

Hewlett Packard
Enterprise

NonStop Technical Boot Camp 2023

TBC23 TB63 Evolving your vNS Environment to keep your NonStop Business Running

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Agenda

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2 to 4 Disk Path Reconfiguration

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Reconfiguring VM Networks



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What Is Evolving



Business Requirements Driving Change for vNS

- Adoption of virtualization mandated by IT management
- Converting a POC to production
- Improving storage availability
- Increasing NSK disk volumes capacity
- Adding NSK disk volumes
- Changing backend storage products
- Adding and removing NICs
- N + 1 ESXi hosts
 - Refer to the vNS Rolling Outages discussion in the talk: “Best Practices for Configuring and Managing HPE Virtualized NonStop Systems for Mission Critical Workloads



Online Evolution Challenges



Online Evolution Challenges

- Initial storage design no longer meets business requirements
- Some storage reconfiguration tasks require stopping NonStop virtual machines
- VMware vMotion
 - SR-IOV is problematic for vMotion
 - Works fine for Windows and Linux virtual machines
 - “Offline vMotion” for NonStop virtual machines
- Anticipate long execution times when moving or rebuilding NSK volumes
- Leverage standard NonStop online capabilities
 - Changing DP2 attributes online (NUMDISKPROCESSES)
 - Online disk capacity upgrades (swap mirror)
 - NonStop Dynamic Capacity
 - CLIM reimage
- Avoid planned system outages by execute vNS workflows only on the primary or mirror NSK disk

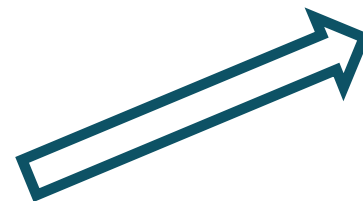


Internal to External VMware Datastore Moves



Planning for Disk Moves to External Storage

- VMware datastore configuration tasks complete
- Reference the section on 2 to 4 disk path reconfiguration
- Execute the vNS workflow Migrate NSK volumes
- Limit the number of concurrent disk migration tasks
 - Group 1a: \$DATA1 - \$DATA5 primary disks
 - Group 1b: \$DATA1 - \$DATA5 mirror disks
 - Group 2a: \$DATA6 - \$DATA10 primary disks
 - Group 2b: \$DATA6 - \$DATA10 mirror disks
- Online move of NSK volumes from internal to external storage
- Build script files to automate SCF commands to stop and start NSK disks
- Build the JSON files for reconfiguring disk paths
 - Including \$SYSTEM



Sample JSON File for Moving NSK Disks

- Create a JSON file for moving group 1a mirror NSK disks
- Don't destroy the existing NSK data: "deleteOldFiles": false
- Add more entries in the "volsToMigrate" section (only one NSK volume shown)

```
{
  "datacenterName": "vNS",
  "sysName": "vmwr1",
  "deleteOldFiles": false,
  "volsToMigrate": [
    {
      "name": "$DATA1",
      "datastoreFrom": "compute4LocalDS",
      "datastoreTo": "vNS MirrorDS"
    }
  ],
  "ignoreExistingFiles": true
}
```



- Internal Storage Configuration
 - \$DATA1-P (compute3LocalDS)
 - \$DATA1-M (compute4LocalDS)



- External storage Configuration
 - vNS PrimaryDS & vNS MirrorDS

Execute the vNS Migration Workflow

- NSK storage health checks & backups complete
- SCF STOP DISK (\$DATA1-M, \$DATA2-M, \$DATA3-M)
- Launch vRO
- Execute Migrate NSK Volumes
- Select the appropriate JSON file (e.g. Group 1a)
- Monitor the migrate actions
- Revive the NSK volumes
- Repeat for the remaining migration groups



- It's possible that the vNS workflow status shows a timeout (may be a false positive)
- Allow the action to complete
- Status the VMDK file moves using vCenter
 - “Copy To” action



Migrate NSK Volumes using vNS GUI

+ Migrate vNS Volumes ✕

Datacenter: Volumes: Datastore From:
vNS: Datastore To:

Volume	Path	Datastore From	Datastore To	
DATA1	Primary	DsVols_Big_p	datastore2	<input type="button" value="Delete"/>
DATA3	Primary	DsVols_b_p	datastore2	<input type="button" value="Delete"/>
SYSTEM	Primary	DsVols_b_p	datastore2	<input type="button" value="Delete"/>

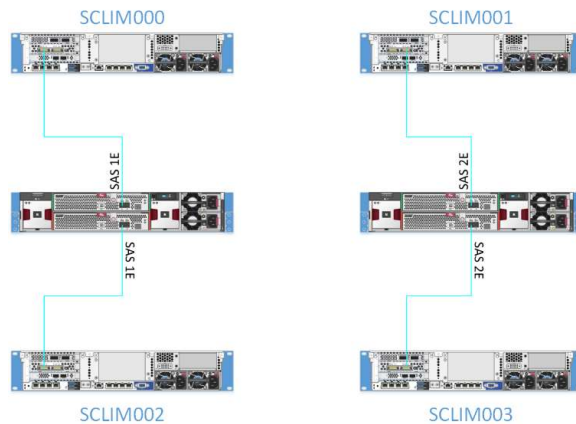
Delete Old Files Ignore Existing Files Rollback Disk Copies

2 to 4 Disk Path Reconfiguration



Planning for 2 to 4 Disk Path Reconfiguration

- Reference Internal to External VMware Datastore Moves section
- NSK volumes configured using disks internal to the ESXi host only supports 2 disk paths
- A 4-disk path configuration requires backend storage external to the ESXi host
- Configuring VMware datastores using vSAN allows for 4 disk paths



- Requires cold loading \$SYSTEM using the 4-path option (planned outage)
- Verify the total number of LUNs assigned to the below 400
 - A LUN is assigned to each disk path
 - 400 LUNs (split between 2 Storage vCLIMs)
 - 100 Primary paths
 - 100 Backup paths
 - 100 Mirror paths
 - 100 Mirror backup paths
- Build script files to automate SCF commands to stop, delete, re-add and start NSK disks
- Build the JSON files for reconfiguring disk paths

Execute the vNS Disk Reconfiguration Workflow

- NSK storage health checks & backups complete
- Remove the targeted NSK volumes from TMF
- Execute the SCF script to remove the targeted NSK volumes
- Launch vRO
- Execute Reconfigure NSK Volumes workflow in two steps
 - Remove volumes
 - Add volumes using Backup and Mirror Backup paths
- Execute LUNMGR to re-discover the new LUN assignments
- Execute the SCF script to re-add the targeted NSK volumes
- Repeat for the remaining migration groups
- It's possible that the vNS workflow status shows a timeout (may be a false positive)
- Allow the action to complete
- Status the Storage CLIM VM using vCenter
- Save the workflow output
 - GNSC will request when placing a support request
- More NSK volume 4-path configuration changes done concurrently



Sample JSON File for Removing NSK Disks

- Run Reconfigure NSK Volumes workflow to remove the volume
- Keep the VMDK file on the external datastore for later re-use

```
{  
  "sysName": "SYSNAME",  
  "datacenterName": "YourDatacenter",  
  "removeVols": [  
    {  
      "name": "$DATA1"  
    }  
  ],  
  "faultZone": 2  
}
```

Sample JSON File for Adding NSK Disks

- Run Reconfigure NSK Volumes workflow to add the volume
- Keep the VMDK file on the external datastore for later re-use

```
{
  "sysName": "SYSNAME",
  "datacenterName": "YourDatacenter",
  "newVols": [
    {
      "name": "$SYSTEM",
      "sizeGb": 300,
      "primaryClim": "SCLIM000",
      "backupClim": "SCLIM001",
      "primaryDatastore": "datastoreP",
      "mirrorClim": "SCLIM001",
      "mirrorBackupClim": "SCLIM000",
      "mirrorDatastore": "datastoreM",
    }
  ],
  "faultZone": 2
}
```



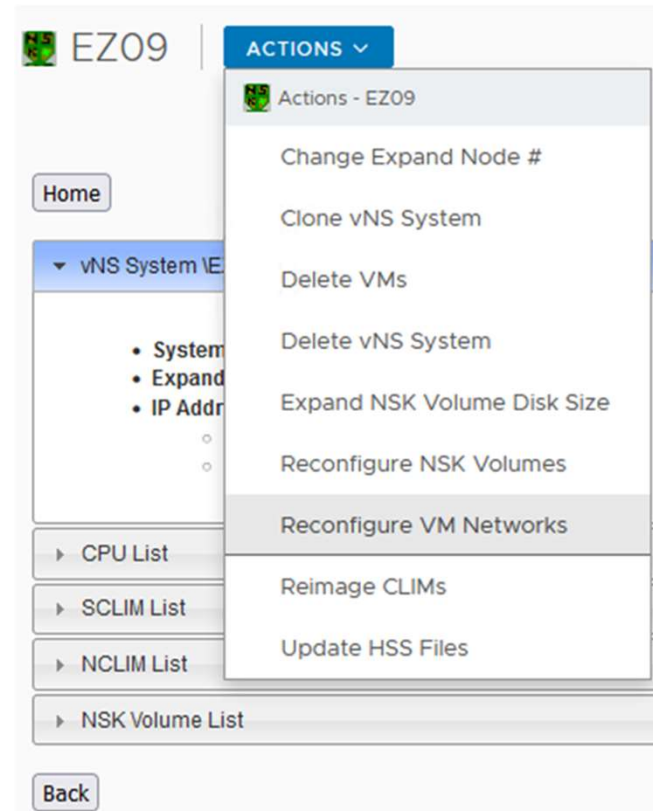
Online Disk Capacity Expansion



Graphical Actions for a vNS System

vNS App Plugin Actions added to vNS System Action List

- Expand NSK Volume Disk Size
- Reconfigure VM Networks



vNSK Disk Expansion

- Workflow: Expand NSK Volume Disk Size
- Supported starting at L22.09
 - vNS Deployment Tool for VMware version T0876_L01-AAR
 - DP2 version T9053_L03-BCK
- Using the vNS Deployment Tool GUI is convenient
- NSK Volume Size Limits
 - T9053^ L03^BCX & later support 1.6TB NSK volumes
 - T9053^ L03^BCK introduced support for 1.0 TB NSK volumes
- Requires user to expand the Primary and Mirror disk of a single volume separately
- Make sure the alternate disk path(s) are available before executing Expand NSK Volume Disk Size
- Enable DP2 CAPACTIYMISMATCH



Sample JSON File for Expanding NSK Disks

- Run Expand NSK Volume Disks workflow
 - Using vNS GUI or workflow
 - Only Primary or Mirror disk per workflow run



```
{  
  "datacenterName": "OSM Datacenter",  
  "sysName": "vNSd",  
  "expandDisks": [  
    {"diskName": "$DATA1_p", "sizeGb": 36 },  
    {"diskName": "$DATA2_p", "sizeGb": 36 }  
  ]  
}
```




Execute the Expand NSK Volume Disk Workflow

- NSK storage health checks complete
- SCF STOP DISK (\$DATA1-M, \$DATA2-M, \$DATA3-M)
- Launch vRO or vNS GUI
- Execute Expand NSK Volume Disk
- Select the appropriate JSON file (e.g. Group 1a)
- Monitor the workflow actions
- Revive the NSK volumes
- Repeat for the remaining migration groups
- It's possible that the vNS workflow status shows a timeout (may be a false positive)
- Allow the action to complete
- Status the VMDK file moves using vCenter



Expand NSK Volume Size

 Expand NSK Volume Disk Size ✕

Select the disk(s) you would like to expand. By default, the primary disk will be expanded for disks that are equal in size and the smaller of two disks will be expanded (to the larger size) for disks that are not equal in size. Set the disk selection to 'None' or leave the new disk size empty to abstain from expanding that volume.

Volume	Primary Disk Size (GB)	Mirror Disk Size (GB)	Disk Selection	New Disk Size (GB)
BCI	1	1	Primary ▾	<input type="text"/>
DATA1	11	11	Primary ▾	<input type="text"/>
DATA2	10	10	Primary ▾	<input type="text"/>
DATA3	1	1	Primary ▾	2 <input type="text"/>
DATA4	1	1	Primary ▾	<input type="text"/>
DATA6	1	1	Primary ▾	<input type="text"/>
DATA7	1	1	Primary ▾	<input type="text"/>
ONEPATH	1	1	Primary ▾	<input type="text"/>
SYSTEM	100	100	Primary ▾	<input type="text"/>
TEST1010	1	1	Primary ▾	<input type="text"/>

Back Next Cancel



Reconfiguring NonStop VM Networks



What's Driving Network Changes

- Applying ESXi host software updates (e.g. CVEs) requires stopping the host for a number of hours
- ESXi host fails, troubleshooting and repairs may take hours or days
- 2nd fabric NICs added, reconfigure Y fabric to use new NIC
- Previously configured network is no longer needed
- Physical network switch ports are filled and more network connections are required
- SR-IOV NIC replacement is required due to a failed NIC



Reconfigure VM Networks Using JSON File

```
{  
  "datacenterName" : "OSM DataCenter",  
  "vmsToChangeNet": [  
    {  
      "vmName": "SYS_NCLIM001",  
      "newPciAddress" : "0000:81:00.0",  
      "newPciAddressYFab" : "0000:37:00.1",  
      "newInterfaces": [  
        {  
          "interfaceName" : "eth1",  
          "networkName" : "VM Network"  
        },  
        {  
          "interfaceName" : "eth2",  
          "macAddress" : "9c:dc:71:79:ba:b8",  
          "pciAddress" : "0000:81:00.0"  
        },  
        {  
          "interfaceName" : "eth3",  
          "pciAddress" : "0000:84:00.0",  
          "networkName": "VM Network"  
        }  
      ],  
      "removeInterfaces": ["eth4", "eth5"]  
    }  
  ]  
}
```

Reconfiguring VM Networks Using vNS GUI Deployment

The screenshot shows the vNS GUI interface for a system named 'EZ09'. A blue 'ACTIONS' dropdown menu is open, listing various management tasks. The 'Reconfigure VM Networks' option is highlighted in grey, and a red arrow points from it to the right-hand screenshot. Other options in the menu include 'Change Expand Node #', 'Clone vNS System', 'Delete VMs', 'Delete vNS System', 'Expand NSK Volume Disk Size', 'Reconfigure NSK Volumes', 'Reimage CLIMs', and 'Update HSS Files'. The left sidebar shows a navigation tree with 'vNS System VE' expanded, and buttons for 'Home' and 'Back' are visible.

The 'Reconfigure VM Networks' dialog box is shown, containing the following configuration fields:

- Select Virtual Machine: NCLIM000
- Current PciAddress: 0000:37:00:0
- Current PciAddress Yfab: 0000:86:00:1
- New PciAddress: [Empty]
- New Y PciAddress: [Empty]
- Select Orchestrator: Custom Orchestrator
- FQDN: [Empty]
- Orchestrate with vRO 8.x: [Unchecked]
- Automatic Login: [Checked]

Buttons for 'Submit' and 'Cancel' are located below the fields. At the bottom of the dialog is a table with the following data:

Edit	Interface Name	Interface Type	Network Name	PCI Address	MAC Address	Remove Interface
Edit	ETH 1					<input type="checkbox"/>

Reconfiguring VM Networks #2

Reconfigure VM Networks

Select Virtual Machine: SCLIM001 ▼

- NCLIM000
- SCLIM001
- SCLIM000
- NCLIM001

Current PciAddress:

Current PciAddress Yfab:

New PciAddress:

New Y PciAddress:

Select Orchestrator: Custom Orchestrator ▼

FQDN:

Orchestrate with vRO 8.x:

Automatic Login:

Edit	Interface Name	Interface Type	Network Name	PCI Address	MAC Address	Remove Interface
<input type="button" value="Edit"/>	ETM					



Reconfiguring VM Networks #3

Reconfigure VM Networks

Select Virtual Machine: NCLIM001

Current PciAddress: 0000:37:00.0

Current PciAddress Yfab: 0000:86:00.1

New PciAddress: 0000:86:00.0

New Y PciAddress: 0000:37:00.1

Select Orchestrator: Custom Orchestrator

FQDN:

Orchestrate with vRO 8.x:

Automatic Login:

Submit **Cancel**

Edit	Interface Name	Interface Type	Network Name	PCI Address	MAC Address	Remove Interface
Edit	ETH 1					<input type="checkbox"/>



Reconfiguring VM Networks #4

Reconfigure VM Networks

Select Virtual Machine: NCLIM000

Current IP Address: 192.168.1.100

Current MAC Address: 00:0C:29:00:00:00

New IP Address:

New MAC Address:

Select Operating System:

Orchestration:

Automatically Reconfigure:

Edit Interface 1

Interface Type: VMXNET3

Network Name: VM Network

PCI Address:

MAC Address:

Edit	Interface Name	Interface Type	Network Name	PCI Address	MAC Address	Remove Interface
<input type="button" value="Edit"/>	ETH 1		VM Network			<input type="checkbox"/>

Edit existing Network Interface



Reconfiguring VM Networks #5

The screenshot displays the 'Reconfigure VM Networks' window. At the top, there is a title bar with a pencil icon and the text 'Reconfigure VM Networks'. Below this, there are several input fields: 'New Y pciAddress:' with the value '0000:37:00:1', and 'Select Orchestrator:' with a dropdown menu showing 'Custom Orchestrator'. A table below these fields has columns for 'Orchestrator', 'Automatic', and 'Interface'. The first row in the table has 'ETH/2' in the 'Interface' column. A red circle highlights the 'Edit' button in the first row of the table. A red arrow points from this button to a dialog box titled 'Edit Interface 2'. The dialog box contains the following fields: 'Interface Type:' with a dropdown menu set to 'SR-IOV', 'Network Name:' with the text 'SRIOV Network', 'PCI Address:' with the text '0000:af:00:0', and 'MAC Address:' with an empty field. At the bottom of the dialog box are 'Confirm' and 'Cancel' buttons. A callout box with an orange border and red text 'Add a new Network Interface' is connected to the dialog box by a red arrow.



Reconfiguring VM Networks #6

✎ Reconfigure VM Networks

New Y PciAddress: 0000:37:00.1

Select Orchestrator: Custom Orchestrator

Orchestrator: []

Automatic Login: [?]

Submit Cancel

This will mark the Interface for deletion, and remove any edit information from the table. Would you like to continue?

Confirm Cancel

Edit	Interface Name	Interface Type	Network Name	PCI Address	MAC Address	Remove Interface
<input type="button" value="Edit"/>	ETH 1		VM Network			<input type="checkbox"/>
<input type="button" value="Edit"/>	ETH 2	SR-IOV	SRIOV Group	0000:af:00.1		<input checked="" type="checkbox"/>
<input type="button" value="Edit"/>						

Remove a Network Interface

Reconfiguring VM Networks #7

The screenshot shows the 'Reconfigure VM Networks' dialog box. The 'Select Orchestrator' field is highlighted with a red circle and contains 'vRO_Yi (192.168.150.51)'. The 'Submit' button is also highlighted with a red circle. A success message dialog box is open, stating 'Workflow has been successfully started, check the vRO to view its progress.' with an 'OK' button highlighted by a red circle. A list of steps is shown in a grey box with an orange border:

1. Select a vRO Instance
2. Submit the request to start workflow
3. Check vRO for progress and result
4. OK

Other fields in the dialog include: Select Virtual Machine: NCLIM001, Current PciAddress: 0000:37:00.0, Current PciAddress Yfab: 0000:86:00.1, New PciAddress: 0000:86:00.0, New Y PciAddress: 0000:37:00.1, Orchestrate with vRO: 8.x [?], Automatic Login: [?] (checked).

Edit	Interface Name	Interface Type	Network Name	PCI Address	MAC Address	Remove Interface
------	----------------	----------------	--------------	-------------	-------------	------------------



Additional TBC Talks for vNS



TBC Talks for vNS

M10	Virtualized NonStop Storage	Marcelo De Azevedo, Lars Plum
M11	Best Practices for Configuring and Managing HPE Virtualized NonStop Systems for Mission Critical Workloads	Marcelo De Azevedo, Lars Plum, Bryce Kosinski, John Zimsky



NonStop Partnership- It's a Beautiful Thing!



Thank you for attending this talk TBC23-M17 Evolving your vNS Environment to keep your NonStop Business Running

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