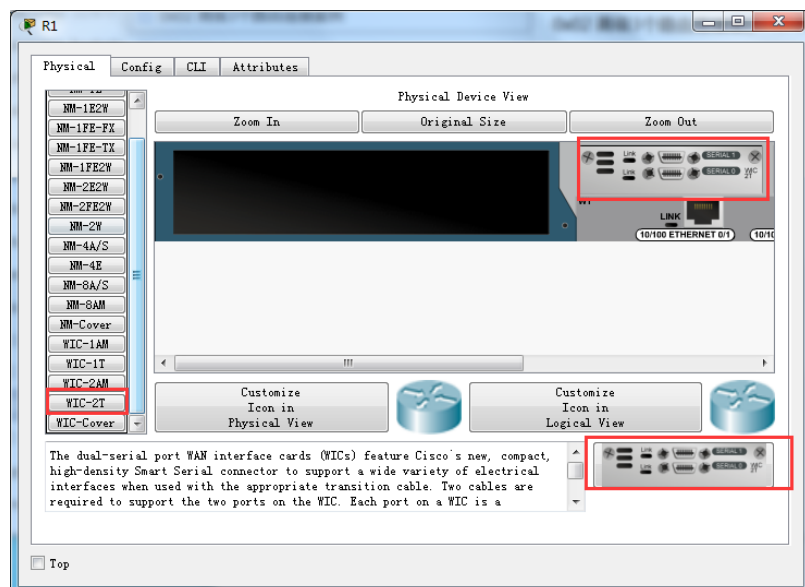


## 实验目的：

对于路由器WIC-2T模块的添加，vlan建立，和vlan之间的通信，路由与路由之间的通信，静态路由表的转发数据。



## 实验环境：

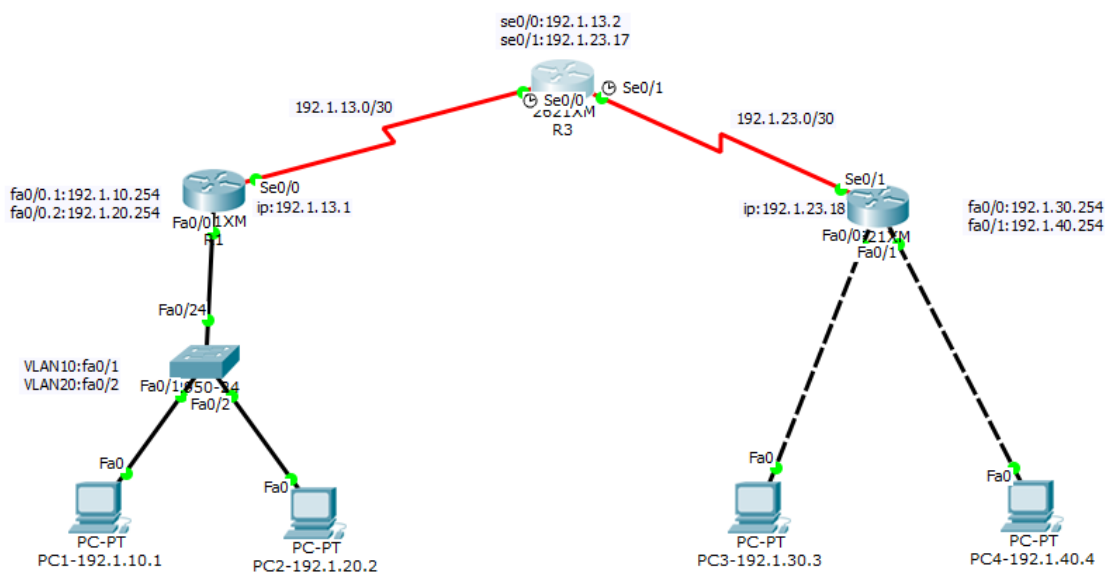
PC1 Vlan10

PC2 Vlan20

R1 : 192.1.13.1

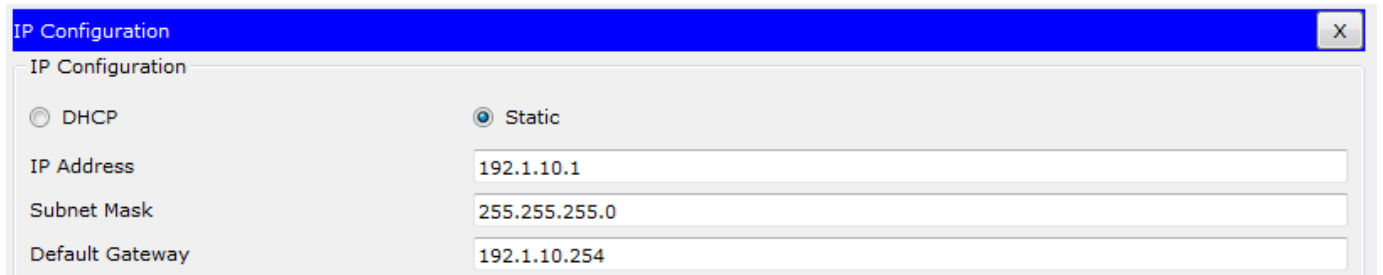
R2 : 192.1.23.2或者 ( 192.1.23.18 )

R3-Se0/0(192.1.13.2)-Se0/1(192.1.23.1)或者 ( 192.1.23.17 )



## 实验步骤：

### 1) 设置所有PC的IP地址：



IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IP Address	192.1.10.1
Subnet Mask	255.255.255.0
Default Gateway	192.1.10.254

### 2) 设置交换机S1的配置，进行VLAN配置和端口的工作模式更改

```
1 Switch(config)#hostname S1
2 S1(config)#vlan 10
3 S1(config)#interface fastEthernet 0/1
4 S1(config-if)#switchport access vlan 10
5 S1(config-if)#exit
6
7 S1(config-if)#vlan 20 //创建 VLAN
8 S1(config)#interface fastEthernet 0/2 //进入端口
9 S1(config-if)#switchport access vlan 20 //将端口加入Vlan
10 S1(config-if)#exit
11
12 S1(config)#interface fastEthernet 0/24
13 S1(config-if)#switchport mode trunk //将链接Router的端口进行trunk工作模式
```

### 3) 对于路由器R1配置子接口，（有vlan）并封装协议，设置serial接口地址

```
1 Router(config)#no ip domain look
2 Router(config)#hostname R1
3
4 R1(config)#interface fastEthernet 0/0.1
5 R1(config-subif)#encapsulation dot1Q 10 //important 封装协议 + vlan号
6 R1(config-subif)#ip address 192.1.10.254 255.255.255.0 //添加上子接口C段的 网
  关地址
7 R1(config-subif)#no shutdown
8 R1(config-subif)#exit
9
10
```

```

11 R1(config)#interface fastEthernet 0/0.2 //进入 fa0/0.2子接口
12 R1(config-subif)#encapsulation dot1Q 20
13 R1(config-subif)#ip address 192.1.20.254 255.255.255.0
14 R1(config-subif)#no shutdown
15
16 R1(config)#interface fastEthernet 0/0
17 R1(config-if)#no shutdown //启动端口
18
19 R1(config)#interface serial 0/0 //进入serial接口
20 R1(config-if)#ip address 192.1.13.1 255.255.255.252 //设置路由serial端口的ip地
    址
21 R1(config-if)#no shutdown
22

```

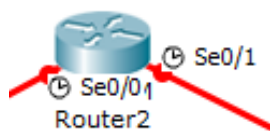
4) 对于路由器R2配置子接口，设置serial接口地址。

```

1 Router(config)#hostname R2
2 R2(config)#no ip domain lookup
3
4 R2(config)#interface fastEthernet 0/0
5 R2(config-if)#ip address 192.1.30.254 255.255.255.0 //PC3的网关地址 + mask
6 R2(config-if)#no shutdown
7
8 R2(config)#interface fastEthernet 0/1
9 R2(config-if)#ip address 192.1.40.254 255.255.255.0 //PC3的网关地址 + mask
10 R2(config-if)#no shutdown
11
12 R2(config)#interface serial 0/1
13 R2(config-if)#ip address 192.1.23.2 255.255.255.252 //本地路由serial接口ip
    地址
14 R2(config-if)#no shutdown

```

5) 设置路由器R3的serial接口，与clock时钟马特率设置



DCE的那一端要设置clock rate.

```

1 Router(config)#no ip domain lookup

```

```

2 Router(config)#hostname R3
3
4 R3(config)#interface serial 0/0
5 R3(config-if)#ip address 192.1.13.2 255.255.255.252
6 R3(config-if)#clock rate 64000 //设置时钟马特率bps,注意只有在SERIAL DCE那一端
  有效.
7 R3(config-if)#no shutdown //启动接口
8 %LINK-5-CHANGED: Interface Serial0/0, changed state to up
9 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to up
10
11 R3(config)#interface serial 0/1
12 R3(config-if)#ip address 192.1.23.1 255.255.255.252
13 R3(config-if)#clock rate 64000 //设置时钟马特率bps,注意只有在SERIAL DCE那一端
  有效.
14 R3(config-if)#no shutdown
15

```

## 6) 设置R1, R2, R3的静态路由表 (包括下一跳:)

```

1 R1(config)#ip route 192.1.30.0 255.255.255.0 192.1.13.2
2 R1(config)#ip route 192.1.40.0 255.255.255.0 192.1.13.2
3 R1#show ip route
4 R1#show ip interface brief

```

```

R1#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    192.1.10.0/24 is directly connected, FastEthernet0/0.1
    192.1.13.0/30 is subnetted, 1 subnets
C      192.1.13.0 is directly connected, Serial0/0
C    192.1.20.0/24 is directly connected, FastEthernet0/0.2
S    192.1.30.0/24 [1/0] via 192.1.13.2
S    192.1.40.0/24 [1/0] via 192.1.13.2

```

```

1 R2(config)#ip route 192.1.10.0 255.255.255.0 192.1.23.1
2 R2(config)#ip route 192.1.20.0 255.255.255.0 192.1.23.1

```

```

R2#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

S    192.1.10.0/24 [1/0] via 192.1.23.17
S    192.1.20.0/24 [1/0] via 192.1.23.17
     192.1.23.0/30 is subnetted, 1 subnets
C     192.1.23.16 is directly connected, Serial0/1
C    192.1.30.0/24 is directly connected, FastEthernet0/0
C    192.1.40.0/24 is directly connected, FastEthernet0/1

```

```

1 R3(config)#ip route 192.1.10.0 255.255.255.0 192.1.13.1
2 R3(config)#ip route 192.1.20.0 255.255.255.0 192.1.13.1
3 R3(config)#ip route 192.1.30.0 255.255.255.0 192.1.23.2
4 R3(config)#ip route 192.1.40.0 255.255.255.0 192.1.23.2
5 R1#show ip interface brief

```

```

Router#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

S    192.1.10.0/24 [1/0] via 192.1.13.1
     192.1.13.0/30 is subnetted, 1 subnets
C     192.1.13.0 is directly connected, Serial0/0
S    192.1.20.0/24 [1/0] via 192.1.13.1
     192.1.23.0/30 is subnetted, 1 subnets
C     192.1.23.16 is directly connected, Serial0/1
S    192.1.30.0/24 [1/0] via 192.1.23.18
S    192.1.40.0/24 [1/0] via 192.1.23.18
Router#

```

```

Router#show ip interface brief

```

Interface	IP-Address	OK?	Method	Status	Protocol
FastEthernet0/0	unassigned	YES	unset	administratively down	down
FastEthernet0/1	unassigned	YES	unset	administratively down	down
Serial0/0	192.1.13.2	YES	manual	up	up
Serial0/1	192.1.23.17	YES	manual	up	up

```

Router#

```

7) 验证结果：

PC1, PING其他的PC2, PC3, PC4都没有问题

```
PC>ping 192.1.20.2 -n 2

Pinging 192.1.20.2 with 32 bytes of data:

Reply from 192.1.20.2: bytes=32 time=8ms TTL=127
Reply from 192.1.20.2: bytes=32 time=0ms TTL=127

Ping statistics for 192.1.20.2:
    Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 8ms, Average = 4ms

PC>ping 192.1.30.3 -n 2

Pinging 192.1.30.3 with 32 bytes of data:

Reply from 192.1.30.3: bytes=32 time=17ms TTL=125
Reply from 192.1.30.3: bytes=32 time=5ms TTL=125

Ping statistics for 192.1.30.3:
    Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 5ms, Maximum = 17ms, Average = 11ms

PC>ping 192.1.40.4 -n 2

Pinging 192.1.40.4 with 32 bytes of data:

Reply from 192.1.40.4: bytes=32 time=2ms TTL=125
Reply from 192.1.40.4: bytes=32 time=3ms TTL=125

Ping statistics for 192.1.40.4:
    Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 3ms, Average = 2ms
```

## Command Prompt

```
PC>ping 192.1.10.1
```

```
Pinging 192.1.10.1 with 32 bytes of data:
```

```
Reply from 192.1.10.1: bytes=32 time=6ms TTL=125
```

```
Reply from 192.1.10.1: bytes=32 time=10ms TTL=125
```

```
Ping statistics for 192.1.10.1:
```

```
Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
Minimum = 6ms, Maximum = 10ms, Average = 8ms
```

```
Control-C
```

```
^C
```

```
PC>ping 192.1.20.2
```

```
Pinging 192.1.20.2 with 32 bytes of data:
```

```
Reply from 192.1.20.2: bytes=32 time=2ms TTL=125
```

```
Reply from 192.1.20.2: bytes=32 time=4ms TTL=125
```

```
Reply from 192.1.20.2: bytes=32 time=2ms TTL=125
```

```
Reply from 192.1.20.2: bytes=32 time=6ms TTL=125
```

```
Ping statistics for 192.1.20.2:
```

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
Minimum = 2ms, Maximum = 6ms, Average = 3ms
```

```
PC>
```