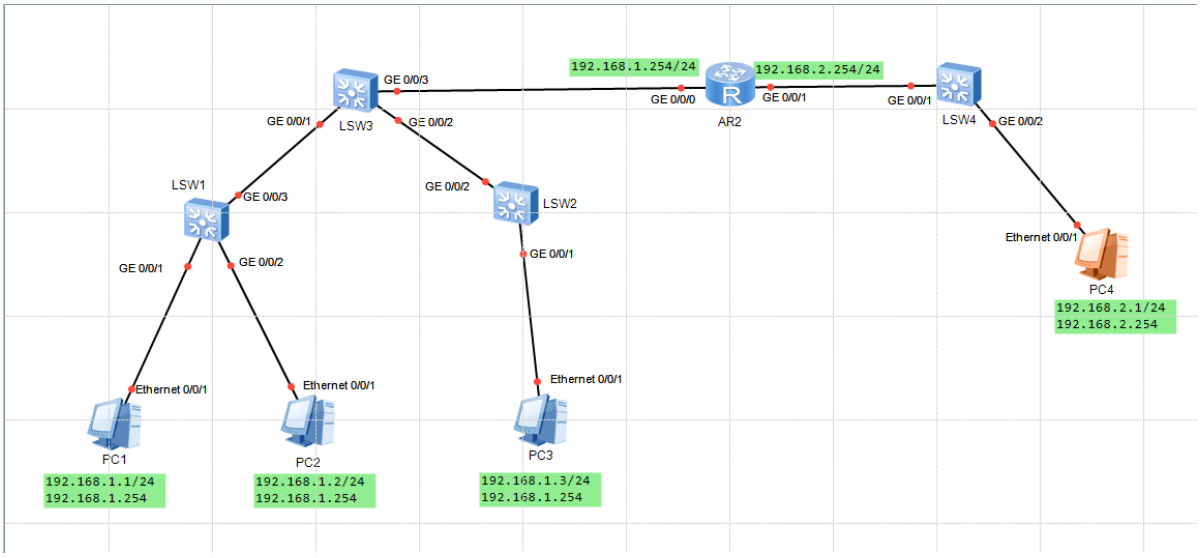
ARP欺骗攻击与防御策略

环境拓扑



实验步骤

配置AR2

```
<Huawei>sys
[Huawei]sys AR2
[AR2]undo info en
[AR2]int g0/0/0
[AR2-GigabitEthernet0/0/0]ip add 192.168.1.254 255.255.255.0
[AR2-GigabitEthernet0/0/0]q
[AR2]int g0/0/1
[AR2-GigabitEthernet0/0/1]ip add 192.168.2.254 255.255.255.0
[AR2-GigabitEthernet0/0/1]q
[AR2]
```

ping各PC之间的情况

```
PC>ping 192.168.2.1

Ping 192.168.2.1: 32 data bytes, Press Ctrl_C to break
From 192.168.2.1: bytes=32 seq=1 ttl=127 time=110 ms
From 192.168.2.1: bytes=32 seq=2 ttl=127 time=62 ms
From 192.168.2.1: bytes=32 seq=3 ttl=127 time=93 ms
From 192.168.2.1: bytes=32 seq=4 ttl=127 time=94 ms
From 192.168.2.1: bytes=32 seq=5 ttl=127 time=110 ms

--- 192.168.2.1 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 62/93/110 ms
```

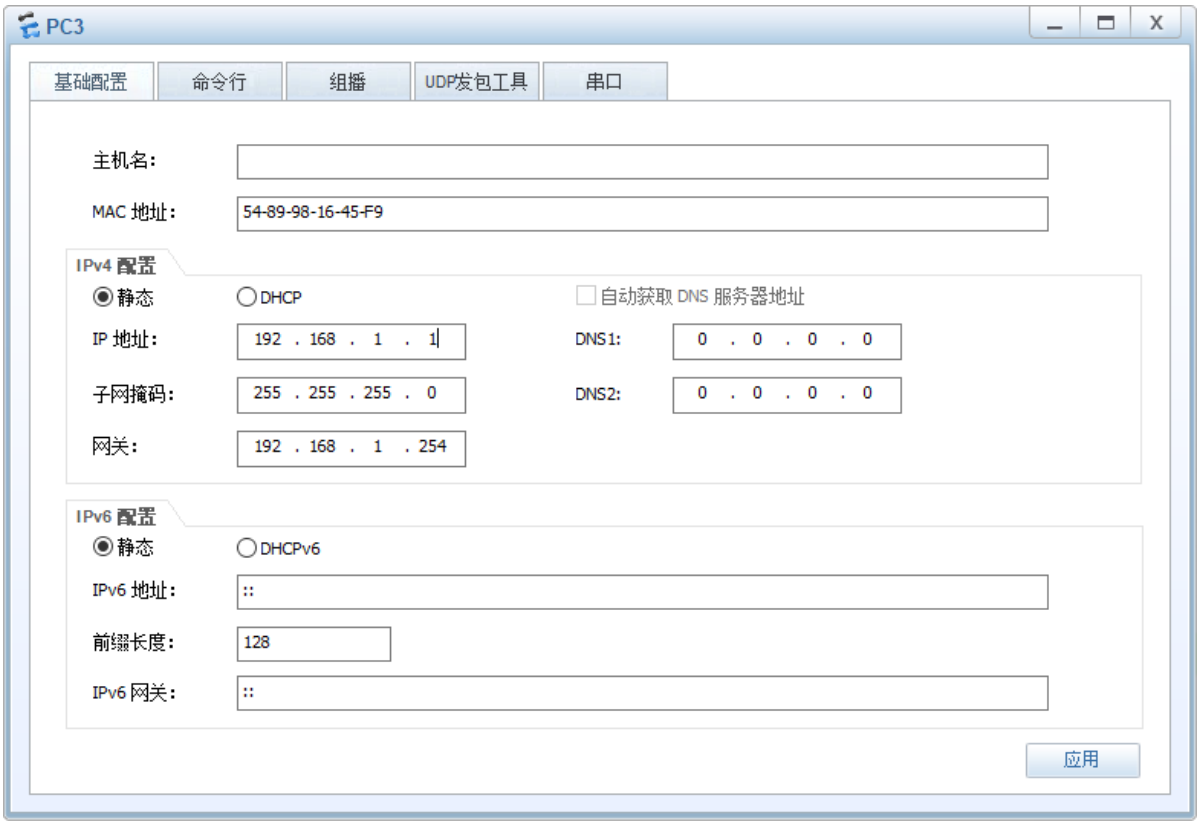
```
PC>ping 192.168.1.2

Ping 192.168.1.2: 32 data bytes, Press Ctrl_C to break
From 192.168.1.2: bytes=32 seq=1 ttl=128 time=47 ms
From 192.168.1.2: bytes=32 seq=2 ttl=128 time=31 ms
From 192.168.1.2: bytes=32 seq=3 ttl=128 time=47 ms
From 192.168.1.2: bytes=32 seq=4 ttl=128 time=31 ms
From 192.168.1.2: bytes=32 seq=5 ttl=128 time=47 ms

--- 192.168.1.2 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 31/40/47 ms

PC>ping 192.168.1.3

Ping 192.168.1.3: 32 data bytes, Press Ctrl_C to break
From 192.168.1.3: bytes=32 seq=1 ttl=128 time=78 ms
From 192.168.1.3: bytes=32 seq=2 ttl=128 time=78 ms
From 192.168.1.3: bytes=32 seq=3 ttl=128 time=94 ms
From 192.168.1.3: bytes=32 seq=4 ttl=128 time=62 ms
From 192.168.1.3: bytes=32 seq=5 ttl=128 time=78 ms

--- 192.168.1.3 ping statistics ---
  5 packet(s) transmitted
  5 packet(s) received
  0.00% packet loss
  round-trip min/avg/max = 62/78/94 ms

PC>ping 192.168.1.254

Ping 192.168.1.254: 32 data bytes, Press Ctrl_C to break
From 192.168.1.254: bytes=32 seq=1 ttl=255 time=125 ms
From 192.168.1.254: bytes=32 seq=2 ttl=255 time=62 ms
From 192.168.1.254: bytes=32 seq=3 ttl=255 time=63 ms
From 192.168.1.254: bytes=32 seq=4 ttl=255 time=46 ms
From 192.168.1.254: bytes=32 seq=5 ttl=255 time=63 ms
```

查看路由器的mac和IP地址绑定情况(arp表)

```
[AR2]dis arp
IP ADDRESS       MAC ADDRESS    EXPIRE(M) TYPE        INTERFACE    VPN-INSTANCE
                                          VLAN/CEVLAN PVC
-------------------------------------------------------------------------------
192.168.1.254    00e0-fc2b-48fc           I -         GE0/0/0
192.168.1.1      5489-9851-2565  18       D-0         GE0/0/0
192.168.1.2      5489-98a2-34fc  17       D-0         GE0/0/0
192.168.1.3      5489-9816-45f9  20       D-0         GE0/0/0
192.168.2.254    00e0-fc2b-48fd           I -         GE0/0/1
192.168.2.1      5489-9872-4d5b  20       D-0         GE0/0/1
-------------------------------------------------------------------------------
Total:6          Dynamic:4       Static:0     Interface:2
```

修改pc3 IP地址为pc1 IP地址，并查看arp信息，清除arp

1修改ip



2清除arp信息

arp -d

```
PC>arp -d


PC>arp -a

Internet Address      Physical Address      Type
```

使用PC3 ping PC4 查看AR1的arp表项

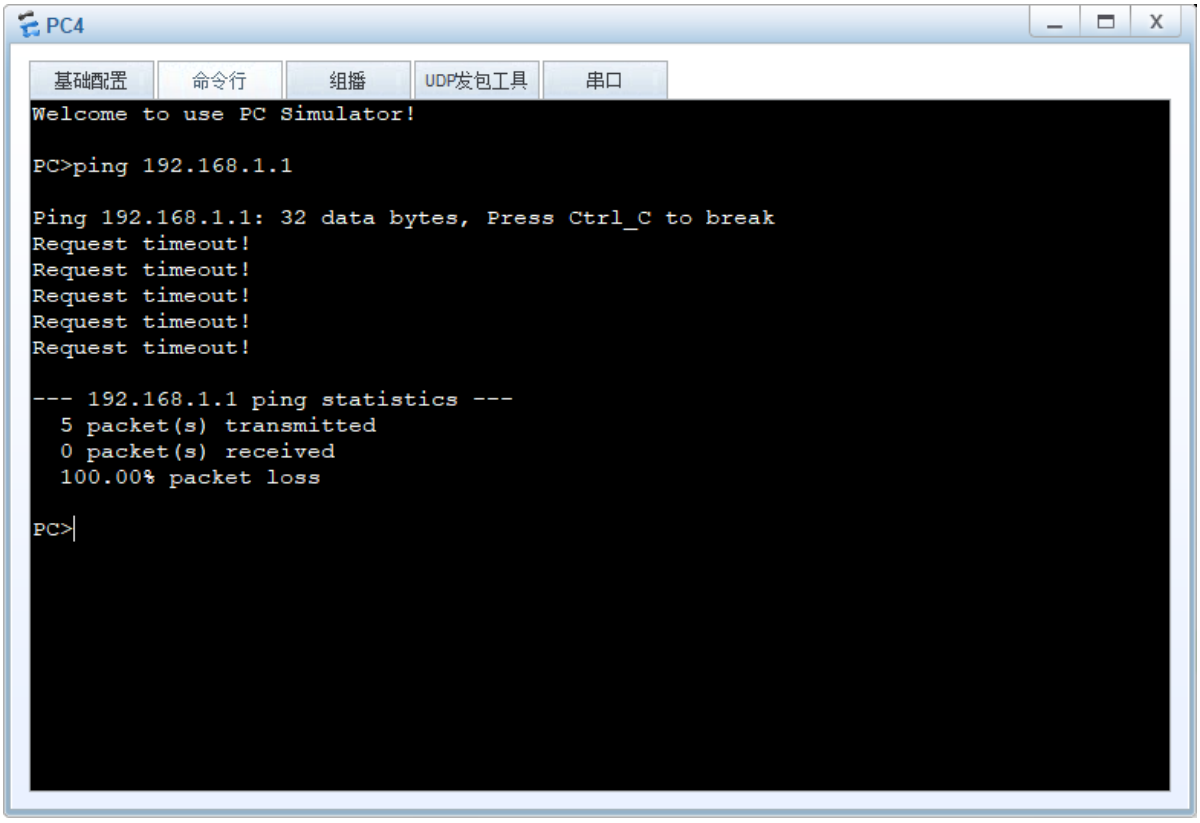
1.使用PC3 ping PC4

```
PC>ping 192.168.2.1

Ping 192.168.2.1: 32 data bytes, Press Ctrl_C to break
Request timeout!
From 192.168.2.1: bytes=32 seq=2 ttl=127 time=78 ms
From 192.168.2.1: bytes=32 seq=3 ttl=127 time=78 ms
From 192.168.2.1: bytes=32 seq=4 ttl=127 time=78 ms
From 192.168.2.1: bytes=32 seq=5 ttl=127 time=79 ms

--- 192.168.2.1 ping statistics ---
  5 packet(s) transmitted
  4 packet(s) received
  20.00% packet loss
  round-trip min/avg/max = 0/78/79 ms
```

2.AR1的arp表项

```
[AR2]dis arp
IP ADDRESS       MAC ADDRESS     EXPIRE(M) TYPE        INTERFACE    VPN-INSTANCE
                                           VLAN/CEVLAN PVC
-------------------------------------------------------------------------------
192.168.1.254    00e0-fc2b-48fc            I -         GE0/0/0
192.168.1.1      5489-9816-45f9  19        D-0         GE0/0/0
192.168.1.2      5489-98a2-34fc  7         D-0         GE0/0/0
192.168.1.3      5489-9816-45f9  10        D-0         GE0/0/0
192.168.2.254    00e0-fc2b-48fd            I -         GE0/0/1
192.168.2.1      5489-9872-4d5b  19        D-0         GE0/0/1
-------------------------------------------------------------------------------
Total:6          Dynamic:4       Static:0      Interface:2
```

PC3 IP地址重新修改为192.168.1.3,然后让PC4 ping 192.168.1.1



防御策略

在AR2绑定网关与MAC地址映射关系

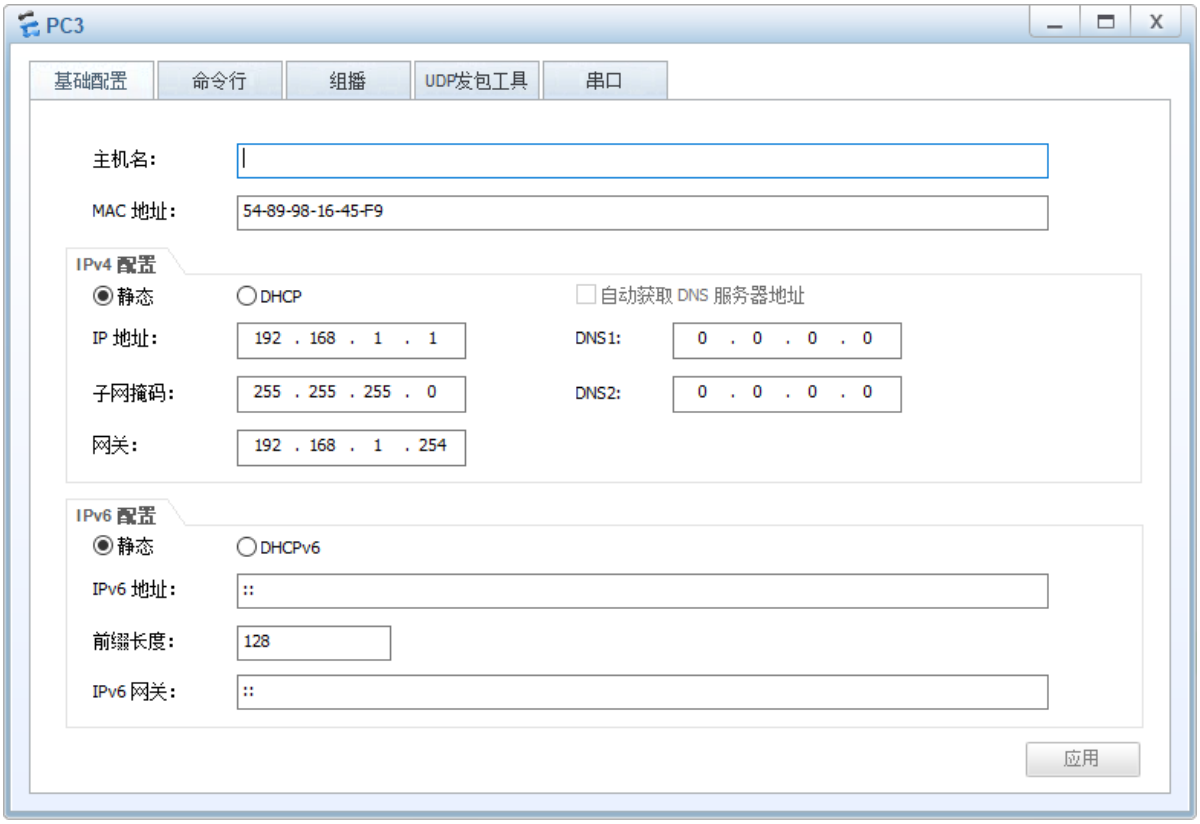
```
<AR2>sys
[AR2]user-bind static ip-address 192.168.1.1 MAC-address 5489-9851-2565
Info: 1 static user-bind item(s) added.
```

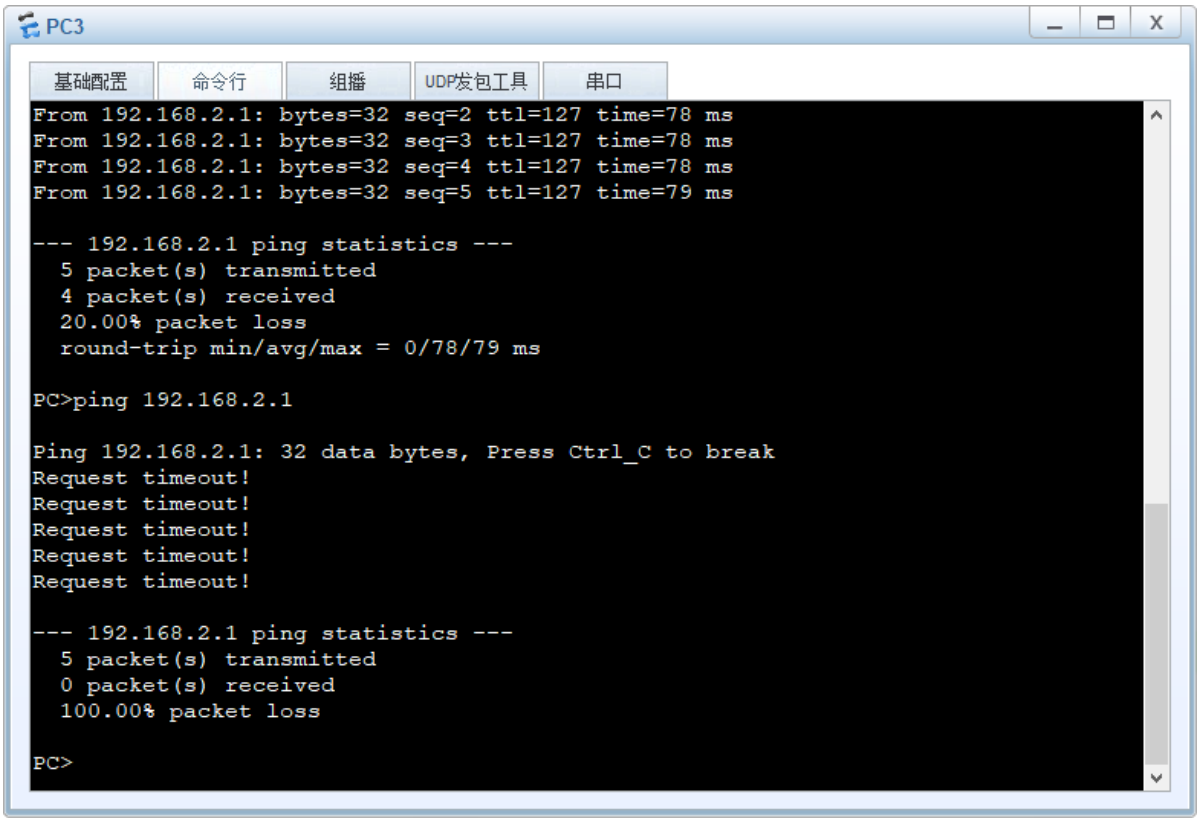
在交换机SW3开启动态arp监测

```
<Huawei>sys
Enter system view, return user view with Ctrl+Z.
[Huawei]int g0/0/3
[Huawei-GigabitEthernet0/0/3]arp anti-attack check user-bind enable
```

验证

将pc3的IP地址改为pc1后 无法ping通





查看AR2的arp表

```
[AR2]dis arp
IP ADDRESS       MAC ADDRESS     EXPIRE(M) TYPE        INTERFACE    VPN-INSTANCE
                                           VLAN/CEVLAN PVC
-------------------------------------------------------------------------------
192.168.1.254    00e0-fc2b-48fc            I -         GE0/0/0
192.168.1.1      5489-9851-2565  16        D-0         GE0/0/0
192.168.1.2      5489-98a2-34fc  3         D-0         GE0/0/0
192.168.1.3      5489-9816-45f9  7         D-0         GE0/0/0
192.168.2.254    00e0-fc2b-48fd            I -         GE0/0/1
192.168.2.1      5489-9872-4d5b  17        D-0         GE0/0/1
-------------------------------------------------------------------------------
Total:6          Dynamic:4       Static:0     Interface:2
```

任务总结

1.交换机可以只绑定IP与ＭＡＣ地址关系，即执行如下操作

user-bind static ip-address 192.168.1.1 MAC-address 5489-9851-2565

2.为防范ARP攻击，假如管理员没有开启动态ARP监测(DAI)功能,在客户机上可以自己手动绑定网关IP与MAC地址关系以避免遭受攻击

3.ARP欺骗劫持不属于病毒木马，不能通过安装防病毒软件达到防御效果