NonStop Technical Boot Camp 2023 TBC23 TB63 Evolving your vNS Environment to keep your NonStop Business Running

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Forward-looking statements
This is a rolling (up to three year) Roadmap and is subject to change without notice

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Agenda

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HPE Slides and Materials Usage
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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
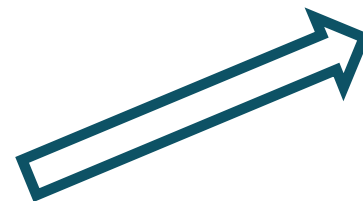
Sample JSON File for Moving NSK Disks

- 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

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
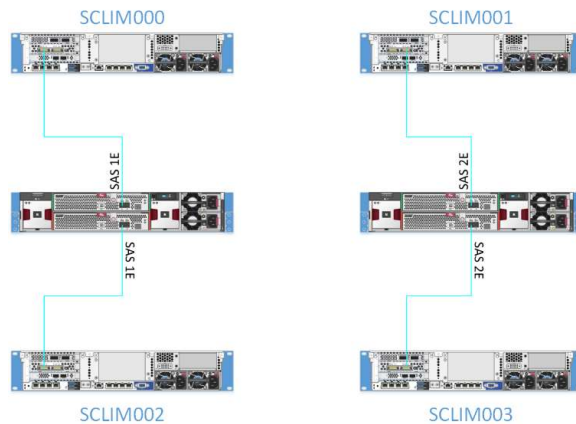
- Requires cold loading $SYSTEM using the 4-path option (planned outage)
- Verify the total number of LUNs assigned to the below 400
  - A LUN is assigned to each disk path
  - 400 LUNs (split between 2 Storage vCLIMs)
    - 100 Primary paths
    - 100 Backup paths
    - 100 Mirror paths
    - 100 Mirror 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

```json
{
    "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
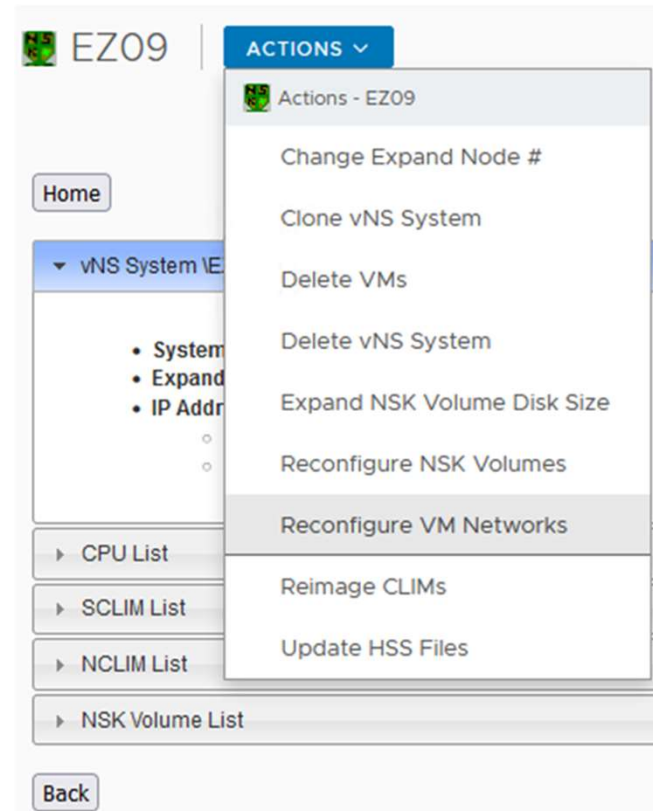
vNSK Disk Expansion

- 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 ⌄	
DATA1	11	11	Primary ⌄	
DATA2	10	10	Primary ⌄	
DATA3	1	1	Primary ⌄	2
DATA4	1	1	Primary ⌄	
DATA6	1	1	Primary ⌄	
DATA7	1	1	Primary ⌄	
ONEPATH	1	1	Primary ⌄	
SYSTEM	100	100	Primary ⌄	

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

Reconfiguring VM Networks #2

Reconfiguring VM Networks #3

Reconfiguring VM Networks #4

Edit existing Network Interface

Reconfiguring VM Networks #5

Add a new Network Interface

Reconfiguring VM Networks #6

Remove a Network Interface

Reconfiguring VM Networks #7

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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