Windows 2012 NPIV on UCS Configuration Example

Contents

Introduction

This document describes how to configure Windows Server 2012 N_Port ID Virtualization (NPIV) on Unified Computing System (UCS) Version 2.1(2a). With this feature, a Virtual Machine (VM) that runs on a server can share a single adapter, and still have independent access to its own protected storage.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Windows Fabric Network Interface Controller (fNIC) Driver Compatible with UCS Manager (UCSM) Version 2.1(2)
- UCSM Version 2.1(2) Virtual Interface Card (VIC) Firmware Image
- UCSM Version 2.1(2) on Fabric Interconnect/ I/O Modules (IOMs)
- Hyper−V 2012 and Windows 2012 Guests

Components Used

The information in this document is based on these software and hardware versions:

- Hyper−V Version 3.0
- Windows Server 2012
- NetApp Storage
- UCS Chassis, Fabric Interconnects, and B−Series Servers

• Cisco Nexus 5000 Series Switches

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Configure

Complete these steps in order to configure NPIV:

1. From a UCS perspective, you must configure your service profile with two Virtual Host Bus Adapters (vHBAs), one for each fabric. This image shows the vHBAs for one service profile. You can correlate the World Wide Port Names (WWPNs) with the service profile in the output that is shown later in the document.

   Note: When you use Storage Area Network (SAN) storage in order to boot Hyper−V hosts, it is ***highly recommended*** that a separate set of vHBAs be used for VM traffic and for device booting. This example outlines a basic configuration with two vHBAs.


2. Configure your Virtual Storage Area Network (VSAN) from Hyper−V Manager. You must create two VSANs, one for each fabric. When you create a VSAN in other Hyper−V hosts, ensure that you use the same names; otherwise, Live Migration does not work. Click the ***host***, and then click ***Virtual SAN Manager.***
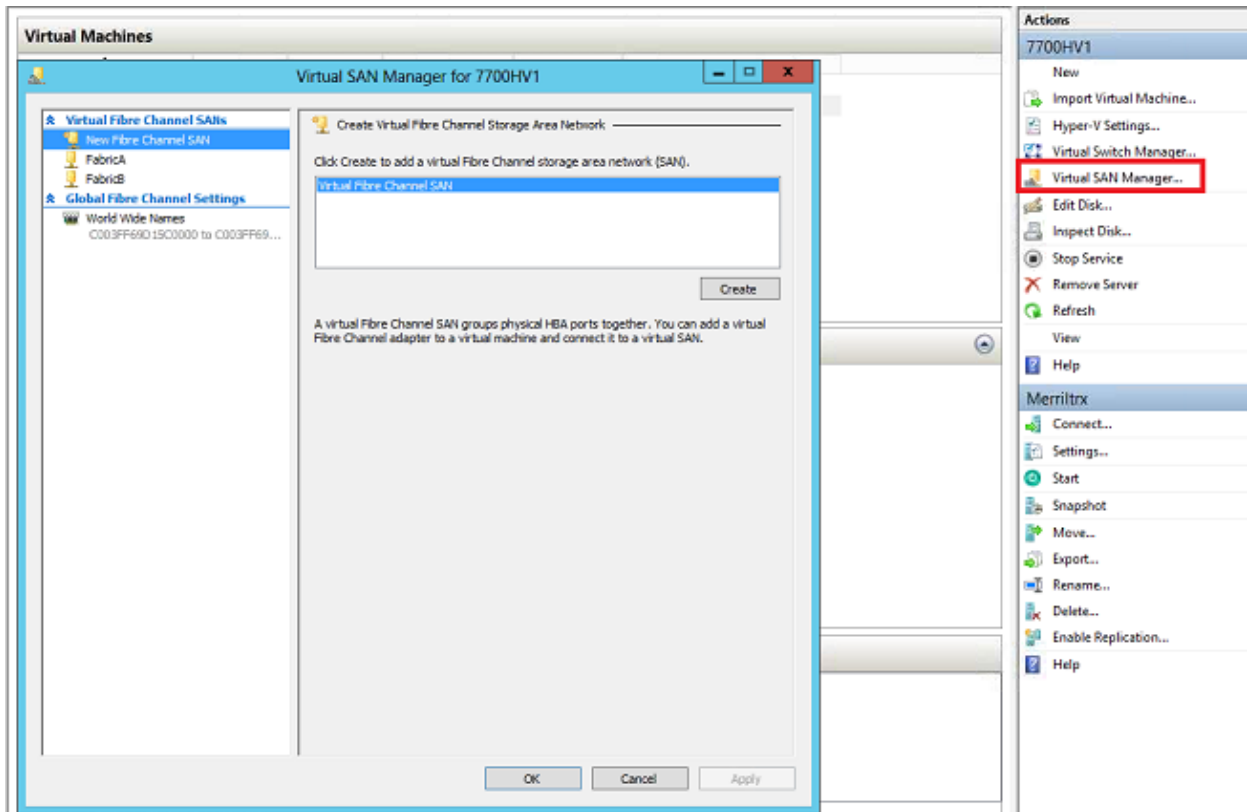
3. Create a new **Fibre Channel SAN** called FabricA, and select the **World Wide Node Name (WWNN)/WWPN** that corresponds to vHBA0–FabricA.
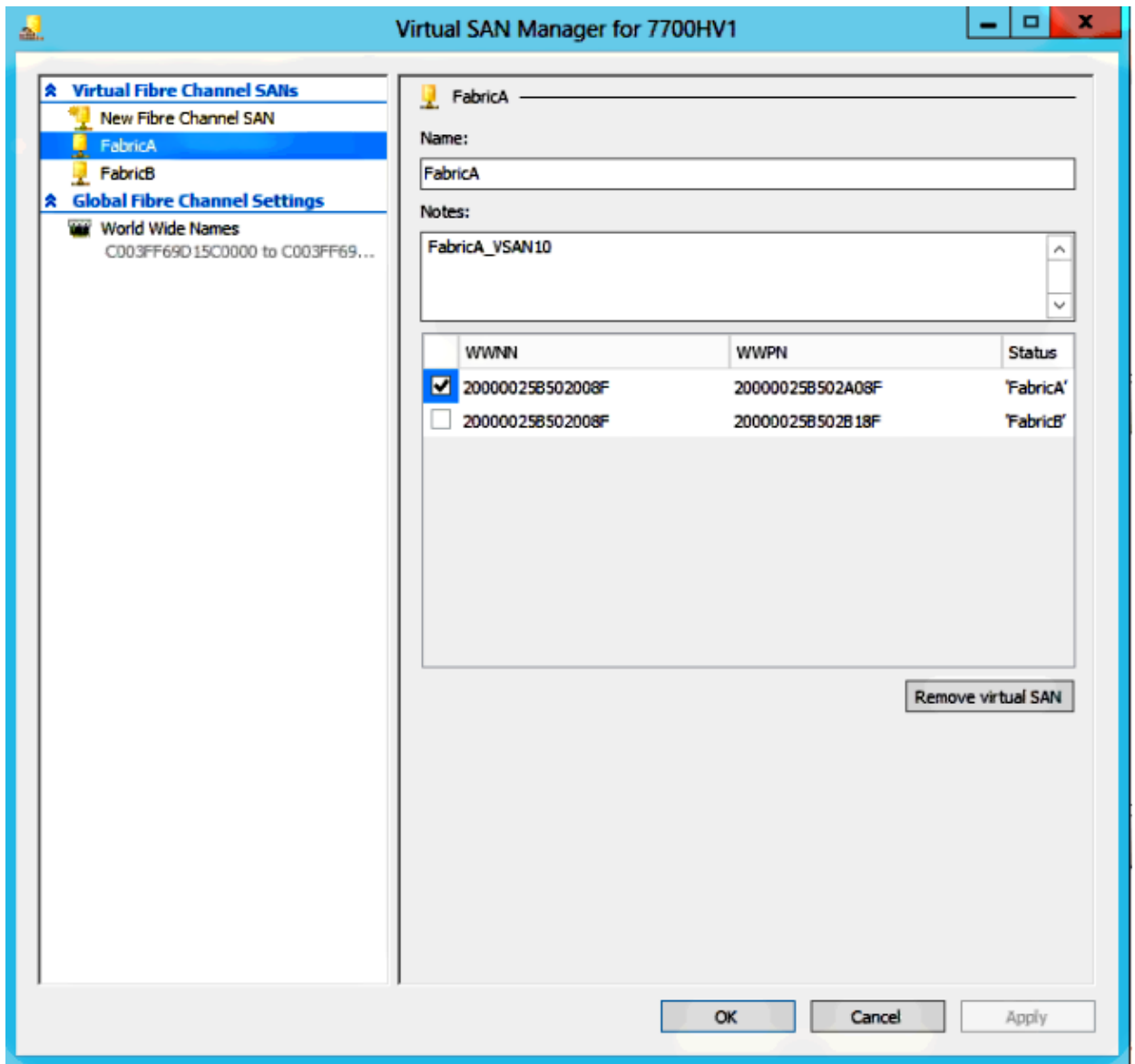
4. Add **FabricB**, and select the **WWNN/WWPN** that corresponds to vHBA1–FabricB.
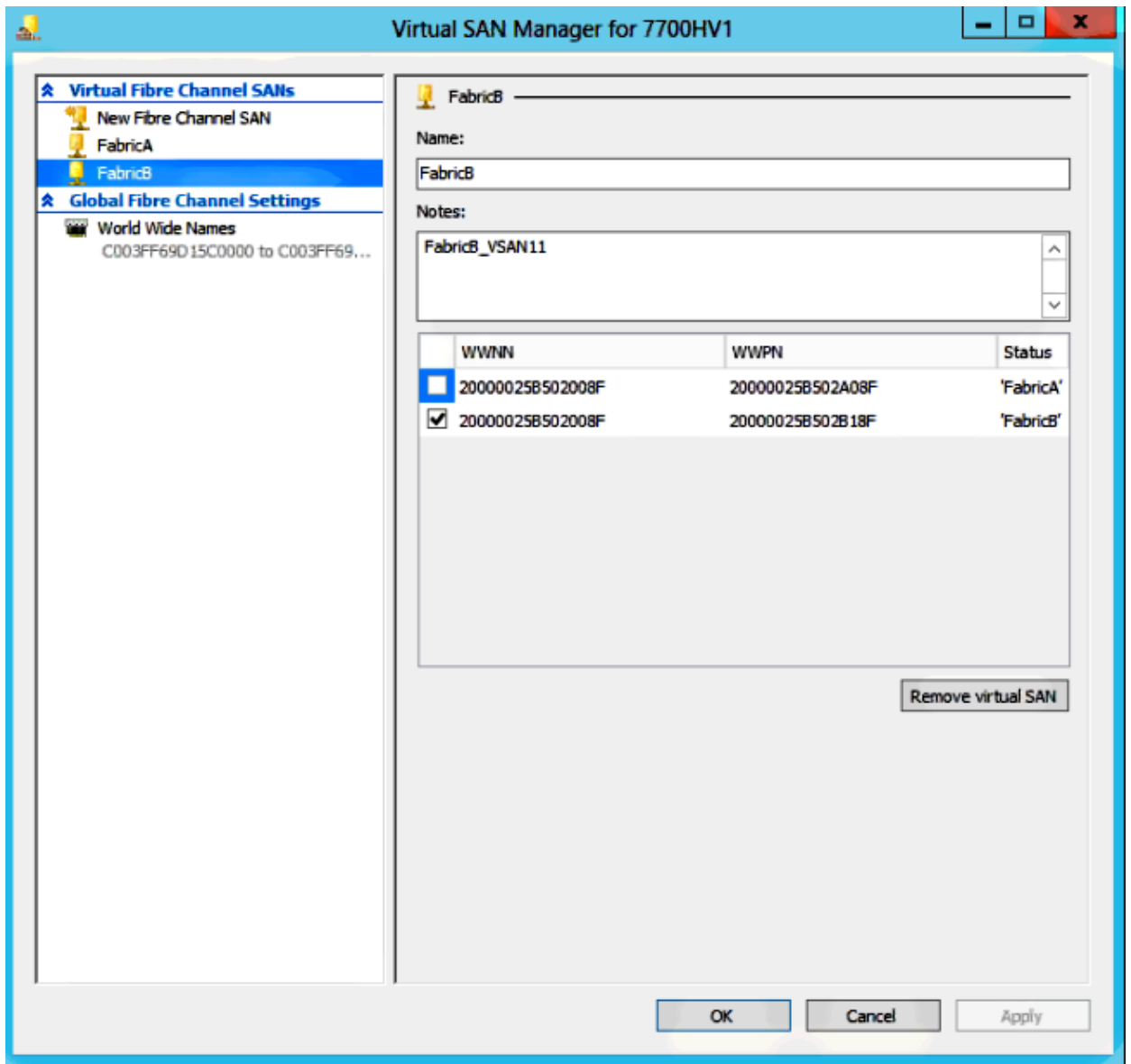
5. Configure the settings for the Windows Server 2012 VM, and add two fibre channel adapters. With
   the VM powered off, right–click and choose *Settings*. This is done with the Failover Cluster Manager
   because these hosts are part of a cluster.
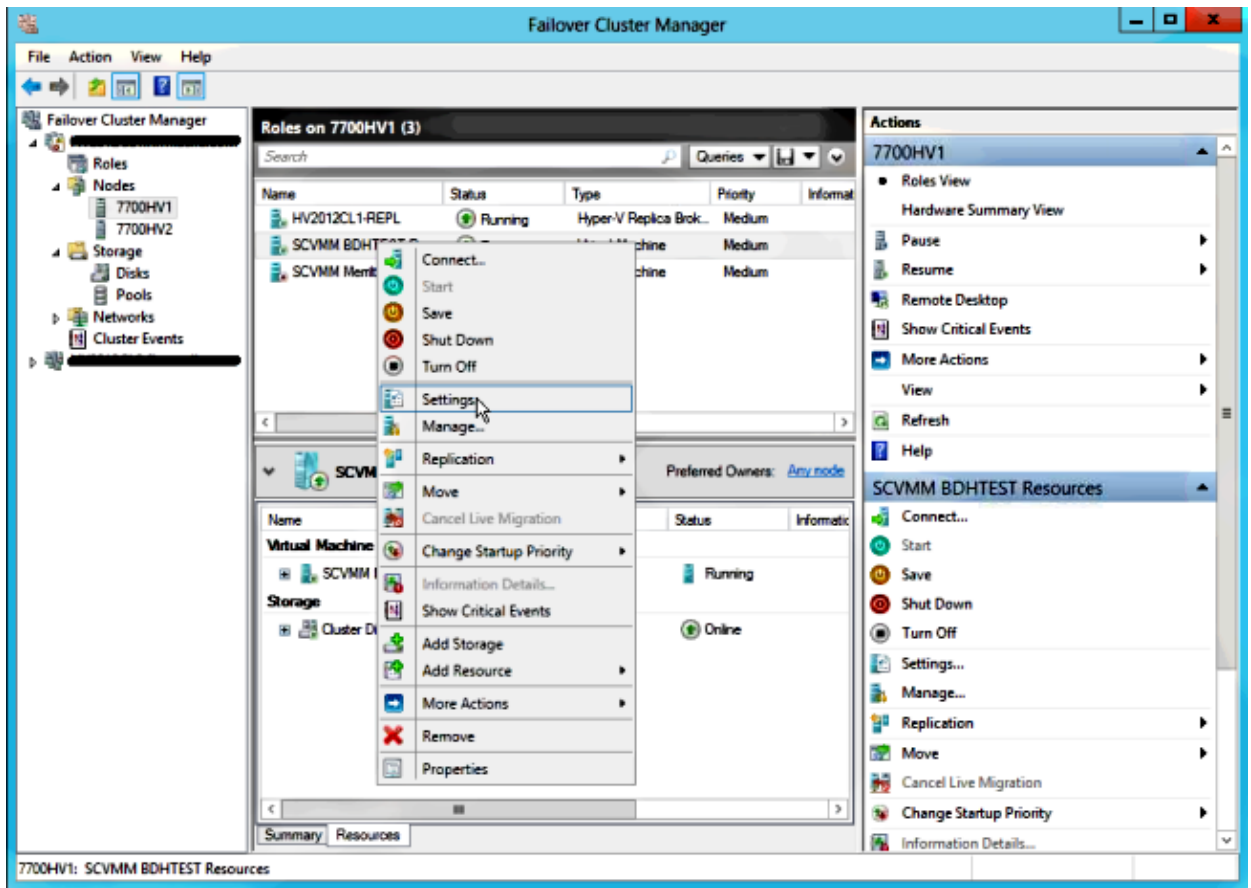
6. Click *Add Hardware*, select *Fibre Channel Adapter*, and click *Add*.
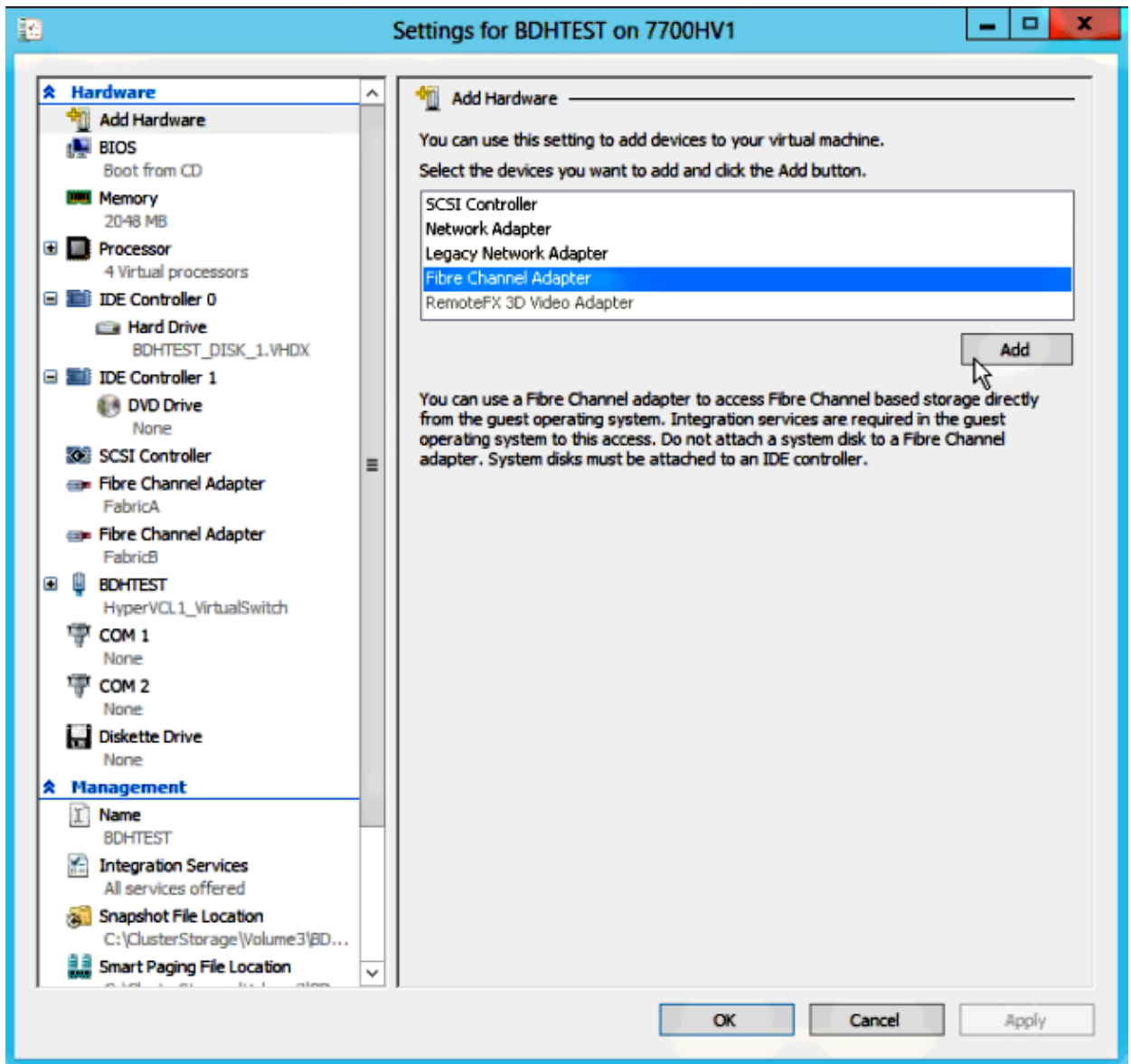
7. Select ***Virtual SAN FabricA*** for the first adapter, and ***Virtual SAN FabricB*** for the second adapter.
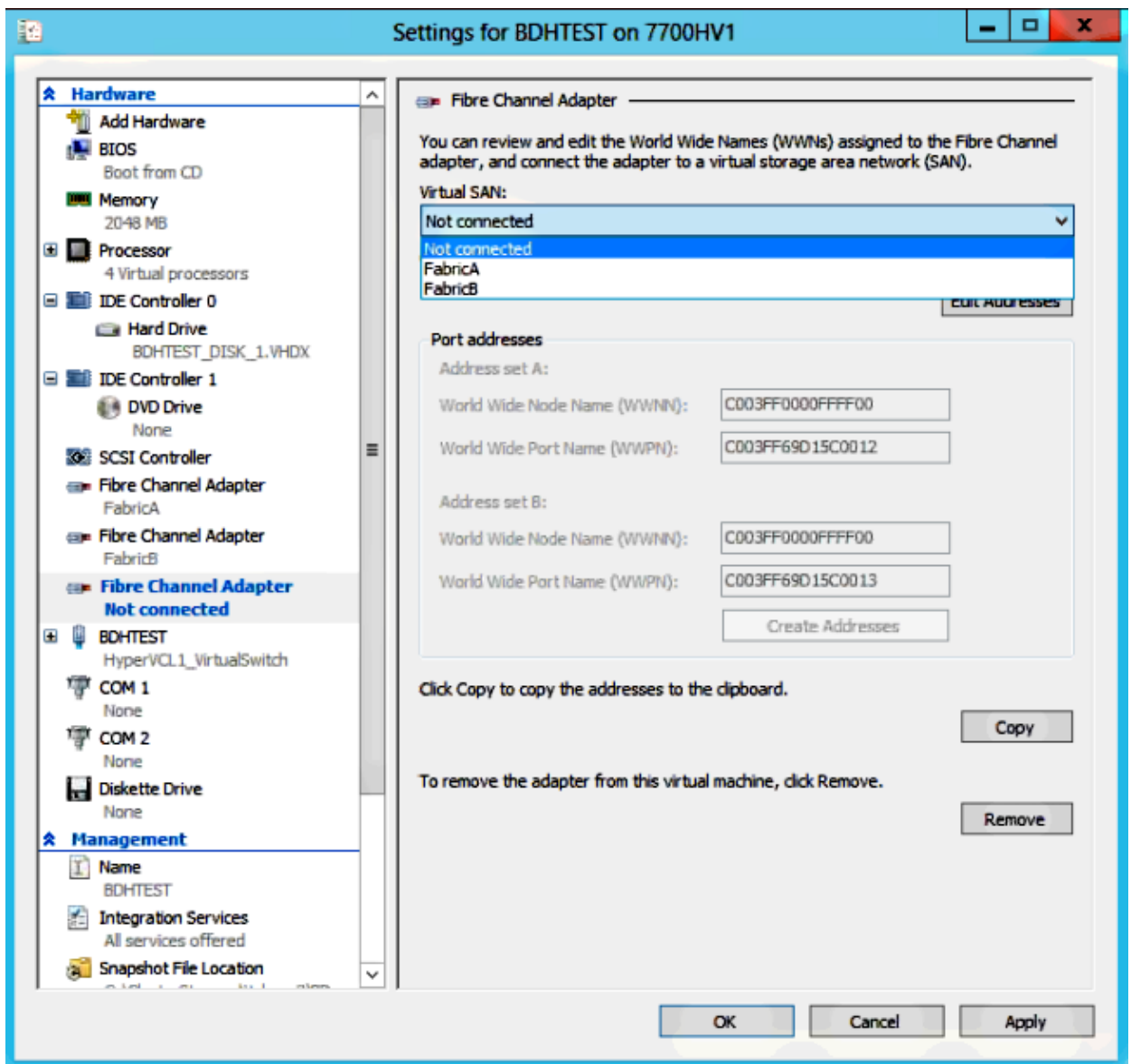
These images show both adapters and their respective WWNNs/WWPNs.

Settings for BDHTEST on 7700HV1

Hardware
- Add Hardware
- BIOS
  - Boot from CD
- Memory
  - 2048 MB
- Processor
  - 4 Virtual processors
- IDE Controller 0
  - Hard Drive
    - BDHTEST_DISK_1.VHDX
- IDE Controller 1
  - DVD Drive
    - None
- SCSI Controller
- Fibre Channel Adapter
  - FabricA
- Fibre Channel Adapter
  - FabricB
- BDHTEST
  - HyperVCL1_VirtualSwitch
- COM 1
  - None
- COM 2
  - None
- Diskette Drive
  - None

Management
- Name
  - BDHTEST
- Integration Services
  - All services offered
- Snapshot File Location
  - C:\ClusterStorage\Volume3\BD...
- Smart Paging File Location

Fibre Channel Adapter

You can review and edit the World Wide Names (WWNs) assigned to the Fibre Channel adapter, and connect the adapter to a virtual storage area network (SAN).

Virtual SAN:

FabricA

Click Edit Addresses to edit the port addresses.

[Edit Addresses]

Port addresses

Address set A:

World Wide Node Name (WWNN): C003FF0000FFFF00

World Wide Port Name (WWPN): C003FF69D15C000E

Address set B:

World Wide Node Name (WWNN): C003FF0000FFFF00

World Wide Port Name (WWPN): C003FF69D15C000F

[Create Addresses]

Click Copy to copy the addresses to the clipboard.

[Copy]

To remove the adapter from this virtual machine, click Remove.

[Remove]

[OK] [Cancel] [Apply]

8. Add zoning on Nexus 5k switches.

Here is an example of how the Nexus 5000 Series switch might look (zoning for WWPNs of the UCS vHBAs are not shown):

```
! Zoning for HYVERTEST Fabric A

fcalias name HYPERVTEST vsan 10
        member pwwn c0:03:ff:69:d1:5c:00:0e
        member pwwn c0:03:ff:69:d1:5c:00:0f

        zone name HYPERVTEST_to_NetApp1 vsan 10
        Member fcalias HYPERVTEST
        Member fcalias NetApp1

zoneset name HyperVZoneset1 vsan 10
        member HYPERVTEST_to_NetApp1

zoneset activate name HyperVZoneset1 vsan 10
```

```
!Zoning for HYPERVTEST Fabric B

fcalias name HYPERVTEST vsan 11
        member pwwn c0:03:ff:69:d1:5c:00:10
        member pwwn c0:03:ff:69:d1:5c:00:11

        zone name HYPERVTEST_to_NetApp2 vsan 11
        Member fcalias HYPERVTEST
        Member fcalias NetApp2

zoneset name HypervZoneset2 vsan 11
        member HYPERVTEST_to_NetApp2

zoneset activate name HyperVZoneset2 vsan 11
```

9. Add the WWPNs to *NetApp* in order to make sure they can access the Logical Unit Numbers (LUNs).

Live Migration

Each VM adapter has two sets of WWNN/WWPN. These are used by Hyper–V during a live migration. This image shows how each of the WWPNs is used during live migration.
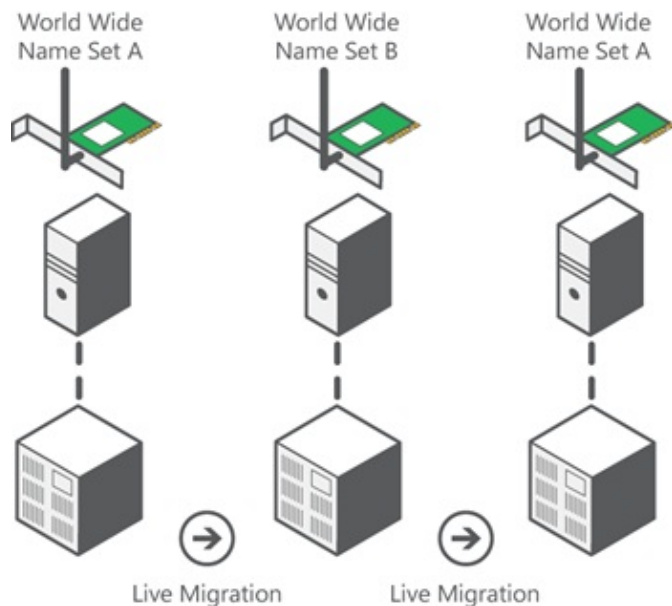
Source: Hyper–V Virtual Fibre Channel Overview

It is important to note that there is a moment of overlap in which both WWPNs are logged in to the fabric.

This guarantees continuous work on the storage without interruption, even in case of migration failure.

The *Verify Live Migration* section shows the flogi database during the live migration process so you can see both WWPNs for the adapter flogi during the process.

Quick Migration

Unlike live migration, quick migration temporarily suspends the VM that is moved.

Due to this, there is no reason to log in both WWPNs from a set. Instead, the VM can log out from one node and log in from a new node.

Verify Live Migration

If everything is configured correctly, you should see a flogi entry in the flogi database for the UCS vHBAs and the VM fibre channel adapters.

```
NEXUS1# show flogi database
--------------------------------------------------------------------------
Interface VSAN    FCID     Port Name                Node Name
--------------------------------------------------------------------------
fc1/31     10     0x930001  50:0a:09:83:8d:80:b7:ae 50:0a:09:80:8d:80:b7:ae
fc1/32     10     0x930000  50:0a:09:84:9d:80:b7:ae 50:0a:09:80:8d:80:b7:ae
San-po31   10     0x930002  24:1f:54:7f:ee:57:1d:c0 20:0a:54:7f:ee:57:1d:c1
San-po31   10     0x930003  20:00:00:25:b5:02:a0:8f 20:00:00:25:b5:02:00:8f <vHBA0-FabricA
San-po31   10     0x930004  20:00:00:25:b5:02:a0:9f 20:00:00:25:b5:02:00:9f
San-po31   10     0x930005  20:00:00:25:b5:02:a0:6f 20:00:00:25:b5:02:00:6f
San-po31   10     0x930006  20:00:00:25:b5:02:a0:7f 20:00:00:25:b5:02:00:7f
San-po31   10     0x930007  20:00:00:25:b5:02:a0:4f 20:00:00:25:b5:02:00:4f
San-po31   10     0x930008  20:00:00:25:b5:02:a0:5f 20:00:00:25:b5:02:00:5f
San-po31   10     0x930009  c0:03:ff:69:d1:5c:00:0e c0:03:ff:00:00:ff:ff:00 <Set A for
Adapter FabricA

NEXUS2# show flogi database
```

```
--------------------------------------------------------------------------------
Interface VSAN    FCID     Port Name                Node Name
--------------------------------------------------------------------------------
fc1/31    11     0x9f0001  50:0a:09:84:8d:80:b7:ae 50:0a:09:80:8d:80:b7:ae
fc1/32    11     0x9f0000  50:0a:09:83:9d:80:b7:ae 50:0a:09:80:8d:80:b7:ae
San-po32  11     0x9f0002  24:20:54:7f:ee:57:1a:80 20:0b:54:7f:ee:57:1a:81
San-po32  11     0x9f0003  20:00:00:25:b5:02:b1:8f 20:00:00:25:b5:02:00:8f <vHBA1-FabricB
San-po32  11     0x9f0004  20:00:00:25:b5:02:b1:9f 20:00:00:25:b5:02:00:9f
San-po32  11     0x9f0005  20:00:00:25:b5:02:b1:6f 20:00:00:25:b5:02:00:6f
San-po32  11     0x9f0006  20:00:00:25:b5:02:b1:7f 20:00:00:25:b5:02:00:7f
San-po32  11     0x9f0007  20:00:00:25:b5:02:b1:4f 20:00:00:25:b5:02:00:4f
San-po32  11     0x9f0008  20:00:00:25:b5:02:b1:5f 20:00:00:25:b5:02:00:5f
San-po32  11     0x9f000b  c0:03:ff:69:d1:5c:00:10 c0:03:ff:00:00:ff:ff:00 <Set A for
Adapter FabricB
```

In order to show the LUN, open the Disk Management in the guest VM, and enter the ***rescan disks*** command. If the LUN appears twice, Multipath I/O (MPIO) is not enabled.

During a live migration, you should see the WWPN for both Address Set A and Address Set B in each of the switches.

```
NEXUS1# show flogi database
--------------------------------------------------------------------------------
Interface VSAN    FCID     Port Name                Node Name
--------------------------------------------------------------------------------
fc1/31    10     0x930001  50:0a:09:83:8d:80:b7:ae 50:0a:09:80:8d:80:b7:ae
fc1/32    10     0x930000  50:0a:09:84:9d:80:b7:ae 50:0a:09:80:8d:80:b7:ae
San-po31  10     0x930002  24:1f:54:7f:ee:57:1d:c0 20:0a:54:7f:ee:57:1d:c1
San-po31  10     0x930003  20:00:00:25:b5:02:a0:8f 20:00:00:25:b5:02:00:8f
San-po31  10     0x930004  20:00:00:25:b5:02:a0:9f 20:00:00:25:b5:02:00:9f
San-po31  10     0x930005  20:00:00:25:b5:02:a0:6f 20:00:00:25:b5:02:00:6f
San-po31  10     0x930006  20:00:00:25:b5:02:a0:7f 20:00:00:25:b5:02:00:7f
San-po31  10     0x930007  20:00:00:25:b5:02:a0:4f 20:00:00:25:b5:02:00:4f
San-po31  10     0x930008  20:00:00:25:b5:02:a0:5f 20:00:00:25:b5:02:00:5f
San-po31  10     0x930009  c0:03:ff:69:d1:5c:00:0e c0:03:ff:00:00:ff:ff:00 <Address Set A
San-po31  10     0x93000a  c0:03:ff:69:d1:5c:00:0f c0:03:ff:00:00:ff:ff:00 <Address Set B

NEXUS2# show flogi database
--------------------------------------------------------------------------------
Interface VSAN    FCID     Port Name                Node Name
--------------------------------------------------------------------------------
fc1/31    11     0x9f0001  50:0a:09:84:8d:80:b7:ae 50:0a:09:80:8d:80:b7:ae
fc1/32    11     0x9f0000  50:0a:09:83:9d:80:b7:ae 50:0a:09:80:8d:80:b7:ae
San-po32  11     0x9f0002  24:20:54:7f:ee:57:1a:80 20:0b:54:7f:ee:57:1a:81
San-po32  11     0x9f0003  20:00:00:25:b5:02:b1:8f 20:00:00:25:b5:02:00:8f
San-po32  11     0x9f0004  20:00:00:25:b5:02:b1:9f 20:00:00:25:b5:02:00:9f
San-po32  11     0x9f0005  20:00:00:25:b5:02:b1:6f 20:00:00:25:b5:02:00:6f
San-po32  11     0x9f0006  20:00:00:25:b5:02:b1:7f 20:00:00:25:b5:02:00:7f
San-po32  11     0x9f0007  20:00:00:25:b5:02:b1:4f 20:00:00:25:b5:02:00:4f
San-po32  11     0x9f0008  20:00:00:25:b5:02:b1:5f 20:00:00:25:b5:02:00:5f
San-po32  11     0x9f000b  c0:03:ff:69:d1:5c:00:10 c0:03:ff:00:00:ff:ff:00 <Address Set A
San-po32  11     0x9f000c  c0:03:ff:69:d1:5c:00:11 c0:03:ff:00:00:ff:ff:00 <Address Set B
```

Troubleshoot

This section provides information you can use in order to troubleshoot your configuration.

Common Problems

- The ***device or driver does not support virtual fibre channel*** message displays under the Status column of a Virtual Fibre Channel SAN in ***Hyper−V Manager > Virtual SAN Manager*** when the

Microsoft Windows 2012 FNIC driver is not at the correct version. Verify the current FNIC driver version by going to **Device Manager > Storage Controllers > Cisco VIC FCoE Storport Miniport > Properties > Driver**. Use the UCS Interoperability Matrix in order to determine which driver is supported based on the blade model, UCS firmware version, and adapter. If necessary, update the driver.

- Under certain conditions, Live Migration fails with the **Synthetic FibreChannel Port: Failed to finish reserving resources** message. A couple of things should be verified:

    - Whether the WWPNs are added at the storage target – initiator groups in NetApp.
    - Whether zoning information accounts for access of both sets of WWPNs assigned to VMs.
    - Whether the latest patches have been applied from Microsoft, whic includes KB 2894032.

- Live migration might fail when the device uses the same pair of HBAs for booting and VM traffic. This is described inUnified Computing System Virtual Machine Live Migration Fails with Virtual Fibre Channel Adapters.
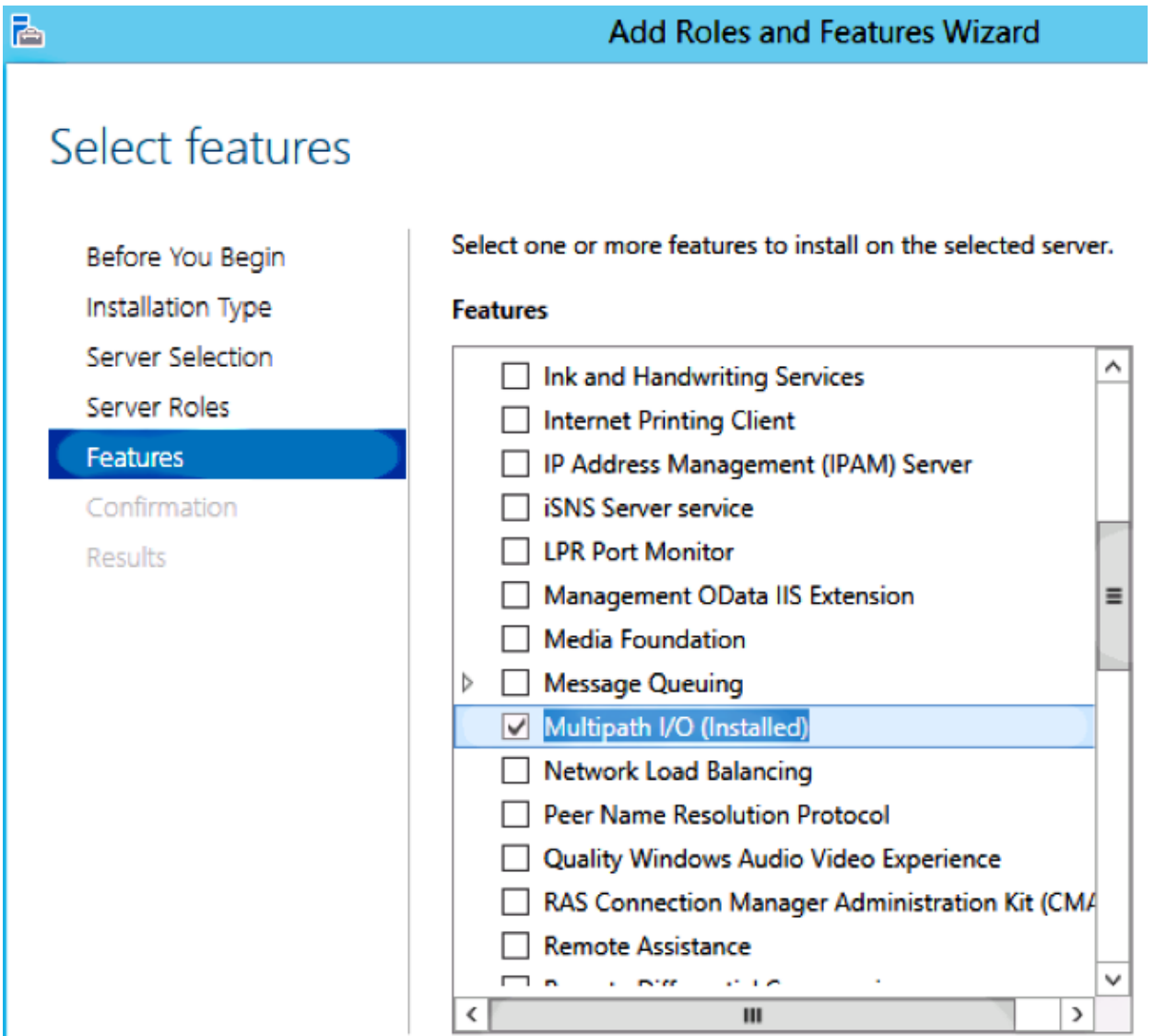
MPIO

For resiliancy and fault tolerance, MultiPath I/O should be enabled on the operating system.

1. Enable Asymmetric Logical Unit Access (ALUA) on the NetApp for a particular initiator group.

2. Enable the MPIO feature on the Microsoft side. From the **Add Roles and Features**, make sure that MPIO is enabled.

Related Information

- *Hyper−V Virtual Fibre Channel Overview*
- *Virtual Machine Live Migration Overview*
- *Technical Support & Documentation − Cisco Systems*

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