**Identifying disks when working with VMware ESX/ESXi (1014953)**

**Purpose**

When performing troubleshooting with ESX/ESXi storage, you may use command line tools which require you to identify a specific disk or LUN connected to ESX/ESXi. This article explores different ways to identify these disks.

**Resolution**

**ESXi 5.x**

Use these commands to collect disk and LUN information from within ESXi:

* The command esxcli storage core path list generates a list of all LUN paths currently connected to the ESXi host.  
    
  The output appears similar to:   
    
  fc.5001438005685fb5:5001438005685fb4-fc.50060160c46036df:50060167446036df-naa.6006016094602800e07ff528b73ae011  
     UID: fc.5001438005685fb5:5001438005685fb4-fc.50060160c46036df:50060167446036df-naa.6006016094602800e07ff528b73ae011  
     Runtime Name: vmhba0:C0:T0:L23  
     Device: naa.6006016094602800e07ff528b73ae011  
     Device Display Name: DGC Fibre Channel Disk (naa.6006016094602800e07ff528b73ae011)  
     Adapter: vmhba0  
     Channel: 0  
     Target: 0  
     LUN: 23  
     Plugin: NMP  
     State: active  
     Transport: fc  
     Adapter Identifier: fc.5001438005685fb5:5001438005685fb4  
     Target Identifier: fc.50060160c46036df:50060167446036df  
     Adapter Transport Details: WWNN: 50:01:43:80:05:68:5f:b5 WWPN: 50:01:43:80:05:68:5f:b4  
     Target Transport Details: WWNN: 50:06:01:60:c4:60:36:df WWPN: 50:06:01:67:44:60:36:df  
    
  fc.5001438005685fb5:5001438005685fb4-fc.50060160c46036df:5006016f446036df-naa.6006016094602800e07ff528b73ae011  
     UID: fc.5001438005685fb5:5001438005685fb4-fc.50060160c46036df:5006016f446036df-naa.6006016094602800e07ff528b73ae011  
     Runtime Name: vmhba0:C0:T1:L23  
     **Device:** naa.6006016094602800e07ff528b73ae011  
     Device Display Name: DGC Fibre Channel Disk (naa.6006016094602800e07ff528b73ae011)  
     Adapter: vmhba0  
     Channel: 0  
     Target: 1  
     LUN: 23  
     Plugin: NMP  
     State: active  
     Transport: fc  
     Adapter Identifier: fc.5001438005685fb5:5001438005685fb4  
     Target Identifier: fc.50060160c46036df:5006016f446036df  
     Adapter Transport Details: WWNN: 50:01:43:80:05:68:5f:b5 WWPN: 50:01:43:80:05:68:5f:b4  
     Target Transport Details: WWNN: 50:06:01:60:c4:60:36:df WWPN: 50:06:01:6f:44:60:36:df  
    
    
  **Note**: To detail path information for a specific device (**Device:** <device>), use the command esxcli storage core path list -d <device>.
* The command esxcli storage core device list generates a list of LUNs currently connected to the ESXi host.  
    
  The output appears similar to:   
    
  mpx.vmhba0:C0:T0:L0  
     Display Name: Local VMware Disk (mpx.vmhba2:C0:T0:L0)  
     Has Settable Display Name: false  
     Size: 286070  
     Device Type: Direct-Access  
     Multipath Plugin: NMP  
     Devfs Path: /vmfs/devices/disks/mpx.vmhba2:C0:T0:L0  
     Vendor: VMware  
     Model: Block device  
     Revision: 1.0  
     SCSI Level: 2  
     Is Pseudo: false  
     Status: on  
     Is RDM Capable: false  
     Is Local: true  
     Is Removable: false  
     Is SSD: false  
     Is Offline: false  
     Is Perennially Reserved: false  
     Thin Provisioning Status: unknown  
     Attached Filters:  
     VAAI Status: unsupported  
     Other UIDs: vml.0000000000766d686261323a303a30
* The command esxcli storage vmfs extent list generates a list of extents for each volume as well as providing the mapping from device name to UUID.  
    
  The output appears silmilar to:  
    
  Volume Name   VMFS UUID                            Extent Number  Device Name                           Partition  
  ------------  -----------------------------------  -------------  ------------------------------------  ---------  
  esxi-local    4e0d86e1-0db6f826-6991-d8d3855ff8d6              0  mpx.vmhba2:C0:T0:L0                           3  
  datastore1    4d4ac840-c1386fa0-9f6d-0050569300a7              0  naa.6006016094602800364ce22e3825e011          1  
  vmfs5         4dad8f16-911648ca-d660-d8d38563e658              0  naa.600601609460280052eb8621b73ae011          1
* The command esxcli storage filesystem list generates a compact list of the LUNs currently connected to the ESXi host, including VMFS version.  
    
  The output appears silmilar to:  
    
  Mount Point                                        Volume Name   UUID                                 Mounted  Type             Size          Free  
  -------------------------------------------------  ------------  -----------------------------------  -------  ------  -------------  ------------  
  /vmfs/volumes/f98fbd51-d2efb396                    ISOs          f98fbd51-d2efb396                       true  NFS      581284225024  181569196032  
  /vmfs/volumes/4d4ac840-c1386fa0-9f6d-0050569300a7  datastore1    4d4ac840-c1386fa0-9f6d-0050569300a7     true  VMFS-3     9395240960     746586112  
  /vmfs/volumes/4e0d86e1-0db6f826-6991-d8d3855ff8d6  esxi-local    4e0d86e1-0db6f826-6991-d8d3855ff8d6     true  VMFS-5   294473695232  293884395520  
  /vmfs/volumes/4dad8f16-911648ca-d660-d8d38563e658  vmfs5         4dad8f16-911648ca-d660-d8d38563e658     true  VMFS-5     1879048192     220200960  
  /vmfs/volumes/4e303229-94dedb01-508c-d8d3855ff8d6                4e303229-94dedb01-508c-d8d3855ff8d6     true  vfat       4293591040    4290248704  
  /vmfs/volumes/f9618575-313f4ef5-943d-d5308d29e876  Hypervisor1   f9618575-313f4ef5-943d-d5308d29e876     true  vfat        261853184     128241664  
  /vmfs/volumes/12e6c575-9a49251d-634c-1c34f28a0238  Hypervisor2   12e6c575-9a49251d-634c-1c34f28a0238     true  vfat        261853184     163708928  
  /vmfs/volumes/2da668ef-40e5d96b-90bf-855ddb9c5547  Hypervisor3   2da668ef-40e5d96b-90bf-855ddb9c5547     true  vfat        299778048     114704384
* The command ls -alh /vmfs/devices/disks lists the possible targets for certain storage operations.   
    
  The output appears similar to:  
    
  lrwxrwxrwx 1 root root 19 Jul 27 16:40 vml.0000000000766d686261323a303a30 -> mpx.vmhba2:C0:T0:L0  
  lrwxrwxrwx 1 root root 21 Jul 27 16:40 vml.0000000000766d686261323a303a30:1 -> mpx.vmhba2:C0:T0:L0:1  
  lrwxrwxrwx 1 root root 21 Jul 27 16:40 vml.0000000000766d686261323a303a30:2 -> mpx.vmhba2:C0:T0:L0:2  
  lrwxrwxrwx 1 root root 21 Jul 27 16:40 vml.0000000000766d686261323a303a30:3 -> mpx.vmhba2:C0:T0:L0:3  
  lrwxrwxrwx 1 root root 21 Jul 27 16:40 vml.0000000000766d686261323a303a30:4 -> mpx.vmhba2:C0:T0:L0:4  
  lrwxrwxrwx 1 root root 21 Jul 27 16:40 vml.0000000000766d686261323a303a30:5 -> mpx.vmhba2:C0:T0:L0:5  
  lrwxrwxrwx 1 root root 21 Jul 27 16:40 vml.0000000000766d686261323a303a30:6 -> mpx.vmhba2:C0:T0:L0:6  
  lrwxrwxrwx 1 root root 21 Jul 27 16:40 vml.0000000000766d686261323a303a30:7 -> mpx.vmhba2:C0:T0:L0:7  
  lrwxrwxrwx 1 root root 21 Jul 27 16:40 vml.0000000000766d686261323a303a30:8 -> mpx.vmhba2:C0:T0:L0:8  
  lrwxrwxrwx 1 root root 36 Jul 27 16:40 vml.02000600006006016094602800364ce22e3825e011524149442030 -> naa.6006016094602800364ce22e3825e011  
  lrwxrwxrwx 1 root root 38 Jul 27 16:40 vml.02000600006006016094602800364ce22e3825e011524149442030:1 -> naa.6006016094602800364ce22e3825e011:1  
  lrwxrwxrwx 1 root root 36 Jul 27 16:40 vml.02000e0000600601609460280052eb8621b73ae011524149442030 -> naa.600601609460280052eb8621b73ae011  
  lrwxrwxrwx 1 root root 38 Jul 27 16:40 vml.02000e0000600601609460280052eb8621b73ae011524149442030:1 -> naa.600601609460280052eb8621b73ae011:1

The following are definitions for some of identifiers and their conventions:

* naa.<NAA>:<Partition> or eui.<EUI>:<Partition>   
    
  NAA stands for Network Addressing Authority identifier. EUI stands for Extended Unique Identifier. The number is guaranteed to be unique to that LUN. The NAA or EUI identifier is the preferred method of identifying LUNs and the number is generated by the storage device. Since the NAA or EUI is unique to the LUN, if the LUN is presented the same way across all ESXi hosts, the NAA or EUI identifier remains the same. For more information on these standards, see the SPC-3 documentation from the [InterNational Committee for Information Technology Standards (T10)](http://www.t10.org/).  
    
  The <Partition> represents the partition number on the LUN or Disk. If the <Partition> is specified as 0, it identifies the entire disk instead of only one partition. This identifier is generally used for operations with utilities such as vmkfstools.  
    
  Example: naa.6090a038f0cd4e5bdaa8248e6856d4fe:3 = Partition 3 of LUN naa.6090a038f0cd4e5bdaa8248e6856d4fe.
* mpx.vmhba<Adapter>:C<Channel>:T<Target>:L<LUN> or mpx.vmhba<Adapter>:C<Channel>:T<Target>:L<LUN>:<Partition>  
    
  Some devices do not provide the NAA number described above. In these circumstances, an MPX Identifier is generated by ESXi to represent the LUN or disk. The identifier takes the form similar to that of the canonical name of previous versions of ESXi with the mpx. prefix. This identifier can be used in the exact same way as the NAA Identifier described above.
* vml.<VML> or vml.<VML>:<Partition>  
    
  The VML Identifier can be used interchangeably with the NAA Identifier and the MPX Identifier. Appending :<Partition> works in the same way described above. This identifier is generally used for operations with utilities such as vmkfstools.  
    
  To find out the vml ID you can use the command:  
    
  vmkfstools -q <vm-disk>.vmdk
* vmhba<Adapter>:C<Channel>:T<Target>:L<LUN>  
    
  This identifier is now used exclusively to identify a path to the LUN. When ESXi detects that paths associated to one LUN, each path is assigned this Path Identifier. The LUN also inherits the same name as the first path, but it is now used an a Runtime Name, and not used as readily as the above mentioned identifiers as it may be different depending on the host you are using. This identifier is generally used for operations with utilities such as vmkfstools.  
    
  Example: vmhba1:C0:T0:L0 = Adapter 1, Channel 0, Target 0, and LUN 0.  
    
  **Note**: Generally, multi-port fiber channel adapters are equipped with dedicated controllers for each connection, and therefore each controller is represented by different vmhba#. If the adapter supports multiple connections to the *same* controller, it is represented by a different channel number. This representation is directly dependant on the capability of the adapter.
* <UUID>  
    
  The <UUID> is a unique number assigned to a VMFS volume upon the creation of the volume. It may be included in syntax where you need to specify the full path of specific files on a datastore.