

院 系 数据科学与计算机学院

学号

___18340215__ 姓名 _张天祎__

班级 18

【实验题目】静态路由实验

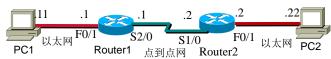
【实验目的】掌握静态路由的配置和使用方法。

【实验拓扑】

192.168.1.0/24

192.168.2.0/24

192.168.3.0/24



【实验命令】

■ 查看接口状态

#show interface

#show ip interface brief

#show ip interface f0/1

■ 配置 IP 地址和子网掩码

(config)#interface serial 1/2

!进行接口模式

(config-if)#ip address 192.168.1.11 255.255.255.0 !配置接口的 IP 地址和子网掩码

■ 配置串口时钟和带宽

(config-if)#clock rate 64000

!配置时钟频率 64000 (在 DCE 上配置, DTE 不用配置)

(config-if)#bandwidth 512

!配置端口的带宽速率为 512KB

■ 配置静态路由

(config)#ip route network net-mask next-hop ! next-hop 可以为转发的串行接口名或下一跳的 IP 地址

例: ip route 192.168.3.0 255.255.255.0 192.168.2.2

ip route 192.168.3.0 255.255.255.0 S2/0

■ 显示路由表

#show ip route

■ 配置静态路由参数

(config)#ip route network net-mask next-hop [distance] [weight number] [disable|enable]

! distance 设置管理距离 (默认为1), weight 为权重。

!将 distance 设置为一个大的值(例如, 125。这大于 OSPF 的 110)可以作为备份路由。

■ 配置默认路由

(config)# ip route 0.0.0.0 0.0.0.0 next-hop

例: ip route 0.0.0.0 0.0.0.0 192.168.2.1

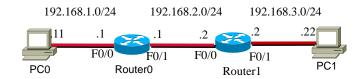
【实验说明】

- ■配置前先重启路由器#reload
- ■参与 ping 的主机要删除校园网网关。
- ■注意关闭 Windows 的防火墙









由于实际上所用的接口名不一定是上面标明的,先用#show ip interface brief 查看接口名,并根据实际接 线修改上图的接口和 IP 地址标记。

配置好 PC 机的 IP 地址、子网掩码和默认网关,按下面步骤依次进行配置和测试(注意保存一些步骤的 pkt):

(1) (static1.pkt)配置 Router0 和 Router1 的 IP 地址和子网掩码 (见上面"实验命令")。

[1a. 显示 Router0 的路由表并截屏]

Router#sh ip rou

Gateway of last resort is not set

```
Router#sh ip rou

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - SIGRP, EX - SIGRP enternal, O - OSPF, IA - OSPF inter area
NI - OSPF NSSA external type 1, N2 - OSPF HSSA external type 2
SI - OSPF external type 1, E2 - OSPF external type 2
SI - SISTS, LI - IS-IS level-1, LZ - IS-IS level-2, ia - IS-IS inter area
' - candidate default, U - per-user static route, O - ODR
P - periodic downloaded static route

Cateway of last resort is not set

C 192.169.1.0/24 is directly connected, FastEthernetO/0

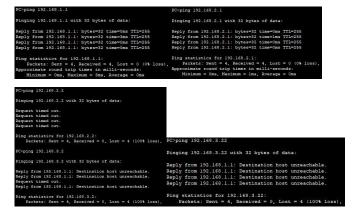
C 192.169.2.0/24 is directly connected, FastEthernetO/1

[1b. 显示 Router1 的路由表并截屏]

Router#sh ip rou

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - SIGRP, EX - SIGRP external, O - OSPF, IA - OSPF inter area
NI - OSPF NSSA external type 1, N2 - OSPF MSSA external type 2
SI - OSPF external type 1, N2 - OSPF external type 2, E - EGP
1 - IS-IS, LI - IS-IS level-1, LZ - IS-IS level-2, ia - IS-IS inter area
' - candidate default, U - per-user static route, O - ODR
P - periodic downloaded static route
```

[1c. PCO 依次 ping 到 PC1 路径上的所有 IP 地址, 并截屏]



[1d. 指出 ping 不通的 IP 地址是在哪里出问题的(可以查看仿真的结果)并进行分析]

Router0 路由表为空,除 Router0 上的端口外,其他地方均无法 ping 到。其中 192. 168. 2. 2 是可以接触到的,但因为确认包在 Router1 上没有路由表,无法发到 PCO,而 192. 168. 3. 0/24 是不能接触到的子网,所以 ping 失败返回了不同的信息。

(2) (static2.pkt)在 Router1 上配置 192.168.1.0/24 的静态路由指向 Router0。

[2a. 显示 Router1 的路由表并截屏]

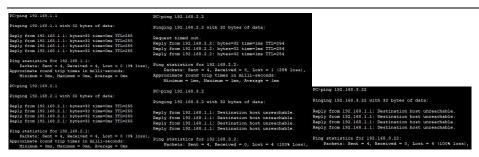
```
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
NI - OSPF NSSA external type 1, N2 - OSPF MSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-1, ia - IS-IS level-3, 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

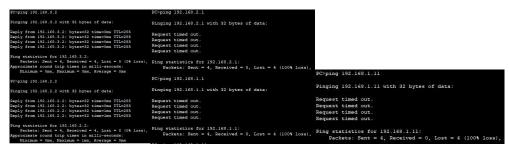
S 192.168.1.0/24 [1/0] via 192.168.2.1
C 192.168.2.0/24 is directly connected, FastEthernet0/0
L 192.168.3.0/24 is directly connected, FastEthernet0/1
```

[2b. PCO 依次 ping 到 PC1 路径上的所有 IP 地址, 并截屏]





[2c. 指出上面 ping 不通的 IP 地址是在哪里出问题的(可以查看仿真的结果)并进行分析]
Router1 中无 192. 168. 3. 0 的路由表, 192. 168. 3. 0/24 子网无法到达。即包卡在了 Router1。
[2d. PC1 依次 ping 到 PC0 路径上的所有 IP 地址,并截屏]



[2e. 指出上面 ping 不通的 IP 地址是在哪里出问题的(可以查看仿真的结果)并进行分析] 只有 192. 168. 1. 0/24ping 不通,但实际上包是到达了的,只是确认包在经过 Router0 时,没有路由表, 无法返回。

(3) (static3. pkt)在 Router0 上配置静态路由 192. 168. 3. 0/24 的静态路由指向 Router1。 [3a. 显示 Router0 的路由表并截屏]

```
Router#sh ip rou

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

M1 - OSPF INSA external type 1, E2 - OSPF MSEA external type 2

E1 - OSPF OSPF external type 1, E2 - OSPF WISEA external type 2

i - ISP 15: Li - IS-IS level-1, La - IS-IS level-1, 1a - IS-IS

- candidate default, U - per-uner static route, O - ODR

P - periodic downloaded static route

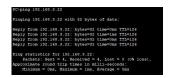
Gateway of last resort is not set

C 192.189,1.0/24 is directly connected, FastEthernet0/0

C 193.180,2.0/24 is directly connected, FastEthernet0/1

S 193.180,3.0/24 [i/O via 193.180.2.2]
```

[3b.PCO ping PC1, 并截屏]



(4) (static4.pkt)如果在路由器 Router0 和 Router1 只配置默认路由指向对方(要先删除原静态路由)。 [4a.PC0 ping PC1,并截屏]

```
PC:pling 192.168.3.22 with 32 bytes of data:

Panging 192.168.3.22 with 32 bytes-03 time-Dms TTI-116

Reply from 192.168.3.22: bytes-03 time-Dms TTI-116

Reply from 192.168.3.21: bytes-03 time-Dms TTI-126

Reply from 192.168.3.21: bytes-03 time-Dms TTI-126

Pang statistics for 192.168.3.22:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate round trip times in mill-seconds:

Minimar Oss, Maximar lms, Average - Oms
```

[4b. 显示 Router0 的路由表并截屏]

```
Routerish is rou

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP

D - RIGRP, EX - RIGRP enternal, O - OSEP, IA - OSEP finet area

NI - OSEP MSA external type 1, N2 - OSEP RSA external type 2

El - OSEP external type 1, N2 - OSEP RSA external type 2, E - RGP

i 158-15, ll - 157 is level-1, l2 - 158-15 level-2, is - 157-15 inter area

* candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is 192.168.2.2 to network 0.0.0.0

C 192.169.1.0/24 is directly connected, FastEthernet0/0

C 192.169.2.0/24 is directly connected, FastEthernet0/1

S 0.0.0.0/0 (1/d) via 192.168.2.2
```

[4c. 显示 Router1 的路由表并截屏]



```
fsh ip rou
C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EK - EIGRP external, O - GSFF, IA - GSFF inter area
N1 - GSFF NSSA external type 1, N3 - GSFF NSSA external type 2
E1 - GSFF external type 1, E2 - GSFF external type 2
E1 - GSFF external type 1, E2 - GSFF external type 2
E - GSFF external type 1, E2 - GSFF external type 2, E - EGF
i - IS-IS, Li - IS-IS level-1, L3 - 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 192.168.2.1 to network 0.0.0.0
C 192.168.2.0/24 is directly connected, FastEthernet0/0 C 192.168.3.0/24 is directly connected, FastEthernet0/1 S* 0.0.0.0/0 [1/0] via 192.168.2.1
```

[4d. 分析结果]

所有包都会发给另一个路由器, 所以 ping 通了。

(5) 在上个步骤及基础上,用 PCO ping 一个不属于实验中的任何子网的 IP 地址,

[5a. 截屏结果]

```
statistics for 192.168.4.0:
sckets: Sent = 4, Received = 0, Lost
```

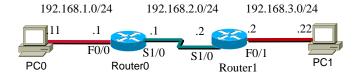
[5b. 启动仿真画面显示结果截屏]



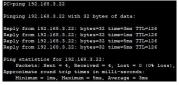
[5c. 分析结果]

该包会在两个路由器之间不停的传,而 PCO 则会超时。

(6) (static6.pkt)按下图设计网络,配置 Router0 和 Router1 串行口的时钟、IP 地址和子网掩码,采用 接口名作为下一跳配置静态路由(只有串行接口才可以这样做),令 PCO 可以 ping 通 PC1。



[6a.用 PCO ping PC1 并截屏]



[6b. 显示 Router0 的路由表并截屏]

```
right ip rou

1: C - connected, S - static, I - IGSP, R - RIF, M - mobile, B - BGP

D - EIGSP, EK - EIGSP external, O - OSFF, IA - OSFF inter area

NI - OSFF NSSA external type 1, N2 - OSFF NSSA external type 2

El - OSFF osternal type 1, 2 - OSFF osternal type 2 = E - OSFF osternal type 2 = E - OSFF osternal type 3, E - EGGP

1 - IS-IS, LI - IS-IS level-1, LZ - IS-IS level-2, ia - IS-IS inter area

P - periodic downloaded static route
                way of last resort is not set
               192.168.1.0/24 is directly connected, FastEthernet0/0 192.168.2.0/24 is directly connected, Serial0/1/0 192.168.3.0/24 is directly connected, Serial0/1/0
                       [6c. 显示 Router1 的路由表并截屏]
                   rfsh ip rou

: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP entermal, O - OGFP, IA - OGFP inter area

EX - OGFP entermal type 1, EX - OGFP entermal type 2, E - EGP

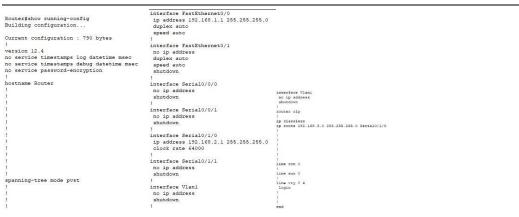
EX - OGFF entermal type 1, EX - OGFP entermal type 2, E - EGP

- candidate default, U - per-user static route, O - OGR

- periodic downloaded static route
S 192.168.1.0/24 is directly connected, Serial0/1/0
C 192.168.2.0/24 is directly connected, Serial0/1/0
C 192.168.3.0/24 is directly connected, FastEthernet0/1
```

[6d. 用#show running-config 显示 Router0 的当前配置并截屏]





[6e. 用#show running-config 显示 Routerl 的当前配置并截屏]

```
interface FastEthernet0/0
no ip address
duplex auto
speed auto
shutdown
  Router#sh run
Building configuration...
  Current configuration : 759 bytes
Two results of timestamps log datetime msec no service timestamps debug datetime msec no service password-encryption the servi
                                                                                                                                                                                                                                                                                                     !
interface Serial0/0/0
no ip address
shutdown
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ip classless
ip route 192.168.1.0 255.255.255.0 Seria10/1/0
                                                                                                                                                                                                                                                                                                         interface Serial0/1/0
ip address 192.168.2.2 255.255.255.0
                                                                                                                                                                                                                                                                                                       !
interface Serial0/1/1
no ip address
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              line con 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              line aux 0
    spanning-tree mode pvst
                                                                                                                                                                                                                                                                                                     interface Vlanl
no ip address
shutdown
```

(7) (static7.pkt)在上一个步骤的配置中删除用接口名作为下一跳的静态路由,然后配置用 IP 地址作为 下一跳的静态路由,令PCO可以ping通PC1。

[7a.用PCO ping PC1 并截屏]

```
from 192.168.3.22: bytes=32 time=10ms TTL=12
from 192.168.3.22: bytes=32 time=5ms TTL=126
from 192.168.3.22: bytes=32 time=6ms TTL=126
from 192.168.3.22: bytes=32 time=ims TTL=126
```

[7b. 显示 Router0 的路由表并截屏]

```
Router>ema
Routerish ip Tou
Codes: C - commected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
Codes: C - commected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSFF, ISA external type 2
EI - OSFF MSA external type 1, E2 - OSFF MSA external type 2
EI - OSFF external type 1, E2 - OSFF external type 2, E - EGGP
i - IS-15, L1 - IS-15 [evel-1], L2 - IS-15 [evel-2], L3 - IS-15 [inter area

* - candidate default, O per-user static route, O - OGR
P - periodic downloaded static route
 Gateway of last resort is not set
                192.168.1.0/24 is directly connected, FastEthernet0/0 192.168.2.0/24 is directly connected, Serial0/1/0 192.168.3.0/24 [1/0] via 192.168.2.2
```

[7c. 显示 Router1 的路由表并截屏]

```
Router>ena
Routerish ip rou
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - RIGRP, EX - RIGRP external, 0 - OSPF, IA - OSPF inter area
NI - OSPF mSSA external type 1, N2 - OSPF mSSA external type 2
El - OSPF external type 1, R2 - OSPF external type 2, E - ROP
i 15-15, Li - 15-15 level-1, L2 - 15-15 level-2, La - 15-15 inter area
' - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
                        192.168.1.0/24 [1/0] via 192.168.2.1
192.168.2.0/24 is directly connected, Serial0/1/0
192.168.3.0/24 is directly connected, FastEthernet0/1
```

[7d. 用#show running-config 显示 RouterO 的当前配置并截屏]



interface Serial0/0/0 no ip address shutdown Router#sh run Building configuration... ! interface Serial0/0/1 no ip address shutdown sec shutdown
interface Serial0/1/0
interface Serial0/1/0
ip address 152.169.2.1 255.255.255.0
clock rate 65000 ! interface Vlan1 no ip address shutdown router rip ; ip classless ip route 192.168.3.0 255.255.255.0 192.168.2.2 spanning-tree mode pvst line vty 0 4 interface FastEthernet0/1 no ip address duplex auto

[7e. 用#show running-config 显示 Routerl 的当前配置并截屏]

Router#sh run Building configuration Current configuration : 759 bytes version 12.4 no service timestamps log datetime msec no service timestamps debug datetime msec no 1p eddress no service password-encryption shutdown : nostname Router interface Serial0/1/0 ip address 192.168.2.2 255.255.255.0 ! interface Serial0/1/1 no ip address shutdown interface Vlanl no ip address shutdown !
ip classless
ip route 192.168.1.0 255.255.255.0 192.168.2.1 panning-tree mode pvst ! interface FastEthernet0/0 no ip address duplex auto speed auto shutdown line con 0 ! line aux 0 line vty 0 4 login

【实验体会】

写出实验过程中的问题, 思考及解决方法, 简述实验体会(如果有的话)

坑 1. 在实验的第一步, 配置好路由器的各接口参数后, 需要将接口打开, 否则都是无连接的状态。 坑 2. PC 忘记设置默认路由(网关),导致包怎么都发不出去,只会卡在 PC 处。

【完成情况】

是否完成以下步骤?(√完成×未做)

 $(1) \quad [\checkmark] \quad (2) \quad [\checkmark] \quad (3) \quad [\checkmark] \quad (4) \quad [\checkmark] \quad (5) \quad [\checkmark] \quad (6) \quad [\checkmark] \quad (7) \quad [\checkmark]$

【交实验报告】

交实验报告地址: http://103.26.79.35/netdisk/default.aspx?vm=18net

截止日期(不迟于): 2020年6月30日(周二)23:00

上传文件名: 学号_姓名_静态路由.doc

学号_姓名_静态路由.rar (所有 pkt 文件)