Basic VSS Pair Configuration

Virtual Switching System (VSS) allows two Cisco Catalyst 6500 or 4500 switches to be connected together so that they appear to the network as a single switch. Other devices in the network will see the VSS configured switches as a single switch, which allows the engineer the ability to create multi chassis Ether-Channels between the VSS pair and other devices while appearing to other protocols like spanning-tree as a single switch.

By far the best feature of VSS is NSF (Non Stop Forwarding) / SSO (Stateful Switchover) which allows the failure of a single device without any downtime. This is due to the routing table / CEF table etc. being stored in supervisor module of both chassis, allowing one device to take over when the other fails similar to the failover that occurs between supervisor modules in a switch equipped with dual supervisors.

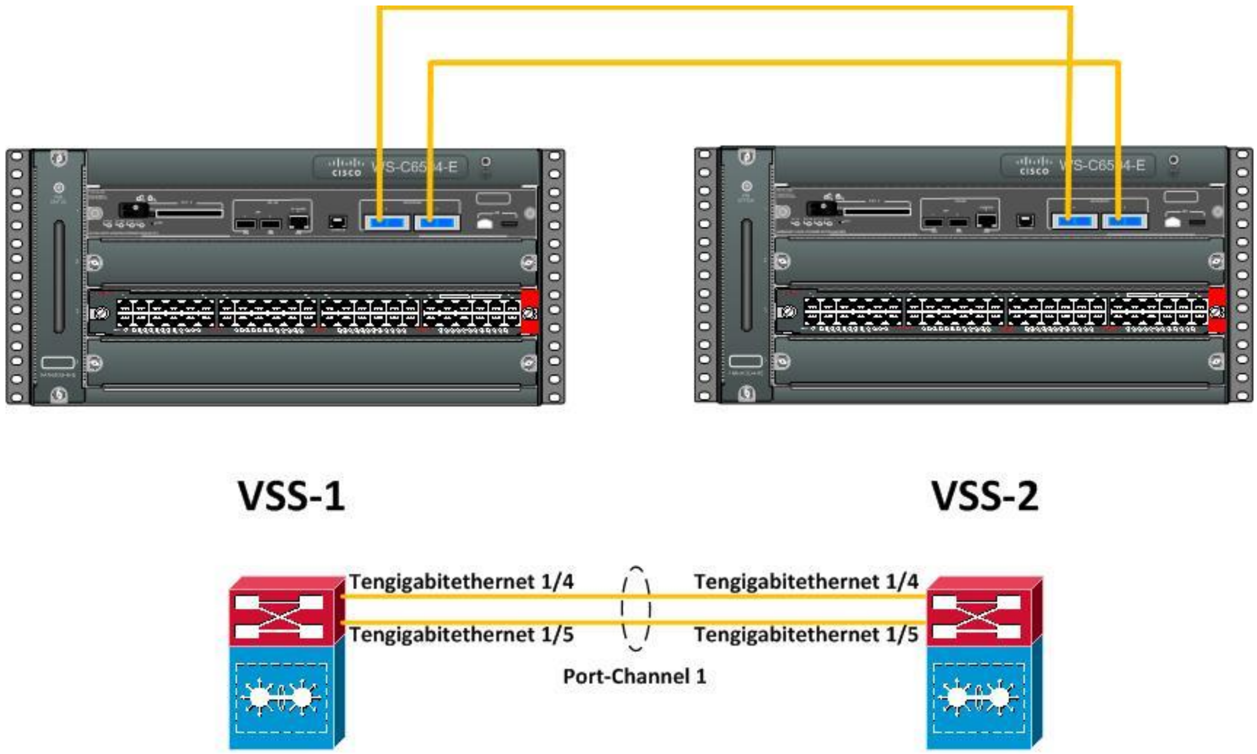
Another great feature of VSS is the ability to have a single point to make changes. Changes made to configuration or IOS on the supervisor of one device within the VSS pair are synchronized to the supervisor of the other device, similar to a 6500 or 4500 with dual supervisors or a 3750 stack.

Learning Objectives:

- Verify software and hardware compatibility with VSS
- Understand and configure Virtual Switch Domains.
- Understand and configure Virtual Switch Links.
- Understand and execute Virtual Switch Conversion.

Topology:

I recently acquired the use of two Cisco 6504-E switches; each switch is configured with a single VS-S720-10G supervisor module and a WS-X6748-GE-TX 40 port Ethernet module. Both switches are running IOS version 15.0(1)SY2.



Tasks:

1. Verify the software and hardware is compatible with VSS.
   a. Display the information of the modules installed in the switch chassis.

```
VSS-1>sh mod
Mod Ports Card Type                                Model              Serial No.
--- ----- -------------------------------------- ------------------ -----------
 1    5  Supervisor Engine 720 10GE (Active)     VS-S720-10G         SAL1443XB2A
 3   48  CEF720 48 port 10/100/1000mb Ethernet  WS-X6748-GE-TX      SAD1711Z3FO

Mod MAC addresses              -------    Hw    Fw           Sw            Status
--- ---------------------------------- ------ ------------ ------------ -------
 1  0026.cb61.adf8 to 0026.cb61.adff  3.2   8.5(4)         15.0(33)SXI7  Ok
 3  0002.fcc1.1bd0 to 0002.fcc1.1bff   1.2   12.2(14r)S5  15.0(33)SXI7  Ok

Mod  Sub-Module                    Model            Serial             Hw   Status
---- ------------------------- ----------- ------------------- ----------------- ------ ------
 1  Policy Feature Card 3          VS-F6K-PFC3C     SAL1442X40S      1.1    Ok
 1  MSFC3 Daughterboard            VS-F6K-MSFC3     SAL1442X15N      5.1    Ok
 3 Centralized Forwarding Card     WS-F6700-CFC     SAD1711Z3FO      3.1    Ok

Mod Online Diag Status
------ --------- ------ -----------
 1     Pass
 3     Pass
```

VSS-2>sh mod

Mod	Ports	Card Type	Model	Serial No.
1	5	Supervisor Engine 720 10GE (Active)	VS-S720-10G	SAL1453XC6A
3	48	CEF720 48 port 10/100/1000mb Ethernet	WS-X6748-GE-TX	SAD1733Z6SO

Mod	MAC addresses	-------	Hw	Fw	Sw	Status
1	0026.cb61.adf8 to 0026.cb61.adff		3.2	8.5(4)	15.0(33)SXI7	Ok
3	0002.fcc1.1bd0 to 0002.fcc1.1bff		1.2	12.2(14r)S5	15.0(33)SXI7	Ok

Mod	Sub-Module	Model	Serial	Hw	Status
1	Policy Feature Card 3	VS-F6K-PFC3C	SAL1461Y40F	1.1	Ok
1	MSFC3 Daughterboard	VS-F6K-MSFC3	SAL1461Y13N	5.1	Ok
3	Centralized Forwarding Card	WS-F6700-CFC	SAD1733Z6SO	3.1	Ok

Mod	Online Diag Status
1	Pass
3	Pass

b. Display the IOS version of the two switches.

VSS-1#show version
Cisco IOS Software, s72033_rp Software (s72033_rp -ADVENTERPRISEK9-M), Version 15.0(33)SXI7, RELEASE SOFTWARE (fc4)
Technical Support: http://www.cisco.com/techsupport

VS-2S#show version
Cisco IOS Software, s72033_rp Software (s72033_rp -ADVENTERPRISEK9-M), Version 15.0(33)SXI7, RELEASE SOFTWARE (fc4)
Technical Support: http://www.cisco.com/techsupport

2. Create a Virtual Switch Domain and assign switch numbers.
   a. Configure VSS-1 to be part of Virtual Switch Domain 1 as switch 1.
   VSS-1#config T
   VSS-1(config)#switch virtual domain 1
   VSS-1(config-vs-domain)#switch 1

   b. Configure VSS-2 to be part of Virtual Switch Domain 1 as switch 2.
   VSS-2#config T
   VSS-2(config)#switch virtual domain 1
   VSS-2(config-vs-domain)#switch 2

   c. Assign a priority to determine which switch will become active and which will be standby. The higher the priority the more likely the switch will become the active

switch. VSS-1 will have a priority of 110 and VSS-2 a priority of 100. This means VSS-1 will become the active switch and VSS-2 the standby.

VSS-2#config T
VSS-2(config)#switch virtual domain 1
VSS-1(config-vs-domain)#switch 1 priority 110
VSS-1(config-vs-domain)#switch 2 priority 100

VSS-2#config T
VSS-2(config)#switch virtual domain 1
VSS-2(config-vs-domain)#switch 1 priority 110
VSS-2(config-vs-domain)#switch 2 priority 100

3. Configure Virtual Switch Link so that the switches can exchange configuration and stateful information between the two physical switches. To do this you can use a single physical interface or create an Ether-Channel. For this demonstration we will use an Ether-Channel.
    a. Create port-channel 1 on VSS-1

    VSS-1#config t
    VSS-1(config)#interface port-channel 1
    VSS-1(config-if)#no shutdown
    VSS-1(config-if)#switch virtual link 1
    VSS-1(config-if)#exit

    b. Configure VSS-1 Tengigabitethernet interface 1/4 and 1/5 to be in the channel-group 1.

    VSS-1(config)#int range ten 1/4 - 5
    VSS-1(config-if-range)#channel-group 1 mode on
    VSS-1(config-if-range)#no shut

    c. Create port-channel 2 on VSS-2

    VSS-2#config t
    VSS-2(config)#interface port-channel 2
    VSS-2(config-if)#no shutdown
    VSS-2(config-if)#switch virtual link 2
    VSS-2(config-if)#exit

    d. Configure VSS-2 Tengigabitethernet interface 1/4 and 1/5 to be in the channel-group 2.

    VSS-2(config)#int range ten 1/4 - 5
    VSS-2(config-if-range)#channel-group 2 mode on
    VSS-2(config-if-range)#no shut

4. Verify Ether-Channel is properly configured and working.
    a. Display the ether-channel summary on both switches.

    VSS-1#show etherchannel summary | incl Po1
    1 Po1(RU) - Te1/4(P) Te1/5(P)

    VSS-2#show etherchannel summary | incl Po2
    2 Po2(RU) - Te1/4(P) Te1/5(P)

5. Execute the conversion on the switches. This Merge the configurations of both switches into a single configuration. The interface numbers will be renumbered from slot/port to switch-number/slot/port. Negotiation will be performed to determine which switch will become active or standby.
    a. Execute conversion on VSS-1.
    VSS-1#switch convert mode virtual

    This command will convert all interface names
    to naming convention "interface-type switch-number/slot/port",
    save the running config to startup-config and
    reload the switch.

    NOTE: Make sure to configure one or more dual-active detection methods
    once the conversion is complete and the switches have come up in VSS mode.

    Do you want to proceed? [yes/no]: yes
    Converting interface names
    Building configuration...

    b. Execute conversion on VSS-2.
    VSS-2#switch convert mode virtual

    This command will convert all interface names
    to naming convention "interface-type switch-number/slot/port",
    save the running config to startup-config and
    reload the switch.

    NOTE: Make sure to configure one or more dual-active detection methods
    once the conversion is complete and the switches have come up in VSS mode.

    Do you want to proceed? [yes/no]: yes
    Converting interface names
    Building configuration...

    c. The switches will now reboot and display the following.
    VSS-1#
    System detected Virtual Switch configuration...
     Interface TenGigabitEthernet 1/1/4 is member of PortChannel 1
     Interface TenGigabitEthernet 1/1/5 is member of PortChannel 1

    VSS-2#
    System detected Virtual Switch configuration...
     Interface TenGigabitEthernet 2/1/4 is member of PortChannel 2
     Interface TenGigabitEthernet 2/1/5 is member of PortChannel 2

    VSS-1#
    %PFREDUN-6-ACTIVE: Initializing as ACTIVE processor for this switch

%VSL_BRINGUP-6-MODULE_UP: VSL module in slot 1 switch 1 brought up
%VSLP-5-RRP_ROLE_RESOLVED: Role resolved as ACTIVE by VSLP
%VSL-5-VSL_CNTRL_LINK: New VSL Control Link 1/1/4

VSS-2#
%PFREDUN-6-ACTIVE: Initializing as ACTIVE processor for this switch

%VSL_BRINGUP-6-MODULE_UP: VSL module in slot 1 switch 2 brought up
%VSLP-5-RRP_ROLE_RESOLVED: Role resolved as STANDBY by VSLP
%VSL-5-VSL_CNTRL_LINK: New VSL Control Link 2/1/4

d. Once the switches have completed rebooting create a new hostname to identify the new VSS pair.
VSS-1# config t
VSS-1(config)#hostname VSS-Pair

e. Verify the new VSS pair.
VSS-PAIR#show switch virtual
Switch mode : Virtual Switch
Virtual switch domain number : 1
Local switch number : 1
Local switch operational role: Virtual Switch Active
Peer switch number : 2
Peer switch operational role : Virtual Switch Standby
The show switch virtual command tells us that this switch is active and the other one is standby. We can also take a closer look at the VSL:
VSS-PAIR#show switch virtual link
VSL Status : UP
VSL Uptime : 42 minutes
VSL SCP Ping : Pass
VSL ICC Ping : Pass
VSL Control Link : Te1/1/4
VSL Encryption : Configured Mode - Off, Operational Mode - Off
This is how you can check the VSL etherchannel:

VSS-PAIR#show interfaces vsl
VSL Port-channel: Po1
Port: Te1/1/4
Port: Te1/1/5
And there's a useful command that gives you more information about the switch roles and priorities:

VSS-PAIR#show switch virtual role
RRP information for Instance 1

Valid Flags Peer Preferred Reserved
Count Peer Peer

```
-------------------------------------------------------------------------
TRUE    V       1         1         1

Switch  Switch   Status     Priority    Role    Local   Remote
        Number             Oper(Conf)          SID     SID
-------------------------------------------------------------------------
LOCAL   1        UP         110(110)    ACTIVE  0       0
REMOTE  2        UP         100(100)    STANDBY 2921    12

Peer 0 represents the local switch

Flags: V - Valid

In dual-active recovery mode: No
```

I hope you have found this example of configuring a VSS pair helpful.