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    SAL1443X6A
 3  48 CEF720 48 port 10/100/1000mb Ethernet WS-X6748-GE-TX SAD171123FO

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            SAL1442X40      1.1 Ok
 1  MSFC3 Daughterboard                    VS-F6K-MSFC3            SAL1442X15N     5.1 Ok
 3  Centralized Forwarding Card            WS-F6700-CFC            SAD171123FO     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.adf 3.2 8.5(4) 15.0(33)SXI7 Ok
3 0002.fcc1.1bd0 to 0002.fcc1.1bfff 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
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      |
   +-----------------------------------------------+-------------------+-------------------+
<table>
<thead>
<tr>
<th>Switch</th>
<th>Switch</th>
<th>Status</th>
<th>Priority</th>
<th>Role</th>
<th>Local</th>
<th>Remote</th>
<th>Peer 0 represents the local switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCAL 1</td>
<td>UP</td>
<td>110(110)</td>
<td>ACTIVE</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>REMOTE 2</td>
<td>UP</td>
<td>100(100)</td>
<td>STANDBY</td>
<td>2921</td>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Flags: V - Valid

In dual-active recovery mode: No

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