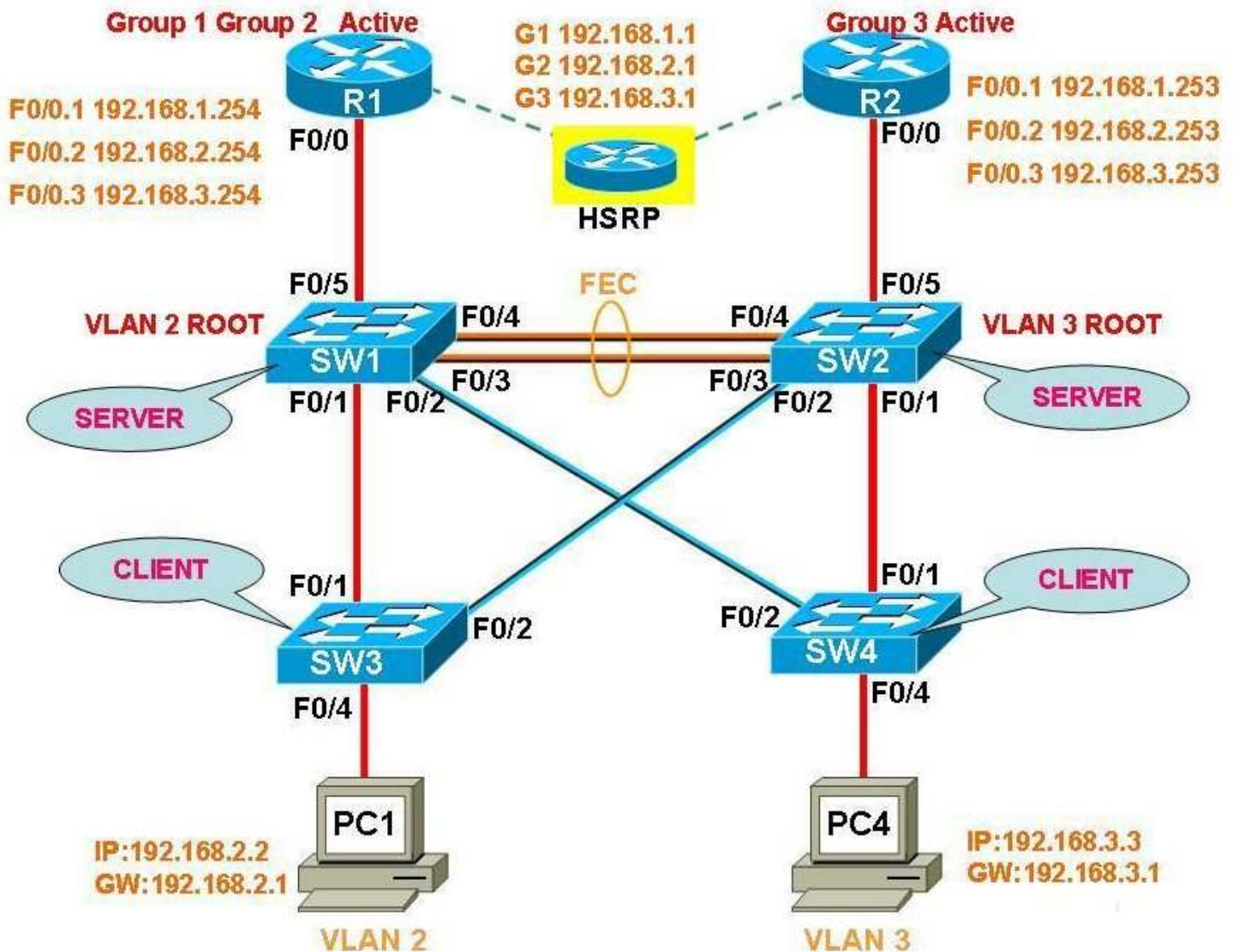


## 交换综合实验(基础)



### 实验要求:

在交换机上面配置 VLAN,TRUNK,VTP,STP,SPANNING TREE PORTFAST(速端口)和 UPLINKFAST(上行速链路).  
在路由器上面配置单臂路由实现不同 VLAN 之间通讯,配置双向 HSRP 热备份组,实现负载均衡.

## 配置部分:

### 1.SW1 配置:

```
SW1#vlan database
SW1(vlan)#vlan 2
SW1(vlan)#vlan 3
SW1(vlan)#vtp server
SW1(vlan)#vtp domain sy
SW1(vlan)#vtp password cisco
SW1(vlan)#vtp pruning
SW1(vlan)#exit
SW1#conf t
SW1(config)#int rang f0/1 - 5
SW1(config-if-range)#switchport mode trunk
SW1(config-if-range)#exit
SW1(config)#int range f0/3 - 4
SW1(config-if-range)#channel-group 1 mode on    // 配置以太通道
SW1(config-if-range)#end
```

### 2.SW2 配置:

```
SW2#vlan database
SW2(vlan)#vtp server
SW2(vlan)#vtp domain sy
SW2(vlan)#vtp password cisco
SW2(vlan)#exit
SW2#conf t
SW2(config)#int range f0/1 - 5
SW2(config-if-range)#switchport mode trunk
SW2(config-if-range)#exit
SW2(config)#int range f0/3 - 4
SW2(config-if-range)#channel-group 1 mode on    // 配置以太通道
SW2(config-if-range)#end
```

### 3.SW3 配置:

```
SW3#vlan database
SW3(vlan)#vtp client
SW3(vlan)#vtp domain sy
SW3(vlan)#vtp password cisco
SW3(vlan)#exit
SW3#conf t
SW3(config)#int rang f0/1 -2
SW3(config-if-range)#int rang f0/1 - 2
SW3(config-if-range)#switchport mode trunk
```

```
SW3(config-if-range)#end
```

#### 4.SW4 配置:

```
SW4#vlan database
SW4(vlan)#vtp client
SW4(vlan)#vtp domain sy
SW4(vlan)#vtp password cisco
SW4(vlan)#exit
SW4#conf t
SW4(config)#int range f0/1 - 2
SW4(config-if-range)#switchport mode trunk
SW4(config-if-range)#end
SW4#conf t
SW4(config)#spanning-tree uplinkfast
SW4(config)#int f0/4
SW4(config-if)#spanning-tree portfast
SW4(config-if)#end
```

#### 5.SW3 配置:

```
SW3#conf t
SW3(config)#spanning-tree uplinkfast
SW3(config)#int f0/4
SW3(config-if)#spanning-tree portfast
SW3(config-if)#exit
SW3(config)#end
```

#### 6.SW2 配置:

```
SW2#conf t
SW2(config)#spanning-tree vlan 3 priority 4096 // (spanning-tree vlan 3 root primary)设置为 VLAN3 的根桥
SW2(config)#end
```

#### 7.SW1 配置:

```
SW1#conf t
SW1(config)#spanning-tree vlan 2 priority 4096 // (spanning-tree vlan 2 root primary)设置为 VLAN2 的根桥
SW1(config)#end
```

#### 8.R1 配置:

```
R2#conf t
R1(config)#int f0/0
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#int f0/0.1
R1(config-subif)#encapsulation dot1Q 1 // HSRP 配置部分
R1(config-subif)#ip address 192.168.1.254 255.255.255.0
```

```

R1(config-subif)#no shutdown
R1(config-subif)#exit
R1(config)#int f0/0.2
R1(config-subif)#encapsulation dot1q 2
R1(config-subif)#ip address 192.168.2.254 255.255.255.0
R1(config-subif)#no shutdown
R1(config-subif)#exit
R1(config-subif)#int f0/0.3
R1(config-subif)#encapsulation dot1q 3
R1(config-subif)#ip address 192.168.3.254 255.255.255.0
R1(config-subif)#no shutdown
R1(config-subif)#exit
R1(config)#int f0/0.1
R1(config-subif)#standby 1 ip 192.168.1.1
R1(config-subif)#standby 1 priority 200 // 默认优先级为 100,这里更改为 200 是使其成为活跃路由器
R1(config-subif)#standby 1 preempt // 配置抢占,使得本路由器从 DOWN 中恢复了后仍可以抢占为活跃路由器
R1(config-subif)#exit
R1(config)#int f0/0.2
R1(config-subif)#standby 2 ip 192.168.2.1
R1(config-subif)#standby 2 priority 200
R1(config-subif)#standby 2 preempt
R1(config-subif)#exit
R1(config)#int f0/0.3
R1(config-subif)#standby 3 ip 192.168.3.1

```

## 9.R2 配置:

```

R2#conf t
R2(config)#int f0/0
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#int f0/0.2 //HSRP 配置部分
R2(config-subif)#encapsulation dot1q 253 255.255.255.0
R2(config-subif)#no shutdown
R2(config-subif)#int f0/0.3
R2(config-subif)#encapsulation dot1q 3
R2(config-subif)#ip address 192.168.3.253 255.255.255.0
R2(config-subif)#no shutdown
R2(config-subif)#exit
R2(config)#int f0/0.1
R2(config-subif)#encapsulation dot1Q 1
R2(config-subif)#ip address 192.168.1.253 255.255.255.0
R2(config-subif)#no shutdown
R2(config-subif)#end
R2(config-subif)#exit

```

```
R2(config)#int f0/0.1 //这一部分没有配置抢占,它将成为备用路由器
R2(config-subif)#standby 1 ip 192.168.1.1
R2(config-subif)#exit
R2(config)#int f0/0.2
R2(config-subif)#standby 2 ip 192.168.2.1
R2(config-subif)#exit
R2(config)#int f0/0.3
R2(config-subif)#standby 3 ip 192.168.3.1
R2(config-subif)#standby 3 priority 200
R2(config-subif)#standby 3 preempt
```

10.客户机配置:

```
PC1:
IP:192.168.2.2/24
GW:192.168.2.1 //这里的网关地址实际上是虚拟出来的地址,真正转发数据的是活跃路由器
PC3:
IP:192.168.3.3/24
GW:192.168.3.1
```

实验效果验证部分:

```
sw3#show vlan-switch brief
```

VLAN Name	Status	Ports
1 default	active	Fa0/0, Fa0/3, Fa0/5, Fa0/6 Fa0/7, Fa0/8, Fa0/9, Fa0/10 Fa0/11, Fa0/12, Fa0/13, Fa0/14 Fa0/15
2 VLAN0002	active	Fa0/4
3 VLAN0003	active	
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

sw3#

sw3#sho vtp status

VTP Version : 2  
Configuration Revision : 1  
Maximum VLANs supported locally : 256  
Number of existing VLANs : 7  
VTP Operating Mode : Client  
VTP Domain Name : sy  
VTP Pruning Mode : Enabled  
VTP V2 Mode : Disabled  
VTP Traps Generation : Disabled  
MD5 digest : 0xC6 0xB6 0xCD 0xF2 0xA5 0x97 0x3C 0x7B  
Configuration last modified by 0.0.0.0 at 3-1-02 00:16:27

r1#show standby brief

P indicates configured to preempt.

Interface	Grp	Prio	P State	Active	Standby	Virtual IP
Fa0/0.1	1	100	P Active	local	192.168.1.253	192.168.1.1
Fa0/0.2	2	200	P Active	local	192.168.2.253	192.168.2.1
Fa0/0.3	3	100	Standby	192.168.3.253	local	192.168.3.1

r1#

r2#sho standby brief

P indicates configured to preempt.

Interface	Grp	Prio	P State	Active	Standby	Virtual IP
Fa0/0.1	1	100	Standby	192.168.1.254	local	192.168.1.1
Fa0/0.2	2	100	Standby	192.168.2.254	local	192.168.2.1
Fa0/0.3	3	200	P Active	local	192.168.3.254	192.168.3.1

r2#show standby

FastEthernet0/0.1 - Group 1

State is Standby

4 state changes, last state change 00:06:53

Virtual IP address is 192.168.1.1

Active virtual MAC address is 0000.0c07.ac01

Local virtual MAC address is 0000.0c07.ac01 (v1 default)

Hello time 3 sec, hold time 10 sec

Next hello sent in 0.716 secs

Preemption disabled

Active router is 192.168.1.254, priority 100 (expires in 8.364 sec)

Standby router is local

Priority 100 (default 100)

IP redundancy name is "hsrp-Fa0/0.1-1" (default)  
FastEthernet0/0.2 - Group 2  
State is Standby  
4 state changes, last state change 00:06:53  
Virtual IP address is 192.168.2.1  
Active virtual MAC address is 0000.0c07.ac02  
Local virtual MAC address is 0000.0c07.ac02 (v1 default)  
Hello time 3 sec, hold time 10 sec  
Next hello sent in 0.824 secs  
Preemption disabled  
Active router is 192.168.2.254, priority 200 (expires in 8.348 sec)  
Standby router is local  
Priority 100 (default 100)  
IP redundancy name is "hsrp-Fa0/0.2-2" (default)

FastEthernet0/0.3 - Group 3  
State is Active  
2 state changes, last state change 00:09:31  
Virtual IP address is 192.168.3.1  
Active virtual MAC address is 0000.0c07.ac03  
Local virtual MAC address is 0000.0c07.ac03 (v1 default)  
Hello time 3 sec, hold time 10 sec  
Next hello sent in 2.048 secs  
Preemption enabled  
Active router is local  
Standby router is 192.168.3.254, priority 100 (expires in 8.676 sec)  
Priority 200 (configured 200)  
IP redundancy name is "hsrp-Fa0/0.3-3" (default)

r2#

pc2#ping 192.168.1.1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.1.1, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 60/84/108 ms

pc2#

pc2#

pc2#ping 192.168.2.1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.2.1, timeout is 2 seconds:

.!!!!

Success rate is 80 percent (4/5), round-trip min/avg/max = 60/66/76 ms

pc2#

pc2#

pc2#ping 192.168.3.1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.3.1, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 32/45/76 ms

pc2#