Verifying host LUN path and multipath configuration verification

ONTAP FLI

NetApp
May 27, 2025

This PDF was generated from https://docs.netapp.com/us-en/ontap-fli/san-migration/concept_verifying_host_lun_path_and_multipath_configuration.html on May 27, 2025. Always check docs.netapp.com for the latest.

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Verifying host LUN path and multipath configuration verification

Verifying host LUN path and multipath configuration verification

Prior to any migrations, verify that multipathing is correctly configured and working properly. All available paths to LUNs should be active.

Multipath verification for Windows hosts

As part of the Foreign LUN Import (FLI) process, you should verify that multipath is configured and functioning correctly on your hosts.

Step-by-step instructions for Windows hosts can be found in the Multipathing section of Using Windows Server 2022 with ONTAP.

Multipath verification for Linux hosts

As part of the Foreign LUN Import (FLI) process, you should verify that multipath is configured and functioning correctly on your hosts.

Complete the following steps for Linux hosts.

Step

1. To verify that DM-MP multipath is configured and functioning correctly on a Linux host, run the following commands:`multipath -ll`

```
mpath2 (360060e801046b96004f2bf4600000012) dm-6 HITACHI,DF600F
[size=2.0G][features=0][hwhandler=0][rw]
\_ round-robin 0 [prio=1][active]
 \_ 0:0:1:2 sdg 8:96  [active][ready]
 \_ 1:0:1:2 sdo 8:224 [active][ready]
\_ round-robin 0 [prio=0][enabled]
 \_ 0:0:0:2 sdc 8:32  [active][ready]
 \_ 1:0:0:2 sdk 8:160 [active][ready]
mpath1 (360060e801046b96004f2bf4600000011) dm-5 HITACHI,DF600F
[size=2.0G][features=0][hwhandler=0][rw]
\_ round-robin 0 [prio=1][active]
 \_ 0:0:0:1 sdb 8:16  [active][ready]
 \_ 1:0:0:1 sdj 8:144 [active][ready]
\_ round-robin 0 [prio=0][enabled]
 \_ 0:0:1:1 sdf 8:80  [active][ready]
 \_ 1:0:1:1 sdn 8:208 [active][ready]
mpath0 (360060e801046b96004f2bf4600000010) dm-0 HITACHI,DF600F
[size=20G][features=0][hwhandler=0][rw]
\_ round-robin 0 [prio=1][active]
 \_ 0:0:1:0 sde 8:64  [active][ready]
 \_ 1:0:1:0 sdm 8:192 [active][ready]
\_ round-robin 0 [prio=0][enabled]
 \_ 0:0:0:0 sda 8:0   [active][ready]
 \_ 1:0:0:0 sdi 8:128 [active][ready]
mpath3 (360060e801046b96004f2bf4600000013) dm-7 HITACHI,DF600F
[size=3.0G][features=0][hwhandler=0][rw]
\_ round-robin 0 [prio=1][active]
 \_ 0:0:0:3 sdd 8:48  [active][ready]
 \_ 1:0:0:3 sdl 8:176 [active][ready]
\_ round-robin 0 [prio=0][enabled]
 \_ 0:0:1:3 sdh 8:112 [active][ready]
 \_ 1:0:1:3 sdp 8:240 [active][ready]
[root@dm-rx200s6-22 ~]#
```

Multipath verification for ESXi hosts

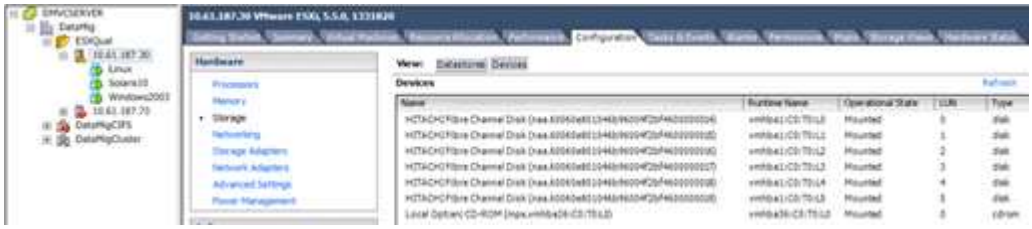
As part of the Foreign LUN Import (FLI) process, you should verify that multipath is configured and functioning correctly on your hosts.

Complete the following steps for ESXi hosts.

Steps

1. Determine ESXi and virtual machine using VMware vSphere Client.

2. Determine SAN LUNs to be migrated using vSphere Client.



3. Determine VMFS and RDM (vfat) volumes to be migrated: `esxcli storage filesystem list`

```
Mount Point                                                Volume Name
UUID                                   Mounted  Type            Size
Free
-----------------------------------------------------  ------------------
-----------------------------------  -------  ------  -----------
-----------
/vmfs/volumes/538400f6-3486df59-52e5-00262d04d700  BootLun_datastore
538400f6-3486df59-52e5-00262d04d700     true  VMFS-5  13421772800
12486443008
/vmfs/volumes/53843dea-5449e4f7-88e0-00262d04d700  VM_datastore
53843dea-5449e4f7-88e0-00262d04d700     true  VMFS-5  42681237504
6208618496
/vmfs/volumes/538400f6-781de9f7-c321-00262d04d700
538400f6-781de9f7-c321-00262d04d700     true  vfat     4293591040
4269670400
/vmfs/volumes/c49aad7f-afbab687-b54e-065116d72e55
c49aad7f-afbab687-b54e-065116d72e55     true  vfat      261853184
77844480
/vmfs/volumes/270b9371-8fbedc2b-1f3b-47293e2ce0da
270b9371-8fbedc2b-1f3b-47293e2ce0da     true  vfat      261853184
261844992
/vmfs/volumes/538400ef-647023fa-edef-00262d04d700
538400ef-647023fa-edef-00262d04d700     true  vfat      299712512
99147776
~ #
```

In case of VMFS with extends \(spanned VMFS\), all LUNs that are part of the span should be migrated. To show all the extends in the GUI, go to Configuration \> Hardware \> Storage and click datastore to select the Properties link.

Post-migration, while adding them back to storage, you will see multiple LUN entries with the same VMFS label. In this scenario you should ask the customer to select only the entry marked as head.

4. Determine the LUN and size to be migrated: `esxcfg-scsidevs -c`

```
Device UID                            Device Type      Console Device
Size      Multipath PluginDisplay Name
mpx.vmhba36:C0:T0:L0                  CD-ROM
/vmfs/devices/cdrom/mpx.vmhba36:C0:T0:L0                    0MB       NMP
Local Optiarc CD-ROM (mpx.vmhba36:C0:T0:L0)
naa.60060e801046b96004f2bf4600000014  Direct-Access
/vmfs/devices/disks/naa.60060e801046b96004f2bf4600000014  20480MB   NMP
HITACHI Fibre Channel Disk (naa.60060e801046b96004f2bf4600000014)
naa.60060e801046b96004f2bf4600000015  Direct-Access
/vmfs/devices/disks/naa.60060e801046b96004f2bf4600000015  40960MB   NMP
HITACHI Fibre Channel Disk (naa.60060e801046b96004f2bf4600000015)
~~~~~~ Output truncated ~~~~~~~
~ #
```

5. Identify raw device mapping (RDM) LUNs to be migrated.
6. Find RDM devices: `find /vmfs/volumes -name **-rdm**`

```
/vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Windows2003/Windows2003_1-rdmp.vmdk
/vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Windows2003/Windows2003_2-rdm.vmdk
/vmfs/volumes/53843dea-5449e4f7-88e0-00262d04d700/Linux/Linux_1-rdm.vmdk
/vmfs/volumes/53843dea-5449e4f7-88e0-00262d04d700/Solaris10/Solaris10_1-
rdmp.vmdk
```

7. Remove -rdmp and -rdm from preceding output and run the vmkfstools command to find vml mapping and RDM type.

```
# vmkfstools -q /vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Windows2003/Windows2003_1.vmdk
vmkfstools -q /vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Windows2003/Windows2003_1.vmdk
Disk /vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Windows2003/Windows2003_1.vmdk is a Passthrough Raw Device
Mapping
Maps to: vml.020002000060060e801046b96004f2bf460000016444636303046
~ # vmkfstools -q /vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Windows2003/Windows2003_2.vmdk
Disk /vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Windows2003/Windows2003_2.vmdk is a Non-passthrough Raw
Device Mapping
Maps to: vml.020003000060060e801046b96004f2bf460000017444636303046
~ # vmkfstools -q /vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Linux/Linux_1.vmdk
Disk /vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Linux/Linux_1.vmdk is a Non-passthrough Raw Device Mapping
Maps to: vml.020005000060060e801046b96004f2bf460000019444636303046
~ # vmkfstools -q /vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Solaris10/Solaris10_1.vmdk
Disk /vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Solaris10/Solaris10_1.vmdk is a Passthrough Raw Device
Mapping
Maps to: vml.020004000060060e801046b96004f2bf460000018444636303046
~ #
```

Passthrough is RDM with physical \(RDMP\), and nonpassthrough is RDM with virtual \(RDMV\). VMs with virtual RDMs and VM Snapshot copies will break after migration due to VM Snapshot delta vmdk pointing to an RDM that has a stale naa ID. So before migration, ask the customer to remove all Snapshot copies in such VMs. Right-click VM and click the Snapshot --\> Snapshot Manager Delete All button. Refer to NetApp KB 3013935 for details about hardware-accelerated locking for VMware on NetApp storage.

8. Identify LUN naa to RDM device mapping.

```
~ # esxcfg-scsidevs -u | grep
vml.020002000060060e801046b96004f2bf46000000164444636303046
naa.60060e801046b96004f2bf4600000016
vml.020002000060060e801046b96004f2bf46000000164444636303046
~ # esxcfg-scsidevs -u | grep
vml.020003000060060e801046b96004f2bf46000000174444636303046
naa.60060e801046b96004f2bf4600000017
vml.020003000060060e801046b96004f2bf46000000174444636303046
~ # esxcfg-scsidevs -u | grep
vml.020005000060060e801046b96004f2bf46000000194444636303046
naa.60060e801046b96004f2bf4600000019
vml.020005000060060e801046b96004f2bf46000000194444636303046
~ # esxcfg-scsidevs -u | grep
vml.020004000060060e801046b96004f2bf46000000184444636303046
naa.60060e801046b96004f2bf4600000018
vml.020004000060060e801046b96004f2bf46000000184444636303046
~ #
```

9. Determine virtual machine configuration: `esxcli storage filesystem list | grep VMFS`

```
/vmfs/volumes/538400f6-3486df59-52e5-00262d04d700  BootLun_datastore
538400f6-3486df59-52e5-00262d04d700     true  VMFS-5  13421772800
12486443008
/vmfs/volumes/53843dea-5449e4f7-88e0-00262d04d700  VM_datastore
53843dea-5449e4f7-88e0-00262d04d700     true  VMFS-5  42681237504
6208618496
~ #
```

10. Record the UUID of the datastore.
11. Make a copy of `/etc/vmware/hostd/vmInventory.xml` and note the contents of file and vmx config path.

```
~ # cp /etc/vmware/hostd/vmInventory.xml
/etc/vmware/hostd/vmInventory.xml.bef_mig
~ # cat /etc/vmware/hostd/vmInventory.xml
<ConfigRoot>
  <ConfigEntry id="0001">
    <objID>2</objID>
    <vmxCfgPath>/vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Windows2003/Windows2003.vmx</vmxCfgPath>
  </ConfigEntry>
  <ConfigEntry id="0004">
    <objID>5</objID>
    <vmxCfgPath>/vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Linux/Linux.vmx</vmxCfgPath>
  </ConfigEntry>
  <ConfigEntry id="0005">
    <objID>6</objID>
    <vmxCfgPath>/vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Solaris10/Solaris10.vmx</vmxCfgPath>
  </ConfigEntry>
</ConfigRoot>
```

12. Identify the virtual machine hard disks.

    This information is required post-migration to add the removed RDM devices in order.

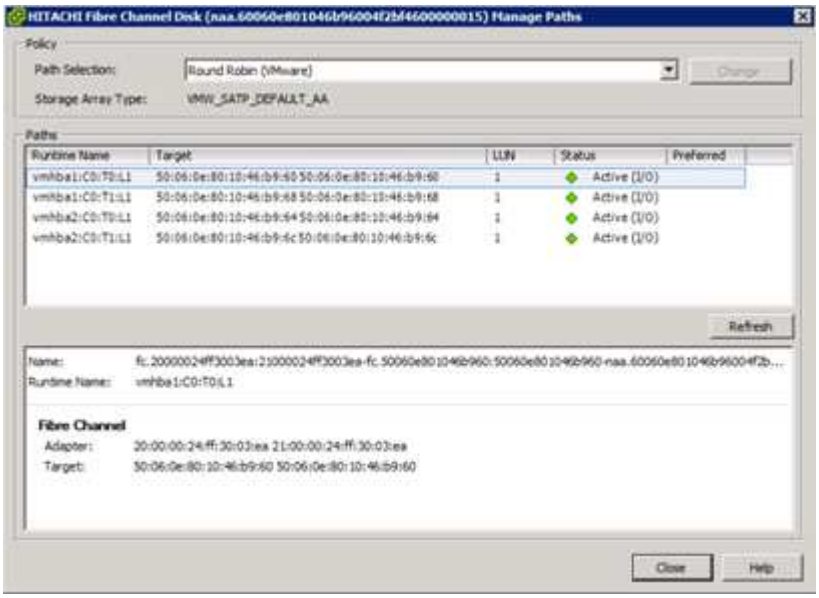
```
~ # grep fileName /vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Windows2003/Windows2003.vmx
scsi0:0.fileName = "Windows2003.vmdk"
scsi0:1.fileName = "Windows2003_1.vmdk"
scsi0:2.fileName = "Windows2003_2.vmdk"
~ # grep fileName /vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Linux/Linux.vmx
scsi0:0.fileName = "Linux.vmdk"
scsi0:1.fileName = "Linux_1.vmdk"
~ # grep fileName /vmfs/volumes/53843dea-5449e4f7-88e0-
00262d04d700/Solaris10/Solaris10.vmx
scsi0:0.fileName = "Solaris10.vmdk"
scsi0:1.fileName = "Solaris10_1.vmdk"
~ #
```

13. Determine RDM device, virtual machine mapping, and compatibility mode.
14. Using the preceding information, note the RDM mapping to device, virtual machine, compatibility mode, and order.

    You will need this information later, when adding RDM devices to the VM.

```
Virtual Machine -> Hardware -> NAA -> Compatibility mode
Windows2003 VM -> scsi0:1.fileName = "Windows2003_1.vmdk" ->
naa.60060e801046b96004f2bf4600000016
-> RDM Physical
Windows2003 VM -> scsi0:2.fileName = "Windows2003_2.vmdk" ->
naa.60060e801046b96004f2bf4600000017
-> RDM Virtual
Linux VM -> scsi0:1.fileName = “Linux_1.vmdk” ->
naa.60060e801046b96004f2bf4600000019 -> RDM Virtual
Solaris10 VM -> scsi0:1.fileName = “Solaris10_1.vmdk” ->
naa.60060e801046b96004f2bf4600000018 -> RDM Physical
```

15. Determine multipath configuration.
16. Obtain multipath settings for your storage in the vSphere Client:
    a. Select an ESX or ESXi host in the vSphere Client and click the Configuration tab.
    b. Click **Storage**.
    c. Select a datastore or mapped LUN.
    d. Click **Properties**.
    e. In the Properties dialog box, select the desired extent, if necessary.
    f. Click **Extent Device** > **Manage Paths** and obtain the paths in the Manage Path dialog box.



17. Obtain LUN multipathing information from the ESXi host command line:
    a. Log in to the ESXi host console.
    b. Run esxcli storage nmp device list to get multipath information.

```
# esxcli storage nmp device list
naa.60060e801046b96004f2bf4600000014
```

```
   Device Display Name: HITACHI Fibre Channel Disk
(naa.60060e801046b96004f2bf4600000014)
   Storage Array Type: VMW_SATP_DEFAULT_AA
   Storage Array Type Device Config: SATP VMW_SATP_DEFAULT_AA does
not support device configuration.
   Path Selection Policy: VMW_PSP_RR
   Path Selection Policy Device Config:
{policy=rr,iops=1000,bytes=10485760,useANO=0; lastPathIndex=3:
NumIOsPending=0,numBytesPending=0}
   Path Selection Policy Device Custom Config:
   Working Paths: vmhba2:C0:T1:L0, vmhba2:C0:T0:L0, vmhba1:C0:T1:L0,
vmhba1:C0:T0:L0
   Is Local SAS Device: false
   Is Boot USB Device: false

naa.60060e801046b96004f2bf4600000015
   Device Display Name: HITACHI Fibre Channel Disk
(naa.60060e801046b96004f2bf4600000015)
   Storage Array Type: VMW_SATP_DEFAULT_AA
   Storage Array Type Device Config: SATP VMW_SATP_DEFAULT_AA does
not support device configuration.
   Path Selection Policy: VMW_PSP_RR
   Path Selection Policy Device Config:
{policy=rr,iops=1000,bytes=10485760,useANO=0; lastPathIndex=0:
NumIOsPending=0,numBytesPending=0}
   Path Selection Policy Device Custom Config:
   Working Paths: vmhba2:C0:T1:L1, vmhba2:C0:T0:L1, vmhba1:C0:T1:L1,
vmhba1:C0:T0:L1
   Is Local SAS Device: false
   Is Boot USB Device: false

naa.60060e801046b96004f2bf4600000016
   Device Display Name: HITACHI Fibre Channel Disk
(naa.60060e801046b96004f2bf4600000016)
   Storage Array Type: VMW_SATP_DEFAULT_AA
   Storage Array Type Device Config: SATP VMW_SATP_DEFAULT_AA does
not support device configuration.
   Path Selection Policy: VMW_PSP_RR
   Path Selection Policy Device Config:
{policy=rr,iops=1000,bytes=10485760,useANO=0; lastPathIndex=1:
NumIOsPending=0,numBytesPending=0}
   Path Selection Policy Device Custom Config:
   Working Paths: vmhba2:C0:T1:L2, vmhba2:C0:T0:L2, vmhba1:C0:T1:L2,
vmhba1:C0:T0:L2
   Is Local SAS Device: false
   Is Boot USB Device: false
```

```
naa.60060e801046b96004f2bf4600000017
   Device Display Name: HITACHI Fibre Channel Disk
(naa.60060e801046b96004f2bf4600000017)
   Storage Array Type: VMW_SATP_DEFAULT_AA
   Storage Array Type Device Config: SATP VMW_SATP_DEFAULT_AA does
not support device configuration.
   Path Selection Policy: VMW_PSP_RR
   Path Selection Policy Device Config:
{policy=rr,iops=1000,bytes=10485760,useANO=0; lastPathIndex=1:
NumIOsPending=0,numBytesPending=0}
   Path Selection Policy Device Custom Config:
   Working Paths: vmhba2:C0:T1:L3, vmhba2:C0:T0:L3, vmhba1:C0:T1:L3,
vmhba1:C0:T0:L3
   Is Local SAS Device: false
   Is Boot USB Device: false

naa.60060e801046b96004f2bf4600000018
   Device Display Name: HITACHI Fibre Channel Disk
(naa.60060e801046b96004f2bf4600000018)
   Storage Array Type: VMW_SATP_DEFAULT_AA
   Storage Array Type Device Config: SATP VMW_SATP_DEFAULT_AA does
not support device configuration.
   Path Selection Policy: VMW_PSP_RR
   Path Selection Policy Device Config:
{policy=rr,iops=1000,bytes=10485760,useANO=0; lastPathIndex=1:
NumIOsPending=0,numBytesPending=0}
   Path Selection Policy Device Custom Config:
   Working Paths: vmhba2:C0:T1:L4, vmhba2:C0:T0:L4, vmhba1:C0:T1:L4,
vmhba1:C0:T0:L4
   Is Local SAS Device: false
   Is Boot USB Device: false

naa.60060e801046b96004f2bf4600000019
   Device Display Name: HITACHI Fibre Channel Disk
(naa.60060e801046b96004f2bf4600000019)
   Storage Array Type: VMW_SATP_DEFAULT_AA
   Storage Array Type Device Config: SATP VMW_SATP_DEFAULT_AA does
not support device configuration.
   Path Selection Policy: VMW_PSP_RR
   Path Selection Policy Device Config:
{policy=rr,iops=1000,bytes=10485760,useANO=0; lastPathIndex=1:
NumIOsPending=0,numBytesPending=0}
   Path Selection Policy Device Custom Config:
   Working Paths: vmhba2:C0:T1:L5, vmhba2:C0:T0:L5, vmhba1:C0:T1:L5,
vmhba1:C0:T0:L5
```

```
   Is Local SAS Device: false
   Is Boot USB Device: false
```

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