



# Using Veritas Infoscale 7 for Linux with NetApp ONTAP

ONTAP SAN Host

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# Using Veritas Infoscale 7 for Linux with NetApp ONTAP

## Introduction

This document provides guidance on ONTAP SAN host configuration settings for the Veritas Infoscale storage foundation 7 series release for Red Hat Enterprise Linux & Oracle Linux (RHCK based) platforms with FC, FCoE and iSCSI protocols.

## Installing the Linux Unified Host Utilities

The NetApp Linux Unified Host Utilities software package is available on the [NetApp Support Site](#) in a 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.

### Before you begin

If you have a version of Linux Unified Host Utilities currently installed you should upgrade it or, you should remove it and use the following steps to install the latest version.

### Steps

1. Download the 64-bit Linux Unified Host Utilities software package from the [NetApp Support Site](#) to your host.
2. Use the following command to install the software package:

```
rpm -ivh netapp_linux_unified_host_utilities-7-1.x86_64
```

## SAN Toolkit

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 illustration, the `sanlun show` command returns LUN information.

```
# sanlun show -p -v SFRAC:/vol/fen1/lun1
```

```
ONTAP Path: SFRAC:/vol/fen1/lun1
```

```
LUN: 0
```

```
LUN Size: 10g
```

```
Product: cDOT
```

```
DMP NODE: sfrac0_47
```

```
Multipath Provider: Veritas
```

```
-----
```

Veritas	host	vserver	host:			
path	path	path	/dev/	chan:	vserver	major:
state	state	type	node	id:lun	LIF	minor
enabled	up	active/non-optimized	sdea	14:0:1:0	lif_10	128:32
enabled (a)	up	active/optimized	sdcj	14:0:0:0	lif_2	69:112
enabled (a)	up	active/optimized	sdb	13:0:0:0	lif_1	8:16
enabled	up	active/non-optimized	sdas	13:0:1:0	lif_9	66:192

```
-----
```

## SAN Booting

### Before you begin

If you decide to use SAN booting, it must be supported by your configuration. You can use the [NetApp Interoperability Matrix Tool](#) to verify that your OS, HBA, HBA firmware and the HBA boot BIOS, and ONTAP version are supported.

Refer to Veritas Support Portal (Product Matrix, Platform Lookup, HCL Matrix) to verify SAN Boot configuration supportability and known caveats.

### Steps

1. Map the SAN boot LUN to the host.
2. Verify multiple paths are available.

Remember, multiple paths will only be available after the host OS is up and running on the paths.

3. Enable SAN booting in the server BIOS for the ports to which the SAN boot LUN is mapped.

For information on how to enable the HBA BIOS, see your vendor-specific documentation.

4. Reboot the host to verify the boot is successful.

# Multipathing

You must verify that your configuration meets the system requirements. For more information, see the [NetApp Interoperability Matrix Tool](#) and the Veritas HCL Matrix.

## Example

In this example, the `vxdmpadm` command is used to verify that the VxDMP Multipath has the ONTAP target array attached.

```
# vxdmpadm listenclosure
ENCLR_NAME      ENCLR_TYPE      ENCLR_SNO      STATUS      ARRAY_TYPE      LUN_COUNT
FIRMWARE
=====
=====
sfrac0          SFRAC           804Xw$PqE52h  CONNECTED   ALUA            43
9800
```

```
# vxdmpadm getdmpnode
NAME           STATE      ENCLR-TYPE     PATHS     ENBL     DSBL     ENCLR-NAME
=====
sfrac0_47     ENABLED   SFRAC          4         4        0        sfrac0
```

With Veritas Dynamic Multipathing (VxDMP), you must perform configuration tasks to claim NetApp LUNs as Veritas Multipath Devices. You must have the Array Support Library (ASL) and the Array Policy Module (APM) packages installed that Veritas provides for NetApp storage systems. While the Veritas Software Installation loads the default ASL APM packages along with the product, it is recommended to use the latest supported packages listed on Veritas support portal.

## Example

The following example displays the Veritas Support Library (ASL) and the Array Policy Module (APM) configuration.

```
# vxdmpadm list dmpnode dmpnodename=sfrac0_47 | grep asl
asl          = libvxnetapp.so
```

```
# vxddladm listversion |grep libvxnetapp.so
libvxnetapp.so          vm-7.4-rev-1      6.1

# rpm -qa |grep VRTSaslapm
VRTSaslapm-x.x.x.0000-RHEL8.X86_64
```

```

vxddladm listsupport libname=libvxnetapp.so
ATTR_NAME    ATTR_VALUE
=====
LIBNAME      libvxnetapp.so
VID          NETAPP
PID          All
ARRAY_TYPE   ALUA, A/A

```

## Non-ASA Configuration

For non-ASA configuration there should be two groups of paths with different priorities. The paths with the higher priorities are Active/Optimized, meaning they are serviced by the controller where the aggregate is located. The paths with the lower priorities are active but are non-optimized because they are served from a different controller. The non-optimized paths are only used when no optimized paths are available.

### Example

The following example displays the correct output for an ONTAP LUN with two Active/Optimized paths and two Active/Non-Optimized paths:

```

# vxddm adm getsubpaths dmpnodename-sfrac0_47
NAME STATE [A]    PATH-TYPE [M]    CTLR-NAME    ENCLR-TYPE    ENCLR-NAME    ATTRS
PRIORITY
=====
=====
sdas  ENABLED        Active/Non-Optimized c13    SFRAC        sfrac0        -
-
sdb   ENABLED (A)    Active/Optimized    c14    SFRAC        sfrac0        -
-
sdcj  ENABLED (A)    Active/Optimized    c14    SFRAC        sfrac0        -
-
sdea  ENABLED        Active/Non-Optimized c14    SFRAC        sfrac0        -
-

```



Do not use an excessive number of paths to a single LUN. No more than 4 paths should be required. More than 8 paths might cause path issues during storage failures.

## Recommended Settings

### Settings for Veritas Multipath

The following Veritas VxDMP tunables are recommended by NetApp for optimum system configuration in storage failover operations.

Parameter	Setting
dmp_lun_retry_timeout	60

Parameter	Setting
dmp_path_age	120
dmp_restore_interval	60

DMP tunables are set online by using the `vxdmpadm` command as follows:

```
# vxdmpadm settune dmp_tunable=value
```

The values of these tunable can be verified dynamically by using `#vxdmpadm gettune`.

### Example

The following example shows the effective VxDMP tunables on the SAN host.

```
# vxdmpadm gettune

Tunable                Current Value    Default Value
dmp_cache_open         on               on
dmp_daemon_count       10              10
dmp_delayq_interval    15              15
dmp_display_alua_states on               on
dmp_fast_recovery      on               on
dmp_health_time        60              60
dmp_iostats_state       enabled          enabled
dmp_log_level          1               1
dmp_low_impact_probe   on               on
dmp_lun_retry_timeout  60              30
dmp_path_age           120             300
dmp_pathswitch_blks_shift 9                9
dmp_probe_idle_lun     on               on
dmp_probe_threshold    5               5
dmp_restore_cycles     10              10
dmp_restore_interval   60              300
dmp_restore_policy     check_disabled  check_disabled
dmp_restore_state      enabled          enabled
dmp_retry_count        5               5
dmp_scsi_timeout       20              20
dmp_sfg_threshold      1               1
dmp_stat_interval      1               1
dmp_monitor_ownership  on               on
dmp_monitor_fabric     on               on
dmp_native_support     off              off
```

### Settings by protocol

- For FC/FCoE only: Use the default timeout values.

- For iSCSI only: Set the `replacement_timeout` parameter value to 120.

The iSCSI `replacement_timeout` parameter controls how long the iSCSI layer should wait for a timed-out path or session to reestablish itself before failing any commands on it. Setting the value of `replacement_timeout` to 120 in the iSCSI configuration file is recommended.

### Example

```
# grep replacement_timeout /etc/iscsi/iscsid.conf
node.session.timeo.replacement_timeout = 120
```

### Settings by OS platforms

For Red Hat Enterprise Linux 7 and 8 series, you must configure `udev` `rport` values to support the Veritas Infoscale environment in storage failover scenarios. Create the file `/etc/udev/rules.d/40-rport.rules` with the following file content:

```
# cat /etc/udev/rules.d/40-rport.rules
KERNEL=="rport-*", SUBSYSTEM=="fc_remote_ports", ACTION=="add",
RUN+="/bin/sh -c 'echo 20 >
/sys/class/fc_remote_ports/%k/fast_io_fail_tmo;echo 864000
>/sys/class/fc_remote_ports/%k/dev_loss_tmo'"
```



For all other settings specific to Veritas, refer to the standard Veritas Infoscale product documentation.

## Multipath Coexistence

If you have a heterogenous multipath environment including Veritas Infoscale, Linux Native Device Mapper, and LVM volume manager, please refer to the Veritas Product Administration guide for configuration settings.

## Known Problems and Limitations

There are no known problems and limitations.



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