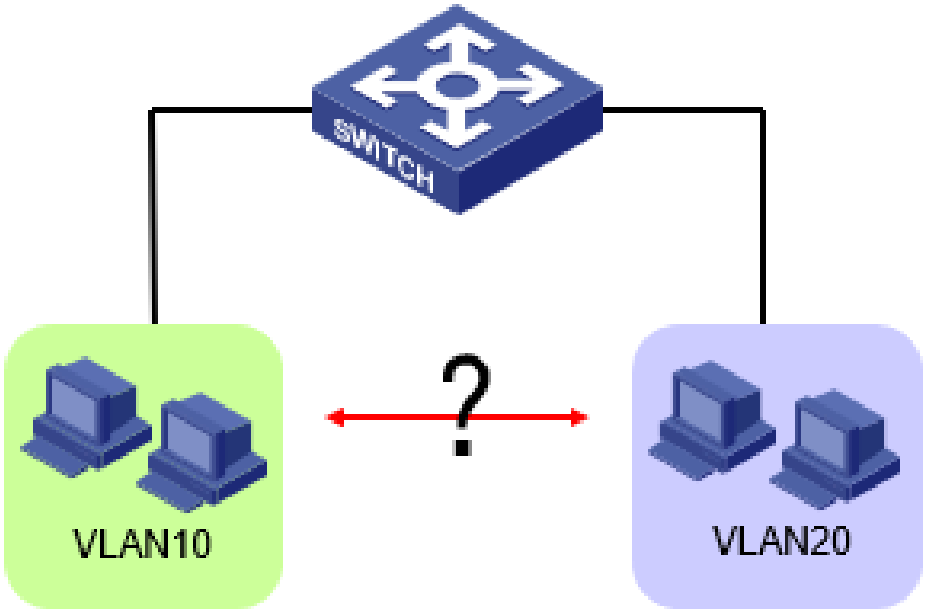
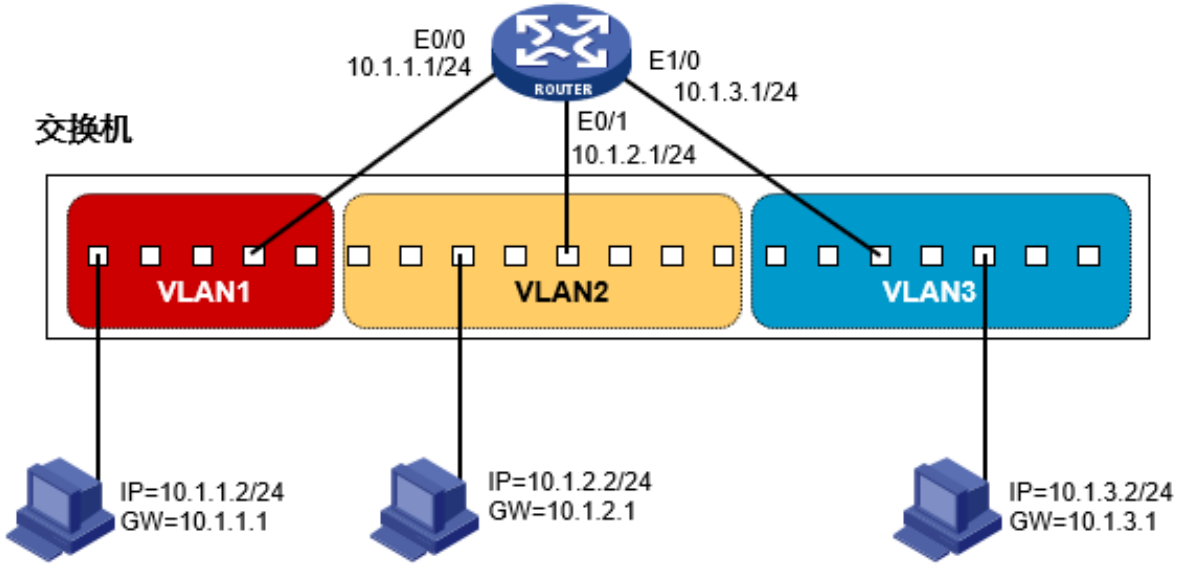
VLAN的通信

VLAN间的通信需求



路由器实现VLAN间通信

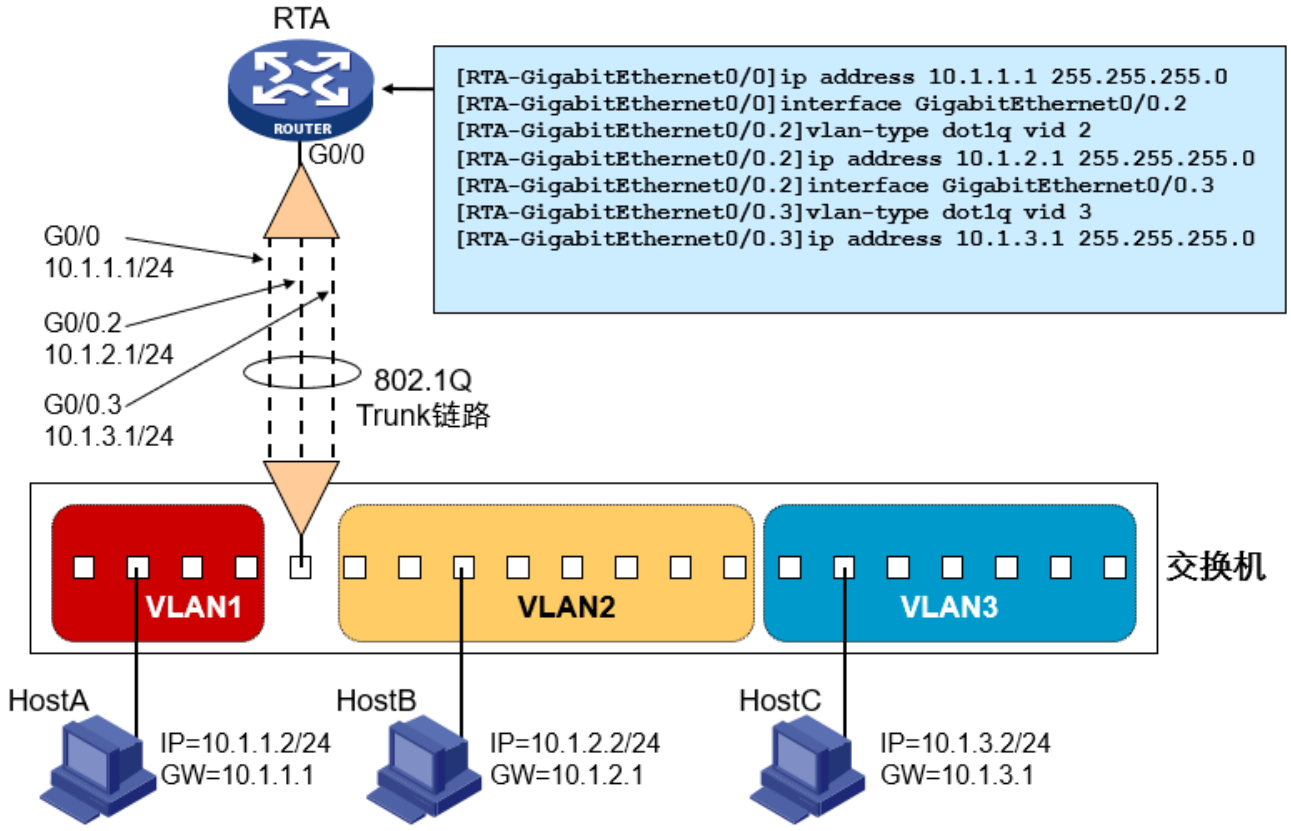


- 路由器端口的数量问题?

单臂路由

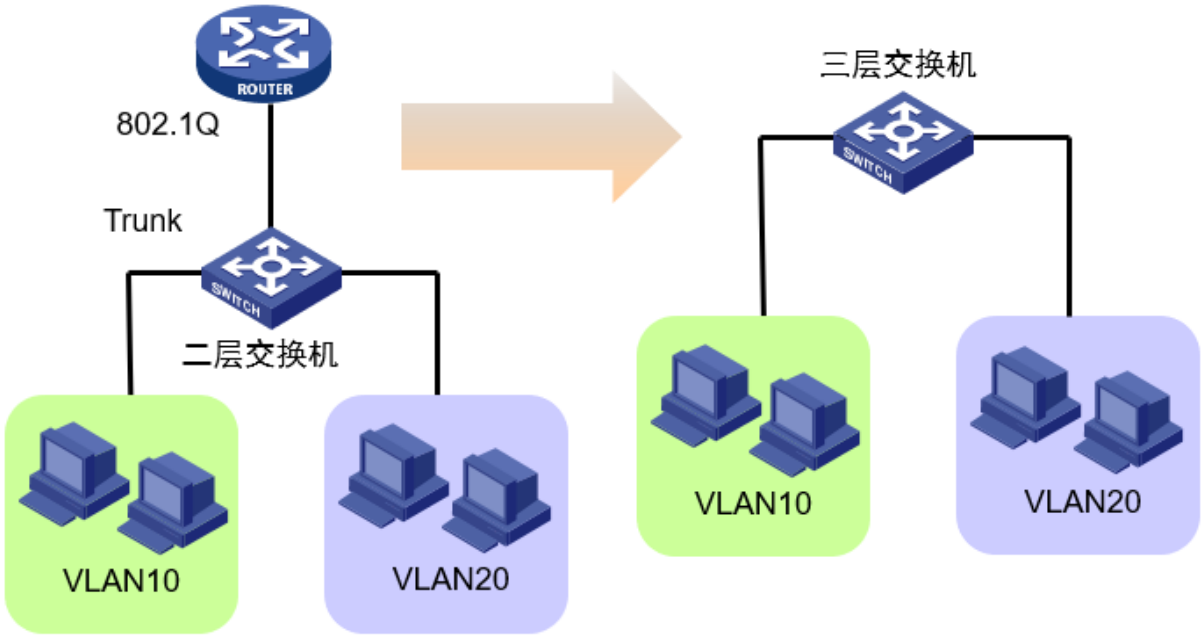
- 利用802.1Q和子接口实现

- 存在的问题?



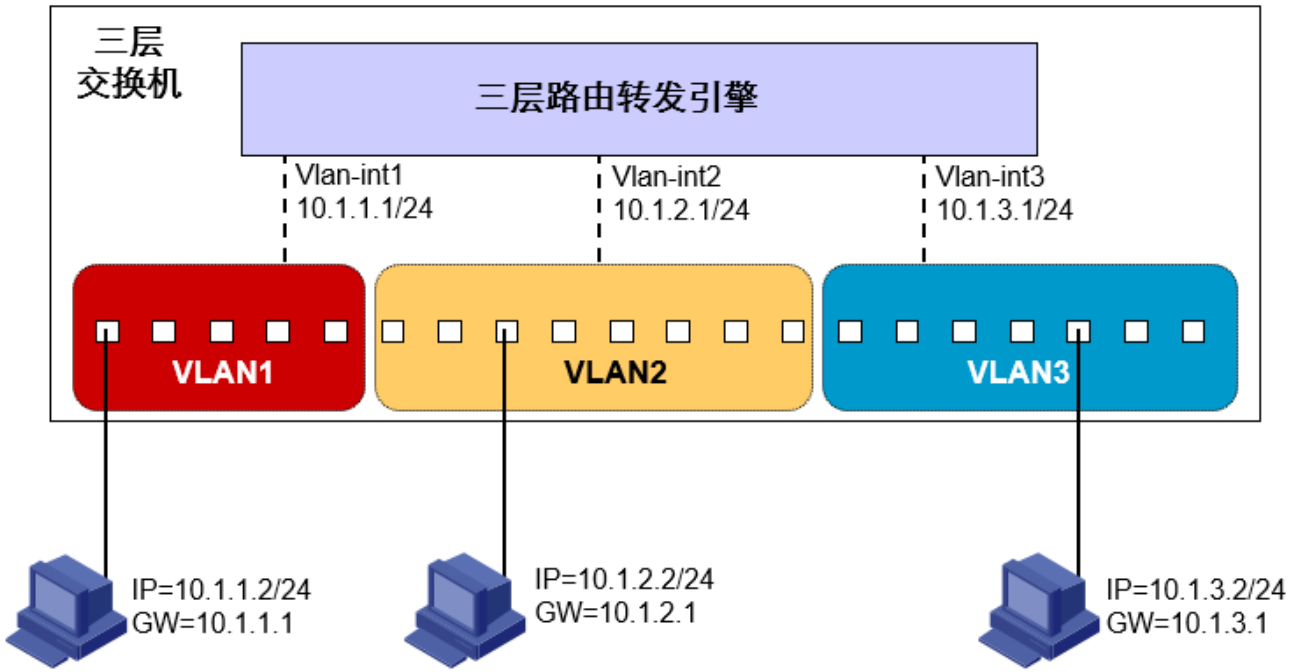
三层交换机的产生

- 二层交换和三层路由的集成



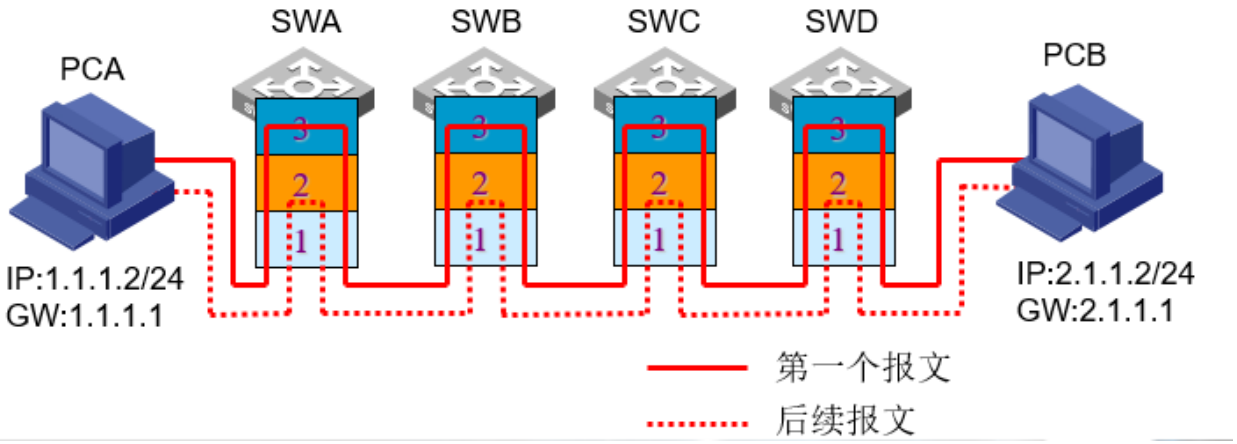
利用三层交换机实现VLAN间通信

- 三层路由转发引擎

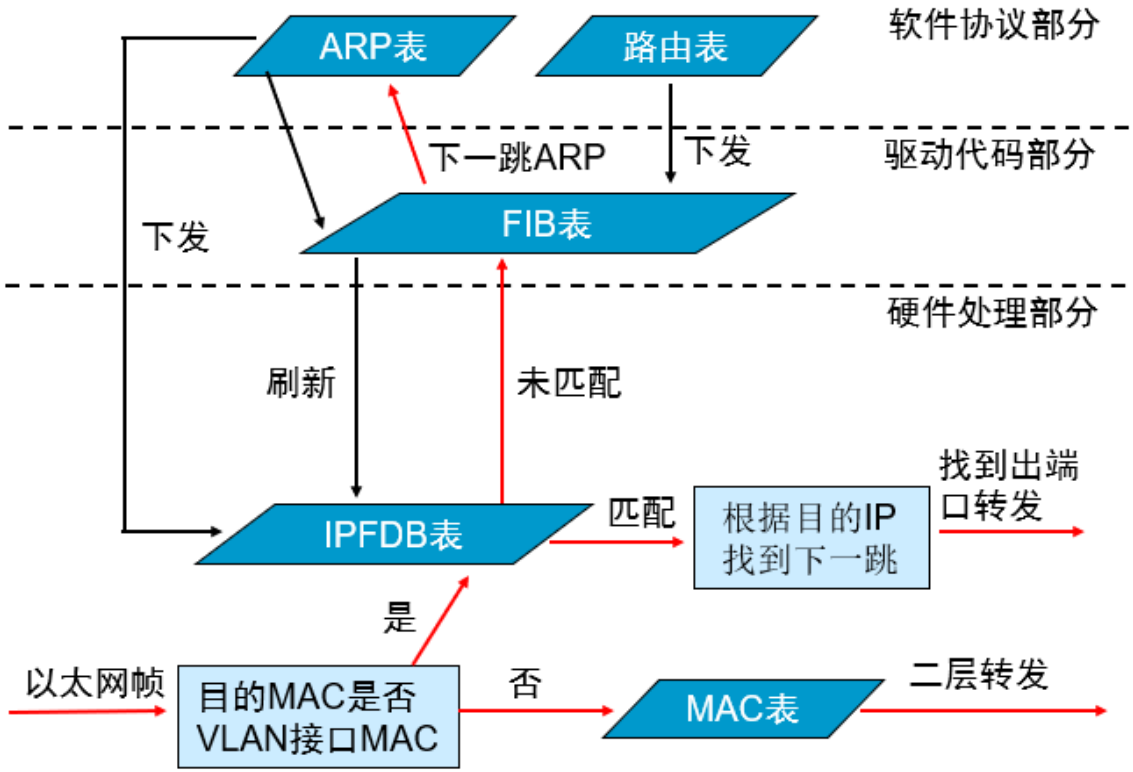


交换机匹配转发模型

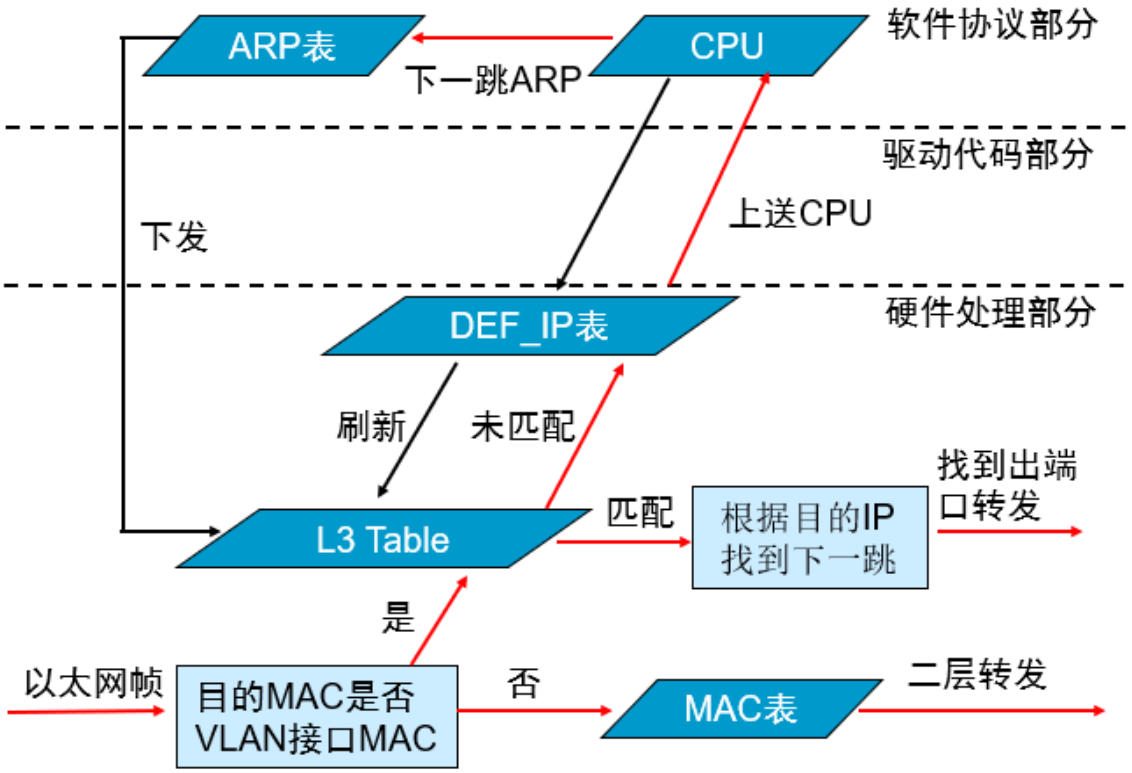
- CPU维护路由表
- ASIC芯片完成主要的数据转发
- 一次路由，多次交换



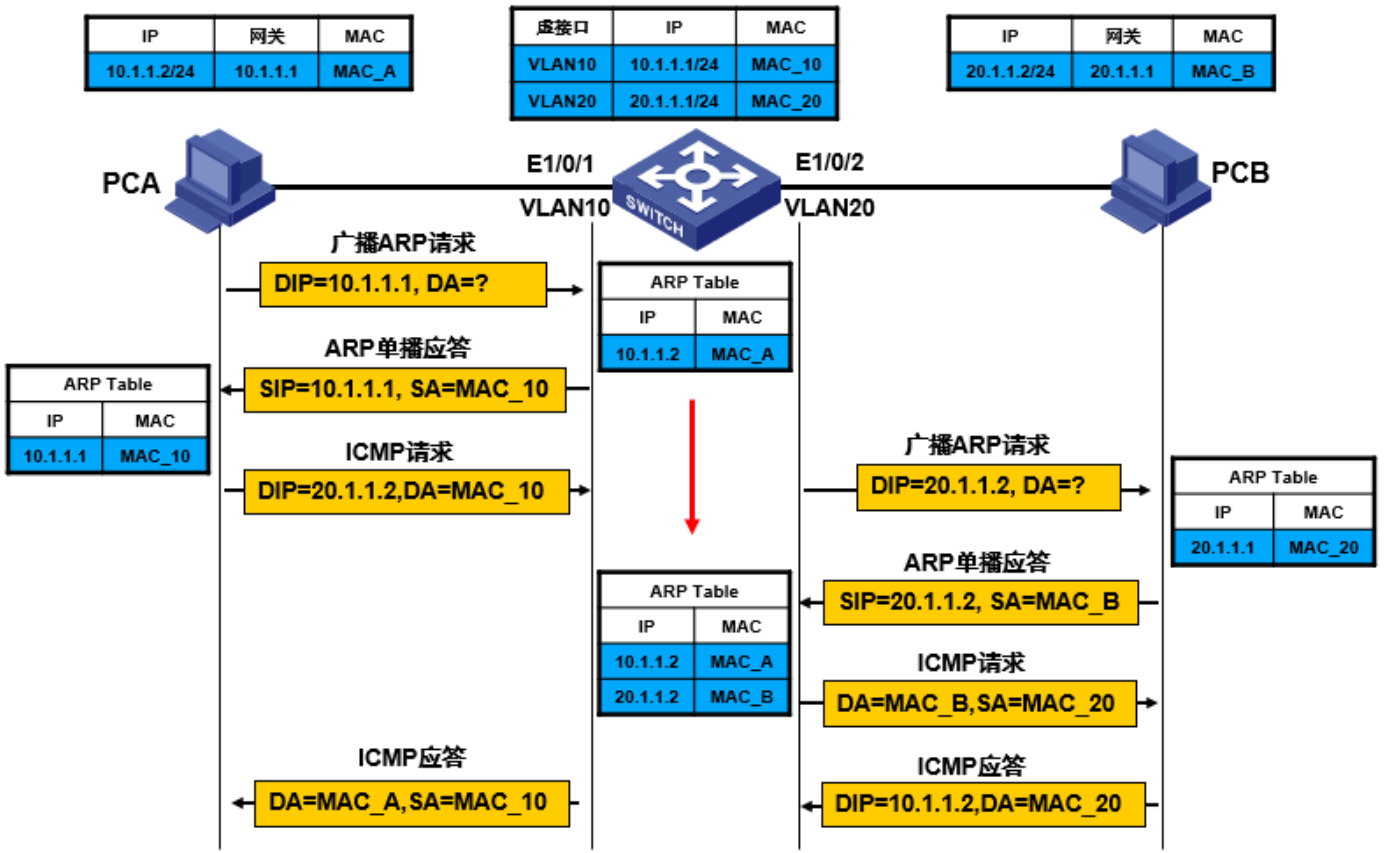
交换机转发表


ARP表
路由表
软件协议部分
下一跳ARP
下发
驱动代码部分
下发
FIB表
硬件处理部分
刷新
未匹配
找到出端口转发
IPFDB表
匹配
根据目的IP找到下一跳
是
以太网帧
目的MAC是否VLAN接口MAC
否
MAC表
二层转发

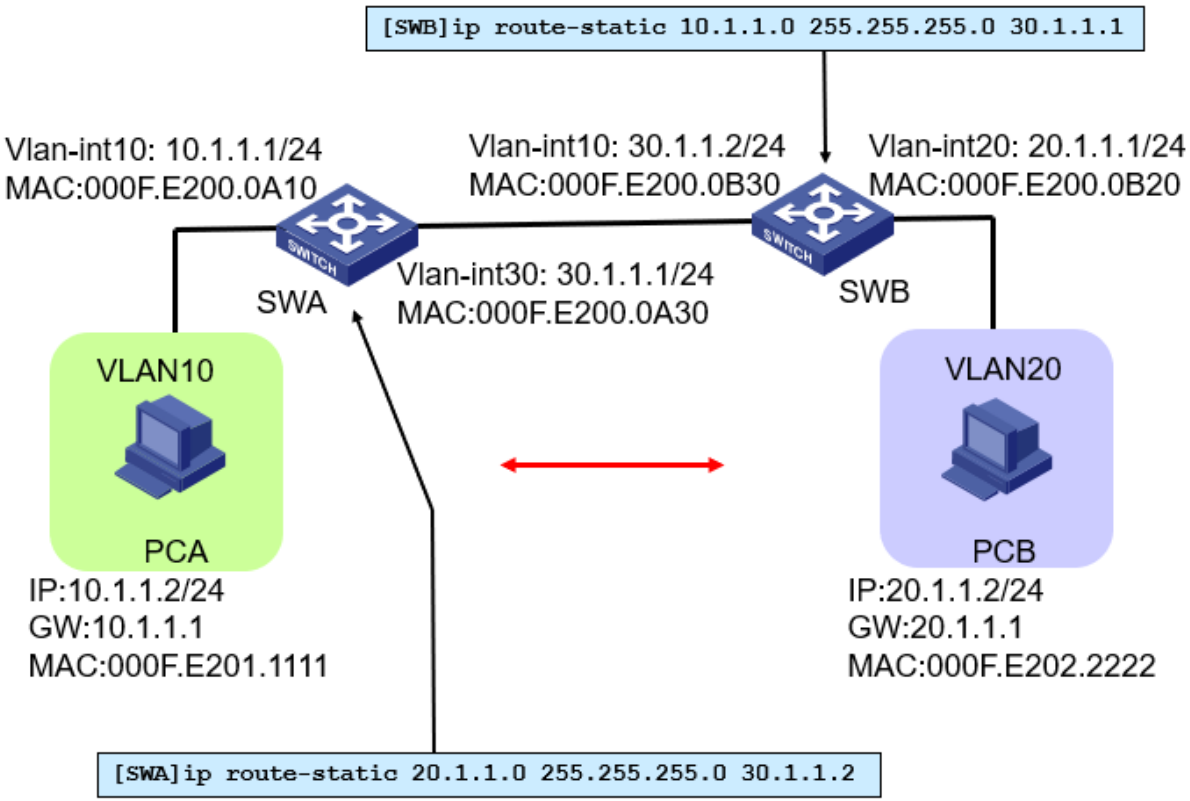
交换机最长匹配转发表


ARP表
CPU
软件协议部分
下一跳ARP
驱动代码部分
下发
上送CPU
DEF_IP表
硬件处理部分
刷新
未匹配
找到出端口转发
匹配
L3 Table
根据目的IP找到下一跳
是
以太网帧
目的MAC是否VLAN接口MAC
否
MAC表
二层转发

直连VLAN间流量转发

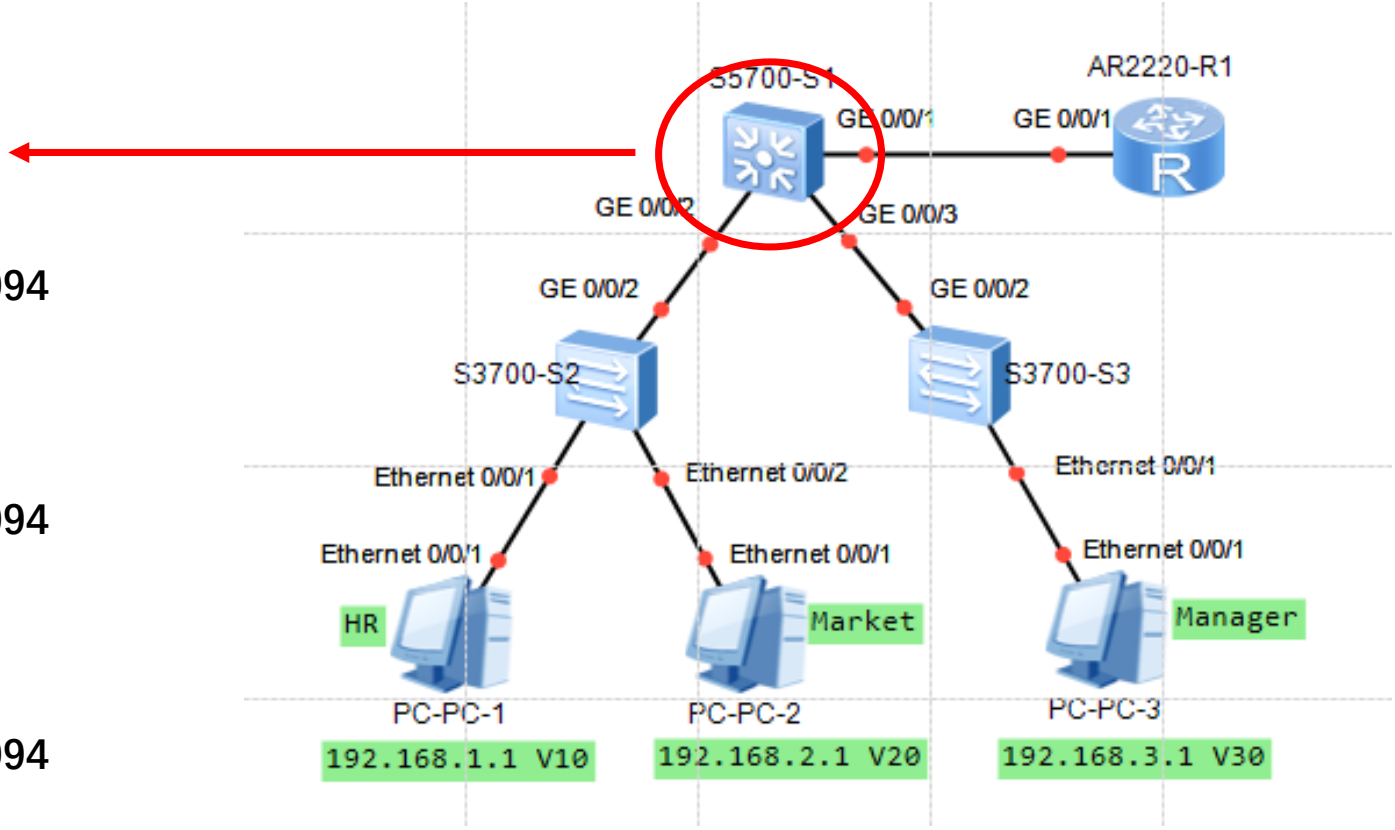


跨设备VLAN间流量转发



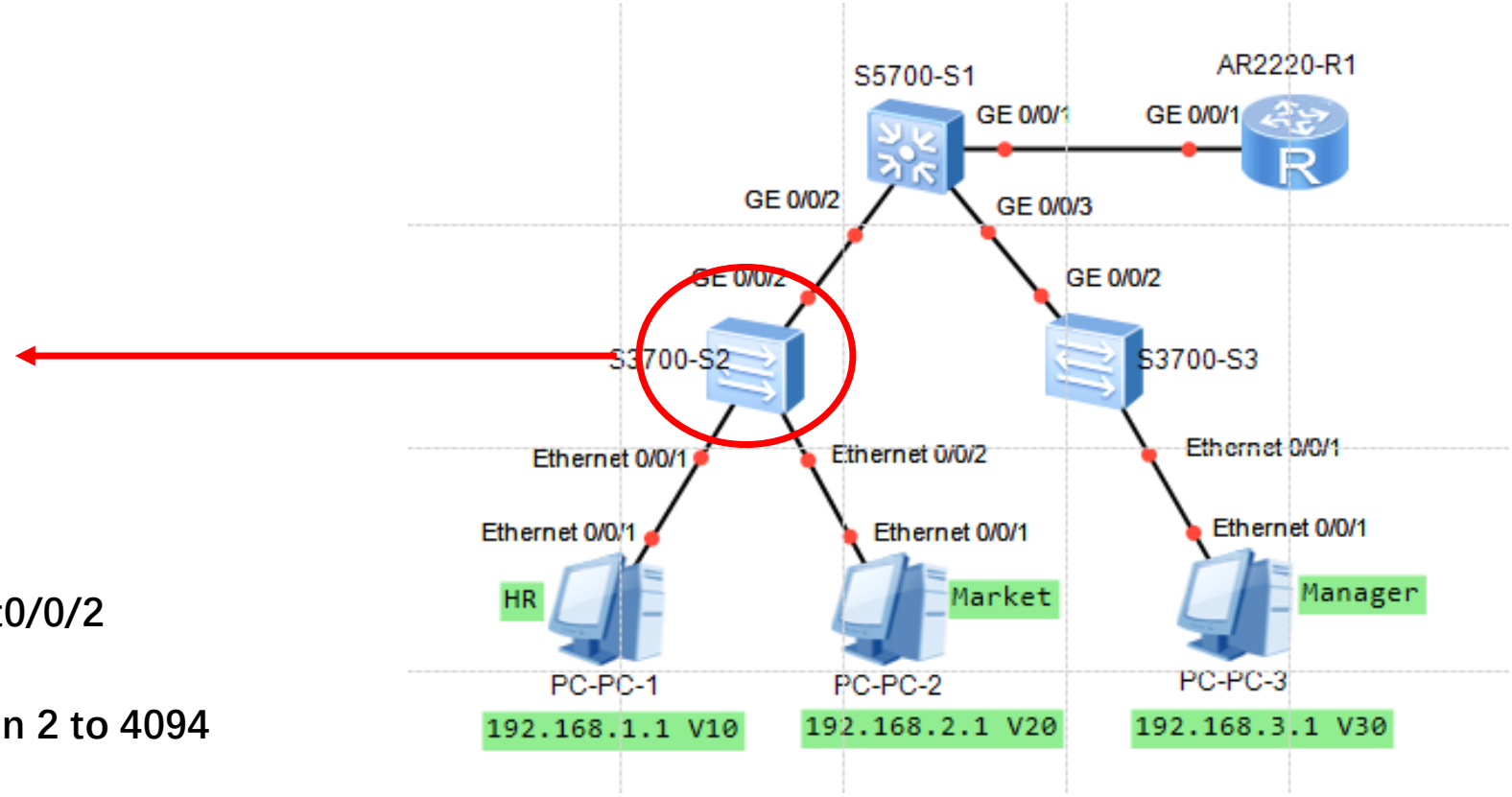
单臂路由案例

S1
vlan batch 10 20 30
interface GigabitEthernet0/0/1
 port link-type trunk
 port trunk allow-pass vlan 2 to 4094
#
interface GigabitEthernet0/0/2
 port link-type trunk
 port trunk allow-pass vlan 2 to 4094
#
interface GigabitEthernet0/0/3
 port link-type trunk
 port trunk allow-pass vlan 2 to 4094



单臂路由案例

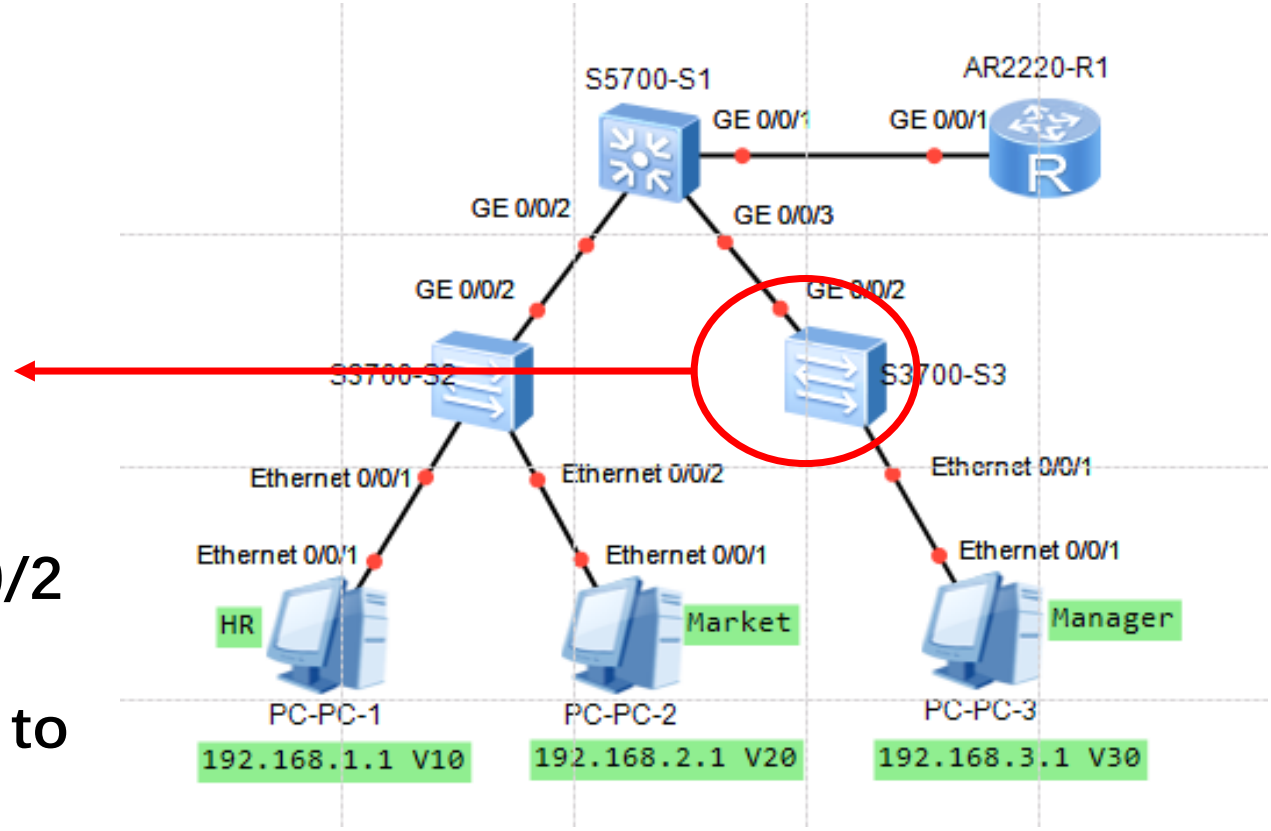
```
S2
vlan batch 10 20
#
interface Ethernet0/0/1
 port link-type access
 port default vlan 10
#
interface Ethernet0/0/2
 port link-type access
 port default vlan 20
interface GigabitEthernet0/0/2
 port link-type trunk
port trunk allow-pass vlan 2 to 4094
```



单臂路由案例

S3

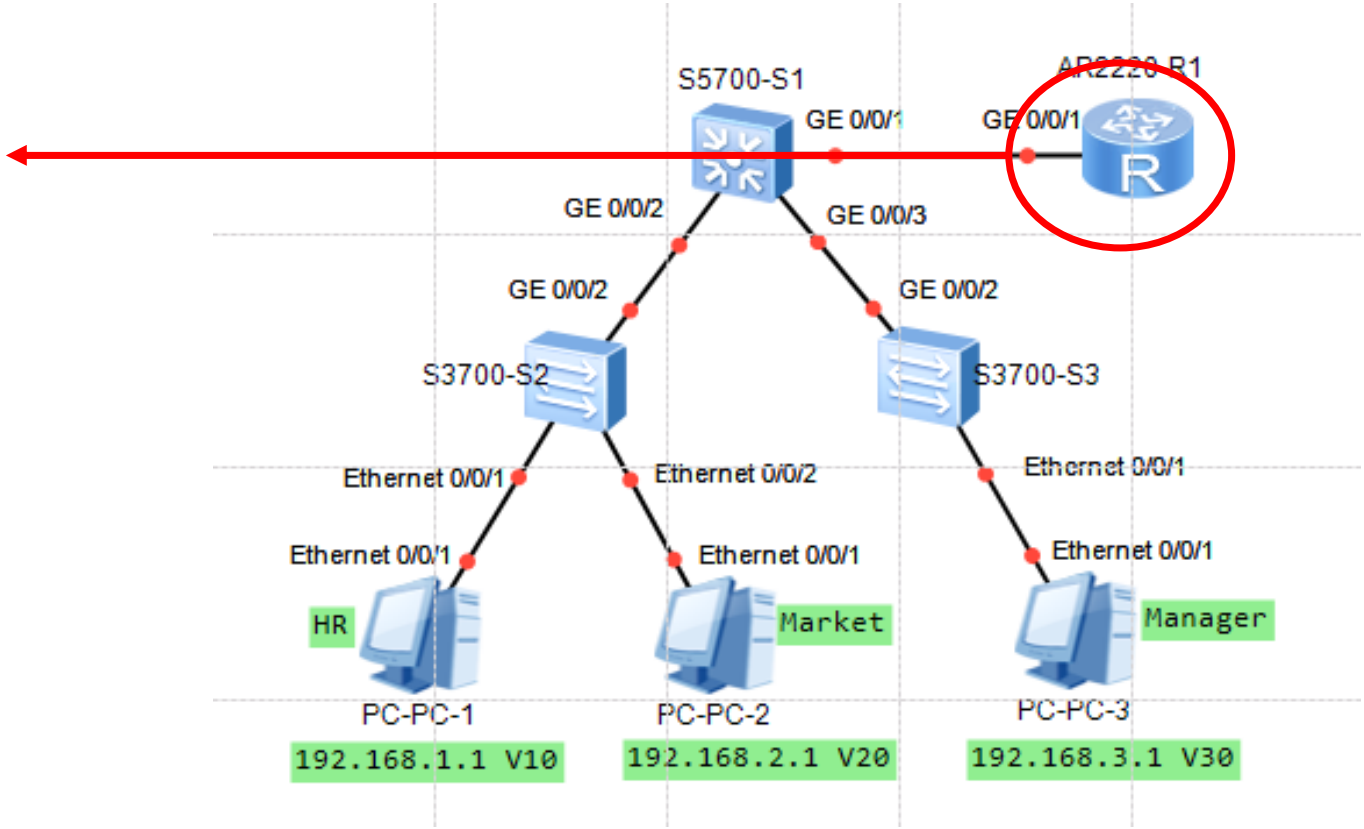
```
vlan batch 30
#
interface Ethernet0/0/1
 port link-type access
 port default vlan 30
#
interface GigabitEthernet0/0/2
 port link-type trunk
port trunk allow-pass vlan 2 to 4094
```



单臂路由案例

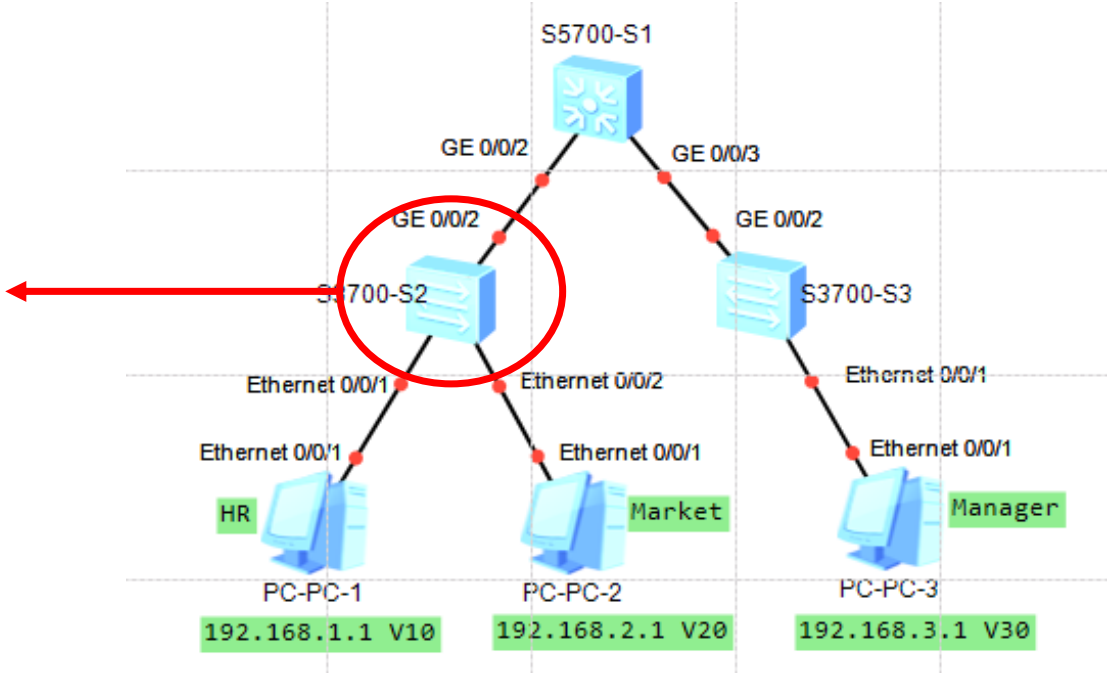
R

```
interface GigabitEthernet0/0/1.1
 dot1q termination vid 10
 ip address 10.1.1.254 255.255.255.0
 arp broadcast enable
#
interface GigabitEthernet0/0/1.2
 dot1q termination vid 20
 ip address 20.1.1.254 255.255.255.0
 arp broadcast enable
#
interface GigabitEthernet0/0/1.3
 dot1q termination vid 30
 ip address 30.1.1.254 255.255.255.0
 arp broadcast enable
```



三层交换机案例

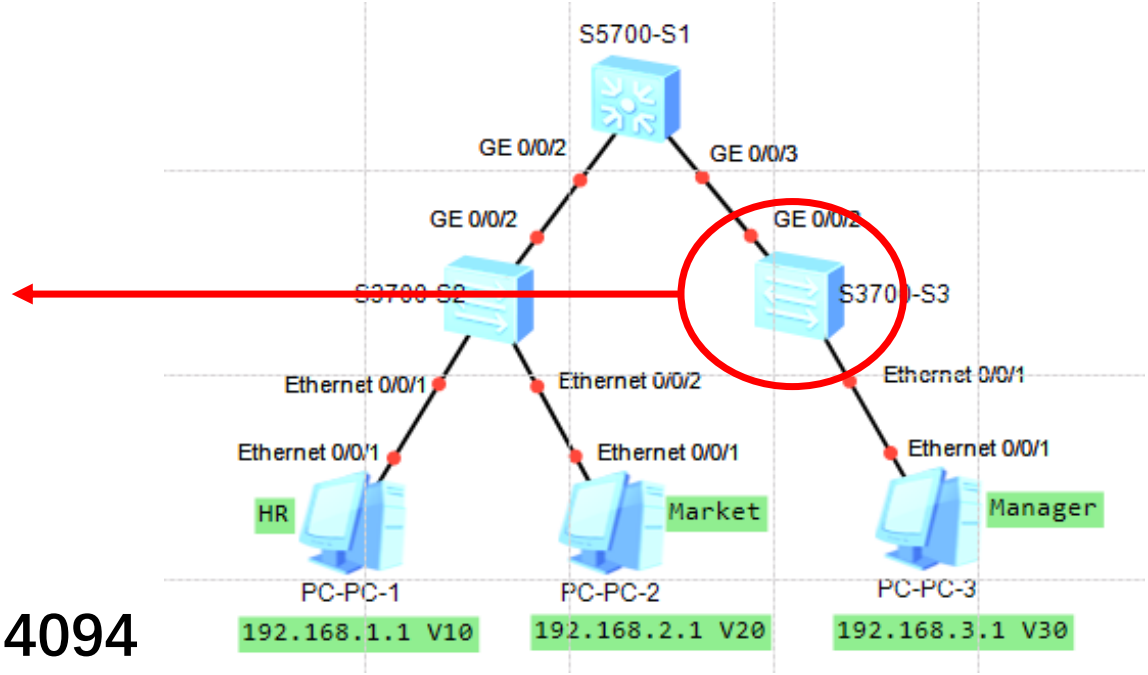
```
S2
vlan batch 10 20
#
interface Ethernet0/0/1
 port link-type access
 port default vlan 10
#
interface Ethernet0/0/2
 port link-type access
 port default vlan 20
interface GigabitEthernet0/0/2
 port link-type trunk
port trunk allow-pass vlan 2 to 4094
```



三层交换机案例

S3

```
vlan batch 30
#
interface Ethernet0/0/1
 port link-type access
 port default vlan 30
#
interface GigabitEthernet0/0/2
 port link-type trunk
port trunk allow-pass vlan 2 to 4094
```



三层交换机案例

S1

```
vlan batch 10 20 30
interface Vlanif10
 ip address 192.168.1.254 255.255.255.0
interface Vlanif20
 ip address 192.168.2.254 255.255.255.0
interface Vlanif30
 ip address 192.168.3.254 255.255.255.0
interface GigabitEthernet0/0/2
 port link-type trunk
 port trunk allow-pass vlan 2 to 4094
interface GigabitEthernet0/0/3
 port link-type trunk
 port trunk allow-pass vlan 2 to 4094
```