

OES 2 Linux Migration Utilities

prepared for

Novell OES 2 Linux Customers

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OES 2 Migration Tools: Migrating NetWare Services to Linux

The information in this guide is a synopsis of information gathered from several sources, primarily the product documentation and early-adopter Novell OES 2 Linux consulting engagements. This guide should be used in conjunction with the [OES 2 Migration Tools Administration Guide](#) and the migration information for each service.

This document is one of a series of three that discuss best practices for migrating from NetWare to OES 2 Linux. See also:

- Migrating from NetWare to OES 2 Linux Best Practice Guide
- OES 2 Consolidation & Migration Best Practice Guide

These additional documents can be accessed from the [NetWare to Linux Migration Sources](#) on the Novell Open Enterprise Server Migration Web site.

OES 2 Linux Migration Tools

With OES 2, the migration tool model has changed. You no longer use the Server Consolidation and Migration Toolkit (SCMT) used with OES1. Instead, SCMT has been replaced with an OES Migration Tool plus individual migration utilities specific to each service. SCMT is still an optional route for some migrations, but we recommend using the OES Migration Tools rather than SCMT wherever possible.

Data. The primary purpose of the OES Migration Tool is to *migrate data* from the NetWare platform to the OES 2 Linux platform. This tool can also be used to migrate data from OES 1.0 Linux servers and from Microsoft* Windows servers. A good place to start is the [OES 2 Migration Tools Administration Guide](#) which provides general information about migrating data. A helpful Migration Command Reference section is included.

Services. The best information about migrating individual services is included in the administration guide for each of the services.

The information in this document includes an overview of data migration, but is primarily a compilation of the migration sections from the product documentation for most OES 2 Linux services. Cross references to complete migration documentation for each service are provided for your convenience. Links to the migration sections of each service guide are also provided on the [OES 2 Documentation Web Site](#).

In many cases, you will first need to install the service on an OES 2 Linux server and then use the specific migration tool to migrate data and configuration information to Linux. Both command line and GUI migration tools are available; however, OES 2 Linux must first be installed to access the GUI tools which are then available via YaST under the Migration and Open Enterprise Server categories.

- The OES Migration Tools are run exclusively on the destination Linux server and pull data from the NetWare source server. A Windows workstation is not required.
- The migration tools are made up of individual commands that work together to perform a full migration when run in the proper order.

eDirectory. A new utility (`migedir`) is available with eDirectory 8.8 but is not integrated with the OES Migration Tools. This tool must be used in stand-alone mode (it is not compatible with other OES Tools). Use it when the **only** thing you want to migrate from NetWare to Linux is eDirectory. Compatibility with other migration tools so you can use them all in concert is scheduled for inclusion in SP1.

Data Migration with OES Migration Tools

OES Migration Tools 1.0 migrate data from NetWare to OES 2 Linux. Two versions are available (command line and YaST):

- **Command line:** `migfiles` and associated command line utilities (`mls`, `maptrustees`, and `migtrustees`)

All migration command line utilities are located in the `/opt/novell/migration/sbin` directory.

- **YaST:** Migrate NetWare Volumes tool

All migration GUI wizards are found in the Migration group of the YaST Control Center. The GUI wizards drive the Linux command line utilities.

For data migrations, the source servers can be running NetWare or Windows. The target volumes on the OES 2 Linux server where you are running the commands can be a Novell Storage Services™ (NSS) volume or a Linux POSIX* file system with or without a Novell Core Protocol™ (NCP) volume created on it.

Data is copied from the source server to the destination server, along with the related users, groups, and trustee rights. The source server remains intact with all of its data (non-destructive migration).

Tables are available in the [OES 2: Migration Tools Administration Guide](#) that list and explain the following:

- File system migration utilities, including a description of what the utility accomplishes
- Supported file system migrations from various source servers (NetWare 6.5, NetWare 5.1, OES 1 Linux)
- Which file systems are supported (NSS to NSS in same or different trees, Traditional to NSS, NSS to NCP volumes).
- Whether SCMT can also be used, and so on.

Note: The OES Migration Tools do not support NetWare to NetWare migrations. You must use SCMT if you want to migrate or consolidate data from NetWare source servers to NetWare destination servers. SCMT 1.2, which supports eDirectory™ 8.8. x, is not yet available.

You can migrate data:

- To a server in the same eDirectory tree
- To a server in a different eDirectory tree (same trustee context)
- To a server in a different eDirectory tree (different trustee context)

Direct Migration of Some File Services Isn't Possible

- Direct migration of CIFS services is not provided in OES. You must carefully plan the manual migration of services prior to installing OES.

For example, if you plan to replace CIFS (Windows) file services on a NetWare server with OES Samba running on OES 2 Linux, you need to plan to have the Samba service in place before shutting down the current CIFS service. For more information on implementing Samba, see the Samba Administration Guide for OES Linux SP2 .

- AFP is under development and expected to be released with OES 2 SP1.

Prerequisites

Prerequisites are the same no matter which toolset (command line or YaST) you use.

NetWare Source Server

1. Update the source sever.

To migrate data on servers running older versions of NetWare (such as NetWare 5.0 or 6.0), you must first upgrade the servers to NetWare 6.5 SP6 and then use the OES 2 Migration Tools to migrate the data (SCMT 1.2 can also be used in this scenario).

2. Ensure that the latest version of Storage Management Services™ (SMS) is running on the source NetWare server.
3. Check name spaces on traditional NetWare volumes.

When migrating data from a Traditional NetWare volume, ensure that all name spaces (DOS, LONG, NFS, and MAC) are loaded on the source NetWare server.

4. Make a backup.

Although data on the source server is not deleted as part of the migration, you should make a current backup of the data as a precaution.

OES1 Linux Source Server

To migrate data on OES 1.0 Linux initial release or SP1 servers, you must

- Update to SP2, apply the latest OES patches (NCP and SMS), and then use the OES Migration Tools 1.0 (either command line or GUI) to migrate data.
- Make sure all source volumes are NSS volumes.

Destination Server

Make sure the OES 2 Linux destination server is installed and running on the network. For instructions, see "Installing Open Enterprise Server 2 (OES 2) Linux" in the [OES 2: Linux Installation Guide](#).

The destination can be NSS volumes, NCP volumes, or POSIX paths.

Note: The migration steps and procedures for migrating file system data from either a NetWare to Linux or Linux to Linux migration are the same. However, the procedures for migrating file system data from NetWare NSS or Traditional volumes varies depending on whether the source and destination servers are in the same eDirectory tree or in different trees. See Section 2.2, "Using the Migration Commands" in the Migration Guide for complete information.

Using Command Line Tools

NSS Destination Volumes

1. Use the Novell Storage Services Management Utility (nssmu) or iManager to create the NSS volumes to which you will be migrating the data. Make sure you allocate enough space for the volume to hold all of the source data.
2. Make sure destination volumes have properties similar to those of the source volumes (compression, user quotas, etc.).

3. Make sure CASA RPMs are installed and that the CASA daemon is started.

See Section "5.1 File System Migration Utilities" in the [OES 2: Migration Tools Administration Guide](#) for a list and description of command line options, or refer to the respective man page for each command, or use the -h option.

NCP Destination Volumes

1. Use the NCP Server Console utility (ncpcon) to create the NCP volumes.
2. Make sure the user performing the migration (usually the eDirectory admin) has read/write access to the POSIX path that corresponds to the NCP volume. One way to ensure this is to make admin the owner of the POSIX directory where the NCP volume is created.
3. Make sure the Novell Cross Platform Libraries are installed and that the `novell-smdrd` daemon is started:

```
novell-xplatlib. version.rpm for 32-bit servers running the i386 Linux kernel
novell-xplatlib-32bit. version.rpm for 64-bit servers running the x86_64
Linux kernel
```

4. Make sure the `novell-smdrd` daemon is restarted once the libraries are installed.

Moving Data from NSS or Traditional NetWare File Systems

The process for moving the data from NSS or Traditional NetWare file systems varies depending on whether you are migrating data to a server in the same or a different eDirectory tree:

- **Migrating data to a server in the same tree**

Run the `migfiles` command to copy the data from the source to the destination server. If you need to modify the home directories of migrated users, you also need to use `mls`, `maptrustees`, and `migtrustees`.

- **Migrating data to a server in a different eDirectory tree**

Run the `migfiles` command to copy the data from the source to the destination server.

Map the trustees (users and groups) and trustee rights from the source tree to corresponding users and groups in the destination tree using the `mls`, `maprights` and `migrights` commands.

In either scenario, refer to Section 2.0, "Migrating Data from NetWare to Linux" in the [OES 2: Migration Tools Administration Guide](#) for examples, command syntax, instructions, limitations, and troubleshooting.

Using the YaST Migrate NetWare Volumes Tool

When you install an OES 2 Linux server, the Migrate NetWare Volumes tool (graphical interface) is automatically installed in YaST.

Once prerequisites have been met (see above), you can access the tool from the graphical desktop at the destination OES 2 Linux server:

```
Computer > YaST Administrator Settings > Migration > Migrate NetWare
Volumes
```

See Section 2.3, "Using the Migrate NetWare Volumes Tool" in the [OES 2: Migration Tools Administration Guide](#) for migration instructions.

Additional Migration Information

[OES 2: Migration Tools Administration Guide](#)

[Novell Open Enterprise Server Migration Web site](#)

Data Migration with Dynamic Storage Technology

Dynamic Storage Technology, and OES 2 feature, can also be used to move data from NetWare to OES 2 Linux.

Valid Source Platforms

The following source platforms are supported:

- NetWare 6.5 SP7
- OES 1 SP3 NetWare
- OES 2 NetWare

Migration Considerations

If you have existing data on a supported source server on direct-attached storage (DAS) and want to move to an OES 2 Linux system, then a shadow can be set up with the NetWare NSS volume as the secondary storage volume. The user is authenticated to the Linux system and sees all of the NetWare based information as if it were on the Linux system.

Dynamic Storage Technology automatically migrates data from the secondary storage volume to the remote, or shadow volume based on policies such as use, last modified date, etc. You can migrate all by forcing demigration, or migrate only selected files.

When using Dynamic Storage Technology in combination with Distributed File Services (DFS) Migration (see page 14), consider the following guidelines:

- If the volume that you want to assign as a secondary volume contains junctions, you must create those junctions on the NSS volume you want to assign as the primary volume, delete the junctions on the secondary, then define the shadow volume.
- Create new DFS junctions only on the primary storage area of a shadow volume defined between two NSS volumes.
- When the junction's target volume is in a shadow relationship, point the junction at the primary volume. Junctions support only NSS volumes or NetWare Core Protocol (NCP) volumes as junction targets.
- When the target volume of an existing junction becomes the secondary volume in a shadow relationship, the junction is broken. You must create a new junction that points to the same location on the primary volume of that shadow relationship, then delete the junction that points to the secondary volume.
- Do not create a shadow relationship for any NSS volume while a DFS Move Volume or Split Volume task is in progress for the volumes involved.

Creating a DST Volume

To create a DST volume, complete the following:

1. From within Novell Remote Manager, select the share for which you want to create a DST volume and click its Info icon.

2. In the `Share Information` dialog, click `Add DST Volume`.
3. In the `Create DST for Volume [share name]` dialog, enter the storage location for the DST volume in the `DST Path` entry field and click `Create`.

Defining DST Policies

To define policies, complete the following:

1. From within `Volume Inventory`, select the desired share.
2. Select `Links to Specific Reports`.
3. Scroll to the bottom of the `Reports` page and select the DST volume options that you want to apply to your policy.
4. Click `Start Scan`.

Once the DST volume has been created and policies assigned, users' inactive files will be automatically relocated—based on actual use—to the appropriate storage locations, enabling you to better optimize storage resources.

Additional Information

For complete information on using DST as a data migration tool, see Section 3.0, "Migrating Data from NetWare to OES 2 Linux with Dynamic Storage Technology" in the [OES 2: Novell Dynamic Storage Technology Administration Guide](#).

If you are not yet familiar with DST, we recommend reading an article written by Ken Baker and published in the [Novell Connections Magazine](#) as an excellent source for information: [Dynamic Storage Technology](#).

eDirectory Migration

eDirectory migration from NetWare requires both the migration of eDirectory data and the server identity to provide seamless accessibility after migration.

OES 2 (with eDirectory 8.8) includes a migration tool, `migedir`, that works well if you intend to migrate **only** eDirectory. The eDirectory migration utility handles the scenario where the entire server identity is migrated to the target server. This means that eDirectory does not exist any longer on the source and hence other OES Migration Tools will not work against this NetWare server. The eDirectory migration utility performs many pre-migration tasks, health validations, server backups, server migration, and post-migration tasks for you. All eDirectory objects, including user objects, are moved..

If you intend to migrate other services from NetWare to OES 2 Linux, the `migdir` utility can't be used and migrating eDirectory is still a mostly manual process that takes advantage of replicas.

In this scenario, you copy the existing eDirectory information from a NetWare server to a new OES 2 Linux server, without the Linux server assuming the NetWare server's identity. You can then migrate objects to a new OES Linux branch and then gradually retire the older NetWare branch. Once you've added a branch, it's easy to drag and drop users and login scripts, certificates, and PKI so they don't have to be recreated. .

This discussion introduces both migration alternatives as well as essential information about migrating. Refer to the eDirectory installation, upgrade, and migration sections in [Novell eDirectory 8.8 Installation Guide](#) for complete information.

Automated Migration with `migedir`

With `migedir`, the eDirectory database is upgraded to a new format when SP2 is installed. The appropriate upgrade utility is called after the packages are upgraded to eDirectory 8.8.

Important. Even though eDirectory migration using `migedir` is tested and certified by Novell test labs, it's not a complete solution for migrating from Netware to Linux. The `migedir` utility is intended as a standalone migration utility to be used when you want to migrate eDirectory alone and can't be used in concert with any of the other OES Migration Tools. Once the `migedir` utility is used, the services on the source server (NetWare 6.5) are no longer available. Compatibility issues with other utilities are scheduled to be addressed in OES 2 SP1, but until then you must choose between using `migedir` and using other OES 2 Migration Tools.

The migration utility handles the following:

Pre-migration. The utility performs the following checks:

- The health and state of the replicas in the ring are verified.
- Configuration information for the server being migrated is collected and written to a configuration file to be used by other operations during the migration.
- Time synchronization is verified between the source and target servers.
- The target server is checked for any existing eDirectory instances.
 - If an instance exists, the user is prompted and the existing instance removed before proceeding with the migration.
 - If the instance doesn't exist, a new instance is configured and used.

Migration. The utility migrates the eDirectory instance based on the collected configuration information. This involves backing up the source server data, locking the eDirectory instance on the source server, migrating data to the target server, and restoring the eDirectory instance on the target server. Dependent NICI files are also migrated.

The utility also configures the local instance on the target server with the source server details obtained during the previous checks.

Post-migration. After migration, the following tasks are performed by the utility:

- The `nds.conf` configuration file is modified with the source server eDirectory instance information, such as tree name and server name.
- The eDirectory instance on the target server is restarted so it can use the new data.
- Network address repair is performed to start the synchronization of the new IP address in the replica ring.

Prerequisites

Source NetWare Server

The source NetWare server should be running and should not be part of any partition operation.

The source has to be eDirectory 8.7.3 IR5.

Linux Target Server

- The target server must be running OES 2 Linux.
- eDirectory 8.8 SP2 RPMs should already be installed. You can install and configure eDirectory through YaST.
- The default eDirectory 8.8 SP2 instance must already be configured and be active (this instance will be overwritten during the migration).
- The target Linux server must be able to access the NetWare server remotely. (The eDirectory migration utility runs only on the target server.)

Valid Platforms

The eDirectory migration utility is designed to run only on OES 2 Linux, which is the target platform for migration. Hardware and supported platform requirements are the same as those for OES 2 Linux.

Considerations

- IP address and DNS migrations are not performed by the eDirectory migration utility.
- Only the eDirectory instance will be migrated. Applications depending on eDirectory will not.
- Only the target server will be available after the migration. The source server will be locked.

Note: You should not use this migration methodology if both servers need to be available during the migration operation.

Migration Process

1. Run the `migeddir` utility by entering the following command on the target server:

```
migeddir -s <IP address> [-A <log directory name>] [-t] [-v] [-h]
```

The utility takes the following command line options:

Option	Description
-s <IP address>	Specifies the IP address of the source server containing the eDirectory instance to be migrated. This is a mandatory parameter.
-A directory name	Enables auditing. Directory name specifies the directory in which log files should be created.
-t	Tests the validity of the input parameters. This option verifies the IP address; however, it does not perform the actual migration.
-v	Enables the verbose mode.
-h	Prints help about using this utility.

2. Follow the on-screen display as the utility performs the migration.

Handling Failures

During migration, the database on the source server is locked to avoid multiple copies of the instance running on the source and target servers since multiple instances can lead to data inconsistency. If the process fails and if you intend to bring up the source server again, you need to perform the following tasks:

- Remove the partially migrated eDirectory instance on the target server.
Refer to Removing a Server Object and Directory Services from a Tree for more information.
- Restore and unlock the database in the source server. The database backup is saved in the `sys:ni/data` folder.
Refer to Section 15.0, "Backing Up and Restoring Novell eDirectory" in the Novell eDirectory 8.8 Administration Guide for more information.

Post Migration Procedures

After migration, the target eDirectory instance listens on the IP address of the target server and not on the source server's address. Allow additional time after migration for the eDirectory instance to synchronize the new IP address in the replica ring. Successful eDirectory migration can be verified by performing eDirectory operations on the new IP address.

Important: If you want to use the existing security certificates, you must change the IP address of the target server to that of the source server. If you don't want to do this, you must issue new certificates.

If you change the IP address of the target server after migration, you must modify the `nds.conf` file, restart the eDirectory instance, and repair the network address and partitions replica manually. For more information on repairing eDirectory instances, refer to Section 11.9, "Advanced DSRepair Options" in the [Novell eDirectory 8.8 Administration Guide](#).

Manual Migration Using Replicas

If all you want to do is copy the existing eDirectory information from a NetWare server to a new OES 2 Linux server, without the Linux server assuming the NetWare server's identity, you can migrate objects to a new OES Linux branch and then gradually retire the older NetWare branch. Once you've added a branch, it's easy to drag and drop users and login scripts, certificates, and PKI so they don't have to be recreated.

1. Create a new OES 2 server and create a new eDirectory 8.8 tree on Linux.
2. Create an eDirectory replica on the target Linux server by attaching it to the same replica ring as the source NetWare server.
This creates two instances of eDirectory in the environment. The OES Migration Tools do a non-destructive migration of all services, hence they need both servers with their respective directories up and running.
3. Allow the Linux directory to synchronize.
If necessary, you can rework the layout of your tree structure, remap the location of all user objects in your new tree, and delete any user objects that are no longer needed.
4. Once eDirectory synchronization of the replica is complete, run the required service migrations with the OES Migration Tools.
5. Retire the older NetWare server.

Except where dependencies exist, there is no required order for migrating services in the same tree. An example of a dependency would be that the Archive and Versioning service depends on the file system.

Dynamic Host Configuration Protocol (DHCP) Server Migration

With OES 2, DNS and DHCP have been integrated with eDirectory. This means you can transition your existing DNS and DHCP infrastructure from NetWare to Linux, as well as centrally administer them the same way you do on NetWare. Novell DHCP uses eDirectory to provide configuration parameters to client computers and integrate them into a network. This integration allows you to centrally administer and manage DHCP servers across the enterprise and lets you set up DHCP subnet replication via Novell eDirectory.

Note: Only a few DHCP features available with NetWare are not supported on Linux. See Section 12.2.2, "DHCP Differences Between NetWare and OES 2 Linux" in the [OES 2: Planning and Implementation Guide](#) for additional information.

Prerequisites

- An eDirectory integrated DHCP server has been installed on the target OES 2 Linux machine. A pattern install is available and selects and installs these companion services:
 - Novell Backup/Storage Management Services (SMS)
 - Novell eDirectory
 - Novell Linux User Management (LUM)
 - Novell Remote Manager (NRM)
- Schema extension is already complete on the target server tree.
- The dhcpLocator and DHCPGroup objects have been created.

Valid Source Platforms

The following platforms are valid source platforms for the migration process:

- NetWare 5.1 SP8
- NetWare 6.0 SP5
- NetWare 6.5 SP5 and later versions

Migration Process

From YaST

1. Open YaST.
2. Select **Open Enterprise Server > Migrate Novell DHCP Server package and follow the screen prompts.**

From the Command Line

Run `/opt/novell/migration/bin/migdhcp.sh` with the following parameters:

```
-s <source_ldap_ipaddress> -sp <source_ldap_port> -sa  
<source_admindn> -sw <source_admin_password> -d  
<destination_ldap_ipaddress> -dp <destination_ldap_port> -da  
<destination_admindn> -dw <destination_admin_password> -l  
<locator_dn> -g <group_object_dn> -svr <servername> -bdn <base_dn>  
-ssls <ssl_bind_for_Source> -ssld <ssl_bind_for_Destination>
```

Additional Information. See the [OES 2 DNS/DHCP Administration Guide for Linux](#).

DNS Server Migration

With OES 2, DNS (and DHCP) has been integrated with eDirectory. This means you can transition your existing DNS and DHCP infrastructure from NetWare to Linux, as well as centrally administer them the same way you do on NetWare. To accomplish eDirectory integration on the DNS side, Novell did a full port of NetWare DNS to Linux to make it functionally equivalent to DNS in NetWare 6.5.

Novell DNS uses Novell eDirectory to deliver information associated with domain names, in particular, the IP address. This eDirectory integration facilitates centralized administration and management of DNS servers across the enterprise and lets you set up a DNS zone via Novell eDirectory.

A direct migration of DNS from NetWare to Linux is not supported. However, you can install a DNS server on Linux and then use iManager to move DNS servers within the same eDirectory Tree or across eDirectory trees.

Note: Only a few DNS features available with NetWare are not supported on Linux. See Section 12.2.1, "DNS Differences Between NetWare and OES 2 Linux in the [OES 2: Planning and Implementation Guide](#) for additional information.

Prerequisites

- An eDirectory integrated DNS server is already installed on the target Linux machine.
A pattern install is available that selects and installs these companion services:
 - Novell Backup/Storage Management Services (SMS)
 - Novell eDirectory
 - Novell Linux User Management (LUM)
 - Novell Remote Manager (NRM)
- Schema extension is already complete on the destination server tree.
- DNS-DHCP Group, RootServerInfo, and DNS-DHCP Locator objects have been created.
- The user running the migration process has the right to update files on the target machine. This user should also be included in the DNS-DHCP group in eDirectory.

Valid Source Platforms

The following platforms are valid source platforms for the DNS migration process:

- NetWare 5.1 SP8
- NetWare 6.0 SP5
- NetWare 6.5 SP5 and later versions

Migration Process

Once the DNS server has been installed on OES 2 Linux, use iManager to launch the DNS/DHCP management utility and move DNS servers within the same eDirectory Tree or across eDirectory trees.

Additional Information

See the [OES 2 DNS/DHCP Administration Guide for Linux](#).

iPrint Migration

Novell iPrint lets employees, partners, and customers access printers from a variety of locations across the network and the Internet. From a Web browser, users can install any printer on the network from any location.

For complete information, see the [OES 2 iPrint for Linux Administration Guide](#).

Prerequisites

Set up a new print system on OES 2 Linux:

1. Install iPrint on the OES 2 target Linux server. See Section 3.0, "Setting Up iPrint on Your Server."

A pattern install is available that selects and installs these companion services:

- Novell Backup/Storage Management Services (SMS)
- Novell eDirectory
- Novell iManager
- Novell Linux User Management (LUM)
- Novell Remote Manager (NRM)

2. Create a Print Manager on the target server. See Section 3.2.3, "Creating a Print Manager."
3. Create a OES 2 Driver Store on the network. See Section 3.2.1, "Creating a Driver Store."

Note: Source and Target servers can be in the same or different eDirectory trees.

NDPS clients are not supported on Linux. You must therefore migrate any NDPS clients to iPrint before you migrate print services to OES 2 Linux. For more information, see "Migrating NDPS Printers to iPrint" in the [OES 2: iPrint Administration Guide for NetWare](#).

Valid Source Platforms

- NetWare 6.5 SP 5 and above
- Open Enterprise Server 1.0 Support Pack 2 with the latest patches

Migration Process

The iPrint migration process uses XML data files to describe all of the items to be migrated including the Print Manager, Printer Agents, Pools, Banners, and Profiles. The XML files refer to driver files that will be migrated, but they do not contain actual driver data. Some objects are not migrated as part of this process (such as brokers and driver stores) and have no XML representation.

Use the iPrint command line or GUI migration tools to copy the existing print environment to the destination Linux server.

From the YaST iPrint Utility

The iPrint Migration tool available in YaST provides a graphical environment to complete a migration without having to know all of the command line options. The YaST graphical user interface makes calls to the command line programs such as `iprintman` and `iprintmig`.

For instructions, see Section 5.3.1, "Migrating Your iPrint System using the YaST iPrint Migration Utility" in the [OES 2 iPrint for Linux Administration Guide](#).

From the Command Line

The command line migration process uses the following command line programs:

- `iprintman` (or `iprntman`)
- `iprintmig`
- `ncpshell`
- `psminfo.nlm` when migrating from a NetWare server
- `scp` when migrating from a Linux server.

From a terminal prompt on the target server, run `iprintmig` to obtain the XML file from the source server. For complete information and instructions, see Section 5.3.2, "Using the Command Line Utilities to Migrate to OES 2 Linux" in the [OES 2 iPrint for Linux Administration Guide](#).

iFolder 3.6 Migration

iFolder migration is not supported.

Novell Archive & Versioning Services Migration

NetWare Archive and Versioning Services is now available on Linux. These services provide a convenient and cost-effective way for individual users to instantly restore previous versions of modified, renamed, or deleted files. The services archive interval-based file versions and then make them available for restoration based on the date of the file change or the user who modified the files. To restore a file, users simply view a list of the archived file versions and select the version they want.

Prerequisites

Before proceeding to migrate, make sure the following are in place:

- Install an NSS file system on the OES 2 Linux server.
- Make sure the Archive server and the Primary volume reside in the same eDirectory tree.
- Make sure the Archive server, PostgreSQL database, and Archive volume are installed on the same machine.

Valid Source Platforms

The only source system that's supported is NetWare 6.5 SPx.

Migration Process

Using YaST

1. Open YaST.
2. Select `Software>Software Management`
3. Download and install the `rpm novell-migration-arkmanager`.
4. Select `Novell Migration > Migrate Archive Version Services Utility`.

5. Enter the inputs for the fields in the Migrate Archive and Version Services screen. Refer to the help on the left pane for details on the fields.

Note: If PostgreSQL was manually configured, the migration utility migrates the configuration data but not the database. If you receive an error, click OK and manually migrate the database. For more information on manual steps, refer to "Manually Migrating the PostgreSQL Database from OES 1 to OES 2" in the [OES 2: Novell Archive & Versioning Services 2.1 for Linux Administration Guide](#).

From the Command Line

Run `/opt/novell/migration/bin/mig_ark.sh`

Information about command options is included in "Using the Command Line" in the [OES 2: Novell Archive & Versioning Services 2.1 for Linux Administration Guide](#).

Note: If you encounter any errors during migration, check the `migark.log` file in `/var/log/migration` folder. After resolving the errors, execute the migration procedure again.

Data Migration

You can use either the GUI interface or the command line to migrate data from the Primary volume on the NetWare server to an OES 2 Linux server. For more information, refer to Data Migration on page 2 above or to the [OES 2 Migration Tools Administration Guide](#).

Post Installation Procedures

Before restarting the Archive server, ensure the following:

- Migration of the Archive volume is successful.
- (Optional) The migration of the Primary volume is successful. In the `arkconfig.xml` file under the job tag, make sure the server name and context reflect the configuration details of the new machine.
- The migrated data from the volumes and database is consistent.
- Edit `arkConfig.xml` to update the Archive volume path under `archivePath` tag on the OES 2 Linux server.

Additional Information

Refer to the [OES 2: Novell Archive & Versioning Services 2.1 for Linux Administration Guide](#) for complete information about migrating Novell Archive & Versioning Services 2.1 from NetWare to OES 2 Linux:

Distributed File Services (DFS) Migration

The new DFS junction support on OES 2 brings the NetWare Novell Distributed File System feature set to Linux, and with the following additions:

- VLDB service are cluster-enabled.
- Junctions can point to subdirectories, not just the root of a volume.
- All administration is performed via iManager.
- Junctions can be created on any file system, not just Novell Storage Services.

Novell Distributed File Services (DFS) for the Novell Storage Services (NSS) file system provides location transparency of file data to end users. You can modify the underlying physical organization of

data on NSS volumes to maximize the use and performance of available storage resources. With DFS, you can create a single virtual file system for data on NSS volumes that spans multiple machines.

DFS preserves the logical file organization from the user perspective by maintaining a Volume Location Database (VLDB) for all volumes in a DFS management context. When you move an NSS volume to a new volume in a different pool, the VLDB helps redirect queries to the new location. If you split an NSS volume to relocate a directory's data to a newly created NSS volume, DFS places a junction file (in place of the directory) at the source location that points to the destination location. When a user attempts to access the data, DFS uses that information to look up the location of the destination volume in the VLDB, and then automatically redirects queries so that the session connection can be made transparently from the user's point of view. After the connection is made, the junction itself is no longer involved in the session.

Using junctions and the VLDB eliminates the user's need to know the path to the physical location of the data. DFS provides a solution to the common problem of storage volumes growing too large to back up within the desired or required time period. Instead, you can split a too-large volume into two (or more) volumes, and then backup the resulting volumes separately. You can split a volume without changing the logical path to files. You and your users can continue to use the logical paths when mapping network drives or creating login scripts. The physical location of data can change over time, and that change is completely transparent to the end user.

Valid Source Platforms

The migration procedures support migration from the following NetWare platforms to OES 2 Linux:

- NetWare 6.5 SP6 or later
- OES 1 SP2 NetWare or later
- OES 2 NetWare

Supported Migration Scenarios

It is the nature of Novell Distributed File Services that junctions and the volume location database (VLDB) service reside in the same tree, but not across trees. Supported migration scenarios include the following:

- Migrating VLDB services between servers in the same DFS management context.
- Migrating non-encrypted NSS volumes between servers in the same DFS management context, using the DFS Move Volume and Split Volume tasks.

Management Context Prerequisites

If an NSS volume that you want to migrate is not currently in a DFS management context, you must create a new DFS management context in the eDirectory tree that includes both the NetWare server and the Linux server. The servers must reside in the same DFS management context until the move or split process is complete.

VLDB Prerequisites

Prerequisites for migrating the VLDB service are listed below:

DFS Management Context

The NetWare server and Linux server must reside within the same DFS management context.

NetWare Server

- The NetWare server must be running NetWare 6.5 SP6, OES 1 SP2 NetWare, or later.
- The NetWare server is hosting an instance of the VLDB service for the DFS management context.
- The VLDB is up-to-date.
- The VLDB service is running.

OES 2 Linux Server

An instance of the VLDB service cannot already be running on the Linux server. Install and configure DFS and other OES 2 services for which DFS is a consumer before using DFS on the OES 2 Linux server. A pattern install is available that selects and installs these companion services:

- Novell Linux User Management
- NCP Server
- Novell eDirectory (configured and running)
- Novell Storage Services (includes DFS)
- Novell Storage Management Services
- SLP (Service Location Protocol)
- File Access Protocols (NCP, CIFS, Samba)
- Novell iManager
- Enterprise Volume Management System (Linux)

The [OES 2: Distributed File Services Administration Guide](#) includes instructions for installing these systems and services. See Section 3.1, "Requirements for OES 2 Services."

Migration Planning

Before migrating, make sure you understand the content in the following sections of the [OES 2: Distributed File Services Administration Guide](#):

- Section 5.1, "Migration Issues for DFS"
- Section 5.1.1, "Caveats for Junctions"
There is no change in format between junctions created on NSS volumes on NetWare and those created on NSS volumes on Linux. The junctions that are created on a NetWare NSS volume continue to work if that volume is later mounted on Linux, and vice versa.
- Section 5.1.2, "Caveats for Protocol Compatibility"
DFS on Linux requires the NCP protocol for the junction's server because Samba and AFP do not support DFS junctions. For NSS volumes that contain junctions, NCP Server must be running on the Linux server, and users must access the junction via the Novell Client. An NSS volume on an OES 2 Linux server running Samba can be the target of a junction that resides on an NSS volume on a NetWare CIFS server.
 - In an **NCP environment**, junctions can point to the root of a target volume or to a subdirectory on it. For junctions pointing to subdirectories, users must use the latest version of the Novell Client in order for junctions to work.
 - In a **CIFS/Samba environment**, junctions can point to the root of a target volume, but not to a subdirectory.
- Section 5.1.3, "Caveats for Mounting NSS Volumes on Different Servers"
- Section 5.2, "Planning Your Migration in a DFS Management Context"

- Section 5.3, "Migrating the DFS VLDB Service"
- Section 5.4, "Migrating NSS Volumes with the DFS Move Volume or Split Volume Task"

If you move devices with NSS volumes cross-platform, make sure your migration plan considers the issues inherent in the following scenarios:

- Remounting volumes
- Remounting volumes (both shared and unshared) on different servers
- Remounting NSS volumes when Move and Split jobs are in progress
- Mounting an NSS volume on a server in the same DFS Management context
- Mounting an NSS volume on a server in a different DFS Management context in the same tree
- Mounting an NSS volume on a server in a different tree

Migration Process

A direct migration of DFS to OES 2 Linux is not supported. However, you can install DFS on Linux and then migrate file data with either the DFS Move or Split Volume Tasks or with the Data Migration Tool. Consider the following before choosing an option:

Using the DFS Move or Split Volume Tasks. The Data Migration Tool does not consider the consequences of moving data from NSS volumes in a DFS environment. For this reason, we recommend using the DFS Move Volume or Split Volume tasks to migrate *data* from the NetWare server to an OES 2 Linux server. This allows you to gradually move data to an OES 2 Linux environment, without committing to a turnkey change of operating environment. This NSS to NSS migration relocates data with trustees and quotas intact, without moving the physical device to the other server, and also avoids breaking junctions. For information about moving and splitting NSS volumes, see Section 5.4, "Migrating NSS Volumes with the DFS Move Volume or Split Volume Task."

Note: We strongly advise against using the Move Volume or Split Volume tasks for *encrypted* NSS volumes because the data is not secure in the new location.

Both the source and destination servers must reside in the same DFS management context (and remain there until the move or split process is complete). If not, you must create a new context in the eDirectory tree that includes both the NetWare server and the Linux server.

Consider using this gradual migration option under the following conditions:

- NSS volumes on a NetWare server reside in a DFS management context, and they are the targets of one or multiple junctions.
- NSS volumes on a NetWare server contain junctions.
- You want to gradually migrate data from the NSS volumes on the NetWare server to one or more NSS volumes on the same or different OES 2 Linux servers.
- The NSS volume is not encrypted.

Using the Data Migration Tool. If you do decide to use the Data Migration Tool, make sure your migration plan considers the caveats in the following scenarios:

- Migrating data from NSS volumes to non-NSS volumes
If the NSS volume contains junctions, the junctions do not work if you migrate data from the NSS volume to a non-NSS volume. If an NSS volume is a junction target, junctions that point to it do not work if you migrate the data from an NSS volume to a non-NSS volume.
- Migrating data to a different server in the same DFS management context

After migrating data to a different server in the same management context, you must run VLDB repair for the DFS management context. This updates the VLDB with the new physical location of the volume. For instructions, see Section 9.10, "Repairing the VLDB."

- Migrating data to a different server in the same tree but in a different DFS management context

After the migration, you must run VLDB repair in the original DFS management context to remove the volume entry. You must run VLDB repair in the destination DFS management context to add the volume entry. For instructions on VLDB repair, see Section 9.10, "Repairing the VLDB."

- Migrating data to a different server in a different tree

DFS does not work across trees. After the migration, all junctions on the volume are broken. They cannot point to volumes in the original tree. All junctions in the original tree that pointed to the volume are broken.

If you move all of the volumes that are involved to the new tree, you must create a new DFS management context in the new tree, wait until the VLDB is built, and then modify the target location for each of the broken junctions to point to the volumes in their new location.

Migrating a Replica Site

Migrating a DFS replica site is more complicated than migrating most services from NetWare to Linux. To complement this process, a new utility, DFS Migration (DFSMIG), has been created. (other migration options are also available). However, there are many scenarios to consider, each with its own caveats. Some of these are outlined below and cross-referenced, but you'll want to refer to "Migrating DFS from NetWare to OES 2 Linux" in the [OES 2: Distributed File Services Administration Guide](#) for detailed information before you begin your migration. See these sections for complete migration information:

- 5.3.2, "Migrating a VLDB Service by Adding It as a Replica Site using iManager" (iManager > Distributed File Services > Manage Replica Sites)
- 5.3.3, "Migrating a VLDB Service with DFSMIG"

The Distributed File Services Migration (DFSMIG) utility migrates DFS control files for an instance of the VLDB service from a supported NetWare server to an OES 2 Linux server. Using the DFSMIG method allows you to keep two replica sites running while the VLDB service control files are copied to a third server. After the migration, the Linux server replaces the NetWare server for that instance of the replica site.

The DFSMIG utility uses the `ncpmount` command to mount the NetWare server's `sys: volume` on the OES 2 Linux server. NCP Server must be installed and running on the OES 2 Linux server before you issue the `dfsmig` command.

For additional information about DFSMIG and other command options and examples, see Section A.1, "DFSMIG (Linux)."

- 5.4, "Migrating NSS Volumes with the DFS Move Volume or Split Volume Task"

DFS includes the Move Volume and Split Volume tasks for NSS volumes so you can relocate data with trustees and quotas intact, without moving the physical device to the other server.

Additional Information

For additional instructions for moving NSS devices cross-platform, see "Migrating NSS Devices from NetWare to OES 2 Linux" in the [OES 2: NSS File System Administration Guide](#).

NetStorage Migration

NetStorage provides secure Internet-based access to files and folders on Linux and NetWare servers on your network. It is a bridge between a company's protected Novell storage network and the Internet. Users can copy, move, rename, delete, read, write, recover, and set trustee assignments (based on their privilege level) on files between a local workstation and a Novell storage network.

Once installed, users can potentially have access to any Linux or NetWare 5 or later server anywhere on your geographically dispersed network and access those files securely from any Internet-attached workstation, anywhere in the world, with nothing to download or install on the workstation. Files can be stored anywhere on the network and accessed using either a browser or Microsoft Web Folders (Microsoft's implementation of WebDAV).

NetStorage just provides a way to access files and directories, not store them. NetStorage authentication relies on Novell eDirectory to provide secure access; this way, Internet-based access is as secure as accessing files from within the network.

Migration Process

NetStorage is *not* considered a "migratable" service (there is no migration path from NetStorage on NetWare to NetStorage on OES 2 Linux). On NetWare, NetStorage parses login scripts and looks for drive mappings and home directories to give users access to data. On OES Linux, users are given access to the same data via Storage Location Objects. If users are currently accessing data through a NetWare NetStorage server, and that server is removed, there is no need to migrate NetStorage; you just add an OES 2 Linux NetStorage server and create the needed Storage Location Objects to point to the needed files and directories.

NetStorage is automatically preconfigured to default settings during the Open Enterprise Server 2 Linux installation. You can accept the defaults, customize them during the installation process, or configure them later via iManager.

The pattern install selects and installs these companion services:

- Novell Backup/Storage Management Services (SMS)
- Novell iManager
- Novell Linux User Management (LUM)
- Novell Remote Manager (NRM)

For most networks, NetStorage needs to be installed on only one server; however, this might vary depending on the size of your network and your organization's needs. For example, if your company is geographically dispersed, you might want to install NetStorage on one server in each geographic region.

NetStorage can also be set up in a clustered environment so that if a NetStorage server goes down, another NetStorage server in the cluster can take over the function of the downed server, and users don't lose access to data.

Additionally, NetStorage also provides secure access to files that users have located on Novell iFolder 2.x and *earlier* servers (not yet enabled for iFolder 3.x). Users must have their iFolder 2.x user accounts enabled through the iFolder server in order to access iFolder using NetStorage and will also need to set iFolder passphrases in NetStorage.

For more information, see

- The [OES 2: Linux Installation Guide](#)

- "Changing the NetStorage Default Configuration" and "Administering NetStorage" in the [OES 2: NetStorage for Linux Administration Guide](#)
- The Novell iFolder 2.1 online documentation

Novell Cluster Services Migration

Novell Cluster Services is a server clustering system that allows you to configure up to 32 Linux servers into a high-availability cluster. You can move resources, either manually or automatically, to any server in the cluster. It is enabled for Novell eDirectory and supports failover, failback, and migration (load balancing) of individually managed cluster resources including data, applications, and services..

You can add Linux nodes to an existing NetWare 6.5 or OES NetWare cluster without bringing down the cluster, or you can create an all-Linux cluster. With a mixed cluster, you can migrate services between OS kernels, and if services (such as NSS) are alike on both platforms, you can set the services to fail over across platforms.

Typical cluster configurations normally include a shared disk subsystem connected to all servers in the cluster. This disk subsystem can be connected via high-speed fibre channel cards, cables, and switches for best performance, or by a shared SCSI or iSCSI for a low-cost SAN. If a server fails, another designated server in the cluster automatically mounts the shared disk directories previously mounted on the failed server. This gives network users continuous access to the directories on the shared disk subsystem.

Novell Cluster Services can be set up on Linux in several ways. You can

- Implement a new installation on Linux that is separate from your NetWare cluster. The pattern install also installs these complementary services:
 - Novell Backup/Storage Management Services (SMS)
 - Novell Linux User Management (LUM)
 - Novell Remote Manager (NRM)
- Add Linux nodes to an existing NetWare cluster
- Change existing NetWare cluster nodes to Linux cluster nodes (Rolling Cluster Conversion)
- Use a mixed NetWare Linux cluster

Using the Novell Cluster Services tool to manage live cluster migrations from the Novell NetWare OS to Novell SUSE Linux via a rolling conversion is one of the easier methods and is documented here.

Prerequisites

- Any NetWare cluster to be converted must be running at least NetWare 6.0. If you have a NetWare 5.1 cluster, you must upgrade to a NetWare 6.5 cluster before adding new Linux cluster nodes or converting existing NetWare cluster nodes to Linux cluster nodes. The process for converting 6.0 and 6.5 nodes is the same.
- Each Linux server must contain at least one local disk device.
- At least 512 MB of memory must be available on each server in the cluster.

While identical hardware for each cluster server is not required, having servers with the same or similar processors and memory can reduce differences in performance between cluster nodes.

- All nodes in a given cluster, whether NetWare or Linux:
 - Must be configured with a static IP address.

An additional IP address needs to be available for the cluster and for each cluster resource and cluster-enabled pool.

- Must reside on the same IP subnet and in the same eDirectory tree.
- A shared disk subsystem should be connected to all servers in the cluster (optional, but recommended for most configurations) and should be properly set up and functional according to the manufacturer's instructions.
- We recommend configuring the disks contained in the shared disk system to use mirroring or RAID to add fault tolerance to the shared disk system.
- At least 20 MB of free disk space on the shared disk system needs to be available for creating a cluster partition.

The Novell Cluster Services installation automatically allocates one cylinder on one drive of the shared disk system for the cluster partition. Depending on the location of the cylinder, the actual amount of space used by the cluster partition may be less than 20 MB.

- High-speed fibre channel cards, cables, and switch or SCSI cards and cables need to be installed to connect the servers to the shared disk subsystem.
 - If you are using a fibre channel SAN, the host bus adapters (HBAs) for each cluster node should be identical.
 - If you are using iSCSI for shared disk system access, make sure you have configured iSCSI initiators and targets prior to installing Novell Cluster Services.
- Novell Cluster Services software must be running on the Linux server (SLES 10 and OES must be installed on every OES 2 Linux server added to a cluster). You can install Novell Cluster Services and create a new cluster, or add a server to an existing cluster either during the SLES 10/OES installation or afterwards, using YaST.

See Section 3.5.2, "Installing Novell Cluster Services during the OES Installation" and Section 3.5.3, "Installing Novell Cluster Services after the OES Installation" in the [OES 2: Novell Cluster Services 1.8.4 for Linux Administration Guide](#).

Migration Process (Rolling Cluster Conversion)

Performing a rolling cluster conversion from NetWare 6.5 to Linux is one of the easier ways to migrate Cluster Services to Linux and keep your cluster up and running during the process.

In this method, one server is converted to Linux while the other servers in the cluster continue running NetWare 6.5. Then, as needed, other nodes can be converted to Linux incrementally until all servers in the cluster have been converted. While it is feasible to use a mixed NetWare and Linux cluster temporarily as a migration strategy, Novell does not recommend it as a permanent production implementation.

Caveats

There are several caveats that you need to be aware of:

- Resources created on Linux cannot run on NetWare.
- You cannot add additional NetWare nodes to your cluster after adding a new Linux node or changing an existing NetWare cluster node to a Linux cluster node. If you want to add NetWare cluster nodes after converting part of your cluster to Linux, you must first remove the Linux nodes from the cluster.
- The server that holds the master eDirectory replica needs to be converted last, at the end of the rolling cluster conversion, not first.
- You can't change existing shared pools or volumes (storage reconfiguration) in a mixed NetWare/Linux cluster. If you need to make changes to existing pools or volumes, you must

temporarily bring down either all Linux cluster nodes or all NetWare cluster nodes prior to making changes. Attempting to reconfigure shared pools or volumes in a mixed cluster can cause data loss.

The basic process for a rolling cluster conversion is as follows:

- Remove eDirectory from the NetWare node with NWConfig.
- Bring down the NetWare node so cluster resources fail over to another node in the cluster
- In eDirectory, remove (delete) the Cluster Node object, the Server object, and all corresponding objects relating to the downed NetWare node.
- Run DSRepair on another server in the eDirectory tree to fix any directory problems.
- Install SLES 10 and OES 2 on the Linux server, but do not install the Cluster Services component of OES 2.

Suggestion: Use the same server name and IP address that were used on the NetWare server.

- Set up and verify SAN connectivity for the Linux node.
- Install Cluster Services on the Linux node and add the node to the existing NetWare 6.5 cluster.
- Verify that the new node can see the cluster SBD partition on the SAN by entering `sbdutil -f` at the Linux server console. Failure can occur at this point if the Linux server can't find an existing SBD partition on the SAN.

`sbdutil -f` also tells you which SAN device holds the SBD partition.

- Start the cluster software by going to the `/etc/init.d` directory and running `./novell-ncs start` (you must be logged in as root).

After Linux nodes have been added to a NetWare cluster environment, Novell Cluster Services pushes down various cluster load and unload scripts, XML files, and `.conf` files in the `/etc/opt/novell/ncs` and `/var/opt/novell/ncs` directories and translates NetWare-specific commands using the `ncs-resourced` daemon

- (Conditional) If necessary, manually migrate the resources that were on the former NetWare node to this Linux node.

The resources will automatically fail back if the following criteria are met :

- This Linux node is the next server added to the cluster:
- The failback mode for the resources was set to Auto.
- You used the same node number for this Linux server as was used for the former NetWare server.
- This Linux server is the preferred node for the resources.
- To configure Novell Storage Services use YaST > System > NSS.
- To configured Novell Cluster Services use YaST > System > NCS.
- Verify that the Linux node has been added to the cluster using iManager.

Refer to the following sections in the [OES 2: Novell Cluster Services 1.8.4 for Linux Administration Guide](#) for additional information about migrating Novell Cluster Services:

- Section 3.6, "Converting a NetWare Cluster to Linux"
- Section 3.7, "Upgrading an OES 1 Linux Cluster to OES 2"
- Section 4.1, "Migrating Resources"

An additional resource is a document created in conjunction with Dell: "[Managing Live Migrations from Novell NetWare to SUSE Linux Enterprise Server](#)." This document references OES1, but should apply equally to OES 2.

Novell Remote Manager Migration

Novell Remote Manager for Linux is a browser-based utility that can be used to manage one or more Linux servers from a remote location to monitor server health, change the server configuration, or perform diagnostic and debugging tasks.

- It does not require a special client.
- It provides a graphical interface that makes interpreting diagnostic information much more comprehensive and easier to manage.
- It provides added functionality that is not available in other management utilities.

Prerequisites

- OES services must be installed when you install the OES 2 Linux server.
- Supported browsers include Mozilla* Firefox* 1.0, Microsoft* Internet Explorer 6 or later, Mozilla 1.7 (SLES 9 SP1 and Linux Professional 9.2), KDE 3.2 Konqueror (limited functionality), or Safari* 1.2 (limited functionality).
- The HTTPSTKD module must be loaded and running on the server. This module is selected, installed, and configured with a default configuration when you install any of the Open Enterprise Server 2 patterns on Linux (unless you deselect it).

Migration Process

There is no need to migrate Novell Remote Manager (NRM) from NetWare to Linux. Instead, this service can be installed when any Open Enterprise Server pattern is installed, and then, if you have created server groups for monitoring NetWare 6.5 servers, they can be accessed and monitored from Remote Manager on Linux just as they can from a NetWare server running NetWare 6.0 or later.

However, NRM is configured somewhat differently on Linux than on NetWare. When NRM is installed, it sets up a small Web server on the Linux server. The interface and module is called HTTPSTKD. Basic configuration parameters are pre-set; however, these can be changed by editing the `httpstkd config` or `httpstkd PAM config` files. See "Changing the Configuration" in [OES 2: Novell Remote Manager Administration Guide for Linux](#) for details.

You can log in as user Root, a local Linux user, or as an eDirectory user who is Linux User Management (LUM) enabled.

- If Linux User Management is enabled in your tree and is installed and configured on the local server, you can log in to Novell Remote Manager using your eDirectory credentials. See the [OES 2: Novell Linux User Management Technology Guide](#) for details.
- If you log in as a local Linux user or as a non-Admin eDirectory user, you can see only the information that the user you log in as has rights to view.

Novell Storage Services File System (NSS) Migration

NSS is a 64-bit file system that can manage a virtually unlimited number of file objects.

- NSS volumes are cross-compatible between Linux and NetWare. You can mount an NSS data volume on either platform. In a mixed-platform cluster with Novell Cluster Services, NSS volumes can fail over between Linux and NetWare, allowing for full data, trustee, and file system feature preservation when migrating data to Linux.

- NSS devices and storage can be managed in the Web-based Novell iManager utility. NSS also supports third-party tools on both platforms for advanced data protection and management, virus scanning, and traditional archive and backup solutions.
- NSS abstracts up to four physical partitions on each physical storage device to make them appear as contiguous free space.
- NSS recognizes physical and logical devices up to 2 TB in size from which you can create any number of virtual storage resources (pools).
- You can choose space from at least four logical devices of up to 2 TB each to create a pool with a maximum pool size of 8 TB.
- A pool can contain any number of volumes, depending on the pool size, where the minimum volume size is 10 MB.
- If the pool spans devices by using space from them for the pool, the volumes automatically span the devices.
- A single volume can contain up to 8 trillion files and grow to 8 TB, depending on the size of the pool and space consumed by other volumes in the pool.

NSS provides the following benefits on Linux and NetWare:

- A journaling file system that lets you create bigger volumes that activate (mount) quicker, store more data, and resist corruption better than non-journaling file systems
- Encrypted volume support to meet the legal standard of making data inaccessible to software that circumvents normal access control
- An unlimited number of NSS volumes, with up to 255 mounted concurrently
- Software RAID support, including RAID 0 (striping), RAID 1 (mirroring), RAID 5 (striping), RAID 10 (mirroring RAID 0 devices), and RAID 15 (mirroring RAID 5 devices)
- Multiple server activation prevention (MSAP) to help protect pools from being concurrently activated by multiple servers that do not share a cluster relationship
- An NSS volume in a storage pool that spans multiple storage devices
- Up to 4 billion (10E9) files in a single directory
- Fast access to data, regardless of file size or volume size
- Low memory requirements: 1 MB of RAM can activate an NSS volume, independent of the number of files it contains.
With NSS, you can activate up to 256 NSS volumes (the system volume plus 255 other NSS volumes) concurrently per server, up to the available server memory.
- Directory and user space restrictions
- Salvage support for deleted volumes and files
- Pool snapshots that capture point-in-time versions of files in the pool

NSS: What's New in OES 2 Linux

Features for NSS in OES 2 that were not in the initial release of OES 1 are described below.

NetWare and Linux

These enhancements are available on both platforms:

- **Media Upgrade for Hard Link Support**

Hard links are supported for the following releases (and later versions):

- OES 2 Linux and NetWare

- OES 1 SP 1 NetWare
- NetWare 6.5 SP4

The new metadata structure allows up to 65,535 hard links per file. A media upgrade is required to take advantage of this feature.

Note: The new media support for hardlinks on NSS volumes is not available for OES 1 SP2 Linux and earlier. It is available for NW65SP4 and later, OES 1 SP1 NetWare and later, and OES 2 Linux and NetWare. If you've already upgraded the media format of the volume, you cannot fall over to a node that is running OES 1 SP2 Linux.

- **Novell Distributed File Services Plug-In**

Novell Distributed File Services (DFS) allows you to better manage storage growth by defining virtual file structures with junctions, moving volumes, and splitting volumes. It can now be managed fully within the Distributed File Services plug-in for iManager 2.7.

- **User Quota Option in the Storage Plug-In**

The User Quota option in the Storage plug-in for iManager 2.7 now allows users to access information about their personal user quotas on NSS volumes via iManager.

Additional Information

See the following in the [OES 2: NSS File System Administration Guide](#):

- Section 2.0, "What's New for NSS"
- Section 5.0, "Upgrading the NSS Media Format"

Linux

These features, previously available only on NetWare, are now available on OES 2 Linux:

- Novell Distributed File Services
- Hard Links Support
- Pool Snapshots

The [OES 2: NSS File System Administration Guide](#) contains tables that further compare:

- NSS on NetWare with NSS on Linux
- NSS on Linux with Linux Traditional File Systems

NSS Data Migration Prerequisites

Two primary tools are recommended for migrating file system data (including NSS data) from NetWare to Linux:

- Command Line Utilities (migfiles)
- The File System Migration Tool

Prerequisites for both source and destination servers are the same for either method.

Before beginning the migration, make sure you understand "Section 7.0, "Migrating NSS Devices from NetWare to OES 2 Linux" in the [OES 2: NSS File System Administration Guide](#). This section includes the following subsections:

- Section 7.1, Guidelines for Moving Devices Cross-Platform
- Section 7.2, Moving Non-Clustered Devices From NetWare Servers to OES 2 Linux Servers
- Section 7.3, Moving Non-Clustered Devices From NetWare 6.0 to OES 2 Linux

- Section 7.4, Moving Non-Clustered Devices From NetWare 6.0 to NetWare 6.5 or OES NetWare
- Section 7.5, Moving Clustered Devices with NSS Volumes Cross-Platform
- Section 7.6, Upgrading NetWare 5.1 NSS Volumes and NetWare Traditional Volumes to NSS Volumes

Source NetWare Server

1. Upgrade previous versions of NetWare and Linux as necessary:

Migrating Data from Previous Versions of NetWare. If you have data you want to migrate on servers running older versions of NetWare (such as NetWare 5.0 or 6.0), you must first upgrade the servers to NetWare 6.5 SP6 and then use the OES Migration Tools 1.0 or SCMT 1.2 to migrate the data.

- **To upgrade Legacy NSS Volumes:** Mount the NSS volume on a NetWare 6. x server. The mounting process starts the upgrade which takes some time.
Leave the upgraded NSS volume mounted on NetWare 6.x afterwards since the media format is not backward compatible with NetWare 5.1 servers.
- **To convert traditional NetWare volumes to NSS volumes:** Use the Volume Copy Utility to upgrade legacy NetWare 5.1 Traditional volumes to NSS volumes on OES NetWare.

Note: After upgrading a NetWare server to OES NetWare, it is possible for a Traditional volume to still reside on that server, but this creates a problem when migrating from OES NetWare to OES Linux because the Traditional volume data cannot be read on OES Linux. You should move the data from the Traditional volume to an NSS volume before upgrading, either by directly copying it, using the Volume Copy Utility (VCU), or using the Server Consolidation and Migration Tool (SCMT).

For additional information, see Section C.O, "Upgrading Legacy NSS and NetWare Traditional Volumes" in the [OES 2: NSS File System Administration Guide](#).

2. Make sure the media format is consistent with the format that will be used by the destination server. (If you will be taking advantage of the new media format on the destination server that allows hard links, see Section 5.0, "Upgrading the NSS Media Format" in the [OES 2: Migration Tools Administration Guide](#) before proceeding.

You can move NetWare 6.5 SP 4 or later NSS media to an OES 2 Linux server if the operating platform can support the NSS media format. NetWare 6.5 SP3, OES 1 SP2 Linux, and earlier servers do not have this support.

3. Ensure that the latest version of Storage Management Services™ (SMS) is running on the source NetWare server.

SMS updates can be downloaded from the Novell Downloads Web site.

4. When migrating data from a Traditional NetWare volume, ensure that all name spaces (DOS, LONG, NFS, and MAC) are loaded on the source NetWare server.

If the source server is running NetWare 5.1 SP8 and your data contains extended ASCII or Unicode characters, add the following setting to the `/etc/opt/novell/sms/tsafs.cfg` file:

```
useCodeSet= xxx
```

For xxx, substitute the code page value set on the NetWare server. For example, the default code page is 437. (Alternate forms include CP437, CSPC8CODEPAGE437, and IBM437.) For more information and a list of code page values, see “Code Pages” in the NetWare 5.1 Server Operating System Guide.

5. Restart SMS by running the following command:

```
rcnovell-smdrd restart
```

6. Although data on the source server is not deleted as part of the migration, you should make a current backup of the data as a precaution.

A module named `tcnvlrx.nlm` is copied to the `SYS:system` folder of the source NetWare server and a `tcnvlrx.cfg` configuration file is also created in the same folder. The module generates an output file containing a listing of files, directories, and associated trustees. This output file is stored in the `SYS:system/tcnvlrx` directory.

Destination OES 2 Linux Server

The NSS kernel module (`km_nss`) is delivered in SUSE Linux Enterprise Server and thus is installed by default. It provides NSS support for Linux utilities and commands and is open-source to meet GPL (GNU Public License) requirements.

The basic NSS code, however, is not usable without several other OES 2 services that are provided as part of the NSS pattern installation included with OES 2 Linux (see the installation instructions below).

You'll need to install NSS on the OES 2 Linux destination server before moving devices (shared or unshared) or data from NSS on NetWare to NSS on Linux.

The following prerequisites must also be met on the destination OES 2 Linux server.

For NSS Destination Volumes

1. Use the Novell Storage Services™ Management Utility (`nssmu`) or `iManager` to create the NSS volumes to which you will be migrating the data. Make sure you allocate sufficient space for the volume to hold all of the source data.

Make sure the destination volumes have similar properties to the source volumes. For example, if compression is turned on for the source volume, turn on compression for the destination volume as well. The same applies to user quotas and other NSS features.

2. (Conditional) If you want to use the CASA secret store to store usernames and passwords during the migration (via the `--use-casa` option),

- a. Make sure the following RPM is installed on the OES 2 Linux server:

```
CASA-1.7- xxx.i586.rpm
```

- b. Restart the CASA daemon by entering the following command:

```
/etc/init.d/miCASA restart
```

For more information, see `Using CASA with Linux in the Novell Common Authentication Services Adapter (CASA) documentation`.

For NCP Destination Volumes

If you have installed the NCP server for Linux, you can create NCP volumes on top of Ext3 or Reiser file systems on Linux. NCP allows you to use the same method of file system trustees and trustee rights to control access to data on Linux Traditional volumes as you use on NSS volumes and NetWare Traditional volumes.

Since both NSS volumes and NCP volumes use the Novell trustee model for controlling access to data, if you migrate data from an NSS volume on NetWare to an NCP volume, the trustees and trustee rights are enforced. You will need to make sure trustees are authorized users of the destination server.

- NCP Server must be installed and running on the OES 2 Linux server.
- Linux User Management must be installed and enabled.
- Users must be Novell eDirectory users that are Linux enabled for the server

Be aware of the following:

- **User Quotas.** NCP volumes do not support user quotas. If they are set on the NSS volume, they are not enforced on the NCP volume.
- **Deleted Files.** NCP volumes do not support deleted file salvage and purge. If you have deleted files on the NSS volume, they are not migrated. If you want to salvage deleted files, do it before you migrate the data.
- **Encryption.** NCP volumes do not support volume encryption. If you migrate data from an encrypted NSS volume, the data is not encrypted on the NCP volume. Novell strongly recommends not migrating data from an encrypted NSS volume to an NCP volume.

Note: Moving files is now supported between NCP volumes. For example, you can move a file from an NCP volume on NSS to an NCP volume on a Traditional Linux file system. Trustee rights to files are maintained. However, file attributes unique to NSS, such as those associated with quotas and salvaging, are lost if the target volume is not NSS. In addition, NSS file attributes can now be set on NSS volumes from an NCP client.

If you will be moving NSS data to NCP destination volumes, complete the following:

1. Use the NCP Server Console utility (ncpcon) to create the NCP destination volumes.
2. Make sure the user performing the migration (usually the eDirectory admin) has read/write access to the POSIX path that corresponds to the NCP volume. One way to ensure this is to make admin the owner of the POSIX directory where the NCP volume is created.

See Section 4.0, "Migrating Data from NSS Volumes to NCP Volumes" in the [OES 2: NCP Server for Linux Administration Guide](#) for additional information.

Install NSS on OES 2 Linux

To install NSS on Linux, make the following selections during the OES 2 Linux installation.

1. Select EVMS as the volume manager.

If you are installing OES 2 Linux on a system with a single device and plan to create NSS volumes, that device must be managed by the Enterprise Volume Management System (EVMS) volume manager instead of the default Linux Volume Manager 2 (LVM2). You should also choose the EVMS install option if you plan to use free space on the system device to create NSS volumes. The volume manager for the system device is configured in the Partitioning section of the Installation Settings for the YaST install.

2. Install the NSS pattern.

- a. On the Installations Settings page in the YaST install, click `Software` to go to the `Software Selections and System Tasks` page.
- b. From the OES Services options, select `Novell Storage Services`.

The following additional OES 2 services are automatically selected:

- Novell Backup / Storage Management Services
- Novell eDirectory
- Novell Linux User Management
- NCP Server / Dynamic Storage Technology

3. Install iManager somewhere in the same tree as the NSS server.
 - **Same server.** If you install iManager and NSS on the same server, the storage-related plug-ins are automatically installed.
 - **Different server.** If you install iManager on a different server, make sure you install the storage-related plug-ins needed to manage the NSS file system and services. See Section 9.1, "Novell iManager and Storage-Related Plug-Ins."

4. Enable NSS.

When you install NSS during the initial install, NSS is enabled automatically.

5. Create a Linux Identity for Users

In order to use Linux services and utilities on an OES 2 Linux server, eDirectory users must also have a Linux identity. The Linux User Management (LUM) technology creates the local user identity and stores the UID for the user in eDirectory.

You don't need to Linux-enable users unless you plan to use the following NSS capabilities:

- User quotas
- Hard links
- For information about how to Linux-enable users, see the [OES 2: Novell Linux User Management Technology Guide](#).

6. Upgrade the media format for hard link support (optional).

The new hard link support in NSS requires a media format upgrade after you have installed or upgraded the operating system. For guidelines and media upgrade instructions, see Section 5.0, "Upgrading the NSS Media Format" in the [OES 2: NSS File System Administration Guide](#).

Migration Process

NSS supports moves of devices containing NSS volumes between any servers that support a compatible media format, including moves between NetWare servers and OES 2 Linux servers.

The [OES 2: NSS File System Administration Guide](#) includes a table specifying which operating systems can be moved cross-platform between servers in the same Novell eDirectory **tree**. See "Table 5-1 Cross-Platform Compatibility of NSS Volumes by Operating Platforms." Links are also provided to examples of each category of move.

- **Unshared Devices.** When you move an unshared device to a different server, you must decommission its volumes in eDirectory for the current server, and then recommission them for the new server in order to preserve the NSS pool and volumes on the device when you move it.

- Decommission the volume by removing its related Storage object from eDirectory for the original server.
- Recommission the volume by creating a new Storage object in eDirectory for the destination server.

When moving a non-clustered device, you must also move any other devices that contribute segments to the NSS pools on the device you are moving.

- **Shared Devices.** When you move shared devices cross-platform, Novell Cluster Services automatically manages Storage object updates to eDirectory. You can use a shared NSS data pool and volume in a mixed cluster configuration, using Novell Cluster Services for Linux, if all nodes in the cluster support the same NSS media format.
 - For information about upgrading to the latest media format, see Section 5.0, "Upgrading the NSS Media Format" in the [OES 2: NSS File System Administration Guide](#).
 - To use NSS with Novell Cluster Services, see the [OES 2: Novell Cluster Services 1.8.4 for Linux Administration Guide](#).

Set Up File Access for Users

File access for users on the OES 2 Linux server can be set up either before or after you move an NSS volume from NetWare to Linux.

- **Same tree.** File system trustees and trustee rights continue to work after the move.
- **Different tree.** Use eDirectory to enable or reassign affected users for access in the destination tree.

One of the following protocols and services must also be set up and configured:

- **NCP Server and Services:** Install and configure NCP Server to allow users to access the volume with the Novell Client or other NCP services. For information, see the [OES 2: NCP Server for Linux Administration Guide](#).
- **Other Protocols and Services:** Install and configure other protocols, such as Samba or NFS as needed.

If you use non-NCP protocols or Linux services for user access on the destination OES 2 Linux server, you must Linux-enable the current users of the volumes with Linux User Management *before* you move the devices if you want file ownership information to be usable after the move.

- To enable multiple users at once, use the `nambulkadd` command. User IDs are automatically refreshed after the enabling process ends.
- To enable a single user at a time, use iManager.

Deactive and Reactivate Pools

For each NSS pool, decommission the pool and its volumes on the original server and reactivate them on the destination server. See the following sections in the [OES 2: NSS File System Administration Guide](#).

- Section 7.2.3, "Decommissioning Each NSS Pool and Its Volumes on the Original Server"
- Section 7.2.4, "Recommissioning Each NSS Pool and Its Volumes on the Destination Server"

Migrating NSS Data

NSS data can be migrated to OES 2 Linux from NSS volumes on NetWare using the command line or GUI migration tools provided with OES 2 Linux.

- **Migrating Data with Command Line Tool (migfiles).** If you are using the command line tools, the procedures for migrating file system data from NetWare NSS or Traditional volumes varies depending on whether the source and destination servers are in the same eDirectory tree or in different trees.

See Section 2.2, "Using the Migration Commands" in the [OES 2: Migration Tools Administration Guide](#) for detailed instructions.

- **Migrating Data Volumes with the File System Migration tool.** When you install an OES 2 Linux server, the File System Migration tool is automatically installed in YaST. This tool lets you perform basic data migrations from NetWare or OES 1 Linux to OES 2 Linux by using a graphical user interface (GUI) instead of command-line utilities.

The File System Migration tool supports only full volume migrations. Source volumes on OES1 Linux servers must be NSS volumes.

Access the tool from the graphical desktop at the destination OES 2 Linux server, by selecting `Computer > YaST Administrator Settings > Open Enterprise Server > File System Migration Utility`.

See Section 2.3, "Using the File System Migration Tool" in the [OES 2: Migration Tools Administration Guide](#) for detailed instructions.

Additional Information

- For a general discussion of migration issues in OES 2, see "Migrating and Consolidating Existing Servers and Data" in the [OES 2: Planning and Implementation Guide](#).
- For guidelines about users and access, see Section 22.2, "Access Control Issues for NSS on Linux" in the [OES 2: NSS File System Administration Guide](#).

Novell Backup/Storage Management Services (SMS) Migration

The Novell Storage Management Services (SMS) backup infrastructure, provides backup applications with the framework to develop a complete backup and restore solution.

SMS helps back up file systems (such as NSS) or application data, such as data from GroupWise on NetWare and SUSE Linux Enterprise Server (SLES), to removable tape media or other media for off-site storage. It provides a single consistent interface for all file systems and applications across NetWare and SLES.

There is no migration path for SMS. It needs to be installed anew on the OES 2 Linux server. A pattern install is available and selects and installs these companion services:

- Novell Linux User Management (LUM)
- Novell Remote Manager (NRM)

NetWare Core Protocol (NCP) Migration

The NetWare Core Protocol (NCP) Server provides the same services on OES 2 Linux that are available on NetWare. With NCP Server, you can define NCP volumes (NCP shares on Linux Ext3 and Reiser file systems). The advantage of using an NCP server is that you can control access using the Novell trustee model. Windows* and Linux workstations running Novell Client software can access data and manage file sharing on OES 2 Linux servers just as they do on NetWare servers.

Novell NCP Server for Linux enables support for login scripts, mapping drives to OES Linux servers, and other services commonly associated with Novell Client access. This means that Windows users with the Novell Client installed can be seamlessly transitioned to file services on OES Linux.

Services provided by NCP include file access, file locking, security, resource allocation tracking, event notification, synchronization with other servers, connection and communication, print services and queue management, and network management.

NCP is a client/server LAN protocol. Workstations create NCP requests and use TCP/IP to send them over the network. At the server, NCP requests are received, unpacked, and interpreted.

Some of the benefits provided by NCP Server on Linux include the following:

- Users can log in to the Linux network from their Novell Client workstation just like they do with NetWare. This means that users familiar with a NetWare environment do not need to be retrained and there is no need to reconfigure Novell Client workstations to access a Linux network.
- Users and administrators can map drives to volumes and directories on Linux servers just like they do on NetWare.
- NetWare-style login scripts can be created for users to automate drive mappings and other network functions.
- The file and directory attributes and rights that exist on NetWare are now available and configurable on Linux.
- Directory limits for individual users can be set and administered on Linux.

Novell Client software must be used to initiate a connection between a Windows or Linux workstation running Novell Client software and a Linux server running NCP Server services. Intelligence at both ends of the connection work together to verify that clients are who they claim to be, and that file controls are followed when using shared server files.

New NCP Features in OES 2 Linux

Novell Dynamic Storage Technology. NCP Server also includes Novell Dynamic Storage Technology, which allows rarely accessed files on NCP volumes to be automatically moved, according to policies set by the administrator, from faster-access storage to lower-cost storage media where the files can be more easily managed and backed up at a lower cost. The primary and secondary storage areas appear to users as a single unified file system.

For information about managing storage with Dynamic Storage Technology, see the [OES 2: Novell Dynamic Storage Technology Administration Guide](#).

POSIX permissions. You can now modify the Inherit POSIX Permissions setting for files on NCP volumes, using Novell Remote Manager (NRM). See Section 10.7, "Configuring Inherit POSIX Permissions for an NCP Volume."

File share modes. File share modes have been added to lock files being accessed across protocols. See Section 3.9, "Configuring Cross-Protocol Locks for NCP Server."

Installing NCP on OES 2 Linux

Rather than migrating the NCP service from NetWare to Linux, you need to install NCP on Linux and then migrate the data. A pattern install is available that selects and installs these services:

- **Novell Backup/Storage Management Services (SMS).**

- **Novell eDirectory.** NCP Server and Dynamic Storage Technology require that access to data be restricted to users with User objects defined in Novell eDirectory. The eDirectory replica can reside on the same or a different server. If the replica is on a different server, make sure that SLP is configured on the server. For information about configuring eDirectory and users, see the [Novell eDirectory 8.8 Administration Guide](#).
- **Linux User Management.** Dynamic Storage Technology, a component of NCP Server, requires that users be defined in Novell eDirectory and be Linux-enabled with Linux User Management. See the [Novell Linux User Management Technology Guide](#).
- **Novell Remote Manager for Linux.** This service is required for managing NCP Server services, NCP volumes, and Dynamic Storage Technology. See the [OES 2: Novell Remote Manager Administration Guide for Linux](#).

NCP Server for Linux can be installed during the Novell Open Enterprise Server (OES) 2 Linux installation.

1. During the YaST install, on the Install Settings page, click `Software` to view details.
2. Select `NCP Server (Dynamic Storage Technology)` from the OES options, and then click `Finish` to start the installation.

You can also install NCP Server for Linux at any time after the initial OES 2 Linux install. See "Installing or Configuring OES Services on an Existing OES 2 Linux or SLES 10 SP1 Server" in the [OES 2: Linux Installation Guide](#).

Note: Novell Storage Services can be installed with NCP Server, but is not required.

Post Installation Configuration

Refer to Sections 3.4 through 3.9 in the [OES 2: NCP Server for Linux Administration Guide](#) for information about configuring the NCP server.

NSS Data Migration

To migrate data from an NSS Volume on NetWare to an NCP Volume on Linux, use the command line or GUI Data Migration Tool provided with OES 2 Linux to migrate data and trustee information from an NSS volume on NetWare to an NCP volume on an OES 2 Linux server. See Data Migration on page 2 for information.

Prerequisites

- NCP Server must be installed and running on the OES 2 Linux server.
- Linux User Management must be installed and enabled.
- Users must be Novell eDirectory users who are Linux-enabled for the server.

Valid Source Platforms

- OES 2 NetWare
- NetWare 6.5 SP6 and later
- OES 1 NetWare SP3 and later

Migration Planning

Consider these guidelines when planning a data migration from NSS volumes on NetWare to NCP volumes on Linux:

- **Trustees and Trustee Rights.** Both NSS and NCP volumes use the Novell trustee model for controlling access to data. If you migrate data, trustees and trustee rights are enforced. Make sure that the trustees are also authorized users of the destination server..
- **User Quotas.** NCP volumes do not support user quotas
- **Deleted Files.** NCP volumes do not support deleted file salvage and purge. Deleted files on the NSS volume are not migrated. If you want to salvage deleted files, do it before you migrate the data.
- **Encryption.** NCP volumes do not support volume encryption. If you migrate data from an encrypted NSS volume, the data is not encrypted on the NCP volume.

Warning: We strongly recommend that you do not migrate data from an encrypted NSS volume to an NCP volume. Consider migrating the device that contains the encrypted NSS volume from the NetWare server to the Linux server. For information on this scenario, see "Moving Non-Clustered Devices From NetWare Servers to OES 2 Linux Servers" in the [OES 2: NSS File System Administration Guide](#).

- **Novell Distributed File Services.** The Novell Distributed File Services feature of NSS requires special handling if you are migrating NSS data to NCP. See Section 4.2.5, "Distributed File Services" in the [OES 2: NCP Server for Linux Administration Guide](#) for particulars.

Novell FTP Migration

Novell FTP (File Transfer Protocol) is integrated with Novell eDirectory so that users can securely transfer files to and from OES Linux or OES NetWare volumes.

Supported Source Platforms

- NetWare 5.1 SP8
- NetWare 6.0 SP5
- NetWare 6.5 SP5 and later

Migration Process

1. Install FTP on the Linux server.

The FTP installation selects and installs these complementary services:

- Novell Backup/Storage Management Services (SMS)
- Novell eDirectory
- Novell Linux User Management (LUM)
- Novell Remote Manager (NRM)

2. Migrate the NetWare FTP configuration using either YaST or the command line interface.

During migration, the NetWare FTP configuration parameters in the NetWare `SYS:/etc/ftpserv.cfg` file are mapped to the equivalent PureFTPd parameters in the Linux `/etc/pureftpd/pure-ftpd.conf` file.

Using YaST

1. Open YaST and select `Open Enterprise Server > Migrate Novell FTP`.
2. Enter the required FTP configuration parameters (IP address, username, and password)

3. Click `Accept` to begin the migration.

Using the Command Line

Run `/opt/novell/migration/sbin/migftp.pl` with the following parameters:

```
-s <source_server> -i [input-file] -o [output-file] -h [help]
```

Where the `-i` and `-o` options are optional and default to the NetWare configuration file (`SYS:/etc/ftpserv.cfg`) and the PureFTPd configuration file (`/etc/pure-ftpd/pure-ftpd.conf`) respectively.

Section 5.2, "Migration Procedures" in the [OES 2 : Novell FTP for NetWare Administration Guide](#) contains detailed information for both procedures.

Novell iManager Migration

Novell® iManager is a Web-based administration console that provides secure, customized access to network administration utilities and content from virtually anywhere administrators have access to the Internet and a Web browser.

iManager provides the following:

- Single point of administration for Novell eDirectory™ objects, schema, partitions, and replicas
- Single point of administration for many other network resources
- Management of many other Novell products using iManager plug-ins
- Role-Based Services (RBS) for delegated administration

A pattern install is available that selects and installs these complementary services:

- Novell Backup/Storage Management Services (SMS)
- Novell Linux User Management (LUM)
- Novell Remote Manager (NRM)

What's New in Version 2.7

Novell iManager 2.7 contains the following new features:

Tree View: The iManager tree view in the left-side navigation frame approximates functionality available in ConsoleOne's Console View. You can navigate the tree structure, expanding and collapsing container objects as necessary. The right-side content frame displays contents and menu items for the object selected in the navigation frame.

File System Browse: iManager 2.7 lets you browse through an eDirectory Volume object to the underlying NCP-enabled volume. Within the volume structure, you can select File and/or Directory objects. The actual tasks you can perform on file system objects is provided by the NSS iManager plug-in, which is available separately.

File system browsing does not support accessing the file system through NCP Server objects or NSS junction point objects.

File system browsing is available from the Object Selector, Object Browse, and Tree view, but is not available in Advanced Browsing mode. Also, file system browsing is not accessible from the Search or Advanced Search panes.

Available Novell Plug-in Modules: iManager 2.7 lists all the available iManager plug-ins contained in the packages directory/download site by default. You can download and install plug-ins from within iManager by querying the Novell download Web site. The previous versions of iManager listed only the updates to the installed plug-in modules.

Note: With NetWare, iManager 2.7 now requires and installs only Tomcat 5. However, OES 2 Linux installs both Tomcat and Apache. Note that iManager is supported only with the version of Tomcat that is installed with iManager.

Supported Web Browsers

- Microsoft IE 6 SP1 or later, or IE 7
- Firefox* 1.5. x, or 2. x

Note: You may be able to access iManager via a Web browser not listed, but Novell does not guarantee or support full functionality with any browser.

Caveats

- In order for some iManager wizards and help to work, you must enable pop-up windows in your Web browser.
- iManager 2.7 can coexist in the same eDirectory tree with both iManager 2.6 and iManager 2.5.
- If your network has more than three servers, or one or more servers that do not host eDirectory replicas, you must have SLP properly configured for iManager to log in. For more information, see the [Novell Open Enterprise Server SLP documentation](#).
- iManager 2.7 can manage any server running Novell eDirectory 8.6.2 or later.
- iManager 2.7 plug-ins are not compatible with previous versions of iManager. Additionally, any custom plug-ins you want to use with iManager 2.7 must be re-compiled in the iManager 2.7 environment.

Installing iManager

The following dependencies are installed with iManager::

- Tomcat 4.1.30
- Sun* J2SDK 1.4.2.05
- Novell International Cryptographic Infrastructure (NICI) 2.7.8

Prerequisites

Apply the latest Service Packs for your platform.

The following prerequisites apply to iManager on Linux:

- **Required Linux Packages:** If any of the following packages are not installed, you must install them before installing iManager. They should be on your installation CDs.
 - `compat` (SUSE)
 - `compat-libstdc++-33` (Red Hat AS 4.0)
- **Previous Versions of iManager:** If you have installed iManager 2. x, you do not need to uninstall it. The iManager 2.7 installation can overwrite the files and does not remove custom-created content.
- **Processor:** Pentium* III 600MHz or higher processor

- **Disk Space:** 200 MB hard-disk space for a local installation
- **Memory:** 512 MB RAM (1024 MB recommended)
- **Port Setup:** Be aware of possible port conflicts. Tomcat is installed as part of the iManager 2.7 installation. The installation process determines whether the default ports for Tomcat are already in use. If so, you are prompted for different ports. By default, Tomcat uses ports 8080, 8443, and 9009.

Note: If the iManager 2.7 installation routine detects a previously installed version of iManager 2.5 or 2.6, it prompts you that it will remove the existing iManager and Tomcat. If you do not want this to happen, stop the installation. If you decide to remove a previously installed version, its directory structure is backed up to the old TOMCAT_HOME directory to preserve any previously created custom content. In order to apply previous settings, such as authorized users, to the new iManager 2.7 installation, manually copy configiman.properties from the old TOMCAT_HOME backup to the iManager 2.7 installation.

Updating/Migrating Role-Based Services (RBS)

If you currently have a version of Novell iManager installed on a server, you need to either upgrade or migrate to iManager 2.7.

From iManager 1.5x. After you install iManager 2.7, the RBS objects in your eDirectory tree must be migrated to the iManager 2.7 format. This can be done with the new RBS Configuration task in iManager 2.7 which is accessed via the iManager Configure view (click `Role Based Service > RBS Configuration`).

From iManager 2.x. The first time you use iManager 2.7 to log in to an eDirectory tree that already contains an RBS collection, some roles and tasks may not be displayed since some of the plug-ins require updates so that iManager 2.7 can fully utilize them. The RBS Configuration task will list RBS modules that are out of date. We recommend that you update these to the latest version so that you can see and use all of the installed modules on iManager 2.0.2, 2.5, and 2.7.

Note: Be aware that you might have multiple roles with the same name depending on the naming conventions used by plug-in developers. Some roles may appear to be duplicated when, in fact, they are from different versions.

In addition, you might see discrepancies in the module report for any given collection if different installations of iManager have a different number of plug-ins locally installed. In order for the numbers to match between iManager installations, make sure that the same subset of plug-ins is installed on each iManager instance in the tree.

For complete instructions for migrating and update RBS, see Section 2.1 "Migrating Role-Based Services" in the [Novell iManager 2.7 Installation Guide](#).

Migrating iManager to Linux

Complete the following to migrate an iManager server from the OES-NetWare® platform to the OES-Linux platform:

1. Install iManager on the new OES 2 Linux server.
2. Copy the file system configuration from the old OES NetWare server to the new OES Linux Server.

To do this, copy the following files and directories to the new OES 2 Linux server:

- Copy `sys:/tomcat/4/webapps/nps/WEB-INF/configiman.properties` to `/var/opt/novell/iManager/nps/WEB-INF/configiman.properties`.
- Copy `sys:/tomcat/4/webapps/nps/WEB-INF/config.xml` to `/var/opt/novell/iManager/nps/WEB-INF/config.xml`.
- Copy `sys:/tomcat/4/webapps/nps/packages/custom.npm` to `/var/opt/novell/iManager/nps/packages/custom.npm`.
This file might not exist if you have not created any Plug-in Studio tasks.
- Copy the contents of the `sys:/tomcat/4/webapps/nps/WEB-INF/config` directory to `/var/opt/novell/iManager/nps/WEB-INF/config`.

3. (Conditional) Set up the iManager AppArmor Profile.

OES 2 Linux includes an AppArmor profile for iManager 2.7. The profile name is `etc.opt.novell.tomcat5.init.d.tomcat5` and is installed at `/etc/apparmor/profiles/extras/iManager`.

This profile is not enabled by default. To enable it, copy the profile into the `/etc/apparmor.d` folder.

For more information about AppArmor and AppArmor profiles, see the [Novell AppArmor documentation](#).

4. Re-Install any custom plug-ins

To migrate or replicate custom Plug-in Studio plug-ins to another iManager instance, or a new version of iManager, do the following:

- a. From the iManager Configure view, select **Role Based Services > Plug-in Studio**.
The Content frame displays the custom plug-in in the list, including the location of the RBS collection to which it belongs.
- b. Select the plug-in you want to re-install or migrate, then click **Edit**.
You can only edit one plug-in at a time.
- c. Click **Install**.
You should be notified that the edit was successful.

Novell QuickFinder Migration

This section provides a brief summary of new QuickFinder features and information about migrating QuickFinder from NetWare to Linux. For complete information, refer to the [OES 2: Novell QuickFinder Server 5.0 Administration Guide](#).

QuickFinder lets users search for information on any of your public and private Web sites, partners' sites, and any number of additional Web sites across the Internet or on internal file servers, all from a single search form on your Web page. The look and feel of the search page is configurable so you can match your corporate design. You can create full-text indexes of HTML, XML, PDF, Word, OpenOffice.org, and many other document formats in almost any language with the QuickFinder Unicode* indexing engine. You can also configure and maintain such indexes remotely from anywhere on the network with the QuickFinder Web-based administration module.

New Features

QuickFinder Server 5.0 has been enhanced with new features that speed up searching, improve the accuracy of search results, and enhance the experience users have while searching. You can:

- Index all local and remote NCP, NSS, and NetWare volumes
- Filter search results based on NCP server rights
- Properly encode file URLs so that they open directly through a file browser
- Index large amounts of data per index (Novell has indexed over a million files in our testing)
- Dynamically load new external File Readers, which makes it easier to update and add new File Readers
- Display arbitrary admin-specified meta data from indexed documents on the Search Results page
- Display hits per index on the Search Results page
- Search filenames by default with every query

File Reader Updates

QuickFinder Server 5.0 includes the following file reader updates:

- **PDF:** QuickFinder Server 5.0 detects even more text in PDF files, and includes support for compressed Adobe 6 and 7 files, a variety of unusual fonts (including Asian and double-byte fonts), and external CMAP files. The handling of descendant fonts has also been improved.
- **OpenOffice.org:** Support for Unknown field names has been added, and specific OpenOffice.org types can now be detected using the mimetype file within a ZIP.
- **HTML:** Handling of entity references within a meta tag has been added, as well as improved handling of entity references. NoFollow to Robots comment tags were also added.
- **ASCII:** More encodings are now supported for ASCII files (UTF8, UNICODE, big- and little-endian, etc.).
- **Microsoft Office:** Includes improved support for embedded documents and support for additional Meta data (including Unicode meta data).

Migration Process

Complete the following steps to migrate QuickFinder from a NetWare server to an OES 2 Linux server.

Note: Migrating from QuickFinder running on OES NetWare to OES Linux will replace any indexes or configurations already on the Linux server. If you want to merge your changes from NetWare to Linux, you must manually recreate the changes using the QuickFinder Server Manager.

1. Install QuickFinder on Linux.

A pattern install is available that selects and installs these companion services:

- Novell Backup/Storage Management Services (SMS)
- Novell Linux User Management (LUM)
- Novell Remote Manager (NRM)

For more information, see Section 3.0, "Installing QuickFinder" in the [.OES 2: Novell QuickFinder Server 5.0 Administration Guide](#)

2. Access QuickFinder Server Manager on the NetWare server, and then click `Global Settings` on the top toolbar.
3. Write down the paths for each virtual search server displayed in the Location column.
4. On the OES for Linux server, mount the NetWare server (you can use `ncpmount`).

5. Make a backup of `/var/lib/qfsearch/SiteList.properties`.
6. Make sure you don't have a file with this name as a backup on the NetWare server.
7. Copy all `.properties` and `Cron.jobs` files from the root directory `sys:/qfsearch` on the NetWare server to `/var/lib/qfsearch` on the Linux server.
8. Copy `sys:/qfsearch/Sites` and all its sub directories to `/var/lib/qfsearch/Sites`.
9. Copy `sys:/qfsearch/Templates` and all its sub directories to `/var/lib/qfsearch/Templates`.

If any of the paths listed in Step 3 are not under `sys:/qfsearch` (for example, if you installed a virtual search server somewhere other than the default location), you must also copy those paths to Linux.

10. Edit all NetWare paths in `/var/lib/qfsearch/SiteList.properties` to reflect the new Linux paths (such as `sys:/qfsearch` to `/var/lib/qfsearch`).

Note:Some paths might have one or two backslashes (`\`) that must be replaced with one forward slash (`/`). For example, `sys:\\qfsearch\\docs` needs to be change to `/var/lib/qfsearch/docs`.

11. Update all NetWare paths in the properties and configuration files copied in the steps above to the Linux paths, and update any DNS names.

These files must be updated:

- `AdminServlet.properties`
- `Cron.jobs`
- `Sites/Highlighter.properties`
- `Sites/Print.properties`
- `Sites/Search.properties`

For each of the virtual search servers, modify the following:

- `qfind.cfg`
- Any of the above `.properties` files, if they exist.

Note:Most properties files are mixed case, so make sure the files copied from NetWare are the correct case. You can compare them to the `.properties.sample` files on Linux.

You might also need to update paths in templates. If you have problems with a template not being found or some properties not being set properly, check the case of the filename. Linux filenames are case sensitive.

If you had to modify any “file” index paths to index directories on the Linux server, that index must be regenerated.

12. After all the files have been modified, run the following commands to set the access rights and owner/groups so that the QuickFinder engine has rights to access the files:

```
chown -R root:www /var/lib/qfsearch
chmod -R 770 /var/lib/qfsearch
```

Post Migration Considerations

After upgrading from a previous version of Web Search or QuickFinder Server, be aware of the following issues:

- If you are upgrading QuickFinder (including the original OES version) on a NetWare server that is running Web Search, the QuickFinder install recognizes the older installation and migrates the configuration settings and indexes that QuickFinder uses. However, you must regenerate the older indexes before they can be searched.
- If you are migrating from an existing NetWare server with Web Search to a new Linux server with QuickFinder, you must manually copy files from NetWare to Linux so that everything doesn't have to be newly created.
- QuickFinder 5.0 indexes are not compatible with previous version of QuickFinder. The indexes must be regenerated; in addition, you cannot synchronize QuickFinder 5.0 indexes with indexes from a previous version of QuickFinder (and visa-versa).
- The new template files are not placed in the <qfsearch>/Templates directory because this would overwrite any changes you might have made to them.

Instead, they are placed in the <qfsearch>/Templates/Samples directory. To take advantage of the functionality the new templates provide, copy the template files from the <qfsearch>Templates/Samples directory to the <qfsearch>/Templates directory.

Services Not Included in OES 2 Linux

eGuide (White Pages)

eGuide has been removed from OES 2 Linux and will also be removed from OES NetWare in releases subsequent to the initial OES 2 release.

This functionality is now part of the Identity Manager 3.5 User Application. For more information, see the [Identity Manager 3.5 Documentation Web Site](#).

Virtual Office

The Virtual Office (VO) 1.5 product and associated patches are not included in OES SP2. However, version 1.6.1 updates of the product for both OES Linux and OES NetWare are available on the Web.

You can use these updates to either upgrade an existing VO installation or an OES server to version 1.6.1 or to perform a new installation of VO 1.6.1.

To obtain the update, see the Web page for each platform:

[OES Linux](#)

[OES NetWare](#)

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