



Linux unified host utilities

SAN hosts and cloud clients

NetApp
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Linux unified host utilities

Linux Unified Host Utilities 7.1

Pre-requisites

- For reliable operation, you must verify that your entire iSCSI, FC, or FCoE configuration is supported.

You can use the [NetApp Interoperability Matrix Tool](#) to verify your configuration.

- You must install the HBA management packages provided by the vendors on their web sites.

The management software enables the SAN Tool kit commands to gather information about the FC HBAs, such as their WWPNs. For `sanlun fcp show adapter` to work, ensure that the following packages are installed:

- QLogic HBA – QConvergeConsole CLI
- Emulex HBA - OneCommand Manager core application CLI
- Brocade HBA – Brocade Command Utility CLI

RPM Packages "libhbaapi" and "libhbalinux" available for each Linux Distribution should be installed on the host OS.

SAN Toolkit

Linux Unified Host Utilities is a NetApp host software that provides a command line tool kit on your Linux host.

The toolkit is installed automatically when you install the NetApp Host Utilities package. This kit provides the `sanlun` utility, which helps you manage LUNs and HBAs. The `sanlun` command returns information about the LUNs mapped to your host, multipathing, and information necessary to create initiator groups.

Example

In the following example, the `sanlun lun show` command returns LUN information.

```
# sanlun lun show all
controller(7mode/E-Series)/          device      host          lun
vserver(cDOT/FlashRay)  lun-pathname filename  adapter  protocol  size
Product
-----
data_vserver            /vol/vol1/lun1  /dev/sdb  host16  FCP
120.0g  cDOT
data_vserver            /vol/vol1/lun1  /dev/sdc  host15  FCP
120.0g  cDOT
data_vserver            /vol/vol2/lun2  /dev/sdd  host16  FCP
120.0g  cDOT
data_vserver            /vol/vol2/lun2  /dev/sde  host15  FCP
120.0g  cDOT
```



This toolkit is common across all configurations and protocols of the Host Utilities. As a result some of its contents apply to one configuration, but not another. Having unused components does not affect your system performance.



The SAN toolkit is not supported on Citrix XenServer, Oracle VM, and Red Hat Enterprise Virtualization Hypervisor.

Install Linux Unified Host Utilities

The NetApp Linux Unified Host Utilities software package is available on the [NetApp Support Site](#) in a 32-bit or 64-bit .rpm file.

Installing the Linux Unified Host Utilities is strongly recommended, but not mandatory. The utilities do not change any settings on your Linux host. The utilities improve management and assist NetApp customer support in gathering information about your configuration.

Steps

1. If you have a version of Linux Unified Host Utilities currently installed, use the following command to remove it:

```
rpm -e netapp_linux_unified_host_utilities-7-1
```

For older versions of Linux Host Utilities, go to the directory where the host utility software is installed and enter the `uninstall` command.

2. Download the either the 32-bit or 64-bit Linux Unified Host Utilities software package from the [NetApp Support Site](#) to your host.
3. Go to the directory to which you downloaded the software package and use the following command to install it:

```
rpm -ivh netapp_linux_unified_host_utilities-7-1.x86_xx.rpm
```

```
Verifying... #####
[100%]
Preparing... #####
[100%]
Updating / installing...
 1:netapp_linux_unified_host_utiliti#####
[100%]
```

4. Verify the installation:

```
sanlun version
```

```
sanlun version 7.1.386.1644
```

Sample command reference

List all host initiators mapped to host

```
# sanlun fcp show adapter -v

adapter name:      host15
WWPN:             10000090fa022736
WWNN:             20000090fa022736
driver name:      lpfc
model:            LPe16002B-M6
model description: Emulex LPe16002B-M6 PCIe 2-port 16Gb Fibre Channel
Adapter
serial number:    FC24637890
hardware version: 0000000b 00000010 00000000
driver version:   12.8.0.5; HBAAPI(I) v2.3.d, 07-12-10
firmware version: 12.8.340.8
Number of ports: 1
port type:        Fabric
port state:       Operational
supported speed:  4 GBit/sec, 8 GBit/sec, 16 GBit/sec
negotiated speed: 16 GBit/sec
OS device name:   /sys/class/scsi_host/host15

adapter name:      host16
WWPN:             10000090fa022737
WWNN:             20000090fa022737
driver name:      lpfc
model:            LPe16002B-M6
model description: Emulex LPe16002B-M6 PCIe 2-port 16Gb Fibre Channel
Adapter
serial number:    FC24637890
hardware version: 0000000b 00000010 00000000
driver version:   12.8.0.5; HBAAPI(I) v2.3.d, 07-12-10
firmware version: 12.8.340.8
Number of ports: 1
port type:        Fabric
port state:       Operational
supported speed:  4 GBit/sec, 8 GBit/sec, 16 GBit/sec
negotiated speed: 16 GBit/sec
OS device name:   /sys/class/scsi_host/host16
```

List all LUNs mapped to host

```
# sanlun lun show -p -v all
```

```
ONTAP Path: vs_sanboot:/vol/sanboot_169/lun
LUN: 0
LUN Size: 150g
Product: cDOT
Host Device: 3600a0980383143393124515873683561
Multipath Policy: service-time 0
DM-MP Features: 3 queue_if_no_path pg_init_retries 50
Hardware Handler: 1 alua
Multipath Provider: Native
```

```
-----
-----
dm-mp      host      vservers      host:
state      path      path          /dev/         chan:         vservers      major:
           state    type          node          id:lun        LIF           minor
-----
-----
active     up        primary       sdq           15:0:5:0      lif_18        65:0
active     up        primary       sds           16:0:5:0      lif_17        65:32
active     up        primary       sdac          16:0:7:0      lif_25        65:192
active     up        primary       sdad          15:0:7:0      lif_26        65:208
active     up        secondary     sdt           15:0:4:0      lif_20        65:48
active     up        secondary     sdr           15:0:6:0      lif_19        65:16
active     up        secondary     sdad          16:0:4:0      lif_27        66:96
active     up        secondary     sdan          16:0:6:0      lif_28        66:112
```

List all LUNs mapped to host from a given SVM

```
# sanlun lun show -p -v vs_sanboot
```

```
ONTAP Path: vs_sanboot:/vol/sanboot_169/lun
LUN: 0
LUN Size: 160g
Product: cDOT
Host Device: 3600a0980383143393124515873683561
Multipath Policy: service-time 0
DM-MP Features: 3 queue_if_no_path pg_init_retries 50
Hardware Handler: 1 alua
Multipath Provider: Native
```

```
-----
-----
dm-mp      host      vsserver      host:
major:    path      path          /dev/      chan:      vsserver
state     state     type          node      id:lun     LIF
minor
-----
-----
active     up        primary      sdce      15:0:5:0   lif_16g_5
69:32
active     up        primary      sdfk      16:0:5:0   lif_16g_7
130:96
active     up        primary      sdfm      16:0:7:0   lif_16g_8
130:128
active     up        primary      sdcg      15:0:7:0   lif_16g_6
69:64
active     up        secondary    sdcd      15:0:4:0   lif_16g_1
69:16
active     up        secondary    sdcf      15:0:6:0   lif_16g_2
69:48
active     up        secondary    sdfj      16:0:4:0   lif_16g_3
130:80
active     up        secondary    sdfl      16:0:6:0   lif_16g_4
130:112
```

List all attributes of a given LUN mapped to host

```
# sanlun lun show -p -v vs_sanboot:/vol/sanboot_169/lun

ONTAP Path: vs_sanboot:/vol/sanboot_169/lun
LUN: 0
LUN Size: 160g
Product: cDOT
Host Device: 3600a0980383143393124515873683561
Multipath Policy: service-time 0
DM-MP Features: 3 queue_if_no_path pg_init_retries 50
Hardware Handler: 1 alua
Multipath Provider: Native
```

```
-----
```

dm-mp	host	vserver		host:	
major:	path	path	/dev/	chan:	vserver
state	state	type	node	id:lun	LIF
minor					
active	up	primary	sdce	15:0:5:0	lif_16g_5
69:32					
active	up	primary	sdfk	16:0:5:0	lif_16g_7
130:96					
active	up	primary	sdfm	16:0:7:0	lif_16g_8
130:128					
active	up	primary	sdcg	15:0:7:0	lif_16g_6
69:64					
active	up	secondary	sdcd	15:0:4:0	lif_16g_1
69:16					
active	up	secondary	sdcf	15:0:6:0	lif_16g_2
69:48					
active	up	secondary	sdfj	16:0:4:0	lif_16g_3
130:80					
active	up	secondary	sdf1	16:0:6:0	lif_16g_4
130:112					

```
-----
```

List the ONTAP SVM identity from which a given LUN is mapped to host


```

# sanlun lun show -m -v vs_sanboot:/vol/sanboot_169/lun
                                device
host                            lun
vserver                          lun-pathname      filename
adapter  protocol  size  product
-----
vs_sanboot                        /vol/sanboot_169/lun      /dev/sdfm
host16      FCP      160g  cDOT
          LUN Serial number: 81C91$QXsh5a
          Controller Model Name: AFF-A400
          Vserver FCP nodename: 2008d039ea1308e5
          Vserver FCP portname: 2010d039ea1308e5
          Vserver LIF name: lif_16g_8
          Vserver IP address: 10.141.12.165
                                10.141.12.161
                                10.141.12.163
          Vserver volume name: sanboot_169
MSID::0x00000000000000000000000000809E7CC3
          Vserver snapshot name:

```

List ONTAP LUN attributes by Host Device File name

```

# sanlun lun show -d /dev/sdce
controller(7mode/E-Series)/      device      host
lun
vserver(cDOT/FlashRay)          lun-pathname      filename      adapter
protocol  size  product
-----
vs_sanboot                        /vol/sanboot_169/lun      /dev/sdce      host15
FCP      160g  cDOT
[root@sr630-13-169 ~]#

```

List all SVM target LIF WWPNS attached to host

```
# sanlun lun show -wwpn
controller(7mode/E-Series)/  target
device          host          lun
vserver(cDOT/FlashRay)      wwpn          lun-pathname
filename        adapter      size  product
-----
-----
vs_169_16gEmu          202cd039ea1308e5  /vol/VOL_8g_169_2_8/lun
/dev/sdlo             host18          10g    cDOT
vs_169_16gEmu          202cd039ea1308e5  /vol/VOL_8g_169_2_9/lun
/dev/sdlp             host18          10g    cDOT
vs_169_16gEmu          202cd039ea1308e5  /vol/VOL_8g_169_2_7/lun
/dev/sdln             host18          10g    cDOT
vs_169_16gEmu          202cd039ea1308e5  /vol/VOL_8g_169_2_5/lun
/dev/sdll             host18          10g    cDOT
```

List ONTAP LUNs seen on host by a given SVM target LIF WWPN

```
# sanlun lun show -wwpn 2010d039ea1308e5
controller(7mode/E-Series)/  target
device          host          lun
vserver(cDOT/FlashRay)      wwpn          lun-pathname
filename        adapter      size  product
-----
-----
vs_sanboot          2010d039ea1308e5  /vol/sanboot_169/lun
/dev/sdfm           host16          160g    cDOT
```

Notice File

[Linux Unified Host Utilities Notice File](#)

Linux Unified Host Utilities 7.1 Release Notes

This Release Notes document contains the latest information for the Linux Unified Host Utilities 7.1 release, including updates about known problems and limitations, any important cautions, new features, and enhancements. It also describes any issues that might have been discovered since the Host Utilities were released.

About the Linux Unified Host Utilities 7.1 release

The Linux Unified Host Utilities support several Linux operating systems. The Host Utilities enable you to connect a Linux host to NetApp storage systems.

The Linux Unified Host Utilities 7.1 continues to support the following versions of Linux:

- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- Oracle Linux
- Oracle VM
- Citrix XenServer
- Veritas



For specific information about the operating system versions and updates that the Host Utilities support, see the [NetApp Interoperability Matrix Tool](#).

The Host Utilities software is provided as both 32-bit and 64-bit .rpm files. You can download the correct .rpm file for your host architecture and the documentation from the [NetApp Support Site](#).

For instructions about installing and setting up, see the [Linux Unified Host Utilities 7.1 Installation Guide](#).

What's new in the 7.1 release

Linux Host Utilities is now called *Linux Unified Host Utilities* because it supports NetApp E-Series storage systems running SANtricity as well as AFF and FAS systems running ONTAP.



Any mention of Host Utilities or Linux Host Utilities in this document refers to Linux Unified Host Utilities.

- This release of the Linux Unified Host Utilities provides support for a tuned package for setting server profiles and improving I/O performance on Red Hat Enterprise Linux 6 and 7 hosts.
- The Linux Unified Host Utilities 7.1 continues to support versions of the following:
 - Red Hat Enterprise Linux
 - SUSE Linux Enterprise Server
 - Oracle Linux
 - Oracle VM
 - Citrix XenServer
 - Veritas
- Red Hat Enterprise Linux 6 and 7 now have a tuned package with a `tuned-adm` command to set different server profiles on the host depending on the environment.
 - This includes an enterprise storage profile for configurations where LUNs from enterprise storage arrays are used. You can also use the virtual guest profile for Red Hat Enterprise Linux as a guest virtual machine. Using these tuned packages can result in marked improvement in throughput and latency on ONTAP.



NetApp continues to work with the Host Utilities to add support for features after the initial release. For latest information about the features that are supported and the new features that have been added, see the [NetApp Interoperability Matrix Tool](#).

New features and enhancements

The Release Notes are updated between product releases as new information is available.

7.1 enhancements

- This release includes support for the following:
 - SUSE Linux Enterprise Server 15 series
 - Oracle VM 3.2 series
 - Oracle Linux 6 and 7 series
 - Red Hat Enterprise Linux 6 and 7 series
 - SUSE Linux Enterprise Server 11 SP4
 - KVM and XEN, RHEV 6.4 and 6.5
 - Citrix XenServer parameters
- Adds support for 32 GB Fibre Channel adapters from Emulex and Qlogic.
- Fixes `sanlun lun show -p` getting SIGABRT in SLES12SP1, OL7.2, RHEL7.2, and RHEL 6.8.
- Extends support for Red Hat Linux 6.8, Oracle Linux 6.8, XenServer 7.0, Oracle VM 3.3 series, and Oracle VM 3.4 series operating systems.

Known problems and limitations

NetApp Bug ID	Description
1457017	<code>sanlun</code> installation issues warning messages related to <code>libdevmapper.so</code> and <code>libnl.so</code> libraries. These warnings do not affect the functionality of <code>sanlun</code> kit.

[NetApp Bugs Online](#) provides complete information for most known issues, including suggested workarounds where possible.

Some keyword combinations and bug types that you might want to use include the following:

- FCP - Linux
- iSCSI – Linux

Refer to the [ONTAP SAN Host Configuration documentation](#) for more information on Host OS settings and configurations.

About SAN Host Configuration documentation

Documentation for SAN Host Utilities is included in the [ONTAP SAN Host Configuration documentation](#). ONTAP SAN HOST configuration documentation is cumulative, covering all current SAN HOST releases. Any functional differences across releases are noted in context.

Additional information

Default values recommended when using drivers bundled with Linux kernel

When you are setting up an FC environment that uses the native, inbox drivers that are bundled with the Linux kernel, you can use the default values for the drivers. In iSCSI environments where you are using a iSCSI

solution software, you need to manually set certain recommended values depending on the OS version you are using.

Where to find product documentation and other information

You can access documentation for all NetApp products and find other product information resources, such as technical reports and white papers on the Product Documentation page of the NetApp corporate site.

Related information

Configuring and managing your ONTAP storage system

- The [ONTAP Software Setup Guide](#) for your version of ONTAP
- The [ONTAP SAN Administration Guide](#) for your version of ONTAP
- The [ONTAP Release Notes](#) for your version of ONTAP

Configuring and managing your E-Series storage system

- The SANtricity Storage Manager Configuration and Provisioning for Windows Express Guide that is appropriate for your protocol
- The SANtricity Storage Manager Configuration and Provisioning Express Guide for your operating system, protocol, and version of SANtricity.
- The SANtricity Storage Manager Software Installation Reference specific for your version of SANtricity.
- The SANtricity Storage Manager Multipath Driver's Guide specific for your version of SANtricity.
- The SANtricity Storage Manager Release Notes for your version of SANtricity.

Go to the [E-Series documentation](#) to find SANtricity related documentation.

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