



Veritas

ONTAP SAN Host

NetApp
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Veritas

Using Veritas Infoscale 7.3 for Linux with NetApp ONTAP

Introduction

This document provides guidance on ONTAP SAN host configuration settings for Veritas Infoscale 7.3, 7.3.1 releases 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.

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  
eanbled      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.

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 `vxddmpadm` command is used to verify that the VxDMP Multipath has the ONTAP target array attached.

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

```
# vxddmpadm 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.

```
# vxddmpadm 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-7.4.2.0000-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:

```

# vxddmpadm 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_tmp;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 heterogeneous 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.

Using Veritas Infoscale 7.4.1 for Linux with NetApp ONTAP

Introduction

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      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
eanbled      up          active/non-optimized sdas      13:0:1:0   lif_9
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=====
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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 -
-
```



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| 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

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RUN+="/bin/sh -c 'echo 20 >
/sys/class/fc_remote_ports/%k/fast_io_fail_tmp;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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