

计算机网络与应用

实验二 基于 PacketTracer 的仿真组网

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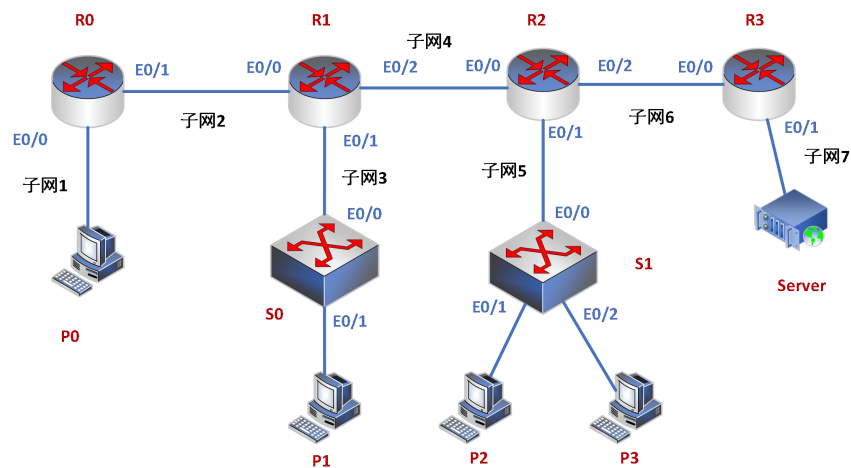
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一、实验目的

1. 学习掌握 PacketTracer 仿真软件的使用方法。
2. 掌握网络设备的选择、连接线（直通线和交叉线）的使用。
3. 掌握主机的配置方法。
4. 掌握路由器的配置方法（端口和静态路由）。

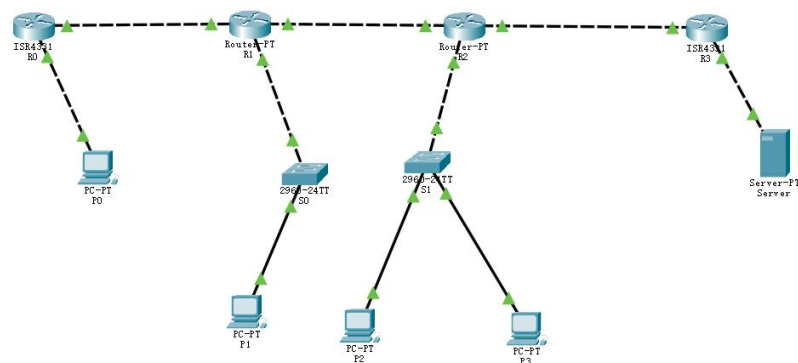
二、实验内容

1. 学习 PacketTracer 基本操作；
2. 根据指定拓扑进行组网，保证网络的连通性。



三、实验过程（含解析）

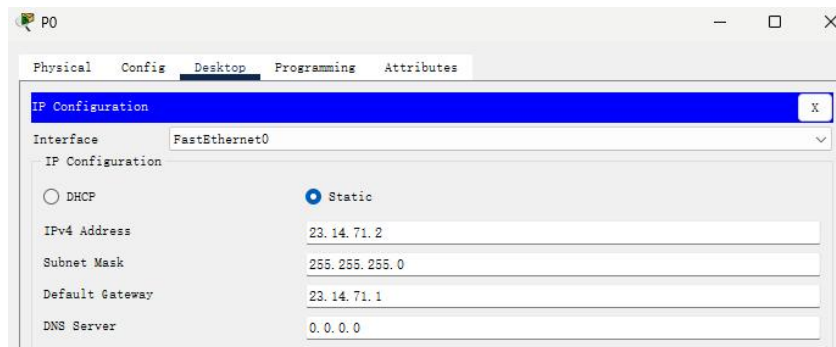
设计图：



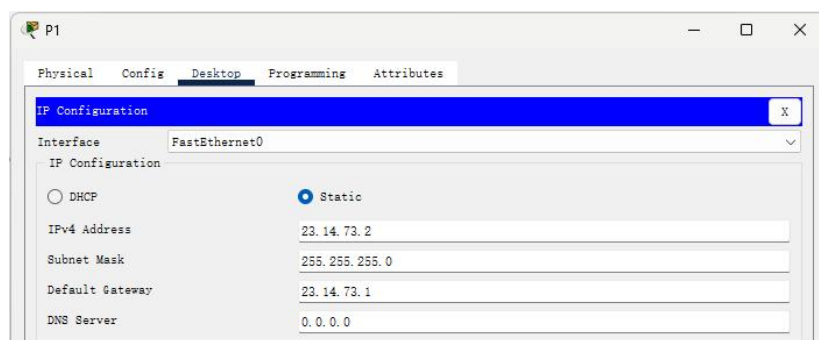
其中，路由器与路由器，路由器与交换机，路由器与主机和服务端之间使用交叉线连接，

交换机与主机之间采用直通线连接。

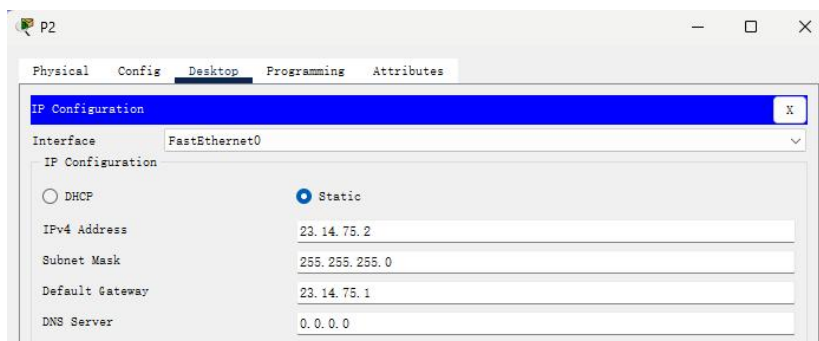
P0 配置:



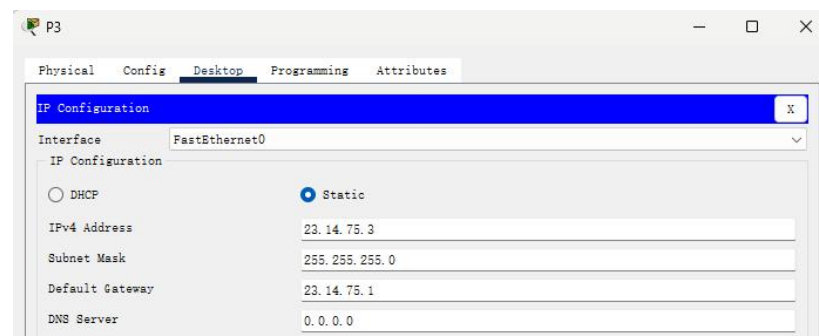
P1 配置:



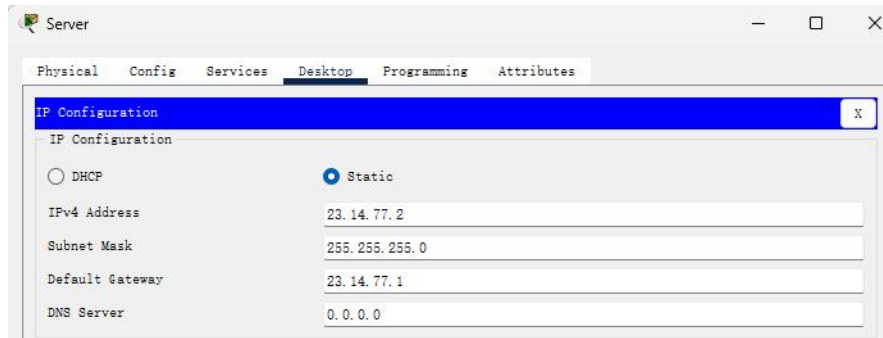
P2 配置:



P3 配置:

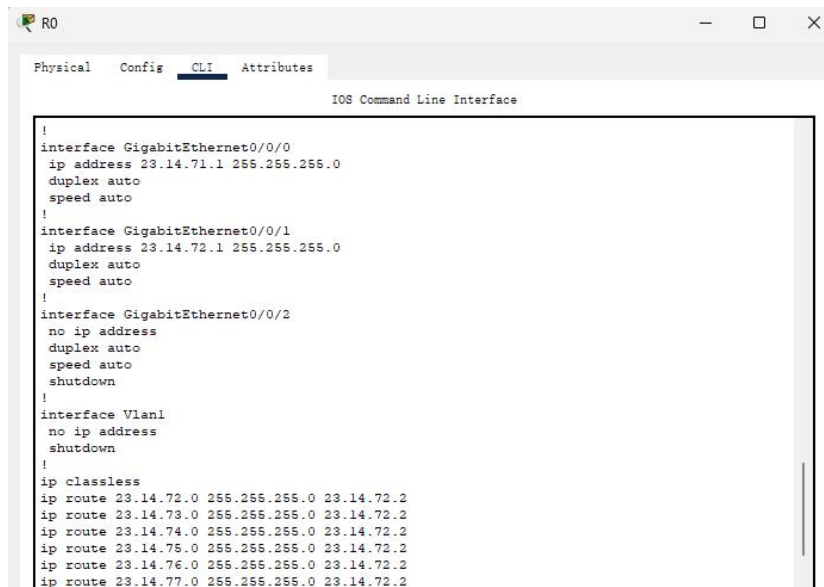


Sever 配置:

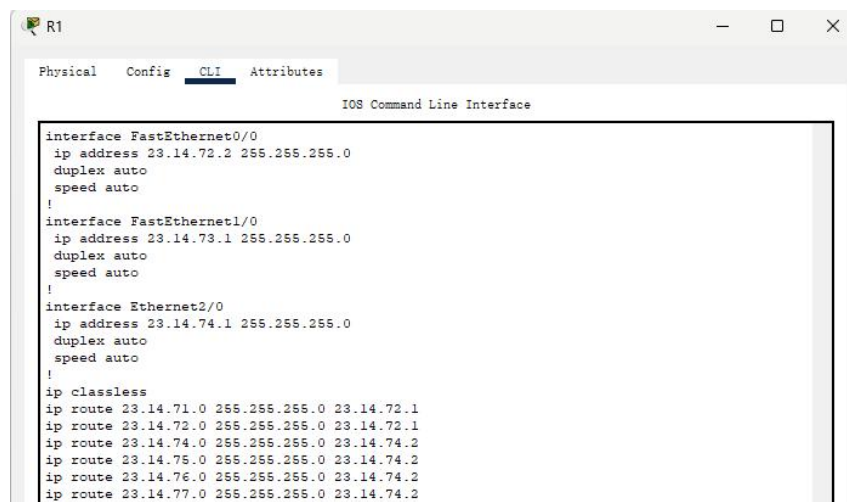


每一台主机/服务器都需要配置接口的 IP 地址，子网掩码以及默认网关。

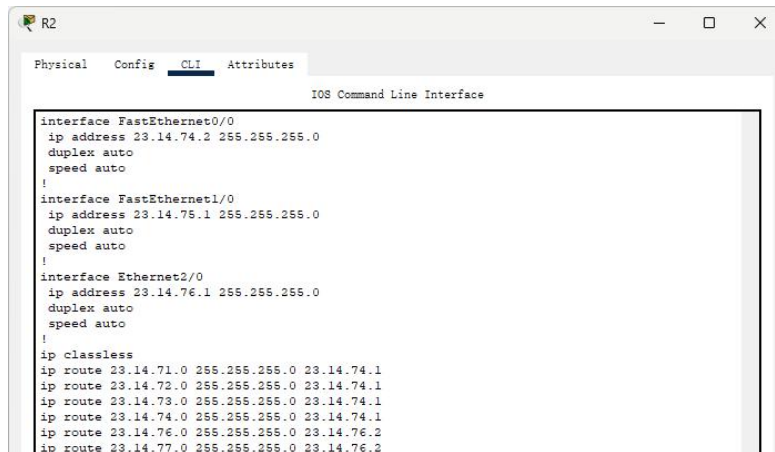
R0 配置:



R1 配置:

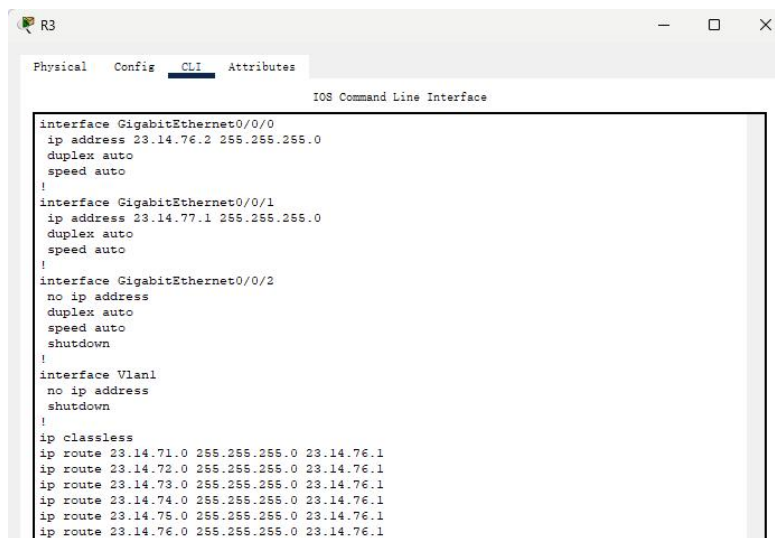


R2 配置:

The screenshot shows the configuration window for router R2. The 'CLI' tab is selected, displaying the 'IOS Command Line Interface'. The configuration includes three interfaces: FastEthernet0/0 with IP 23.14.74.2, FastEthernet1/0 with IP 23.14.75.1, and Ethernet2/0 with IP 23.14.76.1. All interfaces are configured with 'duplex auto' and 'speed auto'. A 'classless' routing table is shown with eight static routes for the 23.14.71.0 through 23.14.77.0 subnets, all pointing to the next hop 23.14.74.1.

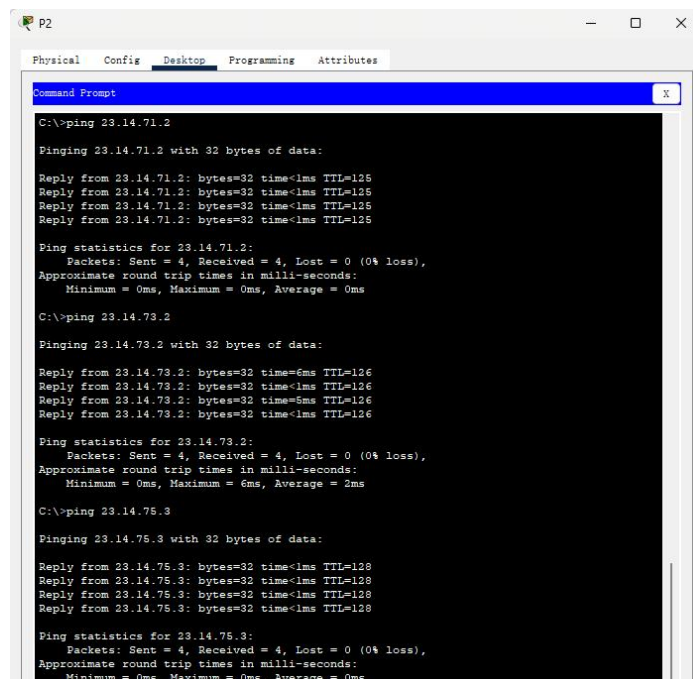
```
interface FastEthernet0/0
ip address 23.14.74.2 255.255.255.0
duplex auto
speed auto
!
interface FastEthernet1/0
ip address 23.14.75.1 255.255.255.0
duplex auto
speed auto
!
interface Ethernet2/0
ip address 23.14.76.1 255.255.255.0
duplex auto
speed auto
!
ip classless
ip route 23.14.71.0 255.255.255.0 23.14.74.1
ip route 23.14.72.0 255.255.255.0 23.14.74.1
ip route 23.14.73.0 255.255.255.0 23.14.74.1
ip route 23.14.74.0 255.255.255.0 23.14.74.1
ip route 23.14.76.0 255.255.255.0 23.14.76.2
ip route 23.14.77.0 255.255.255.0 23.14.76.2
```

R3 配置:

The screenshot shows the configuration window for router R3. The 'CLI' tab is selected, displaying the 'IOS Command Line Interface'. The configuration includes three GigabitEthernet interfaces: GigabitEthernet0/0/0 with IP 23.14.76.2, GigabitEthernet0/0/1 with IP 23.14.77.1, and GigabitEthernet0/0/2 which is unconfigured. A 'classless' routing table is shown with eight static routes for the 23.14.71.0 through 23.14.76.0 subnets, all pointing to the next hop 23.14.76.1.

```
interface GigabitEthernet0/0/0
ip address 23.14.76.2 255.255.255.0
duplex auto
speed auto
!
interface GigabitEthernet0/0/1
ip address 23.14.77.1 255.255.255.0
duplex auto
speed auto
!
interface GigabitEthernet0/0/2
no ip address
duplex auto
speed auto
shutdown
!
interface Vlan1
no ip address
shutdown
!
ip classless
ip route 23.14.71.0 255.255.255.0 23.14.76.1
ip route 23.14.72.0 255.255.255.0 23.14.76.1
ip route 23.14.73.0 255.255.255.0 23.14.76.1
ip route 23.14.74.0 255.255.255.0 23.14.76.1
ip route 23.14.75.0 255.255.255.0 23.14.76.1
ip route 23.14.76.0 255.255.255.0 23.14.76.1
```

每一台路由器需要配置每个端口的 IP 地址，子网掩码，以及路由器的路由表。
连通性测试:

The screenshot shows a Windows command prompt window on a PC named P2. The user has performed three ping tests: to 23.14.71.2, 23.14.73.2, and 23.14.75.3. Each test shows four successful replies with 0% loss and round trip times of approximately 1ms, 6ms, and 1ms respectively.

```
C:\>ping 23.14.71.2

Pinging 23.14.71.2 with 32 bytes of data:

Reply from 23.14.71.2: bytes=32 time<1ms TTL=125
Reply from 23.14.71.2: bytes=32 time<1ms TTL=125
Reply from 23.14.71.2: bytes=32 time<1ms TTL=125
Reply from 23.14.71.2: bytes=32 time<1ms TTL=125

Ping statistics for 23.14.71.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 23.14.73.2

Pinging 23.14.73.2 with 32 bytes of data:

Reply from 23.14.73.2: bytes=32 time=6ms TTL=126
Reply from 23.14.73.2: bytes=32 time<1ms TTL=126
Reply from 23.14.73.2: bytes=32 time=5ms TTL=126
Reply from 23.14.73.2: bytes=32 time<1ms TTL=126

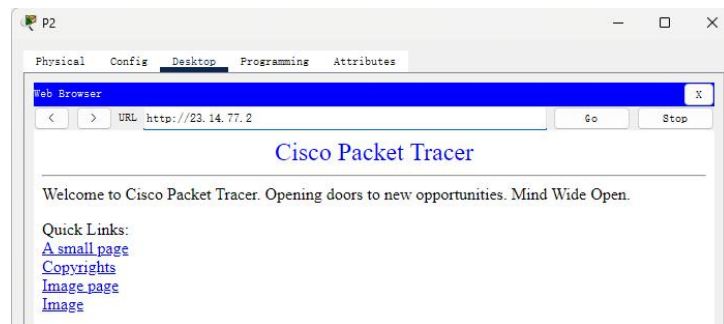
Ping statistics for 23.14.73.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 6ms, Average = 3ms

C:\>ping 23.14.75.3

Pinging 23.14.75.3 with 32 bytes of data:

Reply from 23.14.75.3: bytes=32 time<1ms TTL=128
Reply from 23.14.75.3: bytes=32 time<1ms TTL=128
Reply from 23.14.75.3: bytes=32 time<1ms TTL=128
Reply from 23.14.75.3: bytes=32 time<1ms TTL=128

Ping statistics for 23.14.75.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```



此处以 P2 为例，其他主机类似。使用 ping 指令获取数据包，可见 P2 与 P0,P1,P3 都是联通的。使用浏览器访问 Sever，成功访问到页面，P2 与 Sever 也是联通的。

四、实验总结

本次实验过程非常顺利，让我通过实际操作明白了链路层和网络层的通讯过程，学会了如何组织网络，配置 IP 地址,路由表等等。