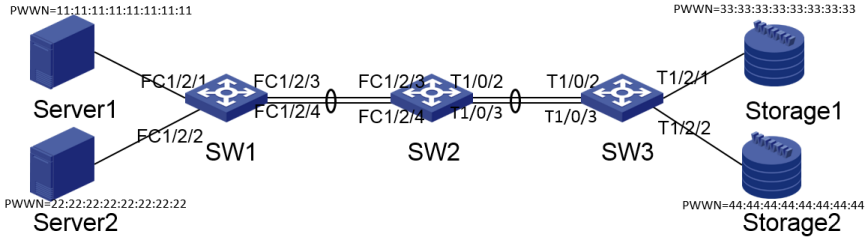
H3C S6800系列交换机FCoE+FC对接典型配置

FCoE 郑标 2018-03-15 发表

- 要求一：Server1、Server2均能够访问Storage1和Storage2；
- 要求二：Storage1和Storage2不能相互访问；
- 要求三：交换机之间通过聚合方式部署。



配置思路：

1、将Server1、Server2、Storage1、Storage2配置在同一个VSAN10中；

2、把Server1、Server2、Storage1划入Zone1；Server1、Server2、Storage2划入Zone2；

3、SW1与SW2间配置FC链路聚合，SW2与SW3间配置以太网链路聚合。

主要配置：

（一）SW1

开启高级模式，设置FCoE模式（必选）

```
<SW1> system-view
[SW1] system-working-mode advance //必选
[SW1] save
< SW1 > reboot
[SW1] fcoe-mode fcf     //必选
```

创建vsan与vlan关联（必选）

```
[SW1] vsan 10 //必选
[SW1-vsan10] domain-id 1 static //可选，建议手动配置
[SW1-vsan10] fspf enable //可选，默认使能
[SW1] vlan 10 //必选
[SW1-vlan10] fcoe enable vsan 10        //必选
[SW1-vlan10] quit
```

配置FC端口关联vsan（必选）

```
[SW1] interface Ten-GigabitEthernet1/2/1
[SW1 -Ten-GigabitEthernet1/2/1] port-type fc  //必选
[SW1] interface fc 1/2/1
[SW1 -fc1/2/1] fc mode f //必选
[SW1 -fc1/2/1] port access vsan 10      //必选
[SW1 -fc1/2/1] qos trust dot1p     //必选
[SW1] interface Ten-GigabitEthernet1/2/2
[SW1 -Ten-GigabitEthernet1/2/2] port-type fc  //必选
[SW1] interface fc 1/2/2
[SW1 -fc1/2/2] fc mode f //必选
[SW1 -fc1/2/2] port access vsan 10      //必选
[SW1 -fc1/2/2] qos trust dot1p     //必选
[SW1] interface Ten-GigabitEthernet1/2/3
[SW1 -Ten-GigabitEthernet1/2/3] port-type fc  //必选
[SW1] interface Ten-GigabitEthernet1/2/4
[SW1 -Ten-GigabitEthernet1/2/4] port-type fc  //必选
[SW1] interface fc 1/2/3
[SW1 -fc1/2/3] fc mode e //必选
[SW1 -fc1/2/3] port trunk vsan 10        //必选
[SW1 -fc1/2/3] qos trust dot1p
[SW1] interface fc 1/2/4
[SW1 -fc1/2/4] fc mode e //必选
[SW1 -fc1/2/4] port trunk vsan 10        //必选
[SW1 -fc1/2/4] qos trust dot1p
```

配置FC链路聚合

```
[SW1] interface san-aggregation 1
[SW1-SAN-Aggregation1] fc mode e
[SW1-SAN-Aggregation1] quit
[SW1] interface fc 1/2/3
[SW1-Fc1/2/3] shutdown
[SW1-Fc1/2/3] san-aggregation group 1
[SW1-Fc1/2/3] undo shutdown
[SW1-Fc1/2/3] quit
[SW1] interface fc 1/2/4
[SW1-Fc1/2/4] shutdown
[SW1-Fc1/2/4] san-aggregation group 1
[SW1-Fc1/2/4] undo shutdown
[SW1-Fc1/2/4] quit
[SW1] interface san-aggregation 1
[SW1-SAN-Aggregation1] fc mode e //必选
[SW1-SAN-Aggregation1] port trunk vsan 10       //必选
```

ZONE配置（H3C设备必选）

```
[SW1] VSAN 10
[SW1 -vsan10] domain-id 1 static
[SW1 -vsan10] zone mode enhanced（可选，推荐-便于FCID管理 和 zone策略扩散）
[SW1 -vsan10] zone default-zone permit （必选，需要与对端设备配置保持一致）
[SW1 -vsan10] zone name zone1
[SW1 -vsan10-zone-zone1]pairwise-zoning enable
[SW1 -vsan10-zone-zone1] member pwwn 11:11:11:11:11:11:11:11 initiator
[SW1 -vsan10-zone-zone1] member pwwn 22:22:22:22:22:22:22:22 initiator
[SW1 -vsan10-zone-zone1] member pwwn 33:33:33:33:33:33:33:33 target
[SW1 -vsan10-zone-zone1] quit
[SW1 -vsan10] zone name zone2
[SW1 -vsan10-zone-zone2]pairwise-zoning enable
[SW1 -vsan10-zone-zone2] member pwwn 11:11:11:11:11:11:11:11 initiator
[SW1 -vsan10-zone-zone2] member pwwn 22:22:22:22:22:22:22:22 initiator
[SW1 -vsan10-zone-zone2] member pwwn 44:44:44:44:44:44:44:44 target
[SW1 -vsan10-zone-zone2] quit
[SW1 -vsan10] zoneset name zoneset1
[SW1 -vsan10-zoneset-zoneset1] member zone1
[SW1 -vsan10-zoneset-zoneset1] member zone2
[SW1 -vsan10-zoneset-zoneset1] quit
[SW1 -vsan10] zoneset activate name zoneset1 （zone策略激活并扩散同步）
```

（二）SW2

开启高级模式，设置FCoE模式（必选）

```
<SW2> system-view
[SW2] system-working-mode advance //必选
[SW2] save
< SW2 > reboot
[SW2] fcoe-mode fcf     //必选
```

创建vsan与vlan关联（必选）

```
[SW2] vsan 10 //必选
[SW2-vsan10] domain-id 2 static //可选，建议手动配置
[SW2-vsan10] fspf enable //可选，默认使能
[SW2] vlan 10 //必选
[SW2-vlan10] fcoe enable vsan 10        //必选
 [SW2-vlan10] quit
```

配置FC端口关联vsan（必选）

```
[SW2] interface Ten-GigabitEthernet1/2/3
[SW2 -Ten-GigabitEthernet1/2/3] port-type fc  //必选
[SW2] interface Ten-GigabitEthernet1/2/4
[SW2 -Ten-GigabitEthernet1/2/4] port-type fc  //必选
[SW2] interface fc 1/2/3
[SW2 -fc1/2/3] fc mode e //必选
[SW2 -fc1/2/3] port trunk vsan 10        //必选
[SW2 -fc1/2/3] qos trust dot1p
[SW2] interface fc 1/2/4
[SW2 -fc1/2/4] fc mode e //必选
```

[SW2 -fc1/2/4] port trunk vsan 10　　//必选
[SW2 -fc1/2/4] qos trust dot1p
配置FC链路聚合
[SW2] interface san-aggregation 1
[SW2-SAN-Aggregation1] fc mode e
[SW2-SAN-Aggregation1] quit
[SW2] interface fc 1/2/3
[SW2-Fc1/2/3] shutdown
[SW2-Fc1/2/3] san-aggregation group 1
[SW2-Fc1/2/3] undo shutdown
[SW2-Fc1/2/3] quit
[SW2] interface fc 1/2/4
[SW2-Fc1/2/4] shutdown
[SW2-Fc1/2/4] san-aggregation group 1
[SW2-Fc1/2/4] undo shutdown
[SW2-Fc1/2/4] quit
[SW2] interface san-aggregation 1
[SW2-SAN-Aggregation1] fc mode e //必选
[SW2-SAN-Aggregation1]port trunk vsan 10　　//必选
配置以太网链路聚合
[SW2] interface bridge-aggregation 1
[SW2-Bridge-Aggregation1] port trunk permit vlan 10
[SW2-Bridge-Aggregation1] quit
[SW2] interface ten-gigabitethernet 1/0/2
[SW2-Ten-GigabitEthernet1/0/2] port link-aggregation group 1
[SW2] interface ten-gigabitethernet 1/0/3
[SW2-Ten-GigabitEthernet1/0/3] port link-aggregation group 1
配置VFC端口关联vsan（必选）
[SW2] interface vfc 102
[SW2-Vfc102] fc mode e
[SW2-Vfc102] bind interface interface bridge-aggregation 1
[SW2-Vfc102] port trunk vsan 10
[SW2-Vfc102] quit
配置物理端口（必选）
[SW2] interface Ten-GigabitEthernet1/0/2
[SW2-Ten-GigabitEthernet1/0/2] port link-mode bridge
[SW2-Ten-GigabitEthernet1/0/2] port link-type trunk　（必选，或hybrid模式）
[SW2-Ten-GigabitEthernet1/0/2] port trunk permit vlan 10（必选）
[SW2-Ten-GigabitEthernet1/0/2]] qos trust dot1p（必选）
[SW2] interface Ten-GigabitEthernet1/0/3
[SW2-Ten-GigabitEthernet1/0/3] port link-mode bridge
[SW2-Ten-GigabitEthernet1/0/3] port link-type trunk　（必选，或hybrid模式）
[SW2-Ten-GigabitEthernet1/0/3] port trunk permit vlan 10（必选）
[SW2-Ten-GigabitEthernet1/0/3]] qos trust dot1p（必选）
ZONE配置（H3C设备必选）
[SW2] VSAN 10
[SW2 -vsan10] domain-id 2 static
[SW2 -vsan10] zone mode enhanced（可选，推荐-便于FCID管理 和 zone策略扩散）
[SW2 -vsan10] zone default-zone permit （必选，需要与对端设备配置保持一致）
SW2无需进行ZONE相关配置
QoS配置- PFC （H3C设备必选）
[SW2] interface ten-gigabitethernet 1/0/2
[SW2 -Ten-GigabitEthernet1/0/2] priority-flow-control auto
[SW2 -Ten-GigabitEthernet1/0/2] priority-flow-control no-drop dot1p 3
[SW2 -Ten-GigabitEthernet1/0/2] qos trust dot1p
[SW2 -Ten-GigabitEthernet1/0/2] quit

（三）SW3
开启高级模式，设置FCoE模式（必选）
<SW3> system-view
[SW3] system-working-mode advance //必选
[SW3] save

< SW3 > reboot
[SW3] fcoe-mode fcf　//必选
创建vsan与vlan关联（必选）
[SW3] vsan 10 //必选
[SW3-vsan10] domain-id 3 static //可选，建议手动配置
[SW3-vsan10] fspf enable //可选，默认使能
[SW3] vlan 10 //必选
[SW3-vlan10] fcoe enable vsan 10　　//必选
[SW3-vlan10] quit
配置以太网链路聚合
[SW3] interface bridge-aggregation 1
[SW3-Bridge-Aggregation1] port trunk permit vlan 10
[SW3-Bridge-Aggregation1] quit
[SW3] interface ten-gigabitethernet 1/0/2
[SW3-Ten-GigabitEthernet1/0/2] port link-aggregation group 1
[SW3] interface ten-gigabitethernet 1/0/3
[SW3-Ten-GigabitEthernet1/0/3] port link-aggregation group 1
配置VFC端口关联vsan（必选）
[SW3] interface vfc 121 (必选)
[SW3-Vfc121] fc mode f (必选)
[SW3-Vfc121] bind interface ten-gigabitethernet 1/2/1 (必选)
[SW3-Vfc121] port trunk vsan 10 (必选)
[SW3-Vfc121] quit
[SW3] interface vfc 122 (必选)
[SW3-Vfc122] fc mode f (必选)
[SW3-Vfc122] bind interface ten-gigabitethernet 1/2/2 (必选)
[SW3-Vfc122] port trunk vsan 10 (必选)
[SW3-Vfc122] quit
[SW3] interface vfc 102
[SW3-Vfc102] fc mode e
[SW3-Vfc102] bind interface interface bridge-aggregation 1
[SW3-Vfc102] port trunk vsan 10
[SW3-Vfc102] quit
配置物理端口（必选）
[SW3] interface Ten-GigabitEthernet1/2/1
[SW3-Ten-GigabitEthernet1/2/1] port link-mode bridge
[SW3-Ten-GigabitEthernet1/2/1] port link-type trunk　（必选，或hybrid模式）
[SW3-Ten-GigabitEthernet1/2/1] port trunk permit vlan 10（必选）
[SW3-Ten-GigabitEthernet1/2/1] qos trust dot1p（必选）
[SW3] interface Ten-GigabitEthernet1/2/2
[SW3-Ten-GigabitEthernet1/2/2] port link-mode bridge
[SW3-Ten-GigabitEthernet1/2/2] port link-type trunk　（必选，或hybrid模式）
[SW3-Ten-GigabitEthernet1/2/2] port trunk permit vlan 10（必选）
[SW3-Ten-GigabitEthernet1/2/2] qos trust dot1p（必选）
[SW3] interface Ten-GigabitEthernet1/0/2
[SW3-Ten-GigabitEthernet1/0/2] port link-mode bridge
[SW3-Ten-GigabitEthernet1/0/2] port link-type trunk　（必选，或hybrid模式）
[SW3-Ten-GigabitEthernet1/0/2] port trunk permit vlan 10（必选）
[SW3-Ten-GigabitEthernet1/0/2]] qos trust dot1p
[SW3] interface Ten-GigabitEthernet1/0/3
[SW3-Ten-GigabitEthernet1/0/3] port link-mode bridge
[SW3-Ten-GigabitEthernet1/0/3] port link-type trunk　（必选，或hybrid模式）
[SW3-Ten-GigabitEthernet1/0/3] port trunk permit vlan 10（必选）
[SW3-Ten-GigabitEthernet1/0/3]] qos trust dot1p
ZONE配置（H3C设备必选）
[SW3] VSAN 10
[SW3 -vsan10] domain-id 2 static
[SW3 -vsan10] zone mode enhanced（可选，推荐-便于FCID管理 和 zone策略扩散）
[SW3 -vsan10] zone default-zone permit （必选，需要与对端设备配置保持一致）
QoS配置-DCBX （H3C设备必选）

```
[SW3] lldp global enable
[SW3] acl number 4000
[SW3-acl-ethernetframe-4000] rule 0 permit type 8906 ffff
[SW3-acl-ethernetframe-4000] rule 5 permit type 8914 ffff
[SW3-acl-ethernetframe-4000] quit
[SW3] traffic classifier DCBX operator or
[SW3-classifier-DCBX] if-match acl 4000
[SW3-classifier-DCBX] quit
[SW3] traffic behavior DCBX
[SW3-behavior-DCBX] remark dot1p 3
[SW3-behavior-DCBX] quit
[SW3] qos policy DCBX
[SW3-qospolicy-DCBX] classifier DCBX behavior DCBX mode dcbx
[SW3-qospolicy-DCBX] quit
[SW3] interface ten-gigabitethernet 1/2/1
[SW3-Ten-GigabitEthernet1/2/1] lldp enable
[SW3-Ten-GigabitEthernet1/2/1] lldp tlv-enable dot1-tlv dcbx
[SW3-Ten-GigabitEthernet1/2/1] qos apply policy DCBX outbound
[SW3-Ten-GigabitEthernet1/2/1] quit
[SW3] interface ten-gigabitethernet 1/2/2
[SW3-Ten-GigabitEthernet1/2/2] lldp enable
[SW3-Ten-GigabitEthernet1/2/2] lldp tlv-enable dot1-tlv dcbx
[SW3-Ten-GigabitEthernet1/2/2] qos apply policy DCBX outbound
[SW3-Ten-GigabitEthernet1/2/2] quit
```

QoS配置- PFC （H3C设备必选）

```
[SW3] interface ten-gigabitethernet 1/2/1
[SW3-Ten-GigabitEthernet1/2/1] priority-flow-control auto
[SW3 -Ten-GigabitEthernet1/2/1] priority-flow-control no-drop dot1p 3
[SW3 -Ten-GigabitEthernet1/2/1] qos trust dot1p
[SW3 -Ten-GigabitEthernet1/2/1] quit
[SW3] interface ten-gigabitethernet 1/2/2
[SW3-Ten-GigabitEthernet1/2/2] priority-flow-control auto
[SW3 -Ten-GigabitEthernet1/2/2] priority-flow-control no-drop dot1p 3
[SW3 -Ten-GigabitEthernet1/2/2] qos trust dot1p
[SW3 -Ten-GigabitEthernet1/2/2] quit
[SW3] interface ten-gigabitethernet 1/0/2
[SW3 -Ten-GigabitEthernet1/0/2] priority-flow-control auto
[SW3 -Ten-GigabitEthernet1/0/2] priority-flow-control no-drop dot1p 3
[SW3 -Ten-GigabitEthernet1/0/2] qos trust dot1p
[SW3 -Ten-GigabitEthernet1/0/2] quit
```

QoS配置- ETS （H3C设备必选）

```
[SW3] qos map-table dot1p-lp
[SW3-maptbl-dot1p-lp] import 3 export 1
[SW3-maptbl-dot1p-lp] import 0 export 0
[SW3-maptbl-dot1p-lp] import 1 export 0
[SW3-maptbl-dot1p-lp] import 2 export 0
[SW3-maptbl-dot1p-lp] import 4 export 0
[SW3-maptbl-dot1p-lp] import 5 export 0
[SW3-maptbl-dot1p-lp] import 6 export 0
[SW3-maptbl-dot1p-lp] import 7 export 0
[SW3-maptbl-dot1p-lp] quit
[SW3] interface ten-gigabitethernet 1/2/1
[SW3-Ten-GigabitEthernet1/2/1] qos wrr af1 group 1 byte-count 1
[SW3-Ten-GigabitEthernet1/2/1] qos wrr be group 1 byte-count 1
[SW3-Ten-GigabitEthernet1/2/1] qos wrr af2 group sp
[SW3-Ten-GigabitEthernet1/2/1] qos wrr af3 group sp
[SW3-Ten-GigabitEthernet1/2/1] qos wrr af4 group sp
[SW3-Ten-GigabitEthernet1/2/1] qos wrr ef group sp
[SW3-Ten-GigabitEthernet1/2/1] qos wrr cs6 group sp
[SW3-Ten-GigabitEthernet1/2/1] qos wrr cs7 group sp
[SW3-Ten-GigabitEthernet1/2/1] quit
[SW3] interface ten-gigabitethernet 1/2/2
[SW3-Ten-GigabitEthernet1/2/2] qos wrr af1 group 1 byte-count 1
[SW3-Ten-GigabitEthernet1/2/2] qos wrr be group 1 byte-count 1
```

```
[SW3-Ten-GigabitEthernet1/2/2] qos wrr af2 group sp
[SW3-Ten-GigabitEthernet1/2/2] qos wrr af3 group sp
[SW3-Ten-GigabitEthernet1/2/2] qos wrr af4 group sp
[SW3-Ten-GigabitEthernet1/2/2] qos wrr ef group sp
[SW3-Ten-GigabitEthernet1/2/2] qos wrr cs6 group sp
[SW3-Ten-GigabitEthernet1/2/2] qos wrr cs7 group sp
[SW3-Ten-GigabitEthernet1/2/2] quit
```

表项信息：

（一）SW1

```
<SW1>dis fc name-service database //显示名称服务数据库信息
VSAN: 10
  FCID     Type            PWWN(vendor)                FC4-type:feature
  0x010001 0x01(N)         11:11:11:11:11:11:11:11     SCSI-FCP:Initiator
  0x010002 0x01(N)         22:22:22:22:22:22:22:22     SCSI-FCP:Initiator
  0x030001 0x01(N)         33:33:33:33:33:33:33:33     SCSI-FCP:Target
  0x030002 0x01(N)         44:44:44:44:44:44:44:44     SCSI-FCP:Target
<SW1> display fc routing-table vsan 10
  Routing Table: VSAN 10
  Destinations : 3        Routes : 4
  Destination/mask   Protocol   Preference   Cost     Interface
  0x030000/8         FSPF       20           100      SAN-Aggregation1
```

（二）SW2

```
<SW1> display fc routing-table vsan 10
  Routing Table: VSAN 10
  Destinations : 3        Routes : 4
  Destination/mask   Protocol   Preference   Cost     Interface
  0x030000/8         FSPF       20           100      Vfc102
```

（三）SW3

```
<SW2> dis fc login vsan 10     //显示本地节点注册的相关信息
Interface VSAN FCID     Node WWN                Port WWN
Vfc121      10  0x030001 88:88:33:33:33:33:33:33 33:33:33:33:33:33:33:33
Vfc122      10  0x030002 88:88:44:44:44:44:44:44 44:44:44:44:44:44:44:44
```

1、 Qos trust dot1p配置，必须在SW1、SW2、SW3之间的12个物理接口上进行部署（San-aggregation接口上无法部署，仅能在成员FC物理接口上部署），以保障流量转发的可靠性；

2、 Zone视图下，若指定member角色（member pwwn xx:xx:xx:xx:xx:xx:xx:xx initiator/traget），则需要需要将zone设定为enhanced模式（zone mode enhanced），以便角色在zone策略扩散时，能够被其他设备识别并保证同步成功；

3、 Zone default-zone permit需要在SW1、SW2、SW3 三台交换机对应的VSAN中都进行配置，否则zone策略无法扩散成功；

4、 实验中两台服务器、两台存储设备对应的FC或VFC接口必须属于同一个VSAN_ID中（不同VSAN之间Enode设备无法进行通信）；

5、 FC接口在加入到San-aggregation前，必须要先shutdown，待FC接口加入到San-aggregation后，再undo shutdown；

6、 交换机上通过display fc login命令查看节点注册信息时，仅能够看到与本FCF交换机直连的服务器或存储设备的PWWN信息，对于远端交换机上的服务器或存储PWWN信息查看不到；

7、 实验中对于FCoE流量带宽均按照50%的形式进行配置部署，及FCoE与普通以太网流量比为1:1的关系。在实际的客户组网中，需要根据实际情况进行调整，请注意下调整方法。下面是给大家的一个举例，可参考：

a、 通过MQC将FCoE流量remark为dot1p 3

```
#
traffic classifier DCBX operator or
if-match acl 4000
#
traffic behavior DCBX
remark dot1p 3
#
```

b、通过dot1p-lp对应关系，将FCoE流量指定为AF1队列

```
#
qos map-table dot1p-lp
```

```
import 0 export 0
import 2 export 0
import 3 export 1        //1对应af1队列
import 4 export 0
import 5 export 0
import 6 export 0
import 7 export 0
#
[H3C-Ten-GigabitEthernet1/0/22]qos wrr ?
  INTEGER<0-7>  Queue number
  af1           Interior precedence is AF1 (1)
```

c、 在接口上对FCoE流量与以太网流量带宽占比进行调整

```
#
interface Ten-GigabitEthernet1/0/27
……
priority-flow-control auto
 priority-flow-control no-drop dot1p 3
 lldp tlv-enable dot1-tlv dcbx
qos trust dot1p
qos wrr af1 group 1 byte-count 4      //将af1队列权值定义为4
qos wrr be group 1 byte-count 1（缺省配置，display cu时缺省不显示） //缺省所有流量都是在be 0号
队列中的，权值为1，因此Fcoe与普通以太网流量比就是4:1
……
#
```