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# NetIQ® Identity Manager

## Driver for Bidirectional eDirectory Implementation Guide

February 2017

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# Contents

<b>About this Book and the Library</b>	<b>5</b>
<b>About NetIQ Corporation</b>	<b>7</b>
<b>1 Understanding the Bidirectional eDirectory Driver</b>	<b>9</b>
Driver Concepts	10
Key Terms	10
Data Flow	12
How the Bidirectional eDirectory Driver Works	12
Standard Driver Features	13
Local Platforms	13
Entitlements	14
Password Synchronization	14
Driver Packages	14
<b>2 Installing the Driver Files</b>	<b>15</b>
<b>3 Preparing the Connected System</b>	<b>17</b>
Preventing Loopback on the Publisher Channel	17
Installing the Change-Log Module on a Remote eDirectory server	17
Extending the Remote eDirectory Schema	18
Installing the Change-Log Module on Linux	18
Installing the Change-Log Module on Windows	20
Removing the Driver from a Remote eDirectory Server	20
<b>4 Creating a New Driver Object</b>	<b>23</b>
Creating the Driver Object in Designer	23
Importing the Current Driver Packages	23
Installing the Driver Packages	24
Configuring the Driver Object	28
Deploying the Driver Object	28
Starting the Driver	29
Activating the Driver	29
Adding Packages to an Existing Driver	30
<b>5 Upgrading an Existing Driver</b>	<b>31</b>
Supported Upgrade Paths	31
What's New in Version 4.0.2	31
Upgrading the Driver	31
Upgrading the Installed Packages	31
Applying the Driver Patch	32
<b>6 Configuring SSL Connections</b>	<b>35</b>
Importing the Certificate into the Client's Certificate Store	35

Configuring Mutual Authentication .....	36
Security Considerations .....	37
<b>7 Synchronizing Passwords</b>	<b>39</b>
<b>8 Managing the Driver</b>	<b>41</b>
<b>9 Troubleshooting</b>	<b>43</b>
Troubleshooting Driver Processes .....	43
<b>10 Known Issues</b>	<b>45</b>
Object class violation when creating a user with templates .....	45
Trace displays unable to load dxdap extension module error message .....	45
The structured attributes are not properly converted .....	45
Users Are Not Correctly Synchronized .....	46
NDS Password does not synchronize on the Subscriber Channel with Read-Only, Filter Read-Only, and Filter Read/Write replicas. ....	46
Importing the Driver Causes Change of Driver Icon .....	46
Account Tracking GCV is not upgraded with Designer AU2 .....	46
Connected eDirectory Does not Shutdown on a Windows Computer .....	46
Loopback Detection of Delete and Password Modification Events .....	46
<b>A Driver Properties</b>	<b>49</b>
Driver Configuration .....	49
Driver Module .....	50
Driver Object Password .....	50
Authentication .....	50
Startup Option .....	50
Driver Parameters .....	51
ECMAScript .....	53
Global Configurations .....	53
Global Configuration Values .....	53
eDirectory Base Container .....	54
Default Configuration .....	54
Password Synchronization .....	55
Account Tracking .....	55
Entitlements .....	56
Managed System Information .....	58
Trace Levels .....	59
<b>B Synchronized Attributes</b>	<b>61</b>
Default Attributes .....	61
Creating Home Directories .....	62

# About this Book and the Library

The *Identity Manager Driver for Bidirectional eDirectory Implementation Guide* explains how to install and configure the Identity Manager Bidirectional driver for eDirectory.

## Intended Audience

This book provides information for individuals responsible for understanding administration concepts for roles and resource management across the enterprise, and implementing a secure, distributed administration model.

## Other Information in the Library

The library provides the following information resources:

### **Identity Manager Setup Guide**

Provides overview of Identity Manager and its components. This book also provides detailed planning and installation information for Identity Manager.

### **Designer Administration Guide**

Provides information about designing, testing, documenting, and deploying Identity Manager solutions in a highly productive environment.

### **User Application: Administration Guide**

Describes how to administer the Identity Manager User Application.

### **User Application: User Guide**

Describes the user interface of the Identity Manager User Application and how you can use the features it offers, including identity self-service, the Work Dashboard, role and resource management, and compliance management.

### **User Application: Design Guide**

Describes how to use the Designer to create User Application components, including how to work with the Provisioning view, the directory abstraction layer editor, the provisioning request definition editor, the provisioning team editor, and the role catalog.

### **Identity Reporting Module Guide**

Describes the Identity Reporting Module for Identity Manager and how you can use the features it offers, including the Reporting Module user interface and custom report definitions, as well as providing installation instructions.

### **Analyzer Administration Guide**

Describes how to administer Analyzer for Identity Manager.

### **Identity Manager Driver Administration Guide**

Provides information about administration tasks that are common to all Identity Manager drivers.

## **Identity Manager Driver Guides**

Provides implementation information about Identity Manager drivers.

# About NetIQ Corporation

We are a global, enterprise software company, with a focus on the three persistent challenges in your environment: Change, complexity and risk—and how we can help you control them.

## Our Viewpoint

### **Adapting to change and managing complexity and risk are nothing new**

In fact, of all the challenges you face, these are perhaps the most prominent variables that deny you the control you need to securely measure, monitor, and manage your physical, virtual, and cloud computing environments.

### **Enabling critical business services, better and faster**

We believe that providing as much control as possible to IT organizations is the only way to enable timelier and cost effective delivery of services. Persistent pressures like change and complexity will only continue to increase as organizations continue to change and the technologies needed to manage them become inherently more complex.

## Our Philosophy

### **Selling intelligent solutions, not just software**

In order to provide reliable control, we first make sure we understand the real-world scenarios in which IT organizations like yours operate—day in and day out. That's the only way we can develop practical, intelligent IT solutions that successfully yield proven, measurable results. And that's so much more rewarding than simply selling software.

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- ◆ Security Management
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# 1 Understanding the Bidirectional eDirectory Driver

The NetIQ Identity Manager Bidirectional eDirectory driver synchronizes data between the Identity Vault and eDirectory.

The traditional Identity Manager driver for eDirectory synchronizes objects and attributes between two eDirectory trees. This requires Identity Manager to be configured on both eDirectory servers. It also requires two instances of the eDirectory driver configuration.

Another way of connecting to eDirectory is by using the LDAP driver. However, connecting to eDirectory driver through an LDAP driver has the following limitations:

- ♦ The LDAP driver uses LDAP Search method to synchronize eDirectory data because eDirectory does not provide a Change-Log functionality. The LDAP Search method is not as efficient as the Change-Log method.
- ♦ The LDAP driver does not support universal password synchronization on the Publisher channel.

The Bidirectional eDirectory driver was designed to make the connection between two connected trees easier in cases where one of the trees did not have an Identity Manager server. This also reduces the licencing burden for customers who do not need Identity Manager in multiple trees.

If you are connecting two Identity Manager enabled trees, it is recommended to use the traditional eDirectory driver. The traditional eDirectory driver and the new Bidirectional eDirectory driver are mutually exclusive. The Bidirectional eDirectory driver's Change-Log cannot be installed on an Identity Manager server. [Table 1-1](#) contains details about the features of the two drivers.

*Table 1-1 Traditional NDS-to-NDS Driver Compared to the Bidirectional eDirectory Driver*

Features	Bidirectional eDirectory Driver	Traditional NDS-to-NDS Driver
Installation	The Change-Log module is installed on the connected eDirectory.	Identity Manager is installed on the connected eDirectory.
Configuration	One driver is configured for achieving data synchronization between Identity Vault and eDirectory.	Two drivers are configured for achieving synchronization.  The configuration is split across the Identity Vault and eDirectory.
Communication	LDAP/TLS is used for communication.	TCP/SSL is used for communication.
NDS Password Sync	Available	Available
Distribution Password Sync	Available	Available
Driver Package	Available	Available
Account Tracking	Available	Available
Entitlements	Available	Available
Data Collection Service	Available	

- ◆ [“Driver Concepts” on page 10](#)
- ◆ [“Standard Driver Features” on page 13](#)

## Driver Concepts

- ◆ [“Key Terms” on page 10](#)
- ◆ [“Data Flow” on page 12](#)
- ◆ [“How the Bidirectional eDirectory Driver Works” on page 12](#)

## Key Terms

**Identity Manager:** NetIQ Identity Manager is a service that synchronizes data among servers in a set of connected systems by using a robust set of configurable policies. Identity Manager uses the Identity Vault to store shared information, and uses the Metadirectory engine for policy-based management of the information as it changes in the vault or connected system. Identity Manager runs on the server where the Identity Vault and the Metadirectory engine are located.

**Connected System:** Any system that can share data with Identity Manager through a driver.

**Identity Vault:** A hub, with applications and directories publishing their changes to it. The Identity Vault then sends changes to the applications and directories that have subscribed for them. This results in two main flows of data: the Publisher channel and the Subscriber channel.

**Metadirectory Engine:** The core server that implements the event management and policies of Identity Manager. The engine runs on the Java Virtual Machine in eDirectory.

**Driver:** A set of policies, filters, and objects that act as the connector between an Identity Vault and the driver shim.

This software enables an application to publish events from an application to the directory, enables an application to subscribe to events from the directory, and synchronizes data between the directory and applications.

**Driver Object:** A collection of channels, policies, rules, and filters that connect an application to an Identity Vault that is running Identity Manager.

Each driver performs different tasks. Policies, rules, and filters tell the driver how to manipulate the data to perform those tasks.

The Driver object displays information about the driver's configuration, policies, and filters. This object enables you to manage the driver and provide eDirectory management of the driver shim parameters.

**Driver Shim:** The driver shim handles communication between the eDirectory and the Metadirectory engine. A driver shim can be implemented either in Java class or as a native Windows DLL file.

The driver shim filename for the Bidirectional eDirectory driver is `EdirDriverShim.jar`.

**Remote Loader:** Enables a driver shim to execute outside of the Metadirectory engine (perhaps remotely on a different machine). The Remote Loader is typically used when the Identity Manager server does not meet the requirements of the driver shim.

The Remote Loader executes the driver shim and passes information between the shim and the Metadirectory engine. When you use a Remote Loader, you install the driver shim on the server where the Remote Loader is running, not on the server where the Metadirectory engine is running. You can choose to use SSL to encrypt the connection between the Metadirectory engine and the Remote Loader. For more information, see [Understanding Identity Manager Communication](#) in the *NetIQ Identity Manager Setup Guide*.

---

**NOTE:** The Bidirectional eDirectory driver does not support the Remote Loader.

---

**TAO:** A TAO (Timing Analysis Output) file is an ASCII text file with the `.TAO` extension. The file contains the results of a timing analysis. In the current context, the TAO file refers to the event cache file used by Identity Manager.

**LDAP:** The Lightweight Directory Access Protocol. An Internet protocol for accessing distributed directory services that act in accordance with X.500 data and service models.

**SSL:** Secure Sockets Layer. A protocol for managing the security of the messages transmitted on the Internet. SSL uses a program layer located between the Internet's Hypertext Transfer Protocol (HTTP) and Transport Control Protocol (TCP) layers. SSL uses the public-and-private key encryption system from RSA, which also includes the use of a digital certificate.

**TLS:** Transport Layer Security. A protocol that ensures privacy between communicating applications and their users on the Internet. When a server and client communicate, TLS ensures that there is no tampering with any message. TLS is the successor of the Secure Sockets Layer (SSL).

**Keystore:** A keystore contains private keys and certificates with their corresponding public keys required by a server for client authentication.

## Data Flow

The Identity Manager Bidirectional eDirectory driver synchronizes data between the Identity Vault and eDirectory. The driver can run anywhere that a Metadirectory server is running. The driver uses the Lightweight Directory Access Protocol to bidirectionally synchronize changes between an Identity Vault and the connected system (eDirectory).

The driver uses the Change-Log publication method to recognize data changes and communicates them to an Identity Vault. The Subscriber channel sends the Identity Vault changes to the connected system (eDirectory) through LDAP/LDAPS.

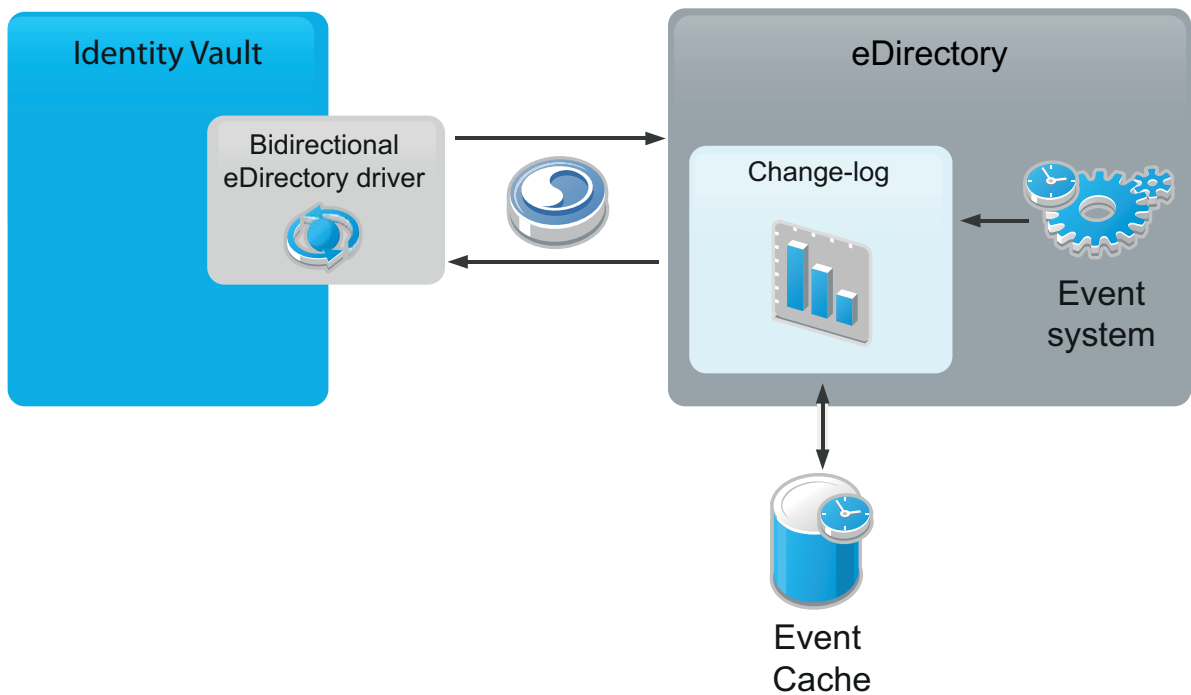
## How the Bidirectional eDirectory Driver Works

The Bidirectional eDirectory driver requires a Change-Log module to be present in the eDirectory server. The Change-Log module cannot coexist with the Identity Manager engine.

The Change-Log module provides change notification for the driver's Publisher channel. The data flow between the Bidirectional eDirectory driver and the Identity Vault is controlled by filters and policies that are in place for the Bidirectional eDirectory driver.

If you need to connect to an Identity Manager server, you must use the traditional eDirectory driver.

*Figure 1-1 Bidirectional eDirectory Driver Functionality*



- ◆ **Driver:** The bidirectional driver has Subscriber and Publisher channels:
  - ◆ **Subscriber Channel:** The Subscriber channel watches for additions and modifications to Identity Vault objects and issues LDAP commands that make changes to the connected system (eDirectory).
  - ◆ **Publisher Channel:** The Publisher channel reads information from Change-Log and submits that information to an Identity Vault via the Metadirectory engine. By default, the Publisher channel checks the log every 10 seconds. The Metadirectory engine applies policies, takes the appropriate actions, and posts the events to the Identity Vault.

- ♦ **Filters:** Identity Manager uses filters to control which objects and attributes are shared. The default filter configuration for the Bidirectional eDirectory driver allows objects and attributes to be shared.
- ♦ **Policies:** Policies are used to control data synchronization between the driver and the Identity Vault.
- ♦ **Change-log Module:** The Change-Log module has the following components:
  - ♦ **Change Cache:** The event logger logs eDirectory events into a change cache, which is a TAO file that has the same structure as the Identity Manager engine. A unique change cache is associated with a registered driver instance. Every successful new driver registration creates a new change cache that is associated with that driver. The TAO files have a proprietary format and are designed to reduce the disk usage for storing the change information. The change cache files are local to the eDirectory server on which they are created, because they refer to several server-specific details in the logged events.
  - ♦ **Event Logger:** The event logger is an Identity Manager dxevent module with a limited functionality. It registers event handlers for the eDirectory events. The event handler uses the filter information that is passed to Change-Log when an eDirectory driver is registered. The filters determine events that the driver can consume from Change-Log. The event handler filters events based on the driver filter. All filtered events are logged by the event logger.
  - ♦ **Change-log Extension Handler:** The Change-Log module provides LDAP extensions for changes to the eDirectory driver. The LDAP extension handler exposes the extension for registering an eDirectory driver instance and for initiating and stopping a change publication to the eDirectory driver. The driver registration information is stored in the `driver data` configuration file, which resides in the DIB directory of eDirectory. The event logger module provides changes to Change-Log. The changes are stored in the TAO file format of the Identity Manager engine.
 

The LDAP extension handler is a limited version of the `dxldap` module, whose only job is to expose extensions for Change-Log. Other Identity Manager extensions are not present in the Change-Log module.

There are four Change-Log operations: `InitRequest`, `GetChangesRequest`, `SendChangesResponse`, and `EndRequest`. The `clientID` is the GUID of the eDirectory driver in the Identity Vault. The GUID is used to uniquely identify the registered eDirectory driver instances.

## Standard Driver Features

The following sections provide information about how the Bidirectional eDirectory driver supports standard driver features:

- ♦ [“Local Platforms” on page 13](#)
- ♦ [“Entitlements” on page 14](#)
- ♦ [“Password Synchronization” on page 14](#)
- ♦ [“Driver Packages” on page 14](#)

## Local Platforms

The Bidirectional eDirectory driver runs in any Identity Manager installation. See [“Considerations for Installing Drivers with the Identity Manager Engine”](#) in the *NetIQ Identity Manager Setup Guide*.

## Entitlements

Entitlements standardize a method of recording this information on objects in the Identity Vault. The Bidirectional eDirectory driver implements entitlements. You can use entitlements to grant or revoke rights to an account in the driver. The driver is unaware of the User Application or Role-Based Entitlements. It depends on the User Application server or the Entitlements driver to grant or revoke the entitlement for a user based upon its own rules.

You should enable entitlements for the driver only if you plan to use the User Application or Role-Based Entitlements with the driver. For more information about entitlements, see the [NetIQ Identity Manager Entitlements Guide](#).

## Password Synchronization

The Bidirectional eDirectory driver supports password synchronization via Universal Password. You can also use the older form of password synchronization (a public/private key pair or NDS password). For more information, see [Chapter 7, “Synchronizing Passwords,” on page 39](#).

## Driver Packages

The Identity Manager content is now delivered in packages. The packages are included with Identity Manager 4.0 and later. For more information about Identity Manager packages, see “[Configuring Packages](#)” in the [NetIQ Designer for Identity Manager Administration Guide](#).

There are multiple packages for the Bidirectional eDirectory driver. The packages create a driver with a set of policies suitable for synchronizing data with the Identity Vault.

# 2 Installing the Driver Files

By default, the Bidirectional eDirectory driver files are installed on the Metadirectory server at the same time as the Metadirectory engine. The installation program extends the Identity Vault's schema and installs the driver shim. It does not create the driver in the Identity Vault (see [Chapter 4, "Creating a New Driver Object,"](#) on page 23).

If you performed a custom installation and did not install the Bidirectional eDirectory driver on the Metadirectory server, you must install the files on the Metadirectory server, using the instructions in "Preparing to Install the Engine, Drivers, and Plug-ins" in the *NetIQ Identity Manager Setup Guide*.

For the Bidirectional eDirectory driver to work, you must also install the change log module on the connected system (eDirectory). For information about Change-Log installation, see "[Installing the Change-Log Module on a Remote eDirectory server](#)" on page 17.





# 3 Preparing the Connected System

You need to do the following tasks to prepare the connected system (eDirectory server) to which you are connecting:

- ♦ Create a user account through which the Bidirectional eDirectory driver can authenticate to the connected eDirectory.
- ♦ Install the Change-Log module on the connected eDirectory server for synchronization of data from the connected eDirectory server to the Identity Vault (Publisher channel).

The following sections provide instructions for creating an eDirectory user object and installing the Change-Log module on a connected eDirectory server:

- ♦ [“Preventing Loopback on the Publisher Channel” on page 17](#)
- ♦ [“Installing the Change-Log Module on a Remote eDirectory server” on page 17](#)
- ♦ [“Removing the Driver from a Remote eDirectory Server” on page 20](#)

## Preventing Loopback on the Publisher Channel

The Change-Log mechanism implements loopback detection by ignoring events that are detected in the connected system made by the account that is used in the driver configuration. All changes made in the connected system by the account used in the driver configuration are not published in the Identity Vault on the Publisher channel. For example, if the driver is configured with user account as “jdoe”, use any other user account except “jdoe” to make changes on the connected system. To create an account with proper rights to be used in the driver configuration, see [“Security Considerations” on page 37](#).

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**NOTE:** If the connected eDirectory is a Read/Write replica, the move events from the Subscriber channel is looped back to the Publisher channel. This is because move operation happens on the Master Replica.

---

## Installing the Change-Log Module on a Remote eDirectory server

For the Bidirectional eDirectory driver to work, you must install the Change-Log module on the remote eDirectory server. The Change-Log enables the driver to recognize the changes that require publication from the remote eDirectory to the Identity Vault. The Change-Log module is supported on the following eDirectory versions:

- ♦ 9.0.x
- ♦ 8.8.8.x

---

## NOTE

- ◆ If the driver is running on an engine prior to Identity Manager 4.5.4, the driver will connect to Suite B enabled LDAP service on the connected eDirectory only if you enable **Always Accept Server Certificate** under the driver settings. For more information see, “[Driver Settings](#)” on [page 51](#).
- ◆ When you configure eDirectory modules in a Suite B mode, they include support for ECDSA certificates and enforce the use of TLS 1.2 and Suite B ciphers as specified in RFC 6460. For more information on configuring eDirectory in Suite B modes, see [NetIQ eDirectory Administration Guide](#).
- ◆ When you upgrade to driver version 4.0.2 or later, ensure that there are no encrypted attribute events in the change cache.

---

The Change-Log module is provided on the Identity Manager media for 64-bit platforms. Copy the Change-Log module from the `/products/IDM/Dirxml-ChangeLog` directory of your installation folder and install it on the connected eDirectory server.

The following sections provide instructions to install the Change-Log module on Linux and Windows platforms:

- ◆ “[Extending the Remote eDirectory Schema](#)” on [page 18](#)
- ◆ “[Installing the Change-Log Module on Linux](#)” on [page 18](#)
- ◆ “[Installing the Change-Log Module on Windows](#)” on [page 20](#)

## Extending the Remote eDirectory Schema

Before installing or upgrading to Change-Log or driver version 4.0.2 or later, you need to manually extend the connected remote eDirectory schema to introduce a new attribute `DirXMLServerKeys`. You must perform an eDirectory health check to ensure that the tree is ready to accept the new schema.

To extend the `clschema.sch` schema file, use the `ice` utility ([https://www.netiq.com/documentation/edirectory-9/edir\\_admin/data/a5hgmnu.html](https://www.netiq.com/documentation/edirectory-9/edir_admin/data/a5hgmnu.html)) or `ndssch` ([https://www.netiq.com/documentation/edirectory-9/edir\\_admin/data/amijj0.html#a6q5iw2](https://www.netiq.com/documentation/edirectory-9/edir_admin/data/amijj0.html#a6q5iw2)).

Example using `ice` utility:

```
ice -S SCH -f clschema.sch -D LDAP -s <remote eDirectory server> -d <Admin DN> -w <password>
```

Example using `ndssch`:

```
ndssch -h <hostname[:port]> -t <tree_name> admin.<context> <directory_path>/clschema.sch
```

## Installing the Change-Log Module on Linux

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**IMPORTANT:** On SUSE Linux Enterprise Server (SLES) 12.x and Red Hat Enterprise Linux (RHEL) 7.x platforms, Identity Manager supports Change-Log module version 4.0.2 or later.

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Your choice of performing the Change-Log module installation as a root or a non-root user should match the method used for installing eDirectory.

## Installing the Change-Log Module as a Root User

### 1 Extend the schema.

Download the latest bidirectional eDirectory patch, unzip the folder, navigate to the directory containing the remote eDirectory schema file (`clschema.sch`), and extend the schema. For more information, see [Extending the Remote eDirectory Schema](#).

### 2 Stop eDirectory.

### 3 Install the Change-Log module.

- ◆ Navigate to the directory containing the Change-Log RPM and run the following command:

```
rpm -ivh <rpm name>.rpm
```

For example: `rpm -ivh ./novell-DXMLChlgx.rpm`

- ◆ Run the following command on OES 2018 for any **Changelog** version prior to 4.0.5 (4.0.2, 4.0.3, and 4.0.4)

```
rpm -Uvh <rpm name>.rpm --force
```

For example: `rpm -Uvh /home/novell-DXMLChlgx*.rpm --force`

### 4 Start eDirectory.

## Installing the Change-Log Module as a Non-root User

If eDirectory is installed as a non-root user, you must install the Change-Log module as a non-root user. The Change-Log files are included in the driver RPM. To install the Change-Log module, install the driver RPM.

- ### 1 Set the `root` directory to non-`root` eDirectory location by entering the following command in the command prompt:

```
ROOTDIR=<non-root eDirectory location>
```

This will set the environmental variables to the directory where eDirectory is installed as a non-`root` user.

For example, `ROOTDIR="/local/home/bshidm/base/bshappl/edir`.

Note that this location is specified in the example script in Step 2.

Alternatively, set the `root` directory by directly editing the script in a text editor before running the script in Step 2.

- ### 2 Install the Change-Log module by running the following script in a command prompt:

```
*****
#!/bin/sh
#set -x
#© 2017 NetIQ Corporation and its affiliates. All Rights Reserved

clear

echo "=====
echo " Installing packages... "
echo "=====

if [ "$1" == "" ] ; then
    exit
fi

pkgfile=$1
```

```

ROOTDIR="/local/home/bshidm/base/bshappl/edir"
RPMDB=$ROOTDIR/rpm

if [ ! -d "$RPMDB" ] ; then
    mkdir $RPMDB
fi

# create rpm database if it doesn't exist
if [ ! -f $RPMDB/__db.000 ]
then
#
    mkdir -p $RPMDB
    rpm --dbpath "$RPMDB" --initdb
fi

RPM_FLAGS="--dbpath $RPMDB -Uvh --relocate=/etc=$ROOTDIR/etc --relocate=/
opt=$ROOTDIR/opt --relocate=/opt/novell/eDirectory/lib64=$ROOTDIR/opt/novell/
eDirectory/lib64 --relocate=/var=$ROOTDIR/var --badreloc --nodeps --
replacefiles --force"

rpm $RPM_FLAGS $pkgfile

```

## Installing the Change-Log Module on Windows

### 1 Extend the schema.

Download the latest bidirectional eDirectory patch, unzip the folder, navigate to the directory containing the remote eDirectory schema file (`clschema.sch`), and extend the schema. For more information, see [Extending the Remote eDirectory Schema](#).

### 2 Shutdown the eDirectory service.

### 3 Navigate to the 64-bit folder containing the following DLLs and copy them to the eDirectory installation location. The default install location is `C:\Novell\NDS`.

- ◆ `dirxmllib.dll`
- ◆ `dxevent.dll`
- ◆ `xclldap.dll`

### 4 Start the eDirectory service.

For information about upgrading Change-Log, see ["Upgrading the Driver" on page 31](#).

## Removing the Driver from a Remote eDirectory Server

The driver includes Change-Log utility, `clutil`. This utility allows you to remove Change-Log entries on a remote eDirectory server for bidirectional driver shims connected to it. Removing Change-Log entries removes the selected driver entry from Change-Log in the remote eDirectory and removes the cache files.

On Linux, the Identity Manager install program installs this utility as a part of the `novell-DXMLChlgx.rpm` file. To configure it on an eDirectory server, locate the `clutil` script in the `/opt/novell/eDirectory/bin` location.

On Windows, this utility is provided with other deliverables for the `Dirxml-ChangeLog` file on the Identity Manager media. Create a `lib` directory in the location where eDirectory is installed (For example: `C:\Novell\NDS\`), and copy the `clutil.jar` file into it.

To run the utility, do the following:

- 1 Set PATH to a valid location where java is installed.

For example:

- ♦ **Linux:** /opt/novell/eDirectory/lib64/nds-modules/embox/jre/bin
- ♦ **Windows:** C:\novell\NDS\embox\jre\bin

- 2 **On Linux:** Provide the execute permission to the `clutil` file if not already provided, and run the `clutil` command.

**On Windows:** Browse to the eDirectory installation folder (For example, C:\Novell\NDS\) and run the `clutil.bat` file.

Running this utility displays the list of Change-Log driver entries configured for the eDirectory server. This list shows a mapping of the driver names to their respective driver entries.

- 3 Stop the driver shim, then select the serial number corresponding to the Change-Log entry of the driver that you want to remove.
- 4 When prompted for credentials, enter the administrator user credentials in LDAP format and the password. This is the same administrator user account used during driver configuration.

This deletes the driver entry, TAO files, and updates the configuration.

---

**IMPORTANT:** If the remote eDirectory server is installed on Windows, you must delete the TAO file manually after shutting down eDirectory. This is because `nds` process locks the TAO file and `clutil` utility cannot delete it. However, when the TAO file is deleted, you can no longer use the corresponding driver because the driver fails to establish a successful connection with the remote eDirectory.

---



# 4 Creating a New Driver Object

After the Bidirectional eDirectory driver files are installed on the server where you want to run the driver (see [Chapter 2, “Installing the Driver Files,” on page 15](#)), you can create the driver in the Identity Vault. You do so by installing the driver packages and then modifying the driver configuration to suit your environment.

- ♦ [“Creating the Driver Object in Designer” on page 23](#)
- ♦ [“Activating the Driver” on page 29](#)
- ♦ [“Adding Packages to an Existing Driver” on page 30](#)

## Creating the Driver Object in Designer

To create the Bidirectional eDirectory driver object, install the driver packages and then modify the configuration to suit your environment. After you create and configure the driver object, you need to deploy it to the Identity Vault and start it.

To synchronize data between the eDirectory connected system and the Identity Vault, you need to complete the following procedures for the drivers that are installed in each Identity Vault:

- ♦ [“Importing the Current Driver Packages” on page 23](#)
- ♦ [“Installing the Driver Packages” on page 24](#)
- ♦ [“Configuring the Driver Object” on page 28](#)
- ♦ [“Deploying the Driver Object” on page 28](#)
- ♦ [“Starting the Driver” on page 29](#)

---

**NOTE:** You should not create driver objects using the new Identity Manager 4.0 and later configuration files through iManager. This method of creating driver objects is no longer supported. To create drivers, you now need to use the new package management features provided in Designer.

---

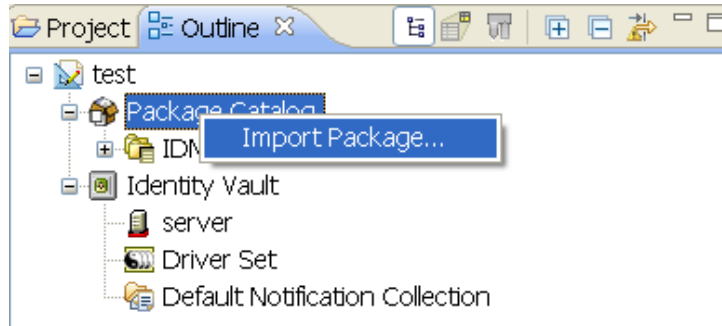
## Importing the Current Driver Packages

The driver packages contain the items required to create a driver, such as policies, entitlements, filters, and Schema Mapping policies. These packages are only available in Designer. You can upgrade any package that is installed if there is a newer version of the package available. Before creating a driver object in Designer, it is recommended to have the latest packages in the Package Catalog. Designer prompts you for importing the required packages when it creates the driver object. For more information on upgrading packages, see [“Upgrading Installed Packages”](#) in the *NetIQ Designer for Identity Manager Administration Guide*.

To verify that you have the most recent version of the driver packages imported into the Package Catalog:

- 1 Open Designer.
- 2 In the toolbar, click **Help > Check for Package Updates**.

- 3 Click **OK** to update the packages  
or  
Click **OK** if the packages are up-to-date.
- 4 In the Outline view, right-click the Package Catalog.
- 5 Click **Import Package**.



In the Select Package window, browse to the installation folder and select Bidirectional eDirectory driver packages. These packages are added to the list of packages for this driver.

- 6 Click **Select All** to import all of the packages displayed.  
By default, only the base packages are displayed. Deselect **Show Base Packages Only** to display all packages.
- 7 Click **OK** to import the selected packages, then click **OK** in the successfully imported packages message.
- 8 After the current packages are imported, restart Designer.  
Continue with “[Installing the Driver Packages](#)” on page 24.

## Installing the Driver Packages

After you import the current driver packages into the Package Catalog, you can install the driver packages to create a new driver.

- 1 In Designer, open your project.
- 2 In the Modeler, right-click the driver set where you want to create the driver, then click **New > Driver**.
- 3 Select **eDir2eDir Base**, then click **Next**.
- 4 Select the optional packages to install for the Bidirectional eDirectory driver. All options are selected by default. The options are:

**Default Configuration:** These packages contain the default configuration information for the Bidirectional eDirectory driver. Always leave this option selected.

**Entitlements:** These packages contain the policies and entitlements required to enable the driver for account creation and management with entitlements. For more information, see the [NetIQ Identity Manager Entitlements Guide](#).

**Password Synchronization:** These packages contain the policies required to enable password synchronization. Leave this option selected if you want to synchronize passwords between the Identity Vault and the eDirectory server.



**Data Collection:** These packages contain the policies that enable the driver to collect data for reports. If you are using the Identity Reporting Module, verify that this option is selected. For more information, see the [Administrator Guide to NetIQ Identity Reporting](#).

**Account Tracking:** These packages contain the policies that enable account tracking information for reports. If you are using the Identity Reporting Module, verify that this option is selected. For more information, see the [Administrator Guide to NetIQ Identity Reporting](#).

- 5 After selecting the optional packages, click **Next**.
- 6 If there is a package dependency, install the dependent package. For example, Password Synchronization Notification Packages.
- 7 (Conditional) Click **OK** to install the Common Settings package and the edir2eDir Default Configuration package, if you have not installed any other packages into the selected driver set.
- 8 (Conditional) Fill in the following fields on the Common Settings page, then click **Next**:

The Common Settings page is displayed only if the Common Settings package is installed as a dependency.

**User Container:** Select the container where the users are added if they don't already exist in the Identity Vault. This value becomes the default value for all drivers in the driver set. It is in slash format, such as netiq/users, where `ou=users.o=netiq`.

If you want a unique location for this driver, set the value for all drivers on this page. After the driver is created, change the value on the driver's Global Configuration Values page.

**Group Container:** Select the container where the groups are added if they don't already exist in the Identity Vault. This value becomes the default value for all drivers in the driver set.

If you want a unique location for this driver, set the value for all drivers on this page. After the driver is created, change the value on the driver's Global Configuration Values page.

- 9 On the Driver Information page, specify a name for the driver, then click **Next**.
- 10 On the Application Authentication page, fill in the following fields, then click **Next**:

**Authentication ID:** Specify the DN of the LDAP account in full LDAP DN format that the driver will use to authenticate to connected eDirectory.

For information, see [Chapter 6, "Configuring SSL Connections," on page 35](#).

**Connection Information:** Specify the hostname or IP address of the eDirectory server as well as the decimal port number (for example, 187.168.1.1:389).

Port 389 uses the TLS protocol for clear text transfer and port 636 uses the SSL protocol. For more information, see [Chapter 6, "Configuring SSL Connections," on page 35](#).

**Password:** Specify the password for the LDAP account that the driver will use to authenticate to connected eDirectory.

**Use SSL:** Select **Yes** to use SSL to secure communication between the Bidirectional eDirectory driver and the eDirectory server. If you use SSL, fill in the following parameters:

- ◆ **Always Accept Server Certificate:** Select **Yes** for the driver to accept the LDAP server's certificate for establishing the SSL connection with the eDirectory server. To use the keystore, select this option to **No**. For more information on setting up SSL connections, see [Chapter 6, "Configuring SSL Connections," on page 35](#).
- ◆ **Keystore Path for SSL Certs:** Specify the full path to the keystore file containing the SSL certificates.
- ◆ **Use Mutual Authentication:** Select **Yes** if you want the driver to use SSL mutual authentication (both client and server), or select **No** for server authentication only. If you select **Yes**, you must have the appropriate certificates configured in your keystore.
- ◆ **Key Alias:** Specify the alias of the key.

- ♦ **Keystore Password:** Specify the keystore password for accessing the keystore file containing the SSL certificates.

**eDirectory Base Container:** Specify the connected eDirectory container in LDAP format where objects are synchronized. If you are using a flat Placement rule, this is the container where the objects are placed. If you are using a mirrored Placement rule, this is the base container. For example, `ou=people,o=com`.

---

**NOTE:** If you want to use the root of the connected eDirectory tree as the base container to hold the objects, leave the eDirectory base container blank.

---

---

**NOTE:** If you are using Identity Tracking with the driver, NetIQ recommends that you have a unique organization name (O) between the remote eDirectory tree and the Identity Vault. If it is not done and the trees are not mirrored, events might be reported for an unrelated object in the connected system (eDirectory tree) with the same DN.

---

- 11 On the Remote Loader page, do not fill any fields. Click **Next**.

---

**NOTE:** The Bidirectional eDirectory driver does not support the Remote Loader. This option does not apply.

---

- 12 (Conditional) Fill in the following fields to define your connected eDirectory system, then click **Next**:

This page is displayed only if you selected to install the Data Collection and Account Tracking packages.

**Name:** Specify a descriptive name for this connected eDirectory system. The name is displayed in the reports.

**Description:** Specify a brief description of the connected eDirectory system. The description is displayed in the reports.

**Location:** Specify the physical location of the connected eDirectory system. The location is displayed in the reports.

**Vendor:** Select NetIQ as the vendor of the connected eDirectory system. The vendor information is displayed in the reports.

**Version:** Specify the version of the connected eDirectory system. The version is displayed in the reports.

- 13 (Conditional) Fill in the following fields to define the ownership of the connected eDirectory system, then click **Next**:

This page is displayed only if you selected to install the Data Collection and Account Tracking packages.

**Business Owner:** Select a user object in the Identity Vault that is the business owner of the connected eDirectory system. This can only be a user object, not a role, group, or container.

**Application Owner:** Select a user object in the Identity Vault that is the application owner of the connected eDirectory system. This can only be a user object, not a role, group, or container.

- 14 (Conditional) Fill in the following fields to define the classification of the connected eDirectory system, then click **Next**:

This page is displayed only if you selected to install the Data Collection and Account Tracking packages.

**Classification:** Select the classification of the connected eDirectory system. This information is displayed in the reports. The options are:

- ♦ Mission-Critical

- ◆ Vital
- ◆ Not-Critical
- ◆ Other

If you select **Other**, you must specify a custom classification for the Identity Vault.

**Environment:** Select the type of environment the connected eDirectory system provides. The options are:

- ◆ Development
- ◆ Test
- ◆ Staging
- ◆ Production
- ◆ Other

If you select **Other**, you must specify a custom classification for the connected eDirectory system.

- 15** Fill in the following fields on the bidirectional eDirectory Default Configuration page, then click **Next**:

**Publisher Placement type:** Select the desired form of placement for the Publisher channel. This option determines the Publisher Channel Placement policies. The options are:

- ◆ **Mirrored:** Mirrors the structure between the Identity Vault and eDirectory.  
This option in the driver configuration synchronizes User, Group, Organization, Country, and Organizational Unit objects.
- ◆ **Flat:** All of the objects are placed into a single (base) container.  
This option synchronizes User, Group, Organization, and Organizational Unit objects.

**Subscriber Channel Placement Type:** Select the desired form of placement for the Subscriber channel. This option determines the Subscriber Channel Placement policies. The options are:

- ◆ **Mirrored:** Mirrors the structure between the Identity Vault and the connected eDirectory server. It places objects hierarchically within the base container.  
This option in the driver configuration synchronizes User, Group, Organization, Country, and Organizational Unit objects.
- ◆ **Flat:** All of the objects are placed within the base container.  
This option synchronizes User, Group, Organization, and Organizational Unit objects.

- 16** On the Password Sync Settings page, specify a password for the user, then click **Next**.  
This option in the driver configuration assumes a default password if you don't specify the password for the user.

- 17** (Conditional) On the Account Tracking page, specify the name of the realm which uniquely identifies the location of the users in the connected eDirectory.

- 18** Review the summary of tasks, then click **Finish**.

- 19** After the driver packages are installed, there is additional configuration required for the Bidirectional eDirectory driver. Continue to [“Configuring the Driver Object” on page 28](#) to configure the driver.

## Configuring the Driver Object


The Bidirectional eDirectory driver is operational after the driver packages are installed. However, the basic configuration might not meet the requirements for your environment. You should complete the following tasks to configure the driver object:

- ♦ **Secure the driver connection:** The Bidirectional eDirectory driver communicates through LDAP protocols via SSL, using digital certificates for authentication. You need to set up this secure connection. See [Chapter 6, “Configuring SSL Connections,” on page 35](#).
- ♦ **Configure the driver filter:** Modify the driver filter to include the object classes and attributes you want synchronized between the eDirectory connected system and the Identity Vault. For information about the classes and attributes included in the filter for the basic configuration, see [Appendix B, “Synchronized Attributes,” on page 61](#).
- ♦ **Configure policies:** Modify the policies as needed for your driver.
- ♦ **Configure password synchronization:** The basic driver configuration is set up to support bidirectional password synchronization through Universal Password and NDS password. By default, Universal Password is configured. For more information, see [Chapter 7, “Synchronizing Passwords,” on page 39](#).

After completing the configuration tasks, continue with the next section, [Deploying the Driver Object \(page 28\)](#).

## Deploying the Driver Object

After the driver object is created in Designer, it must be deployed into the Identity Vault.

- 1 In Designer, open your project.
- 2 In the Modeler, right-click the driver icon  or the driver line, then select **Live > Deploy**.
- 3 If you are authenticated to the Identity Vault, skip to [Step 5](#); otherwise, specify the following information:

**Host:** Specify the IP address or DNS name of the server hosting the Identity Vault.

**Username:** Specify the DN of the user object used to authenticate to the Identity Vault.

---

**IMPORTANT:** The **Username** specified in the driver properties should be an `admin` type user that is only used by the Bidirectional eDirectory driver for authentication and rights to the connected eDirectory tree. Create an `admin` user in the connected eDirectory that is solely used by the Bidirectional eDirectory driver for authentication.

If you are authenticating to the Bidirectional eDirectory driver as the same user that you used to administer the connected eDirectory tree, the Change-Log filter fails to pick and synchronize changes that you made to the connected eDirectory because the loopback protection disregards the changes. For the driver to pick the changes, you must connect to the Bidirectional eDirectory driver as a different user.

---

**Password:** Specify the user's password.

- 4 Click **OK**.
- 5 Read through the deployment summary, then click **Deploy**.
- 6 Read the message indicating that the deployment was successful, then click **OK**.
- 7 Click **Define Security Equivalence** to assign rights to the driver.

The driver requires rights to objects within the Identity Vault. The Admin user object is most often used to supply these rights. However, you might want to create a DriversUser (for example) and assign security equivalence to that user.

For receiving events from the Identity Vault, ensure that the driver's **Security Equals DN** has the following rights in the Identity Vault:

- ♦ **Entry:** Browse rights.
- ♦ **Attributes:** Read rights.

For more information, see [“Security Considerations” on page 37](#).

**7a** Click **Add**, then browse to and select the object with the correct rights.

**7b** Click **OK** twice.

**8** Click **Exclude Administrative Roles** to exclude users that should not be synchronized.

You should exclude any administrative User objects (for example, Admin and DriversUser) from synchronization.

**8a** Click **Add**, then browse to and select the user object you want to exclude, then click **OK**.

**8b** Repeat [Step 8a](#) for each object you want to exclude, then click **OK**.


**9** Click **OK**.

## Starting the Driver

When a driver is created, it is stopped by default. To make the driver work, you must start the driver. Identity Manager is an event-driven system, so after the driver is started, it won't do anything until an event occurs. You can use `iManager` or `dxcmd` commands to start the driver.

To start the driver by using Designer:

**1** Launch Designer, then open your project.

**2** In the Modeler, right-click the driver icon  or the driver line, then select **Live > Start Driver**.

For information about management tasks with the driver, see [Chapter 8, “Managing the Driver,” on page 41](#).


## Activating the Driver

The Identity Manager driver for Bidirectional eDirectory does not need a separate activation. If you create the driver in a driver set where you have already activated the Identity Manager server and service drivers, the driver inherits the activation from the driver set.

If you create the driver in a driver set that has not been previously activated, the driver will run in the evaluation mode for 90 days. You must activate the driver during the evaluation period; otherwise, the driver will be disabled. If you try to run the driver, `ndstrace` displays an error message indicating that you need to reactivate the driver to use it. For information on activation, refer to [Activating Identity Manager](#) in the *NetIQ Identity Manager Setup Guide*.

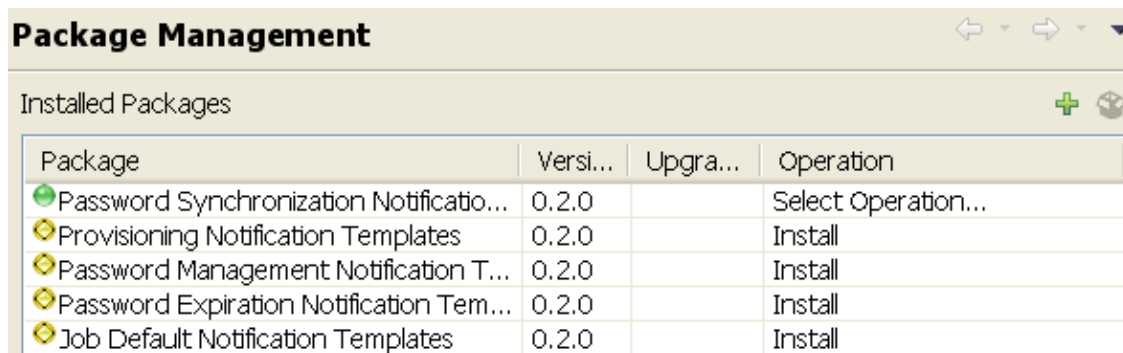
# Adding Packages to an Existing Driver

You can add new functionality to an existing driver by adding new packages to an existing driver.

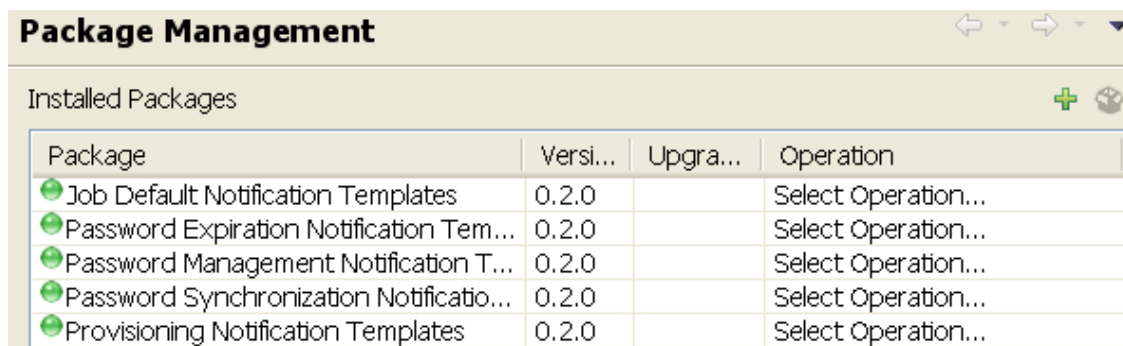
- 1 Right-click the driver, then click **Properties**.
- 2 Click **Packages**, then click the **Add Packages** icon .
- 3 Select the packages to install. If the list is empty, there are no available packages to install.
- 4 (Optional) Deselect the **Show only applicable package versions** option, if you want to see all available packages for the driver, then click **OK**.

This option is only displayed on drivers. By default, only the packages that can be installed on the selected driver are displayed.

- 5 Click **Apply** to install all of the packages listed with the Install operation.



- 6 (Conditional) Fill in the fields with appropriate information to install the package you selected for the driver, then click **Next**.
- 7 Read the summary of the installation, then click **Finish**.
- 8 Click **OK** to close the Package Management page after you have reviewed the installed packages.



- 9 Repeat [Step 1](#) through [Step 8](#) for each driver where you want to add the new packages.

# 5 Upgrading an Existing Driver

The following sections provide information to help you upgrade an existing driver:

- ♦ “Supported Upgrade Paths” on page 31
- ♦ “What’s New in Version 4.0.2” on page 31
- ♦ “Upgrading the Driver” on page 31

## Supported Upgrade Paths

You can upgrade the driver from version 4.0.1 to 4.0.2.

## What’s New in Version 4.0.2

This version of the driver includes support for connecting to eDirectory 9.0.2.x.

## Upgrading the Driver

The driver upgrade process involves upgrading the installed driver packages, updating the driver files, and Change-Log.

This section provides general instructions for updating a driver. For information about updating the driver to a specific version, search for that driver patch in the [NetIQ Patch Finder Download Page](#) and follow the instructions from the Readme file accompanying the driver patch release.

---

**NOTE:** If you are using encrypted attributes, ensure that the driver cache file is empty before Change-Log module is upgraded. You can do this by preventing changes to eDirectory or by stopping the inbound synchronization to eDirectory through iMonitor until the upgrade is completed.

---

Complete the following steps to upgrade a driver:

- ♦ “Upgrading the Installed Packages” on page 31
- ♦ “Applying the Driver Patch” on page 32

## Upgrading the Installed Packages

- 1 Download the latest available packages.

To configure Designer to automatically read the package updates when a new version of a package is available, click **Windows > Preferences > NetIQ > Package Manager > Online Updates** in Designer. For more information about managing packages, see the [NetIQ Designer for Identity Manager Administration Guide](#).

- 2 Upgrade the installed packages.
  - 2a Open the project containing the driver.
  - 2b Right-click the driver for which you want to upgrade an installed package, then click **Driver > Properties**.
  - 2c Click **Packages**.

If there is a newer version of a package, there is check mark displayed in the Upgrades column.
  - 2d Click **Select Operation** for the package that indicates there is an upgrade available.
  - 2e From the drop-down list, click **Upgrade**.
  - 2f Select the version that you want to upgrade to, then click **OK**.

---

**NOTE:** Designer lists all versions available for upgrade.

---

- 2g Click **Apply**.
- 2h (Conditional) Fill in the fields with appropriate information to upgrade the package, then click **Next**.

Depending on which package you selected to upgrade, you must fill in the required information to upgrade the package.
- 2i Read the summary of the packages that will be installed, then click **Finish**.
- 2j Review the upgraded package, then click **OK** to close the Package Management page.

For detailed information, see the [Upgrading Installed Packages](#) in the *NetIQ Designer for Identity Manager Administration Guide*.

## Applying the Driver Patch

The driver patch updates the driver files. You can install the patch as a `root` or `non-root` user.

### Prerequisites

Before installing the patch, complete the following steps:

- 1 Take a back-up of the current driver configuration.
- 2 Stop the driver instance.
- 3 Stop the Identity Vault.
- 4 In a browser, navigate to the [NetIQ Patch Finder Download Page](#).
- 5 Under **Patches**, click **Search Patches**.
- 6 Specify **Identity Manager *nn* Bidirectional eDirectory Driver *nn*** in the search box.
- 7 Download and unzip the contents of the patch file to a temporary location on your server.

For example, `IDM45_Bidirectional_4020.zip`.



## Applying the Patch as a Root User

In a root installation, the driver patch installs the driver files in the default locations on Linux. On Windows, you need to manually copy the files to the default locations.

### 1 Update the driver files:

- ♦ **Linux:** Open a command prompt and run the following command to upgrade the existing RPM:

```
rpm -Uvh <Driver Patch File Temporary Location>/linux/novell-DXMLEdirDrv.rpm
```

For example, `rpm -Uvh <IDM45_Bidirectional_4020.zip>/linux/novell-DXMLEdirDrv.rpm`

- ♦ **Windows:** Navigate to the *<Extracted Driver Patch File Temporary Location>\windows* folder and copy the `EdirDriverShim.jar` file to *<IdentityManager installation>\NDS\lib* folder.

For example, copy `EdirDriverShim.jar` from *<Extracted IDM45\_Bidirectional\_4020.zip>\windows* folder to *<IdentityManager installation>\nds\lib* folder.

### 2 (Conditional) Update the Change-Log module.

#### 2a Start the Identity Vault.

#### 2b Extend the schema.

- ♦ **Linux:** Open a command prompt and run the following command:

```
ndssch -h xxx.xxxx.xxx.xxx -t TREE_NAME admin.xxxxxx /xxxx/dirxmlchangelogfp/schema/clschema.sch
```

For example,

```
ndssch -h 192.99.78.51 -t edir_tree1 admin.sa.system <password> dirxmlchangelogfp/schema/clschema.sch
```

- ♦ **Windows:** Run the following command:

```
ice -S SCH -f input.sch -D LDAP -s <server> -d <DN of Admin user> -w <password>
```

For example,

```
ice -S SCH -f schema.sch -D LDAP -s 192.99.78.51 -d cn=user,o=company -w <password>
```

#### 2c Stop the Identity Vault.

#### 2d Upgrade the Change-Log files.

- ♦ **Linux:** Upgrade the existing RPM by running the following command:

```
rpm -Uvh --noscripts <Driver Patch File Temporary Location>/linux_64/novell-DXMLChlgx.rpm
```

---

**IMPORTANT:** If `--noscripts` option is not specified in the command, the upgrade fails and lists the existing and new RPMs when you issue the version check command. In this case, uninstall or erase all the RPMs starting from new RPMs followed by the existing RPM and reinstall the new Change-Log RPM.

---

- ♦ **Windows:** Navigate to the <Extracted Driver Patch File Temporary Location>\windows-x64 folder and perform the following actions:
  1. Copy the following files to <IdentityManager installation>\nds folder:
    - ♦ dirxml.lib.dll
    - ♦ dxevent.dll
    - ♦ xclldap.dll
    - ♦ clschema.sch
    - ♦ clutil.bat
  2. Copy the following files to <IdentityManager installation>\nds\lib folder:
    - ♦ clutil.jar
    - ♦ ldap.jar
- 3 Start the Identity Vault.
- 4 Start the driver instance.

## Applying the Patch as a Non-Root User

- 1 Verify that <non-root eDirectory location>/rpm directory exists and contains the file, \_db.000.

The \_db.000 file is created during a non-root installation of the Identity Manager engine. Absence of this file might indicate that Identity Manager is not properly installed. Reinstall Identity Manager to correctly place the file in the directory.

- 2 To set the root directory to non-root eDirectory location, enter the following command in the command prompt:

```
ROOTDIR=<non-root eDirectory location>
```

This will set the environmental variables to the directory where eDirectory is installed as a non-root user.

- 3 To install the driver files, enter the following command:

```
rpm --dbpath $ROOTDIR/rpm -Uvh --relocate=/usr=$ROOTDIR/opt/novell/eDirectory
--relocate=/etc=$ROOTDIR/etc --relocate=/opt/novell/eDirectory=$ROOTDIR/opt/
novell/eDirectory --relocate=/opt/novell/dirxml=$ROOTDIR/opt/novell/dirxml --
relocate=/var=$ROOTDIR/var --badreloc --nodeps --replacefiles <rpm-location>
```

For example, to install the Bidirectional eDirectory driver RPM, use this command:

```
rpm --dbpath $ROOTDIR/rpm -Uvh --relocate=/usr=$ROOTDIR/opt/novell/eDirectory
--relocate=/etc=$ROOTDIR/etc --relocate=/opt/novell/eDirectory=$ROOTDIR/opt/
novell/eDirectory --relocate=/opt/novell/dirxml=$ROOTDIR/opt/novell/dirxml --
relocate=/var=$ROOTDIR/var --badreloc --nodeps --replacefiles /home/user/
novell-DXMLEdirDrv.rpm
```

# 6 Configuring SSL Connections

The Bidirectional eDirectory driver uses the LDAP protocol to communicate with the eDirectory servers. SSL connections encrypt all traffic on the TCP/IP socket by using a public/private key pair.

If your environment has Identity Manager engine version 4.6 connecting to a target server that has eDirectory 9.0.2 enabled with Suite B, the existing certificates in the Identity Vault do not work when SSL is configured to use the keystore method or when **Always Accept Server Certificate** option is enabled for the driver. Suite B specifies increased strength of encryption for the certificates used for SSL connections. To increase the encryption level of certificates, include Java Cryptography Extension (JCE) Unlimited Strength Jurisdiction Policy files in the JRE path of your Identity Manager installation and then create new Elliptic Curve (EC) certificates that are compatible with Suite B or use the **Always Accept Server Certificate** option for SSL communication. For example, download Java 8 JCE files from [Oracle's download page](#) and follow the instructions from the `Readme.txt` file included in the downloaded file.

The Bidirectional eDirectory driver supports mutual authentication to support secure data transfer and data integrity. You can establish mutual authentication on the Identity Manager side for the Bidirectional eDirectory driver to authenticate to the Identity Vault.

- ♦ [“Importing the Certificate into the Client's Certificate Store” on page 35](#)
- ♦ [“Configuring Mutual Authentication” on page 36](#)
- ♦ [“Security Considerations” on page 37](#)

## Importing the Certificate into the Client's Certificate Store

You need to import the trusted root certificate into a certificate store (also called a keystore) that the driver can use.

- 1 Import the trusted root certificate from the connected eDirectory server and save it to a file in `der` format.
  - 1a In iManager, log in to the connected eDirectory server with administrator rights.
  - 1b In the left pane of the **Roles and Tasks** tab, select **NetIQ Certificate Access > Server Certificates**, then select a server certificate.
    - ♦ Select an Elliptic Curve (EC) certificate if your Identity Vault and connected system have eDirectory 9.0.2.x.
    - ♦ Select a non-EC certificate if your Identity Vault and connected system have eDirectory 8.8.8.x.
  - 1c Click **Export**.
  - 1d Select **OU=Organizational CA** certificate from drop down menu for the **Certificate** option.
  - 1e Select `der` as the **Export** format, then click **Next**.
  - 1f Save the file to a local file system.
- 2 Add the `.der` file to the keystore by using the following command at the command line:

```
keytool -import -file PATH_OF_DERFile\PublicKeyCert.der -keystore
KEYSTOERPATH\NAME.keystore -storepass keystorepass
```

You are recommended to use Java 1.8 keytool or later.

- 3 When you are asked to trust this certificate, select **Yes**, then click **Enter**.
- 4 Copy the `.keystore` file to any directory on the same file system that has the Identity Vault files.
- 5 In iManager, select **Identity Manager > Identity Manager Overview**.
- 6 Search for drivers.
- 7 Click the Bidirectional eDirectory driver object, then click it again in the **Identity Manager Driver Overview** page.
- 8 In the **Keystore Path** parameter, enter the complete path to the `keystore` file.
- 9 Enable the driver's SSL parameter and adjust the other SSL parameters as needed.  
For information, see [“Driver Parameters” on page 51](#).

Continue with [“Configuring Mutual Authentication” on page 36](#).

## Configuring Mutual Authentication

Use the following procedure to configure mutual authentication between the Bidirectional eDirectory driver and the Identity Vault:

- 1 Complete [Step 1](#) through [Step 9](#) in [“Importing the Certificate into the Client’s Certificate Store” on page 35](#).
- 2 Create a user certificate that the driver can use:
  - 2a In iManager, log in to the connected eDirectory server with administrator rights.
  - 2b In the left pane of the **Roles and Tasks** tab, select **NetIQ Certificate Server > Create User Certificate > Browse > Driver Authenticate User** option, then click **Next**.
  - 2c Specify the **Nickname**, then select **Custom**, and then click **Next**.
  - 2d Click **Finish**.
- 3 Import the user `cert.pfx` file:
  - 3a In iManager, log in to the connected eDirectory server as the driver's authenticated user.
  - 3b In the left pane of the **Roles and Tasks** tab, select **NetIQ Certificate Access > User Certificates > Nickname**, then click **Export**.  
The **Nickname** must be same as the one specified in [Step 2](#).  
You are recommended to use Java 1.8 keytool or later.
  - 3c Specify the private key password for the certificate, then click **Next**.
  - 3d Save the `cert.pfx` file to a local file system.
- 4 Copy the `cert.pfx` file to any directory on the same file system that has the Identity Vault files.
- 5 Add the private key to the keystore by using the following command at the command line:

```
keytool -importkeystore -srckeystore cert.pfx -srcstoretype PKCS12 -
destkeystore mykeystore -alias AliasName
```

The **AliasName** must be the same as **Nickname** that you specified for the user certificate. Ensure that you use the same keystore file that you used for the SSL configuration in [Step 2 on page 35](#).
- 6 Adjust the driver's configuration as needed.

- 7 Change the LDAP options of the connected eDirectory server to enable mutual authentication with the Identity Vault:
  - 7a In iManager, log in to the connected eDirectory server with administrator rights.
  - 7b In the left pane of the **Roles and Tasks** tab, select **LDAP > LDAP Options > View LDAP Server**, then select the connected eDirectory server from the list of servers with which you want to enable mutual authentication
  - 7c In the **Connections** tab, specify the connection information, then click **OK**.
  - 7d Change the **Set Client Certificate** option to **Requested**, then click **OK**. Leave other settings as the defaults.
 

To communicate only with mutual authentication, set this option to **Required**.
  - 7e Click **Apply**, then click **OK**.
- 8 Start the driver.

## Security Considerations

- ♦ The Bidirectional eDirectory driver requires appropriate read/write rights in the container on which it operates. The eDirectory servers where you install the driver must hold master or read/write replicas of the objects you want synchronized between eDirectory and Identity Vault. The following permissions are required for synchronizing changes with the connected system and the Identity Vault:
  - ♦ **Rights Required on the Connected System:** For receiving events from the connected system, the driver's **Authentication DN** must have the following rights in the connected system (eDirectory):
    - ♦ **Entry Rights:** Browse permission.
    - ♦ **Attributes Rights:** Read permission.

For synchronizing the NDS password, ensure that the driver's **Authentication DN** has Read and Write permissions on the ACLs of the objects.

For synchronizing changes to the connected system, ensure that the driver's **Authentication DN** has the following rights in the connected system (eDirectory).

    - ♦ **Entry Rights:** The rights to create entries in the connected system. Supervisor rights on the objects for synchronizing NDS passwords.
    - ♦ **Attributes Rights:** The rights to modify the attributes in the connected system.

For modifying the write-managed attributes, the driver's **Authentication DN** must have the management rights on the objects whose DN is being modified.
  - ♦ **Rights Required on the Identity Vault:** To synchronize changes to the Identity Vault, ensure that the driver's **Security Equals DN** has the following rights in the Identity Vault:
    - ♦ **Entry Rights:** The rights to create entries in the Identity Vault.
    - ♦ **Attributes Rights:** The rights to modify the attributes in the Identity Vault.

For modifying the write-managed attributes, the driver's **Security Equals DN** must have management rights on the objects whose DN is being modified.

For receiving events from the Identity Vault, the driver's **Security Equals DN** must have the following rights in the Identity Vault.

    - ♦ **Entry Rights:** Browse permission.
    - ♦ **Attributes Rights:** Read permission.

- ♦ The Change-Log file contains information about events on the connected eDirectory servers and passwords. It is encrypted, but it should be protected against access by unauthorized users. The Change-Log file is located in the DIB directory of eDirectory. The name of the Change-Log file is based on the GUID of the driver and has a `.TAO` extension. The Change-Log file can only be accessed by the owner of the eDirectory instance.
- ♦ Sensitive data like passwords and encrypted attributes is encrypted before writing it to the Change-Log cache file.

# 7 Synchronizing Passwords

The following list contains information that is specific to setting up password synchronization with the Bidirectional eDirectory driver. Use it to supplement the information in the [NetIQ Identity Manager Password Management Guide](#).

The Distribution Password is the default method used to synchronize passwords to and from the Identity Vault with the Bidirectional eDirectory Driver. The Bidirectional eDirectory driver's default configuration policies and filters are set up to support the password synchronization using the Distribution Password. A Universal Password policy must be assigned to the user in the Identity Vault and connected tree. Ensure the **Synchronize Distribution Password when setting Universal Password** option is checked, for password synchronization to occur using the Distribution Password.

To synchronize the NDS password between the Identity Vault and the connected eDirectory by using the Bidirectional eDirectory driver, in the [Driver Configuration](#) section, set the **Password Sync Type** to NDS password.

Password transfer over a clear-text connection is disabled by default. Password transfer is allowed over a secure connection only. The default behavior for transferring passwords can be changed by setting the **Allow password on clear-text connection** driver configuration parameter to **True**. However, this is not a recommended configuration.

To synchronize eDirectory Read-only filtered replica in the connected tree through the Publisher Channel, ensure that the following attributes are enabled on the eDirectory Read-Only filter replica for the user object:

- ◆ CN
- ◆ Surname
- ◆ nspmDistributionPassword
- ◆ nspmPasswordKey

---

**NOTE:** eDirectory Filtered Read-only replica is not the same as Driver Filter on a BiDirectional eDirectory Driver.

---





# 8 Managing the Driver

As you work with the Bidirectional eDirectory driver, there are several management tasks you might need to perform, including the following:

- ◆ Starting, stopping, and restarting the driver
- ◆ Viewing driver version information
- ◆ Using Named Passwords to securely store passwords associated with the driver
- ◆ Monitoring the driver's health status
- ◆ Backing up the driver
- ◆ Inspecting the driver's cache files
- ◆ Viewing the driver's statistics
- ◆ Using the DirXML Command Line utility to perform management tasks through scripts
- ◆ Securing the driver and its information
- ◆ Synchronizing objects
- ◆ Migrating and resynchronizing data
- ◆ Activating the driver

Because these tasks, as well as several others, are common to all Identity Manager drivers, they are included in one reference, the [NetIQ Identity Manager Driver Administration Guide](#).



# 9 Troubleshooting

This section provides information about troubleshooting problems you might encounter with the Bidirectional eDirectory driver:

- ♦ [“Troubleshooting Driver Processes” on page 43](#)

## Troubleshooting Driver Processes

Viewing driver processes is necessary to analyze unexpected behavior. To view the driver processing events, use DSTrace. You should only use it during testing and troubleshooting the driver. Running DSTrace while the drivers are in production increases the utilization on the Identity Manager server and can cause events to process very slowly. For more information, see [“Viewing Identity Manager Processes”](#) in the *NetIQ Identity Manager Driver Administration Guide*.

For more information about generating trace levels, see [Change-log Trace Level](#).

The following articles provide more information about the Identity Manager trace:

- ♦ [Capturing and Reading NetIQ Identity Manager Traces \(http://www.novell.com/communities/node/5681/capturing-and-reading-novell-identity-manager-traces\)](http://www.novell.com/communities/node/5681/capturing-and-reading-novell-identity-manager-traces)
- ♦ [Comprehending NetIQ Identity Manager Traces - Part 1 \(http://www.novell.com/communities/node/9677/comprehending-idm-traces-part-1\)](http://www.novell.com/communities/node/9677/comprehending-idm-traces-part-1)
- ♦ [Comprehending NetIQ Identity Manager Traces - Part 2 \(http://www.novell.com/communities/node/11166/comprehending-idm-traces-part-2\)](http://www.novell.com/communities/node/11166/comprehending-idm-traces-part-2)



# 10 Known Issues

The following known issues exist for this version of the driver:

- ♦ “Object class violation when creating a user with templates” on page 45
- ♦ “Trace displays unable to load dxldap extension module error message” on page 45
- ♦ “The structured attributes are not properly converted” on page 45
- ♦ “Users Are Not Correctly Synchronized” on page 46
- ♦ “NDS Password does not synchronize on the Subscriber Channel with Read-Only, Filter Read-Only, and Filter Read/Write replicas” on page 46
- ♦ “Importing the Driver Causes Change of Driver Icon” on page 46
- ♦ “Account Tracking GCV is not upgraded with Designer AU2” on page 46
- ♦ “Connected eDirectory Does not Shutdown on a Windows Computer” on page 46
- ♦ “Loopback Detection of Delete and Password Modification Events” on page 46

## Object class violation when creating a user with templates

The driver fails to create a user with the following error:

```
LDAPException: Object Class Violation (65) Object Class Violation
```

To work around the issue, examine the template object used in eDirectory and remove the `setPasswordAfterCreate` attribute from the object.

## Trace displays unable to load dxldap extension module error message

Sometimes NDSttrace displays the following error message when you refresh the LDAP server object or restart eDirectory on a computer that has Change-Log installed and had Identity Manager installed on it earlier:

```
Unable to load extension module dxldap, err = -5984 (0xffffffffffffe8a0)
```

When the LDAP server tries to load the `dxldap` handlers that were registered earlier with Identity Manager installation, it doesn't find them because `dxldap` module which has those handlers no longer exists on the computer.

It is safe to ignore this error.

## The structured attributes are not properly converted

The driver does not support the syntax of ACL, Octet List, and SYN\_HOLD attributes.

## Users Are Not Correctly Synchronized

If you add a user on the connected eDirectory system by using the same **Authentication ID** that was specified in the driver configuration, the newly created user might be synchronized with Identity manager without password.

If the loopback detection is enabled, Change-Log fails to pick any changes when you create or modify an object with the same credentials as used in **Authentication ID**. **Authentication ID** should be a unique ID in the connected eDirectory that is not used by any users for object creation, modification, or deletion.

## NDS Password does not synchronize on the Subscriber Channel with Read-Only, Filter Read-Only, and Filter Read/Write replicas

The driver fails to synchronize NDS passwords on the Subscriber Channel because changes cannot be written to the replicas enabled with Read-Only, Filter Read-Only, or Filter Read/Write setting. If **Prefer Chaining** setting is enabled on the replica server, though users are synchronized on the Subscriber channel over the LDAP protocol, the NDS passwords are not synchronized.

## Importing the Driver Causes Change of Driver Icon

When you import the driver into Designer, the driver icon changes to the legacy eDirectory driver icon.

## Account Tracking GCV is not upgraded with Designer AU2

To work around this issue, add LDAP DN to the existing set of Account Tracking GCV identifiers.

## Connected eDirectory Does not Shutdown on a Windows Computer

After establishing connection with the Identity Vault, the connected system (eDirectory) does not shut down on Windows.

To shut down eDirectory, stop the driver before stopping eDirectory.

## Loopback Detection of Delete and Password Modification Events

Although loopback detection is enabled on the Publisher channel of a driver, the following types of events are looped back on the channel:

- ◆ Password modification
- ◆ Delete

---

**NOTE:** This issue is not reported on add or modify events.

---

This causes an additional event in the Publisher channel. However, the engine ignores the additional event and there is no functionality loss.





# A Driver Properties


This section provides information about the Driver Configuration, Global Configuration Values properties, and Trace Levels for the Bidirectional eDirectory driver. These are the only unique properties for the Bidirectional eDirectory driver. All other driver properties (Named Password, Engine Control Values, Log Level, and so forth) are common to all drivers. Refer to “[Driver Properties](#)” in the *NetIQ Identity Manager Driver Administration Guide* for information about the common properties.

The information is presented from the viewpoint of iManager. If a field is different in Designer for Identity Manager, it is marked with a Designer icon.

- ♦ “[Driver Configuration](#)” on page 49
- ♦ “[Global Configuration Values](#)” on page 53
- ♦ “[Trace Levels](#)” on page 59

## Driver Configuration

In iManager:

- 1 Click  to display the Identity Manager Administration page.
- 2 Open the driver set that contains the driver whose properties you want to edit:
  - 2a In the **Administration** list, click **Identity Manager Overview**.
  - 2b If the driver set is not listed on the **Driver Sets** tab, use the **Search In** field to search for and display the driver set.
  - 2c Click the driver set to open the Driver Set Overview page.
- 3 Locate the driver icon, then click the upper right corner of the driver icon to display the **Actions** menu.
- 4 Click **Edit Properties** to display the driver’s properties page.

In Designer:

- 1 Open a project in the Modeler, then right-click the driver line and click **Properties > Driver Configuration**.

The Driver Configuration options are divided into the following sections:

- ♦ “[Driver Module](#)” on page 50
- ♦ “[Driver Object Password](#)” on page 50
- ♦ “[Authentication](#)” on page 50
- ♦ “[Startup Option](#)” on page 50
- ♦ “[Driver Parameters](#)” on page 51
- ♦ “[ECMAScript](#)” on page 53
- ♦ “[Global Configurations](#)” on page 53

## Driver Module

The driver module changes the driver from running locally to running remotely or the reverse.

**Java:** Used to specify the name of the Java class that is instantiated for the shim component of the driver. This class can be located in the `classes` directory as a class file, or in the `lib` directory as a `.jar` file. If this option is selected, the driver is running locally. By default, the Java class name is `com.novell.nds.dirxml.driver.edir.EDIRDriverShim`. The class path is case-sensitive.

**Native:** This option is not used with the Bidirectional eDirectory driver.

**Connect to Remote Loader:** The Remote Loader is not used with the Bidirectional eDirectory driver.

## Driver Object Password

This option is not used with the Bidirectional eDirectory driver.

## Authentication

The Authentication section stores the information required to authenticate to the connected system. For the Bidirectional eDirectory driver, it stores the information required to authenticate to the eDirectory server that the driver is associated with.

**Authentication ID:** Specify the DN of the LDAP account that the driver will use to authenticate to connected eDirectory. For information, see [Chapter 6, “Configuring SSL Connections,” on page 35](#).

**Connection Context:** Specify the hostname or IP address of the eDirectory server as well as the decimal port number (for example, 187.168.1.1:389).

Port 389 uses the TLS protocol for a clear text connection, and port 636 uses the SSL protocol. For more information, see [Chapter 6, “Configuring SSL Connections,” on page 35](#).

**Remote Loader Connection Parameters:** The Bidirectional eDirectory driver does not support the use of the Remote Loader for a local driver. These options do not apply.

**Driver Cache Limit (KB):** Specify the maximum event cache file size (in KB). If the value is set to zero, the file size is unlimited. Click **Unlimited** to set the file size to unlimited in Designer.

**Application Password:** Specify the password for the user object listed in the **Authentication ID** option.

For more information, see [Chapter 6, “Configuring SSL Connections,” on page 35](#).

**Remote Loader Password:** This option is not used with the Bidirectional eDirectory driver.

## Startup Option

The Startup Option section enables you to set the driver state when the Identity Manager server is started.

**Auto start:** The driver starts every time the Identity Manager server is started.

**Manual:** The driver does not start when the Identity Manager server is started. The driver must be started through Designer or iManager.

**Disabled:** The driver has a cache file that stores all of the events. When the driver is set to **Disabled**, this file is deleted and no new events are stored in the file until the driver state is changed to **Manual** or **Auto Start**.

If the driver is **Disabled** and then changed to **Auto start** or **Manual**, you can select the **Do Not Automatically Synchronize the Driver** check box. This prevents the driver from synchronizing objects automatically when it loads. To synchronize objects manually, use the **Synchronize** button on the Driver Overview page.

## Driver Parameters

The Driver Parameters section lets you configure the driver-specific parameters. When you change driver parameters, you tune driver behavior to align with your network environment.

The parameters are divided into the following categories:

- ◆ “[Driver Settings](#)” on page 51
- ◆ “[Subscriber Settings](#)” on page 52
- ◆ “[Publisher Settings](#)” on page 52

## Driver Settings

**Use SSL:** Select **Yes** to use SSL to secure communication between the Bidirectional eDirectory driver and the eDirectory server. If you use SSL, fill in the following parameters:

- ◆ **Always Accept Server Certificate:** Select **Yes** if you want the driver to accept the LDAP server's certificate for establishing SSL connection with the eDirectory server. To use the keystore, select this option to **No**. For more information on setting up SSL connections, see [Chapter 6, “Configuring SSL Connections,”](#) on page 35.
- ◆ **Keystore Path for SSL Certificates:** Specify the full path to the keystore file containing the SSL certificates.
- ◆ **Use Mutual Authentication:** Select **Yes** if you want the driver to use SSL mutual authentication (both client and server), or select **No** for server authentication only. If you select **Yes**, you must have the appropriate certificates configured in your keystore.
- ◆ **Key Alias:** Specify the alias of the key.
- ◆ **Keystore Password:** Specify the password for accessing the keystore file containing the SSL certificates.
- ◆ **Reenter Keystore Password:** Specify the password again.
- ◆ **Remove Existing Password:** Enable this option if you do not want to specify the keystore password. If you select this option, the **Keystore Password** option is automatically disabled.

**Password Sync Type:** Specifies which password sync type to use. By default, this option is set to **Sync UP password**. To sync NDS password, select **Sync NDS password** option and enable the public/private key pair in the driver filter for both Publisher and Subscriber channels.

**User Container:** Specifies the container where the users are added if they don't already exist in the Identity Vault. This value becomes the default value for all drivers in the driver set. It is in slash format, such as `netiq/users`, where `ou=users`, `o=netiq`.

## Subscriber Settings

**Show Default Configuration:** This option applies to the connected eDirectory server. Select **Show** to display the following option:

- ♦ **eDirectory Port Number:** Specify the port number of the connected eDirectory server. This port number is used for creating home directories. The default value is 524. For more information, see [“Creating Home Directories” on page 62](#).

## Publisher Settings

**Show Default Configuration:** This option applies to the connected eDirectory server. Select **Show** to display the following options:

- ♦ **eDirectory Base Container:** Specifies the connected eDirectory container in LDAP format where objects are synchronized. If you are using a flat Placement rule, this is the container where the objects are placed. If you are using a mirrored Placement rule, this is the base container. For example, `ou=people,o=com`.
- ♦ **Polling Interval in Seconds:** Specifies the number of seconds that the Publisher channel waits after running the polling script and sending eDirectory events from Change-Log to the Metadirectory engine.
- ♦ **Heartbeat Interval in Minutes:** Specifies how often, in minutes, the driver shim contacts the Metadirectory engine when there has not been any traffic during the interval time. Specify 0 to disable the heartbeat.
- ♦ **Keep Alive Interval in Minutes:** Specifies how often, in minutes, the driver shim re-initializes an idle Change-Log connection in order to keep the connection alive between the bidirectional eDirectory shim and Change-Log. The default value is 30 minutes. The minimum duration is 1 minute. Setting the interval as 0 or lesser will disable this option.

---

**NOTE:** After the set interval duration, the shim will re-initialize the connection and re-register with Change-Log. Lesser interval results in more re-initialization and re-registration activity and consequently additional cpu cycles.

---

- ♦ **Allow Loop-back Detection:** When this option is set to **True**, the driver avoids event loopback. However, the passwords still loopback into the Publisher channel since passwords are always modified by the server object. When the option is set to **False**, the Subscriber channel events might loop into the Publisher channel.

The default behavior of the Publisher channel is to avoid sending changes that the Subscriber channel makes. The Publisher channel detects Subscriber channel changes by looking at the `creatorsName` or `modifiersName` attribute to see whether the authenticated entry that made the change is the same entry that the driver uses to authenticate to the eDirectory server. If the entry is the same, the Publisher channel assumes that this change was made by the driver's Subscriber channel and does not synchronize the change.

**Show Change-log Plug-in Configuration:** This setting applies to the configuration of the Change-Log plug-in. Select **Show** to display the following options:

- ♦ **Maximum Days without Reconnect:** Specify the number of days after which driver change cache and registration information is deleted if the driver does not connect. The default value is 30.
- ♦ **Ignore Processing Errors:** Specify if Change-Log should ignore any error codes that it receives during `SendChangesResponse` operation. If the value is set to true, the errors are ignored and the next event is processed. By default, the value is set to false, which means the same event might be resent.

- ♦ **Allow Password on Clear-text Connection:** By default, the value is false, which means that the password is sent over a secure channel. You can change the value to true to send the password in clear text, but this is not a recommended setting.
- ♦ **Change-log Trace Level :** Specify the Change-Log trace level. There are three trace levels: ERROR, INFO, and DEBUG. Detailed messages are logged if you select INFO. DEBUG logs debugging data along with detailed messages. The default trace level is ERROR.  
To view the Change-Log trace on the remote eDirectory server, enable the DVRS and DXML flags of the DSTrace utility.
- ♦ **Change-log Preferred Maximum Batch-size:** Specify the maximum number of events that Change-Log sends in a batch between a range of 1 to 500.

## ECMAScript

The ECMAScript section enables you to add ECMAScript resource files. The resources extend the driver's functionality when Identity Manager starts the driver.


## Global Configurations

The Global Configurations section displays an ordered list of Global Configuration objects. The objects contain extension GCV definitions for the driver that Identity Manager loads when the driver is started. You can add or remove the Global Configuration objects, and you can change the order in which the objects are executed.

## Global Configuration Values


Global configuration values (GCVs) are values that can be used by the driver to control functionality. GCVs are defined on the driver or on the driver set. Driver set GCVs can be used by all drivers in the driver set. Driver GCVs can be used only by the driver on which they are defined.

The Bidirectional eDirectory driver includes several GCVs that are created from information supplied during importing the driver configuration file (see [Chapter 4, "Creating a New Driver Object," on page 23](#)) and one that is not.

The driver also includes the GCVs that are used with password synchronization. In Designer, you must click the  icon next to a password synchronization GCV to edit it. This displays the Password Synchronization Options dialog box that has a better view of the relationship between the different settings. In iManager, navigate to **Driver Properties > Global Configuration Values** and edit the password synchronization settings in your password synchronization policy tab.

You can add your own GCVs if you discover you need additional ones as you implement policies in the driver.

To access the driver's GCVs in iManager:


- 1 Click  to display the Identity Manager Administration page.
- 2 Open the driver set that contains the driver whose properties you want to edit:
  - 2a In the **Administration** list, click **Identity Manager Overview**.
  - 2b If the driver set is not listed on the **Driver Sets** tab, use the **Search In** field to search for and display the driver set.
  - 2c Click the driver set to open the Driver Set Overview page.

- 3 Locate the driver icon, click the upper right corner of the driver icon to display the **Actions** menu, then click **Edit Properties**.

or

To add a GCV to the driver set, click **Driver Set**, then click **Edit Driver Set properties**.

To access the driver's GCVs in Designer:

- 1 Open a project in the Modeler.
- 2 Right-click the driver icon  or line, then select **Properties > Global Configuration Values**.

or

To add a GCV to the driver set, right-click the driver set icon , then click **Properties > GCVs**.

The Global Configuration Values are divided into following categories:

- ♦ [“eDirectory Base Container” on page 54](#)
- ♦ [“Default Configuration” on page 54](#)
- ♦ [“Password Synchronization” on page 55](#)
- ♦ [“Account Tracking” on page 55](#)
- ♦ [“Entitlements” on page 56](#)
- ♦ [“Managed System Information” on page 58](#)

## eDirectory Base Container

The eDirectory Base Container specifies the connected eDirectory container in LDAP format where objects are synchronized. If you are using a Flat Placement rule, this is the container where the objects are placed. If you are using a Mirrored Placement rule, this is the base container. For example, `ou=people,o=com`.

## Default Configuration

The following GCVs define control the default configuration of the Bidirectional eDirectory driver:

**Subscriber Channel Placement type:** Controls how the objects are placed in the base container of the connected eDirectory server. The options are:

- ♦ **Mirrored:** Mirrors the structure between the Identity Vault and the connected eDirectory server. It places objects hierarchically within the base container.

This option in the driver configuration synchronizes User, Group, Organization, Country, and Organizational Unit objects.

- ♦ **Flat:** All of the objects are placed within the base container.

This option synchronizes User, Group, Organization, and Organizational Unit objects.

**Publisher Channel Placement Type:** Controls how the objects are placed in the Identity Vault. The options are:


- ♦ **Mirrored:** Mirrors the structure between the Identity Vault and the connected eDirectory server. It places objects hierarchically within the base container.

This option in the driver configuration synchronizes User, Group, Organization, Country, and Organizational Unit objects.

- ♦ **Flat:** All of the objects are placed within the base container.  
This option synchronizes User, Group, Organization, and Organizational Unit objects.

## Password Synchronization

The following GCVs control password synchronization for the Bidirectional eDirectory driver. For more information, see the [NetIQ Identity Manager Password Management Guide](#).

In Designer, you must click the  icon next to a GCV to edit it. This displays the Password Synchronization Options dialog box for a better view of the relationship between the different GCVs.

In iManager, to edit the Password management options go to **Driver Properties > Global Configuration Values**, and then edit it in your Password synchronization policy tab.

**Connected System Name or Driver Name:** Specify the name of the driver. The e-mail notification template uses this value to identify the source of the notification message.

**Application accepts passwords from Identity Manager:** If this option is set to **True**, it allows passwords to flow from the Identity Manager data store to the connected eDirectory server.

**Identity Manager accepts passwords from application:** If this option is set to **True**, it allows passwords to flow from the connected system to Identity Manager.

**Publish passwords to NDS password:** Use the password from the connected system to set the non-reversible NDS password in eDirectory.

**Publish passwords to Distribution Password:** Use the password from the connected system to set the NMAS Distribution Password used for Identity Manager password synchronization.

**Require password policy validation before publishing passwords:** If this option is set to **True**, it applies NMAS password policies during publish password operations. The password is not written to the data store if it does not comply.

**Reset user's external system password to the Identity Manager password on failure:** If this option is set to **True**, and the Distribution Password fails to distribute, attempt to reset the password in the connected system by using the Distribution Password from the Identity Manager data store.

**Notify the user of password synchronization failure via e-mail:** If this option is set to **True**, notify the user by e-mail of any password synchronization failures.

## Account Tracking

Account tracking is part of the Identity Reporting Module. For more information, see the [Administrator Guide to NetIQ Identity Reporting](#).

**Enable account tracking:** Set this to **True** to enable account tracking policies. Set it to **False** if you do not want to execute account tracking policies.

**Realm:** Specify the name of the realm, security domain, or namespace in which the account name is unique.

**Object Class:** Add the object class to track. Class names must be in the application namespace.

**Identifiers:** Add the account identifier attributes. Attribute names must be in the application namespace.

**Status attribute:** Name of the attribute in the application namespace to represent the account status.

**Status active value:** Value of the status attribute that represents an active state.

**Status inactive value:** Value of the status attribute that represents an inactive state.

**Subscription default status:** Select the default status the policies assume when an object is subscribed to the application and the status attribute is not set in the Identity Vault.

**Publication default status:** Select the default status the policies assume when an object is published to the Identity Vault and the status attribute is not set in the application.

## Entitlements

There are multiple sections in the **Entitlements** tab. Depending on which packages you installed, different options are enabled or displayed.

- ◆ [“Entitlements” on page 56](#)
- ◆ [“Data Collection” on page 56](#)
- ◆ [“Role Mapping” on page 57](#)
- ◆ [“Resource Mapping” on page 57](#)
- ◆ [“Parameter Format” on page 57](#)
- ◆ [“Entitlement Extensions” on page 57](#)

## Entitlements

For more information about entitlements, see [“Entitlements” on page 14](#).

**Use Entitlements to control eDirectory Accounts:** Select **True** to enable the driver to manage user accounts based on the driver’s defined entitlements. Select **False** to disable management of user accounts based on the entitlements.

**Enable Login Disabled attribute sync:** Select **True** if the changes made to the LoginDisabled attribute in the Identity Vault should be synced even if the User Account entitlement (Account) is enabled.

**Account action on Entitlement Revoke:** Select the action to take when a user account entitlement is revoked. The options are **Disable User**, **Do Nothing**, or **Delete User**. By default, **Disable User** is selected.

**Use Group Entitlement:** Select **True** to enable the driver to manage user groups based on the driver’s defined entitlements.

Select **False** to disable management of group membership based on the entitlements.

**Advanced Settings:** Select show to display the entitlement options that allow or deny additional functionality like data collection and others. These settings should rarely be changed.

## Data Collection

Data collection enables the Identity Report Module to gather information to generate reports. For more information, see the [Administrator Guide to NetIQ Identity Reporting](#).

**Enable data collection:** Select **Yes** to enable data collection for the driver through the Data Collection Service by the Managed System Gateway driver. If you are not going to run reports on data collected by this driver, select **No**.



**Allow data collection from user accounts:** Select **Yes** to allow data collection by the Data Collection Service through the Managed System Gateway driver for the user accounts.

**Allow data collection from groups:** Select **Yes** to allow data collection by the Data Collection Service through the Managed System Gateway driver for groups.

## Role Mapping

Catalog Administrator allows you to map business roles with IT roles.

**Enable role mapping:** Select **Yes** to make this driver visible to the Catalog Administrator.

**Allow mapping of user accounts:** Select **Yes** if you want to allow mapping of user accounts in the Catalog Administrator. An account is required before a role, profile, or license can be granted through Catalog Administrator.

**Allow mapping of groups:** Select **Yes** if you want to allow mapping of groups in the Catalog Administrator.

## Resource Mapping

The Roles Based Provisioning Module allows you to map resources to users. For more information, see the [NetIQ Identity Manager - User's Guide to the Identity Applications](#).

**Enables resource mapping:** Select **Yes** to make this driver visible to the Roles Based Provisioning Module.

**Allow mapping of user accounts:** Select **Yes** if you want to allow mapping of user accounts in the Roles Based Provisioning Module. An account is required before a role, profile, or license can be granted.

**Allow mapping of groups:** Select **Yes** if you want to allow mapping of groups in the Roles Based Provisioning Module.

## Parameter Format

**Format for Account entitlement:** Select the parameter format the entitlement agent must use. The options are **Identity Manager 4** or **Legacy**.

**Format for Group entitlement:** Select the parameter format the entitlement agent must use. The options are **Identity Manager 4** or **Legacy**.

## Entitlement Extensions

**User account extensions:** The content of this field is added below the entitlement elements in the EntitlementConfiguration resource object.

**Group extensions:** The content of this field is added below the entitlement element in the EntitlementConfiguration resource object.

**Exchange mailbox extensions:** The content of this field is added below the entitlement element in the EntitlementConfiguration resource object.

# Managed System Information

These settings help the Identity Reporting Module function to generate reports. There are different sections in the **Managed System Information** tab.

- ◆ [“General Information” on page 58](#)
- ◆ [“System Ownership” on page 58](#)
- ◆ [“System Classification” on page 58](#)
- ◆ [“Connection and Miscellaneous Information” on page 59](#)

## General Information

**Name:** Specify a descriptive name for this connected eDirectory system. This name is displayed in the reports.

**Description:** Specify a brief description of this connected eDirectory system. This description is displayed in the reports.

**Location:** Specify the physical location of this connected eDirectory system. This location is displayed in the reports.

**Vendor:** Select NetIQ as the vendor of the connected eDirectory system. This information is displayed in the reports.

**Version:** Specify the version of this connected eDirectory system. This version information is displayed in the reports.

## System Ownership

**Business Owner:** Browse to and select the business owner in the Identity Vault for this connected eDirectory system. You must select a user object, not a role, group, or container.

**Application Owner:** Browse to and select the application owner in the Identity Vault for this connected eDirectory system. You must select a user object, not a role, group, or container.

## System Classification

**Classification:** Select the classification of the connected eDirectory system. This information is displayed in the reports. The options are:

- ◆ Mission-Critical
- ◆ Vital
- ◆ Not-Critical
- ◆ Other

If you select **Other**, you must specify a custom classification for the connected eDirectory system.

**Environment:** Select the type of environment the connected eDirectory system provides. The options are:

- ◆ Development
- ◆ Test
- ◆ Staging

- ◆ Production
- ◆ Other

If you select **Other**, you must specify a custom classification for the connected eDirectory system.

## Connection and Miscellaneous Information

**Connection and miscellaneous information:** This options is always set to **hide**, so that you don't make changes to these options. These options are system options that are necessary for reporting to work. If you make any changes, reporting stops working.

## Trace Levels

The driver supports the following trace levels:

*Table A-1 Supported Trace Levels*

Level	Description
0	No Trace Messages
1-2	Basic Trace Messages such as driver start/stop, documents sent/received are displayed
3-12	Previous level plus some additional information message
13	Previous level plus in depth details of messages received in publisher



# B Synchronized Attributes

By default, the filter for the basic driver configuration supports the following attributes. You can customize the filter to extend support for additional attributes.

- ♦ [“Default Attributes” on page 61](#)
- ♦ [“Creating Home Directories” on page 62](#)

## Default Attributes

---

assistant	homeState	Postal Code
assistantPhone	homeZipCode	Postal Office Box
businessCategory	Initials	instantMessagingID
C	instantMessagingID	preferredDeliveryMethod
city	Internet EMail Address	preferredName
CN	jackNumber	registeredAddress
co	jobCode	roomNumber
company	L	S
costCenter	Language	SA
costCenterDescription	Login Disabled	Security Equals
children	Mailbox ID	See Also
departmentNumber	Mailbox Location	siteLocation
Description	mailstop	spouse
directReports	manager	Surname
EMail Address	managerWorkforceID	Telephone Number
employeeStatus	Member	teletexTerminalIdentifier
employeeType	mobile	telexNumber
Equivalent To Me	NSCP:employeeNumber	Timezone
Facsimile Telephone Number	nspmDistributionPassword	Title
Full Name	O	tollFreePhoneNumber
Generational Qualifier	otherPhoneNumber	UID
Given Name	OU	uniqueID
Group Membership	pager	userCertificate
homeCity	personalMobile	vehicleInformation

---

homeEmailAddress	personalTitle	
homeFax	Postal Address	
homePhone	photo	workforceID
homePostalAddress	Physical Delivery Office Name	User

## Creating Home Directories

You can use the user template to create home directories in the destination eDirectory. In the policy, set the value for the **Set Operation Template DN (do-set-op-template-dn)** as the DN of the template that is used to create the home directory.

### *Example B-1 Example*

```

<actions>
  <do-set-op-template-dn>
    <arg-dn>
      <token-text xml:space="preserve">Data\Users\UserCreationTemplate</token-
text>
    </arg-dn>
  </do-set-op-template-dn>
</actions>

```