

[数据通信与网络]eNSP实验三、四

原创

Obs_cure 于 2021-11-30 14:37:20 发布 1678 收藏 1

文章标签: 华为 计算机网络

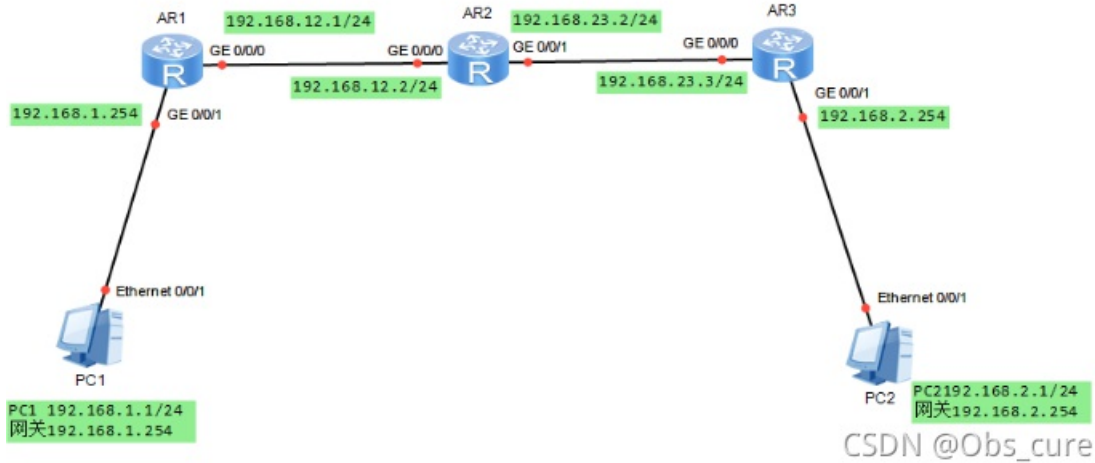
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一、AR2220路由器静态路由实验

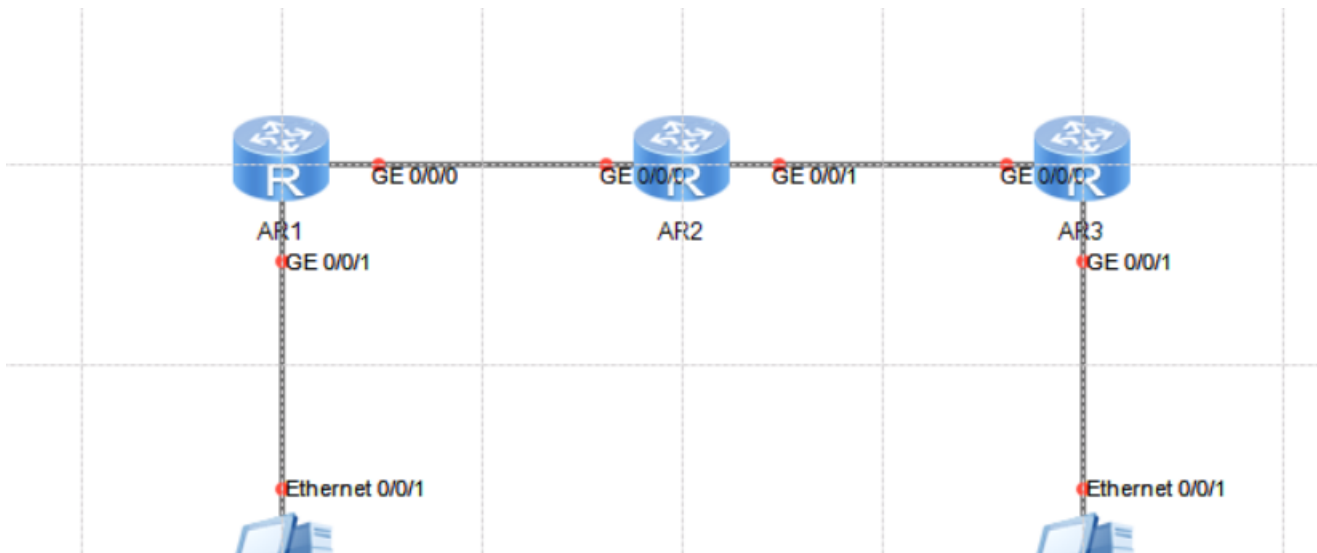
1.实验原理



本次实验配置上图格式的网络拓扑, 由2个主机和三个路由器组成。

2.实验步骤

首先画出网络拓扑图





PC1



PC2

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老师说要在每个设备上写注释，是一种良好的习惯~这里照着老师的流程配。

AR1
GE 0/0/1
Ethernet 0/0/1
PC1

IP:192.168.41.1/24
网关: 192.168.41.254

PC1

基础配置 命令行 组播 UDP发包工具

主机名:

MAC 地址: 54-89-98-47-54-0B

IPv4 配置

静态 DHCP

IP 地址: 192 . 168 . 41 . 1

子网掩码: 255 . 255 . 255 . 0

网关: 192 . 168 . 41 . 254

IPv6 配置

静态 DHCPv6

AR3
GE 0/0/1
Ethernet 0/0/1
PC2

IP:192.168.82.1/24
网关: 192.168.82.254

PC2

基础配置 命令行 组播 UDP发包工具

主机名:

MAC 地址: 54-89-98-F6-44-15

IPv4 配置

静态 DHCP

IP 地址: 192 . 169 . 82 . 1

子网掩码: 255 . 255 . 255 . 0

网关: 192 . 168 . 82 . 254

IPv6 配置

静态 DHCPv6

IPv6 地址: ::

然后开机，配置三台路由器。首先配置路由器AR1，因为不明白老师要怎么改IP，这里直接用他默认的IP了。

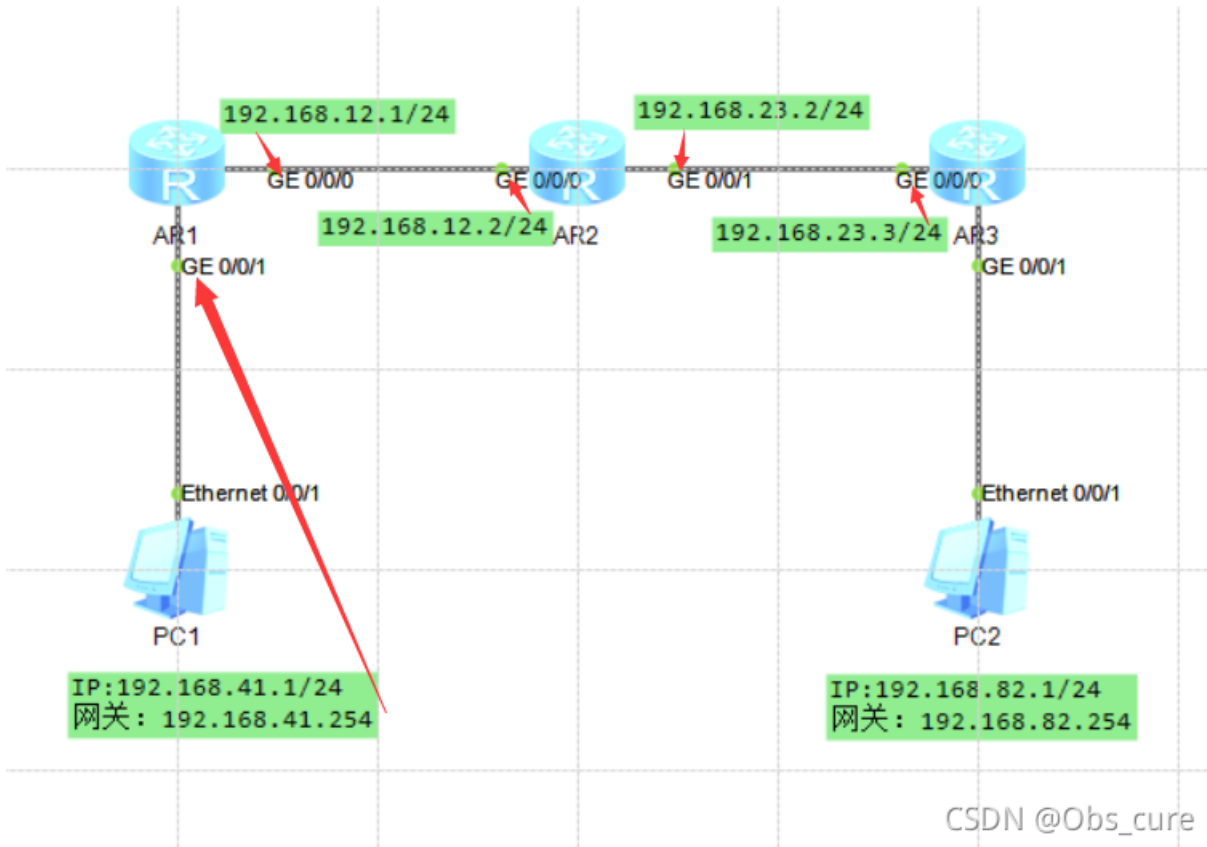
```

system-view
sysname AR1
interface GigabitEthernet 0/0/0
ip address 192.168.12.1 24
interface GigabitEthernet 0/0/1
ip address 192.168.41.254 24
ip route-static 192.168.82.0 24 192.168.12.2

```

需要注意的是这里配置的路由信息和路由器的接口有关，配置之前注意看一眼接口。并且在这里面IP是相对于两个路由器的地址，每个接口的都有一个IP。

这个代码的前面都好理解，定义接口，最后一句是设置了静态路由，含义为：如果想找192.168.82.x的数据就从192.168.12.2的路由器里去寻找。（大概）



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然后配置第二台路由器

```

system-view
sysname AR2
interface GigabitEthernet 0/0/0
ip address 192.168.12.2 24
interface GigabitEthernet 0/0/1
ip address 192.168.23.2 24
ip route-static 192.168.41.0 24 192.168.12.1
ip route-static 192.168.82.0 24 192.168.23.3

```

以及第三台路由器

```

system-view
sysname AR3
interface GigabitEthernet 0/0/0
ip address 192.168.23.3 24
interface GigabitEthernet 0/0/1
ip address 192.168.82.254 24
ip route-static 192.168.41.0 24 192.168.23.2

```

3.实验结果

三个路由器的路由表如下：

Routing Tables: Public
Destinations : 11 Routes : 11

Destination/Mask	Proto	Pre	Cost	Flags	NextHop	Interface
127.0.0.0/8	Direct	0	0	D	127.0.0.1	InLoopBack0
127.0.0.1/32	Direct	0	0	D	127.0.0.1	InLoopBack0
127.255.255.255/32	Direct	0	0	D	127.0.0.1	InLoopBack0
192.168.12.0/24	Direct	0	0	D	192.168.12.1	GigabitEthernet 0/0/0
192.168.12.1/32	Direct	0	0	D	127.0.0.1	GigabitEthernet 0/0/0
192.168.12.255/32	Direct	0	0	D	127.0.0.1	GigabitEthernet 0/0/0
192.168.41.0/24	Direct	0	0	D	192.168.41.254	GigabitEthernet 0/0/1
192.168.41.254/32	Direct	0	0	D	127.0.0.1	GigabitEthernet 0/0/1
192.168.41.255/32	Direct	0	0	D	127.0.0.1	GigabitEthernet 0/0/1
192.168.82.0/24	Static	60	0	RD	192.168.12.2	GigabitEthernet 0/0/0
255.255.255.255/32	Direct	0	0	D	127.0.0.1	InLoopBack0

[AR1]

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Destination/Mask	Proto	Pre	Cost	Flags	NextHop	Interface
127.0.0.0/8	Direct	0	0	D	127.0.0.1	InLoopBack0
127.0.0.1/32	Direct	0	0	D	127.0.0.1	InLoopBack0
127.255.255.255/32	Direct	0	0	D	127.0.0.1	InLoopBack0
192.168.12.0/24	Direct	0	0	D	192.168.12.2	GigabitEthernet 0/0/0
192.168.12.2/32	Direct	0	0	D	127.0.0.1	GigabitEthernet 0/0/0
192.168.12.255/32	Direct	0	0	D	127.0.0.1	GigabitEthernet 0/0/0
192.168.23.0/24	Direct	0	0	D	192.168.23.2	GigabitEthernet 0/0/1
192.168.23.2/32	Direct	0	0	D	127.0.0.1	GigabitEthernet 0/0/1
192.168.23.255/32	Direct	0	0	D	127.0.0.1	GigabitEthernet 0/0/1

```
192.168.41.0/24 Static 60 0 RD 192.168.12.1 GigabitEthernet
0/0/0
192.168.82.0/24 Static 60 0 RD 192.168.23.3 GigabitEthernet
0/0/1
255.255.255.255/32 Direct 0 0 D 127.0.0.1 InLoopBack0
[AR2]
```

```
AR3
Routing Tables: Public
Destinations : 11 Routes : 11

Destination/Mask Proto Pre Cost Flags NextHop Interface
127.0.0.0/8 Direct 0 0 D 127.0.0.1 InLoopBack0
127.0.0.1/32 Direct 0 0 D 127.0.0.1 InLoopBack0
127.255.255.255/32 Direct 0 0 D 127.0.0.1 InLoopBack0
192.168.23.0/24 Direct 0 0 D 192.168.23.3 GigabitEthernet
0/0/0
192.168.23.3/32 Direct 0 0 D 127.0.0.1 GigabitEthernet
0/0/0
192.168.23.255/32 Direct 0 0 D 127.0.0.1 GigabitEthernet
0/0/0
192.168.41.0/24 Static 60 0 RD 192.168.23.2 GigabitEthernet
0/0/0
192.168.82.0/24 Direct 0 0 D 192.168.82.254 GigabitEthernet
0/0/1
192.168.82.254/32 Direct 0 0 D 127.0.0.1 GigabitEthernet
0/0/1
192.168.82.255/32 Direct 0 0 D 127.0.0.1 GigabitEthernet
0/0/1
255.255.255.255/32 Direct 0 0 D 127.0.0.1 InLoopBack0
[AR3]
```

可以看到有static的信息，以及设置成功了。

```

PC2
基础配置  命令行  组播  UDP发包工具  串口
From 192.168.41.1: bytes=32 seq=3 ttl=125 time=15 ms
From 192.168.41.1: bytes=32 seq=4 ttl=125 time=32 ms
From 192.168.41.1: bytes=32 seq=5 ttl=125 time=15 ms

--- 192.168.41.1 ping statistics ---
 5 packet(s) transmitted
 4 packet(s) received
20.00% packet loss
round-trip min/avg/max = 0/23/32 ms

PC>ping 192.168.41.1

Ping 192.168.41.1: 32 data bytes, Press Ctrl_C to break
From 192.168.41.1: bytes=32 seq=1 ttl=125 time=16 ms
From 192.168.41.1: bytes=32 seq=2 ttl=125 time=31 ms
From 192.168.41.1: bytes=32 seq=3 ttl=125 time=16 ms
From 192.168.41.1: bytes=32 seq=4 ttl=125 time=15 ms
From 192.168.41.1: bytes=32 seq=5 ttl=125 time=32 ms

--- 192.168.41.1 ping statistics ---
 5 packet(s) transmitted
 5 packet(s) received
 0.00% packet loss
round-trip min/avg/max = 15/22/32 ms

PC>

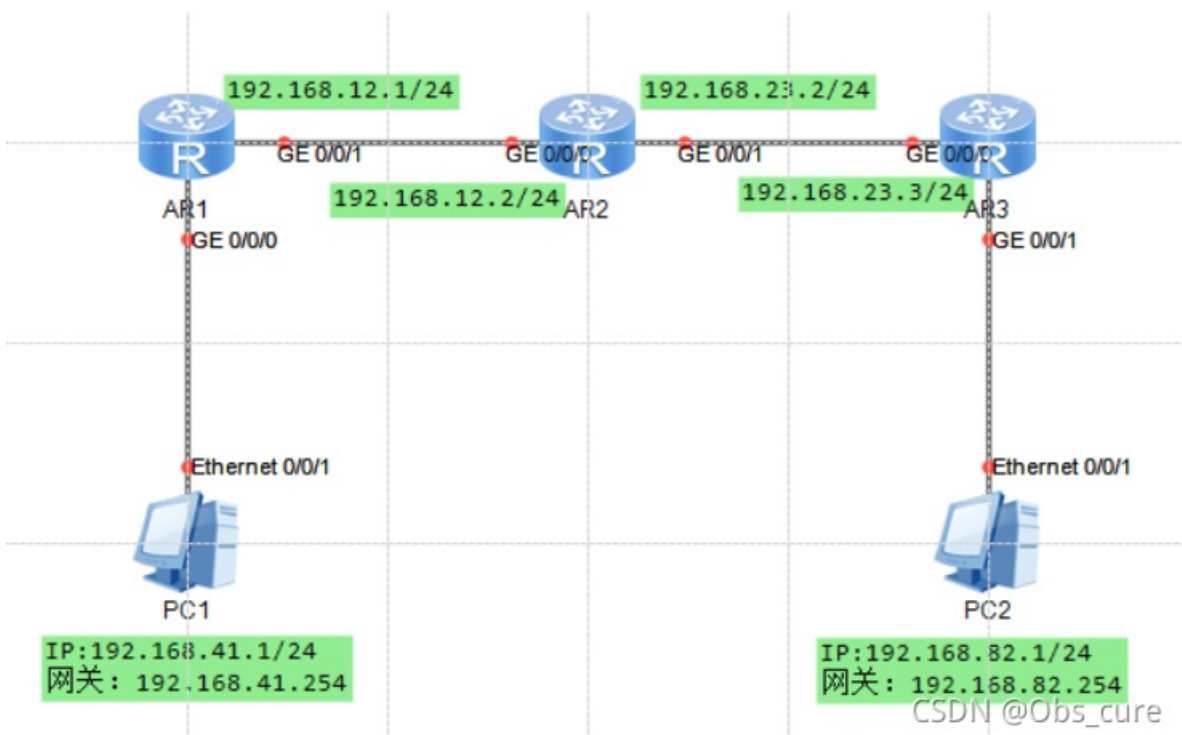
```

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可以PING通，实验成功。

二、AR2220路由器动态路由RIPv2实验

1.实验原理



拓扑图和上面的一样，不同的是路由器使用了RIP协议。通俗的理解就是，上个实验我们是手动配置的路由信息，而RIP协议下，每30s可以自动检索一遍路由信息。

RIP协议提出的年代是20世纪80年代，年代较为久远，因此有很多局限性。在后来的发展中出现了2.0版本，因此这次实验的命令协议都是RIPv2。但其网络路径不能超过15，不适合大型网络，以被OSPF协议淘汰。

2.实验步骤

首先配置IP，和上个实验一样，不再赘述，然后是配置三个路由器，这里我随手连的，和老师连的不一样，和上个实验也不一样！一定要注意：

```
system-view
sysname AR1
interface GigabitEthernet 0/0/0
ip address 192.168.41.254 24
interface GigabitEthernet 0/0/1
ip address 192.168.12.1 24
rip 1
version 2
network 192.168.12.0
network 192.168.41.0
```

然后是路由器2

```
system-view
sysname AR2
interface GigabitEthernet 0/0/0
ip address 192.168.12.2 24
interface GigabitEthernet 0/0/1
ip address 192.168.23.2 24
rip 1
version 2
network 192.168.12.0
network 192.168.23.0
```

然后是路由器3

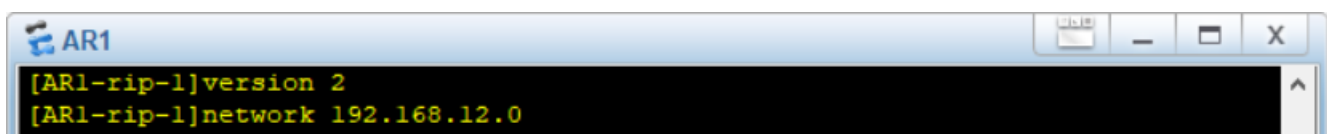
```
system-view
sysname AR3
interface GigabitEthernet 0/0/0
ip address 192.168.23.3 24
interface GigabitEthernet 0/0/1
ip address 192.168.82.254 24
rip 1
version 2
network 192.168.23.0
network 192.168.82.0
```

3.实验结果

直接查看RIP路由表，命令为：

```
display ip routing-table protocol rip
```

各个路由器的RIP表为：



```
[AR1-rip-1]network 192.168.41.0
[AR1-rip-1]
[AR1-rip-1]display ip routing-table protocol rip
Route Flags: R - relay, D - download to fib
-----
Public routing table : RIP
      Destinations : 2          Routes : 2

RIP routing table status : <Active>
      Destinations : 2          Routes : 2

Destination/Mask    Proto  Pre  Cost    Flags NextHop          Interface
-----
 192.168.23.0/24    RIP    100  1       D    192.168.12.2         GigabitEthernet0/0/1
 192.168.82.0/24   RIP    100  2       D    192.168.12.2         GigabitEthernet0/0/1

RIP routing table status : <Inactive>
      Destinations : 0          Routes : 0

[AR1-rip-1]|
```

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```
AR2
[AR2-rip-1]version 2
[AR2-rip-1]network 192.168.12.0
[AR2-rip-1]network 192.168.23.0
[AR2-rip-1]
[AR2-rip-1]display ip routing-table protocol rip
Route Flags: R - relay, D - download to fib
-----
Public routing table : RIP
      Destinations : 2          Routes : 2

RIP routing table status : <Active>
      Destinations : 2          Routes : 2

Destination/Mask    Proto  Pre  Cost    Flags NextHop          Interface
-----
 192.168.41.0/24    RIP    100  1       D    192.168.12.1         GigabitEthernet0/0/0
 192.168.82.0/24   RIP    100  1       D    192.168.23.3         GigabitEthernet0/0/1

RIP routing table status : <Inactive>
      Destinations : 0          Routes : 0

[AR2-rip-1]|
```

CSDN @Obs_care

```
AR3
[AR3-rip-1]network 192.168.23.0
[AR3-rip-1]
[AR3-rip-1]network 192.168.82.0
[AR3-rip-1]
[AR3-rip-1]display ip routing-table protocol rip
Route Flags: R - relay, D - download to fib
```



```
-----
Public routing table : RIP
      Destinations : 2          Routes : 2

RIP routing table status : <Active>
      Destinations : 2          Routes : 2

Destination/Mask    Proto  Pre  Cost    Flags NextHop         Interface
-----
 192.168.12.0/24    RIP    100  1       D    192.168.23.2    GigabitEthernet0/0/0
 192.168.41.0/24    RIP    100  2       D    192.168.23.2    GigabitEthernet0/0/0

RIP routing table status : <Inactive>
      Destinations : 0          Routes : 0

[AR3-rip-1]|
```

```
PC1
基础配置  命令行  组播  UDP发包工具  串口
Ping 192.168.82.1: 32 data bytes, Press Ctrl_C to break
Request timeout!
From 192.168.82.1: bytes=32 seq=2 ttl=125 time=32 ms

--- 192.168.82.1 ping statistics ---
 2 packet(s) transmitted
 1 packet(s) received
 50.00% packet loss
 round-trip min/avg/max = 0/32/32 ms

PC>ping 192.168.82.1

Ping 192.168.82.1: 32 data bytes, Press Ctrl_C to break
From 192.168.82.1: bytes=32 seq=1 ttl=125 time=16 ms
From 192.168.82.1: bytes=32 seq=2 ttl=125 time=31 ms
From 192.168.82.1: bytes=32 seq=3 ttl=125 time=31 ms
From 192.168.82.1: bytes=32 seq=4 ttl=125 time=16 ms
From 192.168.82.1: bytes=32 seq=5 ttl=125 time=16 ms

--- 192.168.82.1 ping statistics ---
 5 packet(s) transmitted
 5 packet(s) received
 0.00% packet loss
 round-trip min/avg/max = 16/22/31 ms

PC>
```

PING成功了。第一次PING的时候没PING通，可能是路由表没更新吧~所以有丢失还请重新PING一下吧！