

# **Novell Linux Volume Manager Reference**

## **Open Enterprise Server 11**

July 6, 2012

**Novell.**

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# About This Guide

The Novell Linux Volume Manager (NLVM) allows you to use NetWare partitions on a Novell Open Enterprise Server (OES) 11 server. This guide describes NLVM and how to use it with Novell Storage Services (NSS) file systems, Linux POSIX file systems, and Novell Cluster Services.

- ♦ [Chapter 1, “Overview of NLVM,” on page 9](#)
- ♦ [Chapter 2, “What’s New or Changed in Novell Linux Volume Manager,” on page 11](#)
- ♦ [Chapter 3, “Planning for NLVM,” on page 15](#)
- ♦ [Chapter 4, “NLVM Commands,” on page 21](#)
- ♦ [Chapter 5, “NLVM Examples,” on page 71](#)
- ♦ [Chapter 6, “Troubleshooting NLVM,” on page 73](#)
- ♦ [Chapter 7, “Security Considerations,” on page 75](#)
- ♦ [Appendix A, “Configuring Settings for the NLVM Library,” on page 77](#)
- ♦ [Appendix B, “Documentation Updates,” on page 79](#)

## Audience

This guide is intended for storage and cluster administrators.

## Feedback

We want to hear your comments and suggestions about this manual and the other documentation included with this product. Please use the User Comments feature at the bottom of each page of the online documentation.

## Documentation Updates

For the most recent version of the *OES 11: NLVM Reference*, visit the [OES 11 Web site \(http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bookinfo.html\)](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bookinfo.html).

## Additional Documentation

For documentation on OES 11, see the [OES 11 Documentation Web site \(http://www.novell.com/documentation/oes11/\)](http://www.novell.com/documentation/oes11/).



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# 1 Overview of NLVM

The Novell Linux Volume Manager (NLVM) provides management of Novell Storage Services (NSS) storage objects in Novell Open Enterprise Server (OES) 11. The command line interface (CLI) commands can be used in a Linux console or in a script. The NSS management tools use the NLVM library of APIs to create and manage NSS storage objects. NLVM also provides options to create Linux POSIX file systems, such as Ext3, ReiserFS, and XFS.

This command reference describes how to use command line commands to manage the following storage objects:

- ♦ [Devices and Partitions](#)
- ♦ [Linux POSIX Volumes](#)
- ♦ [NSS Pools](#)
- ♦ [NSS Pool Snapshots](#)
- ♦ [NSS Software RAIDs](#)
- ♦ [NSS Volumes](#)



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# 2 What's New or Changed in Novell Linux Volume Manager

This section describes the changes made to Novell Linux Volume Manager (NLVM) since the Novell Open Enterprise Server (OES) 11 release.

- ♦ [Section 2.1, “What’s New \(May 2012 Patches\),” on page 11](#)
- ♦ [Section 2.2, “What’s New \(April 2012 Patches\),” on page 11](#)
- ♦ [Section 2.3, “What’s New \(OES 11\),” on page 12](#)

## 2.1 What’s New (May 2012 Patches)

In addition to bug fixes, the following changes and enhancements were made in the OES 11 May 2012 Scheduled Maintenance patches:

- ♦ **Confirmation Prompt:** You are automatically prompted to confirm actions for certain commands that destroy data, such as when you initialize a device or delete Linux POSIX volumes.
- ♦ **No Prompt:** The `--no-prompt` NLVM option can be used with certain commands to prevent a confirmation message from being displayed, such as when you initialize a device or delete Linux POSIX volumes, pool moves, partitions, pools, RAIDs, RAID segments, snapshots, and NSS volumes.

## 2.2 What’s New (April 2012 Patches)

In addition to bug fixes, the following changes and enhancements were made in the OES 11 April 2012 Scheduled Maintenance patches:

- ♦ **Sizes:** The following enhancements are available for the `size` option:
  - ♦ The default multiplier for sizes was changed from M (megabytes) to G (gigabytes). If no multiplier is provided, the value is assumed to be in gigabytes. For example:  

```
size=20
```

 (20 gigabytes is used)
  - ♦ Use the T multiplier to specify sizes in terabytes (TB).
  - ♦ All sizes can be entered as whole numbers or with fractional parts such as 200.45G and 3.98T.
- ♦ **Delete Move:** The `abort` option has been deprecated. This command deletes the move request, returns the pool back to its original location, and removes the new location. You can delete the move at any time while the move is in progress, even if it is pending only the `complete` move command to be finalized. Use the `complete` move command if you want to keep the new location and remove the original location.

- ♦ **List Move:** You can alternatively specify the pool name instead of the pool move name.
- ♦ **Move:** The `nlvm delete move` command sets the pool back to the original location and removes the new location. You can delete the move at any time while the move is in progress, even if it is pending only the `complete move` command to be finalized.
- ♦ **Rename Volume:** Rename a specified volume. This option is new.

## 2.3 What's New (OES 11)

The Novell Linux Volume Manager (NLVM) replaces the Enterprise Volume Management System (EVMS) for the management of Novell Storage Services (NSS) storage objects in Novell Open Enterprise Server (OES) 11. NLVM provides the same media management functionality that was used by NSS in EVMS, and makes the following enhancements for OES 11:

- ♦ **Initialize a Device with a DOS or GPT Partitioning Scheme:** The `nlvm init` command allows you to specify partitioning scheme format of MS-DOS (the default) or GPT. MS-DOS has a 2 TB size limit. Devices of any size can be configured with GPT. For information, see “Init Device” ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bu80fut.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bu80fut.html)) in the *OES 11: NLVM Reference* ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bookinfo.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bookinfo.html)).
- ♦ **8 TB Device Size for Pools:** The `nlvm create pool` command allows you to use devices up to 8 TB in size. The maximum pool size is 8 TB. Previously, pools could use devices of up to 2 TB in size. For information, see “Create Pool” ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bu80fr4.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bu80fr4.html)) in the *OES 11: NLVM Reference* ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bookinfo.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bookinfo.html)).
- ♦ **Move a Pool:** The `nlvm move` command allows you to move an NSS pool from one location to a new location on the same system. For information, see “Move” ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bu80fx9.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bu80fx9.html)) in the *OES 11: NLVM Reference* ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bookinfo.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bookinfo.html)).

See also the related commands:

- ♦ “Complete Move” ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bu80fq5.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bu80fq5.html))
- ♦ “Delete Move” ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bu80ft2.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bu80ft2.html))
- ♦ “List Move” ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bu80fvo.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bu80fvo.html))
- ♦ “List Moves” ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bu80fvt.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bu80fvt.html))
- ♦ **Rescan:** The `nlvm rescan` command performs a rescan of the storage objects (such as partitions, NSS pools, and NSS software RAIDs) on known devices, and creates any Device Mapper device or partition objects, or updates them as needed. For information, see “Rescan” ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bu80fy4.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bu80fy4.html)) in the *OES 11: NLVM Reference* ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bookinfo.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bookinfo.html)).
- ♦ **Expand a Partition:** The `nlvm expand partition` command allows you to expand a partition by using free contiguous space that follows the partition. For information, see “Expand Partition” ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bu80fu2.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bu80fu2.html)) in the *OES 11: NLVM Reference* ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bookinfo.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bookinfo.html)).

- ♦ **Create a Linux POSIX File System Volume:** The `nlvm create linux volume` command allows you to create a volume with a Linux POSIX file system. The volume can be created as a traditional Linux volume or as a Linux Logical Volume Manager 2 (LVM2) volume on an LVM2 volume group. If the device is shared with nodes in a Novell Cluster Services cluster, you can cluster-enable the LVM2 volume group. For information, see “[Create Linux Volume](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bu80fq9.html)” ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bu80fq9.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bu80fq9.html)) in the *OES 11: NLVM Reference* ([http://www.novell.com/documentation/oes11/stor\\_nlvm\\_lx/data/bookinfo.html](http://www.novell.com/documentation/oes11/stor_nlvm_lx/data/bookinfo.html)).



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# 3 Planning for NLVM

Consider the requirements and caveats in this section when planning to use Novell Linux Volume Manager (NLVM) command line commands for Novell Open Enterprise Server (OES) 11.

- ♦ [Section 3.1, “Root User,” on page 15](#)
- ♦ [Section 3.2, “Naming Conventions for Storage Objects,” on page 15](#)
- ♦ [Section 3.3, “NSS Pools on the System Device,” on page 17](#)
- ♦ [Section 3.4, “NSS Pools Created on NetWare Servers,” on page 17](#)
- ♦ [Section 3.5, “NSS Pools Created on OES 2 Servers and OES 1 Servers,” on page 17](#)
- ♦ [Section 3.6, “Linux LVM Volume Group,” on page 18](#)
- ♦ [Section 3.7, “Linux LVM Volume Group Cluster Resources,” on page 18](#)
- ♦ [Section 3.8, “Using NLVM with Linux Software RAID,” on page 18](#)

## 3.1 Root User

The Linux system root user privileges are required to use the NLVM commands.

## 3.2 Naming Conventions for Storage Objects

Consider the naming conventions in this section when you create or rename storage objects with NLVM.

- ♦ [Section 3.2.1, “NSS Pool and Volume Names,” on page 15](#)
- ♦ [Section 3.2.2, “NSS Pool Snapshot Names,” on page 16](#)
- ♦ [Section 3.2.3, “NSS Software RAID Names,” on page 16](#)
- ♦ [Section 3.2.4, “Linux LVM Volume Group and Logical Volume Names,” on page 16](#)

### 3.2.1 NSS Pool and Volume Names

Novell Storage Services (NSS) pool names and volume names must be unique from other pools and volumes on the server. In a cluster, the names of shared pools and volumes must be unique across all nodes in the cluster.

Pool and volume names can be 2 to 15 characters.

Uppercase letters A to Z, number characters 0 to 9, and underscore (\_) are valid characters for all pools and volumes. Names cannot start or end in an underscore, and cannot contain double underscores. When you create an NSS pool or volume, the name you specify is automatically converted to uppercase.

If the pool is not shared, the pool name or volume name can also contain special characters:

!@#%& ( )

Names that contain special characters must be enclosed in quotation marks in all commands and scripts.

The names cannot be reserved names such as `con`, `com`, `lpt`, `pipe`, `all`, and so on.

### 3.2.2 NSS Pool Snapshot Names

An NSS pool snapshot name must be a unique snap name on the server.

Pool snapshot names are 2 to 15 characters.

The naming conventions for a pool snapshot are the same as for NSS pools and volumes. When you create an NSS pool snapshot, the name you specify is automatically converted to uppercase.

### 3.2.3 NSS Software RAID Names

An NSS software RAID name must be unique from other devices on the server. In a cluster, the names of shared software RAID names must be unique across all nodes in the cluster.

RAID names are 2 to 58 characters.

Names are preferred to use characters A to Z, a to z, 0 to 9, and underscore (`_`). Names cannot start or end in underscore, and cannot contain double underscores. Printable ASCII characters (see decimal codes 33 to 122 in a code chart) are valid. The name is case sensitive; it can contain uppercase and lowercase characters.

RAID names can contain special characters such as:

!@#%& ( )

Names that contain special characters must be enclosed in quotation marks in all commands and scripts. On the BASH command line, each special character must be escaped by preceding it with a backslash character (`\`).

The RAID names cannot be reserved names such as `con`, `com`, `lpt`, `pipe`, `all`, and so on.

### 3.2.4 Linux LVM Volume Group and Logical Volume Names

Consider the following conventions for naming Linux Logical Volume Manager (LVM) volume groups and logical volumes:

- ♦ [“NLVM Requirements for LVM Names” on page 16](#)
- ♦ [“LVM2 Requirements for LVM Names” on page 17](#)
- ♦ [“Clustered LVM Requirements for LVM Names” on page 17](#)

#### NLVM Requirements for LVM Names

NLVM requires that Linux LVM volume group names and logical volume names be unique from any volume, device, pool, RAID, and other Device Mapper name. The LVM group name is limited to 128 characters. The LVM logical volume name is limited to 64 characters.

## LVM2 Requirements for LVM Names

LVM2 allows volume group names and logical volume names to contain characters A to Z, a to z, 0 to 9, underscore (\_), hyphen (-), dot (.), and plus (+). The names cannot begin with a hyphen.

Reserved names and character strings that are used internally by LVM cannot be used as volume group names or logical volume names. A volume group cannot be called anything that exists in /dev/ at the time of creation. It cannot be named '.' (a single dot) or '..' (double dot).

A logical volume cannot be named the following reserved words:

```
. (a single dot)
.. (double dot)
snapshot
pvmove
```

The logical volume name also cannot contain the following strings:

```
_mlog
_mimage
```

## Clustered LVM Requirements for LVM Names

In a Novell Cluster Services cluster, the names of clustered LVM volume groups and logical volumes must be unique across all nodes in the cluster.

## 3.3 NSS Pools on the System Device

You can create an NSS pool on the system device where you installed the SUSE Linux Enterprise Server (SLES) 11 SP1 operating system if there is free space available on the device. This capability is not supported at install time. When you create the pool, select the system device (such as sda) and specify the amount of free space to use for the pool. This capability is not supported at install time.

## 3.4 NSS Pools Created on NetWare Servers

NLVM is compatible with NSS pools that were created on NetWare servers.

For information about relocating a pool from a standalone NetWare server to an OES 11 server, see [“Migrating NSS Devices to OES 11”](#) in the *OES 11: NSS File System Administration Guide for Linux*.

For information about cluster migrating a shared pool cluster resource to an OES 11 node during a rolling cluster conversion, see the *OES 11: Novell Cluster Services NetWare to Linux Conversion Guide*.

## 3.5 NSS Pools Created on OES 2 Servers and OES 1 Servers

NLVM is compatible with NSS pools that were created on OES 2 servers and OES 1 servers.

For information about relocating a pool from a standalone OES 2 server or OES 1 server to an OES 11 server, see [“Migrating NSS Devices to OES 11”](#) in the *OES 11: NSS File System Administration Guide for Linux*.

For information about cluster migrating a shared pool cluster resource to an OES 11 node during a rolling cluster upgrade, see [“Upgrading Clusters from OES 2 to OES 11”](#) in the *OES 11: Novell Cluster Services 2.0 for Linux Administration Guide*.

## 3.6 Linux LVM Volume Group

NLVM uses the Linux Logical Volume Manager to create volume groups. LVM requires that the devices you use to create a volume group are already initialized and contain no partitions. LVM uses the entire device for the volume group.

## 3.7 Linux LVM Volume Group Cluster Resources

Novell Cluster Services 2.0, NLVM, and NSSMU use the Clustered Logical Volume Manager (CLVM) to manage LVM volume group cluster resources. CLVM requires the Linux kernel 2.6.32.45-0.3 or later. You can get the latest kernel version by using the SLES 11 SP1 update channel.

When you create clustered LVM volume groups on shared storage, all of the nodes in the cluster must have shared physical access to the devices that you want to use to create the volume group. A quorum of nodes must be present in the cluster. The volume group cluster resource is brought online on only one node at a time.

LVM requires that the devices you use to create a volume group are already initialized and contain no partitions. In a cluster, a device should be physically attached to all nodes in a cluster. The device must not be marked as Shareable for Clustering because that adds a 4 KB partition on the device to store the shared state. LVM uses the entire device for the volume group.

## 3.8 Using NLVM with Linux Software RAIDs

Linux Software RAIDs are intended to be used with Linux tools and file systems. Consider the caveats in this section before implementing Linux Software RAIDs on your OES 11 server.

- ♦ [Section 3.8.1, “Linux Software RAIDs Are Not Cluster Aware,” on page 18](#)
- ♦ [Section 3.8.2, “NSS Tools Do Not Support Linux Software RAIDs,” on page 19](#)
- ♦ [Section 3.8.3, “Linux Software RAIDs Are Not Recommended for the System Device,” on page 19](#)

### 3.8.1 Linux Software RAIDs Are Not Cluster Aware

Do not use Linux Software RAIDs for devices that you plan to use for shared storage objects. Linux Software RAID devices do not support concurrent activation on multiple nodes; that is, they are not cluster aware. They cannot be used for shared-disk storage objects, such as the OCFS2 file system, CLVM volume groups, and Novell Cluster Services SBD (split-brain-detector) partitions.

For shared disks, you can use hardware RAID devices on your storage subsystem to achieve fault tolerance.

### **3.8.2 NSS Tools Do Not Support Linux Software RAIDs**

Do not use Linux Software RAIDs for devices that you plan to use for storage objects managed by Novell Storage Services (NSS) tools, such as NLVM, NSSMU, and the Storage plug-in to iManager. NSS tools ignore Linux Software RAID devices, and do not show them as options when you create NSS pools, Linux POSIX volumes, LVM volume groups, and CLVM volume groups.

For NSS pools, you can use hardware RAID devices or NSS Software RAID devices to achieve disk fault tolerance.

For Linux POSIX volumes, LVM volume groups, and CLVM volume groups, you can use hardware RAID devices on your storage subsystem to achieve disk fault tolerance.

### **3.8.3 Linux Software RAIDs Are Not Recommended for the System Device**

Do not use Linux Software RAIDs on the system device if you plan to use free space on the device later for storage objects managed by NSS tools. During the SLES 11/OES 11 installation, if you create a Linux Software RAID device to use as the system device (for the root (/) file system), the free space on the system device cannot later be used for NSS pools because the NSS tools do not allow that device to be seen.

For the Linux system device, you can use a hardware RAID device to achieve fault tolerance. This allows NSS tools to see and use any available free space on the system device for unshared NSS pools.



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# 4 NLVM Commands

The Novell Linux Volume Manager (NLVM) command line interface (CLI) for Novell Open Enterprise Server (OES) 11 provides commands that can be used in a Linux console or in a script. The Novell Storage Services (NSS) management tools use NLVM to create and manage NSS storage objects. NLVM provides options to create Linux POSIX file systems, such as Ext3, ReiserFS, and XFS.

This section describes the syntax and usage for NLVM commands.

- ♦ [General Options](#)
- ♦ [Devices and Partitions](#)
- ♦ [Linux POSIX Volumes](#)
- ♦ [NSS Pools](#)
- ♦ [NSS Pool Snapshots](#)
- ♦ [NSS Software RAIDs](#)
- ♦ [NSS Volumes](#)
- ♦ [All Commands \(A to Z\)](#)

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## 4.1 Syntax Overview

Novell Linux Volume Manager can be used to manage NSS file systems or Linux POSIX file systems on your OES 11 server. This section describes the general syntax and conventions for NLVM.

- ♦ [Section 4.1.1, “Syntax,” on page 24](#)
- ♦ [Section 4.1.2, “Syntax Conventions,” on page 24](#)
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### 4.1.1 Syntax

Using commands for the NLVM program requires root user privileges.

```
nlvm [nlvm_options] <command> <command_options>
```

### 4.1.2 Syntax Conventions

When issuing NLVM commands, consider the following general syntax conventions:

- ♦ [“NSS Pool and Volume Names” on page 24](#)
- ♦ [“NSS Software RAID Names” on page 25](#)
- ♦ [“Order of Options” on page 25](#)
- ♦ [“Sizes” on page 25](#)

#### NSS Pool and Volume Names

All NSS pool names and NSS volume names are automatically converted to uppercase.

## NSS Software RAID Names

NSS software RAID names are case sensitive.

## Order of Options

Command options can be specified in any order except where it is otherwise noted. Options with an equal sign (=) can be in any order.

## Sizes

All sizes are in bytes and can be specified with one of the following multipliers: K, M, G, and T. Multipliers are case insensitive and are multiples of 1024. If no multiplier is specified, it is assumed to be G by default. If 'max' is entered, all of the free unpartitioned space on the device is used. All sizes can be entered as whole numbers or with fractional parts such as 200.45G and 3.98T.

Examples for common command options:

size=20 (If no multiplier is used, it is assumed to be G (gigabytes).)

size=20G (You can also specify max instead of a value and multiplier.)

device=sdb (You can also specify anydisk or anyshared instead of the device.)

part=sdcl.1

name=MYPOOL1 (All NSS pool names and NSS volume names are converted to uppercase.)

### 4.1.3 Documentation Conventions

In the command syntax for NLVM, the mandatory command options are surrounded by angle brackets (<>). The optional command options are surrounded by square brackets ([ ]). The brackets are not used when you issue the command. For example, the command syntax conventions are:

nlvm command <mandatory\_command> [optional\_command]

### 4.1.4 Files

The following are key files used by NLVM:

**/etc/opt/novell/nss/nlvm.conf**

Location of the NLVM configuration file.

**/opt/novell/nss/sbin/nlvm**

Location of the NLVM utility. It also has a link in the sbin directory so that it is in the search path.

**/var/opt/novell/nss/debug**

Location of the debug log files.

## 4.2 NLVM Options

The NLVM options can be used as needed with any command, except where it is otherwise noted.

- ♦ `-d, --debug`
- ♦ `-f, --force`
- ♦ `-l, --getlock`
- ♦ `-m`
- ♦ `--no-prompt`
- ♦ `-r, --rescan`
- ♦ `-s, --share`

### **`-d, --debug`**

This option causes a `/var/opt/novell/log/nss/debug/nlvm_debug.log` file to be created so that the operations can be reviewed. This is helpful in diagnosing problems in running the NLVM utility. Up to 10 debug files can be created; they are numbered automatically.

---

**NOTE:** The debug can be turned on always by using the `/etc/opt/novell/nss/nlvm.conf` file.

---

### **`-f, --force`**

This option can be used with certain commands to force the command to complete. Support for this NLVM option is indicated in the individual commands.

### **`-l, --getlock`**

This option forces the command to get the `nlvm` lock. The lock protects multiple users from modifying things at the same time.

Use with caution! This option is to be used only if the lock does not get released properly due to a segment fault or other operation aborts.

### **`-m`**

This option prevents the pools from being automatically mounted during a scan. It is used for testing purposes only.

### **`--no-prompt`**

The `--no-prompt` NLVM option can be used with certain commands to prevent a confirmation message from being displayed, such as when you initialize a device or delete Linux POSIX volumes, pool moves, partitions, pools, RAIDs, RAID segments, snapshots, and NSS volumes. Support for this NLVM option is indicated in the individual commands.

### **`-r, --rescan`**

This option forces a fresh rescan of the system before executing a command to update the device and partition objects. Use this if something changed the information outside the `nssmu`, `iManager`, or `nlvm` utilities.

### **`-s, --share`**

This option sets the shared override bit for the command being executed.

## 4.3 Complete Move

**complete move** <move\_name>

Check to see if an NSS pool move is complete. If the move is complete, the old location is deleted. If the move is not completed, it will return an error 11 (EAGAIN).

If a pool is cluster-enabled, issue the command on the node where its pool cluster resource is currently online.

```
nlvm [nlvm_options] complete move <move_name>
```

### Command Option

*move\_name*

Mandatory. Specify the name of the move object to check. The move name typically looks like POOLNAME\_move.

### Command Example

```
nlvm complete move MYPOOL1_move
```

Verify that the move MPOOL1\_move is complete. If it is, delete the old location of the pool.

## 4.4 Create Linux Volume

**create linux volume** <type> <device> <size> [mp] [mkopt] [mntopt] [lvm] [name] [group] [shared] [ip] [ncp]

Create a Linux POSIX volume on a device.

```
nlvm [nlvm_options] create linux volume <type> <device> <size> [mp] [mkopt] [mntopt] [lvm] [name] [group] [shared] [ip] [ncp]
```

### Command Options

**type=fstype**

Mandatory. Specify the type of Linux POSIX file system to use for mkfs.

### Example

```
type=ext3
type=reiserfs
```

**device=<devicename|anydisk>**

Mandatory. Specify the node name (such as sdb) of the device to use for the Linux POSIX volume, or specify the keyword anydisk.

If the device is seen by a single server, or a single node in a cluster, do not use the shared option.

If the device is seen by multiple nodes in a Novell Cluster Services cluster, you must specify the *devicename* and use the *shared*, *ip*, *name*, *lvm*, and *group* (optional) options to create the Linux volume group cluster resource. The device should already be initialized but do not mark it as shareable. The cluster-enabled LVM volume group uses the entire device. Novell Cluster Services mounts the cluster resource exclusively on one node at a time.

### Examples

```
device=sdb
device=anydisk
```

**size=<value[K|M|G|T]|max>**

Mandatory if the `shared` option is not used; optional if the `shared` option is used. Specify a size of the partition to create for the Linux volume, or specify `max` to use all of the free unpartitioned space for the volume. The minimum allowed size is 1 megabyte.

If the `shared` option is used, the entire device is dedicated to the LVM volume group. If the `size` option is specified, it is ignored.

#### Examples

```
size=20G
size=100m
size=max
```

**mp[=</mount\_path>]**

Specify the path of the mount point where the volume is to be mounted. If the path does not currently exist, it will be created. If a path is not specified, the utility assigns a default mount path of

```
/media/<file_system_type>_<next_available_number>
```

For example, if the file system type is `ext3`, the default mount path is `/media/ext3_0`. If that path is not available, the path would be `/media/ext3_1` and so forth.

For Linux POSIX volumes, the volume name is the same as the final directory of the full mount point path. For example, if the mount point is `/home/users/bob`, the volume name is `/bob`. For this reason, the final directory name must be unique on the server.

#### Example

```
mp=/home
```

**mkopt=<option1[,option2,...]>**

Specify the options to use when running `mkfs`. For a list of available options, see the `mkfs(8)` man page. No default option is specified.

#### Example

```
mkopt=-v
```

**mntopt=<option1[option2][...]>**

Specify the options to use when mounting the volume. For a list of available options, see the `mount(8)` man page. The default `mntopt` value is `rw`.

#### Example

```
mntopt=rw
```

### lvm

Used to specify that an LVM volume and volume group is to be created.

If the `lvm` option is used, the `name` option must be provided to specify a name for the LVM volume. Specifying a different name for the LVM volume group is optional.

#### Example

```
lvm
```

**name=<lvm\_volume\_name>**

Used with the `lvm` option to specify a name for the LVM volume.

If you do not specify the `group` option, this name is also used as the LVM volume group name.

For LVM logical volume naming conventions, see [Section 3.2.4, “Linux LVM Volume Group and Logical Volume Names,”](#) on page 16.

If the `lvm` option is not specified, this option is ignored.

#### Example

```
name=mylvmvol1
```

#### **group=<lvm\_volume\_group\_name>**

Optional. Used with the `lvm` option to specify a name for the LVM volume group. If the `group` option is not specified, the volume group name is the same as the LVM volume name.

For LVM volume group naming conventions, see [Section 3.2.4, “Linux LVM Volume Group and Logical Volume Names,”](#) on page 16.

If the `lvm` option is not specified, this option is ignored.

#### Example

```
group=myclustervg01
```

#### **shared**

Used to cluster-enable an LVM volume group. This creates an LVM volume group cluster resource, including its load, unload, and monitoring scripts, for use in an existing Novell Cluster Services cluster. The cluster resource name is the LVM volume group name plus `_resource`; that is, `<lvm_vg_name>_resource`. For example, `mylvmvg01_resource`. The resource is created and set to an Offline state. You can use the Clusters plug-in in iManager to modify the scripts and resource settings as needed, then use iManager or cluster commands to online the resource.

If the `shared` option is used, the `ip`, `name`, and `lvm` options must also be provided. You can use the `group` option to specify a different name for the LVM volume group.

The device should already be initialized but do not mark the device as shareable. The LVM volume group uses the entire device. Use Novell Cluster Services tools or commands to online the cluster resource exclusively on one node at a time.

#### Example

```
shared lvm ip=10.10.10.101 name=mylvmvol1  
shared lvm ip=10.10.10.101 name=mylvmvol1 group=mylvmvg1
```

#### **ip=<IP\_address\_for\_LVM\_volgroup\_cluster\_resource>**

Used with the `shared` option to specify the IP address to use for the Linux volume group cluster resource. This is required for cluster-enabled Linux volume groups on Novell Cluster Services clusters. Specify the IP address in IPv4 format.

If the `shared` option is not specified, this option is ignored.

#### Example

```
ip=10.10.10.101
```

#### **ncp**

Used to enable the Linux POSIX file system on the volume to be accessed with the NetWare Core Protocol (NCP). This option creates an NCP share at the root of the Linux POSIX file system with the same name as the Linux POSIX volume.

You can alternatively enable NCP for an existing Linux POSIX file system by using the *Manage NCP Services > Manage Shares > Create New Share* option in the NCP plug-in for Novell Remote Manager. You can create NCP shares at the root of the volume and on subfolders in the volume. For information about creating or using NCP shares, see [“Managing NCP Volumes”](#) in the *OES 11: NCP Server for Linux Administration Guide*.

### Example

```
ncp
```

### Command Examples

```
nlvm create linux volume type=ext3 device=sdf size=10G mp=/home/bob mntopt=rw
```

Create a 10 gigabyte Linux POSIX volume using the Ext3 file system on the `/dev/sdf` device. Mount the volume on path `/home/bob` with the Read/Write mount option.

```
nlvm create linux volume type=ext3 device=sdf mp=/home/bob mntopt=rw lvm shared  
ip=10.10.10.101 name=myclustervolbob group=myclustervgbob
```

Create and cluster-enable an LVM volume group on the `/dev/sdf` device with a resource IP address of 10.10.10.101, an LVM volume name of “myclustervolbob”, and an LVM volume group name of “myclustervgbob”. Create a Linux POSIX volume on the LVM volume using the Ext3 file system. The entire device is dedicated to the LVM volume. The new cluster resource is set to offline, and waits to be brought online by using the cluster commands.

This command automatically creates an LVM volume group cluster resource called `myclustervgbob_resource` in a Novell Cluster Services cluster where the node is a member. It creates its resource load, unload, and monitoring scripts, then sets the resource to offline. You manage the resource by using Novell Cluster Services tools and commands.

## 4.5 Create Partition

```
create partition <type> <device> <size> [label] [dm]
```

Create a partition on a disk.

```
nlvm [nlvm_options] create partition <type> <device> <size> [label] [dm]
```

### Command Options

**type=partition\_type**

Mandatory. You must specify the partition type in hexadecimal, without the leading 0x.

### Example

```
type=83 (partition type for Linux)  
type=169 (partition type for NSS)  
type=lad (partition type for Novell Cluster Services SBD partition)
```

**device=<devicename|anydisk|anyshared>**

Mandatory. Specify the node name (such as `sdb`) of the device to use for the partition, or specify the keyword `anydisk` or `anyshared`.

### Examples

```
device=sdb  
device=anydisk  
device=anyshared
```

**size=<value[K|M|G|T]|max>**

Mandatory. Specify the size of the partition to create, or specify **max** to use all free unpartitioned space. The minimum allowed size is 1 MB.

#### Example

```
size=20G
size=100.45M
size=max
```

**label="Label for the partition"**

Specify the label to be added to a Novell partition type. This option is ignored for other partition types. If the label contains spaces, you must put quotation marks around it. If the label contains a special character, you must escape the character by adding a backslash character (\) in front of it.

If you create a Novell Cluster Services SBD partition, the label should be the cluster name. For example, if the cluster name is `cluster1`, NLVM creates a partition named `cluster1.sbd`. If an SBD partition already exists for the cluster, the new partition is named `cluster1.sbd1`, and the cluster does not recognize it. To use the new partition for the cluster, you must delete the old partition. Then the new partition is automatically renamed as `cluster1.sbd`, and is used by the cluster.

#### Example

```
label="This label has spaces"
label=engineering
label=special\character
```

**dm**

Create a device mapper object for this partition in the `/dev/nss` directory. This is useful when creating Novell partition types that need to be accessed directly.

#### Example

```
dm
```

### Command Examples

```
nlvm create partition type=169 device=sdb size=20G dm
```

Create an NSS partition on the `/dev/sdb` device of size 20 GB. Also create a device mapper object for the partition, `/dev/nss/sdb1.1`.

```
nlvm create partition type=83 device=sdc size=200G
```

Create a Linux partition on the `/dev/sdc` device of size 200 GB.

```
nlvm create partition type=lad device=sdg size=max label=cluster1
```

Create a Novell Cluster Services SBD partition on the `/dev/sdg` device, and use all available free space on the device.

## 4.6 Create Pool

**create pool <name> <size [device]|part> [ip] [vsu] [csn] [cifs] [afp]**

Create an NSS pool.

```
nlvm [nlvm_options] create pool <name> <size [device]|part> [ip] [vsu] [csn]
[cifs] [afp]
```

## Command Options

### **name=pool\_name**

Mandatory. Specify the name of the pool to create. This name must be unique from other pools. The pool name is automatically converted to uppercase.

Pool names are 2 to 15 characters. Uppercase letters A to Z, number characters 0 to 9, and underscore (\_) are valid characters for all pools. Names cannot start or end in underscore, and cannot contain double underscores.

If the pool is not shared, the pool can also contain special characters:

!@#\$\$%& ( )

Names that contain special characters must be enclosed in quotation marks in all commands and scripts.

The names cannot be reserved names such as con, com, lpt, pipe, all, and so on.

### **Example**

```
name=MYPOOL1
```

### **size=value[K|M|G|T]**

Specify the size of the pool. The size is mandatory unless you specify the `part=partition_name` option. The pool size must be greater than 10 megabytes.

### **Example**

```
size=20G
size=3.98T
```

### **device=<devicename|anydisk|anyshared>**

Specify the node name (such as `sdb`) of the device to use for the pool, or specify the keyword `anydisk` or `anyshared`. This option is ignored if you specify the partition option. If neither the device option nor the partition option is given, the NLVM utility selects a device that has enough free space for the specified size. The maximum pool size is 8 TB. The command allows up to 8 TB from a single device.

### **Examples**

```
device=sdb
device=anydisk
device=anyshared
```

### **part=partition\_name**

Specify the node name (such as `sdcl.1`) for the partition where you want to create the pool. The partition must exist; it is not created with this command. The entire partition is used for the pool. If this option is used, the pool size and device options are ignored.

### **Example**

```
part=sdcl.1
```

### **ip=ip\_address**

Specify this option to create a cluster enabled pool. If using this option, the device or partition must be shared. This option is mandatory if you are creating a cluster enabled pool.

### **Example**

```
ip=10.10.10.41
```

***vsn=virtual\_server\_name***

Specify the virtual server name for a cluster enabled pool. It is optional and used only for cluster enabled pools. If a name is not supplied, the default name will be used.

**Example**

```
vsn=CLUSTER2-POOL2-SERVER
vsn=MYCLUSTER_MYPOOL_SERVER
```

***csn=cifs\_virtual\_server\_name***

Specify the CIFS virtual server name for a cluster enabled pool. It is optional and only used for cluster enabled pools where CIFS is enabled as an advertising protocol. If a name is not supplied, the default CIFS virtual server name will be used.

The name can be up to 15 characters. A default name is specified in the form of *<clustername>\_<poolname>\_w*. If this exceeds 15 characters, characters are dropped from the left.

**Example**

```
csn=CLUS1_MYPOOL_W
```

***cifs***

Specify this option to enable CIFS as an advertising protocol when you create a cluster enabled pool. By default, CIFS is disabled as an advertising protocol. Novell CIFS must be installed on the machine in order for this option to work.

**Example**

```
cifs
```

***afp***

Specify this option to enable AFP as an advertising protocol when you create a cluster enabled pool. By default, AFP is disabled as an advertising protocol. Novell AFP must be installed on the machine in order for this option to work.

**Example**

```
afp
```

**Command Examples**

```
nlvm create pool name=MYPOOL1 size=20G device=sdb
```

Create a pool named MYPOOL1 on device /dev/sdb that is 20 GB in size.

```
nlvm create pool name=MYPOOL2 size=200G device=anydisk
```

Create a pool named MYPOOL2 on any device that has 200 GB of free unpartitioned space available.

```
nlvm create pool name=MYPOOL3 size=100G device=anyshared
```

Create a pool named MYPOOL3 on any shared device that has 100 GB of free unpartitioned space available.

```
nlvm create pool name=MYPOOL4 part=sdc1.1
```

Create a pool named MYPOOL4 on partition /dev/sdc1.1 and use all of the partition.

## 4.7 Create RAID

**create raid <name> <size> <raid> <device> [stripe] [type] [part]**

Create an NSS software RAID device.

```
nlvm [nlvm_options] create raid <name> <size> <raid> <device> [stripe] [type] [part]
```

### Command Options

**name=raid\_name**

Mandatory. Specify the name of the NSS software RAID device to create. This name must be unique from other RAID devices. The RAID name is case sensitive.

RAID names are 2 to 58 characters. Names are preferred to use characters A to Z, a to z, 0 to 9, and underscore (\_). Names cannot start or end in underscore, and cannot contain double underscores. Printable ASCII characters (see decimal codes 33 to 122 in a code chart) are valid.

RAID names can contain special characters such as:

```
!@#$$%& ( )
```

Names that contain special characters must be enclosed in quotation marks in all commands and scripts. On the BASH command line, each special character must be escaped by preceding it with a backslash character (\).

The names cannot be reserved names such as con, com, lpt, pipe, all, and so on.

### Example

```
name=MYRAID1
```

**size=value[K|M|G|T]**

Mandatory. Specify the size of each segment of the RAID. The minimum size is 12 megabytes.

### Example

```
size=20G  
size=1.45T
```

**raid=<0|1|5>**

Mandatory. Specify the RAID type. Valid options are 0 for striping, 1 for mirrored, or 5 for striping with parity.

### Example

```
raid=1
```

**device=devicename**

Mandatory. Specify the device to create a RAID segment on. This option is used multiple times, once for each segment to create. RAID 0 or RAID 1 requires a minimum of two devices. RAID 5 requires a minimum of three devices. Devices must be unique for each instance.

### Example

```
device=sdb device=sd c device=sdd
```

**stripe=stripe\_size**

Specify the RAID strip size in bytes. This option is applicable only for RAID 0 and RAID 5. The stripe size must be a power of 2, with a minimum size of 4 KB and a maximum size of 256 KB. The default stripe size is 64 KB.

**Example**

```
stripe=64K
```

**type=<nss|sbd>**

Specify the type of partition to mirror. This option is used only for RAID 1. Valid options are *nss* and *sbd* (split-brain detector). The default mirror type is *nss*. The *sbd* type is used by the Novell Cluster Services Split-Brain Detector Utility (*sbdutil*) to mirror an SBD partition for a cluster.

**Example**

```
type=nss
```

**part=partition\_name**

Specify the node name (such as *sdcl.1*) for the partition to be mirrored. Use this option to mirror an existing NSS partition or Novell Cluster Services SBD partition. The existing partition is the first segment of a RAID 1 mirror.

If this option is used, the RAID type and size options are ignored. The RAID type is RAID 1 mirror by default. Each segment's size is the size of the existing partition. The data on the original partition is mirrored on up to three specified devices.

After you mirror the partition, you manage the RAID 1 device by using the normal NSS software RAID management tools and commands.

**Example**

```
part=sdcl.1
```

**Command Examples**

```
nlvm create raid name=MYRAID5 size=20G raid=5 device=sdb device=sdcl device=sdd
```

Create a RAID 5 (striping with parity) device that has segments of 20 GB each on devices */dev/sdb*, */dev/sdc*, and */dev/sdd*. The default stripe size of 64 KB is automatically applied. The default partition type is *nss*.

```
nlvm create raid name=MYRAID1 raid=1 device=sdf part=sdcl.1
```

Create a RAID 1 (mirror) for the existing partition */dev/sdcl.1* on the */dev/sdf* device. The partition type is the same as the existing partition's type. The pool's existing partition becomes the first segment of the RAID, and its existing data is mirrored to device */dev/sdf*.

## 4.8 Create Snap

**create snap <name> <pool> <device> <size> [chunk]**

Create a snapshot of an NSS pool.

```
nlvm [nlvm_options] create snap <name> <pool> <device> <size> [chunk]
```

## Command Options

### **name=***snapshot\_name*

Mandatory. Specify the name of the NSS snapshot. This name must be a unique snap name on the server. The snap name is automatically converted to uppercase.

Pool snapshot names are 2 to 15 characters. The naming conventions are the same as for pools.

#### **Example**

```
name=POOL1SNAP
```

### **pool=***pool\_name*

Mandatory. Specify the name of an existing pool that you want to snap.

#### **Example**

```
pool=MYPOOL1
```

### **device=***devicename*

Specify the node name (such as sdb) of the device where you want to create a partition to be used to store copy-on-write data.

#### **Example**

```
device=sdb
```

### **size=***value*[K|M|G|T]

Specify the size of the partition used to store copy-on-write data. The minimum size is 1 MB; there is no maximum.

NSSMU restricts the size of Snapshots, with a minimum size of 50 MB, and a maximum size of 8 TB.

#### **Example**

```
size=20G  
size=100.50M
```

### **chunk=***chunk\_size*

Specify the chunk size of the snapshot in bytes. The default size is 64 KB. The chunk size must be a power of 2, with the minimum size of 512 bytes, and a maximum size of 256 KB.

#### **Example**

```
chunk=128K
```

## Command Example

```
nlvm create snap name=POOL1SNAP pool=MYPOOL1 device=sdb size=20G chunk=128K
```

Create a snapshot named POOL1SNAP of pool MYPOOL1. The copy-on-write partition is on device /dev/sdb and of size 20 GB, and the snapshot chunk size is 128 KB.

## 4.9 Create Volume

**create volume <name> <pool> [passw] [quota]**

Create an NSS volume on an existing pool. NSS volumes are always mounted at `/media/nss/<VolumeName>` unless otherwise specified.

```
nlvm [nlvm_options] create volume <name> <pool> [passw] [quota]
```

### Command Options

**name=volume\_name**

Mandatory. Specify the name of the NSS volume to create. This name must be unique from other volumes. The volume name is automatically converted to uppercase.

Volume names are 2 to 15 characters. The naming conventions are the same as for pools.

#### Example

```
name=MYVOL1
```

**pool=pool\_name**

Mandatory. Specify the name of an existing NSS pool where you want to create the volume.

#### Examples

```
pool=MYPOOL1
```

**passw=password**

Specify a password if the volume is an encrypted volume.

#### Example

```
passw=novell
```

**quota=size**

Optional. Specify a quota for the volume. A quota is the maximum amount of space in the pool that can be used by the volume. If no quota is specified, the volume can grow to the size of the pool.

If the maximum pool size is smaller than the specified volume quota, the volume can grow only to the size of the pool. If you later expand the size of the pool, then the volume quota is again the limiting factor.

#### Example

```
quota=500G
```

### Command Examples

```
nlvm create volume name=MYVOL1 pool=MYPOOL1
```

Create a non-encrypted NSS volume on an existing pool named MYPOOL1.

```
nlvm create volume name=MYVOL1 pool=MYPOOL1 passw=novell
```

Create an NSS volume on an existing pool named MYPOOL1, and encrypt the volume using the password of novell.

```
nlvm create volume name=MYVOL1 pool=MYPOOL1 quota=500G
```

Create a non-encrypted NSS volume on an existing pool named MYPOOL1. The volume has a quota of 500 GB.

## 4.10 Delete Linux Volume

### **delete linux volume <volume\_name>**

Delete an existing Linux POSIX volume. You cannot delete the root (/) volume. You must unmount the volume before you can delete it.

If the volume is a clustered LVM volume group and logical volume, you must take the cluster resource offline, then delete the resource before you can delete the volume.

```
nlvm [nlvm_options] delete linux volume <volume_name>
```

You are automatically prompted to confirm the delete action. Respond Y (Yes) or N (No). Use the `--no-prompt` NLVM option to suppress the confirmation.

You can use the `nlvm list linux volumes` command to find the *volume\_name*. A Linux POSIX volume is preceded by a forward slash, such as `/vol1`. This is the last directory of the mount point path that you provided when you created the Linux POSIX volume with NLVM or NSSMU. An LVM volume name is the volume name you used when you created the volume, such as `lvvol1`.

### **Command Options**

#### ***volume\_name***

Mandatory. Specify the name of the volume to delete.

#### **Examples**

For a Linux POSIX volume mounted at `/home/bob`, the volume name is `/bob`.

For an LVM logical volume that you named `lvvol1` that is mounted at `/mnt/lvvol1`, the volume name is `lvvol1` (with no forward slash).

For an LVM logical volume that you named `lvvol2` that is mounted at `/home/users`, the volume name is `lvvol2` (not `/users`).

#### **`--no-prompt`**

Optional. Specify this NLVM option to prevent a confirmation message from being displayed.

#### **Example**

```
--no-prompt
```

### **Command Examples**

```
nlvm delete linux volume /bob
```

Delete the Linux POSIX volume that is mounted at `/home/bob`.

```
nlvm delete linux volume lvvol1
```

Delete the Linux LVM logical volume `lvvol1` that is mounted at `/mnt/lvvol1`.

```
nlvm --no-prompt delete linux volume lvvol2
```

Delete the Linux LVM logical volume `lvvol2` that is mounted at `/home/users`. the confirmation message is not displayed.

## 4.11 Delete Move

**delete move** <<move\_name>|<pool\_name>>

Delete an NSS pool move. This command deletes the move request, returns the pool back to its original location, and removes the new location. You can delete the move at any time while the move is in progress, even if it is pending only the `complete move` command to be finalized.

Use the `complete move` command if you want to keep the new location and remove the original location.

If a pool is cluster-enabled, issue the command on the node where its pool cluster resource is currently online.

```
nlvm [nlvm_options] delete move <<move_name>|<pool_name>>
```

You are automatically prompted to confirm the delete action. Respond Y (Yes) or N (No). Use the `--no-prompt` NLVM option to suppress the confirmation.

### Command Options

*move\_name, pool\_name*

Mandatory. Specify the name of the NSS pool move to delete, such as `POOLNAME_move`. You can alternatively specify the pool name.

`--no-prompt`

Optional. Specify this NLVM option to prevent a confirmation message from being displayed.

### Example

```
--no-prompt
```

### Command Examples

```
nlvm delete move MYPOOL_move
```

Delete the pool move named `MYPOOL_move`. This removes the new location, and sets the pool to the original location.

## 4.12 Delete Partition

**delete partition** <partition\_name>

Delete an existing partition by name.

```
nlvm [nlvm_options] delete partition <partition_name>
```

You are automatically prompted to confirm the delete action. Respond Y (Yes) or N (No). Use the `--no-prompt` NLVM option to suppress the confirmation.

### Command Options

*partition\_name*

Mandatory. Specify the node name (such as `sdcl.1`) of the partition to be deleted.

### Example

```
sdcl.1
```

**-f, --force**

Optional. The force NLVM option can be used with the `delete partition` command if the partition is part of a pool or move. If the partition is part of a pool, deleting the partition automatically deletes the pool. If the partition is part of a move destination, deleting the partition automatically deletes the pool move.

**Examples**

```
-f
--force
```

**--no-prompt**

Optional. Specify this NLVM option to prevent a confirmation message from being displayed.

**Example**

```
--no-prompt
```

**Command Examples**

```
nlvm delete partition sdc1.1
```

Delete the partition `/dev/sdc1.1`.

```
nlvm --force delete partition sdd1.2
```

Delete the partition `/dev/sdd1.2` that is part of an NSS pool move destination. The pool move is deleted as well.

## 4.13 Delete Pool

**delete pool <pool\_name>**

Delete an existing NSS pool by name.

```
nlvm [nlvm_options] delete pool <pool_name>
```

You are automatically prompted to confirm the delete action. Respond Y (Yes) or N (No). Use the `--no-prompt` NLVM option to suppress the confirmation.

**Command Options**

**pool\_name**

Mandatory. Specify the name of the NSS pool to be deleted.

**Example**

```
MYPOOL1
```

**--no-prompt**

Optional. Specify this NLVM option to prevent a confirmation message from being displayed.

**Example**

```
--no-prompt
```

**Command Example**

```
nlvm delete pool MYPOOL1
```

Delete the NSS pool named `MYPOOL1`.

## 4.14 Delete RAID

**delete raid <raid\_name>**

Delete an existing NSS software RAID device by name.

```
nlvm [nlvm_options] delete raid <raid_name>
```

You are automatically prompted to confirm the delete action. Respond Y (Yes) or N (No). Use the `--no-prompt` NLVM option to suppress the confirmation.

### Command Options

**raid\_name**

Mandatory. Specify the name of the NSS software RAID device to be deleted.

### Example

```
MYRAID1
```

**--no-prompt**

Optional. Specify this NLVM option to prevent a confirmation message from being displayed.

### Example

```
--no-prompt
```

### Command Example

```
nlvm delete raid MYRAID1
```

Delete the NSS software RAID device named MYRAID1.

## 4.15 Delete RAID Segment

**delete raid <raid\_name> segment <number>**

Delete a specified segment of an existing NSS software RAID device. This is valid only for RAID 1 and RAID 5 devices. RAID 5 can remove only 1 segment, but it must be replaced by another segment to have redundancy.

```
nlvm [nlvm_options] delete raid <raid_name> segment <number>
```

You are automatically prompted to confirm the delete action. Respond Y (Yes) or N (No). Use the `--no-prompt` NLVM option to suppress the confirmation.

### Command Options

**raid\_name**

Mandatory. Specify the name of the NSS software RAID device that contains the segment to be deleted.

### Example

```
MYRAID1
```

**number**

Mandatory. Specify the segment index (zero relative) to be removed. For RAID 1, the value must be 0 to 3. For RAID 5, the value must be 0 to 13.

### Example

0

**--no-prompt**

Optional. Specify this NLVM option to prevent a confirmation message from being displayed.

### Example

`--no-prompt`

### Command Example

```
nlvm delete raid MYPOOL1 segment 0
```

Delete the first segment of the NSS software RAID device named MYRAID1.

## 4.16 Delete Snap

**delete snap** <snap\_name>

Delete an existing NSS pool snapshot by name.

```
nlvm [nlvm_options] delete snap <snap_name>
```

You are automatically prompted to confirm the delete action. Respond Y (Yes) or N (No). Use the `--no-prompt` NLVM option to suppress the confirmation.

### Command Options

*snap\_name*

Mandatory. Specify the name of the NSS pool snapshot to be deleted.

### Example

POOL1SNAP

**--no-prompt**

Optional. Specify this NLVM option to prevent a confirmation message from being displayed.

### Example

`--no-prompt`

### Command Example

```
nlvm delete snap POOL1SNAP
```

Delete the NSS pool snapshot named POOL1SNAP.

## 4.17 Delete Volume

**delete volume** <volume\_name>

Delete an existing NSS volume by name.

```
nlvm [nlvm_options] delete volume <volume_name>
```

You are automatically prompted to confirm the delete action. Respond Y (Yes) or N (No). Use the `--no-prompt` NLVM option to suppress the confirmation.

### Command Options

#### *volume\_name*

Mandatory. Specify the name of the NSS volume to be deleted.

#### Example

```
MYVOL1
```

#### **--no-prompt**

Optional. Specify this NLVM option to prevent a confirmation message from being displayed.

#### Example

```
--no-prompt
```

### Command Example

```
nlvm delete volume MYVOL1
```

Delete the NSS volume named MYVOL1.

## 4.18 Expand Partition

### **expand partition** <partition\_name> <size>

Expand an existing partition.

This command does not add a partition, but expands the existing partition. There must be free space contiguously following this partition in order to expand it.

```
nlvm [nlvm_options] expand partition <partition_name> <size>
```

### Command Options

#### *partition\_name*

Mandatory. Specify the node name (such as sdc1.1) of the partition to be expanded. This must be the first command option.

#### Example

```
sdc1.1
```

#### **size=value**[K|M|G|T]

Mandatory. Specify the amount of space to add to the existing partition.

#### Example

```
size=20G  
size=200.45G
```

### Command Example

```
nlvm expand partition sdc1.1 size=20G
```

Expand the /dev/sdc1.1 partition by adding the next 20 GB of contiguous free unpartitioned space. For example, if the original partition is 20 GB, the expanded size is 40 GB.

## 4.19 Expand Pool

**expand pool** <pool\_name> <<size> <device>|<part>>

Expand an existing NSS pool by adding a new partition. Either a partition must be specified, or the device and size must be specified.

If the specified device is the same device as the last segment of the existing pool, and free space exists following the last segment, the utility tries to expand the partition first before trying to add a new partition.

```
nlvm [nlvm_options] expand pool <pool_name> <<size> <device>|<part>>
```

### Command Options

#### *pool\_name*

Mandatory. Specify the name of the NSS pool to be expanded. This must be the first command option.

#### Example

```
MYPOOL1
```

#### *device=device\_name*

Specify the node name (such as sdf) of the device to use for the expanded space.

#### Example

```
device=sdb
```

#### *size=value[K|M|G|T]*

Specify the amount of space to add to the existing pool.

#### Example

```
size=20G  
size=100.50M
```

#### *part=partition\_name*

Specify the name of a partition to add to the pool. The entire partition size is added to the pool's capacity. The partition must be of type 0X169 (nss).

#### Example

```
part=sdc1.1
```

### Command Examples

```
nlvm expand pool MYPOOL1 device=sdf size=20G
```

Expand the NSS pool named MYPOOL1 by adding the 20 GB of free space from device /dev/sdf.

```
nlvm expand pool MYPOOL1 part=sdc1.1
```

Expand the NSS pool named MYPOOL1 by adding the /dev/sdc1.1 partition to it. The partition is type 0X169. The entire partition size is added to the pool's capacity.

## 4.20 Expand RAID

**expand raid** <raid\_name> <device>

Expand an existing NSS software RAID device by adding a new segment. Specify the RAID name and the device to use. The device option can be specified multiple times to specify additional segments. Each device must have a free space area at least as big as the segment size of the RAID.

```
nlvm [nlvm_options] expand raid <raid_name> <device>
```

### Command Options

**raid\_name**

Mandatory. Specify the name of the NSS software RAID device to be expanded. This must be the first command option.

#### Example

```
MYRAID1
```

**device=device\_name**

Specify the node name (such as sdb) of the device to use for the expanded space.

#### Example

```
device=sdb
```

### Command Examples

```
nlvm expand raid MYRAID1 device=sdf
```

Expand the NSS software RAID device named MYRAID1 by adding the device /dev/sdf.

```
nlvm expand raid MYRAID5 device=sdg device=sdh
```

Expand the NSS software RAID device named MYRAID5 by adding the /dev/sdg and /dev/sdh devices as two new segments.

## 4.21 Init Device

**init** <device\_name> [format] [shared|unshared]

Initialize a device by deleting all partitions on the device and setting the partitioning scheme.

```
nlvm [nlvm_options] init <device_name> [format] [shared|unshared]
```

You are automatically prompted to confirm the initialize action. Respond Y (Yes) or N (No). Use the --no-prompt NLVM option to suppress the confirmation.

You can optionally specify whether to set the device as shared or unshared. If neither the shared nor unshared option is added, the device is initialized, the partitioning scheme is set, and the shared state remains what it was before the initialize command.

### Command Options

**device\_name**

Mandatory. Specify the name of the device to be initialized. This must be the first command option.

#### Example

```
sdb
```

**format=<gpt|msdos>**

Specify the partitioning scheme as `gpt` or `msdos`. The default is `msdos`. The MSDOS partitioning scheme supports device sizes that are less than or equal to 2 TB. If the device size is greater than 2 TB and the partitioning scheme is not specified, the default partitioning scheme of MSDOS applies, and the device size is truncated to 2 TB with the remainder as unusable space. Devices of any size can be set to use the GPT partitioning scheme.

#### Example

```
format=msdos
```

#### shared

After initializing the device, the device is set as shared. A small partition is created on the device to store the shared setting. The remainder of the device is free space.

For example, use this option to mark a device as Shareable for Clustering if you plan to use it for a shared NSS pool. NSS looks for this setting to cluster enable the pool.

#### unshared

After initializing the device, the device is not marked as shared. The device is unpartitioned free space.

Use this option to remove all partitions from a device. For example, LVM requires that a device contains no partitions before it creates a volume group on it.

#### **-f, --force**

Optional. Specify this NLVM option to force the initialization. This option is required if the device contains a root (/), swap, or boot partition, or if the `init` command cannot delete any pools on the disk.

#### Example

```
-f
--force
```

#### **--no-prompt**

Optional. Specify this NLVM option to prevent a confirmation message from being displayed.

#### Example

```
--no-prompt
```

### Command Examples

```
nlvm --force init sdb
```

Force the initialization of a previously formatted device `/dev/sdb`, and set its partitioning scheme to use the default setting of `msdos`. If the device size is greater than 2TB, the device has only 2 TB of usable space. If the device was previously set as shared, the shared setting remains after the initialization. Otherwise, the device is unshared.

```
nlvm init sdd format=gpt unshared
```

Initialize the device `/dev/sdd`, and set its partitioning scheme to GPT. If the device was previously set as shared, this removes the shared setting from the device. The device is unpartitioned free space.

```
nlvm --no-prompt init sde format=gpt shared
```

Initialize the device `/dev/sde`, set its partitioning scheme to GPT, and mark the device as shared. The device contains a small partition to hold the shared setting, and the rest is free space. The confirmation message is not displayed.

## 4.22 Label

**label** *<partition\_name>* *<"label text">*

Modify or add a label to a Novell type partition (NSS, SBD, or RAID).

```
nlvm [nlvm_options] label <partition_name> <"label text">
```

### Command Options

*partition\_name*

Mandatory. Specify the node name (such as `sdcl.1`) of the partition. This must be the first command option.

### Example

```
sdcl.1
```

*"label text"*

Mandatory. Specify the text word or phrase to use for the label. If the text has spaces, use quotation marks.

### Example

```
"This is the label"  
engineering
```

### Command Example

```
nlvm label sdcl.1 "This is the label"
```

Add the label "This is the label" to the `/dev/sdcl.1` partition.

## 4.23 List Device

**list device** *<device\_name>*

Print the details of a specified device.

```
nlvm [nlvm_options] list device <device_name>
```

### Command Option

*device\_name*

Mandatory. Specify the node name of the device.

### Example

```
sdb
```

### Command Example

```
nlvm list device sdb
```

Print the details for the `/dev/sdb` device.

## Response Parameters

The command returns the following information about the specified device:

Device name

Device major:minor

Size of device in MB or GB

Free space remaining on the device in KB, MB, or GB

Partitioning format MSDOS, GPT, CSM, LVM (meaning Clustered Linux LVM volume),  
None

Geometry heads:sectors per track

Shared – (Yes or No) Whether this device is marked as shared

RAID – (Yes or No) Whether this is an NSS software RAID device

For RAID devices, it provides the following information:

Type – 0 or 5 Software RAID type

Segs – Number of segments that this RAID should have

Missing – Segment number (if any) that is missing in the RAID

Stripe – RAID stripe size in bytes (typically kilobytes)

Enbl – (Yes or No) Whether the RAID is enabled on this node

Sync – (1 or 0) Whether the RAID is in sync

% – Percent complete of remirror or restripe

For RAID segments, it provides the following information:

Segment index

Segment (partition) name

Device name of the segment

Segment size

Sync – (1 or 0) If this mirror segment is in sync

% – Percent this mirror segment is remirrored

For a device's partitions, it provides the following information:

Partition name

Partition size

Partition type

Pool name if the partition is the NSS type and it contains a pool

## Sample Command Responses

### Sample 1: Standard Device

```
nlvm list device D1_LH-DFS01-1
D1_LH-DFS01-1 (253:6) size=25.00GB(52428800) free=0KB(0) format=MSDOS
h:s=255:63 shared=Yes RAID=No
```

```
Partition D1_LH-DFS01-1_part1.1 size=24.99GB(52427968) type=NSS
pool=DFS01_TEST
```

### Sample 2: Mirror Device

```
nlvm list device myraid
myraid (253:1) size=199.99GB(419430368) free=179.99GB(377487328)
format=MSDOS h:s=255:32 shared=No RAID=Yes

Mirror segs=2 enbl=Yes sync=1 100%
  Segment 0: sdc1.1 device=sd c size=200.00GB(419430400) sync=Yes 100%
  Segment 1: sdd1.1 device=sdd size=200.00GB(419430400) sync=Yes 100%

Partition myraid1.1 size=20.00GB(41943040) type=NSS pool=MYPPOOL
```

### Sample 3: RAID 0 Device

```
nlvm list device myraid
myraid (253:1) size=199.99GB(419430368) free=179.99GB(377487328)
format=MSDOS h:s=255:32 shared=No RAID=Yes

Raid type 0 segs=3 missing=None stripe=64k enbl=Yes sync=1 100%
  Segment 0: sdc1.1 device=sd c size=66.69GB(139878400)
  Segment 1: sdd1.1 device=sdd size=66.69GB(139878400)
  Segment 2: sde1.1 device=sde size=66.69GB(139878400)

Partition myraid1.1 size=20.00GB(41943040) type=NSS pool=MYPPOOL
```

## 4.24 List Devices

### list devices [more] [exclude]

Print a list of the devices. If no other options are specified, this prints a list of all devices and software RAID devices.

```
nlvm [nlvm_options] list devices [more] [exclude]
```

### Command Options

#### more

Specifies to print detailed information about each of the devices. This is the same information that is printed for the `list device` command.

#### Example

```
more
```

#### exclude=<raid|nonraid|shared|nonshared|lvm|nonlvm>

Exclude the specified type of devices. This option can be used multiple times to add exclusions for different types. Valid device types are `raid`, `nonraid`, `shared`, `nonshared`, `lvm`, or `nonlvm`.

#### Example

```
exclude=raid exclude=nonshared
```

### Command Example

```
nlvm list devices more exclude=raid exclude=nonshared exclude=lvm
```

Print the details for all non-LVM shared devices that are not software RAID devices.

### Response Parameters

The command returns the following information about the devices on the server:

- Device name
- Size of device in MB or GB

Free space remaining on the device in KB, MB, or GB

Partitioning format MSDOS, GPT, CSM, LVM (meaning Clustered Linux LVM volume),  
None

Shared – (Yes or No) Whether this device is marked as shared

RAID – (Yes or No) Whether this is an NSS software device

If the more option is specified, the information returned for each device is the same as for the `list device` command.

#### Sample Command Response

```
nlvm list devices | egrep "LH-DFS01-|LH-DFS01 |LH_DFS01"
```

```
D1_LH-DFS01 size=100.00GB free=99.99GB format=GPT shared=Yes RAID=No
D1_LH-DFS01-1 size=25.00GB free=0KB format=MSDOS shared=Yes RAID=No
D1_LH-DFS01-2 size=25.00GB free=24.99GB format=GPT shared=Yes RAID=No
D1_LH-DFS01-3 size=50.00GB free=49.99GB format=MSDOS shared=Yes RAID=No
D2_LH-DFS01 size=100.00GB free=99.99GB format=MSDOS shared=Yes RAID=No
D2_LH-DFS01-1 size=25.00GB free=24.99GB format=MSDOS shared=Yes RAID=No
D2_LH-DFS01-2 size=25.00GB free=24.99GB format=GPT shared=Yes RAID=No
D2_LH-DFS01-3 size=50.00GB free=49.99GB format=GPT shared=Yes RAID=No
```

## 4.25 List Linux Volumes

### list linux volumes

Print a list of Linux POSIX volumes and their mount points. There are no command options available.

```
nlvm [nlvm_options] list linux volumes
```

#### Command Example

```
nlvm list linux volumes
```

Print a list of Linux POSIX volumes and the paths where they are mounted.

#### Response Parameters

The command returns the following information about the Linux volumes on the server:

Volume name. If it is LVM, this is the name you assigned to the logical volume. If it is not LVM, this is the ending of the mount point.

Device path. For LVM, this is typically `/dev/<volume_group_name>/<logical_volume_name>`. If it is not LVM, this is the partition path.

Mount point where the volume is mounted.

File system type (such as ext2, ext3, reiserfs, or xfs)

If it is mounted, it displays “Mounted”.

#### Sample Command Response

```
nlvm list linux volumes
```

```
Linux Volumes:
Name=/ Path=/dev/sda3 mountpoint=/ type=ext3 Mounted
Name=/boot Path=/dev/sda1 mountpoint=/boot type=ext2 Mounted
Name=/lxvold Path=/dev/sdd1 mountpoint=/media/lx/lxvold type=xfs Mounted
Name=lvmvlve Path=/dev/lvmvge/lvmvlve mountpoint=/media/lvmvlve type=xfs
Mounted
```

## 4.26 List Move

**list move** <<move\_name>|<pool\_name>>

Print detailed information about a specified NSS pool move. It lists the devices you are moving from and the devices you are moving to, such as

```
from=sdsc,sdd,sde to=sdg
```

If a pool is cluster-enabled, the pool move is enabled and active only on the node where the pool cluster resource is currently online. On other nodes in the cluster, the pool move is not enabled.

```
nlvm [nlvm_options] list move <<move_name>|<pool_name>>
```

The move occurs as a low-level block mirror between the original location and the new location. The entire pool area is mirrored. The response reports the number of mirror blocks to be moved for the pool relative to the maximum original pool size, which is unrelated to the NSS blocks in use. The block count does not change during the move. The percentage indicates the percentage of mirror blocks that have moved.

The size of a mirror block is determined internally based on the total size of the mirror. One sector is used to track the number of mirror blocks that are currently synchronized. A bit represents a mirror block, and there are 4096 bits total ( $512 * 8$ ) to track. A shift technique is used so that the mirror block size is always a power of 2 (128, 256, 512, and so on) and the total number of blocks to move is less than or equal to 4096. Except for very small mirrors, the number of mirror blocks is usually between 2048 and 4096. The minimum mirror block size used is 64 sectors (32KB). There is no maximum. For an 8TB pool the mirror block size is 2GB. When a complete block is mirrored, the bit is set. If a block is partially mirrored during a system failure or cluster resource migration, the entire block is remirrored when mirroring resumes.

The response identifies the temporary Device Mapper objects that are being used for the original location (<poolname>\_movefrom) and the new location (<poolname>\_moveto). You can use the `dmsetup` command to view the devices represented by the Device Mapper object:

```
dmsetup table <<poolname>_movefrom|<poolname>_moveto>
```

For example, if you are moving POOLA enter the following commands to view a list of devices used by the original location and a list of devices used by the new location:

```
dmsetup table POOLA_movefrom
```

```
dmsetup table POOLA_moveto
```

### Command Option

*move\_name, pool\_name*

Mandatory. Specify the name of the move, such as POOLNAME\_move. You can alternatively specify the pool name.

### Example

```
MYPOOL_move
```

### Command Example

```
nlvm list move MYPOOL_move
```

Print detailed information about the MYPOOL\_move move.

### Response Parameters

The command returns the following information about the specified pool move:

Name of the move. Typically, `<pool_name>_move`.  
 Major:minor of the move object  
 Name of the pool being moved  
 Name of the DM object to move the pool from. Typically, `<pool name>_movefrom`.  
 Name of the DM object to move the pool to. Typically, `<pool name>_moveto`.  
 Size of the pool being moved  
 Total number of mirror blocks to be moved  
 Number of mirror blocks that are complete along with associated percent complete  
 Status of the “from” group (Active, ReadError, WriteError, Missing, NotEnabled)  
 Status of the “to” group (Active, ReadError, WriteError, Missing, NotEnabled)

### Sample Command Responses

#### Sample 1: Cluster Node where the Pool Cluster Resource Is Active

```
nlvm list move DFS01_TEST

Move=DFS01_TEST_move (253:200) pool=DFS01_TEST
from=DFS01_TEST_movefrom to=DFS01_TEST_moveto
size=209711104 blocks=3200 complete=1460 %=45
fromstat=Active tostat=Active
```

#### Sample 2: Any Cluster Node where the Pool Cluster Resource Is Not Active

```
nlvm list move DFS01_TEST

Move=DFS01_TEST_move (253:200) pool=DFS01_TEST
from=DFS01_TEST_movefrom to=DFS01_TEST_moveto
Move is not enabled on this node.
```

## 4.27 List Moves

### list moves

Print a list of current NSS pool moves. There are no command options available.

If a pool is cluster-enabled, the pool move is enabled and active only on the node where the pool cluster resource is currently online. On other nodes in the cluster, the pool move is not enabled.

```
nlvm [nlvm_options] list moves
```

### Command Example

```
nlvm list moves
```

Print a list of NSS pool moves that are in progress now.

### Response Parameters

The command returns the following information about the pool moves on the server:

Name of the move. Typically, `<pool_name>_move`.  
 Name of the pool being moved  
 Percent complete  
 Status of the “from” group (Active, ReadError, WriteError, Missing, NotEnabled)  
 Status of the “to” group (Active, ReadError, WriteError, Missing, NotEnabled)

## Sample Command Responses

### Sample 1: Server with No Active Moves

```
nlvm list moves
No moves
```

### Sample 2: Cluster Node where the Pool Cluster Resource Is Active

```
nlvm list moves

Moves:
Name=DFS01_TEST_move Pool=DFS01_TEST percent=71 fromstat=Active
tostat=Active
```

### Sample 3: Any Cluster Node where the Pool Cluster Resource Is Not Active

```
nlvm list moves

Moves:
Name=DFS01_TEST_move Pool=DFS01_TEST percent=0 fromstat=NotEnabled
tostat=NotEnabled
```

## 4.28 List Partition

**list partition** <partition\_name>

Print detailed information about a specified partition.

```
nlvm [nlvm_options] list partition <partition_name>
```

### Command Option

*partition\_name*

Mandatory. Specify the node name (such as sdc1.1) for the partition.

### Example

```
sdc1.1
```

### Command Example

```
nlvm list partition sdc1.1
```

Print detailed information about the /dev/sdc1.1 partition.

### Response Parameters

The command returns the following information about the specified partition:

- Name of the partition
- Major:minor of the partition (if applicable)
- Device the partition is on
- Name of the pool using this partition (if applicable)
- Partition type in both hex and type name if known
- Starting sector of the partition
- Size of the partition in both byte format and sector count
- Whether the partition is shared for clustering or not (1, 0)

### Sample Command Response

```
nlvm list partition clus1.msbd0

clus1.msbd0 (0:0) on sdb pool= type=1AD(Cluster) start=32
size=99.59MB(203968) shared=1
Label: clus1
```

## 4.29 List Partitions

### list partitions [device] [mask]

Print a list of partitions based on the options. If no command options are specified, all data partitions are listed.

```
nlvm [nlvm_options] list partitions [device] [mask]
```

#### Command Options

**device=***device\_name*

Print a list of the partitions on the specified device. Specify the node name (such as sdb) of the device.

#### Example

```
device=sdb
```

**mask=<free|all|nss|nssfree>**

Print a list of the partitions that meet the specified mask option.

#### Mask Options

**free**

Print a list of only the free space partitions.

**all**

Print a list of both data and free space partitions.

**nss**

Print a list of only NSS type partitions.

**nssfree**

Print a list of free space that can be used to create NSS partitions. This option combines contiguous free space together to give a true view of available space.

#### Example

```
mask=nss
```

#### Command Example

```
nlvm list partitions device=sdb mask=nss
```

Print a list of partitions of type nss on the /dev/sdb device.

#### Response Parameters

The command returns the following information about the specified partition:

Name of the partition

Device the partition is on

Partition type in both hex and type name if known

Starting sector of the partition

Size of the partition in both byte format and sector count

### Sample Command Responses

#### Sample 1: All Partitions

```
nlvm list partitions

sda1 device=sda type=83(Linux) start=63 size=196.07MB(401562)
sda2 device=sda type=82(Linux Swap) start=401625 size=1019.75MB(2088450)
sda3 device=sda type=83(Linux) start=2490075 size=8.49GB(17816085)
sda5.1 device=sda type=169(NSS) start=20306223 size=400.00MB(819200)
sda6.1 device=sda type=169(NSS) start=21125538 size=200.00MB(409600)
sda7.1 device=sda type=169(NSS) start=21543228 size=200.00MB(409600)
clus1.msbd0 device=sdb type=1AD(Cluster) start=32 size=99.59MB(203968)
clus1.msbd1 device=sdc type=1AD(Cluster) start=32 size=99.59MB(203968)
sde1.1 device=sde type=169(NSS) start=32 size=200.00MB(409600)
```

#### Sample 2: Partitions that Contain a Specified String in the Name

```
nlvm list partitions | grep LH-DFS01-

Dl_LH-DFS01-1_part1.1 device=Dl_LH-DFS01-1 type=169(NSS) start=32
size=24.99GB(52427968)
```

## 4.30 List Pool

### list pool <pool\_name>

Print detailed information about a specified NSS pool.

```
nlvm [nlvm_options] list pool <pool_name>
```

### Command Option

#### *pool\_name*

Mandatory. Specify the name of the NSS pool.

#### Example

```
MYPOOL1
```

### Command Example

```
nlvm list pool MYPOOL1
```

Print detailed information about the pool MYPOOL1.

### Response Parameters

The command returns the following information about the specified pool:

Pool name

Major:minor of the pool object

State of the pool (active, deactive, maintenance, unknown)

Size of the pool in byte format

Used space in byte format

Number of segments in the pool

Number of volumes in the pool

Whether the pool is shared for clustering or not (Yes, No)

If it is a snapshot pool, it displays "snapshot"

Name of the pool move (if applicable)

Percent complete of the pool move (if applicable)

Date and time the pool was created

The command returns the following information about the pool's segments:

Starting offset in the pool

Next offset in the pool

Partition name for this segment

### Sample Command Responses

#### Sample 1: Pool with No Volumes

```
nlvm list pool DFS01_TEST
DFS01_TEST (253:162) state=active size=24.99GB used=78.56MB segments=1
volumes=0 shared=Yes
Created Wed Sep 28 11:00:06 2011
1: Start 0 Next 52427936 on D1_LH-DFS01-1_part1.1
```

#### Sample 2: Pool with a Volume

```
nlvm list pool DFS01_TEST
DFS01_TEST (253:162) state=active size=24.99GB used=78.62MB segments=1
volumes=1 shared=Yes
Created Wed Sep 28 11:00:06 2011
1: Start 0 Next 52427936 on D1_LH-DFS01-1_part1.1
```

#### Sample 3: Pool with a Pool Move at 100% but before Complete Move

```
nlvm list pool DFS01_TEST
DFS01_TEST (253:162) state=active size=99.99GB used=2.51GB segments=3
volumes=1 shared=Yes
Move object DFS01_TEST_move at 100% complete
Created Wed Sep 28 13:50:44 2011
1: Start 0 Next 52427936 on LH_DFS01_01_R1
2: Start 52427936 Next 104856607 on LH_DFS01_02_R1
3: Start 104856607 Next 209712543 on LH_DFS01_03_R1
```

#### Sample 4: Pool Is Deactive

```
nlvm list pool DFS01_TEST
DFS01_TEST (253:162) state=deactive segments=3 shared=No
```

## 4.31 List Pools

### list pools [more] [exclude]

Print a list of all NSS pools.

```
nlvm [nlvm_options] list pools [more] [exclude]
```

### Command Options

#### more

Print detailed information about each pool. This option provides the same information as the list pool command.

#### Example

```
more
```

**exclude=<nss|shared|nonshared|snap|snapnomount>**

Specify types of pools to exclude from the list. The `exclude` option can be used multiple times to add exclusions.

#### **Exclude Options**

**nss**

NSS pools

**shared**

Shared pools

**nonshared**

Pools that are not shared

**snap**

Snapshot pools that are mounted

**snapnomount**

Snapshot pools that are not mounted

#### **Example**

```
exclude=snap exclude=snapnomount
```

#### **Command Example**

```
nlvm list pools more exclude=shared
```

Print detailed information about the each of the pools, but exclude shared pools.

#### **Response Parameters**

The command returns the following information about the pools on the server:

Pool name

Size of the pool in byte format

If mounted, it displays “mounted”

If it is a snapshot pool, it displays “snapshot”

Whether the pool is shared for clustering or not (Yes, No)

If the `more` option is specified, the information returned for each pool is the same as for the `list pool` command.

#### **Sample Command Response**

```
nlvm list pools
```

```
POOLA size=199.98MB mounted shared=No
POOLB size=199.98MB mounted shared=No
POOLD size=399.98MB mounted shared=No
POOLE size=199.98MB mounted shared=No
```

## **4.32 List Snap**

**list snap <snap\_name>**

Print detailed information about a specified snapshot. There are no command options available.

```
nlvm [nlvm_options] list snap <snap_name>
```

### Command Example

```
nlvm list SNAP1
```

Print a detailed information about SNAP1.

### Response Parameters

The command returns the following information about the specified pool snapshot:

Name of the snapshot

Major:minor of the snapshot object

Pool that is being snapped

Partition used to store copy-on-write data

Mounted state of the snapshot (mounted, not\_mounted)

Size of the snapshot (same size as the pool)

Size of the partition storing the copy-on-write data

Chunk size

Percent of space on the partition that is used for copy-on-write-data

Snap flags in hex (2=shared, 4=mounted, 8=snapshot, 16=valid DM object, 32=writeable, 64=invalid, this snapshot has a duplicate partition)

### Sample Command Responses

#### Sample 1: Snap Is Not Mounted

```
nlvm list snap DFS01_TEST_S1

Snap=DFS01_TEST_S1 (253:145) pool=DFS01_TEST partition=D2_LH-DFS01-
1_part1.1 state=not_mounted
size=209652188 part_size=10485760 chunk=128 %=0 flags=30
```

#### Sample 2: Snap Is Mounted

```
nlvm list snap DFS01_TEST_S2

Snap=DFS01_TEST_S2 (253:192) pool=DFS01_TEST partition=D2_LH-DFS01-
1_part1.2 state=mounted
size=209652188 part_size=10485760 chunk=128 %=0 flags=34
```

## 4.33 List Snaps

### list snaps [more]

Print a list of all snapshots.

```
nlvm [nlvm_options] list snaps [more]
```

### Command Option

#### more

Displays details about each of the snapshots. This is the same information as in the `list snap` command.

### Example

```
more
```

### Command Example

```
nlvm list snaps more
```

Print a list of all snapshots and detailed information about each one.

### Response Parameters

The command returns the following information about the pool snapshots on the server:

Name of the snapshot

Pool that is being snapped

Mounted state of the snapshot (mounted, not\_mounted)

If the `more` option is specified, the information returned for each pool snapshot is the same as for the `list snap` command.

### Sample Command Response

```
nlvm list snaps
```

```
DFS01_TEST_S3 pool=DFS01_TEST state=not_mounted
DFS01_TEST_S2 pool=DFS01_TEST state=mounted
DFS01_TEST_S1 pool=DFS01_TEST state=not_mounted
```

## 4.34 List Volume

**list volume** <volume\_name>

Print detailed information about a specified NSS volume.

```
nlvm [nlvm_options] list volume <volume_name>
```

### Command Option

*volume\_name*

Mandatory. Specify the name of the NSS volume.

### Example

```
MYVOL1
```

### Command Example

```
nlvm list volume MYVOL1
```

Print detailed information about the volume MYVOL1.

### Response Parameters

The command returns the following information about the specified NSS volume:

Volume name

Pool name

Volume state (active, deactive)

Mount point

Amount of space used

Amount of free space

Amount of purgeable space

Volume quota (value, none)

Number of objects

Number of files

Authentication model ID (1, 0)

Block size

Shred count

ReadAheadBlocks setting

Primary name space  
Namespaces supported (for NSS volumes: DOS, MAC, UNIX, LONG)  
Date created  
Date last modified  
Date last modified  
Date last archived

#### Sample Command Response

```
nlvm list volume DFS01_TEST
```

```
Volume DFS01_TEST on pool DFS01_TEST State=active
Mountpoint: /media/nss/DFS01_TEST
Used=556KB Free=24.92GB Purgeable=12KB
Quota=none
Objects=13 Files=13 authModelID=1
Blocksize=4096 ShredCount=1 ReadAheadblocks=16
Primary name space: LONG Namespaces Supported: DOS MAC UNIX LONG
Create time: Wed Sep 28 11:11:34 2011
Mod time: Wed Sep 28 11:11:55 2011
Archive time: never
```

## 4.35 List Volumes

### list volumes

Print a list of NSS volumes on the system. There are no command options available.

```
nlvm [nlvm_options] list volumes
```

#### Command Example

```
nlvm list volumes
```

Print a list of NSS volumes.

#### Response Parameters

The command returns the following information about the NSS volumes on the server:

Volume name  
Pool name  
Volume state (active, deactive)

#### Sample Command Response

```
nlvm list volumes
```

```
Volumes:
DFS02_TEST on pool DFS02_TEST state=active
LH_DRSTORE01 on pool LH_DRSTORE01 state=active
LH_USER01 on pool LH_USER01 state=active
LH_USER04 on pool LH_USER04 state=active
DFS01_TEST on pool DFS01_TEST state=active
```

## 4.36 Mount

### mount <pool\_name>

Mount a specified NSS pool.

```
nlvm [nlvm_options] mount <pool_name>
```

### Command Option

*pool\_name*

Mandatory. Specify the name of the NSS pool to mount.

### Example

MYPOOL1

### Command Example

```
nlvm mount MYPOOL1
```

Mount the pool MYPOOL1.

## 4.37 Move

**move** <pool\_name> <device> <size> [<device> <size>...]

Move an NSS pool from one location to another on the same system. If the new location is larger than the original location, the pool is automatically expanded after the move is complete.

```
nlvm [nlvm_options] move <pool_name> <device> <size> [<device> <size>...]
```

You can use the `device` and `size` options in combination multiple times to create a move target comprised of multiple segments. You must specify a size for each device. The `device` and `size` options can be used in any order. The first device instance is matched to the first size instance, and so on. The move target's size is the sum of the space contributed from the specified segments.

The total size of the target must be at least as big as the pool. You cannot shrink a pool by using the move command. If the size is larger, the pool size is expanded when the move is complete.

If a pool is cluster-enabled, issue the command on the node where the pool cluster resource is currently online. The move advances only when the resource is online. If the pool cluster resource is cluster migrated to another node, the move is enabled and active on the new node when the resource is brought online, and then the pool move continues. The status of the pool move can be reported only on the node where the resource is online.

You can check the status of a pool move by using the `nlvm complete move` command.

The pool move is not automatically finalized. When the move status is 100% complete, you must issue the `nlvm complete move` command to finalize the move. This sets the pool to the new location and removes the original location.

You can delete a pool move by using the `nlvm delete move` command. This sets the pool back to the original location and removes the new location.

In a cluster, issue the commands to complete, delete, or list the pool move from the node where the pool cluster resource is currently online.

### Command Options

*pool\_name*

Mandatory. Specify the name of the NSS pool to be moved. This must be the first command option.

### Example

MYPOOL1

**device=***device\_name*

Mandatory. Specify the node name (such as `sdb`) of the target device where the pool will be relocated.

You can specify multiple device instances to create a move target comprised of multiple segments. Each device instance must have a matching `size` instance. The first device instance is matched to the first size instance, and so on.

**Example**

```
device=sdg
```

**size=***value*[K|M|G|T]

Mandatory. Specify the size of the target partition. The size must be the same size or larger than the original pool.

If multiple devices are specified, each device instance must have a matching `size` instance. The first size instance is matched to the first device instance, and so on.

**Example**

```
size=200G  
size=3.98T
```

**Command Examples**

```
nlvm move MYPOOL1 device=sdg size=200G
```

Move the NSS pool named MYPOOL1 to the `/dev/sdg` device and allocate 200 GB to the partition.

```
nlvm move MYPOOL1 device=sdg size=200G device=sdh size=500G
```

Move the NSS pool named MYPOOL1 to a 700 GB space comprised of 200 GB of free space from device `sdg` and 500 GB of free space from device `sdh`.

## 4.38 Pool Activate

**pool activate** *<pool\_name>*

Activate a specified NSS pool.

```
nlvm [nlvm_options] pool activate <pool_name>
```

**Command Option**

*pool\_name*

Mandatory. Specify the name of the NSS pool to activate.

**Example**

```
MYPOOL1
```

**Command Example**

```
nlvm pool activate MYPOOL1
```

Activate the pool MYPOOL1.

## 4.39 Pool Deactivate

**pool deactivate** *<pool\_name>*

Deactivate a specified NSS pool.

```
nlvm [nlvm_options] pool deactivate <pool_name>
```

### Command Option

*pool\_name*

Mandatory. Specify the name of the NSS pool to deactivate.

### Example

```
MYPOOL1
```

### Command Example

```
nlvm pool deactivate MYPOOL1
```

Deactivate the pool MYPOOL1.

## 4.40 RAID

**raid** *<raid\_action>* *<raid\_name>*

Perform actions an NSS software RAID device.

```
nlvm [nlvm_options] raid <raid_action> <raid_name>
```

### RAID Actions

**abort** *<raid\_name>*

Abort the restripe or remirror currently in progress on the specified NSS software RAID. If the restripe/remirror is complete, the command has no effect.

### Example

```
nlvm raid abort MYRAID1
```

**delete** *<raid\_name>*

Delete a single element mirror from a pool, leaving the pool on the corresponding partition. This applies for RAID 1 (mirror) objects only.

This is a duplicate of the `nlvm delete raid` command, but it is added here for support reasons. This command removes only a single element mirror object.

### Example

```
nlvm raid delete MYRAID1
```

**disable** *<raid\_name>*

Disable an NSS software RAID device from remIRRORing or restriping on this server, and do not allow stamp updates to occur.

This command is used in Novell Cluster Services clusters to disable an NSS software RAID device that is active on another node.

### Example

```
nlvm raid disable MYRAID1
```

**enable <raid\_name>**

Enable a RAID device to remirror or restripe on this server. This enables an NSS software RAID device that was disabled by using the `nlvm raid disable` command.

This command is used in Novell Cluster Services clusters to enable an NSS software RAID device for this node. It is important that the RAID device be enabled on only one node at a time.

---

**WARNING:** Use caution when in a cluster configuration to avoid possible corruption that can occur if the RAID is enabled on multiple nodes at the same time.

---

**Example**

```
nlvm raid enable MYRAID1
```

**force <raid\_name>**

Force a single element mirror to be in sync. This condition can occur if a mirror element was removed, and the last element shows that it is not in sync due to a crash after a successful remirror. This command is only valid on NSS software RAID1 (mirror) devices.

---

**WARNING:** If a remirror has not completed successfully on this element, using the `nlvm raid force` command causes the element to look in sync, but the data is not there, and is corrupt. Use this command only if you know that a remirror was completed successfully on this element.

---

**Example**

```
nlvm raid force MYRAID1
```

**pause <raid\_name>**

Pause a remirror process to allow other I/O to happen during a heavy I/O process. This command is valid only on NSS software RAID1 (mirror) devices. Because remirroring can cause many I/Os to the devices, a pause allows other I/Os to happen more quickly.

The device must be resumed again by using the `nlvm raid resume` command. The pause is intended to be used only for a short time.

**Example**

```
nlvm raid pause MYRAID1
```

**status [raid\_name]**

Check the status on one or all NSS software RAID devices. The name is optional. If a name is specified, it returns detailed status for the given RAID device. If the name is omitted, it returns the status for all the NSS software RAID devices on the server.

**Example**

```
nlvm raid status MYRAID1
nlvm raid status
```

**remirror <raid\_name>**

Restart a remirror or restripe process on the specified NSS software RAID device that has either been aborted, or has failed.

**Example**

```
nlvm raid remirror MYRAID1
nlvm raid remirror MYRAID5
```

**resume <raid\_name>**

Resume a remirror process that was paused by using the `nlvm raid pause` command. This command is valid only on NSS software RAID1 (mirror) devices.

**Example**

```
nlvm raid resume MYRAID1
```

**Command Option****raid\_name**

Mandatory where specified. Specify the name of the NSS software RAID device to be acted upon.

**Example**

```
MYRAID1
```

**Sample Command Responses****Sample 1: RAID Status During a Remirror**

```
nlvm raid status LH_DFS01_01_R1

LH_DFS01_01_R1 is remirroring at 9%
--> D1_LH-DFS01-1_part1.1 (100%) In Sync
--> D2_LH-DFS01-1_part1.1 (9%) Out of Sync
```

**Sample 2: RAID Status During a Remirror on a Cluster Node where the RAID Is Not Active**

```
nlvm raid status

LH_DFS01_01_R1 is remirroring at 5%
LH_DFS02_R1 is Synchronized
tst-nda04150cl.sbd is not active on this node
```

## 4.41 Rename Pool

**rename pool <pool\_name> <new\_pool\_name>**

Rename a specified NSS pool.

If a pool is cluster-enabled, issue the command on the node where the pool cluster resource is currently online.

```
nlvm [nlvm_options] rename pool <pool_name> <new_pool_name>
```

**Command Option****pool\_name**

Mandatory. Specify the name of the NSS pool to rename.

**Example**

```
MYPOOL1
```

**new\_pool\_name**

Mandatory. Specify the new name of the NSS pool.

For pool naming conventions, see the [create pool](#) command.

**Example**

```
P_SALES
```

### Command Example

```
nlvm rename pool MYPOOL1 P_SALES
```

Rename the pool MYPOOL1 as P\_SALES.

## 4.42 Rename Volume

**rename volume** *<volume\_name>* *<new\_volume\_name>* [*encryption\_password*]

Rename a specified NSS volume. If the volume is encrypted, you might also need to provide its encryption password.

If a volume's pool is cluster-enabled, issue the command on the node where the pool cluster resource is currently online.

```
nlvm [nlvm_options] rename volume <volume_name> <new_volume_name>
[encryption_password]
```

### Command Options

#### *volume\_name*

Mandatory. Specify the name of the NSS volume to rename.

#### Example

```
MYVOL1
```

#### *new\_volume\_name*

Mandatory. Specify the new name of the NSS volume.

Volume names are 2 to 15 characters. The naming conventions are the same as for pools. See the `create pool` command for naming conventions.

#### Example

```
V_SALES
```

#### *encryption\_password*

Optional. If the volume is encrypted, the volume's encryption password might be needed. You can try the command without the password. If the password is needed, you are prompted to enter it.

#### Example

```
novell
```

### Command Example

```
nlvm rename volume MYVOL1 V_SALES
```

Rename the NSS volume MYVOL1 as V\_SALES.

```
nlvm rename volume MYVOL2 V_FINANCE novell
```

Rename the encrypted NSS volume MYVOL2 as V\_FINANCE. In this example, the encryption password is novell.

## 4.43 Rescan

### **rescan**

Performs a rescan of the storage objects (such as partitions, NSS pools, and NSS software RAIDs) on known devices, and creates any Device Mapper device or partition objects, or updates them as needed. It also mounts all pools that are not mounted unless you use the `-m` option. There are no command options.

```
nlvm [nlvm_options] rescan
```

#### **Command Example**

```
nlvm rescan
```

Scans for storage objects, creates and updates Device Mapper objects, and mounts pools as needed.

## 4.44 Share

### **share <device\_name>**

Set the specified device as shared.

```
nlvm [nlvm_options] share <device_name>
```

#### **Command Option**

*device\_name*

Mandatory. Specify the node name of the device.

#### **Example**

```
sdb
```

#### **Command Example**

```
nlvm share sdb
```

Sets the `/dev/sdb` device as shared.

## 4.45 Unmount

### **unmount <pool\_name>**

Unmount a specified NSS pool. This removes the pool from NSS and causes any open files to be closed and any volumes to be deactivated. Use this command with caution.

```
nlvm [nlvm_options] unmount <pool_name>
```

#### **Command Option**

*pool\_name*

Mandatory. Specify the name of the NSS pool to unmount.

#### **Example**

```
MYPOOL1
```

### Command Example

```
nlvm unmount MYPOOL1
```

Unmount the pool MYPOOL1.

## 4.46 Unshare

**unshare** <device\_name>

Set the specified device as not shared.

```
nlvm [nlvm_options] unshare <device_name>
```

### Command Option

*device\_name*

Mandatory. Specify the node name of the device.

### Example

```
sdb
```

### Command Example

```
nlvm unshare sdb
```

Sets the /dev/sdb device as not shared.

## 4.47 Volume Mount

**volume mount** <volume\_name> [encryption\_password]

Mount a specified NSS volume. This also activates the volume before mounting it.

```
nlvm [nlvm_options] volume mount <volume_name> [encryption_password]
```

### Command Option

*volume\_name*

Mandatory. Specify the name of the NSS volume to mount.

### Example

```
MYVOL
```

*encryption\_password*

Optional. The password is required to mount an encrypted NSS volume on the first mount after a reboot. Thereafter, the password is stored encrypted in system memory until the next server reboot.

### Example

```
novell
```

### Command Examples

```
nlvm volume mount MYVOL
```

Mount the volume MYVOL.

```
nlvm volume mount MYVOL2 novell
```

Mount the encrypted volume MYVOL2 on the first mount after a reboot. Thereafter until the next reboot, the password is not used to mount the volume. For example:

```
nlvm volume mount MYVOL2
```

## 4.48 Volume Unmount

**volume unmount** *<volume\_name>*

Dismount a specified NSS volume. This also deactivates the volume before dismounting it.

```
nlvm [nlvm_options] volume unmount <volume_name>
```

### Command Option

*volume\_name*

Mandatory. Specify the name of the NSS volume to dismount.

### Example

```
MYVOL
```

### Command Example

```
nlvm volume unmount MYVOL
```

Dismount the volume MYVOL.



---

# 5 NLVM Examples

This section provides examples for using the Novell Linux Volume Manager to manage the Novell Storage Services (NSS) file system on your Novell Open Enterprise Server (OES) 11 servers.

For information about using NLVM commands to create and manage Linux POSIX volumes on your OES 11 servers, see [“Managing Linux POSIX Volumes with NLVM Commands”](#) in the *OES 11: Linux POSIX Volume Administration Guide*.

- ♦ [Section 5.1, “Creating an NSS Pool and Volume,” on page 71](#)
- ♦ [Section 5.2, “Mirroring a Partition,” on page 71](#)

## 5.1 Creating an NSS Pool and Volume

Enter commands at a terminal console prompt as the `root` user.

Create an NSS pool named `MYPOOL1` with a size of 100 GB on device `/dev/sdb`. Create a volume on the new pool named `MYVOL`.

```
nlvm create pool device=sdb size=100G name=MYPOOL1
nlvm create volume name=MYVOL pool=MYPOOL1
```

The command to create an NSS pool creates the partition, pool, Device mapper object, (such as `/dev/nss/sdb1.1`), and activates the pool.

The command to create the volume creates the volume and automatically mounts it if the pool is not shared. If the pool is shared and cluster enabled, you must configure the pool cluster resource and use the Novell Cluster Services commands to bring the resource and its volume online.

## 5.2 Mirroring a Partition

You can mirror an existing NSS partition or Novell Cluster Services SBD partition by using the `Create RAID` command with the `part=<existing_partition_name>` option as follows:

```
nlvm [nlvm_options] create raid name=<raid_name> raid=1
    part=<existing_partition_name>
    device=<dev1_name> [device=<dev2_name>] [device=<dev3_name>]
```

This command specifies the existing partition as the first segment of a RAID 1 mirror. You must specify the `device` option one time with the device to use as its mirror. You can use the `device` option up to three times to specify additional mirrored segments. You do not specify a size in the command; the size of the existing partition determines the amount of space that is used on each of the specified devices. Each added segment of the RAID is a complete mirror of the original partition. The partition type created for the mirrors is the same type as the original partition. After you mirror the partition, you manage the RAID 1 device by using the normal NSS software RAID management tools and commands.

For example, if `POOL1` uses partition `sdcl.1`, the following command creates an NSS software RAID 1 mirrored device named `POOL1RAID1`. The pool's existing partition becomes the first segment of the RAID, and its existing data is mirrored to device `sdf`.

```
nlvm create raid name=POOL1RAID1 raid=1 part=sdcl.1 device=sdf
```

---

# 6 Troubleshooting NLVM

This section identifies common problems and troubleshooting tips for Novell Linux Volume Manager (NLVM) on your Novell Open Enterprise Server (OES) 11 server.

- [Section 6.1, “Error Codes and Messages,” on page 73](#)
- [Section 6.2, “Failure to Create a Clustered LVM Volume Group,” on page 73](#)
- [Section 6.3, “Failure to Create an LVM Volume Group,” on page 73](#)
- [Section 6.4, “Device Is Not Available for Use in an LVM Volume Group,” on page 74](#)
- [Section 6.5, “NLVM Pool Move Fails and Deactivates the Pool,” on page 74](#)

## 6.1 Error Codes and Messages

If an error message for a failed NLVM command line operation provides an error code without a corresponding message, you can use the following Novell Storage Services (NSS) Console (`nsscon`) command to view the message:

```
nsscon /ErrorCode=<error_number>
```

## 6.2 Failure to Create a Clustered LVM Volume Group

When you create a clustered Linux Volume Manager (LVM) volume group, the command fails with the following error:

```
Error 23384: Device /dev/sde is not shared by clvmd
```

This error can occur if the installed Linux kernel does not contain the latest Clustered LVM software. Clustered LVM requires the Linux kernel 2.6.32.45-0.3 or later. You can get the latest kernel version by using the SUSE Linux Enterprise Server (SLES) 11 SP1 update channel. For information about applying patches for your OES 11 server, see [“Updating \(Patching\) an OES 11 Server”](#) in the [OES 11: Installation Guide](#).

## 6.3 Failure to Create an LVM Volume Group

When you create an LVM volume group or clustered LVM volume group, the command fails with the following error:

```
Error 23384: Not enough free space to handle requested size
```

This error occurs if any one of the devices you used for the volume group is not initialized. Uninitialized devices report that there is no available free space on the device. Initialize the device and try again.

## 6.4 Device Is Not Available for Use in an LVM Volume Group

A device cannot be used to create an LVM volume group if any of the following conditions exist:

- ♦ The device is not initialized.
- ♦ The device contains partitions.
- ♦ The device is marked as Shareable for Clustering, which adds a 4 KB partition on the device to store the shared state.

## 6.5 NLVM Pool Move Fails and Deactivates the Pool

If a hardware error is encountered during an `nlvm move`, the pool move fails, and the pool is automatically deactivated. Currently, no error is returned, but the pool will not activate.

The pool move cannot continue because of the hardware error. You must delete the move to clear the move:

```
nlvm delete move [<poolname>|<move>]
```

After the move is deleted, you can activate the pool.

Because of the hardware error, you cannot use the `nlvm move` command to move the pool. You can move the pool's data to another SAN device by restoring files from backup media, or by copying the files from the old pool to a new pool.

---

# 7 Security Considerations

This section describes the security considerations for the Novell Linux Volume Manager (NLVM) on a Novell Open Enterprise Server (OES) 11 server.

- ♦ [Section 7.1, “Root User Privileges,” on page 75](#)
- ♦ [Section 7.2, “Files,” on page 75](#)

## 7.1 Root User Privileges

The Linux system root user privileges are required to use NLVM commands.

## 7.2 Files

**/dev/nss/**

Location where NSS software RAID and SBD partition device mapper objects are created.

**/dev/pool/**

Location where NSS pool device mapper objects are created.

**/etc/opt/novell/nss/nlvm.conf**

Location of the NLVM configuration file.

**/opt/novell/nss/mnt/.pools/**

Location where NSS pool objects are mounted.

**/opt/novell/nss/nlvm/**

Location of the NLVM storage configuration database files. The database files are named `nlvm.<number.>db`, such as `nlvm.db`, `nlvm.1.db`, and so on. The default is to keep the 10 most recent files. The number of NLVM database files to keep is set in the `/etc/opt/novell/nss/nlvm.conf` file.

**/opt/novell/nss/sbin/nlvm**

Location of the NLVM utility. It also has a link in the `sbin` directory so that it is in the search path.

**/var/opt/novell/log/nss/debug/**

Location of the debug log files when debug is enabled. The debug files are named `nlvm_debug.<number.>log`, such as `nlvm_debug.log`, `nlvm_debug.1.log`, and so on. The default is to keep the 10 most recent files. The number of debug log files to keep is set in the `/etc/opt/novell/nss/nlvm.conf` file.

**/var/run/novell-nss/nlvm.lock**

Local lock file for NLVM.

---

# A Configuring Settings for the NLVM Library

The Novell Linux Volume Manager (NLVM) library software has some configurable settings that are exposed in the `/etc/opt/novell/nss/nlvm.conf` file. The default settings are automatically configured. To modify the default behavior, use the options described in [Table A-1](#).

**Table A-1** *Default Settings for the NLVM Library*

Parameter	Description
<code>Debug on</code>	<p>If this line is enabled, the command allows the debug feature of the NLVM utility to run every time without needing to use the <code>-d</code> option.</p> <p>The default is off (commented out). You can enable debug as needed by using the <code>-d</code> option when you start the utility.</p> <p>To enable debug to run every time, you can uncomment the <code>Debug on</code> command in the <code>nlvm.conf</code> file.</p> <p>To return to the default debug behavior with the <code>-d</code> option, you can comment out the <code>Debug on</code> command again.</p>
<code>Debug files 10</code>	<p>If this line is enabled, the command specifies the number of NLVM debug log files to keep before deleting the oldest file. A log file shows actions that were performed by the NLVM library.</p> <p>The default is to keep the 10 most recent files. The minimum value is 1. The default setting applies when the command is commented out.</p> <p>To modify the number of files kept, uncomment the line and specify a new value.</p> <p>To use the default setting, comment out the command again.</p> <p>When debug runs, a debug log file is opened in the <code>/var/opt/novell/log/nss/debug</code> directory. The debug files are named <code>nlvm_debug.&lt;number.&gt;log</code>, such as <code>nlvm_debug.log</code>, <code>nlvm_debug.1.log</code>, and so on.</p>

Parameter	Description
Data base files 10	<p>If this line is enabled, the command specifies the number of NLVM data base files to keep before deleting the oldest file. Data base files are stored every time a change is made to the system with the NLVM library.</p> <p>The default is to keep the 10 most recent files. The minimum value is 1. The default setting applies when the command is commented out.</p> <p>To modify the number of files kept, uncomment the line and specify a new value.</p> <p>To use the default setting, comment out the command.</p> <p>When a change is made to the system, a data base file is opened in the <code>/opt/novell/nss/nlvm/</code> directory. The database files are named <code>nlvm.&lt;number&gt;.db</code>, such as <code>nlvm.db</code>, <code>nlvm.1.db</code>, and so on.</p>
Auto refresh off	<p>If this line is enabled, the command turns off the autorefresh. The system gets its information from the data base files. This results in much faster load times for utilities, but might require a refresh within the utility. If the autorefresh is off, a refresh can be triggered by using the <code>-r</code> option when you start the NLVM utility.</p> <p><b>IMPORTANT:</b> If Novell Cluster Services is on, the autorefresh is always on.</p> <p>The default is that autorefresh is enabled (the line is commented out). This allows the NLVM library to refresh the system each time it is used. The autorefresh picks up any changes to the system that happened outside the library.</p>

---

# B Documentation Updates

This section contains information about documentation content changes made to the *OES 11: Novell Linux Volume Manager Reference* since the initial release of Novell Open Enterprise Server (OES) 11.

This document was updated on the following dates:

- ♦ [Section B.1, “July 6, 2012,” on page 79](#)
- ♦ [Section B.2, “May 2012 \(OES 11 Patches\),” on page 79](#)
- ♦ [Section B.3, “April 30, 2012 \(OES 11 Patches\),” on page 80](#)
- ♦ [Section B.4, “January 18, 2012,” on page 81](#)

## B.1 July 6, 2012

Changes were made to the following section. The changes are explained below.

- ♦ [Section B.1.1, “NLVM Commands,” on page 79](#)
- ♦ [Section B.1.2, “Troubleshooting NLVM,” on page 79](#)

### B.1.1 NLVM Commands

Location	Change
<a href="#">Section 4.4, “Create Linux Volume,” on page 27</a>	Corrections for the <code>mntopt</code> option.

### B.1.2 Troubleshooting NLVM

Location	Change
<a href="#">Section 6.5, “NLVM Pool Move Fails and Deactivates the Pool,” on page 74</a>	This section is new.

## B.2 May 2012 (OES 11 Patches)

Changes were made to the following sections. The changes are explained below.

- ♦ [Section B.2.1, “NLVM Commands,” on page 80](#)
- ♦ [Section B.2.2, “What’s New or Changed in Novell Linux Volume Manager,” on page 80](#)

## B.2.1 NLVM Commands

Location	Change
<a href="#">“Init Device” on page 45</a> <a href="#">“Delete Linux Volume” on page 38</a> <a href="#">“Delete Move” on page 39</a> <a href="#">“Delete Partition” on page 39</a> <a href="#">“Delete Pool” on page 40</a> <a href="#">“Delete RAID” on page 41</a> <a href="#">“Delete RAID Segment” on page 41</a> <a href="#">“Delete Snap” on page 42</a> <a href="#">“Delete Volume” on page 42</a>	You are automatically prompted to confirm the delete action. Respond Y (Yes) or N (No). Use the <code>--no-prompt</code> NLVM option to suppress the confirmation.

## B.2.2 What’s New or Changed in Novell Linux Volume Manager

Location	Change
<a href="#">Section 2.1, “What’s New (May 2012 Patches),” on page 11</a>	This section is new.

## B.3 April 30, 2012 (OES 11 Patches)

Changes were made to the following sections. The changes are explained below.

- ♦ [Section B.3.1, “NLVM Commands,” on page 81](#)
- ♦ [Section B.3.2, “What’s New or Changed in Novell Linux Volume Manager,” on page 81](#)

## B.3.1 NLVM Commands

Location	Change
<a href="#">“Sizes” on page 25</a>	All sizes can be entered as whole numbers or with fractional parts such as 200.45G and 3.98T.
<a href="#">“Sizes” on page 25</a> <a href="#">“Create Linux Volume” on page 27</a> <a href="#">“Create Partition” on page 30</a> <a href="#">“Create Pool” on page 31</a> <a href="#">“Create RAID” on page 34</a> <a href="#">“Create Snap” on page 35</a> <a href="#">“Expand Partition” on page 43</a> <a href="#">“Expand Pool” on page 44</a> <a href="#">“Move” on page 61</a>	A terabyte (TB) multiplier of T is supported for OES 11 with the latest patches applied. If no multiplier is specified, the default multiplier of gigabytes is assumed.
<a href="#">Section 4.11, “Delete Move,” on page 39</a>	The abort option has been deprecated.
<a href="#">Section 4.26, “List Move,” on page 51</a>	You can alternatively specify the pool name instead of the pool move name.
<a href="#">Section 4.37, “Move,” on page 61</a>	The <code>nlvm delete move</code> command sets the pool back to the original location and removes the new location. You can delete the move at any time while the move is in progress, even if it is pending only the <code>complete move</code> command to be finalized.
<a href="#">Section 4.42, “Rename Volume,” on page 66</a>	Rename a specified volume. This option is new.

## B.3.2 What’s New or Changed in Novell Linux Volume Manager

Location	Change
<a href="#">Section 2.2, “What’s New (April 2012 Patches),” on page 11</a>	This section is new.

## B.4 January 18, 2012

The document format was updated to reflect corporate standards.

Corrected Linux partition type as 83.

