计算机网络实验报告

课程名称：   计算机网络

实验名称：   课程实验 2

学　　号：   71118415

姓　　名：   叶宏庭

成文日期：   2020 年 5 月 8 日

1 实验目的及目标

了解网络基本概念，基于路由器的网络互连，掌握构建网络的设施(终端，交换机，路由器，介质等)，学会仿真网络配置软件(Packet Tracer)的使用，在仿真环境下配置网络互连实例。

2 实验过程

① **复习基于路由器的网络互连相关知识；**

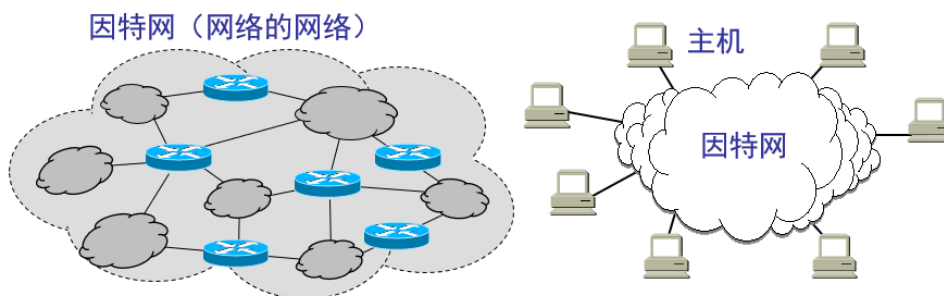**1、网络基本概念**

因特网：基于路由器的网络互连实例，由路由器+用户端设备（包括主机）构成的网络：

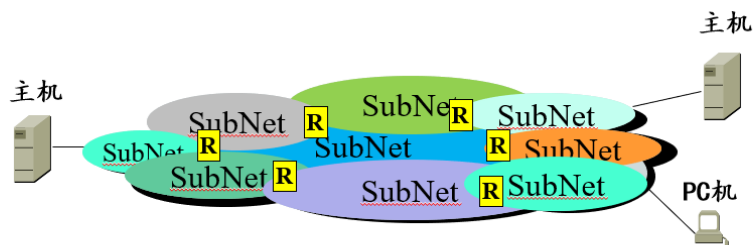路由器：互连子网络（基于子网掩码的网络地址）；

用户端设备：通过交换机接入子网，辅助用户访问（或者提供）因特网的各种资源。

用户端接入因特网的必要条件：网络接口（转发服务）、统一软件（TCP/IP协议集）、全网的唯一标识（IP地址）；
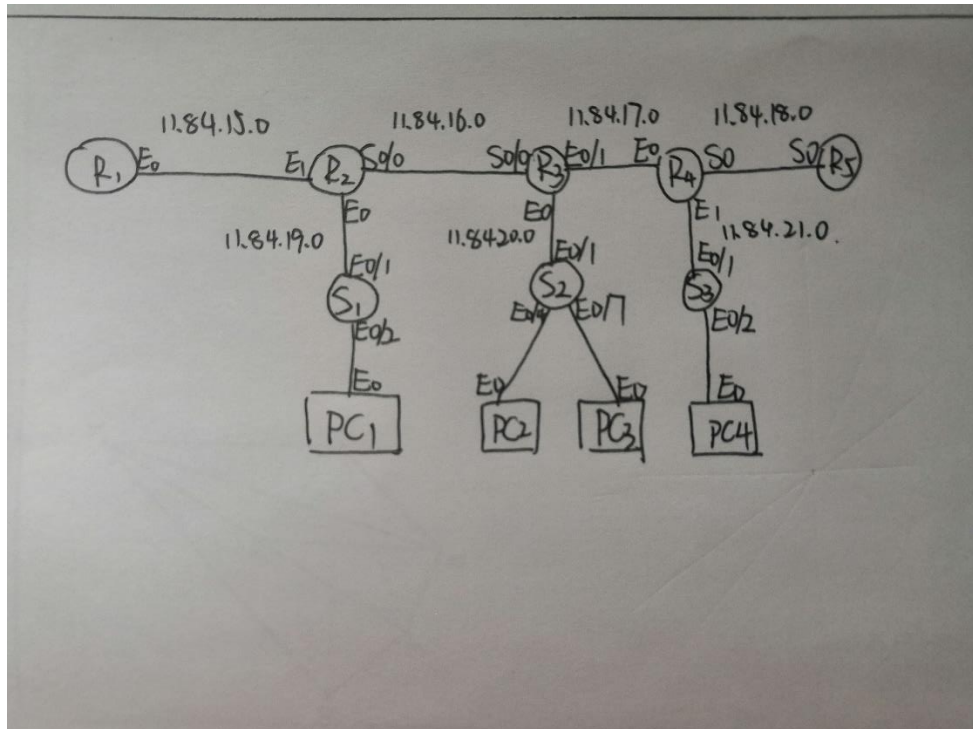

② **复习构建网络的设施，了解每个设施的作用；**

构建网络的设施：
1、终端T：PC和主机(含网卡)，辅助用户使用网络；
2、交换机S：连接终端，构建物理网络（以太网）；连接路由器，网络互连；
3、路由器R：互连不同的网络（子网）；通过路由表寻找目的主机；
4、介质：连接网络设施。

③ **下载并熟悉仿真软件的使用；**
④ **在草稿纸上设计好网络配置；**

子网信息表

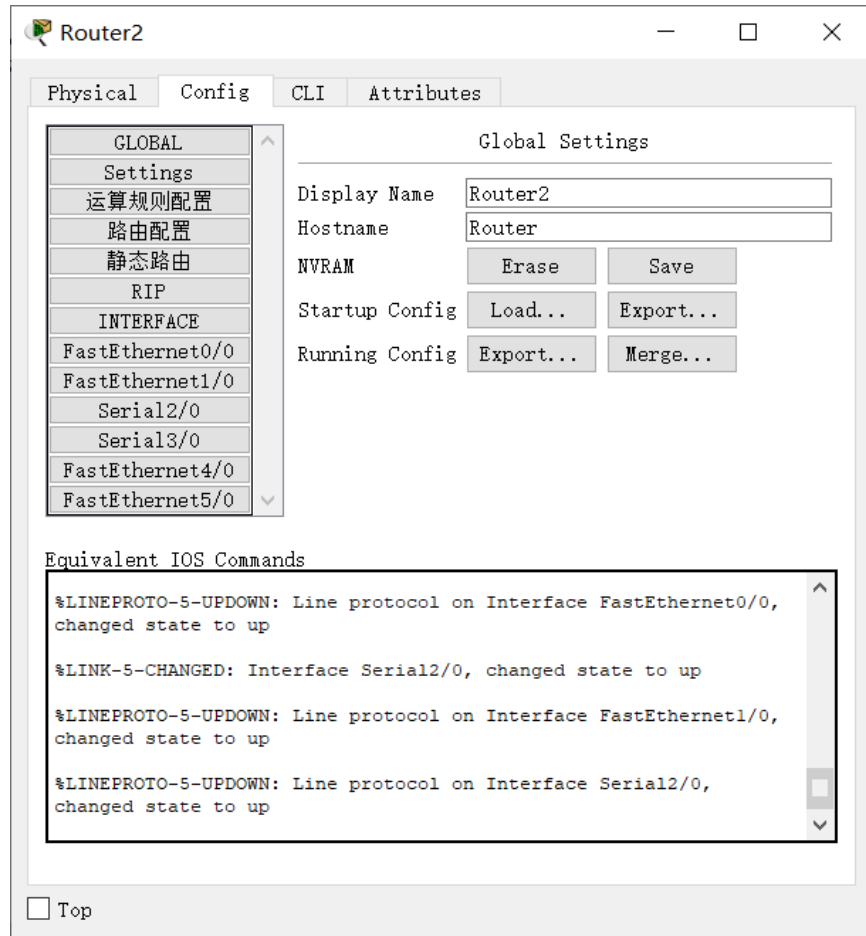| 子网名称	子网地址	连接设备
子网 1	11.84.15.0	R1—R2
子网 2	11.84.16.0	R2—R3
子网 3	11.84.17.0	R3—R4
子网 4	11.84.18.0	R4—R5
子网 5	11.84.19.0	R2—S1
子网 6	11.84.20.0	R3—S2
子网 7	11.84.21.0	R4—S3

⑤ 设计网络拓扑图；
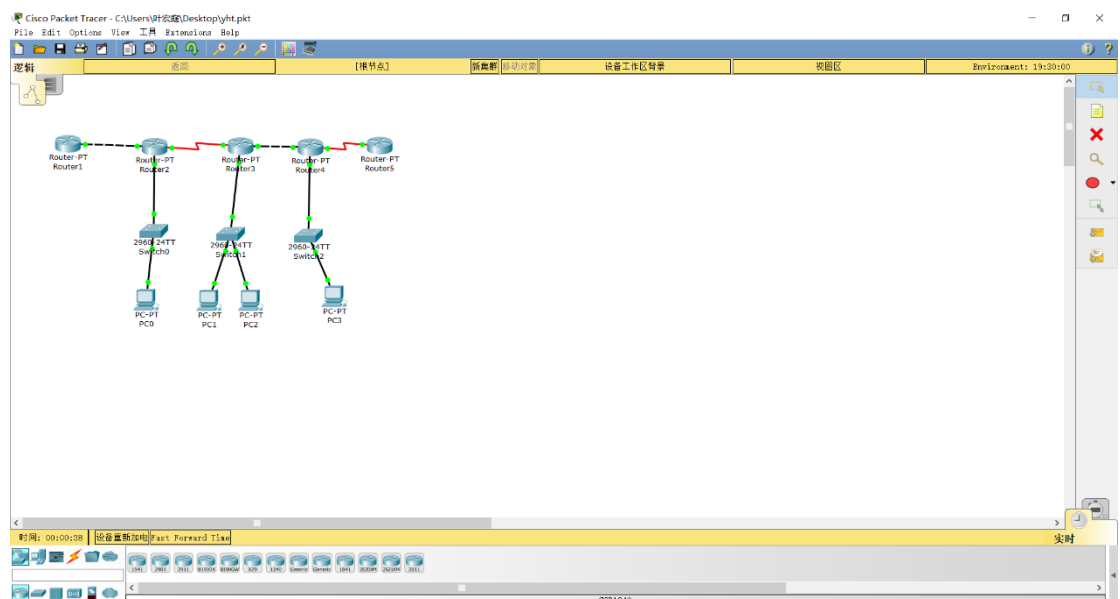
在下方工具栏，拖动设备到设计界面即可。

⑥ **为每个网络设施配置网络参数；**

为路由器配置静态路由表，每个端口配置 IP 地址

为 PC 配置 IP 地址，子网掩码，默认网关(Gateway)
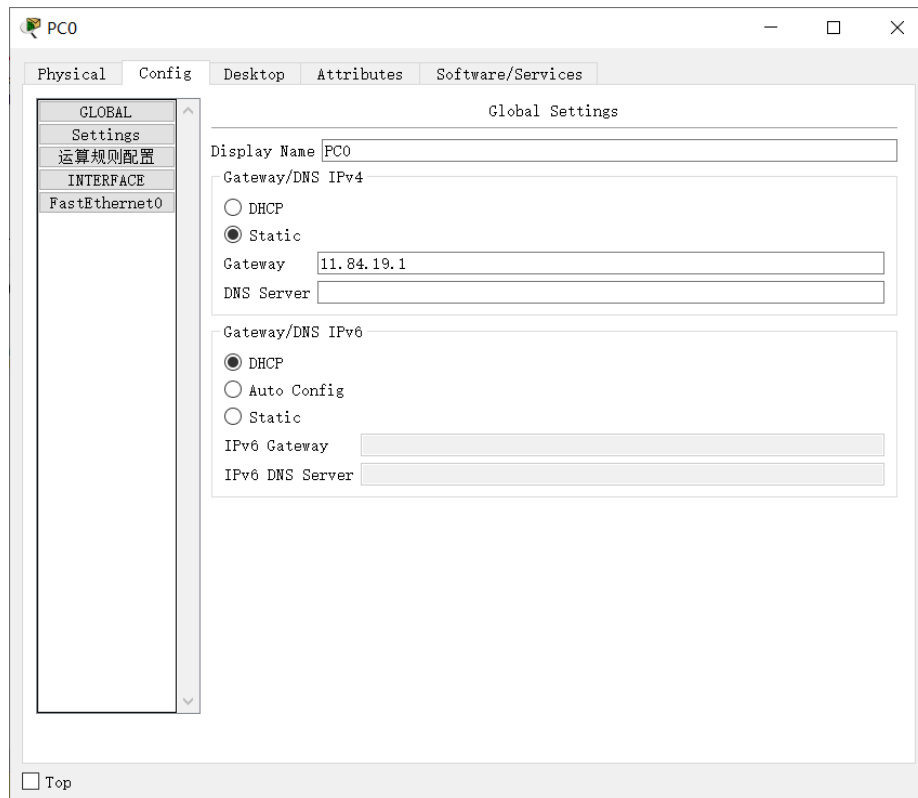
路由表网络参数配置表

设备	端口	IP 地址
R1	E0	11.84.15.1
R2	E1	11.84.15.2
R2	S0	11.84.16.1
R2	E0	11.84.19.1
R3	S0	11.84.16.2
R3	E0/1	11.84.17.1
R3	E0	11.84.20.1
R4	E0	11.84.17.2
R4	S0	11.84.18.1
R4	E1	11.84.21.1
R5	S0	11.84.18.2

PC 网络参数配置表

设备	IP 地址	默认网关
PC1	11.84.19.2	11.84.19.1
PC2	11.84.20.2	11.84.20.1
PC3	11.84.20.3	11.84.20.1
PC4	11.84.21.2	11.84.21.1

3 实验结果

① 软件下载地址：

https://www.packettracernetwork.com/

② 网络拓扑结构图：
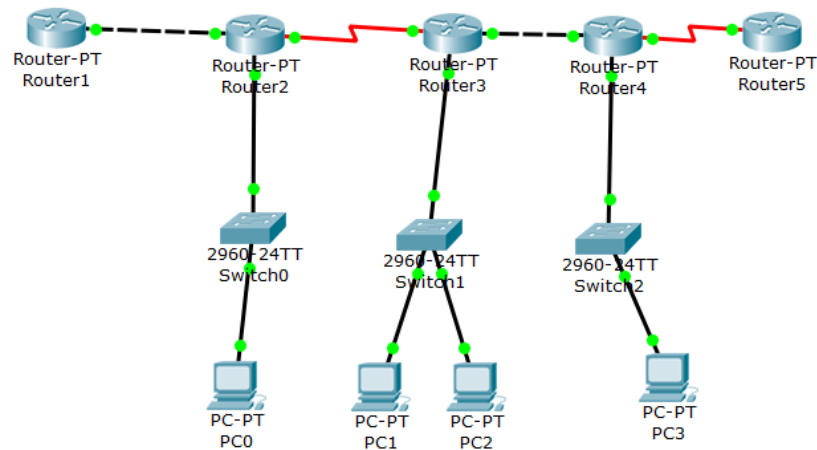
③ 路由器网络参数:
    路由器网络参数见附表。
④ 连通性测试结果：
    源地址：11.84.15.1（路由器）　　宿地址：11.84.19.1（路由器）

```
Router>enable
Router#ping 11.84.19.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 11.84.19.1, timeout is
2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max
= 0/0/1 ms

Router#
```

    源地址：11.84.19.2（PC）　　宿地址：11.84.20.3（PC）

```
C:\>ping 11.84.20.3

Pinging 11.84.20.3 with 32 bytes of data:

Request timed out.
Reply from 11.84.20.3: bytes=32 time=1ms TTL=126
Reply from 11.84.20.3: bytes=32 time=14ms TTL=126
Reply from 11.84.20.3: bytes=32 time=1ms TTL=126

Ping statistics for 11.84.20.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 14ms, Average = 5ms
```

    源地址：11.84.19.2（PC）　　宿地址：11.84.17.1（路由器）

```
C:\>ping 11.84.17.1

Pinging 11.84.17.1 with 32 bytes of data:

Reply from 11.84.17.1: bytes=32 time=1ms TTL=254
Reply from 11.84.17.1: bytes=32 time=1ms TTL=254
Reply from 11.84.17.1: bytes=32 time=1ms TTL=254
Reply from 11.84.17.1: bytes=32 time=1ms TTL=254

Ping statistics for 11.84.17.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

4 实验小结

通过本次实验，复习了基于路由器的网络互连、构建网络的基本设施，了解并掌握了仿真软件 Cisco Packet Tracer 的使用，掌握了 IP 地址配置，静态路由配置等相关内容。在此基础上，后续可进行动态路由实验。

附表

路由器参数表

R1

```
Router#show run
Building configuration...

Current configuration : 1028 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
interface FastEthernet0/0
 ip address 11.84.15.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet1/0
 no ip address
 duplex auto
 speed auto
!
interface Serial2/0
 no ip address
```

```
interface Serial2/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial3/0
 no ip address
 clock rate 2000000
 shutdown
!
interface FastEthernet4/0
 no ip address
 shutdown
!
interface FastEthernet5/0
 no ip address
 shutdown
!
router rip
!
ip classless
ip route 11.84.16.0 255.255.255.0 11.84.15.2
ip route 11.84.17.0 255.255.255.0 11.84.15.2
ip route 11.84.18.0 255.255.255.0 11.84.15.2
ip route 11.84.19.0 255.255.255.0 11.84.15.2
ip route 11.84.20.0 255.255.255.0 11.84.15.2
ip route 11.84.21.0 255.255.255.0 11.84.15.2
!
ip flow-export version 9
!
!
!
no cdp run
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end

Router#
```

```
Router#show run
Building configuration...

Current configuration : 970 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
interface FastEthernet0/0
 ip address 11.84.19.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet1/0
 ip address 11.84.15.2 255.255.255.0
 duplex auto
 speed auto
!
interface Serial2/0
 ip address 11.84.16.1 255.255.255.0
```

```
interface Serial2/0
 ip address 11.84.16.1 255.255.255.0
 clock rate 2000000
!
interface Serial3/0
 no ip address
 clock rate 2000000
 shutdown
!
interface FastEthernet4/0
 no ip address
 shutdown
!
interface FastEthernet5/0
 no ip address
 shutdown
!
router rip
!
ip classless
ip route 11.84.17.0 255.255.255.0 11.84.16.2
ip route 11.84.18.0 255.255.255.0 11.84.16.2
ip route 11.84.20.0 255.255.255.0 11.84.16.2
ip route 11.84.21.0 255.255.255.0 11.84.16.2
!
ip flow-export version 9
!
!
!
no cdp run
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end

Router#
```

```
Router#show run
Building configuration...

Current configuration : 937 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
interface FastEthernet0/0
 ip address 11.84.20.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet1/0
 ip address 11.84.17.1 255.255.255.0
 duplex auto
 speed auto
!
interface Serial2/0
 ip address 11.84.16.2 255.255.255.0
```

```
interface Serial2/0
 ip address 11.84.16.2 255.255.255.0
!
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 11.84.15.0 255.255.255.0 11.84.16.1
ip route 11.84.18.0 255.255.255.0 11.84.17.2
ip route 11.84.19.0 255.255.255.0 11.84.16.1
ip route 11.84.21.0 255.255.255.0 11.84.17.2
!
ip flow-export version 9
!
!
!
no cdp run
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end

Router#
```

```
Router#show run
Building configuration...

Current configuration : 957 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
interface FastEthernet0/0
 ip address 11.84.17.2 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet1/0
 ip address 11.84.21.1 255.255.255.0
 duplex auto
 speed auto
!
interface Serial2/0
 ip address 11.84.18.1 255.255.255.0
```

```
interface Serial2/0
 ip address 11.84.18.1 255.255.255.0
 clock rate 2000000
!
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 11.84.15.0 255.255.255.0 11.84.17.1
ip route 11.84.16.0 255.255.255.0 11.84.17.1
ip route 11.84.19.0 255.255.255.0 11.84.17.1
ip route 11.84.20.0 255.255.255.0 11.84.17.1
!
ip flow-export version 9
!
!
!
no cdp run
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end
```

```
Router#show run
Building configuration...

Current configuration : 985 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime mse
no service password-encryption
!
hostname Router
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
interface FastEthernet0/0
 no ip address
 duplex auto
 speed auto
!
interface FastEthernet1/0
 no ip address
 duplex auto
 speed auto
!
interface Serial2/0
 ip address 11.84.18.2 255.255.255.0
```

```
interface Serial2/0
 ip address 11.84.18.2 255.255.255.0
!
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 11.84.15.0 255.255.255.0 11.84.18.1
ip route 11.84.16.0 255.255.255.0 11.84.18.1
ip route 11.84.17.0 255.255.255.0 11.84.18.1
ip route 11.84.19.0 255.255.255.0 11.84.18.1
ip route 11.84.20.0 255.255.255.0 11.84.18.1
ip route 11.84.21.0 255.255.255.0 11.84.18.1
!
ip flow-export version 9
!
!
!
no cdp run
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end
```