Nexus 1000V and HP's Virtual Connect

June 2010

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Agenda

- Cisco Nexus 1000V with HP's Virtual Connect (Flex-10)
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  - Logical (Virtualized) Topologies
- Sample Environment 1 (Nexus 1000V)
  - 2 FlexNIC Configuration
  - Virtual Connect Network Configuration
  - Server Profile Configuration
  - Nexus 1000V Configuration
- Sample Environment 2 (Nexus 1000V)
  - 4 FlexNIC Configuration
  - Virtual Connect Network Configuration
  - Server Profile Configuration
  - Nexus 1000V Configuration
- Advance Configurations
  - Configuration of vPC of Nexus 5000 with Flex-10

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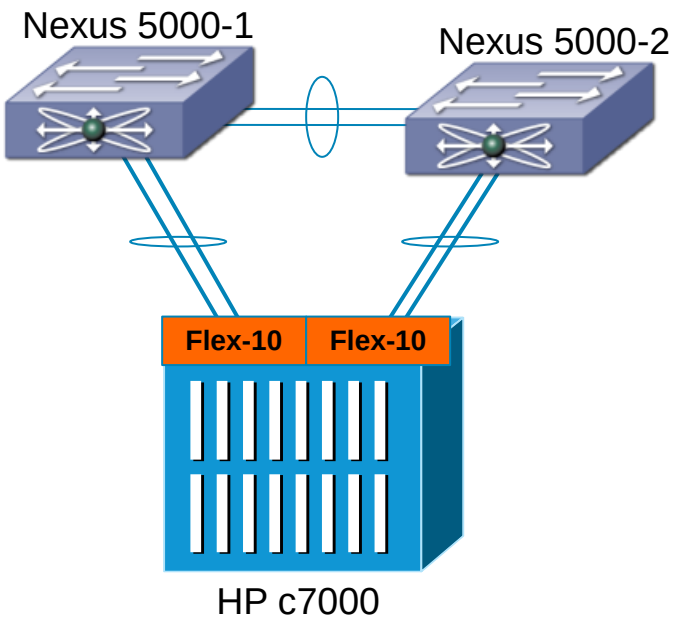
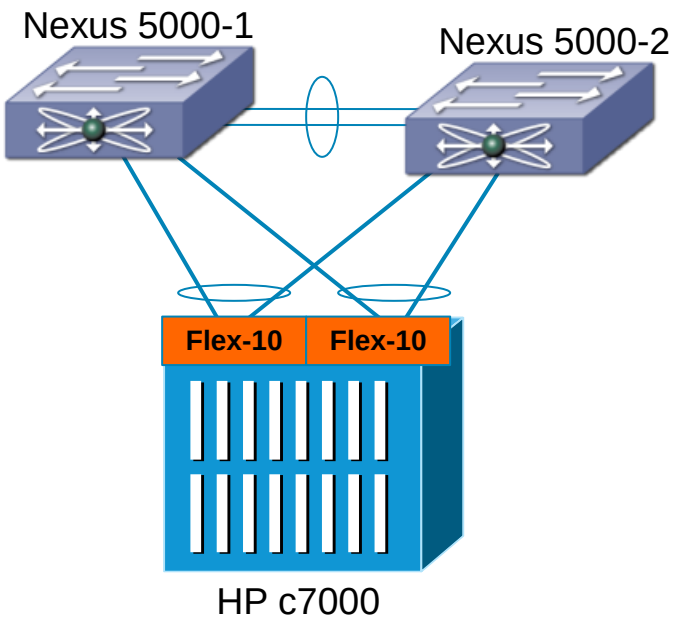
Flex-10 with Nexus 5000 Physical Topologies

Single-homed Flex-10 to Nexus 5000 Connectivity (non-vPC)



Dual-homed Flex-10 to Nexus 5000 Connectivity (vPC)



- Both topologies are supported
- vPC provides additional redundancy upstream in case a single upstream switch fails
- non-vPC has simpler network flow for easier troubleshooting, since HPVC does not provide much troubleshooting tools and upstream switch does not have much visibility into Flex-10 in a virtualized environment

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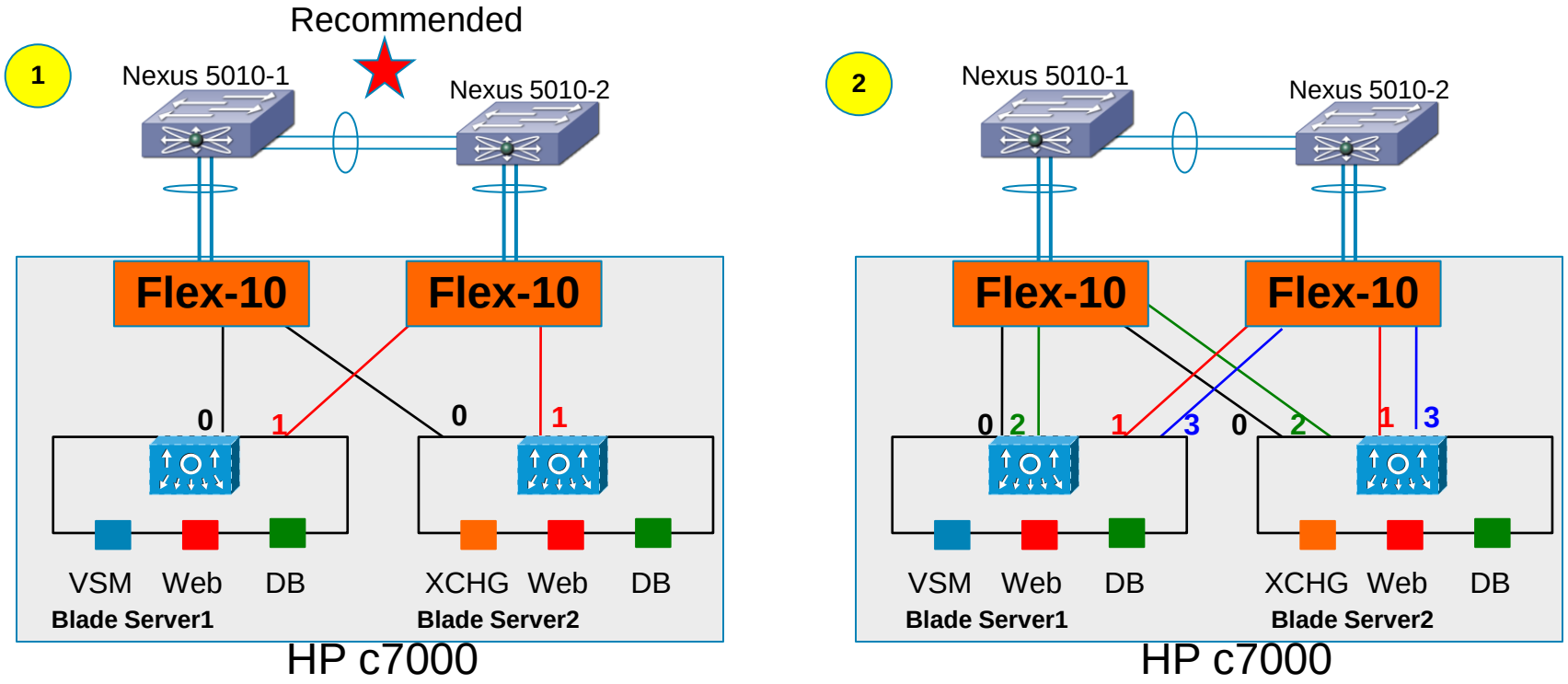
Nexus 1000V Logical with FlexNIC Topology



Type of Traffic	Option 1	Option 2
Service Console (mgmt), vmotion, vmkernel, FT, Control, Packet	vmnic0 &vmnic1	vmnic0 & vmnic1
VM Data	vmnic0 & vmnic1	vmnic2 & vmnic3

Note: All traffic of the VMs, including vmotion, vmkernel and the VSM are behind the VEM.

- **Option 1:** is recommended and is the most simplest to manage.
- **Option 2:** provides additional separation for certain traffic utilizing HPVC FlexNIC technology.

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Test Environment Firmware

- Nexus 5000
  - Nexus 5010 hardware
  - Firmware 4.2(1)N1(1) - DeeWhy
- HP c7000 Chassis
  - HP Onboard Administrator – version 2.60
  - HP Virtual Connect – version 2.32
  - BL490c G6 blade server
    - iLO version1.81
    - Power Management version 3.4
- VMware ESX Server
  - VMware ESX version 4.0 Update 1 (build 208167)
  - Broadcom LOM
    - driver (bnx2x) version 1.52.12 v40.3
    - firmware-version: bc 5.0.11
- Nexus 1000V
  - Version 4.0(4)SV1(3)

Note: Previous deployments of Nexus 1000V and HPVC were working in earlier versions. As new version of code come from the above components (N5K, HPVC, VMware, and N1KV), Cisco continues to work closely with VMware but have little control on HPVC and what proper firmware for the overall HP c7000 chassis should be at. As new code arises from Cisco, we will continue to make sure the things work properly. Again, we will not have much control if new firmware from HP arises and may break this solution.

The above firmware was used in this environment and would suggest upgrading to these firmware for all of the above components.

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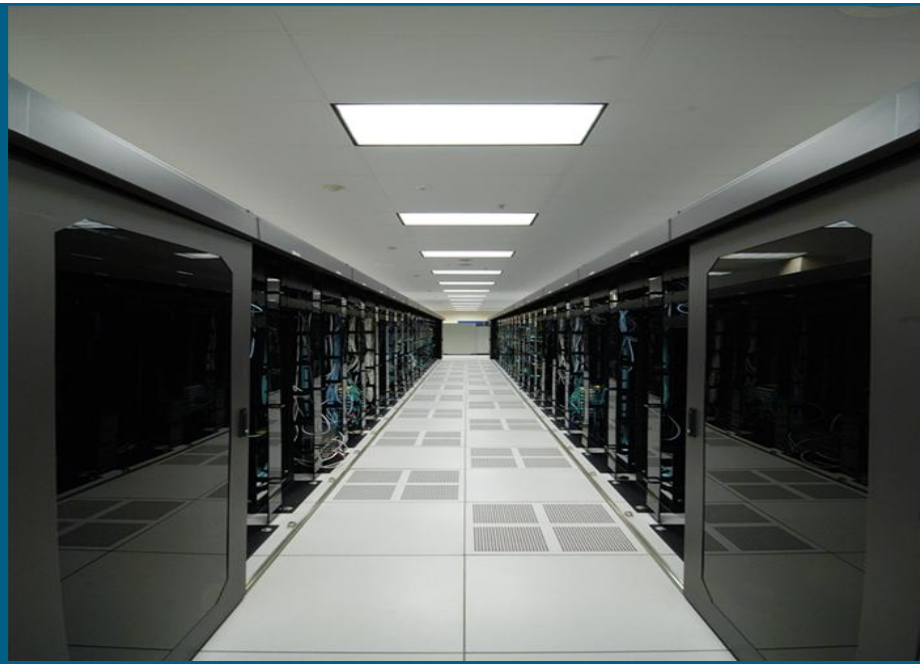
Sample Environment 1



2 FlexNICs – Nexus 1000V Only

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Sample Environment 1 - Topology

VLAN Mappings

- Management (Service Console) → 182
- vmkernel (shared IP storage) → 100
- vmotion → 101
- Control & Packet → 200
- VM Data → 301-305

HPVC Shared Uplink Set

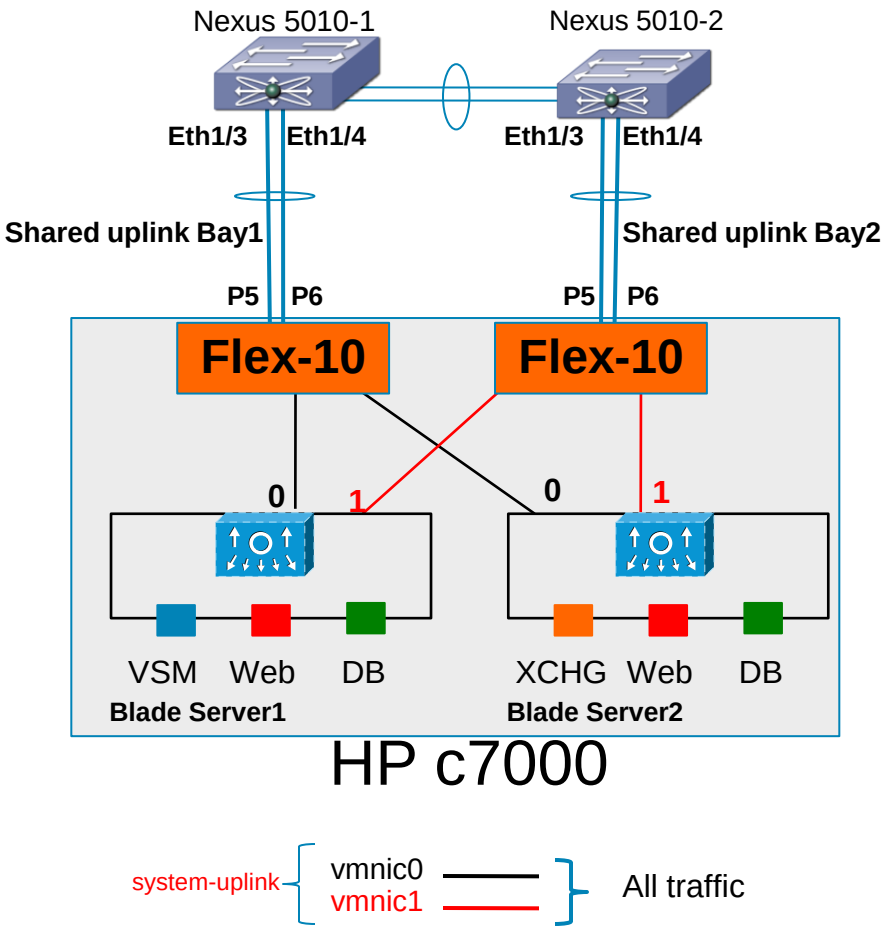
- Need to provide all vlans to traverse uplinks
- Recommended to name “uplink” set with particular naming convention to recognize the vlan traversing which uplink set.
- HPVC “vlan mapping” was used but refer to HP’s documentation on differences between “tunneling” and “vlan mapping”

HPVC Server Profile

- Create only 2 FlexNIC (default)
- FlexNIC1 is “pinned” to Flex-10 on Bay1
- FlexNIC2 is “pinned” to Flex-10 on Bay2
- When assigning the network to the FlexNIC, select “multiple networks” and choose the “Shared Uplink Set” that corresponds to the correct FlexNIC. Then “check” all the vlans.

Nexus 1000V Port-Profile

- Configure system-uplink as vPC-HM with mac-pinning
- Create port-profile for “vsm-control-packet” so that VSM can be behind VEM
- Create port-profiles service-console, ip-storage (vmkernel), vmotion as to migrate to Nexus 1000V control



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Nexus 5010-1 Configuration

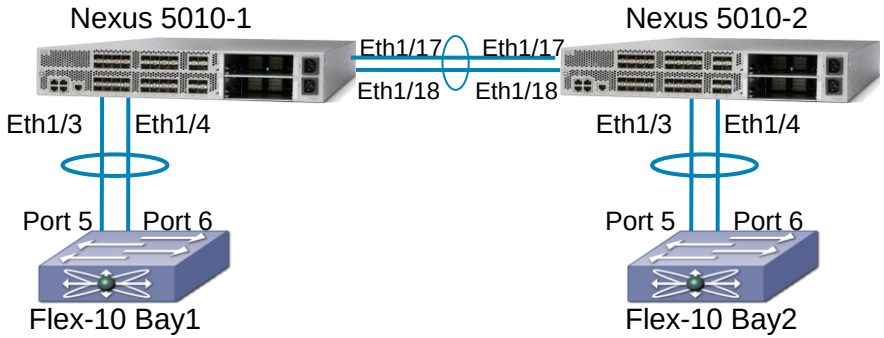
Nexus 5010-1 (Flex-10 Bay1)

```
n5k-1# show running-config interface ethernet 1/3-4
version 4.2(1)N1(1)

interface Ethernet1/3
  description "HP Chassis Flex-10 Bay1 - Port5"
  switchport mode trunk
  switchport trunk native vlan 182
  spanning-tree port type edge trunk
  speed 10000
  channel-group 200 mode active

interface Ethernet1/4
  description "HP Chassis Flex-10 Bay1 - Port6"
  switchport mode trunk
  switchport trunk native vlan 182
  spanning-tree port type edge trunk
  speed 10000
  channel-group 200 mode active

n5k-1# show running-config interface port-channel 200
version 4.2(1)N1(1)

interface port-channel200
  switchport mode trunk
  switchport trunk native vlan 182
  spanning-tree port type edge trunk
```

N5K-1 & N5K-2 Port-Channel

```
n5k-1# show running-config interface ethernet 1/17-18
version 4.2(1)N1(1)

interface Ethernet1/17
  switchport mode trunk
  channel-group 1 mode active

interface Ethernet1/18
  switchport mode trunk
  channel-group 1 mode active

n5k-1# show running-config interface port-channel 1
version 4.2(1)N1(1)

interface port-channel1
  switchport mode trunk
```

Note: HPVC Flex-10 supports LACP, so configure the Nexus 5000 interfaces to channel-group mode “active” that are connected to the Flex-10 in the Port-Channel



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Nexus 5010-2 Configuration

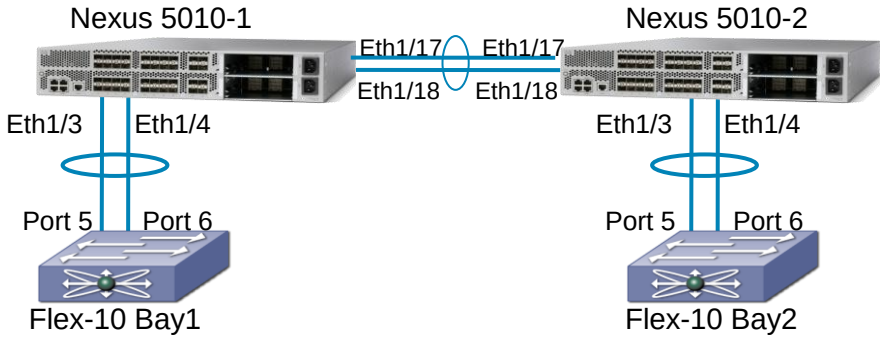
Nexus 5010-2 (Flex-10 Bay2)

```
n5k-2# show running-config interface ethernet 1/3-4
version 4.2(1)N1(1)

interface Ethernet1/3
  description "HP Chassis Flex-10 Bay1 - Port5"
  switchport mode trunk
  switchport trunk native vlan 182
  spanning-tree port type edge trunk
  speed 10000
  channel-group 200 mode active

interface Ethernet1/4
  description "HP Chassis Flex-10 Bay1 - Port6"
  switchport mode trunk
  switchport trunk native vlan 182
  spanning-tree port type edge trunk
  speed 10000
  channel-group 200 mode active

n5k-2# show running-config interface port-channel 200
version 4.2(1)N1(1)

interface port-channel200
  switchport mode trunk
  switchport trunk native vlan 182
  spanning-tree port type edge trunk
```

N5K-2 & N5K-1 Port-Channel

```
n5k-2# show running-config interface ethernet 1/17-18
version 4.2(1)N1(1)

interface Ethernet1/17
  switchport mode trunk
  switchport trunk allowed vlan 1-3967,4048-4093
  channel-group 1 mode active

interface Ethernet1/18
  switchport mode trunk
  switchport trunk allowed vlan 1-3967,4048-4093
  channel-group 1 mode active

n5k-2# show running-config interface port-channel 1
version 4.2(1)N1(1)

interface port-channel1
  switchport mode trunk
  switchport trunk allowed vlan 1-3967,4048-4093
```

Note: HPVC Flex-10 supports LACP, so configure the Nexus 5000 interfaces to channel-group mode “active” that are connected to the Flex-10 in the Port-Channel



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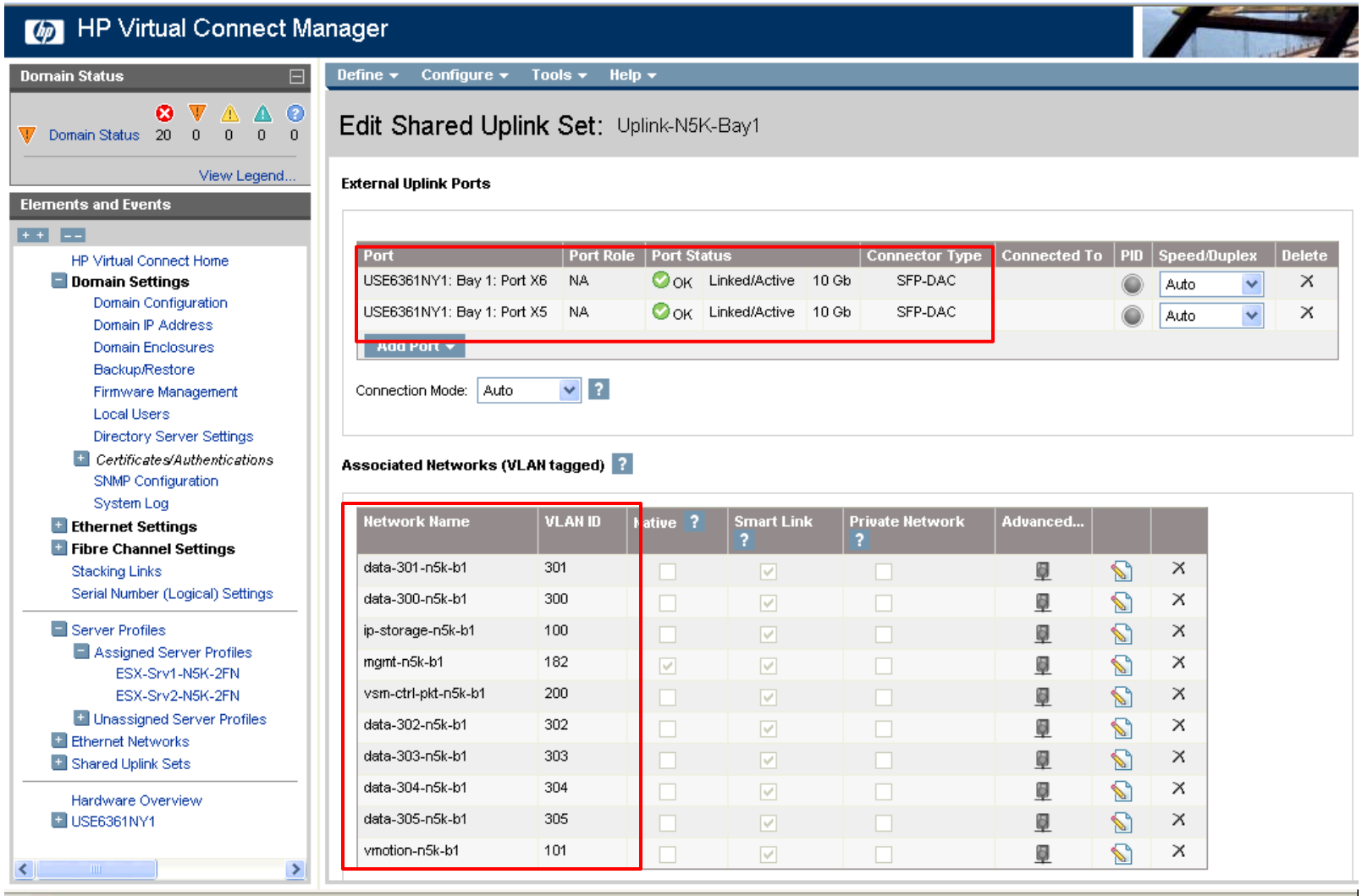
HPVC Flex-10 - Shared Uplinks Bay 1

Within Virtual Connect Manager, create a “Shared Uplink Set”

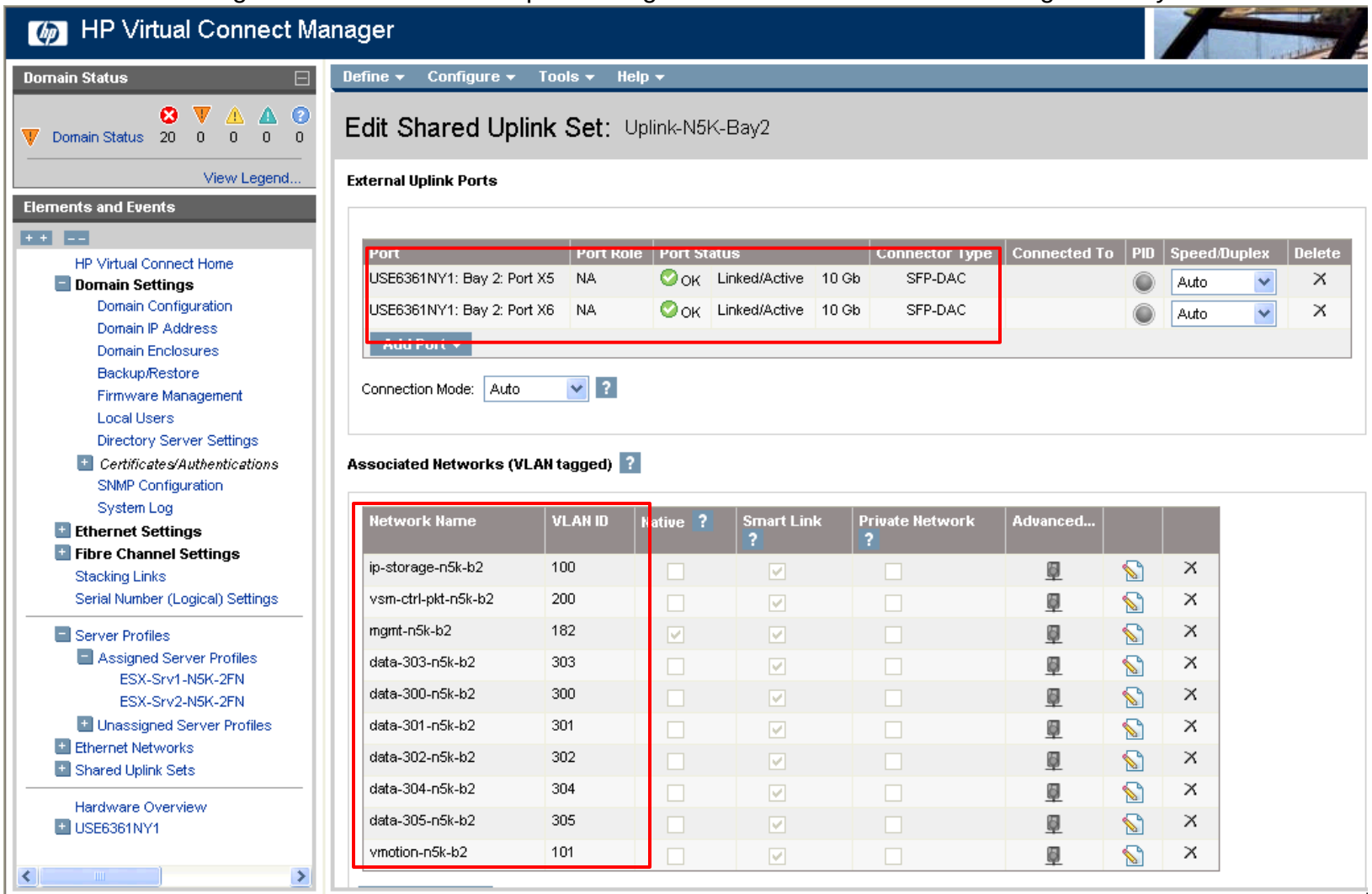
- Name: “Uplink-N5K-Bay1”
- Added Port X5 and Port X6 to Uplink Set
- Note the “Associated Networks (VLAN tagged)” that is created to traverse this Shared Uplink
- Note the naming of the network has unique naming so that it defines that it is coming from Bay1



HPVC Flex-10 - Shared Uplinks Bay 2

Within Virtual Connect Manager, create a “Shared Uplink Set”

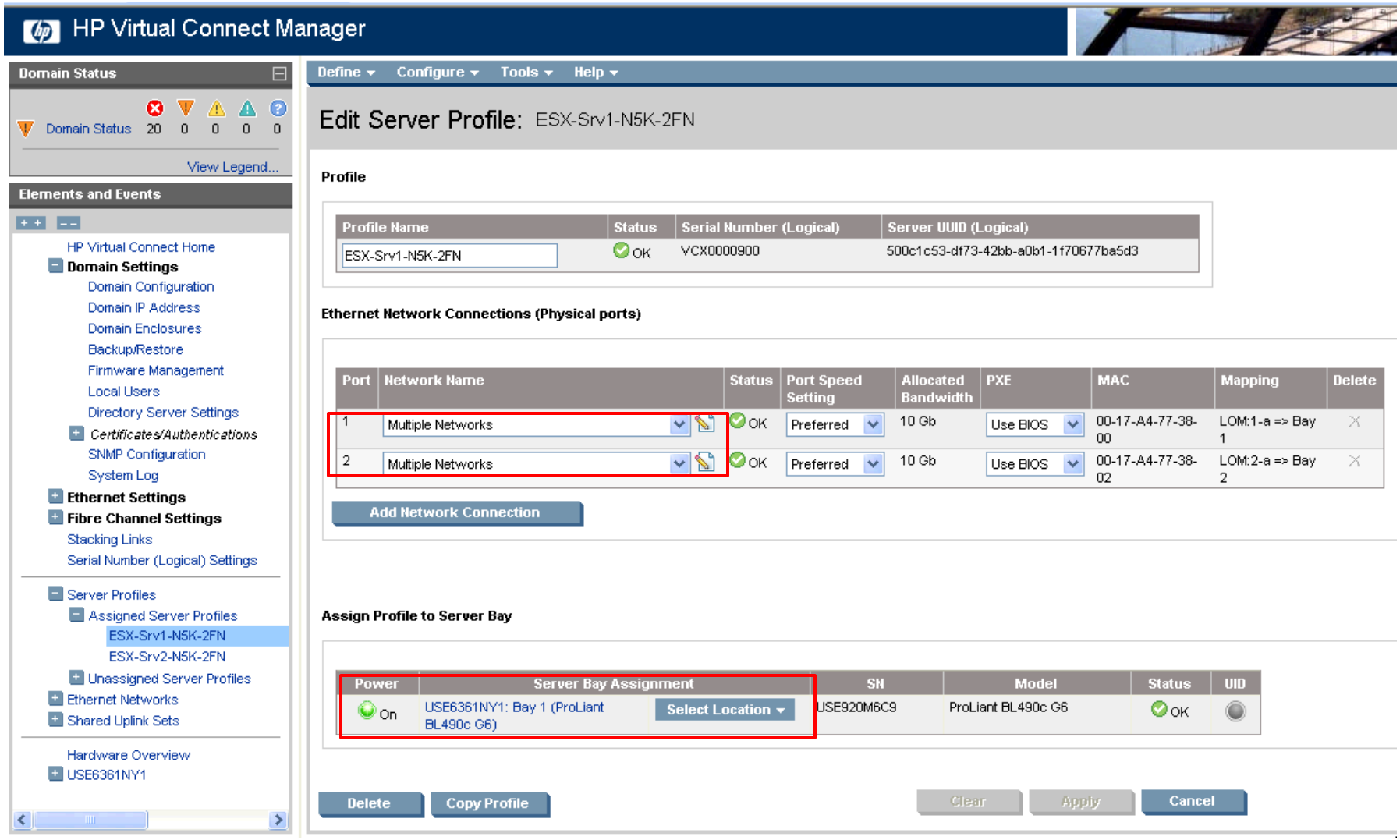
- Name: “Uplink-N5K-Bay2”
- Added Port X5 and Port X6 to Uplink Set
- Note the “Associated Networks (VLAN tagged)” that is created to traverse this Shared Uplink (should be same as “Uplink-N5K-Bay1”
- Note the naming of the network has unique naming so that it defines that it is coming from Bay 2



Server Profiles – Blade Server1 (2 FlexNICs)

In Virtual Connect, creation of a “Server Profile” defines a few parameters is needed for this example

1. Ethernet Network - how many FlexNICs and which VLAN(s) those FlexNICs will be using
2. Assign Profile – Binds this Server Profile to a particular Blade Server in the chassis



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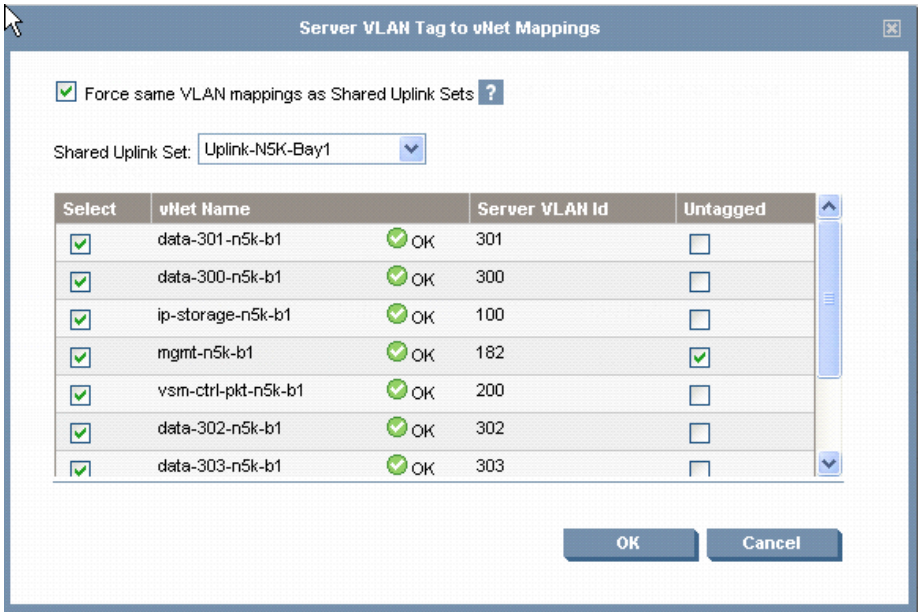
Blade Server1 – FlexNIC "Network" settings

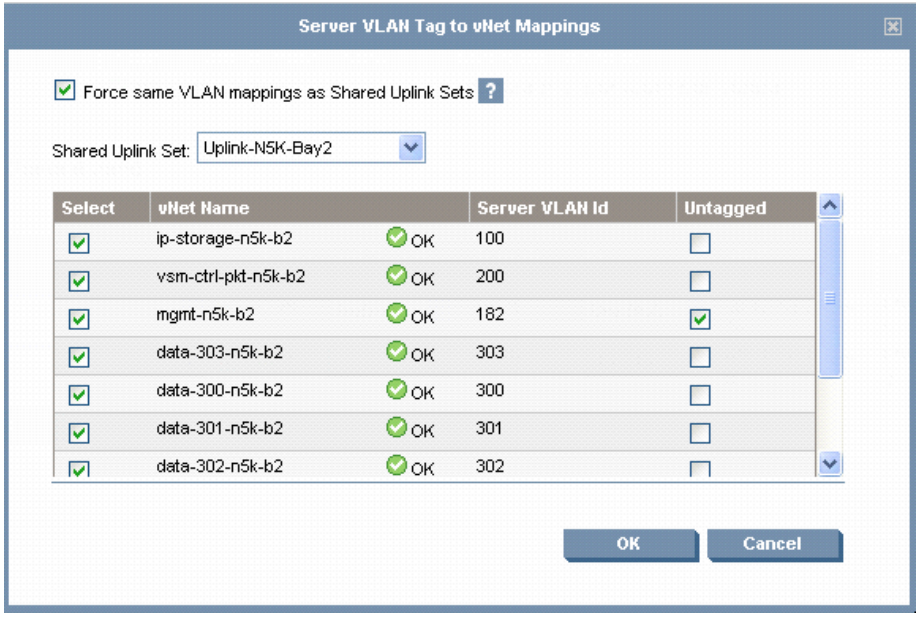
The FlexNIC will need to be configured for "Multiple Networks", use the following to enable the vlans for this FlexNIC

- Click "Force same VLAN mappings as Shared Uplink Sets" to use these networks
- Check all the vlans to allow them to be enabled for the FlexNIC
- Note that "untagged" packets will be tagged for "mgmt-n5k-b1" vlan (vlan 182) – this is used if "Service Console" is set to "vlan 0"

FlexNIC – Port 1



FlexNIC – Port 2



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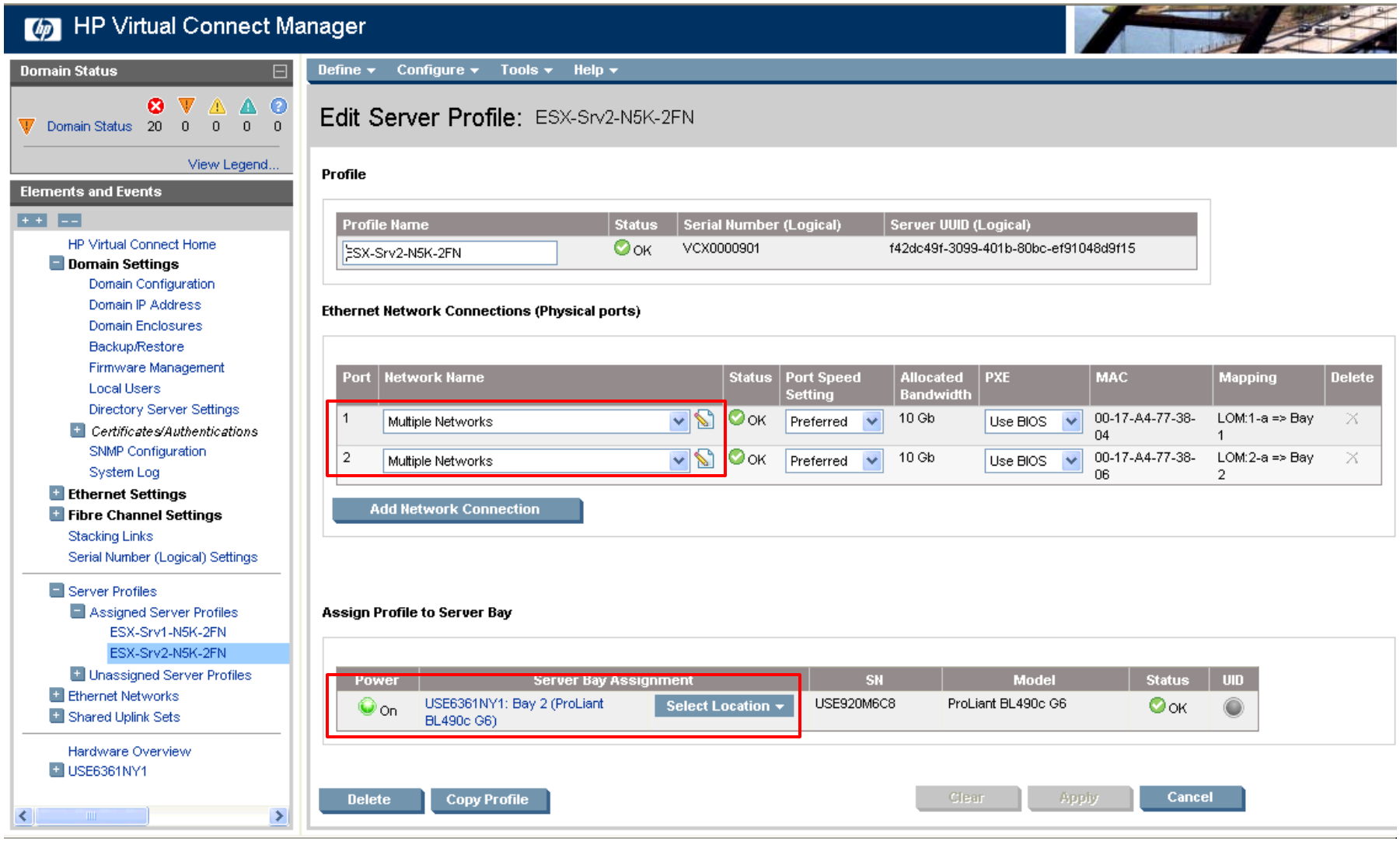
Server Profiles – Blade Server2 (2 FlexNICs)

In Virtual Connect, creation of a “Server Profile” defines a few parameters is needed for this example
1. Ethernet Network - how many FlexNICs and which VLAN(s) those FlexNICs will be using
2. Assign Profile – Binds this Server Profile to a particular Blade Server in the chassis



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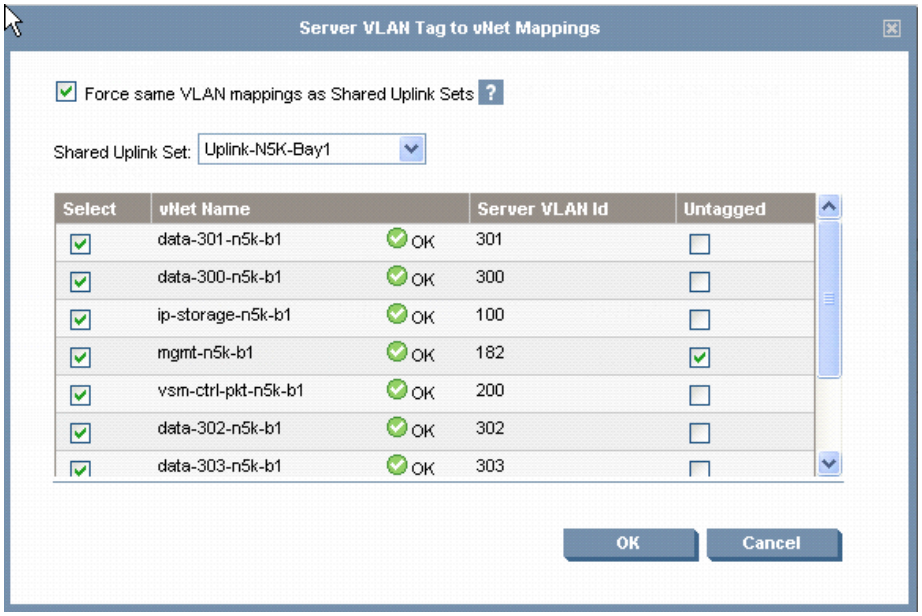
Blade Server2 – FlexNIC "Network" settings

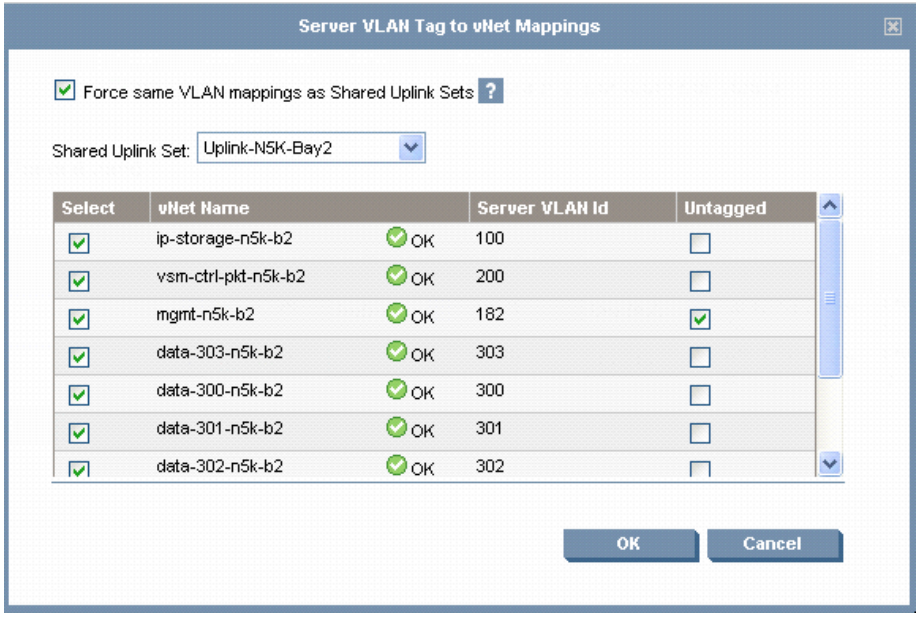
The FlexNIC will need to be configured for "Multiple Networks", use the following to enable the vlans for this FlexNIC

- Click "Force same VLAN mappings as Shared Uplink Sets" to use these networks
- Check all the vlans to allow them to be enabled for the FlexNIC
- Note that "untagged" packets will be tagged for "mgmt-n5k-b1" vlan (vlan 182) – this is used if "Service Console" is set to "vlan 0"

FlexNIC – Port 1



FlexNIC – Port 2



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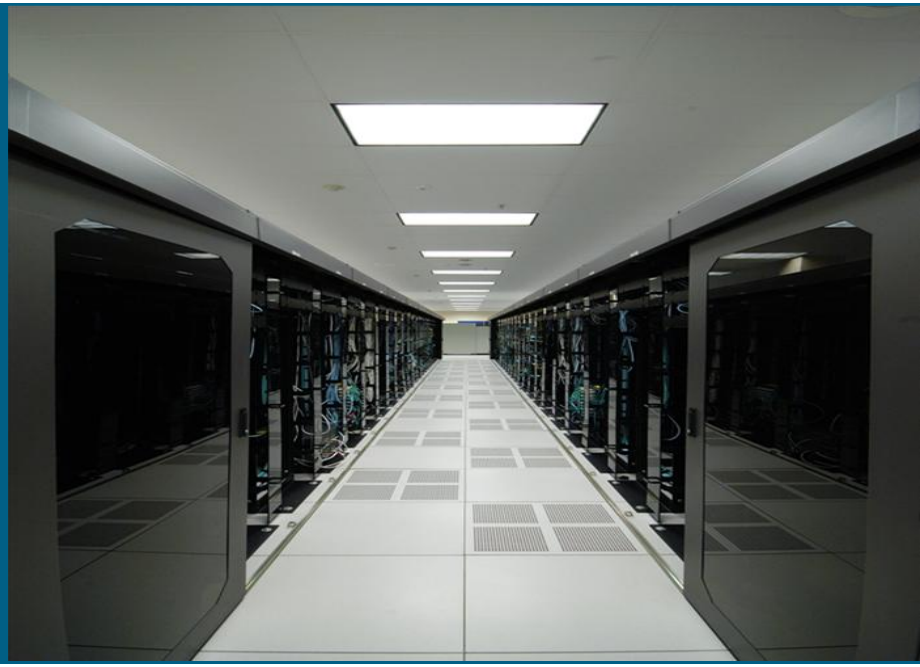
Nexus 1000V Configuration



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Nexus 1000V Configurations

- Creating Port-Profiles on Nexus 1000V
  - Configuring system-uplink
  - Configuring Service-Console, Vmotion, ip-storage (vmkernel), vsm-control-packet and other VM port-profiles
- Steps to Add VEMs and place VSM behind VEM
  - Add host to Nexus 1000V (use only 1 interface to import host as VEM)
  - Migrate service-console, vmkernel and vmotion port-groups to Nexus 1000V
  - Modify VSM (VM) to use port-profiles from Nexus 1000V (not vSwitch)
  - Add second physical vmnic to the Nexus 1000V control
  - Continue adding other hosts as VEMs

Note: These steps will not include how to install the VSM. Please consult the "Nexus 1000V installation guide" for details

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Port-Profile: System-Uplink, Service-Console & Vmotion

Configuration of “System-Uplink”

• system vlans: recommended to add control, packet, service-console and vmkernel vlans
• switchport mode is set to “trunk” to allow required vlans to traverse the uplinks
• list of allowed vlans: default is all but can be pruned to limit to allowed list of vlans
• Since HPVC Flex-10 does not support “vPC”, setting the “channel-group auto mode on mac-pinning” is recommended for better load-balancing

System-Uplink Configuration from VSM

```
HPC7K-VSM# show running-config port-profile system-uplink
version 4.0(4)SV1(3)
port-profile type ethernet system-uplink
  vmware port-group
  switchport mode trunk
  switchport trunk native vlan 182
  switchport trunk allowed vlan all
  channel-group auto mode on mac-pinning
  no shutdown
  system vlan 100,182,200
  state enabled
```

Configuration of “Service-Console”

• switchport mode is set to “access” for particular vlan (this case vlan 182)

Service-Console Configuration from VSM

```
HPC7K-VSM# show running-config port-profile service-console
version 4.0(4)SV1(3)
port-profile type vethernet service-console
  vmware port-group
  switchport mode access
  switchport access vlan 182
  no shutdown
  state enabled
```

Configuration of “VMotion”

• switchport mode is set to “access” for particular vlan (this case vlan 101)

VMotion Configuration from VSM

```
HPC7K-VSM# show running-config port-profile vmotion
version 4.0(4)SV1(3)
port-profile type vethernet vmotion
  vmware port-group
  switchport mode access
  switchport access vlan 101
  no shutdown
  state enabled
```

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Port-Profile: Mgmt, IP-Storage & “Control-Packet”

- Following are port-profiles needed to be created to allow the VSM to reside behind the VEM
- The “control and packet” port-profile is recommended to have the “system-vlan” to have vlan 200, which is the vlan that control and packet vlan are set to in this example

Configuration of “mgmt”

- switchport mode is set to “access” for particular vlan (this case vlan 182)

Management Configuration from VSM

```
HPC7K-VSM# show running-config port-profile mgmt
version 4.0(4)SV1(3)
port-profile type vethernet mgmt
  vmware port-group
  switchport mode access
  switchport access vlan 182
  no shutdown
  state enabled
```

Configuration of “control-packet”

- switchport mode is set to “access” for particular vlan (this case vlan 200)

Control-Packet Configuration from VSM

```
HPC7K-VSM# show running-config port-profile vsm-ctrl-pkt
version 4.0(4)SV1(3)
port-profile type vethernet vsm-ctrl-pkt
  vmware port-group
  switchport mode access
  switchport access vlan 200
  no shutdown
  system vlan 200
  state enabled
```

Configuration of “IP-Storage”

- switchport mode is set to “access” for particular vlan (this case vlan 100)

IP-Storage Port-Profile Configuration from VSM

```
HPC7K-VSM# show running-config port-profile ip-storage
version 4.0(4)SV1(3)
port-profile type vethernet ip-storage
  vmware port-group
  switchport mode access
  switchport access vlan 100
  no shutdown
  state enabled
```

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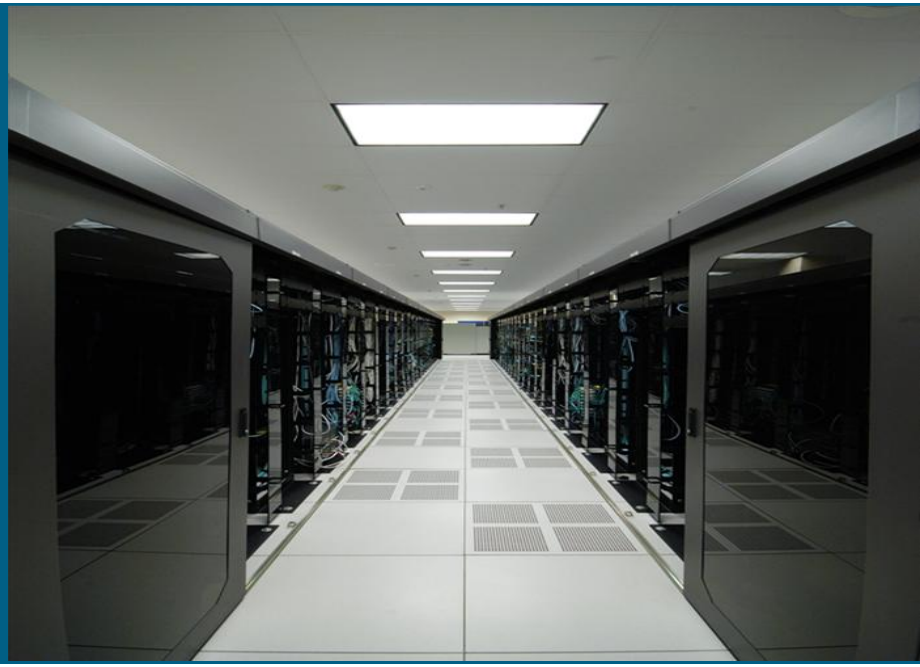
Adding VEMs



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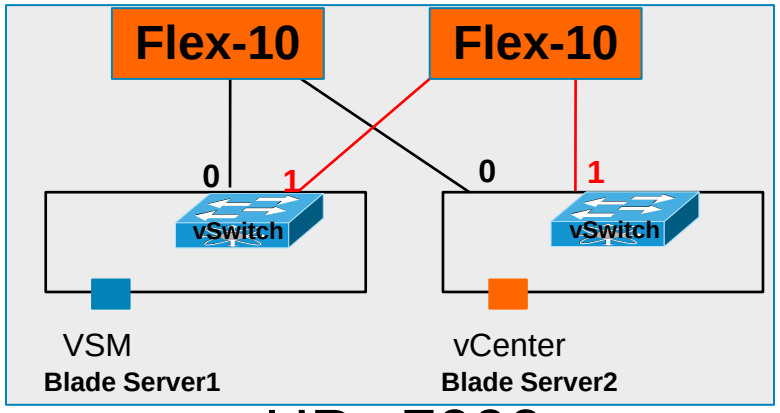
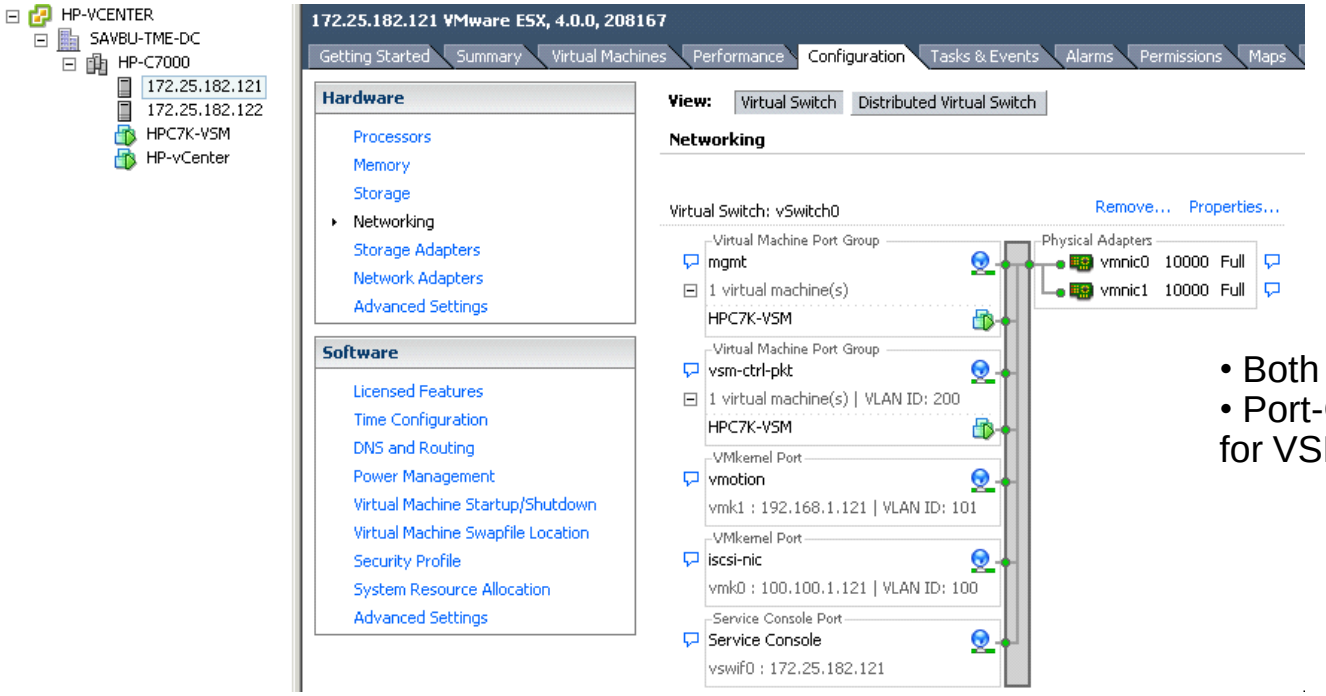
Before Adding Blade Server1 as VEM



- Note that VSM is currently on Blade Server1
- Will add Blade Server1 as VEM first



- Both vmnics are under vSwitch
- Port-Groups under vSwitch is used for VSM (VM)

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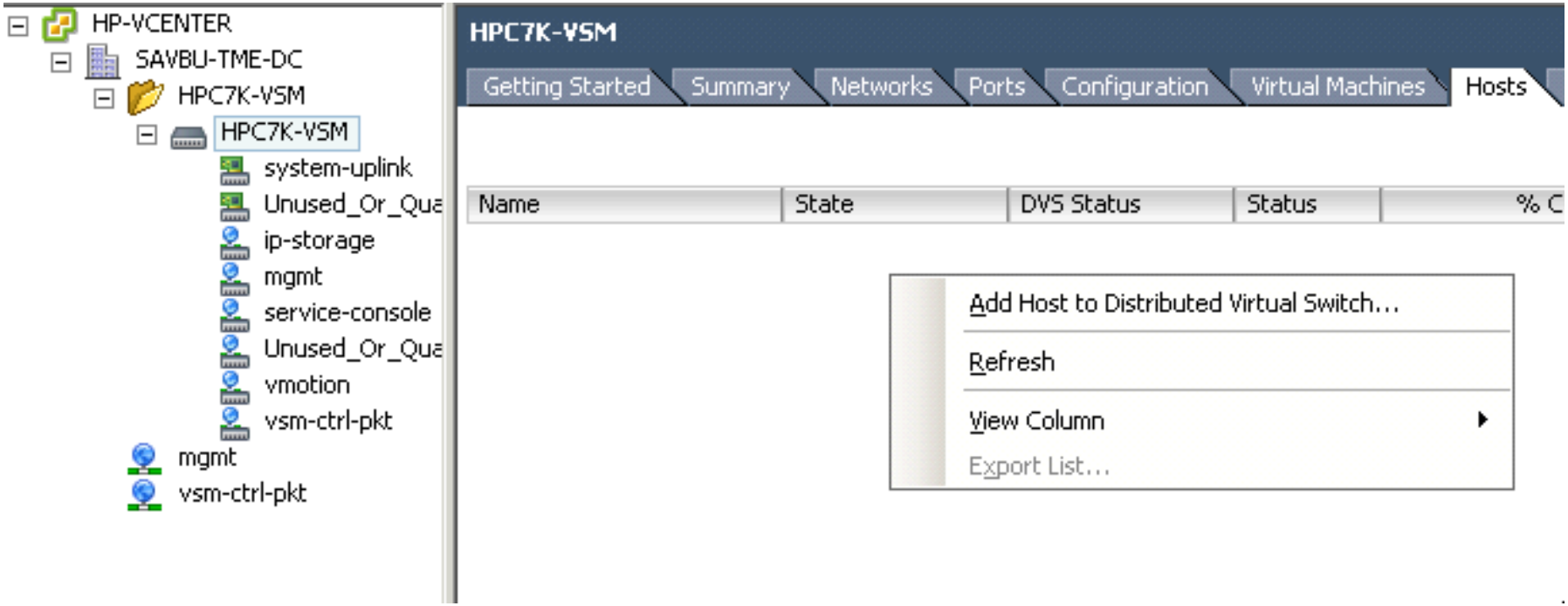
Adding Blade Server1 as VEM

- Under “Networking”, make sure to select the Nexus 1000V VSM and go to the “Host” tab
- Right-click and select “Add Host to Distributed Switch…”



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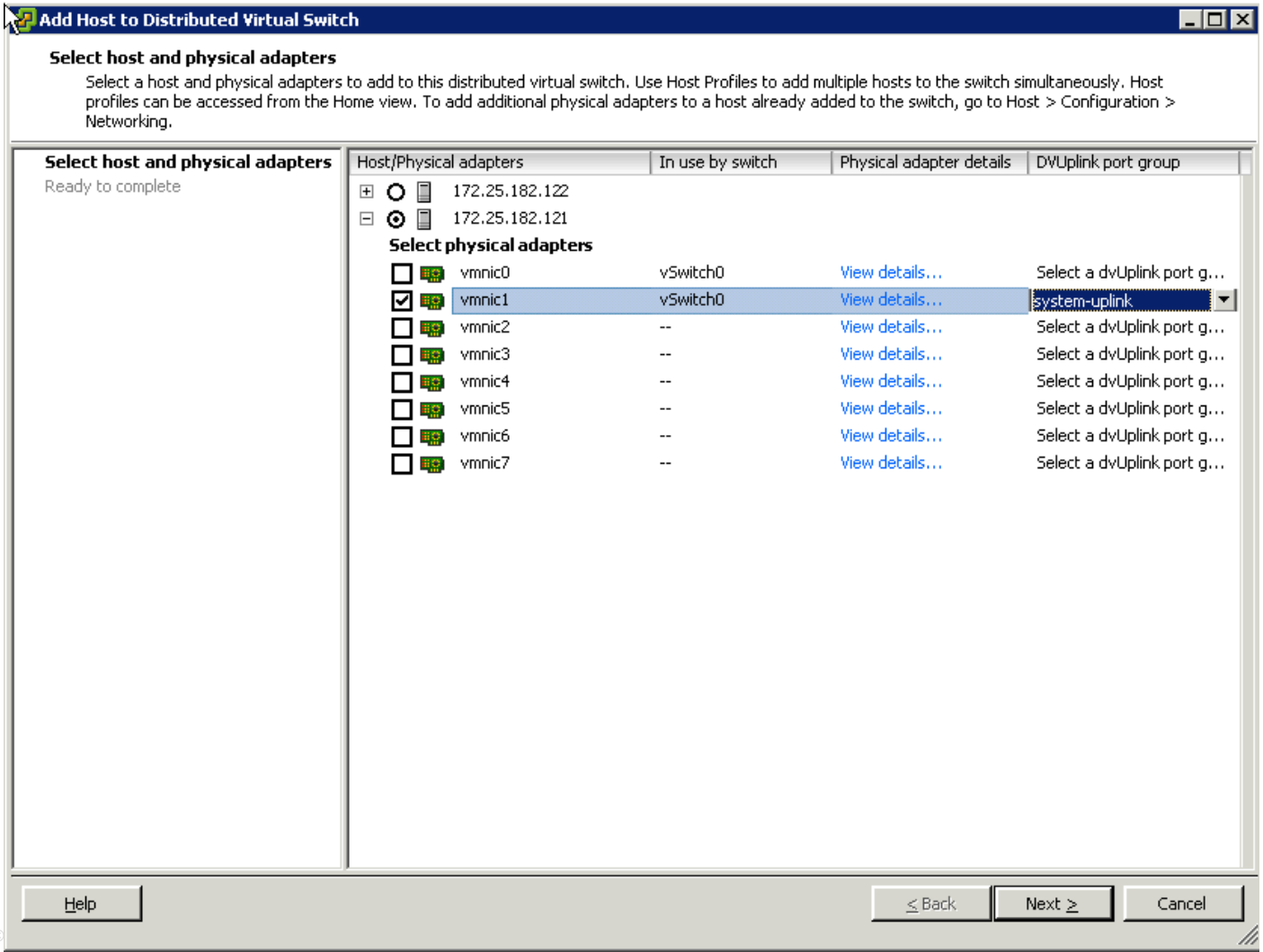
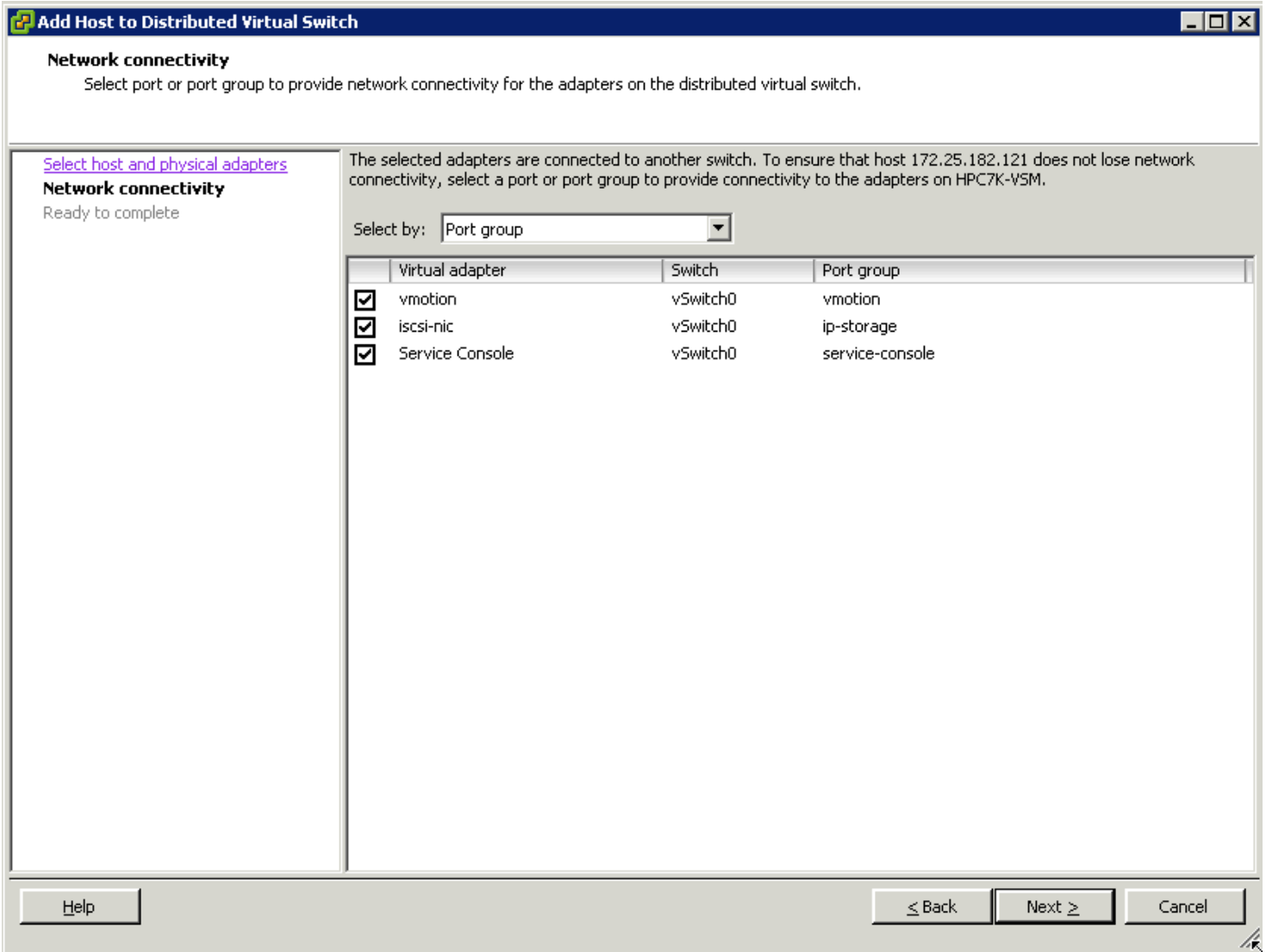
Adding Blade Server1 as VEM Continued…

- Choose the radio-button for blade server1
- There are 2 active vmnics that are currently used by vSwitch, select only 1 vmnic (vmnic0 or vmnic1)
- Select the dvUplink port group, which in this case is “system-uplink” (click Next)



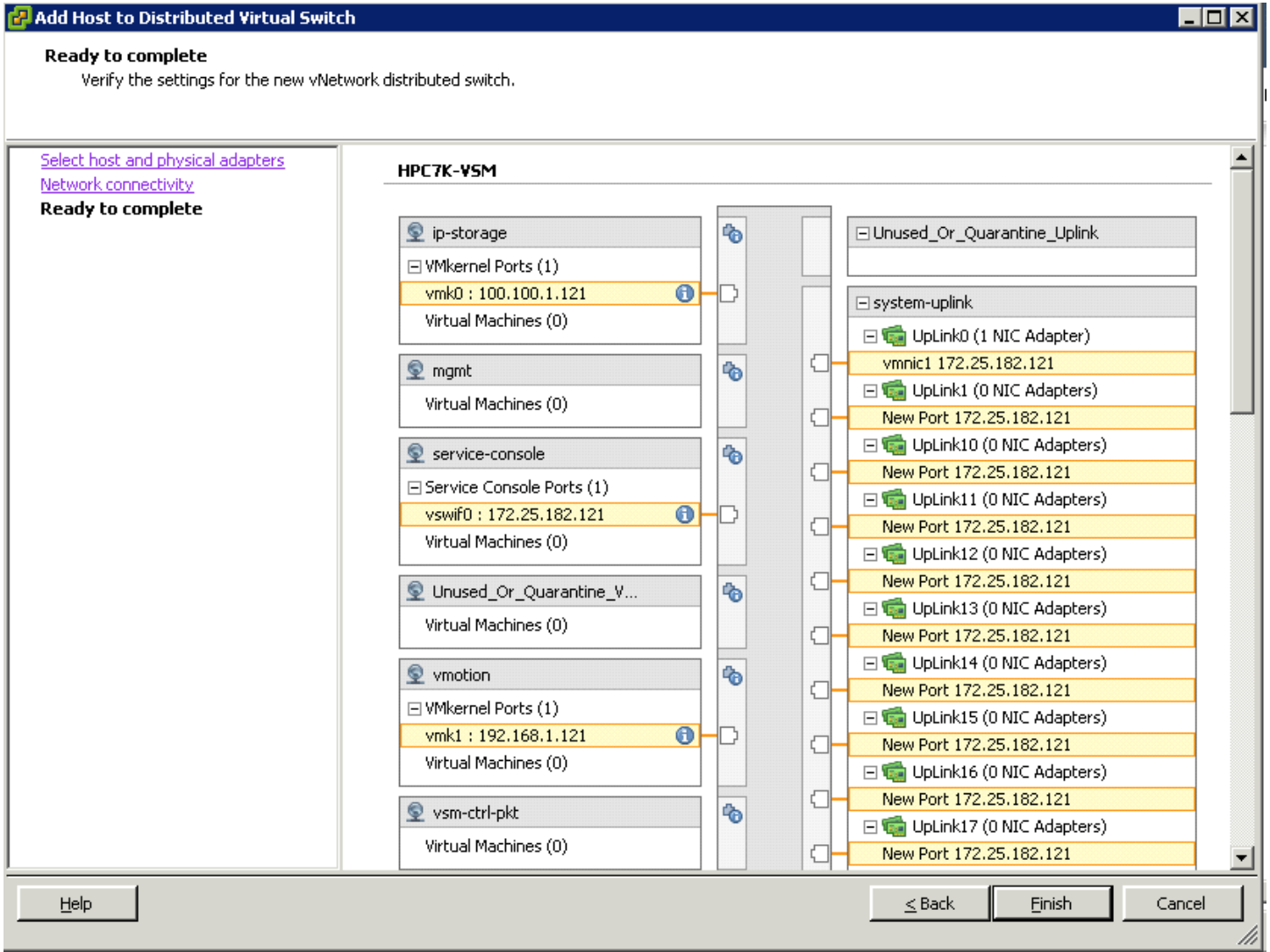
Adding Blade Server1 as VEM Continued…

- Migration of “vmkernel” port-groups can be done here, where port-profiles have already been created
- Choose appropriate “Port Group” for each virtual adapter and click on “Next”
- Please note that when migrating “Service Console”, make sure that the port-profile is configured correctly so that communication to the “Service Console” is not lost during this migration phase



Adding Blade Server1 as VEM Continued…

- Click “Finish”
- Process of adding Blade Server 1 as a VEM begins
- Note that if VUM is installed (recommended), the VEM binaries are automatically installed to the ESX server. Otherwise a manual process to install the VEM on this ESX server is required. Please refer to the Nexus 1000V Configuration Guide for further detailed instructions



Verifying Blade Server 1 as VEM

- Verify that the Blade Server1 is a VEM on the VSM
- Take note of the virtual interfaces created for the migrated vmkernel interfaces

```
HPC7K-VSM# show module
Mod  Ports  Module-Type                    Model             Status
---  -----  -------------------------------- ------------------ ------------
1    0      Virtual Supervisor Module        Nexus1000V        active *
3    248    Virtual Ethernet Module          NA                ok

Mod  Sw              Hw
---  --------------  ------
1    4.0(4)SV1(3)    0.0
3    4.0(4)SV1(3)    1.9

Mod  MAC-Address(es)                         Serial-Num
---  --------------------------------------  ----------
1    00-19-07-6c-5a-a8 to 00-19-07-6c-62-a8  NA
3    02-00-0c-00-03-00 to 02-00-0c-00-03-80  NA

Mod  Server-IP        Server-UUID                          Server-Name
---  ---------------  -----------------------------------  --------------------
1    172.25.182.141   NA                                   NA
3    172.25.182.121   531c0c50-73df-bb42-a0b1-1f70677ba5d3  172.25.182.121

HPC7K-VSM# show interface virtual

------------------------------------------------------------------------------
Port        Adapter      Owner                    Mod Host
------------------------------------------------------------------------------
Veth1       vswif0       VMware Service Console   3   172.25.182.121
Veth2       vmk1         VMware VMkernel          3   172.25.182.121
Veth3       vmk0         VMware VMkernel          3   172.25.182.121
```

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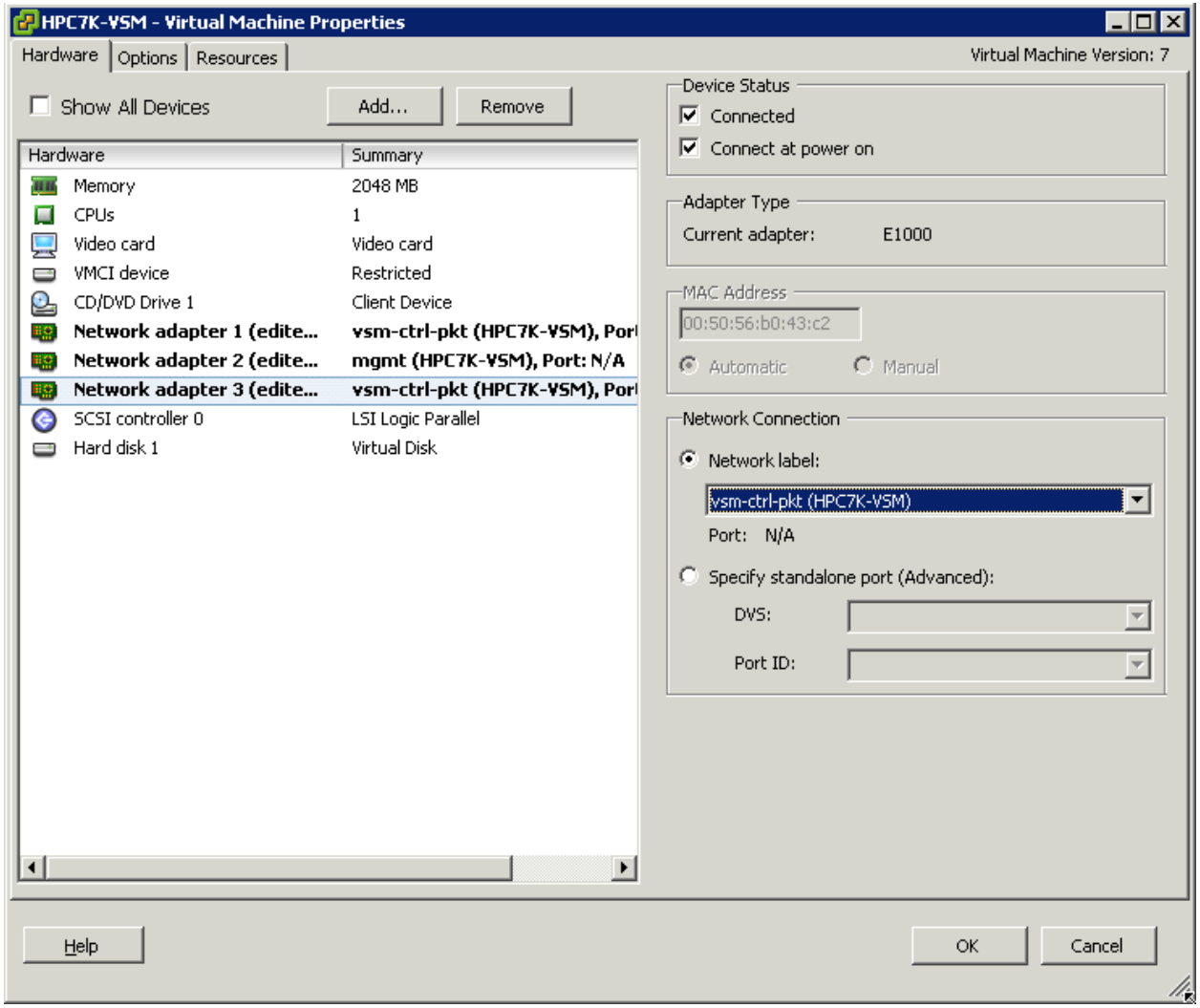
Moving VSM behind VEM

- Go to “Edit Settings” for the VSM VM
- Select the 3 adapters and modify the port-group to utilize the port-profiles (Nexus 1000V) for the appropriate adapter. These port-profiles were shown earlier
- Click on “OK” and when it completes refreshing the network, there will be a minor disruption in the access of the VSM during this process but will recover



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Verifying VSM is behind VEM

- Take note of the virtual interfaces created for the 3 interfaces of the VSM

```
HPC7K-VSM# show interface virtual

------------------------------------------------------------------------------
Port       Adapter       Owner                    Mod Host
------------------------------------------------------------------------------
Veth1      vswif0        VMware Service Console   3   172.25.182.121
Veth2      vmk1          VMware VMkernel          3   172.25.182.121
Veth3      vmk0          VMware VMkernel          3   172.25.182.121
Veth4      Net Adapter 1 HPC7K-VSM                3   172.25.182.121
Veth5      Net Adapter 2 HPC7K-VSM                3   172.25.182.121
Veth6      Net Adapter 3 HPC7K-VSM                3   172.25.182.121
```

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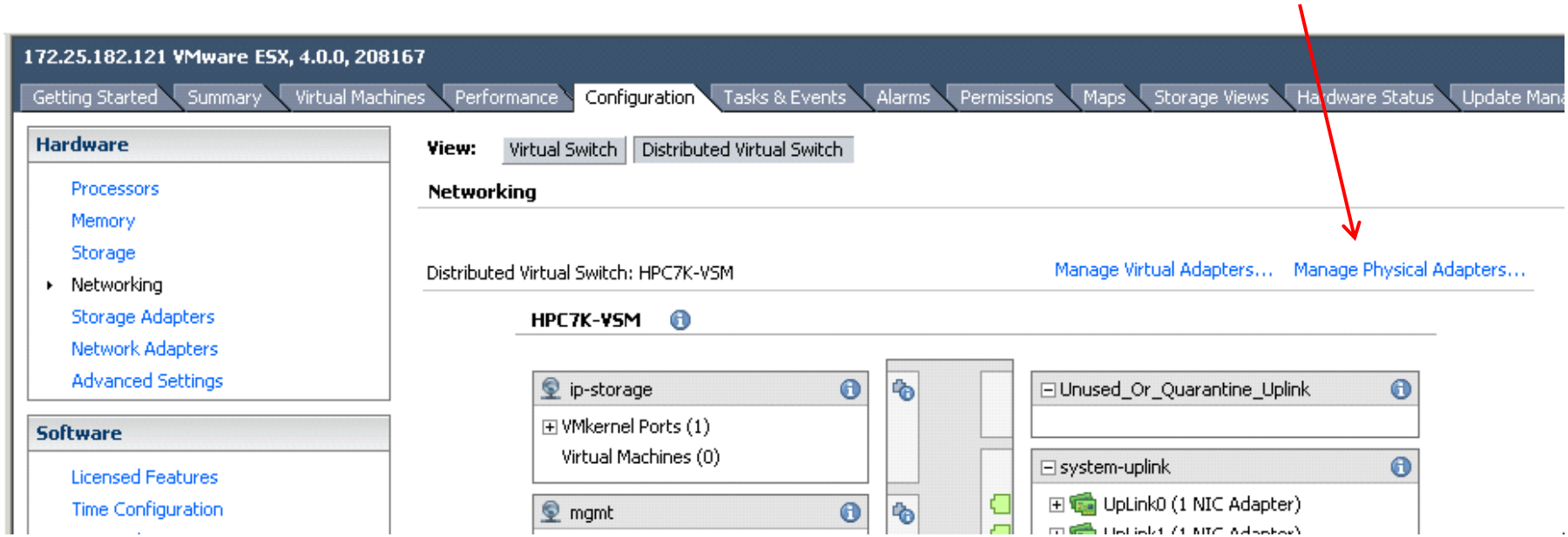
Adding second vmnic to Nexus 1000V

- Go to "Configuration" tab and select "Networking"
- Select "Distributed Virtual Switch" and click on "Manage Physical Adapters" near the top right hand side



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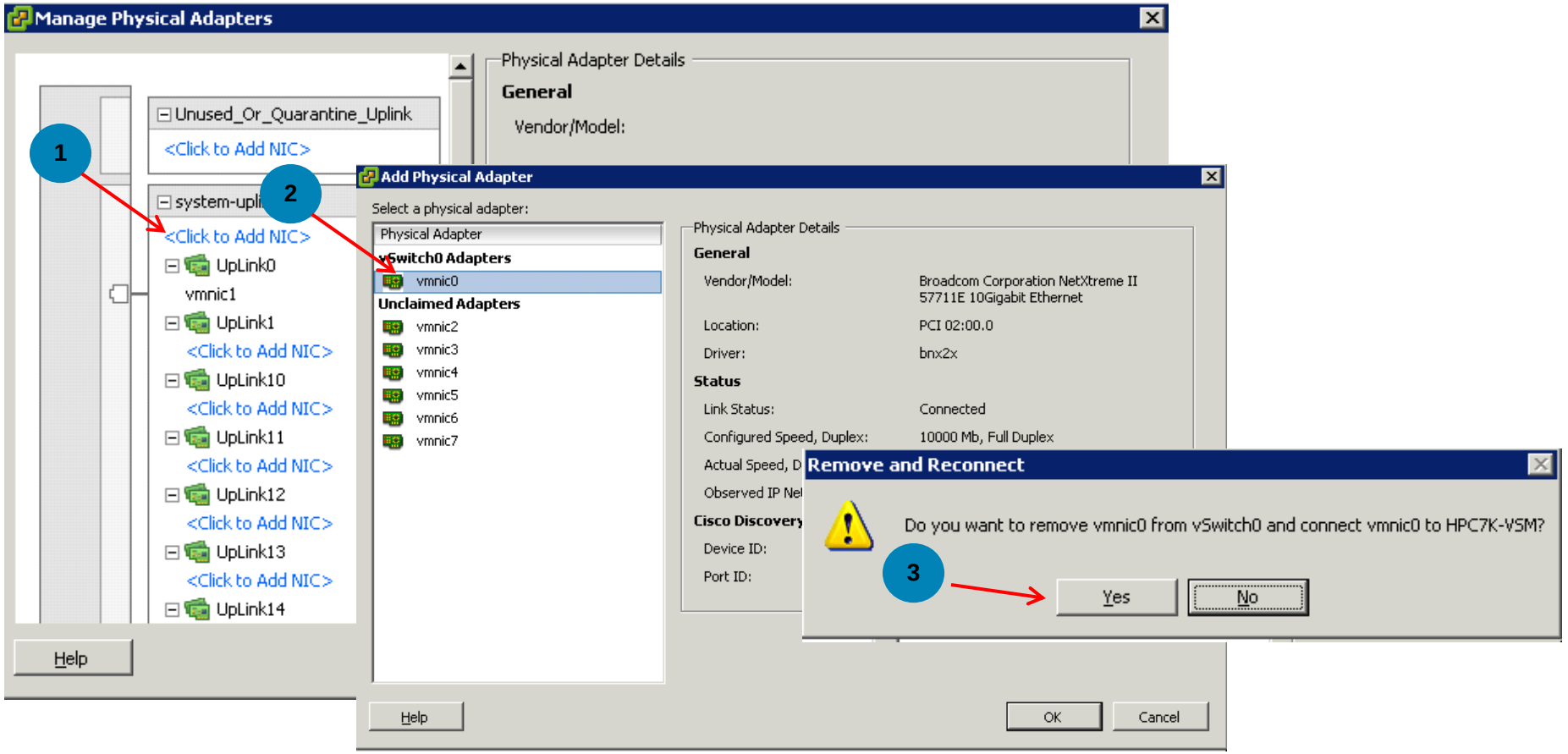
Adding second vmnic to Nexus 1000V Continued…

1. Click on “<Click to Add NIC>” under the “system-uplink” section
2. Another window will appear and select “vmnic0” and click “OK”
3. Another warning message will appear and click on “Yes”

When completed, vminc0 will be shown as another interface used by Nexus 1000V



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Verifying both vmnics are used for Nexus 1000V

- Run the following commands to verify both vmnics are used for Nexus 1000V

```
HPC7K-VSM# show interface brief

--------------------------------------------------------------------------------
Port     VRF          Status IP Address                Speed    MTU
--------------------------------------------------------------------------------
mgmt0    --           up     172.25.182.141            1000     1500

--------------------------------------------------------------------------------
Ethernet     VLAN   Type Mode   Status  Reason               Speed     Port
Interface                                                    Ch #
--------------------------------------------------------------------------------
Eth3/1       182    eth  trunk  up      none                 10G(D) 1
Eth3/2       182    eth  trunk  up      none                 10G(D) 1

--------------------------------------------------------------------------------
Port-channel VLAN  Type Mode   Status  Reason               Speed  Protocol
Interface
--------------------------------------------------------------------------------
Po1          182   eth  trunk  up      none                 a-10G(D)  none

HPC7K-VSM# show port-channel summary
Flags:  D - Down        P - Up in port-channel (members)
        I - Individual  H - Hot-standby (LACP only)
        s - Suspended   r - Module-removed
        S - Switched    R - Routed
        U - Up (port-channel)
--------------------------------------------------------------------------------
Group Port-       Type     Protocol  Member Ports
      Channel
--------------------------------------------------------------------------------
1     Po1(SU)     Eth      NONE      Eth3/1(P)    Eth3/2(P)
```

Physical interfaces automatically added in Port-Channel

State of the Port-Channel is up

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Repeat steps to add more VEMs

- For each additional ESX server, following the same procedure to add the VEM
- Steps on moving the VSM behind the VEM will depend if you have the secondary VSM on another ESX server that will be used as a VEM, if so, follow the same procedure
- It is always a best practice to utilize a single “vmnic” to allow to add the VEM first, then when things are functional, then add the second vmnic under Nexus 1000V control
- If existing VMs are using vSwitch port-groups, make sure that port-profiles are created for those to allow the migration of those VMs to be under control of the Nexus 1000V (i.e. VM Data Traffic – port-profiles)

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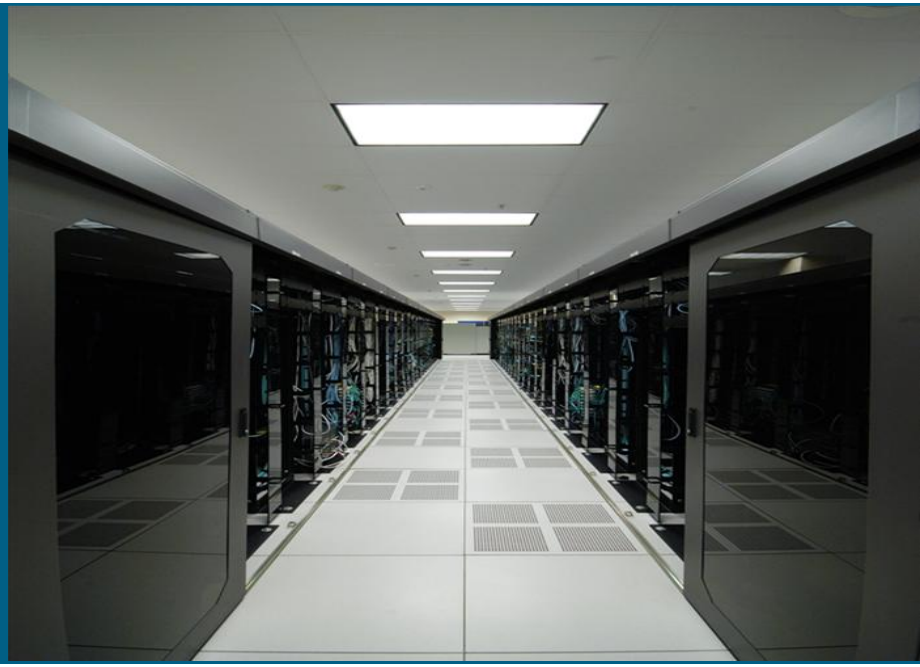
Sample Environment 2



4 FlexNICs – Nexus 1000V

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Sample Environment 2 - Topology

VLAN Mappings

- Management (Service Console) → 182
- vmkernel (shared IP storage) → 100
- vmotion → 101
- Control & Packet → 200
- VM Data → 301-305

HPVC Shared Uplink Set

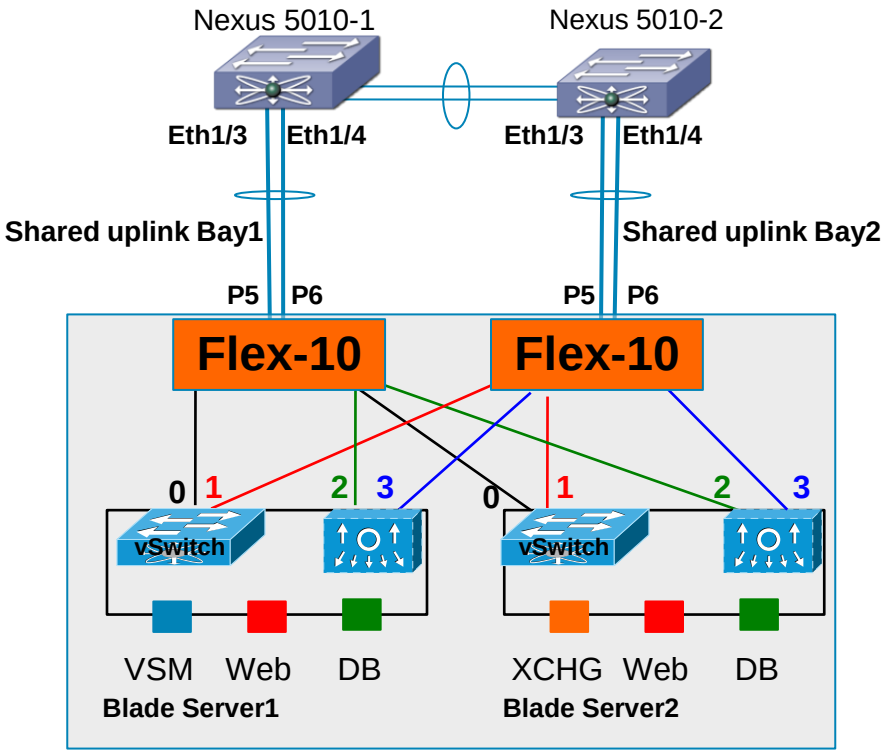
- Need to provide all vlans to traverse uplinks
- Recommended to name “uplink” set with particular naming convention to recognize the vlan traversing which uplink set.
- HPVC “vlan mapping” was used but refer to HP’s documentation on differences between “tunneling” and “vlan mapping”

HPVC Server Profile

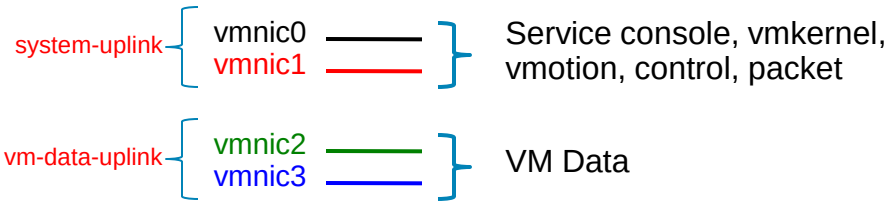
- Create only 4 FlexNIC
- FlexNIC1 is “pinned” to Flex-10 on Bay1
- FlexNIC2 is “pinned” to Flex-10 on Bay2
- FlexNIC3 is “pinned” to Flex-10 on Bay1
- FlexNIC4 is “pinned” to Flex-10 on Bay2
- When assigning the network to the FlexNIC, select “multiple networks” and choose the “Shared Uplink Set” that corresponds to the correct FlexNIC. Then “check” the appropriate vlans

Nexus 1000V Port-Profile

- Configure system-uplink as vPC-HM with mac-pinning and allow only vlan traffic for vmnic0/vmnic1
- Configure vm-data-uplink as vPC-HM with mac-pinning and allow only vlan traffic for vmnic2/vmnic3



HP c7000



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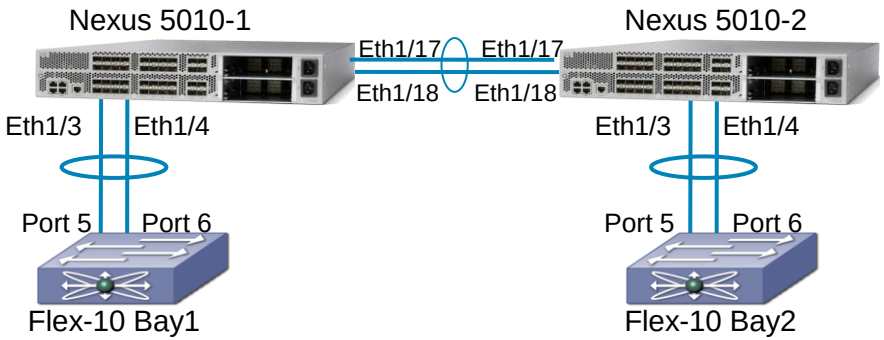
Nexus 5000 and HPVC Shared Uplink Configuration

Nexus 5000 Configuration

- Configuration is the same as in Example 1 for both 5010-1 and 5010-2
- Same vlans are utilized

HPVC Flex-10 Shared Uplink

- Configuration is the same as in Example 1 for both shared uplink sets
- Same vlans are utilized



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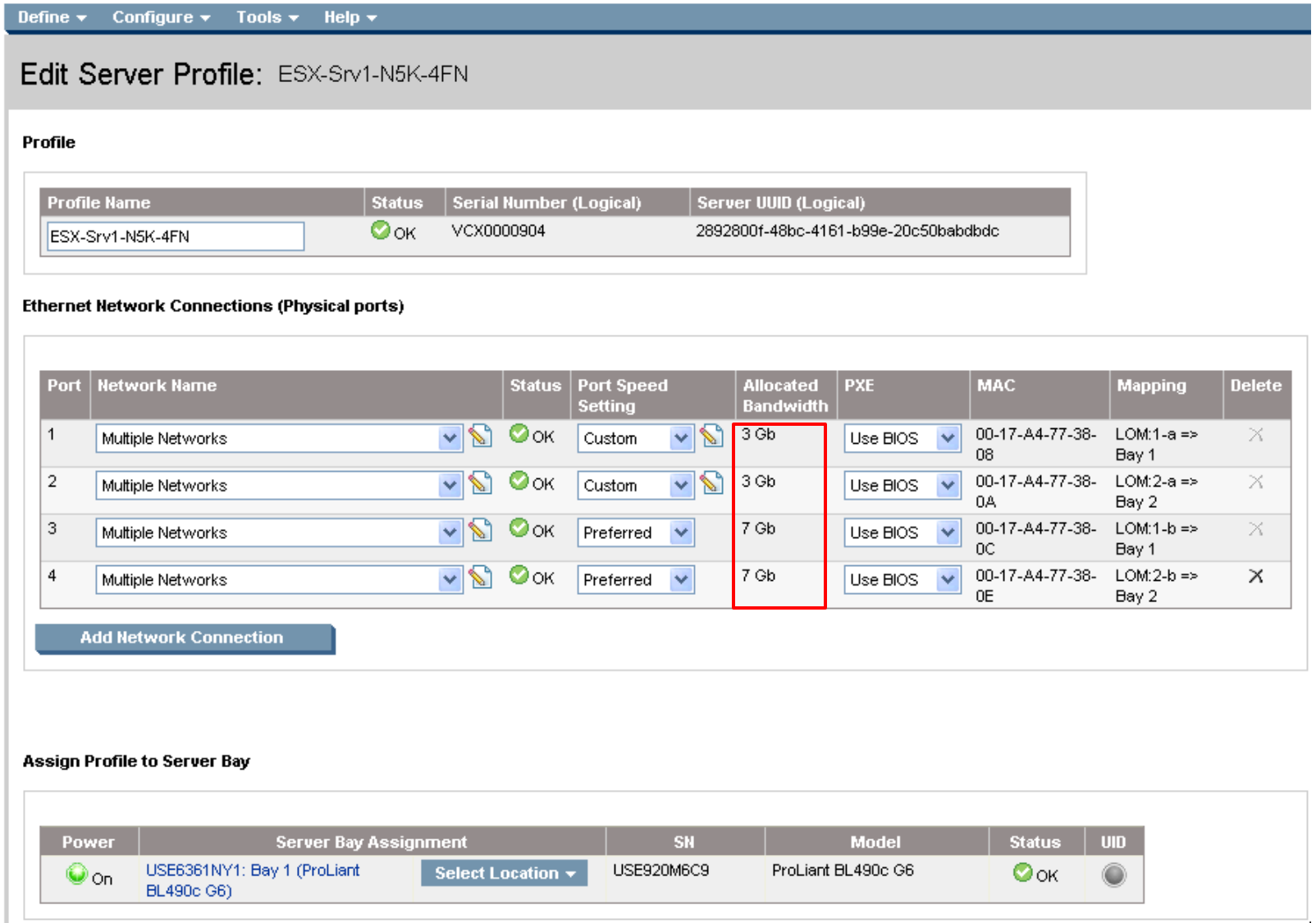
Server Profiles – Blade Server1 (4 FlexNICs)

In Virtual Connect, creation of a “Server Profile” defines a few parameters is needed for this example
1. FlexNIC1 and FlexNIC2 are used for vSwitch and is configured to use only 3Gig of bandwidth
2. FlexNIC3 and FlexNIC4 are used for Nexus 1000V for the VM Data traffic and utilized the rest of the bandwidth, in this case 7Gig each

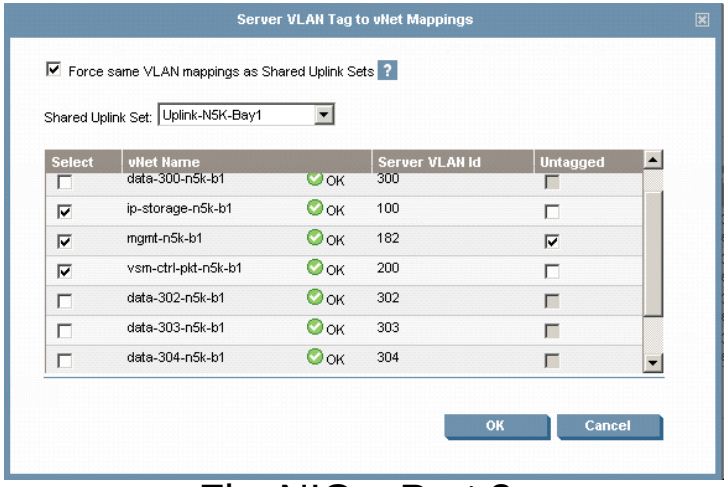


Blade Server1 – FlexNIC "Network" settings

The FlexNICs will need to be configured for "Multiple Networks", use the following to enable the vlans for each of the FlexNIC

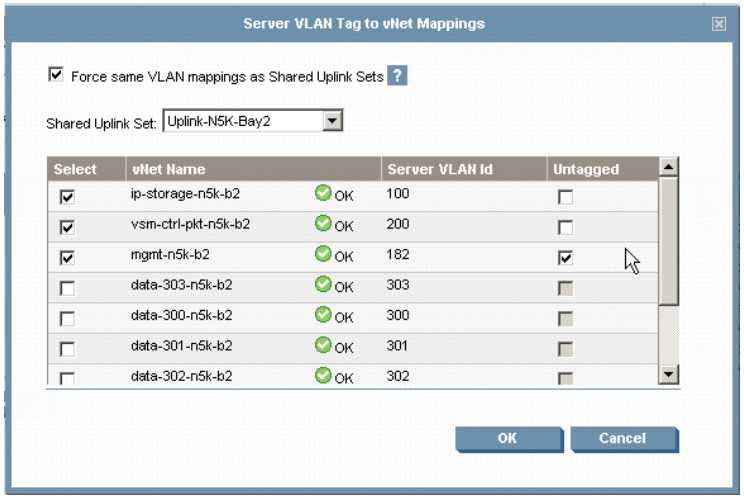
- Click "Force same VLAN mappings as Shared Uplink Sets" to use these networks
- Check all the vlans to allow them to be enabled for the FlexNIC

FlexNIC – Port 1

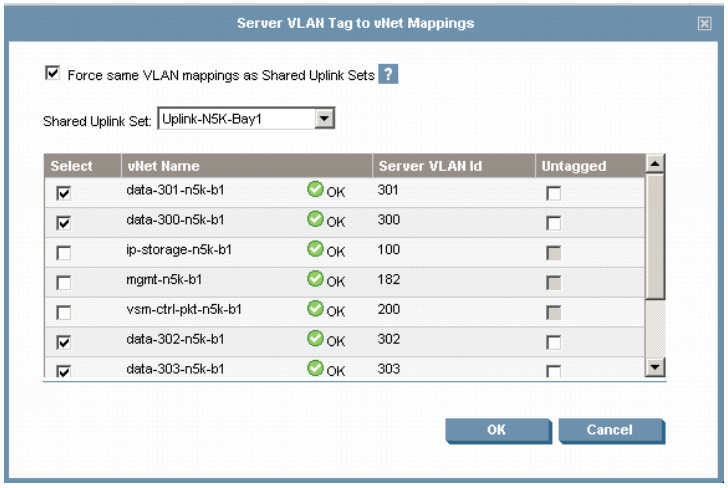


VLAN 100 – IP-Storage
VLAN 101 - Vmotion
VLAN 182 – Mgmt
VLAN 200 – Ctrl-Pkt

FlexNIC – Port 2

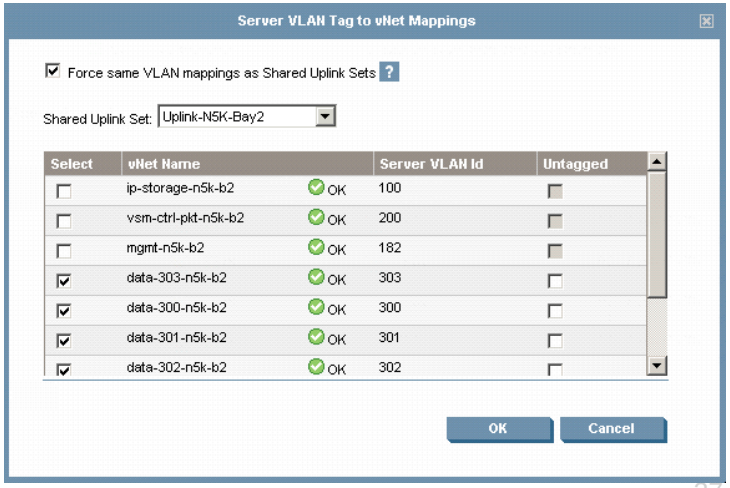


FlexNIC – Port 3



VLAN 300 – Data300
VLAN 301 – Data301
VLAN 302 – Data302
VLAN 303 – Data303
VLAN 304 – Data304
VLAN 305 – Data305

FlexNIC – Port 4



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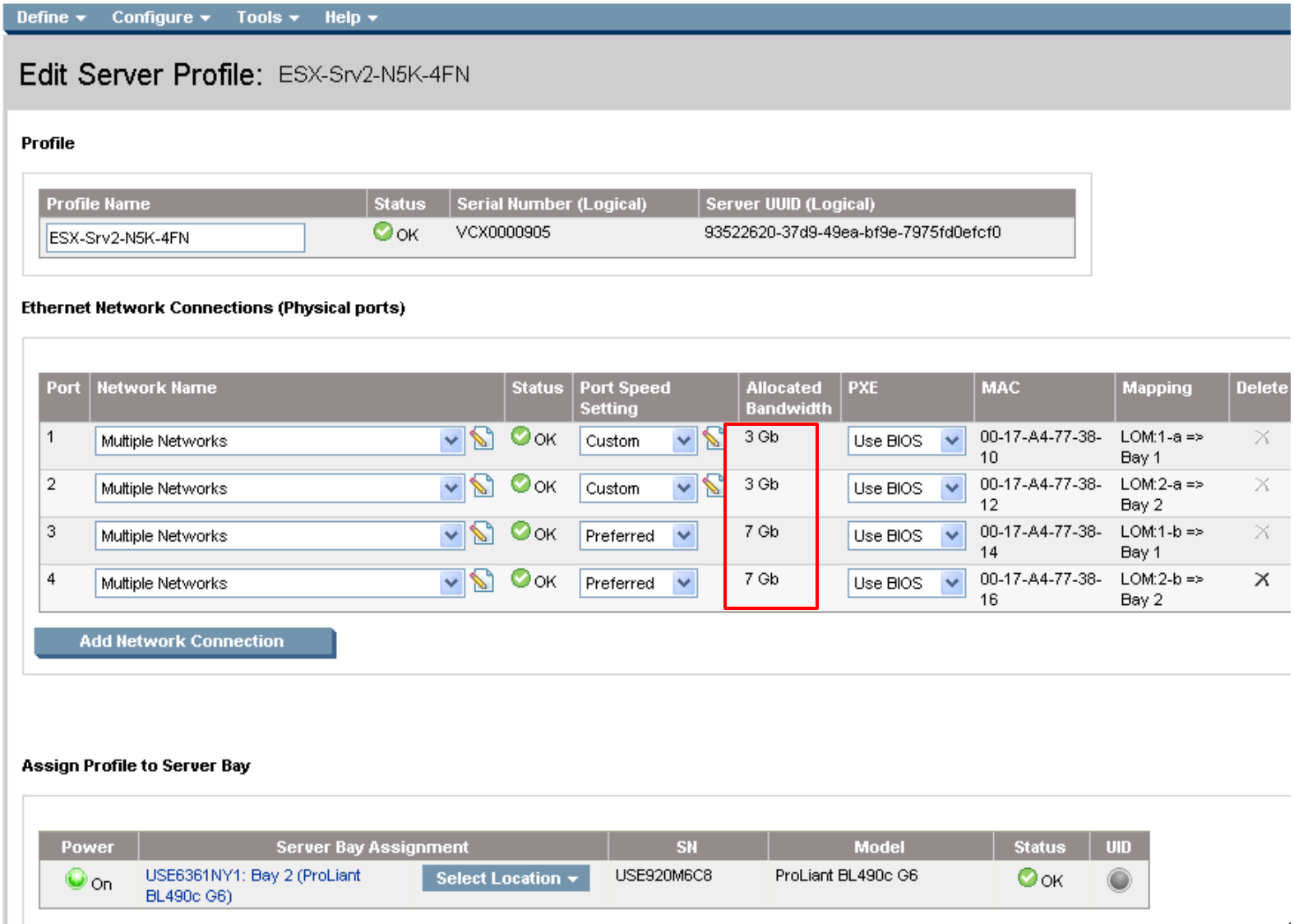
Server Profiles – Blade Server2 (4 FlexNICs)

In Virtual Connect, creation of a “Server Profile” defines a few parameters is needed for this example

1. FlexNIC1 and FlexNIC2 are used for certain traffic (SC, vmkernel, vmotion, control/packet) and is configured to use only 3Gig of bandwidth
2. FlexNIC3 and FlexNIC4 are used for VM Data traffic and utilized the rest of the bandwidth, in this case 7Gig each

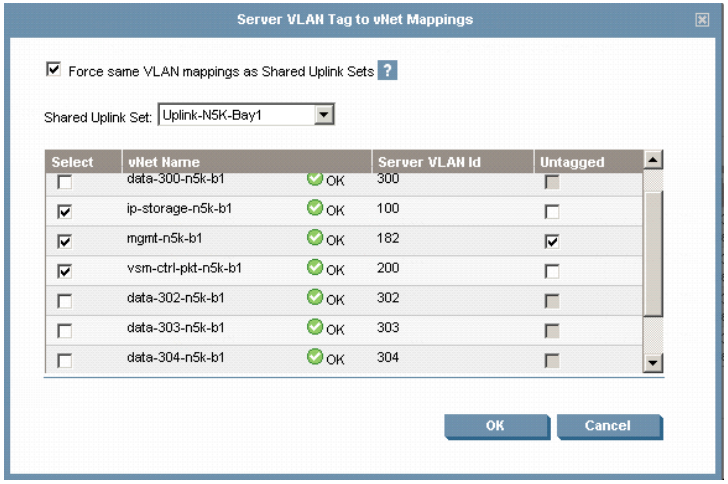


Blade Server2 – FlexNIC "Network" settings

The FlexNICs will need to be configured for "Multiple Networks", use the following to enable the vlans for each of the FlexNIC

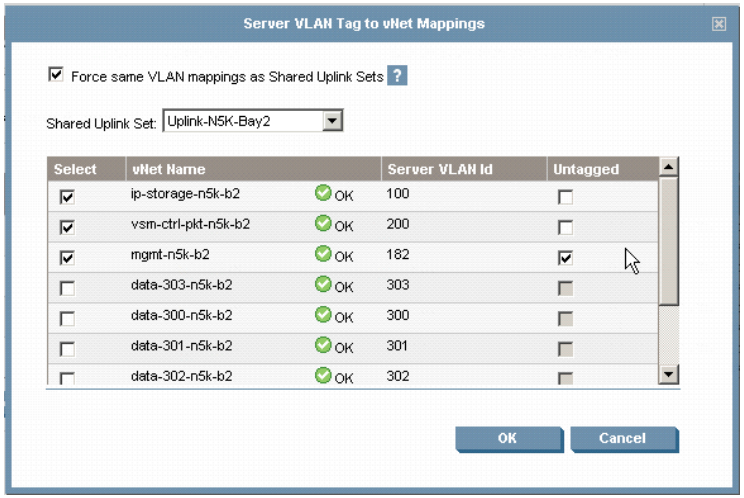
- Click "Force same VLAN mappings as Shared Uplink Sets" to use these networks
- Check all the vlans to allow them to be enabled for the FlexNIC

FlexNIC – Port 1

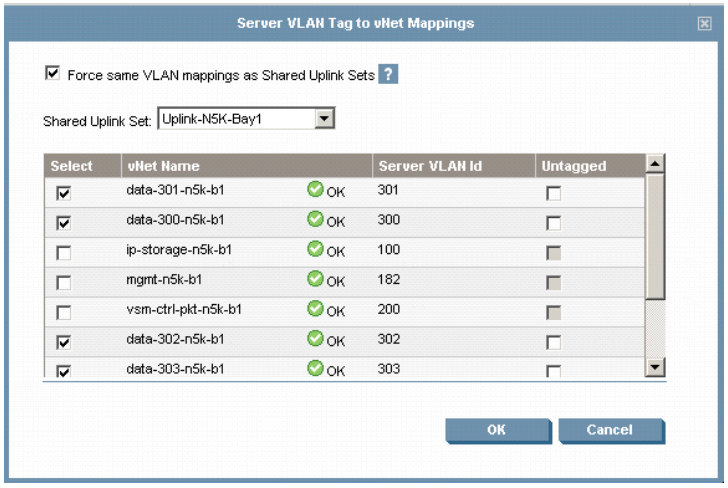


VLAN 100 – IP-Storage
VLAN 101 - Vmotion
VLAN 182 – Mgmt
VLAN 200 – Ctrl-Pkt

FlexNIC – Port 2

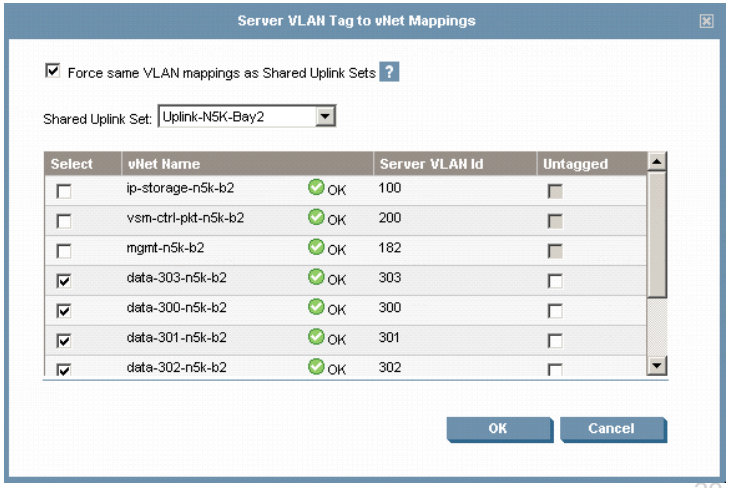


FlexNIC – Port 3



VLAN 300 – Data300
VLAN 301 – Data301
VLAN 302 – Data302
VLAN 303 – Data303
VLAN 304 – Data304
VLAN 305 – Data305

FlexNIC – Port 4



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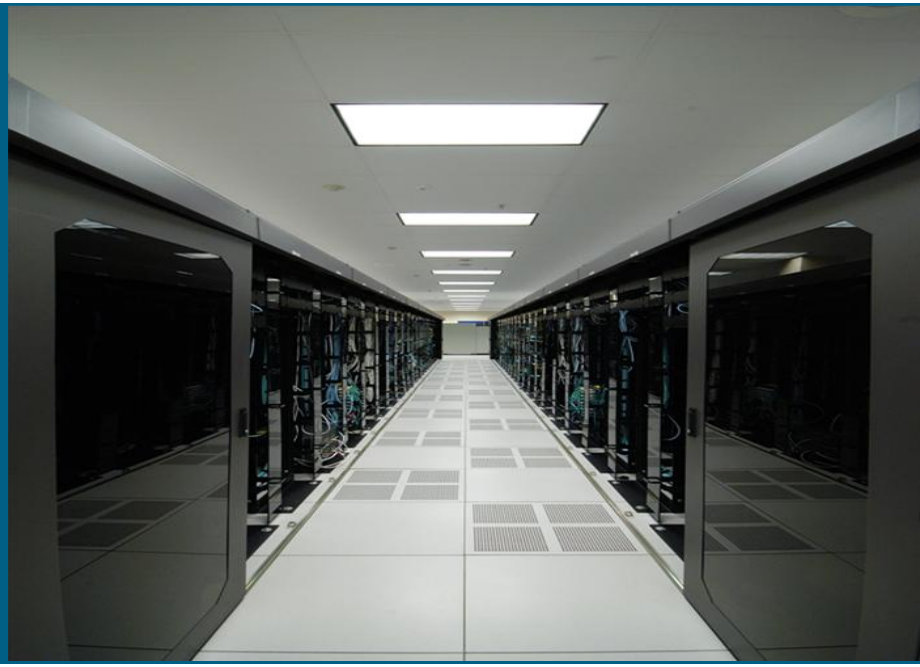
Nexus 1000V Configuration



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Nexus 1000V Configurations

- Creating Port-Profiles on Nexus 1000V
  - Configuring system-uplink and vm-data-uplink
  - Configuring Service-Console, Vmotion, ip-storage (vmkernel), vsm-control-packet and other VM port-profiles
- Steps to Add VEMs and place VSM behind VEM
  - Add host to Nexus 1000V (use only 1 interface to import host as VEM)
  - Migrate service-console, vmkernel and vmotion port-groups to Nexus 1000V
  - Modify VSM (VM) to use port-profiles from Nexus 1000V (not vSwitch)
  - Add second physical vmnic to the Nexus 1000V control
  - Continue adding other hosts as VEMs

Note: These steps will not include how to install the VSM. Please consult the "Nexus 1000V installation guide" for details

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Port-Profile: System-Uplink & vm-data-uplink

Configuration of “System-Uplink”

- system vlans: recommended to add control, packet, service-console and vmkernel vlans for “system-uplink” port-profile
- switchport mode is set to “trunk” to allow required vlans to traverse each of the uplink
- list of allowed vlans: default is all but can be pruned to limit to allowed list of vlans
- Since HPVC Flex-10 does not support “vPC”, setting the “channel-group auto mode on mac-pinning” is recommended for better load-balancing

system-Uplink Configuration from VSM

```
version 4.0(4)SV1(3)
port-profile type ethernet system-uplink
  vmware port-group
  switchport mode trunk
  switchport trunk native vlan 182
  switchport trunk allowed vlan 100-101,182,200
  channel-group auto mode on mac-pinning
  no shutdown
  system vlan 100,182,200
  state enabled
```

vm-data-uplink Configuration from VSM

```
HPC7K-VSM# show running-config port-profile
vm-data-uplink
version 4.0(4)SV1(3)
port-profile type ethernet vm-data-uplink
  vmware port-group
  switchport mode trunk
  switchport trunk allowed vlan 300-305
  channel-group auto mode on mac-pinning
  no shutdown
  state enabled
```

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Port-Profile: Management & “Control-Packet”

- Following are port-profiles needed to be created to allow the VSM to reside behind the VEM
- The “control and packet” port-profile is recommended to have as the “system-vlan” set to vlan 200, which is the vlan that control and packet vlan are set to in this example

Configuration of “mgmt”

- switchport mode is set to “access” for particular vlan (this case vlan 182)

Management Configuration from VSM

```
HPC7K-VSM# show running-config port-profile mgmt
version 4.0(4)SV1(3)
port-profile type vethernet mgmt
  vmware port-group
  switchport mode access
  switchport access vlan 182
  no shutdown
  state enabled
```

Configuration of “vsm-ctrl-pkt”

- switchport mode is set to “access” for particular vlan (this case vlan 200)

Control-Packet Configuration from VSM

```
HPC7K-VSM# show running-config port-profile vsm-ctrl-pkt
version 4.0(4)SV1(3)
port-profile type vethernet vsm-ctrl-pkt
  vmware port-group
  switchport mode access
  switchport access vlan 200
  no shutdown
  system vlan 200
  state enabled
```

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Port-Profile: IP-Storage, Service-Console, vMotion

- The following are port-profiles that are needed when migrating vSwitch portgroups to Nexus 1000V control
- Other port-profiles for VM Data can be created later and can be migrated after the ESX server becomes a VEM

Configuration of “IP-Storage”

- switchport mode is set to “access” for particular vlan (this case vlan 100)

IP-Storage Port-Profile Configuration from VSM

```
HPC7K-VSM# show running-config port-profile ip-storage
version 4.0(4)SV1(3)
port-profile type vethernet ip-storage
  vmware port-group
  switchport mode access
  switchport access vlan 100
  no shutdown
  state enabled
```

Configuration of “Service-Console”

- switchport mode is set to “access” for particular vlan (this case vlan 182)

Service-Console Configuration from VSM

```
HPC7K-VSM# show running-config port-profile service-console
version 4.0(4)SV1(3)
port-profile type vethernet service-console
  vmware port-group
  switchport mode access
  switchport access vlan 182
  no shutdown
  state enabled
```

Configuration of “VMotion”

- switchport mode is set to “access” for particular vlan (this case vlan 101)

VMotion Configuration from VSM

```
HPC7K-VSM# show running-config port-profile vmotion
version 4.0(4)SV1(3)
port-profile type vethernet vmotion
  vmware port-group
  switchport mode access
  switchport access vlan 101
  no shutdown
  state enabled
```

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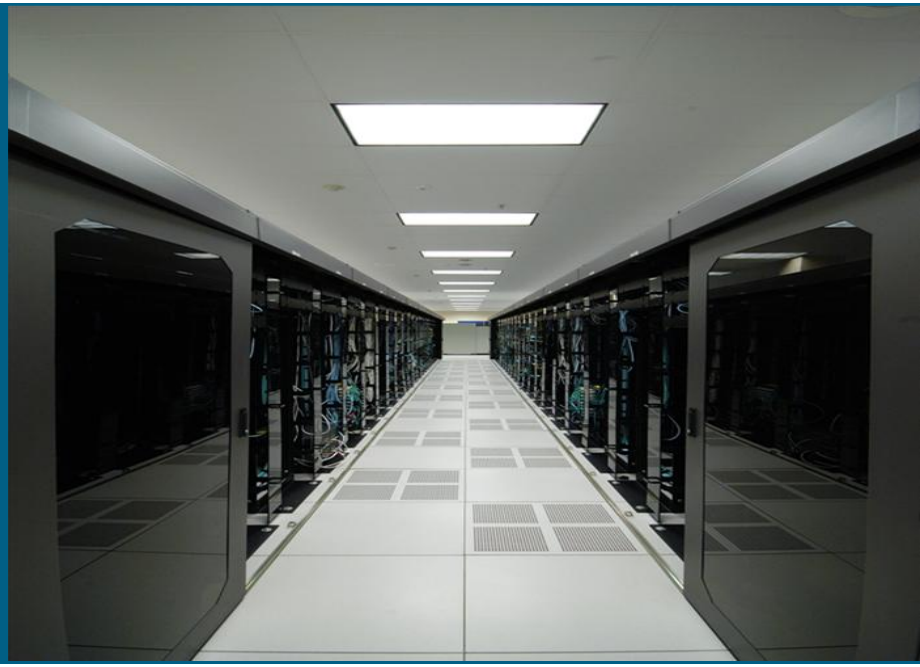
Adding VEMs



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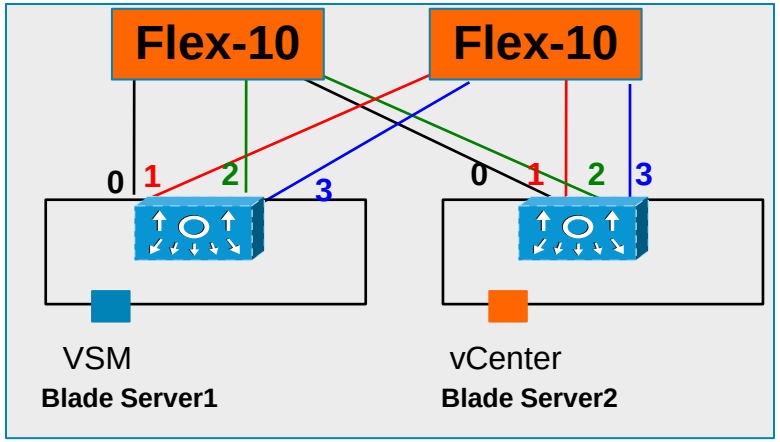
Before Adding Blade Server1 as VEM

- VSM (VM) mgmt interface is controlled by vSwitch & “control/packet” will eventually be managed by Nexus 1000V
- vmnic0/vmnic1 are teamed, vmnic2/vmnic3 are teamed

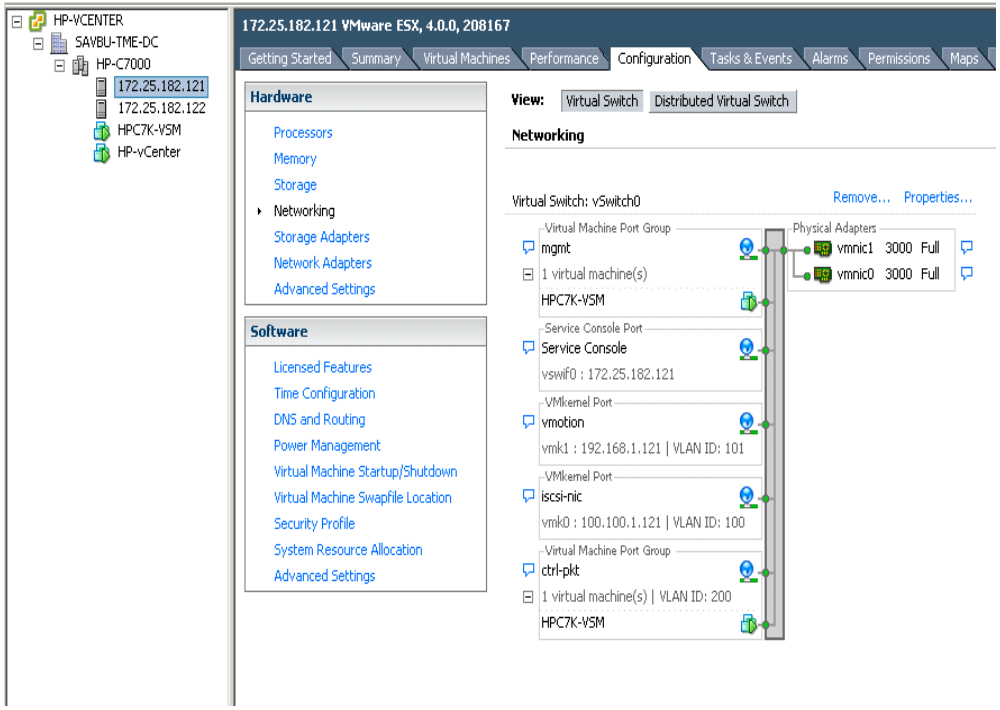
Note: The number of FlexNICs used (4) in this example shows where environments wants to utilize multiple FlexNICs to segregate their traffic within the controls of HP Virtual Connect



HP c7000

vmnic0 ——
vmnic1 ——
} Service console, vmkernel, vmotion, control, packet

vmnic2 ——
vmnic3 ——
} VM Data



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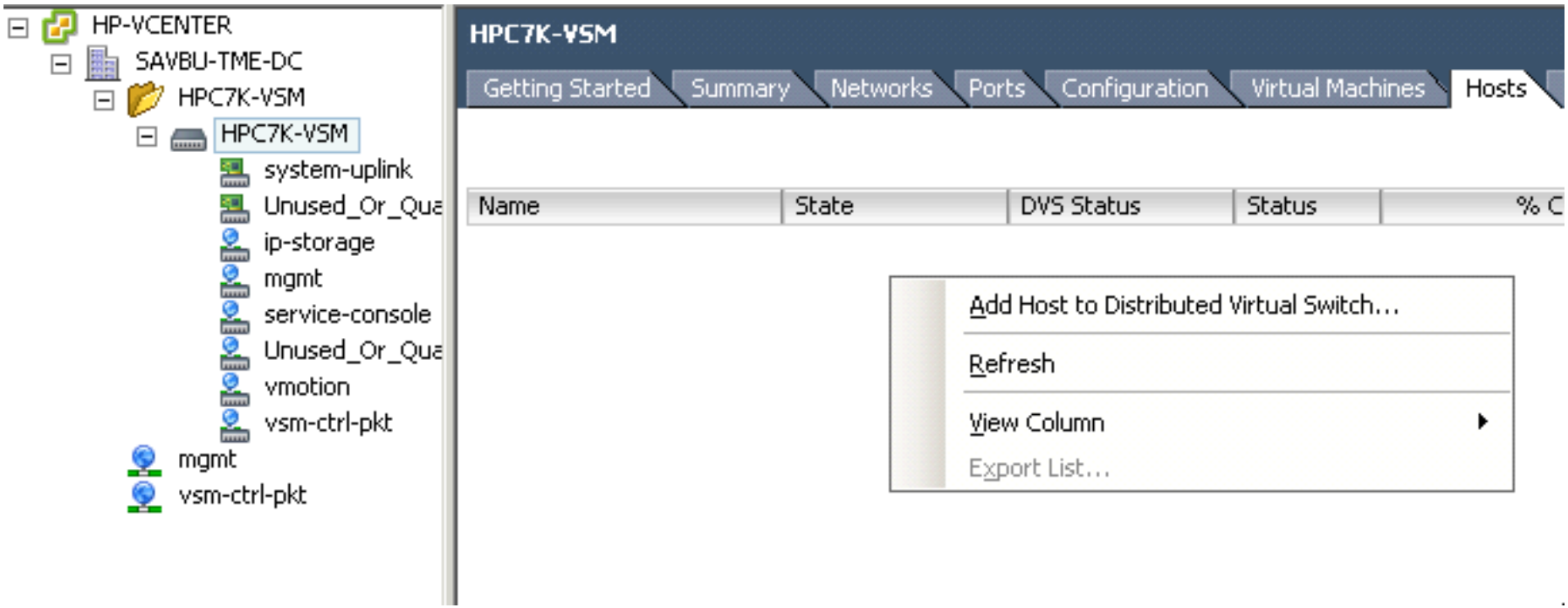
Adding Blade Server1 as VEM

- Under “Networking”, make sure to select the Nexus 1000V VSM and go to the “Host” tab
- Right-click and select “Add Host to Distributed Switch…”



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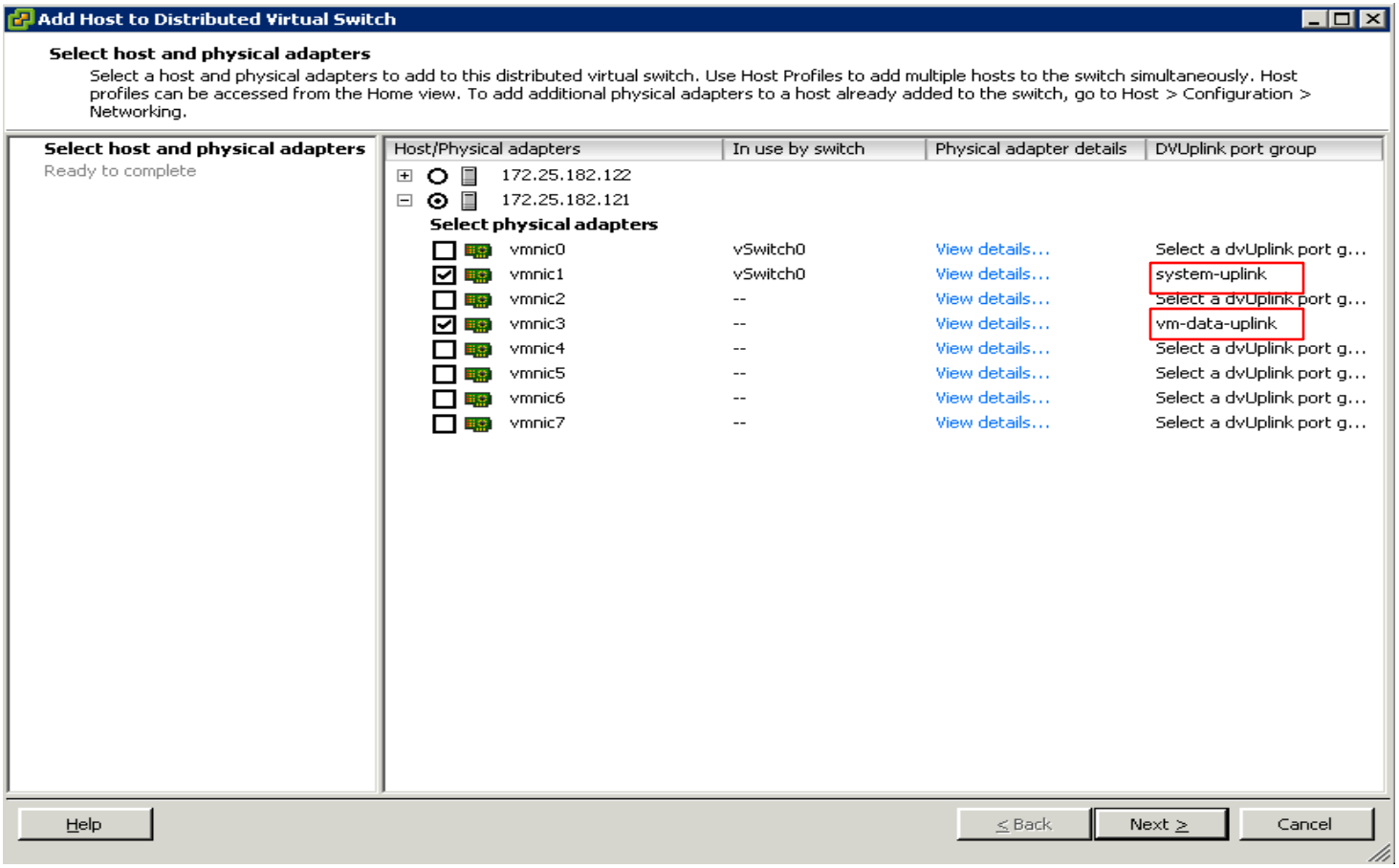
Adding Blade Server1 as VEM Continued…

- Choose the radio-button for blade server1
- There are 4 active vmnics that are currently used by vSwitch, select either vmnic0 or vmnic1 to be able to allow blade server1 to become a VEM (where control/packet traffic flows)
- Select the dvUplink port group, which in this case is “system-uplink” (click Next)
- Select either vmnic2 or vmnic3 so to allow “VM Data” traffic and select “vm-data-uplink”
- Additional physical nics will be added later for redundancy



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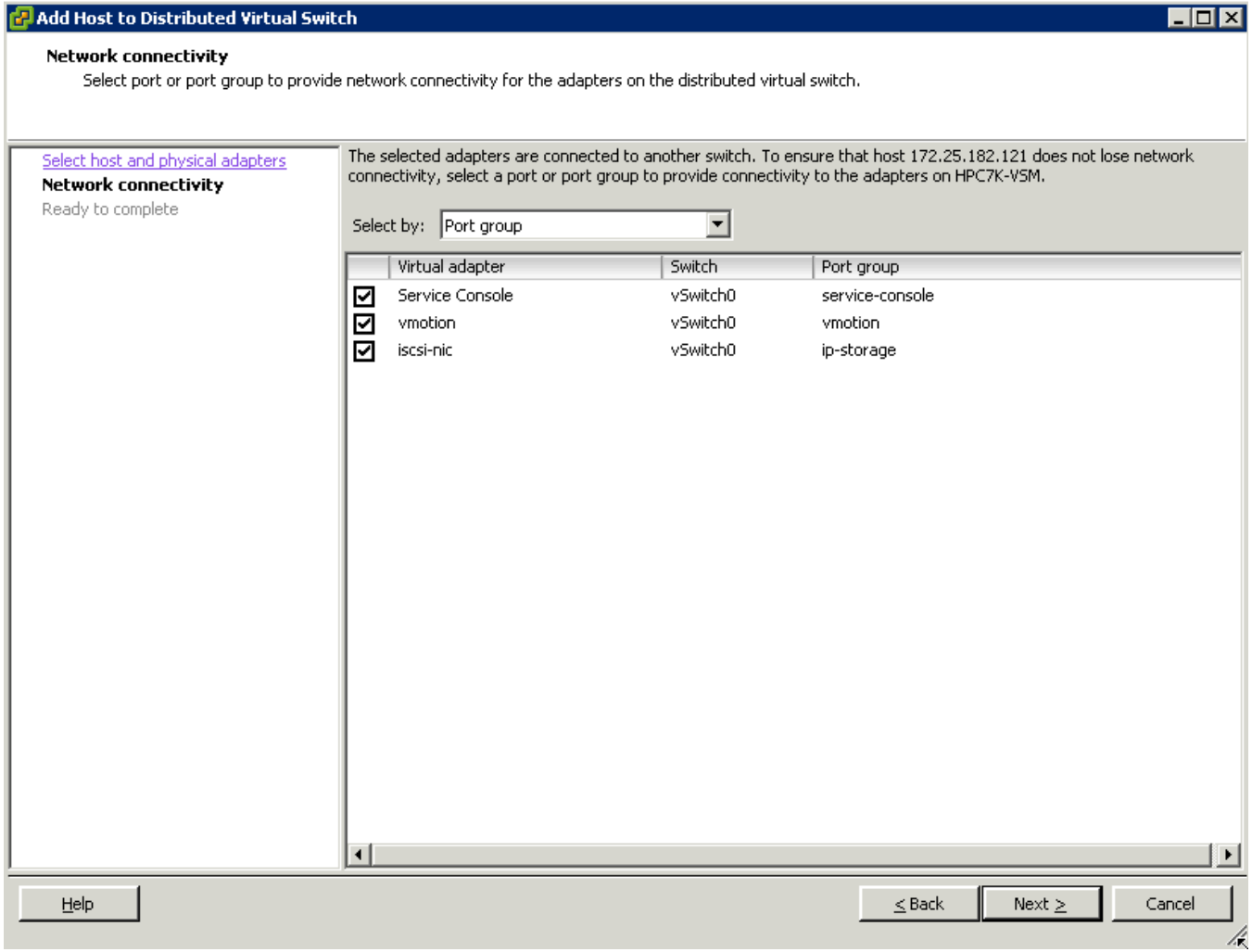
Adding Blade Server1 as VEM Continued…

- Migration of “vmkernel” port-groups can be done here, where port-profiles have already been created
- Choose appropriate “Port Group” for each virtual adapter and click on “Next”
- Please note that when migrating “Service Console”, make sure that the port-profile is configured correctly so that communication to the “Service Console” is not lost during this migration phase



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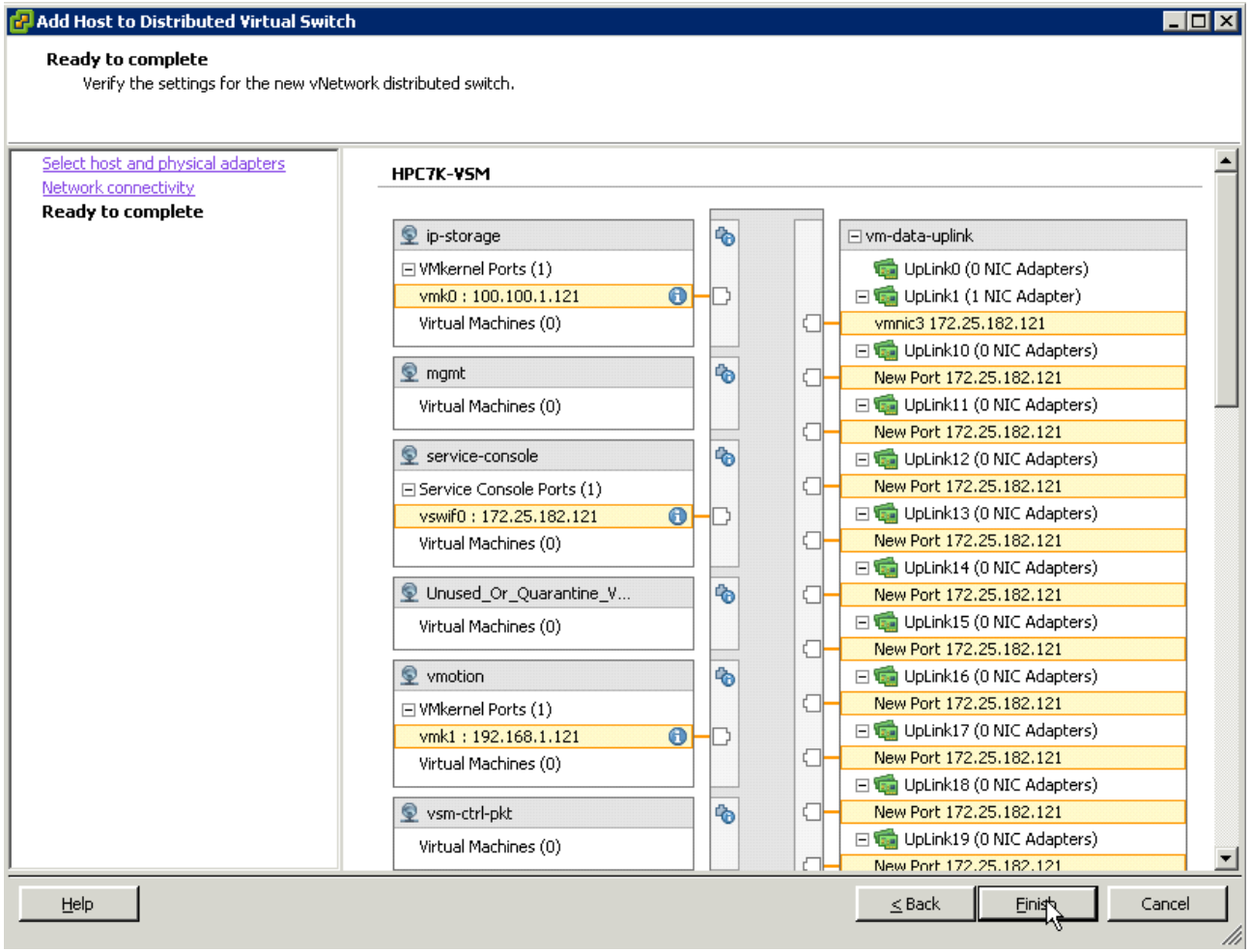
Adding Blade Server1 as VEM Continued…

- Click “Finish”
- Process of adding Blade Server 1 as a VEM begins
- Note that if VUM is installed, the VEM binaries are automatically installed to the ESX server. Otherwise a manual process to install the VEM on this ESX server is required. Please refer to the Nexus 1000V Configuration Guide for further detailed instructions



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Verifying Blade Server 1 as VEM

- Verify that the Blade Server1 is a VEM on the VSM

```
HPC7K-VSM# show module
Mod  Ports  Module-Type                    Model            Status
---  -----  -------------------------------- ------------------ ------------
1    0      Virtual Supervisor Module        Nexus1000V         active *
3    248    Virtual Ethernet Module          NA                 ok

Mod  Sw              Hw
---  --------------  ------
1    4.0(4)SV1(3)    0.0
3    4.0(4)SV1(3)    1.9

Mod  MAC-Address(es)                         Serial-Num
---  --------------------------------------  ----------
1    00-19-07-6c-5a-a8 to 00-19-07-6c-62-a8  NA
3    02-00-0c-00-04-00 to 02-00-0c-00-04-80  NA

Mod  Server-IP       Server-UUID                          Server-Name
---  --------------  -----------------------------------  --------------------
1    172.25.182.141  NA                                   NA
3    172.25.182.121  0f809228-bc48-6141-b99e-20c50babdbdc  bl490cg6-esx-01
```

•this terminal session

```
HPC7K-VSM# show interface virtual

--------------------------------------------------------------------------------
Port        Adapter      Owner                    Mod Host
--------------------------------------------------------------------------------
Veth1       vswif0       VMware Service Console   3   172.25.182.121
Veth2       vmk1         VMware VMkernel          3   172.25.182.121
Veth3       vmk0         VMware VMkernel          3   172.25.182.121
```

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Verifying Blade Server 1 as VEM Continued

- Verify Physical Interfaces for VEM

```
HPC7K-VSM# show module
Mod  Ports  Module-Type                    Model            Status
---  -----  -------------------------------- ------------------ ------------
1    0      Virtual Supervisor Module        Nexus1000V         active *
3    248    Virtual Ethernet Module          NA                 ok

Mod  Sw              Hw
---  --------------  ------
1    4.0(4)SV1(3)    0.0
3    4.0(4)SV1(3)    1.9

Mod  MAC-Address(es)                         Serial-Num
---  --------------------------------------  ----------
1    00-19-07-6c-5a-a8 to 00-19-07-6c-62-a8  NA
3    02-00-0c-00-04-00 to 02-00-0c-00-04-80  NA

Mod  Server-IP        Server-UUID                          Server-Name
---  ---------------  ------------------------------------  --------------------
1    172.25.182.141   NA                                    NA
3    172.25.182.121   0f809228-bc48-6141-b99e-20c50babdbdc  bl490cg6-esx-01


•this terminal session
HPC7K-VSM# show interface virtual

--------------------------------------------------------------------------------
Port        Adapter      Owner                    Mod Host
--------------------------------------------------------------------------------
Veth1       vswif0       VMware Service Console   3   172.25.182.121
Veth2       vmk1         VMware VMkernel          3   172.25.182.121
Veth3       vmk0         VMware VMkernel          3   172.25.182.121
```

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Verifying Blade Server 1 as VEM

- Verify that the Blade Server1 is a VEM on the VSM

```
HPC7K-VSM# show interface brief

--------------------------------------------------------------------------------
Port     VRF          Status IP Address                 Speed    MTU
--------------------------------------------------------------------------------
mgmt0    --           up     172.25.182.141             1000     1500

--------------------------------------------------------------------------------
Ethernet      VLAN   Type Mode   Status  Reason               Speed     Port
Interface                                                    Ch #
--------------------------------------------------------------------------------
Eth3/2        182    eth  trunk  up      none                   10(D) 1
Eth3/4        1      eth  trunk  up      none                   10(D) 2

--------------------------------------------------------------------------------
Port-channel VLAN  Type Mode   Status  Reason               Speed  Protocol
Interface
--------------------------------------------------------------------------------
Po1          182   eth  trunk  up      none                 a-10(D)  none
Po2          1     eth  trunk  up      none                 a-10(D)  none

--------------------------------------------------------------------------------
Port     VRF          Status IP Address                 Speed    MTU
--------------------------------------------------------------------------------
ctrl0    --           up     --                         1000     1500
```

Note: Each of the uplink port-profiles has 1 physical interface and is automatically added to a Port-Channel

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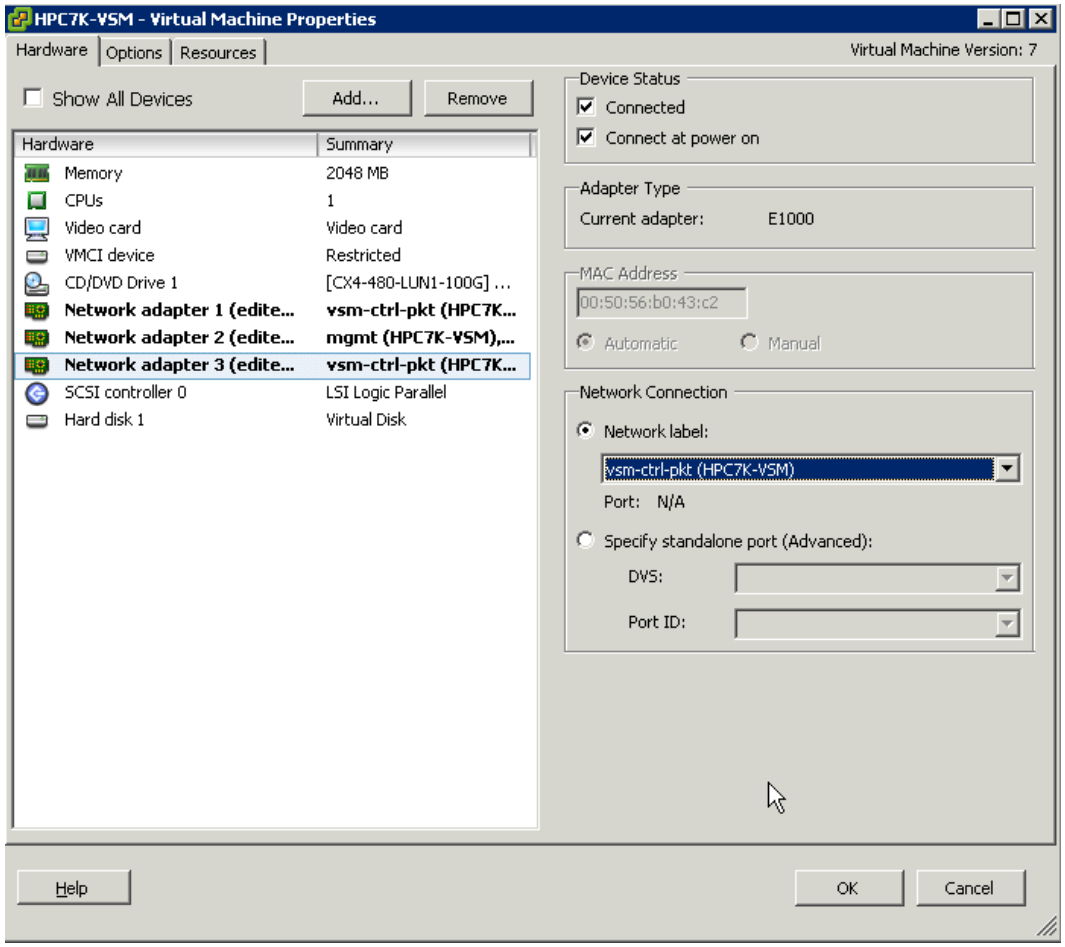
Moving VSM behind VEM

- Go to “Edit Settings” for the VSM VM
- Select the adapters (1 & 3)and modify the port-group to utilize the port-profile (vsm-ctrl-pkt under Nexus 1000V) for the appropriate adapter. This port-profile was shown earlier
- Select adapter 2 and choose the port-group for the “mgmt” from the VSM
- Click on “OK” and when it completes refreshing the network, there will be a minor disruption in the access of the VSM during this process but will recover. Data traffic will not be affected for any VMs that has already been utilizing the Nexus 1000V



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Verifying VSM is behind VEM

- Take note of the virtual interfaces created for the 3 interfaces of the VSM

```
HPC7K-VSM# show interface virtual

------------------------------------------------------------------------------
Port       Adapter       Owner                    Mod Host
------------------------------------------------------------------------------
Veth1      vswif0        VMware Service Console   3   172.25.182.121
Veth2      vmk1          VMware VMkernel          3   172.25.182.121
Veth3      vmk0          VMware VMkernel          3   172.25.182.121
Veth4      Net Adapter 1 HPC7K-VSM                3   172.25.182.121
Veth5      Net Adapter 2 HPC7K-VSM                3   172.25.182.121
Veth6      Net Adapter 3 HPC7K-VSM                3   172.25.182.121
```

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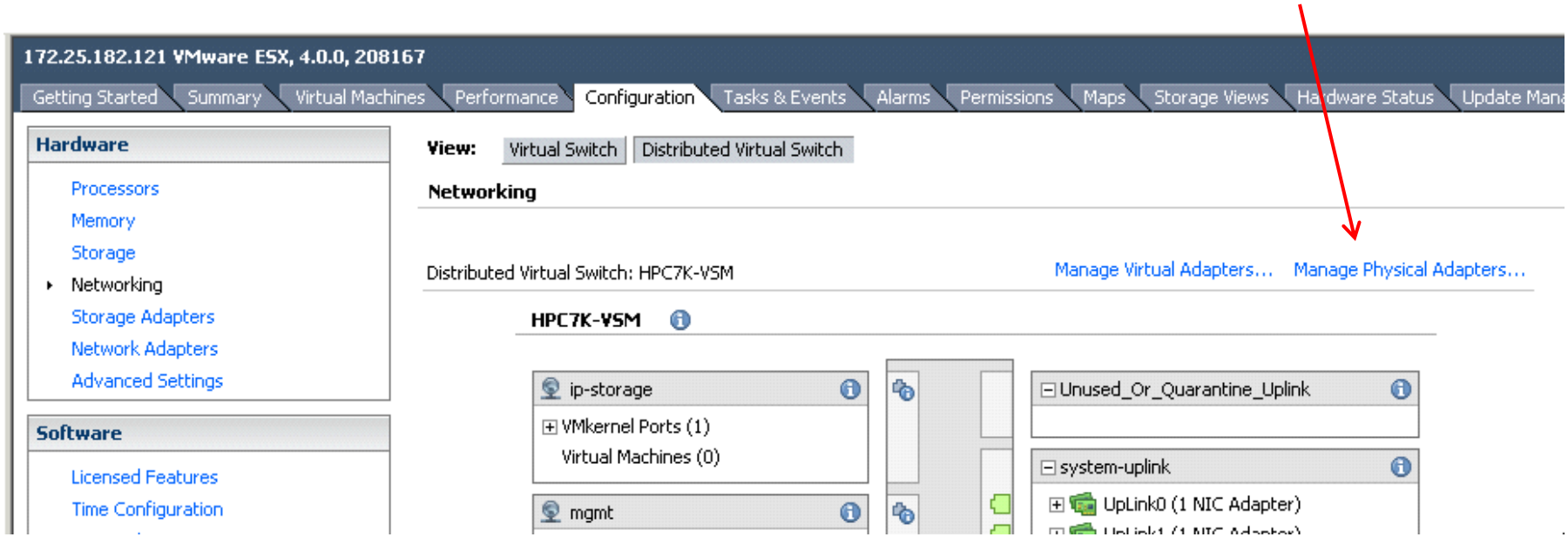
Adding second vmnic to Nexus 1000V

- Go to “Configuration” tab and select “Networking”
- Select “Distributed Virtual Switch” and click on “Manage Physical Adapters” near the top right hand side



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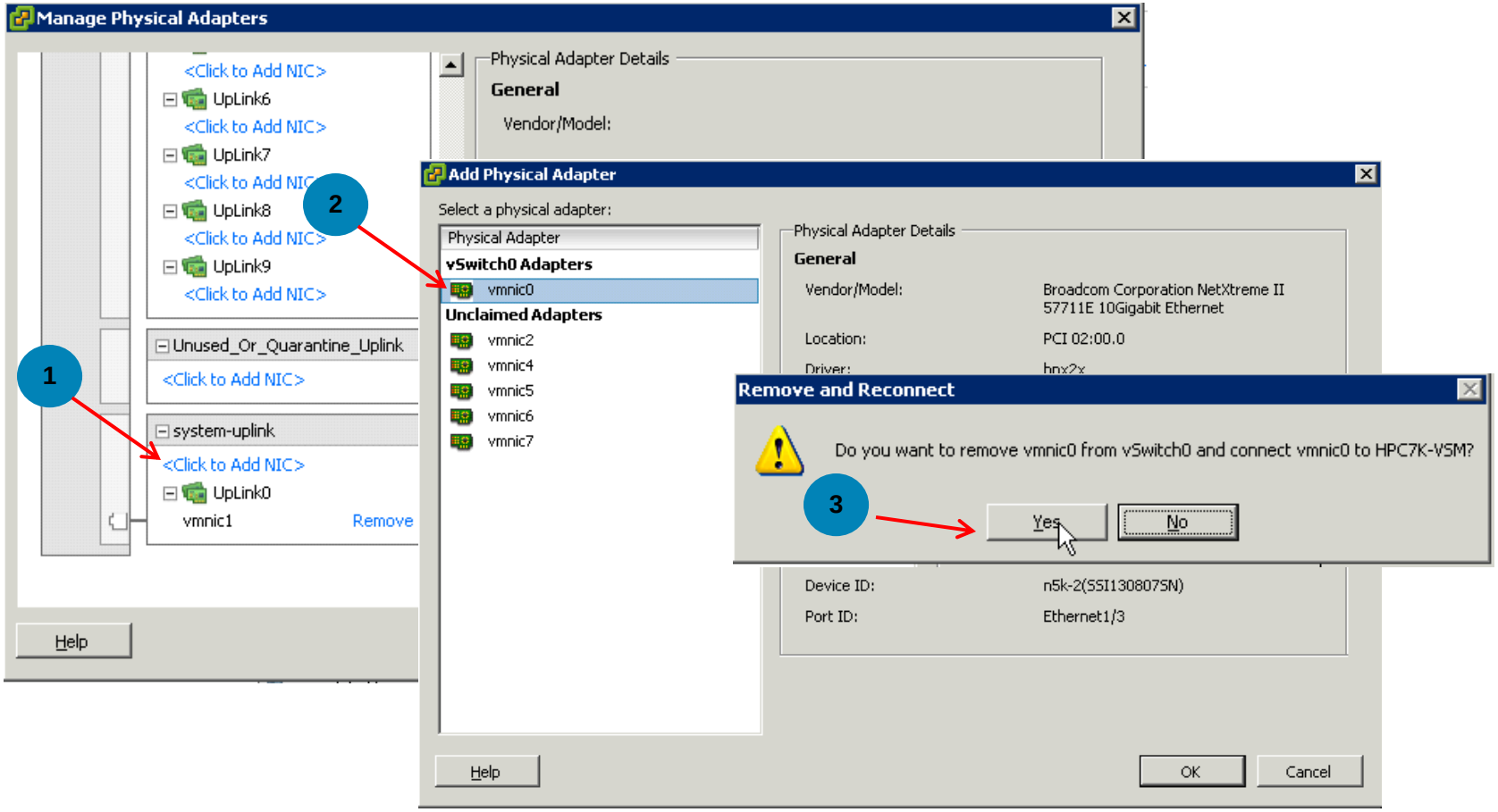
Adding second vmnic to system-uplink port-profile

1. Click on “<Click to Add NIC>” under the “system-uplink” section
2. Another window will appear and select “vmnic0” and click “OK”
3. Another warning message will appear and click on “Yes”

When completed, vminc0 will be shown as another interface used for Nexus 1000V



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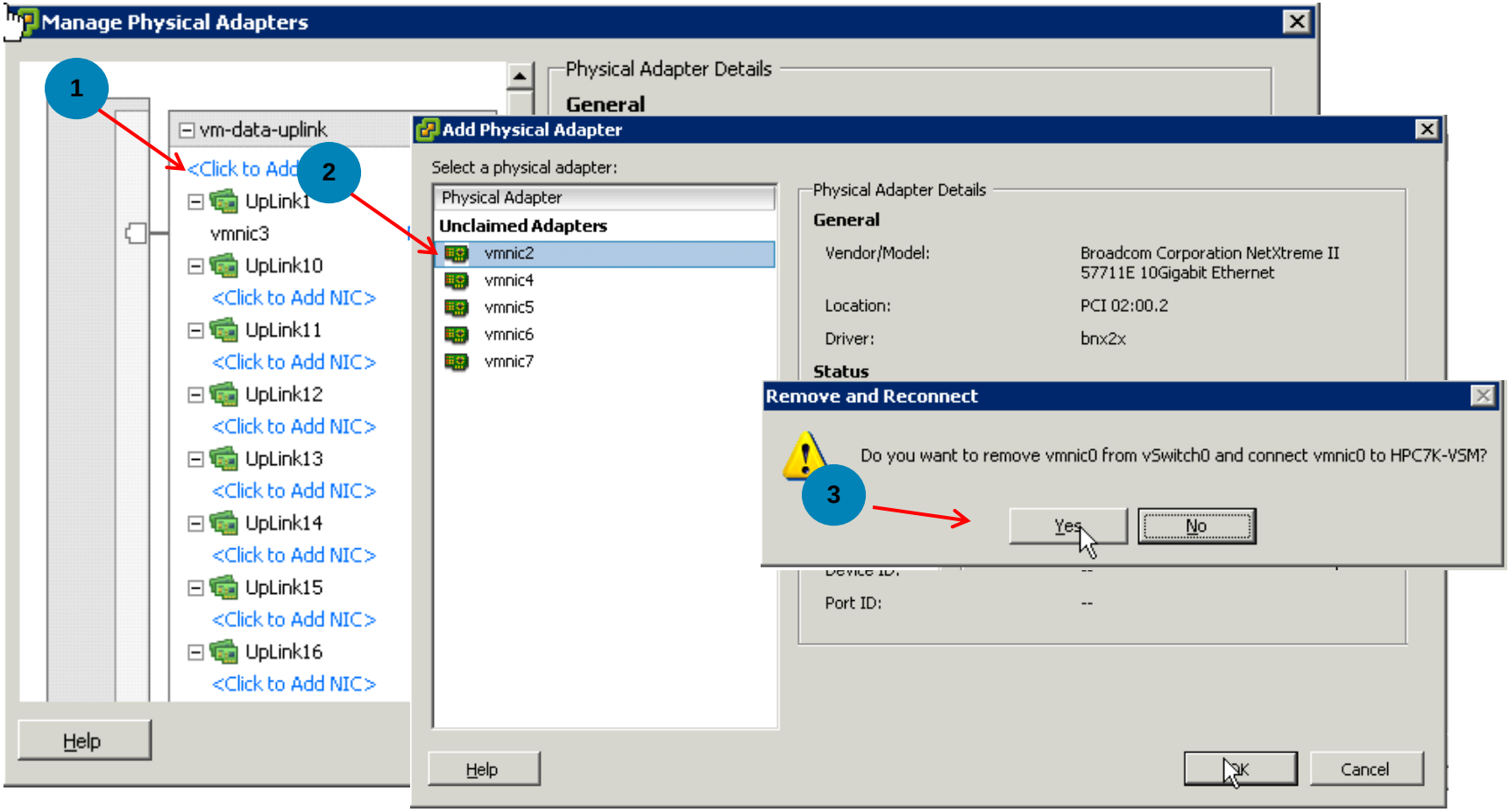
Adding second vmnic to vm-data-uplink port-profile

1. Click on “<Click to Add NIC>” under the “vm-data-uplink” section
2. Another window will appear and select “vmnic2” and click “OK”
3. Another warning message will appear and click on “Yes”

When completed, vminc2 will be shown as another interface used for Nexus 1000V



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Verifying both vmnics are used for Nexus 1000V

- Run the following commands to verify both vmnics are used for Nexus 1000V for both uplink port-profiles

```
HPC7K-VSM# show interface brief

--------------------------------------------------------------------------------
Port    VRF          Status IP Address                Speed    MTU
--------------------------------------------------------------------------------
mgmt0   --           up     172.25.182.141            1000     1500

--------------------------------------------------------------------------------
Ethernet     VLAN   Type Mode   Status  Reason              Speed     Port
Interface                                                  Ch #
--------------------------------------------------------------------------------
Eth4/1       182    eth  trunk  up      none                10(D) 1
Eth4/2       182    eth  trunk  up      none                10(D) 1
Eth4/3       1      eth  trunk  up      none                10(D) 2
Eth4/4       1      eth  trunk  up      none                10(D) 2

--------------------------------------------------------------------------------
Port-channel VLAN  Type Mode   Status  Reason              Speed  Protocol
Interface
--------------------------------------------------------------------------------
Po1          182   eth  trunk  up      none                a-10(D)  none
Po2          1     eth  trunk  up      none                a-10(D)  none

…. <skip>

HPC7K-VSM# show running-config interface port-channel 1
version 4.0(4)SV1(3)

interface port-channel1
  inherit port-profile system-uplink

HPC7K-VSM# show running-config interface port-channel 2
version 4.0(4)SV1(3)

interface port-channel2
  inherit port-profile vm-data-uplink
```

Physical interfaces automatically added in Port-Channel

Shows which uplink port-profile the port-channel belongs to

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Repeat steps to add more VEMs

- For each additional ESX server, following the same procedure to add the VEM
- Steps on moving the VSM behind the VEM will depend if you have the secondary VSM on another ESX server that will be used as a VEM, if so, follow the same procedure
- It is always a best practice to utilize a single “vmnic” to allow to add the VEM first, then when things are functional, then add the second vmnic under Nexus 1000V control
- If existing VMs are using vSwitch port-groups, make sure that port-profiles are created for those to allow the migration of those VMs to be under control of the Nexus 1000V (i.e. VM Data Traffic – port-profiles)

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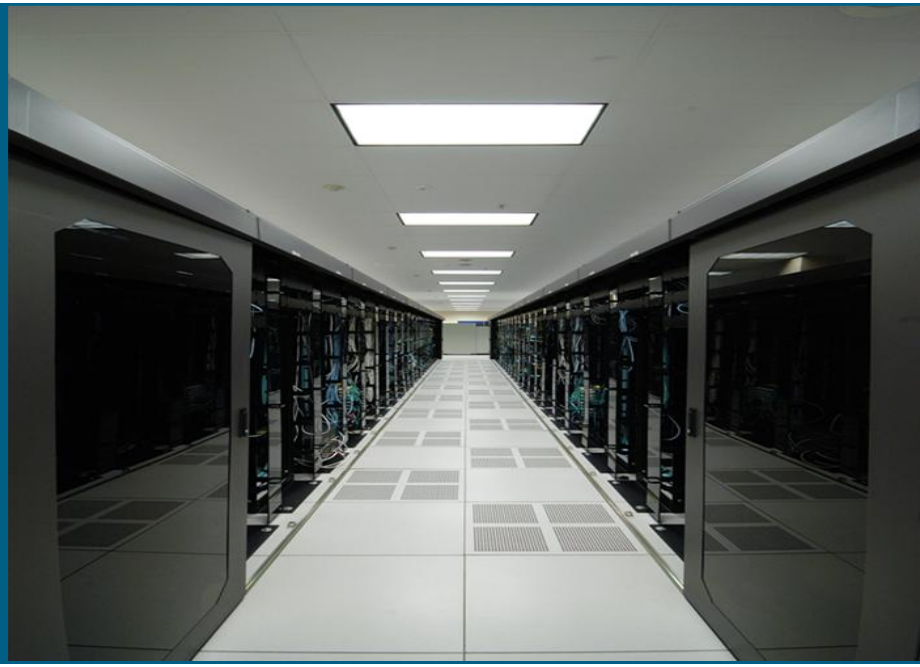
Advance Configurations



vPC on Nexus 5000 with Flex-10

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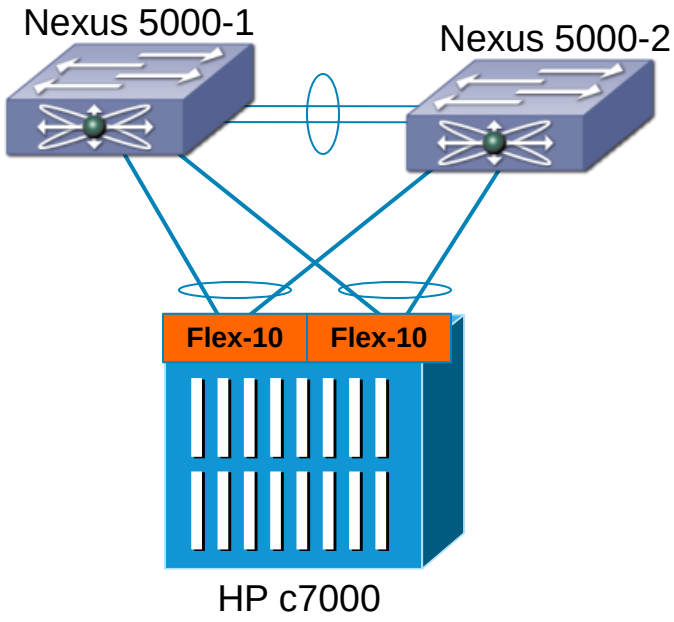
vPC on Nexus 5000 with Flex-10



- vPC provides additional redundancy upstream in case a single upstream switch fails
- Following details provide example on how to configure Nexus 5000 with Flex-10 for vPC
- For detail vPC configuration, please consult the Nexus 5000 configuration guide

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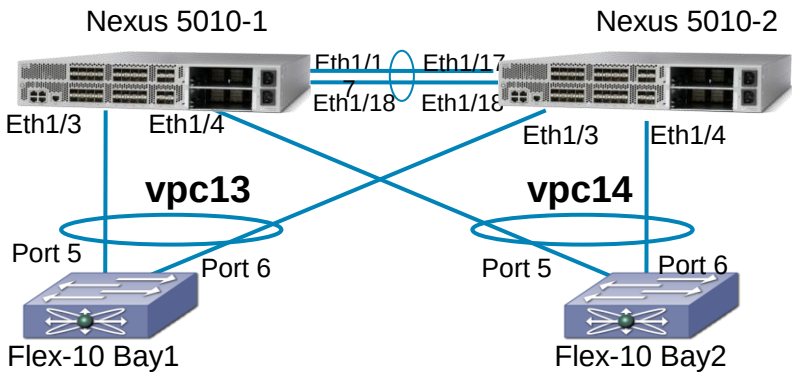
Nexus 5010-1 Configuration

Nexus 5010-1 (Flex-10 Bay1)

```
n5k-1# show running-config interface ethernet 1/3-4

version 4.2(1)N1(1)

interface Ethernet1/3
  switchport mode trunk
  switchport trunk native vlan 182
  channel-group 13 mode active

interface Ethernet1/4
  switchport mode trunk
 switchport trunk native vlan 182
 channel-group 14 mode active

n5k-1# show running-config interface port-channel 13-14
version 4.2(1)N1(1)

interface port-channel13
  switchport mode trunk
  vpc 13
  switchport trunk native vlan 182
  spanning-tree port type edge trunk

interface port-channel14
  switchport mode trunk
  vpc 14
  switchport trunk native vlan 182
  spanning-tree port type edge trunk
```

N5K-1 & N5K-2 Port-Channel

```
n5k-1# show running-config interface ethernet 1/17-18

version 4.2(1)N1(1)

interface Ethernet1/17
  switchport mode trunk
  channel-group 1 mode active

interface Ethernet1/18
  switchport mode trunk
  channel-group 1 mode active

n5k-1# show running-config interface port-channel 1

version 4.2(1)N1(1)

interface port-channel1
  switchport mode trunk
  vpc peer-link
  spanning-tree port type network
```



Note: HPVC Flex-10 supports LACP, so configure the Nexus 5000 interfaces to channel-group mode "active" that are connected to the Flex-10 in the Port-Channel

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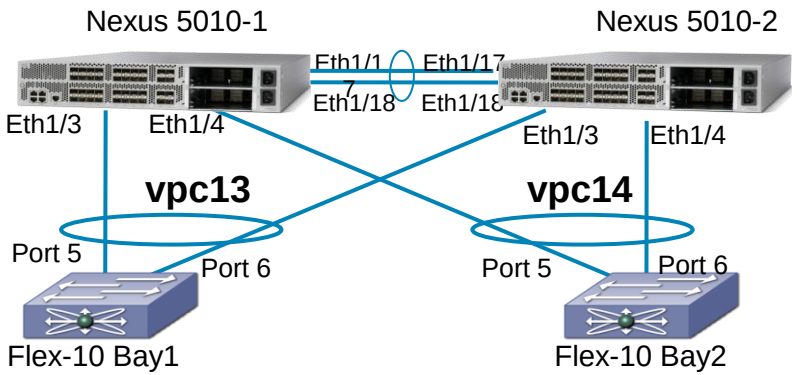
Nexus 5010-2 Configuration

Nexus 5010-2 (Flex-10 Bay1)

```
n5k-2# show running-config interface ethernet 1/3-4

version 4.2(1)N1(1)

interface Ethernet1/3
  switchport mode trunk
  switchport trunk native vlan 182
  channel-group 13 mode active

interface Ethernet1/4
  switchport mode trunk
 switchport trunk native vlan 182
 channel-group 14 mode active

n5k-2# show running-config interface port-channel 13-14
version 4.2(1)N1(1)

interface port-channel13
  switchport mode trunk
  vpc 13
  switchport trunk native vlan 182
  spanning-tree port type edge trunk

interface port-channel14
  switchport mode trunk
  vpc 14
  switchport trunk native vlan 182
  spanning-tree port type edge trunk
```

N5K-2 & N5K-1 Port-Channel

```
n5k-2# show running-config interface ethernet 1/17-18

version 4.2(1)N1(1)

interface Ethernet1/17
  switchport mode trunk
  channel-group 1 mode active

interface Ethernet1/18
  switchport mode trunk
  channel-group 1 mode active

n5k-2# show running-config interface port-channel 1

version 4.2(1)N1(1)

interface port-channel1
  switchport mode trunk
  vpc peer-link
  spanning-tree port type network
```



Note: HPVC Flex-10 supports LACP, so configure the Nexus 5000 interfaces to channel-group mode "active" that are connected to the Flex-10 in the Port-Channel

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