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# How to Use This Manual

## Introduction

*Installing and Using NetSync* tells you how to connect NetWare 3.1x servers to a NetWare 4 server using NetSync.



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## Contents Overview

### Before Using NetSync

This chapter describes what you need to do before installing NetSync and gives you conceptual information about NetSync.

### Installing NetSync

This chapter gives instructions on how to install a NetSync cluster by installing NETSYNC4 on a NetWare 4 server and installing NETSYNC3 on NetWare 3.1x servers.

### Using the NetSync Options Menu

This chapter describes how to configure NetSync and monitor its operation.

### Printing Support for NetSync

This chapter describes how printing works in NetSync.

## NetSync Issues

This appendix covers issues NetWare issues that apply specifically to using NetSync.

## Command Syntax Conventions

Command line utilities are entered at the system prompt. The following example illustrates several command line syntax conventions.

```
MAP [P | NP] [options ...] drive:= [drive: | path]
```

After typing the command, press <Enter> to execute the command.

Convention	Explanation
<b>Boldface</b> characters	Boldface characters indicate items that you type at the prompt, such as commands.
<i>Italicized</i> characters	Italicized characters indicate variables that you replace with information pertinent to your task.
... (ellipses)	Ellipses indicate that parameters, options, or settings can be repeated.
[ ]	An item enclosed in square brackets is optional. You can enter the command with or without the item.
[[ ]]	Items enclosed by nested square brackets are optional, but if you use the items within the innermost brackets, you must also use the items within the outer brackets.
	When items are separated by delimiter bar, you can use either item, but not both
{ }	Curley braces indicate that you must choose one of the enclosed options.

## Online Help

- ◆ **Context-sensitive help.** If you are using a NetWare menu utility and want more information about how to complete a task, press <F1>.

If you are unsure how to use a command, type the command name and add the `/?` option for help. For example, for help with the RIGHTS command, type “RIGHTS `/?`”.

- ◆ **DynaText online documentation.** The DynaText viewer allows you to read NetWare documentation from your DOS, MS Windows, Macintosh\*, UNIX, or OS/2\* workstation.

All NetWare 4™ and 3.12 documentation except the *Quick Access Guide* are available on the *NetWare Online Documentation CD-ROM*.

## User Comments

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## What NetSync Does

NetSync is a management utility that allows you to extend part of the benefits of the Novell® Directory Services™ architecture to NetWare 3.1x file servers. Specifically, NetSync lets you

- ◆ Synchronize NetWare 3.1x users and groups with objects in a NetWare 4 server's bindery context

For more information, see "Bindery context" in *Concepts*.

When you update or create a user in the bindery context of the NetWare 4 host, that user is synchronized with all NetWare 3.1x servers in the NetSync *cluster*.

(A NetSync *cluster* consists of one NetWare 4 server and up to 12 attached NetWare 3.1x servers.)

The user now exists on all NetWare 3.1x servers that are part of the cluster and are actively attached. Consequently, you don't have to update or create this user on each NetWare 3.1x server.

- ◆ Manage NetWare 3.1x users and groups from within the NetWare 4 administrative utilities (NETADMIN or NetWare Administrator)

Do not use SYSCON for these tasks.

- ◆ Move NetWare 3.1x print services to a NetWare 4 server

(See "Printing Support for NetSync" on page 45.)

- ◆ Manage NetWare 3.1x printing with the NetWare 4 print utilities (NetWare Administrator or PCONSOLE)

Do not use NetWare 3.1x printing utilities to manage print services moved to the NetWare 4 host.

# When to Use NetSync

Use NetSync on your NetWare 3.1x and NetWare 4 servers if:

- ◆ You are running NetWare Name Service® (NNS) software and don't want to upgrade all servers in an NNS® domain to NetWare 4 simultaneously
- ◆ You need a temporary solution for central administration of a mixed network before full migration to NetWare 4--if you want a centrally administered, mixed NetWare 3.1x and NetWare 4 network that consists of at least one NetWare 4 server and a maximum of twelve 3.1x servers per NetWare 4 server
- ◆ You want to make existing NetWare 3.1x users, groups, and print queues part of the NetWare 4 Directory database, without upgrading all NetWare 3.1x servers to NetWare 4

Do not use NetSync if

- ◆ You have only NetWare 4™ servers on your network
- ◆ You intend to migrate all your NetWare 3.1x servers to NetWare 4 simultaneously or within a short time period
- ◆ You plan to have a separate network supervisor for each NetWare 3.11 server in your network who will continue to manage users and groups with SYSCON and other NetWare 3.1x utilities
- ◆ You do not see a need to make NetWare 3.11 users and groups part of the NetWare 4 Directory database

# How NetSync Works

To run NetSync, you select one NetWare 4 server to be the host for up to 12 NetWare 3.1x servers. The host's function is to

- ◆ Act as a repository for bindery objects that are copied into its bindery context
- ◆ Download all the objects in its bindery context to the 3.1x servers that are synchronized with the host

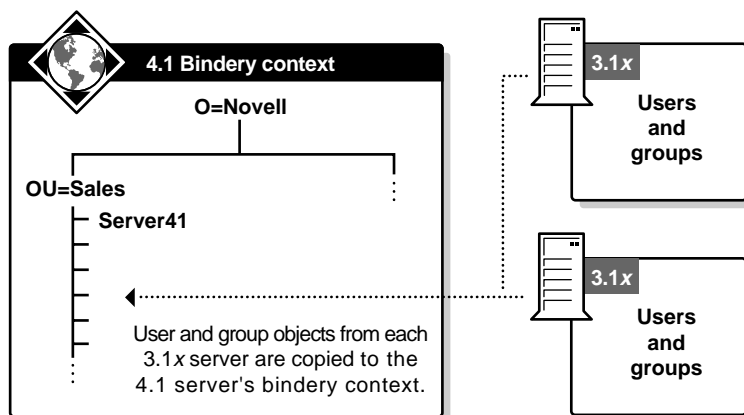
- ◆ Continuously monitor changes to objects in the NetWare 4 bindery context, and then download those changes to all attached NetWare 3.1x servers in the NetSync cluster
- ◆ Update the bindery of 3.1x servers when they are brought up again after downtime

## NetSync Modules

You load NetSync NLM™ programs first on the NetWare 4 host server and then on the NetWare 3.1x servers. These programs allow the servers to communicate with each other.

They initially copy (upload) all users and groups from the NetWare 3.1x servers' binderies into the bindery context of the NetWare 4 server, as illustrated in the following figure.

Figure 1-1  
NetWare 3.1x  
bindery is uploaded  
to NetWare 4 host



NetSync depends on the setting of a bindery context on the NetWare 4 server, and this bindery context must not be changed. The default bindery context set for NetWare 4 is the container where the server is installed.

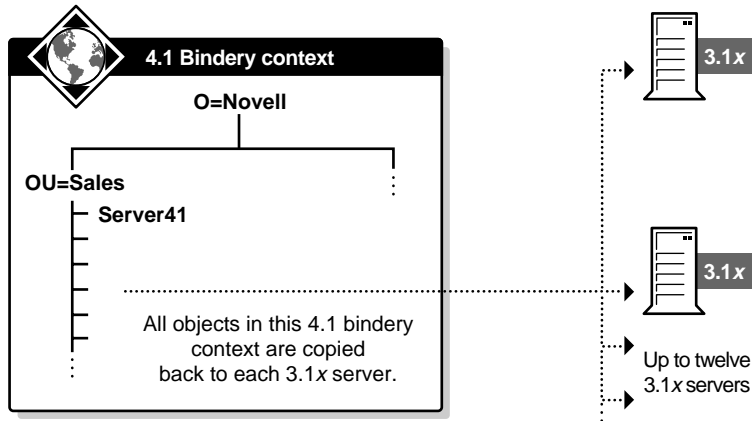
However, you can set the bindery context for NetSync to any context in the Directory; the NetWare 4 host's Server object does not have to be part of this bindery context.

For more information on setting a bindery context, see “SET” in *Utilities Reference*.

All bindery and Directory Services User and Group objects are combined and copied to each NetWare 3.1x server. Each NetWare 3.1x

server then has a copy of this “super-bindery,” as illustrated in the figure below.

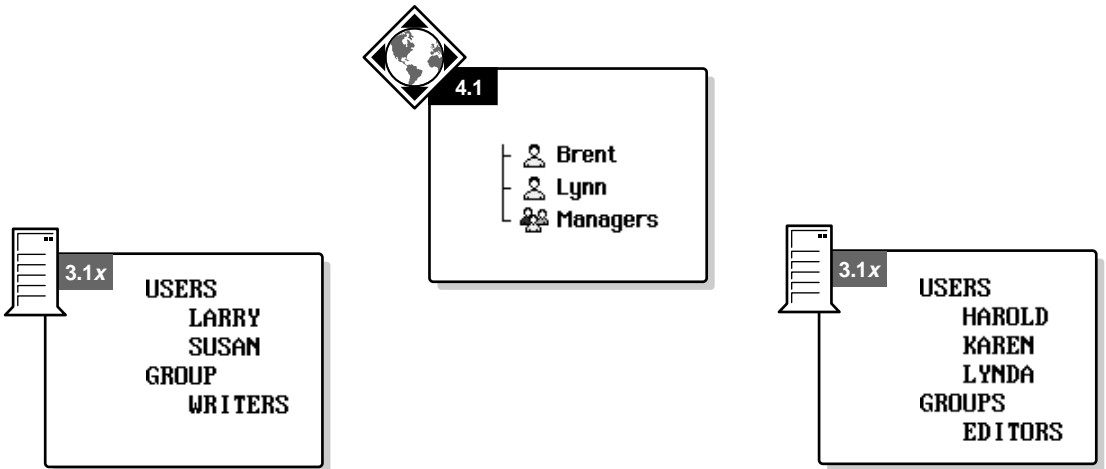
Figure 1-2  
Super-bindery  
copied to 3.1x  
servers



Consequently, any NetWare 3.1x user can access any other NetWare 3.1x server that is part of the same NetSync cluster. (File access is still controlled by trustee rights, which must be assigned locally on each server, as before.)

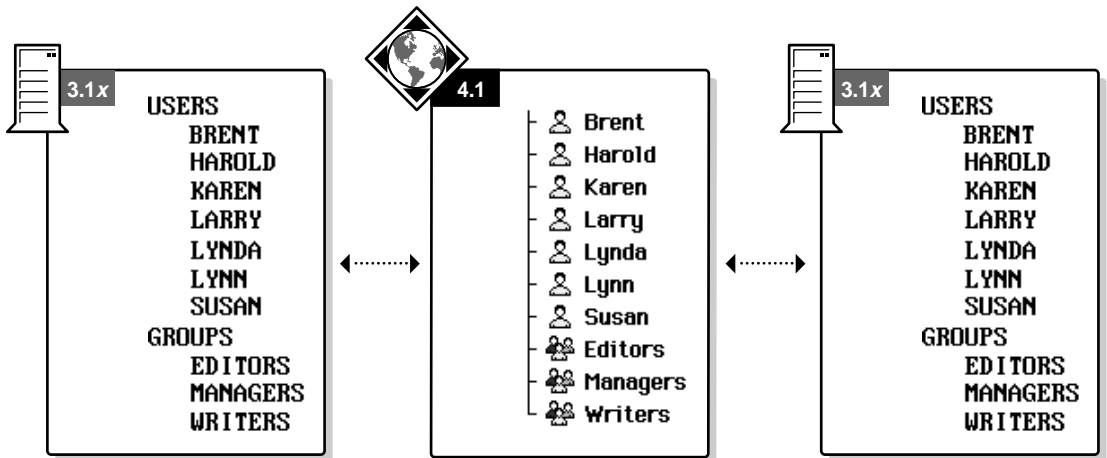
The following illustration shows example users and groups on one NetWare 4 and two NetWare 3.1x servers before the installation of NetSync.

Figure 1-3  
Users and Groups before installing NetSync



After the installation of NetSync, the example users and groups are distributed as follows.

Figure 1-4  
Users and Groups after installing NetSync



## Bindery Synchronization

Under normal circumstances, synchronization of the NetWare 3.1x servers' binderies with the NetWare 4 Directory is required only once—when the NetWare 3.1x server is first brought into the NetSync environment.

Updates from the NetWare 4 bindery context to the NetWare 3.1x servers then happen automatically and continuously, whenever changes are made to objects in the NetWare 4 server's bindery context.

The NetWare 4 server also downloads the bindery context to a NetWare 3.1x server whenever that 3.1x server is brought up again after downtime. This download brings the 3.1x server up to date on changes made to the bindery context while it was down.

## Use NETADMIN, Not SYSCON

After synchronization, make all changes to users or groups on the NetWare 3.1x servers with NETADMIN or NetWare Administrator. Changes made this way are automatically dispersed to all other servers in the NetSync cluster.



Any changes made with NetWare 3.1x administrative utilities (such as SYSCON) on NetWare 3.1x servers are *not* copied to other servers in the cluster, so your servers will get out of sync. Therefore, don't use SYSCON except to manage accounting charge rates on each NetWare 3.1x server. (Accounting rate changes are not handled by NetSync.)

If, after installing NetSync, you use SYSCON to change user or group information on a 3.1x server and want to synchronize this information, you must recopy the bindery information to the NetWare 4 server. (See “Copying a NetWare 3.1x Server's Bindery to NetWare 4” on page 41.)

## Multiple 4 Servers in the NetSync Bindery Context

If you have more than one NetWare 4 server running NetSync with the same bindery context, all NetWare 3.1x servers attached to these hosts are synchronized with the same “super-bindery.”

For example, assume five NetWare 4 servers have the same bindery context. All five servers are running NetSync, and each of them has 12 NetWare 3.1x servers attached.

All 60 NetWare 3.1x servers upload their binderies to the NetWare 4 bindery context, and the whole bindery context then gets downloaded to these 60 NetWare 3.1x servers.

While there is no fixed upper limit to the number of NetWare 4 servers per bindery context, be aware that NetSync is a memory- and CPU-intensive process. The more objects being synchronized, the more synchronization overhead the servers experience.

## Moving Print Servers

With NetSync, you can move all NetWare 3.1x print servers and merge them into a single print server on the NetWare 4 server. Existing print queues appear the same to users, but are now serviced by the NetWare 4 print server.

Old NetWare 3.1x print utilities are automatically replaced with NetWare 4 print utilities that have been copied to the NetWare 3.1x servers.

For more on NetSync printing, see “Printing Support for NetSync” on page 45.

## Which Objects Are Synchronized

NetSync synchronizes the following objects:

- ◆ Users and all their properties, for example, passwords, login scripts, and login restrictions
- ◆ Groups
- ◆ Profiles (NetWare Name Service)
- ◆ Print queues created on NetWare 3.1x servers and changes made to print queues on the NetWare 4 server

## What Information Does Not Get Synchronized

- ◆ User SUPERVISOR (each NetWare 3.1x server will have a separate SUPERVISOR and corresponding password)
- ◆ User object ADMIN (on the NetWare 4 server)
- ◆ Print queues created on the NetWare 4 server.
- ◆ Accounting charge rates and account balances (specific to NetWare 3.1x servers; charge rates are managed through SYSCON.)
- ◆ Object names that include characters that were illegal in bindery names  
  
(Illegal characters for bindery names are \$, ?, \, /, ", [, ], :, |, <, >, +, and =. Illegal characters can vary among different languages.)
- ◆ File system rights that NetWare 3.1x users and groups have on the NetWare 3.1x server (these rights continue to be server-specific and are only valid for the volumes on those servers)
- ◆ System login scripts

## NetSync Modules

NetSync consists primarily of three loadable modules: NETSYNC4, NETSYNC3, and REMAPID. These and other modules (explained in the following table) are needed for NetSync to function properly.



NetWare Module	Description
NETSYNC4	<p data-bbox="461 189 1224 274">Loaded on the NetWare 4 “host” server. Use this module to control the NetSync cluster. You can authorize NetWare 3.1x servers and copy necessary files to 3.1x servers.</p> <p data-bbox="461 300 1224 413">Once synchronized, when changes are detected, NETSYNC4 copies (downloads) updated Directory information to all attached NetWare 3.1x servers in the cluster. It also copies updated Directory information to 3.1x servers that are brought up again after downtime.</p> <p data-bbox="461 439 1224 552">NETSYNC4 should run continuously, so you should add the command <b>LOAD NETSYNC4</b> to the NetWare 4 server’s AUTOEXEC.NCF file. (This command can be added automatically during the NetSync installation process.)</p>
NETSYNC3	<p data-bbox="461 586 1224 699">Loaded on each NetWare 3.1x server in the cluster. Copies (uploads) the 3.1x server’s bindery information to the NetWare 4 server’s bindery context, then continues to communicate with the NetWare 4.1 server to receive updates to its bindery.</p> <p data-bbox="461 725 1224 810">NETSYNC3 converts the 3.1x PRINTDEF and PRINTCON databases to a database format compatible with NetWare 4 so you can move print servers and their associated queues and printers to NetWare 4.</p> <p data-bbox="461 836 1224 888">NETSYNC3 creates a working directory (NETSYNC) for the NetSync log files under SYS:SYSTEM.</p> <p data-bbox="461 914 1224 1055">NETSYNC3 should run continuously, so you should add the command <b>LOAD NETSYNC3</b> to the NetWare 3.1x server’s AUTOEXEC.NCF file. (This command can be added automatically during the NetSync installation process). However, NETSYNC3 can run only if NETSYNC4 is already loaded on the NetWare 4 server.</p>
REMAPID	<p data-bbox="461 1090 1224 1175">Autoloaded by NETSYNC3.NLM on every NetWare 3.1x server in the cluster. This module handles password synchronization and must remain loaded even if the NETSYNC3 module is unloaded.</p> <p data-bbox="461 1201 1224 1315">REMAPID should run continuously, so you should add the command <b>LOAD REMAPID</b> to the NetWare 3.1x server’s AUTOEXEC.NCF file. (This command can be added automatically during the NetSync installation process.)</p>

NetWare Module	Description
Additional NetWare 3.1x loadable modules (CLIB, STREAMS, NWPSRV3X, NWSNUT, AFTER311, A3112, and PBURST [NetWare 3.11 only])	The latest versions of these modules must replace older versions on all NetWare 3.1x servers in the NetSync cluster. These modules are automatically copied to your NetWare 3.1x servers when you install NetSync.

## Location of NetSync Log Files

NetSync log files track the messages displayed while NetSync is running. This includes all events that were handled, uploads and downloads that were completed, and so on.

Log files are located in SYS:SYSTEM\NETSYNC on each NetWare 3.1x server in the cluster and on the NetWare 4 server.

This directory is created when you load NETSYNC3 on a NetWare 3.1x server, and is created on a NetWare 4 server during the regular server installation process.

The log file is an ASCII file, default maximum size 0.5 MB, called NETSYNC.LOG. This file will grow to the designated size.

If it is not cleared before it reaches 0.5 MB (or other specified size), this file is automatically renamed to NETSYNC.OLD and a new NETSYNC.LOG is begun.

To change the maximum size of the log file, see “Changing the Size of the Log File” on page 36.

Only two NETSYNC log files are retained at any time. Older files are deleted automatically.

You can turn off the log file option so that none is created (see “Disabling the Log File” on page 38). By turning off the log file, you might notice an increase in the speed of network operations.

## What Happens When You Unload NetSync

When you unload NETSYNC4 at the NetWare 4 server's console, NETSYNC3 is automatically unloaded from all authorized NetWare 3.1x servers in the NetSync cluster. To reload, load NETSYNC4 before NETSYNC3.

REMAPID.NLM, which handles password synchronization and is automatically loaded by NETSYNC3.NLM, must remain loaded on the NetWare 3.1x server.



REMAPID.NLM must remain resident for users to continue to be able to log in to a NetWare 3.1x server. If you unload REMAPID, you must reload REMAPID to restore the passwords or manually assign new passwords to all users in the system.

## Managing NetSync Users

### Don't Use SYSCON

Manage users and groups *only* from within NetWare 4 utilities (NETADMIN or NetWare Administrator.) Do not use SYSCON to administer these objects, because changes made in SYSCON are not synchronized across the NetSync cluster.

Consequently, using SYSCON on a NetWare 3.1x server to manage users and groups will cause this server to become out of sync. Thus, the whole purpose of using NetSync is defeated.

### Eliminate Duplicate Objects before Using NetSync

Make sure that there are no duplicate Directory Services or bindery object names (except names of print queues or printers) that refer to different objects on any NetWare servers that are part of the same NetSync cluster.

Any existing Directory Services object takes precedence over any bindery object of the same name.

Objects with identical names can exist on different NetWare 3.1x servers that are uploaded into the same bindery context under NetSync.

However, Novell Directory Services on the NetWare 4 server does not allow more than one object with the same name in the same bindery context.

Consequently, when you upload NetWare 3.1x binderies into the same context, conflicts may arise.

Duplicate object conflicts can arise for

- ◆ Objects of the same type
- ◆ Objects of different types
- ◆ Existing objects in a bindery context path
- ◆ Object names containing diacritic characters

## Objects of the Same Type

Assume that two user objects named Joe are on two NetWare 3.1x servers that will be part of the same NetSync cluster.

- ◆ If the two Joes are the same person, NetSync will merge the two objects in the NetWare 4 bindery context.

Be aware that the user Joe on the first NetWare 3.1x server to be synchronized (Joe A) takes precedence-- he gets created as an object with all properties intact.

When NetSync encounters the second user Joe (Joe B), it scans Joe B's properties for any that did not exist for Joe A. If a property already exists, Joe B's property is discarded. If a property does not already exist, Joe B's property is added, merging the two Joes.

- ◆ If the two Joes don't refer to the same user, change login names before running NetSync so that the two Joes have distinct names, such as JSmith and JJones.

Otherwise, the two users will be merged as in the above example—the difference being that both user's definitions are now corrupted, because the usernames did not refer to the same user.

For example, the merged user Joe might have Joe A's email address and login restrictions but have Joe B's login script.

## Objects of Different Types

Avoid using the same name for different object types, such as a print queue named Joe and a user named Joe. Using duplicate names causes problems when the objects are uploaded by NetSync.

When you run NetSync and multiple objects have identical names on NetWare 3.1x servers, only the first object to be uploaded will be converted to a Directory object.

For example, if print queue Joe gets uploaded to the NetWare 4 bindery context before user Joe, print queue Joe will become a Print Queue object.

User Joe, however, since his object type is different from Print Queue Joe, will become an object of type “bindery object,” and will not show up as a User object. User Joe would not be able to access Novell Directory Services but would be able to access bindery services.

For more information on bindery objects, see “Bindery object” in *Concepts*.

## Objects in a Bindery Context Path

See “Duplicate Names in a Bindery Context Path” on page 62.

## Object Names Containing Diacritic Characters

See “Usernames Containing European Diacritic Characters” on page 61.

## Home Directories in NetSync

When a user is created in the NetWare 4 bindery context and synchronized with the NetWare 3.1x servers, NetSync does not create a home directory for that user on each NetWare 3.1x server.

Likewise, when users are copied from the NetWare 3.1x server into the NetWare 4 Directory, no home directory is created on the NetWare 4 server.

You cannot create home directories automatically for users in a NetSync environment. If you need home directories on other than the original server, you must manually create them (and grant rights).

## Accounting and NetSync

Charge rates and account balances are not synchronized. Charges made on a NetWare 3.1x or NetWare 4 server stay local to the server they are made on.

For example, when a user uses time on a NetWare 3.1x server, the user's account balance is diminished on that 3.1x server only.

You must still manage accounting and charge rates for the NetWare 3.1x servers through SYSCON, and for the NetWare 4 Directory through NETADMIN or NetWare Administrator.

## Login Considerations

### How Users Log In

NetSync automatically copies the NetWare 4 LOGIN utility to the SYS:LOGIN and SYS:PUBLIC directories on the NetWare 3.1x server. The "old" NetWare 3.1x LOGIN utility is overwritten.

However, users can still log in to NetWare 3.1x servers the same way they always have.

Users can log in using Virtual Loadable Module™ (VLM) programs or NETX software. Workstations need to use VLM programs only if users want to access Novell Directory Services on the NetWare 4 server.

The older NETX client software cannot authenticate to Novell Directory Services, but it can still be used for logging in to a NetWare 4 server through bindery services. (For more information on bindery services, see "Bindery services" in *Concepts*.)

To log in to a NetWare 4 server through bindery services, use the following syntax:

```
LOGIN servername/username /B <Enter>
```

or

```
LOGIN /B <Enter>
```

## What Happens to Passwords

Passwords are the only pieces of information in NetSync that are synchronized in both directions.

This means that users can change their passwords on any server in the NetSync cluster (even with NetWare 3.1x utilities on their 3.1x server), and the change is propagated throughout the cluster.

In NetWare 3.1x, if users have accounts on more than one server, they will typically maintain the same password on all servers.

When changing their password with 3.1x SETPASS or LOGIN, the utility will ask them if they want to synchronize password changes to all attached servers.

With NetSync, passwords are synchronized automatically for servers that are in the same cluster, even if users say “No” to the “synchronize passwords” question.

## What Happens to Login Scripts

### User Login Scripts

On a NetWare 3 server, a user login script is a file in each user’s MAIL directory. On a NetWare 4 server, a user’s login script is a property of the User object.

NetSync synchronizes the MAIL directory login script on the NetWare 3.1x server with the NDS login script property.

When you change the user’s login script, use the NetWare 4 utilities to change the NDS login script property, and the change will be synchronized to the NetWare 3.1x MAIL directory.

By default, NetSync also creates a login script file in the user's MAIL directory on the NetWare 4 server. (You can disable this parameter as one of the configuration options. See "Disabling the Synchronization of 3.1x Login Scripts with NetWare 4 Login Scripts" on page 38.)

If you allow this, the user login script will be synchronized in three places: the NDS login script property on the NetWare 4 server, the user's 3.1x MAIL directory, and the user's NetWare 4 MAIL directory.

Creating a login script file in the user's NetWare 4 MAIL directory allows the user to log in to the NetWare 4 server and have the same user login script execute regardless of whether the user is using VLM programs and Directory Services software (which use the NDS login script property) or bindery services software and NETX or VLM programs (which use the MAIL directory file.)

Login scripts are synchronized when uploaded from NetWare 3.1x servers to the NetWare 4 server, when downloaded from the NetWare 4 to the NetWare 3.1x server, or when an update event is detected.

To prevent synchronization, see "Disabling the Synchronization of 3.1x Login Scripts with NetWare 4 Login Scripts" on page 38.



If multiple NetWare 4 servers have the same bindery context and you want to keep the user's NetWare 3.1x login script in SYS:SYSTEMMAIL synchronized with the Directory Services login script on all the NetWare 4 servers, run a copy of NETSYNC4 on each NetWare 4 server. This allows users to log in to the NetWare 4 servers with a bindery login.

## System Login Scripts

System login scripts are not synchronized, because they are specific to each NetWare 3.1x server.

When a user logs in to a NetWare 3.1x server, that server's system login script executes, giving the user server-specific drive mappings.

When the user uses VLM programs and logs in to the NetWare 4 server, authenticating to Novell Directory Services, the NDS container object's login script executes instead.



# NetWare Name Service (NNS) Considerations

If you use NNS, you can replace it with NetSync. NetSync will automatically convert most of the NNS configuration information to a form usable by NetWare 4. Then when you are ready to upgrade the 3.1x servers in the NetSync environment to NetWare 4, it will be a much easier process.

To keep the servers in the NNS domain synchronized, you must migrate all NetWare 3.1x servers in the NNS domain to NetSync at the same time.

Once you load NETSYNC3 on a NetWare 3.1x server, NNS is automatically uninstalled. The NETSYNC3 NLM checks for the presence of NNS on the server, and then removes the server from the NNS domain.

When NetSync is installed, NNS profiles are converted to Novell Directory Services (NDS) profiles. NNS profile login scripts are assigned to Profile objects and still available for use.

The default profile property in NNS is converted to the profile property in Novell Directory Services, so users who had default profiles in NNS still have them in NetWare 4 with NetSync.

Although the NetWare 3.1x LOGIN utility does not allow profile login scripts, the new NetWare 4 LOGIN utility does. The NetWare 4 LOGIN utility is copied to each NetWare 3.1x server during NetSync installation.

If you want to continue using the drive mappings that were defined in the profile login scripts, you must add an attach statement for each server to which you are mapping a drive in the system login script on each 3.1x server. This will allow users to continue using these mappings without logging in again.

This means that NetSync users can use profile login scripts on 3.1x servers even if they weren't previously using NNS.

To assign a profile login script to a NetSync user, use NETADMIN or NetWare Administrator to select that User object and assign it to the profile. You must manually grant rights to read the profile login script.

The login scripts execute in this order: system login script (specific to each 3.1x server), profile login script, and then user login script.

NetSync will also upgrade NNS printing. See “Upgrading NetWare Name Service (NNS) Printing” on page 57.

## Managing NetSync Problems

### If a NetWare 3.1x Server Goes Down

If a NetWare 3.1x server goes down, that server will miss synchronization information that occurs during the downtime.

When the server is brought back up, the NetWare 4 bindery context is copied (downloaded) to the server again, to ensure that it has all updates that occurred while it was down.



Don't delete or rename objects unless all servers in the NetSync cluster are running. If you delete or rename User or Group objects in the NetWare 4 bindery context during down time, the NetWare 3.1x server will be out of sync.

This occurs because deleted objects are not cleared after the connection is re-established. Then, if you manually upload the NetWare 3.1x server's bindery to the NetWare 4 side (see “Copying a NetWare 3.1x Server's Bindery to NetWare 4” on page 41) the deleted objects are re-created and again synchronized with the other NetWare 3.1x servers.

### If the NetWare 4 Server Goes Down

If the NetSync host goes down while the binderies of one or more NetWare 3.1x servers are being copied (uploaded), restart the synchronization when the server comes back up by recopying the bindery information of the affected NetWare 3.1x servers.

(For more information, see “Copying a NetWare 3.1x Server's Bindery to NetWare 4” on page 41.)

### If the Server Runs Out of Disk Space

If a NetWare 3.1x or NetWare 4 server runs out of disk space for the bindery synchronization information, an error message is displayed on each server.

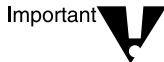
Either add more disk space to the server or delete unnecessary files.  
Then reload NETSYNC3.NLM or NETSYNC4.NLM.



## Prerequisites

### Hardware

- ◆ At least one NetWare® 4™ server.
- ◆ Up to twelve NetWare 3.1x servers per NetWare 4 server.



No additional RAM and disk space should be required to run NetSync. However, note that running NetSync is memory- and CPU-intensive on the NetWare 4 server and CPU-intensive on the NetWare 3.1x servers.

With NetSync running, do not let the cache buffer count drop below 200 (on the NetWare 4 server) or server utilization rise above 80% (on both NetWare 4 and 3.1x servers.) You can see server usage of these with the MONITOR utility.

### Software

- ◆ NetSync files  
The necessary files are already on the NetWare 4 server in the SYS:SYSTEM directory (NetWare 4 files) and the SYS:SYSTEM\NETSYNC directory (NetWare 3.1x files). The NetSync files needed by the 3.1x servers will be copied (downloaded) during the installation process.
- ◆ One free licensed connection on the NetWare 4 server  
A licensed connection is temporarily required while each NetWare 3.1x server in the cluster is authenticated. Once the 3.1x server is authenticated, the licensed connection is freed.

## Tasks

- ◆ Clean up duplicate usernames on all NetWare servers that will be part of the NetSync cluster. (See “Managing NetSync Users” on page 11.)
- ◆ Make sure the bindery context you want NetWare 3.1x servers to be synchronized with is set on the NetWare 4 host. The default bindery context on the NetWare 4 host is set to the context where the server is installed.

If you have several containers in your bindery context path, any objects NetSync creates will be placed in the first container in the path. For more information about how NetSync deals with bindery context paths, see “Duplicate Names in a Bindery Context Path” on page 62.

During installation, NetWare adds the command `SET BINDERY CONTEXT= default` to the NetWare 4 server’s AUTOEXEC.NCF file.



Change this bindery context only before you run NetSync. Once NetSync is running, do not change the bindery context.

- ◆ Make sure you have a valid user account and rights to the SYS:SYSTEM directory on all servers you want to install NetSync on.

## Loading NETSYNC4 on a NetWare 4 Server



You must load NETSYNC4 on the NetWare 4 server and authorize the 3.1x servers before loading NETSYNC3 on the NetWare 3.1x servers. Otherwise, the NetWare 3.1x servers cannot connect to the NetSync cluster.

### Procedure



1. **Load NETSYNC4 on the NetWare 4 server.**

At the NetWare 4 server’s console, type

```
LOAD NETSYNC4 <Enter>
```

NETSYNC4 autoloads the following modules to run properly: CLIB, STREAMS, DSAPI, NWPSRV, and NWSNUT.

The SYS:SYSTEM\NETSYNC directory is automatically created during NetWare 4 server installation. This directory contains

- ◆ NetSync log files
- ◆ NetSync files that can be copied automatically to the NetWare 3.1x servers in the cluster

## Authorizing a NetWare 3.1x Server

After you load NETSYNC4, you must authorize each NetWare 3.1x server that is to use NetSync. This allows these NetWare 3.1x servers to attach to the NetWare 4 host.

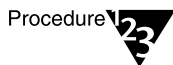
After you load NETSYNC4, a screen similar to the following appears.

Figure 2-1  
Screen when first load NETSYNC4

Authorized 3.1x Servers	
1	7
2	8
3	9
4	10
5	11
6	12

NO 3.1x servers are currently authorized to attach to this server for bindery synchronization. Each server MUST be authorized before it can attach. You must authorize at least one server to continue.  
<Press ENTER to continue>

### Procedure



1. **Press** <Enter>.

The "Options" menu appears with the "Edit Server List" option selected.

2. **Press** <Enter> to choose the "Edit Server List" option.

3. To start authorizing individual 3.1x servers, on a blank line press <Enter> or <Ins>.

A screen similar to the following appears.

Figure 2-2

### Authorized Server Information screen

Authorized Server Information
3.1x File Server Name: NetSync Password: Install NetSync Files on the 3.1x Server: Yes Copy 3.1x Bindery to 4.x: Yes

4. Enter the name of the NetWare 3.1x server whose bindery you want to synchronize with the NetWare 4 host.
5. Set the NETSYNC password.

This is not a user password, but a password that the NetWare 3.1x server uses to connect to the NetWare 4 server. This password is used only for NetSync authorization purposes, to establish the initial NetSync attachment between the NetWare 4 host server and the NetWare 3.1x servers. You specify this password two times:

- ◆ On this NetWare 4 server, you set the password to initially authorize the NetWare 3.1x server.
- ◆ On each NetWare 3.1x server, you specify the same password to initially attach to the NetWare 4 server's NetSync cluster. NetSync creates its own randomly generated password after that. (See "Loading NETSYNC3 on a NetWare 3.1x Server" on page 27.)

You can specify a different NetSync password for each NetWare 3.1x server. However, the password you set for the 3.1x server has to match the one you will enter on the NetWare 3.1x server to attach to the NetWare 4 server.

Therefore, remember the password you are using in this step. If you should forget the password, you must remove this server from the "Authorized 3.1x Servers" list and re-authorize it, giving it a new password. Once you enter the password on the 3.1x server and it attaches to the NetWare 4 server, you won't use the



password again. (For more information, see “Adding to the List of Authorized Servers” on page 40.)



Do not use the ADMIN or the SUPERVISOR password as the NETSYNC password. Doing this could pose a security risk.

- 6. To copy NetSync files to the NetWare 3.1x server, press the Down arrow key. Otherwise, press <Enter> and type “No.”**



This option appears only when you initially authorize a NetWare 3.1x server. If you subsequently edit the server information, you do not receive the option to copy files.

The default is Yes. If you are authorizing this NetWare 3.1x server for the first time, accept the default.

This option causes all files necessary for running NetSync to be copied from the NetWare 4 server’s SYS:SYSTEM\NETSYNC directory to several directories on the NetWare 3.1x server. For a complete list of files that are copied, look in the file INSTALL.DAT in the SYS:SYSTEM/NETSYNC directory on the NetWare 4 server.

- 7. To copy (upload) bindery data from the NetWare 3.1x server to the NetWare 4 server, press the Down arrow key. Otherwise, press <Enter> and type “No.”**

For the initial installation, the default is Yes. Subsequently, the default is No.

The bindery data copied includes User and Group objects and their properties.

In most cases, answer “Yes.” Answer “No” only in two instances:

- ◆ This server is running NetWare Name Service® (NNS) and you already copied all the domain information to the NetWare 4 server when you authorized another NNS® server. (You can still answer “Yes,” but the bindery data is discarded because it already exists.)
- ◆ You don’t want to upload this server’s user and group bindery objects, but you still want this server to be part of the NetSync cluster. In this case, the 3.1x server would be out of sync with the NetWare 4 server.

- 8. To confirm your responses, press <Esc> and then <Enter>.**

**9. Enter a username for the NetWare 3.1x server.**

This username is necessary so that NetSync can log in to the 3.1x server to copy files to the SYS:SYSTEM and SYS:PUBLIC directories if you answered “Yes” in Step 6 on page 25.

This user has to have Read, Write, Modify, and Delete rights to the SYS:SYSTEM directory on the NetWare 3.1x server. The username “SUPERVISOR” is a good choice, but you can choose another username that has these rights.

**10. Enter this user’s password.**

If the files copied successfully, a message similar to the following appears:

```
Installation of NetSync was successful. NOTE:  
Some NLMs may have been replaced! It is therefore  
recommended that server servername be restarted  
before running NetSync on it. This will ensure  
that the current versions of the NLMs are loaded.  
Press <Enter> to continue.
```

**11. Press <Enter>.**

After a short while, the name of the NetWare 3.1x server you just authorized appears in the “Authorized 3.1x Servers” box.

If this is the first server in the list you have authorized, you are also asked if you want to add commands to the AUTOEXEC.NCF file on the NetWare 4 server to automatically load NETSYNC4.

For each 3.1x server, you are also asked if you want to add commands to the AUTOEXEC.NCF file on the 3.1x server to automatically load NETSYNC3.

One of the following three symbols can appear next to the server name in the list.

Symbol	Explanation
*	You are currently attached to this server.
@	This server is currently receiving downloaded bindery information from the NetWare 4 host
!	This server is currently copying (uploading) information to the NetWare 4 host.

- 12. To authorize additional NetWare 3.1x servers to be part of this NetSync cluster, repeat Steps 2 through 10 for each server.**
- 13. (Optional) To configure the NetSync environment on this NetWare 4 server, press <Esc> to activate the “Options” menu.**

After you have authorized at least one NetWare 3.1x server, you can access the “Options” menu. For more information, see “Using the NetSync Options Menu” on page 33.

## Loading NETSYNC3 on a NetWare 3.1x Server

You must load NETSYNC3 on each NetWare 3.1x server that you want to synchronize with the NetWare 4 host. Make sure NETSYNC4 is already loaded on the NetWare 4 server.

### Procedure



- 1. Restart each 3.1x server from its console.**

You need to restart the server because NetWare 4 versions of some NetWare modules were copied to the NetWare 3.1x servers when you ran NETSYNC4. These newer versions will execute, however, only if the old versions are no longer in memory.

These modules are replaced by NetWare 4 versions:

PSERVER.NLM  
CLIB  
STREAMS

NWSNUT  
AFTER311  
A3112  
PBURST (NetWare 3.11 only)

Some utilities on the 3.1x server are also replaced. You can see a list of replaced utilities in the file INSTALL.DAT in the directory SYS:SYSTEM/NETSYNC on the 3.1x server.

For more information on running RCONSOLE, see “Using Remote Console to Manage a Server” in Chapter 7 of *Supervising the Network*.

**1a. At the 3.1x server, type**

DOWN <Enter>

**1b. At the 3.1x server, type**

EXIT <Enter>

**1c. At the DOS prompt, type**

SERVER <Enter>

**1d. At each NetWare 3.1x server's console type**

LOAD NETSYNC3 [/C] <Enter>

The /c option lets you load NETSYNC3 without attaching to the NetSync cluster. You can then modify the configuration options without the changes being uploaded to the NetWare 4 server. This option is useful if you want to delete the configuration options without the NetWare 4 server running.

NETSYNC3 is loaded automatically if you added the command to the AUTOEXEC.NCF file on the 3.1x server.

NETSYNC3.NLM autoloads REMAPID.NLM if it isn't already loaded.

NETSYNC3.NLM also autoloads the following modules: CLIB, STREAMS, NWPSRV3X, NWSNUT, AFTER311, A3112, and PBURST (NetWare 3.11 only).



NETSYNC3.NLM and REMAPID.NLM must run continuously. If you had NetSync copy files to the NetWare 3.1x server, NetSync adds

the commands to load these modules to the AUTOEXEC.NCF file. REMAPID should never be unloaded, even if you no longer run NetSync and NETSYNC3 is removed from the server.

- 1e. **(Conditional: only if the NetWare 3.1x server is part of an NNS domain) Select “Yes” and press <Enter> to remove the server from the NNS domain and load NetSync on the server. Otherwise, select “No” and press <Enter> to keep the server in the NNS domain and to exit the NETSYNC3 program.**

For more information on installing NetSync on NNS servers, see “NetWare Name Service (NNS) Considerations” on page 17.

- 1f. **(Conditional: only if the NetWare 3.1x server was part of an NNS domain) Select “Yes” and press <Enter> to convert NNS replicated (fake) print queues to real queues. Select “No” and press <Enter> to delete the fake queues.**

For more information on converting NNS print queues with NetSync, see “Upgrading NetWare Name Service (NNS) Printing” on page 57.

- 1g. **(Conditional: only if the NetWare 3.1x server was part of an NNS domain and you chose to convert fake print queues to real queues) Select “Yes” and press <Enter> to rebuild NNS printing so it works in NetSync. Select “No” and press <Enter> to leave NNS printing alone.**

For more information on upgrading NNS printing with NetSync, see “Upgrading NetWare Name Service (NNS) Printing” on page 57.

- 1h. **(Conditional: only when you first load NETSYNC3 on this server) Enter the name of the NetWare 4 host that you want this NetWare 3.1x server to synchronize with at the following prompt:**

4.11 Server Name:

- 1i. **(Conditional: only when you first load NETSYNC3 on this server) Enter the NETSYNC password.**

For more information on the NetSync password, see Step 5 on page 24.



NetSync now copies (uploads) NetWare 3.1x bindery information to the NetWare 4 bindery context and downloads that bindery context to this NetWare 3.1x server.

From this point on, do not use SYSCON to modify user and group information on NetWare 3.1x servers in the NetSync cluster. If you do, your servers will be out of sync. Use only NETADMIN or NetWare Administrator.

The “Options” menu appears.

**1j. (Optional) Configure the NetSync environment on the NetWare 3.1x server.**

For more information, see “Using the NetSync Options Menu” on page 33.

**1k. (Optional) Verify that all information is synchronized.**

You can perform some spot checks with the NetWare administrative utilities. (NetWare Administrator or NETADMIN for NetWare 4; SYSCON for NetWare 3.1x.)

- ◆ Log in to a server in the NetSync cluster and verify that you can see all users in the cluster.
- ◆ Create a user from the NetWare 4 server and see how this user is synchronized across the cluster.

For more information see “NETADMIN” in *Utilities Reference* and “NetWare Administrator” in *Utilities Reference*.

## Where to Go from Here

Topic	Reference
Using the “Options” menu to view the log file, etc.	“Using the NetSync Options Menu” on page 33
Moving print services to the NetWare 4 server	“Printing Support for NetSync” on page 45
Technical issues concerning NetSync	Appendix A, “NetSync Issues” on page 61





## Using the NetSync Options Menu

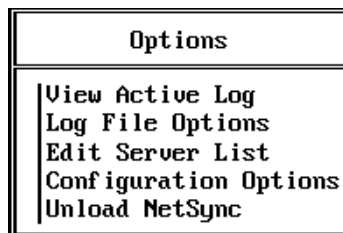
The “Options” menu of NETSYNC3 and NETSYNC4 lets you configure your NetSync environment in detail.

You can perform most tasks on both NetWare 4 and 3.1x servers. Exceptions are noted under the task headings in this chapter.

### NETSYNC4 Menu Options

After you authorize at least one NetWare 3.1x server (see “Authorizing a NetWare 3.1x Server” on page 23), you can access the NETSYNC4 “Options” menu by pressing <Esc>. Subsequently, whenever you load NETSYNC4, the first thing you see is this menu.

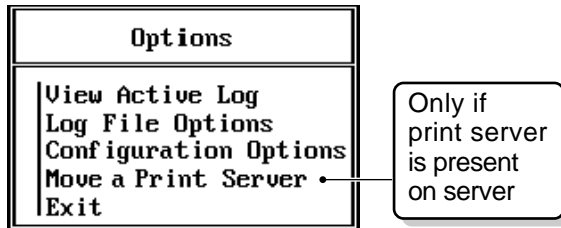
Following is the main “Options” menu on the NetWare 4 server:



### NETSYNC3 Menu Options

After you initially attach to a NetWare 4 host, the NETSYNC3 “Options” menu appears. Subsequently, when you load NETSYNC3, the first thing you see is this menu.

Following is the main “Options” menu on the NetWare 3.1x server:



For more information on moving print servers, see “Printing Support for NetSync” on page 45.

## Managing the NetSync Log File

On each NetWare 4 and 3.1x server, the log file is called NETSYNC.LOG and is located in SYS:SYSTEM\NETSYNC. The NetSync log file can show all synchronization events that occur. Such events include the following:

- ◆ Added, deleted, or changed users or groups
- ◆ Password changes
- ◆ Logins (attachments) to and logouts (detachments) from NetSync servers
- ◆ Login script changes
- ◆ Success or failure of local modification attempts
- ◆ Items queued to be sent to other servers

The following illustration shows a partial log file.

Figure 3-1  
Sample NetSync log screen

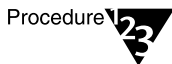
```
01/27/94 10:28:02  ** Status **  
Bindery Context = '0=NOVELL'  
  
01/27/94 10:28:02  ** Status **  
Waiting for Bindery Synchronization Requests...  
  
01/27/94 11:23:21  ** Status **  
Bindery Synchronization Login from TSYNC312  
  
01/27/94 11:23:21  ** Status **  
Password for TSYNC312 changed  
  
01/27/94 11:23:28  ** Status **
```

## Viewing the Log File

On a NetWare 3.1x server, you can view the log file only by using a workstation text editor.

On a NetWare 4 server, you can use either a workstation text editor or the following procedure to view the log file.

### Procedure



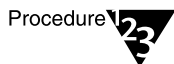
1. From the “Options” menu, select “Log File Options.”
2. Select “View Log File History.”

This allows you to scroll the log file. You can go back and look at previous events that have occurred.

If there is not a large block of contiguous memory, this option might sometimes fail, even if you have a large amount of “free” memory. If this option fails, use a workstation editor to view the log file.

3. To scroll through the file, use the arrow or paging keys.
4. To exit the display, press <Esc>.

## Viewing the Active Log Display



1. From the “Options” menu, select “View Active Log.”

This allows you to view, but not scroll or edit, the log file. This screen scrolls as events occur, showing real-time updates.

2. To exit the display, press <Esc>.

## Changing the Size of the Log File

The default size of the log file is 0.5 MB, the range is from 10 KB (10240 bytes) to 10 MB (10485760 bytes).

You can make the log file smaller to have it take up less disk space. Or, if you want more events to be included in the current file, you can increase its size. If the file is too large, you might not be able to view it.

### Procedure



1. From the “Options” menu, select “Log File Options.”
2. Select “Maximum Size of Log File.”
3. Type the new size of the log file in bytes and press <Enter>.
4. To exit “Log File Options,” press <Esc>.

## Showing Events on the Log Screen

The “Show All Events on Log Screen” option influences whether all events or only major events and failed operations show up on the active log screen.

However, if the log file is enabled, all events are still recorded in the log file for history purposes.

The default is “No” (don’t show all events).



Note

“Expected” failures, such as adding a property to an object when that property already exists, are not shown on the log screen when the option is set to “No.”

### Procedure



Procedure

1. From the “Options” menu, select “Log File Options.”
2. Select “Show All Events on Log Screen.”
3. To show all events, type “Yes”. Otherwise, type “No”.

Changing this option to “Yes” causes all events, instead of only major events and failed operations, to appear on the active log screen.

4. To save your changes, press <Enter>.
5. To exit the “Log File Options” menu, press <Esc>.

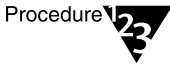
## Deleting the Log File

You can delete the log file when you

- ◆ Remove NetSync from the server
- ◆ Want to delete old log information to be able to start with a new log file

If you delete the log file, a new file is automatically created to log new NetSync data.

### Procedure



Procedure

1. From the “Options” menu, select “Log File Options.”
2. Select “Delete Current Log File.”
3. Delete the log file by typing “Y” and pressing <Enter>.
4. To exit the “Log File Options” menu, press <Esc>
5. Highlight “Yes” or “No” and press <Enter> to confirm your choice.

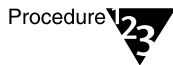
## Disabling the Log File

This option prevents a log file from being created. You could disable the log file if

- ◆ NetSync has run smoothly for some time
- ◆ You want to make your system run a bit more efficiently by eliminating the overhead that a log file creates

The default is “Yes,” meaning that the log file is enabled and gets created by default.

### Procedure



1. From the “Options” menu, select “Log File Options.”
2. Select “Enable Log File.”
3. Disable the log file by typing “N” and pressing <Enter>.
4. To exit the “Log File Options” menu, press <Esc>.

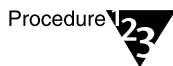
## Disabling the Synchronization of 3.1x Login Scripts with NetWare 4 Login Scripts

You can perform this task only in NETSYNC4.

Synchronization of 3.1x login scripts with NetWare 4 login scripts allows users logging in through bindery services to still have a login script on the NetWare 4 server. The default is “Yes.”

You can choose to not have this synchronization take place. For more information, see “User Login Scripts” on page 15.

### Procedure



1. From the “Options” menu, select “Configuration Options.”
2. Select “Synchronize Login Script Updates to Mail Dir:.”

3. **Disable the synchronization of login scripts to the mail directory on the NetWare 4 server by typing “N” and pressing <Enter>.**

Login scripts are always synchronized to the 3.1x servers mail directory.

4. **To save your changes, press <Enter>.**

## Changing the Watchdog Delay Interval

In NETSYNC4 (on the NetWare 4 host), the watchdog delay interval determines how often the NetWare 3.1x servers in the cluster are checked for proper operation.

In NETSYNC3 (on the NetWare 3.1x servers in the cluster), the watchdog delay interval determines how often the NetWare 4 host is checked for proper operation.

The default interval is five minutes, and the range is from 30 seconds to 64800 seconds (18 hours).

### Procedure



1. **From the “Options” menu, select “Configuration Options.”**
2. **Select “Watchdog Delay Interval.”**
3. **Enter the interval in seconds.**
4. **Press <Enter>.**

# Managing the List of Authorized NetWare 3.1x Servers

Authorized NetWare servers are those NetWare 3.1x servers that are authorized to attach to the NetWare 4 host and, thus, are part of the NetSync cluster.

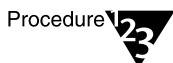
## Adding to the List of Authorized Servers

You can perform this task only in NETSYNC4.

To replace a server on the list with another, first delete the server you are replacing. Then add the new server to the blank spot on the list. You authorize most servers during NetSync installation (see “Authorizing a NetWare 3.1x Server” on page 23.)

Add servers to the NetSync cluster by following this procedure.

### Procedure



1. **At the NetWare 4 server console, load NETSYNC4.**
2. **From the “Options” menu, select “Edit Server List.”**
3. **Highlight an empty slot and type the servername, or press <Ins> or <Enter>.**



Do not change a server name in this list unless the name of the actual server has changed.

4. **Complete steps 3 through 9 under “Authorizing a NetWare 3.1x Server” on page 23.**
5. **To confirm your changes, press <Enter>.**

## Deleting from the List of Authorized Servers

You can perform this task only in NETSYNC4.

Deleting a server from the list of Authorized Servers removes the server from the NetSync cluster.



You can remove servers only one at a time.



## Procedure



1. From the “Options” menu, select “Edit Server List.”
2. Highlight the NetWare 3.1x server you want to delete and press <Delete>.

## Copying a NetWare 3.1x Server’s Bindery to NetWare 4

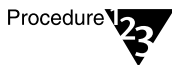
You can perform this task only in NETSYNC4.

You can manually copy (upload) a NetWare 3.1x server’s bindery to the NetWare 4 bindery context if the NetWare 3.1x server is out of sync. This could happen under the following circumstances:

- ◆ You made changes to user and group information on the NetWare 3.1x server using SYSCON. Changes made in SYSCON are not synchronized with the NetWare 4 server’s bindery context.
- ◆ You ran a program on the NetWare 3.1x server that modified its bindery.
- ◆ You authorized a 3.1x server, but it never joined the NetSync cluster during the NETSYNC4 session you authorized it in. This could happen if you unload and reload NETSYNC4 before loading NETSYNC3 for the first time on an authorized 3.1x server.

When NETSYNC4 is unloaded, it clears the “Copy 3.1x bindery to 4.11” setting for each 3.1x server. Therefore, you must turn on the “Copy 3.1x bindery to 4.11” setting again before you load NETSYNC3 on the 3.1x server so the bindery is copied to the 4 server.

## Procedure



1. From the “Options” menu, select “Edit Server List.”
2. Highlight the NetWare 3.1x server whose bindery you want to upload and press <Enter>.
3. Highlight the “Copy 3.1x bindery to 4.11” option and press <Y> to toggle to “Yes.”

If you unload and reload NETSYNC4 for any reason, this option is cleared for all servers. You need to change this option to “Yes” for any 3.1x servers that have not yet copied their binderies to the NetWare 4 server.

4. **To save the change, press <Enter>.**
5. **To exit the “Edit Server List” menu, press <Esc>.**
6. **To confirm the change, highlight “Yes” and press <Enter>.**

All bindery information is copied, but only new information is added to the NetWare 4 server’s bindery context. Duplicate information is discarded.

## Deleting NetSync Configuration Data

Configuration data includes the following:

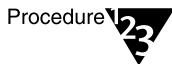
On the NetWare 4 host	On the NetWare 3.1x server
Names of authorized NetWare 3.1x servers and associated passwords	Name of NetWare 4 host
NetSync password	NetSync password

You can delete NetSync configuration from a NetWare 3.1x server if the server

- ◆ Is going to join a different NetSync cluster
- ◆ Is not going to run NetSync any more

The default is to not delete the configuration data (“No”).

### Procedure



1. **From the “Options” menu, select “Configuration Options.”**
2. **Select “Delete NetSync Configuration Data.”**
3. **Delete the configuration data by typing “Y.”**

4. To save the change, press <Enter>.
5. To exit the “Configuration Options” menu, press <Esc>.
6. To confirm the change, highlight “Yes” and press <Enter>



# 4 *Printing Support for NetSync*

## Overview

NetSync printing support consists of two parts.

- ◆ *Automatic* processes that happen when you run NETSYNC3 on your NetWare® 3.1x server (after you load NETSYNC4 on the NetWare 4 server):
  - ◆ All NetWare 4 workstation print utilities are copied to the NetWare 3.1x servers.
  - ◆ PRINTCON and PRINTDEF databases are updated to NetWare 4 format and duplicated in the NetWare 4 database. Subsequent changes made in PRINTDEF and PRINTCON on the 4 server are copied to the 3.1x servers.



NetWare Name Service® (NNS) printing is not fully supported by NetSync. If you attempt to upgrade an NNS® server using NetSync, certain printing configurations will not be upgraded completely. For more information on converting NNS printing to NetSync, see “Upgrading NetWare Name Service (NNS) Printing” on page 57.

- ◆ *Optional* tasks you can perform in NetSync:

You can move your NetWare 3.1x print servers by merging them into one print server on the NetWare 4 server.

This process also places your printers into the NetWare 4 Directory where they can be managed from a single NetWare 4 print server.

# Upgrading of Utilities and Databases

When you run NETSYNC3 on your NetWare 3.1x server (after you load NETSYNC4 on the NetWare 4 server), your NetWare 3.1x print utilities and databases are upgraded automatically regardless of whether you move print servers.

With NetSync, Directory Services-based print queues synchronize with NetWare 3.1x servers. This applies only to print queues that existed on 3.1x servers and were uploaded to the NetWare 4 server during the synchronization process. New queues created on the NetWare 4 server are not synchronized with the 3.1x servers.

## Using NetWare 4 Print Utilities in Your 3.1x Environment

You can use the new NetWare 4 print utilities immediately in your NetWare 3.1x environment. All NetWare 4 print utilities copied to your NetWare 3.1x server are compatible with your NetWare 3.1x setup.

The utilities copied are CAPTURE, NPRINT, NPRINTER (.NLM and .EXE), PCONSOLE, PRINTCON, PRINTDEF, and PSC. All support files needed for these utilities are copied as well.

After running NetSync, load the NetWare 4 NPRINTER.EXE utility on all workstations that currently use RPRINTER. You should make this change even if you do not move print servers to the NetWare 4 server.

To run printers attached to the 3.1x servers after moving print servers to the NetWare 4 server, unload PSERVER.NLM on the 3.1x servers, load PSERVER.NLM on the NetWare 4 host server, and load NPRINTER.NLM on the 3.1x servers.

For more information, see “Using NPRINTER.NLM” in Chapter 7 of *Print Services*.

## Using NetWare 4 Print Databases on Your 3.1x Environment

NetWare 3.1x printing databases created using PRINTCON and PRINTDEF are synchronized with the NetWare 4 server. PRINTDEF databases are then copied back to all the NetWare 3.1x servers in the NetSync cluster.

In the case of duplicate information from different servers, such as duplicate print job names or duplicate print device modes, only the information that is synchronized to the NetWare 4 server first will be retained.

For example, if user JAMES has PRINTJOB1 defined in his PRINTCON.DAT file on two NetWare 3.1x servers in the NetSync cluster, PRINTJOB1 on the first synchronized server will be retained in the new printing configuration. PRINTJOB1 on the second server will be discarded.

After synchronization has been completed, you should always make changes to the NetWare 4 print databases on the NetWare 4 server using NetWare 4 utilities. Changes made on a NetWare 3.1x server will not be synchronized with the NetWare 4 server and the other NetWare 3.1x servers.

## Moving Print Servers

By using NetSync to move your NetWare 3.1x print servers, you can merge the print resources of up to 12 NetWare 3.1x servers with the NetWare 4 Directory, allowing all printing to be administered from a single NetWare 4 host server.



In some cases, NetSync does not fully upgrade printing configurations from NetWare Name Service (NNS) servers. You might need to complete additional steps to upgrade NNS printing. For more information on converting NNS printers to NetSync, see “Upgrading NetWare Name Service (NNS) Printing” on page 57.

When you move NetWare 3.1x print servers, configuration information for those print servers and their associated printers and queues is transferred to the NetWare 4 print server into which they are being merged.

Since PSERVER.NLM can be loaded only once, and PSERVER.EXE no longer exists in NetWare 4™ software, all NetWare 3.1x print servers must be merged when you move them to the NetWare 4 server. This requires you to make configuration changes to your printing setup. For example, printer numbers might need to be reassigned.

Under the new configuration, NPRINT.EXE takes the place of both PSERVER.EXE and RPRINTER.EXE.

## When to Use NetSync to Move Print Servers

Moving print servers with NetSync can be a useful process in relatively large or complex printing environments where the move from NetWare 3.1x to NetWare 4 must be implemented gradually.

For example, if you have numerous print queue operators or lengthy lists of queue users, and you don't want to re-enter this information for a NetWare 4 configuration yet, using NetSync can be a valuable interim step in your move to NetWare 4.

Some manual reconfiguration is required in your printing setup as part of the NetWare synchronization process.

Even if your printing setup relies primarily on default settings, such as group EVERYONE, and you use a modest number of printers (perhaps a dozen or fewer), you might find it easier to use NetSync to move print servers than setting up printing manually on the NetWare 4 server.

## General Guidelines for Moving Print Servers

With NetSync, you move each NetWare 3.1x print server to the NetWare 4 server as needed. NetSync allows you to move multiple print servers that were previously in NetWare 3.1x and merge them into a single NetWare 4 print server.

You specify the name of each NetWare 3.1x print server that you want to move, and then complete the process of moving it before you move the next print server. (The procedure for moving print servers is found in "Procedure for Moving Print Servers" on page 50.)

When you move a NetWare 3.1x print server, all properties and associated printer configurations are moved intact; you cannot move them selectively. You can, however, change or delete these properties after they are moved.

The first print server you move retains the configuration information it had in NetWare 3.1x, including printer numbers.

But when you move additional print servers to the same NetWare 4 print server, the printer numbers might conflict with printer numbers assigned on that print server. In this case, NetSync assigns new numbers to these new printers.

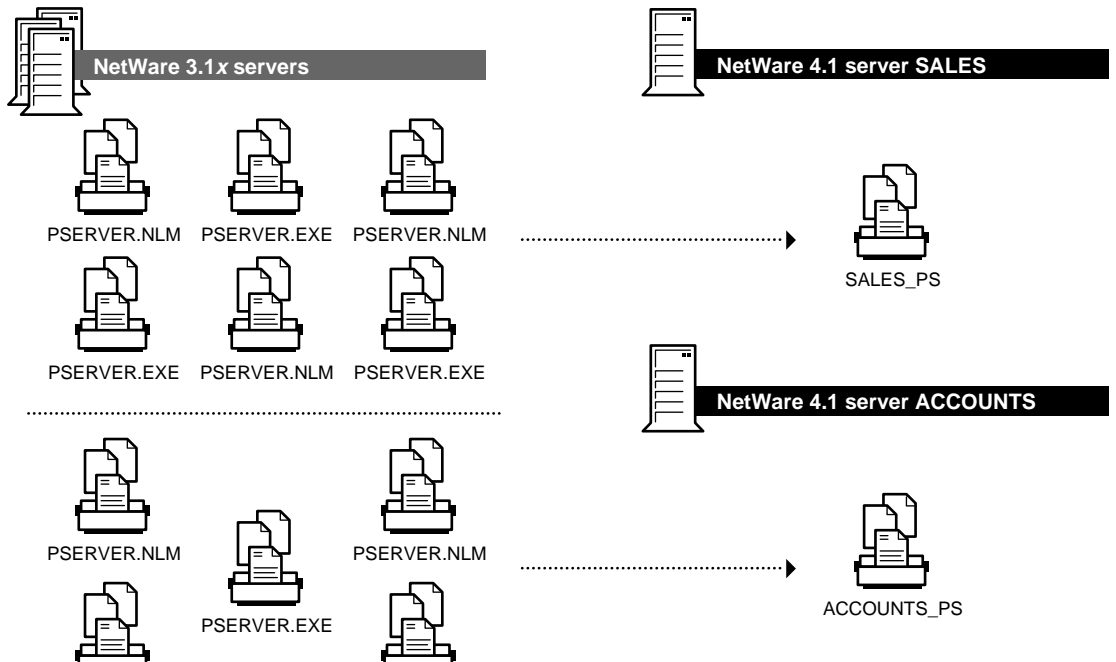


You can move multiple NetWare 3.1x print servers to multiple NetWare 4 print servers or incorporate them into a single print server.

For example, you could move 11 NetWare 3.1x print servers to NetWare 4, incorporating six 3.1x print servers into print server SALES\_PS on NetWare server SALES and the other five into print server ACCOUNTS\_PS on NetWare server ACCOUNTS.

This is illustrated in the following figure.

**Figure 4-1**  
**Merging multiple 3.1x print servers into one 4 print server**



To move print servers from a single NetWare 3.1x server to multiple NetWare 4 servers contained in more than one container, you must load NETSYNC4 on a NetWare 4 server in each container.

There is no limit to the number of NetWare 3.1x print servers you can move to a single NetWare 4 print server, provided the total number of printers administered through the NetWare 4 print server does not exceed 255.

You can move print servers from the NetWare 3.1x servers to more than one NetWare 4 server. You can even move print servers from a single 3.1x server to more than one NetWare 4 server. However, you must load NETSYNC4 on each NetWare 4 server.

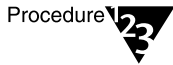
NetWare 3.1x print servers that you do not move must be administered through PCONSOLE. (The NetWare 4 NetWare Administrator utility cannot be used for this purpose.)

## Procedure for Moving Print Servers

NetSync files are loaded automatically in the AUTOEXEC.NCF file for your NetWare 3.1x and NetWare 4 servers to ensure normal operation.

The following procedure explains how to move a NetWare 3.1x print server and its configuration information, including associated printers, to a NetWare 4 server.

### Procedure



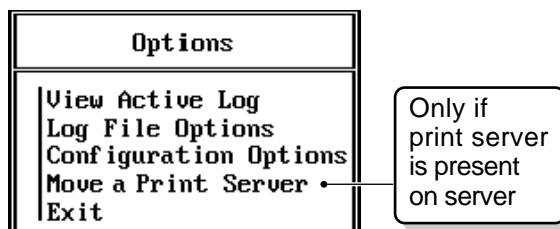
1. **Load NETSYNC4 on your NetWare 4 server.**

See "Loading NETSYNC4 on a NetWare 4 Server" on page 22.

2. **Load NETSYNC3 on your NetWare 3.1x server.**

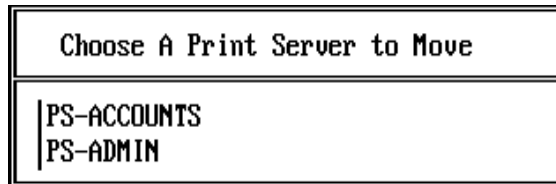
See "Loading NETSYNC3 on a NetWare 3.1x Server" on page 27.

The following NetSync "Options" menu is displayed.



**3. From the “Options” menu, choose “Move a Print Server.”**

If two or more print servers are available, the following “Choose A Print Server to Move” window appears.



If only one print server is available to be moved, that server is selected by default and the window does not appear. Continue with Step 5.

**4. Select the name of the print server you want to move to the NetWare 4 server.**

After a print server is moved to NetWare 4, it no longer exists as a candidate for synchronization, so it will not appear on the list of print servers to choose from.

**5. At the prompt, type the name you want to assign to the print server you are moving to the NetWare 4 server.**

You can use the name already assigned to the print server or assign a different name to it. The default is to use the name already assigned to the NetWare 3.1x print server, with no merging of print servers occurring.

- ◆ If you assign a print server name that already exists on the NetWare 4 server, the 3.1x print server is merged into it.

The 3.1x password is deleted. (The password for the NetWare 4 print server is not affected by incorporating additional NetWare 3.1x print servers into it.)

- ◆ If you assign a print server name that does not already exist on the NetWare 4 server, a NetWare 4 print server object is created with that name.

The new NetWare 4 print server is not assigned a password. You should assign a password to the new NetWare 4 print server.

## Moving Printers

Printers are moved along with their associated print servers as part of the process of moving print servers.

In NetWare 3.1x, printers exist as properties of print servers. In NetWare 4, printers exist as objects in the Directory Services database. A new Printer object is created automatically in the NetWare 4 Directory for each printer moved from a NetWare 3.1x print server.

This allows you to manage each printer in your NetSync environment with the NetWare 4 utilities.

## Printer Configurations

Printer configurations are not changed while the print server is being moved.

A printer servicing multiple queues is moved in the same way as is a printer servicing a single queue. It still services the same queues as before.

Printers configured as local on the NetWare 3.1x print server are configured as “Manual Load” (remote) printers in NetWare 4.

Printers you want to attach directly to a NetWare 4 print server can be reconfigured as “Auto Load (Local)” printers.

Notification lists for each moved printer return to the default, which is the job owner. To add users to the notification list, use NetWare Administrator or PCONSOLE on the NetWare 4 server.

## Printer Name Synchronization

NetSync reconciles duplicate printer names when print servers are moved to NetWare 4.

If the printer name duplicates a name that already exists in the NetWare 4 bindery context, the name assigned to the printer being synchronized (one being moved from the NetWare 3.1x bindery to NetWare 4 bindery services or the super-bindery) is modified.

In this case, the synchronized printer has a numerical suffix assigned to its name to differentiate it from the first printer. For example, a duplicate printer “MY\_PRINTER” would become “MY\_PRINTER-001.”

## **New Printer Numbers**

Duplicate printer numbers are reconciled along with printer names during the NetSync process.

The first print server you move retains the configuration information it had in NetWare 3.1x, including printer numbers.

But when you move additional print servers to the same NetWare 4 print server, the printer numbers might conflict with printer numbers assigned on that print server. In this case, NetSync assigns new numbers to these new printers.

To determine this new number, use PCONSOLE or NetWare Administrator.

NPRINTER must use the new print server and printer number. You might need to change the printer number at workstations that will be loading NPRINTER.EXE.

## **Status of 3.1x Queues during Synchronization**

In most cases, print jobs remaining in a queue while the printer is being moved to NetWare 4 continue printing because they still have access to the queue and the print server is still running.

However, if possible, avoid moving print servers when printing is going on.

## **Managing Print Servers after Synchronization**

After moving your NetWare 3.1x print servers to NetWare 4, you can manage your NetWare 4 print servers the same way as you did before.

This section describes modifications that occur in your print server configurations following the NetSync process that can help you better manage your print services.

After the NetSync process is completed, in most cases you should unload the NetWare 3.1x print servers whose configurations were moved to NetWare 4.

## Reference Print Servers Created to Service 3.1x Queues

When you move a print server to NetWare 4 and, in the process, assign a new name to it, a reference print server by that name is simultaneously created on the NetWare 3.1x file server.

This new *reference print server* is a bindery object through which the NetWare 4 print server attaches so it can service queues on the 3.1x server.

This new reference print server on the NetWare 3.1x server has no assigned properties or resources (such as printers) and it does not need to be loaded. However, it is listed on the print server list in PCONSOLE and NetWare Administrator.



Do not delete this reference print server from the NetWare 3.1x server for any reason. If there is no print server on the NetWare 3.1x server with a name matching the name of the NetWare 4 print server, the NetWare 4 print server cannot log in to the NetWare 3.1x server, and queues on the NetWare 3.1x server cannot be serviced.

If you delete this reference print server from the NetWare 3.1x server, you cannot recreate it by running NetSync again. Instead use NetWare 3.1x PCONSOLE to create it again and then reattach each queue to the print server.

Because the new reference print server is created by NetSync and the NetWare 4 print server logs in to the NetWare 3.1x server automatically, none of this should require any action on your part.

## Print Server Operators

All designated operators of NetWare 3.1x print servers moved to NetWare 4 are automatically made operators of the NetWare 4 print server after being moved. This can have security implications for your network.

If you do not want many print server operators on your NetWare 4 network, change the operator assignments after synchronization is completed.

## Users and Groups

A user or group assigned as a member of the Users property of a NetWare 3.1x print server being moved to a NetWare 4 print server is automatically a user or group of the NetWare 4 print server.

However, NetWare 4 users and groups do not synchronize with the 3.1x reference print server.

## Managing Print Queues after Synchronization

You can use NetWare Administrator and PCONSOLE from the NetWare 4 server to perform system administration on bindery queues existing on NetWare 3.1x servers. By making the changes on the NetWare 4 host server, the changes are also made in the corresponding print queues on the 3.1x servers. You can add or delete print queues on the NetWare 4 or the 3.1x servers, depending on the desired result.

If you delete a print queue on the NetWare 4 server, the corresponding print queue on the 3.1x servers is also deleted. If you delete a print queue on a 3.1x server, however, only the queue on that server is deleted. The corresponding queue on the NetWare 4 server remains intact, as do the queues on the other 3.1x servers.

If you add a print queue on the NetWare 4 server, that queue is created only on the NetWare 4 server. To access that print queue from the 3.1x servers in the NetSync cluster, use a bindery reference queue on the NetWare 4 server or add the server reference to your capture statement.

Remember, to submit jobs to a queue on a particular NetWare 3.1x server, you must be designated as a user of that queue in the NetWare 4 Queue object.

In most NetWare 3.1x print configurations, group EVERYONE is included by default as a queue user. As a result, because NetSync merges all EVERYONE groups, all users are designated users of all queues.

## Bindery Reference Queues

After moving NetWare 3.1x print servers to the NetWare 4 Directory, *bindery reference queues* are created on the NetWare 4 server to represent the real queues on the NetWare 3.1x servers.

These reference queues are actually pointers to the real NetWare 3.1x queues.

Since they are just pointers, these reference queues differ from the real queues that are created and merged on the NetWare 4 server during the NetSync upgrade process. Altering these reference queues can make the real queues unusable, so these queues should not be accessed or configured in any way. They also should not be deleted for any reason.

## Reference Name Synchronization

The names of NetWare 4 bindery reference queues are enclosed in brackets. These reference names have the name of the NetWare 3.1x queue appended to the original server name.

For example, the reference name used on a NetWare 4 server for a NetWare 3.1x print queue named “Q1” on NetWare 3.1x server “SALES” would be “{SALES\_Q1}.”

Bindery reference queues appear at the bottom of the queue list in the PCONSOLE and NetWare Administrator utilities.

## Queue Operators, Users, and Groups

Queue operators, users, and groups are not changed when a NetWare 3.1x print server is moved to a NetWare 4 print server.

Groups synchronize from NetWare 4 to NetWare 3.1x. If a user was originally in a group with queue rights on a NetWare 3.1x server, the user still can use the queue. (In Directory Services, a user must authenticate to the server on which the desired queue resides.)



# Upgrading NetWare Name Service (NNS) Printing

NetWare Name Server® (NNS) printing configurations differ from printing in other NetWare software, so NNS® printing will not work in other NetWare environments without some conversion. NetSync can convert most or all of your NNS printing configuration so it works in NetSync or NetWare 4. The completeness of the print conversion depends on the number of servers in the NNS domain.

## How NetSync Rebuilds NNS Printing

Under NNS, a print queue is originally created on one of the servers in the NNS domain. A replicated print queue (a fake queue that references the real queue) with the same name is then automatically created on each of the other servers in the domain. This allows users to print to a queue no matter which server they use to log in to the domain.

When NetSync is originally installed on servers in an NNS domain, it breaks the domain. Each server that was in the domain is now considered an individual server in the NetSync cluster. Since the domain is broken, the fake queues lose their reference to their real counterparts.

NetSync gives you several options to restore printing functionality. First, you can convert the fake print queues to real queues. NetSync can convert all the fake print queues on each 3.1x server into real queues that inherit the properties of the original real queues. NetSync can then use these converted queues to rebuild the print environment. If you choose not to convert the fake queues to real queues, the fake queues are deleted. You must either manually establish printing connections or change CAPTURE statements to access printing on the servers where fake queues resided.

If you choose to convert the fake queues, the installation program also asks if you want to rebuild the print environment. If you answer “Yes,” NetSync tries to completely restore the printing functionality you had under NNS. If you answer “No,” NetSync only converts replicated print queues to real print queues. Printing will not work again until you take additional steps.

When NetSync rebuilds the print environment, it duplicates the print servers and their properties on all the 3.1x servers. It then connects all the print queues (the original real queues and the fake queues converted to real queues) to the original print server.

## Functionality of NetSync Printing Depends on Size of NNS Domain

If you choose to have NetSync rebuild the print environment, the functionality of the resulting print configuration depends on the size of your original NNS domain. To completely restore printing, you may also need to move the print server from each 3.1x server to the NetWare 4 host server, again depending on the size of your NNS domain.

If your NNS domain had eight servers or fewer, printing continues to work as it did under NNS for users on the 3.1x servers in the NetSync cluster.

If you have 9-12 servers in your NNS domain, your printing works as it did under NNS only if you also move printing to NetWare 4 after running NetSync. One limitation in rebuilding printing from NNS domains of this size is that each print server created on the 3.1x servers by NetSync can service only eight file servers.

However, you could keep the print servers on the NetWare 3.1x servers if you plan on using print servers on eight or fewer of the servers in the NetSync cluster. In this case you could just choose which servers you want to print from and then add those servers to the NetSync cluster first. Then printing would continue to work without moving printing to NetWare 4.

Printing information for more than eight servers is still retained, so when you do move printing to NetWare 4, that information is copied over and allows printing for as many as 12 servers in the NetSync cluster.

If you have more than 12 servers in your NNS domain, you need to make some modifications to allow printing to all print queues from all the servers that were in the domain. However, you can restore printing for each NetSync cluster (with as many as 12 NetWare 3.1x servers) as described earlier.

## Considerations in Moving Printing to NetWare 4

If you choose not to rebuild the print environment, one option to restore printing functionality is to manually set up printing on the NetWare 4 server. In this case, you would need to create a print server on the NetWare 4 server. Then delete any print queues on the 3.1x servers you won't use. As a final step, create a bindery reference queue on the NetWare 4 server (serviced by the print server there) for each queue you are using on the 3.1x servers.

Be aware that there is a large storage overhead when NetSync moves printing to NetWare 4. When NetSync converts NNS printing, it must create real print queues for all the fake queues on every 3.1x server in the NetSync cluster. When you move printing to the NetWare 4 host server, bindery reference queues are created for every queue on every NetWare 3.1x server. If you had 20 print queues on 12 NetWare 3.1x servers in your NNS domain, 240 bindery reference queues (20 queues x 12 servers) would be created on the NetWare 4 server after you moved printing there.

It is easy to modify print queues or print servers in NetSync. You might find it easier to let NetSync duplicate all the print queues, and then you can delete those you aren't using. For larger domains, you might find it easier to design your printing from scratch and set it up on the NetWare 4 server.

While NetSync does not resolve all the printing incompatibilities with NNS and NetWare 4, it does allow you to easily convert printing for NNS domains with 12 or fewer servers. For larger domains, you probably need to go through the process of setting up printing in NetWare 4, a process you need to do anyway when you convert NNS to NetWare 4.

## Using Third-Party Network-Direct Print Devices

Network-direct printers and hardware queue servers produced by various manufacturers either connect to a printer and then to the network or are installed in a port at the printer.

These print devices and their installation programs are designed to look in the NetWare 3.1x bindery for network printing information.

Therefore, queue server configurations used by these printers should *not* be moved.

For more information, see “Using Third-Party Network-Direct Print Devices with NetWare 4” in Chapter 6 of *Print Services*.

## Username Containing European Diacritic Characters

NetWare<sup>®</sup> 3.1x utilities (such as SYSCON) automatically convert diacritic characters (such as umlaut, accents, cedilla, tilde, circumflex, etc.) to upper case. NetWare 4<sup>™</sup> utilities do not.

If, for example, a user logs in to a NetWare 3.1x server as “José,” his username is converted to “JOSE.” But the same user’s login name stays “José” in the NetWare 4 environment.

As a result, after you install NetSync on both NetWare 3.1x and NetWare 4 servers, user José could exist twice in the NetWare 4 server’s super-bindery, as José and as JOSE. (The super-bindery includes all User and Group objects being synchronized.)

NetSync tries to solve this problem by loosely matching the two usernames and assuming that they refer to the same user.

To ensure consistent behavior of foreign language characters and usernames, take the following precautions:

- ◆ Specify the same code page in the NetWare 4 server’s LCONFIG.SYS file in INSTALL.NLM and in each NetWare client’s CONFIG.SYS file (with the **COUNTRY=** command).
- ◆ If your users use NetWare 4 LOGIN and SETPASS utilities to log in to or change their password on a NetWare 3.1x server, they should use the following syntax:

```
LOGIN servername/username /B <Enter>
```

or

```
LOGIN username /B <Enter>
```

```
SETPASS servername/username /B <Enter>
```

or

```
SETPASS username /B <Enter>
```

## Duplicate Names in a Bindery Context Path

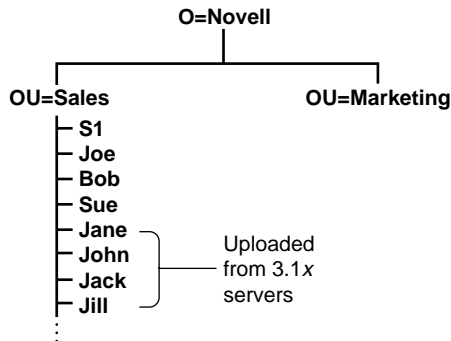
NetWare 4 allows the bindery context to include up to 16 containers. (Previous versions of NetWare 4 allowed only one container in a bindery context.)

This group of containers in the bindery context is called a *bindery context path*. (For more information, see “Bindery context path” in *Concepts*.)

All NetWare 3.1x bindery objects are copied (uploaded) into the first container listed in the bindery context path. For example, assume that the bindery context has two containers as shown in the following bindery context path:

```
OU=Sales.O=Novell;OU=Marketing.O=Novell
```

In this example, all NetWare 3.1x user and group bindery objects end up in the Sales container, the first container in the path, as shown in the following figure.



Subsequently, however, all objects from *all* containers in a bindery context path are synchronized with each NetWare 3.1x server.

For example, the following situation involving duplicate names can arise in a bindery context path scenario.

When User object Joe is copied from a NetWare 3.1x server, NetSync tries to create this object in the first container of the context path (OU=Sales.)

If an object by the name Joe already exists in this container, this Novell Directory Services object takes precedence and the NetWare 3.1x User object is merged with it.

If no object Joe exists anywhere in the bindery context, NetSync creates one for the NetWare 3.1x bindery object. If, after the original synchronization, an administrator creates another object Joe in a container also in the bindery context path, one of the Joe objects is “eclipsed” by the other. Both objects still exist in the Directory tree, but only one is visible to bindery services.

If the newer object Joe is in a container further down the list, it is eclipsed by the original object Joe. It is not be visible to bindery services and, consequently, is also not visible to the NetWare 3.1x servers on NetSync.

Alternatively, if the newer object Joe is in a container farther up the list than the original object Joe, the original object is eclipsed.

## Upgrading NetSync Servers to NetWare 4

You can independently upgrade each of the NetWare 3.1x servers in the NetSync cluster to NetWare 4. After you upgrade a 3.1x server, you can remove it from the NetSync cluster by deleting the server name from the “Authorized 3.1x Server” list in NETSYNC4 on the NetWare 4 host server.

In the original synchronization process, NetSync created all the necessary Novell Directory Services objects for the 3.1x server. Upgrading a 3.1x server to NetWare 4 is, therefore, a smooth process that should require little user intervention.

There are two steps you should follow to make sure the upgrade process works properly:

- ◆ Do not unload NETSYNC3 on the NetWare 3.1x server until you are ready to upgrade to NetWare 4.

NetSync keeps all changes to the objects synchronized so they upgrade properly.

- ◆ Upgrade all the NetWare 3.1x servers in the NetSync cluster to the same Directory tree.

You do not need to upgrade all the 3.1x servers at the same time.



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