

DVS to AVE migration guide:

Introduction:

What is AVE?

From the White paper:

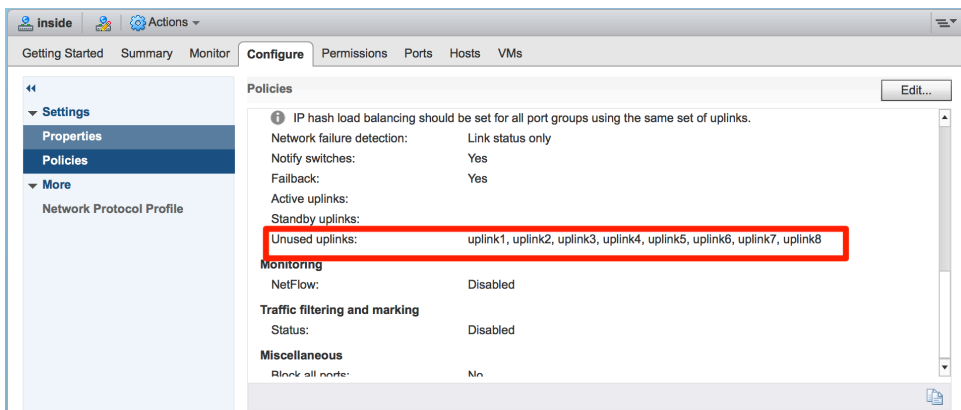
“The Cisco Application Centric Infrastructure Virtual Edge solution is the next generation of the Application Virtual Switch (AVS) for Cisco ACI environments. Cisco ACI Virtual Edge is a hypervisor-independent distributed service appliance that leverages the native Distributed Virtual Switch (DVS) that belongs to the hypervisor. Cisco ACI Virtual Edge runs in the user space, operates as a virtual leaf, and is managed by the Cisco Application Policy Infrastructure Controller (APIC).”

In practice AVE leverages the forwarding by the use of private Vlans. Instead of configuring normal trunk Portgroups in the DVS for any given EPG, a private vlan trunk is configured for it.

The AVE VM becomes the only way out of the DVS, with one VM instance per ESXi added to the DVS. Each instance has two interfaces for the data plane, and one more for management, for each interface a portgroup is created, called inside, outside and management.

Inside

One of the Interfaces it's a promiscuous trunk port listening for the Private VLAN range assigned to the VMM Domain, the portgroup is configured with the entire private vlan range, and it's configure to not use any of the DVS uplinks.



The current Vlan pool (`fvnsVlanInstP`) used for the DVS can be used. An additional Vlan block (`fvnsEncapBlk`) can be added, this new block has a different attribute called role, *external* by default, which needs to be set as *internal*, for example:

```

<?xml version="1.0" encoding="UTF-8"?>
<imdata totalCount="1">
<fvnsVlanInstP allocMode="dynamic" annotation="" descr=""
dn="uni/infra/vlanns-[AVE-VlanPool]-dynamic" name="AVE-VlanPool"
nameAlias="" ownerKey="" ownerTag="">

<fvnsEncapBlk allocMode="inherit" annotation="" descr="" from="vlan-
40" name="" nameAlias="" role="internal" to="vlan-50"/>

<fvnsEncapBlk allocMode="inherit" annotation="" descr="" from="vlan-
20" name="" nameAlias="" role="external" to="vlan-30"/>

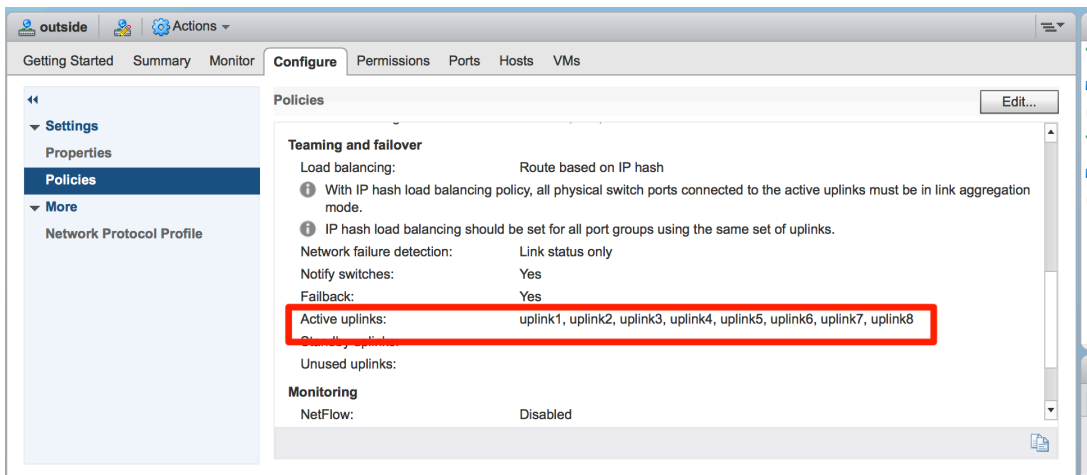
</fvnsVlanInstP>
</imdata>

```

We need two internal Vlans per EPG when using AVE. The Vlan block will only be allocated within each DVS instance and it's not used in the compute Leaf. The reason for needing two Vlans it's because one it's used by the AVE VM to send the Traffic out to the Endpoints(*primary*), and other one (*secondary*) it's used to send the traffic to the AVE VM

Outside

The second interface from the AVE VM associates with the portgroup called *outside*. The profile configures a promiscuous trunk port in the external Vlan block and the infra Vlan, with active uplink association.



The VMs send traffic in the secondary private VLAN, the traffic is then received by the Internal Interface. The AVE VM forwards the traffic out in the Outside interface, based on a mapping between a pair of private VLANs, and the external VLAN or VxLAN assigned to the EPGs, from the Block node set with the role as *external*. So, for any given EPG we will have i VlanP, i VlanS, e Vlan. The first two are internal to the DVS, one used by the AVE VM

to receive the traffic from the VMs(_iVlanS) and other to send out to the VMs(_iVlanP). The third one is external, which is the actual tagging received by the compute Leaf(_eVlan).

Native and AVE Modes

In order to migrate from DVS to AVE, we need to instantiate the AVE VM and change some of the behavior on the DVS, like creating the portgroups mapped to this AVE VM.

ACI allows two modes of VMM Domain association (**fvRsDomAtt**) with any given EPG, once we have enabled the “migrate to AVE” option, which are Native and AVE modes. The modes are set by changing the attribute **switchingMode** from the default value *native* to *AVE*

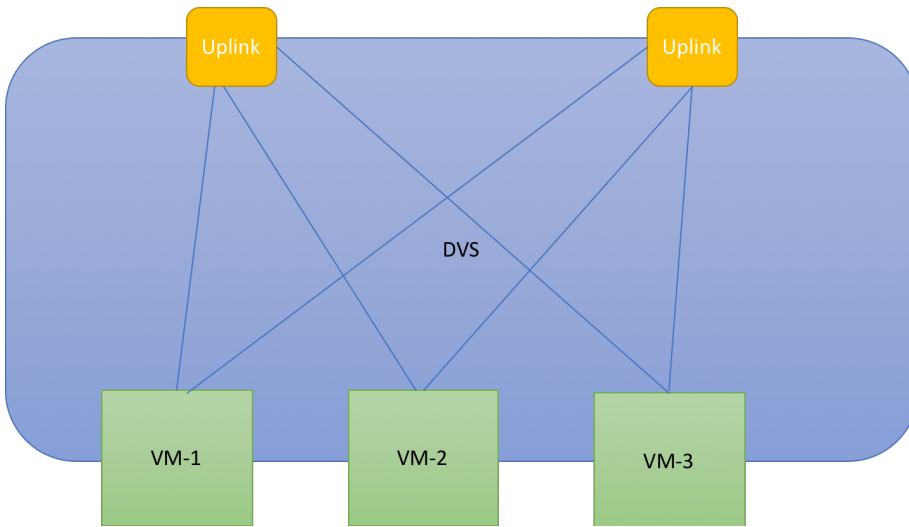
Example:

```
<fvRsDomAtt annotation="" classPref="encap" delimiter=""
encap="unknown" encapMode="auto" epgCos="Cos0" epgCosPref="disabled"
instrImedcy="immediate" netflowDir="both" netflowPref="disabled"
primaryEncap="unknown" primaryEncapInner="unknown"
resImedcy="immediate" secondaryEncapInner="unknown"
switchingMode="native" tDn="uni/vmmp-VMware/dom-DVStoAVE">
  <vmmSecP allowPromiscuous="reject" annotation="" descr=""
  forgedTransmits="reject" macChanges="reject" name="" nameAlias=""
  ownerKey="" ownerTag=""/>
</fvRsDomAtt>
```

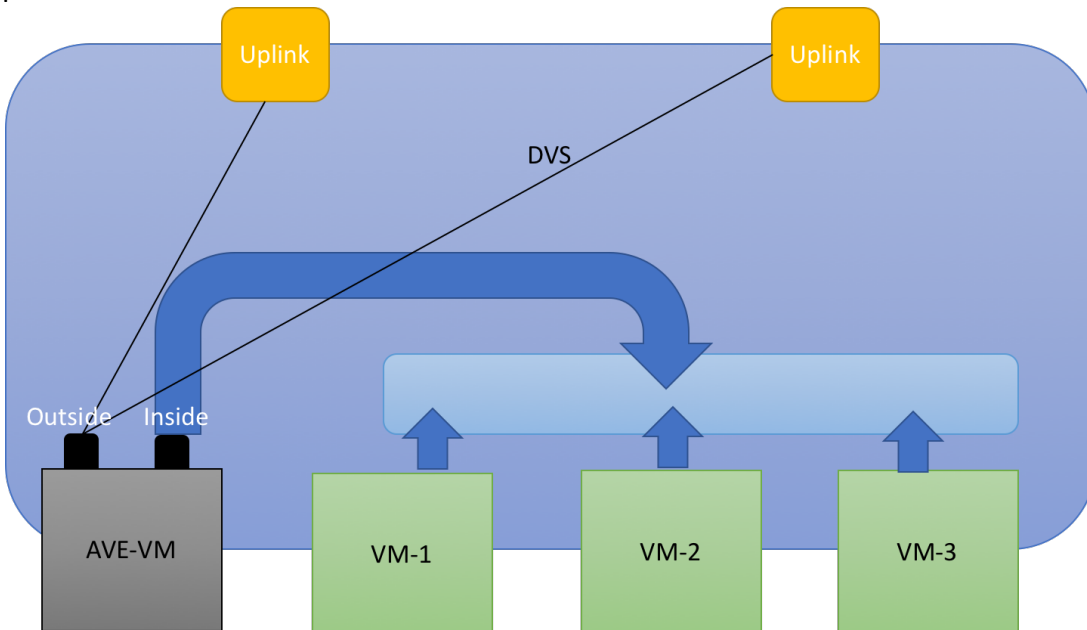
```
<fvRsDomAtt annotation="" classPref="encap" delimiter=""
encap="unknown" encapMode="auto" epgCos="Cos0" epgCosPref="disabled"
instrImedcy="immediate" netflowDir="both" netflowPref="disabled"
primaryEncap="unknown" primaryEncapInner="unknown"
resImedcy="immediate" secondaryEncapInner="unknown"
switchingMode="AVE" tDn="uni/vmmp-VMware/dom-DVStoAVE">
  <vmmSecP allowPromiscuous="reject" annotation="" descr=""
  forgedTransmits="reject" macChanges="reject" name="" nameAlias=""
  ownerKey="" ownerTag=""/>
</fvRsDomAtt>
```

AVE Mode

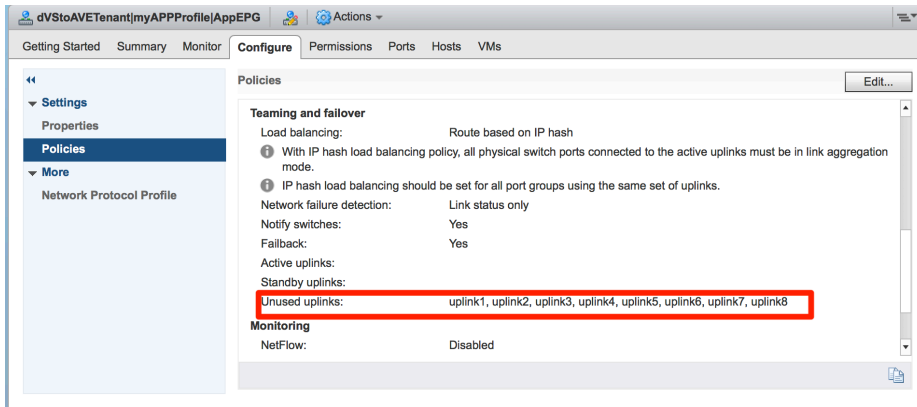
The AVE mode changes the traffic flow inside each DVS from its default behavior, in which each VM has direct connection to the Uplink:



To a design when one port from the AVE instance connects to the Fabric and the other port faces the VM traffic:



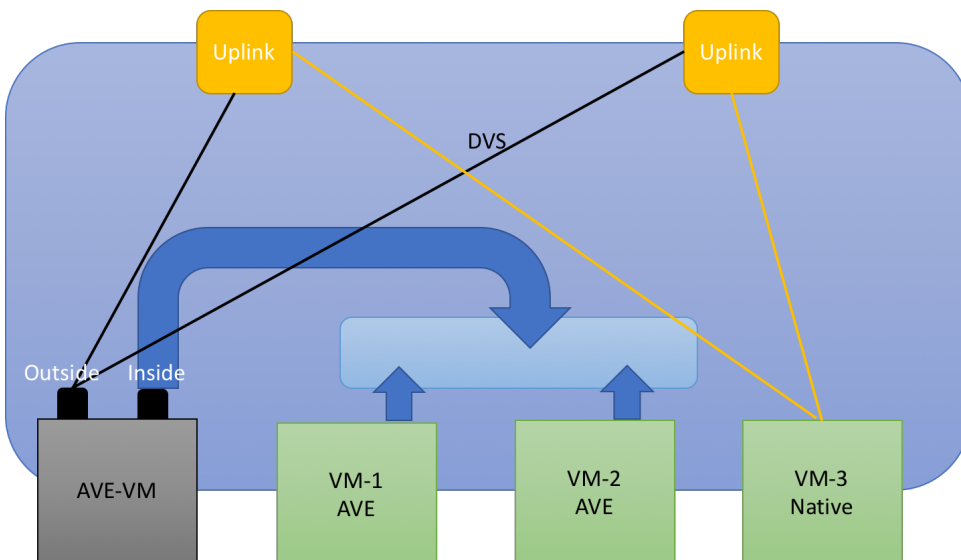
Only the Outside interface has association to the uplinks, due to the Portgroup configuration done by APIC (described above). The Inside port is listening in the entire private VLAN block assigned to the VMM domain. The EPGs with the AVE switching mode will have their portgroup configuration changed. So, in addition to use the private VLAN block, the portgroups will have all uplinks disabled:



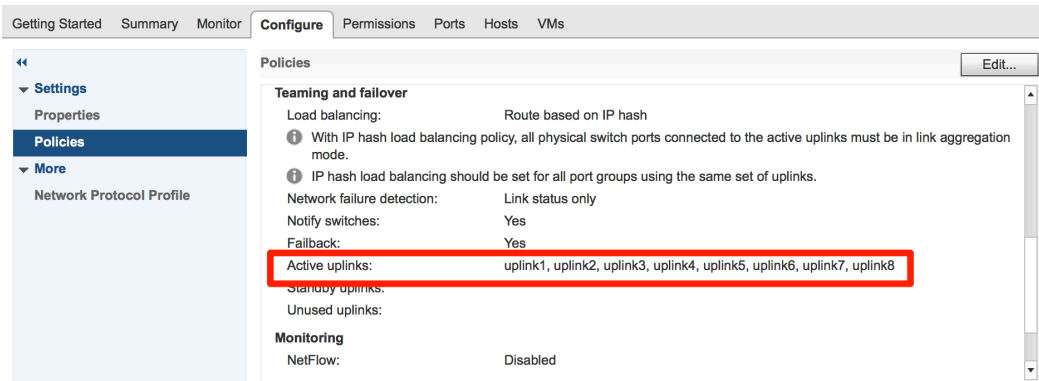
This way AVE can ensure the Inside port will catch all the traffic from the VMs.

Native Mode

Once the VMM domain has been migrated to AVE, all the EPGs already associated with the DVS will have the switching mode set as Native. Any new EPG can be set as Native or AVE, and EPGs can be mixed in the same DVS, the way the traffic flow works for both modes is due to the Portgroup configuration for the Native Portgroups, as it allows to use the uplinks, which is not allowed for the AVE Portgroups.



Native Portgroup configuration:



The AVE VM will not see any traffic for the Native EPGs, as the Inside portgroup is only trunking the private VLAN range, and the Outside Portgroup only trunks the External VLANs for the AVE EPGs.

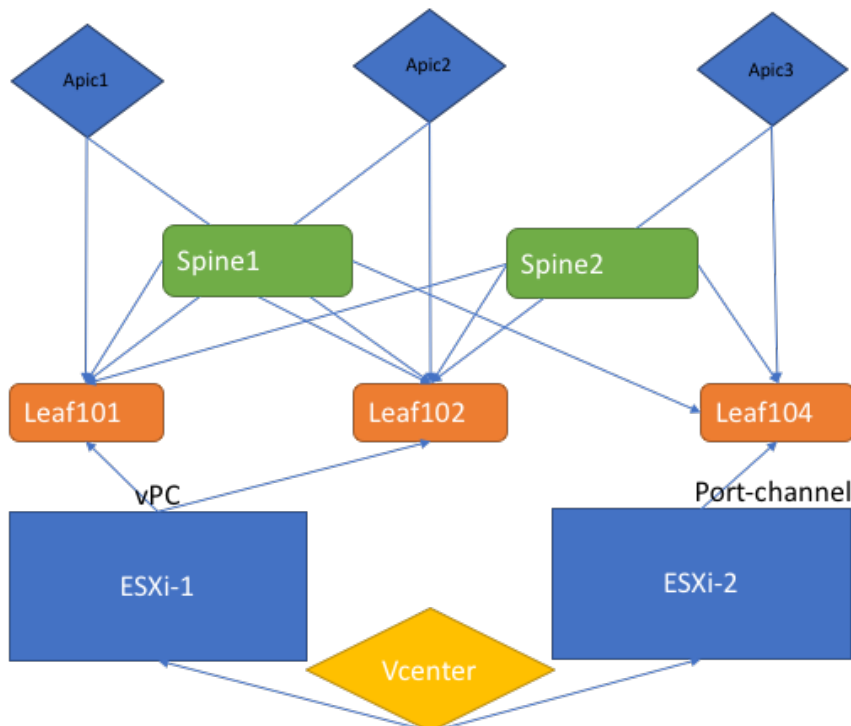
This way, the user can migrate the EPGs individually while the other EPGs deployed are still in Native mode.

Migrating DVS to AVE

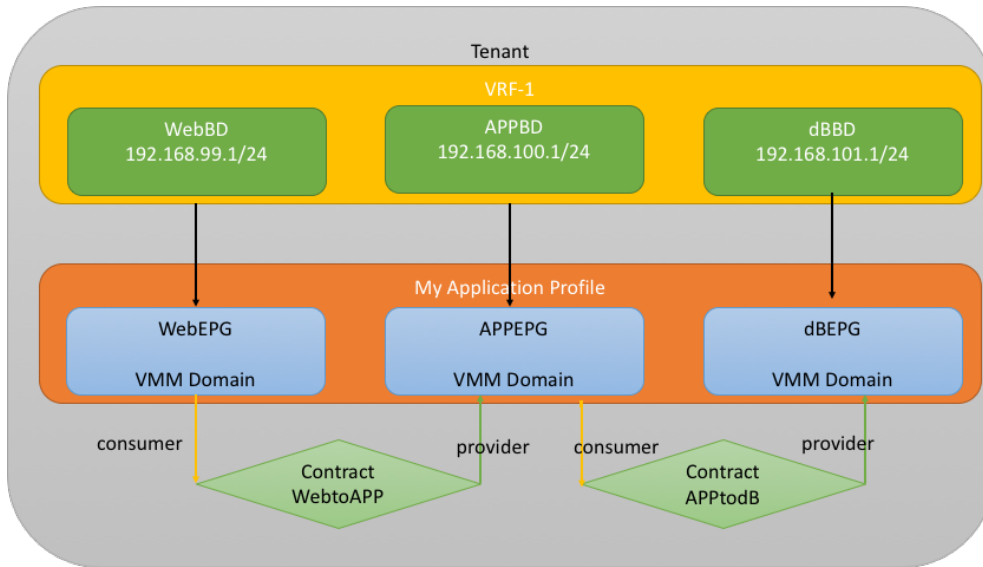
Assumptions:

ACI Fabric has already an associated VMM domain using DVS.
 VCenter Plugin already installed, and Fabric registered to Vcenter.

Topology:



Logical Tenant Topology:



Devices:

APIC APIC-SERVER-M2

Spines: N9K-C9336PQ

Leaf Switches: N9K-C9396PX (Nodes 101-102) , N9K-C93180YC-EX (Node-104)

ESXi: UCS C220-M4S

vCenter: Virtual Machine

Version:

APIC 3.2(1m)

Spines: 13.2(1m)

Leaf Switches: 13.2(1m)

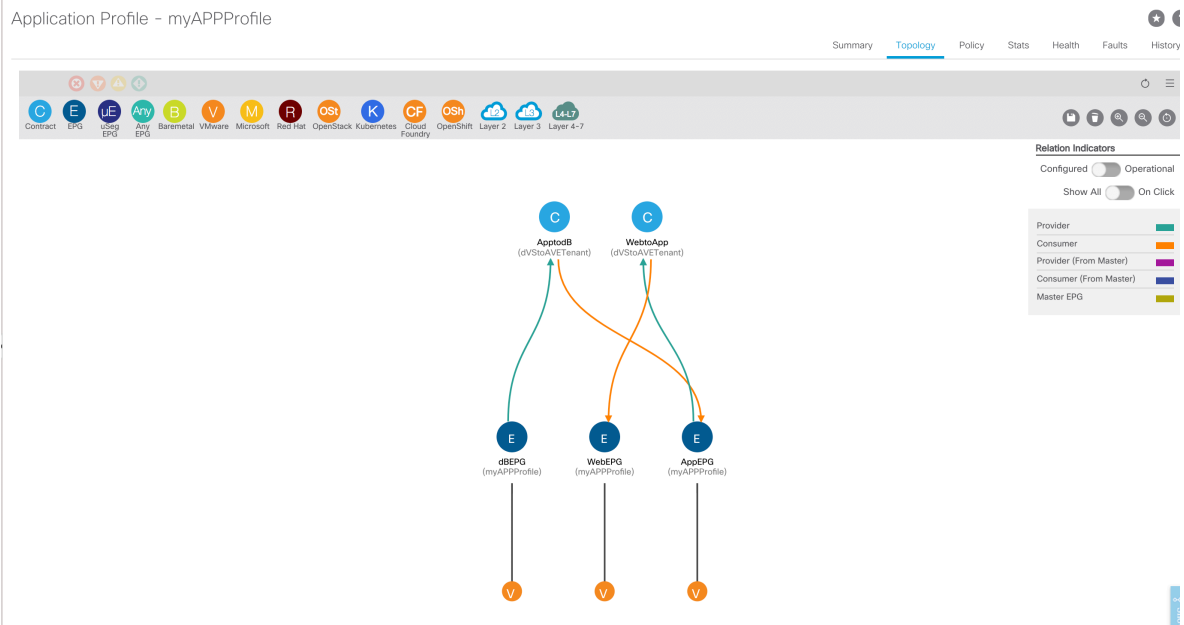
ESXi: 6.0.0, 5050593

vCenter: 6.5

Initial Setup:

TENANT

We have a Tenant with Three EPGs, each one associated to the same VMM domain using DVS, the communication between the EPGs is controlled by contracts, pictured next:



Web EPG consumes the WebtoApp contract, which is provided by App EPG
 App EPG consumes the ApptoDB contract, which is provided by dB EPG.

VMM

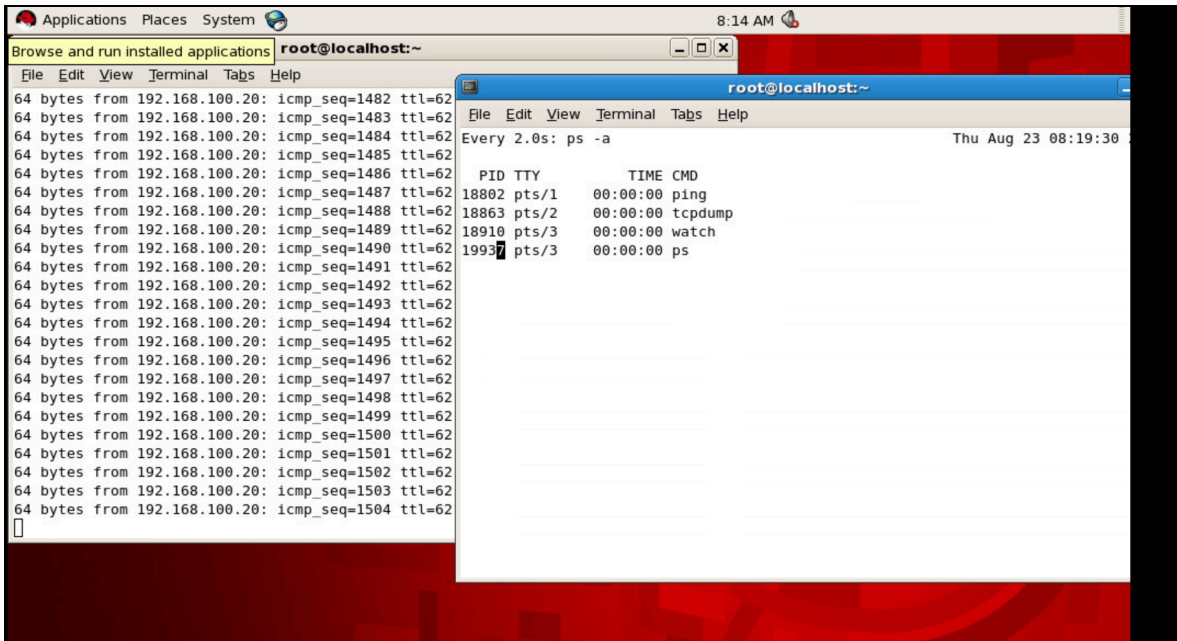
We have a DVS expanded upon 2 ESXi Hosts:

Name	State	Status	Cluster	Consumed CPU %	Consumed Memory
10.88.247.33	Connected	Normal		0	
10.88.247.34	Connected	Normal		0	

The portroups available belong to Uplinks and the EPGs.

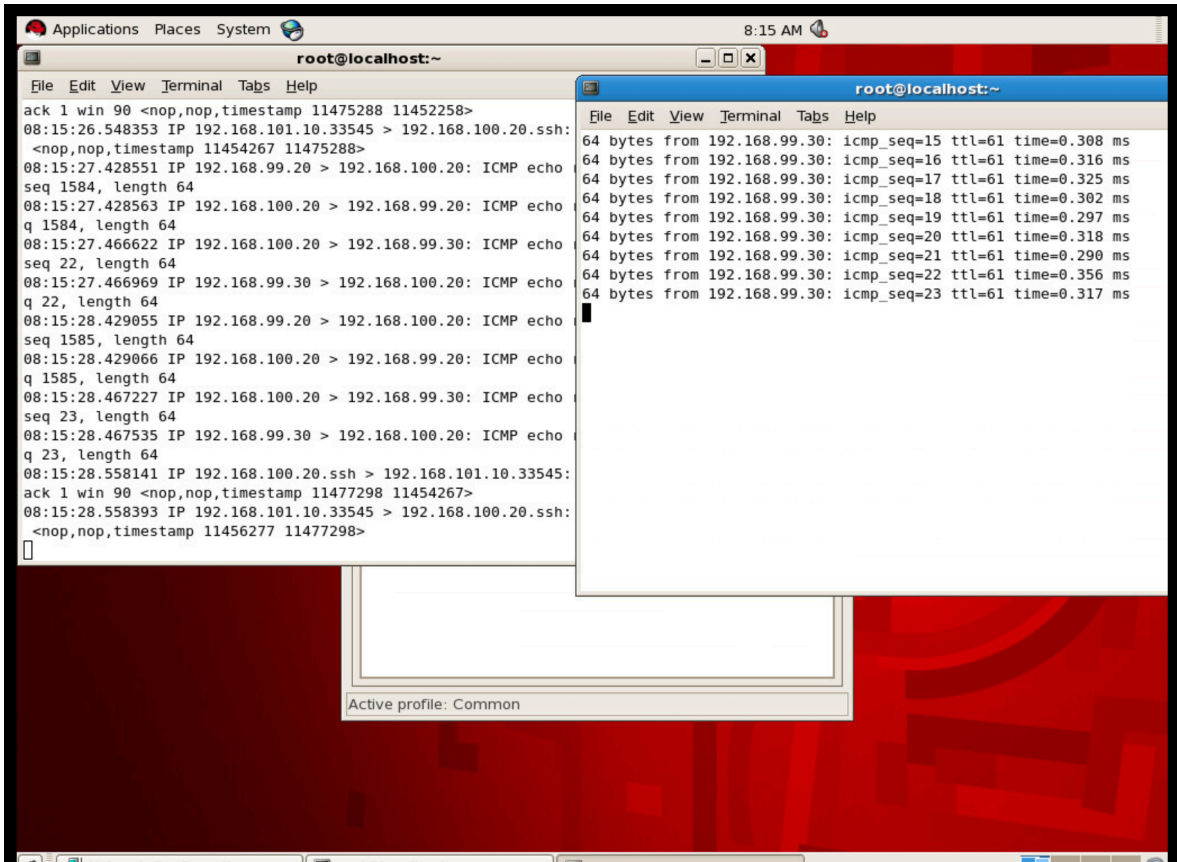
Active Communication between the VMs:

Web EPG:



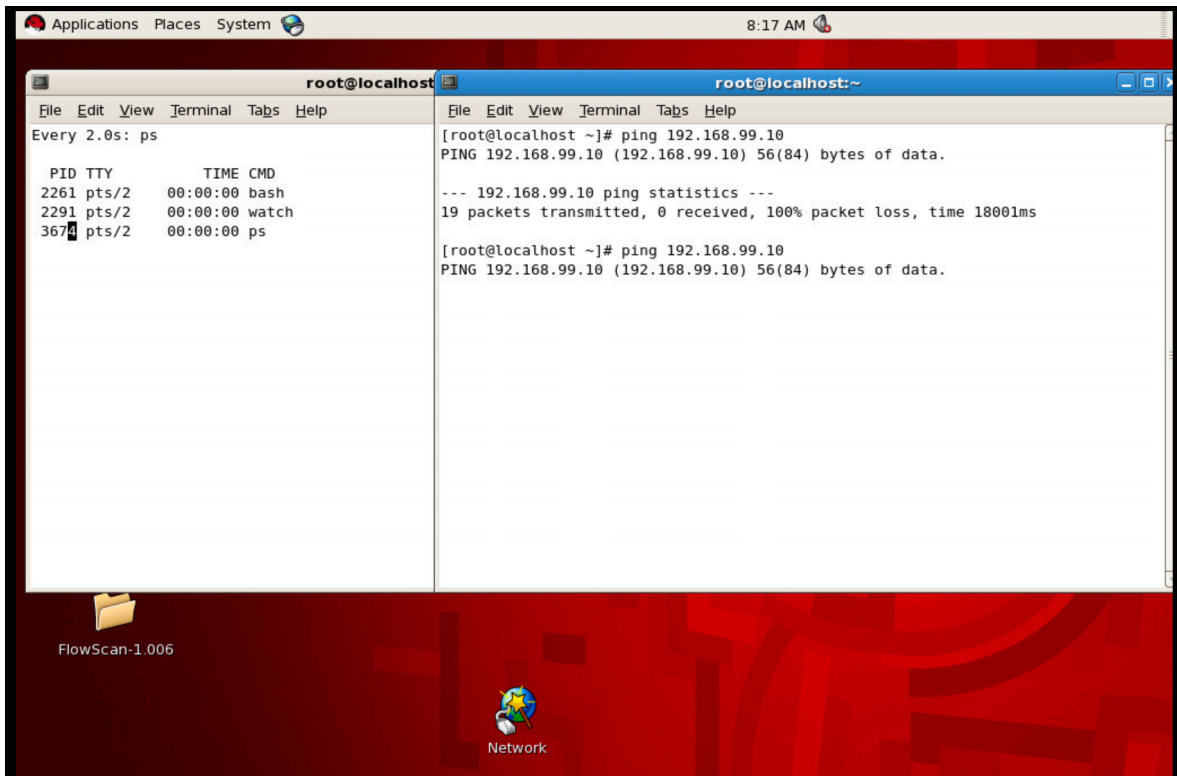
Ping and ssh console to VM in App EPG

App EPG:



Tcpdump session showing traffic from db EPG, and ping towards web EPG

dB EPG:



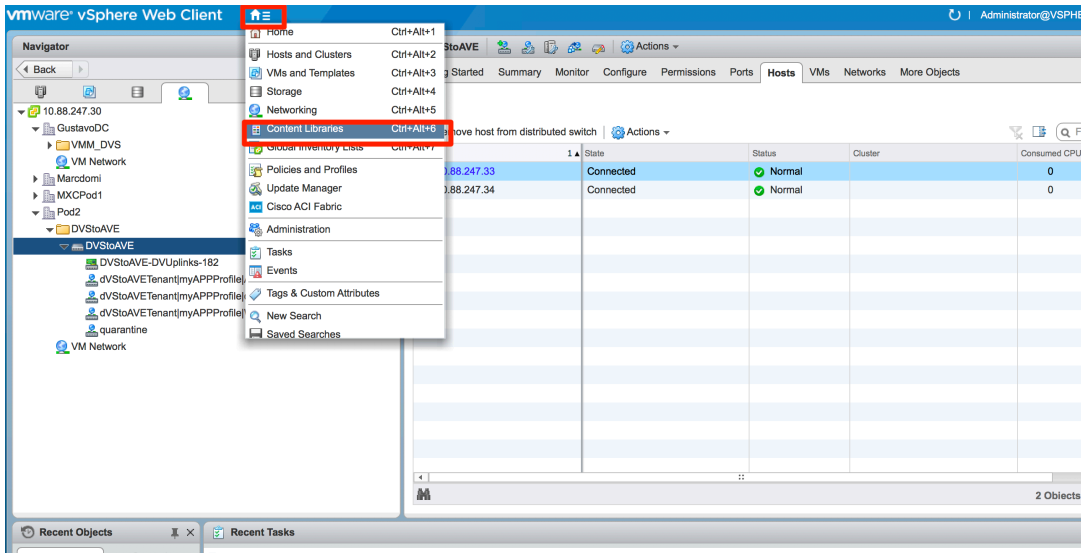
Ssh console to App EGP and failing ping to WebEPG.

Pre Migration work:

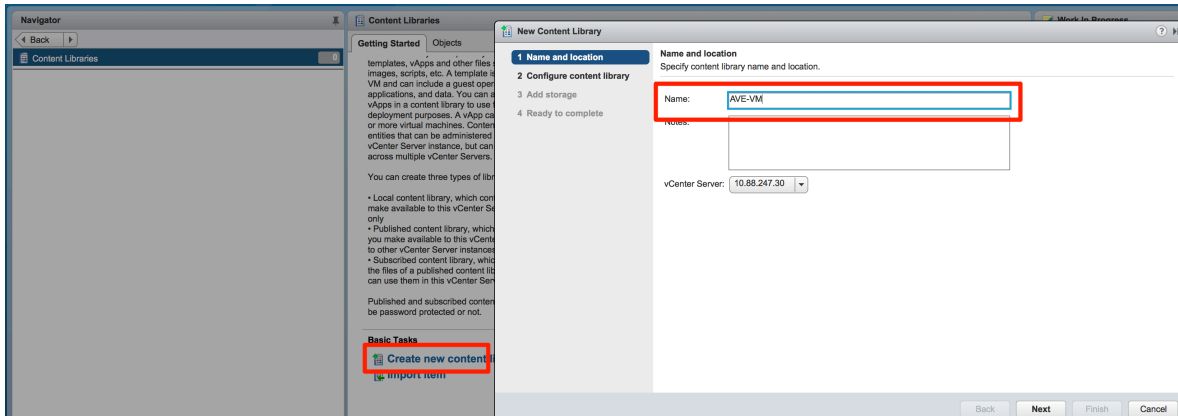
1. Running at least APIC version 3.1X
2. Vcenter running at least 6.0U3
3. AVE OVF file uploaded to Vcenter (using AVE 1.2.1a)

Uploading AVE OVF file to Vcenter Content Library

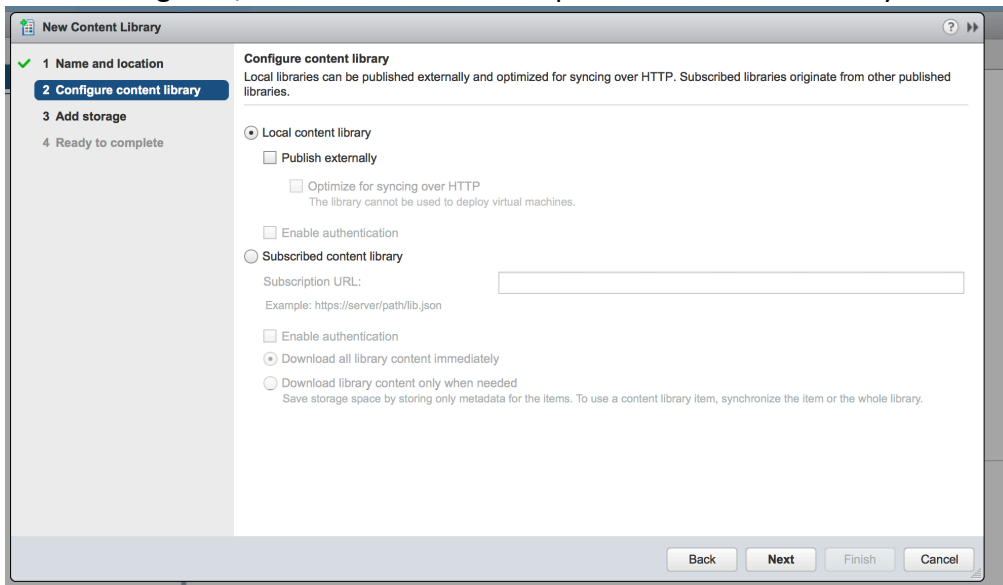
Before the migration, Vcenter must have the AVE OVF file ready to be deployed in different ESXi hosts. To do this, we must log in to Vcenter and click in Home-> Content Library:



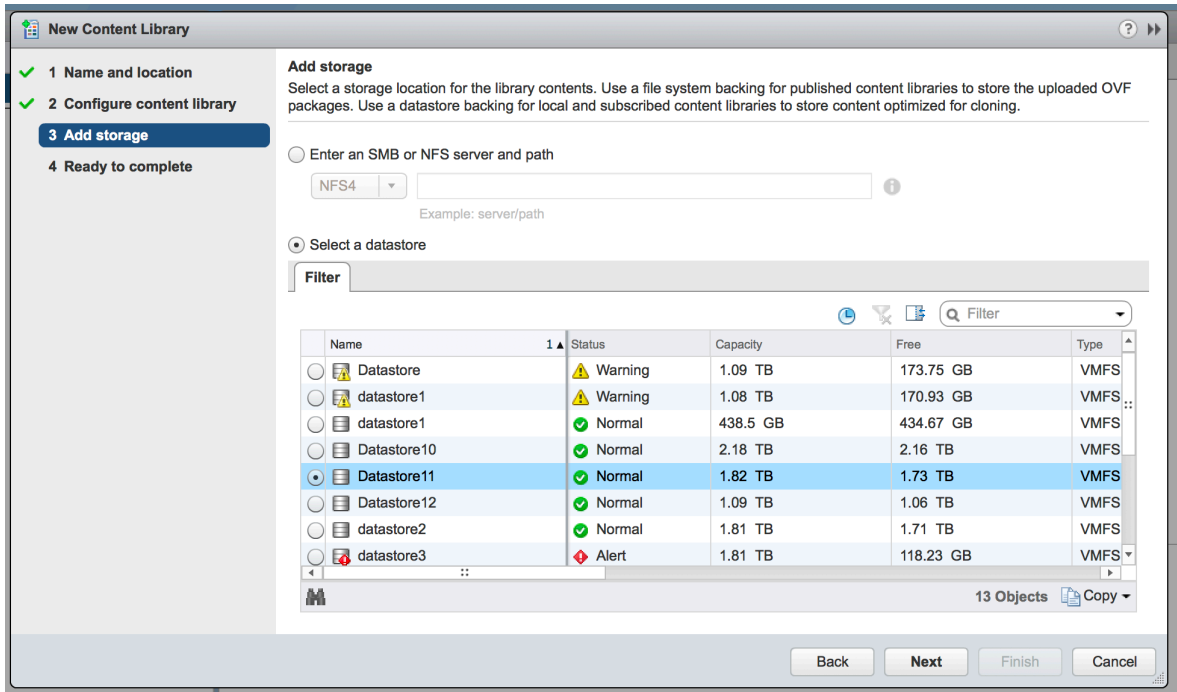
Under Getting started, click in Create new Content Library, we need to give a name for it:



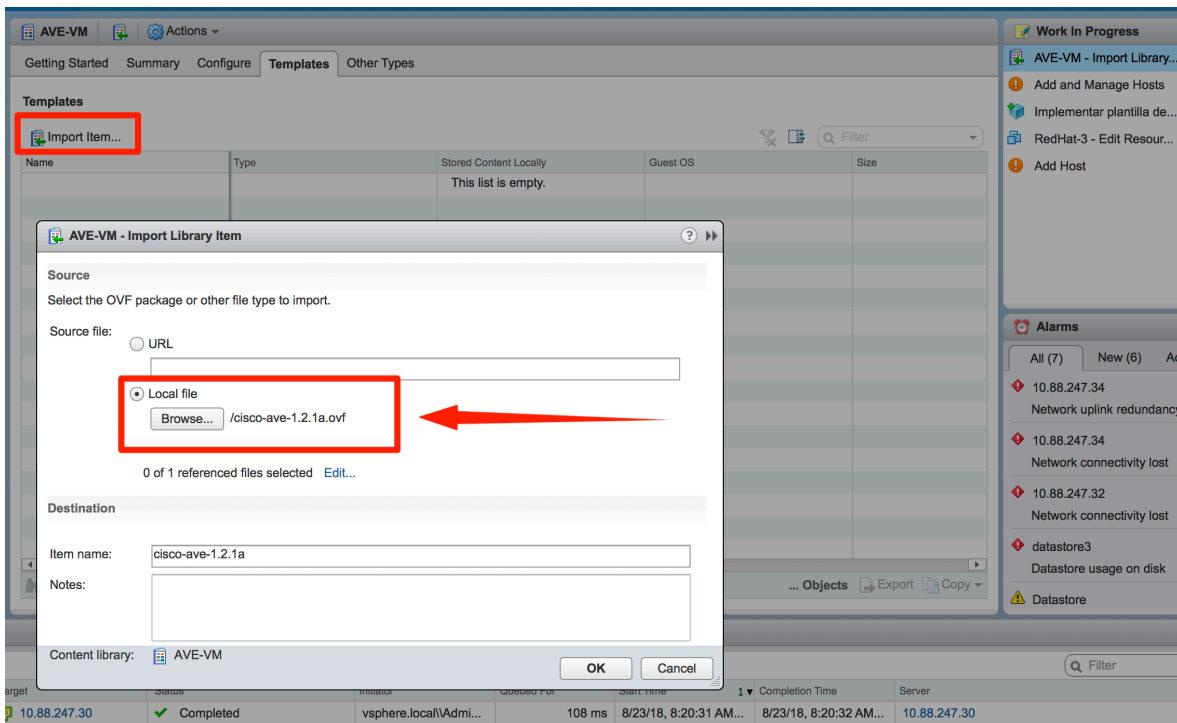
After clicking next, we need to select the option Local content library and click next:



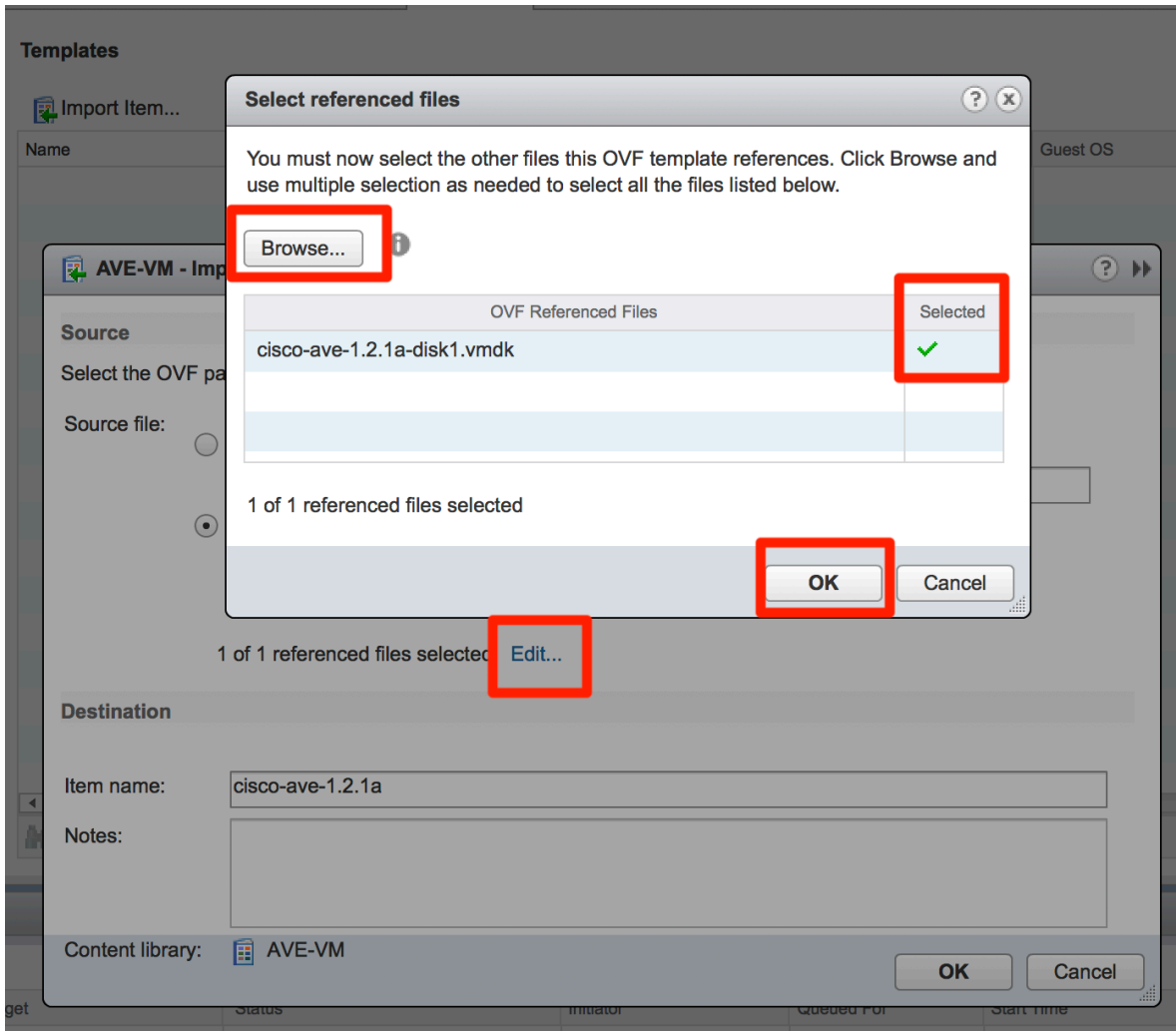
We then need to select a Datastore for the OVF:



After clicking next, we need to select the OVF file from the local host:



There should be 0 of 1 referenced files selected, we need to click in Edit... and select the requested file the click ok:



After this, the operation to upload the AVE will start:

Recent Tasks

Task Name	Target	Status	Initiator	Queued For	Start Time
Upload Files to a Library Item	cisco-ave-1.2.1a		VSPHERE.LOCAL\...	106 ms	8/23/18, 8:22:07 /
Create Library Item	AVE-VM	✓ Completed	vsphere.local\Admi...	107 ms	8/23/18, 8:22:06 /
Create Library	10.88.247.30	✓ Completed	vsphere.local\Admi...	108 ms	8/23/18, 8:20:31 /
Delete file	Datastore11	✓ Completed	VSPHERE.LOCAL\...	15 ms	8/23/18, 8:18:53 /
Delete Library	ACI-AVE	✓ Completed	vsphere.local\Admi...	105 ms	8/23/18, 8:18:52 /

Recent Tasks

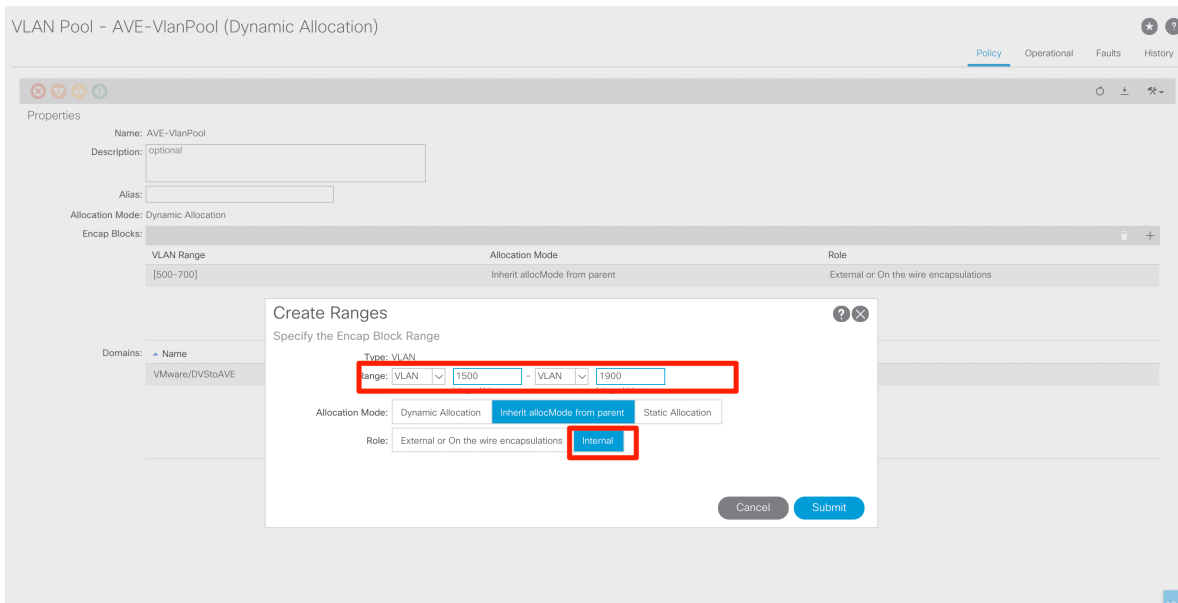
Task Name	Target	Status	Initiator	Queued For	Start Time	Completion Time	Server
Upload Files to a Library Item	cisco-ave-1.2.1a		VSPHERE.LOCAL\...	106 ms	8/23/18, 8:22:07 AM...		10.88.247.30
Create Library Item	AVE-VM	✓ Completed	vsphere.local\Admi...	107 ms	8/23/18, 8:22:06 AM...	8/23/18, 8:22:06 AM...	10.88.247.30
Create Library	10.88.247.30	✓ Completed	vsphere.local\Admi...	108 ms	8/23/18, 8:20:31 AM...	8/23/18, 8:20:32 AM...	10.88.247.30
Delete file	Datastore11	✓ Completed	VSPHERE.LOCAL\...	15 ms	8/23/18, 8:18:53 AM...	8/23/18, 8:18:53 AM...	10.88.247.30
Delete Library	ACI-AVE	✓ Completed	vsphere.local\Admi...	105 ms	8/23/18, 8:18:52 AM...	8/23/18, 8:18:54 AM...	10.88.247.30

Task Name	Target	Status	Initiator	Queued For	Start Time	Completion Time	Server
Upload Files to a Library Item	cisco-ave-1.2.1a	✓ Completed	VSPHERE.LOCAL\...	106 ms	8/23/18, 8:22:07 AM...	8/23/18, 8:26:52 AM...	10.88.247.30
Create Library Item	AVE-VM	✓ Completed	vsphere.local\Admi...	107 ms	8/23/18, 8:22:06 AM...	8/23/18, 8:22:06 AM...	10.88.247.30
Create Library	10.88.247.30	✓ Completed	vsphere.local\Admi...	108 ms	8/23/18, 8:20:31 AM...	8/23/18, 8:20:32 AM...	10.88.247.30
Delete file	Datastore11	✓ Completed	VSPHERE.LOCAL\...	15 ms	8/23/18, 8:18:53 AM...	8/23/18, 8:18:53 AM...	10.88.247.30
Delete Library	ACI-AVE	✓ Completed	vsphere.local\Admi...	105 ms	8/23/18, 8:18:52 AM...	8/23/18, 8:18:54 AM...	10.88.247.30

A minimum of 8 GB is available on disks of the ESXi server to install Virtual Edge. At this point, AVE is available to all ESXi hosts associated to Vcenter.

Access Policies

From a working DVS, the only additional access policies needed are an internal Vlan Block used to assign the Private Vlans for the EPG portgroups:



The policy will result in the following objects.

```
<?xml version="1.0" encoding="UTF-8"?>
<imdata totalCount="1">
<fvnsVlanInstP allocMode="dynamic" annotation="" descr=""
dn="uni/infra/vlanns-[AVE-VlanPool]-dynamic" name="AVE-VlanPool"
nameAlias="" ownerKey="" ownerTag="">
```

```
<fvnsEncapBlk allocMode="inherit" annotation="" descr="" from="vlan-
1500" name="" nameAlias="" role="internal" to="vlan-1900"/>
<fvnsEncapBlk allocMode="inherit" annotation="" descr="" from="vlan-
500" name="" nameAlias="" role="external" to="vlan-700"/>
</fvnsVlanInstP>
</imdata>
```

And a Multicast address Pool(*fvnsMcastAddrInstP*) used for the EPGs deployed with AVE.

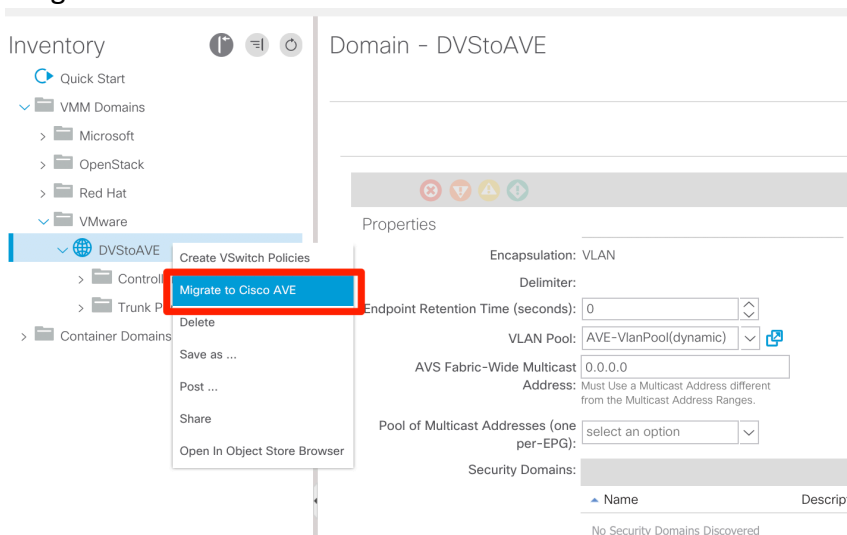
Multicast Address Pool - AVE-pool



```
<?xml version="1.0" encoding="UTF-8"?>
<imdata totalCount="1">
<fvnsMcastAddrInstP annotation="" descr="" dn="uni/infra/maddrns-AVE-pool" name="AVE-pool" nameAlias="" ownerKey="" ownerTag="">
<fvnsMcastAddrBlk annotation="" descr="" from="225.0.0.1" name="" nameAlias="" to="225.0.0.255"/>
</fvnsMcastAddrInstP>
</imdata>
```

Migrating the VMM domain from dVS to AVE

We need to select the VMM domain (*vmmDomP*) and right-click it. Then Select the option “Migrate to Cisco AVE”



The following window will appear. We then need to select the Switching preferences and the Encap mode. The Switching preference (*enfPref*) sets if the local traffic between Endpoints will reach the compute leaf or not. The second attribute is the Encap mode (*prefEncapMode*) will let us use VxLAN or VLAN. In either case, a range of private Vlans is necessary, as the VxLAN encapsulation will only be used by the AVE Vm Outside Port. A fabric wide Multicast IP address(*mcastAddr*) and a Multicast range(associated with the MO *vmmRsDomMcastAddrNs*) is required as an AVS implementation, within the pool, each EPG will use one of the addresses.

Migrate To Cisco AVE

i This will migrate the existing VMM Domain to a new Cisco AVE VMM domain. All properties will be preserved. Any required properties of the new virtual switch must be entered here as well. No copy of the existing VMM domain will remain.

! All associated EPGs of the VMM domain will remain in the current switch mode of native. In order to complete the conversion, you must first deploy the AVE VM on all the hosts connected to DVS. Once that is complete, go to the AVE domain you created here and from the Associated EPGs tab you can switch the mode to AVE for each EPG.

Virtual Switch Name: DVStoAVE

Switching Preference: No Local Switching Local Switching

Default Encap Mode: VLAN mode VXLAN mode

AVE Fabric-Wide Multicast Address: 224.101.101.1
Must Use a Multicast Address different from the Pool of Multicast Addresses.

Pool of Multicast Addresses (one per-EPG): AVE-pool

VLAN Pool: AVE-VlanPool(dynamic)

STP Policy: select an option

Firewall Policy: select an option

This will result in an AVE-ready (*enableAVE*) VMM domain:

```
<?xml version="1.0" encoding="UTF-8"?>
<imdata totalCount="1">
<vmmDomP accessMode="read-write" annotation="" arpLearning=""
childAction="" configIssues="" ctrlKnob="epDpVerify" delimiter=""
dn="uni/vmmp-VMware/dom-DVStoAVE" enableAVE="yes"
encapMode="unknown" enfPref="sw" epInventoryType="on-link"
epRetTime="0" extMngdBy="" lcOwn="local" mcastAddr="224.101.101.1"
modTs="2018-08-23T15:57:23.590-05:00" mode="default"
monPolDn="uni/fabric/monfab-default" name="DVStoAVE" nameAlias=""
ownerKey="" ownerTag="" prefEncapMode="vlan" status=""
txId="14987979559891666009" uid="15374"/>
</imdata>
```

```
<?xml version="1.0" encoding="UTF-8"?>
<imdata totalCount="1">
<vmmRsDomMcastAddrNs annotation="" childAction="" dn="uni/vmmp-
VMware/dom-DVStoAVE/rsdomMcastAddrNs" extMngdBy="" forceResolve="yes"
lcOwn="local" modTs="2018-08-23T15:57:23.695-05:00"
monPolDn="uni/fabric/monfab-default" rType="mo" state="formed"
stateQual="none" status="" tCl="fvnsMcastAddrInstP"
tDn="uni/infra/maddrns-AVE-pool" tType="mo" uid="15374"/>
</imdata>
```

Audit log:

```
<aaaModLR affected="uni/vmmp-VMware/dom-DVStoAVE" cause="transition"
changeSet="enableAVE (Old: no, New: yes), enfPref (Old: hw, New: sw),
mcastAddr (Old: 0.0.0.0, New: 224.101.101.1), prefEncapMode (Old:
```



```
unspecified, New: vlan)" childAction="" clientTag="" code="E4213323"
created="2018-08-23T15:57:07.572-05:00" descr="DomP DVStoAVE modified"
dn="subj-[uni/vmmp-VMware/dom-DVStoAVE]/mod-4294969399"
id="4294969399" ind="modification" modTs="never"
sessionId="EXNIZM6gQhOqNGLWzqLNyQ==" severity="info" status=""
trig="config" txId="576460752305265178" user="admin"/>
```

```
<aaaModLR affected="uni/vmmp-VMware/dom-DVStoAVE/rsdomMcastAddrNs"
cause="transition" changeSet="tDn:uni/infra/maddrns-AVE-pool"
childAction="" clientTag="" code="E4213379" created="2018-08-
23T15:57:07.572-05:00" descr="RsDomMcastAddrNs created" dn="subj-
[uni/vmmp-VMware/dom-DVStoAVE/rsdomMcastAddrNs]/mod-4294969398"
id="4294969398" ind="creation" modTs="never"
sessionId="EXNIZM6gQhOqNGLWzqLNyQ==" severity="info" status=""
trig="config" txId="576460752305265178" user="admin"/>
```

VMMMgr

Need to verify the VMM Domain set the AVE mode, switching mode and encap mode properly, might be found in the logs from different APICs:

```
5399||18-08-23 15:57:07.631-
05:00||actionUpdate__||DBG4||fr=ifc_policymgr:2:2:6:0:26:1,to=ifc_vmmgr:2:3:14:0:18:1,co=do
er:18:1:0x90000000001b40ce:1,si=0x2061a1817ad24b:1 ms|(envelope 0x7000000061357: RECEIVE-
BULK:REQUEST[actionUpdate/]) CONTENT :
<actionUpdate dn="uni/vmmp-VMware/dom-DVStoAVE/ctrlr-Vcenter" action="557" run="1062"
stage="146" timestamp="1535057843590">
<vmmCtrlrPTask childAction="deleteNonPresent" data="" descr="" dn="action/policymgrsubj-
[uni/vmmp-VMware/dom-DVStoAVE/ctrlr-Vcenter]/vmmCtrlrPTask-Config" endTs="never" fail="0"
flags="0" id="Config" invErrCode="none" invErrDescr="" invRslt="" lcOwn="local" modTs="2018-
08-23T15:57:23.590-05:00" oDn="comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter"
operSt="processing" originMinority="no" runId="1062" startTs="2018-08-23T15:57:23.590-05:00"
startTx="2662054" status="created" try="0" ts="2018-08-23T15:57:23.590-05:00"/>
<inConfig>
<compCtrlr accessMode="read-write" apiVer="" childAction="" ctrlKnob="epDpVerify"
ctrlrPKey="uni/vmmp-VMware/dom-DVStoAVE/ctrlr-Vcenter" deployIssues="" descr=""
dn="comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter" domName="DVStoAVE" dvsVersion="6.0"
enableAVE="yes" enableTag="yes" epRetTime="0" hostOrIp="10.88.247.30" id="0"
inventoryStartTS="never" inventoryTrigSt="untriggered" issues="" key=""
lastEventCollectorId="datacenter" lastEventId="0" lastEventTS="0"
lastInventorySt="completed" lastInventoryTS="never" lcOwn="local"
maxWorkerQSize="defaultQueueSize" modTs="never" mode="default" model=""
monPolDn="uni/infra/moninfra-default" name="Vcenter" nameAlias="" operSt="unknown" port="0"
remoteErrMsg="" remoteOperIssues="" rev="" rn="" rootContName="Pod2" scope="vm" ser=""
setDeployIssues="" setRemoteOperIssues="" status="" unsetDeployIssues=""
unsetRemoteOperIssues="" usr="administrator@vsphere.local" vendor="" vsphereTag="no"
vxlanDeplPref="vxlan">
<compPolCont childAction="deleteNonPresent" descr="" id="0" issues="" lcOwn="local"
modTs="2018-08-23T11:58:24.769-05:00" monPolDn="uni/infra/moninfra-default" name=""
nameAlias="" rn="polCont" status="">
<cdpIfPolDef adminSt="disabled" childAction="deleteNonPresent" descr="" lcOwn="local"
modTs="2018-08-23T11:58:24.952-05:00" name="cdp-disabled" nameAlias="" ownerKey=""
ownerTag="" rn="cdpIfPD-cdp-disabled" status=""/>
<compStatsPol childAction="deleteNonPresent" enable="yes" isValidNlkvPol="yes" lcOwn="local"
modTs="2018-08-23T15:57:23.590-05:00" monPolDn="uni/infra/moninfra-default" name=""
nameAlias="" rn="statsPol" status=""/>
<l2InstPolDef childAction="deleteNonPresent" descr="" fabricMtu="9000" lcOwn="local"
managementMtu="9000" modTs="2018-08-23T11:58:24.815-05:00" name="default" nameAlias=""
ownerKey="" ownerTag="" rn="l2polD-default" status=""/>
<stpIfPolDef childAction="deleteNonPresent" ctrl="" descr="" lcOwn="local" modTs="2018-08-
23T11:58:24.823-05:00" name="default" nameAlias="" ownerKey="" ownerTag="" rn="ifPolD-
default" status=""/>
```

```

<lacpLagPolDef childAction="deleteNonPresent" ctrl="fast-sel-hot-stdby,graceful-conv,susp-
individual" descr="" lcOwn="local" maxLinks="16" minLinks="1" modTs="2018-08-
23T11:58:24.829-05:00" mode="off" monPolDn="uni/infra/moninfra-default"
name="DVStoAVE_lacpLagPol" nameAlias="" ownerKey="" ownerTag="" rn="lagPD-
DVStoAVE_lacpLagPol" status=""/>
<lldpIfPolDef adminRxSt="enabled" adminTxSt="enabled" childAction="deleteNonPresent"
descr="" lcOwn="local" modTs="2018-08-23T11:58:24.829-05:00" name="DVStoAVE_lldpIfPol"
nameAlias="" ownerKey="" ownerTag="" rn="lldpIfPD-DVStoAVE_lldpIfPol" status=""/>
<nwsFwPolDef childAction="deleteNonPresent" descr="" lcOwn="local" modTs="2018-08-
23T11:58:24.769-05:00" mode="learning" name="default" nameAlias="" ownerKey="" ownerTag=""
rn="fwPD-default" status=""/>
</compPolCont>
</compCtrlr>
</inConfig>
<inSecondaries/>
</actionUpdate>||../common/src/framework/./core/proc/Stimulus.cc||895

12936||18-08-23 15:57:07.634-
05:00||polUpdate__||DBG4||fr=ifc_policymgr:2:2:6:0:26:1,to=ifc_vmmmgr:2:2:14:0:26:1,co=doer:
26:1:0xd00000000019b4f4:1,si=0x2061a1817ad66b:4 ms|(envelope 0x7000000001396: RECEIVE-
BULK:REQUEST[polUpdate/]) CONTENT :
<polUpdate dn="pcons/refcont-[registry/class-2136/instcl-vmmDomP/ra-[relnholder]-14-0-0-0-
Self-service]/trdn-[uni/vmmp-VMware/dom-DVStoAVE]" action="13" run="1074" stage="12"
timestamp="1535057843590">
<pconsRefTask childAction="deleteNonPresent" data="" descr="" dn="action/policymgrsubj-
[pcons/refcont-[registry/class-2136/instcl-vmmDomP/ra-[relnholder]-14-0-0-0-Self-
service]/trdn-[uni/vmmp-VMware/dom-DVStoAVE]]/pconsRefTask-PolUpdate" endTs="never" fail="0"
flags="0" id="PolUpdate" invErrCode="none" invErrDescr="" invRslt="" lcOwn="local"
modTs="2018-08-23T15:57:23.590-05:00" oDn="pcons/refcont-[registry/class-2136/instcl-
vmmDomP/ra-[relnholder]-14-0-0-0-Self-service]/trdn-[uni/vmmp-VMware/dom-DVStoAVE]"
operSt="processing" originMinority="no" runId="1074" startTs="2018-08-23T15:57:23.590-05:00"
startTx="2662054" status="created" try="0" ts="2018-08-23T15:57:23.590-05:00"/>
<inIgnoreNonResolvedPols value="yes"/>
<inConfigs>
<vmmDomP accessMode="read-write" annotation="" arpLearning="" childAction="" configIssues=""
ctrlKnob="epDpVerify" delimiter="" dn="uni/vmmp-VMware/dom-DVStoAVE" enableAVE="yes"
encapMode="vlan" enfPref="sw" epInventoryType="on-link" epRetTime="0" extMngdBy=""
lcOwn="policy" mcastAddr="224.101.101.1" modTs="never" mode="default"
monPolDn="uni/fabric/monfab-default" name="DVStoAVE" nameAlias="" ownerKey="" ownerTag=""
prefEncapMode="vlan" rn="" status="created,modified" txId="1498797955981666009" uid="15374"
uniqueId="4380"/>
</inConfigs>
<inConsumers>
<pconsCons cDn="relnholder" childAction="" distType="SameShard" dn="registry/class-
2136/instcl-vmmDomP/ra-[relnholder]-14-0-0-0-Self-service/cons-[relnholder]-service"
lcOwn="local" modOnly="no" modTs="2018-02-07T13:40:05.550-05:00" relMetaId="531"
relnDn="relnholder/rsdcmpRel" resolveType="Resolvable" resolverType="service" rn=""
status=""/>
</inConsumers>
</polUpdate>||../common/src/framework/./core/proc/Stimulus.cc||895

```

VMMmgr process also creates the Portgroups for the **Inside** and **Outside** Interfaces, and for each **EPG** associated from the Customer Tenants, and one for the **ave-ctrl** EPG created under infra tenant, used during vMotion. We need to ensure the proper configuration is set for them:

```

5399||18-08-23 15:57:07.635-
05:00||actionUpdate__||DBG4||fr=ifc_policymgr:2:2:6:0:26:1,to=ifc_vmmmgr:2:3:14:0:18:1,co=doer:
18:1:0x900000000001b40cf:1,si=0x2061a1817ad33e:3 ms|(envelope 0x70000000061358: RECEIVE-
BULK:REQUEST[actionUpdate/]) CONTENT :
<actionUpdate dn="uni/vmmp-VMware/dom-DVStoAVE/intcustomaggr-inside/rsctrlrP-[uni/vmmp-
VMware/dom-DVStoAVE/ctrlr-Vcenter]" action="556" run="1060" stage="145"
timestamp="1535057843590">
<compRsCtrlrPTask childAction="deleteNonPresent" data="10992" descr=""
dn="action/policymgrsubj-[uni/vmmp-VMware/dom-DVStoAVE/intcustomaggr-inside/rsctrlrP-
[uni/vmmp-VMware/dom-DVStoAVE/ctrlr-Vcenter]]/compRsCtrlrPTask-EpPDUpd" endTs="never"
fail="0" flags="0" id="EpPDUpd" invErrCode="none" invErrDescr="" invRslt="" lcOwn="local"
modTs="2018-08-23T15:57:23.590-05:00" oDn="comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter/eppd-

```

```
[uni/vmmp-VMware/dom-DVStoAVE/intcustomaggr-inside]" operSt="processing" originMinority="no"
runId="1060" startTs="2018-08-23T15:57:23.590-05:00" startTx="2662054" status="created"
try="0" ts="2018-08-23T15:57:23.590-05:00"/>
<inConfig>
<compEpPD allocMode="dynamic" bdDn="" blockAllPorts="Disabled" cfgdDelimiter=""
childAction="deleteNonPresent" classPref="encap" configFlags="" crtrnEnabled="no"
deployIssues="" descr="" dn="comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter/eppd-[uni/vmmp-
VMware/dom-DVStoAVE/intcustomaggr-inside]" encap="unknown" encapAllocKey=""
encapChanged="no" encapCtx="" encapMode="trunk" encapModeOverride="auto" epgCos="Cos0"
epgCosPref="disabled" epgPKey="uni/vmmp-VMware/dom-DVStoAVE/intcustomaggr-inside" eppDn=""
faultDKey="" forgedTransmit="Enabled" id="0" idConsumerDn="" instrImedcy="lazy"
intraSecConf="" issues="" lbAlgo="ip-hash" lcOwn="local" macChange="Enabled"
mcastAddr="0.0.0.0" modTs="never" monPolDn="" name="inside" nameAlias="" netflowDir="both"
netflowPref="disabled" operDelimiter="" pcEnfPref="unenforced" primaryEncap="unknown"
primaryEncapInner="unknown" promMode="Enabled" remoteErrMsg="" remoteOperIssues=""
resImedcy="lazy" rn="" secondaryEncapInner="unknown" statsCollectionState="no" status=""
switchingMode="native" txId="0" type="Tenant" updateTs="0" vxlanDeplPref="vxlan">
<fvnsEncapBlkDef allocMode="inherit" childAction="deleteNonPresent" descr="" from="vlan-
1500" lcOwn="local" modTs="never" name="" nameAlias="" rn="deffrom-[vlan-1500]-to-[vlan-
1900]" role="internal" status="" to="vlan-1900"/>
</compEpPD>
</inConfig>
<inSecondaries/>
</actionUpdate>| | ../common/src/framework/./core/proc/Stimulus.cc| | 895
```

We see the Inside portgroup enabling a promiscuous trunk port in the Private Vlan block, allowing Mac change, and Forged transmit. Outside port has similar configuration, but only allowing the infra vlan for now, as the EPGs are set as native mode.

```
5399| | 18-08-23 15:57:07.635-
05:00| | ifc_vmmngr| | DBG4| | co=doer:18:1:0x90000000001b40cf:1, dn='DxwgAAAcAvk13YXJlAAkARFZTdG9
BVkUACABWY2VudGVyABkA+G4JAAEJAERWU3RvQVZFAAcAaW5zaWRlAA==' | | executeCompRsCtrlrPEpPDUpdCb| | .
./svc/vmmngr/src/gen/ifc/app/./imp/comp/TaskCompRsCtrlrPEpPDUpdUpdateImp.cc| | 68
```

```
5399| | 18-08-23 15:57:07.635-
05:00| | actionUpdate_| | DBG4| | fr=ifc_policymgr:2:2:6:0:26:1, to=ifc_vmmngr:2:3:14:0:18:1, co=do
er:18:1:0x90000000001b40cf:1, si=0x2061a1817ad3dd:3 ms| | (envelope 0x7000000061359: RECEIVE-
BULK:REQUEST[actionUpdate/]) CONTENT :
<actionUpdate dn="uni/vmmp-VMware/dom-DVStoAVE/intcustomaggr-outside/rsctrlrP-[uni/vmmp-
VMware/dom-DVStoAVE/ctrlr-Vcenter]" action="556" run="1061" stage="145"
timestamp="1535057843590">
<compRsCtrlrPTask childAction="deleteNonPresent" data="10992" descr=""
dn="action/policymgrsubj-[uni/vmmp-VMware/dom-DVStoAVE/intcustomaggr-outside/rsctrlrP-
[uni/vmmp-VMware/dom-DVStoAVE/ctrlr-Vcenter]]/compRsCtrlrPTask-EpPDUpd" endTs="never"
fail="0" flags="0" id="EpPDUpd" invErrCode="none" invErrDescr="" invRslt="" lcOwn="local"
modTs="2018-08-23T15:57:23.590-05:00" oDn="comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter/eppd-
[uni/vmmp-VMware/dom-DVStoAVE/intcustomaggr-outside]" operSt="processing"
originMinority="no" runId="1061" startTs="2018-08-23T15:57:23.590-05:00" startTx="2662054"
status="created" try="0" ts="2018-08-23T15:57:23.590-05:00"/>
<inConfig>
<compEpPD allocMode="dynamic" bdDn="" blockAllPorts="Disabled" cfgdDelimiter=""
childAction="deleteNonPresent" classPref="encap" configFlags="" crtrnEnabled="no"
deployIssues="" descr="" dn="comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter/eppd-[uni/vmmp-
VMware/dom-DVStoAVE/intcustomaggr-outside]" encap="unknown" encapAllocKey=""
encapChanged="no" encapCtx="" encapMode="trunk" encapModeOverride="auto" epgCos="Cos0"
epgCosPref="disabled" epgPKey="uni/vmmp-VMware/dom-DVStoAVE/intcustomaggr-outside" eppDn=""
faultDKey="" forgedTransmit="Enabled" id="0" idConsumerDn="" instrImedcy="lazy"
intraSecConf="" issues="" lbAlgo="ip-hash" lcOwn="local" macChange="Enabled"
mcastAddr="0.0.0.0" modTs="never" monPolDn="" name="outside" nameAlias="" netflowDir="both"
netflowPref="disabled" operDelimiter="" pcEnfPref="unenforced" primaryEncap="unknown"
primaryEncapInner="unknown" promMode="Enabled" remoteErrMsg="" remoteOperIssues=""
resImedcy="lazy" rn="" secondaryEncapInner="unknown" statsCollectionState="no" status=""
switchingMode="native" txId="0" type="Tenant" updateTs="0" vxlanDeplPref="vxlan">
<fvnsEncapBlkDef allocMode="dynamic" childAction="deleteNonPresent" descr="" from="vlan-
4093" lcOwn="local" modTs="never" name="" nameAlias="" rn="deffrom-[vlan-4093]-to-[vlan-
4093]" role="external" status="" to="vlan-4093"/>
</compEpPD>
</inConfig>
<inSecondaries/>
```

```
</actionUpdate>| | ../common/src/framework/. /core/proc/Stimulus.cc| |895
```

After outside and inside, we need configure the Portgroups for each EPG, next is shown the configuration for one of the EPGs (dbEPG). We see the difference is within the encap mode (access instead of trunk), forged mac and promiscuous mode settings

```
5399| |18-08-23 15:57:07.635-
05:00| |actionUpdate__| |DBG4| |fr=ifc_policymgr:2:2:6:0:26:1,to=ifc_vmmngr:2:3:14:0:18:1,co=do
er:18:1:0x90000000001b40cf:1,si=0x2061a1817ad473:3 ms| |(envelope 0x700000006135a: RECEIVE-
BULK:REQUEST[actionUpdate/]) CONTENT :
<actionUpdate dn="uni/vmmp-VMware/dom-DVStoAVE/eppd-[uni/tn-dVStoAVETenant/ap-
myAPPProfile/epg-dBEPG]/rsctrlrP-[uni/vmmp-VMware/dom-DVStoAVE/ctrlr-Vcenter]" action="556"
run="1063" stage="145" timestamp="1535057843590">
<compRsCtrlrPTask childAction="deleteNonPresent" data="2134" descr=""
dn="action/policymgrsubj-[uni/vmmp-VMware/dom-DVStoAVE/eppd-[uni/tn-dVStoAVETenant/ap-
myAPPProfile/epg-dBEPG]/rsctrlrP-[uni/vmmp-VMware/dom-DVStoAVE/ctrlr-
Vcenter]]/compRsCtrlrPTask-EpPDUpd" endTs="never" fail="0" flags="0" id="EpPDUpd"
invErrCode="none" invErrDescr="" invRslt="" lcOwn="local" modTs="2018-08-23T15:57:23.590-
05:00" oDn="comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter/eppd-[uni/tn-dVStoAVETenant/ap-
myAPPProfile/epg-dBEPG]" operSt="processing" originMinority="no" runId="1063" startTs="2018-
08-23T15:57:23.590-05:00" startTx="2662054" status="created" try="0" ts="2018-08-
23T15:57:23.590-05:00"/>
<inConfig>
<compEpPD allocMode="dynamic" bdDn="uni/tn-dVStoAVETenant/BD-dBBD" blockAllPorts="Disabled"
cfgdDelimiter="" childAction="deleteNonPresent" classPref="encap" configFlags=""
crtEnEnabled="no" deployIssues="" descr="" dn="comp/prov-VMware/ctrlr-[DVStoAVE]-
Vcenter/eppd-[uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-dBEPG]" encap="vlan-634"
encapAllocKey="uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-dBEPG" encapChanged="no"
encapCtx="AVE-VlanPool" encapMode="access" encapModeOverride="auto" epgCos="Cos0"
epgCosPref="disabled" epgPKey="uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-dBEPG"
eppDn="uni/ep/fv-[uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-dBEPG]" faultDKey="uni/tn-
dVStoAVETenant/ap-myAPPProfile/epg-dBEPG" forgedTransmit="Disabled" id="0"
idConsumerDn="uni/vmmp-VMware/dom-DVStoAVE/eppd-[uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-
dBEPG]" instrImedcy="lazy" intraSecConf="" issues="" lbAlgo="ip-hash" lcOwn="local"
macChange="Disabled" mcastAddr="0.0.0.0" modTs="never" monPolDn="uni/tn-common/monepg-
default" name="8de472f6-0c9c-4822-acde-0e4cd19d70b0" nameAlias="" netflowDir="both"
netflowPref="disabled" operDelimiter="" pcEnfPref="unenforced" primaryEncap="unknown"
primaryEncapInner="unknown" promMode="Disabled" remoteErrMsg="" remoteOperIssues=""
resImedcy="immediate" rn="" secondaryEncapInner="unknown" statsCollectionState="yes"
status="" switchingMode="native" txId="3458764513822773813" type="Tenant" updateTs="0"
vxlanDeplPref="vxlan"/>
</inConfig>
<inSecondaries/>
</actionUpdate>| | ../common/src/framework/. /core/proc/Stimulus.cc| |895
```

The encap VLAN is the same as the one assigned already by the VMM domain.

PolicyMgr. Since the EPG is on native mode, neither the primary nor the secondary VLANs are defined yet.

```
5399| |18-08-23 15:57:07.881-
05:00| |actionUpdate__| |DBG4| |fr=ifc_policymgr:2:2:6:0:26:1,to=ifc_vmmngr:2:3:14:0:18:1,co=do
er:18:1:0x90000000001b40de:1,si=0x2061a1817ea2cd:0 ms| |(envelope 0x70000000613c3: RECEIVE-
BULK:REQUEST[actionUpdate/]) CONTENT :
<actionUpdate dn="uni/vmmp-VMware/dom-DVStoAVE/eppd-[uni/tn-infra/ap-ave-ctrl/epg-ave-
ctrl]/rsctrlrP-[uni/vmmp-VMware/dom-DVStoAVE/ctrlr-Vcenter]" action="556" run="1101"
stage="145" timestamp="1535057843845">
<compRsCtrlrPTask childAction="deleteNonPresent" data="2134" descr=""
dn="action/policymgrsubj-[uni/vmmp-VMware/dom-DVStoAVE/eppd-[uni/tn-infra/ap-ave-ctrl/epg-
ave-ctrl]/rsctrlrP-[uni/vmmp-VMware/dom-DVStoAVE/ctrlr-Vcenter]]/compRsCtrlrPTask-EpPDUpd"
endTs="never" fail="0" flags="0" id="EpPDUpd" invErrCode="none" invErrDescr="" invRslt=""
lcOwn="local" modTs="2018-08-23T15:57:23.845-05:00" oDn="comp/prov-VMware/ctrlr-[DVStoAVE]-
Vcenter/eppd-[uni/tn-infra/ap-ave-ctrl/epg-ave-ctrl]" operSt="processing"
originMinority="no" runId="1101" startTs="2018-08-23T15:57:23.845-05:00" startTx="2662087"
status="created" try="0" ts="2018-08-23T15:57:23.845-05:00"/>
<inConfig>
```

```

<compEpPD allocMode="dynamic" bdDn="uni/tn-infra/BD-ave-ctrl" blockAllPorts="Disabled"
cfgdDelimiter="" childAction="deleteNonPresent" classPref="encap" configFlags="skip-inner-
pvlan,skip-pg-create" crtrnEnabled="no" deployIssues="" descr="" dn="comp/prov-VMware/ctrlr-
[DVStoAVE]-Vcenter/epdp-[uni/tn-infra/ap-ave-ctrl/epg-ave-ctrl]" encap="vlan-500"
encapAllocKey="uni/tn-infra/ap-ave-ctrl/epg-ave-ctrl" encapChanged="no" encapCtx="AVE-
VlanPool" encapMode="access" encapModeOverride="auto" epgCos="Cos0" epgCosPref="disabled"
epgPKey="uni/tn-infra/ap-ave-ctrl/epg-ave-ctrl" eppDn="uni/epg/fv-[uni/tn-infra/ap-ave-
ctrl/epg-ave-ctrl]" faultDKey="uni/tn-infra/ap-ave-ctrl/epg-ave-ctrl"
forgedTransmit="Disabled" id="0" idConsumerDn="uni/vmmp-VMware/dom-DVStoAVE/epdp-[uni/tn-
infra/ap-ave-ctrl/epg-ave-ctrl]" instrImedcy="lazy" intraSecConf="" issues="" lbAlgo="ip-
hash" lcOwn="local" macChange="Disabled" mcastAddr="0.0.0.0" modTs="never" monPolDn="uni/tn-
common/monepg-default" name="c37c26c6-c6bd-4563-afd9-084e0c6a7ca2" nameAlias=""
netflowDir="both" netflowPref="disabled" operDelimiter="|" pcEnfPref="unenforced"
primaryEncap="unknown" primaryEncapInner="unknown" promMode="Disabled" remoteErrMsg=""
remoteOperIssues="" resImedcy="immediate" rn="" secondaryEncapInner="unknown"
statsCollectionState="yes" status="" switchingMode="AVE" txId="5764607523036594931"
type="Tenant" updateTs="0" vxlanDeplPref="vxlan"/>
</inConfig>
<inSecondaries/>
</actionUpdate>| | ../common/src/framework/./core/proc/Stimulus.cc| | 895

```

The config flags for that EPG are “*skip-inner-pvlan,skip-pg-create*”, so the Vcenter won’t create the Portgroup for the epg-ave-ctrl EPG, even if it’s associated to the VMM domain in AVE mode. The vlan-500 is assigned for the ave-ctrl EPG. Up next, the VMM mgr adds that vlan in the **outside** port trunk.

```

5399||18-08-23 15:57:07.883-
05:00||actionUpdate__||DBG4||fr=ifc_policymgr:2:2:6:0:26:1,to=ifc_vmmmgr:2:3:14:0:18:1,co=do
er:18:1:0x90000000001b40df:1,si=0x2061a1817ea38c:2 ms|(envelope 0x70000000613c4: RECEIVE-
BULK:REQUEST[actionUpdate/]) CONTENT :
<actionUpdate dn="uni/vmmp-VMware/dom-DVStoAVE/intcustomaggr-outside/rsctrlrP-[uni/vmmp-
VMware/dom-DVStoAVE/ctrlr-Vcenter]" action="556" run="1102" stage="145"
timestamp="1535057843845">
<compRsCtrlrPTask childAction="deleteNonPresent" data="10992" descr=""
dn="action/policymgrsubj-[uni/vmmp-VMware/dom-DVStoAVE/intcustomaggr-outside/rsctrlrP-
[uni/vmmp-VMware/dom-DVStoAVE/ctrlr-Vcenter]]/compRsCtrlrPTask-EpPDUpd" endTs="never"
fail="0" flags="0" id="EpPDUpd" invErrCode="none" invErrDescr="" invRslt="" lcOwn="local"
modTs="2018-08-23T15:57:23.845-05:00" oDn="comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter/epdp-
[uni/vmmp-VMware/dom-DVStoAVE/intcustomaggr-outside]" operSt="processing"
originMinority="no" runId="1102" startTs="2018-08-23T15:57:23.845-05:00" startTx="2662087"
status="created" try="0" ts="2018-08-23T15:57:23.845-05:00"/>
<inConfig>
<compEpPD allocMode="dynamic" bdDn="" blockAllPorts="Disabled" cfgdDelimiter=""
childAction="deleteNonPresent" classPref="encap" configFlags="" crtrnEnabled="no"
deployIssues="" descr="" dn="comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter/epdp-[uni/vmmp-
VMware/dom-DVStoAVE/intcustomaggr-outside]" encap="unknown" encapAllocKey=""
encapChanged="no" encapCtx="" encapMode="trunk" encapModeOverride="auto" epgCos="Cos0"
epgCosPref="disabled" epgPKey="uni/vmmp-VMware/dom-DVStoAVE/intcustomaggr-outside" eppDn=""
faultDKey="" forgedTransmit="Enabled" id="0" idConsumerDn="" instrImedcy="lazy"
intraSecConf="" issues="" lbAlgo="ip-hash" lcOwn="local" macChange="Enabled"
mcastAddr="0.0.0.0" modTs="never" monPolDn="" name="outside" nameAlias="" netflowDir="both"
netflowPref="disabled" operDelimiter="" pcEnfPref="unenforced" primaryEncap="unknown"
primaryEncapInner="unknown" promMode="Enabled" remoteErrMsg="" remoteOperIssues=""
resImedcy="lazy" rn="" secondaryEncapInner="unknown" statsCollectionState="no" status=""
switchingMode="native" txId="0" type="Tenant" updateTs="0" vxlanDeplPref="vxlan">
<fvnsEncapBlkDef allocMode="dynamic" childAction="deleteNonPresent" descr="" from="vlan-500"
lcOwn="local" modTs="never" name="" nameAlias="" rn="deffrom-[vlan-500]-to-[vlan-500]"
role="external" status="" to="vlan-500"/>
<fvnsEncapBlkDef allocMode="dynamic" childAction="deleteNonPresent" descr="" from="vlan-
4093" lcOwn="local" modTs="never" name="" nameAlias="" rn="deffrom-[vlan-4093]-to-[vlan-
4093]" role="external" status="" to="vlan-4093"/>
</compEpPD>
</inConfig>
<inSecondaries/>
</actionUpdate>| | ../common/src/framework/./core/proc/Stimulus.cc| | 895

```

VMMMGr seems to create the MO for the Opflex Certificate.

```
5404||18-08-23 15:57:07.699-
05:00|polUpdate_|DBG4||fr=ifc_policymgr:2:2:6:0:17:1,to=ifc_vmmmgr:2:3:14:0:18:1,co=doer:
18:1:0x90000000001b40d1:1,si=0x206111817bc55d:0 ms|(envelope 0x7000000061375: RECEIVE-
BULK:REQUEST[polUpdate/]) CONTENT :
<polUpdate dn="pcons/refcont-[registry/class-7660/instdn-
[uni/userext/odevpkiext/odevkeyring]/ra-[comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter]-14-0-0-
0-SubtreeWithRels-mo)/trdn-[uni/userext/odevpkiext/odevkeyring]" action="13" run="4650"
stage="12" timestamp="1535057843691">
<pconsRefTask childAction="deleteNonPresent" data="" descr="" dn="action/policymgrsubj-
[pcons/refcont-[registry/class-7660/instdn-[uni/userext/odevpkiext/odevkeyring]/ra-
[comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter]-14-0-0-0-SubtreeWithRels-mo)/trdn-
[uni/userext/odevpkiext/odevkeyring]]/pconsRefTask-PolUpdate" endTs="never" fail="0"
flags="0" id="PolUpdate" invErrCode="none" invErrDescr="" invRslt="" lcOwn="local"
modTs="2018-08-23T15:57:23.691-05:00" oDn="pcons/refcont-[registry/class-7660/instdn-
[uni/userext/odevpkiext/odevkeyring]/ra-[comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter]-14-0-0-
0-SubtreeWithRels-mo)/trdn-[uni/userext/odevpkiext/odevkeyring]" operSt="processing"
originMinority="no" runId="4650" startTs="2018-08-23T15:57:23.691-05:00" startTx="3126626"
status="created" try="0" ts="2018-08-23T15:57:23.691-05:00"/>
<ignoreNonResolvedPols value="yes"/>
<inConfigs>
<opflexODevKeyRing caCertCrt="-----BEGIN CERTIFICATE-----
MIICjJCCafegAWIBAgIJAOkml5ofpNgYMA0GCSqGSIb3DQEBCwUAMGAXCzAJBgNV
BAYTAlVTMQswCQYDVQQIDAJDYTERMA8GALUEBwwIU2FuIEpvc2UxDTALEBGNVBAOM
BEFQSUMxDDAKBgNVBAsMA1ZNTTEUMBIGALUEAwWLVQVBJQYBjYWNlcnQwHhcNMTgw
MjA3MTgzOTAwWhcNMjgwMjA3MTgzOTAwWjBgMQswCQYDVQQGEwJVUzELMAkGA1UE
CAwCQ2ExETAPBgNVBAMCMFhbiBkKb3NlMQ0wCwYDVQQKDAwBUElDMQwwCgYDVQQQL
DANWTU0xFDASBgNVBAMMCM0FQSUMGy2FjZXJ0MIGfMA0GCSqGSIb3DQEBQUAA4GN
ADCBiQKBBgQDMGwrT9aHcnFZjBkFiZSlpPicMbqbHttIzimirQ0mnlLNyjh/8uThPG
+SIc1//x3IdY2rj5epQ8zawBfkO6yAsRo0JQ16xdLE3KGb7TSVJGnnjjWnYrz4jQ
Sdkm8tW5uLDWjbuOn/pgcMNezR/7nVD2nbf4L0MbNWpp92AEhq1RfwIDAQABolAw
TjAdBgNVHQ4EFgQUVw0sXrOGGRM3uMPP3YMwGK8vh+EwHwYDVR0jBBGwFoAUVw0s
XrOGGRM3uMPP3YMwGK8vh+EwDAYDVR0TBAAUwAwEB/zANBgkqhkiG9w0BAQsFAAOB
gQDJkKZME+0j9iSxGDIBqdNU+pCS6by+B5NCKPoFiq3K29ss/OVYyOfWmw9GYO75
UYihUEPJoGupSDudPRVWxgppZSfXu9m/shNgzDS+WGrf8nraUk0SGdaalMPLAJ86
2HUjioBvBYQLao87YT6os4vFabiylSPSrWV/1K/fyUUZA==
-----END CERTIFICATE-----

" childAction="deleteNonPresent" descr="" dn="uni/userext/odevpkiext/odevkeyring"
lcOwn="policy" modTs="never" name="" nameAlias="" ownerKey="" ownerTag="" rn=""
status="created,modified"/>
</inConfigs>
<inConsumers>
<pconsCons cDn="comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter" childAction=""
distType="SameShard" dn="registry/class-7660/instdn-[uni/userext/odevpkiext/odevkeyring]/ra-
[comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter]-14-0-0-0-SubtreeWithRels-mo/cons-[comp/prov-
VMware/ctrlr-[DVStoAVE]-Vcenter]-mo" lcOwn="local" modOnly="no" modTs="2018-08-
23T15:57:23.691-05:00" relMetaId="1141" relnDn="comp/prov-VMware/ctrlr-[DVStoAVE]-
Vcenter/rsODevKeys" resolveType="Resolvable" resolverType="mo" rn="" status=""/>
</inConsumers>
</polUpdate>| |../common/src/framework/./core/proc/Stimulus.cc||895
```

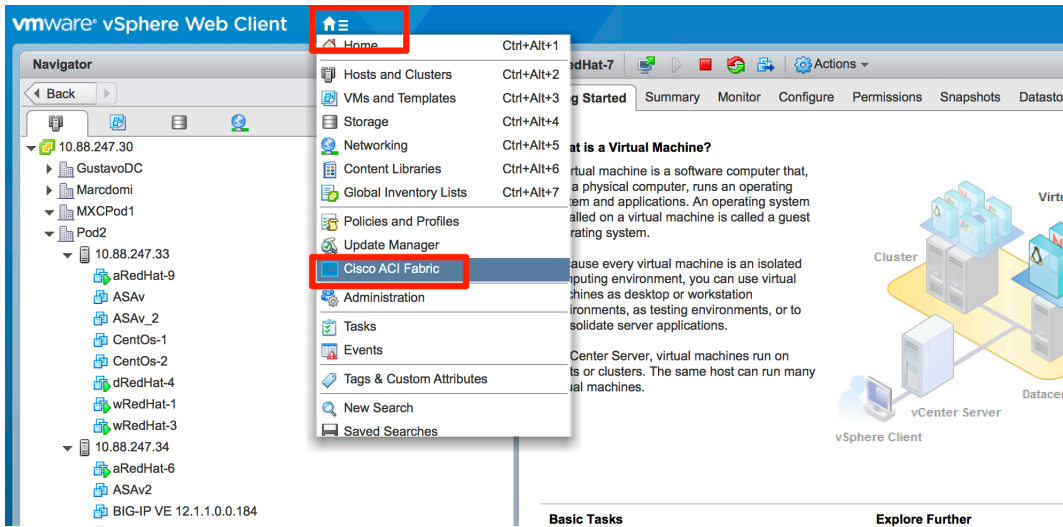
At this point, the DVS has created the portgroups for the AVE VM to use, but no instance of AVE VM has been deployed yet. The portgroups assigned to EPGs are still in native mode. Next step is to install the AVE with the ACI Plugin in Vcenter.

Installing AVE in Vcenter via ACI Plugin

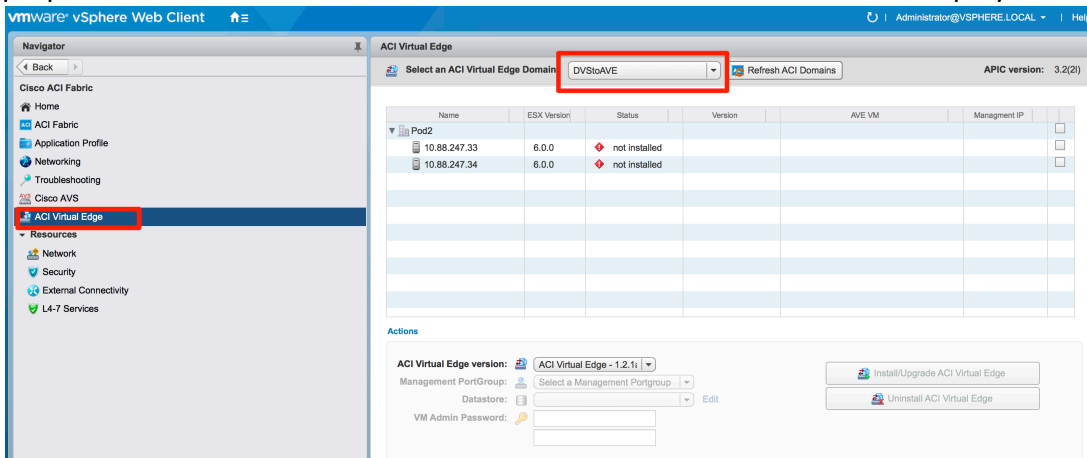
The assumption is the plugin had been installed already. The following link depicts how to install the plugin:

https://www.cisco.com/c/en/us/td/docs/switches/datacenter/aci/apic/sw/1-1-x/virtualization/b_ACI_Virtualization_Guide_2_1_1/b_ACI_Virtualization_Guide_2_1_1_chapter_01000.html#d4945e388a1635

We need to connect to Vcenter, click on Cisco ACI Fabric



In the home view for the plugin, we Select the ACI Virtual Edge, then we need to select the proper VMM Domain. You should see a list of ESXi hosts with the DVS deployed.



At the bottom in the Actions section, we should see the same AVE version as the one in the OVF.

We need to **select the ESXi** which will part of the AVE deployment. In the Actions section, we need to set the **management portgroup**, which could be either a management EPG within the fabric or by OOB using the Default Standard Swtich. We can select the Auto option for the **Datastore** and configure the **admin password** for the VM access.

We need to wait for the VMS to be deployed. Under recent task we can track the process:

Task Name	Target	Status	Initiator	Queued For	Start Time	Completion Time	Server
Transfer file(s)	10.88.247.33	53%	VSPHERE.LOCAL\...	3 ms	8/23/18, 9:04:11 AM ...		10.88.247.30
Transfer file(s)	10.88.247.33	10%	VSPHERE.LOCAL\...	23 ms	8/23/18, 9:04:11 AM ...		10.88.247.30
Fetch Content of a Library Item	cisco-ave-1.2.1a	Completed	vsphere.local\vpd...	84 ms	8/23/18, 9:04:04 AM ...	8/23/18, 9:04:10 AM...	10.88.247.30
Fetch Content of a Library Item	cisco-ave-1.2.1a	Completed	vsphere.local\vpd...	129 ms	8/23/18, 9:04:04 AM ...	8/23/18, 9:04:09 AM...	10.88.247.30
Deploy OVF template	cisco-ave_10.88.24...	0%	VSPHERE.LOCAL\...	5 ms	8/23/18, 9:03:54 AM ...		10.88.247.30
Deploy OVF template	cisco-ave_10.88.24...	0%	VSPHERE.LOCAL\...	7 ms	8/23/18, 9:03:53 AM ...		10.88.247.30
Fetch Content of a Library Item	cisco-ave-1.2.1a	Completed	vsphere.local\vpd...	85 ms	8/23/18, 9:03:45 AM ...	8/23/18, 9:03:51 AM...	10.88.247.30
Fetch Content of a Library Item	cisco-ave-1.2.1a	Completed	vsphere.local\vpd...	89 ms	8/23/18, 9:03:45 AM ...	8/23/18, 9:03:51 AM...	10.88.247.30
Deploy OVF package from Content ...	10.88.247.33	0%	vsphere.local\Admi...	109 ms	8/23/18, 9:03:45 AM ...		10.88.247.30
Deploy OVF package from Content ...	10.88.247.34	0%	vsphere.local\Admi...	104 ms	8/23/18, 9:03:44 AM ...		10.88.247.30
Fetch Content of a Library Item	cisco-ave-1.2.1a	Completed	vsphere.local\vpd...	84 ms	8/23/18, 9:03:24 AM ...	8/23/18, 9:03:43 AM...	10.88.247.30
Fetch Content of a Library Item	cisco-ave-1.2.1a	Completed	vsphere.local\vpd...	82 ms	8/23/18, 9:03:24 AM ...	8/23/18, 9:03:43 AM...	10.88.247.30
Parse OVF package in Content Libr...	10.88.247.33	Completed	vsphere.local\Admi...	105 ms	8/23/18, 9:03:24 AM ...	8/23/18, 9:03:44 AM...	10.88.247.30
Parse OVF package in Content Libr...	10.88.247.34	Completed	vsphere.local\Admi...	106 ms	8/23/18, 9:03:23 AM ...	8/23/18, 9:03:44 AM...	10.88.247.30
Install ACI Virtual Edge	10.88.247.33	33%	Administrator	190 ms	8/23/18, 9:03:22 AM ...		10.88.247.30
Install ACI Virtual Edge	10.88.247.34	33%	Administrator	105 ms	8/23/18, 9:03:22 AM ...		10.88.247.30

At this point, no traffic should be lost. This operation only deploys the AVE VM, and Vcenter will automatically associate each port to the Inside and Outside. The AVE VM will be ready to function as soon as an EPG changes to AVE mode.

Task Name	Target	Status	Initiator	Queued For	Start Time	Completion Time	Server
Power On virtual machine	cisco-ave_10.88.24...	Completed	VSPHERE.LOCAL\...	7 ms	8/23/18, 9:05:01 AM ...	8/23/18, 9:05:04 AM...	10.88.247.30
Reconfigure AutoStart Manager	10.88.247.33	Completed	VSPHERE.LOCAL\...	6 ms	8/23/18, 9:05:01 AM ...	8/23/18, 9:05:01 AM...	10.88.247.30
Reconfigure virtual machine	cisco-ave_10.88.24...	Completed	VSPHERE.LOCAL\...	5 ms	8/23/18, 9:04:59 AM ...	8/23/18, 9:05:00 AM...	10.88.247.30
Transfer file(s)	10.88.247.33	Completed	VSPHERE.LOCAL\...	3 ms	8/23/18, 9:04:11 AM ...	8/23/18, 9:04:41 AM...	10.88.247.30
Transfer file(s)	10.88.247.33	Completed	VSPHERE.LOCAL\...	23 ms	8/23/18, 9:04:11 AM ...	8/23/18, 9:06:18 AM...	10.88.247.30
Fetch Content of a Library Item	cisco-ave-1.2.1a	Completed	vsphere.local\vpd...	84 ms	8/23/18, 9:04:04 AM ...	8/23/18, 9:04:10 AM...	10.88.247.30
Fetch Content of a Library Item	cisco-ave-1.2.1a	Completed	vsphere.local\vpd...	129 ms	8/23/18, 9:04:04 AM ...	8/23/18, 9:04:09 AM...	10.88.247.30
Deploy OVF template	cisco-ave_10.88.24...	Completed	VSPHERE.LOCAL\...	5 ms	8/23/18, 9:03:54 AM ...	8/23/18, 9:04:55 AM...	10.88.247.30
Deploy OVF template	cisco-ave_10.88.24...	Completed	VSPHERE.LOCAL\...	7 ms	8/23/18, 9:03:53 AM ...	8/23/18, 9:06:36 AM...	10.88.247.30
Fetch Content of a Library Item	cisco-ave-1.2.1a	Completed	vsphere.local\vpd...	85 ms	8/23/18, 9:03:45 AM ...	8/23/18, 9:03:51 AM...	10.88.247.30
Fetch Content of a Library Item	cisco-ave-1.2.1a	Completed	vsphere.local\vpd...	89 ms	8/23/18, 9:03:45 AM ...	8/23/18, 9:03:51 AM...	10.88.247.30
Deploy OVF package from Content ...	10.88.247.33	Completed	vsphere.local\Admi...	109 ms	8/23/18, 9:03:45 AM ...	8/23/18, 9:04:56 AM...	10.88.247.30
Deploy OVF package from Content ...	10.88.247.34	Completed	vsphere.local\Admi...	104 ms	8/23/18, 9:03:44 AM ...	8/23/18, 9:06:37 AM...	10.88.247.30
Fetch Content of a Library Item	cisco-ave-1.2.1a	Completed	vsphere.local\vpd...	84 ms	8/23/18, 9:03:24 AM ...	8/23/18, 9:03:43 AM...	10.88.247.30
Fetch Content of a Library Item	cisco-ave-1.2.1a	Completed	vsphere.local\vpd...	82 ms	8/23/18, 9:03:24 AM ...	8/23/18, 9:03:43 AM...	10.88.247.30
Parse OVF package in Content Libr...	10.88.247.33	Completed	vsphere.local\Admi...	105 ms	8/23/18, 9:03:24 AM ...	8/23/18, 9:03:44 AM...	10.88.247.30
Parse OVF package in Content Libr...	10.88.247.34	Completed	vsphere.local\Admi...	106 ms	8/23/18, 9:03:23 AM ...	8/23/18, 9:03:44 AM...	10.88.247.30
Install ACI Virtual Edge	10.88.247.33	81%	Administrator	190 ms	8/23/18, 9:03:22 AM ...	8/23/18, 9:05:05 AM...	10.88.247.30
Install ACI Virtual Edge	10.88.247.34	81%	Administrator	105 ms	8/23/18, 9:03:22 AM ...		10.88.247.30

Once the process is finished, we need to wait for the Status of AVE changes to “Online”, meaning the VM has an active Opflex tunnel to ACI

Select an ACI Virtual Edge Domain: DVStoAVE Refresh ACI Domains APIC version: 3.2(2)

Name	ESX Version	Status	Version	AVE VM	Management IP
Pod2					
10.88.247.33	6.0.0	online	1.2.1a	cisco-ave_10.88.247.33_DVStoAVE	
10.88.247.34	6.0.0	down	1.2.1a	cisco-ave_10.88.247.34_DVStoAVE	

Both VMs are Online:

Select an ACI Virtual Edge Domain: DVStoAVE Refresh ACI Domains APIC version: 3.2(2)

Name	ESX Version	Status	Version	AVE VM	Management IP
Pod2					
10.88.247.33	6.0.0	online	1.2.1a	cisco-ave_10.88.247.33_DVStoAVE	
10.88.247.34	6.0.0	online	1.2.1a	cisco-ave_10.88.247.34_DVStoAVE	

On the APIC GUI, we can expand the information for the ESXi, and by selecting *AVE Details* the following information will appear:

Inventory

Hypervisor - 10.88.247.33

Topology AVE Details General Stats Faults History

AVE Details	Mgmt IP	VTEP IP	MAC	VM Status
	10.0.0.0	10.0.24.66	00:50:56:A8:C5:49	poweredOn

The VTEP column, must have an IP address within the VTEP pool, one for each VM. In our case the two ESXis have 10.0.24.66 and 10.24.0.67 as the VTEP IP addresses.

Compute Leaf

Each Leaf connecting an AVE-VM attached will show a new infra endpoint entry. The endpoint information from the leaf, should have the MAC address and the VTEP address assigned by the apic

```
latam-pod2-leaf4# show vlan extended
```

VLAN Name	Encap	Ports
34 infra:default	vxlan-16777209, vlan-4093	Eth1/17, Eth1/18, Eth1/46, Po4, Po5

```
latam-pod2-leaf4# show endpoint vlan 34
```

Legend:

s - arp	H - vteq	V - vpc-attached	p - peer-aged
R - peer-attached-rl	B - bounce	S - static	M - span
D - bounce-to-proxy	O - peer-attached	a - local-aged	L - local

VLAN/ Interface Domain	Encap VLAN	MAC Address IP Address	MAC Info/ IP Info
34 po4	vxlan-16777209	0050.56a6.c549	LH
overlay-1 po4	vxlan-16777209	10.0.24.66	LH

the other switch:

```
latam-pod2-leaf2# show vlan extended
```

VLAN Name	Encap	Ports
8 infra:default	vxlan-16777209, vlan-4093	Eth1/45, Eth1/46, Eth1/48, Po2

```
latam-pod2-leaf2# show endpoint vla 8
```

Legend:

s - arp	H - vtep	V - vpc-attached	p - peer-aged
R - peer-attached-rl	B - bounce	S - static	M - span
D - bounce-to-proxy	O - peer-attached	a - local-aged	L - local

VLAN/ Interface Domain	Encap VLAN	MAC Address IP Address	MAC Info/ IP Info
8 po2	vxlan-16777209	0050.56a6.30ef	LVH
overlay-1 po2	vxlan-16777209	10.0.24.67	LVH

Status from AVE:

We can connect to the AVE-VM by using the VTEP IP address from the Apic, the ssh user@VTEP command should give us access to the VM CLI.

```
apic1# ssh admin@10.0.24.67
Warning: Permanently added '10.0.24.67' (ECDSA) to the list of known hosts.
ACI Virtual Edge
admin@10.0.24.67's password: <- Password assigned by the ACI Vcenter plugin
```

```

cisco-ave:~$
cisco-ave:~$ vemcmd show port
  LTL      Port  Admin Link  State  Cause  PC-LTL  SGID  ORG  svcpath  Type  Owner  Vem Port
  19      Eth2/1  UP    UP    FWD    -        0      0    0        0      -      int-uplink  dpdk
  20      Eth2/2  UP    UP    FWD    -      1041    0    0        0      -      ext-uplink  dpdk
  51      UP      UP    UP    FWD    -        0      0    0        0      -      kni-opflex  dpdk
  52      UP      UP    UP    FWD    -        0      0    0        0      -      kni-ave-ctrl  dpdk
  1041    Po1     UP    UP    FWD    -        0      0    0        0      -

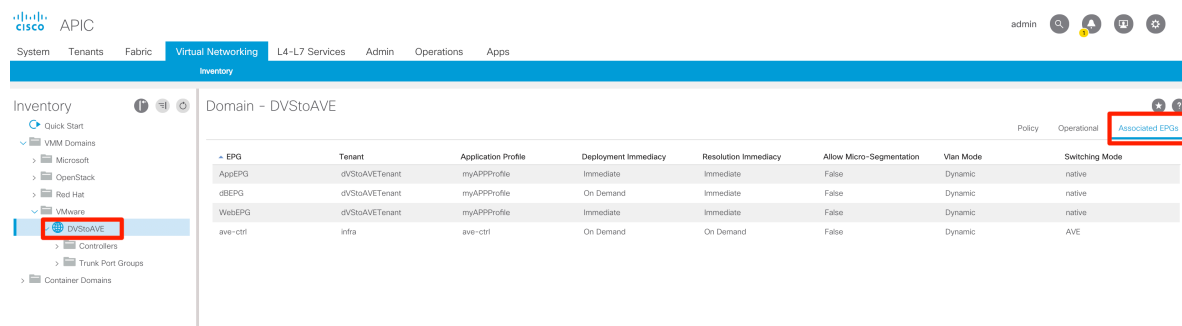
```

As now, the AVE VM only has configuration for the default interfaces. The external interface seems to be assigned to a Port-channel (Po1 from the PC-LTL info). It seems the internal port is not configured like it.

The Domain has no EPGs in AVE mode, so no traffic should pass through the AVE. The VMM domain is now ready to migrate the actual EPGs to be AVE.

Changing the VMM domain from DVS to AVE

Now the AVE VM is up and the Opflex tunnel is online, we are ready to migrate the EPGs. This is done by changing the Switching mode from Native to AVE, which can be done from the Domain view in the EPG in question, or with the Associated EPGs view, under the VMM Domain.



In this view, we can double-click on any EPG and change the Switching mode to AVE. The change will reflect the AVE switching mode in the VMM Domain

Audit log:

```

<aaaModLR affected="[uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-AppEPG/rsdomAtt-[uni/vmmp-VMware/dom-DVStoAVE]" cause="transition" changeSet="switchingMode (Old: native, New: AVE)" childAction="" clientTag="" code="E4212009" created="2018-08-23T16:40:44.777-05:00" descr="RsDomAtt uni/vmmp-VMware/dom-DVStoAVE modified" dn="subj-[uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-AppEPG/rsdomAtt-[uni/vmmp-VMware/dom-DVStoAVE]]/mod-4294969439" id="4294969439" ind="modification" modTs="never" sessionId="EXNIZM6gQhOqNGLWzqLNyQ==" severity="info" status="" trig="config" txId="576460752305266224" user="admin"/>

```

The Vcenter will reflect this migration in changes to the Portgroup from that EPG.

Task Name	Target	Status	Initiator	Queued For	Start Time	Completion Time
Reconfigure Distributed Port Group	dVStoAVETenant[myAPPProfile]AppEPG	Completed	VSPHERE.LOCAL/...	4 ms	8/23/18, 9:28:37 AM...	8/23/18, 9:28:37 AM...
Reconfigure Distributed Port Group	dVStoAVETenant[myAPPProfile]AppEPG	Completed	VSPHERE.LOCAL/...	14 ms	8/23/18, 9:28:36 AM...	8/23/18, 9:28:36 AM...
Reconfigure vSphere Distributed Sw...	DVStoAVE	Completed	VSPHERE.LOCAL/...	11 ms	8/23/18, 9:28:35 AM...	8/23/18, 9:28:35 AM...
Reconfigure Distributed Port Group	dVStoAVETenant[myAPPProfile]AppEPG	Completed	VSPHERE.LOCAL/...	5 ms	8/23/18, 9:28:35 AM...	8/23/18, 9:28:36 AM...
Reconfigure Distributed Port Group	outside	Completed	VSPHERE.LOCAL/...	8 ms	8/23/18, 9:28:35 AM...	8/23/18, 9:28:35 AM...

The "Associated EPGs" view will now show the AppEPG as AVE.

Domain - DVStoAVE

EPG	Tenant	Application Profile	Deployment Immediacy	Resolution Immediacy	Allow Micro-Segmentation	Vlan Mode	Switching Mode
AppEPG	dVStoAVETenant	myAPPProfile	Immediate	Immediate	False	Dynamic	AVE
dBEPG	dVStoAVETenant	myAPPProfile	On Demand	Immediate	False	Dynamic	native
WebEPG	dVStoAVETenant	myAPPProfile	Immediate	Immediate	False	Dynamic	native
ave-ctrl	infra	ave-ctrl	On Demand	On Demand	False	Dynamic	AVE

Policy manager

In the policy manager process logs, we can see the changes to the EPG and it's VMM domain, where the mode changes to AVE:

```
5506||18-08-23 16:40:44.884-
05:00||actionUpdate__||DBG4||fr=ifc_policymgr:2:3:6:0:6:1,to=ifc_policymgr:2:2:6:0:26:1,co=do
oer:18:1:0xd00000000028a3b5:1,si=0x3060611d7a5b79:0 ms||(envelope 0x900000002b92a: RECEIVE-
BULK:REQUEST[actionUpdate/]) CONTENT :
<actionUpdate dn="uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-AppEPG/rsdomAtt-[uni/vmmp-
VMware/dom-DVStoAVE]" action="548" run="735" stage="138" timestamp="1535060460840">
<fvRsDomAttTask childAction="deleteNonPresent" data="" descr="" dn="action/policymgrsubj-
[uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-AppEPG/rsdomAtt-[uni/vmmp-VMware/dom-
DVStoAVE]]/fvRsDomAttTask-EpPDUpd" endTs="never" fail="0" flags="0" id="EpPDUpd"
invErrCode="none" invErrDescr="" invRsIt="" lcOwn="local" modTs="2018-08-23T16:41:00.840-
05:00" oDn="uni/vmmp-VMware/dom-DVStoAVE/eppd-[uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-
AppEPG]" operSt="processing" originMinority="no" runId="735" startTs="2018-08-
23T16:41:00.840-05:00" startTx="2237964" status="created" try="0" ts="2018-08-
23T16:41:00.840-05:00"/>
<inConfig>
<vmmEppd allocMode="dynamic" bdDn="uni/tn-dVStoAVETenant/BD-AppBD" blockAllPorts="Disabled"
cfgdDelimiter="" childAction="" classPref="encap" configFlags="" crtrnEnabled="no"
deployIssues="" descr="" dn="uni/vmmp-VMware/dom-DVStoAVE/eppd-[uni/tn-dVStoAVETenant/ap-
myAPPProfile/epg-AppEPG]" encap="unknown" encapAllocKey="uni/tn-dVStoAVETenant/ap-
myAPPProfile/epg-AppEPG" encapChanged="no" encapCtx="" encapMode="access"
encapModeOverride="auto" epgCos="Cos0" epgCosPref="disabled" epgPKey="uni/tn-
dVStoAVETenant/ap-myAPPProfile/epg-AppEPG" eppDn="uni/epp/fv-[uni/tn-dVStoAVETenant/ap-
myAPPProfile/epg-AppEPG]" faultDKey="uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-AppEPG"
forgedTransmit="Disabled" id="0" idConsumerDn="" instrImedcy="immediate" intraSecConf=""
issues="" lbAlgo="mac-pin" lcOwn="local" macChange="Disabled" mcastAddr="0.0.0.0"
modTs="never" monPolDn="uni/tn-common/monepg-default" name="" nameAlias="" netflowDir="both"
netflowPref="disabled" operDelimiter="" pcEnfPref="unenforced" primaryEncap="unknown"
primaryEncapInner="unknown" promMode="Disabled" resImedcy="immediate" rn=""
secondaryEncapInner="unknown" statsCollectionState="yes" status="" switchingMode="AVE"
txId="3458764513822773698" type="Tenant" updateTs="0"/>
</inConfig>
<inSecondaries/>
</actionUpdate>||../common/src/framework/./core/proc/Stimulus.cc||895
```

It's the VMM manager process which assigns the primary(1634) and secondary(1635) VLANs to the migrated EPG. :

```
5403||18-08-23 16:40:45.032-
05:00||actionUpdate__||DBG4||fr=ifc_policymgr:2:2:6:0:26:1,to=ifc_vmmmgr:2:3:14:0:18:1,co=do
er:18:1:0x90000000001b4536:1,si=0x2061a11d7ca82e:10 ms||(envelope 0x700000000617e1: RECEIVE-
BULK:REQUEST[actionUpdate/]) CONTENT :
<actionUpdate dn="uni/vmmp-VMware/dom-DVStoAVE/eppd-[uni/tn-dVStoAVETenant/ap-
myAPPProfile/epg-AppEPG]/rsctrlrP-[uni/vmmp-VMware/dom-DVStoAVE/ctrlr-Vcenter]" action="556"
run="1125" stage="145" timestamp="1535060460978">
<compRsCtrlrPTask childAction="deleteNonPresent" data="2134" descr=""
dn="action/policymgrsubj-[uni/vmmp-VMware/dom-DVStoAVE/eppd-[uni/tn-dVStoAVETenant/ap-
myAPPProfile/epg-AppEPG]/rsctrlrP-[uni/vmmp-VMware/dom-DVStoAVE/ctrlr-
Vcenter]]/compRsCtrlrPTask-EpPDUpd" endTs="never" fail="0" flags="0" id="EpPDUpd"
invErrCode="none" invErrDescr="" invRsIt="" lcOwn="local" modTs="2018-08-23T16:41:00.978-
05:00" oDn="comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter/eppd-[uni/tn-dVStoAVETenant/ap-
myAPPProfile/epg-AppEPG]" operSt="processing" originMinority="no" runId="1125"
```

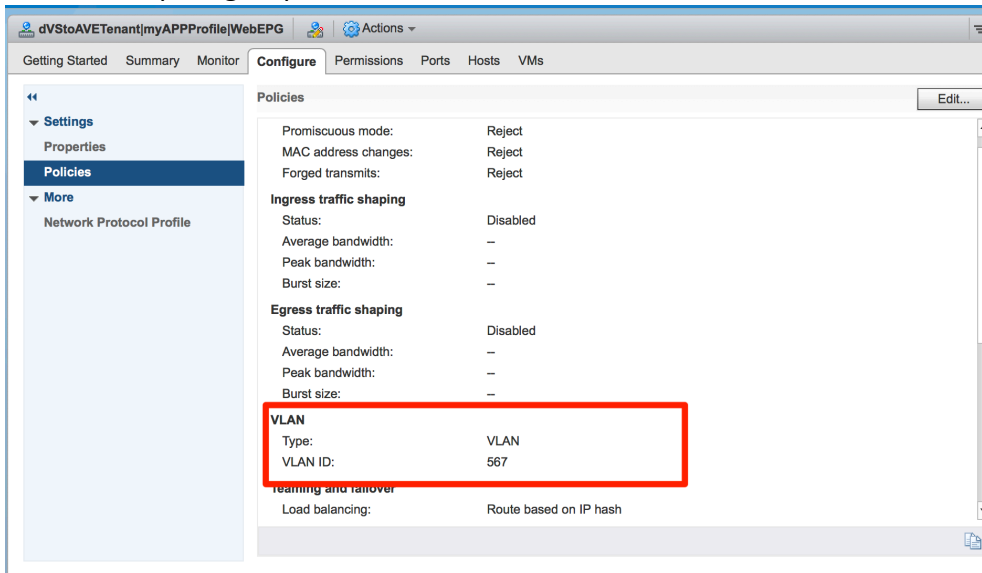
```

startTs="2018-08-23T16:41:00.978-05:00" startTx="2663352" status="created" try="0" ts="2018-
08-23T16:41:00.978-05:00"/>
<inConfig>
<compEppD allocMode="dynamic" bdDn="uni/tn-dVStoAVETenant/BD-AppBD" blockAllPorts="Disabled"
cfgdDelimiter="" childAction="deleteNonPresent" classPref="encap" configFlags=""
crtrnEnabled="no" deployIssues="" descr="" dn="comp/prov-VMware/ctrlr-[DVStoAVE]-
Vcenter/eppd-[uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-AppEPG]" encap="vlan-501"
encapAllocKey="uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-AppEPG" encapChanged="no"
encapCtx="AVE-VlanPool-internal" encapMode="access" encapModeOverride="auto" epgCos="Cos0"
epgCosPref="disabled" epgPKey="uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-AppEPG"
eppDn="uni/epp/fv-[uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-AppEPG]" faultDKey="uni/tn-
dVStoAVETenant/ap-myAPPProfile/epg-AppEPG" forgedTransmit="Disabled" id="0"
idConsumerDn="uni/vmmp-VMware/dom-DVStoAVE/allctr-[uni/tn-dVStoAVETenant/ap-
myAPPProfile/epg-AppEPG]" instrImedcy="immediate" intraSecConf="" issues="" lbAlgo="ip-hash"
lcOwn="local" macChange="Disabled" mcastAddr="0.0.0.0" modTs="never" monPolDn="uni/tn-
common/monepg-default" name="59e27a84-1936-40f9-b960-e99fdb83dfd1" nameAlias=""
netflowDir="both" netflowPref="disabled" operDelimiter="|" pcEnfPref="unenforced"
primaryEncap="unknown" primaryEncapInner="vlan-1634" promMode="Disabled" remoteErrMsg=""
remoteOperIssues="" resImedcy="immediate" rn="" secondaryEncapInner="vlan-1635"
statsCollectionState="yes" status="" switchingMode="AVE" txId="3458764513822773698"
type="Tenant" updateTs="0" vxlanDeplPref="vxlan"/>
</inConfig>
<inSecondaries/>
</actionUpdate>| | ../common/src/framework/./core/proc/Stimulus.cc| | 895

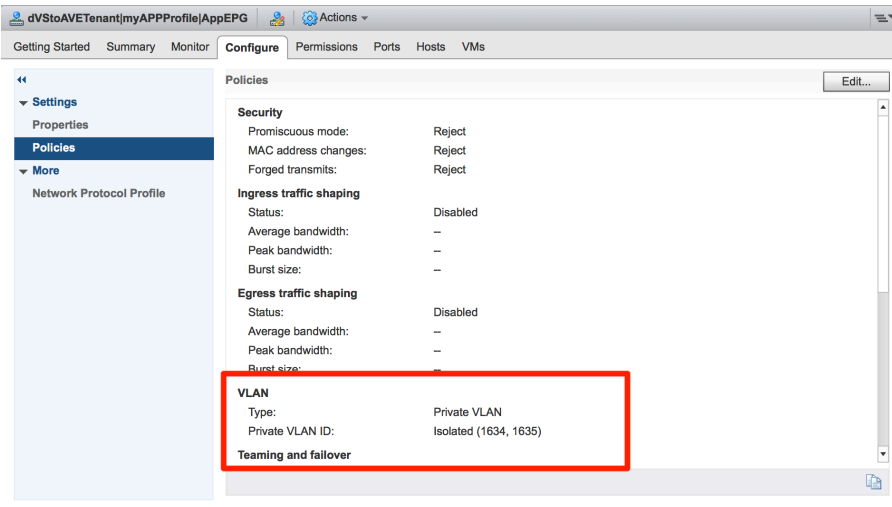
```

We see the internal VLANs is taken from the **internal VLAN pool**. The **External VLAN** used by the EPG is not changed. The portgroup of the EPG is also changed, as it starts using private VLANs.

Native EPG/port-group, uses a normal VLAN:



AVE Portgroup EPG, uses primary and secondary Private VLANs:



The AVE status also changes, reflecting the new **AppEPG** portgroup. The display is similar to any Vmm EPG, with the Name of the VM and Mac address information.

AVE-1

```
cisco-ave:~$ vemcmd show port
  LTL      Port Admin Link State      Cause  PC-LTL  SGID  ORG  svcpath  Type              Owner
Vem Port
  19      Eth2/1   UP   UP   FWD      -       0      0    0      0      int-uplink
dpdk
  20      Eth2/2   UP   UP   FWD      -      1041    0    0      0      ext-uplink
dpdk
  51              UP   UP   FWD      -       0      0    0      0      kni-opflex
dpdk
  52              UP   UP   FWD      -       0      0    0      0      kni-ave-ctrl
dpdk
  53              UP   UP   FWD      -       0      0    0      0      00:50:56:88:22:3d
aRedHat-9:1
  1041     Po1     UP   UP   FWD      -       0      0    0      0
cisco-ave:~$
```

AVE-2

```
cisco-ave:~$ vemcmd show port
  LTL      Port Admin Link State      Cause  PC-LTL  SGID  ORG  svcpath  Type              Owner
Vem Port
  19      Eth2/1   UP   UP   FWD      -       0      0    0      0      int-uplink
dpdk
  20      Eth2/2   UP   UP   FWD      -      1041    0    0      0      ext-uplink
dpdk
  51              UP   UP   FWD      -       0      0    0      0      kni-opflex
dpdk
  52              UP   UP   FWD      -       0      0    0      0      kni-ave-ctrl
dpdk
  53              UP   UP   FWD      -       0      0    0      0      00:50:56:88:4d:37
aRedHat-6:1 <-----
```

The inventory gets pushed by the APIC (obtained from Vcenter) to each AVE via Opflex messages. Two tables form the inventory, one for **DVSPortgroup** the other for **Endpoint** information. With the command '*vemcmd dpa dump inventory*' we can see both tables.

AVE-1

```
cisco-ave:log$ vemcmd dpa dump inventory
=>dpa command is: dump inventory
```

Portgroup Inventory Table (pvlan array content)

```
-----
    dvportgroup-189, pvlans (0/0 - pg 0), flags 0x00000000, EPG: uni/vmmp-VMware/dom-
DVStoAVE/intcustomaggr-outside
    dvportgroup-188, pvlans (0/0 - pg 0), flags 0x00000000, EPG: uni/vmmp-VMware/dom-
DVStoAVE/intcustomaggr-inside
    dvportgroup-186, pvlans (1634/1635 - pg 186), flags 0x00000000, EPG: uni/tn-
dVStoAVETenant/ap-myAPPProfile/epg-AppEPG
    dvportgroup-190, pvlans (1500/1501 - pg 190), flags 0x00000001, EPG: -
```

The portgroup information will have the **EPG dn**, and an array with both **private vlans** and the **portgroup id**.

Endpoint Inventory Table

```
-----
    00:50:56:88:22:3d, dvportgroup-186, AVEs (0x0a001842/0x00000000), flags 0x00000000, aRedHat-
9:1, vm-60
#byeBye#
```

The endpoint table will have the **MAC address**, the **VM name** and the **portgroup id** for the endpoint.

AVE-2

```
cisco-ave:~$ vemcmd dpa dump inventory
=>dpa command is: dump inventory
```

Portgroup Inventory Table (pvlan array content)

```
-----
    dvportgroup-189, pvlans (0/0 - pg 0), flags 0x00000000, EPG: uni/vmmp-VMware/dom-
DVStoAVE/intcustomaggr-outside
    dvportgroup-188, pvlans (0/0 - pg 0), flags 0x00000000, EPG: uni/vmmp-VMware/dom-
DVStoAVE/intcustomaggr-inside
    dvportgroup-186, pvlans (1634/1635 - pg 186), flags 0x00000000, EPG: uni/tn-
dVStoAVETenant/ap-myAPPProfile/epg-AppEPG
    dvportgroup-190, pvlans (1500/1501 - pg 190), flags 0x00000001, EPG: -
```

Endpoint Inventory Table

```
-----
    00:50:56:88:4d:37, dvportgroup-186, AVEs (0x0a001843/0x00000000), flags 0x00000000, aRedHat-
6:1, vm-68
#byeBye#
```

The AVE has another command to look at the control messages from the Apic. We can use *vemlog show all*, it will show the Push messages from the Apic with EPG policies.

From the entries, it seems the Portgroup table is updated via **PG Inventory** and the Endpoint table as **EP Inventory**. We see the logs showing **warning** for dvportgroup-186 before the PG inventory action added it:

```

cisco-ave:log$ vemlog show all
Timestamp          Entry CPU  Mod Lv      Message
Aug 23 13:36:24.866567 309 0  99 128    Log Got EPP policy:
Aug 23 13:36:24.871480 310 0  99 128    Log alias=dvportgroup-186
Aug 23 13:36:24.878405 311 0  99 128    Log eppdn=uni/epp/fv-[uni/tn-dVStoAVETenant/ap-
myAPPProfile/epg-AppEPG]
Aug 23 13:36:24.885403 312 0  99 128    Log handle=0x0, timestamp=1535060461066
Aug 23 13:36:24.896499 313 0  99 128    Log scope ID=0xcfl7a6a91fb6e2bd
Aug 23 13:36:24.903476 314 0  99 4    Warning sf_ospa_process_epp_prof_cb epp dvportgroup-186
not recognized. Ignore

```

The **MAC** , **VM** and **Portgroup** information is pushed to AVE with the EP inventory, still no portgroup created, warnings are stil seen.

```

Aug 23 13:36:24.913294 315 0  99 128    Log EP Inventory add: 00:50:56:88:22:3d
dvportgroup-186 Name aRedHat-9 OID 60
Aug 23 13:36:24.921467 316 0  99 1    Error sf_inventory_port_attach: dvportgroup-186
inventory not found
Aug 23 13:36:25.329027 317 0  99 128    Log Got EPP policy:
Aug 23 13:36:25.329411 318 0  99 128    Log alias=dvportgroup-186
Aug 23 13:36:25.336458 319 0  99 128    Log eppdn=uni/epp/fv-[uni/tn-dVStoAVETenant/ap-
myAPPProfile/epg-AppEPG]
Aug 23 13:36:25.345722 320 0  99 128    Log handle=0x0, timestamp=1535060461480
Aug 23 13:36:25.356435 321 0  99 128    Log scope ID=0xcfl7a6a91fb6e2bd
Aug 23 13:36:25.363457 322 0  99 4    Warning sf_ospa_process_epp_prof_cb epp dvportgroup-186
not recognized. Ignore
Aug 23 13:36:25.769747 323 0  99 128    Log Got EPP policy:
Aug 23 13:36:25.770456 324 0  99 128    Log alias=dvportgroup-186
Aug 23 13:36:25.781455 325 0  99 128    Log eppdn=uni/epp/fv-[uni/tn-dVStoAVETenant/ap-
myAPPProfile/epg-AppEPG]
Aug 23 13:36:25.788416 326 0  99 128    Log handle=0x0, timestamp=1535060461975
Aug 23 13:36:25.795458 327 0  99 128    Log scope ID=0xcfl7a6a91fb6e2bd
Aug 23 13:36:25.806455 328 0  99 4    Warning sf_ospa_process_epp_prof_cb epp dvportgroup-186
not recognized. Ignore

```

The PG inventory message adds the portgroup, both secondary and primary private vlans and adds the MAC to the secondary vlan(used by Inside port to send the traffic to VMs), note primary vlan is not added.

```

Aug 23 13:36:25.816205 329 0  99 128    Log PG Inventory add: dvportgroup-186 (1634, 1635)
uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-AppEPG
Aug 23 13:36:25.838395 330 0  1  1    Error sf_uspace_attach_mac: mac:00:50:56:88:22:3d
vlan 1635
Aug 23 13:36:25.838450 331 0  1  1    Error nlkv_add_port: Port 00:50:56:88:22:3d type is 2
Aug 23 13:36:25.838757 332 0  1  4    Warning nlkv_get_ltl_from_name_vlan: Trying to add
existing port,ltl (53 / 00:50:56:88:22:3d) svlan 1635
Aug 23 13:36:25.892505 333 0  99 1    Error sf_keydb_update_port_ext: Invalid attach flags
for ifindex 0xb010020
Aug 23 13:36:25.910156 334 0  99 1    Error sf_port_state_ospa_wait_inventory: handling
INV_DOWNLOADED
Aug 23 13:36:25.942192 335 0  99 128    Log PORT-ATTACH-REQ: 00:50:56:88:22:3d, 0.0.0.0,
dvportgroup-186, dldEpp
Aug 23 13:36:25.962172 336 0  99 128    Log PORT-ATTACH-ACK: 00:50:56:88:22:3d, 0.0.0.0,
dvportgroup-186
Aug 23 13:36:25.977979 337 0  99 128    Log Got EPP policy:
Aug 23 13:36:25.988459 338 0  99 128    Log alias=dvportgroup-186
Aug 23 13:36:25.999404 339 0  99 128    Log eppdn=uni/epp/fv-[uni/tn-dVStoAVETenant/ap-
myAPPProfile/epg-AppEPG]
Aug 23 13:36:25.999509 340 0  99 128    Log handle=0x0, timestamp=1535060461975
Aug 23 13:36:26.006419 341 0  99 128    Log scope ID=0xcfl7a6a91fb6e2bd
Aug 23 13:36:26.765496 342 0  99 128    Log Got EPP policy:
Aug 23 13:36:26.767462 343 0  99 128    Log alias=dvportgroup-186
Aug 23 13:36:26.778457 344 0  99 128    Log eppdn=uni/epp/fv-[uni/tn-dVStoAVETenant/ap-
myAPPProfile/epg-AppEPG]
Aug 23 13:36:26.785454 345 0  99 128    Log handle=0x0, timestamp=1535060462972
Aug 23 13:36:26.792466 346 0  99 128    Log scope ID=0xcfl7a6a91fb6e2bd

```


Opflex Element logs

The Leaf and AVE VM will have an Opflex tunnel up in order for the Leaf to push policies to the VM(AVE will show as online). Basically the logs show the different **EPG** settings being pushed to the AVE:

Before the EPG change, we see the Opflex element has an Device ID(**devId**) assigned to the VM:

```
10644||18-08-23 16:21:55.420-
05:00||opflexFaeTransition_|DBG4||fr=ifc_opflexagent:4:3456:26:6210:0:0,to=ifc_opflexelem:1:3456:
27:0:0:0,co=ifm,si=0x0:0 ms||(envelope 0x300000000015a: :REQUEST[opflexFaeTransition/]) CONTENT :
<opflexFaeTransition>
<inSubjScope>
<opflexSubject childAction="" dn="" id="0" lcOwn="local" modTs="never" name="" nameAlias="" rn=""
scopeOp="in-scope" scopeType="identity" status=""/>
</inSubjScope>
<inScopeInst>
<opflexODev annotation="" childAction="" compHvDn="" ctrlrName="" devId="167778370"
devOperIssues="" devType="ave" dn="" domName="" encap="vlan-4093" epStatsBulkAckStatus="processed"
extMngdBy="" fabricPathDn="" features="14335" handle="0" hbPeriod="0" hbStatus="valid-dvs"
hostName="localhost" id="0" ip="10.0.24.66" ipAddr="" isSecondary="" lNodeDn="comp/prov-
VMware/ctrlr-[DVStoAVE]-Vcenter/sw-dvs-182" lastHandshakeTime="1969-12-31T19:00:00.000-05:00"
lastNumHB="0" lcOwn="local" mac="00:50:56:A6:C5:49" maxMissHb="0" modTs="never" monPolDn=""
name="" nameAlias="" numHB="0" operSt="identified" pcIfId="369098755" portId="0" rn=""
state="unknown" status="" transitionStatus="attached" uid="0" updateTs="0" uuid="42261FB0-FA91-
C877-0E2C-96375EDC146E" version="3.2(11)" vmmCtrlrPKey=""/>
</inScopeInst>
<inOnBehalf/>
<inData/>
<opflexFaeTransition>|../dme/common/src/framework/./core/proc/Stimulus.cc||895
10644||18-08-23 16:21:55.420-05:00||ifc_opflexelem||INFO||co=ifm|| sendFaeTransitionUpdate Message
Timestamp: 1535059315420|../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/ODevController.cc||140
```

We see the encap set as the Infra Vlan, the Ip address matches the VTEP address assigned by Apic, the mac attribute has MAC address of the infra:default Endpoint.

The policies pushed have the **devId** to identify the destination AVE, first we see information matching the DVSPortgroup table:

```
10610||18-08-23 16:43:02.103-
05:00||moUpdate_|DBG4||fr=ifc_opflexelem:1:104:27:0:6:1,to=ifc_opflexelem:1:104:27:0:0:0,co=doer
:255:127:0xff000000000001f70:1,si=0x1b0001d7de637:1 ms||(envelope 0x3000000000022f: RECEIVE-
SINGLE:REQUEST[moUpdate/0/0/0/15e]) CONTENT :
<moUpdate>
<inOpcode value="2"/>
<inChunkId value="689"/>
<inTxId value="48083"/>
<inIsRetry value="no"/>
<inMsgRef value="179431199760"/>
<inUpdateInfo>
<moUpdateInfo chgBmp="" childAction="" dn="" index="0" lcOwn="local" moDn="comp/prov-VMware/ctrlr-
[DVStoAVE]-Vcenter/eppd-[uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-AppEPG]" modTs="never"
priKey="1262:199003" rn="" status=""/>
</inUpdateInfo>
<moUpdate>|../dme/common/src/framework/./core/proc/Stimulus.cc||895
10610||18-08-23 16:43:02.103-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff000000000001f70:1||detachEpPDEp eppd : comp/prov-
VMware/ctrlr-[DVStoAVE]-Vcenter/eppd-[uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-AppEPG] odev:
sys/br-[eth1/17]|odev-167778370|../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||2569
10610||18-08-23 16:43:02.103-05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff000000000001f70:1||No
eppd idep ref container found|../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||2602
```

```

10610||18-08-23 16:43:02.103-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||attachEpPDEp eppd : comp/prov-
VMware/ctrlr-[DVStoAVE]-Vcenter/eppd-[uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-AppEPG] odev:
sys/br-[eth1/17]|odev-167778370||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||1607
10610||18-08-23 16:43:02.104-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||Attach : EpPD EP on
eth1/17||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||1736
10610||18-08-23 16:43:02.105-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||Create IDEp: sys/br-
[eth1/17]/idep-00:00:00:00:00:00-encap-[vlan-
501]||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||1755
10610||18-08-23 16:43:02.105-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||Add IDEpEpPRef (new IDEp):
comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter/eppd-[uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-
AppEPG]||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||1764
10610||18-08-23 16:43:02.106-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||About to Send EpP to odev id:
167778370||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4416
10610||18-08-23 16:43:02.106-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||Added BDDef to EpP to odev id:
167778370||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4432
10610||18-08-23 16:43:02.106-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||odev 167778370 doesn't support
features: 2048||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||3424
10610||18-08-23 16:43:02.106-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||FHS feature is not supported
for ODev : 167778370||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4461
10610||18-08-23 16:43:02.106-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||EpP id : dvportgroup-
186||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4483
10610||18-08-23 16:43:02.106-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||Encap : vlan-
501||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4484
10610||18-08-23 16:43:02.106-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||Mcast addr:
0.0.0.0||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4485
10610||18-08-23 16:43:02.106-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||Eppdn: uni/epg/fv-[uni/tn-
dVStoAVETenant/ap-myAPPProfile/epg-
AppEPG]||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4486
10610||18-08-23 16:43:02.106-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||IDEp handle:
0||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4487
10610||18-08-23 16:43:02.107-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||Netflow is Disabled!
||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4500
10610||18-08-23 16:43:02.107-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||Netflow Direction ingress:
-----||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4505
10610||18-08-23 16:43:02.107-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||Primary Vlan: vlan-
1634Secondary Vlan: vlan-1635||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4518
10610||18-08-23 16:43:02.107-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||Epg Cos
Disabled||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4522
10610||18-08-23 16:43:02.107-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||Setting scope id in eppdevinfo
to : 14922579135627190973||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4539
10610||18-08-23 16:43:02.107-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||EPP ModTs:
1535049314185||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4580
10610||18-08-23 16:43:02.107-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||EPPD ModTs:
1535060461066||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4581
10610||18-08-23 16:43:02.107-05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||BD
Def ModTs: 1535049314291||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4584
10610||18-08-23 16:43:02.107-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||EPPDEV ModTs:
1535060461066||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4588
10610||18-08-23 16:43:02.107-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f70:1||Sending EpP to odev id:
167778370||../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||4594

```

We see the operation includes the **Encapsulation used**, the external and the two private VLANs. The information also has the id of the **portgroup** and the **EPG Dn**.

The other update matches the endpoint table information, as we share the **VM information (Name and Id)**, the **portgroup id** and the **MAC** information:

```
10610||18-08-23 16:43:02.111-05:00||moUpdate_||DBG4||fr=ifc_opflexelem
:1:104:27:0:6:1,to=ifc_opflexelem:1:104:27:0:0:0,co=doer:255:127:0xff00000000001f72:1,si=0x1b0001d
7de713:9 ms|(envelope 0x3000000000231: RECEIVE-SINGLE:REQUEST[moUpdate/0/0/0/160]) CONTENT :
<moUpdate>
<inOpcode value="2"/>
<inChunkId value="574"/>
<inTxId value="48083"/>
<inIsRetry value="no"/>
<inMsgRef value="179420297744"/>
<inUpdateInfo>
<moUpdateInfo chgBmp="" childAction="" dn="" index="0" lcOwn="local" moDn="comp/prov-VMware/ctrlr-
[DVStoAVE]-Vcenter/vm-vm-68/vnic-00:50:56:88:4D:37" modTs="never" priKey="1125:198882" rn=""
status=""/>
<moUpdateInfo chgBmp="" childAction="" dn="" index="1" lcOwn="local" moDn="comp/prov-VMware/ctrlr-
[DVStoAVE]-Vcenter/vm-vm-60/vnic-00:50:56:88:22:3D" modTs="never" priKey="1125:198918" rn=""
status=""/>
</inUpdateInfo>
</moUpdate>| | ../dme/common/src/framework/./core/proc/Stimulus.cc| |895
10610||18-08-23 16:43:02.111-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f72:1||Ignore modify on
VMNic| | ../dme/svc/opflexelem/src/gen/ifc/beh/imp/./comp/VNicBI.cc| |65
10610||18-08-23 16:43:02.111-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f72:1||Ignore modify on
VMNic| | ../dme/svc/opflexelem/src/gen/ifc/beh/imp/./comp/VNicBI.cc| |65
10610||18-08-23 16:43:02.111-05:00||ha|DBG4||co=doer:255:127:0xff00000000001f72:0||enqueuing
msgRef: 0x29c6487a10 to ifm for drop| | ../dme/common/src/ha/node/sw/HaswIntf.cc| |567
10644||18-08-23 16:43:02.111-05:00||ha|INFO||co=ifm||Drop mts msg: sap:1259 opcode: 310517: src:
'0x00000101/1248', msgRef: 179420297744 (0x29c6487a10), size=174 rrtoken=0
| | ../dme/common/src/ha/node/sw/MtsReader.cc| |500
10610||18-08-23 16:43:02.111-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f73:1||Sending inventory for MAC
60806139367424| | ../dme/svc/opflexelem/src/gen/ifc/beh/imp/./comp/RsDlPolBI.cc| |112
10610||18-08-23 16:43:02.111-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f73:1||RsHv comp/prov-VMware/ctrlr-
[DVStoAVE]-Vcenter/hv-host-65| | ../dme/svc/opflexelem/src/gen/ifc/beh/imp/./comp/RsDlPolBI.cc| |129
10610||18-08-23 16:43:02.111-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f73:1||Looking for SVMNicInfo for
compHV comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter/hv-host-
65| | ../dme/svc/opflexelem/src/gen/ifc/beh/imp/./comp/RsDlPolBI.cc| |133
10610||18-08-23 16:43:02.111-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f73:1||Svm comp/prov-VMware/ctrlr-
[DVStoAVE]-Vcenter/hv-host-65/svm-
00:50:56:A6:30:EF| | ../dme/svc/opflexelem/src/gen/ifc/beh/imp/./comp/RsDlPolBI.cc| |144
10610||18-08-23 16:43:02.112-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f73:1||Sending inventory for MAC
60806139367424 SVM One: 10.0.24.67 SVM Two: 0.0.0.0 and dvs portgroup id dvportgroup-
186| | ../dme/svc/opflexelem/src/gen/ifc/beh/imp/./comp/RsDlPolBI.cc| |190
10610||18-08-23 16:43:02.113-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f73:1||Odev doesn't exist for odev id:
167778371| | ../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc| |3418
10610||18-08-23 16:43:02.113-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f73:1||Guest AVS not compatible with
odev - skipping sending inventory to odev :
167778371| | ../dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc| |6903
```

Interesting, we see the Opflex element is ignoring the inventory information meant for another DevID (connected AVE has devId= 167778370).

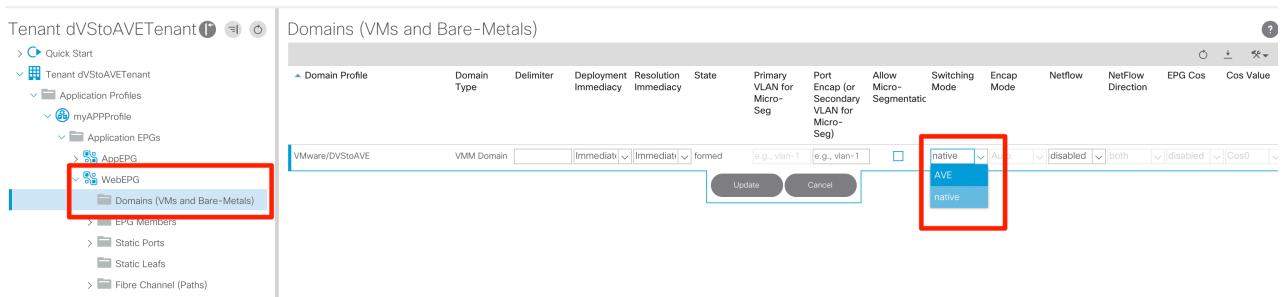
```
10610||18-08-23 16:43:02.113-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f73:1||Sending inventory for MAC
67218525540352| | ../dme/svc/opflexelem/src/gen/ifc/beh/imp/./comp/RsDlPolBI.cc| |112
10610||18-08-23 16:43:02.113-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f73:1||RsHv comp/prov-VMware/ctrlr-
[DVStoAVE]-Vcenter/hv-host-50| | ../dme/svc/opflexelem/src/gen/ifc/beh/imp/./comp/RsDlPolBI.cc| |129
10610||18-08-23 16:43:02.113-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f73:1||Looking for SVMNicInfo for
compHV comp/prov-VMware/ctrlr-[DVStoAVE]-Vcenter/hv-host-
50| | ../dme/svc/opflexelem/src/gen/ifc/beh/imp/./comp/RsDlPolBI.cc| |133
```

```

10610||18-08-23 16:43:02.113-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f73:1||Svm comp/prov-VMware/ctrlr-
[DVStoAVE]-Vcenter/hv-host-50/svm-
00:50:56:A6:C5:49|./dme/svc/opflexelem/src/gen/ifc/beh/imp/./comp/RsDlPolBI.cc||144
10610||18-08-23 16:43:02.113-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f73:1||Sending inventory for MAC
67218525540352 SVM One: 10.0.24.66 SVM Two: 0.0.0.0 and dvs portgroup id dvportgroup-
186|./dme/svc/opflexelem/src/gen/ifc/beh/imp/./comp/RsDlPolBI.cc||190
10610||18-08-23 16:43:02.113-
05:00||ifc_opflexelem||INFO||co=doer:255:127:0xff00000000001f73:1||Sending dvs policy to odev id:
167778370|./dme/svc/opflexelem/src/gen/ifc/app/./imp/ole/Common.cc||1527
10610||18-08-23 16:43:02.114-
05:00||opflexPolicy_||DBG4||fr=ifc_opflexelem:0:0:0:0:0:0,to=ifc_opflexelem:0:0:0:0:0:0,co=doer:2
55:127:0xff00000000001f73:1,si=0x0:0 ms|(envelope 0x40000000012be: SENDING
:REQUEST[opflexPolicy{]) CONTENT :
<opflexPolicy>
<inEnfScope>
<opflexSubject childAction="" dn="" id="0" lcOwn="local" modTs="never" name="" nameAlias="" rn=""
scopeOp="in-scope" scopeType="all-epg" status=""/>
</inEnfScope>
<inEnfInst>
<opflexODev annotation="" childAction="" compHvDn="" ctrlrName="" devId="167778370"
devOperIssues="" devType="nlkv" dn="" domName="" encap="unknown" epStatsBulkAckStatus="processed"
extMngdBy="" fabricPathDn="" features="0" handle="0" hbPeriod="0" hbStatus="valid-dvs" hostName=""
id="0" ip="0.0.0.0" ipAddr="" isSecondary="" lNodeDn="" lastHandshakeTime="1969-12-
31T19:00:00.000-05:00" lastNumHB="0" lcOwn="local" mac="00:00:00:00:00:00" maxMissHb="0"
modTs="never" monPolDn="" name="" nameAlias="" numHB="0" operSt="identified" pcIfId="0" portId="0"
rn="" state="unknown" status="" transitionStatus="attached" uid="0" updateTs="0" uuid=""
version="" vmmCtrlrPKey=""/>
</inEnfInst>
<inOnBehalf/>
<inData>
<opflexODevInv childAction="" dn="" dvportid="dvportgroup-186" id="0" lcOwn="local"
mac="00:50:56:88:22:3D" modTs="never" name="" nameAlias="" rn="" status="" svmono="10.0.24.66"
svmtwo="0.0.0.0" type="Tenant" vmname="aRedHat-9" vmoid="vm-60" vnicname="Network adapter 1"/>
</inData>
</opflexPolicy>|./dme/common/src/framework/./core/proc/Stimulus.cc||895

```

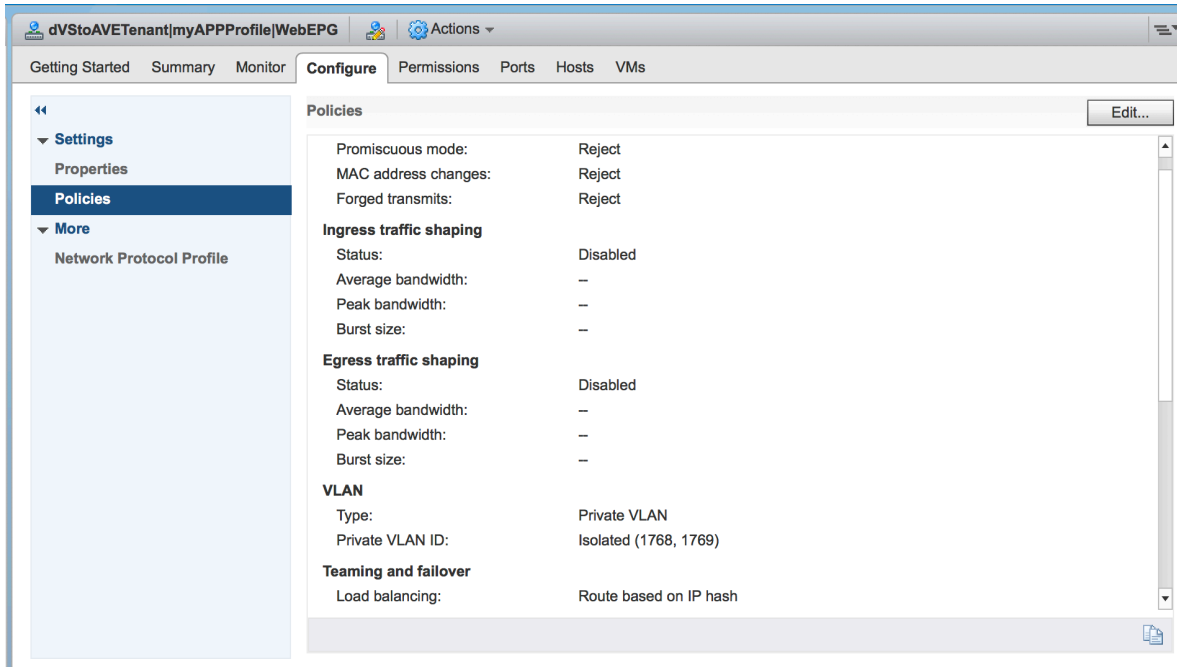
For the other two EPGs, the change to AVE was done in the Tenant policies. We need to select the Domains view, double click in the VMM domain and change the Switching to AVE:



The tasks in Vcenter will be the same:

Task Name	Target	Status	Initiator	Queued For	Start Time	Completion Time
Reconfigure Distributed Port Group	dVStoAVETenant[myAPPProfile]WebEPG	Completed	VSPHERE.LOCAL\...	7 ms	8/23/18, 10:23:54 A...	8/23/18, 10:23:54 A...
Reconfigure Distributed Port Group	outside	Completed	VSPHERE.LOCAL\...	9 ms	8/23/18, 10:23:52 A...	8/23/18, 10:23:53 A...
Reconfigure vSphere Distributed Sw.	DVStoAVE	Completed	VSPHERE.LOCAL\...	14 ms	8/23/18, 10:23:52 A...	8/23/18, 10:23:53 A...
Reconfigure Distributed Port Group	dVStoAVETenant[myAPPProfile]WebEPG	Completed	VSPHERE.LOCAL\...	16 ms	8/23/18, 10:23:52 A...	8/23/18, 10:23:53 A...

We see the Portgroup of the WebEPG now with both Private VLANs assigned:



The audit logs look the same:

```
<aaaModLR affected="uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-WebEPG/rsdomAtt-[uni/vmmp-VMware/dom-DVStoAVE]" cause="transition" changeSet="switchingMode (Old: native, New: AVE)"
childAction="" clientTag="" code="E4212009" created="2018-08-23T17:36:01.864-05:00"
descr="RsDomAtt uni/vmmp-VMware/dom-DVStoAVE modified" dn="subj-[uni/tn-dVStoAVETenant/ap-myAPPProfile/epg-WebEPG/rsdomAtt-[uni/vmmp-VMware/dom-DVStoAVE]]/mod-4294969465" id="4294969465"
ind="modification" modTs="never" sessionId="qv7cQMZeRqahmwNalbzdtw==" severity="info" status=""
trig="config" txId="576460752305267518" user="admin"/>
```

The AVE VM will reflect the three EPGs working in AVE:

AVE-1

```
cisco-ave:log$ vemcmd show port
LTL Port Admin Link State Cause PC-LTL SGID ORG svcpath Type Owner Vem Port
19 Eth2/1 UP UP FWD - 0 0 0 0 int-uplink dpdk
20 Eth2/2 UP UP FWD - 1041 0 0 0 ext-uplink dpdk
51 UP UP FWD - 0 0 0 0 kni-opflex dpdk
52 UP UP FWD - 0 0 0 0 kni-ave-ctrl dpdk
53 UP UP FWD - 0 0 0 0 00:50:56:88:22:3d aRedHat-9:1
54 UP UP FWD - 0 0 0 0 00:50:56:88:6b:67 wRedHat-1:1
55 UP UP FWD - 0 0 0 0 00:50:56:88:73:8e wRedHat-3:1
57 UP UP FWD - 0 0 0 0 00:50:56:88:b0:f8 CentOS-1:1
1041 Po1 UP UP FWD - 0 0 0 0
```

AVE-2

```
cisco-ave:~$ vemcmd show port
LTL Port Admin Link State Cause PC-LTL SGID ORG svcpath Type Owner Vem Port
19 Eth2/1 UP UP FWD - 0 0 0 0 int-uplink dpdk
20 Eth2/2 UP UP FWD - 1041 0 0 0 ext-uplink dpdk
51 UP UP FWD - 0 0 0 0 kni-opflex dpdk
52 UP UP FWD - 0 0 0 0 kni-ave-ctrl dpdk
53 UP UP FWD - 0 0 0 0 00:50:56:88:4d:37 aRedHat-6:1
54 UP UP FWD - 0 0 0 0 00:50:56:9a:d2:27 wRedHat-5:1
55 UP UP FWD - 0 0 0 0 00:50:56:9a:9b:e7 dRedHat-7:1
1041 Po1 UP UP FWD - 0 0 0 0
```

The DVSPortgroup and Endpoint tables will be updated too:

AVE-1

```
cisco-ave:log$ vemcmd dpa dump inventory  
=>dpa command is: dump inventory
```

Portgroup Inventory Table (pvlan array content)

```
-----  
dvportgroup-189, pvlans (0/0 - pg 0), flags 0x00000000, EPG: uni/vmmp-VMware/dom-  
DVStoAVE/intcustomaggr-outside  
dvportgroup-188, pvlans (0/0 - pg 0), flags 0x00000000, EPG: uni/vmmp-VMware/dom-  
DVStoAVE/intcustomaggr-inside  
dvportgroup-186, pvlans (1634/1635 - pg 186), flags 0x00000000, EPG: uni/tn-dVStoAVETenant/ap-  
myAPPProfile/epg-AppEPG  
dvportgroup-185, pvlans (1768/1769 - pg 185), flags 0x00000000, EPG: uni/tn-dVStoAVETenant/ap-  
myAPPProfile/epg-WebEPG  
dvportgroup-187, pvlans (1636/1637 - pg 187), flags 0x00000000, EPG: uni/tn-dVStoAVETenant/ap-  
myAPPProfile/epg-dBEPG  
dvportgroup-190, pvlans (1500/1501 - pg 190), flags 0x00000001, EPG: -
```

Endpoint Inventory Table

```
-----  
00:50:56:88:6b:67, dvportgroup-185, AVES (0x0a001842/0x00000000), flags 0x00000000, wRedHat-1:1, vm-55  
00:50:56:88:22:3d, dvportgroup-186, AVES (0x0a001842/0x00000000), flags 0x00000000, aRedHat-9:1, vm-60  
00:50:56:9a:9a:ed, dvportgroup-187, AVES (0x0a001842/0x00000000), flags 0x00000000, dRedHat-4:1, vm-54  
00:50:56:88:73:8e, dvportgroup-185, AVES (0x0a001842/0x00000000), flags 0x00000000, wRedHat-3:1, vm-59  
00:50:56:88:b0:f8, dvportgroup-186, AVES (0x0a001842/0x00000000), flags 0x00000000, CentOs-1:1, vm-57  
#byeBye#  
cisco-ave:log$
```

AVE-2

```
cisco-ave:~$ vemcmd dpa dump inventory  
=>dpa command is: dump inventory
```

Portgroup Inventory Table (pvlan array content)

```
-----  
dvportgroup-189, pvlans (0/0 - pg 0), flags 0x00000000, EPG: uni/vmmp-VMware/dom-  
DVStoAVE/intcustomaggr-outside  
dvportgroup-188, pvlans (0/0 - pg 0), flags 0x00000000, EPG: uni/vmmp-VMware/dom-  
DVStoAVE/intcustomaggr-inside  
dvportgroup-186, pvlans (1634/1635 - pg 186), flags 0x00000000, EPG: uni/tn-dVStoAVETenant/ap-  
myAPPProfile/epg-AppEPG  
dvportgroup-185, pvlans (1768/1769 - pg 185), flags 0x00000000, EPG: uni/tn-dVStoAVETenant/ap-  
myAPPProfile/epg-WebEPG  
dvportgroup-187, pvlans (1636/1637 - pg 187), flags 0x00000000, EPG: uni/tn-dVStoAVETenant/ap-  
myAPPProfile/epg-dBEPG  
dvportgroup-190, pvlans (1500/1501 - pg 190), flags 0x00000001, EPG: -
```

Endpoint Inventory Table

```
-----  
00:50:56:9a:9b:e7, dvportgroup-187, AVES (0x0a001843/0x00000000), flags 0x00000000, dRedHat-7:1, vm-72  
00:50:56:9a:d2:27, dvportgroup-185, AVES (0x0a001843/0x00000000), flags 0x00000000, wRedHat-5:1, vm-73  
00:50:56:88:4d:37, dvportgroup-186, AVES (0x0a001843/0x00000000), flags 0x00000000, aRedHat-6:1, vm-68
```

The AVE VM dump logs can also give the details of any given port created. For example:

```
cisco-ave:log$ vemcmd show port  
LTL Port Admin Link State Cause PC-LTL SGID ORG svcpath Type Owner Vem Port  
19 Eth2/1 UP UP FWD - 0 0 0 0 int-uplink dpdk  
20 Eth2/2 UP UP FWD - 1041 0 0 0 ext-uplink dpdk  
51 UP UP FWD - 0 0 0 0 kni-opflex dpdk  
52 UP UP FWD - 0 0 0 0 kni-ave-ctrl dpdk  
53 UP UP FWD - 0 0 0 0 00:50:56:88:22:3d aRedHat-9:1  
54 UP UP FWD - 0 0 0 0 00:50:56:88:6b:67 wRedHat-1:1  
55 UP UP FWD - 0 0 0 0 00:50:56:88:73:8e wRedHat-3:1  
57 UP UP FWD - 0 0 0 0 00:50:56:88:b0:f8 CentOs-1:1  
1041 Po1 UP UP FWD - 0 0 0 0
```

We can use the **LTL id** to get the events of that interface.

```
cisco-ave:log$ vemcmd dpa dump port 57
=>dpa command is: dump port 57
LTL 57 Event History
#####
Jan 1 00:00:00.000000 PRINT_STATE_REQ -> [ INITIAL] ==> INITIAL
Jan 1 00:00:00.000000 PRINT_STATE_REQ -> [ INITIAL] ==> INITIAL
Jan 1 00:00:00.000000 PRINT_STATE_REQ -> [ INITIAL] ==> INITIAL
Jan 1 00:00:00.000000 PRINT_STATE_REQ -> [ INITIAL] ==> INITIAL
Jan 1 00:00:00.000000 PRINT_STATE_REQ -> [ INITIAL] ==> INITIAL
Jan 1 00:00:00.000000 PRINT_STATE_REQ -> [ INITIAL] ==> INITIAL
Jan 1 00:00:00.000000 PRINT_STATE_REQ -> [ INITIAL] ==> INITIAL
Jan 1 00:00:00.000000 PRINT_STATE_REQ -> [ INITIAL] ==> INITIAL
Jan 1 00:00:00.000000 PRINT_STATE_REQ -> [ INITIAL] ==> INITIAL
Jan 1 00:00:00.000000 PRINT_STATE_REQ -> [ INITIAL] ==> INITIAL
Jan 1 00:00:00.000000 PRINT_STATE_REQ -> [ INITIAL] ==> INITIAL
Jan 1 00:00:00.000000 PRINT_STATE_REQ -> [ INITIAL] ==> INITIAL
Aug 23 15:01:54.912638 INV_DOWNLOADED -> [ WAIT_INV] ==> ATTACH_START
Aug 23 15:01:55.034466 ATTACH_FROM_DP -> [ ATTACH_START] ==> ATTACHED
Aug 23 15:01:55.052482 ATTACH_ACK -> [ ATTACHED] ==> ATTACHED
Aug 23 15:01:55.679908 ATTACH_FROM_DP -> [ ATTACHED] ==> ATTACHED

LTL 57 Opflex Transaction History
#####
Jan 1 00:00:00.000000 NO_EVENT
Jan 1 00:00:00.000000 NO_EVENT
Jan 1 00:00:00.000000 NO_EVENT
Jan 1 00:00:00.000000 NO_EVENT
Jan 1 00:00:00.000000 NO_EVENT
Jan 1 00:00:00.000000 NO_EVENT
Jan 1 00:00:00.000000 NO_EVENT
Jan 1 00:00:00.000000 NO_EVENT
Jan 1 00:00:00.000000 NO_EVENT
Jan 1 00:00:00.000000 NO_EVENT
Jan 1 00:00:00.000000 NO_EVENT
Jan 1 00:00:00.000000 NO_EVENT
Jan 1 00:00:00.000000 NO_EVENT
Jan 1 00:00:00.000000 NO_EVENT
Aug 23 15:01:54.955406 ATTACH_NOTIF_SENT
Aug 23 15:01:55.052475 ATTACH_ACK_RECV

LTL 57 State History
#####
INITIAL INITIAL INITIAL INITIAL
INITIAL INITIAL INITIAL INITIAL
INITIAL INITIAL INITIAL INITIAL
INITIAL INITIAL ATTACH_START ATTACHED
#byeBye#
cisco-ave:log$
```

Endpoint view from the Leaf

After all three EPGs are in AVE mode, the endpoint information will not change much in the compute leaf switches. We will learn MAC/IP in the external encap-vlan.

From Leaf104:

```
latam-pod2-leaf4# show endpoint interface po6
Legend:
s - arp          H - vtep          V - vpc-attached    p - peer-aged
R - peer-attached-rl B - bounce      S - static          M - span
D - bounce-to-proxy O - peer-attached  a - local-aged     L - local

+-----+-----+-----+-----+-----+
| VLAN/ | Encap | MAC Address | MAC Info/ | Interface |
| Domain | VLAN | IP Address | IP Info | |
+-----+-----+-----+-----+-----+
59 | | | | | po6
dVStoAVETenant:vrfl | vlan-567 | 192.168.99.30 | L | po6
59/dVStoAVETenant:vrfl | vlan-567 | 0050.5688.738e | L | po6
60 | | | | | po6
dVStoAVETenant:vrfl | vlan-634 | 0050.569a.9aed | L | po6
dVStoAVETenant:vrfl | vlan-634 | 192.168.101.20 | L | po6
64 | | | | | po6 <---
dVStoAVETenant:vrfl | vlan-501 | 0050.5688.223d | L | po6 <---
dVStoAVETenant:vrfl | vlan-501 | 192.168.100.10 | L | po6 <---
34 | vxlan-16777209 | 0050.56a6.c549 | LH | po6
overlay-1 | vxlan-16777209 | 10.0.24.66 | LH | po6
```

```
latam-pod2-leaf2# show endpoint interface port-channel 2
Legend:
s - arp          H - vtep          V - vpc-attached    p - peer-aged
R - peer-attached-rl B - bounce      S - static          M - span
D - bounce-to-proxy O - peer-attached a - local-aged     L - local
```

VLAN/ Domain	Encap VLAN	MAC Address IP Address	MAC Info/ IP Info	Interface
42	vlan-567	0050.569a.d227 LV		po2
dVStoAVETenant:vrf1	vlan-567	192.168.99.20 LV		po2
46	vlan-634	0050.569a.9be7 LpV		po2
dVStoAVETenant:vrf1	vlan-634	192.168.101.10 LV		po2
49	vlan-501	0050.5688.4d37 LpV		po2 <----
dVStoAVETenant:vrf1	vlan-501	192.168.100.20 LV		po2 <---
8	vxlan-16777209	0050.56a6.30ef LVH		po2
overlay-1	vxlan-16777209	10.0.24.67 LVH		po2

```
Clatam-pod2-leaf1# show endpoint interface port-channel 2
Legend:
s - arp          H - vtep          V - vpc-attached    p - peer-aged
R - peer-attached-rl B - bounce      S - static          M - span
D - bounce-to-proxy O - peer-attached a - local-aged     L - local
```

VLAN/ Domain	Encap VLAN	MAC Address IP Address	MAC Info/ IP Info	Interface
32	vlan-567	0050.569a.d227 LV		po2
dVStoAVETenant:vrf1	vlan-567	192.168.99.20 LV		po2
36	vlan-634	0050.569a.9be7 LaV		po2
dVStoAVETenant:vrf1	vlan-634	192.168.101.10 LV		po2
39	vlan-501	0050.5688.4d37 LaV		po2 <----
dVStoAVETenant:vrf1	vlan-501	192.168.100.20 LV		po2 <---
8	vxlan-16777209	0050.56a6.30ef LVH		po2
overlay-1	vxlan-16777209	10.0.24.67 LVH		po2

```
latam-pod2-leaf1#
```

For remote endpoints, the local compute leaf will have it pointing to a **tunnel** destined to the remote compute leaf. For example, IP **192.168.100.1** connected to Leaf-104:

```
latam-pod2-leaf1# show endpoint ip 192.168.100.10
Legend:
s - arp          H - vtep          V - vpc-attached    p - peer-aged
R - peer-attached-rl B - bounce      S - static          M - span
D - bounce-to-proxy O - peer-attached a - local-aged     L - local
```

VLAN/ Domain	Encap VLAN	MAC Address IP Address	MAC Info/ IP Info	Interface
dVStoAVETenant:vrf1		192.168.100.10 a		tunnel152

```
latam-pod2-leaf1# show interface tunnel 52
Tunnel52 is up
  MTU 9000 bytes, BW 0 Kbit
  Transport protocol is in VRF "overlay-1"
  Tunnel protocol/transport is vxlan
  Tunnel source 10.0.56.67/32 (lo0)
  Tunnel destination 10.0.56.69 ← VTEP for Leaf-104
  Last clearing of "show interface" counters never
  Tx
  0 packets output, 1 minute output rate 0 packets/sec
  Rx
  0 packets input, 1 minute input rate 0 packets/sec
```