

Novell eDirectory™

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TRUBLESHOOTING GUIDE

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About This Book

This Troubleshooting Guide describes how to resolve Novell® eDirectory™ 8.8 issues and contains the following sections:

- ◆ Chapter 1, “Resolving Error Codes,” on page 11
- ◆ Chapter 2, “Installation and Configuration,” on page 13
- ◆ Chapter 3, “Determining the eDirectory Version Number,” on page 17
- ◆ Chapter 4, “Log Files,” on page 23
- ◆ Chapter 5, “Troubleshooting LDIF Files,” on page 25
- ◆ Chapter 6, “Troubleshooting SNMP,” on page 43
- ◆ Chapter 7, “Obituaries,” on page 47
- ◆ Chapter 8, “Migrating to Novell eDirectory,” on page 53
- ◆ Chapter 9, “Replication,” on page 61
- ◆ Chapter 10, “Novell Public Key Infrastructure Services,” on page 63
- ◆ Chapter 11, “Troubleshooting Utilities on Linux and UNIX,” on page 65
- ◆ Chapter 12, “NMASS on Linux and UNIX,” on page 81
- ◆ Chapter 13, “Troubleshooting on Windows,” on page 83
- ◆ Chapter 14, “Accessing HTTPSTK When DS Is Not Loaded,” on page 85
- ◆ Chapter 15, “Encrypting Data in eDirectory,” on page 87
- ◆ Chapter 16, “The eDirectory Management Toolbox,” on page 91
- ◆ Chapter 17, “SASL-GSSAPI,” on page 93
- ◆ Chapter 18, “Miscellaneous,” on page 95

Audience

The guide is intended for network administrators.

Feedback

We want to hear your comments and suggestions about this manual and the other documentation included with this product. Please use the User Comments feature at the bottom of each page of the online documentation, or go to www.novell.com/documentation/feedback.html and enter your comments there.

Documentation Updates

For the most recent version of the *Novell eDirectory 8.8 Installation Guide*, see the [Novell eDirectory 8.8 Documentation \(http://www.novell.com/documentation/edir88/index.html\)](http://www.novell.com/documentation/edir88/index.html) Web site.

Additional Documentation

For documentation on managing and administering eDirectory, see the *Novell eDirectory 8.8 Administration Guide (http://www.novell.com/documentation/edir88/index.html)*.

Documentation Conventions

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

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

Resolving Error Codes

1

For a complete list and explanation of eDirectory error codes, see the [Novell Error Codes Web page](http://www.novell.com/documentation/lg/nwec/index.html) (<http://www.novell.com/documentation/lg/nwec/index.html>).

Installation and Configuration

2

- ♦ Section 2.1, “Installation,” on page 13
- ♦ Section 2.2, “Configuration,” on page 15
- ♦ Section 2.3, “Multiple Instances,” on page 16

2.1 Installation

This section discusses various problems you may encounter during the eDirectory 8.8 installation alongwith troubleshooting tips.

- ♦ Section 2.1.1, “Installation Not Successful,” on page 13
- ♦ Section 2.1.2, “Installation Takes a Long Time,” on page 14
- ♦ Section 2.1.3, “eDirectory Install Fails for Container Administrators,” on page 14
- ♦ Section 2.1.4, “Unable to Install into an Existing Tree over the WAN,” on page 14
- ♦ Section 2.1.5, “NICI Installation Failed - 1497,” on page 15
- ♦ Section 2.1.6, “Naming Objects,” on page 15
- ♦ Section 2.1.7, “NICI Does Not Get Installed in the Server Mode on Windows,” on page 15
- ♦ Section 2.1.8, “Tarball Upgrade Fails With "Cannot open or remove a file containing a running program" Error Message,” on page 15

2.1.1 Installation Not Successful

- ♦ Check for the following error message in the `/var/adm/messages` directory:
`Unable to bind to SLP Multicast Address. Multicast route not added?`

This message is displayed if the Linux or Solaris machine is not configured for a multicast route address.

Add the multicast route address and restart the `slpuasa` daemon.
- ♦ If the `-632: Error description System failure` error message appears during installation, exit from the installation process.

Set the `n4u.base.slp.max-wait` parameter to a larger value, such as 50, in the `/etc/opt/novell/eDirectory/conf/nds.conf` file, then restart the installation process.
- ♦ During installation, if the `Tree Name Not Found` error message is displayed, do the following:
 - 1 Check whether multicast routing is enabled on the Solaris host that you are installing the product on.
 - 2 Specify the IP address of the master server of the Tree partition.

2.1.2 Installation Takes a Long Time

When you are installing eDirectory into an existing tree and the installation takes a long time to complete, look at the DSTrace screen on the server. If the `-625 Transport failure` message is displayed, you need to reset the address cache.

To reset the address cache, enter the following command at the system console:

```
set dstrace = *A
```

2.1.3 eDirectory Install Fails for Container Administrators

The eDirectory 8.8 installation program supports installations by administrators who have supervisor rights to the container that the server resides in. In order to handle this, the first server that eDirectory 8.8 is installed into must have supervisor rights to [Root] to extend the schema. From that point on, subsequent servers do not have to have rights to [Root]. However, with eDirectory 8.8, depending on the platform that eDirectory 8.8 is installed in to first, all schema might not be extended, requiring supervisor rights to [Root] for subsequent server installations on different platforms.

If eDirectory 8.8 will be installed on multiple platforms, make sure that you have supervisor rights to [Root] for the first server eDirectory will be installed on for EACH platform. For example, if the first server that eDirectory 8.8 is going to be installed on is running NetWare, and eDirectory 8.8 will also be installed on Solaris, the first server for each platform must have supervisor rights to [Root]. Subsequent servers on each platform will only have to have container administrator rights to the container where the server is being installed.

For additional information, see solution [NOVL81742 \(http://support.novell.com/cgi-bin/search/searchtid.cgi?/10073723.htm\)](http://support.novell.com/cgi-bin/search/searchtid.cgi?/10073723.htm) in the Novell eDirectory 8.7.x Readme Addendum.

2.1.4 Unable to Install into an Existing Tree over the WAN

You need a NetWare 5 or later server to install eDirectory on a Linux or Solaris system over the WAN.

- 1 Enter the following command at the server console to run the Directory Agent (DA) on the NetWare server:

```
slpda
```

- 2 On the server containing the master replica, edit the DA_ADDR parameter in slpuasa.conf:

```
DA_ADDR = IP_address_of_the_NetWare_server_where_the_DA_is_
running
```

- 3 Restart the slpuasa daemon.
- 4 Install eDirectory over the WAN on the Linux or Solaris system.

- 4a Run nds-install to add the product packages.

Do not configure the product. See “[Linux, Solaris, AIX, and HP-UX Packages for Novell eDirectory](#)” in the *Novell eDirectory 8.8 Installation Guide* for more information.

- 4b Edit the `/etc/opt/novell/eDirectory/conf/nds.conf` and add the following parameters:

```
n4u.uam.ncp-retries = 5
n4u.base.slp.max-wait = 20
```

- 4c Edit the `/etc/slpuasa.conf` to add the following parameter:

```
DA_ADDR =  
IP_address_of_the_NetWare_server_where_the_DA_is_running
```

4d Run `ndsconfig` to configure eDirectory.

2.1.5 NICI Installation Failed - 1497

NICI initialization failed means the NFK file is not right. Ensure that you have the right NFK file. This problem might not come on Linux and UNIX platforms as by default the NFK file is part of the NICI package.

2.1.6 Naming Objects

When you use special characters while naming objects, the `-671 No Such Parent` error message appears. Avoid using any of the following special characters when naming objects:

`\ / , * ? .`

2.1.7 NICI Does Not Get Installed in the Server Mode on Windows

In the Properties dialog box of the NICIFK file there is a tab called Security. If there are no names in the Group or user names field, then this issue occurs.

To work around this problem, do the following:

- 1 Remove the NICIFK file.

This is present in `C:/Windows/system32/novell/nici` if the system root is `C:/Windows/system32`. If the system root is `F:/Windows/system32` then this file is present in `F:/Windows/system32/novell/nici`.

- 2 Install eDirectory.

2.1.8 Tarball Upgrade Fails With "Cannot open or remove a file containing a running program" Error Message

While doing Tarball Upgrade in AIX, in the file copying stage if you get "Cannot open or remove a file containing a running program" error message, perform the following steps to resolve the issue:

- 1 Run `"/usr/sbin/slibclean "` as a root user.
- 2 Continue the upgrade from file copying stage.

2.2 Configuration

The section contains problems you may encounter during the eDirectory 8.8 configuration.

2.2.1 Tree Name Lookup Failed: -632 Error While Configuring eDirectory 8.8 on Linux

While configuring eDirectory 8.8 on Linux, you might get the Tree name lookup failed: -632 error. To resolve this, do the following:

- 1 After installing the SLP package, ensure that you manually start SLP as follows:

```
/etc/init.d/slpuasa start
```
- 2 After uninstalling the SLP package, ensure that you manually stop SLP as follows:

```
/etc/init.d/slpuasa stop
```

2.3 Multiple Instances

While handling Multiple Instances of eDirectory, you may encounter the following problems:

- ♦ [Section 2.3.1, “If the First Instance is Down, HTTP Does Not Work,” on page 16](#)
- ♦ [Section 2.3.2, “eDirectory Does Not Listen on All the Configured Interfaces,” on page 16](#)

2.3.1 If the First Instance is Down, HTTP Does Not Work

On Linux and UNIX platforms, if eDirectory is configured on a box with multiple NIC cards and if HTTP is bound to more than one interface; if the first interface goes down, HTTP would not be accessible from the remaining interfaces.

This is because the remaining interfaces will redirect the request to the first one, but the first interface is down.

To resolve this issue, if the first interface goes down, restart eDirectory.

2.3.2 eDirectory Does Not Listen on All the Configured Interfaces

Ensure that all the interfaces on which eDirectory is configured are up and connected.

2.3.3 ndsd Falls Back to Default Port if the Interface Specified is Incorrect

When using `ndsconfig new` or `ndsmanage` to create a second instance of the directory, if the interface specified is incorrect, `nds` tries to use the default interface. If you specify non default port (for example 1524), the interface specified is incorrect, it uses the default interface and the default port of 524.

For `n4u.server.interfaces`, if the interface specified is incorrect, then `nds` will try to listen on the first interface and the port number would be the one specified in `n4u.server.tcp-port`.

Determining the eDirectory Version Number

3

The following sections list ways you can determine the version of eDirectory installed on a server:

- ♦ Section 3.1, “NetWare,” on page 17
- ♦ Section 3.2, “Windows,” on page 18
- ♦ Section 3.3, “Linux,” on page 18
- ♦ Section 3.4, “Solaris,” on page 19
- ♦ Section 3.5, “AIX,” on page 19
- ♦ Section 3.6, “HP-UX,” on page 20

3.1 NetWare

- ♦ Run `ds.nlm`, or any other `.nlm`.

At the server console, enter `ds.nlm`. This displays both the marketing string (for example, Novell eDirectory 8.7) and the internal build number (for example, DS v10410.xx).

- ♦ Run iMonitor.

On the Agent Summary page, click Known Servers. Then under Servers Known to Database, click Known Servers. The Agent Revision column displays the internal build number for each server. For example, an Agent Revision number for Novell eDirectory 8.7.1 might be 10510.64.

For information on running iMonitor, see “[Accessing iMonitor](#)” in the Novell eDirectory 8.8 Administration Guide.

- ♦ Run `nwconfig`.

At the server console, enter `nwconfig`, then select Product Info. If the install registered eDirectory (which it does with NDS[®] eDirectory 8.5 and later), this will display what was registered during the install. This is typically a hybrid of marketing and build numbers. For example, you might see marketing version eDir 8.5 and build version 85.01.

- ♦ LDAP shows configuration through DSTrace.

This is true for most utilities (for example, DSRepair or DSMerge) as they load. This method will display the internal build number.

For more information on DSTrace, see [Looking Into the Directory Services Trace \(DSTrace\) Options](#) (<http://developer.novell.com/research/sections/netmanage/dirprimer/2001/august/spv.htm>) and [More on Using the DSTrace Command](#) (<http://developer.novell.com/research/sections/netmanage/dirprimer/2001/septembe/p010901.htm>).

- ♦ Read the eDirectory download filename.

The eDirectory download filename usually matches the marketing string. For example, the download filename for Novell eDirectory 8.7.1 is `edir871.exe`.

- ♦ Enter `version` at a console prompt.

This will display the eDirectory version.

3.2 Windows

- ◆ Run iMonitor.

On the Agent Summary page, click Known Servers. Then under Servers Known to Database, click Known Servers. The Agent Revision column displays the internal build number for each server. For example, an Agent Revision number for Novell eDirectory 8.7.1 might be 10510.64.

For information on running iMonitor, see “[Accessing iMonitor](#)” in the *Novell eDirectory 8.8 Administration Guide*.

- ◆ Run NDSCons.exe.

In the Windows Control Panel, double-click Novell eDirectory Services. In the Services column, select ds.dlm, then click Configure. The Agent tabs displays both the marketing string (for example, Novell eDirectory 8.7.1) and the internal build number (for example, 10510.64).

- ◆ Run an eDirectory utility.

Most eDirectory utilities have an About option on their Help menu that displays the version number of the utility (for example, Merge Graft Utility 10510.35). Some utilities include the internal build version in the main label of the utility (for example, DSRepair - Version 10510.37).

To load an eDirectory utility (such as DSMerge or DSRepair), double-click Novell eDirectory Services in the Windows Control Panel. In the Services column, select the utility, then click Start.

- ◆ View the properties of an eDirectory .dlm file.

Right-click the .dlm in Windows Explorer, then click the Version tab in the Properties dialog box. This will display the version number of the utility. The default location for eDirectory .dlm files is C:\novell\NDS.

3.3 Linux

- ◆ Run ndsstat.

The ndsstat utility displays information related to eDirectory servers, such as the eDirectory tree name, the fully distinguished server name, and the eDirectory version. In the following example, eDirectory 8.7.1 is the product version (marketing string), and 10510.65 is the binary version (internal build number).

```
osg-dt-srv17: />ndsstat
Tree Name: SNMP-HPUX-RASH
Server Name: .CN=osg-dt-srv17.O=novell.T=SNMP-HPUX-RASH.
Binary Version: 10510.65
Root Most Entry Depth: 0
Product Version: NDS/Unix - NDS eDirectory v8.7.1 [DS]
```

For information on running ndsstat, see “[Novell eDirectory Linux and UNIX Commands and Usage](#)” in the *Novell eDirectory 8.8 Administration Guide*, or the ndsstat man page (ndsstat.1m).

- ◆ Run ndsd --version.

For information on running ndsd, see “[Novell eDirectory Linux and UNIX Commands and Usage](#)” in the *Novell eDirectory 8.8 Administration Guide*, or the ndsd man page (ndsd.1m).

- ♦ Run iMonitor.

On the Agent Summary page, click Known Servers. Then under Servers Known to Database, click Known Servers. The Agent Revision column displays the internal build number for each server. For example, an Agent Revision number for Novell eDirectory 8.7.1 might be 10510.64.

For information on running iMonitor, see “[Accessing iMonitor](#)” in the *Novell eDirectory 8.8 Administration Guide*.

- ♦ Run `rpm -qi NDSserv`.

Entering this command will display similar information to `ndsd --version`.

3.4 Solaris

- ♦ Run `ndsstat`.

The `ndsstat` utility displays information related to eDirectory servers, such as the eDirectory tree name, the fully distinguished server name, and the eDirectory version. In the following example, eDirectory 8.7.1 is the product version (marketing string), and 10510.65 is the binary version (internal build number).

```
osg-dt-srv17: />ndsstat
Tree Name: SNMP-HPUX-RASH
Server Name: .CN=osg-dt-srv17.O=novell.T=SNMP-HPUX-RASH.
Binary Version: 10510.65
Root Most Entry Depth: 0
Product Version: NDS/Unix - NDS eDirectory v8.7.1 [DS]
```

For information on running `ndsstat`, see “[Novell eDirectory Linux and UNIX Commands and Usage](#)” in the *Novell eDirectory 8.8 Administration Guide*, or the `ndsstat` man page (`ndsstat.1m`).

- ♦ Run `ndsd --version`.

For information on running `ndsd`, see “[Novell eDirectory Linux and UNIX Commands and Usage](#)” in the *Novell eDirectory 8.8 Administration Guide*, or the `ndsd` man page (`ndsd.1m`).

- ♦ Run iMonitor.

On the Agent Summary page, click Known Servers. Then under Servers Known to Database, click Known Servers. The Agent Revision column displays the internal build number for each server. For example, an Agent Revision number for Novell eDirectory 8.7.1 might be 10510.64.

For information on running iMonitor, see “[Accessing iMonitor](#)” in the *Novell eDirectory 8.8 Administration Guide*.

- ♦ Run `pkginfo -l NDSserv`.

Entering this command will display similar information to `ndsd --version`.

3.5 AIX

- ♦ Run `ndsstat`.

The `ndsstat` utility displays information related to eDirectory servers, such as the eDirectory tree name, the fully distinguished server name, and the eDirectory version. In the following example, eDirectory 8.7.1 is the product version (marketing string), and 10510.65 is the binary version (internal build number).

```
osg-dt-srv17: />ndsstat
Tree Name: SNMP-HPUX-RASH
Server Name: .CN=osg-dt-srv17.O=novell.T=SNMP-HPUX-RASH.
Binary Version: 10510.65
Root Most Entry Depth: 0
Product Version: NDS/Unix - NDS eDirectory v8.7.1 [DS]
```

For information on running `ndsstat`, see “[Novell eDirectory Linux and UNIX Commands and Usage](#)” in the *Novell eDirectory 8.8 Administration Guide* or the `ndsstat` man page (`ndsstat.1m`).

- ◆ Run `ndsd --version`.

For information on running `ndsd`, see “[Novell eDirectory Linux and UNIX Commands and Usage](#)” in the *Novell eDirectory 8.8 Administration Guide*, or the `ndsd` man page (`ndsd.1m`).

- ◆ Run iMonitor.

On the Agent Summary page, click Known Servers. Then under Servers Known to Database, click Known Servers. The Agent Revision column displays the internal build number for each server. For example, an Agent Revision number for Novell eDirectory 8.7.1 might be 10510.64.

For information on running iMonitor, see “[Accessing iMonitor](#)” in the *Novell eDirectory 8.8 Administration Guide*.

3.6 HP-UX

- ◆ Run `ndsstat`.

The `ndsstat` utility displays information related to eDirectory servers, such as the eDirectory tree name, the fully distinguished server name, and the eDirectory version. In the following example, eDirectory 8.7.1 is the product version (marketing string), and 10510.65 is the binary version (internal build number).

```
osg-dt-srv17: />ndsstat
Tree Name: SNMP-HPUX-RASH
Server Name: .CN=osg-dt-srv17.O=novell.T=SNMP-HPUX-RASH.
Binary Version: 10510.65
Root Most Entry Depth: 0
Product Version: NDS/Unix - NDS eDirectory v8.7.1 [DS]
```

For information on running `ndsstat`, see “[Novell eDirectory Linux and UNIX Commands and Usage](#)” in the *Novell eDirectory 8.8 Administration Guide*, or the `ndsstat` man page (`ndsstat.1m`).

- ◆ Run `ndsd --version`.

For information on running `ndsd`, see “[Novell eDirectory Linux and UNIX Commands and Usage](#)” in the *Novell eDirectory 8.8 Administration Guide*, or the `ndsd` man page (`ndsd.1m`).

- ◆ Run iMonitor.

On the Agent Summary page, click Known Servers. Then under Servers Known to Database, click Known Servers. The Agent Revision column displays the internal build number for each

server. For example, an Agent Revision number for Novell eDirectory 8.7.1 might be 10510.64.

For information on running iMonitor, see “[Accessing iMonitor](#)” in the *Novell eDirectory 8.8 Administration Guide*.

This section contains information on the following log files:

- ♦ [Section 4.1, “modschema.log,” on page 23](#)
- ♦ [Section 4.2, “dsinstall.log,” on page 23](#)

4.1 modschema.log

The modschema.log file contains the results of all schema extensions that are applied when an eDirectory server is installed into an existing tree. Each line of the log states which class or attribute is being added or modified and gives the status of the modification attempt.

This log is created or overwritten each time the install process is run, so it only represents the results of the last attempt. In addition to the eDirectory schema extensions, this log contains the results of any other schema extensions (such as LDAP or SAS) applied by the DSINSTALL front end prior to adding the new eDirectory server.

This log will not be generated when a standalone server is installed or if the version of the target server is NDS 7.01 or later.

4.2 dsinstall.log

The first part of the log lists environment variables that are set. The second part contains status messages documenting the eDirectory installation process.

Troubleshooting LDIF Files

5

The Novell Import Conversion Export utility lets you easily import LDIF files into and export LDIF files from eDirectory. For more information, see “[Novell Import Conversion Export Utility](#)” in the *Novell eDirectory 8.8 Administration Guide*.

In order for an LDIF import to work properly, you must start with an LDIF file that the Novell Import Conversion Export utility can read and process. This section describes the LDIF file format and syntax and provides examples of correct LDIF files.

- ◆ [Section 5.1, “Understanding LDIF,” on page 25](#)
- ◆ [Section 5.2, “Debugging LDIF Files,” on page 33](#)
- ◆ [Section 5.3, “Using LDIF to Extend the Schema,” on page 37](#)

5.1 Understanding LDIF

LDIF is a widely used file format that describes directory information or modification operations that can be performed on a directory. LDIF is completely independent of the storage format used within any specific directory implementation, and is typically used to export directory information from and import data to LDAP servers.

LDIF is usually easy to generate. This makes it possible to use tools like awk or perl to move data from a proprietary format into an LDAP directory. You can also write scripts to generate test data in LDIF format.

5.1.1 LDIF File Format

Novell Import Conversion Export imports require LDIF 1 formatted files. The following are the basic rules for an LDIF 1 file:

- ◆ The first noncomment line must be version: 1.
- ◆ A series of one or more records follows the version.
- ◆ Each record is composed of fields, one field per line.
- ◆ Lines are separated by either a new line or a carriage return/new line pair.
- ◆ Records are separated by one or more blank lines.
- ◆ There are two distinct types of LDIF records: content records and change records. An LDIF file can contain an unlimited number of records, but they all must be of the same type. You can’t mix content records and change records in the same LDIF file.
- ◆ Any line beginning with the pound sign (#) is a comment and is ignored when processing the LDIF file.

5.1.2 LDIF Content Records

An LDIF content record represents the contents of an entire entry. The following is an example of an LDIF file with four content records:

```

1  version: 1
2  dn: c=US
3  objectClass: top
4  objectClass: country
5
6  dn: l=San Francisco, c=US
7  objectClass: top
8  objectClass: locality
9  st: San Francisco
10
11 dn: ou=Artists, l=San Francisco, c=US
12 objectClass: top
13 objectClass: organizationalUnit
14 telephoneNumber: +1 415 555 0000
15
16 dn: cn=Peter Michaels, ou=Artists, l=San Francisco, c=US
17 sn: Michaels
18 givenname: Peter
19 objectClass: top
20 objectClass: person
21 objectClass: organizationalPerson
22 objectClass: iNetOrgPerson
23 telephonenumber: +1 415 555 0001
24 mail: Peter.Michaels@aaa.com
25 userpassword: Peter123
26

```

This LDIF file is composed of the following parts:

Component	Description
Version Specifier	<p>The first line of an LDIF file contains the version. Zero or more spaces are allowed between the colon and the version number, which is currently defined to be 1.</p> <p>If the version line is missing, any application processing the LDIF file is allowed to assume that the file is version 0. It's also possible that the LDIF file could be rejected as syntactically incorrect. Novell utilities that process LDIF assume a file version of 0 when the version line is missing.</p>
Distinguished Name Specifier	<p>The first line of every content record (lines 2, 6, 11, and 16 in the example above) specifies the DN of the entry that it represents.</p> <p>The DN specifier must take one of the following two forms:</p> <ul style="list-style-type: none"> ◆ dn: <i>safe_UTF-8_distinguished_name</i> ◆ dn: <i>Base64_encoded_distinguished_name</i>
Line Delimiters	<p>The line separator can be either a line feed or a carriage return/line feed pair. This resolves a common incompatibility between Linux and Solaris text files, which use a line feed as the line separator, and MS-DOS* and Windows text files, which use a carriage return/line feed pair as the line separator.</p>

Component	Description
Record Delimiters	<p>Blank lines (lines 5, 10, 15, and 26 in the example above) are used as record delimiters.</p> <p>Every record in an LDIF file including the last record must be terminated with a record delimiter (one or more blank lines). Although some implementations will silently accept an LDIF file without a terminating record delimiter, the LDIF specification requires it.</p>
Attribute Value Specifier	<p>All other lines in a content records are value specifiers. Value specifiers must take on one of the following three forms:</p> <ul style="list-style-type: none"> ◆ Attribute description: <i>value</i> ◆ Attribute description:: <i>Base64_encoded_value</i> ◆ Attribute description: < <i>URL</i>

5.1.3 LDIF Change Records

LDIF change records contain modifications to be made to a directory. Any of the LDAP update operations (add, delete, modify, and modify DN) can be represented in an LDIF change record.

LDIF change records use the same format for the distinguished name specifier, attribute value specifier, and record delimiter as LDIF content records. (See “[LDIF Content Records](#)” on page 25 for more information.) The presence of a changetype field is what distinguishes an LDIF change record from an LDIF content record. A changetype field identifies the operation specified by the change record.

A changetype field can take one of the following five forms:

Form	Description
changetype: add	A keyword indicating that the change record specifies an LDAP add operation.
changetype: delete	A keyword indicating that the change record specifies an LDAP delete operation.
changetype: moddn	A keyword indicating that the change record specifies an LDAP modify DN operation if the LDIF processor is bound to the LDAP server as a version 3 client or a modify RDN operation if the LDIF processor is bound to the LDAP server as a version 2 client.
changetype: modrdn	A synonym for the moddn change type.
changetype: modify	A keyword indicating that the change record specifies an LDAP modify operation.

The Add Change Type

An add change record looks just like a content change record (see “[LDIF Content Records](#)” on page 25) with the addition of the changetype: add field immediately before any attribute value fields.

All records must be the same type. You can’t mix content records and change records.

```

1 version: 1
2 dn: c=US
3 changetype: add
4 objectClass: top
5 objectClass: country
6
7 dn: l=San Francisco, c=US
8 changetype: add
9 objectClass: top
10 objectClass: locality
11 st: San Francisco
12
14 dn: ou=Artists, l=San Francisco, c=US
15   changetype: add
16 objectClass: top
17 objectClass: organizationalUnit
18 telephoneNumber: +1 415 555 0000
19
20 dn: cn=Peter Michaels, ou=Artists, l=San Francisco, c=US
21 changetype: add
22 sn: Michaels
23 givenname: Peter
24 objectClass: top
25 objectClass: person
26 objectClass: organizationalPerson
27 objectClass: iNetOrgPerson
28 telephonenumber: +1 415 555 0001
29 mail: Peter.Michaels@aaa.com
30 userpassword: Peter123
31

```

The Delete Change Type

Because a delete change record specifies the deletion of an entry, the only fields required for a delete change record are the distinguished name specifier and a delete change type.

The following is an example of an LDIF file used to delete the four entries created by the LDIF file shown in [“The Add Change Type” on page 27](#).

IMPORTANT: To delete entries you have previously added, reverse the order of the entries. If you don't do this, the delete operation fails because the container entries are not empty.

```

1 version: 1
2 dn: cn=Peter Michaels, ou=Artists, l=San Francisco, c=US
3 changetype: delete
4
5 dn: ou=Artists, l=San Francisco, c=US
8   changetype: delete
9
10 dn: l=San Francisco, c=US
11 changetype: delete
12
13 dn: c=US

```

14 changetype: delete
15

The Modify Change Type

The modify change type lets you to specify the addition, deletion, and replacement of attribute values for an entry that already exists. Modifications take one of the following three forms:

Element	Description
add: attribute type	A keyword indicating that subsequent attribute value specifiers for the attribute type should be added to the entry.
delete: attribute type	A keyword indicating that values of the attribute type are to be deleted. If attribute value specifiers follow the delete field, the values given are deleted. If no attribute value specifiers follow the delete field, then all values are deleted. If the attribute has no values, this operation will fail, but the desired effect will still be achieved because the attribute had no values to be deleted.
replace: attribute type	A keyword indicating that the values of the attribute type are to be replaced. Any attribute value specifiers that follow the replace field become the new values for the attribute type. If no attribute value specifiers follow the replace field, the current set of values is replaced with an empty set of values (which causes the attribute to be removed). Unlike the delete modification specifier, if the attribute has no values, the replace will still succeed. The net effect in both cases is the same.

The following is an example of a modify change type that will add an additional telephone number to the cn=Peter Michaels entry.

```
1 version: 1
2 dn: cn=Peter Michaels, ou=Artists, l=San Francisco, c=US
3 changetype: modify
4 # add the telephone number to cn=Peter Michaels
4 add: telephonenumber
5 telephonenumber: +1 415 555 0002
6
```

Just as you can combine a mixture of modifications in a single LDAP modify request, you can specify multiple modifications in a single LDIF record. A line containing only the hyphen (-) character is used to mark the end of the attribute value specifications for each modification specifier.

The following example LDIF file contains a mixture of modifications:

```
1 version: 1
2
3 # An empty line to demonstrate that one or more
4 # line separators between the version identifier
5 # and the first record is legal.
6
7 dn: cn=Peter Michaels, ou=Artists, l=San Francisco, c=US
8 changetype: modify
```

```

 9 # Add an additional telephone number value.
10 add: telephonenumber
11 telephonenumber: +1 415 555 0002
12 -
13 # Delete the entire facsimiletelephonenumber attribute.
14 delete: facsimileTelephoneNumber
15 -
16 # Replace the existing description (if any exists)
17 # with two new values.
18 replace: description
19 description: guitar player
20 description: solo performer
21 -
22 # Delete a specific value from the telephonenumber
23 # attribute.
24 delete: telephonenumber
25 telephonenumber: +1 415 555 0001
26 -
27 # Replace the existing title attribute with an empty
28 # set of values, thereby causing the title attribute to
29 # be removed.
30 replace: title
31 -
32

```

The Modify DN Change Type

The modify DN change type lets you rename an entry, move it, or both. This change type is composed of two required fields and one optional field.

Field	Description
newrdn (required)	<p>Gives the new name for the entry that will be assigned while processing this record. The new RDN specifier must take of the following two forms:</p> <ul style="list-style-type: none"> ◆ newrdn: <i>safe_UTF-8_relative_distinguished_name</i> ◆ newrdn:: <i>Base64_encoded_relative_distinguished_name</i> <p>The new RDN specifier is required in all LDIF records with a modify DN change type.</p>
deleteoldrdn (required)	<p>The delete old RDN specifier is a flag that indicates whether the old RDN should be replaced by the newrdn or if it should be kept. It takes one of the two following forms:</p> <ul style="list-style-type: none"> ◆ deleteoldrdn: 0 <p>Indicates that the old RDN value should be kept in the entry after it is renamed.</p> ◆ deleteoldrdn: 1 <p>Indicates that the old RDN value should be deleted when the entry is renamed.</p>

Field	Description
newsuperior (optional)	<p>The new superior specifier gives the name of the new parent that will be assigned to the entry while processing the modify DN record. The new superior specifier must take of the following two forms:</p> <ul style="list-style-type: none"> ◆ newsuperior: <i>safe_UTF-8_distinguished_name</i> ◆ newsuperior:: <i>Base64_encoded_distinguished_name</i> <p>The new superior specifier is optional in LDIF records with a modify DN change type. It is only given in cases where you want to reparent the entry.</p>

The following is an example of a modify DN change type that shows how to rename an entry:

```

1 version: 1
2
3 # Rename ou=Artists to ou=West Coast Artists, and leave
4 # its old RDN value.
5 dn: ou=Artists,l=San Francisco,c=US
6 changetype: moddn
7 newrdn: ou=West Coast Artists
8 deleteoldrdn: 1
9

```

The following is an example of a modify DN change type that shows how to move an entry:

```

1 version: 1
2
3 # Move cn=Peter Michaels from
4 # ou=Artists,l=San Francisco,c=US to
5 # ou=Promotion,l=New York,c=US and delete the old RDN.
5 dn: cn=Peter Michaels,ou=Artists,l=San Francisco,c=US
6 changetype: moddn
7 newrdn: cn=Peter Michaels
8 deleteoldrdn: 1
9 newsuperior: ou=Promotion,l=New York,c=US
10

```

The following is an example of a modify DN change type that shows how to move an entry and rename it at the same time:

```

1 version: 1
2
3 # Move ou=Promotion from l=New York,c=US to
4 # l=San Francisco,c=US and rename it to
5 # ou=National Promotion.
5 dn: ou=Promotion,l=New York,c=US
6 changetype: moddn
7 newrdn: ou=National Promotion
8 deleteoldrdn: 1
9 newsuperior: l=San Francisco,c=US
10

```

IMPORTANT: The LDAP 2 modify RDN operation doesn't support moving entries. If you try to move an entry using the LDIF newsuperior syntax with an LDAP 2 client, the request will fail.

5.1.4 Line Folding within LDIF Files

To fold a line in an LDIF file, simply insert a line separator (a newline or a carriage return/newline pair) followed by a space at the place where you want the line folded. When the LDIF parser encounters a space at a beginning of the line, it knows to concatenate the rest of the data on the line with the data on the previous line. The leading space is then discarded.

You should not fold lines in the middle of a multibyte UTF-8 character.

The following is an example of an LDIF file with a folded line (see lines 13 and 14):

```
1 version: 1
2 dn: cn=Peter Michaels, ou=Artists, l=San Francisco, c=US
3 sn: Michaels
4 givenname: Peter
5 objectClass: top
6 objectClass: person
7 objectClass: organizationalPerson
8 objectClass: inetOrgPerson
9 telephonenumber: +1 415 555 0001
10 mail: Peter.Michaels@aaa.com
11 userpassword: Peter123
12 description: Peter is one of the most popular music
13   ians recording on our label. He's a big concert dr
14   aw, and his fans adore him.
15
```

5.1.5 Hashed Password Representation in LDIF Files

The hashed password is represented as base64 data in the LDIF file. The attribute name *userpassword* should be followed with the name of the encryption used for hashing the password. This name should be given within a pair of flower brackets “{ }” as shown below:

Example 1

For SHA hashed passwords:

```
1 version: 1 2 dn: cn=Peter Michaels, ou=Artists, l=San Francisco, c=US
3 sn: Michaels 4 userpassword: {SHA}xcbdh46ngh37jsd0naSFDedjAS30dm5
objectclass: inetOrgPerson
```

Example 2

For SSHA hashed passwords:

```
1 version: 1 2 dn: cn=Peter Michaels, ou=Artists, l=San Francisco, c=US
3 sn: Michaels 4 userpassword:
{SSHA}sGs948DFGkakdfkasDF34DF4dS3skl5DFS5 objectclass: inetOrgPerson
```

Example 3

For Digest MD5 hashed passwords:

```
1 version: 1 2 dn: cn=Peter Michaels, ou=Artists, l=San Francisco, c=US
3 sn: Michaels 4 userpassword:
{MD5}a451kSDF234SDFG62dsfsf2DG2QEvgdmnk4305 objectclass: inetOrgPerson
```


5.2 Debugging LDIF Files

- ♦ “Enabling Forward References” on page 33
- ♦ “Checking the Syntax of LDIF Files” on page 35
- ♦ “Using the LDIF Error File” on page 36
- ♦ “Using LDAP SDK Debugging Flags” on page 37

If you have problems with an LDIF file, consider the following:

5.2.1 Enabling Forward References

You might occasionally encounter LDIF files in which a record to add one entry comes before a record to add its parents. When this happens, an error is generated because the new entry’s parent does not exist when the LDAP server attempts to add the entry.

To solve this problem, simply enable the use of forward references. When you enable the creation of forward references and an entry is going to be created before its parent exists, a placeholder called a forward reference is created for the entry’s parent to allow the entry to be successfully created. If a later operation creates the parent, the forward reference is changed into a normal entry.

It is possible that one or more forward references will remain after your LDIF import is complete (if, for example, the LDIF file never created the parent for an entry). In this case, the forward reference will appear as an Unknown object in ConsoleOne and iManager. Although you can search on a forward reference entry, you cannot read attributes (except objectClass) from the forward reference entry because it does not have any attributes or attribute values. However, all LDAP operations will work normally on the real object entries located below the forward reference.

Identifying Forward Reference Entries


Forward reference entries have an object class of Unknown and also have their internal NDS EF_REFERENCE entry flag set. In ConsoleOne and iManager, entries with an object class of Unknown are represented by a round yellow icon with a question mark in the center. You can use LDAP to search for objects with an Unknown object class, although there is currently no way to access the entry flag settings through LDAP to be sure that they are forward reference entries.

Changing Forward Reference Entries into Normal Objects

You can change a forward reference entry into a normal object by simply creating it (using, for example, an LDIF file or an LDAP client request). When you ask eDirectory to create an entry that already exists as a forward reference, eDirectory transforms the existing forward reference entry into the object you asked it to create.

Using the Novell eDirectory Import Convert Export Wizard

To enable forward references during an LDIF import:


- 1 In Novell iManager, click the Roles and Tasks button .
- 2 Click eDirectory Maintenance > Import Convert Export Wizard.
- 3 Click Import Data from File on Disk, then click Next.
- 4 Select LDIF as the type of file you want to import.

- 5 Specify the name of the file containing the data you want to import, specify the appropriate options, then click Next.
- 6 Specify the LDAP server where the data will be imported.
- 7 Add the appropriate options, as described in the following table:

Option	Description
Server DNS name/IP address	DNS name or IP address of the destination LDAP server
Port	Integer port number of the destination LDAP server
DER File	Name of the DER file containing a server key used for SSL authentication
Login method	Authenticated Login or Anonymous Login (for the entry specified in the User DN field)
User DN	Distinguished name of the entry that should be used when binding to the server-specified bind operation
Password	Password attribute of the entry specified in the User DN field

- 8 Under Advanced Settings, click Allow Forward References.
- 9 Click Next, then click Finish.

To enable forward references during a data-to-data server migration:

- 1 In Novell iManager, click the Roles and Tasks button .
- 2 Click eDirectory Maintenance > Import Convert Export Wizard.
- 3 Click Migrate Data Between Servers, then click Next.
- 4 Specify the LDAP server holding the entries you want to migrate.
- 5 Add the appropriate options, as described in the following table:

Option	Description
Server DNS name/IP address	DNS name or IP address of the source LDAP server
Port	Integer port number of the source LDAP server
DER file	Name of the DER file containing a server key used for SSL authentication
Login method	Authenticated Login or Anonymous Login (for the entry specified in the User DN field)
User DN	Distinguished name of the entry that should be used when binding to the server-specified bind operation
Password	Password attribute of the entry specified in the User DN field

- 6 Under Advanced Settings, click Allow Forward References.
- 7 Click Next.
- 8 Specify the search criteria (described below) for the entries you want to migrate:

Option	Description
Base DN	Base distinguished name for the search request If this field is left empty, the base DN defaults to " " (empty string).
Scope	Scope of the search request
Filter	RFC 2254-compliant search filter The default is objectclass=*
Attributes	Attributes you want returned for each search entry

- 9 Click Next.
- 10 Specify the LDAP server where the data will be migrated.
- 11 Click Next, then click Finish.

NOTE: Ensure that the schema is consistent across LDAP Services.

Using the Novell Import Conversion Export Utility Command Line Interface

To enable forward references in the command line interface, use the -F LDAP destination handler option.


For more information, see “[LDIF Destination Handler Options](#)” in the *Novell eDirectory 8.8 Administration Guide*.

5.2.2 Checking the Syntax of LDIF Files

You can check the syntax of an LDIF file before you process the records in the file by using the Display Operations But Do Not Perform LDIF source handler option.

The LDIF source handler always checks the syntax of the records in an LDIF file as it processes them. Using this option disables the processing of the records and lets you verify the syntax.

Using the Novell eDirectory Import Convert Export Wizard

- 1 In Novell iManager, click the Roles and Tasks button .
- 2 Click eDirectory Maintenance > Import Convert Export Wizard.
- 3 Click Import Data from File on Disk, then click Next.
- 4 Select LDIF as the type of file you want to import.
- 5 Specify the name of the file containing the data you want to import, specify the appropriate options.
- 6 Under Advanced Settings, click Display Operations But Do Not Perform, then click Next.
- 7 Specify the LDAP server where the data will be imported.
- 8 Add the appropriate options, as described in the following table:

Option	Description
Server DNS name/IP address	DNS name or IP address of the destination LDAP server
Port	Integer port number of the destination LDAP server
DER File	Name of the DER file containing a server key used for SSL authentication
Login method	Authenticated Login or Anonymous Login (for the entry specified in the User DN field)
User DN	Distinguished name of the entry that should be used when binding to the server-specified bind operation
Password	Password attribute of the entry specified in the User DN field

9 Click Next, then click Finish.

Using the Novell Import Conversion Export Utility Command Line Interface

To check the syntax of an LDIF file in the command line interface, use the `-n` LDIF source handler option.

For more information, see “[LDIF Source Handler Options](#)” in the *Novell eDirectory 8.8 Administration Guide*.

5.2.3 Using the LDIF Error File

The Novell Import Conversion Export utility automatically creates an LDIF file listing any records that failed processing by the destination handler. You can edit the LDIF error file generated by the utility, fix the errors, then reapply it to the server to finish an import or data migration that contained failed records.

Using the Novell eDirectory Import/Export Wizard

This feature is available only in ConsoleOne.

- 1 In ConsoleOne, click Wizard > NDS Import/Export.
- 2 Click the task you want to perform.
- 3 Click Advanced.
- 4 In the Log File field, specify a filename where output messages (including error messages) will be logged.
- 5 In the LDIF Output File for Failed Records field, specify a filename where entries that fail are output in LDIF format.

You can use this file to examine or correct errors. You can also reapply a modified (corrected) version of this file to the directory.

- 6 Click Close.
- 7 Follow the online instructions to finish your selected task.

Using the Novell Import Conversion Export Utility Command Line Interface

To configure error log options in the command line utility, use the `-l` general option.

For more information, see “[General Options](#)” in the *Novell eDirectory 8.8 Administration Guide*.

5.2.4 Using LDAP SDK Debugging Flags

To understand some LDIF problems, you might need to see how the LDAP client SDK is functioning. You can set the following debugging flags for the LDAP source handler, the LDAP destination handler, or both.

Value	Description
0x0001	Trace LDAP function calls.
0x0002	Print information about packets.
0x0004	Print information about arguments.
0x0008	Print connections information.
0x0010	Print BER encoding and decoding information.
0x0020	Print search filter information.
0x0040	Print configuration information.
0x0080	Print ACL information.
0x0100	Print statistical information.
0x0200	Print additional statistical information.
0x0400	Print shell information.
0x0800	Print parsing information.
0xFFFF (-1 Decimal)	Enable all debugging options.

To enable this functionality, use the `-e` option for the LDAP source and LDAP destination handlers. The integer value you give for the `-e` option is a bitmask that enables various types of debugging information in the LDAP SDK.

For more information, see “[LDAP Source Handler Options](#)” and “[LDAP Destination Handler Options](#)” in the *Novell eDirectory 8.8 Administration Guide*.

5.3 Using LDIF to Extend the Schema

Because LDIF can represent LDAP update operations, you can use LDIF to modify the schema.

5.3.1 Adding a New Object Class

To add a class, simply add an attribute value that conforms to the specification for `NDSObjectClassDescription` to the `objectClasses` attribute of the `subschemaSubentry`.

```
NDSObjectClassDescription = "(" whsp
    numericoid whsp
```

```

[ "NAME" qdescrs ]
[ "DESC" qdstring ]
[ "OBSOLETE" whsp ]
[ "SUP" oids ]
[ ( "ABSTRACT" / "STRUCTURAL" / "AUXILIARY" ) whsp ]
[ "MUST" oids ]
[ "MAY" oids ]
[ "X-NDS_NOT_CONTAINER" qdstrings ]
[ "X-NDS_NONREMOVABLE" qdstrings ]
[ "X-NDS_CONTAINMENT" qdstrings ]
[ "X-NDS_NAMING" qdstrings ]
[ "X-NDS_NAME" qdstrings ]
whsp ")"

```

The following example LDIF file adds the person objectClass to the schema:

```

1 version: 1
2 dn: cn=schema
3 changetype: add
4 objectClasses: ( 2.5.6.6 NAME 'person' DESC 'Standard
5   ObjectClass' SUP ndsLoginProperties STRUCTURAL MUST
6   (cn $ sn) MAY (description $ seeAlso $ telephoneNum
7   ber $ fullName $ givenName $ initials $ uid $ userPa
8   ssword) X-NDS_NAMING ('cn' 'uid') X-NDS_CONTAINMENT
9   ('organization' 'organizationalUnit' 'domain') X-NDS
10  _NAME 'Person' X-NDS_NOT_CONTAINER '1' X-NDS_NONREMO
11  VABLE '1')
12

```

Mandatory Attributes

Mandatory attributes are listed in the MUST section of the object class description. For the person object class, the mandatory attributes are cn and sn.

Optional Attributes

Optional attributes are listed in the MAY section of the object class description. The optional attributes in the person object class are description, seeAlso, telephoneNumber, fullName, givenName, initials, uid, and userPassword.

NOTE: The userPassword attribute cannot be used as an optional (MAY) attribute. The operation will fail if you try to use it as a mandatory (MUST) attribute in the new objectClass using this LDIF format to extend the schema.

Containment Rules

The object classes that can contain the object class being defined are given in the X-NDS_CONTAINMENT section of the object class description. The person object class can be contained by the organization, organizationalUnit, and domain object classes.

5.3.2 Adding a New Attribute

To add an attribute, simply add an attribute value that conforms to the specification for `NDSAttributeTypeDescription` to the `attributes` attribute of the `subschemaSubentry`.

```
NDSAttributeTypeDescription = "(" whsp
    numericoid whsp ; AttributeType identifier
    [ "NAME" qdescrs ] ; name used in AttributeType
    [ "DESC" qdstring ] ; description
    [ "OBSOLETE" whsp ]
    [ "SUP" woid ] ; derived from this other AttributeType
    [ "EQUALITY" woid ] ; Matching Rule name
    [ "ORDERING" woid ] ; Matching Rule name
    [ "SUBSTR" woid ] ; Matching Rule name
    [ "SYNTAX" whsp noidlen whsp ] ; Syntax OID
    [ "SINGLE-VALUE" whsp ] ; default multi-valued
    [ "COLLECTIVE" whsp ] ; default not collective
    [ "NO-USER-MODIFICATION" whsp ] ; default user modifiable
    [ "USAGE" whsp AttributeUsage ] ; default userApplications
    [ "X-NDS_PUBLIC_READ" qdstrings ]
        ; default not public read ('0')
    [ "X-NDS_SERVER_READ" qdstrings ]
        ; default not server read ('0')
    [ "X-NDS_NEVER_SYNC" qdstrings ]
        ; default not never sync ('0')
    [ "X-NDS_NOT_SCHED_SYNC_IMMEDIATE" qdstrings ]
        ; default sched sync immediate ('0')
    [ "X-NDS_SCHED_SYNC_NEVER" qdstrings ]
        ; default schedule sync ('0')
    [ "X-NDS_LOWER_BOUND" qdstrings ]
        ; default no lower bound('0')
        ;(upper is specified in SYNTAX)
    [ "X-NDS_NAME_VALUE_ACCESS" qdstrings ]
        ; default not name value access ('0')
    [ "X-NDS_NAME" qdstrings ] ; legacy NDS name
whsp ")"
```

The following example LDIF file adds the title attribute type to the schema:

```
1 version: 1
2 dn: cn=schema
3 changetype: add
4 attributeTypes: ( 2.5.4.12 NAME 'title' DESC 'Standa
5 rd Attribute' SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{
6 64} X-NDS_NAME 'Title' X-NDS_NOT_SCHED_SYNC_IMMEDIA
7 TE '1' X-NDS_LOWER_BOUND '1')
8
```

Single-Valued versus Multivalued

An attribute defaults to multivalued unless it is explicitly made single-valued. The following example LDIF file makes title single-valued by adding the `SINGLE-VALUE` keyword after the `SYNTAX` section:

```
1 version: 1
2 dn: cn=schema
```

```

3 changetype: add
4 attributeTypes: ( 2.5.4.12 NAME 'title' DESC 'Standa
5 rd Attribute' SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{
6 64} SINGLE-VALUE X-NDS_NAME 'Title' X-NDS_NOT_SCHED
7 _SYNC_IMMEDIATE '1' X-NDS_LOWER_BOUND '1')
8

```

Adding an Optional Attribute to an Existing Object Class

Although adding new schema elements is an acceptable practice, modifying or extending existing schema elements is usually dangerous. Because every schema element is uniquely identified by an OID, when you extend a standard schema element, you effectively create a second definition for the element even though it still uses the original OID. This can cause incompatibility problems.

There are times when it is appropriate to change schema elements. For example, you might need to extend or modify new schema elements as you refine them during development. Instead of adding new attributes directly to a class, you should generally use auxiliary classes only to

- ◆ Add new attributes to an existing object class.
- ◆ Subclass an existing object class.

5.3.3 Adding or Removing Auxiliary Classes

The following sample LDIF file creates two new attributes, creates an auxiliary class with these new attributes, then adds an inetOrgPerson entry with the auxiliary class as an object class of the entry and with values for the auxiliary class attributes.

```

version: 1
# Add an attribute to track a bear's hair. The attribute is
# multi-valued, uses a case ignore string syntax,
# and has public read rights
# Values may include: long hair, short, curly, straight,
# none, black, and brown
# X-NDS_PUBLIC_READ '1' The 1 allows public read,
# 0 denies public read
dn: cn=schema
changetype: modify
add: attributeTypes
attributeTypes: ( 2.16.840.1.113719.1.186.4.10 NAME
'bearHair' SYNTAX 1.3.6.1.4.1.1466.115.121.1.15
X-NDS_PUBLIC_READ '1' )

# add an attribute to store a bear's picture
dn: cn=schema
changetype: modify
add: attributeTypes
attributeTypes: ( 2.16.840.1.113719.1.186.4.11 NAME
'bearPicture' SYNTAX 1.3.6.1.4.1.1466.115.121.1.5
SINGLE-VALUE )

# create an Auxiliary class for the bearfeatures
dn: cn=schema
changetype: modify
add: objectclasses

```



```
objectclasses: (2.16.840.1.113719.1.186.6.101 NAME
'bearFeatures' MAY (bearHair $ bearPicture) AUXILIARY)
```

```
# now create a user named bobby
dn: cn=bobby,o=bearcave
changetype: add
cn: bobby
sn: bear
givenName: bobby
bearHair: Short
bearHair: Brown
bearHair: Curly
bearPicture:< file:///c:/tmp/alien.jpg
objectClass: top
objectClass: person
objectClass: inetOrgPerson
objectClass: bearFeatures
```

```
# now create a person named john that will later be changed
# into a bear when bearFeatures is added to its objectClass
# list
dn: cn=john,o=bearcave
changetype: add
cn: John
sn: bear
givenName: john
objectClass: top
objectClass: person
objectClass: inetOrgPerson
```

```
# now morph john into a bear by adding bearFeatures
dn: cn=john,o=bearcave
changetype: modify
add: objectClass
objectClass: bearFeatures
-
add: bearHair
bearHair: long
bearHair: black
#bearPicture:< file:///c:/tmp/john.jpg>
-
```

```
# to morph john back to a person, simply delete the
# objectClass bearFeatures
dn: cn=john,o=bearcave
changetype: modify
delete: objectClass
objectClass: bearFeatures
```

When removing auxiliary classes, you don't have to delete all of the values associated with the auxiliary class when you remove the auxiliary class from the objectClass list. eDirectory does this automatically.

If the auxiliary class had MUST attributes, they must all be specified in the same modify operation that adds the auxiliary class to the objectClass list, or the modification will fail.

Known Problems with XML Parsing

XML processing of any LDIF Record (LDIF format or records generated from LDAP server) will not succeed if the individual records will not satisfy all the XML rules specified in the XML file

Troubleshooting SNMP

6

This section includes information for troubleshooting SNMP on all platforms.

- ◆ [Section 6.1, “Traps Might Not Get Generated As Expected,” on page 43](#)
- ◆ [Section 6.2, “SNMP Group Object,” on page 43](#)
- ◆ [Section 6.3, “SNMP Initializing Errors,” on page 43](#)
- ◆ [Section 6.4, “SNMP Subagent Does Not Start,” on page 44](#)
- ◆ [Section 6.5, “SNMP on HP-UX,” on page 44](#)
- ◆ [Section 6.6, “SNMP Issues After Upgrading from eDirectory 8.7.3 to eDirectory 8.8,” on page 45](#)

6.1 Traps Might Not Get Generated As Expected

Traps are sent only if the corresponding verb request is received by the server. They are not sent in any other cases. For example, `ndsDeleteAttribute` is sent only when the `ndsRemoveEntry` (trap number 108) request is sent. But an application can always read the ACLs and decide to check whether the user has sufficient rights to perform the delete operation. In this case, the `ndsDeleteAttribute` trap will not be generated. However, you can use `iMonitor` to view the verb statistics on a particular server.

To get the traps for all occurrences, set the time interval to zero.

You can enable traps to send only on failure conditions. You can enable traps to get them under all conditions.

6.2 SNMP Group Object

If the installation of the SNMP Group object fails, you can rectify this problem by executing the following command on the server console:

```
ndsconfig add -m snmp
```

6.3 SNMP Initializing Errors

eDirectory SNMP initialization component. Error code: -255

or

Initialization failure. Error code: -255

The possible cause could be that you have not specified `hostname:port` or `IP_address:port` as a parameter to the `SERVER` command in eDirectory SNMP configuration file.

The eDirectory SNMP configuration is known as `dssnmp.cfg` on NetWare and `ndssnmp.cfg` file on Linux, UNIX, and Windows. It is located in the following directories:

- ◆ NetWare: `sys:\etc\`

- Linux and UNIX: `/etc/opt/novell/eDirectory/conf/ndssnmp/`
- Windows: `install_directory\SNMP\`

6.4 SNMP Subagent Does Not Start

While starting the SNMP subagent you might get a segmentation error. This might be because of extra spaces in the `ndssnmp.cfg` file. Remove the spaces and start `ndssnmpsa`.

6.5 SNMP on HP-UX

This release of eDirectory does not support HP-UX. Support will be available shortly.

6.5.1 Error while Contacting the SNMP Master Agent from the MIB Browser

If you get an error (for example, a timeout error) while contacting the SNMP master agent from the MIB browser, do the following:

- Ensure that the SNMP master agent is up and running.
You can check this using the `ps` command as follows:

```
ps -ef | grep snmpdm
```
- See the error and warning messages in `/var/adm/snmpd.log` file.

6.5.2 Problems Configuring NET-SNMP-5.0.8

See the `net-snmp-5.0.8` master agent related error and warning messages in the `/usr/adm/snmpd.log` file.

NOTE: If the `net-snmp` master agent is down and is restarted, then `ndssnmpsa` should also be restarted.

6.5.3 Problems Configuring the NAA Agent

See the NAA agent related error and warning messages in the `/var/adm/snmpd.log` file.

Ensure that you have started the NAA agent with log messages enabled. Start the `naaagt` as follows:

```
/usr/sbin/naaagt -m APALL
```

NOTE: By default, `naaagt` terminates automatically when `snmpdm` terminates (unless `naaagt` is started with the `-K` option). See the `naaagt` man page for more details.

6.5.4 Unable to Get the SNMP Query Result from the MIB Browser

Ensure that `net-snmp-5.0.8` is configured, up, and running.

For any problem configuring the eDirectory SNMP subagent (ndssnmpsa), see the /etc/opt/novell/eDirectory/conf/ndssnmp/ndssnmpsa.log file. To get the debug messages, start ndssnmpsa in verbose mode as follows:

```
/opt/novell/eDirectory/bin/ndssnmpsa -v 3 -l 3
```

Where *v* is verbose mode and *l* indicates the log mode.

6.5.5 Traps are Not Received at the SNMP Console or the MIB Browser

Ensure that the trap destination is entered in net-snmp configuration.

For more details on how to configure see section “[Configuring the Master Agent](#)” in the *Novell eDirectory 8.8 Administration Guide*.

6.6 SNMP Issues After Upgrading from eDirectory 8.7.3 to eDirectory 8.8

After upgrading from eDirectory 8.7.3 to eDirectory 8.8, you might get the following error:

```
%%% Attempting to restart the Novell eDirectory SNMP subagent
(ndssnmpsa)...
Starting NDS SNMP Subagent ...
Initialization failure. Error code : -255
Please Wait...
Done
```

```
%%% Unable to start ndssnmpsa... Please try starting it manually...
```

This error occurs because with eDirectory 8.8, eDirectory does not listen on the localhost. Earlier the ndssnmp.cfg file had SERVER localhost set by default.

To resolve this error, you need to manually edit the ndssnmp.cfg file and include the host name of the eDirectory server, which needs to be monitored.

For example, type the following in the ndssnmp.cfg file:

```
SERVER test-server
```

test-server is the hostname on which eDirectory is running on the default NCP port (that is 524). If eDirectory is running on a different port (for ex: 1524), the entry should be as follows:

```
SERVER test-server:1524
```


There has been a great deal of confusion surrounding obituaries stored in the directory and, as a result, some people have developed poor business practices to deal with them. Unlike some directory products, Novell eDirectory ensures referential integrity between objects. For example, if Group A has a member, User B, and User B is deleted, the directory automatically removes the reference to User B from Group A. Obituaries exist as operational attributes placed on objects by eDirectory as another way of ensuring referential integrity during delete, move, rename, restore, and other operations.

There are three general classifications for obituaries:

- ◆ Primary obituaries include the types Dead (0001), Restored (0000), Moved (0002), New RDN (0005), and Tree New RDN (0008).
- ◆ Secondary obituaries are generally associated with a Primary obituary and represent the agents and partitions that need to be notified of the operation specified in the Primary obituary. They include the types Back Link (0006), Used By (000C), and Move Tree (000a).
- ◆ Tracking obituaries include the types Inhibit Move (0003), Old RDN (0004), and Tree Old RDN (0007).

Obituaries, with the exception of Tracking obituaries, must move through a set of synchronizing states:

- ◆ Initial State or Issued (0)
- ◆ Notified (1)
- ◆ OK to Purge (2)
- ◆ Purgeable (4)

The states are recorded in the Flags field in the obituary attribute. Before an obituary can move to the next state, the current state must have been synchronized to all replicas of the real object. In order to determine whether all replicas in the ring have seen a given obituary state, a vector is computed from the transitive vector. In eDirectory 8.6 and later, a nonstored Obituary Vector is used. In previous versions of eDirectory, the Purge Vector is used. If the Modification Timestamp (MTS) on the obituary is older than the corrupted vector, the server responsible for that obituary can advance it to the next state.

For a Secondary obituary of type Back Link, the agent that holds the master replica of the object with the obituary is responsible for advancing the states. For a Secondary obituary of type Used By, the replica agent that created it is responsible for advancing the obituary states as long as that replica still exists. If it does not still exist, the agent holding the master of that partition takes over advancing the obituary states for the Used By obituary. For a Move Tree obituary, the master of the root partition is responsible for advancing the states.

Primary obituaries can be advanced in their states only after all Secondary obituaries have advanced through all of their states. After the Primary obituary reaches its last state, and that state synchronizes to all servers in the ring, all that remains is the object husk, which is an object without attributes—one which can subsequently be purged from the system by the Purge Process. Tracking obituaries are removed after the Primary obituary is ready to be removed or, in the case of

Inhibit_move, the Tracking obituary is removed after the Primary obituary has moved to the OBF_NOTIFIED state on the master replica.

The replica responsible for processing obituaries does so on a background process (the Obituary Process), which is scheduled on a per-partition basis after a given partition finishes an inbound synchronization cycle. If there are no other replicas of the partition, the Outbound Replication Process is still scheduled on the heartbeat interval. The Outbound Replication Process then starts the Obituary Process. The Obituary Process cannot be manually scheduled, nor does it need to be. As synchronization occurs, the transitive vectors are updated, thus advancing the Purge Vector and Obit Vector. As these vectors move forward, the obituary states are allowed to move forward. This, together with the automatic scheduling done upon inbound synchronization, completes the obituary processing cycle. Therefore, the lifeblood of obituary processing is object synchronization.

For an object that is being removed, after all obituaries whose associated Primary obituary is of type Dead have been advanced to the last state (Purgeable), and that state has been synchronized to all replicas, a new process is responsible for removing the remaining entry husk from the database. The Purge Process runs automatically to remove these husks. You can manually schedule the Purge Process and modify its automatic schedule interval by using the [Agent Configuration](#) page in iMonitor.

7.1 Examples

This section contains the following examples:

- ♦ [“Deleting an Object” on page 48](#)
- ♦ [“Moving an Object” on page 49](#)

7.1.1 Deleting an Object

1 Add the Primary obituary OBT_DEAD.

The Back Link attribute contains a list of servers that have an interest in this object and need to be notified of changes to this entry. For every DN listed in the Back Link attribute and all servers listed in the entry's partition replica attribute, eDirectory adds a Back Link obituary. The creation time of the Primary obituary, OBT_DEAD, is stored in the Secondary obituary.

The Used By attribute contains a list of partitions that have an interest in this object and need to be notified of changes to this entry. For every DN listed in the Used By attribute, eDirectory adds a Used By obituary. The creation time of the Primary obituary, OBT_DEAD, is stored in the Secondary obituary.

2 Remove all attributes but the obituaries.

The Outbound Replication Process then synchronizes this change to all other servers in the replica ring.

On the next inbound synchronization of this partition, the Obituary Process is started, which does the following:

- ♦ Computes a time vector which is a minimum transitive vector, referred to as the purge vector. Later versions of eDirectory compute a second minimum vector, called the obituary vector, which does not consider replicas which are subordinate references.
- ♦ Each Obituary in this partition is now examined.

If the obituary is a Primary obituary, there are no Secondary obituaries, and the attribute's modification time (MTS) on the obituary is older than the Purge Vector, then all servers have seen the change and this obituary will be removed.

If the obituary is a Back Link obituary and this server is the master, then this server is responsible for processing this obituary.

IMPORTANT: Perform the required operation for this state if it has not been done. Most often, this is done by notifying an external reference.

If the obituary is a Used By obituary and this server is the server where the delete occurred (determined by comparing the replica number in the obituary's MTS to our replica number), this server is responsible for processing this obituary.

- ♦ If this server is responsible for processing a particular Secondary obituary type (Back Link or Used By), all Secondary obituaries of that type on an entry are in the same state, the required operation for that state has been completed on all obituaries (for example, servers have been notified), and the obituary's MTSs for that obituary type are older than the Obituary Vector, then all Secondary obituaries of that type can be advanced to the next state.

7.1.2 Moving an Object

Move acts much like **Delete**, but with the following changes:

- ♦ Before the Primary obituary is placed on the move source, a partial entry is created in the destination container and a Tracking obituary (OBT_INHIBIT_MOVE) is placed on that partial entry. This Tracking obituary is placed to prevent the entry from being moved or taking part in a partition operation before the full entry is transferred from the source.
- ♦ On the source entry, the Primary obituary is OBT_MOVED.
- ♦ After the Primary obituary (OBT_MOVED) is moved to the Notified state (meaning that all replicas of the source know the entry is being moved) and all external references have been notified, the Tracking obituary (OBT_INHIBIT_MOVE) is removed from the destination entry.

7.2 Impact of Stuck and Orphaned Obituaries

Objects with obituaries are considered every time an agent outbound synchronizes, and by the obituary process, which is scheduled to run at the end of an inbound synchronization cycle.

7.3 Prevention

On a regular basis, run the iMonitor Server Information report. This report walks the entire tree, communicates with every NCP server it can find, and reports any errors it finds. You can use this report to diagnose time synchronization and limber problems, or to find out if the current server is able to communicate with all other servers from this server's perspective. If selected in the configuration page, the server can also generate NDS Agent Health information for every server in the tree. See "[Configuring and Viewing Reports](#)" in the *Novell eDirectory 8.8 Administration Guide* for more information on running the Server Information report.

If you are using iMonitor 2.0 or later, make sure that the Errors and Health Sub-report report options are enabled. The following items will be verified. You should browse the report and make sure that there are no errors.

- ◆ Based on the information in the ndsimonhealth configuration file stored with iMonitor (see “[Configuration Files](#)” in the *Novell eDirectory 8.8 Administration Guide*), this report will check the eDirectory agent version to ensure you are running the correct directory patches tree-wide.
- ◆ All servers are within Timesync tolerances.
- ◆ This server can communicate with all other servers.
- ◆ There have not been any servers improperly or incompletely removed from the tree.
- ◆ The Health subreport will indicate if any partitions are not within tolerance for the replication sync times.

If you are using iMonitor 1.5, select the Errors report option. The following items will be verified. You should browse the report and make sure that there are no errors.

- ◆ The agent version is displayed. Make sure all servers tree-wide are running the most current eDirectory Support Pack available from the [Novell Support Web site \(http://support.novell.com\)](http://support.novell.com).
- ◆ All servers are within Timesync tolerances.
- ◆ This server can communicate with all other servers.
- ◆ There have not been any servers improperly or incompletely removed from the tree.

Using the iMonitor Obituary Listing report or the iMonitor Object Statistics report, you can find any obituaries on your system. If you find any obituaries that you don't believe are being processed, see [Section 7.4, “Troubleshooting Tips,” on page 50](#).

7.4 Troubleshooting Tips

There are two general reasons that obituaries don't process: either the obituary has been orphaned (that is, the obituary exists on some servers but not all servers) or the obituary is stuck (that is, it exists on all servers but its states are not advancing for some reason).

Do the following to troubleshoot orphaned or stuck obituaries:

- Don't panic!
- If the obituary is for an object not stored on this server (that is, the object is an External Reference):
 - ◆ Check to see if the real object has a matching obituary. If not, this obituary has been orphaned. See “[Resolving Orphaned Obituaries on Extrefs](#)” on [page 52](#) for more information.
 - ◆ If the real object has a matching obituary, troubleshoot and resolve obituary problems on the real object before attempting to address any issues with the obit on the ExtRef partition.
- Make sure that the obituaries are correctly synchronized.
 - ◆ Use the iMonitor [Agent Synchronization page](#) to check for and resolve any synchronization errors.

- ◆ Obituaries can change states only after all agents holding a copy of the replica ring have seen the state change. There are several ways to ensure that every replica has seen the data:

While browsing the entry with obituaries, click the Entry Synchronization link. The page displayed will show all attributes that have not been synchronized to all replicas.

Find the oldest time stamp on any of the obituary attribute values. The difference between that time and the current time should be greater than the interval shown in the Max Ring Delta field on the Partition Synchronization page.

Evaluate the transitive vector.

- ❑ Run the iMonitor **Server Information Report** to ensure that all server communication is functioning.
- ❑ Examine the **Agent Process Status: Obituaries** to look for any errors.
 - ◆ Common problems in Agent Process Status: Obituaries include -625, -622, -634, and -635 communication problems. See **Server Information Report** for more details.
 - 601, and -603, indicating servers that have been improperly removed, or that the Server object might have a base class of Unknown.
 - ◆ Errors shown on this page are not fatal. The next time the obituary process runs for that partition, it will retry the operation. Resolve any issues shown in this page, then wait for the retry.
- ❑ While looking at obituary objects, walk around the replica ring, comparing the obituary around the ring.
 - ◆ If not all replicas have a copy of the obituary and all attribute values are not purgeable, this object is inconsistent around the replica ring—and this is a case of an orphaned obituary. See **“Resolving Orphaned Obituaries” on page 51** for more information.
 - ◆ If the object exists on all replicas and is consistent, then it might not be advancing because of synchronization errors, or the obituary process might be getting errors.
- ❑ As needed, use **Trace** with the Obituary option enabled to examine the obituary process in detail.
- ❑ To prevent obituary problems in the future, upgrade to the latest Support Pack (for eDirectory 8.6 servers). There have been fixes for all known obituary issues.

7.4.1 Solutions

Use the proper solution referred to in **Section 7.4, “Troubleshooting Tips,” on page 50**.

Before using any of these solutions, you must make sure that your data is safe. You might need to back up the directory database files, server configuration, and trustees. To increase the probability of success and to minimize future problems, upgrade to the latest eDirectory Support Packs.

Resolving Orphaned Obituaries

- ◆ **Preferred method:** If eDirectory 8.6 or later is on any of the servers in the replica ring, browse to the object in iMonitor, then select Send Single Entry. This will perform a nonauthoritative send to all other replicas.

- ♦ **Far less desirable method:** If all servers in the replica ring that have a copy of the orphaned obituary are older than eDirectory 8.6, load DSBrowse with the -a option, browse to the object, then time-stamp the entry. This will make the object as it exists on this server the authoritative copy. We do not recommend making objects authoritative as a matter of practice.

Resolving Orphaned Obituaries on Extrefs

- ♦ **Less desirable method:** Run DSRepair with the time stamp option selected.
- ♦ **Less desirable method:** Move a real replica to the server, wait for it to turn on, then wait for the obituary to be processed. If the obituary is not processed, use the information in [Section 7.4, “Troubleshooting Tips,” on page 50](#) to resolve the issue now that the object is on a real replica. After the obituary has processed, the replica can be removed if desired.

7.4.2 Previous Practices

In the past, several different strategies have been employed to resolve stuck obituaries. Some of these strategies involve expensive partitioning operations, or the use of undocumented features that might cause problems in the future.

The first strategy was to switch which replica held the master. This would work in some cases because the master is the agent responsible for moving the Back Link obituaries through their various states. In the case where the replica was inconsistent and the master didn't hold the deleted object, switching masters to an agent that held the deleted entry with its obituaries would give the new agent the license to push the obituaries through their states and eventually purge it out. Send Single Entry is a much cleaner and less dangerous way to resolve obituaries that are stuck because the replica is inconsistent.

The second strategy used was to run DSRepair with certain switches to delete all obituaries. (There is a third-party application which resolves stuck obituaries by launching DSRepair.) We do not recommend this strategy. Using those switches will delete all obituaries on this agent, which means that obituaries that are not stuck might also be removed, creating further replica inconsistencies and more stuck obituaries. Because this is not a distributed operation, you must run DSRepair on all of the servers with stuck obituaries, which increases the odds that one of those servers has obituaries for another partition which will be prematurely deleted. The premature deletion of obituaries can cause additional orphaned obituaries and, in turn, cause problems which can be found years later when you change replicas types, add new replicas, or perform other partitioning operations.

The third strategy used was to make objects authoritative, either using DSBrowse with the advanced mode operation and time stamping the entry, or running DSRepair with the -OT switch. This forces the entry to become authoritative and synchronize out to all other replicas. This should be done with great care because you might lose data changed on other servers. We recommend that this be a rarely employed method of obituary cleanup.

This chapter explains the process to migrate to Novell® eDirectory™ from:

- ♦ [Section 8.1, “Migrating the Sun ONE Schema to Novell eDirectory,” on page 53](#)
- ♦ [Section 8.2, “Migrating the Active Directory Schema to Novell eDirectory Using ICE,” on page 56](#)

8.1 Migrating the Sun ONE Schema to Novell eDirectory

To migrate the Sun ONE* schema to Novell eDirectory, complete the following steps:

“[Step 1: Perform the Schema Cache Update Operation](#)” on page 53

“[Step 2: Rectify the Error LDIF File to Eliminate the Errors](#)” on page 53

“[Step 3: Import the LDIF File](#)” on page 55

8.1.1 Step 1: Perform the Schema Cache Update Operation

You can write the errors encountered while comparing the schema to an error file using the following command:

```
ice -e LDIF error file name -C -a -SLDAP -s Sun ONE server -p Sun ONE port -DLdap -s eDirectory server -p eDirectory port
```

For example:

```
ice -e err.ldf -C -a -SLDAP -s sun_srv1 -p sun_port1 -DLdap -s edir_srv2 -p edir_port2
```

Any errors encountered while comparing the schema is written to the error file (err.ldf in the example). You do not need to login to perform this operation unless one of the servers require authentication in order to read the Root DSE. Microsoft Active Directory requires authentication to read the Root DSE.

8.1.2 Step 2: Rectify the Error LDIF File to Eliminate the Errors

- ♦ Sun ONE defines some schema definitions publicly that eDirectory does not. This includes attributes like, “objectClasses”, “attributeTypes”, “ldapSyntaxes” and “subschemSubentry”. These definitions exist internally and are very important to the schema, and therefore, they cannot be modified. Operations that try to modify these definitions results in the following error:

```
LDAP error : 53 (DSA is unwilling to perform)
```

Any records that contain references to these definitions cause the following error:

```
LDAP error : 16 : ( No such attribute )
```

Thus, records that contain any reference to these objects or that try to modify these definitions need to be commented in the LDIF error file (err.ldf in the example).

- ◆ Some objectClasses definitions in Sun ONE do not have naming attributes. Adding these objectClasses would result in the following error in eDirectory:

```
LDAP error : 80 (NDS error: ambiguous naming (-651))
```

This error occurs because Sun ONE does not use the same method for determining naming rules as eDirectory.

To solve this, you can use any *one* of the three following options:

Option 1:

Go through each of the offending objectClasses and add a valid naming attribute to each of them.

For example:

To add the naming attribute [cn] to the objectclass “netscapeMachineData” modify the entry (that is *emphasized* in the example below) in the err.ldf file to include the X-NDS_NAMING flag as shown below:

```
dn: cn=schemachangetype: modifyadd: objectClassesobjectClasses: (
2.16.840.1.113730.3.2.32 NAME 'netscapeMachineData'
DESC 'iPlanet defined objectclass' SUP top STRUCTURAL MAY 'cn'
X-NDS_NAMING 'cn' )-
```

Option 2:

Go through each of the offending objectClasses and make them AUXILIARY or ABSTRACT.

For example:

To modify the objectclass definition of objectclass “netscapeMachineData” from “STRUCTURAL” to “AUXILIARY”, modify the err.ldf file entry (that is *emphasized* in the example below) as shown below:

```
dn: cn=schemachangetype: modifyadd: objectClassesobjectClasses: (
2.16.840.1.113730.3.2.32 NAME 'netscapeMachineData'
DESC 'iPlanet defined objectclass' SUP top AUXILIARY )-
```

To modify the objectclass definition of objectclass “netscapeMachineData” from “STRUCTURAL” to “ABSTRACT”, modify the err.ldf file entry (that is *emphasized* in the example below) as shown below:

```
dn: cn=schemachangetype: modifyadd: objectClassesobjectClasses: (
2.16.840.1.113730.3.2.32 NAME 'netscapeMachineData'
DESC 'iPlanet defined objectclass' SUP top ABSTRACT )-
```

Option 3:

Add cn to the definition of Top in eDirectory, which causes a potential naming attribute for all objectClasses.

There are two ways of adding cn to Top:

- ◆ **Method 1:**

Create a file as shown below and name it topsch.ldf.

```
version : 1
dn:cn=schema
changetype :modify
delete : objectclasses
objectclasses : ( 2.5.6.0 NAME 'top' STRUCTURAL )
-
```

```
add:objectclasses
objectclasses : (2.5.6.0 NAME 'top' STRUCTURAL MAY cn)
```


Use the following Novell Import Conversion Export command line:

```
ice -SLDIF -f LDIF_file_name -DLDAP -s eDirectory_server -p
eDirectory_port -d eDirectory_Admin_DN -w eDirectory_password
```

For example:

```
ice -SLDIF -f topsch.ldf -DLDAP -s edir_srv2 -p edir_port2 -d
cn=admin,o=org -w pwd1
```

◆ **Method 2:**

1. In Novell iManager, click the Roles and Tasks button .
2. Click Schema > Add Attribute.
3. In the Available Classes list, select Top, then click OK.
4. Double-click CN in the Available Optional Attributes list.
5. Click OK.

- ◆ Some objectClass definitions contain *userPassword* as part of their mandatory attributes list. Adding such objectClasses to eDirectory cause the following error:

```
LDAP error : 16 (No such attribute)
```

To resolve this error, modify the objectClass definition to inherit the new objectClass from *ndsLoginProperties* and remove the *userPassword* attribute from the mandatory attribute list.

For example:

An objectClass containing *userPassword* in the mandatory attributes list:

```
version : 1
dn: cn=schemaz
changetype: modify
add: objectClasses
objectClasses: ( 0.9.2342.19200300.100.4.19 NAME
'simpleSecurityObject' DESC '
Standard LDAP objectClass' SUP top STRUCTURAL MUST userPassword )
```

Needs to be modified as following (notice the change to the last line):

```
version : 1
dn: cn=schema
changetype: modify
add: objectClasses
objectClasses: ( 0.9.2342.19200300.100.4.19 NAME
'simpleSecurityObject' DESC '
Standard LDAP objectClass' SUP (ndsLoginProperties $ top)
STRUCTURAL )
```

8.1.3 Step 3: Import the LDIF File

Use the following Novell Import Conversion Export command to import the modified schema compare LDIF file (*err.ldf* in our example):

```
ice -e error_file -SLDIF -f modified_LDIF_file -DLDAP -s
eDirectory_server -p eDirectory_port -d eDirectory_Admin_DN -w
eDirectory_password
```

For example:

```
ice -e errors.ldf -SLDIF -f err.ldf -DLDAP -s edir_srv2 -p edir_port2 -d cn=admin,o=org -w pwd1
```

8.2 Migrating the Active Directory Schema to Novell eDirectory Using ICE

While migrating schema from Active Directory* to Novell eDirectory using ICE, schema migration for the “Computer” objectclass fails with an ambiguous naming error (-651) error.

To resolve this, complete the following steps:

“Step 1: Perform the Schema Cache Update Operation” on page 53

“Step 2: Rectify the Error LDIF File to Eliminate the Errors” on page 53

“Step 3: Import the LDIF File” on page 55

8.2.1 Step 1: Perform the Schema Cache Update Operation

While migrating schema from Active Directory to Novell eDirectory using ICE, ensure that you have provided the error log option (-e) of ICE as follows:

```
ice -e error_file -S ldap -s Active_Directory_server -p Active_Directory_port -d Active_Directory_full_admin_context -w Active_Directory_password -D ldap -s eDirectory_server -p eDirectory_port -d eDirectory_full_admin_context -w eDirectory_password
```

For example:

```
ice -e err.ldf -S ldap -s activesrv1 -p activeport1 -d cn=admin,o=company -w activepwd -D ldap -s edirsrv2 -p edirport2 -d cn=admin,o=company -w edirpwd
```

8.2.2 Step 2: Rectify the Error LDIF File to Eliminate the Errors

The failed entry would be present in the err.ldf file as shown below:

```
dn: cn=schema
changetype: modify
delete: objectclasses
objectclasses: ( 2.16.840.1.113719.1.1.6.1.4 NAME 'computer' )
-
add: objectclasses
objectclasses: ( 2.16.840.1.113719.1.1.6.1.4 NAME 'computer' SUP
(device $
user ) STRUCTURAL MAY (operator $ server $ status $ cn $
networkAddress $
local PolicyFlags $ defaultLocalPolicyObject $ machineRole $ location
$
netbootInitialization $ netbootGUID $ netbootMachineFilePath $
siteGUID $
operatingSystem $ operatingSystemVersion $ operatingSystemServicePack
$
```



```

operatingSystemHotfix $ volumeCount $ physicalLocationObject $
dNSHostName
$ policyReplicationFlags $ managedBy $ rIDSetReferences $ catalogs $
netbootSIFFile $ netboot MirrorDataFile ) X-NDS_NOT_CONTAINER '1' X
-NDS_NONREMOVABLE '1' X-NDS_NAME 'Computer' )
-

```

Modify this entry in the error file (err.ldf in the example) to remove the “user” objectclass from the list of superior objectclasses in the definition of the “Computer” objectclass, as shown below:

```

dn: cn=schema
changetype: modify
delete: objectclasses
objectclasses: ( 2.16.840.1.113719.1.1.6.1.4 NAME 'computer' )
-
add: objectclasses
objectclasses: ( 2.16.840.1.113719.1.1.6.1.4 NAME 'computer' SUP
device
STRUCTURAL MAY (operator $ server $ status $ cn $ networkAddress $
local
PolicyFlags $ defaultLocalPolicyObject $ machineRole $ location $
netbootInitialization $ netbootGUID $ netbootMachineFilePath $
siteGUID $
operatingSystem $ operatingSystemVersion $ operatingSystemServicePack
$
operatingSystemHotfix $ volumeCount $ physicalLocationObject $
dNSHostName
$ policyReplicationFlags $ managedBy $ rIDSetReferences $ catalogs $
netbootSIFFile $ netbootMirrorDataFile ) X-NDS_NOT_CONTAINER '1' X
-NDS_NONREMOVABLE '1' X-NDS_NAME 'Computer' )
-

```

8.2.3 Step 3: Import the LDIF File

Now, import the modified entry using the following ICE command:

```
ice -S ldif -f LDIF_file -D ldap -s Novell_eDirectory_server -p
port_number -d full_admin_context -w password
```

For example:

```
ice -S ldif -f err.ldf -D ldap -s edirsrv1 -p edirport1 -d
cn=admin,o=company -w pwd1
```

8.3 Migrating from OpenLDAP to Novell eDirectory

- ◆ [Section 8.3.1, “Prerequisites,” on page 58](#)
- ◆ [Section 8.3.2, “Migrating the OpenLDAP Schema to eDirectory,” on page 58](#)
- ◆ [Section 8.3.3, “Migrating the Open LDAP Data to Novell eDirectory,” on page 59](#)
- ◆ [Section 8.3.4, “Making PAM Work with Novell eDirectory After Migration,” on page 59](#)

8.3.1 Prerequisites

The data that is migrated from an OpenLDAP server can have MD5 passwords, which may cause the applications to break if the appropriate NMAS methods are not installed. The NMAS method, SimplePassword, needs to be installed for the Novell eDirectory using the command as below:

```
nmasinst -addmethod admin_context treename configfile -h  
Hostname:port-w password
```

Example: nmasinst -addmethod admin.novell eDir-Tree /Linux/eDirectory/nmas/NmasMethods/
Novell/SimplePassword/config.txt -h eDir_srv:524 -w secret

8.3.2 Migrating the OpenLDAP Schema to eDirectory

To migrate the OpenLDAP schema to eDirectory, complete the following steps:

- ◆ “Step 1: Perform the Schema Cache Update Operation” on page 58
- ◆ “Step 2: Rectify the Error LDIF File to Eliminate the Errors” on page 58

Step 1: Perform the Schema Cache Update Operation

You can write the errors encountered while comparing the schema to an error file using the following command:

```
ice -e error_file -C -a -S ldap -s OpenLDAP_server -p Open_LDAP_port -  
D ldap -s eDirectory_server -p eDirectory_port -d  
eDirectory_full_admin_context -w eDirectory_password
```

For example:

```
ice -e err.ldf -C -a -SLDAP -s open_srv1 -p open_port1 -DLDAP -s  
edir_srv2 -p edir_port2 -d cn=admin,o=novell -w secret
```

Any errors encountered while comparing the schema is written to the error file (err.ldf in the example).

Step 2: Rectify the Error LDIF File to Eliminate the Errors

Open LDAP defines some schema definitions publicly, which include attributes like objectClasses, attributeTypes, ldapSyntaxes, and subschemSubentry. These definitions exist internally and are very important to the schema, and therefore, they cannot be modified. Operations that try to modify these definitions results in the following error:

```
LDAP error : 53 (DSA is unwilling to perform)
```

Any records that contain references to these definitions cause the following error:

```
LDAP error : 16 ( No such attribute )
```

Thus, records that contain any reference to these objects or that try to modify these definitions need to be commented in the LDIF error file (err.ldf in the example).

8.3.3 Migrating the Open LDAP Data to Novell eDirectory

Execute the following command to migrate the data:

```
ice -e error_data.ldif -SLDAP -s OpenLDAP_server -p OpenLDAP_port -d
admin_context -w password -t -b dc=blr,dc=novell,dc=com -F
objectclass=* -DLdap -d admin_context -w password -l -F
```

For example:

```
ice -e err_data.ldif -SLDAP -s open_srv1 -p open_port1 -d
cn=administrator,dc=blr,dc=novell,dc=com -w secret1 -t -b
dc=blr,dc=novell,dc=com -F objectclass=* -DLdap -d cn=admin,o=novell -
w secret2 -l -F
```

Some objects also may fail due to forward referencing and internal dependencies on the objects, which may not break any applications.

8.3.4 Making PAM Work with Novell eDirectory After Migration

After migrating from OpenLDAP to eDirectory, you need to make some changes for PAM to work with eDirectory.

Changes in /etc/ldap.conf File

```
# The distinguished name to bind to the server with.
# Optional: default is to bind anonymously.
binddn cn=admin,o=acme
...
# The credentials to bind with.
# Optional: default is no credential.
bindpw secret
...
# The search scope.
scope sub
...
# Filter to AND with uid=%s
pam_filter objectclass=inetorgperson
...
# Remove old password first, then update in
# cleartext. Necessary for use with Novell
# Directory Services (NDS)
pam_password nds
...
ssl off
...
```

Changes to the Data in the Directory

This change is only specific to the scenario where the users objects in OpenLDAP have CRYPT as the password hash algorithm.

Using iManager, add the following attribute with the specified value to the container having all the user objects:

Attribute: sasDefaultLoginSequence

Value: Simple Password

- ♦ [Section 9.1, “Recovering from eDirectory Replica Problems,”](#) on page 61

9.1 Recovering from eDirectory Replica Problems

eDirectory offers the Novell robust directory service and the fault tolerance inherent in replication. Replication allows you to keep copies of the eDirectory database, or portions of it, on multiple servers at once.

You should always keep multiple replicas of eDirectory partitions. If you do so and one replica becomes corrupted or is lost because of a failed hard disk, you can delete that replica using ConsoleOne® or Novell iManager and replace it with a new one from the intact replica.

For more information on deleting replicas, see [Deleting a Replica \(http://www.novell.com/documentation/edir88/edir88/data/fbgciaad.html\)](http://www.novell.com/documentation/edir88/edir88/data/fbgciaad.html) in the Novell eDirectory 8.8 Administration Guide.

- ♦ [Section 10.1, “PKI Operations Not Working,” on page 63](#)
- ♦ [Section 10.2, “LDAP Search from Netscape Address Book Fails,” on page 63](#)
- ♦ [Section 10.3, “Removing the configuration of an eDirectory server that is acting as a treekey server in a multiserver tree after having moved the existing eDirectory objects to a different server fails with the error code for Crucial Replica.,” on page 63](#)
- ♦ [Section 10.4, “While Uninstalling the eDirectory Server holding the CA, the KMOs created on that server will be moved to another server in the tree and become invalid,” on page 64](#)

10.1 PKI Operations Not Working

If PKI operations in ConsoleOne or iManager are not working, it could be because Novell PKI Services are not running on the Linux, Solaris, AIX, or HP-UX host. Start the PKI Services by entering `npki -l`.

If you cannot create certificates, you need to ensure that the NICE module has been properly installed. See [“Initializing the NICE Module on the Server”](#) in the *Novell eDirectory 8.8 Administration Guide*. To verify if NICE is initialized, see [“Verifying Whether NICE Is Installed and Initialized on the Server”](#) in the *Novell eDirectory 8.8 Administration Guide*.


10.2 LDAP Search from Netscape Address Book Fails

If you are using an export version of the Netscape browser and a KMO key size larger than 512 bits associated with the LDAP Server object, the LDAP search from the Netscape Address Book might fail.

Use a domestic version of the Netscape browser in such cases.

10.3 Removing the configuration of an eDirectory server that is acting as a treekey server in a multiserver tree after having moved the existing eDirectory objects to a different server fails with the error code for Crucial Replica.

To complete the operation, change the Key Server DN attribute in the W0 object under Security Container > KAP to another server in the tree that has downloaded the treekey from this server.

- 1 In Novell iManager, click the Roles and Tasks button .
- 2 Click eDirectory Administration > Modify Object.

- 3 Specify the name and context of the W0 object (usually W0.KAP.Security), then click OK.
- 4 In the Valued Attributes column, select NDSPKI:SD Key Server DN, then click Edit.
- 5 Specify the name and context of a different server in the Security Domain Key Server's DN field, then click OK.
- 6 Click Apply, then click OK.

10.4 While Uninstalling the eDirectory Server holding the CA, the KMOs created on that server will be moved to another server in the tree and become invalid

You should re-create the CA and KMOs for the tree. See “[Creating an Organizational Certificate Authority Object](#)” and “[Creating a Server Certificate Object](#)” in the *Novell eDirectory 8.8 Administration Guide* for more information.

We recommend that you do not uninstall the eDirectory server where the CA for the tree has been created.

Troubleshooting Utilities on Linux and UNIX

11

- ◆ Section 11.1, “Novell Import Convert Export Utility,” on page 65
- ◆ Section 11.2, “ndsmerge Utility,” on page 65
- ◆ Section 11.3, “ndstrace Utility,” on page 65
- ◆ Section 11.4, “ndsbackup Utility,” on page 65
- ◆ Section 11.5, “Using Ndsrepair,” on page 66
- ◆ Section 11.6, “Using ndstrace,” on page 73

11.1 Novell Import Convert Export Utility

If an LDAP server is refreshed or unloaded, while a Novell Import Conversion Export operation is running, the `LBURP operation is timed out` message is displayed on the Novell Import Conversion Export screen. The server recovers later, when the `LBURP` operation times out.

11.2 ndsmerge Utility

The PKI servers are not active after a merge operation. They must be restarted using the `npki -l` command.

Merge operations might not be successful on different versions of the product. If your server is running an older version of NDS or eDirectory, update to the latest version of eDirectory, then continue the merge operations.

The merging of two trees will not succeed if containers with similar names subordinate to a tree are present in both the source and target trees. Rename one of the containers, then continue with the merge operation.

During the graft operation, error message `-611 Illegal Containment` might appear. Modify the schema by running `ndsrepair(1)`. Then run `ndsrepair -S` and select `Optional Schema Enhancements`.

11.3 ndstrace Utility

When you turn on the `ndstrace(1)` screen, an error message might display indicating that a primary object is invalid for the reference link. You can ignore this message if eDirectory is functioning correctly.

11.4 ndsbackup Utility

While backing up eDirectory, `NDS Error: Connect to NDS server failed` might display. This might be caused by eDirectory listening on a port other than the default port 524. At the command line, enter the port number that eDirectory was configured on. For example, if eDirectory is configured on port number 1524, enter the following:

ndsbackup sR 164.99.148.82:1524

In eDirectory 8.8 and later, while you back up the data, NDS Error: Requires a Password might be displayed. This is because the server might have attributes marked for encryption and you might not have used the option -E to encrypt or decrypt the backup data.

11.5 Using Ndsrepair

This section consists of the following:

- ♦ “Syntax” on page 66
- ♦ Section 11.5.2, “Troubleshooting ndsrepair,” on page 72

Use the ndsrepair utility at the server console to do the following:

- ♦ Correct eDirectory problems such as bad records, schema mismatches, bad server addresses, and external references.
- ♦ Make advanced changes to the eDirectory schema.
- ♦ Perform the following operations on the eDirectory database:
 - ♦ Check the structure of the database automatically without closing the database and without database intervention.
 - ♦ Check the database index.
 - ♦ Repair the database without closing the database and locking out users.
 - ♦ Reclaim free space by discarding empty records.

11.5.1 Syntax

To run ndsrepair, use the following syntax:

```
ndsrepair {-U| -P| -S| -C| -E| -N| -T| -J entry_id}  
[-A yes|no] [-O yes|no] [-F filename] [-Ad]
```

or

```
ndsrepair -R [-l yes|no [-u yes|no] [-m yes|no] [-i yes|no] [-f yes|no]  
[-d yes|no] [-t yes|no] [-o yes|no] [-r yes|no] [-v yes|no] [-c yes|no]  
[-A yes|no] [-O yes|no] [-F filename]
```

IMPORTANT: The -Ad option should not be used without prior direction from Novell Support personnel.

Ndsrepair Options

Option	Description
-U	Unattended Full Repair option. Instructs ndsrepair to run and exit without further user intervention. This is the suggested means of repair unless you are told by Novell Support to perform certain operations manually. You can view the log file after the repair has completed to determine what changes ndsrepair has made.

Option	Description
-P	<p>Replica and Partition Operations option. Lists the partitions that have replicas stored in the current server's eDirectory database files. The Replica options menu provides options to repair replicas, cancel a partition operation, schedule synchronization, and designate the local replica as the master replica.</p> <p>For more information, see "Replica and Partition Operations Option" on page 69.</p>
-S	<p>Global Schema Operations option. This option contains several schema operations that might be necessary to bring the server's schema into compliance with the master of the Tree object. However, these operations should be used only when necessary. The local and unattended repair operations already verify the schema.</p>
-C	<p>Check External Reference Object option. Checks each external reference object to determine if a replica containing the object can be located. If all servers that contain a replica of the partition with the object are inaccessible, the object will not be found. If the object cannot be found, a warning is posted.</p>
-E	<p>Report Replica Synchronization option. Reports replica synchronization status for every partition that has a replica on the current server. This operation reads the synchronization status attribute from the replica's Tree object on each server that holds replicas of the partitions. It displays the time of the last successful synchronization to all servers and any errors that have occurred since the last synchronization. A warning message is displayed if synchronization has not completed within 12 hours.</p>
-N	<p>Servers Known to This Database option. Lists all servers known to the local eDirectory database. If your current server contains a replica of the Tree partition, this server displays a list of all servers in the eDirectory tree. Select one server to cause the server options to be executed.</p>
-J	<p>Repairs a single object on the local server. You will need to provide the Entry ID (in hexadecimal format) of the object you want to repair. You can use this option instead of using the Unattended Repair (-U) option to repair one particular object that is corrupted. The Unattended Repair option can take many hours depending on the size of database. This option will help you save time.</p>
-T	<p>Time Synchronization option. Contacts every server known to the local eDirectory database and requests information about each server's time synchronization status. If this server contains a replica of the Tree partition, then every server in the eDirectory tree will be polled. The version of eDirectory that is running on each server is also reported.</p>
-A	<p>Append to the existing log file. The information is added to the existing log file. By default, this option is enabled.</p>
-O	<p>Logs the output in a file. By default, this option is enabled.</p>
-F <i>filename</i>	<p>Logs the output in the specified file.</p>
-R	<p>Repair the Local Database option. Repairs the local eDirectory database. Use the repair operation to resolve inconsistencies in the local database so that it can be opened and accessed by eDirectory. This option has suboptions that facilitate repair operations on the database. It has function modifiers which are explained in "Function Modifiers Used with the -R Option" on page 68.</p>

Function Modifiers Used with the -R Option

Modifier	Description
-l	Locks the eDirectory database during the repair operation.
-u	Uses a temporary eDirectory database during the repair operation.
-m	Maintains the original unrepaired database.
-i	Checks the eDirectory database structure and the index.
-f	Reclaims the free space in the database.
-d	Rebuilds the entire database.
-t	Performs a tree structure check. Set it to Yes to check all the tree structure links for correct connectivity in the database. Set it to No to skip the check. Default=Yes
-o	Rebuilds the operational schema.
-r	Repairs all the local replicas.
-v	Validates the stream files.
-c	Checks local references.

Global Schema Operations

You can use the `ndsrepair -S` ([-Ad] advanced switch) option to display a list showing all the schema operations that you can perform. The following table shows the available options.

Option	Description
Request Schema From Master Server	Requests the master replica of the root of the tree to synchronize its schema to this server. Any changes to the schema will be propagated to this server from the master replica of the Tree object for the next 24 hours. If all servers request the schema from the master replica, network traffic can increase.
Reset Local Schema	Invokes a schema reset that clears the time stamps on the local schema and requests an inbound schema synchronization. This option is unavailable if executed from the master replica of the Tree partition. This is to ensure that all servers in the tree are not reset at the same time.
Post NetWare 5 Schema Update	Extends and modifies the schema for compatibility with post-NetWare 5 DS changes. This option requires that the server where <code>ndsrepair</code> is run contains a replica of the Tree partition, and that the state of the replica is On.

Option	Description
Optional Schema Enhancements	<p>Extends and modifies the schema for containment and other schema enhancements. This option requires this server to contain a replica of the Tree partition, and the replica state must be On. In addition, all NetWare 4 servers in the tree must have the following versions of eDirectory:</p> <ul style="list-style-type: none"> ◆ NetWare 4.10 servers must have NDS 5.17 or later ◆ NetWare 4.11/4.2 servers must have NDS 6.03 or later <p>Previous versions of NDS will not be able to synchronize these changes.</p>
Import Remote Schema (Advanced Switch Option)	<p>Select an eDirectory tree that contains the schema you want to add to the schema of the current tree. After you select a tree, the server that holds the master replica of the Tree partition is contacted. The schema from that server will be used to extend the schema on the current tree.</p>
Declare a New Epoch (Advanced Switch Option)	<p>When you declare a new schema epoch, the master replica of the Tree partition is contacted and illegal time stamps are repaired on the schema declared on that server. All other servers receive a new copy of the schema including the repaired time stamps. If the receiving server contains a schema that was not in the new epoch, objects and attributes that use the old schema are changed to the Unknown object class or attribute.</p>

Replica and Partition Operations Option

Enter the following command to display information about each replica stored on the server:

```
ndsrepair -P
```

Select the required replica. The following options are displayed:

- ◆ Repair All Replicas
Repairs all replicas displayed in the replica table.
- ◆ Repair Selected Replica
Repairs only the selected replica listed in the replica table.

IMPORTANT: Repairing a replica consists of checking each object in the replica for consistency with the schema and data according to the syntax of the attribute. Other internal data structures associated with the replica are also checked. If you have not repaired the local eDirectory database in the last 30 minutes, you should do so before repairing any replicas.

- ◆ Schedule Immediate Synchronization
Schedules the immediate synchronization of all the replicas. This is useful if you are viewing the ndstrace screen and want to view eDirectory information for the synchronization process without having to wait for it to run as normally scheduled.

- ◆ **Cancel Partition Operation**
Cancels a partition operation on the selected partition. This option might be necessary if an operation appears to be incomplete or is not completing due to problems in the eDirectory tree, such as a missing server or bad communication links. Some operations might not be cancelled if they have progressed too far.
- ◆ **Designate This Server as the New Master Replica**
Designates the local replica of the selected partition as the new master replica. Use this option to designate a new master replica if the original master replica is lost.
- ◆ **Report Synchronization Status of All Servers**
Reports replica synchronization status of all partitions on the current server. It displays the time of the last successful synchronization to all servers and any errors that have occurred since the last synchronization.
- ◆ **Synchronize the Replica on All Servers**
Determines the complete synchronization status on every server that has a replica of the selected partition. This helps you determine the health of a partition. If all of the servers with a replica of the partition are synchronizing properly, then the partition is considered healthy. Each server performs an immediate synchronization to every other server in the replica ring. Servers do not synchronize to themselves. Therefore, the status for the current server's own replicas is displayed as Host.
- ◆ **Repair Ring, All Replicas**
Repairs the replica ring of all the replicas displayed in the replica table.
- ◆ **Repair Ring, Selected Replica**
Repairs the replica ring of selected replica listed in the replica table.

IMPORTANT: Repairing a replica ring consists of checking the replica ring information on each server that contains a replica of a given partition and validating remote ID information. If you have not repaired the local eDirectory database in the last 30 minutes, you should do so before repairing all or selected rings. You can repair the local database using the -R option. For more information, see “-R” on page 67.

- ◆ **View Replica Ring**
Displays a list of all servers that contain a replica of the selected partition. This set of servers is called the replica ring. The replica ring list shows information about the type of replica and current status for each server in the ring. Select a server after viewing the replica ring to view server options.

Server Options

- ◆ **Report Synchronization Status on the Selected Server**
Reports replica synchronization status for a selected partition that has a replica on a selected server. This operation reads the synchronization status attribute from the replica root object on each server that holds replicas of the partitions. It displays the time of the last successful synchronization to all servers and any errors that have occurred since the last synchronization. This option displays a warning message if synchronization has not completed within 12 hours.
- ◆ **Synchronize the Replica on the Selected Server**
Determines the complete synchronization status on the selected server that has a replica of the selected partition. This helps you determine the health of a partition. If the server with

a replica on the partition is synchronizing properly, the partition is considered healthy. The server is immediately synchronized to every other server in the replica ring. The server does not synchronize with itself. Therefore, the status for the current server's own replica is displayed as Host.

- ◆ Send All Objects to Every Replica in the Ring

Sends all objects from the selected server in the replica ring to all other servers that contain a replica of the partition. This operation can generate a lot of network traffic. Use this option to ensure that the selected partition's replica on the selected server in the replica ring is synchronized with all other servers in the replica ring. This operation cannot be performed on a server that contains only a subordinate reference replica of the partition.

- ◆ Receive All Objects from the Master to This Replica

Receives all objects from the master replica to the replica on the selected servers. This operation can generate a lot of network traffic. Use this option to ensure that the selected partition's replica on the selected server in the replica ring is synchronized with the master replica. This operation cannot be performed on a server that contains only a master replica.

- ◆ View Entire Server's Name

Used to view the complete server name when the width of the server name is too long to view from within the server table.

- ◆ Remove This Server from Replica Ring

(Advanced switch option.) Removes a selected server from the selected replica stored on the current server. If a server appears in the replica ring but it is no longer part of the eDirectory tree or no longer contains a replica of the partition, delete the Server object using iManager. When the Server object has been deleted, the object should eventually be excluded from the replica ring.

WARNING: Misuse of this operation can cause irrevocable damage to the eDirectory database. You should not use this option unless directed by Novell Support personnel.

- ◆ View Entire Partition Name

Determines the complete distinguished partition name when the width of the partition is too great to view from within the replica table.

- ◆ Repair Time Stamps and Declare a New Epoch

(Advanced switch option.) Provides a new point of reference to the master replica so that all updates to replicas of the selected partition are current. This operation is always performed on the master replica of a partition. The master replica does not need to be in the local replica on this server. Time stamps are placed on objects when they are created or modified and they must be unique. All time stamps in a master replica are examined. If any time stamps are post-dated to the current network time, they are replaced with a new time stamp.

- ◆ Destroy the Selected Replica on This Server

(Advanced switch option.) Removes the selected replica on this server. Using this option is not recommended. Use this option only when all other utilities are unable to delete the replica.

- ◆ Delete Unknown Leaf Objects

(Advanced switch option.) Deletes all objects in the local eDirectory database that have the unknown object class and maintain no subordinate objects. This option marks Unknown objects for deletion. The deletion will later be synchronized to other replicas in the eDirectory tree.

WARNING: Use this option only when the objects cannot be modified or deleted using ConsoleOne or iManager.

Options on Servers Known to This Database

The following repair options are available for servers:

- ◆ Repair All Network Address

Checks the network address for every server in the local eDirectory database. This option searches the SLP directory agent, depending on the transport protocol available, for each server's name. Each address is then compared to the Server object's network address property and the address record of each replica property of every partition Tree object. If the addresses are different, they are updated to be the same.

- ◆ Repair Selected Server's Network Address

Checks the network address for a specific server in the local eDirectory database files. This option searches the SLP directory agent, depending on the transport protocols currently bound for the server's name.

- ◆ View Entire Server's Name

Displays the complete name of the server when the width of the server name is too great to view from within the server's table. This option is the same as the -P option. For more information, see [“-P” on page 67](#).

Examples

To perform an unattended repair and log events in the /root/ndsrepair.log file, or to append events to the log file if it already exists, enter the following command:

```
ndsrepair -U -A no -F /root/ndsrepair.log
```

To display a list of all global schema operations along with the advanced options, enter the following command:

```
ndsrepair -S -Ad
```

To repair the local database by forcing a database lock, enter the following command:

```
ndsrepair -R -l yes
```

NOTE: The input for the ndsrepair command can be redirected from an option file. The option file is a text file that can contain replica and partition operation-related options and suboptions that do not require authentication to the server. Each option or suboption is separated by a new line. Make sure that the contents of the file are in the proper sequence. If the contents are not in the proper sequence, the results will be unpredictable.

11.5.2 Troubleshooting ndsrepair

Error -786 While Running Ndsrepair

While doing ndsrepair you need to have three times the size of DIB free in that specific partition of your machine.

11.6 Using ndstrace

The ndstrace utility has three main parts:

- ♦ “Basic Functions” on page 73
- ♦ “Debugging Messages” on page 73
- ♦ “Background Processes” on page 76

11.6.1 Basic Functions

The basic functions of ndstrace are used to

- ♦ View the status of the ndstrace screen in Linux, Solaris, AIX, or HP-UX.
- ♦ Initiate limited synchronization processes.

To start the ndstrace screen, enter the following command at the server prompt:

```
/opt/novell/eDirectory/bin/ndstrace
```

To initiate the basic ndstrace functions, enter commands at the server prompt using the following syntax:

```
ndstrace command_option
```

The following table lists the command options that you can enter.

Option	Description
ON	Starts the eDirectory trace screen with basic trace messages.
OFF	Disables the trace screen.
ALL	Starts the eDirectory trace screen and displays all the trace messages.
AGENT	Starts the eDirectory trace screen with the trace messages that are equivalent to the ON, BACKLINK, DSAGENT, JANITOR, RESNAME, and VCLIENT flags.
DEBUG	Turns on a predefined set of trace messages typically used for debugging. The flags set are ON, BACKLINK, ERRORS, EMU, FRAGGER, INIT, INSPECTOR, JANITOR, LIMBER, MISC, PART, RECMAN, REPAIR, SCHEMA, SKULKER, STREAMS, and VCLIENT.
NODEBUG	Leaves the trace screen enabled, but turns off all debugging messages previously set. This option also leaves the messages set to the ON command option.

11.6.2 Debugging Messages

When the ndstrace screen is enabled, the information displayed is based on a default set of filters. If you want to view more or less than the default, you can manipulate the filters using the debugging message flags. The debugging messages help you determine the status of eDirectory and verify that everything is working well.

Each eDirectory process has a set of debugging messages. To view the debugging messages on a particular process, use a plus sign (+) and the process name or option. To disable the display of a process, use a minus sign (-) and the process name or option. The following are some examples:

Message	Description
set ndstrace = +SYNC	Enables the synchronization messages.
set ndstrace = -SYNC	Disables the synchronization messages.
set ndstrace = +SCHEMA	Enables the schema messages.

You can also combine the debugging message flags by using the Boolean operators & (which means AND) and | (which means OR). The syntax for controlling the debugging messages at the server console is as follows:

```
set ndstrace = +trace_flag [trace_flag]
```

or

```
set ndstrace = +trace_flag> [&trace_flag]
```

The following table describes the trace flags for the debugging messages. You can enter abbreviations for each of the trace flags.

Trace Flag	Description
ABUF	Messages and information related to inbound and outbound packet buffers that contain data being received in conjunction with, or in response to, an eDirectory request.
ALOC	Messages to show the details of memory allocation.
AREQ	Messages related to inbound requests from other servers or clients.
AUTH	Messages and error reports relating to authentication.
BASE	Debug error messages at the minimum debugging level.
BLNK	Backlink and inbound obituary messages and error reports.
CBUF	Messages related to outbound DS Client requests.
CHNG	Change cache messages.
COLL	Status and error reports concerning an object's update information when the update has been previously received.
CONN	Messages that show information about the servers your server is trying to connect to, and about errors and timeouts that might be causing your server not to connect.
DNS	Messages about the eDirectory-integrated DNS server processes.
DRLK	Distributed reference link messages.
DVRS	Messages to show DirXML [®] driver-specific areas that eDirectory might be working on.
DXML	Messages to show details of DirXML events.

Trace Flag	Description
FRAG	Messages from the NCP™ fragger which breaks eDirectory messages into NCP-sized messages.
IN	Messages related to inbound requests and processes.
INIT	Messages related to the initialization of eDirectory.
INSP	Messages related to the integrity of objects in the source server's local database. Using this flag increases the demands on the source server's disk storage system, memory, and processor. Do not leave this flag enabled unless objects are being corrupted.
JNTR	Messages related to the following background processes: janitor, replica synchronization, and flat cleaner.
LDAP	Messages related to the LDAP server.
LMBR	Messages related to the limber process.
LOCK	Messages related to the use and manipulation of the source server's local database locks.
LOST	Messages related to lost entries.
MISC	Messages from different sources in eDirectory.
MOVE	Messages from the move partition or move subtree operations.
NCPE	Messages to show the server receiving NCP-level requests.
NMON	Messages related to iMonitor.
OBIT	Messages from the obituary process.
PART	Messages related to partition operations from background processes and from request processing.
PURG	Messages about the purge process.
RECM	Messages related to the manipulation of the source server's database.
RSLV	Reports related to the processing of resolve name requests.
SADV	Messages related to the registration of tree names and partitions with Service Location Protocol (SLP).
SCMA	Messages related to the schema synchronization process.
SCMD	Messages showing the details of schema-related operations. They give details of both inbound and outbound synchronization.
SKLK	Messages related to the replica synchronization process.
SPKT	Messages related to eDirectory NCP server-level information.
STRM	Messages related to the processing of attributes with a Stream syntax.
SYDL	Messages showing more details during the replication process.
SYNC	Messages about inbound synchronization traffic (what is being received by the server).

Trace Flag	Description
TAGS	Displays the tag string that identifies the trace option that generated the event on each line displayed by the trace process.
THRD	Messages to show when any background processes (threads) begin and end.
TIME	Messages about the transitive vectors that are used during the synchronization process.
TVEC	Messages related to the following attributes: Synchronize Up To, Replica Up To, and Transitive Vector.
VCLN	Messages related to the establishment or deletion of connections with other servers.

As you use the debugging messages in `ndstrace`, you will find that some of the trace flags are more useful than others. One of the favorite `ndstrace` settings of Novell Support is actually a shortcut:

```
set ndstrace = A81164B91
```

This setting enables a group of debugging messages.

11.6.3 Background Processes

In addition to the debugging messages, which help you check the status of eDirectory, there is a set of commands that force the eDirectory background processes to run. To force the background process to run, place an asterisk (*) before the command. For example:

```
set ndstrace = *H
```

You can also change the status, timing, and control for a few of the background processes. To change these values, place an exclamation point (!) before the command and enter a new parameter or value. For example:

```
set ndstrace = !H 15 (parameter_value_in_minutes)
```

The following is the syntax for each statement controlling the background processes of eDirectory:

```
set ndstrace = *trace_flag [parameter]
```

or

```
set ndstrace = !trace_flag [parameter]
```

The following table lists the trace flags for the background processes, any required parameters, and the process the trace flags will display.

Trace Flag	Parameters	Description
*A	None	Resets the address cache on the source server.
*AD	None	Disables the address cache on the source server.
*AE	None	Enables the address cache on the source server.
*B	None	Schedules the backlink process to begin execution on the source server in one second.

Trace Flag	Parameters	Description
IB	Time	Sets the interval (in minutes) for the backlink process. Default=1500 minutes (25 hours) Range=2 to 10080 minutes (168 hours)
*CT	None	Displays the source server's outbound connection table and the current statistical information for the table. These statistics do not give any information about the inbound connections from other servers or clients to the source server.
*CTD	None	Displays, in comma-delimited format, the source server's outbound connection table and the current statistical information for the table. These statistics do not give any information about the inbound connections from other servers or clients to the source server.
*D	Replica rootEntry ID	Removes the specified local entry ID from the source server's Send All Object list. The entry ID must specify a partition root object that is specific to the server's local database. This command is usually used only when a Send All Updates process is endlessly trying to show updates and failing because a server is inaccessible.
ID	Time	Sets the inbound and outbound synchronization interval to the specified number of minutes. Default=24 minutes. Range=2 to 10080 minutes (168 hours)
IDI	Time	Sets the inbound synchronization interval to the specified number of minutes. Default=24 minutes Range=2 to 10080 minutes (168 hours)
IDO	Time	Sets the outbound synchronization interval to the specified number of minutes. Default=24 minutes Range=2 to 10080 minutes (168 hours)
*E	None	Reinitializes the source server's entry cache.
IE	None	Schedules the inbound and outbound synchronization processes to begin execution.
IEI	None	Schedules the inbound synchronization process to begin execution.
IEO	None	Schedules the outbound synchronization process to begin execution.
*F	None	Schedules the flat cleaner process, which is part of the janitor process, to begin execution on the source server in five seconds.

Trace Flag	Parameters	Description
!F	Time	Sets the interval (in minutes) for the flat cleaner process. Default=240 minutes (4 hours) Range=2 to 10080 minutes (168 hours)
*G	Replica rootEntry ID	Rebuilds the change cache of the specified root partition ID.
*H	None	Schedules the replica synchronization process to begin execution immediately on the source server.
!H	Time	Sets the interval (in minutes) for the heartbeat synchronization process. Default=30 minutes Range=2 to 1440 minutes (24 hours)
*HR	None	Clears the in-memory last-sent vector.
*I	Replica rootEntry ID	Adds the specified local entry ID to the source server's Send All Object list. The entry ID must specify a partition root object that is specific to the server's local database. The replica synchronization process checks the Send All Object list. If the entry ID of a partition's root object is in the list, eDirectory synchronizes all objects and attributes in the partition, regardless of the value of the Synchronized Up To attribute.
!I	Time	Sets the interval (in minutes) for the heartbeat synchronization process. Default=30 minutes Range=2 to 1440 minutes (24 hours)
*J	None	Schedules the purge process, which is part of the replica synchronization process, to begin running on the source server.
!J	Time	Sets the interval (in minutes) for the janitor process. Default=2 minutes Range=1 to 10080 minutes (168 hours)
*L	None	Schedules the limber process to begin running on the source server in five seconds.
*M	Bytes	Changes the maximum file size used by the source server's ndstrace.log file. The command can be used regardless of the state of the debug file. The bytes specified must be a hexadecimal value between 10000 bytes and 100 MB. If the value specified is higher or lower than the specified range, no change occurs.
!M	None	Reports the maximum memory used by eDirectory.
!N	0 1	Sets the name form. 0=hex only 1=full dot form
*P	None	Displays the tunable parameters and their default settings.

Trace Flag	Parameters	Description
*R	None	Resets the TTF file, which is the sys:system\ndstrace.dbg file by default. This command is the same as the SET parameter NDS Trace File Length Set to Zero.
*S	None	Schedules the Skulker process, which checks whether any of the replicas on the server need to be synchronized.
ISI	Time	Sets the interval (in minutes) for the inbound schema synchronization process. Default=24 minutes Range=2 to 10080 minutes (168 hours)
ISO	Time	Sets the interval (in minutes) for the outbound schema synchronization process. Default=24 minutes Range=2 to 10080 minutes (168 hours)
ISIO	Time	Disables the inbound schema synchronization process for the specified number of minutes. Default=24 minutes Range=2 to 10080 minutes (168 hours)
ISO0	Time	Disables the inbound schema synchronization process for the specified number of minutes. Default=24 minutes Range=2 to 10080 minutes (168 hours)
*SS	None	Forces immediate schema synchronization.
*SSA	None	Schedules the schema synchronization process to begin immediately and forces schema synchronization with all target servers, even if they have been synchronized in the last 24 hours.
*SSD	None	Resets the source server's Target Schema Sync list. This list identifies which servers the source server should synchronize with during the schema synchronization process. A server that does not hold any replicas sends a request to be included in the target list of a server that contains a replica with its Server object.
*SSL	None	Prints the schema synchronization list of target servers.
*ST	None	Displays the status information for the background processes on the source server.
*STX	None	Displays the status information for the backlink process (external references) on the source server.
*STS	None	Displays the status information for the schema synchronization process on the source server.
*STO	None	Displays the status information for the backlink process (obituaries) on the source server.
*STL	None	Displays the status information for the limber process on the source server.

Trace Flag	Parameters	Description
!T	Time	Sets the interval (in minutes) for checking the server's UP state. Default=30 minutes Range=1 to 720 minutes (12 hours)
*U	Optional ID of server	If the command does not include an entry ID, this changed the status of any server that has been previously labeled down to up . If the command includes a local entry ID, it changes the status of the specified server from down to up . Entry IDs are specific to the source server's database and must refer to an object that represents a server.
!V	A list	Lists the restricted eDirectory versions. If no versions are listed, there are no restrictions. Each version is separated by a comma.
*Z	None	Displays the currently scheduled tasks.

- [Section 12.1, “Unable to Log In Using Any Method,” on page 81](#)
- [Section 12.2, “The User Added Using the ICE Utility Is Unable to Log In Using Simple Password,” on page 81](#)

12.1 Unable to Log In Using Any Method

After installing and configuring NMAS, restart NDS Server.

After reinstalling a method after you have uninstalled a previous instance of that method, restart NDS Server.

12.2 The User Added Using the ICE Utility Is Unable to Log In Using Simple Password

While adding users with simple passwords through the Novell Import Conversion Export utility, use the `-l` option.

- ♦ [Section 13.1, “The eDirectory for Windows Server Won’t Start,” on page 83](#)
- ♦ [Section 13.2, “The Windows Server Can’t Open the eDirectory Database Files,” on page 83](#)
- ♦ [Section 13.3, “Restoring eDirectory on Windows after an Emergency Repair,” on page 84](#)

13.1 The eDirectory for Windows Server Won’t Start

If the eDirectory server fails to start when you boot the Windows server, a message will notify you that the service failed to start.

If there are no other eDirectory database replicas, users can't log in.

If there are other replicas, logging in might be slow and you will see communication errors and synchronization errors on the servers holding those replicas.

- ♦ The eDirectory server entries in the Windows Registry might have been edited, or the Windows Registry might be corrupt.
- ♦ eDirectory database files might have been corrupted or deleted.
- ♦ If the eDirectory server can't start because another service didn't start, you can get more information from Start > Programs > Administrative Tools > Event Viewer.

You'll need to resolve the related-service problem before starting the eDirectory server.

- ♦ The Registry or eDirectory executable files are corrupted or lost. Run the SAMMIG utility in the system directory. Select Uninstall NDS on Windows NT and include new eDirectory information in the NT domain. Continue with the Uninstall until completed. Then restart sammig.exe and proceed to install eDirectory.
- ♦ Database files have been corrupted or deleted. If the eDirectory server comes up on the NT server but the service can't open the eDirectory database files, see [Section 13.2, “The Windows Server Can’t Open the eDirectory Database Files,” on page 83](#).
- ♦ The eDirectory server is not connected to a hub or switch or directly to a workstation (using a crossover cable). Connect the server to a hub or switch.

13.2 The Windows Server Can’t Open the eDirectory Database Files

If the eDirectory server can't open the database files, a message on the Windows server will notify you.

If there are no other database replicas, users can't log in.

If there are other replicas, logging in might be slow and you will see communication errors and synchronization errors on the servers holding those replicas.

- ♦ The database files might have been corrupted through disk errors on the NT/2000 server.

- ♦ Someone might have deleted one or more of the database files.

If other replicas of the eDirectory database exist, complete the following steps:

- 1 Start Novell iManager from an administrative workstation.
- 2 Remove the corrupted replica from the replica ring.
See “**Deleting a Replica**” in the *Novell eDirectory 8.8 Administration Guide* for more information.
- 3 Run the sammig.exe utility in the system directory (usually c:\winnt\system32) on the NT server or from the Start menu (Start > Programs > Administrative Tools (Common) > Migration Tool for NetWare).
- 4 Select the option to create a new replica on the eDirectory server.

If this eDirectory server holds the only replica of the partition, complete the following steps:

- 1 Run the sammig.exe utility in the system directory (usually c:\winnt\system32) on the NT Server or from the Start menu (Start > Programs > Administrative Tools (Common) > Migration Tool for NetWare).
- 2 Select Uninstall NDS on Windows and revert to the previous Windows domain state.
- 3 Continue with the Uninstall until it has completed.
- 4 Restart the Migration Tool for NetWare and proceed to install eDirectory on Windows.
- 5 Move the User objects from the NT/2000 domain to the eDirectory tree.

13.3 Restoring eDirectory on Windows after an Emergency Repair

When you are forced to do an emergency repair on a Windows server and there is no Emergency Repair disk, or the Emergency Repair disk was created before an eDirectory installation, the eDirectory client is removed and Registry settings are deleted. The nds4nter.exe utility both restores the necessary Registry settings and reloads eDirectory files.

Run nds4nter.exe from the \i386\goodies directory.

After an emergency repair is performed, run the Emergency Repair utility from the CD. The utility will first restore some of the Registry settings, then it will launch the eDirectory installation. The installation will copy the files then you must select the reboot option. After rebooting, users will have access to the migrated domains.

Accessing HTTPSTK When DS Is Not Loaded

14

You can set up a preconfigured admin user that allows access to the HTTP Protocol Stack (HTTPSTK) when DS is not loaded. The preconfigured admin user, SAdmin, has rights that are equivalent to the eDirectory Admin User object. If the server is in a state where eDirectory is not functioning correctly, you can log in to the server as this user and perform all the diagnostic and debugging tasks necessary that do not require eDirectory.

- [Section 14.1, “Setting the SAdmin Password on NetWare,” on page 85](#)
- [Section 14.2, “Setting the SAdmin Password on Windows,” on page 85](#)
- [Section 14.3, “Setting the SAdmin Password on Linux, Solaris, AIX, and HP-UX,” on page 86](#)

14.1 Setting the SAdmin Password on NetWare

Use NetWare Remote Manager to enable the SAdmin User object and set or change the password for this object. HTTPSTK.NLM must be running on the eDirectory server in order for you to set or change the SAdmin password.

- 1 Open a Web browser.
- 2 In the address (URL) field, enter the following:


```
http://server's TCP/IP address:port
```

For example:

```
http://137.65.123.11:8008
```

NOTE: The default alternate port number is 8008. If you have changed this value on the Configuration page in NetWare Remote Manager, make sure you enter the new port number.

If you have Domain Name Services (DNS) installed on your network for server name-to-IP address resolution, you can also enter the server's DNS name instead of the IP address.

- 3 Specify a username, context, and password.
- 4 Click the Configure button  > Enable Emergency Account (SADMIN User) and Set Password.
- 5 Specify an SAdmin password, then verify the password you just entered.
- 6 Click Set.

14.2 Setting the SAdmin Password on Windows

Use the DHOST remote manager page (accessible through the /dhost URL or from the root page) to set the SAdmin password. dhost.exe must be running on the eDirectory server in order for you to set or change the SAdmin password.

- 1 Open a Web browser.
- 2 In the address (URL) field, enter the following:

```
http://server.name:port/dhost
```

for example:

```
http://MyServer:80/dhost
```

You can also use the server IP address to access the DHost iConsole. For example:

```
http://137.65.135.150:80/dhost
```

- 3 Specify a username, context, and password.
- 4 Click HTTP Server, then specify an SAdmin password.
- 5 Verify the password you just specified, then click Submit.

14.3 Setting the SAdmin Password on Linux, Solaris, AIX, and HP-UX

You can use either the DHOST remote management page or the ndsconfig utility.

DHOST remote management page

Use the DHOST remote manager page (accessible through the /dhost URL or from the root page) to set the SAdmin password. Novell eDirectory server must be running on the eDirectory server in order for you to set or change the SAdmin password.

- 1 Open a Web browser.
- 2 In the address (URL) field, enter the following:

```
http://server.name:port/dhost
```

for example:

```
http://MyServer:80/dhost
```

You can also use the server IP address to access the DHost iConsole. For example:

```
http://137.65.135.150:80/dhost
```

- 3 Specify a username, context, and password.
- 4 Click HTTP Server, then specify an SAdmin password.
- 5 Verify the password you just specified, then click Submit.

ndsconfig

Use the ndsconfig utility to set the SAdmin password. ndsd must be running on the eDirectory server in order for you to set or change the SAdmin password.

Enter the following at the server console

```
ndsconfig set http.server.sadmin-pwd=password
```

where *password* is the new SAdmin password.

For more information on using the ndsconfig utility, see “[ndsconfig Utility Parameters](#)” in the *Novell eDirectory 8.8 Installation Guide*.

In Novell® eDirectory™ 8.8 and later, you can encrypt specific sensitive data while they are stored on the disk and while they are accessed by the client. This chapter provides you information on the errors you might encounter while using the encrypted attributes and replication features in eDirectory 8.8 and later. For more information on encrypted attributes and replication, refer to *Novell eDirectory 8.8 Administration Guide* (<http://www.novell.com/documentation/edir88/index.html>).

For information on other error messages in eDirectory, refer to *NDS or Novell eDirectory Error Codes* (<http://www.novell.com/documentation/nwec/index.html>)

15.1 Error Messages

This section contains information on the following error messages:

- ♦ [Section 15.1.1, “-6090 0xFFFFE836 ERR_ER_DISABLED,” on page 87](#)
- ♦ [Section 15.1.2, “-6089 0xFFFFE837 ERR_REQUIRE_SECURE_ACCESS,” on page 87](#)
- ♦ [Section 15.1.3, “-666 FFFFD66 INCOMPATIBLE NDS VERSION,” on page 88](#)

15.1.1 -6090 0xFFFFE836 ERR_ER_DISABLED

The eDirectory replica synchronization process tried to start encrypted replication with the target server. But the target eDirectory server has the encrypted replica synchronization process disabled

Possible Cause

Encrypted replication is disabled on the target eDirectory server.

Action

Enable encrypted replication on the target eDirectory server.

15.1.2 -6089 0xFFFFE837 ERR_REQUIRE_SECURE_ACCESS

An application (client access) tried to access an encrypted attribute over a clear text channel.

Source

eDirectory or NDS

Possible Cause

The encrypted attributes are configured to be accessed only over a secure channel. The application is trying to access the encrypted attributes over a clear text channel.

Action

The application should access the encrypted attributes through a secure channel, like LDAP secure channel or HTTP secure channel.

Possible Cause

If you get this error during replication, one or more servers in the replica ring have some attributes marked for encryption and are configured to be accessed only over secure channel.

Action

Change the configuration of the encrypted attribute policy, so that the encrypted attributes can be accessed over insecure channels. For more information, refer to *Novell eDirectory 8.8 Administration Guide* (<http://www.novell.com/documentation/edir88/index.html>).

Possible Cause

If you get this error when encrypted replication is configured at the partition level or between the replicas of the partition, then the replica ring has pre-eDirectory 8.8 servers in it.

Action

Upgrade all the servers in the replica ring to a version compatible with eDirectory 8.8.

15.1.3 -666 FFFFD66 INCOMPATIBLE NDS VERSION

Text goes here

Possible Cause

If encrypted replication is enabled at a partition level and if you are trying to add a replica of this partition to an eDirectory server, then the eDirectory version on this server is incompatible with the version on the source server.

Action

Upgrade the server to a compatible version of eDirectory.

Possible Cause

If the parent partition has pre-eDirectory 8.8 servers (mixed version ring) and if the child partition has ER enabled, the merge and/or join partition operations would be disallowed and the ERR_INCOMPATIBLE_DS_VERSION error will be returned.

The reason for this is that the child partition contains sensitive data with ER enabled at the partition level and the parent partition having pre-eDirectory 8.8 server. With ER enabled only between eDirectory 8.8 servers, on merging, sensitive data is exposed when replicating to pre-eDirectory 8.8 servers.

Action

1. Upgrade the server to a compatible version of eDirectory.

OR

2. Disable ER at the parent or child partition.

NOTE: On disabling ER, replication will happen in the clear text form.

15.2 Problem With Duplicate Encryption Algorithms

If you add an attribute for encryption using LDIF, do not associate duplicate algorithms with one attribute.

For example, marking *title* as an encrypted attribute with AES and DES encryption algorithms makes it unclear as to which algorithm is ultimately considered. Each time when *limber* is run it appears the title attribute toggles between AES and DES. Therefore, it seems as though there were some configuration changes.

To prevent such scenarios, we recommend you to avoid duplicate algorithms been assigned to the same attribute.

This does not happen if you mark an attribute for encryption using *iManager*.

15.3 Encryption of Stream Attributes

Stream attributes might be present as clear text data. This is because *eDirectory 8.8* does not encrypt stream attributes.

The eDirectory Management Toolbox

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The Novell® eDirectory™ Management Toolbox (eMBox) lets you access all of the eDirectory backend utilities remotely as well as on the server.

eMBox works with Novell iManager to provide Web-based access to eDirectory utilities such as DSRepair, DSMerge, Backup and Restore, and Service Manager.

IMPORTANT: Role Based Services must be configured through iManager to the tree that is to be administered in order for eMBox tasks to be run.

All functions are accessible, either on the local server or remotely, through a command line client. You can perform tasks for multiple servers from one server or workstation using the eMBox Client. For all eDirectory Management Tools (eMTools)-such as Backup, DSRepair, DSMerge, Schema Operations, and eDirectory Service Manager-to run, eMBox must be loaded and running on the eDirectory server.

16.1 Unable to Stop the eMTool Services

When running the command "serviceStop -n{service}", where {service} is one of the services (libsasl.so, libncpengine.so, libhttpstk.so, or libdsloader.so), the following error occurs:

```
Service {service} could not be stopped, Error : -660
```

This is not an error. You cannot stop these processes (specifically libsasl.so, libncpengine.so, libhttpstk.so, and libdsloader.so) because there are other modules dependent on them.

16.2 Restore gives -6020 error

If you have roll forward logs in a default location, while performing Restore operation using DSBK or eMBox Client, you will get -6020 error. To avoid this error, you need to give `-s` switch in the `restore` command.

This section discusses the error messages logged by the SASL-GSSAPI authentication mechanism.

- ♦ [Section 17.1, “Log File Locations,” on page 93](#)
- ♦ [Section 17.2, “Error Messages,” on page 93](#)

17.1 Log File Locations

The error messages are logged as follows:

- ♦ Linux and UNIX: ndsd.log
- ♦ NetWare: logger screen
- ♦ Windows: c:\temp\sasl-gss.log

17.2 Error Messages

SASL-GSSAPI: Reading Object *user_FDN* FAILED *eDirectory* error code

Cause: This error is generated in eDirectory. The *user_FDN* does not exist.

SASL-GSSAPI: Reading principal names for *user_FDN* failed *eDirectory* error code

Cause: This error is generated in eDirectory. The Kerberos principal names not attached to the user object (*userdn*).

SASL-GSSAPI: Reading Object *Realm_FDN* FAILED *eDirectory* error code

Cause: This error is generated in eDirectory. The realm object does not exist.

SASL-GSSAPI: Not enough memory

Cause: Not enough memory to perform the specific operation.

SASL-GSSAPI: Invalid Input Token

Cause: Token from client is defective or invalid

SASL-GSSAPI: NMAS error *NMAS* error code

Cause: This error is generated in NMAS and is an internal error.

SASL-GSS: Invalid LDAP service principal name *LDAP_service_principal_name*

Cause: The LDAP service principal name is invalid.

SASL-GSS: Reading LDAP service principal key from eDirectory failed

Cause: The LDAP service principal object is not created.

Cause: The realm object's master key is changed.

Cause: The LDAP service principal object was not found in the subtree of the realm to which it belongs.

SASL-GSS: Creating GSS context failed

Cause: The time is not in sync between the client, KDC and the eDirectory servers.

Cause: The key of the LDAP service principal was changed in the Kerberos database, but not updated in eDirectory.

Cause: The encryption type is not supported.

SASL GSSAPI: Invalid user FDN = *user_FDN*

Cause: The user FDN provided by the client is not valid.

SASL GSSAPI: No user DN is associated with principal *client_principal_name*

Cause: A user object under the subtree is not attached with the Kerberos principal name.

SASL GSSAPI: More than one user DN is associated with principal *client_principal_name*

Cause: More than one user object under the subtree is associated with the same principal.

ldap_simple_bind_s: Invalid credentials major = 1, minor =0

Cause: The cause might be the version mismatch between the ldap service principal on the KDC server and the ldap service principal on the eDirectory server. This is because every time you extract the ldap service principal key to the keytab file, the key version number gets incremented.

Action:

Do the following:

- 1** Update the key in eDirectory server so that the version numbers are in sync.
- 2** Destroy the tickets at the client.
- 3** Get the TGT again for the principal.
- 4** Perform the ldap sasl bind operation.

- ♦ [Section 18.1, “Backing Up a Container,” on page 95](#)
- ♦ [Section 18.2, “Repeated eDirectory Logins,” on page 95](#)
- ♦ [Section 18.3, “TCP Connection not Terminating after Abnormal Logout,” on page 95](#)
- ♦ [Section 18.4, “NDS Error, System Failure \(-632\) Occurs When Doing ldapsearch for the User Objects,” on page 96](#)
- ♦ [Section 18.5, “Disabling SecretStore,” on page 97](#)

18.1 Backing Up a Container

While using ndsbackup to backup a container that has many objects (like a million), it might take some time to get the list of the objects in the container and start their individual backup.

18.2 Repeated eDirectory Logins

Repeated eDirectory logins can use up the available memory. Disable the Login Update attribute using ndsimonitor to overcome this problem.

18.3 TCP Connection not Terminating after Abnormal Logout

Sometimes the OES Linux server fails to detect a client host that has gone down abruptly due to a workstation crashing or a power outage. However, the connection is active for the default timeout (about 12 to 15 minutes) before the connection is cleared.

If you have set the concurrent connections to 1, it is recommended that you either terminate the connection manually, or wait for the estimated timeout before logging in again. This situation occurs when the watchdog process fails to close the connection cleanly. So, if the concurrent connections are set to 1 and the connection is not cleared by the watchdog, users cannot log in.

Linux kernel provides three parameters to change the way keepalive probes work from the server side. Use these parameters to implement a workaround at the TCP level.

These parameters are available in `/proc/sys/net/ipv4/` directory.

- ♦ `tcp_keepalive_time`: Determines the frequency of sending the TCP keepalive packets to keep a connection alive if it is currently unused. This value is used only when keepalive is enabled.

The `tcp_keepalive_time` takes an integer value in seconds. The default value is 7200 seconds or 2 hours. This holds good for most of the hosts and does not require many network resources. If you set this value to low, it engages your network resources with unnecessary traffic.

- ♦ `tcp_keepalive_probes`: Determines the frequency of sending TCP keepalive probes before deciding a broken connection.

The `tcp_keepalive_probes` takes an integer value, recommended less than 50 depending on your `tcp_keepalive_time` and the `tcp_keepalive_interval` values. The default is to set to 9 probes before informing the application of the broken connection.

- ◆ `tcp_keepalive_intvl`: Determines the duration for a reply for each keepalive probe. This value is important to calculate the time before your connection has a keepalive death.

The `tcp_keepalive_intvl` takes an integer value, the default is 75 seconds. So, 9 probes with 75 seconds each will take approximately 11 minutes. The default values of the `tcp_keepalive_probes` and `tcp_keepalive_intvl` variables can be used to evaluate the default time before the connection is timed out because of keepalive.

Modify these three parameters in a way that the change does not generate a lot of extra network traffic and still solves the problem. A sample modification could be as follows (a 3-minute detection time):

- ◆ `tcp_keepalive_time` set -120
- ◆ `tcp_keepalive_probes` - 3
- ◆ `tcp_keepalive_intvl` - 20

NOTE: Be careful with the parameter settings and avoid setting the already valid connections.

The settings take effect immediately after the files are modified. You need not restart any services. However, the settings are valid for the current session only. Once the server is re-booted, the settings revert to the default settings.

To make the setting permanent (even after a reboot), do the following:

Add the following entries in `/etc/sysctl.conf`.

- ◆ `net.ipv4.tcp_keepalive_time=120`
- ◆ `net.ipv4.tcp_keepalive_probes=3`
- ◆ `net.ipv4.tcp_keepalive_intvl=20`

We recommend these settings only if all the clients and servers are connected through LAN.

18.4 NDS Error, System Failure (-632) Occurs When Doing `ldapsearch` for the User Objects

Import the user objects with simple password and then enable universal password for the container where the user objects are imported. Stop the DS server and set the environment as `NDS_TRY_NMASLOGIN_FIRST=true` and then start DS Server. Then when you do and `ldapsearch` for the user objects, which were imported with simple password, you get the following error:

```
ldap_bind: Unknown error, additional info: NDS error: system failure (-632)
```

To resolve this issue, set the default login sequence as simple password for the container where user objects are imported before doing `ldapsearch` for those user objects.

When LDAP requests NMAS to log in a user, NMAS uses the default login sequence. If you do not specify a default login sequence for these users, then it will use the NDS sequence. If these users are not given an NDS password when you imported them, then the NDS sequence will not work. If you enable universal password, then the simple password will be synchronized with the NDS password and universal password when the user logs in with the simple password.

18.5 Disabling SecretStore

An eDirectory administrator can disable SecretStore using the following processes:

18.5.1 On Linux and UNIX

- 1 Go to the `nds-modules` directory and rename or move the following SecretStore modules:

- `libsss.so*`
- `libssnnp.so.*`
- `libssldp.so.*`

- 2 Restart the server.

Alternatively, you can also comment out the line in the `/etc/opt/novell/eDirectory/conf/ndsmodules.conf` file that loads `ssnnp`.

18.5.2 On NetWare

- 1 Go to the `system` directory and rename or move the following SecretStore modules:

- `lsss.nlm`
- `sss.nlm`
- `ssnnp.nlm`
- `ssldp.nlm`

- 2 Restart the server

Alternatively, you can also comment out the line in the `autoexec.ncf` file that loads `ssnnp`.

18.5.3 On Windows

- 1 Go to the `novell\nds` directory and rename or move the following SecretStore modules:

- `lsss.dll`
- `sss.dlm`
- `ssnnp.dlm`
- `ssldp.dlm`

- 2 Restart the server.