

知 S5130-EI交换机静态DHCP不生效经验案例

DHCP/DHCP Relay 孙兆强 2020-09-29 发表

组网及说明



PC直连交换机做测试

问题描述

S5130-EI交换机做为DHCP server，用户pc先动态获取一个地址，随后在交换机上给该pc配置另一个ip的静态地址绑定表项。PC网卡updown之后地址无切换为静态绑定的ip，客户用TPlink路由器测试可以实现地址切换。

过程分析

在电脑上分别抓取连接交换机和TP路由器的DHCP过程报文对比。

1、PC连接交换机情况

连接5130-EI交换机先动态获取11.152.152.2地址然后静态绑定11.152.152.5地址，过程抓包如下：

122	2020-09-06	16:15:04.112784	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover	- Transaction ID 0x64e5007d
130	2020-09-06	16:15:04.655270	11.152.152.1	255.255.255.255	DHCP	342	DHCP Offer	- Transaction ID 0x64e5007d
131	2020-09-06	16:15:04.656435	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request	- Transaction ID 0x64e5007d
132	2020-09-06	16:15:04.654800	11.152.152.1	255.255.255.255	DHCP	342	DHCP ACK	- Transaction ID 0x64e5007d
655	2020-09-06	16:16:54.095895	0.0.0.0	255.255.255.255	DHCP	364	DHCP Request	- Transaction ID 0xe9945540
657	2020-09-06	16:16:54.102176	11.152.152.1	255.255.255.255	DHCP	342	DHCP ACK	- Transaction ID 0xe9945540

从上图看PC先正常获取11.152.152.2地址，pc网卡updown之后直接发送了DHCP Request报文进行续约，展开如

- ▷ Bootp flags: 0x8000, Broadcast flag (Broadcast)
- Client IP address: 0.0.0.0
- Your (client) IP address: 0.0.0.0
- Next server IP address: 0.0.0.0
- Relay agent IP address: 0.0.0.0
- Client MAC address: AsixElec_ca:f5:a3 (00:0e:c6:ca:f5:a3)
- Client hardware address padding: 000000000000000000
- Server host name not given
- Boot file name not given
- Magic cookie: DHCP
- ▷ Option: (53) DHCP Message Type (Request)
- ▷ Option: (61) Client identifier
- ▷ Option: (50) Requested IP Address (11.152.152.2)
- ▷ Option: (12) Host Name
- ▷ Option: (81) Client Fully Qualified Domain Name
- ▷ Option: (60) Vendor class identifier
- ▷ Option: (55) Parameter Request List
- ▷ Option: (255) End

PC对11.152.152.2地址进行续约，交换机回复了ACK，PC续约成功。

2、PC连接路由器情况

PC连接TP路由器先获取192.168.17.11地址然后静态绑定192.168.17.13地址，过程抓包如下：

122	2020-09-06	16:15:04.112784	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover	- Transaction ID 0x64e5007d
130	2020-09-06	16:15:04.655270	11.152.152.1	255.255.255.255	DHCP	342	DHCP Offer	- Transaction ID 0x64e5007d
131	2020-09-06	16:15:04.656435	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request	- Transaction ID 0x64e5007d
132	2020-09-06	16:15:04.654800	11.152.152.1	255.255.255.255	DHCP	342	DHCP ACK	- Transaction ID 0x64e5007d
29763	2020-09-06	16:25:32.098191	0.0.0.0	255.255.255.255	DHCP	364	DHCP Request	- Transaction ID 0x2a877470
29754	2020-09-06	16:25:32.098722	192.168.17.250	255.255.255.255	DHCP	342	DHCP NAK	- Transaction ID 0x2a877470
29775	2020-09-06	16:25:32.184999	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover	- Transaction ID 0xafb4b58f
29776	2020-09-06	16:25:32.185677	192.168.17.250	255.255.255.255	DHCP	342	DHCP Offer	- Transaction ID 0xafb4b58f
29783	2020-09-06	16:25:32.228355	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request	- Transaction ID 0xafb4b58f
29784	2020-09-06	16:25:32.228873	192.168.17.250	255.255.255.255	DHCP	342	DHCP ACK	- Transaction ID 0xafb4b58f

续约request报文展开如下

```
Your (client) IP address: 0.0.0.0
Next server IP address: 0.0.0.0
Relay agent IP address: 0.0.0.0
Client MAC address: AsixElec_ca:f5:a3 (00:0e:c6:ca:f5:a3)
Client hardware address padding: 000000000000000000
Server host name not given
Boot file name not given
Magic cookie: DHCP
▷ Option: (53) DHCP Message Type (Request)
▷ Option: (61) Client identifier
▷ Option: (50) Requested IP Address (192.168.17.11)
▷ Option: (12) Host Name
▷ Option: (81) Client Fully Qualified Domain Name
▷ Option: (60) Vendor class identifier
▷ Option: (55) Parameter Request List
▷ Option: (255) End
```

从抓包看PC先获取192.168.17.11地址，PC网卡updown之后对地址进行续约，但是TP路由器回复了NACK报文，PC重新发送Discover报文，请求新的地址，TP路由器回复192.168.17.13地址。

```
Dynamic Host Configuration Protocol (Offer)
  Message type: Boot Reply (2)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0xafb4b58f
  Seconds elapsed: 0
  Bootp flags: 0x8000, Broadcast flag (Broadcast)
  Client IP address: 0.0.0.0
  Your (client) IP address: 192.168.17.13
  Next server IP address: 0.0.0.0
  Relay agent IP address: 0.0.0.0
  Client MAC address: AsixElec_ca:f5:a3 (00:0e:c6:ca:f5:a3)
  Client hardware address padding: 000000000000000000
  Server host name not given
  Boot file name not given
```

3、从以上过程看，我们对于PC发的续约报文回复了ACK导致续约成功，PC不会发送discover报文重新获取地址。TP路由器对于续约报文回复了NAK导致PC续约不成功，重新发送Discover报文获取新的IP地址。查看我司交换机地址分配顺序如下：

2.1.3 DHCP服务器分配IP地址的优先次序

DHCP服务器为客户端分配IP地址的优先次序如下：

- (1) 与客户端MAC地址或客户端静态绑定的IP地址。
- (2) DHCP服务器记录的曾经分配给客户端的IP地址。
- (3) 客户端发送的DHCP-DISCOVER报文中Option 50字段指定的IP地址。Option 50为客户端请求的IP地址选项（Requested IP Address），客户端通过在DHCP-DISCOVER报文中添加该选项来指明客户端希望获取的IP地址。该选项的内容由客户端决定。
- (4) 按照“2.1.2 DHCP地址池”中所述的动态分配地址选择原则，顺序查找可供分配的IP地址，选择最先找到的IP地址。
- (5) 如果未找到可用的IP地址，则从当前匹配地址池中依次查询租约过期、曾经发生过冲突的IP地址，如果找到则进行分配，否则将不予处理。

为何未按照地址分配优先级分配呢，经确认我司交换机IP地址分配优先顺序是针对discover报文生效的。如果PC发discover报文，即使在交换机上有11.152.152.2的动态分配表项也会优先分配静态绑定的地址。

解决方法

- 1、在交换机上将动态分配表项清除，使之前地址续约不成功重新发送discover报文。
- 2、在PC上输入ipconfig /release直接清除地址记录，使pc发discover报文。