# LAB GUIDE
# DCN 2-Tier L2 Fabric

a Hewlett Packard Enterprise company

**!!IMPORTANT!!**

**THIS GUIDE ASSUMES THAT THE AOS-CX OVA HAS BEEN INSTALLED AND WORKS IN GNS3 OR EVE-NG. PLEASE REFER TO GNS3/EVE-NG INITIAL SETUP LABS IF REQUIRED.**

**WRITE MEM SAVED CONFIGS DON'T IMPORT CORRECTLY, READER SHOULD COPY/PASTE LAB CONFIGS FROM APPENDIX INTO LAB IF REQUIRED.**

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## Lab Objective

At the end of this workshop, you will be able to implement the basic configurations on a standard switch topology to implement a 2- Tier Data Center switch fabric layer 2. The Key technologies leveraged are VSX supporting multi chassis lag , VSX active gateway

## Lab Overview

The lab comprises of a layer 2 core running VSX, Switch A & Switch B, and will host the L3 Gateways on an SVI ( Switch Virtual Interface). The edge switch nodes supporting server access will also run VSX. Switch C & D will form a VSX pair and Switch E & F will form a VSX pair.

With extensive use of VSX providing MCLAG support, there is no requirement to implement spanning tree. All links from the edge to the core are in an active 'forwarding' data plane state.

The lab provides exposure to 'vsx-sync' on specific cli commands where configurations are applied on the VSX primary switch and are synced automatically to the VSX secondary switch.

Layer 3 services in the form of SVI on VLANs would be required on the core switch pair (Switch A & B). This is illustrated in the lab with an example configuration using a single VLAN.

This lab only focuses on the layer 2 interconnectivity model between the edge switch network and the core switches. Layer 3 routing services would be required to interconnect this 2-tier layer DCN fabric to other switch fabrics and/or supporting external connectivity to WAN and internet services. L3 interconnectivity examples can be found in other Aruba developed labs for EVE-NG.

This DCN lab is one of a series, other labs in this series are:-

- DCN 2-Tier L3 fabric with OSPF — August 2021
- DCN 2 -Tier L3 fabric with IBGP — August 2021
- DCN 2-Tier L3 fabric with OSPF — August 2021
- DCN 2-Tier L3 fabric with OSPF – MultVRF — September 2021
- DCN 2-Tier L3 fabric with iBGP – MultVRF — September 2021
- DCN 2-Tier L3 fabric with eBGP – MultVRF — September 2021
- DCN 2-Tier L3 fabric with OSPF VXLAN/EVPN Overlay — September 2021
- DCN 2-Tier L3 fabric with iBGP with VXLAN/EVPN Overlay — October 2021
- DCN 2-Tier L3 fabric with eBGP with VXLAN/EVPN Overlay — October 2021
- NetEdit in the DC: EBGP EVPN Multi-AS VXLAN Fabric provisioning — October 2021
- NetEdit in the DC: iBGP EVPN Multi-AS VXLAN Fabric provisioning — October 2021

The above reflects anticipated dates for lab completion and subsequent posting on the CX Simulator community page.

AOS-CX Switch Simulator Community page

This lab was created using the CX simulator version 10.08

## Lab Network Layout

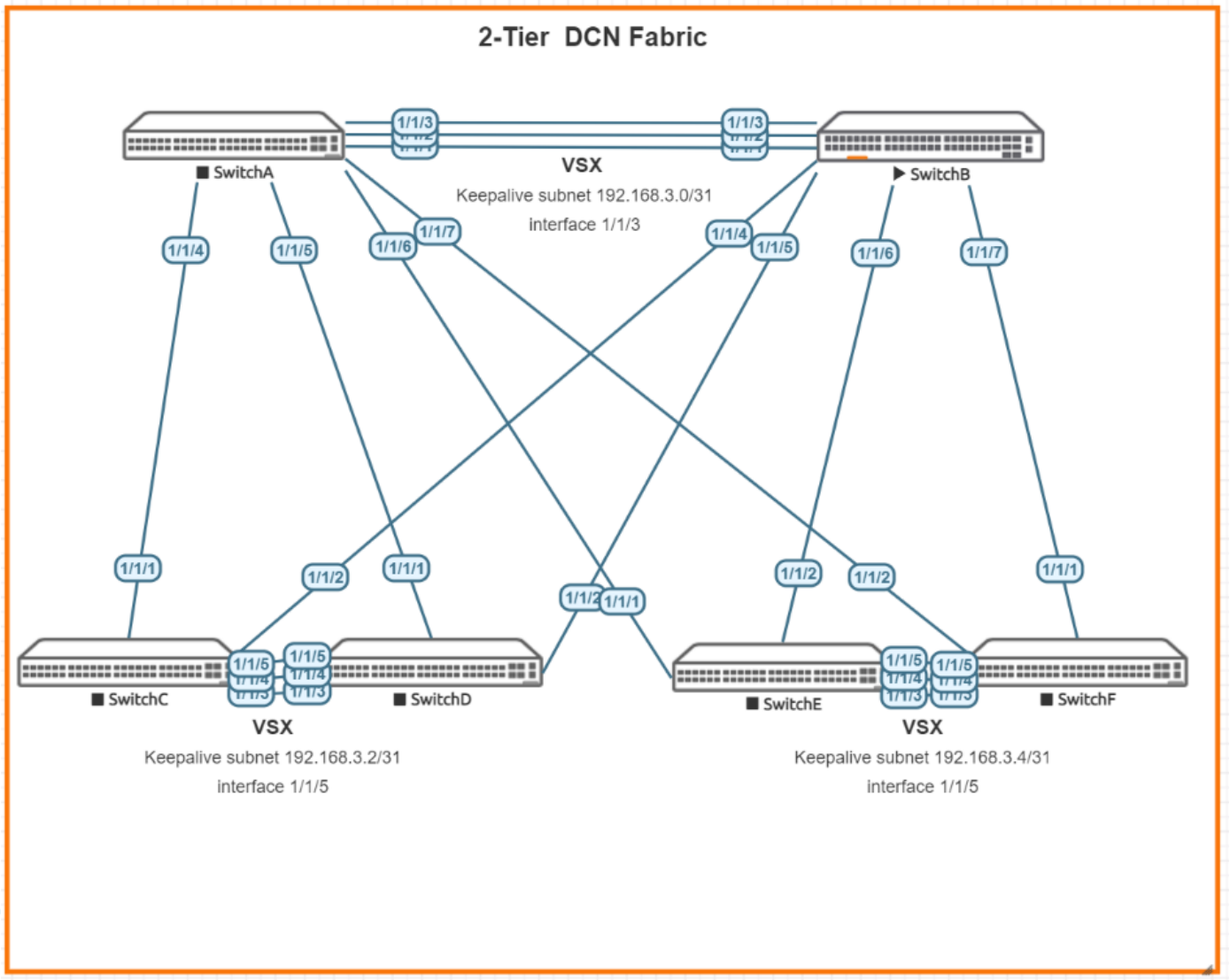


*Figure 1. Lab topology physical interconnection*

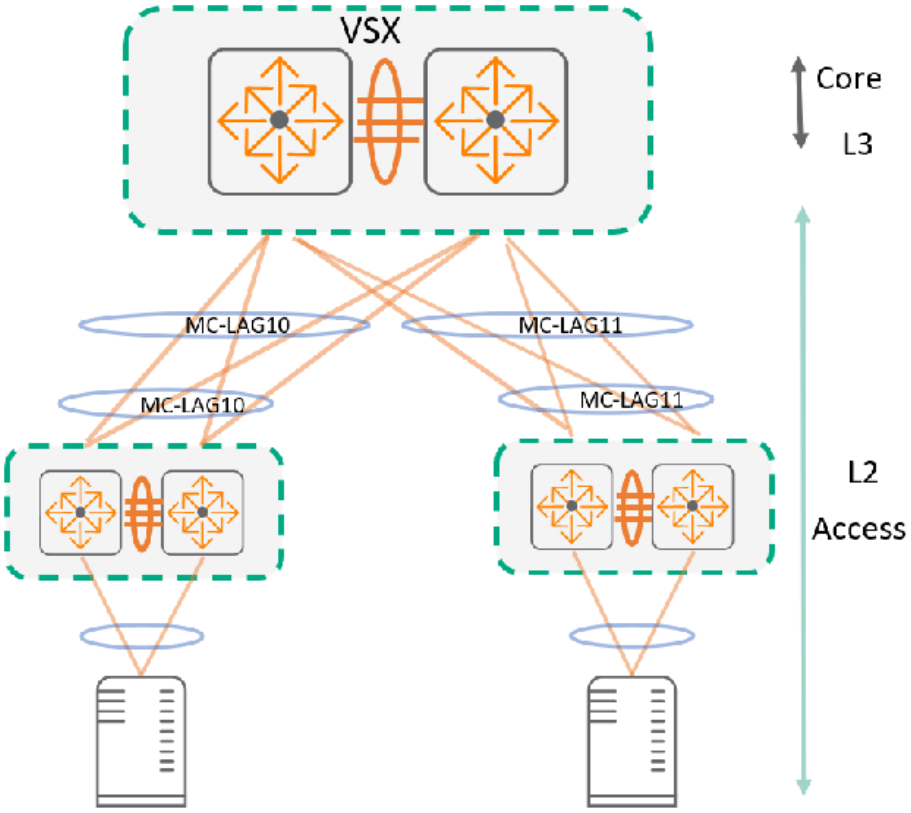


*Figure 2 -Logical connectivity model*

**Server connectivity is not part of the lab – provided for illustration only.*

# Lab Tasks

## Task 1 - Lab setup

For this lab refer to Figure 1 for topology and IP address details.

- Start all the devices
- Open each switch console and log in with user “admin” and no password
- Change all hostnames as shown in the topology:

```
hostname …
```

- :

```
int 1/1/1-1/1/7
  no shutdown
```

Validate LLDP neighbors appear as expected

```
show lldp neighbor
```

**Example Switch A**

```
SwitchA# sh lldp neighbor-info

LLDP Neighbor Information
    =========================
    Total Neighbor Entries          : 7
    Total Neighbor Entries Deleted  : 0
    Total Neighbor Entries Dropped  : 0
    Total Neighbor Entries Aged-Out : 0

LOCAL-PORT  CHASSIS-ID         PORT-ID                    PORT-DESC                  TTL      SYS-NAME
-------------------------------------------------------------------------------------------------------------
1/1/1       08:00:09:16:7b:7e  1/1/1                      1/1/1                      120      SwitchB

1/1/2       08:00:09:16:7b:7e  1/1/2                      1/1/2                      120      SwitchB

1/1/3       08:00:09:16:7b:7e  1/1/3                      1/1/3                      120      SwitchB

1/1/4       08:00:09:b6:77:ac  1/1/1                      1/1/1                      120      SwitchC

1/1/5       08:00:09:9b:4c:6b  1/1/1                      1/1/1                      120      SwitchD

1/1/6       08:00:09:b6:81:f1  1/1/1                      1/1/1                      120      SwitchE

1/1/7       08:00:09:76:73:f6  1/1/2                      1/1/2                      120      SwitchF
```

- Typically, the MTU size would be set to a value of 9198 bytes for active  center networking interfaces however jumbo frames are not supported on the CX simulator and this configuration will not be applied.

## Task 2 – Configure VSX between Switch pairs

**Note:** Switch CX simulator software levels need to be the same for VSX to deploy correctly.

This task will be repeated 3 times for each switch pair and will involve the following:-
.
Creation of a LAG on each switch

VSX configuration on each switch – discrimination between Primary and Secondary nodes

VSX Keep-Alive configuration.

Keep-Alive subnets used:-

- Switch A/B use subnet 192.168.3.0/31
- Switch C/D use subnet 192.168.3.2/31
- Switch E/F use subnet 192.168.3.4/31

**Switch A & B**

On switch A configure the lag 256 as the ISL link

```
interface lag 256
    description ISL to SwitchB
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
    no shut
```

Apply the lag 128  on interfaces 1/1/1 and 1/1/2

```
SwitchA(config)# interface 1/1/1-1/1/2
SwitchA(config-if-<1/1/1-1/1/2>)# lag 256
SwitchA(config-if-<1/1/1-1/1/2
>)# exit
```

**Configure the VSX configuration on Switch A**

```
vsx
    system-mac 02:00:00:00:01:00
    inter-switch-link lag 256
    role primary
    keepalive peer 192.168.3.1 source 192.168.3.0
    no split-recovery
    vsx-sync vsx-global
    vsx-sync mclag-interfaces
```

**Configure the keepalive link to Switch B on interface 1//1/3**

```
interface 1/1/3
    description Keepalive interface to SwitchB
    ip address 192.168.3.0/31
```

repeat the configuration on Switch B , note the changes of VSX role from primary to secondary, keepalive source and destination addressing, and using an ip keepalive address on interface 1/1/9 of 192.168.3.1/31

**On switch B configure the lag 256 as the ISL link**

```
interface lag 256
    description ISL
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
```

Apply the lag 128 on interfaces 1/1/1 and 1/1/2

```
SwitchA(config)# interface 1/1/6-1/1/7
SwitchA(config-if-<1/1/1-1/1/2>)# lag 256
SwitchA(config-if-<1/1/1-1/1/2>)# exit
```

**Configure the VSX configuration on Switch B**

```
    vsx
    system-mac 02:00:00:00:01:00
    inter-switch-link lag 256
    role secondary
    keepalive peer 192.168.3.0 source 192.168.3.1
    no split-recovery
```

**Configure the keepalive link to Switch A on interface 1//1/3**

```
SwitchA(config)# interface 1/1/3
    description Keepalive interface to SwitchA
    ip address 192.168.3.1/31
```

**run the following commands validate the VSX configuration and status**

```
SwitchA# sh interface lag 256 brief
--------------------------------------------------------------------------------
----------------------
Port      Native  Mode   Type           Enabled Status  Reason                  Speed   D
escription
          VLAN                                                                  (Mb/s)
--------------------------------------------------------------------------------
----------------------
```

```
lag256    1       trunk  --             yes      up       --                2000    I
SL
```

```
SwitchA# sh vsx status
VSX Operational State
---------------------
  ISL channel             : In-Sync
  ISL mgmt channel        : operational
  Config Sync Status      : In-Sync
  NAE                     : peer_reachable
  HTTPS Server            : peer_reachable

Attribute           Local                Peer
------------        --------             --------
ISL link            lag256               lag256
ISL version         2                    2
System MAC          02:00:00:00:01:00    02:00:00:00:01:00
Platform            X86-64               X86-64
Software Version    Virtual.10.08.0001BO Virtual.10.08.0001BO
Device Role         primary              secondary
```

```
SwitchA# sh vsx brief
ISL State                              : In-Sync
Device State                           : Peer-Established
Keepalive State                        : Keepalive-Established
Device Role                            : Primary
Number of Multi-chassis LAG interfaces : 0
```

**Configure Switch C & D as a VSX pair**

- Switch C will be the VSX Primary
- Use interfaces 1/1/3-1/1/4 for the lag 256
- Use system mac address of `02:00:00:00:01:01`
- Use subnet 192.168.3.2/31 for keepalive on interface 1/1/5

**VSX example Switch C**

```
interface lag 256
    description ISL
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active

interface 1/1/3
    no shutdown
    lag 256
```

```
interface 1/1/4
    no shutdown
    lag 256

vsx
    system-mac 02:00:00:00:01:01
    inter-switch-link lag 256
    role primary
    keepalive peer 192.168.3.3 source 192.168.3.2
    no split-recovery
    vsx-sync vsx-global
    vsx-sync mclag-interfaces


interface 1/1/5
    no shutdown
    description keepalive to Switch D
    ip address 192.168.3.2/31
```

**SwitchD**

```
interface lag 256
    no shutdown
    description ISL to SwitchC
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
interface 1/1/3
    no shutdown
    lag 256
interface 1/1/4
    no shutdown
    lag 256


vsx
    system-mac 02:00:00:00:01:01
    inter-switch-link lag 256
    role secondary
    keepalive peer 192.168.3.2 source 192.168.3.3
    no split-recovery

interface 1/1/5
    no shutdown
    description keepalive to SwitchC
    ip address 192.168.3.3/31
```

Repeat for Switch E & F, configure Switch E & F as VSX pair

- Switch E will be the VSX Primary

- Use interfaces 1/1/3-1/1/4 for the lag 256
- Use the system mac address of `02:00:00:00:01:02`
- Use subnet 192.168.3.4/31 for keepalive on interface 1/1/5

**SwitchE**

```
interface lag 256
    no shutdown
    description ISL
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active

interface 1/1/3
    no shutdown
    lag 256
interface 1/1/4
    no shutdown
    lag 256

vsx
    system-mac 02:00:00:00:01:02
    inter-switch-link lag 256
    role primary
    keepalive peer 192.168.3.5 source 192.168.3.4
    no split-recovery
    vsx-sync mclag-interfaces vsx-global


interface 1/1/5
    no shutdown
    description keepalive to SwitchD
    ip address 192.168.3.4/31
```

**Switch F**

```
interface lag 256
    no shutdown
    description ISL
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active


interface 1/1/3
    no shutdown
    lag 256
interface 1/1/4
```

```
    no shutdown
    lag 256

vsx
    system-mac 02:00:00:00:01:02
    inter-switch-link lag 256
    role secondary
    keepalive peer 192.168.3.4 source 192.168.3.5
    no split-recovery



interface 1/1/5
    no shutdown
    description keepalive to SwitchD
    ip address 192.168.3.5/31
```

On switch C & E  VSX primary node, validate the VSX status and configuration by using the following commands:-

```
sh interface lag 256
sh vsx status
sh vsx brief
```

```
SwitchC# sh interface lag 256

Aggregate lag256 is up
 Admin state is up
 Description : ISL to SwitchD
 MAC Address                 : 08:00:09:b6:77:ac
 Aggregated-interfaces       : 1/1/3 1/1/4
 Aggregation-key             : 256
 Aggregate mode              : active
 Speed                       : 2000 Mb/s
 L3 Counters: Rx Disabled, Tx Disabled
 qos trust none
 VLAN Mode: native-untagged
 Native VLAN: 1
 Allowed VLAN List: all

 Statistic                          RX                  TX                  Total
 ---------------- -------------------- -------------------- --------------------
 Packets                         69945               105620                   0
   Unicast                           0                    0                   0
   Multicast                         0                    0                   0
   Broadcast                         0                    0                   0
 Bytes                        14688007            120640101                   0
 Jumbos                            0                    0                   0
 Dropped                           0                    0                   0
 Pause Frames                      0                    0                   0
```

```
 Errors                              0                   0                   0
   CRC/FCS                           0                 n/a                   0
   Collision                       n/a                   0                   0
   Runts                             0                 n/a                   0
   Giants                            0                 n/a                   0

SwitchC# sh vsx status
VSX Operational State
---------------------
  ISL channel             : In-Sync
  ISL mgmt channel        : operational
  Config Sync Status      : In-Sync
  NAE                     : peer_reachable
  HTTPS Server            : peer_reachable

Attribute           Local                 Peer
------------        --------              --------
ISL link            lag256                lag256
ISL version         2                     2
System MAC          02:00:00:00:01:01     02:00:00:00:01:01
Platform            X86-64                X86-64
Software Version    Virtual.10.08.0001BO  Virtual.10.08.0001BO
Device Role         primary               secondary

SwitchC# sh vsx brief
ISL State                                : In-Sync
Device State                             : Peer-Established
Keepalive State                          : Keepalive-Established
Device Role                              : Primary
Number of Multi-chassis LAG interfaces : 1
```

## Task 3 – Configure Multi chassis link aggregation from Switch A & B to Switches C,D, E, F

On completion of configuring each VSX Switch pair, multi chassis link aggregation can be configured between each Switch A/B and the VSX switch pairs of Switches C/D and Switches E/F at the edge of the network.

Interfaces 1/1/4 & 1/1/5 on Switch A & Switch B will be used for multi chassis lag 10 to switch C & D

Interfaces 1/1/6 & 1/1/7 on Switch A & Switch B will be used for multi chassis lag 11 to switch E & F

## Task 3.1 Configure Multi-chassis link aggregation Switches A&B to Switches C&D

**On Switch A**

Configure :-

```
interface lag 10 multi-chassis
    description MCLAG to switch C-D
    no routing
    no shutdown
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
```

On interfaces 1/1/4-1/1/5 configure lag 10.

```
interface 1/1/4
    lag 10
interface 1/1/5
    lag 10
```

**On switch B**

configure :-

```
interface lag 10 multi-chassis
```

On entering the ‘interface lag 10 multi-chassis’ command, the lag 10 configuration will dynamically sync from Switch A as a result of the `vsx-sync mclag-interfaces vsx-global` command.

**On interfaces 1/1/4-1/1/5 configure lag 10.**

```
interface 1/1/4
    lag 10
interface 1/1/5
    lag 10
```

**On Switch C**

configure:-

```
interface lag 10 multi-chassis
    description MCLAG to switch A-B
    no routing
    no shutdown
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
```

**On interfaces 1/1/1-1/1/2 configure lag 10.**

```
interface 1/1/1
    lag 10
interface 1/1/2
    lag 10
```

**On Switch D**

configure:-

```
interface lag 10 multi-chassis
```

On entering the 'interface lag 10 multi-chassis' command, the lag 10 configuration will dynamically sync from Switch C as a result of the `vsx-sync mclag-interfaces vsx-global` command.

On interfaces 1/1/1-1/1/2 configure lag 10.

```
interface 1/1/1
    lag 10
interface 1/1/2
    lag 10
```

## Task 3.2 Configure Multi chassis link aggregation Switches A&B to Switch E & F

**On switch A**

Configure:-

```
interface lag 11 multi-chassis
    description MCLAG to switch E-F
    no routing
    no shutdown
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
```

On interfaces 1/1/6-1/1/7 configure lag 11.

```
interface 1/1/6
    lag 11
interface 1/1/7
    lag 11
```

**On Switch B**

Configure:-

```
interface lag 11 multi-chassis
```

On entering the '`interface lag 11 multi-`chassis' command, the lag 11 configuration will dynamically sync from Switch D as a result of the `vsx-sync mclag-interfaces vsx-global` command.

On interfaces 1/1/6-1/1/7 configure lag 11.

```
interface 1/1/6
    lag 11
interface 1/1/7
    lag 11
```

**On Switch E**

Configure:-

```
interface lag 11 multi-chassis
    description MCLAG to switch A-B
    no routing
    no shutdown
    vlan trunk native 1
```

```
    vlan trunk allowed all
    lacp mode active
```

On interfaces 1/1/1-1/1/2 configure lag 11.

```
interface 1/1/1
    lag 11
interface 1/1/2
    lag 11
```

**On Switch F**

Configure:-

```
interface lag 11 multi-chassis
    description MCLAG to switch A-B
    no routing
    no shutdown
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
```

On interfaces 1/1/1-1/1/2 configure lag 11.

```
interface 1/1/1
    lag 11
interface 1/1/2
    lag 11
```

**Validate Multi-chassis lag operation**

**On Switch A**

Run the `sh lacp interfaces` command

```
SwitchA# sh lacp interfaces

State abbreviations :
A - Active        P - Passive      F - Aggregable I - Individual
S - Short-timeout L - Long-timeout N - InSync     O - OutofSync
C - Collecting    D - Distributing
X - State m/c expired              E - Default neighbor state

Actor details of all interfaces:
------------------------------------------------------------------------------
Intf       Aggr       Port  Port  State   System-ID         System Aggr Forwarding
           Name       Id    Pri                             Pri    Key  State
------------------------------------------------------------------------------
1/1/4      lag10(mc)  4     1     ALFNCD  02:00:00:00:01:00 65534  10   up
1/1/5      lag10(mc)  5     1     ALFNCD  02:00:00:00:01:00 65534  10   up
1/1/6      lag11(mc)  6     1     ALFNCD  02:00:00:00:01:00 65534  11   up
1/1/7      lag11(mc)  7     1     ALFNCD  02:00:00:00:01:00 65534  11   up
1/1/1      lag256     2     1     ALFNCD  08:00:09:ee:11:82 65534  256  up
1/1/2      lag256     3     1     ALFNCD  08:00:09:ee:11:82 65534  256  up
```

```
Partner details of all interfaces:
--------------------------------------------------------------------------------
Intf       Aggr       Port  Port  State   System-ID          System Aggr
           Name       Id    Pri                              Pri    Key
--------------------------------------------------------------------------------
1/1/4      lag10(mc)  1     1     ALFNCD  02:00:00:00:01:01  65534  10
1/1/5      lag10(mc)  1001  1     ALFNCD  02:00:00:00:01:01  65534  10
1/1/6      lag11(mc)  1     1     ALFNCD  02:00:00:00:01:02  65534  11
1/1/7      lag11(mc)  1002  1     ALFNCD  02:00:00:00:01:02  65534  11
1/1/1      lag256     2     1     ALFNCD  08:00:09:16:7b:7e  65534  256
1/1/2      lag256     3     1     ALFNCD  08:00:09:16:7b:7e  65534  256
```

Run the `sh lacp interfaces vsx-peer` command

```
SwitchA#  sh lacp interfaces vsx-peer

State abbreviations :
A - Active        P - Passive      F - Aggregable I - Individual
S - Short-timeout L - Long-timeout N - InSync     O - OutofSync
C - Collecting    D - Distributing
X - State m/c expired              E - Default neighbor state

Actor details of all interfaces:
--------------------------------------------------------------------------------
Intf       Aggr       Port  Port  State   System-ID          System Aggr Forwarding
           Name       Id    Pri                              Pri    Key  State
--------------------------------------------------------------------------------
1/1/4      lag10(mc)  1004  1     ALFNCD  02:00:00:00:01:00  65534  10   up
1/1/5      lag10(mc)  1005  1     ALFNCD  02:00:00:00:01:00  65534  10   up
1/1/6      lag11(mc)  1006  1     ALFNCD  02:00:00:00:01:00  65534  11   up
1/1/7      lag11(mc)  1007  1     ALFNCD  02:00:00:00:01:00  65534  11   up
1/1/1      lag256     2     1     ALFNCD  08:00:09:16:7b:7e  65534  256  up
1/1/2      lag256     3     1     ALFNCD  08:00:09:16:7b:7e  65534  256  up


Partner details of all interfaces:
--------------------------------------------------------------------------------
Intf       Aggr       Port  Port  State   System-ID          System Aggr
           Name       Id    Pri                              Pri    Key
--------------------------------------------------------------------------------
1/1/4      lag10(mc)  2     1     ALFNCD  02:00:00:00:01:01  65534  10
1/1/5      lag10(mc)  1002  1     ALFNCD  02:00:00:00:01:01  65534  10
1/1/6      lag11(mc)  2     1     ALFNCD  02:00:00:00:01:02  65534  11
1/1/7      lag11(mc)  1001  1     ALFNCD  02:00:00:00:01:02  65534  11
1/1/1      lag256     2     1     ALFNCD  08:00:09:ee:11:82  65534  256
1/1/2      lag256     3     1     ALFNCD  08:00:09:ee:11:82  65534  256
```

**Repeat the following commands on Switch C**

```
sh lacp interfaces
sh lacp interfaces vsx-peer
```

**Repeat the following commands on Switch E**

```
sh lacp interfaces
sh lacp interfaces vsx-peer
```

The output state for each interface should reflect `ALFNCD` for healthy link(s)

Common problems are typically associated with mc-lag interfaces or physical interfaces in the ‘admin shut’ state . The output is very explicit if either or both are in an ‘admin shut’ state.

See output below for mc-lag11 which is in the ‘admin shut’ state

```
SwitchB# sh lacp interface

State abbreviations :
A - Active        P - Passive      F - Aggregable I - Individual
S - Short-timeout L - Long-timeout N - InSync     O - OutofSync
C - Collecting    D - Distributing
X - State m/c expired              E - Default neighbor state

Actor details of all interfaces:
------------------------------------------------------------------------------
Intf       Aggr       Port  Port  State   System-ID         System Aggr Forwarding
           Name       Id    Pri                             Pri    Key  State
------------------------------------------------------------------------------
1/1/4      lag10(mc)  1004  1     ALFNCD  02:00:00:00:01:00 65534  10   up
1/1/5      lag10(mc)  1005  1     ALFNCD  02:00:00:00:01:00 65534  10   up
1/1/6      lag11(mc)                                                   down
1/1/7      lag11(mc)                                                   down
1/1/1      lag256     2     1     ALFNCD  08:00:09:16:7b:7e 65534  256  up
1/1/2      lag256     3     1     ALFNCD  08:00:09:16:7b:7e 65534  256  up


Partner details of all interfaces:
------------------------------------------------------------------------------
Intf       Aggr       Port  Port  State   System-ID         System Aggr
           Name       Id    Pri                             Pri    Key
------------------------------------------------------------------------------
1/1/4      lag10(mc)  2     1     ALFNCD  02:00:00:00:01:01 65534  10
1/1/5      lag10(mc)  1002  1     ALFNCD  02:00:00:00:01:01 65534  10
1/1/6      lag11(mc)
1/1/7      lag11(mc)
1/1/1      lag256     2     1     ALFNCD  08:00:09:ee:11:82 65534  256
1/1/2      lag256     3     1     ALFNCD  08:00:09:ee:11:82 65534  256
```

## Task 4 – Configure active GWs on Switch A& B

The design topology is L2 from the edge VSX pairs ( Switches C,D, E & F) to the core switch VSX pair of Switch A&B. The design requires L3 SVI GWs to be configured on Switches A& B for appropriate VLANs used to support L3 inter VLAN connectivity.

A sample VLAN configuration is provided here:-

**On Switch A create VLAN 100 and VLAN 100 interface from configuration mode**

Configure:-

```
vlan 100
interface vlan 100
    vsx-sync active-gateways
    ip address 10.100.1.2/24
    active-gateway ip mac 12:01:00:00:01:00
    active-gateway ip 10.100.1.1
    ip helper-address 10.1.1.200
```

on switch B create VLAN 100 and VLAN 100 interface from configuration mode

```
vlan 100
interface vlan 100
```

do the `sh running-config interface vlan 100` command

output:-

```
interface vlan100
    vsx-sync active-gateways
    active-gateway ip mac 12:01:00:00:01:00
    active-gateway ip 10.100.1.1
    exit
```

Note the active GW IP and GW virtual MAC are synchronized due to the vsx-sync command.

**On Switch B**

Configure the specific ip address and ip helper address

```
Interface vlan 100
ip address 10.100.1.3/24
ip helper-address 10.1.1.200
```
(helper dhcp address )

The best practice for SVI active-gateway is to set the active-gateway Virtual IP and Virtual MAC on the VSX primary and get the value synchronized on the VSX secondary with vsx-sync command.

The best practice for active-gateway VMAC is to use the same VMAC for all IPv4 SVIs. The scope of this VMAC is purely link-local. .If some servers or systems have dual-attachment to two different SVIs, and the system administrator would like to see distinct MAC addresses for the next-hops over these separate interfaces, then 16 VMACs are available.

For dual-stack IPv4 and IPv6, 16 VMACs can be used for IPv4 and the same VMACs can be used for IPv6. It is however a best practice to use only 8 VMACs for IPv4 and 8 different VMACs for IPV6.

Refer to the' VSX best practice' documentation for more information :-

VSX Configuration Best Practices

**END of LAB tasks**

# Appendix – Complete Configurations

**Switch A**

```
interface lag 10 multi-chassis
    no shutdown
    description MCLAG to SwitchC-D
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
interface lag 11 multi-chassis
    no shutdown
    description MCLAG to SwitchE-F
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
interface lag 256
    no shutdown
    description ISL SwitchB
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
interface 1/1/1
    no shutdown
    lag 256
interface 1/1/2
    no shutdown
    lag 256
interface 1/1/3

no shutdown
```

```
    description Keepalive interface to SwitchB
    ip address 192.168.3.0/31
interface 1/1/4
    no shutdown
    lag 10
interface 1/1/5
    no shutdown
    lag 10
interface 1/1/6
    no shutdown
    lag 11
interface 1/1/7
    no shutdown
    lag 11
interface vlan 100
    vsx-sync active-gateways
    ip address 10.100.1.2/24
    active-gateway ip mac 12:01:00:00:01:00
    active-gateway ip 10.100.1.1
    ip helper-address 10.1.1.200
vsx
    system-mac 02:00:00:00:01:00
    inter-switch-link lag 256
    role primary
    keepalive peer 192.168.3.1 source 192.168.3.0
    no split-recovery
    vsx-sync mclag-interfaces vsx-global
!
```

**Switch B**

```
interface lag 10 multi-chassis
    no shutdown
    description MCLAG to SwitchC-D
    no routing
    vlan trunk native 1
```

```
    vlan trunk allowed all
    lacp mode active
interface lag 11 multi-chassis
    description MCLAG to SwitchE-F
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
interface lag 256
    no shutdown
    description ISL SwitchA
    no routing
    vlan trunk native 1
    vlan trunk allowed
    lacp mode active
interface 1/1/1
    no shutdown
    lag 256
interface 1/1/2
    no shutdown
    lag 256
interface 1/1/3
    no shutdown
    description keepalive interface to SwitchA
    ip address 192.168.3.1/31
interface 1/1/4
    no shutdown
    lag 10
interface 1/1/5
    no shutdown
    lag 10
interface 1/1/6
    no shutdown
    lag 11
interface 1/1/7
    no shutdown
```

```
    lag 11
interface vlan 100
    vsx-sync active-gateways
    active-gateway ip mac 12:01:00:00:01:00
    active-gateway ip 10.100.1.1
vsx
    system-mac 02:00:00:00:01:00
    inter-switch-link lag 256
    role secondary
    keepalive peer 192.168.3.0 source 192.168.3.1
    no split-recovery
    vsx-sync mclag-interfaces vsx-global
!
```

**Switch C**

```
interface lag 10 multi-chassis
    no shutdown
    description MCLAG to Switch A-B
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
interface lag 256
    no shutdown
    description ISL to SwitchD
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
interface 1/1/1
    no shutdown
    lag 10
interface 1/1/2
    no shutdown
    lag 10
interface 1/1/3
    no shutdown
```

```
    lag 256
interface 1/1/4
    no shutdown
    lag 256
interface 1/1/5
    no shutdown
    description keepalive to Switch D
    ip address 192.168.3.2/31
vsx
    system-mac 02:00:00:00:01:01
    inter-switch-link lag 256
    role primary
    keepalive peer 192.168.3.3 source 192.168.3.2
    no split-recovery
    vsx-sync mclag-interfaces vsx-global
!
```

**Switch D**

```
interface lag 10 multi-chassis
    no shutdown
    description MCLAG to Switch A-B
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
interface lag 256
    no shutdown
    description ISL to SwitchC
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
interface 1/1/1
    no shutdown
    lag 10
interface 1/1/2
    no shutdown
```

```
    lag 10
interface 1/1/3
    no shutdown
    lag 256
interface 1/1/4
    no shutdown
    lag 256
interface 1/1/5
    no shutdown
    description keepalive to SwitchC
    ip address 192.168.3.3/31
vsx
    system-mac 02:00:00:00:01:01
    inter-switch-link lag 256
    role secondary
    keepalive peer 192.168.3.2 source 192.168.3.3
    no split-recovery
    vsx-sync mclag-interfaces vsx-global
!
```

**Switch E**

```
interface lag 11 multi-chassis
    no shutdown
    description MCLAG to switch A-B
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
interface lag 256
    no shutdown
    description ISL
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
interface 1/1/1
    no shutdown
```

```
    lag 11
interface 1/1/2
    no shutdown
    lag 11
interface 1/1/3
    no shutdown
    lag 256
interface 1/1/4
    no shutdown
    lag 256
interface 1/1/5
    no shutdown
    description keepalive switchF
    ip address 192.168.3.4/31
vsx
    system-mac 02:00:00:00:01:02
    inter-switch-link lag 256
    role primary
    keepalive peer 192.168.3.5 source 192.168.3.4
    no split-recovery
    vsx-sync mclag-interfaces vsx-global
!
```

**Switch F**

```
interface lag 11 multi-chassis
    no shutdown
    description MCLAG to switch A-B
    no routing
    vlan trunk native 1
    vlan trunk allowed all
    lacp mode active
interface lag 256
    no shutdown
    description ISL
    no routing
    vlan trunk native 1
    vlan trunk allowed all
```

```
    lacp mode active
interface 1/1/1
    no shutdown
    lag 11
interface 1/1/2
    no shutdown
    lag 11
interface 1/1/3
    no shutdown
    lag 256
interface 1/1/4
    no shutdown
    lag 256
interface 1/1/5
    no shutdown
    description keepalive to SwitchD
    ip address 192.168.3.5/31
vsx
    system-mac 02:00:00:00:01:02
    inter-switch-link lag 256
    role secondary
    keepalive peer 192.168.3.4 source 192.168.3.5
    no split-recovery
    vsx-sync mclag-interfaces vsx-global
!
```

**END OF DOCUMENT**

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