



NPIV Setup and Configuration to Virtualize Fibre-channel card on IBM p5

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Product(s) covered:

Abstract: SSPD - With N_Port ID Virtualization (NPIV), you can configure the managed system so that multiple logical partitions can access independent physical storage through the same physical fibre channel adapter. To access physical storage in a typical storage area network (SAN) that uses fibre channel, the physical storage is mapped to logical units (LUNs) and the LUNs are mapped to the ports of physical fibre channel adapters. Each physical port on each physical fibre channel adapter is identified using one worldwide port name (WWPN). NPIV is a standard technology for fibre channel networks that enables you to connect multiple logical partitions to one physical port of a physical fibre channel adapter. Each logical partition is identified by a unique WWPN, which means that you can connect each logical partition to independent physical storage on a SAN.

Solution Scenario Profile Transcription

Feedback Information:

This profile is provided in the hope that the information it contains may save you some work, spark an idea, or provide a helpful contact. It would be a great help, both to the owners of this database and to the people who have taken the time to contribute this information, to know what you find useful. **If you have made some use of the information you find here**, or even if you feel it's likely that you might, we would appreciate it if you could **send a brief note** to one of the addresses below. Please identify this item using its document number and briefly describe how it was useful to you (did it save you time, give you a new idea, provide a useful contact name, point you to other information, etc.). You will find the document number (e.g. TD100999) of this entry at the top of the document, three rows below the main title and just above the document abstract.

Feedback Notes ID: sspd_database/Raleigh/Contr/IBM@IBMUS

Feedback Internet ID: sspd@us.ibm.com

Document Information:

Solution Title: **NPIV Setup and Configuration to Virtualize Fibre-channel card on IBM p5**

This profile describes a solution created by IBM for test or demonstration purposes. The solution as documented here has been tested and demonstrated to work as expected.

Solution Source: **Other**

SSPD ID: **SSPD-SPUA-7VN8KA**

Customer Profile:

The following information is intended to provide insight into the nature of the customer involved in this solution.

Customer Annual Revenue:

Number of Employees:

Industry:
Customer's Business:

General Solution Description:

IBM Revenue: (in US\$)

Solution Industry: Cross-Industry

Market Play: Cross-Industry

eBusiness On Demand: Cross-Industry

General Solution Description and Overview:

SSPD -Problem Addressed By Solution:

With N_Port ID Virtualization (NPIV), you can configure the managed system so that multiple logical partitions can access independent physical storage through the same physical fibre channel adapter

Solution Components:

IBM p5/p6 server, HBA card supporting NPIV, VIO enabled LPAR

How Solution Components Operate Together to Address Problem:

To access physical storage in a typical storage area network (SAN) that uses fibre channel, the physical storage is mapped to logical units (LUNs) and the LUNs are mapped to the ports of physical fibre channel adapters. Each physical port on each physical fibre channel adapter is identified using one worldwide port name (WWPN). NPIV is a standard technology for fibre channel networks that enables you to connect multiple logical partitions to one physical port of a physical fibre channel adapter. Each logical partition is identified by a unique WWPN, which means that you can connect each logical partition to independent physical storage on a SAN.

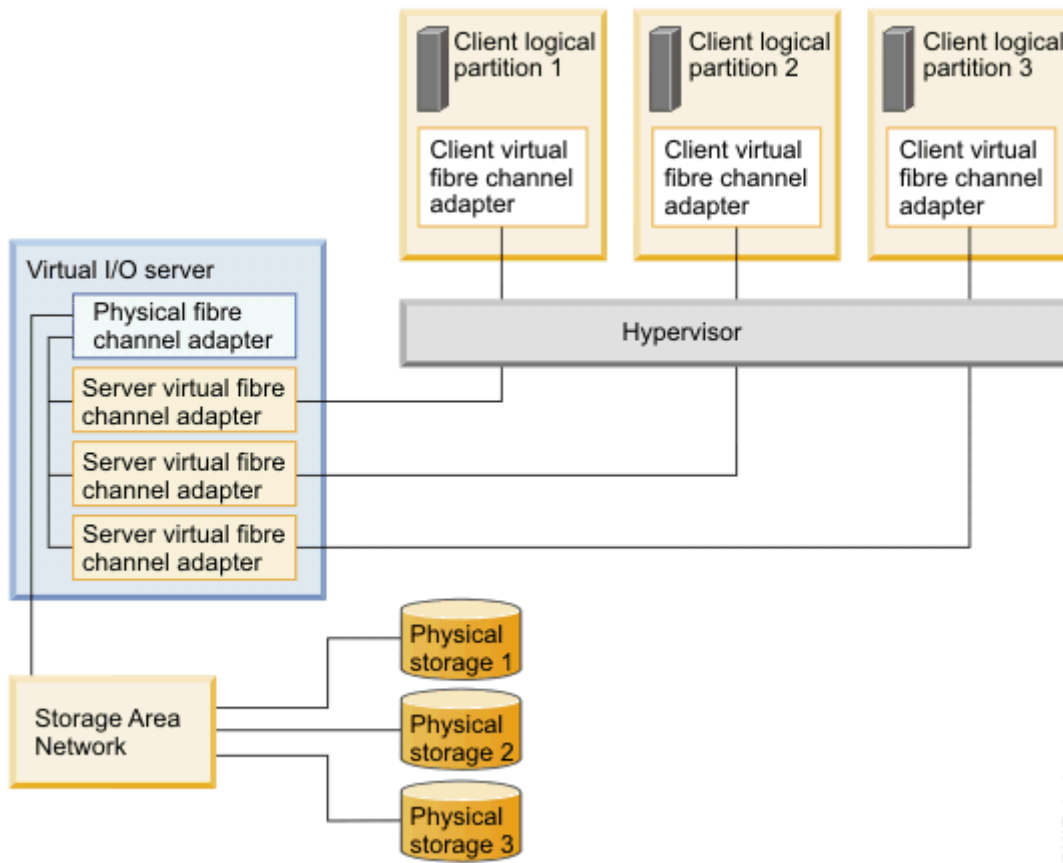
Business Value of Solution:

a) Saves on cost, as a single HBA can be shared among multiple LPARs on a server.

Infrastructure Solution: Yes: IT Optimization

ISRA Used:

Solution Diagrams:



Work Products:
Relative URLs:
Attachments:

Methods Used: No

General Operational Characteristics:

Size single physical HBA card can be virtualized to multiple hosts

Type of Traffic

Usage

Performance & Capacity

Scalability horizontally, by adding more HBAs in a single server.

Availability More than 1 HBA can be used to provide redundancy

Security

Detailed Product/Platform/Logical Implementation Block Descriptions:

Logical Implementation Block Name *NPIV Setup and Configuration to Virtualize Fibre-channel card on IBM p5*

Main function of this logical implementation block

Host

Types of data stored or manipulated in this block

Actions performed on the data in this block

Operating System(s) used:

AIX, Linux

Hardware used:

IBM p6 server

Software Products used:

AIX 6.1 and VIOS 2.1

Attached Documentation:

The following additional documentation contains more complete details about the solution. Please ensure that it does not contain the details you need before contacting the person named in the Contact Information section.



NVIP.pdf

Attachment Language is: **English**

Contact Information:

For additional information about the solution described in this profile, you may contact the person described below. Before contacting this person, ensure that the details you are seeking are not contained within any documentation described above:

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Classification: Hardware; Software

Category: Planning and Design

Platform(s): Cross-Platform

O/S: AIX; Linux

Keywords: SSPD Solution Scenario Profile

NPIV Setup and Configuration to Virtualize Fibre-channel card on IBM p5

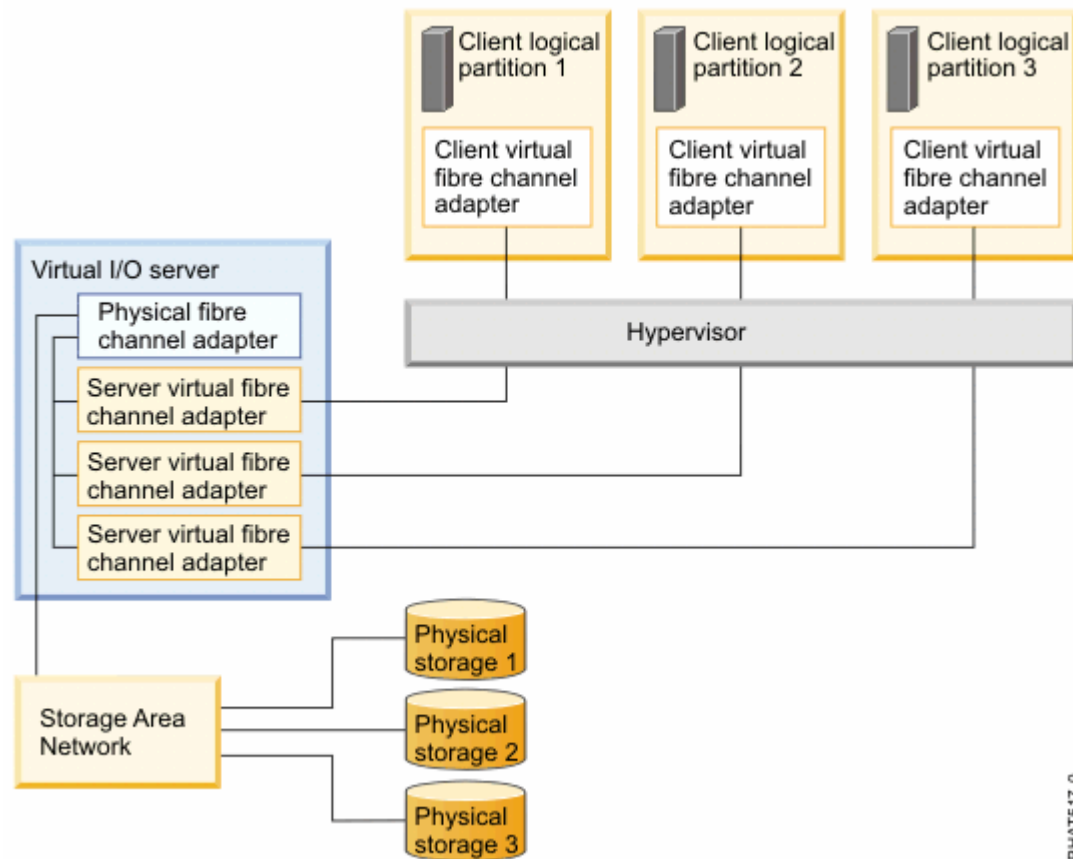
Summary

With N_Port ID Virtualization (NPIV), you can configure the managed system so that multiple logical partitions can access independent physical storage through the same physical fibre channel adapter.

To access physical storage in a typical storage area network (SAN) that uses fibre channel, the physical storage is mapped to logical units (LUNs) and the LUNs are mapped to the ports of physical fibre channel adapters. Each physical port on each physical fibre channel adapter is identified using one worldwide port name (WWPN).

NPIV is a standard technology for fibre channel networks that enables you to connect multiple logical partitions to one physical port of a physical fibre channel adapter. Each logical partition is identified by a unique WWPN, which means that you can connect each logical partition to independent physical storage on a SAN.

The figure below illustrates a managed system configured to use NPIV :-



Requirements

You can configure virtual fibre channel adapters on client logical partitions that run the following operating systems:

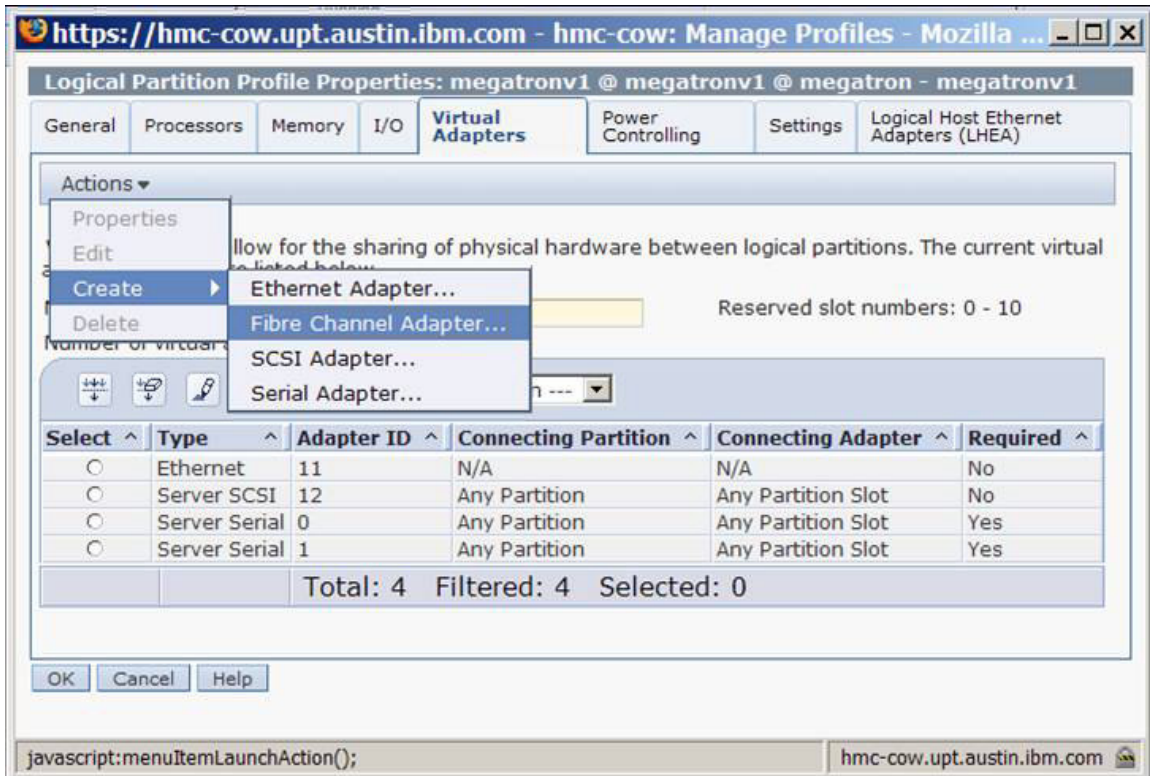
- AIX® version 6.1 Technology Level 2, or later
- AIX 5.3 Technology Level 9
- SUSE Linux® Enterprise Server 11, or later

Configuring Virtual fibre channel for HMC-Managed systems

This section describes the steps to create a virtual fibre channel adapter on a p5 LPAR

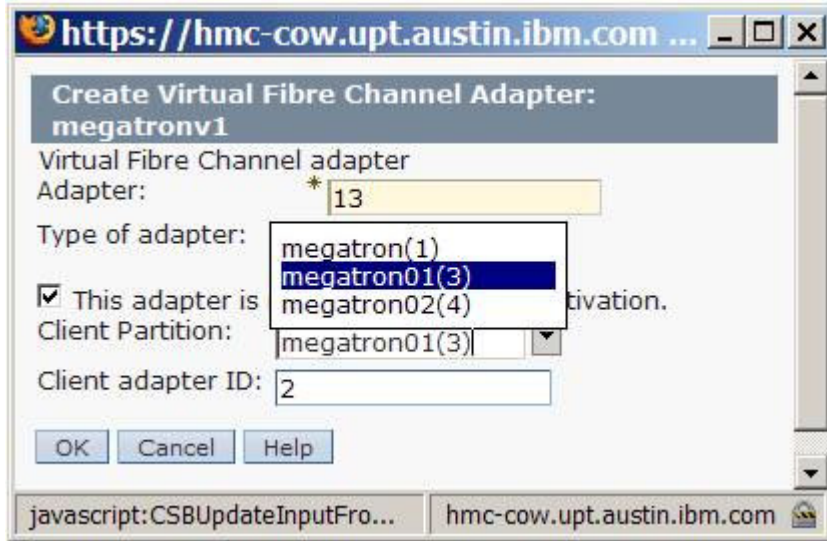
Creating a VFC host adapter on the VIO Server

- Select the VIOS and edit the profile
- Go to the "Virtual Adapters" Tab
 - Select 'Actions > Create > Fibre Channel Adapter'



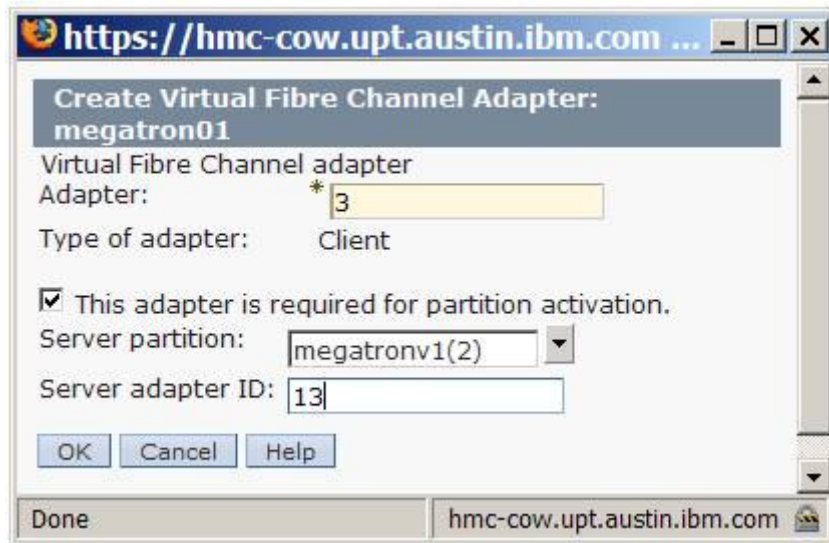
- The type of adapter is "Server" since this is being created on the VIOS.
- Put a 'check' in the box if the adapter is required at the time of partition activation.
 - You would need this box marked if you are using the adapter for SAN boot. I would recommend always checking it.
- Select the client partition you want this Server adapter to be associated with.
- Take a note of the assigned Server Adapter ID (13) and the Client Adapter ID (2). You will need to know this information when you create the client adapter.
 - *If the VIO server is already active you will not be able to modify the adapter ID info in the profile once it has been created. Because of this you will need to first check the client for available virtual adapter ID's then when you create the VIO server adapter specify that available ID for the client adapter ID.*
- Select 'OK' to create

You now have a Virtual Fibre Channel (VFC) host adapter created. The next step is to go to your client partition and create a Virtual Fibre Channel client adapter which will be associated with the VFC host adapter.



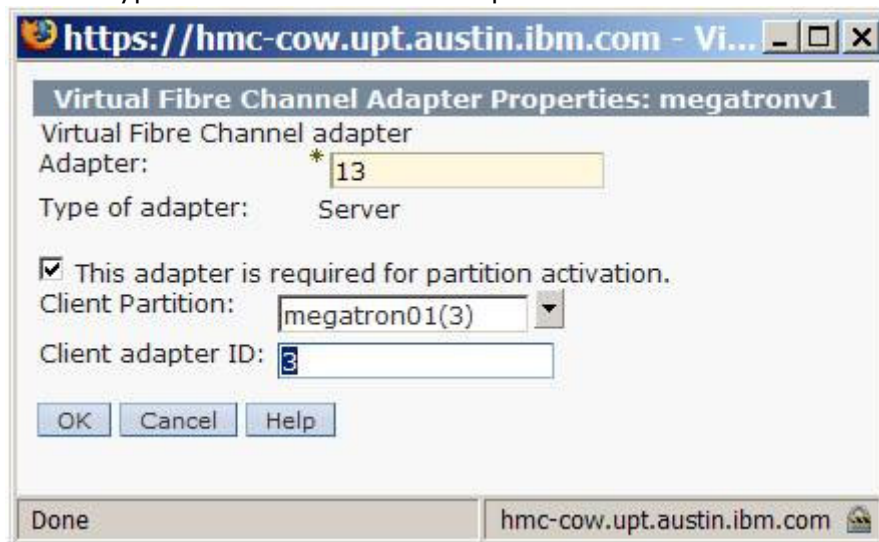
Creating a VFC client adapter on the VIO Client

- From the Client Partition that you selected to use when creating the VFC host adapter in the previous steps, go to the "Virtual Adapters" tab then select 'Actions > Create > Fibre Channel Adapter..
- You will see that the next available Virtual Adapter ID on the the client is "3".
- - When we created the VFC host adapter the value was set to "2" for the client adapter ID. So you will have to go back and change the VFC host adapter after the VFC client adapter has been created so the client ID matches.
- Put a 'check' in the box if the adapter is required at the time of partition activation.
 - You would need this box marked if you are using the adapter for SAN boot. I would recommend always checking it.
- Select the Server partition which has the VFC host adapter that this VFC client adapter will be associated with.
- Change the Server Adapter ID to match the Server Adapter ID that you took note of when creating the VFC host adapter. In this case it was "13".
- Select "OK" to create



Linking the VFC host and VFC client adapters

- Now back on the VIO Server Partition, Edit the profile and go back to the "Virtual Adapters" tab, select 'Actions > Edit > Fibre Channel Adapter..
- You will see that the Client Adapter ID is set to "2". We need to change this to match the adapter ID that was assigned when creating the Client Adapter which was "3".
- Type in the Actual Client Adapter ID and Select "OK" to complete the change.



Virtual Fibre Channel Adapter Verification

In the image below is what you should see from both the VIO Server and the Client Partition Profiles.

You see the Server has a "Server Fibre Channel Adapter with and ID of "13", Connecting Partition of "megatron01, and Connecting Adapter of "3"
Then from the Client you will see the Client has a "Client Fibre Channel Adapter" with an ID of "3", a Connecting Partition of "megatronv1", and a Connecting Adapter of "13".

- VIO Server:

Select ^	Type ^	Adapter ID ^	Connecting Partition ^	Connecting Adapter ^	Required ^
<input type="radio"/>	Ethernet	11	N/A	N/A	No
<input checked="" type="radio"/>	Server Fibre Channel	13	megatron01(3)	3	Yes
<input type="radio"/>	Server SCSI	12	Any Partition	Any Partition Slot	No
<input type="radio"/>	Server Serial	0	Any Partition	Any Partition Slot	Yes
<input type="radio"/>	Server Serial	1	Any Partition	Any Partition Slot	Yes

- VIO Client:

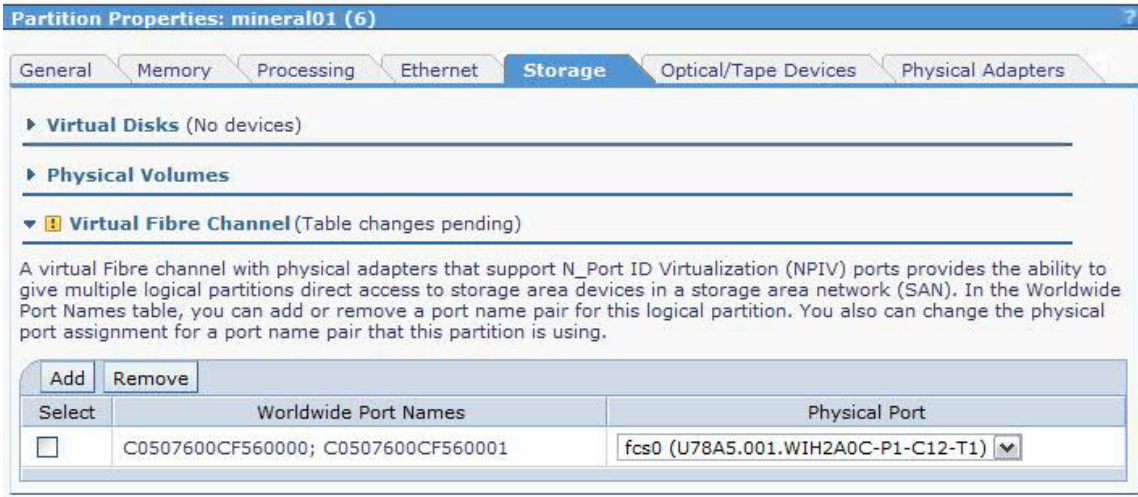
Select ^	Type ^	Adapter ID ^	Connecting Partition ^	Connecting Adapter ^	Required ^
<input type="radio"/>	Ethernet	2	N/A	N/A	Yes
<input checked="" type="radio"/>	Client Fibre Channel	3	megatronv1(2)	13	Yes
<input type="radio"/>	Server Serial	0	Any Partition	Any Partition Slot	Yes
<input type="radio"/>	Server Serial	1	Any Partition	Any Partition Slot	Yes

Total: 4 Filtered: 4 Selected: 1

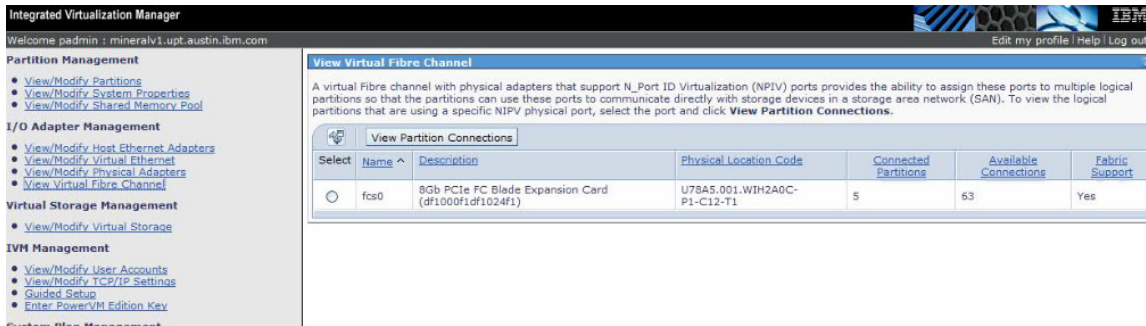
Creating VFC client adapter on the IVM Client

NOTE: For IVM systems you do not need to create the server adapter and link the server and client adapters yourself. The IVM interface takes care of these two steps for you when you create the client adapter

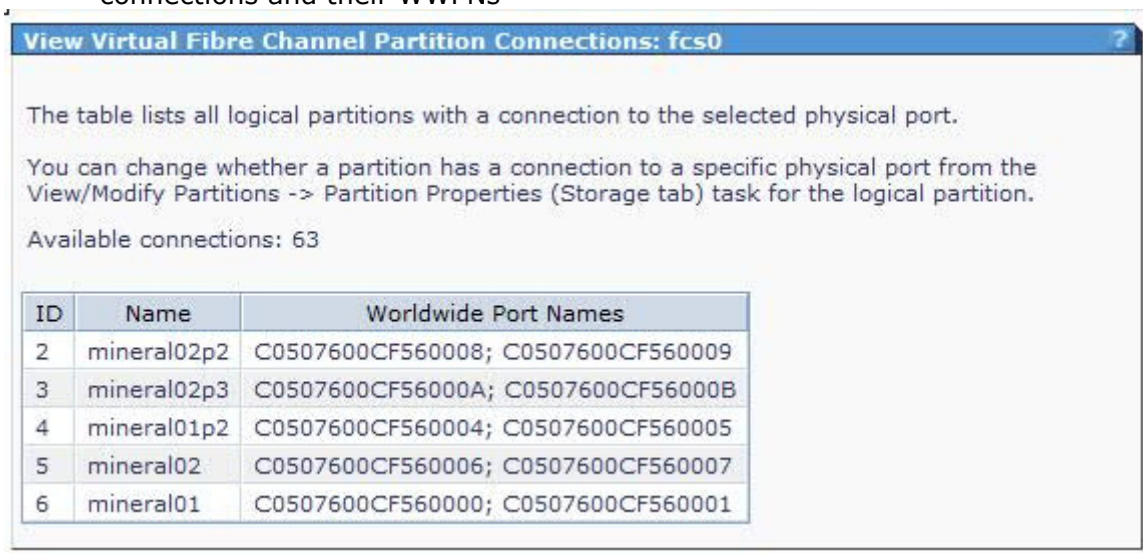
- Open the client properties window. Remember there is no profile for IVM partitions. Click on the "Storage" tab. Find and expand the "Virtual Fibre Channel" section.
- If there is not already an entry showing "Automatically generate" under the WWPN column, click on "Add"
- Select the new entry, and under the "Physical Port" column select the physical adapter, click ok
- After the adapter has been created, you should see the new WWPNs under the "Worldwide Port Names" column



- To verify connections and look up client WWPNs, click on the "View Virtual Fibre Channel" option from the main menu



- You can see each physical adapter and their connections. Select the adapter and click on "View Partition Connections" to bring up the list of client connections and their WWPNs



Mapping the VFC Host Adapter to Physical FC Port

In the previous steps we created the virtual fibre channel adapters however they are not yet associated with any physical fibre channel adapter / port. So the next step is to associate the VFC host adapter on the VIO Server with a physical fibre channel adapter port enabling the vfc host adapter to log into the SAN.

- Verify the VFC adapters are "Available" on the VIOS


```
$ ioscli lsdev -dev vfchost*
name          status  description
vfchost0      Available Virtual FC Server Adapter
```
- Show current VFC mappings to physical (In this example the vfchost has no mappings as indicated by the "NONE")


```
$ ioscli lsdev -dev vfchost0 -attr
map_port NONE N/A      True
```
- Display the physical fibre channel adapters (You will decide which adapter / port to use based on how you setup you switch zoning and Storage allocation plan)

```
$ ioscli lsdev -dev fcs*
name          status  description
fcs0          Available 8Gb PCI Express Dual Port FC Adapter
(df1000f114108a03)
```

fcs1 Available 8Gb PCI Express Dual Port FC Adapter
(df1000f114108a03)

- Map the virtual fibre channel adapter to the physical fibre channel adapter on the VIOS

```
$ ioscli vfcmap -vadapter "VFCServerAdapter" -fcp "FCPName"
```

Example: ioscli vfcmap -vadapter vfchost0 -fcp fcs0

- Show the VFC mapping to the physical fibre channel adapter

```
ioscli lsdev -dev vfchost0 -attr  
map_port fcs0 N/A True
```

WWPN, Allocations and Zoning Info

When you do your storage allocations you will be allocating the storage directly to the WWPN of the VFC client adapter.

If you are attempting to SAN boot, or do Storage allocations prior to the VIO client partition is activated you can display the VFC client adapter WWPN via the HMC with the following steps.

- Go to the Client Partition profile and select edit > Select the Virtual Adapters Tab > Highlight the VFC adapter > Select 'Actions' > Properties

As shown in the picture below, each VFC client adapter will have 2 WWPN's. When allocating storage you should use the first WWPN in the list. The second WWPN is to be used when performing Partition Migrations (discussed later in this doc).



If the VIO client is booted run the following command to display the active WWPN for the VFC client adapter:

```
$ lscfg -vl fcsX <-- where X is the adapter number  
Network Address.....C05076002A7D0000
```