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Chapter 1 VSF

1.1 Overview

1.1.1 Introduction of VSF

Note: VSF on SNR-S2990G series works on FW 7.0.3.5(R0254.xxxx)

VSF is using the VSF port to connect several servers and build up a virtual logical facility. The user can use this virtual machine to manage all the physical facilities that link up together.

Traditional district and the data center network is using the multiple layer network topology structure design as shown below in the Fig 1-1. The following are the drawbacks of this type of network:

- (1) The network and the server are complicated, thus it will cause the operation efficiency decrease and at higher cost.
- (2) No status internet conk out switch will delay the recover time of application and break out time of operation.
- (3) Low usage of resources will decrease the return of income (ROI) and increase the capital.

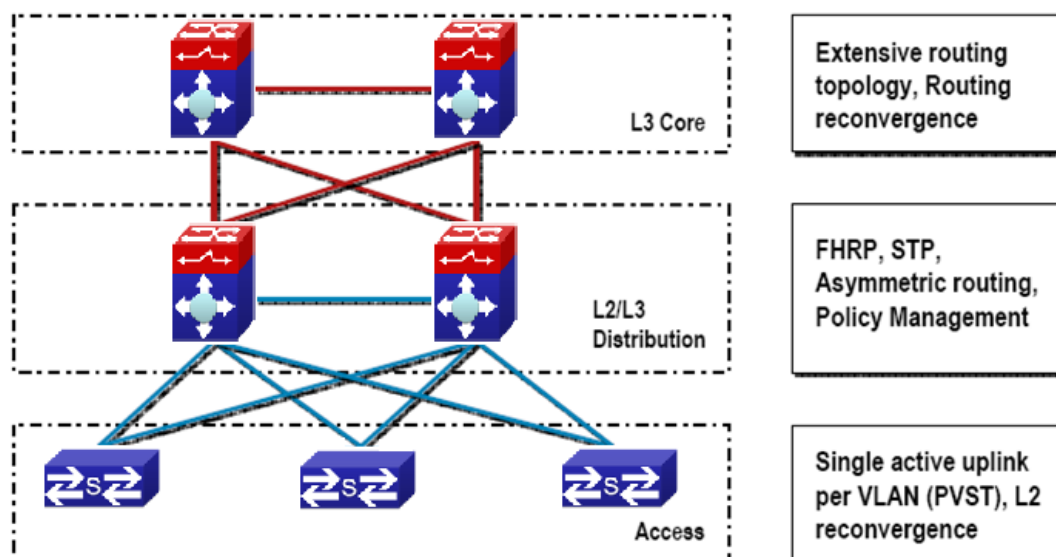


Fig 1-1 Traditional Enterprise Network

In order to solving these problems, VSF comes. Make up more than one device which supports VSF to be the single virtualization switch. In VSF, the data panel of the

management engine and the exchange array of both switches can be activated at the same time. Members of VSF can throughout the VSL to connection. The VSL standard among the members of the switches is using million-mega Ethernet for connection (maximum have 4 linkage, to provide redundancy), likeFig 1-2.

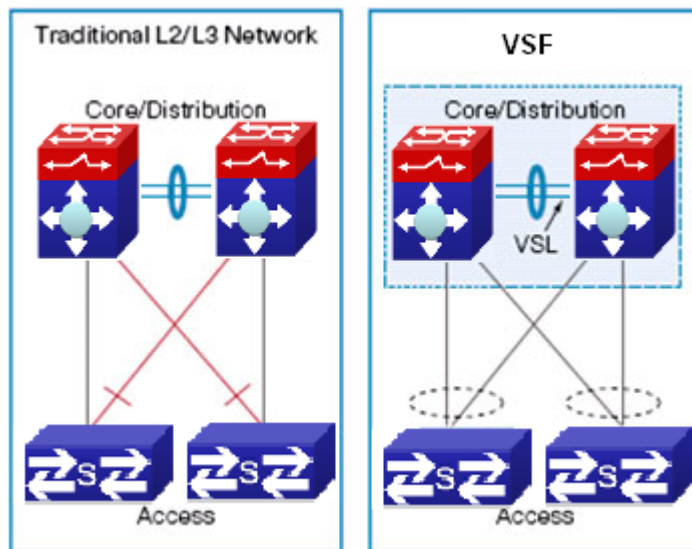


Fig 1-2 VSF

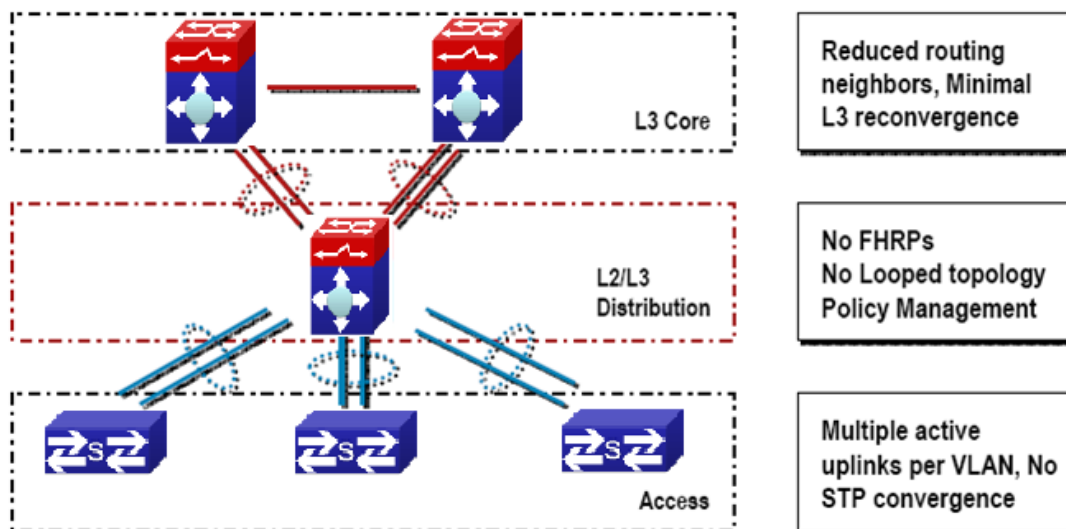


Fig 1-3 Enterprise that adopting virtual technology

Compare with the tradition L2/L3network design, VSF provides with multiple markedness advantages. All in all, we can conclude with 3 main advantages:

1. VSF can increase the efficiency of operation
Only one management point, including configuration documents and gateway IP

address (dispense with HSRP/ VRRP/GLBP)

One logical device which is made up by multiple physical devices creates the simple topology without loop and without the spanning tree protocol (STP).

Bottom physical switches connect together by using standard million-mega Ethernet port; it provides a flexible deploy option for the location.

2. VSF can optimize the uninterruptedly communication

Switches status conk out switching will not interrupt the applications which are using the internet status information. With the help of VSF, if one of the virtual switch members is out of order, no need to continous the reconstringency of L2/L3 can restart the virtual switch recover in short time.

3. VSF can expand the system bandwidth capacity

In the vsf switch can activate all the L2 bandwidth, can carry on the equilibrium of load on the multiple members of VSF when expanding the bandwidth.

1.1.2 Basic Concept

(1) Role

Each of the facilities in the VSF is called member facility. According to the function of each member facility, will divide into 2 different roles:

Master: Responds for manage entire VSF

Standby Master: Is the standby member of VSF, as the Master backup facility for operation. When the Master is out of order, the systems will handover to Standby Master automatically to perform the original job of Master.

Slave: The member facilities that are other than Master and Standby Master in VSF.

Master, Standby Master and Slave are produced by election. For entire VSF, it can only have one Master, one Standby Master, other members should be Slave.

(2) VSF port

It is a logic port which is particular use for VSF. It divides into vsf-port1 and vsf-port2, need to colligate with the VSF physical port and then become effictive.

(3) VSF physical port

It is the facility that is used for physical connection port for VSF. VSF physical port can be VSF specific port, Ethernet port or light port (different equipment and the model will using different port, please equipt it according to the virtual situtation). Usually, Ethernet port and light port respond for transmitting operation message. After they colligate with the VSF port, they will become the VSF physical port. They will use for transmitting the message within the members. The message including VSF related negotiation message and the operation message that needs to cross over different members.

(4) Merge

Two different VSF operation separately, throughout the physical connection and configuration, it will become one VSF. This process is called merge.



Fig 1-4 Merging of VSF

(5) Split

One VSF is formed. Due to the VSF link is out of order, it will cause the facilities that are border upon cannot connect together physically. Therefore, one stracking will divide into two stracking. This process is called split.

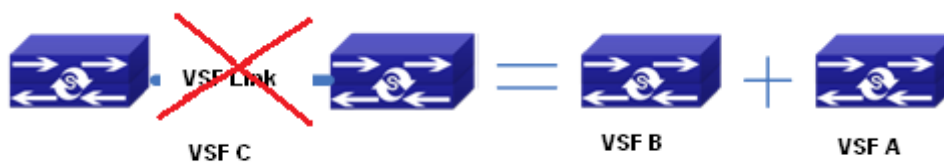


Fig 1-5 Splitting of tacking

(6) Priority of member

Priority of member is the member facilities attribute, mainly use for the role selection for confirming the role of each members. If the facility has higher the priority, it will have higher chance to become the Master. The default setting of the facilities is 1. If the user want to pre-set particular facility become the Master, he can increase the priority value of that facility manually before build up the VSF.

1.1.3 Glossary

VSF is the short form of the Virtual Switching Framework.

VSF Port: VSF port, is a mode on port-channel

VSF AM: the master card of the VSF activities

VSF SM: the backup master card of the VSF activities

VSF Slave: the slave card of VSF, to operate the VSF agreement ,during the switching it means Chassis AM, the not selecte one is VSF AM or VSF SM

VSF Member: the member facilities of VSF

VSF Master Member: the master member facility of VSF

VSF Standby Master Member: the standby master member facility of VSF

VSF Slave Member: the slave member facilities of VSF

HA: High Availability

AM: Active Master, activities controller. It is the switch whose working mode is Master is and it is in the operation status, each of the cassette vsf group can only has a AM at each time.

SM: Standby Master, the working mode in the cassette vsf group is Master and it

locates in the standby status.

SSO: Stateful Switchover, the data of in-phase agreement layer will occur the switchover, the backup master agreement apply function which can connect to corresponding function fleetly. The data of this function will not be lose, but the router agreement data is not in-phase

NSF: None Stop Forwarding. Using the independent management characteristics of data layer control, data layer can still transmit data normally as the control layer is out of order

NSF/SSO: Nonstop Forwarding with Stateful Switchover means that undergo the SSO “master-backup interchange” , the data transmit is not affected

Syn process: HA synchronization processes responsible for activities control and backup agreement function collection or distribution and data synchronization communication.

GR: Graceful restart. In order to transmitting uninterruptedly, require the router confer to extend to support the GR ability.

MAD: Multi-Active Detection

1.1.4 VSF Typical Application

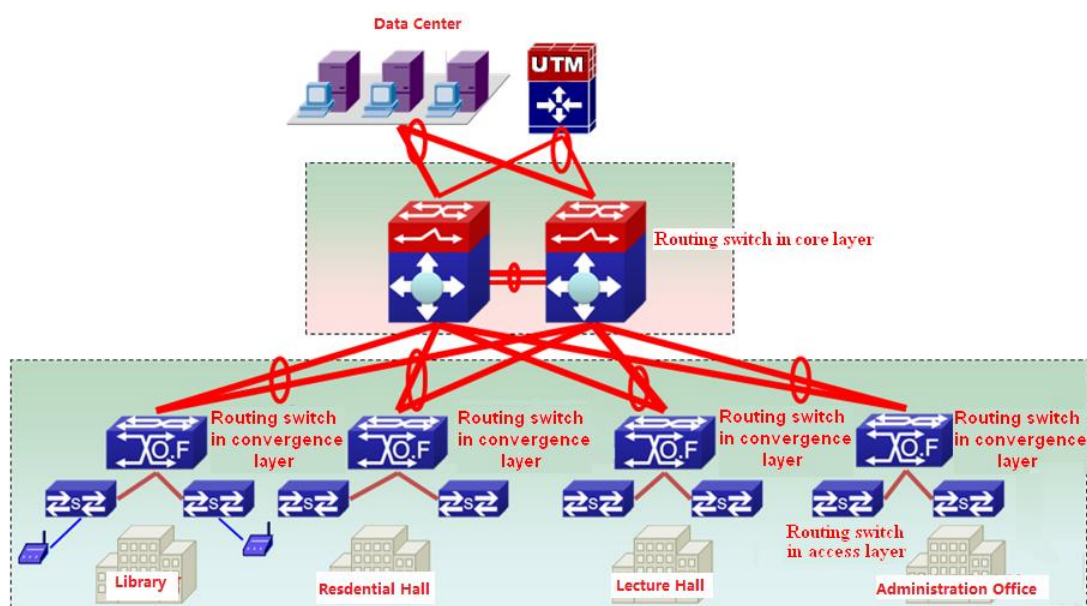


Fig 1-6 application of VSF in the campus data center

Fig 1-6 is the application of VSF in the campus internet. After using the VSF, it groups several facilities together to become the single logic facility and connect to the virtual facility. After the predigestion, the network do not need to use MSTP, VRRP protocol, it simplifies the network configuration. At the same time, it relies on the cross facilities to

aggregate the link. When some of the members are out of order, it will not rely on MSTP, VRRP protocol etc constringency, thus in increase the reliability.

1.1.5 LACP MAD

lacp mad is the dynamic aggregation method based on lacp. Each member device of vsf has one port connecting to the middle device at least.

Notice: The middle device must be the device which supports the extended function of lacp.

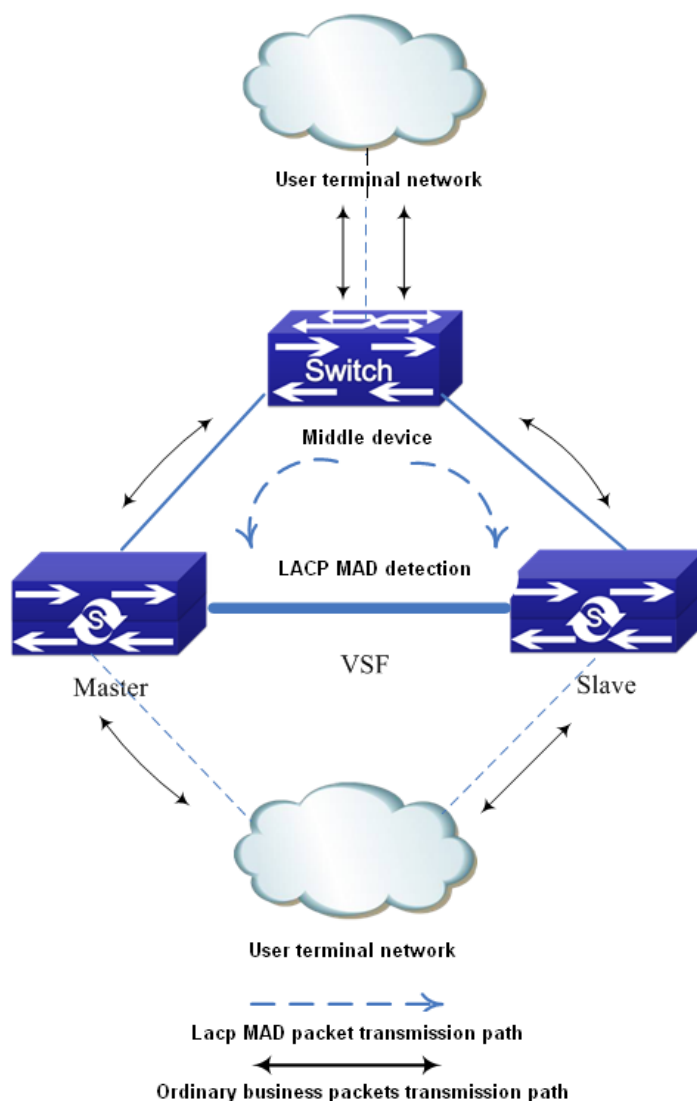


Fig 1-7 LACP MAD detection

LACP MAD detection is achieved through the extended LACP protocol packets content. It defines a new TLV (Type Length Value) in the extended field of LACP protocol packets and this TLV is used for the ActiveID of the interaction VSF. For VSF system, ActiveID value is unique, and it is expressed by the member number of the master device in VSF. After enabling LACP MAD detection, the member device interact the ActiveID

information with other member devices through the LACP protocol packets.

When VSF is running normally, the ActiveID values of the LACP protocol packets sent by all member devices are the same, there is no Active conflict.

When the VSF is split into two vsf, the ActiveID values of the LACP protocol packets sent by different VSF member devices are the different and multiple Active conflict will be detected.

1.2 Relevant VSF Configuration

1.2.1 VSF Configuration

VSF configuration task list:

1. Configure the number of VSF members (necessary)
2. Configure the priority of VSF members (optional)
3. Configure the VSF domain (optional)
4. Configure the logic VSF port
 - (1) Configure the logic VSF port
 - (2) Bind the physical port to the logic port
5. Transform the device from independent operation mode to VSF operation mode
6. Configure the VSF to merge automatically (optional)
7. Describe the VSF members (optional)
8. Configure the down delaying reporting function of the VSF link (optional)
9. Configure the keeping time of MAC address of VSF group after VSF split (optional)
10. Transform the device from VSF operation mode to the independent operation mode
11. Detect the VSF link status' change quickly

1. Configure the number of VSF members (necessary)

Command	Explanation
Global Mode	
vsf member <member-id> no vsf member <member-id>	Configure/delete the number of VSF members.

2. Configure the priority and domain of VSF members (optional)

Command	Explanation
Global Mode	
vsf priority <priority> no vsf priority	Configure/delete the priority of VSF members.
vsf domain <domain-id> no vsf domain	Configure/delete the VSF domain, the nocommand recovers to be default of 1.

3. Configure the logic VSF port and Bind the physical port to the logic port

Command	Explanation
Global Mode	
vsf port-group <port-number> no vsf port-group <port-number>	Configure/delete the logic VSF port.
VSF Port Configuration Mode	
vsf port-group interface Ethernet <interface-list> no vsf port-group interface Ethernet <interface-list>	Bind the physical port to the logic VSF port or delete the binding.

4. Transform the operation modes of the device

Command	Explanation
Global Mode	
switch convert mode (stand-alone vsf)	Transform the device from independent operation mode to VSF operation mode or transform the device from VSF operation mode to the independent operation mode

5. Other configurations

Command	Explanation
Global Mode	
vsf auto-merge enable no vsf auto-merge enable	Enable the automatic merger function of VSF, the no command disables this function.
vsf member <member-id> description <text> no vsf member <member-id> description	Describe the VSF members. This information will be only written in the VSF master configuration file. The no command deletes this information.
vsf link delay<interval> no vsf link delay	Configure the down delaying reporting function of the VSF link, using for avoid link to split and merge due to changing in short period of time. The no command will set the time for delay report to default value.
vsf mac-address persistent <timer always> no vsf mac-address persistent	Configure VSF split group MAC address retention time. No command deletes the MAC address retention time.

vsf non-wait port-inactive no vsf non-wait port-inactive	Detect the VSF link status' change quickly for discovering the vsf splitting. The no command recovers to be the default method.
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1.2.2 LACP MAD Configuration

LACP MAD configuration task list:

1. Create the aggregation groups
2. Add the port into the aggregation group, and one is with the active method at least
3. Configure the quick detection (optional)
4. Enable LACP MAD

1. Create the aggregation groups

Command	Explanation
Global Mode	
port-group <port-group id> no Port-group <port-group id>	Create/delete the port-group.

2. Add the port into the aggregation group

Command	Explanation
Global Mode	
interface ethernet <port-num>	Enter into the port mode.
Port Mode	
port-group <port-group id> mode <active passive> no port-group <port-group id>	Add the port into the aggregation group or let it quit.

3. Configure the quick detection

Command	Explanation
Port Mode	
lacp timeout <long short> no lacp timeout	Configure/delete the quick detection.

4. Enable LACP MAD

Command	Explanation
Aggregation Port Mode	
vsf mad lacp <enable disable>	Enable/disable LACP MAD on port-group.

1.3 Typical VSF Example

Case 1:

Configure under the independent operation mode, let two switches create VSF. The member number of these two facilities is 1 and 2. In order to let vsf member2 as the vsf master, configure the priority of member 2 as 32, and build up two vsf port-group between both facilities. Each of the vsf port-group will colligate one of the million mega port.

switch1 VSF configuration as following:

```
switch1#config
switch1(config)#vsf member 1
switch1(config)#vsf port-group 1
switch1(config-vsf-port1)#vsf port-group interface ethernet 1/1
switch1(config)#vsf port-group 2
switch1(config-vsf-port1)#vsf port-group interface ethernet 1/2
switch1(config)#exit
switch1(config)#switch convert mode vsf
```

switch2 VSF configuration as following:

```
switch2#config
switch1(config)#vsf member 2
switch1(config)#vsf priority 32
switch1(config)#vsf port-group 1
switch1(config-vsf-port1)#vsf port-group interface ethernet 2/1
switch1(config)#vsf port-group 2
switch1(config-vsf-port1)#vsf port-group interface ethernet 2/2
switch1(config)#exit
switch1(config)#switch convert mode vsf
```

Case 2:

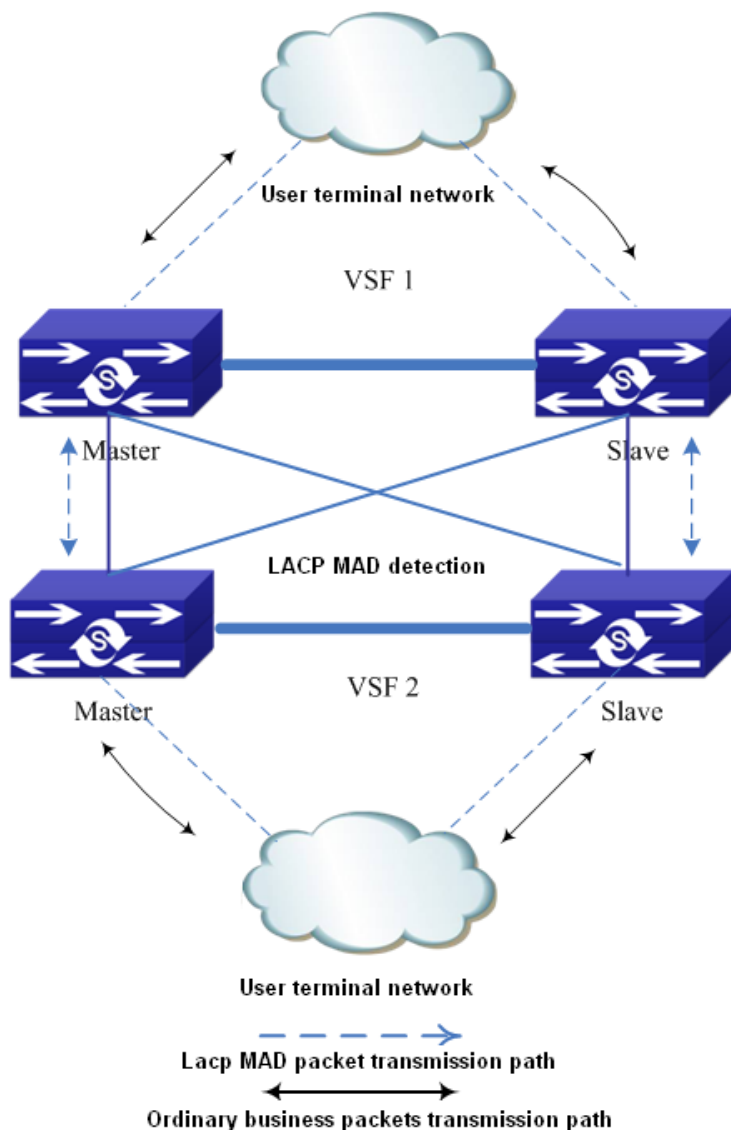


Fig 1-8 lacp mad detection topology

As shown in the above picture, use the lacp mad detection function between two vsf. Vsf1 and vsf2 are the devices which are detected and they are also the middle devices. The configuration is same with above. Proposal: uses create the overlapping connection among the devices to avoid that the vsf1 cannot be the middle device to detect vsf2 after it is split.

Assume that vsf1 and vsf2 use the lacp ports of ethernet1/1/1, ethernet 1/1/2, ethernet 2/1/1 and ethernet 2/1/2.

vsf1 configuration:

```
Switch(config)#vsf domain 1
```

Configure vsf domain number, it can be configured as other value but it cannot be the same as vsf2.

```
Switch(config)#port-group 1
```

```
Switch(config)#interface ethernet 1/1/1
```

```
Switch(config-if-ethernet1/1/1)#port-group 1 mode active
Switch(config)#interface ethernet 1/1/2
Switch(config-if-ethernet1/1/2)#port-group 1 mode active
Switch(config)#interface ethernet 2/1/1
Switch(config-if-ethernet2/1/1)#port-group 1 mode active
Switch(config)#interface ethernet 2/1/2
Switch(config-if-ethernet2/1/2)#port-group 1 mode active
Switch(config-if-ethernet2/1/2)#interface port-channel 1
Switch(config-if-port-channel1)#vsf mad lacp enable
```

vsf2 configuration:

```
Switch(config)#vsf domain 2
```

Configure vsf domain number, it can be configured as other value but it cannot be the same as vsf1.

Other configuration is same as the configuration on vsf1.

1.4 VSF Troubleshooting

For VSF, under the configuration and usage, the command may not be workable, please pay attention to the following items:

- ☞ Whether it is at the operation mode, because some of the commands can only be configured at VSF operation mode, but some of them can operation at both VSF and independent operation mode.

Under the failure of VSF during the VSF processes, or appear any abnormality, please pay attention to the following thing:

- ☞ First, need to check whether physical connection is correct. Right now, the group VSF machine can only support million-mega port or logic port colligate. Please check whether the colligate port is the million-mega port.
- ☞ Whether the Vsf member id is clash, if the member ids are clashing, the facilities cannot form vsf.
- ☞ Whether the Vsf domain numbers are same. Only the vsf domain numbers are identical, the facilities can form the vsf.
- ☞ To see whether the logical port has any physical connection, for example, double speed, bandwidth restriction, safety authentication, ACL etc configuration.

Under the VSF operation mode to undergo configuration, please pay attention to the following things:

- ☞ During the VSF operation mode, VSF related configuration can be done on the each member separately. However, the configuration done on the members cannot be saved independently. It cans still excute the write function on the vsf master. All the membes' personal configuration that is related to vsf will be save in the main computer's vsf.cfg.
- ☞ Under the VSF operation mode, some of the commands such as VSF domain

number, priority of member, member id etc can still be configured or amended. After the configuration, the show run displays as the latest value, it can only be effective as you restart the computer after saving.

For LACP MAD, under the configuration and usage, if there are problems, please pay attention to the following items:

- ☞ When creating the aggregation group, the aggregation of the device which is detected and the middle device must be identical.
- ☞ The ports of the device which is detected and the middle device cannot be added into the aggregation with on mode for LACP MAD, one should be active method at least.
- ☞ When the device which is detected and the middle device are both vsf, the domain id (vsf domain number) of the two vsf cannot be the same.