

问题描述

解决方法

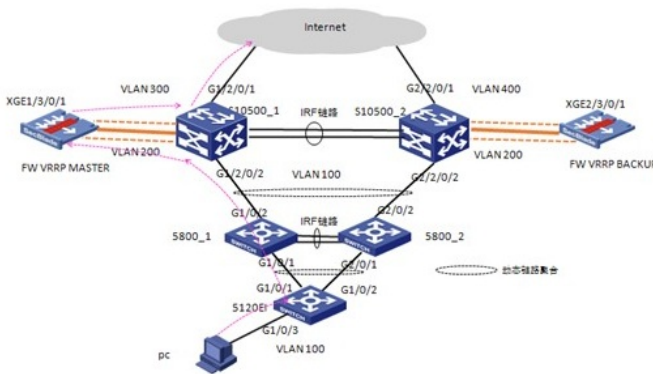
一、组网需求:

用户PC处于vlan 100中, 网关位于10500设备上。两台10500 设备配置IRF功能, 10500 设备上插有两块防火墙板卡, 两块防火墙板卡在vlan 200中配置vrrp 且与10500 互联, 防火墙上分别采用vlan 300、vlan 400 连接运营商。

网络中的终端用户反馈访问外网比较慢, 在终端上ping 公网地址存在丢包。为了排查网络丢包的具体位置, 需要对网络中的设备进行流量统计来确定具体丢包设备。

交换机的流量统计是基于硬件芯片的, 流量统计可以准确确认交换机是否存在丢包。

二、组网图:



从内网向外网的流量走向为:

Pc à5120EI(二层转发) à5800\_IRF (二层转发) à10500\_IRF(三层转发)à防火墙 (三层转发) à10500\_IRF(二层转发) àInternet

从外网向内网的流量走向为:

Internetà10500\_IRF(二层转发)à 防火墙 (三层转发) à10500\_IRF(三层转发)à 5800\_IRF (二层转发)à 5120EI(二层转发)à Pc

本次用户测试PC 发往外网的流量走向请参考拓扑图中红色箭头, 回程流量正好相反。

三、配置步骤:

1. 正确配置PC 的ip地址为100.0.0.1, 掩码为255.255.255.0 , 网关为100.0.0.254 。



- 2.配置网络中各交换机的vlan 及三层接口的ip地址及路由协议使网络可以正常互通, 具体配置略。
- 3.选取公网用户ping测试的目的主机地址, 本案例中选取www.baidu.com (115.239.210.27)作为测试目的地址。
- 4.在5120EI、 5800\_IRF、 10500\_IRF配置用于流量统计的ACL 及QOS策略并下发到相应的物理端口上。
- 4.1在各个交换机上配置用于匹配流量的ACL 3999。

```
acl number 3999
rule 0 permit icmp source 100.0.0.1 0 destination 115.239.210.27 0
rule 5 permit icmp source 115.239.210.27 0 destination 100.0.0.1 0
4.2在5120EI交换机上配置用于流量统计的QOS策略account_test。
traffic classifier account_test operator and
if-match acl 3999
#
traffic behavior account_test
accounting
#
qos policy account_test
classifier account_test behavior account_test
4.3 在5800_IRF、10500_IRF交换机上配置用于流量统计的QOS策略account_test。
traffic classifier account_test operator and
if-match acl 3999
#
traffic behavior account_test
accounting packet
#
qos policy account_test
classifier account_test behavior account_test
4.4在5120EI交换机上涉及的端口上下发流量统计的QOS策略。
interface GigabitEthernet1/0/1
qos apply policy account_test inbound
#
interface GigabitEthernet1/0/2
qos apply policy account_test inbound
#
interface GigabitEthernet1/0/3
qos apply policy account_test inbound
#
4.5 在5800_IRF设备上将配置的QOS策略下发到上下行物理端口上：
interface GigabitEthernet1/0/1
qos apply policy account_test inbound
qos apply policy account_test outbound
#
interface GigabitEthernet1/0/2
qos apply policy account_test inbound
qos apply policy account_test outbound
#
interface GigabitEthernet2/0/1
qos apply policy account_test inbound
qos apply policy account_test outbound
#
interface GigabitEthernet2/0/2
qos apply policy account_test inbound
qos apply policy account_test outbound
#
4.6将10500_IRF设备上配置的QOS策略下发到上下行及连接防火墙的物理端口上：
interface GigabitEthernet1/2/0/1
qos apply policy account_test inbound
qos apply policy account_test outbound
#
interface GigabitEthernet1/2/0/2
qos apply policy account_test inbound
qos apply policy account_test outbound
#
interface GigabitEthernet2/2/0/1
qos apply policy account_test inbound
qos apply policy account_test outbound
#
interface GigabitEthernet2/2/0/2
qos apply policy account_test inbound
qos apply policy account_test outbound
```

```
#
interface Ten-GigabitEthernet1/3/0/1
qos apply policy account_test inbound
qos apply policy account_test outbound
#
```

```
interface Ten-GigabitEthernet2/3/0/1
qos apply policy account_test inbound
qos apply policy account_test outbound
```

5.在ping测试之前请确保5120EI、5800\_IRF、10500\_IRF 上各个端口的qos 统计到的计数为零。

下面以5800\_IRF 上显示为例:

```
<H3C>display qos policy interface GigabitEthernet 1/0/1
Interface: GigabitEthernet1/0/1
Direction: Inbound
Policy: account_test
Classifier: account_test
Operator: AND
Rule(s) : If-match acl 3999
Behavior: account_test
Accounting Enable:
0 (Packets)
Direction: Outbound
Policy: account_test
Classifier: account_test
Operator: AND
Rule(s) : If-match acl 3999
Behavior: account_test
Accounting Enable:
0 (Packets)
```

6.在测试PC 进行PING 1000 个包进行测试。从ping的结果来看一共发送1000个报文，接收900个，丢失100个。

```
C:\Documents and Settings\Administrator>ping 115.239.210.27 -n 1000
```

```
Pinging 115.239.210.27 with 32 bytes of data:
```

```
Reply from 115.239.210.27: bytes=32 time=31ms TTL=53
```

```
Reply from 115.239.210.27: bytes=32 time=31ms TTL=53
```

```
Request timed out.
```

```
Reply from 115.239.210.27: bytes=32 time=31ms TTL=53
```

```
Reply from 115.239.210.27: bytes=32 time=31ms TTL=53
```

```
.....
```

```
Ping statistics for 115.239.210.27:
```

```
    Packets: Sent = 1000, Received = 900, Lost = 100 (10% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
Minimum = 31ms, Maximum = 31ms, Average = 31ms
```

7.在确保PING测试完全结束后，查看各个设备上流量统计结果，从各个设备的统计结果来看网络中5800\_IRF 在转发回程报文时存在丢包，丢失100个报文。

5120EI 设备G1/0/3 端口正常接收到1000个报文，G1/0/1 端口却接收到900个报文，G1/0/2 端口接收到0个报文,由于5120EI 设备仅仅支持inbound方向的流量统计，此时结合pc上ping的结果可知5120EI肯定不存在丢包。

```
<H3C>display qos policy interface GigabitEthernet 1/0/3
```

```
Interface: GigabitEthernet1/0/3
Direction: Inbound
Policy: account_test
Classifier: account_test
Operator: AND
Rule(s) : If-match acl 3999
Behavior: account_test
Accounting Enable:
1000 (Packets)
```

```
<H3C>display qos policy interface GigabitEthernet 1/0/1
```

```
Interface: GigabitEthernet1/0/1
Direction: Inbound
Policy: account_test
Classifier: account_test
Operator: AND
```

Rule(s) : If-match acl 3999

Behavior: account\_test

Accounting Enable:

900 (Packets)

<H3C>display qos policy interface GigabitEthernet 1/0/2

Interface: GigabitEthernet1/0/2

Direction: Inbound

Policy: account\_test

Classifier: account\_test

Operator: AND

Rule(s) : If-match acl 3999

Behavior: account\_test

Accounting Enable:

0 (Packets)

5800\_IRF设备G1/0/1 端口正常接收到1000个报文，G1/0/1 端口发送900个报文，这里缺少100个报文。G1/0/2 端口正常接收及发送1000个报文。G2/0/1、G2/0/2端口接收发送报文数量为0。由此可以知道报文在回程时被5800\_IRF 给丢弃了。

<H3C>display qos policy interface GigabitEthernet 1/0/1

Interface: GigabitEthernet1/0/1

Direction: Inbound

Policy: account\_test

Classifier: account\_test

Operator: AND

Rule(s) : If-match acl 3999

Behavior: account\_test

Accounting Enable:

1000 (Packets)

Direction: Outbound

Policy: account\_test

Classifier: account\_test

Operator: AND

Rule(s) : If-match acl 3999

Behavior: account\_test

Accounting Enable:

900 (Packets)

<H3C>display qos policy interface GigabitEthernet 1/0/2

Interface: GigabitEthernet1/0/2

Direction: Inbound

Policy: account\_test

Classifier: account\_test

Operator: AND

Rule(s) : If-match acl 3999

Behavior: account\_test

Accounting Enable:

1000 (Packets)

Direction: Outbound

Policy: account\_test

Classifier: account\_test

Operator: AND

Rule(s) : If-match acl 3999

Behavior: account\_test

Accounting Enable:

1000 (Packets)

<H3C>display qos policy interface GigabitEthernet 2/0/1

Interface: GigabitEthernet2/0/1

Direction: Inbound

Policy: account\_test

Classifier: account\_test

Operator: AND

Rule(s) : If-match acl 3999

Behavior: account\_test

Accounting Enable:

0 (Packets)

Direction: Outbound

Policy: account\_test  
Classifier: account\_test  
Operator: AND  
Rule(s) : If-match acl 3999  
Behavior: account\_test  
Accounting Enable:  
0 (Packets)

<H3C>display qos policy interface GigabitEthernet 2/0/2

Interface: GigabitEthernet2/0/2

Direction: Inbound

Policy: account\_test

Classifier: account\_test

Operator: AND

Rule(s) : If-match acl 3999

Behavior: account\_test

Accounting Enable:

0 (Packets)

Direction: Outbound

Policy: account\_test

Classifier: account\_test

Operator: AND

Rule(s) : If-match acl 3999

Behavior: account\_test

Accounting Enable:

0 (Packets)

10500\_IRF 设备GigabitEthernet1/2/0/2正常接收发送1000个报文， GigabitEthernet1/2/0/1正常接收发送1000个报文， GigabitEthernet2/2/0/2正常接收发送0个报文， GigabitEthernet2/2/0/1正常接收发送0个报文， Ten-GigabitEthernet1/3/0/1端口正常接收发送1000个报文， Ten-GigabitEthernet2/3/0/1端口正常接收发送0个报文。从流量统计来看10500\_IRF 没有发生丢包。

<H3C>display qos policy interface Ten-GigabitEthernet1/3/0/1

Interface: Ten-GigabitEthernet1/3/0/1

Direction: Inbound

Policy: account\_test

Classifier: account\_test

Operator: AND

Rule(s) : If-match acl 3999

Behavior: account\_test

Accounting Enable:

1000 (Packets)

Direction: Outbound

Policy: account\_test

Classifier: account\_test

Operator: AND

Rule(s) : If-match acl 3999

Behavior: account\_test

Accounting Enable:

1000 (Packets)

<H3C>display qos policy interface Ten-GigabitEthernet2/3/0/1

Interface: Ten-GigabitEthernet2/3/0/1

Direction: Inbound

Policy: account\_test

Classifier: account\_test

Operator: AND

Rule(s) : If-match acl 3999

Behavior: account\_test

Accounting Enable:

0 (Packets)

Direction: Outbound

Policy: account\_test

Classifier: account\_test

Operator: AND

Rule(s) : If-match acl 3999

Behavior: account\_test

Accounting Enable:

```
0 (Packets)
<H3C>display qos policy interface GigabitEthernet1/2/0/2
Interface: Ten-GigabitEthernet1/2/0/2
Direction: Inbound
Policy: account_test
Classifier: account_test
Operator: AND
Rule(s) : If-match acl 3999
Behavior: account_test
Accounting Enable:
1000 (Packets)
Direction: Outbound
Policy: account_test
Classifier: account_test
Operator: AND
Rule(s) : If-match acl 3999
Behavior: account_test
Accounting Enable:
1000 (Packets)
<H3C>display qos policy interface GigabitEthernet1/2/0/1
Interface: Ten-GigabitEthernet1/2/0/1
Direction: Inbound
Policy: account_test
Classifier: account_test
Operator: AND
Rule(s) : If-match acl 3999
Behavior: account_test
Accounting Enable:
1000 (Packets)
Direction: Outbound
Policy: account_test
Classifier: account_test
Operator: AND
Rule(s) : If-match acl 3999
Behavior: account_test
Accounting Enable:
1000 (Packets)
<H3C>display qos policy interface GigabitEthernet2/2/0/2
Interface: Ten-GigabitEthernet2/2/0/2
Direction: Inbound
Policy: account_test
Classifier: account_test
Operator: AND
Rule(s) : If-match acl 3999
Behavior: account_test
Accounting Enable:
0 (Packets)
Direction: Outbound
Policy: account_test
Classifier: account_test
Operator: AND
Rule(s) : If-match acl 3999
Behavior: account_test
Accounting Enable:
0 (Packets)
<H3C>display qos policy interface GigabitEthernet2/2/0/1
Interface: Ten-GigabitEthernet2/2/0/1
Direction: Inbound
Policy: account_test
Classifier: account_test
Operator: AND
Rule(s) : If-match acl 3999
Behavior: account_test
Accounting Enable:
```

0 (Packets)  
 Direction: Outbound  
 Policy: account\_test  
 Classifier: account\_test  
 Operator: AND  
 Rule(s) : If-match acl 3999  
 Behavior: account\_test  
 Accounting Enable:  
 0 (Packets)

**配置关键点:**

1. 设备上用于匹配流量的ACL 一定要精确匹配，如本次配置的acl 匹配报文类型ICMP,源目的IP 的反掩码配置为0。平时在处理的问题的过程中一定要严格匹配流量特征，如TCP、UDP 报文的端口号等特征。
2. 在终端PC PING测试前一定要首先把QOS 策略下发在各个交换机的端口上，即在PING 测试前查看各个交换机的流统计结果一定是0。
3. 查看统计的结果前一定要停止ping 测试。
4. 部分交换机配置流量统计的动作为accounting，部分交换机为accounting packet，各个交换机的具体配置方法请参看相关设备及相关版本的操作手册。
5. QOS 必须下发到物理端口上且聚合组内的所有成员端口都需要下发。

**附录 (V5交换机流量统计支持情况) :**

型号	inbound	outbound	型号	inbound	outbound
75E SA	Y	N	105 SE	Y	Y
75E SC	Y	Y	105 EA	Y	Y
75E SD	Y	Y	105 EB	Y	Y
75E EE	Y	Y	105 SF	Y	Y
5800	Y	Y	5820X	Y	Y
55HI	Y	Y	55EI	Y	Y
5120EI	Y	N	5120HI	Y	Y
5830	Y	Y	36V2	Y	Y
31V2-EI	Y	N	31V2-SI	N	N
55SI	Y	N	5120SI	N	N