

# Novell Open Enterprise Server

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NOVELL CLUSTER SERVICES™ 1.8.1  
RESOURCE CONFIGURATION GUIDE FOR  
LINUX\*



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OES Novell Cluster Services 1.8.1 Resource Configuration Guide for Linux

[August 19, 2005](#)

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# About This Guide

Before running any application on servers in a Novell® Cluster Services™ cluster, the application must be installed and configured properly to take advantage of shared storage and to achieve high availability. This document provides information to help you set up and configure some of the applications and services commonly used in an OES Linux environment. See the Novell Cluster Administration Guide for Linux for cluster installation and configuration instructions, and see your application documentation for specific application installation and setup instructions.

## Documentation Conventions

In this documentation, a greater-than symbol (>) is used to separate actions within a step and items in a cross-reference path.

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When a single pathname can be written with a backslash for some platforms or a forward slash for other platforms, the pathname is presented with a backslash. Users of platforms that require a forward slash, such as UNIX\* or Linux\*, should use forward slashes as required by your software.

## User Comments

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# 1

## Configuring DHCP with Novell Cluster Services

### Benefits of Configuring DHCP for High Availability

A Novell® OES Linux DHCP server automatically assigns IP addresses and other configuration information to clients upon request or when the clients are restarted. If for some reason the Novell OES Linux DHCP server is not accessible, clients lose their ability to connect to the network because they cannot obtain an IP address. Configuring DHCP with Novell Cluster Services™ ensures the IP address range required by users to connect to the network is highly available. This is possible because the DHCP server is automatically started, stopped, and restarted on different servers in the cluster by Novell Cluster Services.

### DHCP Installation and Configuration

Novell Cluster Services (NCS) 1.8 must be installed before configuring DHCP to work in a cluster. NCS 1.8 provides a DHCP resource template, which facilitates configuring DHCP in a cluster environment. Novell OES includes NCS 1.8 and licenses for two cluster nodes.

Before running DHCP with Novell Cluster Services, DHCP must be installed on every server that will run it. To do this, install the Internet Software Consortium (ISC) DHCP server package that ships with SLES9. This server package can be installed when you install your SLES9 server or afterward. You can install the server package after the SLES9 installation using either YaST or Linux commands. More information on DHCP configuration is available in the `/usr/share/doc/packages/dhcp-server` directory.

### Configuring DHCP on the Shared Disk

To configure DHCP to use shared storage, you need to create a shared directory (file system or disk) on the shared disk system and create mount points to that shared file system on each cluster server that will run DHCP.

- 1** Create a file system on the shared disk system using EVMS.  
Enter `evmsgui` at the Linux server to start the EVMSGUI utility.  
Click Help and go to the Web links provided for documentation and information on using EVMS to configure and manage storage.
- 2** On each cluster node that will run DHCP, create the mount point.  
For example, the mount point could be `/mnt/dhcp`.
- 3** Log in as the root user and mount the shared disk (file system) that was created in [Step 1](#).

For example, depending on the mount point and directory names, you could enter a command similar to the following to mount the shared disk:

```
mount /dev/evms/dhcp /mnt/dhcp
```

- 4 At the root of the shared disk you just created (/mnt/dhcp), enter the following commands to create the directories specified:

```
mkdir etc
```

```
mkdir -p var/lib/dhcp
```

These directories must be owned by the root user, and the default group must be root. Also, all four directories must have permissions of drwxr-xr-x.

## Configuring the dhcpd.conf File

- 1 Copy the dhcpd.conf file from the /etc directory on one of the OES Linux cluster servers to the etc directory you created on the shared disk in [Step 4 on page 10](#).

This would be the /mnt/dhcp/etc directory if you used the same directory names as those given in the example above.

- 2 Configure the DHCP daemon by modifying the dhcpd.conf that you copied in [Step 1](#).

For information on what to modify, see any of the following:

```
man dhcpd.conf
```

<http://www.isc.org> (<http://www.isc.org>)

The Linux Documentation Project <http://www.tldp.org> (<http://www.tldp.org>)

## Creating a dhcpd.leases File

A dhcpd.leases file is necessary for DHCP to function. The DHCP daemon requires this file before it will start. The file can be empty, and it must reside in the var/lib/dhcp directory you created in [Step 4 on page 10](#).

One way to create the empty file is to use the touch command. For example, if you used the directory names listed in the example above, you could enter the following to create an empty dhcpd.leases file:

```
touch /mnt/dhcp/var/lib/dhcp/dhcpd.leases
```

## Novell Cluster Services Configuration and Setup

After DHCP is properly installed and configured, you must create and configure a DHCP resource in Novell Cluster Services. This includes configuring DHCP load and unload scripts; setting DHCP start, failover, and failback modes; and assigning the DHCP resource to specific servers in your cluster.

## Creating a DHCP Cluster Resource

Novell Cluster Services includes a DHCP resource template, which greatly simplifies the process for creating a DHCP cluster resource. Much of the DHCP cluster resource configuration is performed automatically by the DHCP resource template. See [“Creating Cluster Resources”](#) in the *OES Novell Cluster Services 1.8.1 Administration Guide for Linux* for more information.

To create a DHCP cluster resource:

- 1 Ensure the shared disk (file system) you created and mounted in [Step 2 on page 9](#) is unmounted.

If you used the directory names specified in the example, you can enter `umount /mnt/dhcp` to unmount the shared disk.

- 2 Open your Internet browser and enter the URL for iManager.

The URL is `http://server_ip_address/nps/manager.html`. Replace *server\_ip\_address* with the IP address or DNS name of a server in the cluster or with the IP address for Apache-based services.

- 3 Enter your username and password.

- 4 In the left column, locate Clusters and then click the Cluster Options link.

iManager displays three links under Clusters that you can use to configure and manage your cluster.

- 5 Specify the cluster name, or browse and select it, then click the New link.

- 6 Specify Resource as the resource type you want to create by clicking the Resource radio button, then click Next.

- 7 Specify a name for the DHCP resource.

**NOTE:** Do not use periods in cluster resource names. Novell clients interpret periods as delimiters. If you use a space in a cluster resource name, that space will be converted to an underscore.

- 8 Type the DHCP template name in the Inherit From Template field, or browse and select it from the list.

- 9 Check the Define Additional Properties check box, click Next, and then continue with [“Configuring DHCP Load and Unload Scripts” on page 11](#).

The DHCP resource template configures the DHCP resource by automatically creating DHCP load and unload scripts, setting failover and failback modes, and assigning DHCP as a resource to all nodes in the cluster.

## Configuring DHCP Load and Unload Scripts

### Load Script Configuration

The DHCP load script page should already be displayed. The load script contains commands to start the DHCP service. You must customize some commands for your specific DHCP configuration.

The load script appears similar to the following example:

```
#!/bin/bash
. /opt/novell/ncs/lib/ncsfuns
# Template for clustering the ISC DHCP daemon.
# You should not configure failover within the DHCP server
# itself. Instead, let NCS manage the failover.
# mount the file system.
exit_on_error mount -t reiserfs /dev/evms/vol /mnt/dhcp
# add the IP address
exit_on_error add_secondary_ipaddress a.b.c.d
# start dhcpd
```

```

exit_on_error /usr/sbin/dhcpd -cf /mnt/dhcp/etc/dhcpd.conf -lf /mnt/
dhcp/var/lib/dhcp/dhcpd.leases
# return status
exit 0

```

To Customize the DHCP load script for your specific configuration:

- 1 View and, if necessary, edit the following lines for your specific directory structure, mount point, and file system.

```

exit_on_error mount -t reiserfs /dev/evms/vol /mnt/dhcp
exit_on_error /usr/sbin/dhcpd -cf /mnt/dhcp/etc/dhcpd.conf -lf /mnt/
dhcp/var/lib/dhcp/dhcpd.leases

```

- 2 Edit the following line to assign a unique IP address to the DHCP cluster resource.

```
exit_on_error add_secondary_ipaddress a.b.c.d
```

Replace a.b.c.d with the IP address you want to assign to the DHCP cluster resource.

The IP address for the DHCP cluster resource allows clients to reconnect to that address regardless of which server is hosting it.

- 3 Click Next and continue with the unload script configuration.

### Unload Script Configuration

The DHCP unload script page should now be displayed. The unload script contains commands to stop the DHCP service. You must customize some commands for your specific DHCP configuration.

The unload script appears similar to the following example:

```

#!/bin/bash
. /opt/novell/ncs/lib/ncsfuncs
# request dhcpd stop
ignore_error killproc -p /var/run/dhcpd.pid -TERM /usr/sbin/dhcpd
# stop dhcpd otherwise
sleep 8
ignore_error fuser -k /mnt/dhcp
# del the IP address
ignore_error del_secondary_ipaddress a.b.c.d
# umount the file system
exit_on_error umount /mnt/dhcp
# return status
exit 0

```

- 1 View and, if necessary edit the mount points in the applicable lines of the unload script.
- 2 Replace a.b.c.d with the same IP address you specified in the load script, then click Next.

## Setting DHCP Start, Failover, and Failback Modes

The page to set Start, Failover, and Failback modes should now be displayed.

The DHCP resource template sets the DHCP resource Start mode and Failover mode to Auto and the Failback Mode to Disable.

If the DHCP resource Start mode is set to Auto, the DHCP server automatically loads on a designated server when the cluster is first brought up. If the DHCP Start mode is set to Manual, you can manually start DHCP on a specific server when you want, instead of having it automatically start when servers in the cluster are brought up.

If the DHCP Failover mode is set to Auto, the DHCP server automatically moves to the next server in the Assigned Nodes list in the event of a hardware or software failure. If the DHCP Failover mode is set to Manual, you can intervene after a failure occurs and before the DHCP server is started on another node.

If the DHCP Failback mode is set to Disable, the DHCP server will continue running on the node it has failed to. If the DHCP Failback Mode is set to Auto, the DHCP server automatically moves back to its preferred node when the preferred node is brought back online. Set the DHCP Failback mode to Manual to prevent the DHCP server from moving back to its preferred node when that node is brought back online, until you are ready to allow it to happen.

View or change the DHCP resource Start, Failover, and Failback modes, then click Next and continue with [“View or Edit DHCP Resource Server Assignments” on page 13](#).

## View or Edit DHCP Resource Server Assignments

The page to view or change DHCP resource server assignments should now be displayed. The DHCP resource template automatically assigns the DHCP resource to all nodes in the cluster. The order of assignment is the order the nodes appear in the resource list.

To view or edit DHCP resource node assignments or change the server failover order:

- 1 From the list of unassigned nodes, select the server you want the resource assigned to, then click the Right-arrow button to move the selected server to the Assigned Nodes list.

Repeat this step for all servers you want assigned to the resource. You can also use the Left-arrow button to unassign servers from the resource.

- 2 Click the Up-arrow and Down-arrow buttons to change the failover order of the servers assigned to the resource or volume.
- 3 Click Apply or Finish to save node assignment changes.

## Additional Information

The configuration described in this document does not run the DHCP daemon in a chroot jail. If that level of security is required, additional configuration is necessary.

For additional information on configuring the ISC DHCP daemon, see the following:

man/info dhcpd

man/info dhcpd.conf

man/info dhcpd.leases

<http://www.isc.org> (<http://www.isc.org>)

[The Linux Documentation Project \(http://www.tldp.org\)](http://www.tldp.org)



# 2

## Configuring DNS with Novell Cluster Services

A Novell® OES Linux DNS server automatically resolves IP addresses with domain names. If for some reason the Novell OES Linux DNS server is not accessible, clients will lose their ability to access certain network resources and applications. Configuring DNS with Novell® Cluster Services™ can help avoid this loss of access.

### Benefits of Configuring DNS for High Availability

Configuring DNS with Novell Cluster Services ensures the IP address/domain name resolution required by users is always highly available. This is possible because the DNS server is automatically started, stopped, and restarted on different servers in the cluster by Novell Cluster Services.

### DNS Installation and Configuration

Novell Cluster Services (NCS) 1.8 must be installed before configuring DNS to work in a cluster. NCS 1.8 provides a DNS resource template, which facilitates configuring DNS in a cluster environment. Novell OES includes NCS 1.8 and licenses for two cluster nodes.

Before running DNS with Novell Cluster Services, DNS must be installed on every server that will run it. To do this, install the DNS DHCP server package that ships with SLES 9. This server package can be installed when you install your SLES 9 server or afterward. You can install the server package after the SLES 9 installation by installing the Bind Domain Name Server component using either YaST or Linux commands. More information on DNS configuration is available in the `/usr/share/doc/packages/bind` directory.

### Configuring DNS on the Shared Disk

To configure DNS to use shared storage, you need to create a shared directory (file system or disk) on the shared disk system and create mount points to that shared file system on each cluster server that will run DNS.

- 1** Create a file system on the shared disk system using EVMS.

Enter `evmsgui` at the Linux server to start the EVMSGUI utility.

Click Help and use the Web links provided for documentation and information on using EVMS to configure and manage storage.

- 2** On each cluster node that will run DNS, create the mount point.

For example, the mount point could be `/mnt/named`.

- 3 At the root of the shared disk you just created (/mnt/named), enter the following commands to create the directories specified:

```
mkdir etc
```

```
mkdir -p var/lib/named
```

These directories must be owned by the root user, and the default group must be root. Also, all four directories must have permissions of drwxr-xr-x.

- 4 Log in as the root user and mount the shared disk (file system) that was created in [Step 1](#).

For example, depending on the mount point and directory names, you could enter a command similar to the following to mount the shared disk:

```
mount /dev/evms/named /mnt/named
```

- 5 Copy the root.hint file from the /var/lib/named directory on one of the OES Linux cluster servers to the /var/lib/named directory on the shared disk.

## Configuring the named.conf File

- 1 Copy the named.conf file from the /etc directory on one of the OES Linux cluster servers to the etc directory you created on the shared disk in [Step 4 on page 10](#).

This would be the /mnt/named/etc directory if you used the same directory names as those given in the example above.

- 2 Configure the DNS daemon by modifying the named.conf that you copied in [Step 1](#).

For information on what to modify, see any of the following:

man/info named.conf

<http://www.isc.org> (<http://www.isc.org>)

The Linux Documentation Project <http://www.tldp.org> (<http://www.tldp.org>)

The BIND 9 Administrator Reference Manual

## Creating Zone Files

Create the necessary zone files in the /var/lib/named directory you created in [Step 4 on page 10](#).

This would be the /mnt/named/var/lib/named directory if you used the same directory names as those give in the example in [Step 2 on page 9](#).

For more information, see any of the following:

<http://www.isc.org> (<http://www.isc.org>)

The Linux Documentation Project <http://www.tldp.org> (<http://www.tldp.org>)

The BIND 9 Administrator Reference Manual

## Novell Cluster Services Configuration and Setup

After DNS is properly installed and configured, you must create and configure a DNS resource in Novell Cluster Services. This includes configuring DNS load and unload scripts; setting DNS Start, Failover, and Failback modes; and assigning the DNS resource to specific servers in your cluster.

## Creating a DNS Cluster Resource

Novell Cluster Services includes a DNS resource template, which greatly simplifies the process for creating a DNS cluster resource. Much of the DNS cluster resource configuration is performed automatically by the DNS resource template. See [“Creating Cluster Resources”](#) in the *OES Novell Cluster Services 1.8.1 Administration Guide for Linux* for more information.

To create a DNS cluster resource:

- 1 Ensure the shared disk (file system) you created and mounted in [Step 1 on page 9](#) is unmounted.

If you used the directory names specified in the example, you can enter `umount /mnt/named` to unmount the shared disk.

- 2 Open your Internet browser and enter the URL for iManager.

The URL is `http://server_ip_address/nps/imanager.html`. Replace *server\_ip\_address* with the IP address or DNS name of a server in the cluster or with the IP address for Apache-based services.

- 3 Enter your username and password.

- 4 In the left column, locate Clusters and then click Cluster Options.

iManager displays three links under Clusters that you can use to configure and manage your cluster.

- 5 Specify the cluster name, or browse and select it, then click New.

- 6 Specify Resource as the resource type you want to create by clicking the Resource radio button, then click Next.

- 7 Specify a name for the DNS resource.

- 8 Type the DNS template name in the Inherit From Template field, or browse and select it from the list.

- 9 Check the Define Additional Properties check box, click Next, and then continue with [“Configuring DHCP Load and Unload Scripts” on page 11](#).

The DNS resource template configures the DNS resource by automatically creating DNS load and unload scripts, setting failover and failback modes, and assigning DNS as a resource to all nodes in the cluster.

## Configuring DNS Load and Unload Scripts

### Load Script Configuration

The DNS load script page should already be displayed. The load script contains commands to start the DNS service. You must customize some commands for your specific DNS configuration.

The load script appears similar to the following example:

```
#!/bin/bash
. /opt/novell/ncs/lib/ncsfuncs
# mount the file system.
exit_on_error mount -t reiserfs /dev/evms/named /mnt/named
# add the IP address
exit_on_error add_secondary_ipaddress a.b.c.d
# start named
```

```

exit_on_error /usr/sbin/named -c /mnt/named/etc/named.conf -u named
sleep 2
exit_on_error checkproc -p /var/run/named/named.pid /usr/sbin/named
# return status
exit 0

```

To customize the DNS load script for your specific configuration:

- 1 View and, if necessary, edit the following lines for your specific directory structure, mount point, and file system:

```

exit_on_error mount -t reiserfs /dev/evms/named /mnt/named
exit_on_error /usr/sbin/named -c /mnt/named/etc/named.conf -u named
exit_on_error checkproc -p /var/run/named/named.pid /usr/sbin/named

```

- 2 Edit the following line to assign a unique IP address to the DNS cluster resource:

```
exit_on_error add_secondary_ipaddress a.b.c.d
```

Replace a.b.c.d with the IP address you want to assign to the DNS cluster resource.

The IP address for the DNS cluster resource allows clients to reconnect to that address regardless of which server is hosting it.

- 3 Click Next and continue with the unload script configuration.

### Unload Script Configuration

The DNS unload script page should now be displayed. The unload script contains commands to stop the DNS service. You must customize some commands for your specific DNS configuration.

The unload script appears similar to the following example:

```

#!/bin/bash
. /opt/novell/ncs/lib/ncsfncs
# request named stop
ignore_error killproc -p /var/run/named.pid -TERM /usr/sbin/named
# stop named otherwise
sleep 8
ignore_error fuser -k /mnt/named
# del the IP address
ignore_error del_secondary_ipaddress a.b.c.d
# umount the file system
exit_on_error umount /mnt/named
# return status
exit 0

```

- 1 View and, if necessary, edit the mount points in the applicable lines of the unload script.
- 2 Replace a.b.c.d with the same IP address you specified in the load script, then click Next.

## Setting DNS Start, Failover, and Failback Modes

The page to set Start, Failover, and Failback modes should now be displayed.

The DNS resource template sets the DNS resource Start mode and Failover mode to Auto and the Failback Mode to Disable.

If the DNS resource Start mode is set to Auto, the DNS server automatically loads on a designated server when the cluster is first brought up. If the DNS Start mode is set to Manual, you can manually start DNS on a specific server when you want, instead of having it automatically start when servers in the cluster are brought up.

If the DNS Failover mode is set to Auto, the DNS server automatically moves to the next server in the Assigned Nodes list in the event of a hardware or software failure. If the DNS Failover mode is set to Manual, you can intervene after a failure occurs and before the DNS server is started on another node.

If the DNS Failback mode is set to Disable, the DNS server will continue running on the node it has failed to. If the DNS Failback Mode is set to Auto, the DNS server automatically moves back to its preferred node when the preferred node is brought back online. Set the DNS Failback mode to Manual to prevent the DNS server from moving back to its preferred node when that node is brought back online, until you are ready to allow it to happen.

View or change the DNS resource Start, Failover, and Failback modes, then click Next and continue with [“View or Edit DHCP Resource Server Assignments”](#) on page 13.

## View or Edit DNS Resource Server Assignments

The page to view or change DNS resource server assignments should now be displayed. The DNS resource template automatically assigns the DNS resource to all nodes in the cluster. The order of assignment is the order the nodes appear in the resource list.

To view or edit DNS resource node assignments or change the server failover order:

- 1** From the list of unassigned nodes, select the server you want the resource assigned to, then click the Right-arrow button to move the selected server to the Assigned Nodes list.  
Repeat this step for all servers you want assigned to the resource. You can also use the Left-arrow button to unassign servers from the resource.
- 2** Click the Up-arrow and Down-arrow buttons to change the failover order of the servers assigned to the resource or volume.
- 3** Click Apply or Finish to save node assignment changes.

## Additional Information

The DNS cluster resource template runs the DNS daemon as the user named. Also, the configuration described in this document does not run the DNS daemon in a chroot jail. If that level of security is required, additional configuration is necessary.

For additional information on configuring the ISC DHCP daemon, see the following:

man/info named

<http://www.isc.org> (<http://www.isc.org>)

[The Linux Documentation Project](http://www.tldp.org) (<http://www.tldp.org>)

The BIND 9 Administrator Reference Manual



# 3

## Configuring iPrint with Novell Cluster Services

This section will help you do the following

- ◆ “Understanding the Benefits of High Availability Printing” on page 21
- ◆ “OES Installation Options” on page 22
- ◆ “Configuring a Shared Disk” on page 22
- ◆ “Configuring Novell Cluster Services” on page 22
- ◆ “Creating a New Partition on the Shared Device” on page 23
- ◆ “Configure a Cluster Volume to Host Printing” on page 30
- ◆ “Starting iPrint Cluster Resource” on page 31
- ◆ “Creating and Configuring a Driver Store and Print Manager” on page 31
- ◆ “Changing Start, Failover, and Failback Modes for Printing” on page 32
- ◆ “Using iPrint in a Clustered Environment” on page 33
- ◆ “Troubleshooting iPrint in a Cluster” on page 33

### Understanding the Benefits of High Availability Printing

Running iPrint on a cluster provides the following benefits:

- ◆ Centralized management
  - ◆ By configuring the Print Management Database to reside on a shared disk cluster volume, you no longer need to replicate information to achieve high availability.
  - ◆ The cluster console GUI lets you monitor and control the location of cluster volumes with the Driver Store and Print Manager services using them from a single management workstation.
  - ◆ Because cluster volumes are tightly consistent and highly available, distributed print management tasks are simplified.
- ◆ Automatic restart of print services
  - ◆ If a server fails, the cluster volume containing the Print Management Database and spool area automatically remounts on a surviving server in the cluster. The Driver Store and Print Manager also automatically restart without user intervention.
  - ◆ On restart, the Driver Store and Print Manager discover the Print Management Database on a cluster volume mounted on their server. Because the cluster volume is the same regardless of which server it is mounted on, no print-related information is lost or out of date.

# OES Installation Options

When you install OES, you should select the iPrint and Novell Cluster Services, and NSS options. During the OES configuration part of the install, you must configure Novell Cluster Services by confirming the Admin user's username and password. On the next screen you must select Configure Later.

## Configuring a Shared Disk

After you have installed Novell Cluster Services, you can begin configuring the shared storage device for the cluster as specified by the shared storage device's documentation or in [“Creating Shared Disk Partitions and Pools”](#) in the *OES Novell Cluster Services 1.8.1 Administration Guide for Linux*.

If YAST appears with a new disk found message during the configuration of a iSCSI or a Storage Area Network (SAN), close the dialog. You do not want to create a file system at this point.

**SAN:** Is a high-speed subnetwork of shared storage devices used for storing data. For information on configuring a SAN, consult the SAN vendor's documentation.

**iSCSI:** Uses SCSI block storage protocols networked over a high-speed TCP/IP network to create a low-cost Storage Area Network (SAN) using commodity high-speed Ethernet hardware. is available from Novell as well as third-party vendors.

- ◆ **iSCSI for NetWare** lets you configure a NetWare server to serve as an iSCSI target. This requires you to install an iSCSI driver that acts as an iSCSI protocol initiator. For more information on iSCSI for NetWare, see [iSCSI 1.1.3 Administration Guide for NetWare 6.5](#). For information on the using an iSCSI initiator on Linux, see [“Accessing iSCSI Targets on NetWare Servers from Linux Initiators”](#) in the *iSCSI 1.1.3 Administration Guide for NetWare 6.5*.

**IMPORTANT:** Configure the iSCSI drives to load when the servers starts by entering `chkconfig iscsi on` at a terminal prompt.

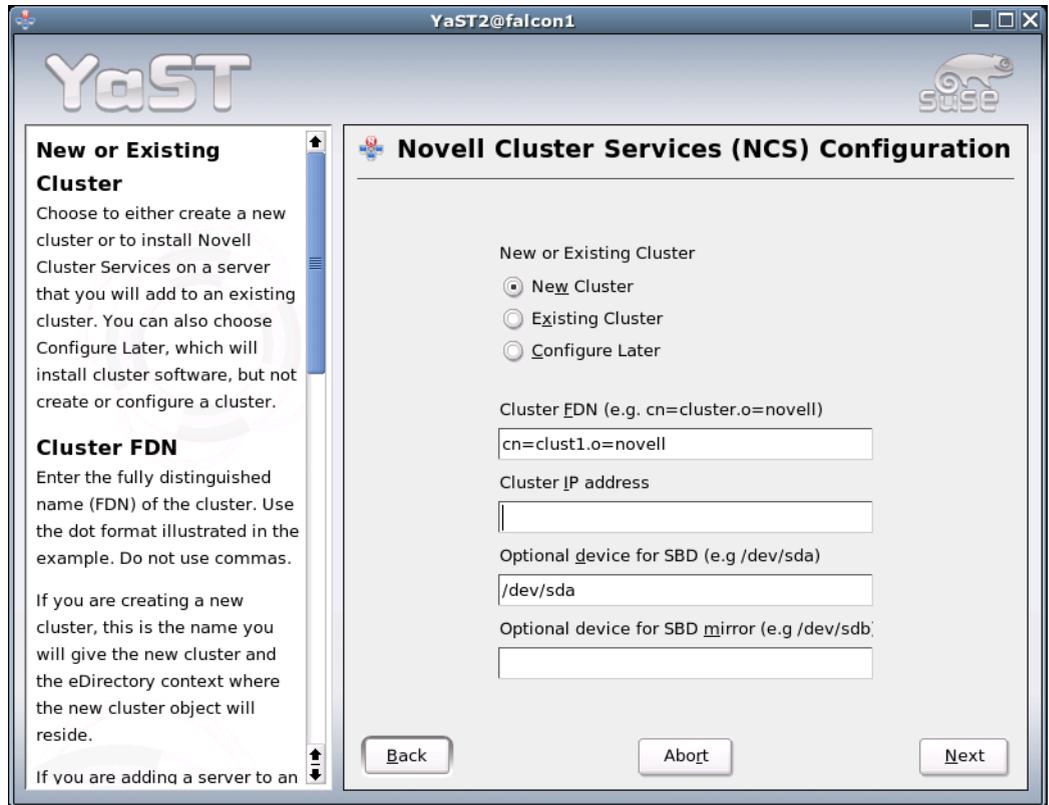
- ◆ **Third-party** vendors have their own iSCSI solutions. Refer to the vendor's documentation.

**NSS Pools:** iPrint is not supported on NSS Pools. You must choose a different type of shared disk.

**Traditional File System:** To cluster enable Linux file system partitions, see [“Cluster Enabling Linux Traditional File System Shared Disk Partitions”](#) in the *OES Novell Cluster Services 1.8.1 Administration Guide for Linux*.

## Configuring Novell Cluster Services

- 1** In Yast got to System, and select Cluster Services (NCS).  
Only click once as this might take a moment to initialize.
- 2** Follow the prompts to configure the service and create an NCS Cluster object.



To create the object you need an IP address for the cluster resource and the device path for an SBD partition that was defined when you configured the shared disk array.

You can look in `/dev/disk/by-id/` for this information

**3** Click Next

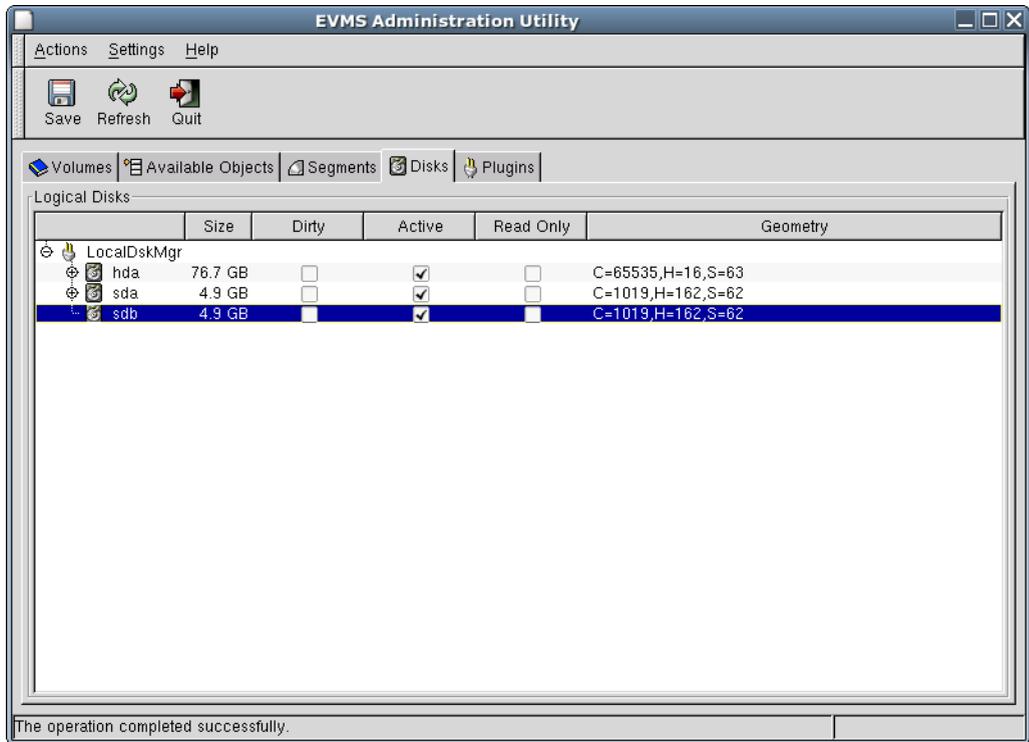
**4** Choose the IP Address for the cluster, and then next.

The cluster object is created and started.

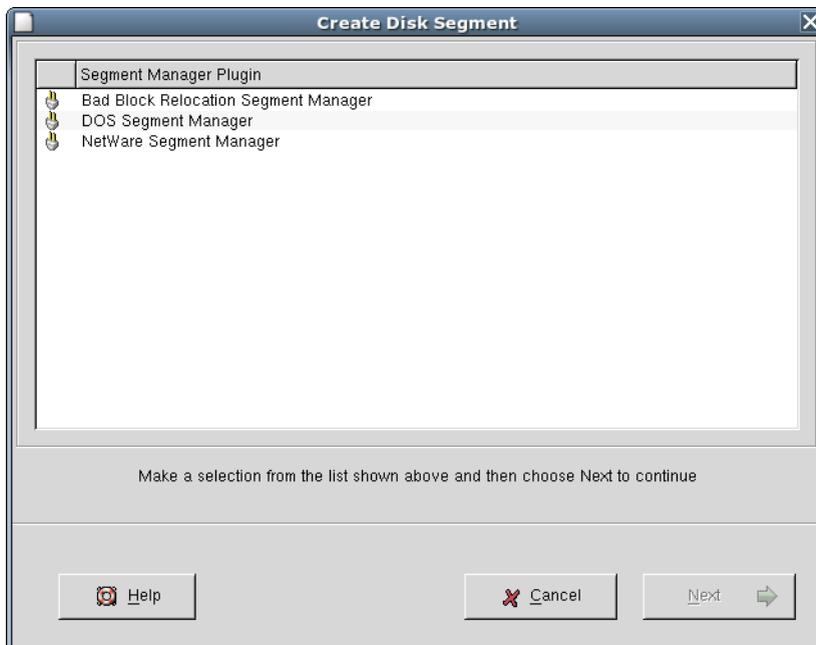
**NOTE:** The Admin user must be a LUM enabled user in order to manage Clustering and NSS from iManager. In some post installs of Clustering and NSS, the Admin user might not be automatically LUM enabled, and you might be required to manually LUM enable the Admin user.

## Creating a New Partition on the Shared Device

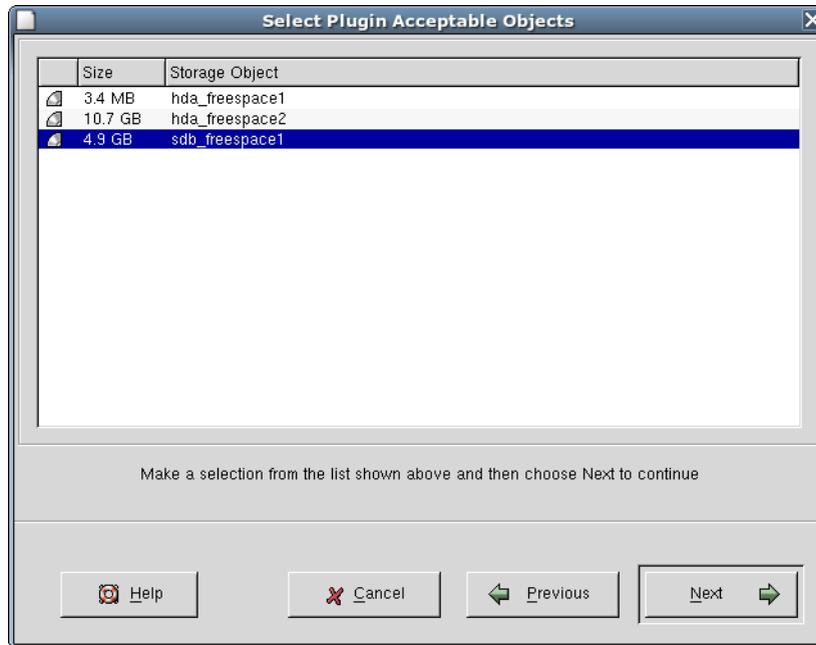
**1** From a terminal prompt, enter `evmsgui` to start the EVMS Administration Utility, and then select the Disks tab.



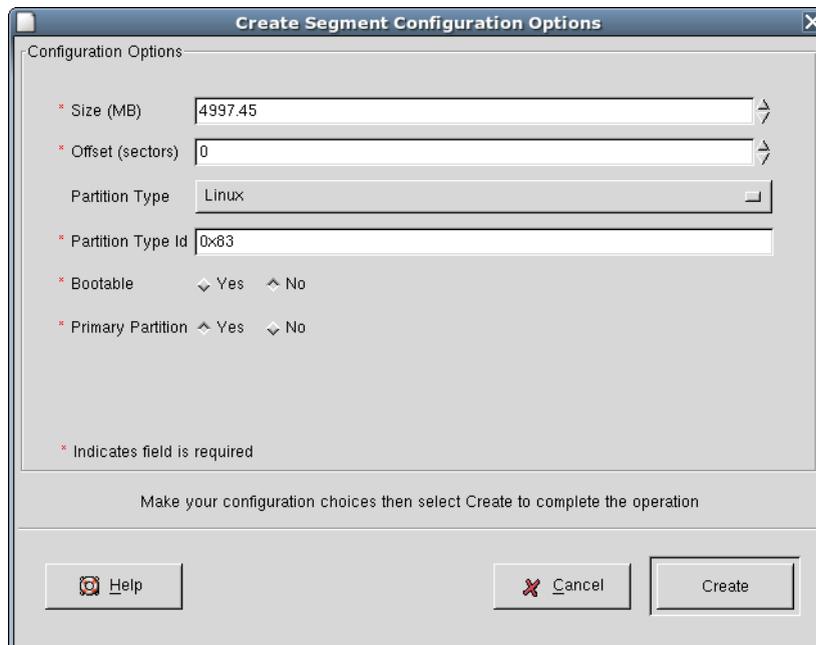
- 2** Expand the device for the shared disk, and then select the Free Space object for the device.
- 3** From the menu, click Actions > Create > Segment.
- 4** Click Create Segment > DOS Segment Manager from the Segment Manager Plugin list, and then click Next.



- 5** Select the storage object, and click Next.



**6** Enter the information for the segment, and then click Create.



**Size:** Enter the size in MB for this segment.

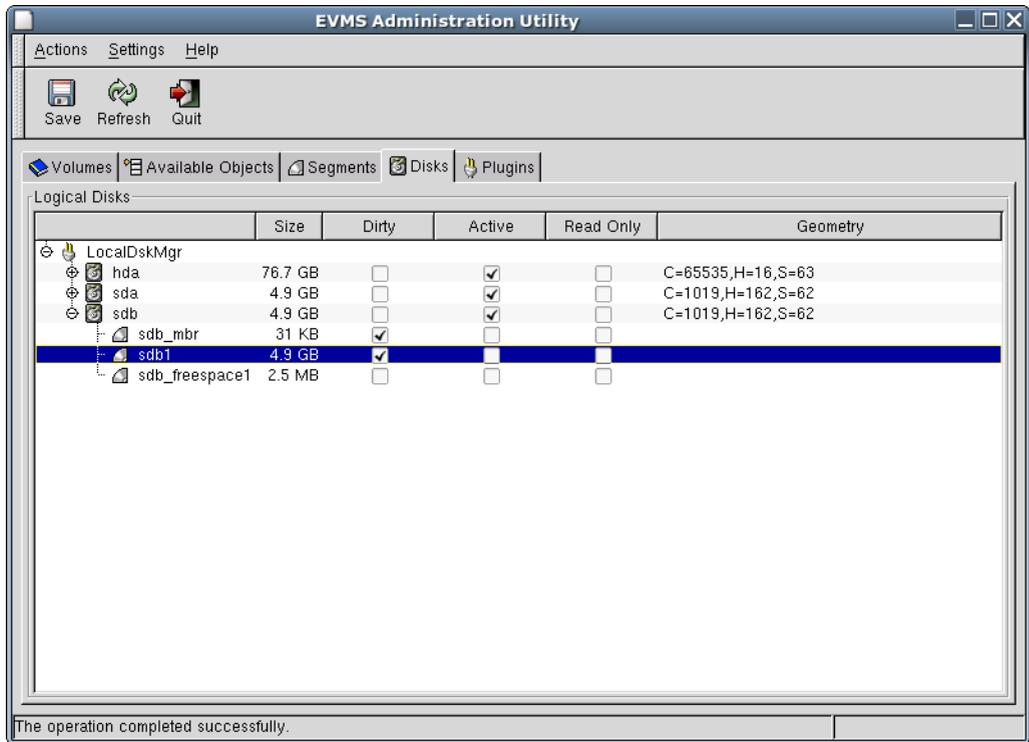
**Offset:** Use the default offset.

**Partition Type:** Select Linux as the partition type.

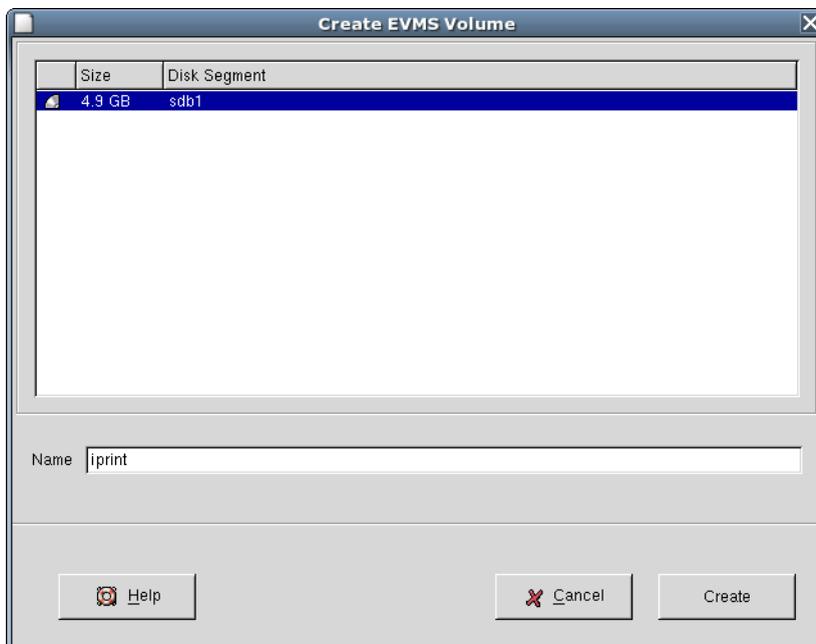
Use the default values for the remaining settings.

**7** Click OK in the confirmation dialog to return to the EVMS Administration Utility screen.

**8** Create an EVMS volume on the new segment by selecting the newly created segment.

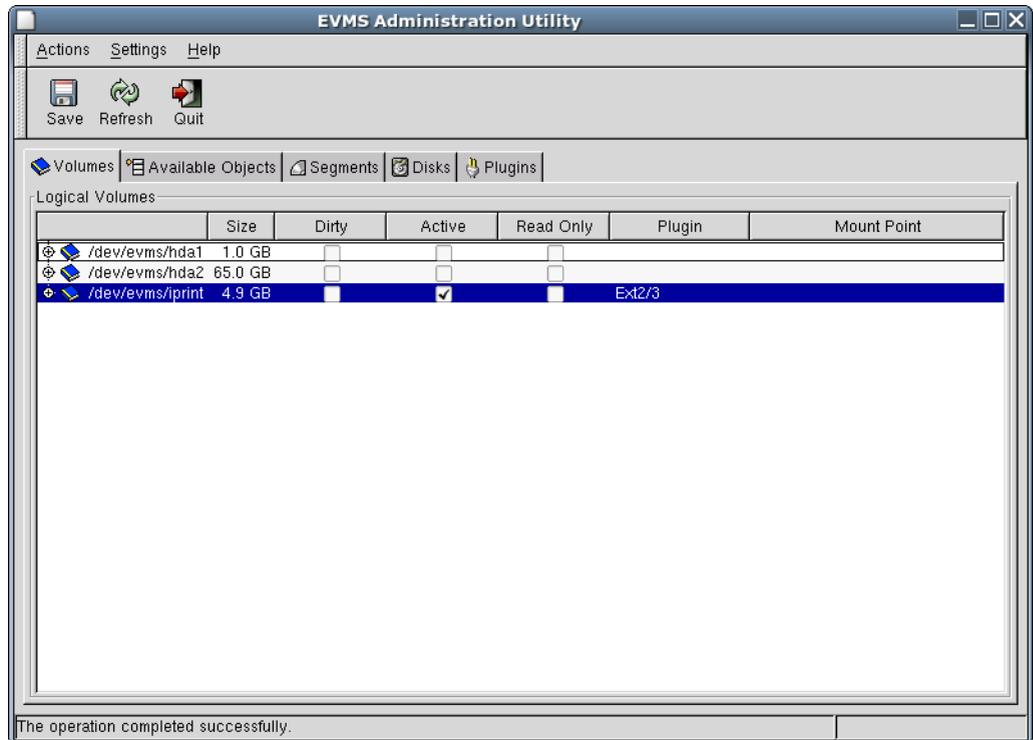


- 9** From the menu, click Actions > Create > EVMS Volume.
- 10** Select the disk segment and enter a name for the new volume, then click Create.



Use “iprint” for the volume name unless this name is already in use. Remember the name used because it will be referenced later in the cluster load and unload scripts.

- 11** Click OK in the confirmation dialog to return to the EVMS Administration Utility screen.
- 12** From the EVMS Administration Utility screen, click the Volumes tab.

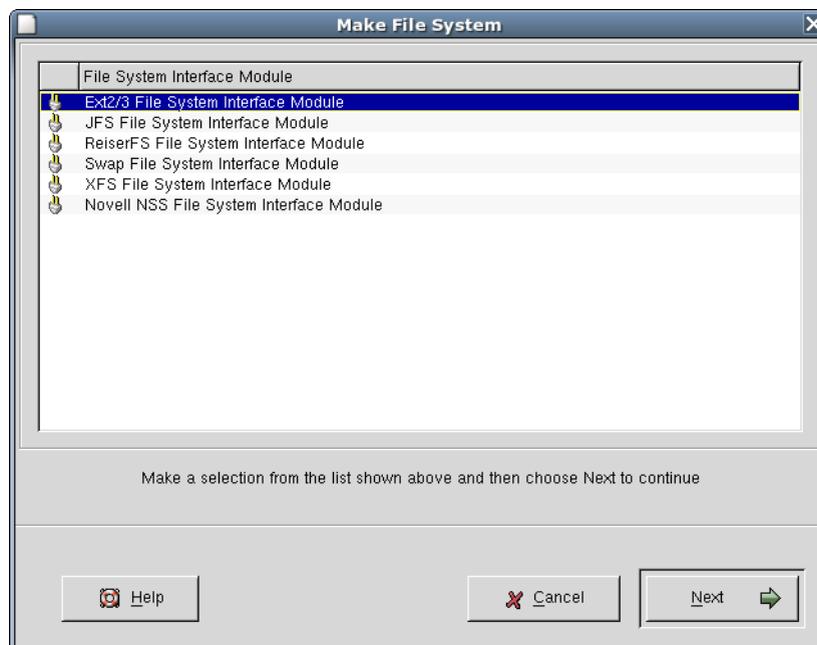


**13** Select the newly created volume.

This is the volume name that you specified in [Step 10 on page 26](#) such as iprint.

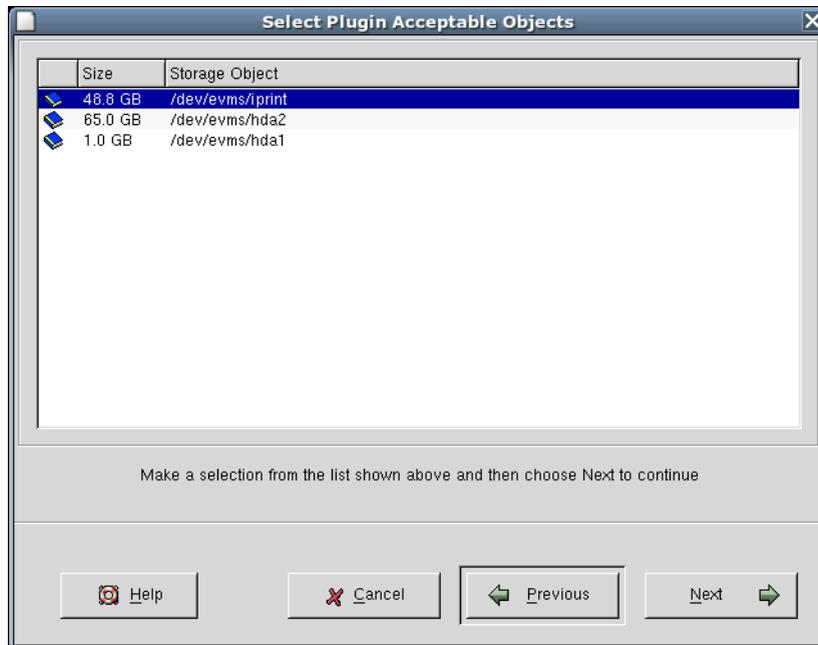
**14** From the menu, click Actions > File System > Make.

**15** Select the File System Type for this volume, and then click Next.

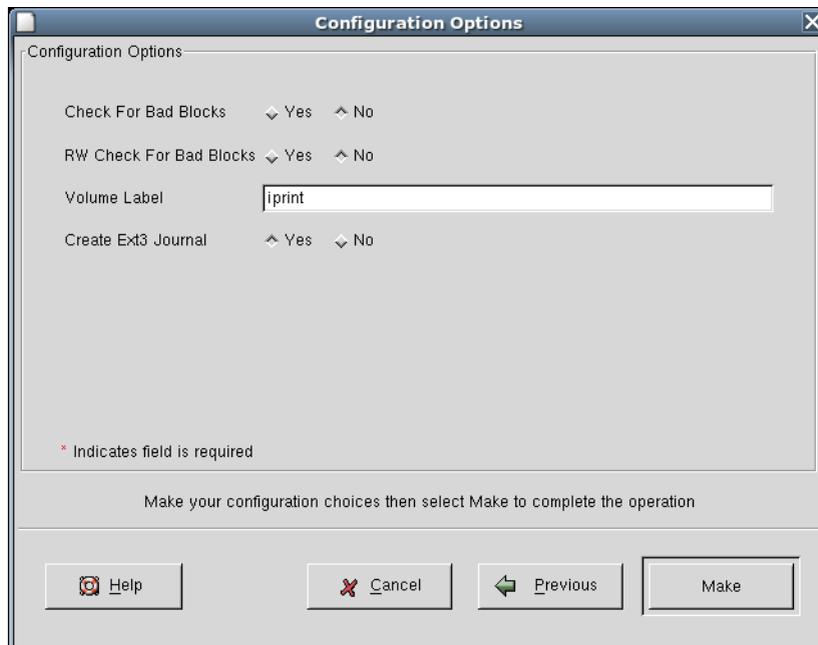


EXT2/3 is recommended for an iPrint cluster resource. iPrint requires a native Linux file system. Do not choose Novell NSS.

**16** Select the Storage Object you created, then click Next.



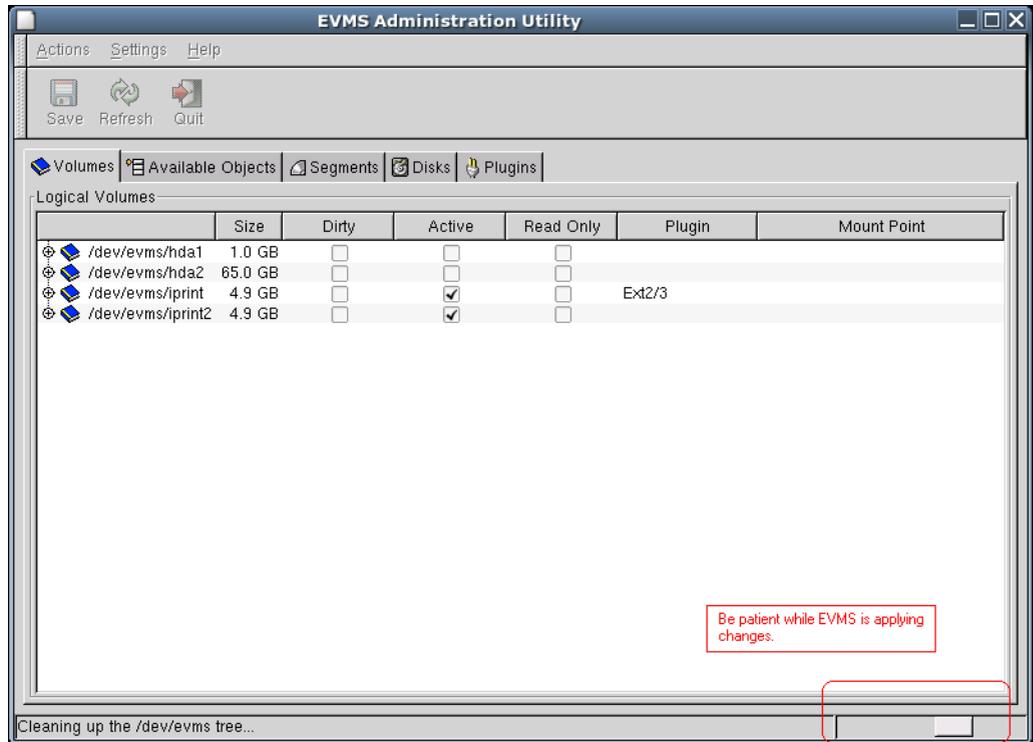
**17** Enter the Volume Label and accept the defaults for the other entries, and then click Make.



**18** Click OK in the confirmation dialog to return to the EVMS Administration Utility screen.

**19** Click Save on the button bar and click save for in the confirmation dialog.

This process might take a while. See the status bar in the bottom right-hand corner.



**20** Exit EVMSGUI.

**21** Click Save, and then OK.

**WARNING:** Do not mount the file system from EVMSGUI. The file system needs to be mounted by the cluster resource load script. Also, entries should not be found in `/etc/fstab` file for the operating system to automatically mount this file system.

You have completed the partition and file system management tasks for setting up an iPrint cluster resource on a Linux server. You now need to **“Configure a Cluster Volume to Host Printing” on page 30.**

# Configure a Cluster Volume to Host Printing

- 1** From iManager, click Clusters > Cluster Options.
- 2** Select the Cluster Object created during the “Configuring Novell Cluster Services” on page 22.
- 3** Under the Cluster Objects heading, click New.
- 4** Select Resource, and then click Next.
- 5** Enter a name in the Cluster Resource Name.
- 6** Browse to and open the Cluster object you created, and select the iPrint\_Template.
- 7** Select Define Additional Properties check box, and then click Next.
- 8** Edit the load.
  - 8a** If a different mount point for the shared disk other than `/mnt/iprint` is desired, specify the mount point by changing `/mnt/iprint`. This same mount point must be specified in the unload script.

```
IPRINT_ROOT=/mnt/iprint
```

**NOTE:** You do not need to create the mount point directories because this is done automatically.

- 8b** If a file system other than `reiserfs` or if an EVMS volume names other an `iprint` was used, specify the file system type by replacing `reiserfs` with what was specified in EVMS such as `ext3` and replacing `iprint` with the EVMS volume name you created.

```
exit_on_error mount -t reiserfs /dev/evms/iprint "$IPRINT_ROOT"
```

- 8c** Edit the line below by replacing `a.b.c.d` with the secondary IP address.

```
exit_on_error add_secondary_ipaddress a.b.c.d
```

- 9** Change the Timeout value to 3 minutes, and then click Next.
- 10** Edit unload scripts.
  - 10a** Edit the line below by replacing `a.b.c.d` with the same IP address specified in the load script.
- 10b** Edit the line below by replacing `/mnt/iprint` with the same mount point specified in the load script.

```
ignore_error del_secondary_ipaddress a.b.c.d
```

```
exit_on_error umount /mnt/iprint
```

- 11** Change the Timeout value to 3 minutes, and then click Next.
- 12** Enable the Ignore Quorum by selecting the checkbox on the Resource Policies page, and then click Next.
- 13** View the current Preferred Nodes assignments, and if necessary, click the right or left arrow button to assign or unassign servers to the print volume resource.

You can click the up or down arrow button to change the failover order of the servers assigned to the print volume.

If you add a node later to the cluster, it might be added to the Assigned Nodes List. For this reason you should check this list after adding nodes to ensure iPrint failover to the desired nodes.

- 14 Click Finish.

## Starting iPrint Cluster Resource

- 1 In iManager, click Cluster > Cluster Manager.
- 2 Browse to and select the print Cluster object.
- 3 Under the Cluster State heading, select the cluster resource you created for print.
- 4 Click Online to load the iPrint cluster resource.

If the resource does not load, check to ensure that the shared disk is running and that the load script contains the correct entries.

Now you are ready to begin [Creating and Configuring a Driver Store and Print Manager](#).

## Creating and Configuring a Driver Store and Print Manager

Before running iPrint in a cluster environment, you must create a Driver Store and Print Manager on the cluster-enabled volume. You should dedicate a volume for printing.

To create a Driver Store and Print Manager, use iManager.

To create a Driver Store using iManager:

- 1 From iManager, click iPrint > Create Driver Store.
- 2 Fill in the fields.

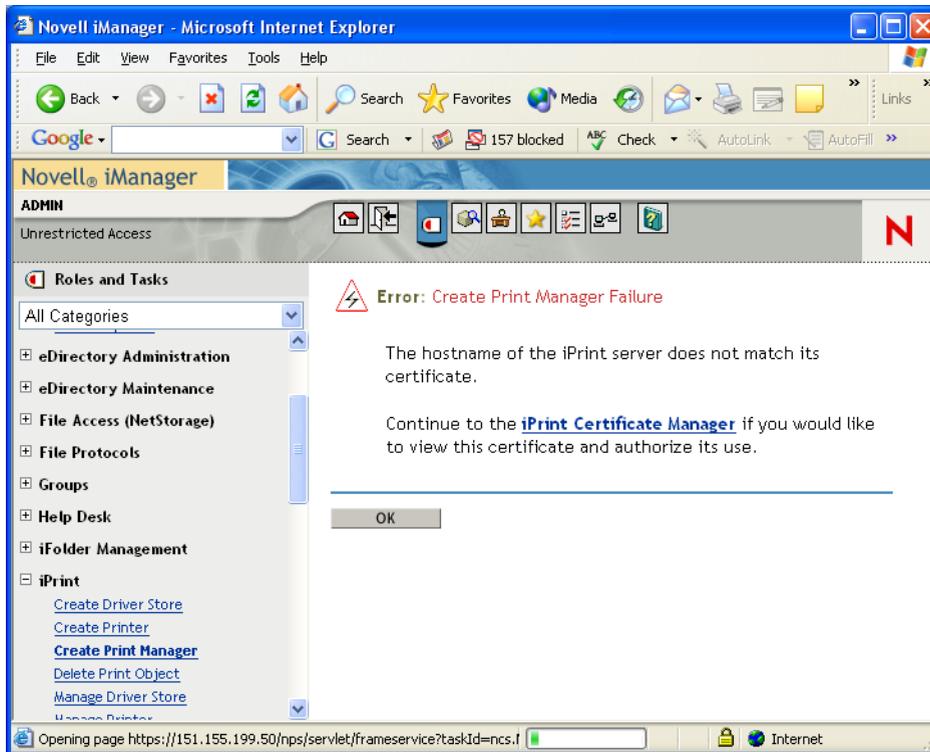
For more information, see [“Creating a Driver Store”](#) in the *OES iPrint Administration Guide for Linux*.

To create a Print Manager:

- 1 From iManager, click iPrint > Create Print Manager.
- 2 Fill in the fields.

For the iPrint service you should use a DNS name that resolves to the secondary IP address used in the cluster load script.

- 3 When you create the Print Manager for the first time, you receive an error about trusting a certificate. You need to click on the iPrint Certificate Manager link and accept the certificate, then attempt to create the Print Manager again.



For more information, see “[Creating a Print Manager](#)” in the *OES iPrint Administration Guide for Linux*.

**IMPORTANT:** While you can have more than one Print Manager running in a cluster, only one Print Manager can run on a cluster resource node. For example, if you have a four node cluster with serverA, serverB, serverC, and serverD, you can have two print managers: one running on serverA and one on serverB and then assign them to failover to different servers: serverC and serverD. If you assign the print managers to failover to the same cluster resource node, the Print Managers will collide and not failover.

Now you can add printer drivers to the Driver Store and begin creating printers. For more information, see “[Adding Printer Drivers](#)” and “[Creating a Printer](#)” in the *OES iPrint Administration Guide for Linux*.

## Changing Start, Failover, and Failback Modes for Printing

Novell Cluster Services by default sets the print cluster volume Start Mode and Failover Mode to Auto, and the Failback Mode to Disable. If the print volume Start Mode is set to Auto, iPrint automatically starts on a server when the cluster is first brought up. If the print volume Start Mode is set to Manual, you must manually start print on a server when you want, instead of having it automatically start when servers in the cluster are brought up.

If the print volume Failover Mode is set to Auto, iPrint automatically starts on the next server in the Assigned Nodes list in the event of a hardware or software failure. If the print volume Failover Mode is set to Manual, you can intervene after a failure occurs and before iPrint is moved to another node.

If the print volume Failback Mode is set to Disable, iPrint will not fail back to its most preferred node when the most preferred node rejoins the cluster. If the print volume Failback Mode is set to Auto, iPrint will automatically fail back to its most preferred node when the most preferred node rejoins the cluster. Generally, you want a failback to a preferred node to occur after business hours. You can set the print volume Failback Mode to Manual to prevent iPrint from moving back

to its preferred node when that node is brought back online, until you are ready to allow it to happen.

**IMPORTANT:** We recommend you use the default settings for Start, Failover and Failback modes.

To view or change the print volume Start, Failover, and Failback modes:

- 1 In iManager, click Clusters > Cluster Options the print volume resource object and select Properties.
- 2 Browse to and select the Cluster you want to manage.
- 3 Select the check box of the Print Cluster object you want to modify, and then click the Properties link under Cluster Objects heading.

The Failover and Failback modes are displayed.

## Using iPrint in a Clustered Environment

If you are using the default iPrint Web pages or are embedding URLs in custom iPrint Web pages, you need to be aware of the following:

- ◆ Links to the default iPrint Printer List Web page or other custom pages in \ippdocs should use the DNS name or IP address of the print service. This is the IP Address used in the cluster load script for iPrint. This address moves with the shared volume to other servers in the cluster during a failover.

If you use the server's DNS Name or IP Address or any other IP Address other than the one assigned to the iPrint Resource, links to iPrint Web pages will be broken when iPrint fails over to a different node in the cluster. In this case iPrint links will display a blank page or return an error.

## Troubleshooting iPrint in a Cluster

Use the following sections to troubleshoot common issues when clustering iPrint:

- ◆ [“Error Code 506D0203” on page 33](#)
- ◆ [“Resource Goes Comatose on Failover” on page 33](#)
- ◆ [“iPrint Web Pages Are Displayed on One Node Only” on page 34](#)

### Error Code 506D0203

If you receive error 506D0203 and the Print Manager fails to load, ensure you are loading print on a native Linux file system such as ext3. iPrint cannot run on an NSS file system

### Resource Goes Comatose on Failover

If a resource goes comatose after a failover, check the nodes in the cluster to see if the shared disk for iPrint is already mounted. If it is mounted, manually unmount the volume using the following command:

```
umount iPrint_mount_point
```

If a message you see a “File system is in use” error, then a user has a terminal open to that file system. You need to have the user, usually an administrator, exit the file system, and then unmount the file system before the cluster resource can come online.

## **iPrint Web Pages Are Displayed on One Node Only**

Ensure the Print Manager is using the secondary IP address for the iPrint resources in `/etc/opt/novell/iprint/ipsmd.conf`. If the Print Manager was created using the node IP address, then iPrint works only on that node.

# 4

## Configuring Samba with Novell Cluster Services

### Benefits of Configuring Samba for High Availability

Samba is a suite of tools that let you use the Microsoft\* SMB/CIFS networking protocol with Linux computers and other platforms. With Samba installed on a Linux server, client computers can access and use files on the Linux server and shared storage devices connected to the Linux server. If for some reason the Novell® OES Linux server running Samba is not accessible, clients lose their ability to access network files. Configuring Samba with Novell Cluster Services™ ensures that Samba is highly available and network files are accessible. This is possible because the Samba server is automatically started, stopped, and restarted on different servers in the cluster by Novell Cluster Services.

### Samba Installation and Configuration

Novell Cluster Services (NCS) 1.8 must be installed before configuring Samba to work in a cluster. NCS 1.8 provides a Samba resource template, which facilitates configuring Samba in a cluster environment. Novell OES includes NCS 1.8 and licenses for two cluster nodes.

Before running Samba with Novell Cluster Services, Samba must be installed on every server that will run it. To do this, install the Samba server package that ships with Novell OES Linux. This includes the SMB/CIFS file server. You can also install any other desired Samba components. This server package can be installed when you install your OES server or afterward. You can install the server package after the OES installation using either YaST or Linux commands. More information on Samba configuration is available in the `/usr/share/doc/packages/samba` directory.

### Configuring Samba on the Shared Disk

To configure Samba to use shared storage, you need to create a shared directory (file system or disk) on the shared disk system and create mount points to that shared file system on each cluster server that will run Samba.

- 1** Create a file system on the shared disk system using EVMS.

Enter `evmsgui` at the Linux server to start the EVMSGUI utility.

Click Help and use the Web links provided for documentation and information on using EVMS to configure and manage storage.

- 2** On each cluster node that will run Samba, create the mount point.

For example, the mount point could be `/mnt/samba`.

- 3** Log in as the root user and mount the shared disk (file system) that was created in [Step 1](#).

For example, depending on the mount point and directory names, you could enter a command similar to the following to mount the shared disk:

```
mount /dev/evms/samba /mnt/samba
```

- 4 At the root of the shared disk you just created (/mnt/samba), enter the following command to create the directories specified:

```
mkdir -p etc/samba
```

These directories must be owned by the root user, and the default group must be root. Also, the directories must have permissions of drwxr-xr-x.

## Configuring the smb.conf File

- 1 Copy the smb.conf file from the /etc/samba directory on one of the OES Linux cluster servers to the etc/samba directory you created on the shared disk in [Step 4 on page 10](#).

This would be the /mnt/samba/etc/samba directory if you used the same directory names as those given in the example above.

- 2 Rename the smb.conf file to include the name you will give the Samba cluster resource.

For example, if the name you will give the Samba cluster resource is samba\_resource, you should name the file samba\_resource\_smb.conf.

- 3 Configure the Samba daemon by modifying the .conf that you copied in [Step 1](#) and renamed in [Step 2](#).

- 3a Add the following lines to the [global] section in the .conf file.

```
bind interfaces only = yes  
  
interfaces = resource_ipaddress  
  
pid directory = $SANBA_ROOT/share/locks
```

Replace *resource\_ipaddress* with the IP address you plan to assign to the Samba cluster resource.

- 3b In the line *netbios name = %h-W*, change *%h-W* to something unique, such as the name you will give the Samba virtual server.
- 4 (Conditional) You probably have other instances of Samba running on servers in your cluster. If this is true, edit the smb.conf file on each server where another Samba instance is running and add the following lines to the [global] section:

```
bind interfaces only = yes  
  
interfaces = server_ipaddress
```

Replace *server\_ipaddress* with the IP address of the server where the instance of Samba is running.

Adding these lines to the smb.conf file eliminates conflicts caused by running multiple instances of Samba.

# Novell Cluster Services Configuration and Setup

After Samba is properly installed and configured, you must create and configure a Samba cluster resource in Novell Cluster Services. This includes configuring Samba load and unload scripts; setting Samba start, failover, and fallback modes; and assigning the Samba resource to specific servers in your cluster.

## Creating a Samba Cluster Resource

Novell Cluster Services includes a Samba resource template, which greatly simplifies the process for creating a Samba cluster resource. Much of the Samba cluster resource configuration is performed automatically by the Samba resource template. See [“Creating Cluster Resources”](#) in the *OES Novell Cluster Services 1.8.1 Administration Guide for Linux* for more information.

To create a Samba cluster resource:

- 1 Ensure the shared disk (file system) you created and mounted in [Step 2 on page 9](#) is unmounted.

If you used the directory names specified in the example, you can enter `umount /mnt/samba` to unmount the shared disk.

- 2 Open your Internet browser and enter the URL for iManager.

The URL is `http://server_ip_address/nps/manager.html`. Replace *server\_ip\_address* with the IP address or DNS name of a server in the cluster or with the IP address for Apache-based services.

- 3 Enter your username and password.

- 4 In the left column, locate Clusters and then click Cluster Options.

iManager displays three links under Clusters that you can use to configure and manage your cluster.

- 5 Specify the cluster name, or browse and select it, then click New.

- 6 Specify Resource as the resource type you want to create by clicking the Resource radio button, then click Next.

- 7 Specify a name for the Samba resource.

- 8 Type the Samba template name in the Inherit From Template field, or browse and select it from the list.

- 9 Check the Define Additional Properties check box, click Next, and then continue with [“Configuring Samba Load and Unload Scripts” on page 37](#).

The Samba resource template configures the Samba resource by automatically creating Samba load and unload scripts, setting failover and fallback modes, and assigning Samba as a resource to all nodes in the cluster.

## Configuring Samba Load and Unload Scripts

### Load Script Configuration

The Samba load script page should already be displayed. The load script contains commands to start the Samba service. You must customize some commands for your specific Samba configuration.

The load script appears similar to the following example:

```
#!/bin/bash
. /opt/novell/ncs/lib/ncsfncs
# define the mount point for the samba partition.
SAMBA_ROOT=/mnt/samba
# mount the file system
exit_on_error mount -t reiserfs /dev/evms/vol $SAMBA_ROOT
# add the IP address
exit_on_error add_secondary_ipaddress a.b.c.d
# start Samba
exit_on_error /usr/sbin/nmbd --log-basename=$SAMBA_ROOT/share/log --
configfile=$SAMBA_ROOT/share/lib/smb.conf
exit_on_error /usr/sbin/smbd --log-basename=$SAMBA_ROOT/share/log --
configfile=$SAMBA_ROOT/share/lib/smb.conf
# return status
exit 0
```

To customize the Samba load script for your specific configuration:

- 1 View and, if necessary, edit the following lines for your specific directory structure, mount point, and file system:

```
SAMBA_ROOT=/mnt/samba
exit_on_error mount -t reiserfs /dev/evms/vol $SAMBA_ROOT
```

- 2 Add the following line below the line to mount the file system:

```
ResourceName=samba_resource_smb.conf
```

Replace *samba\_resource\_smb.conf* with the name you gave the *smb.conf* file in [Step 2 on page 36](#).

- 3 Edit the following line to assign a unique IP address to the Samba cluster resource:

```
exit_on_error add_secondary_ipaddress a.b.c.d
```

Replace *a.b.c.d* with the IP address you want to assign to the Samba cluster resource.

The IP address for the Samba cluster resource allows clients to reconnect to that address regardless of which server is hosting it.

- 4 Add `$ResourceName` to the following lines:

```
exit_on_error /usr/sbin/nmbd --log-basename=$SAMBA_ROOT/share/log --
configfile=$SAMBA_ROOT/share/lib/smb.conf
exit_on_error /usr/sbin/smbd --log-basename=$SAMBA_ROOT/share/log --
configfile=$SAMBA_ROOT/share/lib/smb.conf
```

The lines should now appear as follows:

```
exit_on_error /usr/sbin/nmbd --log-basename=$SAMBA_ROOT/share/log --
configfile=$SAMBA_ROOT/share/lib/$ResourceName
exit_on_error /usr/sbin/smbd --log-basename=$SAMBA_ROOT/share/log --
configfile=$SAMBA_ROOT/share/lib/$ResourceName
```

- 5 Click Next and continue with the unload script configuration.

## Unload Script Configuration

The Samba unload script page should now be displayed. The unload script contains commands to stop Samba. You must customize some commands for your specific Samba configuration.

The unload script appears similar to the following example:

```
#!/bin/bash
. /opt/novell/ncs/lib/ncsfuncs
# define the mount point for the samba partition.
SAMBA_ROOT=/mnt/samba
# request Samba stop
ignore_error killproc -p $SAMBA_ROOT/share/locks/nmbd-smb.conf.pid /usr/
sbin/nmbd
ignore_error killproc -p $SAMBA_ROOT/share/locks/smbd-smb.conf.pid /usr/
sbin/smbd
# stop Samba otherwise
sleep 8
ignore_error fuser -k $SAMBA_ROOT
# del the IP address
ignore_error del_secondary_ipaddress a.b.c.d
# umount the file system
exit_on_error umount $SAMBA_ROOT
# return status
exit 0
```

**1** View and, if necessary, edit the mount points in the applicable lines of the unload script.

**2** Add the following line below the line where the mount point is defined:

```
ResourceName=samba_resource_smb.conf
```

Replace *samba\_resource\_smb.conf* with the name you gave the smb.conf file in [Step 2 on page 36](#).

**3** Replace a.b.c.d with the same IP address you specified in the load script.

**4** Add \$ResourceName to the following lines:

```
ignore_error killproc -p $SAMBA_ROOT/share/locks/nmbd-smb.conf.pid /
usr/sbin/nmbd
ignore_error killproc -p $SAMBA_ROOT/share/locks/smbd-smb.conf.pid /
usr/sbin/smbd
```

The lines should now appear as follows:

```
ignore_error killproc -p $SAMBA_ROOT/share/locks/nmbd-
$ResourceName.pid /usr/sbin/nmbd
ignore_error killproc -p $SAMBA_ROOT/share/locks/smbd-
$ResourceName.pid /usr/sbin/smbd
```

**5** Click Next and continue with [“Setting Samba Start, Failover, and Failback Modes” on page 40](#).

## Setting Samba Start, Failover, and Failback Modes

The page to set Start, Failover, and Failback modes should now be displayed.

The Samba resource template sets the Samba resource Start mode and Failover mode to Auto and the Failback Mode to Disable.

If the Samba resource Start mode is set to Auto, the Samba server automatically loads on a designated server when the cluster is first brought up. If the Samba Start mode is set to Manual, you can manually start Samba on a specific server when you want, instead of having it automatically start when servers in the cluster are brought up.

If the Samba Failover mode is set to Auto, the Samba server automatically moves to the next server in the Assigned Nodes list in the event of a hardware or software failure. If the Samba Failover mode is set to Manual, you can intervene after a failure occurs and before the Samba server is started on another node.

If the Samba Failback mode is set to Disable, the Samba server will continue running on the node it has failed to. If the Samba Failback Mode is set to Auto, the Samba server automatically moves back to its preferred node when the preferred node is brought back online. Set the Samba Failback mode to Manual to prevent the Samba server from moving back to its preferred node when that node is brought back online, until you are ready to allow it to happen.

View or change the Samba resource Start, Failover, and Failback modes, then click Next and continue with [“View or Edit Samba Resource Server Assignments”](#) on page 40.

## View or Edit Samba Resource Server Assignments

The page to view or change Samba resource server assignments should now be displayed. The Samba resource template automatically assigns the Samba resource to all nodes in the cluster. The order of assignment is the order the nodes appear in the resource list.

To view or edit Samba resource node assignments or change the server failover order:

- 1** From the list of unassigned nodes, select the server you want the resource assigned to, then click the Right-arrow button to move the selected server to the Assigned Nodes list.  
Repeat this step for all servers you want assigned to the resource. You can also use the Left-arrow button to unassign servers from the resource.
- 2** Click the Up-arrow and Down-arrow buttons to change the failover order of the servers assigned to the resource or volume.
- 3** Click Apply or Finish to save node assignment changes.

## Additional Information

For more information on Samba with OES Linux, see [“Samba Support in OES”](#) in the *Novell OES SPI Planning and Implementation Guide*.