



Linux Unified Host Utilities

SAN hosts and cloud clients

NetApp
December 12, 2024

Table of Contents

- Linux Unified Host Utilities 1
 - Linux Unified Host Utilities 7.1 Release Notes 1
 - Install Linux Unified Host Utilities 7.1 2
 - Linux Unified Host Utilities 7.1 command reference 5

Linux Unified Host Utilities

Linux Unified Host Utilities 7.1 Release Notes

The release notes describe new features and enhancements, known problems and limitations, and important cautions for configuring and managing your specific host with your ONTAP storage system.

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

What's New

The Linux Host Utilities 7.1 release contains the following new features and enhancements:

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



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

- The following operating systems are now supported:
 - 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
- On Red Hat Enterprise Linux (RHEL) 6 and RHEL 7 hosts, a tuned package for setting server profiles is now supported. You can use the `tuned-adm` command to set different profiles, depending on the environment. For example, you can also use the virtual guest profile as a guest virtual machine and you can use the enterprise storage profile for configurations where LUNs from enterprise storage arrays are used. Using these tuned packages can result in improvement in throughput and latency in ONTAP.
- Adds support for 32GB FC adapters from Broadcom Emulex and Marvell QLogic.



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](#).

Fixed in this release

The intermittent host OS failure issue that occurs when running the `sanlun lun show -p` command in SUSE Linux Enterprise Server 12 SP1, OL 7.2, RHEL 7.2, and RHEL 6.8 is fixed in this release.

Known problems and limitations

The Linux Host Utilities 7.1 release has the following known problems and limitations.

NetApp Bug ID	Title	Description
1457017	sanlun 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.	<p>When you execute the Linux Unified Host Utilities CLI command - "sanlun fcp show adapter -v" on a SAN host, the command fails with an error message displaying that the library dependencies required for an host bus adapter (HBA) discovery cannot be located:</p> <pre>[root@hostname ~]# sanlun fcp show adapter -v Unable to locate /usr/lib64/libHBAAPI.so library Make sure the package installing the library is installed & loaded Refer to NetApp Bugs Online - 1508554.</pre>

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

Install Linux Unified Host Utilities 7.1

The Linux Unified Host Utilities (LUHU) assists you to manage NetApp ONTAP storage attached to a Linux host. NetApp strongly recommends installing the Linux Unified Host Utilities, but it is 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.

The following Linux distributions are supported:

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

What you'll need

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

- 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 host bus adapter (HBA) management packages available on the vendor support site.

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

- Marvell QLogic HBA – QConvergeConsole CLI
 - Broadcom Emulex HBA - OneCommand Manager core application CLI
 - Marvell Brocade HBA – Brocade Command Utility CLI
- RPM Packages "libhbaapi" and "libhbalinux" available for each Linux distribution should be installed on the host OS.



Linux Unified Host Utilities software does not support NVMe over Fibre Channel (NVMe/FC) and NVMe over TCP (NVMe/TCP) host protocols.

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 to remove the installed package.

2. Download 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
```

Example output

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

4. Verify the installation:

```
sanlun version
```

Example output

```
sanlun version 7.1.386.1644
```

Recommended driver settings with Linux kernel

When you configure an FC environment that uses native inbox drivers that are bundled with the Linux kernel, you can use the default values for the drivers.

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
```

Example output:

```
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.

Linux Unified Host Utilities 7.1 command reference

You can use the Linux Unified Host Utilities 7.1 sample command reference for an end-to-end validation of the NetApp storage configuration using the host utilities tool.

List all host initiators mapped to host

You can retrieve a list of all host initiators mapped to a host.

```
# sanlun fcp show adapter -v
```

Example output

```
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

You can retrieve a list of all LUNs mapped to a host.

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

Example output


```

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 state	host path state	vserver path type	/dev/ node	host: chan: id:lun	vserver LIF	major: 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

You can retrieve a list of all LUNs mapped to a host from a specific storage VM (SVM).

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

Example output

```

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      vservers  host:
major:    path      path      /dev/    chan:     vservers
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

You can retrieve a list of all attributes of a specified LUN mapped to a host.

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

Example output

```

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      vservers  host:
major:    path      path      /dev/    chan:    vservers
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 the ONTAP SVM identity from which a given LUN is mapped to host

You can retrieve a list of ONTAP SVM identity from which a specific LUN is mapped to a host.

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

Example output

```

                                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:::0x0000000000000000000000000809E7CC3
          Vserver snapshot name:

```

List ONTAP LUN attributes by host device filename

You can retrieve a list of ONTAP LUN attributes by a host device filename.

```
# sanlun lun show -d /dev/sdce
```

Example output

```

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

You can retrieve a list of all SVM target LIF WWPNS attached to a host.

```
# sanlun lun show -wwpn
```

Example output

```
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

You can retrieve a list of ONTAP LUNs noticed on a host by a specified SVM target LIF WWPN.

```
# sanlun lun show -wwpn 2010d039ea1308e5
```

Example output

```
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
```

Copyright information

Copyright © 2024 NetApp, Inc. All Rights Reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

LIMITED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (b)(3) of the Rights in Technical Data -Noncommercial Items at DFARS 252.227-7013 (FEB 2014) and FAR 52.227-19 (DEC 2007).

Data contained herein pertains to a commercial product and/or commercial service (as defined in FAR 2.101) and is proprietary to NetApp, Inc. All NetApp technical data and computer software provided under this Agreement is commercial in nature and developed solely at private expense. The U.S. Government has a non-exclusive, non-transferrable, nonsublicensable, worldwide, limited irrevocable license to use the Data only in connection with and in support of the U.S. Government contract under which the Data was delivered. Except as provided herein, the Data may not be used, disclosed, reproduced, modified, performed, or displayed without the prior written approval of NetApp, Inc. United States Government license rights for the Department of Defense are limited to those rights identified in DFARS clause 252.227-7015(b) (FEB 2014).

Trademark information

NETAPP, the NETAPP logo, and the marks listed at <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.