

VALIDATED REFERENCE DESIGN GUIDE

VMWARE NSX-V AND 8325 INTEGRATION

CONTENTS

Introduction	3
Requirements	4
vSphere information for reference	4
8325 configuration and verification	6
NSX-V integration configuration	8
Final validation	10

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INTRODUCTION

This document provides guidance on setting up VMware NSX-V and 8325 integration. This integration provides L2 network connectivity between Virtual Machines attached to NSX logical switches and bare metal servers or other devices on the physical network.

ArubaOS-CX 10.3 on 8325, vSphere 6.7 and NSX 6.4.5 were used in the creation of this guide.

8325/NSX-V certification is currently planned for ArubaOS-CX 10.4.

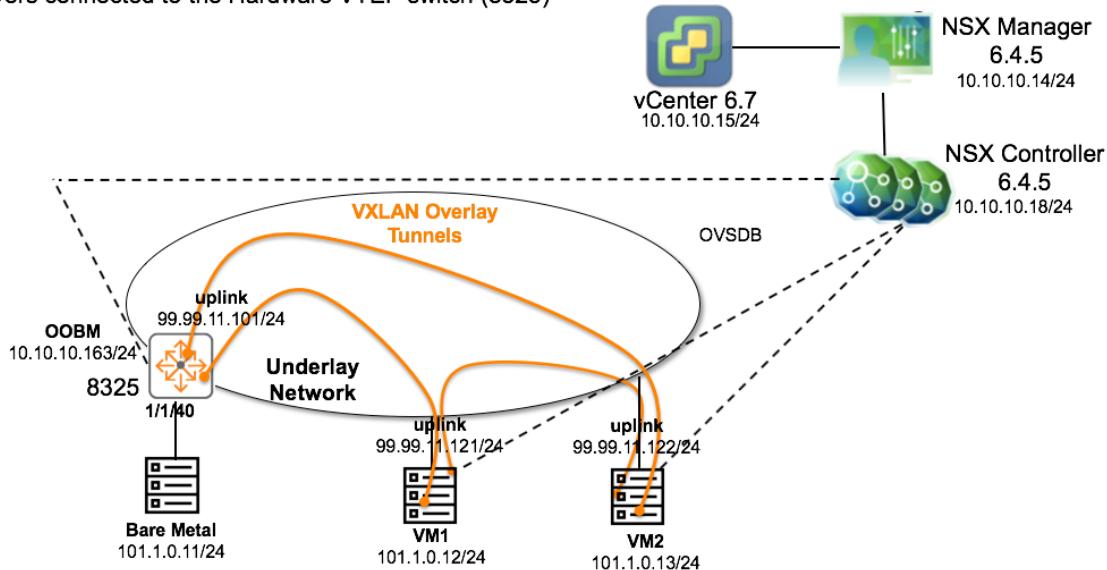
Figure 1 describes the network topology that will be used in this document:

- An Out Of Band (OOB) management network (10.10.10.0/24) is used for communication between the vCenter/NSX manager and NSX controller nodes. The 8325 must communicate with the NSX controller through the OOB management port.
- The in band underlay network (99.99.11.0/24) is used for connectivity between the VXLAN Tunnel End Points (VTEPs), the data plane VXLAN tunnels utilize this network for VM and Bare Metal (BM) network connectivity. The underlay network can be a L2 or L3 network.
- The virtual network (101.1.0.0/24) is used for connectivity between VMs and BM.

Figure 1. Network Topology

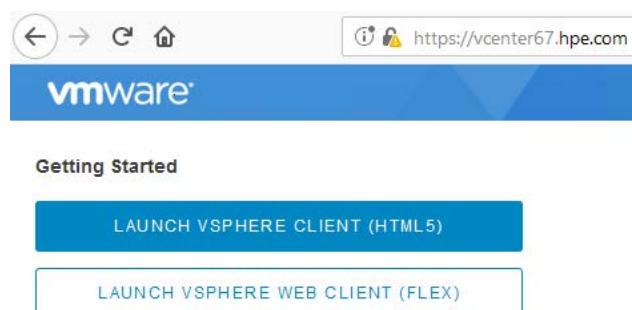
VMware NSX-V 8325 Integration

- Provides L2 network connectivity between VMs (on ESXi hosts) and Bare Metal Servers connected to the Hardware VTEP switch (8325)



Requirements

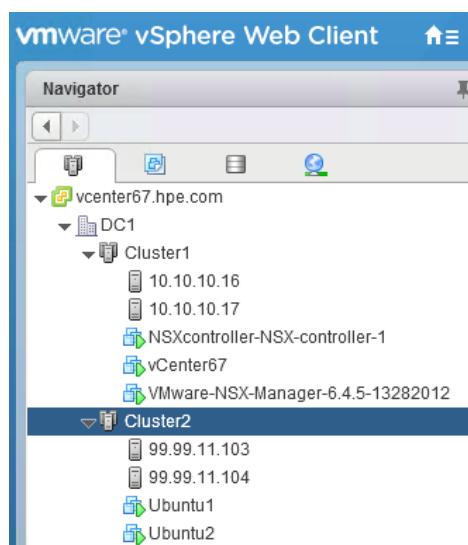
- Ensure DNS and NTP server infrastructure are in place
 - all devices (ESXi host, vCenter, NSX manager, NSX controller, 8325 etc) should point to these
 - NTP is in sync on these devices
 - DNS resolution between devices should work (all devices should have DNS host entries)
- VMware NSX-V should be deployed according to instructions stated here
 - <https://docs.vmware.com/en/VMware-NSX-Data-Center-for-vSphere/index.html>
- Utilize the flash based web client (FLEX) instead of HTML 5, some NSX features only exist in the FLEX client



- A distributed vSwitch is required for NSX-V

vSphere information for reference

- I built 2 clusters
 - Cluster1 hosts the vCenter NSX Manager and NSX controller nodes
 - Cluster2 hosts the VTEPs and VMs



- NSX system overview (VXLAN is only required on the VTEP cluster)

The screenshot shows the VMware vSphere Web Client interface with the title bar "vmware vSphere Web Client" and "Updated at 4:12 PM". The left sidebar, titled "Navigator", contains the following menu items under "Networking & Security": NSX Home, Dashboard (selected), Installation and Upgrade, Service Definitions, Logical Switches, NSX Edges, Security (Service Composer, Firewall, Firewall Settings, Application Rule Manager, SpoofGuard), Groups and Tags, Tools (Flow Monitoring, Endpoint Monitoring, Traceflow). The main panel is titled "Dashboard" and "System Overview". It displays the status of NSX Manager (Up), Controller Nodes (Up), and External Components (Up). Below this is the "Fabric Status" section, which includes Host Preparation Status (2 Clusters), VXLAN Not Configured (1 warning), and Host Communication Channel Status (4 Hosts, No errors or warnings).

- VTEP info

The screenshot shows the VMware vSphere Web Client interface with the title bar "vmware vSphere Web Client" and "Updated at 4:12 PM". The left sidebar, titled "Navigator", contains the same menu items as the previous screenshot. The main panel is titled "Installation and Upgrade" and is currently viewing the "Host Preparation" tab. It shows NSX Manager (Up) and EAM Status (Up). Under "Clusters", there are two entries: "Cluster1" (Firewall, VXLAN) and "Cluster2" (Firewall, VXLAN). A modal dialog box is open over the "Hosts" table, titled "Host Details", showing the host name "vmk1" and IP address "99.99.11.103". The table lists two hosts: "99.99.11.103" (IP 99.99.11.103, NSX Installation 6.4.5.1328, Enabled, UP) and "99.99.11.102" (IP 99.99.11.102, NSX Installation 6.4.5.1328, Enabled, UP). A "VIEW DETAILS" button is visible at the bottom right of the table.

- Logical switch in NSX for VMs and BM

Logical Switch ID	Segment ID	Name	Status	Transport Zone	Connected VMs	Hardware Ports Binding	Scope	Replication Mode
virtualwire-2	5000	LS1	Normal	TZ1	2		Global	Unicast

- Logical switch attached to VM

8325 configuration and verification

Here is 8325 configuration used to integrate with NSX-V.

```

hostname 8325-R1-RU30
user admin group administrators password ciphertext AQBapbLs1Lppa
clock timezone us/pacific
ntp server 10.10.10.254
ntp enable
ntp vrf mgmt
!
ssh server vrf mgmt
!
! Cert to be created for NSX-V integration
crypto pki application hsc certificate local-cert
!
vlan 1
spanning-tree config-name 54:80:28:fd:a4:00
interface mgmt
  no shutdown
  ip static 10.10.10.163/24
  default-gateway 10.10.10.254
! interface group 4 contains ports 1/1/37-1/1/48
system interface-group 4 speed 10g
interface 1/1/40

```

```

! Port to Bare Metal server
no shutdown
no routing
vlan access 1
interface 1/1/43
! Uplink to underlay network
no shutdown
ip address 99.99.11.101/24
!
! A loopback IP with routing enabled and able to communicate with the other VTEPs
! can also be used as source IP of int vxlan 1
interface vxlan 1
source ip 99.99.11.101
no shutdown
vni 5000
vlan 1
! The vni stated here should match the logical switch created in NSX-V
! The VLAN should be mapped to ports connected to the bare metal server
!
https-server rest access-mode read-write
https-server vrf mgmt
hsc
! The IP below refers to the NSX controller IP, do not point to the NSX manager IP
manager ip 10.10.10.18
enable

```

You can validate connectivity to the NSX controller using pings through the VRF

```

8325-R1-RU30# ping 10.10.10.18 vrf mgmt
PING 10.10.10.18 (10.10.10.18) 100(128) bytes of data.
108 bytes from 10.10.10.18: icmp_seq=1 ttl=64 time=0.463 ms
108 bytes from 10.10.10.18: icmp_seq=2 ttl=64 time=0.672 ms
108 bytes from 10.10.10.18: icmp_seq=3 ttl=64 time=0.538 ms

```

Copy 8325 cert info from

```
show crypto pki certificate local-cert pem
```

Ensure there are no spaces in front, here is an example of my 8325 cert

```

-----BEGIN CERTIFICATE-----
MIID1zCCAn+gAwIBAgIIoRTi4eTYgP8wDQYJKoZIhvCNAQELBQAwazEdMBsGA1UE
AwwUc3dpdGNoLFN0PVRXOTNLTTAwMVkxCzAJBgNVBAYTA1VTMRIwEAYDVQQHDA1S
b3NldmlsbGUxCzAJBgNVBAgMAkNBMQwCgYDVQQKDANIUEUxDjAMBgNVBAsMBUFY
dWJhMB4XDTE4MTEyNTA2MDc1M1oXDTQ4MTEExNzA2MDc1M1owazEdMBsGA1UEAwU
c3dpdGNoLFN0PVRXOTNLTTAwMVkxCzAJBgNVBAYTA1VTMRIwEAYDVQQHDA1Sb3N1
dmlsbGUxCzAJBgNVBAgMAkNBMQwCgYDVQQKDANIUEUxDjAMBgNVBAsMBUFydWJh
MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIIBCgKCAQEAvlXYIx0vx4PFm8PEsBc
vWGb/G8v5Mb04g1ENzULE53S1rZVEDxVaNj0EVYkmuH1RNv+6ejQ91JQBfCC8Pev
eLFif+myTetzSZQV/itBuqqSu4CtaPVLooblgRfEEg6itJUwLn//j0pr7+gVLRdN
DPNqzwWu35BTIHjmym1MXTcn1Bszn/QR4JvPKK2FSTTmJbXWgN/YVwIJBGSwl3Ovm
5y8JvYkevlvTR2uiHjd3zwsn3JeP76Uh7HgmD4138IHkbtWVKmvEq2u4K5QtwgZG
TyqU4msAbizH32mg9UwF3WvPzkGog6GidGUDjs/f3q+40dKJMxL5zaCBzIKdZr35
lwIDAQBoz8wPTAMBgNVHRMBAf8EAjAAMA4GA1UdDwEB/wQEAvIF4DAdBgNVHSUE
FjAUUBgggrBgfFBQcDAQYIKwYBBQUHAwIwDQYJKoZIhvCNAQELBQADggEBAIUa+O2i
WRH8onUZ0fGHUQXkCCOWfUCudxiVz+/1Jd6XJVXM8If5i1/P25cTwgFvKukdyFcA
Ctvgalrywa4vSTggjDYm0C3jABoMYsJdiKD1XFDAeU3K7HyAui6p44QiL0nI3oqA
-----END CERTIFICATE-----

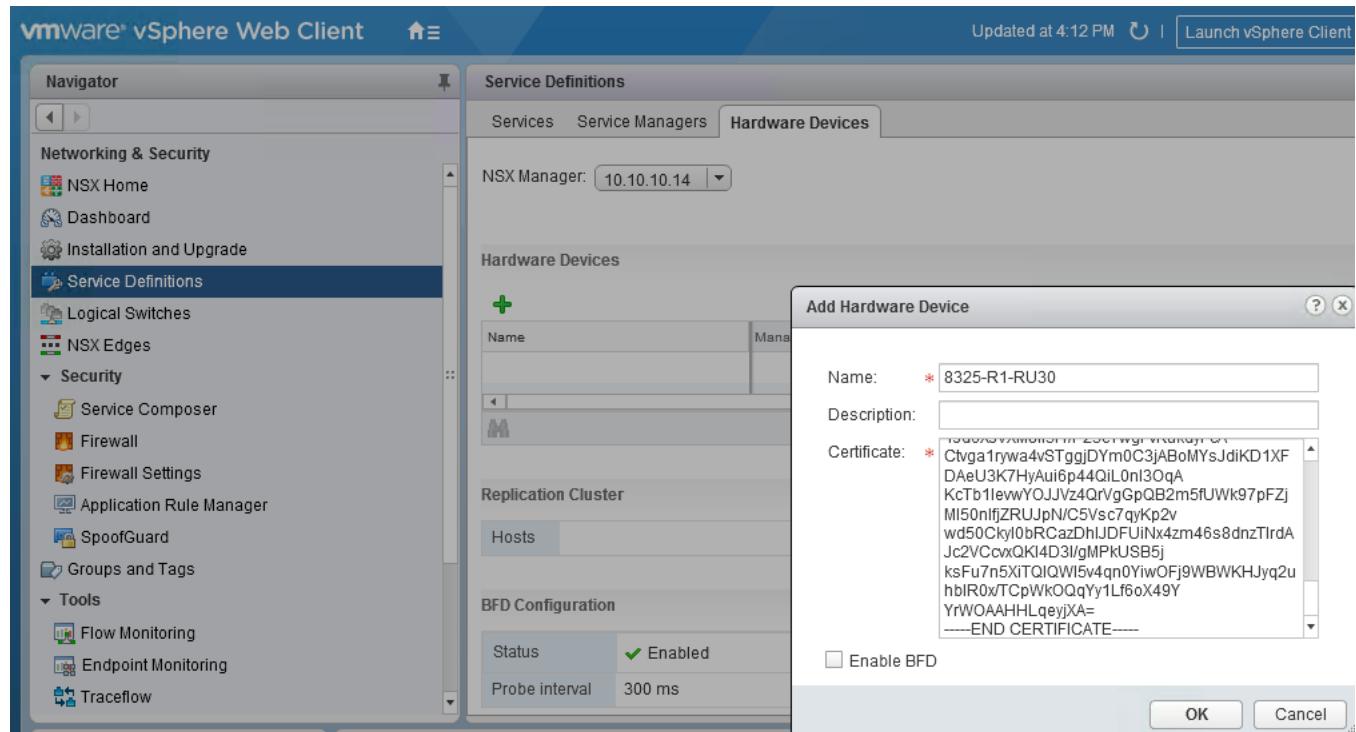
```

```
KcTb1IevwYOJJVz4QrVgGpQB2m5fUWk97pFZjMI50nIfjZRUJpN/C5Vsc7qyKp2v
wd50CkyI0bRCazDhIJDFUiNx4zm46s8dnzTlrdAJc2VCcvxQKI4D3I/gMPkUSB5j
ksFu7n5XiTQlQWl5v4qn0YiwOFj9WBWKHJyq2uhblR0x/TCpWkOQqYy1Lf6oX49Y
YrWOAAHHLqeyjXA=
-----END CERTIFICATE-----
```

NSX-V Configuration

Navigate to “Networking and Security -> Service Definitions -> Hardware Devices”

Add the 8325 and paste in the cert info.



Connectivity should be shown as "Up"

Name	Management IP Address	Connectivity	BFD Enabled	Logical Switch Bindings
8325-R1-RU30	10.10.10.163	Up	Off	0

Navigate to "Networking and Security -> Logical Switches -> select the logical switch -> Actions -> Manage Hardware Bindings"

Logical Switch ID	Segment ID	Name	Status
virtualwire...	5000	LS1	Normal

You should be able to select the port facing the bare metal server

Manage Hardware Bindings | LS1

Switch	Port	VLAN
8325-R1-RU30	1/1/40	1

CANCEL OK

The logical switch should now be connected to VMs and also have hardware port binding shown

Logical Switch ID	Segment ID	Name	Status	Transport Zone	Connected VMs	Hardware Ports Binding	Scope	Replication Mode	Tenant
virtualwire...	5000	LS1	Normal	TZ1	2	1	Global	Unicast	virtual tenant

Final validation

From the 8325, you can validate connectivity to the controller

```
8325-R1-RU30# sh hsc
Controller IP      Port      Connection Connection
address           address    status     state
-----
10.10.10.18       6640      ACTIVE     UP
```

Local and remote mac addresses are learnt when traffic is generated between VM/BM, remote VTEP IPs are also shown.

```
8325-R1-RU30# sh mac-address-table
MAC age-time          : 300 seconds
Number of MAC addresses : 4

MAC Address          VLAN   Type      Port
-----
00:50:56:b4:c7:01    1      hsc       vxlan1(99.99.11.121)
00:50:56:b4:b8:7b    1      hsc       vxlan1(99.99.11.122)
54:80:28:fd:19:00    1      dynamic   1/1/40
54:80:28:fd:19:bd    1      dynamic   1/1/40
```

VM and BM are able to establish L2 network connectivity over the VXLAN tunnels

```
administrator@administrator-virtual-machine: ~
File Edit View Search Terminal Help
inet6 ::1/128 scope host
    valid_lft forever preferred_lft forever
2: ens160: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 00:50:56:b4:c7:01 brd ff:ff:ff:ff:ff:ff
    inet 101.1.0.12/24 brd 101.1.0.255 scope global noprefixroute ens160
        valid_lft forever preferred_lft forever
    inet6 fe80::4efe:ccb4:8432:f772/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
administrator@administrator-virtual-machine:~$ ping 101.1.0.11
PING 101.1.0.11 (101.1.0.11) 56(84) bytes of data.
64 bytes from 101.1.0.11: icmp_seq=1 ttl=64 time=0.613 ms
64 bytes from 101.1.0.11: icmp_seq=2 ttl=64 time=0.653 ms
64 bytes from 101.1.0.11: icmp_seq=3 ttl=64 time=0.694 ms
^C
--- 101.1.0.11 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2041ms
rtt min/avg/max/mdev = 0.613/0.653/0.694/0.039 ms
administrator@administrator-virtual-machine:~$ ping 101.1.0.13
PING 101.1.0.13 (101.1.0.13) 56(84) bytes of data.
64 bytes from 101.1.0.13: icmp_seq=1 ttl=64 time=1.22 ms
64 bytes from 101.1.0.13: icmp_seq=2 ttl=64 time=1.09 ms
64 bytes from 101.1.0.13: icmp_seq=3 ttl=64 time=1.15 ms
^C
--- 101.1.0.13 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 1.090/1.157/1.224/0.061 ms
```

