

Implementation Guide

Novell® Identity Manager Driver for Mainframes: CA* Top Secret*

3.6.1

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About This Guide

This guide describes implementation of the Novell® Identity Manager 3.6.1 driver for CA Top Secret on mainframes (z/OS* operating system).

The driver synchronizes data from a connected mainframe system using CA Top Secret Security with Novell Identity Manager 3.6, the comprehensive identity management suite that allows organizations to manage the full user life cycle, from initial hire, through ongoing changes, to ultimate retirement of the user relationship.

This guide includes the following sections:

- ♦ Chapter 1, “Overview,” on page 11
- ♦ Chapter 2, “Planning for the Top Secret Driver,” on page 19
- ♦ Chapter 3, “Installing the Top Secret Driver,” on page 23
- ♦ Chapter 4, “Upgrading from the Fan-Out Driver,” on page 39
- ♦ Chapter 5, “Configuring the Top Secret Driver,” on page 43
- ♦ Chapter 6, “Customizing the Top Secret Driver,” on page 55
- ♦ Chapter 7, “Using the Top Secret Driver,” on page 67
- ♦ Chapter 8, “Securing the Top Secret Driver,” on page 69
- ♦ Appendix A, “Troubleshooting,” on page 73
- ♦ Appendix B, “System and Error Messages,” on page 81
- ♦ Appendix C, “Technical Details,” on page 103

Audience

This guide is for system administrators and others who plan, install, configure, and use the Top Secret driver for Identity Manager. It assumes that you are familiar with Identity Manager, Novell eDirectory™, and the administration of systems and platforms you connect to Identity Manager.

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Documentation Updates

For the most recent version of this guide, visit the [Identity Manager 3.6.1 Drivers Documentation Web site \(http://www.novell.com/documentation/idm36drivers\)](http://www.novell.com/documentation/idm36drivers).

Additional Documentation

For additional documentation about Identity Manager drivers, see the [Identity Manager 3.6.1 Drivers Documentation Web site \(http://www.novell.com/documentation/idm36drivers\)](http://www.novell.com/documentation/idm36drivers).

For additional documentation about Identity Manager, see the [Identity Manager 3.6.1 Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36).

For documentation about other related Novell products, such as eDirectory and iManager, see [the Novell Documentation Web site's product index \(http://www.novell.com/documentation\)](http://www.novell.com/documentation).

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

Overview

1

The Novell® Identity Manager 3.6.1 driver for CA Top Secret synchronizes data between the Identity Vault and a connected system running Top Secret Security for z/OS. The driver runs on the target z/OS system. The Identity Vault runs on any Identity Manager supported platform and communicates with the driver on the target z/OS system over a secure network link.

The driver uses embedded Remote Loader technology to communicate with the Identity Vault, bidirectionally synchronizing changes between the Identity Vault and the connected system. The embedded Remote Loader component, also called the driver shim, runs as a started task on the connected z/OS system. There is no requirement to install Java* on the connected system.

The Subscriber shim commits changes to the security system using customizable REXX execs that issue native TSO commands.

The Publisher shim uses standard security system exit routines to capture events of interest and submits them to the Metadirectory engine.

The driver uses a scriptable framework, designed so that you can easily add support for existing and future applications.

The Identity Manager 3.6.1 driver for Top Secret combines the flexibility of the Fan-Out driver and the bidirectional support and Identity Manager policy options available from traditional Identity Manager drivers. Key features of the driver include:

- ♦ Bidirectional synchronization of data without requiring Java or a separate Remote Loader
- ♦ Customizable schema to integrate all aspects of account administration
- ♦ Customizable REXX execs to handle all data to be synchronized
- ♦ No LDAP or Fan-Out core driver configuration
- ♦ Configuration on the z/OS system using traditional sequential files
- ♦ Driver shim implemented as a traditional z/OS started task
- ♦ Operator command control for starting and stopping the driver shim, configuring Remote Loader options, and displaying status information

Changes and enhancements in this release include:

- ♦ Support for OpenSSL version 0.9.8h
- ♦ Improved error-handling for service routine failures

The following sections present a basic overview of the driver:

- ♦ [Section 1.1, “Driver Architecture,” on page 11](#)
- ♦ [Section 1.2, “Configuration Overview,” on page 15](#)

1.1 Driver Architecture

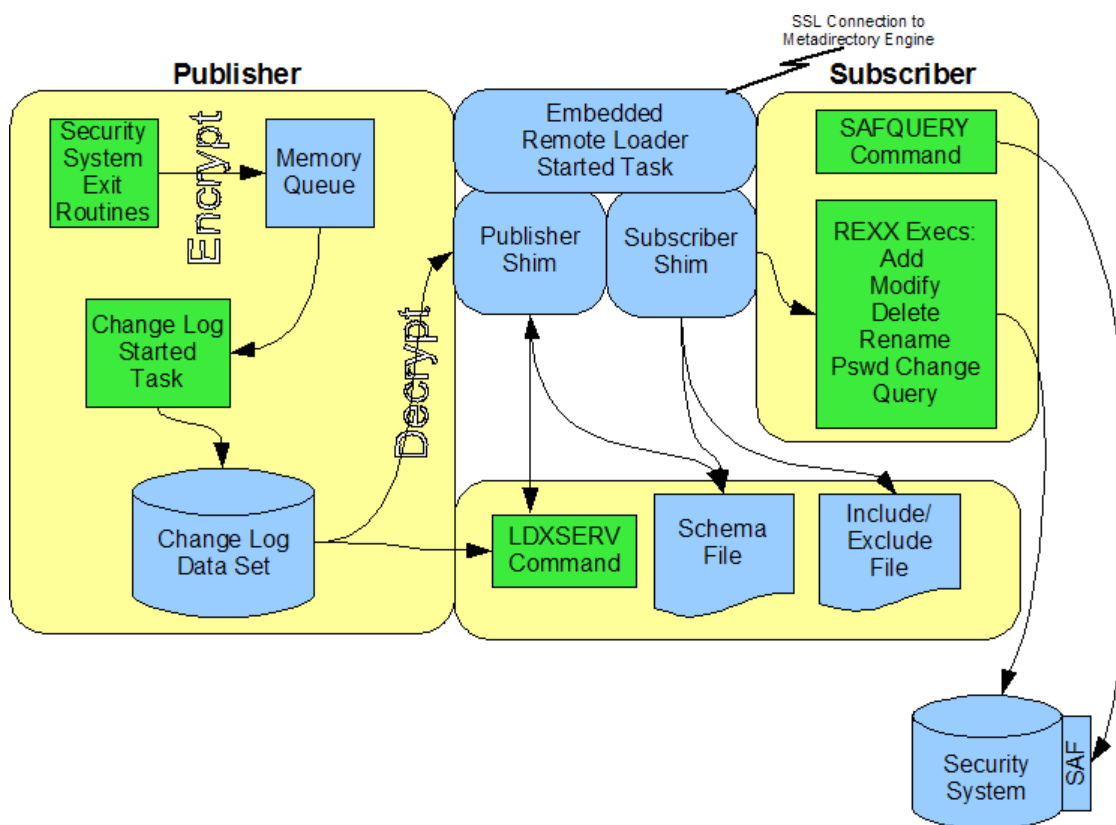
The driver synchronizes information between the Identity Vault and the security system on the connected z/OS system.

The Identity Manager detects relevant changes to identities in the Identity Vault and notifies the Subscriber component of the driver. After customizable policy processing, events are sent to the Subscriber channel of the driver shim started task on the connected system. The Subscriber shim securely passes the information to customizable REXX execs that perform the required actions.

Standard security system exit routines capture password and other changes and place them on a memory queue. The change log started task moves events from the memory queue to the change log data set, where they are stored for processing. At configurable intervals, the Publisher shim polls the change log for events and submits them to the Metadirectory engine. The Metadirectory engine processes these events using customizable policies, and posts relevant changes to the Identity Vault.

The following illustration shows an overview of the architecture.

Figure 1-1 Top Secret Driver Architecture



The following topics describe the driver architecture in more detail:

- ♦ [Section 1.1.1, “Publisher Channel,” on page 13](#)
- ♦ [Section 1.1.2, “Subscriber Channel,” on page 14](#)
- ♦ [Section 1.1.3, “Driver Shim Started Task,” on page 14](#)
- ♦ [Section 1.1.4, “LDXSERV Command,” on page 14](#)
- ♦ [Section 1.1.5, “Scriptable Framework,” on page 14](#)
- ♦ [Section 1.1.6, “Schema File,” on page 15](#)
- ♦ [Section 1.1.7, “Include/Exclude File,” on page 15](#)

1.1.1 Publisher Channel

The Publisher shim periodically examines the change log for events. When the Publisher shim finds events in the change log, it decrypts, processes, and sends them to the Metadirectory engine in XDS format over a Secure Sockets Layer (SSL) network link. The Metadirectory engine applies policies, takes the appropriate actions, and posts the events to the Identity Vault.

z/OS object names are uppercase. The Publisher Placement policy converts object names to lowercase.

Security System Exit Routines

Top Secret provides an installation exit named TSSINSTX. The driver uses this exit to detect activity of interest and to place events in the memory queue. When the driver exit routines place an event in the memory queue, they notify the change log started task. The change log started task then moves the event information to the change log data set. Each system that shares the security system database must run the exit routines provided by the driver in module IDMTSSIX.

The driver exit routines perform the following tasks:

- ♦ Monitor password changes from the local security system and record user and password information in the memory queue.
- ♦ Monitor security system administrative commands entered by users, either directly from the TSO command line, or as generated by the administrative panels. The exit routines record these commands and related information, such as the issuer and time stamp, in the memory queue.

Memory Queue

The memory queue is an encrypted, in-storage buffer that holds events. Events are added to the memory queue by the security system exit routines, and are removed from the queue by the change log started task. The memory queue is located in Subpool 231 (fetch-protected ECSA).

Change Log Started Task

The change log started task is notified of events added to the memory queue by the driver exit routines and moves them to the change log data set.

Each system that shares a security system database must run the change log started task. The change log started task must be started as part of your normal z/OS system initialization procedure and stopped during normal system shutdown.

Change Log Data Set

The change log started task removes encrypted events from the memory queue and stores them in the change log data set for processing by the Publisher shim. The Publisher shim removes events from the change log at configurable intervals and submits them to the Metadirectory engine. If communication with the Metadirectory engine is temporarily lost, events remain in the change log until communication becomes available again.

The change log data set is a standard z/OS direct access (DSORG=DA) data set. There is one change log data set for the set of systems that share the security system database. The change log data set must reside on a shared device unless the security system database is not shared.

1.1.2 Subscriber Channel

The Subscriber channel of the driver shim started task receives XDS command documents from the Metadirectory engine, stores them using z/OS name/token callable services, then calls the appropriate REXX execs to handle the command.

The Subscriber Creation policy converts object names to uppercase before the command documents are sent to the Subscriber. z/OS object names are uppercase.

The Subscriber shim calls the `LDXSERV` command on startup to identify itself to the security system exit routines for loopback detection. This prevents the exit routines from generating events for commands issued by the Subscriber shim.

SAFQUERY Command

`SAFQUERY` is an APF-authorized TSO command that is used by the driver to query security system information. `SAFQUERY` uses the `RACROUTE` macro for z/OS to retrieve information from the security system database through the system authorization facility (SAF).

REXX Execs

The provided REXX execs support adds, modifies, deletes, and renames for User and Group objects, and handle password synchronization. The REXX execs use standard TSO commands to apply the changes. You can extend the REXX execs to support other object types and events. The REXX execs have secure access to the original XDS command data using the `IDMGETV` command. `IDMGETV` accesses z/OS name/token callable services and places the data in REXX variables.

1.1.3 Driver Shim Started Task

The driver shim runs as a started task. Only one system that shares the security system database runs the driver shim started task. The driver shim started task must be started as part of your normal z/OS system initialization procedure and stopped during normal system shutdown.

1.1.4 LDXSERV Command

`LDXSERV` is an APF-authorized TSO command that provides services for the driver shim. The Subscriber channel calls `LDXSERV` with the `NOTSSLOG` parameter at startup. This uses z/OS name/token callable services to create a token in the address space. If the security system exit routines find the token, they do not generate events. This prevents publication of events for actions taken by the Subscriber (loopback).

You can use the `LDXSERV STATUS` command to display information about the Publisher channel event subsystem. To use the `LDXSERV` command, you must include the driver load library in the logon procedure `STEPLIB` concatenation.

1.1.5 Scriptable Framework

The interface between the security system and the driver shim uses customizable REXX execs. You can extend the execs that are provided with the driver to support other applications and databases.

Several utility execs and helper commands are provided with the driver to enable communication with the driver shim and the change log. An extensible connected system schema file allows you to add your own objects and attributes to those already supported by the driver.

For more information about the REXX execs and the scriptable framework, see [Section 6.1, “The Scriptable Framework,” on page 55](#).

1.1.6 Schema File

The configuration of class and attribute definitions for the connected system is specified using the schema file. You can modify and extend this file to include new objects and attributes. For details about configuring the schema file, see [Section 6.2, “The Connected System Schema File,” on page 57](#).

The driver uses the keywords and functions of the Top Secret TSS administrative command to define the schema. The schema includes two classes: USER and GROUP. These correspond to Top Secret users and groups.

Some items in the schema refer to keywords used to create and modify Top Secret users, but cannot be queried or synchronized. These attributes can be used only by Identity Manager policies to make event-time decisions that affect the behavior of the TSS administrative command. The auxiliary schema used to extend eDirectory™ does not include these attributes.

The schema contains some attributes that consolidate multiple Top Secret attributes.

1.1.7 Include/Exclude File

The include/exclude file allows local system policies to enforce which objects are included or excluded from provisioning by the Subscriber channel. This allows for administrative rules to be set and enforced locally rather than having processing decisions made by the Metadirectory engine. For details about using the include/exclude file, see [Section 6.3, “The Connected System Include/Exclude File,” on page 59](#).

To control which objects are processed by the Publisher channel, use policies. For details about customizing policies, see the *Policy Builder and Driver Customization Guide* on the [Identity Manager 3.6.1 Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36).

1.2 Configuration Overview

This section discusses driver configuration details specific to the Identity Manager Driver for Top Secret. For basic configuration information, see the *Identity Manager 3.6.1 Administration Guide* on the [Identity Manager 3.6.1 Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36). For detailed information about configuring the driver, see [Chapter 5, “Configuring the Top Secret Driver,” on page 43](#).

Topics include

- ♦ [Section 1.2.1, “Data Flow,” on page 16](#)
- ♦ [Section 1.2.2, “OMVS Information Management,” on page 16](#)
- ♦ [Section 1.2.3, “TSO Information Management,” on page 16](#)

- ♦ [Section 1.2.4, “Filter and Schema Mapping,” on page 16](#)
- ♦ [Section 1.2.5, “Policies,” on page 17](#)

1.2.1 Data Flow

Filters and policies control the data flow of users and groups to and from the connected system and the Identity Vault. The *Data Flow* option, specified during driver import, determines how these filters and policies behave.

- ♦ **Bidirectional:** Sets classes and attributes to be synchronized on both the Subscriber and Publisher channels.
- ♦ **Application to Identity Vault:** Sets classes and attributes to be synchronized on the Publisher channel only.
- ♦ **Identity Vault to Application:** Sets classes and attributes to be synchronized on the Subscriber channel only.

1.2.2 OMVS Information Management

The *Set Preconfigured OMVS Data* option, specified during driver import, determines whether the driver sets preconfigured OMVS (UNIX System Services) attributes for new users in the security system.

The attributes you can configure are:

- ♦ **OMVSPGM:** The default program (login shell)
- ♦ **UID Assignment:** Whether UID and GID numbers are assigned by the security system or by the Identity Vault
- ♦ **HOME:** The default home directory

1.2.3 TSO Information Management

The *Set Preconfigured TSO Data* option, specified during driver import, determines whether the driver sets preconfigured Time Sharing Option (TSO) information for new users in the security system.

The attributes you can configure are:

- ♦ **TSOLACCT:** The default account number
- ♦ **TSOLPROC:** The default logon procedure
- ♦ **TSOUNIT:** The default unit name

1.2.4 Filter and Schema Mapping

The Metadirectory engine uses filters to control which objects and attributes are shared. The default filter configuration for the driver allows objects and attributes to be shared as described in the following table:

Table 1-1 *Default Filter and Schema Mapping*

eDirectory Class	eDirectory Attribute	Top Secret Class	Top Secret Attribute
User	CN	USER	ACID
User	Group Membership	USER	GROUP
User	Login Disabled	USER	SUSPEND
User	Login Expiration Time	USER	UNTIL
User	Password Expiration Interval	USER	PASSINT
User	Surname	USER	NAME
Group	CN	GROUP	ACID

1.2.5 Policies

The Metadirectory engine uses policies to control the flow of information into and out of the Identity Vault. The following table describes the policy functions for the driver in the default configuration:

Table 1-2 *Default Driver Policy Functions*

Policy	Description
Mapping	Maps the Identity Vault User and Group objects and selected attributes to a user or group in the security system.
Publisher Input	Parses security system commands to produce XDS events.
Publisher Event	None is provided.
Publisher Matching	Restricts privileged accounts and defines matching criteria for placement in the Identity Vault.
Publisher Create	Defines creation rules for users and groups before provisioning into the Identity Vault.
Publisher Placement	Defines where new users and groups are placed in the Identity Vault. Converts object names to lowercase.
Publisher Command	Defines password publishing policies.
Subscriber Matching	Defines rules for matching users and groups in the connected system and restricts events from a configurable container.
Subscriber Create	Defines required creation criteria. Converts object names to uppercase.
Subscriber Command	Defines password subscribing policies.
Subscriber Output	Sends e-mail notifications for password failures and converts information formats from the Identity Vault to the connected system.

Planning for the Top Secret Driver

2

This section helps you plan for deployment of the Novell® Identity Manager 3.6.1 driver for CA Top Secret. Topics include

- ♦ [Section 2.1, “Deployment Planning,” on page 19](#)
- ♦ [Section 2.2, “Migration Planning,” on page 20](#)
- ♦ [Section 2.3, “Customization Planning,” on page 20](#)
- ♦ [Section 2.4, “Started Task User IDs,” on page 21](#)
- ♦ [Section 2.5, “Establishing a Security-Equivalent User,” on page 21](#)

For more information about planning, see the *Identity Manager 3.6.1 Installation Guide* on the [Identity Manager Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36).

2.1 Deployment Planning

- ♦ Review [Chapter 3, “Installing the Top Secret Driver,” on page 23](#) and [Chapter 5, “Configuring the Top Secret Driver,” on page 43](#).
- ♦ Is this a new installation, or are you replacing a Fan-Out driver Platform Services installation? For details about upgrading from the Fan-Out driver, see [Chapter 4, “Upgrading from the Fan-Out Driver,” on page 39](#).
- ♦ Consider where and how you will install each component.
 - ♦ You must install the driver libraries (samples library, load library, and REXX exec library) on a volume that is shared by each system that shares the security system database.
 - ♦ You must run the driver shim started task on only one system that shares the security system database.
 - ♦ You must create the change log data set on a volume that is shared by all systems that share the security system database.
 - ♦ You must run the change log started task on each system that shares the security system database.
 - ♦ You must install the exit routines on each system that shares the security system database.
- ♦ Consider how you will respond to the installation prompts and other installation decisions.
- ♦ You must provide a connected system schema file during installation. A file with the required classes and attributes is provided in the driver samples library member `SCHEMDEF`.
For details about the connected system schema file, see [Section 6.2, “The Connected System Schema File,” on page 57](#).
- ♦ You must provide a driver shim configuration file during installation. A file that you can customize is provided in the driver samples library member `DRVCONF`.
For details about the driver shim configuration file, see [Section 5.2, “The Driver Shim Configuration File,” on page 51](#).
- ♦ You must provide an include/exclude file during installation. A file with basic suggested content is provided in the driver samples library member `INCEXC`.

You can use the include/exclude file on the connected system to limit your initial deployment to a small number of users and groups.

For details about the include/exclude file, see [Section 6.3, “The Connected System Include/Exclude File,” on page 59](#).

- ♦ How will you prototype, test, and roll out your deployment?
- ♦ What user ID will you use to run the change log started task? What user ID will you use to run the driver shim started task?

For details about the requirements for these user IDs, see [Section 2.4, “Started Task User IDs,” on page 21](#).

- ♦ What are the host names or IP addresses of your Metadirectory server and the system that will run the driver shim started task?
- ♦ Will you use the default TCP port numbers?

Table 2-1 *Default TCP Port Numbers*

Purpose	TCP Port Number
Driver shim connection to the Metadirectory engine	8090
Driver shim HTTP services for log viewing	8091
Secure LDAP port	636
Non-secure LDAP port	389

2.2 Migration Planning

- ♦ Where are the objects that you plan to manage with the driver?
- ♦ Can you use a Matching policy to select the objects to manage based on criteria such as department, group membership, or some other attribute?

2.3 Customization Planning

- ♦ Do you plan to customize the REXX execs provided with the driver?

For details about the provided execs, see [Table 6-1, “Identity Vault Command Processing Execs,” on page 56](#); [Table 6-2, “Other Execs,” on page 56](#); and the execs themselves.

- ♦ Do you plan to add attributes or classes to the connected system schema file?

For details about the connected system schema file, see [Section 6.2, “The Connected System Schema File,” on page 57](#).

- ♦ What options do you plan to use in your driver shim configuration file?

For details about the driver shim configuration file, see [Section 5.2, “The Driver Shim Configuration File,” on page 51](#).

- ♦ How will you use the include/exclude file?

For details about the include/exclude file, see [Section 6.3, “The Connected System Include/Exclude File,” on page 59](#).

- ♦ Do you plan to customize policies?

For details about customizing policies, see the *Policy Builder and Driver Customization Guide* on the [Identity Manager 3.6.1 Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36).

- ♦ Are the resources needed to perform the customization available within your organization?

2.4 Started Task User IDs

You must prepare user IDs for each started task to use. For details, see “[Preparing User IDs for the Started Tasks](#)” on page 31.

These user IDs have special requirements.

- ♦ [Section 2.4.1, “Change Log Started Task User Requirements,”](#) on page 21
- ♦ [Section 2.4.2, “Driver Shim Started Task User Requirements,”](#) on page 21

2.4.1 Change Log Started Task User Requirements

The change log started task must run as a user that can update the change log data set.

2.4.2 Driver Shim Started Task User Requirements

The driver shim started task user must have rights to update the change log data set and to perform the Subscriber channel actions carried out by the REXX execs, such as creating and modifying users and groups, defining alias information in the catalog, and creating home directories. For details about using the `TSS ADMIN` command to assign administrative authorities, see your *CA Top Secret Security for z/OS Command Functions Guide*.

2.5 Establishing a Security-Equivalent User

The Driver object must run with Security Equivalence to a user with sufficient rights. You can set the driver equivalent to Admin or a similar user. For stronger security, you can define a user with only the minimal rights necessary for the operations you want the driver to perform.

The driver user must be a trustee of the containers where synchronized users and groups reside, with the rights shown in [Table 2-2](#). Inheritance must be set for [Entry Rights] and [All Attribute Rights].

Table 2-2 Base Container Rights Required by the Driver Security-Equivalent User

Operation	[Entry Rights]	[All Attribute Rights]
Subscriber notification of account changes (recommended minimum)	Browse	Compare and Read
Creating objects in the Identity Vault without group synchronization	Browse and Create	Compare and Read
Creating objects in the Identity Vault with group synchronization	Browse and Create	Compare, Read, and Write

Operation	[Entry Rights]	[All Attribute Rights]
Modifying objects in the Identity Vault	Browse	Compare, Read, and Write
Renaming objects in the Identity Vault	Browse and Rename	Compare and Read
Deleting objects from the Identity Vault	Browse and Erase	Compare, Read, and Write
Retrieving passwords from the Identity Vault	Browse and Supervisor	Compare and Read
Updating passwords in the Identity Vault	Browse and Supervisor	Compare, Read, and Write

If you do not set Supervisor for [Entry Rights], the driver cannot set passwords. If you do not want to set passwords, set the Subscribe setting for the User class nspmDistributionPassword attribute to Ignore in the filter to avoid superfluous error messages. For details about accessing and editing the filter, see the *Policy Builder and Driver Customization Guide* on the [Identity Manager 3.6.1 Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36).

For complete information about rights, see the *Novell eDirectory™ Administration Guide*.

Installing the Top Secret Driver

3

This section provides the information you need to install the Novell® Identity Manager 3.6.1 driver for CA Top Secret.

Topics include

- ♦ Section 3.1, “Before You Begin,” on page 23
- ♦ Section 3.2, “Required Knowledge and Skills,” on page 23
- ♦ Section 3.3, “Prerequisites,” on page 24
- ♦ Section 3.4, “Getting the Installation Files,” on page 24
- ♦ Section 3.5, “Extending the Schema for Identity Manager,” on page 24
- ♦ Section 3.6, “Installing the Java Class File on the Metadirectory Server,” on page 25
- ♦ Section 3.7, “Setting Up the Driver on the Metadirectory Server,” on page 25
- ♦ Section 3.8, “Installing the Driver Shim on the Connected System,” on page 28
- ♦ Section 3.9, “Post-Installation Tasks,” on page 36
- ♦ Section 3.10, “Uninstalling the Driver,” on page 37

3.1 Before You Begin

- ♦ Review Chapter 2, “Planning for the Top Secret Driver,” on page 19.
- ♦ Ensure that you have the most recent distribution, support pack, and patches for the driver.
- ♦ Review the most recent support information for the driver on the [Novell Support Web site](http://support.novell.com) (<http://support.novell.com>).

3.2 Required Knowledge and Skills

To successfully install, configure, and use the driver, you must have system administration skills and rights for Identity Manager, z/OS, and Top Secret. You must be proficient with using iManager to configure Identity Manager drivers. You must be familiar with the facilities of the driver, and you must have developed a deployment plan.

To find other documentation related to this product and its installation, see “Additional Documentation” on page 9.

For an overview of driver facilities, see Chapter 1, “Overview,” on page 11.

For information about planning for the driver, see Chapter 2, “Planning for the Top Secret Driver,” on page 19.

For information about administering your target systems, see your IBM* and Top Secret documentation.

3.3 Prerequisites

- ♦ [Section 3.3.1, “Connected System Requirements,” on page 24](#)
- ♦ [Section 3.3.2, “Identity Vault Requirements,” on page 24](#)

3.3.1 Connected System Requirements

- ❑ z/OS
- ❑ CA Top Secret Security for z/OS

For information about supported platforms and operating environments, see [the Identity Manager 3.6.1 Drivers Documentation Web site \(http://www.novell.com/documentation/idm36drivers\)](#). From this index page, you can select a readme file associated with the platform(s) for which you need support.

3.3.2 Identity Vault Requirements

- ❑ Novell Identity Manager 3.6.1 with the latest Support Pack

3.4 Getting the Installation Files

- 1 Obtain the most recent distribution of the Identity Manager 3.6.1 driver for CA Top Secret from the [Novell Downloads Web site \(http://download.novell.com/\)](#).
The driver is part of the Identity Manager 3.6.1 Integration Module for Mainframes.
- 2 From the distribution, copy the following files onto the workstation you will use for the installation. You will use this workstation to set up the driver on the Metadirectory server and to FTP files to the target system.
 - ♦ TopSecret.xml
 - ♦ tss.sch
 - ♦ samplib.xmt
 - ♦ idmload.xmt
 - ♦ tssexec.xmt
 - ♦ zOS.jar

3.5 Extending the Schema for Identity Manager

You must extend the schema if you want to use the Identity Vault to manage connected system attributes that are not already mapped to standard eDirectory™ attributes. Otherwise, it is not necessary.

Extending the schema adds auxiliary classes to eDirectory User and Group objects for Top Secret user and group attributes.

- 1 In iManager, select the *Extend Schema* task under *Schema*.
- 2 Select *Import data from file on disk*, then click *Next*.
- 3 Select a file type of *Schema File*.

- 4 Type or browse for `tss.sch` as the file to import, then click *Next*.
- 5 Specify the host name or IP address and the LDAP port number of your Metadirectory server.
To connect to the non-secure LDAP port (389), you must have the *Require TLS for Simple Binds with Password* option disabled on your LDAP Group. If necessary, you can edit this option using the *LDAP Options* task under *LDAP* in iManager. For details, see the *Novell eDirectory Administration Guide*.
- 6 Select *Authenticated login* and log in as Admin or another user with rights to extend the schema.
- 7 Click *Next* to go to the summary.
- 8 Click *Finish* to extend the schema.

3.6 Installing the Java Class File on the Metadirectory Server

The file `zos.jar` contains Java classes used by the Publisher channel.

To install the Java class file on the Metadirectory server, copy `zos.jar` to the directory shown in the following table:

Table 3-1 Java Class File Installation Location

Metadirectory System	Destination Directory
Linux and Solaris* with eDirectory 8.7 and earlier	<code>/usr/lib/ldirxml/classes</code>
Linux and Solaris with eDirectory 8.8	<code>/opt/novell/eDirectory/lib/ldirxml/classes</code>
Windows*	<code>\novell\nds\lib</code>

3.7 Setting Up the Driver on the Metadirectory Server

- 1 In iManager, select the *Identity Manager Utilities* task *New Driver*.
- 2 Select a driver set where you want to create the driver, then click *Next*.
If you place this driver in a new driver set, you must specify a driver set name, context, and associated server.
Only one driver set can be active on a server.
- 3 Import the driver rules file.
Select *Import a driver configuration from the client (.XML file)*, type or browse for `TopSecret.xml` on the workstation (where you placed it in [Step 2 on page 24](#)), then click *Next*.
- 4 Specify the configuration settings as described in the following table, then click *Next*.

Configuration Setting	Action
Driver Name	Specify a name for the driver object.
Data Flow	Select <i>Bidirectional</i> , <i>Application to Identity Vault</i> , or <i>Identity Vault to Application</i> . For details, see “Data Flow” on page 44 .
Base Container	Specify the Identity Vault container where synchronized users and groups reside. You can specify separate containers for users and groups by updating the driver properties later. For details, see “User Base Container” on page 50 and “Group Base Container” on page 50 .
Set Preconfigured TSO Data	Select Yes or No. For details, see Section 1.2.3, “TSO Information Management,” on page 16 .
Set Preconfigured OMVS Data	Select Yes or No. For details, see Section 1.2.2, “OMVS Information Management,” on page 16 .
Create Using	Specify a user to be used as a template for creating new users. For details, see “Create Users With” on page 48 .
Default Department	Specify a department to be assigned to new users created by the driver. For details, see “User Default Department” on page 48 .
Default Group	Specify a group to be used as the default group for new users created by the driver. For details, see “User Default Group” on page 48 .
User Catalog Alias	Specify a catalog for alias entries for new users created by the driver. For details, see “User Catalog Alias” on page 46 .
Group Catalog Alias	Specify a catalog for alias entries for new groups created by the driver. For details, see “Group Catalog Alias” on page 47 .
Enable Entitlements	Select Yes or No. For details, see “Enable Entitlements” on page 44 .
Polling Interval	Specify the number of seconds the Publisher shim waits after sending events from the change log to the Metadirectory engine. For details, see “Polling Interval” on page 47 .
Remote Host Name and Port	Specify the host name or IP address and TCP port number of the driver shim on your connected system. The default port number is 8090.
Use SSL	Select Yes or No. For details, see “Use SSL” on page 45 .

Configuration Setting	Action
Driver Object Password Remote Loader Password	Specify secure passwords and remember them. You must enter them when you run the <code>SETPDWDS</code> exec while installing the driver shim on the connected system. For details, see “Driver Object Password” on page 46 and “Remote Loader Password” on page 46 .
Default TSO Account Number	Specify the default account number for new users created by the driver. For details, see “User Default TSO Account Number” on page 48 .
Default TSO Procedure	Specify the default cataloged procedure name for new users created by the driver. For details, see “User Default TSO Proc” on page 49 .
Default TSO Unit	Specify the default disk unit name for new users created by the driver. For details, see “User Default TSO Unit” on page 49 .
UID and GID Assignment	Select <i>Assign by Top Secret</i> or <i>Assign by Identity Vault</i> . For details, see “UID Assignment” on page 49 .
UID Range	Specify a range of numbers to use when the <code>TSS</code> command assigns UID numbers for new users. For details, see “UID Range” on page 49 .
GID Range	Specify a range of numbers to use when the <code>TSS</code> command assigns GID numbers for new groups. For details, see “GID Range” on page 49 .
Default Home Directory	Specify an HFS file path to be used as the default home directory for new users created by the driver. For details, see “Default Home Directory” on page 49 .
Default Program	Specify the default login shell to be assigned to new users created by the driver. For details, see “Default Program” on page 49 .

- 5 Click *Define Security Equivalences* and make the driver equivalent to Admin or another high-rights user so the driver can obtain information from the Identity Vault and create users and groups there.
For details about the rights required by the user, see [Table 2-2, “Base Container Rights Required by the Driver Security-Equivalent User,” on page 21](#).
- 6 (Optional) Click *Exclude Administrative Roles* to exclude users with administrative rights from being processed by the driver.
- 7 Click *Finish* to complete the driver installation.
- 8 Start the driver.
Click the upper right corner of the driver icon, then click *Start driver*.

3.8 Installing the Driver Shim on the Connected System

The driver shim and its files are installed into data sets that you specify, and into files created by the installation process in the HFS.

The driver uses an embedded Remote Loader. It is not necessary to install Java on the connected system.

For all procedures in this section that are performed using the target system, use a user ID with administrative rights.

- ♦ [Section 3.8.1, “Setting Up the Libraries on Your z/OS System,” on page 28](#)
- ♦ [Section 3.8.2, “Authorizing the Driver TSO Commands,” on page 29](#)
- ♦ [Section 3.8.3, “Securing the Driver Shim with SSL,” on page 30](#)
- ♦ [Section 3.8.4, “Configuring the Remote Loader and Driver Object Passwords,” on page 30](#)
- ♦ [Section 3.8.5, “Allocating and Initializing the Change Log Data Set,” on page 30](#)
- ♦ [Section 3.8.6, “Setting Up the Started Tasks,” on page 31](#)
- ♦ [Section 3.8.7, “Testing before Installing the Security System Exit,” on page 33](#)
- ♦ [Section 3.8.8, “Installing the Driver Security System Exit IDMTSSIX,” on page 33](#)
- ♦ [Section 3.8.9, “Testing the Completed Connected System Installation,” on page 36](#)

3.8.1 Setting Up the Libraries on Your z/OS System

The driver shim is packaged as z/OS partitioned data sets (PDS) unloaded with the TRANSMIT command.

- ♦ **Driver Samples Library:** `samplib.xmt` contains sample cataloged procedures, other JCL, and sample configuration-related files.
- ♦ **Driver Load Library:** `idmload.xmt` contains executable programs for the driver shim.
- ♦ **Driver REXX Exec Library:** `tssexec.xmt` contains the REXX execs for the scriptable framework and to perform configuration tasks.

To upload these files to the target system and extract them:

- 1 Use FTP to upload the files to the target system from the workstation where you placed them in [Step 2 on page 24](#).

```
c:\> ftp Your-z/OS-Host
User: Your-User-ID
Password:
ftp> quote site lrecl=80 recfm=fb
ftp> binary
ftp> put samplib.xmt
ftp> put tssexec.xmt
ftp> quote site pri=30 sec=5 cyl
ftp> put idmload.xmt
ftp> quit
```

- 2 Log on to z/OS using the same user ID that you used for the FTP session.

- 3 Use the TSO RECEIVE command to extract the data sets. When RECEIVE prompts you for parameters, specify the appropriate data set names and volumes according to your standards. Place these data sets on a disk volume that is shared by the systems that share the security system database.

```
READY
receive indataset(samplib.xmt)
INMR901I Dataset IDM.SAMPLIB from ADMIN on SYSB
INMR906A Enter restore parameters or 'DELETE' or 'END' +
dsname('sys3.ts.samplib') volume(work0a)
. . . many IEBCOPY messages . . .
INMR001I Restore successful to dataset 'SYS3.TS.SAMPLIB'
READY
receive indataset(idmload.xmt)
INMR901I Dataset IDM.LOAD from ADMIN on SYSB
INMR906A Enter restore parameters or 'DELETE' or 'END' +
dsname('sys3.ts.load') volume(work0a)
. . . many IEBCOPY messages . . .
INMR001I Restore successful to dataset 'SYS3.TS.LOAD'
READY
receive indataset(tssexec.xmt)
INMR901I Dataset IDM.EXECLIB from ADMIN on SYSB
INMR906A Enter restore parameters or 'DELETE' or 'END' +
dsname('sys3.ts.execlib') volume(work0a)
. . . many IEBCOPY messages . . .
INMR001I Restore successful to dataset 'SYS3.TS.EXECLIB'
READY
```

- 4 Add the driver load library to the APF list.

Use the PARMLIB IEAAPFxx or PROGxx member as appropriate. If you use the dynamic APF facility, you can use the SET PROG command to activate your changes. Otherwise, you must IPL for the change to take effect.

- 5 Restrict access to the driver load library.

WARNING: Do not put the driver load library in the linklist unless you use program protection to secure its contents against unauthorized use. Failure to protect the driver load library introduces security exposures.

- 6 Customize the JOB card and run the job in the samples library member HFSINST.

This creates the HFS file system structure for the driver.

3.8.2 Authorizing the Driver TSO Commands

LDXSERV and SAFQUERY require APF authorization. They reside in the driver load library, which you added to the APF list in [Step 4 on page 29](#). You must also add them to the list of authorized TSO commands.

- 1 Add LDXSERV and SAFQUERY to the AUTHCMD NAMES (. . .) statement in member IKJTSOxx of SYS1.PARMLIB or its equivalent.

Example:

```
AUTHCMD NAMES ( +
. . . other commands . . . +
LDXSERV SAFQUERY)
```

- 2 Use the PARMLIB TSO command to activate your changes.

Example:

```
PARMLIB CHECK(00)
PARMLIB UPDATE(00)
```

For more information about the PARMLIB command, see the *TSO/E System Programming Command Reference* for your system.

3.8.3 Securing the Driver Shim with SSL

- 1 Run the REXX exec in the REXX exec library member SETCERT.
- 2 When prompted, enter the Metadirectory server host name or IP address and secure LDAP port number (default is 636).
- 3 When prompted, enter Y to accept the certificate authority presented.

You are about to connect to the eDirectory LDAP server to retrieve the eDirectory Tree Trusted Root public certificate.

```
Enter the LDAP Server Host Address [localhost]: sr.digitalairlines.com
Enter the LDAP Server Port [636]:
```

Certificate Authority:

```
Subject:      ou=Organizational CA,o=TREENAME
Not Before:   20060821144845Z
Not After:    20160821144845Z
```

Do you accept the Certificate Authority? (Y/N) y

3.8.4 Configuring the Remote Loader and Driver Object Passwords

Run the REXX exec in the driver REXX exec library member SETPWDS, and respond to the prompts.

Use the same passwords that you used in [Step 4 on page 25](#) when setting up the driver on the Metadirectory server.

3.8.5 Allocating and Initializing the Change Log Data Set

The change log data set is a standard z/OS direct access data set. The change log data set must reside on a shared device unless it is used by only a single system.

Create one change log data set. It is shared by each z/OS system that shares the security system database. The log file utility LDXUTIL is used to initialize the change log data set. The change log data set must be initialized before you start the driver shim started task for the first time.

To allocate and initialize the change log data set:

- 1 Customize the samples library member LOGINIT.

Update the JCL to conform to your local installation requirements, and specify the following:

- ♦ The name of your driver load library.
- ♦ A name for your change log data set.
- ♦ The shared disk volume where the change log is to be allocated. Specify a different unit name if appropriate.

2 Run the LOGINIT job.

An IEC031I D37 message is normal and should be ignored.

3 Ensure that your change log data set is protected appropriately for the sensitive nature of its contents.

WARNING: If you initialize a change log data set that contains data, the data is lost.

3.8.6 Setting Up the Started Tasks

- ♦ “Preparing User IDs for the Started Tasks” on page 31
- ♦ “Setting Up the Change Log Started Task” on page 32
- ♦ “Setting Up the Driver Shim Started Task” on page 32

Preparing User IDs for the Started Tasks

You can use any name for the user IDs.

1 Create the user for the change log started task.

```
TSS CREATE(LDXLOGR) TYPE(USER) NAME('CHANGE LOG ACID') +  
DEPARTMENT(deptname) PASSWORD(NOPW,0) FACILITY(STC)
```

2 Create the user for the driver shim started task.

```
TSS CREATE(TSDRV) TYPE(USER) NAME('DRIVER SHIM ACID') +  
DEPARTMENT(deptname) PASSWORD(NOPW,0) FACILITY(STC)
```

3 Add the user ACIDs to the STC table to assign them to the started tasks.

```
TSS ADDTO(STC) PROCNAME(LDXLOGR) ACID(LDXLOGR)  
TSS ADDTO(STC) PROCNAME(TSDRV) ACID(TSDRV)
```

4 Grant the users the appropriate rights according to your plans for their use.

For details about the requirements, see [Section 2.4, “Started Task User IDs,” on page 21](#). For details about using the TSS ADMIN command to assign administrative authorities, see the *Top Secret Security for z/OS Command Functions Guide*.

5 Use the include/exclude file to exclude these users from provisioning.

Example Include/Exclude File Fragment:

```
EXCLUDE  
.  
.  
.  
LDXLOGR  
TSDRV  
.  
.  
.  
ENDEXCLUDE
```

For details about the include/exclude file, see [Section 6.3, “The Connected System Include/Exclude File,” on page 59](#).

Setting Up the Change Log Started Task

You must install and run the change log started task on each system that shares the security system database.

To install the change log started task:

- 1 Copy member LDXLOGR from the samples library to your started task procedure library (SYS1.PROCLIB or its equivalent). You can give the change log started task a different name if necessary.
- 2 Update the JCL to specify the following:
 - ♦ The name of your driver load library
 - ♦ The name of your change log data set
- 3 Add the change log started task to your system startup and shutdown procedures.

For information about starting and stopping the change log started task, see [Section 7.2, “Starting and Stopping the Change Log Started Task,” on page 67](#).

The change log started task should be started during your system startup procedure before user processing begins. Any events of interest that occur are stored in the memory queue until the change log started task has initialized.

The change log started task should be stopped during your system shutdown procedure after all user processing has ended. Any events of interest that occur after the change log started task shuts down remain in the memory queue and are lost when the system is shut down.

- 4 Review your Workload Manager definitions to ensure that the change log started task is assigned to a Service Class appropriate for its role.

Setting Up the Driver Shim Started Task

Install and run the driver shim started task on only one system that shares the security system database.

To install the driver shim started task:

- 1 Copy member TSDRV from the samples library to your started task procedure library (SYS1.PROCLIB or its equivalent). You can give the driver shim started task a different name if necessary.
- 2 Update the JCL to specify the following:
 - ♦ The name of your driver load library
 - ♦ The name of your driver shim configuration file
You can use your driver samples library member DRVCONF as a model. For details, see [Section 5.2, “The Driver Shim Configuration File,” on page 51](#).
 - ♦ The name of your connected system schema file
You can use your driver samples library member SCHEMDEF as a model. For details, see [Section 6.2, “The Connected System Schema File,” on page 57](#).
 - ♦ The name of your include/exclude file

You can use your driver samples library member `INCEXC` as a model. For details, see [Section 6.3, “The Connected System Include/Exclude File,” on page 59](#).

- ♦ The name of your change log data set
 - ♦ The name of your driver REXX exec library
- 3 Add the driver shim started task to your system startup and shutdown procedures.
For information about starting and stopping the driver shim started task, see [Section 7.3, “Starting and Stopping the Driver Shim Started Task,” on page 67](#).
The driver shim started task should be started during your system startup procedure before user processing begins. The driver shim started task should be stopped during your system shutdown procedure after all user processing has ended.
 - 4 Review your Workload Manager definitions to ensure that the driver shim started task is assigned to a Service Class appropriate for its role.

3.8.7 Testing before Installing the Security System Exit

You can use the `LDXSERV` command to test your installation before you install the exit.

- 1 If it is not already running, start the change log started task.
For details about starting the change log started task, see [Section 7.2, “Starting and Stopping the Change Log Started Task,” on page 67](#).
- 2 Issue the following command from a TSO session that has the driver load library included in its STEPLIB concatenation:

```
LDXSERV STATUS
```

Examine the output of the command. You should see information about the memory queue, information about the change log started task, and a valid, empty change log data set.

3.8.8 Installing the Driver Security System Exit IDMTSSIX

Follow your normal procedure for applying system-level changes to your z/OS system. We recommend that you do the following:

- ♦ Install and test the exit on a test system or partition first.
- ♦ Make a copy of applicable libraries before applying any changes.
- ♦ Plan a back off procedure.

There are three different procedures for installing the driver exit module IDMTSSIX into the Top Secret installation exit TSSINSTX. Use the following table to select the procedure to use based on your Top Secret version and your current use of TSSINSTX.

Table 3-2 Exit Installation Procedure Choices

Top Secret Version	Your Use of TSSINSTX	Installation Procedure to Use
Version 8 with Support Pack 2	Not used	“Exit Installation Procedure 1” on page 34

Top Secret Version	Your Use of TSSINSTX	Installation Procedure to Use
Version 8 with Support Pack 2	Using TSSINSTX, but not using either the security file change or password functions	“Exit Installation Procedure 2” on page 34
Any version supported by the driver other than version 8 with Support Pack 2	Not using TSSINSTX, or using TSSINSTX but not using either the security file change or password functions	“Exit Installation Procedure 2” on page 34
Any version supported by the driver	Already using the security file change or password functions of TSSINSTX	“Exit Installation Procedure 3” on page 35

Exit Installation Procedure 1

- 1 Use IEBCOPY to copy member TSSINSTX from the driver load library to your TSS load library.

This member was built based on the sample provided in the TSSOPMAT library for CA op Secret 8.0 Support Pack 2.

- 2 If your TSS load library is in the z/OS linklist, refresh LLA with the following operator command:

```
F LLA,REFRESH
```

- 3 Activate the exit using the following operator command:

```
F TSS,EXIT(ON)
```

- 4 Add the following statement to your Top Secret control options parameter file:

```
EXIT(ON)
```

Exit Installation Procedure 2

- 1 Add the following statements to your modified TSSINSTX source at both the CHANGE and PASSWORD labels:

GETMAIN R, LV=72	Get standard savearea
LR R11, R13	Save original R13
LR R13, R1	New savearea addr into R13
LR R1, R9	Copy parmlist base to R1
L R15, =V(IDMTSSIX)	Get addr of IDM module
BALR R14, R15	Call it
LR R1, R13	Copy temp savearea ptr to R1
LR R13, R11	Restore R13
FREEMAIN R, LV=72, A=(1)	Get rid of savearea
B EXIT0	

These statements are in the driver samples library member TSSINSTX.

- 2 In the TSSINSTX function matrix (label MATRIX near the beginning of the source module), set the (32) New Password Verification and (48) Security File Change entries to #####YES.

You can use the MATRIX table in driver samples library member TSSINSTX as an example.

- 3 Assemble and link TSSINSTX to replace your existing TSSINSTX module. Add the following statements to the link step:

```
//SYSLIB DD DISP=SHR,DSN=<driver load library>
//SYSLIN DD DISP=OLD,DSN=<TSSINSTX object from ASM step>
// DD *
INCLUDE SYSLIB(IDMTSSIX)
ENTRY TSSINSTX
NAME TSSINSTX(R)
```

- 4 If your TSS load library is in the z/OS linklist, refresh LLA with the following operator command:

```
F LLA,REFRESH
```

- 5 Activate the exit using the following operator command:

```
F TSS,EXIT(ON)
```

- 6 If it is not already there, add the following statement to your Top Secret control options parameter file:

```
EXIT(ON)
```

Exit Installation Procedure 3

- 1 Determine the calling sequence for your functions and the driver module IDMTSSIX.
 - ♦ The driver exit functions never fail a request, and they expect the current request to succeed.
 - ♦ If your functions might reject a request, call them before IDMTSSIX.
 - ♦ Do not call IDMTSSIX for a request that your exit functions reject.
 - ♦ If your exit functions never reject a request, it does not matter whether IDMTSSIX is called before or after your functions.
- 2 Add the following statements to your modified TSSINSTX source in both the CHANGE and PASSWORD functions:

GETMAIN R, LV=72	Get standard savearea
LR R11, R13	Save original R13
LR R13, R1	New savearea addr into R13
LR R1, R9	Copy parmlist base to R1
L R15, =V(IDMTSSIX)	Get addr of IDM module
BALR R14, R15	Call it
LR R1, R13	Copy temp savearea ptr to R1
LR R13, R11	Restore R13
FREE MAIN R, LV=72, A=(1)	Get rid of savearea
B EXIT0	

These statements are in the driver samples library member TSSINSTX.

- 3 In the TSSINSTX function matrix (label MATRIX near the beginning of the source module), ensure that both the (32) New Password Verification and (48) Security File Change entries are set to #####YES.
You can use the MATRIX table in driver samples library member TSSINSTX as an example.
- 4 Assemble and link TSSINSTX to replace your existing TSSINSTX module. Add the following statements to the link step:

```
//SYSLIB DD DISP=SHR,DSN=<driver load library>
//SYSLIN DD DISP=OLD,DSN=<TSSINSTX object from ASM step>
// DD *
INCLUDE SYSLIB(IDMTSSIX)
ENTRY TSSINSTX
NAME TSSINSTX(R)
```

- 5 If your TSS load library is in the z/OS linklist, refresh LLA with the following operator command:

```
F LLA,REFRESH
```

- 6 Activate the exit using the following operator command:

```
F TSS,EXIT(ON)
```

- 7 If it is not already there, add the following statement to your Top Secret control options parameter file:

```
EXIT(ON)
```

3.8.9 Testing the Completed Connected System Installation

- 1 If it is not already running, start the change log started task.
For details about starting the change log started task, see [Section 7.2, “Starting and Stopping the Change Log Started Task,” on page 67](#).
- 2 Perform some actions to exercise the security system exit routines and create some sample events.
 - 2a Change a password using the logon screen.
 - 2b Create new user ID.
- 3 Issue the following command from a TSO session that has the driver load library included in its STEPLIB concatenation:

```
LDXSERV STATUS
```

Examine the output of the command. You should see the exit routines loaded, information about the memory queue, information about the change log started task, and a valid, non-empty change log data set.

3.9 Post-Installation Tasks

- 1 If desired, set *Startup Option* on the Driver Configuration page to *Auto start*. This causes the driver to start when the Metadirectory engine starts.
- 2 Activate the driver.

Identity Manager and Identity Manager drivers must be activated within 90 days of installation or they shut down. At any time during the 90 days, or afterward, you can activate Identity Manager products.

For details about activating Novell Identity Manager Products, see the *Identity Manager 3.6.1 Installation Guide* on the [Identity Manager 3.6.1 Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36).

3.10 Uninstalling the Driver

- ♦ [Section 3.10.1, “Uninstalling the Security System Exit,” on page 37](#)
- ♦ [Section 3.10.2, “Uninstalling the Driver Shim,” on page 37](#)
- ♦ [Section 3.10.3, “Uninstalling the Driver Object from eDirectory,” on page 38](#)

3.10.1 Uninstalling the Security System Exit

If you were not using the TSSINSTX installation exit before installing the driver, follow [“Exit Uninstallation Procedure 1” on page 37](#).

If you were using the TSSINSTX installation exit before installing the driver, follow [“Exit Uninstallation Procedure 2” on page 37](#).

Exit Uninstallation Procedure 1

- 1 Deactivate the exit using the following operator command:

```
F TSS,EXIT(OFF)
```

- 2 Replace the EXIT(ON) statement to your Top Secret control options parameter file with EXIT(OFF).

Exit Uninstallation Procedure 2

- 1 Replace member TXXINSTX in your TSS load library with a backup copy you made before installing the driver.
- 2 If your TSS load library is in the z/OS linklist, refresh LLA with the following operator command:

```
F LLA,REFRESH
```

- 3 Deactivate the exit using the following operator command:

```
F TSS,EXIT(OFF)
```

- 4 Reactivate the exit using the following operator command:

```
F TSS,EXIT(ON)
```

3.10.2 Uninstalling the Driver Shim

- 1 Remove the change log started task and driver shim started task from your system startup and shutdown procedures.
- 2 Stop the change log started task and driver shim started task.

For details, see [Section 7.2, “Starting and Stopping the Change Log Started Task,” on page 67](#) and [Section 7.3, “Starting and Stopping the Driver Shim Started Task,” on page 67](#).

- 3 Remove members LDXLOGR and TSDRV from your started task procedure library.
- 4 Delete the users you created for the started tasks in [“Preparing User IDs for the Started Tasks” on page 31](#).
- 5 Remove the driver load library from your APF list.
Reverse the action you took in [Step 4 on page 29](#).

- 6 Remove the LDXSERV and SASQUERY commands from IKJTSOxx.
Reverse the actions you took in [Section 3.8.2, “Authorizing the Driver TSO Commands,”](#) on [page 29](#).
- 7 Remove the driver files from the HFS. They were created in [Step 6 on page 29](#).

```
rm -Rf /opt/novell  
rmdir -p /opt/novell/
```
- 8 Delete the driver samples library, load library, and REXX exec library that you created in [Step 3 on page 29](#).
- 9 Delete the change log data set that you created in [Section 3.8.5, “Allocating and Initializing the Change Log Data Set,”](#) on [page 30](#).

3.10.3 Uninstalling the Driver Object from eDirectory

- 1 In iManager, select *Identity Manager Overview* from the Identity Manager task list on the left side of the window.
- 2 Navigate to your driver set by searching the tree or by entering its name.
- 3 Click *Delete Driver* on the Identity Manager Overview page.
- 4 Select the Driver object to be deleted, then click *OK*.

Upgrading from the Fan-Out Driver

4

This section provides the information you need if you are upgrading from the Identity Manager Fan-Out driver to the Identity Manager 3.6.1 driver for CA Top Secret.

Topics include

- ♦ [Section 4.1, “Preparing for Migration,” on page 39](#)
- ♦ [Section 4.2, “Migrating Fan-Out Driver Platform Services to the Top Secret Driver,” on page 40](#)
- ♦ [Section 4.3, “Configuring the Driver,” on page 40](#)
- ♦ [Section 4.4, “Post-Migration Tasks,” on page 40](#)

The Fan-Out driver provides one-way synchronization to a heterogeneous mix of systems including Linux and UNIX systems, and IBM i5/OS* (OS/400* operating system) and z/OS systems. The Fan-Out driver also provides authentication redirection from those systems.

Moving to the Identity Manager 3.6.1 driver for CA Top Secret provides two main advantages.

- ♦ **Bidirectional Synchronization:** The driver allows synchronization from the connected system.
- ♦ **Standard Identity Manager Policies That Simplify Customization:** The Fan-Out driver makes minimal use of Identity Manager policies.

Consider the following before migrating from the Fan-Out driver.

- ♦ **Heterogeneity:** The Fan-Out driver supports operating system environments besides Top Secret. You can continue to use the Fan-Out driver for those systems while using the Identity Manager 3.6.1 driver for CA Top Secret on your Top Secret systems.
- ♦ **Authentication Redirection:** The Fan-Out driver provides authentication redirection using the password exit. The Identity Manager 3.6.1 driver for CA Top Secret provides bidirectional password synchronization.

4.1 Preparing for Migration

We recommend that you perform the upgrade in a test environment similar to your production environment before upgrading production systems.

Before beginning the upgrade process, review [Chapter 3, “Installing the Top Secret Driver,” on page 23](#).

To prepare for installing the upgrade:

- 1 Verify that you have the required knowledge and skills.
For details, see [Section 3.2, “Required Knowledge and Skills,” on page 23](#).
- 2 Ensure that the prerequisites are met.
For details, see [Section 3.3, “Prerequisites,” on page 24](#).
- 3 Prepare the distribution files for installation.

For details, see [Section 3.4, “Getting the Installation Files,” on page 24](#).

- 4 If necessary, migrate the UID and GID numbers from the appropriate Fan-Out driver Platform Set to the OMVS attributes of the Identity Vault users or groups. You can assign OMVS attributes, such as HOME (home directory) and OMVSPGM (login shell), to objects in the Identity Vault.

4.2 Migrating Fan-Out Driver Platform Services to the Top Secret Driver

Perform the following steps on your target platform system:

- 1 Stop the following started tasks:
 - ♦ PLATRCVR
 - ♦ ASCLIENT
- 2 Remove ASCLIENT and PLATRCVR from your system startup and shutdown procedures.
- 3 Remove the Fan-Out driver Top Secret exit.
- 4 Install the driver shim on the connected system.

For details, see [Section 3.8, “Installing the Driver Shim on the Connected System,” on page 28](#).

4.3 Configuring the Driver

- 1 Install and set up the Identity Manager Driver for Top Secret on the Metadirectory server.
For details, see [Section 3.7, “Setting Up the Driver on the Metadirectory Server,” on page 25](#).
- 2 Make any required policy modifications.
Create or modify an appropriate policy to use the alternative naming attribute if one was used by the Fan-Out driver. For more information about policy customization, see the *Policy Builder and Driver Customization Guide* on the [Identity Manager 3.6.1 Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36).
- 3 Start the driver.
Click the upper right corner of the driver icon, then click *Start driver*.
- 4 Migrate the users to make new associations. For details, see [Section 5.4.1, “Migrating Identities from the Identity Vault to the Connected System,” on page 53](#) and [Section 5.4.2, “Migrating Identities from the Connected System to the Identity Vault,” on page 53](#).

4.4 Post-Migration Tasks

Perform the steps listed in [Section 3.9, “Post-Installation Tasks,” on page 36](#).

After the new driver is operating properly, you can remove the Fan-Out driver components.

- 1 Delete the Platform object from the Fan-Out driver configuration.
- 2 On the connected system, uninstall Platform Services.
- 3 If this is the last platform being served by the Fan-Out driver, you can uninstall the Fan-Out core driver.
 - 3a Remove the ASAM directory from the file system.

- 3b** Remove the ASAM System container object and all of its subordinates from the tree.
- 3c** Uninstall the Fan-Out driver plug-ins.

Configuring the Top Secret Driver

5

After you have installed the Identity Manager 3.6.1 driver for CA Top Secret, use the information in this section for configuration. Topics include

- ♦ [Section 5.1, “Driver Parameters and Global Configuration Values,” on page 43](#)
- ♦ [Section 5.2, “The Driver Shim Configuration File,” on page 51](#)
- ♦ [Section 5.3, “Setting the Remote Loader and Driver Object Passwords,” on page 52](#)
- ♦ [Section 5.4, “Migrating Identities,” on page 52](#)

5.1 Driver Parameters and Global Configuration Values

You can control the operation of the driver by modifying the properties described in the following sections.

IMPORTANT: Changing these values requires a restart of the driver.

- ♦ [Section 5.1.1, “Setting Properties during Driver Import,” on page 43](#)
- ♦ [Section 5.1.2, “Driver Configuration Page,” on page 45](#)
- ♦ [Section 5.1.3, “Global Configuration Values Page,” on page 47](#)

To change import-only properties, you must re-import the driver configuration file `TopSecret.xml` over the existing driver. For details, see [Section 3.7, “Setting Up the Driver on the Metadirectory Server,” on page 25](#).

To edit the properties shown on the Driver Configuration page and the Global Configuration Values page:

- 1 In iManager, select *Identity Manager Overview* from the Identity Manager task list on the left side of the window.
- 2 Navigate to your driver set by searching the tree or by entering its name.
- 3 Click the driver to open its overview.
- 4 Click the driver icon.
- 5 Select *Driver Configuration* or *Global Config Values* as appropriate.
- 6 Edit the property values as desired, then click *OK*.

5.1.1 Setting Properties during Driver Import

Properties that you can set only during driver import are used to generate policies and other configuration details.

Table 5-1 *Driver Import-Only Parameters*

Property Name	Values or Format
Data Flow	Bidirectional Application to Identity Vault Identity Vault to Application
Set Preconfigured TSO Data	Yes No
Set Preconfigured OMVS Data	Yes No
Enable Entitlements	Yes No
Use SSL	Yes No

Data Flow

- ♦ **Bidirectional:** Identities are synchronized from both the Identity Vault and the connected system (application). After all pending events are processed, the Identity Vault and connected system mirror each other.
- ♦ **Application to Identity Vault:** Identities are synchronized from the connected system (application) to the Identity Vault, but not vice versa. For example, an identity created in the Identity Vault is not created on the connected system unless explicitly migrated.
- ♦ **Identity Vault to Application:** Identities are synchronized from the Identity Vault to the connected system (application), but not vice versa. For example, changes made to a Top Secret identity are not synchronized to the Identity Vault.

Set Preconfigured TSO Data

- ♦ **Yes:** Enables prompts for the default TSO account number, default TSO procedure, and the default TSO unit.
- ♦ **No:** Disables prompts for the default TSO account number, default TSO procedure, and the default TSO unit.

Set Preconfigured OMVS Data

- ♦ **Yes:** Enables prompts for the UID and GID number assignment source (Top Secret or Identity Vault), the UID number range, the GID number range, the default home directory path, whether to create home directories, and the default program.
- ♦ **No:** Disables prompts for the UID and GID number assignment source (Top Secret or Identity Vault), the UID number range, the GID number range, the default home directory path, whether to create home directories, and the default program.

Enable Entitlements

Specifies whether the driver uses either Approval Flow or Role-Based Entitlements with the Entitlements Service driver.

Enable entitlements for the driver only if you plan to use the User Application or Role-Based Entitlements with the driver.

You can use Role-Based Entitlements to integrate the driver with the Identity Manager User Application. For more information about the User Application, see the User Application guides on the [Novell® Identity Manager Web site \(http://www.novell.com/documentation/idm/index.html\)](http://www.novell.com/documentation/idm/index.html).

Use SSL

Specifies whether the driver uses Secure Sockets Layer (SSL) to encrypt the connection between the Identity Vault and the application.

We strongly recommend that you use SSL. If you do not use SSL, identity data, including passwords, is sent across the network in clear text.

5.1.2 Driver Configuration Page

Table 5-2 *Driver Configuration Page*

Property Name	Values or Format
Driver Module	Connect to Remote Loader must be selected
Driver Object Password	Text value
Authentication ID	Not used
Authentication Context	Not used
Remote Loader Connection Parameters	Host name or IP address and port number of the driver shim on the connected system, and the RDN of the object with the server certificate
Driver Cache Limit	The recommended value is 0 (zero)
Application Password	Not used
Remote Loader Password	Text value
Startup Option	Auto start Manual
Automatic Loopback Detection	Yes No
Create Home Directories	Yes No
User Catalog Alias	Catalog data set name
Group Catalog Alias	Catalog data set name
Polling Interval	Number of seconds
Heartbeat Interval	Number of seconds
Publisher Disabled	Yes No

Driver Object Password

The Driver object password is used by the driver shim (embedded Remote Loader) to authenticate itself to the Metadirectory engine. This must be the same password that is specified as the Driver object password on the connected system driver shim.

Remote Loader Connection Parameters

The Remote Loader Connection Parameters option specifies information that the driver uses for Secure Sockets Layer (SSL) communication with the connected system.

Table 5-3 Remote Loader Connection Parameters

Parameter	Description
<code>host=hostName</code>	Connected system host name or IP address.
<code>port=portNumber</code>	Connected system TCP port number. The default is 8090.
<code>kmo=objectRDN</code>	The RDN of the object with the server certificate signed by the tree's certificate authority. Enclose the RDN in double quotes (") if the name contains spaces.

The following is an example Remote Loader connection parameter string:

```
hostname=192.168.17.41 port=8090 kmo="SSL CertificateIP"
```

Remote Loader Password

The Remote Loader password is used to control access to the driver shim (embedded Remote Loader). This must be the same password that is specified as the Remote Loader password on the connected system driver shim.

Automatic Loopback Detection

Specifies whether the driver shim discards events that would cause loopback conditions. This function supplements the loopback detection provided by the Metadirectory engine.

Create Home Directories

Specifies whether the driver automatically creates home directories in the hierarchical file system when users are created.

User Catalog Alias

Specifies the data set name of the catalog used for new users created by the driver.

If you specify a value for *User Catalog Alias*, the REXX exec to add a new user issues the following command:

```
DEFINE ALIAS (NAME('user') RELATE('UserCatalogAlias'))
```

Group Catalog Alias

Specifies the data set name of the catalog used for new groups created by the driver.

If you specify a value for *Group Catalog Alias*, the REXX exec to add a new group issues the following command:

```
DEFINE ALIAS (NAME ('group') RELATE ('GroupCatalogAlias'))
```

Polling Interval

Specifies the number of seconds that the Publisher shim waits after running the polling exec and sending events from the change log to the Metadirectory engine. The default interval is 60 seconds.

Publisher Disabled

Specifies whether the Publisher shim is active.

Select *Yes* if you are using Identity Vault to Application (one-way) data flow. This saves processing time.

Heartbeat Interval

Specifies how often, in seconds, the driver shim contacts the Metadirectory engine to verify connectivity. Specify 0 to disable the heartbeat.

5.1.3 Global Configuration Values Page

Table 5-4 *Global Configuration Values*

Property Name	Values or Format
Connected System or Driver Name	Text value
Create Users With	Text value
User Default Department	Text value
User Default Group	Text value
User Default TSO Account Number	Text value
User Default TSO Proc	Text value
User Default TSO Unit	Text value
UID Assignment	Assign by Top Secret Assign by Identity Vault
UID Range	Numeric range
GID Range	Numeric range
Default Home Directory	Text value
Default Program	Text value

Property Name	Values or Format
The Top Secret Connected System Accepts Passwords from the Identity Vault	Yes No
The Identity Vault Accepts Passwords from the Top Secret Connected System	Yes No
The Identity Vault Accepts Administrative Password Resets from the Top Secret Connected System	Yes No
Publish Passwords to NDS Password	Yes No
Publish Passwords to Distribution Password	Yes No
Require Password Policy Validation before Publishing Passwords	Yes No
Reset User's External System Password to the Identity Manager Password on Failure	Yes No
Notify the User of Password Synchronization Failure via E-Mail	Yes No
User Base Container	Identity Vault Container object
Group Base Container	Identity Vault Container object

To view and edit Password Management GCVs, select *Show* for *Show Password Management Policy*.

To view and edit User and Group Placement GCVs, select *Show* for *Show User and Group Placements*.

Connected System or Driver Name

Specifies the name of the driver. This value is used by the e-mail notification templates.

Create Users With

Specifies the ACID of a user to be used as a model for creating new users.

User Default Department

Specifies the default department for new users.

User Default Group

Specifies the default group for new users.

User Default TSO Account Number

Specifies the default account number for new users.

User Default TSO Proc

Specifies the default cataloged procedure name for new users. For example, IKJACCNT.

User Default TSO Unit

Specifies the default unit name for new users. For example, SYSALLDA.

UID Assignment

Specifies how UID and GID numbers are assigned to new users and groups. Select *Assign by Top Secret* or *Assign by Identity Vault*.

UID Range

Specifies a range of numbers used when Top Secret assigns UID numbers for new users. The REXX exec to add a new user uses this value with the RANGE keyword on the TSS command. Use a pair of values separated by a comma, similar to the following:

```
10000,200000
```

GID Range

Specifies a range of numbers used when Top Secret assigns GID numbers for new groups. The REXX exec to add a new group uses this value with the RANGE keyword on the TSS command. Use a pair of values separated by a comma, similar to the following:

```
10000,200000
```

Default Home Directory

Specifies the default OMVS home directory path for new users. Include the ending slash (/) in the directory path. The user's ACID is appended to the value that you specify. Use a value similar to the following:

```
/home/
```

In this example, the home directory that is assigned by the driver for a user whose ACID is IBMUSER is /home/IBMUSER.

Default Program

Specifies the default OMVS program (login shell). Use a value similar to the following:

```
/bin/sh
```

The Top Secret Connected System Accepts Passwords from the Identity Vault

Specifies whether the driver allows passwords to flow from the Identity Vault to the connected system.

The Identity Vault Accepts Passwords from the Top Secret Connected System

Specifies whether the driver allows passwords to flow from the connected system to the Identity Vault.

The Identity Vault Accepts Administrative Password Resets from the Top Secret Connected System

Specifies whether the driver allows passwords to be reset from the connected system in the Identity Vault. An administrative user can use the `TSS REPLACE` command to set another user's password.

Publish Passwords to NDS Password

Specifies whether the driver uses passwords from the connected system to set NDS[®] passwords in the Identity Vault. NDS passwords in the Identity Vault are not bidirectional and cannot be synchronized to another system.

Publish Passwords to Distribution Password

Specifies whether the driver uses passwords from the connected system to set NMAS[™] Distribution Passwords, which are used for Identity Manager password synchronization.

Require Password Policy Validation before Publishing Passwords

Specifies whether the driver applies NMAS password policies to published passwords. If so, a password is not written to the Identity Vault if it does not conform.

Reset User's External System Password to the Identity Manager Password on Failure

Specifies whether, on a publish Distribution Password failure, the driver attempts to reset the password on the connected system using the Distribution Password from the Identity Vault.

Notify the User of Password Synchronization Failure via E-Mail

Specifies whether the driver sends an e-mail to a user if the password cannot be synchronized.

User Base Container

Specifies the base container object in the Identity Vault for user synchronization. This container is used in the Subscriber channel Event Transformation policy to limit the Identity Vault objects being synchronized. This container is used in the Publisher channel Placement policy as the destination for adding objects to the Identity Vault. Use a value similar to the following:

```
users.myorg
```

Group Base Container

Specifies the base container object in the Identity Vault for group synchronization. This container is used in the Subscriber channel Event Transformation policy to limit the Identity Vault objects being synchronized. This container is used in the Publisher channel Placement policy as the destination when adding objects to the Identity Vault. Use a value similar to the following:

```
groups.myorg
```

5.2 The Driver Shim Configuration File

The driver shim configuration file controls operation of the driver shim. You can specify the configuration options listed in [Table 5-5](#), one per line. You can also specify these options on the command line. For details about driver shim command line values, see [Section C.1, “Driver Shim Command Line Options,”](#) on page 103.

The driver shim configuration file must be a sequential file or a member of a partitioned data set. The DRVCONF DD statement in the driver shim started task JCL identifies the driver shim configuration file. An example driver shim configuration file is provided in the driver samples library member DRVCONF.

Table 5-5 *Driver Shim Configuration File Statements*

Option (Short and Long Forms)	Description
<code>-conn <connString></code> <code>-connection <connString></code>	A string with connection options. Enclose the string in double quotes ("). If you specify more than one option, separate the options with spaces. <code>port=<driverShimPort></code> <code>ca=<Certificate Authority Key File></code>
<code>-hp <httpPort></code> <code>-httpport <httpPort></code>	Specifies the HTTP services port number. The default HTTP services port number is 8091. You can connect to this port to view log files. For details, see Section A.1.2, “The Trace File,” on page 73 and Section A.1.5, “The Status Log,” on page 74.
<code>-path <driverPath></code>	Specifies the path for driver files. The default path is <code>/opt/novell/tsdrv</code> .
<code>-sp <RLpassword>,<DOPassword>,<setpassword <RLpassword>,<DOPassword></code>	Sets the Remote Loader and Driver object passwords.
<code>-t <traceLevel></code> <code>-trace <traceLevel></code>	Sets the level of debug tracing. 0 is no tracing, and 10 is all tracing. For details, see Section A.1.2, “The Trace File,” on page 73. The output file location is specified by the <code>tracefile</code> option.
<code>-tf <fileName></code> <code>-tracefile <fileName></code>	Sets the trace file location. The default is <code>/opt/novell/tsdrv/logs/trace.log</code> .

Example Driver Shim Configuration File

```
-tracefile /opt/novell/tsdrv/logs/trace.log
-trace 3
-connection "ca=/opt/novell/tsdrv/keys/ca.pem"
-path /opt/novell/tsdrv/
```

5.3 Setting the Remote Loader and Driver Object Passwords

The Remote Loader password is used by the Metadirectory engine to authenticate itself to the driver shim (embedded Remote Loader). The Driver object password is used by the driver shim to authenticate itself to the Metadirectory engine.

These passwords are set during installation. You can set them at any time later using the procedures in the following sections. The corresponding passwords you set on the connected system and in the Identity vault must be identical.

- ♦ [Section 5.3.1, “Connected System,” on page 52](#)
- ♦ [Section 5.3.2, “Identity Vault,” on page 52](#)

5.3.1 Connected System

The Remote Loader and Driver object passwords are stored on the connected system under `/opt/novell/tsdrv/keys` in encrypted files `dpwdf40` (Driver object password) and `lpwdf40` (Remote Loader password).

To set the passwords on the connected system:

- 1 Run the REXX exec in the REXX exec library member `SETPWDS` and respond to the prompts.
- 2 Restart the driver shim started task.

5.3.2 Identity Vault

The Remote Loader and Driver object passwords are set for the driver through iManager and are stored in the Identity Vault. Each password on the connected system must exactly match its counterpart in the Identity vault.

To change the passwords in the Identity Vault after driver installation:

- 1 In iManager, navigate to the Driver Overview for the driver.
- 2 Click the driver icon.
- 3 Specify the Driver object password.
- 4 Specify the Remote Loader password.
The Remote Loader password follows the Authentication heading.
- 5 Click *Apply*.
- 6 Restart the driver.

5.4 Migrating Identities

When you first run the driver, you might have identities in the Identity Vault that you want to provision to the connected system, or vice versa. Identity Manager provides a built-in migration feature to help you accomplish this.

- ♦ [Section 5.4.1, “Migrating Identities from the Identity Vault to the Connected System,” on page 53](#)

- ♦ Section 5.4.2, “Migrating Identities from the Connected System to the Identity Vault,” on page 53
- ♦ Section 5.4.3, “Synchronizing the Driver,” on page 54

5.4.1 Migrating Identities from the Identity Vault to the Connected System

- 1 In iManager, open the Identity Manager Driver Overview for the driver.
- 2 Click *Migrate from Identity Vault*. An empty list of objects to migrate is displayed.
- 3 Click *Add*. A browse and search dialog box that allows you to select objects is displayed.
- 4 Select the objects you want to migrate, then click *OK*.

To view the results of the migration, click *View the Driver Status Log*. For details about the log, see [Section A.1.5, “The Status Log,” on page 74](#).

If a user has a Distribution Password, the Distribution Password is migrated to the connected system as the user’s password. Otherwise, no password is migrated. For information about Universal Passwords and Distribution Passwords, see the *Password Management Administration Guide* (http://www.novell.com/documentation/password_management/index.html).

5.4.2 Migrating Identities from the Connected System to the Identity Vault

- 1 In iManager, open the Identity Manager Driver Overview for the driver.
- 2 Click *Migrate into Identity Vault* to display the Migrate Data into the Identity Vault window.
- 3 Specify your search criteria:
 - 3a To view the list of eDirectory™ classes and attributes, click *Edit List*.
 - 3b Select class User or class Group.

IMPORTANT: Identity Manager imports objects by class in the order specified in the list. Migrate users before you migrate groups so that the users can be added to the newly created groups.

- 3c Select the attributes to be used as search criteria for objects of the selected class, then click *OK*.

The eDirectory attributes map to Top Secret attributes as specified by the driver schema: CN maps to ACID, etc. For the default mappings, see [Table 1-1, “Default Filter and Schema Mapping,” on page 17](#).

- 3d Specify values for the selected attributes, then click *OK*.

The values can include basic regular expressions. For details about basic regular expressions, use the OMVS `man grep` command.

- 4 Click *OK*.

To view the results of the migration, click *View the Driver Status Log*. For details about the log, see [Section A.1.5, “The Status Log,” on page 74](#).

Because local passwords cannot be retrieved from Top Secret, they cannot be submitted to the Metadirectory engine until they are changed. The password change exit routine captures password changes.

5.4.3 Synchronizing the Driver

To generate events for associated objects that have changed since the driver's last processing, open the Identity Manager Driver Overview page for the driver in iManager, then click *Synchronize*.

Customizing the Top Secret Driver

6

This section provides information about available resources for customizing the Identity Manager 3.6.1 driver for CA Top Secret.

Topics include

- ♦ [Section 6.1, “The Scriptable Framework,” on page 55](#)
- ♦ [Section 6.2, “The Connected System Schema File,” on page 57](#)
- ♦ [Section 6.3, “The Connected System Include/Exclude File,” on page 59](#)
- ♦ [Section 6.4, “Managing Additional Attributes,” on page 63](#)

For details about the filters and policies provided with the driver, see [Section 1.2.4, “Filter and Schema Mapping,” on page 16](#) and [Section 1.2.5, “Policies,” on page 17](#).

6.1 The Scriptable Framework

The driver provides a comprehensive scriptable framework that you can use to add to the built-in support for the security system, and to add support for other applications and security system fields that have been customized for a particular installation.

The driver scriptable framework includes components that simplify the job of extending the driver to support new applications and fields.

- ♦ Embedded Remote Loader
 - ♦ Full SSL support, and an installer to easily configure the certificates
 - ♦ Web access to debugging information from the embedded Remote Loader
- ♦ Encrypted change log that stores changes from the application to the Identity Vault if there is a communication problem
- ♦ Loopback detection system to prevent subscribed events from being published back to the Identity Vault
- ♦ z/OS name/token callable services helper programs that provide for securely passing large variables to and from the REXX execs
- ♦ Easily extendable connected system schema file to support any application
- ♦ Include/exclude file for simplified testing and deployment by the platform administrator
- ♦ Event support, both for applications that have exits or callouts, and for applications that must be polled for changes

The names of objects and attributes in the REXX execs are the names specified in the connected system schema file.

The following tables describe the major REXX execs.

Table 6-1 *Identity Vault Command Processing Execs*

REXX Exec	Identity Vault Event
IDMADDG	Add Group
IDMADDU	Add User
IDMCONNU	Add User to Group
IDMDELG	Delete Group
IDMDELU	Delete User
IDMDSABL	Disable User
IDMENABL	Enable User
IDMMODG	Modify Group
IDMMODPW	Password Change
IDMMODU	Modify User
IDMQUERY	Query
IDMRENG	Rename Group
IDMRENU	Rename User
IDMRMVU	Remove User from Group

Table 6-2 *Other Execs*

REXX Exec	Purpose
IDMSUB	Calls the appropriate command processing exec based on the type of event and object. This is executed for every Subscriber event.
IDMPOLL	Not used for CA Top Secret. You can use this exec as needed to support your own applications if they do not generate events when changes are made.
IDMHRBT	Heartbeat exec.
IDMGLBLS	Holds configurable options that all REXX execs can use during event processing.
IDMSTATS	Sends a status document to report the health of the application.
IDMTSOEX	Executes a TSO command and returns the command return code and command output.
SETPWDS	Sets the Remote Loader and Driver object passwords, which are used to authenticate and authorize the connection between the driver shim started task and the Metadirectory system.

REXX Exec	Purpose
SETCERT	Retrieves the certificate authority for the Metadirectory engine that uses SSL to communicate with the driver shim started task.

6.2 The Connected System Schema File

The schema file on the connected system is used to specify the classes and attributes that are available on the system.

The schema file is read by the driver shim when the Metadirectory engine requests it. This typically happens at driver startup. The schema file is also used by the Policy Editor to map the schema of the Identity Vault to the schema of the external application.

If you change the schema file, you must restart the driver shim and the driver.

The REXX execs that are provided with the driver depend on the classes and attributes in the schema file that is provided with the driver.

The connected system schema file must be a sequential file or a member of a partitioned data set. The SCHEMDEF DD statement in the driver shim started task JCL identifies the schema file. An example schema file with the required classes and attributes is provided in the driver samples library member SCHEMDEF.

- ♦ [Section 6.2.1, “Schema File Syntax,” on page 57](#)
- ♦ [Section 6.2.2, “Example Schema File,” on page 58](#)

6.2.1 Schema File Syntax

Each line in the schema file represents an element and must begin with the element name: SCHEMA, CLASS, or ATTRIBUTE.

The first element of the schema file is the schema definition. The schema definition is followed by class definitions. Each class definition can contain attribute definitions.

Except for the values of class and attribute names, the contents of the schema file are case insensitive.

Comments

Lines that begin with an octothorpe (#) are comments.

```
# This is a comment.
```

Schema Definition

The first line in the schema file that is not a comment must be the schema definition.

```
SCHEMA [HIERARCHICAL]
```

HIERARCHICAL specifies that the target application is not a flat set of users and groups, but is organized by hierarchical components, such as a directory-based container object.

Class Definition

```
CLASS className [CONTAINER]
```

You must specify a class name. Enclose the class name in double quotes (") if it contains spaces.

Add the CONTAINER keyword if objects of this class can contain other objects.

The class definition is ended by another class definition or by the end of the file.

Attribute Definition

Any number of attribute definitions can follow a class definition. Attribute definitions define attributes for the class whose definition they follow.

```
ATTRIBUTE attributeName [TypeAndProperties]
```

An attribute name is required. Enclose the attribute name in double quotes (") if it contains spaces.

If no attribute type is specified, the attribute has the string type. The allowable types are:

- ♦ STRING
- ♦ INTEGER
- ♦ STATE
- ♦ DN

The allowable attribute properties are:

- ♦ REQUIRED
- ♦ NAMING
- ♦ MULTIVALUED
- ♦ CASESENSITIVE
- ♦ READONLY

6.2.2 Example Schema File

For a complete example connected system schema file, see the driver samples library member SCHEMDEF. An excerpt from that file follows.

```
SCHEMA
```

```
CLASS USER

  ATTRIBUTE ACID NAMING REQUIRED
  ATTRIBUTE ACTION MULTIVALUED
  ATTRIBUTE AFTER
  ATTRIBUTE AUDIT STATE
  ATTRIBUTE AUTOUID STATE
  . . .
  ATTRIBUTE XCOMMAND MULTIVALUED
  ATTRIBUTE XSUSPEND STATE
  ATTRIBUTE XTRANSACTIONS
```

CLASS GROUP

ATTRIBUTE ACID NAMING REQUIRED
ATTRIBUTE AUTOGID STATE
ATTRIBUTE GID

6.3 The Connected System Include/Exclude File

You can use an optional include/exclude file on the connected system to control which identities are or are not synchronized from the Identity Vault to the connected system.

To control which objects are synchronized from the connected system to the Identity Vault, use policies. For details about customizing policies, see the *Policy Builder and Driver Customization Guide* on the [Identity Manager 3 Documentation Web site \(http://www.novell.com/documentation/idm/index.html\)](http://www.novell.com/documentation/idm/index.html).

The connected system include/exclude file must be a sequential file or a member of a partitioned data set. The INCEXC DD statement in the driver shim started task JCL identifies the include/exclude file. An example include/exclude file that excludes many common z/OS users and groups, such as JES, OMVS, and INIT, is provided in the driver samples library member INCEXC.

The file is read when the driver shim starts. If you make changes to it, you must restart the driver shim.

The include/exclude file can contain include rules and exclude rules. To ensure optimal performance, each include/exclude file should contain no more than 50 entries total.

You can use the include/exclude file to phase in your deployment of the driver, excluding most users and groups at first, and then adding more as you gain confidence and experience.

- ♦ [Section 6.3.1, “Include/Exclude Processing,” on page 59](#)
- ♦ [Section 6.3.2, “Include/Exclude File Syntax,” on page 60](#)
- ♦ [Section 6.3.3, “Example Include/Exclude Files,” on page 62](#)

6.3.1 Include/Exclude Processing

Identity Vault events for identities that match an exclude rule are discarded by the Subscriber shim.

Included identities are treated normally by the Subscriber shim.

Identities that do not match an include rule or an exclude rule in the file are included.

Identities are matched in the following priority:

1. Exclude rules
2. Include rules

Within each level of this matching priority, identities are matched against rules in the order that the rules appear in the file. The first rule that matches determines whether the identity is included or excluded.

6.3.2 Include/Exclude File Syntax

Except for class names, attribute names, and the values to match, the contents of the include/exclude file are case insensitive.

The Subscriber Creation policy converts object names to uppercase. Use uppercase names in the include/exclude file to match identities.

The include/exclude file can contain any number of include sections, exclude sections, and single-line rules.

Include sections and exclude sections can contain class matching rules, and class matching rules can contain attribute matching rules. Include sections and exclude sections can also contain association matching rules.

Class and attribute names used in the include/exclude file must correspond to the names specified in the schema file. For details about the schema file, see [Section 6.2, “The Connected System Schema File,” on page 57](#).

Comments

Lines that begin with an octothorpe (#) are comments.

```
# This is a comment.
```

Include and Exclude Sections

Include and exclude sections provide rules to specify which objects are to be included or excluded from synchronization.

An include section begins with an include line and ends with an endinclude line.

```
INCLUDE
.
.
.
ENDINCLUDE
```

An exclude section begins with an exclude line and ends with an endexclude line.

```
EXCLUDE
.
.
.
ENDEXCLUDE
```

You can use class matching rules and association matching rules within an include section and an exclude section.

Class Matching Rules

Use a class matching rule within an include section or an exclude section to specify the name of a class of objects to include or exclude.

A class matching rule is defined by a class line that specifies the name of the class and ends with an endclass line.

```

CLASS className
.
.
.
ENDCLASS

```

You can use attribute matching rules within a class matching rule.

Attribute Matching Rules

You can use attribute matching rules within a class matching rule to limit the objects that are included or excluded. If no attribute matching rules are specified for a class, all objects of the specified class are included or excluded.

An attribute matching rule comprises an attribute name, an equals sign (=), and an expression. The expression can be an exact value, or it can use limited regular expressions. For details about limited regular expressions, see [“Limited Regular Expressions” on page 62](#).

```
attributeName=expression
```

Multiple attribute matching rules can be specified for a given class.

Attribute matching rules within a class matching rule are logically ANDed together. To logically OR attribute matching rules for a class, specify multiple class matching rules. For example, the following include/exclude file excludes both user01 and user02:

```

# Exclude the User object if its ACID is USER01 or USER02.
EXCLUDE
CLASS USER
    ACID=USER01
ENDCLASS
CLASS USER
    ACID=USER02
ENDCLASS
ENDEXCLUDE

```

Association Matching Rules

You can specify association matching rules in an include or exclude section. Association matching rule expressions can specify an exact association or a limited regular expression. For details about limited regular expressions, see [“Limited Regular Expressions” on page 62](#).

By default, an association is the ACID. Association formation can be customized in the Subscriber REXX execs.

For example, to exclude the root user, specify

```

EXCLUDE
    ROOT
ENDEXCLUDE

```

Single-Line Rules

```
INCLUDE|EXCLUDE [className] objectSelection
```

Where *objectSelection* can be

```
{associationMatch | attributeName=expression}
```

You must specify whether the rule is to include or exclude the objects it matches.

You can specify a class name to limit matches to only objects of that class.

You must specify either an association or an attribute matching expression. The syntax of the association and attribute matching expression is the same as that of association matching rules and attribute matching rules previously described. For details, see [“Association Matching Rules” on page 61](#) and [“Attribute Matching Rules” on page 61](#).

For example, to ignore events from the Admin user in the Identity Vault:

```
# Do not subscribe to events for the Admin user.
EXCLUDE ADMIN
```

Limited Regular Expressions

A limited regular expression is a pattern used to match a string of characters.

Character matching is case sensitive.

Any literal character matches that character.

A period (.) matches any single character.

A bracket expression is a set of characters enclosed by left ([) and right (]) brackets that matches any listed character. Within a bracket expression, a range expression is a pair of characters separated by a hyphen, and is equivalent to listing all of the characters that sort between the given characters. For example, [0–9] matches any single digit.

An asterisk (*) indicates that the preceding item is matched zero or more times.

A plus sign (+) indicates that the preceding item is matched one or more times.

A question mark (?) indicates that the preceding item is matched zero or one times.

You can use parentheses to group multiple expressions into a single item. For example, (abc) + matches abc, abcab, abcabc, etc. Nesting of parentheses is not supported.

6.3.3 Example Include/Exclude Files

Example 1

```
# Exclude users whose names start with TEMP
EXCLUDE
    CLASS USER
        ACID=TEMP.*
    ENDClass
ENDEXCLUDE
```

Example 2

```
# Exclude USERA and USERB
# Because attribute rules are ANDed, these must be in separate
# CLASS sections.
EXCLUDE
    CLASS USER
        ACID=USERA
```

```
ENDCLASS
CLASS USER
    ACID=USERB
ENDCLASS
ENDEXCLUDE
```

6.4 Managing Additional Attributes

You can add additional attributes to the driver for both the Publisher and Subscriber channels. These attributes can be accessed by the REXX execs for all event types.

To publish or subscribe to additional attributes, you must add them to the filter and add support for them into the REXX execs.

- ♦ [Section 6.4.1, “Modifying the Filter,” on page 63](#)
- ♦ [Section 6.4.2, “Modifying the REXX Execs for New Attributes,” on page 63](#)
- ♦ [Section 6.4.3, “Modifying the Publisher Channel for Additional Top Secret Fields,” on page 64](#)

6.4.1 Modifying the Filter

- 1 On the iManager Driver Overview page for the driver, click the *Filter* icon on either the Publisher or Subscriber channel. It is the same object.
- 2 In the Filter Edit dialog box, click the class containing the attribute to be added.
- 3 Click *Add Attribute*, then select the attribute from the list.
- 4 Select the flow of this attribute for the Publisher and Subscriber channels.
 - ♦ **Synchronize:** Changes to this object are reported and automatically synchronized.
 - ♦ **Ignore:** Changes to this object are not reported and not automatically synchronized.
 - ♦ **Notify:** Changes to this object are reported, but not automatically synchronized.
 - ♦ **Reset:** Resets the object value to the value specified by the opposite channel. (You can set this value on either the Publisher or Subscriber channel, but not both.)
- 5 Click *Apply*.

If you want to map this attribute to an existing attribute in the connected system schema file, modify the Schema Mapping policy for the driver.

For complete details about managing filters and Schema Mapping policies, see the *Policy Builder and Driver Customization Guide* on the [Identity Manager 3.6.1 Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36).

6.4.2 Modifying the REXX Execs for New Attributes

In the Subscriber channel, a specific REXX exec is called to take the appropriate action for each type of event. For example, if the additional attribute is required for adds and modifies of users, modify `IDMADDU` and `IDMMODU` to process the additional attribute.

Publishing additional attributes requires that you act on changes made in the source application.

6.4.3 Modifying the Publisher Channel for Additional Top Secret Fields

New field names can be added to the Top Secret Field Descriptor Table (FDT). This table also allows installations to remap existing fields to additional data, supplied by the customer. For more information about the FDT, see your Top Secret documentation.

The Publisher channel makes use of Java classes and XSLT to help you publish new field names for a customized Top Secret installation.

TSO commands, such as TSS, are sent from the change log to the Identity Manager Input Transformation Policies as the original command that was entered by the user, including all keywords and operand values that were supplied. A set of helper functions, written in Java, helps you to parse these keywords appropriately with XSLT, through the use of XSLT Java extension calls.

The default Input Transformation is named TSO (TSS) Input Transformation, and is the first policy to act on data for the Publisher channel. This policy is implemented as an XSLT script. When invoked by the processor, the script retrieves a parser that is created once per lifetime of the Identity Manager JVM* instance and is unique to this particular driver instance and command instance. The parser registers known keywords, and you can register custom keywords. After being registered, the parser is invoked to parse the command image and produces a node set containing a single XML document that represents the command image. This document can then be transformed into XDS documents for event types processed by the Metadirectory engine.

The following table describes the Java classes and methods.

Table 6-3 Java Classes and Methods

Java Class	Java Method	Description
TSOCommandParser	static TSOCommandParser registerParser(String name, String driver)	Static method that creates a new TSOCommandParser object with a uniquely specified name and driver string
TSOCommandParser	static boolean hasParser(String name, String driver)	Static method that returns true if a parser is available or false if one is not
TSOCommandParser	static TSOCommandParser getParser(String name, String driver)	Static method that returns the parser that has been registered previously
TSOCommandParser	void registerCommand(String cmd)	Registers a TSO command with this parser instance
TSOCommandParser	NodeSet parse(String cmd)	Parses the TSO command and returns a NodeSet that can be used for XSLT processing
TSOCommand	TSOCommand(String name)	Constructor method to create a new TSO command with a case-insensitive command string prefix
TSOCommand	void registerKeyword(TSOKeyword keyword)	Registers a keyword to be associated with this TSOCommand instance

Java Class	Java Method	Description
TSOCommand	void registerPositional(TSOPositional pos)	Registers a positional parameter to be associated with this TSOCommand instance
TSOKeyword	TSOKeyword(String name)	Constructor method to create a new TSO keyword instance with a case-insensitive keyword string value
TSOKeyword	void registerKeyword(TSOKeyword keyword)	Registers a sub-keyword for this TSOKeyword instance
TSOKeyword	void registerPositional(TSOPositional pos)	Registers a positional parameter to be associated with this TSOCommand instance
TSOKeyword	void setDefaultValue(String v)	Assigns a default value for a keyword that contains a value during parsing
TSOKeyword	void setImpliedName(String n)	Assigns a name to be used to describe the keyword in lieu of its string name
TSOKeyword	void mapValue(String key, String value)	Assigns a mapped value to the key string when found during parsing
TSOKeyword	void sensitive()	Sets this keyword to be case sensitive by using the XML attribute <code>is-sensitive=true</code>

Using the Top Secret Driver

7

This section provides information about operational tasks commonly used with the Identity Manager 3.6.1 driver for CA Top Secret.

Topics include

- [Section 7.1, “Starting and Stopping the Driver,” on page 67](#)
- [Section 7.2, “Starting and Stopping the Change Log Started Task,” on page 67](#)
- [Section 7.3, “Starting and Stopping the Driver Shim Started Task,” on page 67](#)
- [Section 7.4, “Displaying Driver Shim Status,” on page 68](#)
- [Section 7.5, “Changing the Driver Shim Trace Level,” on page 68](#)
- [Section 7.6, “Monitoring Driver Messages,” on page 68](#)

7.1 Starting and Stopping the Driver

To start the driver:

- 1 In iManager, navigate to the Driver Overview for the driver.
- 2 Click the upper right corner of the driver icon.
- 3 Click *Start driver*.

To stop the driver:

- 1 In iManager, navigate to the Driver Overview for the driver.
- 2 Click the upper right corner of the driver icon.
- 3 Click *Stop driver*.

7.2 Starting and Stopping the Change Log Started Task

The change log started task must be run on each system that shares the security system database.

To start the change log started task, issue the following operator command:

```
START LDXLOGR
```

To stop the change log started task, issue the following operator command:

```
STOP LDXLOGR
```

7.3 Starting and Stopping the Driver Shim Started Task

The driver shim started task must be run on only one system that shares the security system database.

To start the driver shim started task, issue the following operator command:

```
START TSDRV
```

To stop the driver shim started task, issue the following operator command:

```
STOP TSDRV
```

7.4 Displaying Driver Shim Status

To see status and version information for the driver shim, issue the following operator command:

```
MODIFY TSDRV,APPL=STATUS
```

You can use the LDXSERV TSO command to display information about the Publisher channel event subsystem. Enter the following TSO command:

```
LDXSERV STATUS
```

To use the LDXSERV command, you must include the driver load library in your STEPLIB concatenation.

7.5 Changing the Driver Shim Trace Level

To change the trace level setting for the driver shim, issue the following operator command with the desired trace level:

```
MODIFY TSDRV,APPL='CTL(desired_trace_level)'
```

For example

```
MODIFY TSDRV,APPL='CTL(9)'
```

For details about the trace file and trace levels, see [Section A.1.2, “The Trace File,” on page 73](#).

7.6 Monitoring Driver Messages

The driver shim started task writes messages to the system console, SYSLOG, and the driver operational log. The driver operational log data set is defined by the DRVLOG DD statement in the TSDRV started task JCL. Monitor driver activity there in the same way you monitor other key system functions. For details about the messages written by the driver, see [Appendix B, “System and Error Messages,” on page 81](#).

Securing the Top Secret Driver

8

This section describes best practices for securing the Identity Manager 3.6.1 driver for CA Top Secret. Topics include

- ♦ Section 8.1, “Using SSL,” on page 69
- ♦ Section 8.2, “Physical Security,” on page 69
- ♦ Section 8.3, “Network Security,” on page 69
- ♦ Section 8.4, “Auditing,” on page 69
- ♦ Section 8.5, “Driver Security Certificates,” on page 70
- ♦ Section 8.6, “Driver REXX Execs,” on page 70
- ♦ Section 8.7, “The Change Log,” on page 70
- ♦ Section 8.8, “Driver Passwords,” on page 70
- ♦ Section 8.9, “Driver Code,” on page 71
- ♦ Section 8.10, “Administrative Users,” on page 71
- ♦ Section 8.11, “Connected Systems,” on page 71

For additional information about Identity Manager security, see the *Novell® Identity Manager 3.6.1 Administration Guide* on the [Identity Manager 3.6.1 Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36).

8.1 Using SSL

Enable SSL for communication between the Metadirectory engine and the driver shim on the connected system. For more information, see “[Use SSL](#)” on page 45.

If you don’t enable SSL, you are sending information, including passwords, in the clear.

8.2 Physical Security

Keep your servers in a physically secure location with access by authorized personnel only.

8.3 Network Security

Require users outside of the corporate firewall to use a VPN to access corporate data.

8.4 Auditing

Track changes to sensitive information. Examine audit logs periodically.

For details about using Novell Audit to monitor driver operation, see the [Novell Audit Documentation Web site \(http://www.novell.com/documentation/novellaudit20/index.html\)](http://www.novell.com/documentation/novellaudit20/index.html).

For details about auditing Top Secret, see your *CA Top Secret Auditor Guide*.

8.5 Driver Security Certificates

SSL uses security certificates to control, encrypt, and authenticate communications.

Ensure that the security certificate directory `/opt/novell/tsdrv/keys` is appropriately protected. The installation program sets secure file permissions for this directory.

The Driver Shim and the Identity Manager engine communicate through SSL using a certificate created in the Identity Vault and retrieved by the driver shim during the installation process. For more information on this certificate and how to renew or install third-party certificates, refer to the *Identity Manager Administration Guide*.

The Embedded Remote Loader web interface uses a dynamically generated, self-signed certificate for SSL communication. The details of this certificate are as follows:

Table 8-1 Security Certificate Details

Property Name	Values / Parameters
Subject	SSL Server
Issuer	SSL Server
Validity	1 year
Serial Number	0
Key	1024-bit RSA

Renewal of this certificate automatically occurs when the Driver Shim is restarted on the connected platform.

8.6 Driver REXX Execs

The driver uses REXX execs to perform updates on the connected system, and to collect changes made there.

Ensure that the driver REXX exec library is appropriately protected.

8.7 The Change Log

The change log data set contains information about events on the connected system, including passwords. It is encrypted, but it should be protected against access by unauthorized users.

Ensure that the change log data set is appropriately protected.

8.8 Driver Passwords

Use strong passwords for the Driver object and Remote Loader passwords, and restrict knowledge of them to authorized personnel. These passwords are stored in encrypted form in the security certificate directory `/opt/novell/tsdrv/keys`. The installation program sets secure file permissions for this directory.

8.9 Driver Code

Ensure that the driver load library is appropriately protected.

Do not put the driver load library in the linklist unless you use program protection to secure its contents against unauthorized use.

8.10 Administrative Users

Ensure that accounts with elevated rights on the Metadirectory system, Identity Vault systems, and the connected systems are appropriately secure. Protect administrative user IDs with strong passwords.

8.11 Connected Systems

Ensure that connected systems can be trusted with account information, including passwords, for the portion of the tree that is configured as their base containers.

Troubleshooting

A

This section provides information about troubleshooting the Identity Manager 3.6.1 driver for CA Top Secret. Topics include

- ♦ [Section A.1, “Driver Status and Diagnostic Files,” on page 73](#)
- ♦ [Section A.2, “Troubleshooting Common Problems,” on page 75](#)

A.1 Driver Status and Diagnostic Files

There are several log files that you can view to examine driver operation.

- ♦ [Section A.1.1, “The System Log,” on page 73](#)
- ♦ [Section A.1.2, “The Trace File,” on page 73](#)
- ♦ [Section A.1.3, “The REXX Exec Output File,” on page 74](#)
- ♦ [Section A.1.4, “DSTRACE,” on page 74](#)
- ♦ [Section A.1.5, “The Status Log,” on page 74](#)
- ♦ [Section A.1.6, “The Operational Log,” on page 75](#)
- ♦ [Section A.1.7, “Change Log Started Task Message Log,” on page 75](#)

A.1.1 The System Log

SYSLOG is used by the driver shim to record urgent, informational, and debug messages. Examining these should be foremost in your troubleshooting efforts. For detailed message documentation, see [Appendix B, “System and Error Messages,” on page 81](#).

A.1.2 The Trace File

The default trace file exists on the connected system at `/opt/novell/tsdrv/logs/trace.log`. A large amount of debug information can be written to this file. Use the trace level setting in the driver shim configuration file to control what is written to the file. For details about the driver shim configuration file, see [Section 5.2, “The Driver Shim Configuration File,” on page 51](#).

Table A-1 *Driver Shim Trace Levels*

Trace Level	Description
0	No debugging.
1–3	Identity Manager messages. Higher trace levels provide more detail.
4	Previous level plus Remote Loader, driver, driver shim, and driver connection messages.
5–7	Previous level plus change log and loopback messages. Higher trace levels provide more detail.

Trace Level	Description
8	Previous level plus driver status log, driver parameters, driver security, driver Web server, driver schema, driver encryption, and driver include/exclude file messages.
9	Previous level plus low-level networking and operating system messages.
10	Previous level plus maximum low-level program details (all options).

The following is an example the driver shim configuration file line to set the trace level:

```
-trace 9
```

To view the trace file:

- 1 Use a Web browser to access the driver shim at `https://driver-address:8091`. Substitute the DNS name or IP address of your driver for *driver-address*.
- 2 Authenticate by using any user name and the password that you specified as the Remote Loader password.
- 3 Click *Trace*.

A.1.3 The REXX Exec Output File

Output from the REXX execs is written to ddname SYSTSPRT of the driver shim started task. This file captures the standard error output from all execs executed by the driver shim.

A.1.4 DSTRACE

You can view Identity Manager information using the DSTRACE facility on the Metadirectory server. Use iManager to set the tracing level. For example, trace level 2 shows Identity Vault events in XML documents, and trace level 5 shows the results of policy execution. Because a high volume of trace output is produced, we recommend that you capture the trace output to a file. For details about using DSTRACE, see the *Novell® Identity Manager 3.6.1 Administration Guide* on the [Identity Manager 3.6.1 Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36).

A.1.5 The Status Log

The status log is a condensed summary of the events that have been recorded on the Subscriber and Publisher channels. This file exists on the connected system at `/opt/novell/tsdrv/logs/dirxml.log`. You can also view the status log in iManager on the Driver Overview page. You can change the log level to specify what types of events to log. For details about using the status log, see the *Novell Identity Manager 3.6.1 Administration Guide* on the [Identity Manager 3.6.1 Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36).

To view the status log:

- 1 Use a Web browser to access the driver shim at `https://driver-address:8091`. Substitute the DNS name or IP address of your driver for *driver-address*.
- 2 Authenticate by using any user name and the password that you specified as the Remote Loader password.
- 3 Click *Status*.

A.1.6 The Operational Log

The operational log contains both important and informational messages that indicate the operational status of the driver shim. These messages indicate items that are not urgent enough to warrant operator response, but useful for tracking the progress of the driver. The location of the operational log is specified by the DRVLOG DD statement in the driver shim started task JCL.

A.1.7 Change Log Started Task Message Log

The change log started task writes important and informational messages to ddname SYSPRINT.

A.2 Troubleshooting Common Problems

- ♦ [Section A.2.1, “Driver Shim Installation Failure,” on page 75](#)
- ♦ [Section A.2.2, “Driver Rules Installation Failure,” on page 75](#)
- ♦ [Section A.2.3, “Schema Update Failure,” on page 75](#)
- ♦ [Section A.2.4, “Driver Certificate Setup Failure,” on page 76](#)
- ♦ [Section A.2.5, “Driver Start Failure,” on page 76](#)
- ♦ [Section A.2.6, “Driver Shim Startup or Communication Failure,” on page 77](#)
- ♦ [Section A.2.7, “Users or Groups Are Not Provisioned to the Connected System,” on page 77](#)
- ♦ [Section A.2.8, “Users or Groups Are Not Provisioned to the Identity Vault,” on page 77](#)
- ♦ [Section A.2.9, “Identity Vault User Passwords Are Not Provisioned to the Connected System,” on page 78](#)
- ♦ [Section A.2.10, “Connected System User Passwords Are Not Provisioned to the Identity Vault,” on page 78](#)
- ♦ [Section A.2.11, “Users or Groups Are Not Modified, Deleted, Renamed, or Moved,” on page 79](#)
- ♦ [Section A.2.12, “Change Log Errors,” on page 79](#)

A.2.1 Driver Shim Installation Failure

Ensure that you use binary mode to FTP the driver samples library, load library, and REXX exec library XMT files to the target system.

A.2.2 Driver Rules Installation Failure

Ensure that you use a version of iManager compatible with your version of Identity Manager.

A.2.3 Schema Update Failure

- ♦ Examine the log file at `/var/nds/schema.log`.
- ♦ Ensure that you specify the correct parameters (host name, Admin FDN in dotted format, and password).
- ♦ Ensure that you have network connectivity to the Metadirectory server.

A.2.4 Driver Certificate Setup Failure

To set up certificates, the driver shim communicates with the Metadirectory server using the LDAP secure port (636).

- ♦ Ensure that eDirectory™ is running LDAP with SSL enabled. For details about configuring eDirectory, see the *Novell eDirectory Administration Guide*.
- ♦ Ensure that the connected system has network connectivity to the Metadirectory server.

You can use the driver REXX exec library member `SETCERT` to configure the certificate at any time.

If you cannot configure SSL using LDAP, you can install the certificate manually.

- 1 In iManager, browse the Security container to locate your tree's certificate authority (typically named *treeName* CA).
- 2 Click the certificate authority object.
- 3 Click *Modify Object*.
- 4 Select the *Certificates* tab.
- 5 Click *Public Key Certificate*.
- 6 Click *Export*.
- 7 Select *No* to export the certificate without the private key, then click *Next*.
- 8 Select *Base64 format*, then click *Next*.
- 9 Click *Save the exported certificate to a file*, then specify a location to save the file.
- 10 Use FTP or another method to store the file on the connected system as `/opt/novell/tsdrv/keys/ca.pem`.

A.2.5 Driver Start Failure

- ♦ Examine the **status log** and **DSTRACE** output.
- ♦ The driver must be specified as a Remote Loader driver. You can set this option in the iManager Driver Edit Properties window.
- ♦ You must activate both Identity Manager and the driver within 90 days. The Driver Set Overview page in iManager shows when Identity Manager requires activation. The Driver Overview page shows when the driver requires activation.

For details about activating Novell Identity Manager Products, see the *Identity Manager 3.6.1 Installation Guide* on the [Identity Manager 3.6.1 Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36).

- ♦ Ensure that the driver load library is APF-authorized.
You can use the `DISPLAY PROG,APF` operator command to display your APF-authorized libraries.
- ♦ Ensure that the `LDXSERV` and `SAFQUERY` commands are listed as authorized TSO commands in your active `IKJTSOxx` member.
You can use the `DISPLAY IKJTSO,AUTHCMD` operator command to display authorized TSO commands.

For more information about troubleshooting Identity Manager engine errors, see the [Identity Manager 3.6.1 Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36).

A.2.6 Driver Shim Startup or Communication Failure

- ♦ Examine the [trace file](#).
- ♦ Ensure that the connected system's operating system and security system versions are supported. For a list of supported operating systems, see [“Connected System Requirements” on page 24](#).
- ♦ Apply all maintenance for your operating system and security system.
- ♦ Ensure that the Remote Loader and Driver object passwords that you specified while setting up the driver on the Metadirectory server match the passwords stored with the driver shim.
To update these passwords on the connected system, use the SETPWDS REXX exec. The passwords are stored under /opt/novell/tsdrv/keys in encrypted files dpwdf40 (Driver object password) and lpwdf40 (Remote Loader password).
To update these passwords on the Metadirectory server, use iManager to update the driver configuration. For details, see [Section 5.1.2, “Driver Configuration Page,” on page 45](#).
- ♦ Ensure that the correct host name and port number of the connected system are specified in the Driver Configuration Remote Loader connection parameters. You can change the port number (default 8090) in the driver shim configuration file.
- ♦ Ensure that the user ID that the driver shim started task uses has been set up properly. For details, see [“Preparing User IDs for the Started Tasks” on page 31](#).
- ♦ Ensure that only one system in a complex that shares the security system database is running the driver shim started task.

A.2.7 Users or Groups Are Not Provisioned to the Connected System

- ♦ Examine the [status log](#), [DSTRACE](#) output, [trace file](#), and [REXX exec output file](#).
- ♦ To be provisioned, users and groups must be in the appropriate base container. You can view and change the base containers in iManager on the Global Configuration Values page of the Driver Edit Properties window. For more details, see [Section 5.1.3, “Global Configuration Values Page,” on page 47](#).
- ♦ To provision identities from the Identity Vault to the connected system, the driver Data Flow property must be set to Bidirectional or Identity Vault to Application. To change this value, re-import the driver rules file over your existing driver.
- ♦ The user that the driver is security equivalent to must have rights to read information from the base container. For details about the rights required, see [Table 2-2, “Base Container Rights Required by the Driver Security-Equivalent User,” on page 21](#).

A.2.8 Users or Groups Are Not Provisioned to the Identity Vault

- ♦ Examine the [status log](#), [DSTRACE](#) output, and [trace file](#).
- ♦ Examine the *User Base Container* and *Group Base Container* GCV values. For more details, see [Section 5.1.3, “Global Configuration Values Page,” on page 47](#).

- ♦ To provision identities from the connected system to the Identity Vault, the driver Data Flow property must be set to Bidirectional or Application to Identity Vault. To change this value, re-import the driver rules file over your existing driver.
- ♦ The user that the driver is security equivalent to must have rights to update the base container. For details about the rights required, see [Table 2-2, “Base Container Rights Required by the Driver Security-Equivalent User,” on page 21.](#)
- ♦ Ensure that the security system exit has been installed, that LLA has been refreshed, and that the exit has been activated. For details, see [Section 3.8.8, “Installing the Driver Security System Exit IDMTSSIX,” on page 33.](#)

A.2.9 Identity Vault User Passwords Are Not Provisioned to the Connected System

- ♦ Examine the [status log](#), [DSTRACE](#) output, and [REXX exec output file](#).
- ♦ Several password management properties are available in iManager on the Global Configuration Values page of the Driver Edit Properties window. Ensure that the connected system accepts passwords from the Identity Vault. To determine the right settings for your environment, view the help for the options, or see the *Novell Identity Manager 3.6.1 Administration Guide* on the [Identity Manager 3.6.1 Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36).
- ♦ Ensure that the user’s container has an assigned Universal Password policy and that the *Synchronize Distribution Password When Setting Universal Password* option is set for this policy.

A.2.10 Connected System User Passwords Are Not Provisioned to the Identity Vault

- ♦ Examine the [status log](#), [DSTRACE](#) output, and the [trace file](#).
- ♦ Several password management properties are available in iManager on the Global Configuration Values page of the Driver Edit Properties window. Ensure that at least one of the following options is set:
 - ♦ *The Identity Vault Accepts Passwords from the Top Secret Connected System*
 - ♦ *The Identity Vault Accepts Administrative Password Resets from the Top Secret Connected System*

To determine the right settings for your environment, view the help for the options, or see the *Novell Identity Manager 3.6.1 Administration Guide* on the [Identity Manager 3.6.1 Documentation Web site \(http://www.novell.com/documentation/idm36\)](http://www.novell.com/documentation/idm36).

- ♦ If the *Require Password Policy Validation before Publishing Passwords* GCV is set, the user’s password must satisfy the password rules in the password policy assigned to the user container.
- ♦ Ensure that the change log started task is running on all systems that share the security system database.
- ♦ Ensure that the security system exit has been installed, that LLA has been refreshed, and that the exit has been activated. For details, see [Section 3.8.8, “Installing the Driver Security System Exit IDMTSSIX,” on page 33.](#)

A.2.11 Users or Groups Are Not Modified, Deleted, Renamed, or Moved

- ♦ Examine the **status log**, **DSTRACE** output, **trace file**, and **REXX exec output file**.
- ♦ Examine the driver Data Flow setting to verify the authoritative source for identities.
- ♦ Identity Vault and connected system identities must be associated before events are synchronized. To view an identity's associations, use Modify User/Group in iManager and click the *Identity Manager* tab. You can migrate identities to establish associations. For details, see **Section 5.4, "Migrating Identities," on page 52**.
- ♦ Identity Vault move events can remove the identity from the base container monitored by the driver to a container that is not monitored by the driver. This makes the move appear to be a delete.
- ♦ Moving a user or group is not supported by Top Secret.

A.2.12 Change Log Errors

- ♦ Examine the **change log started task messages**.
- ♦ Ensure that the change log started task is running on all systems that share the security system database.
- ♦ Ensure that the user ID that the change log started task uses has been set up properly. For details, see **"Preparing User IDs for the Started Tasks" on page 31**.
- ♦ Ensure that you initialized the change log data set during installation. For details about initializing the change log data set, see **Section 3.8.5, "Allocating and Initializing the Change Log Data Set," on page 30**.
- ♦ You can use the LDXSERV TSO command to display information about the change log data set. Enter the following TSO command:

```
LDXSERV STATUS
```

To use the LDXSERV command, you must include the driver load library in your STEPLIB concatenation.

System and Error Messages

B

Components of the Identity Manager 3.6.1 driver for CA Top Secret write messages to report operational status and problems. For detailed troubleshooting information, see [Appendix A, “Troubleshooting,” on page 73](#).

Each message begins with a code of 3-6 characters associated with the driver component that generated the message. Use this code to find message information quickly as follows:

- ♦ [Section B.1, “CFG Messages,” on page 81](#)
- ♦ [Section B.2, “DOM Messages,” on page 82](#)
- ♦ [Section B.3, “DRVCOM Messages,” on page 82](#)
- ♦ [Section B.4, “HES Messages,” on page 83](#)
- ♦ [Section B.5, “LDX0 Messages,” on page 83](#)
- ♦ [Section B.6, “LDXL Messages,” on page 85](#)
- ♦ [Section B.7, “LDXS Messages,” on page 87](#)
- ♦ [Section B.8, “LDXU Messages,” on page 88](#)
- ♦ [Section B.9, “LDXV Messages,” on page 90](#)
- ♦ [Section B.10, “LWS Messages,” on page 92](#)
- ♦ [Section B.11, “NET Messages,” on page 99](#)
- ♦ [Section B.12, “RDXML Messages,” on page 99](#)

B.1 CFG Messages

Messages beginning with CFG are issued by configuration file processing.

CFG001E Could not open configuration file *filename*.

Explanation: Could not open the configuration file.

Possible cause: The file does not exist.

Possible cause: You don’t have permission to read the file.

Action: Ensure that the configuration file exists at the correct location and that you have file system rights to read it.

CFG002E Error parsing configuration file line: *<configline>*.

Explanation: The line is not formatted as a valid configuration statement and cannot be parsed.

Action: Correct the line in the configuration file.

CFG003W Configuration file line was ignored. No matching statement name found: <configLine>.

Explanation: This line is formatted as a valid configuration file statement, but the statement is not recognized. The line is ignored.

Possible cause: The statement is incorrectly typed or the statement name is used only in a newer version of the software.

Action: Correct the statement.

CFG004E Error parsing configuration file line. No statement name was found: <configLine>.

Explanation: Could not find a statement name on the configuration line.

Action: Correct the line in the configuration file to supply the required statement.

CFG005E A required statement *statement_id* is missing from the configuration file.

Explanation: The *statement_id* statement was not specified in the configuration file, but is required for the application to start.

Action: Add the required statement to the configuration file.

B.2 DOM Messages

Messages beginning with DOM are issued by driver components as they communicate among themselves.

DOM0001W XML parser error encountered: *errorString*.

Explanation: An error was detected while parsing an XML document.

Possible cause: The XML document was incomplete, or it was not a properly constructed XML document.

Action: See the error string for additional details about the error. Some errors, such as no element found, can occur during normal operation and indicate that an empty XML document was received.

B.3 DRVCOM Messages

Messages beginning with DRVCOM are issued by the include/exclude system.

**DRVCOM000I *nameversion* Copyright 2005 Omnibond Systems, LLC.
ID=*code_id_string*.**

Explanation: This message identifies the system component version.

Action: No action is required.

DRVCOM001W Invalid include/exclude CLASS statement.

Explanation: The include/exclude configuration file contains an invalid CLASS statement.

Action: Correct the include/exclude configuration file with proper syntax.

DRVCOM002D An include/exclude Rule was added for class: *class*.

Explanation: The include/exclude configuration supplied a rule for the specified class.

Action: None.

DRVCOM003D An include/exclude Association Rule was added for association *association*.

Explanation: The include/exclude configuration supplied an association rule for the specified association.

Action: None.

B.4 HES Messages

Messages beginning with HES are issued by driver components as they use HTTP to communicate.

HES001E Unable to initialize the HTTP client.

Explanation: Communications in the client could not be initialized.

Possible cause: Memory is exhausted.

Action: Increase the amount of memory available to the process.

HES002I Connecting to host *host_name* on port *port_number*.

Explanation: The client is connecting to the specified server.

Action: None.

HES003W SSL communications have an incorrect certificate. *rc* = *rc*.

Explanation: The security certificate for SSL services could not be verified.

Possible cause: The certificate files might be missing or invalid.

Action: Obtain a new certificate.

B.5 LDX0 Messages

Messages beginning with LDX0 are issued by the driver security system exit module IDMTSSIX and the LDXSERV command.

LDX0001E There are old events on the LDX queue. Ensure that LDXLOGR is started.

Explanation: The memory queue access routine in the security system exit found events in the memory queue that have been unprocessed for at least fifteen minutes. During normal operation, the change log started task processes events from the queue immediately.

Possible cause: The change log started task is not running.

Action: Ensure that the change log started task is running.

LDX0002I Unexpected RC xxxxxxxx during token processing routine.

Explanation: An unexpected return code was received from z/OS name/token callable services by a driver component.

Possible cause: Internal system error.

Action: Collect diagnostic information and contact Novell® Technical Support.

LDX0103E Unable to parse command line.

Explanation: The LDXSERV command contained invalid operands and was unable to prompt for correct information.

Action: Correct the syntax of the LDXSERV command and reissue it. If the command was issued by the driver shim, collect diagnostic information and contact Novell Technical Support.

LDX0105E Internal error: *description*.

Explanation: An unexpected error occurred in the LDXSERV command. The message contains a description of the problem.

Possible cause: Internal error.

Action: Collect diagnostic information and contact Novell Technical Support.

LDX0106E Unable to open the log file.

Explanation: LDXSERV was unable to open the change log data set.

Possible cause: The user ID running the LDXSERV command does not have access to the change log data set.

Action: Check the session log and message files for additional messages concerning the failure. If you are unable to determine and correct the cause of the error, collect diagnostic information and contact Novell Technical Support.

LDX0107E No preallocated log file and no valid environment.

Explanation: The LDXSERV command was unable to find the change log data set because there was no LOGFILE DD statement and there was no valid LDX environment. The LDX environment is created when the security system exit is invoked for the first time after an IPL or when the change log started task first starts.

Action: Ensure that you are logged on to a system where the driver is installed and that the security system exit has been properly installed and is active. If you are unable to determine and correct the cause of the error, collect diagnostic information and contact Novell Technical Support.

LDX0108E No preallocated log file and logger is not active.

Explanation: The LDXSERV command was unable to find the change log data set because there was no LOGFILE DD statement and the change log started task was not active.

Action: If you are unable to determine and correct the cause of the error, collect diagnostic information and contact Novell Technical Support.

LDX0109E Dynamic allocation failed for log file *dsname*, s99rc=*rc*, s99error=*err*.

Explanation: The LDXSERV command was unable to dynamically allocate the change log data set. The dynamic allocation return code and reason codes are given in the message by *rc* and *err* respectively.

Dynamic allocation return codes and reason codes are documented in the IBM publication *z/OS Programming: Authorized Assembler Services Guide*.

Action: If you are unable to determine and correct the cause of the error, collect diagnostic information and contact Novell Technical Support.

B.6 LDXL Messages

Messages beginning with LDXL are issued by the change log started task.

LDXL000 LOGGING STARTED AT *hh:mm:ss* ON *mm/dd/yyyy*.

Explanation: The change log started task has initialized.

Action: Informational only. No action is required.

LDXL001 MESSAGE LOG DISABLED, SYSPRINT DD MISSING.

Explanation: During initialization, the change log started task was unable to open the SYSPRINT DD statement.

The change log started task continues processing, but no messages are written to SYSPRINT.

Possible cause: The SYSPRINT DD statement is missing from the JCL for the change log started task.

Action: Ensure that a SYSPRINT DD statement is present in the JCL and that it defines a file that the change log started task can write to.

LDXL002 EXECUTE STATEMENT PARAMETERS: *parm-values*.

Explanation: During initialization, the change log started task found the listed parameters present on the EXEC statement PARM parameter.

Action: Informational only. No action is required.

LDXL003 START COMMAND PARAMETERS: *parameters*.

Explanation: During initialization, the change log started task found the listed parameters present on the command line.

Action: Informational only. No action is required.

LDXL004 STOP COMMAND RECEIVED.

Explanation: An operator entered a STOP command for the change log started task. The change log started task ends.

Action: Informational only. No action is required.

LDXL005 MODIFY COMMAND PARAMETERS: *parameters*.

Explanation: An operator entered a `MODIFY` command for the change log started task with the listed parameters.

Action: Informational only. No action is required.

LDXL006 UNRECOGNIZED CIBVERB TYPE: *X'hh'*, COMMAND IGNORED.

Explanation: During processing, the change log started task received a command input buffer (CIB) with a verb other than `STOP` or `MODIFY`. Processing continues.

Possible cause: Internal system error.

Action: Collect diagnostic information and contact Novell Technical Support.

LDXL007 OPERATOR CANCEL DETECTED, ATTEMPTING NORMAL SHUTDOWN.

Explanation: An operator has issued a `CANCEL` command without the `DUMP` parameter for the change log started task. The change log started task attempts a clean shutdown.

Action: Wait for the change log started task to end. If the change log started task does not end within a reasonable amount of time, issue another `CANCEL` command specifying the `DUMP` parameter. If you are unable to determine and correct the cause of the error, collect diagnostic information and contact Novell Technical Support.

LDXL008 EVENT TRACING ENABLED.

Explanation: An operator has issued a `MODIFY` command for `TRACE ON` to the change log started task.

Event tracing is turned on.

Action: Informational only. No action is required.

LDXL009 EVENT TRACING DISABLED.

Explanation: An operator has issued a `MODIFY` command for `TRACE OFF` to the change log started task.

Event tracing is turned off.

Action: Informational only. No action is required.

LDXL010 MODIFY COMMAND IGNORED, INVALID OR MISSING PARAMETERS.

Explanation: An operator has issued a `MODIFY` command to the change log started task, but the command parameters are not recognized.

The `MODIFY` command is ignored.

Action: Reissue the `MODIFY` command with the intended parameters.

LDXL011 EVENT RC(*rc*) DATA: *event_data*.

Explanation: Event tracing is turned on and an event has been processed.

The return code from ProcessEvent is *rc*. The content of the event record is *event_data*.

Processing continues.

Action: Informational only. No action is required.

LDXL012 TERMINATING BECAUSE LOGGING ALREADY ACTIVE.

Explanation: On startup, the change log started task has detected that another change log started task is already running.

This instance of the change log started task terminates.

To detect this condition, the change log started task enqueues exclusively on *qname ldxlgr*, *rname #LDXENVIRONTOKEN* when it initializes. If the ENQ macro fails, this message is issued. The change log started task dequeues this resource on shutdown.

Possible cause: A START command for the change log started task has been issued more than once.

Action: Do not start more than one instance of the change log started task at a time.

LDXL013 LOGGING TO DATASET: *dsname*.

Explanation: The name of the change log data set in use is *dsname*.

Action: Informational only. No action is required.

LDXL999 LOGGING ENDED AT *hh:mm:ss* ON *mm/dd/yyyy*.

Explanation: The change log started task is ending.

Possible cause: An operator entered a STOP command for the change log started task.

Action: Informational only. No action is required.

B.7 LDXS Messages

Messages beginning with LDXS are issued by the driver shim change log API.

LDXS000I *nameversion* Copyright 2006 Omnibond Systems, LLC. ID=*code_id_string*.

Explanation: This message identifies the system component version.

Action: No action is required.

LDXS001A Error executing script *scriptName*. The return code is *returnCode*, the reason code is *reasonCode*, the abend code is *abendCode*.

Explanation: The driver shim could not execute *scriptName*.

Possible cause: The script or command does not exist or is not valid.

Action: Ensure that the driver shim is correctly configured to execute the command or script and that the command or script exists and is valid.

LDXS002A The change log service startup failed, rc = rc.

Explanation: The change log API failed to initialize.

Possible cause: The change log data set has not been initialized.

Possible cause: The driver load library is not properly configured.

Possible cause: The driver does not have the required rights to access the change log data set.

Action: Ensure that all of the steps of the installation procedure have been performed correctly and have not subsequently been reversed.

LDXS003A Unable to create token, return code from IEANTCR is rc.

Explanation: z/OS name/token callable services failed to create a token. The return code from IEANTCR is *rc*.

Possible cause: Internal error.

Action: Collect diagnostic information and contact Novell Technical Support.

B.8 LDXU Messages

Messages beginning with LDXU are issued by the log file utility LDXUTIL.

LDXU000I Log File Utility started on mm/dd/yyyy at hh:mm:ss.

Explanation: The log file utility has initialized.

Action: Informational only. No action is required.

LDXU001W Message log disabled, SYSPRINT DD missing.

Explanation: During initialization, the log file utility was unable to open the SYSPRINT DD statement. The log file utility continues processing, but no messages are written to SYSPRINT.

Possible cause: The SYSPRINT DD statement is missing from the JCL for the log file utility.

Action: Ensure that a SYSPRINT DD statement is present in the JCL and that it defines a file that the log file utility can write to.

LDXU002I Execute statement parameters: parm-values.

Explanation: During initialization, the log file utility found the listed parameters present on the EXEC statement PARM parameter.

Action: Informational only. No action is required.

LDXU003E Open failed for log file.

Explanation: The log file utility could not open the change log data set.

Possible cause: The LOGFILE DD statement is missing from the JCL for the log file utility.

Action: Ensure that a LOGFILE DD statement is present in the JCL and that it defines a data set that the log file utility can write to.

LDXU004I Log file blocksize: *blksize*.

Explanation: The log file utility is initializing the change log data set with a blocksize of *blksize*.

Action: Informational only. No action is required.

LDXU005I Log file blocks written: *block-count*.

Explanation: While initializing the change log data set, the log file utility has written *block-count* blocks of empty records.

Action: Informational only. No action is required.

LDXU006E Open failed for LOADIN file.

Explanation: The log file utility load function could not open the LOADIN ddname.

Possible cause: The LOADIN DD statement is missing from the JCL for the log file utility.

Action: Ensure that a LOADIN DD statement is present in the JCL and that it defines a file that the log file utility can read.

LDXU007E Unrecognized or missing execute statement parameter.

Explanation: The log file utility found an unknown parameter in the EXEC statement PARM parameter.

Processing ends.

Possible cause: The EXEC statement PARM value is missing or does not contain one of the following functions:

- ♦ INITIALIZE
- ♦ DUMP
- ♦ LOAD

Action: Correct the PARM value and resubmit the job.

LDXU008I Log file events loaded: *event-count*.

Explanation: The log file utility load function has successfully loaded *event-count* events into the change log data set from the input file.

Action: Informational only. No action is required.

LDXU009E Add event failed, error code *code*.

Explanation: The log file utility load function was unable to add an event record to the change log data set. The LDXLADD LDXIOERR code was *code*.

Possible cause: Internal system error.

Action: Collect diagnostic information and contact Novell Technical Support.

LDXU010E Read header failed, error code *code*.

Explanation: The log file utility dump function was unable to read the header record of the change log data set. The LDXLGTE LDXIOERR code was *code*.

Possible cause: Internal system error.

Action: Collect diagnostic information and contact Novell Technical Support.

LDXU011E Read event failed, error code *code*.

Explanation: The log file utility dump function was unable to read an event record from the change log data set. The LDXLGETE LDXIOERR code was *code*.

Possible cause: Internal system error.

Action: Collect diagnostic information and contact Novell Technical Support.

LDXU990I Open BDAM log succeeded.

Explanation: The log file utility has initialized the change log data set with empty records and has successfully opened it to complete the initialization by updating the header information.

Action: Informational only. No action is required.

LDXU991E Open BDAM log failed.

Explanation: The log file utility has initialized the change log data set with empty records, but could not reopen it to complete the initialization by updating the header information.

Possible cause: Internal system error.

Action: Collect diagnostic information and contact Novell Technical Support.

LDXU999I Log File Utility ended on *mm/dd/yyyy* at *hh:mm:ss*.

Explanation: The log file utility has completed processing.

Action: Informational only. No action is required.

B.9 LDXV Messages

Messages beginning with LDXV are issued by the IDMGETV and IDMSETV commands.

LDXV001E IDM token not present.

Source: IDMGETV command, IDMSETV command

Explanation: The data areas that the driver shim sets up for the IDMGETV or IDMSETV command before calling a script are not present.

Possible Cause: The command was not called by the driver shim.

Action: Ensure that the commands are invoked by the driver shim. They are not intended to be used outside of this environment.

LDXV002E Unable to parse command.

Source: IDMGETV command, IDMSETV command

Explanation: The TSO parsing routine detected an error in the command and was unable to prompt for a correction.

Possible Cause: The command had a syntax error. It was not called from an interactive session and could not prompt for a correction.

Action: Examine the associated messages from the TSO parsing routine that describe the error. Correct the operands of the command.

LDXV003E Error from TSO service routine IKJCT441, RC <rc>.

Source: IDMGETV command

Explanation: TSO routine IKJCT441 detected a problem and ended with return code *rc* (decimal).

Possible Cause: Internal error.

Action: Collect diagnostic information and contact Novell Technical Support.

LDXV004W <variablename> contains invalid characters to be a REXX variable.

Source: IDMGETV command, IDMSETV command

Explanation: The command was directed to create the variable named in the message, but the variable name contained characters that are not acceptable in a REXX variable name. The acceptable characters are as follows:

Alphanumeric characters	A–Z, a–z, 0–9
“At” sign	@
Octothorpe	#
“Dollar” sign	\$
Exclamation mark	!
Question mark	?
Period	.
Underscore	—

Possible Cause: The variable named in the message was defined in eDirectory™ using one or more characters not in the list of acceptable characters. For example, some attribute names might contain spaces.

Action: Use the driver mapping rules to rename the variable to a name that meets the REXX naming requirements.

LDXV005E IDMGETV was not called from a CLIST or REXX exec.

Source: IDMGETV command

Explanation: The IDMGETV command must be called from a REXX exec, because it creates and manipulates REXX variables.

Possible Cause: The command was not called from within the REXX environment.

Action: Call the command from within the REXX environment.

LDXV006E GROUP or USER list required.

Source: IDMSETV command

Explanation: The IDMSETV command requires either the GROUP(*group*list) or USER(*user*list) operand.

Possible Cause: Use one of the required operands.

Action: Correct the operands of the command.

LDXV007E GROUP and USER operands are mutually exclusive.

Source: IDMSETV command

Explanation: The command found both the USER and GROUP operands on the command line. These are mutually exclusive.

Possible Cause: Both GROUP and USER were specified on the IDMSETV command.

Action: Correct the command.

LDXV008E Error returned from <service>: RC <rc>.

Source: IDMGETV command, IDMSETV command

Explanation: The IBM service routine *service* returned the return code *rc* (decimal).

Possible Cause: Internal error.

Action: Collect diagnostic information and contact Novell Technical Support.

B.10 LWS Messages

Messages beginning with LWS are issued by the integrated HTTP server.

LWS0001I Server has been initialized.

Explanation: The server has successfully completed its initialization phase.

Action: None. Informational only.

LWS0002I All services are now active.

Explanation: All of the services offered by the server are now active and ready for work.

Action: None. Informational only.

LWS0003I Server shut down successfully.

Explanation: The server processing completed normally. The server ends with a return code of 0.

Action: No action is required.

LWS0004W Server shut down with warnings.

Explanation: The server processing completed normally with at least one warning. The server ends with a return code of 4.

Action: See the log for additional messages that describe the warning conditions.

LWS0005E Server shut down with errors.

Explanation: The server processing ended with one or more errors. The server ends with a return code of 8.

Action: See the log for additional messages that describe the error conditions.

LWS0006I Starting *service*.

Explanation: The server is starting the specified service.

Action: None. Informational only.

LWS0007E Failed to start *service*.

Explanation: The server attempted to start the specified service, but the service could not start. The server terminates processing.

Action: See the log for additional messages that describe the error condition.

LWS0008I Stopping all services.

Explanation: The server was requested to stop. All services are notified and will subsequently end processing.

Action: None. Informational only.

LWS0009I Local host is *host_name* (*IP_address*).

Explanation: This message shows the host name and IP address of the machine that the server is running on.

Action: None. Informational only.

LWS0010I Local host is *IP_address*.

Explanation: This message shows the IP address of the machine that the server is running on.

Action: None. Informational only.

LWS0011I Server is now processing client requests.

Explanation: The server has successfully started all configured services, and it is ready for clients to begin requests.

Action: None. Informational only.

LWS0012I *service* is now active on port *number*.

Explanation: The server *service* is running on the specified TCP port *number*. Clients can begin making requests to the specified service.

Action: None. Informational only.

LWS0013I *service* is now inactive on port *number*.

Explanation: The server *service* is not active on the specified TCP port *number*. Processing continues, but no client requests can be made to the service until it becomes active again.

Action: None. Informational only.

LWS0014E An error was encountered while parsing execution parameters.

Explanation: An error occurred while parsing the execution parameters. The server terminates with a minimum return code of 8.

Action: Collect diagnostic information and contact Novell Technical Support.

LWS0015E *service* failed to start with error *number*.

Explanation: The specified service failed to start. The server terminates with a minimum return code of 8.

Action: Collect diagnostic information and contact Novell Technical Support.

LWS0020I Server *version* level: *level*.

Explanation: This message contains information detailing the current service level for the server program being executed. The value of *version* indicates the current release of the server. The value of *level* is a unique sequence of characters that can be used by Novell Technical Support to determine the maintenance level of the server being executed.

Action: Normally, no action is required. However, if you report a problem with the server to Novell Technical Support, you might be asked to provide the information in the message.

LWS0023I Listen port *number* is already in use.

Explanation: The displayed listen port is already in use by another task running on the local host. The server retries establishing the listen port.

Action: Determine what task is using the required port number and restart the server when the task is finished, or specify a different port in the configuration file. If the port number is changed for the server, the client must also specify the new port number.

LWS0024W Too many retries to obtain port *number*.

Explanation: The server tried multiple attempts to establish a listen socket on the specified port number, but the port was in use. The server terminates with a return code of 4.

Action: Determine what task is using the required port number, and restart the server when the task is finished, or specify a different port in the configuration file. If the port number is changed for the server, the client must also specify the new port number.

LWS0025I Local TCP/IP stack is down.

Explanation: The server detected that the local host TCP/IP service is not active or is unavailable. The server retries every two minutes to reestablish communication with the TCP/IP service.

Action: Ensure that the TCP/IP service is running.

LWS0026E Unrecoverable TCP/IP error *number* returned from *internal_function_name*.

Explanation: An unrecoverable TCP/IP error was detected in the specified internal server function name. The server ends with a minimum return code of 8. The error number reported corresponds to a TCP/IP errno value.

Action: Correct the error based on TCP/IP documentation for the specified errno.

LWS0027W Listen socket was dropped for port *number*.

Explanation: The server connection to the displayed listen port was dropped. The server attempts to reconnect to the listen port so that it can receive new client connections.

Action: Determine why connections are being lost on the local host. Ensure that the host TCP/IP services are running.

LWS0028E Unable to reestablish listen socket on port *number*.

Explanation: The listen socket on the specified port number was dropped. The server tried multiple attempts to reestablish the listen socket, but all attempts failed. The server ends with a return code of 8.

Action: Determine if the host's TCP/IP service is running. If the host's TCP/IP service is running, determine if another task on the local host is using the specified port.

LWS0029I <*id*> Client request started from *ip_address* on port *number*.

Explanation: A new client request identified by *id* has been started from the specified IP address on the displayed port number.

Action: None. Informational only.

LWS0030I <*id*> Client request started from *host (ip_address)* on port *number*.

Explanation: A new client request identified by *id* has been started from the specified host and IP address on the displayed port number.

Action: None. Informational only.

LWS0031W Unable to stop task *id*: *reason*.

Explanation: The server attempted to terminate a service task identified by *id*. The server could not stop the task for the specified reason. The server ends with a return code of 4.

Action: See the *reason* text for more information about why the task could not terminate.

LWS0032I <id> Client request has ended.

Explanation: The client requested identified by *id* has ended.

Action: None. Informational only.

LWS0033I <id> Client request: *resource*.

Explanation: The client connection identified by *id* issued a request for *resource*.

Action: None. Informational only.

LWS0034W <id> Write operation for client data has failed.

Explanation: A write operation failed for the connection identified by *id*. This is normally because the client dropped the connection. The client connection is dropped by the server.

Action: Ensure that the client does not prematurely drop the connection. Retry the client request if necessary.

LWS0035W <id> Read operation for client data has timed out.

Explanation: A read operation on the connection identified by *id* has timed out because of inactivity. The client connection is dropped by the server.

Action: Ensure that the client does not prematurely drop the connection. Retry the client request if necessary.

LWS0036W <id> Client request error: *error_code* - *error_text*.

Explanation: The server encountered an error while processing the client request. The server terminates the request.

Action: Determine why the request was in error by viewing the error code and error text that was generated.

LWS0037W <id> Client request error: *code*.

Explanation: The server encountered an error while processing the client request. The server terminates the request.

Action: Determine why the request was in error by viewing the error code and error text that was generated.

LWS0038I Received command: *command_text*.

Explanation: The server has received the displayed command from the operator. The server processes the command.

Action: None. Informational only.

LWS0043E Task *id* ended abnormally with RC=*retcode*.

Explanation: The server detected a task that ended with a non-zero return code. The server ends with a minimum return code of 8.

Action: View the log for other messages that might have been generated regarding the error.

LWS0045I Idle session time-out is *number* seconds.

Explanation: The message shows the idle time limit for connections. The server automatically terminates sessions that are idle for longer than the specified number of seconds.

Action: None. Informational only.

LWS0046I Maximum concurrent sessions limited to *number*.

Explanation: The message shows the maximum number of concurrent sessions allowed. The server allows only the specified number of concurrent sessions to be active at any given time. All connections that exceed this limit are forced to wait until the total number of connections drops below the specified value.

Action: None. Informational only.

LWS0047W Unable to delete log file *filename*.

Explanation: The log file could not be deleted as specified.

Possible cause: The user service or daemon does not have file system rights to delete old log files.

Action: Verify that the user service or daemon has the appropriate rights.

Action: Examine the current logs for related messages.

LWS0048I Log file *filename* successfully deleted.

Explanation: The log file has been deleted as specified.

Action: None. Informational only.

LWS0049E Error *error* authenticating to the directory as *fdn*.

Explanation: The connection manager could not connect to the directory as user *fdn*. The error was *error*.

Possible cause: The configuration parameters do not contain the correct user or password.

Action: Correct the cause of the error as determined from *error*.

Action: Verify that the User object has the appropriate rights.

Action: Verify that the password given for the User object in the configuration parameters is correct.

LWS0050E Server application initialization failure was detected.

Explanation: During server initialization, an error was detected while initializing the server Application object.

Possible Cause: This message is commonly logged when the driver is started and then immediately shut down. This can happen during installation, when the shim is started to generate keys or configure SSL. You can safely ignore this message in those cases.

Action: See the error logs for additional messages that indicate the cause of the error.

LWS0051E Server initialization failure was detected.

Explanation: The server failed to initialize properly because of an initialization error specific to the operating system.

Action: See the log for additional messages that indicate the cause of the error.

LWS0052W This server is terminating because of another instance already running (details).

Explanation: The server is shutting down because there is another active instance of this server running on the host.

Possible cause: A previous instance of the server was not stopped before starting a new instance.

Action: Stop or cancel the previous server instance before starting a new one.

LWS0053I The parameter *keyword* is no longer supported.

Explanation: The specified parameter is not supported in this release and might be removed in future releases.

Possible cause: An execution parameter was specified that is no longer supported.

Action: Do not specify the unsupported parameter.

LWS0054I The execution parameter *keyword* is in effect.

Explanation: The specified execution parameter is in effect for the server.

Action: Informational only. Processing continues.

LWS0055W Invalid execution parameter detected: *keyword*.

Explanation: An invalid execution parameter was detected.

Action: Do not specify the invalid or unknown execution parameter.

LWS0056I Not accepting new connections because of the MAXCONN limit. There are *number* active connections now for service.

Explanation: The specified service has a maximum connection limit that has been reached. The service no longer accepts new connections until at least one of the active connections ends.

Action: If you receive this message frequently, increase the MAXCONN limit for this service or set the MAXCONN to unlimited connections.

LWS0057I New connections are now being accepted for service.

Explanation: The service was previously not accepting new connections because of the imposed MAXCONN limit. The service can now accept a new connection because at least one active connection has ended.

Action: None. Informational only.

LWS0058I Listen socket on port *number* has been re-established.

Explanation: The previously dropped listen socket has been reestablished. Services using the specified port can now continue. The listen socket previously dropped because of an error or TCP/IP connectivity problems has been reestablished. Client connection processing continues.

Action: None. Informational only.

LWS0059W Server is terminating because the required service *serviceName* is ending.

Explanation: The specified required service has ended. The server terminates because it cannot continue running without the required service.

Action: See related log messages to determine why the required service ended. Correct the problem and restart the server.

B.11 NET Messages

Messages beginning with NET are issued by driver components during verification of SSL certificates.

NET001W Certificate verification failed. Result is *result*.

Explanation: A valid security certificate could not be obtained from the connection client. Diagnostic information is given by *result*.

Possible cause: A security certificate has not been obtained for the component.

Possible cause: The security certificate has expired.

Possible cause: The component certificate directory has been corrupted.

Action: Respond as indicated by *result*. Obtain a new certificate if appropriate.

B.12 RDXML Messages

Messages beginning with RDXML are issued by the embedded Remote Loader.

**RDXML000I *nameversion* Copyright 2005 Omnibond Systems, LLC.
ID=*code_id_string*.**

Explanation: This message identifies the system component version.

Action: No action is required.

RDXML001I Client connection established.

Explanation: A client has connected to the driver. This can be the Metadirectory engine connecting to process events to and from the driver, or a Web-based request to view information or publish changes through the SOAP mechanism.

Action: No action required.

RDXML002I Request issued to start Driver Shim.

Explanation: The driver received a command to start the driver shim and begin processing events.

Action: No action required.

RDXML003E An unrecognized command was issued. The driver shim is shutting down.

Explanation: The driver received an unrecognized command from the Metadirectory engine. The driver shim is shutting down to avoid further errors.

Possible cause: Network error.

Possible cause: Invalid data sent to the driver.

Possible cause: The Metadirectory engine version might have been updated with new commands that are unrecognized by this version of the driver.

Possible cause: This message is logged when the driver shim process is shut down from the connected system rather than from a Driver object request. The local system can queue an invalid command to the driver shim to simulate a shutdown request and terminate the running process.

Action: Ensure that the network connection is secured and working properly.

Action: Apply updates for the engine or driver if necessary.

Action: If the driver shim process was shut down from the local system, no action is required.

RDXML004I Client Disconnected.

Explanation: A client has disconnected from the driver. This might be the Metadirectory engine disconnecting after a driver shutdown request or a Web-based request that has ended.

Action: No action required.

RDXML005W Unable to establish client connection.

Explanation: A client attempted to connect to the driver, but was disconnected prematurely.

Possible cause: The client is not running in SSL mode.

Possible cause: Mismatched SSL versions or mismatched certificate authorities.

Possible cause: Problems initializing SSL libraries because of improperly configured system entropy settings.

Action: Ensure that both the Metadirectory engine and the driver are running in the same mode: either clear text mode or SSL mode.

Action: If you are using SSL, ensure that the driver and Metadirectory engine have properly configured certificates, and that the driver system is configured properly for entropy.

RDXML006E Error in Remote Loader Handshake.

Explanation: The Metadirectory engine attempted to connect to the driver, but the authorization process failed. Authorization requires that both supply mutually acceptable passwords. Passwords are configured at installation.

Possible cause: The Remote Loader or Driver object passwords do not match.

Action: Set the Remote Loader and Driver object passwords to the same value for both the driver and the driver shim. Use iManager to modify the driver properties. Re-configure the driver shim on the connected system.

RDXML007I Driver Shim has successfully started and is ready to process events.

Explanation: The Metadirectory engine has requested the driver to start the shim for event processing, and the driver shim has successfully started.

Action: No action required.

RDXML008W Unable to establish client connection from *remoteName*.

Explanation: A client attempted to connect to the driver, but was disconnected prematurely.

Possible cause: The client is not running in SSL mode.

Possible cause: Mismatched SSL versions or mismatched certificate authorities.

Possible cause: Problems initializing SSL libraries because of improperly configured system entropy settings.

Action: Ensure that both the Metadirectory engine and the driver are running in the same mode: either clear text mode or SSL mode.

Action: If you are using SSL, ensure that the driver and Metadirectory engine have properly configured certificates, and that the driver system is configured properly for entropy.

RDXML009I Client connection established from *remoteName*.

Explanation: A client has connected to the driver. This can be the Metadirectory engine connecting to process events to and from the driver, or a Web-based request to view information or publish changes through the SOAP mechanism.

Action: No action required.

Topics in this section include

- ♦ [Section C.1, “Driver Shim Command Line Options,” on page 103](#)
- ♦ [Section C.2, “SAF Interface,” on page 104](#)

C.1 Driver Shim Command Line Options

The following options can be specified on the driver shim command line. You can also specify driver shim configuration file statements as command line options. For details about the driver shim configuration file, see [Section 5.2, “The Driver Shim Configuration File,” on page 51](#).

C.1.1 Options Used to Set Up Driver Shim SSL Certificates

The following command line options are used to set up the driver shim SSL certificates:

Table C-1 *Driver Shim Command Line Options for Setting Up SSL Certificates*

Option (Short and Long Forms)	Description
-s -secure	Secures the driver by creating SSL certificates, then exits.
-p -password	Specifies the Remote Loader password.

C.1.2 Other Options

Table C-2 *Other Driver Shim Command Line Options*

Option (Short and Long Forms)	Description
-c <congFile> -config <configFile>	Instructs the driver shim to read options from the specified configuration file. Options are read from ddname DRVCONF by default.
-? -help	Displays the command line options, then exits.
-v -version	Displays the driver shim version and build date, then exits.

C.2 SAF Interface

The driver query processor uses the system authorization facility (SAF) to retrieve information from the security system. Queries are used by the Metadirectory engine for matching and merging. Some fields in Top Secret, including custom fields, cannot be queried, because they are not recognized by SAF. These fields cannot be migrated from the connected system to the Identity Vault. Merge operations, which occur when objects in both the Identity Vault and the connected system are matched for the first time, might not include these fields for the event being processed.

Structured attributes are not supported by the schema. These attributes occur in certain Top Secret commands where more than one operand is used to define a field. Because these operands must be specified atomically on a single command, the corresponding auxiliary attribute in eDirectory™ must provide for this. These operands are filtered out and not synchronized by the default driver configuration. You can customize policies to process these fields if necessary.