VSS – Virtual Switching System
• Campus Challenges
• Virtual Switching System
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  – Software upgrade
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Campus Challenges

- **Challenges I**
  - “Old days” of flexibility, add/move and mobility promise?
  - Spanning VLAN solved that and created some more problems of
    - Stability
    - Response times
    - Inefficient use of resources
    - Managing end host behavior

- **Challenges II**
  - Do not span VLANs.
  - No Loops no underlying threat to the network
  - Solution gave up critical need of not able to span VLANs.
Vss – New Solution

- Solving the same *old* design problem and yet not lose the benefits of stability and mobility

- Virtual Switching allows elimination of loops in the network
VSS - Concept

- Virtual Switching System consists of two Cisco Catalyst 6500 Series defined as members of the same virtual switch domain.
- Single control plane with dual active forwarding planes.
- Design to increase forwarding capacity while increasing availability by eliminating STP loops.
- Reduced operational complexity by simplifying configuration.
VSS - Enabled Campus Design

- Physical network topology does not change
  - Still have redundant chassis
  - Still have redundant links
- Allows the design to replace traditional topology control plane with multi-chassis EtherChannel (MEC)
  - Enables loop-free topology, thus doubles the link capacity
  - Convergence and load balancing are based on EtherChannel
VSS – Multichassis Etherchannel

- MEC is an advanced EtherChannel technology extending link aggregation to two separate physical switches.
- MEC enables VSS to appear as a single logical entity to the devices connected to VSS, thus significantly simplifying campus topology.
- Traditionally spanning VLANs over multiple closets would create STP looped topology. MEC with VSS eliminates these loops in the campus topology.
- MEC replaces spanning tree as the means to provide link redundancy doubling bandwidth available from access.
- Access-layer switch only requires regular EtherChannel to VSS.
VSS – Dual Active

- VSL is the heart of the VSS functionality
- Protecting VSL link bundle is the best practice design
  - Use one port from Supervisor and other from line cards to form a VSL bundle
  - Use diverse fiber path for each VSL links
  - Manage traffic forwarded over VSL link by avoiding single homed devices
- In case of loss of all members of the VSL bundle, no direct indication if the existing ACTIVE rebooted or just VLS links gone down. The hot_standby supervisor will go active, leading to dual active condition.
**VSS – Dual Active Detection**

- **VSLP Fast Hello**
  - A direct pt-pt link connected to an interface on each switch

- **BFD**
  - A direct pt-pt link connected to an interface on each switch
  - Must have a unique IP subnet on each end of the link; BFD session becomes operational only after VSL link failure

- **Enhanced PAgP**
  - By default ePAgP is enabled globally, however requires adding MEC member to participate in dual active recovery
  - ePAgP requires PAgP protocol to be operational on MEC enabled interfaces, however to add to dual active requires admin down state
VSS – MAC Addresses

• Each physical member of VSS pair consist of pool of MAC address stored in backplane EEPROM. The VSS logical pair MAC address pool will be determined during the role resolution negotiation.

• To avoid ARP table update on the end host during the switchover use `mac-address use-virtual`
VSS – Base Configuration

Switch 1
- interface Port-channel1
  - description VSL Link from Switch 1
  - no switchport
  - no ip address
  - switch virtual link 1
  - mls qos trust cos
  - no mls qos channel-consistency

Switch 2
- interface Port-channel2
  - description VSL Link from Switch 2
  - no switchport
  - no ip address
  - switch virtual link 2
  - mls qos trust cos
  - no mls qos channel-consistency

Switch 1
- interface ten 1/5/4
  - channel-group 1 mode on
- interface ten 1/1/1
  - channel-group 1 mode on

Switch 2
- interface ten 2/5/4
  - channel-group 2 mode on
- interface ten 2/1/1
  - channel-group 2 mode on

MEC
- interface GigabitEthernet1/8/23
  - description Access Switch
  - switchport
  - switchport trunk encapsulation dot1q
  - switchport trunk native vlan 202
  - switchport trunk allowed vlan 2,102
  - switchport mode dynamic desirable
  - channel-protocol pagg
  - channel-group 202 mode desirable

- interface GigabitEthernet2/8/23
  - description Access Switch
  - switchport
  - switchport trunk encapsulation dot1q
  - switchport trunk native vlan 202
  - switchport trunk allowed vlan 2,102
  - switchport mode dynamic desirable
  - channel-protocol pagg
  - channel-group 202 mode desirable
Considerations in a VSS Enabled Campus

- EtherChannel Hash Tuning
- Capacity Planning for the Virtual Switch Link
- Restrict VLAN “allowed” on Trunks
- Software upgrade
VSS@NHH

Servicebygget

Meriono

04.11.2010  Fornavn Etternavn, navn@nhh.no
"The pessimist complains about the wind; the optimist expects it to change; the realist adjusts the sails."