
NetIQ® Identity Manager Jobs Guide

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About this Book and the Library

The *Jobs Guide* contains information about managing Identity Manager jobs.

Intended Audience

This book provides information for Identity Manager administrators, partners, and consultants.

Other Information in the Library

For more information about the library for Identity Manager, see the [Identity Manager documentation website](#).

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

Our Viewpoint

Adapting to change and managing complexity and risk are nothing new

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1 Overview

Identity Manager provides the ability to launch jobs that perform specific tasks. The jobs can be run one or more times either manually or at scheduled times.

Identity Manager provides six predefined jobs:

- ♦ **Random Password Generator:** Generates a random password for each object defined in the job's scope. The password is generated by NMAS to match a Password Policy object that the job references. The job submits the generated passwords one at a time to a driver's Subscriber channel. The Subscriber channel policies must take action on the passwords.
- ♦ **Schedule Driver:** Starts or stops a driver.
- ♦ **Subscriber Channel Trigger:** Sends event documents to be processed by a driver's Subscriber channel. For example, a job could generate an event document to trigger policies associated with a user. Submitted event documents can be queued to the driver cache, or they can bypass the cache and be processed immediately.
- ♦ **Driver Health:** Evaluates the health conditions for a driver, assigns the health state, and carries out any actions associated with the health state. This job is used in conjunction with driver health monitoring. For complete instructions about setting up driver health monitoring, including using the Driver Health job, see "[Monitoring Driver Health](#)" in the *NetIQ Identity Manager Driver Administration Guide*.
- ♦ **Password Expiration Notification:** Searches an LDAP directory for objects whose passwords expire in a specified number of days. When an object that meets the criteria is discovered, the job sends an e-mail to the address contained in the object's mail LDAP attribute.
- ♦ **Association Statistics:** Calculates the association statistics per server.

Information about using the predefined jobs is provided in [Chapter 2, "Adding a Predefined Job,"](#) on page 11 and [Chapter 3, "Configuring the Properties of Predefined Jobs,"](#) on page 15.

You can also develop custom jobs to perform tasks. A custom job requires you to create a Job Definition and a Job Implementation. The Job Definition is XML code that defines the parameters for the job. The Job Implementation is a JAR file that contains the Java classes that perform the task. The job can perform any task that you can implement through Java classes. Because the job is initiated through the Identity Manager engine, the job also has access to the Identity Vault data. For more information, see [Chapter 4, "Creating a Custom Job,"](#) on page 27.

2 Adding a Predefined Job

Identity Manager includes the following predefined jobs:

- ♦ **Driver Health:** Evaluates the health conditions for the driver, assigns the health state, and carries out any actions associated with the health state.
- ♦ **Password Expiration Notification:** Sends e-mail notifications to users whose passwords are about to expire.
- ♦ **Random Password Generator:** Generates a random password for identified objects.
- ♦ **Schedule Driver:** Starts or stops the driver.
- ♦ **Subscriber Channel Trigger:** Submits XML documents to the Subscriber channel to trigger events.
- ♦ **Association Statistics:** Calculates the association statistics per server.




Two jobs (Driver Health and Password Expiration Notification) also operate at the driver set level; they automatically apply to all drivers in the driver set unless you change the job scope to exclude some drivers.



The last three jobs (Random Password Generator, Schedule Driver, and Subscriber Channel Trigger) operate at the driver level, which means that you can add them to individual drivers.

- ♦ [“Adding Other Predefined Jobs” on page 11](#)

Adding Other Predefined Jobs

The following steps provide instructions for using iManager to add all of the predefined jobs (Driver Health, Password Expiration Notification, Random Password Generator, Schedule Driver, Subscriber Channel Trigger). For information about using Designer to add jobs, see [“Scheduling Jobs”](#) in the *NetIQ Designer for Identity Manager Administration Guide*.

- 1 In iManager, click  to display the Identity Manager Administration page.
- 2 Open the Overview page for the driver or driver set where you want to add the job:
 - 2a In the **Administration** list, click **Identity Manager Overview** to display the Identity Manager Overview page.
 - 2b In the **Search in** field, specify the fully distinguished name of the container where you want to start searching for driver sets and then click , or leave [root] in the field and click  to search from the root of the tree.

You can also click  to browse for and select the container in the tree structure, or click  to select the container from a list of previously selected objects.
 - 2c After the available driver sets are displayed on the Driver Sets page, click the desired driver set to display the Driver Set Overview page.
 - 2d (Conditional) If you are adding the job to a driver, click the driver to display the Driver Overview page.
- 3 Click the **Jobs** tab.

- 4 Click **New** to display the Create Job page.

The screenshot shows a 'Create Job' dialog box with the following fields and options:

- Job Name:** A text input field containing 'Job1'.
- Job type:**
 - Installed:** A dropdown menu is set to 'Subscriber channel trigger'. Below it, a text description reads: 'This job submits zero or more trigger documents to the subscriber channel. The submission may either be a document per object if a scope is defined or may be a single document for each job run.'
 - Custom:** A text area with the placeholder text 'Enter the XML that defines the custom job.'
- Servers:** A section with the instruction 'Select the server(s) this job should run on:' and a checked checkbox for 'IDMTEST.Novell'.

At the bottom of the dialog are 'OK' and 'Cancel' buttons.



- 5 In the **Job Name** field, specify a descriptive name for the job.
- 6 Under **Job Type**, make sure that **Installed** is selected, then choose one of the following job types:
 - ♦ **Driver Health (Driver Set):** Evaluates the health conditions for a driver, assigns the health state, and carries out any actions associated with the health state.
 - ♦ **Password Expiration Notification (Driver Set):** Sends e-mail notifications to users whose passwords are about to expire.
 - ♦ **Random Password Generator (Driver Only):** Generates a random password for each object in the job's scope. The password is generated by NMAS to match the Password Policy object that the job references. These Password Policy objects are not usually the same as those used for eDirectory user password policies.

The job submits the generated passwords one at a time to the driver's Subscriber channel. The Subscriber channel policies must take action on the passwords.
 - ♦ **Schedule Driver (Driver Only):** Starts or stops the associated driver. You can also toggle a driver to start the driver if it is stopped or to stop the driver if it is running.

- ◆ **Subscriber Channel Trigger (Driver Only):** Submits zero or more trigger documents to the Subscriber channel. The submission can either be a document per object if a scope is defined, or it can be a single trigger event if no scope is defined.

Trigger event documents identify the job and the scope object. A trigger event can bypass the cache and be processed immediately if desired. Trigger jobs allow you to use driver policies that you can customize for your personal requirements.

- 7 In the **Server** field, select the servers where you want to run the job.
- 8 Click **OK** to create the job and display its configuration properties.

Job:  Check driver health.driverset1.idm.services.system  

Identity Manager

Job | #Misc

General | **Schedule** | **Scope** | **Parameters** | **Results**

Java class name: com.novell.nds.dirxml.job.ckdrvhealth.CheckDriverHealthJob

Enable job



Delete the job after it runs once

Servers

Select the server(s) this job should run on:

metaserver1.metaserver1.servers.system

Email server:

Default Notification Collection.Security  

Display name:

Driver Health

Description:

This job checks the health of drivers by evaluating the criteria defined in the driver's health configuration.

OK | **Cancel** | **Apply**

- 9 To configure the job's properties, continue with the instructions in the appropriate section:
 - ◆ [“Configuring the Random Password Generator Job” on page 16](#)
 - ◆ [“Configuring the Schedule Driver Job” on page 17](#)
 - ◆ [“Configuring the Subscriber Channel Trigger Job” on page 18](#)

- ◆ [“Configuring the Driver Health Job” on page 20](#)
- ◆ [“Configuring the Password Expiration Notification Job” on page 22](#)

3 Configuring the Properties of Predefined Jobs

The following sections provide instructions for using iManager to configure the properties for five of the predefined jobs: Random Password Generator, Schedule Driver, Subscriber Channel Trigger, Driver Health, and Password Expiration Notification.

Each job generates intermediate results and a final result, where the intermediate results have an impact on the final result. For more information, see [“Understanding the Different States of a Job” on page 15](#).

For each job, you can schedule the runtimes, define the scope of objects that the job applies to, set the job-specific parameters, and determine the methods used for results notification. For information about using Designer to configure a job, see [“Scheduling Jobs” in the *NetIQ Designer for Identity Manager Administration Guide*](#).

The steps assume that the job is already added to a driver or driver set. For more information on adding predefined jobs, see [Chapter 2, “Adding a Predefined Job,” on page 11](#).

- ♦ [“Understanding the Different States of a Job” on page 15](#)
- ♦ [“Configuring the Random Password Generator Job” on page 16](#)
- ♦ [“Configuring the Schedule Driver Job” on page 17](#)
- ♦ [“Configuring the Subscriber Channel Trigger Job” on page 18](#)
- ♦ [“Configuring the Driver Health Job” on page 20](#)
- ♦ [“Configuring the Password Expiration Notification Job” on page 22](#)
- ♦ [“Modifying the Association Statistics Job Configuration” on page 24](#)

Understanding the Different States of a Job

When a job runs, it generates intermediate results and a final result. The possible results are Success, Warning, Error, and Aborted. The intermediate results have an impact on the final result. The final result is generated when the job is finished.

For each result, you can specify the action you want performed when it occurs. You can instruct the job to generate an event for Novell Audit or Novell Sentinel and also generate an e-mail notification. Alternatively, you might want no action to occur for an intermediate success result and an e-mail notification to be sent for an intermediate error result.

Success

Returned when a job has successfully executed without any errors or warnings.

Warning

Returned when a job cannot complete its execution because of unfulfilled prerequisites required for a successful run of the job. For example, a driver is not configured with health check before a health check job is run on the driver. The job returns a warning as a final result.

A warning is also displayed when a job partly succeeds in executing its defined task. For example, when a Password Expiration Notification job does not find an object's `passwordExpirationTime` attribute value, the job generates a warning message for that object as an intermediate result. If you instructed the job to send an e-mail to the address contained in the object's mail LDAP attribute, the job does not send the specified e-mail. When the job finishes its scheduled run, Identity Manager displays a warning with an appropriate message.

A Password Generator job generates an intermediate success message when it successfully generates a password for a user. If the job fails to generate a password for a user object for some reason, Identity Manager displays a warning as a final result.

Error

Returned when a job has insufficient rights on the object on which it is scheduled to run. An error is also reported when a job is executing and an exception occurs. For example, running a Schedule Driver job to run an already running driver or schedule the job to stop an already stopped driver.

Abort

Stops a job before the job completes its scheduled run. For example, terminating a job using `dxcmd`. Or, when Identity Manager engine is stopped, all running jobs are automatically aborted.

Configuring the Random Password Generator Job

The Random Password Generator job creates a random password for each object defined in the job's scope. The password is generated by NMAS to match a Password Policy object that the job references. Generally, each driver requires a password policy designed specifically for the connected system. If you don't have a password policy to use, you need to create one before continuing with the job configuration. The job submits the generated passwords one at a time to the driver's Subscriber channel. The Subscriber channel policies must take action on the passwords.


- 1 Make sure you've already added the job to the driver. If you haven't, see [Chapter 2, "Adding a Predefined Job,"](#) on page 11.

- 2 On the General page in iManager, configure the following options:

Enable Job: Leave this option selected unless you don't want the job to run.

Delete the Job After it Runs Once: Select this option if you want the job to run one time only and then be deleted.

Servers: Select the servers where you want the job to run. Multiple servers are available only if the driver is running on multiple servers.

E-mail Server: To monitor the job, you (or others) can receive e-mail notifications whenever certain results occur for the job. You configure e-mail notification on the Results page. However, to enable this e-mail notification to work, you must first specify the e-mail server that will be used to send the notifications. Click the  button to locate and select the Default Notification Collection object or any other `notifTemplateCollection` object that defines an SMTP mail server.

Display Name: Displays the name assigned to the job.

Description: Displays the description assigned to the job.

- 3 On the Schedule page, select one of the following options:

Run on a Schedule: Runs the job on a daily, weekly, monthly, or yearly schedule. You can also specify a custom schedule; use the crontab standard when specifying a custom schedule.

Run Manually: Runs the job only when you initiate it through the **Run Now** option (see [Chapter 5, "Starting a Job,"](#) on page 31).

- 4 On the Scope page, click **Add** to add the objects for which you want to generate passwords.
- 5 On the Parameters page, fill in the following fields:

Password Policy Object Used for Password Generation: Select the Password Policy object you want to use to generate the passwords. NMAS uses the password policy to generate the passwords. Generally, each driver requires a password policy designed specifically for the connected system. If you don't have a password policy to use, click **OK** to save the job's current configuration, then create a password policy.

Generate a Password for Objects without a Driver Association: This is set to **False** by default. If you added objects to the Scope page that are not associated with objects in the driver's connected system, and you want to generate passwords for these objects, select **True**.
- 6 On the Results page, define the actions you want performed based on the results for the job. Each time the job runs, it generates intermediate results and a final result. For each result, you can specify the action you want performed when it occurs. For more information, see ["Understanding the Different States of a Job" on page 15](#).
 - 6a Click the **No action** link next to the result to display the Result Notification dialog box.
 - 6b Select **Audit result** if you want to generate an event for Novell Audit or Novell Sentinel.
or
Select **Send email**, then fill in the recipient and e-mail template information.
 - 6c Click **OK** to save your changes.
- 7 When you have finished configuring the job, click **OK** to save your changes.
The job is added to the job list.
- 8 Select the job in the list (by selecting the check box next to the job name), then click **Get Status**.
The Job Status dialog box displays any configuration errors. Because the job requires rights to the driver object and those rights have not yet been granted, you see an `Insufficient rights to driver object error`.
- 9 Click **Grant rights**, then click **OK** to confirm the action.
- 10 If other errors are displayed, resolve the errors. Otherwise, click **Close** to close the Job Status dialog box.

Configuring the Schedule Driver Job


The Schedule Driver job starts or stops the driver based on an established schedule.

- 1 Make sure you've already added the job to the driver. If you haven't, see [Chapter 2, "Adding a Predefined Job," on page 11](#).
- 2 On the General page in iManager, configure the following options:

Enable Job: Leave this option selected unless you don't want the job to run.

Delete the Job After it Runs Once: Select this option if you want the job to run one time only and then be deleted.

Servers: Select the servers where you want the job to run. Multiple servers are available only if the driver is running on multiple servers.

Email Server: To monitor the job, you (or others) can receive e-mail notifications whenever certain results occur for the job. You configure e-mail notification on the Results page. However, to enable this e-mail notification to work, you must first specify the e-mail server that will be used to send the notifications. Click the  button to locate and select the Default Notification Collection object or any other notifTemplateCollection object that defines an SMTP mail server.


- Display Name:** Displays the name assigned to the job.
- Description:** Displays the description assigned to the job.
- 3 On the Schedule page, select one of the following options:
 - Run on a Schedule:** Runs the job on a daily, weekly, monthly, or yearly schedule. You can also specify a custom schedule; use the crontab standard when specifying a custom schedule.
 - Run Manually:** Runs the job only when you initiate it through the **Run Now** option (see [Chapter 5, "Starting a Job," on page 31](#)).
 - 4 Ignore the Scope page; it does not apply to the Schedule Driver job.
 - 5 On the Parameters page, select the type of action you want the job to perform:
 - Start the Driver:** Starts or restarts the driver.
 - Stop the Driver:** Stops the driver.
 - Toggle the Driver:** Starts the driver if it is stopped. Stops the driver if it is running.
 - 6 On the Results page, define the actions you want performed based on the results for the job. Each time the job runs, it generates intermediate results and a final result. For each result, you can specify the action you want performed when it occurs. For more information, see ["Understanding the Different States of a Job" on page 15](#).
 - 6a Click the **No action** link next to the result to display the Result Notification dialog box.
 - 6b Select **Audit result** if you want to generate an event for Novell Audit or Novell Sentinel.
or
Select **Send email**, then fill in the recipient and e-mail template information.
 - 6c Click **OK** to save your changes.
 - 7 When you have finished configuring the job, click **OK** to save your changes.
The job is added to the job list.
 - 8 Select the job in the list (by selecting the check box next to the job name), then click **Get Status**.
The Job Status dialog box displays any configuration errors. Because the job requires rights to the driver object and those rights have not yet been granted, you see an `Insufficient rights to driver object error`.
 - 9 Click **Grant rights**, then click **OK** to confirm the action.
 - 10 If other errors are displayed, resolve the errors. Otherwise, click **Close** to close the Job Status dialog box.

Configuring the Subscriber Channel Trigger Job

The Subscriber Channel Trigger job sends event documents to be processed by the driver's Subscriber channel. For example, a job could generate an event document to trigger policies associated with a user.

You configure the job to generate zero, one, or more event documents by defining a scope for the job. The scope identifies objects for which you want the job to trigger events. If you do not include a scope (no objects), the job creates one event document. If you identify one or more objects, the job creates event documents for each object.

Submitted event documents can be queued to the driver cache, or they can bypass the cache and be processed immediately.

- 1 Make sure you've already added the job to the driver. If you haven't, see [Chapter 2, "Adding a Predefined Job," on page 11](#).
- 2 On the General page in iManager, configure the following options:
 - Enable Job:** Leave this option selected unless you don't want the job to run.
 - Delete the Job After it Runs Once:** Select this option if you want the job to run one time only and then be deleted.
 - Servers:** Select the servers where you want the job to run. Multiple servers are available only if the driver is running on multiple servers.
 - Email Server:** To monitor the job, you (or others) can receive e-mail notifications whenever certain results occur for the job. You configure e-mail notification on the Results page. However, to enable this e-mail notification to work, you must first specify the e-mail server that will be used to send the notifications. Click the  button to locate and select the Default Notification Collection object or any other notifTemplateCollection object that defines an SMTP mail server.
 - Display Name:** Displays the name assigned to the job.
 - Description:** Displays the description assigned to the job.
- 3 On the Schedule page, select one of the following options:
 - Run on a Schedule:** Runs the job on a daily, weekly, monthly, or yearly schedule. You can also specify a custom schedule; use the crontab standard when specifying a custom schedule.
 - Run Manually:** Runs the job only when you initiate it through the **Run Now** option (see [Chapter 5, "Starting a Job," on page 31](#)).
- 4 On the Scope page, add the objects for which you want the job to trigger events. For each identified object, the job creates an event document. If no object is scoped, the job trigger creates one event document.
- 5 On the Parameters page, set the parameters for which you want the job to submit trigger documents.
 1. If you want to submit a trigger document for scoped objects that do not have a driver association, select **True**. Otherwise, keep the default of **False**.
 2. If you want to use the job's Common Name (CN) as a document identifier trigger, keep the default of **True**. Otherwise, select **False**.
 3. (Optional) If you select **False**, enter the string that the job can use as the value for the trigger element's Source attribute.
 4. Select a method for submitting the trigger documents. If you want to queue the job the trigger is from, keep the default of **Queue (use cache)**. Otherwise, select **Direct (bypass cache)**.
 5. (Optional) If you select **Direct (bypass cache)**, you are presented with the **Start driver if not running** option. If you want to start the driver if it is not running, keep the default of **True**. Otherwise, select **False**.
 6. (Optional) If you select **True** on the **Start driver if not running** option, you are presented with the **Stop driver when finished processing triggers** option with the default of **True**. Use the default to stop the driver once it finishes processing the trigger job, or select **False** to keep the driver running.


A customized job definition has its own parameter set.
- 6 On the Results tab, define the actions you want performed based on the results for the job.

Each time the job runs, it generates intermediate results and a final result. For each result, you can specify the action you want performed when it occurs. For more information, see [“Understanding the Different States of a Job” on page 15](#).

- 6a** Click the **No action** link next to the result to display the Result Notification dialog box.
- 6b** Select **Audit result** if you want to generate an event for Novell Audit or Novell Sentinel.
or
Select **Send email**, then fill in the recipient and e-mail template information.
- 6c** Click **OK** to save your changes.
- 7** When you have finished configuring the job, click **OK** to save your changes.
The job is added to the job list.
- 8** Select the job in the list (by selecting the check box next to the job name), then click Get Status.
The Job Status dialog box displays any configuration errors. Because the job requires `write` rights to the `DirXML-AccessSubmitCommand` attribute of the driver object and those rights have not yet been granted, you see an `Insufficient rights to driver object` error.
- 9** Click **Grant rights**, then click **OK** to confirm the action.
- 10** If other errors are displayed, resolve the errors. Otherwise, click **Close** to close the Job Status dialog box.

Configuring the Driver Health Job

The Driver Health job evaluates the conditions for a driver's health states, assigns the driver with the appropriate state, executes any actions associated with the assigned state, and stores the driver's transaction data. The default polling interval is one minute. For more information about setting up health monitoring for a driver, see [“Monitoring Driver Health”](#) in the *NetIQ Identity Manager Driver Administration Guide*.

- 1** Make sure you've already added the job to the driver set. If you haven't, see [Chapter 2, “Adding a Predefined Job,” on page 11](#).
- 2** On the General page in iManager, configure the following options:
 - Enable Job:** Leave this option selected unless you don't want the job to run.
 - Delete the Job After it Runs Once:** Select this option if you want the job to run one time only and then be deleted.
 - Servers:** Select the servers where you want the job to run. Multiple servers are available only if the driver is running on multiple servers.
 - Email Server:** To monitor the job, you (or others) can receive e-mail notifications whenever certain results occur for the job. You can configure e-mail notification on the Results page. However, to enable this e-mail notification to work, you must first specify the e-mail server that will be used to send the notifications. Click the  button to locate and select the Default Notification Collection object or any other `notfTemplateCollection` object that defines an SMTP mail server.
 - Display Name:** Displays the name assigned to the job.
 - Description:** Displays the description assigned to the job.
- 3** On the Schedule page, specify when you want the job to run:

The Driver Health job is a continuously running job, meaning that it does not stop unless a health state action shuts it down or it is shut down manually. The job must run continuously to be able to support transaction data collection for use in Transactions History conditions.

If the job does stop, it is restarted based on the schedule.

Run on a Schedule: Runs the job on a daily, weekly, monthly, or yearly schedule. You can also specify a custom schedule; use the crontab standard when specifying a custom schedule. The default schedule checks every minute to see if the job is running. If the job is not running, it is started.

Run Manually: Runs the job only when you initiate it through the **Run Now** option (see [Chapter 5, “Starting a Job,” on page 31](#)).

- 4 On the Scope page, add the driver sets or individual drivers you want the job applied to.

By default, the job applies to all drivers in the driver set. You can, however, modify the list so that the job applies only to specific drivers in the driver set. You can also add other driver sets or drivers from other driver sets.

- 5 On the Parameters page, select the type of action you want the job to perform:

Login ID: This defaults to the login ID that was used when creating the driver job. You should change this only if you want the driver to authenticate by using different credentials.

You need the following rights to run the health job:

- ◆ Read permission with inheritance to the `DirXML-AccessConfigure` attribute of the Driver Set object
- ◆ Read permission with inheritance to the `DirXML-AccessRun` attribute of the Driver Set object
- ◆ Write permission with inheritance to the `DirXML-AccessSubmitCommand` attribute of the Driver Set object

Login password: This is the password required for the login ID that you supplied in the **Login ID** field.

Subscriber Heartbeat: Controls whether the Driver Health job does a heartbeat query on a driver's Subscriber channel before performing a healthcheck on the driver.

Polling interval: Calculates the driver's transaction data that the health job will store. The default polling interval is one minute.

NOTE: This parameter was earlier used to perform the following actions:

- ◆ Determined how often the job evaluated the conditions for the health states.
- ◆ Assigned the driver the appropriate state.
- ◆ Executed any actions associated with the assigned state.
- ◆ Stored the driver's transaction data.

Polling interval units: Specifies the time unit (minutes, hours, days, weeks) for the number specified in the Polling interval setting.

Duration sampling data is kept: Specifies how long a driver's transaction data is kept. The default, two weeks, causes a transaction to be retained for two weeks before being deleted. A longer duration provides a greater time period that can be used in Transactions History conditions, but requires more memory. For example, to use a Transactions History condition that evaluates of the number of publisher reported events for the last 10 days, you need to keep transaction data for at least 10 days.

Duration units: Specifies the time unit (minutes, hours, days, weeks) for the number specified in the **Duration sampling data is kept** setting.

The combination of **Polling interval**, **Polling interval units**, **Duration sampling data is kept**, and **Duration units** define how much sampling data is maintained by the Driver Health Job, which indicates how much memory the Driver Health Job will require to run.


To store transaction data for one driver every minute (**Polling interval**) for two weeks (**Duration sampling data is kept**) requires approximately 15 MB of memory.

For more information about setting up health monitoring for a driver, see “[Memory Requirements for Driver Health](#)” in the *NetIQ Identity Manager Driver Administration Guide*.

- 6 On the Results page, define the actions you want performed based on the results for the job.
Each time the job runs, it generates intermediate results and a final result. For each result, you can specify the action you want performed when it occurs. For more information, see “[Understanding the Different States of a Job](#)” on page 15.
 - 6a Click the **No action** link next to the result to display the Result Notification dialog box.
 - 6b Select **Audit result** if you want to generate an event for Novell Audit or Novell Sentinel.
or
Select **Send email**, then fill in the recipient and e-mail template information.
 - 6c Click **OK** to save your changes.
- 7 When finished configuring the job, click **OK** to save your changes.
The job is added to the job list.
- 8 Select the job in the list (by selecting the check box next to the job name), then click **Get Status**.
The Job Status dialog box displays any configuration errors. Because the job requires rights to the driver object and those rights have not yet been granted, you see an `Insufficient rights to driver object error`.
- 9 Click **Grant rights**, then click **OK** to confirm the action.
- 10 If other errors are displayed, resolve the errors. Otherwise, click **Close** to close the Job Status dialog box.

Configuring the Password Expiration Notification Job

The Password Expiration Notification job searches an LDAP directory for objects whose passwords expire in a specified number of days. When an object that meets the criteria is discovered, the job sends an e-mail to the address contained in the object’s mail LDAP attribute.

- 1 Make sure you’ve already added the job to the driver set. If you haven’t, see [Chapter 2, “Adding a Predefined Job,”](#) on page 11.
- 2 On the General page in iManager, configure the following options:
 - Enable Job:** Leave this option selected unless you don’t want the job to run.
 - Delete the Job After it Runs Once:** Select this option if you want the job to run one time only and then be deleted.
 - Servers:** Select the servers where you want the job to run. Multiple servers are available only if the driver is running on multiple servers.
 - Email Server:** To monitor the job, you (or others) can receive e-mail notifications whenever certain results occur for the job. You configure e-mail notification on the Results page. However, to enable this e-mail notification to work, you must first specify the e-mail server that will be used to send the notifications. Click the  button to locate and select the Default Notification Collection object or any other `notfTemplateCollection` object that defines an SMTP mail server.
 - Display Name:** Displays the name assigned to the job.
 - Description:** Displays the description assigned to the job.
- 3 On the Schedule page, specify when you want the job to run:

Run on a Schedule: Runs the job on a daily, weekly, monthly, or yearly schedule. You can also specify a custom schedule; use the crontab standard when specifying a custom schedule. The default schedule checks every minute to see if the job is running. If the job is not running, it is started.

Run Manually: Runs the job only when you initiate it through the **Run Now** option (see [Chapter 5, "Starting a Job," on page 31](#)).

4 Ignore the **Scope** page, it does not apply to this job.

5 On the **Parameters** page, fill in the following fields:

LDAP Connection: Use the following fields to specify the information required to connect to the LDAP directory.

- ◆ **LDAP Host:** Specify the IP address or DNS name of the LDAP server.
- ◆ **Use SSL/TLS:** Select **True** if the LDAP connection is secured with SSL/TLS, then set the following options:
 - ◆ **LDAP Port:** Specify the port number that LDAP uses to make a connection. If **Use SSL/TLS** is set to **False**, the default value is 389. If **Use SSL/TLS** is set to **True**, the default value is 636.
 - ◆ **SSL/TLS Provider:** Specify whether the SSL/TLS provider is Novell Secure Transport Layer (NTLS) or Java Secure Socket Extension (JSSE). If you select NTLS, you must provide the name of a KMO object to create the secure connection. If you select JSSE, you must provide a keystore pair of certificates to create the secure connection.
- ◆ **LDAP Authentication Type:** Select whether the LDAP connection is an anonymous connection or an authenticated connection. If you select **Authenticated**, you must provide the username and password of the object that authenticates to the Identity Vault.

LDAP Search: Use the following fields to specify the information used when sending the expiration notification e-mail to users:

- ◆ **Days Until Password expires:** Specify the days, prior to when the password expires, when the job sends an e-mail to users informing them that their password is expiring. By default, the job sends an e-mail to the users 30 days, 15 days, 5 days, and 1 day before their passwords expire.
- ◆ **Search Base:** Specify the DN of the container where the job search occurs. The default value for the Resource Kit is `ou=users,o=company,dc=data`.
- ◆ **Object Class:** Specify the LDAP object class to search. The default is `inetOrgPerson`.

Notification Email: Use the following fields to specify the information used to create the expiration notification e-mail, receivers of the e-mail, and other e-mail settings.

- ◆ **Notification Email Template:** Specify the name of the template used to create the expiration notification e-mail. The default is the Password Expiration Notification template in the Default Notification Collection object.
- ◆ **User Name Attribute:** Specify the LDAP attribute used to add the username into the notification template.
- ◆ **From:** Specify the e-mail address used to populate the e-mail's From field.
- ◆ **Show Advanced Options:** Select **True** to display the advanced options, or select **False** to hide the advanced options. The advanced options are:
 - ◆ **Reply to:** Specify the e-mail address that appears in the Reply to field.
 - ◆ **Admin BCC:** Specify an administrator to blind copy on the notification e-mail.
 - ◆ **Character encoding:** Specify the desired character encoding.
 - ◆ **Custom SMTP headers:** Specify a custom SMTP header if desired.


- 6 On the Results page, define the actions you want performed based on the results for the job. Each time the job runs, it generates intermediate results and a final result. For each result, you can specify the action you want performed when it occurs. For more information, see [“Understanding the Different States of a Job” on page 15](#).
 - 6a Click the **No action** link next to the result to display the Result Notification dialog box.
 - 6b Select **Audit result** if you want to generate an event for Novell Audit or Novell Sentinel.

or

 Select **Send email**, then fill in the recipient and e-mail template information.
 - 6c Click **OK** to save your changes.
- 7 When you have finished configuring the job, click **OK** to save your changes. The job is added to the job list.
- 8 Select the job in the list (by selecting the check box next to the job name), then click **Get Status**. The Job Status dialog box displays any configuration errors. Because the job requires rights to the driver object and those rights have not yet been granted, you see an `Insufficient rights to driver object error`.
- 9 Click **Grant rights**, then click **OK** to confirm the action.
- 10 If other errors are displayed, resolve the errors. Otherwise, click **Close** to close the Job Status dialog box.

Modifying the Association Statistics Job Configuration

The Association Statistics job runs on a daily, weekly, monthly, or yearly basis.

- 1 On the **General** page in iManager, configure the following options:
 - Enable Job:** Leave this option selected unless you do not want the job to run.
 - Delete the Job After it Runs Once:** Select this option if you want the job to run one time only and then be deleted.
 - Servers:** Select the servers where you want the job to run. Multiple servers are available only if the driver is running on multiple servers.
 - Email Server:** To monitor the job, you (or others) can receive e-mail notifications whenever certain results occur for the job. You configure e-mail notification on the **Results** page. However, to enable the e-mail notification, you must specify the e-mail server that will be used to send the notifications. Click the  button to locate and select the Default Notification Collection object or any other `notfTemplateCollection` object that defines an SMTP mail server.
 - Email server password:** Use this option to set your email server password.
 - Display Name:** Displays the name assigned to the job.
 - Description:** Displays the description assigned to the job.
- 2 On the **Schedule** page, specify when you want the job to run:
 - Run on a Schedule:** Runs the job on a daily, weekly, monthly, or yearly schedule. You can also specify a custom schedule; use the crontab standard when specifying a custom schedule. By default, the job is checked every week to see if it is running. If the job is not running, it is started.
 - Run Manually:** Runs the job only when you initiate it through the **Run Now** option (see [Chapter 5, “Starting a Job,” on page 31](#)).
- 3 Ignore the **Scope** page, it does not apply to this job.

- 4 On the **Parameters** page, perform the following actions:

Count no-reference associations: To calculate the no-reference associations, select **True**. By default, the value is set to **False**, which allows the association statistics job to calculate only reference-based associations.

IMPORTANT: To obtain the no-reference associations, add the `StatisticsJob` object (created under the driverset) as a trustee of the data container (where the associated objects reside). You need to have default set of rights. For example, *All Attribute* rights should have *Compare and Read* rights and *Entry* rights should have *Browse* rights.

Persist Result DN's: To export and view the identities, select **True**. If you select **False**, the identities are not exported and a message is displayed stating that `Results discarded due to configuration settings`. Enable "Persist Result DN's" in `StatisticsJob` parameters and `recompute` to view DN's.

Specify System Objects: This list contains objects which are considered for system class.

- 5 On the **Results** page, define the actions you want to be performed based on the results for the job.

Each time the job runs, it generates intermediate results and a final result. For each result, you can specify the action you want performed when it occurs. For more information, see ["Understanding the Different States of a Job" on page 15](#).

5a Click the **No action** link next to the result to display the **Result Notification** dialog box.

5b Select **Audit result** if you want to generate an event for Novell Audit or Novell Sentinel.

or

Select **Send email**, then fill in the recipient and e-mail template information.

5c Click **OK** to save your changes.

- 6 When you have finished configuring the job, click **OK** to save your changes.

The job is added to the job list.

- 7 Select the job in the list (by selecting the check box next to the job name), then click **Get Status**.

The Job Status dialog box displays any configuration errors.

- 8 Click **Grant rights**, then click **OK** to confirm the action.

- 9 If other errors are displayed, resolve the errors. Otherwise, click **Close** to close the **Job Status** dialog box.

- 10 In the **Misc** tab, you can see the trace levels for the association statistics job. For more information about trace levels, see [Chapter 9, "Tracing a Job," on page 39](#).

4 Creating a Custom Job

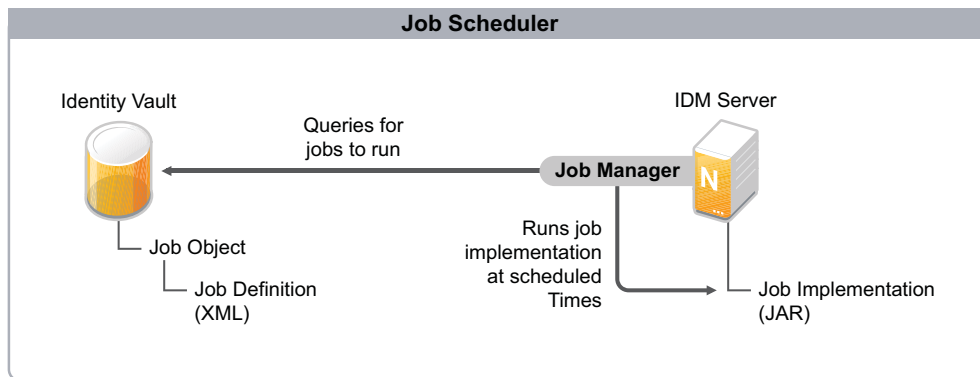
You can create a custom job to perform a task one or more times. The following sections provide the concepts and instructions required to create a custom job:

- ♦ “Job Components” on page 27
- ♦ “Creating the Job Definition and Job Implementation” on page 28
- ♦ “Adding the Job” on page 28

Job Components

The following diagram identifies the principle components required to process a job:

Figure 4-1 High-level view of Job Scheduler process



Job Manager: The Job Manager is responsible for launching scheduled jobs. It runs in the background on each Identity Manager server and checks every minute to see if a job is scheduled to run. When it encounters a scheduled job, it runs the appropriate Job Implementation.

Job Object: The Job object contains all the information necessary to invoke the job. It includes the name, description, schedule, server list, and XML job definition. The Job object is created in the Identity Vault when you use Identity Manager or Designer to add the job to a driver set or driver.

Job Definition: The Job Definition is an XML description of all the parameters necessary to perform a specific job, including the Job Implementation used to actually run the job. The Job Definition is an XML attribute associated with the Job object.

Job Implementation: The Job Implementation file is typically a JAR file that contains the Java classes that perform the job. Each Identity Manager server where you want a job to run must have a copy of the Job Implementation file. The Job Manager runs the Job Implementation at the times scheduled in the Job Definition.




Creating the Job Definition and Job Implementation



The Job Definition is XML that defines the parameters required to perform the job. This includes the schedule, scope, and notification parameters as well as the path to the Job Implementation file. To create the XML, see Jobs DTD in the [DTD documentation \(https://www.netiq.com/documentation/identity-manager-developer/dtd-documentation.html\)](https://www.netiq.com/documentation/identity-manager-developer/dtd-documentation.html) page.

The Job Implementation is a JAR file that contains the Java classes required to perform the job. Novell does not provide instructions for creating the Job Implementation. The only requirement is that the Java classes run in the Identity Manager server's Java Runtime Environment. For more information, see [Javadocs for the job interface](#).

Adding the Job

The following steps provide instructions for using iManager to add a custom job. For information about using Designer to add jobs, see “[Scheduling Jobs](#)” in the *NetIQ Designer for Identity Manager Administration Guide*.

- 1 In iManager, click  to display the Identity Manager Administration page.
- 2 Open the Overview page for the driver or driver set where you want to add the job:
 - 2a In the **Administration** list, click **Identity Manager Overview** to display the Identity Manager Overview page.
 - 2b In the **Search in** field, specify the fully distinguished name of the container where you want to start searching for driver sets and then click , or leave [root] in the field and click  to search from the root of the tree.

You can also click  to browse for and select the container in the tree structure, or click  to select the container from a list of previously selected objects.
 - 2c After the available driver sets are displayed on the Driver Sets page, click the desired driver set to display the Driver Set Overview page.
 - 2d (Conditional) If you are adding the job to a driver, click the driver to display the Driver Overview page.
- 3 Click the **Jobs** tab.
- 4 Click **New** to display the Create Job page.

Overview Advanced Jobs

New **Create Job**

Job Name:

Job type

Installed

Custom

Subscriber channel trigger

This job submits zero or more trigger documents to the subscriber channel. The submission may either be a document per object if a scope is defined or may be a single document for each job run.

Enter the XML that defines the custom job.

Servers

Select the server(s) this job should run on:




IDMTEST.Novell



OK Cancel

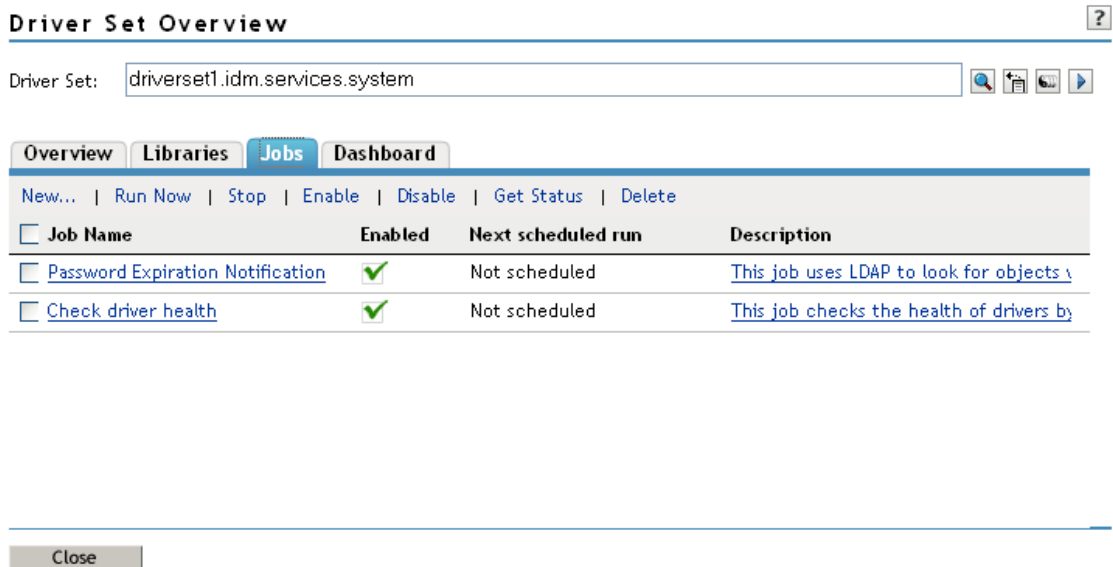
- 5 In the **Job Name** field, specify a descriptive name for the job.
- 6 Under **Job Type**, select **Custom**, then paste the Job Definition's XML into the text box.
- 7 In the **Server** field, select the servers where you want to run the job.
- 8 Click **OK** to create the job and display its configuration properties.
- 9 Provide the General, Schedule, Scope, Parameters, and Results information required by the Job Definition.
- 10 When you have finished, click **OK** to save the configuration.
The job is added to the Jobs list.
- 11 Select the job in the list (by selecting the check box in front of the job name), then click **Get Status**.
The Job Status dialog box displays any configuration errors.
- 12 If errors are displayed, resolve the errors. Otherwise, click **Close** to close the Job Status dialog box.


5 Starting a Job





You can start a job by establishing a run schedule for the job, or you can manually start the job. The following steps explain how to use iManager to manually start a job. For information about creating a schedule to run a job, see [Chapter 2, “Adding a Predefined Job,” on page 11](#). For information about using Designer to start a job, see “Scheduling Jobs” in the *NetIQ Designer for Identity Manager Administration Guide*.

- 1 In iManager, click  to display the Identity Manager Administration page.
- 2 Open the Overview page for the driver or driver set where the job is defined:
 - 2a In the **Administration** list, click **Identity Manager Overview** to display the Identity Manager Overview page.
 - 2b In the **Search in** field, specify the fully distinguished name of the container where you want to start searching for driver sets and then click , or leave [root] in the field and click  to search from the root of the tree.

You can also click  to browse for and select the container in the tree structure, or click  to select the container from a list of previously selected objects.
 - 2c After the available driver sets are displayed on the Driver Sets page, click the desired driver set to display the Driver Set Overview page.
 - 2d (Conditional) If you are starting the job for a driver (rather than a driver set), click the driver to display the Driver Overview page.
- 3 Click the **Jobs** tab.



Driver Set Overview 

Driver Set:    

Overview **Libraries** **Jobs** **Dashboard**

New... | Run Now | Stop | Enable | Disable | Get Status | Delete




<input type="checkbox"/> Job Name	Enabled	Next scheduled run	Description
<input type="checkbox"/> Password Expiration Notification	✓	Not scheduled	This job uses LDAP to look for objects \
<input type="checkbox"/> Check driver health	✓	Not scheduled	This job checks the health of drivers by



- 4 Select the check box in front of the job you want to start, then click **Run Now**.
- 5 Click **OK** to dismiss the startup confirmation dialog box.

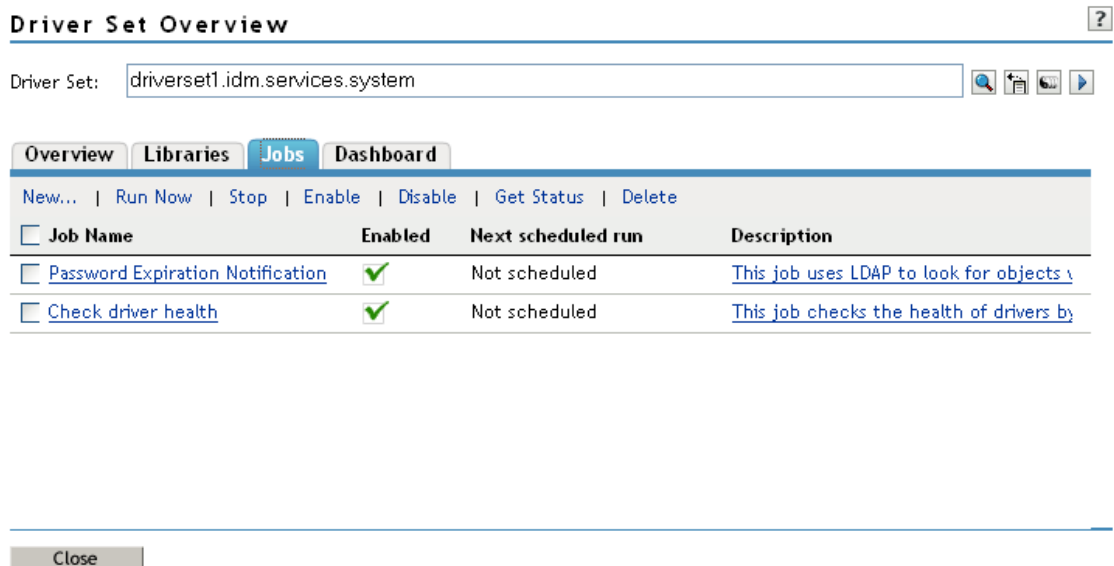
6 Stopping a Job


You can abort a running job by stopping it. The job stops immediately without completing its task.





The following steps provide instructions for using iManager to stop a job. For information about using Designer to stop a job, see “Scheduling Jobs” in the *NetIQ Designer for Identity Manager Administration Guide*.

- 1 In iManager, click  to display the Identity Manager Administration page.
- 2 Open the Overview page for the driver or driver set where the job is defined:
 - 2a In the **Administration** list, click **Identity Manager Overview** to display the Identity Manager Overview page.
 - 2b In the **Search in** field, specify the fully distinguished name of the container where you want to start searching for driver sets and then click , or leave [root] in the field and click  to search from the root of the tree.

You can also click  to browse for and select the container in the tree structure, or click  to select the container from a list of previously selected objects.
 - 2c After the available driver sets are displayed on the Driver Sets page, click the desired driver set to display the Driver Set Overview page.
 - 2d (Conditional) If you are stopping the job for a driver (rather than a driver set), click the driver to display the Driver Overview page.
- 3 Click the **Jobs** tab.



Driver Set Overview 

Driver Set:    

Overview | **Libraries** | **Jobs** | **Dashboard**

[New...](#) | [Run Now](#) | [Stop](#) | [Enable](#) | [Disable](#) | [Get Status](#) | [Delete](#)




<input type="checkbox"/> Job Name	Enabled	Next scheduled run	Description
<input type="checkbox"/> Password Expiration Notification	✓	Not scheduled	This job uses LDAP to look for objects \
<input type="checkbox"/> Check driver health	✓	Not scheduled	This job checks the health of drivers by



- 4 Select the check box in front of the job you want to stop, then click **Stop**.
- 5 Click **OK** to dismiss the confirmation dialog box.

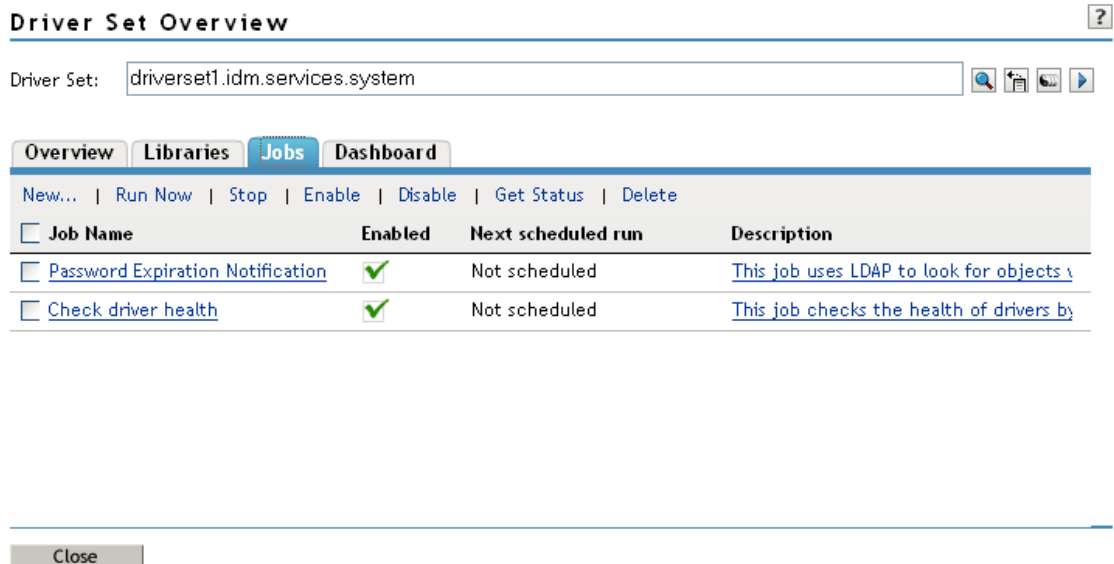
7 Disabling a Job


You can disable a job so that it does not run until it is enabled again.





The following steps provide instructions for using iManager to disable a job. For information about using Designer to disable a job, see “Scheduling Jobs” in the *NetIQ Designer for Identity Manager Administration Guide*.

- 1 In iManager, click  to display the Identity Manager Administration page.
- 2 Open the Overview page for the driver or driver set where the job is defined:
 - 2a In the **Administration** list, click **Identity Manager Overview** to display the Identity Manager Overview page.
 - 2b In the **Search in** field, specify the fully distinguished name of the container where you want to start searching for driver sets and then click , or leave [root] in the field and click  to search from the root of the tree.

You can also click  to browse for and select the container in the tree structure, or click  to select the container from a list of previously selected objects.
 - 2c After the available driver sets are displayed on the Driver Sets page, click the desired driver set to display the Driver Set Overview page.
 - 2d (Conditional) If you are disabling the job for a driver (rather than a driver set), click the driver to display the Driver Overview page.
- 3 Click the **Jobs** tab.



Driver Set Overview 

Driver Set:    

Overview **Libraries** **Jobs** **Dashboard**

[New...](#) | [Run Now](#) | [Stop](#) | [Enable](#) | [Disable](#) | [Get Status](#) | [Delete](#)




<input type="checkbox"/> Job Name	Enabled	Next scheduled run	Description
<input type="checkbox"/> Password Expiration Notification	✓	Not scheduled	This job uses LDAP to look for objects \
<input type="checkbox"/> Check driver health	✓	Not scheduled	This job checks the health of drivers by



- 4 Select the check box in front of the job you want to disable, then click **Disable**.
- 5 Click **OK** to dismiss the confirmation dialog box.

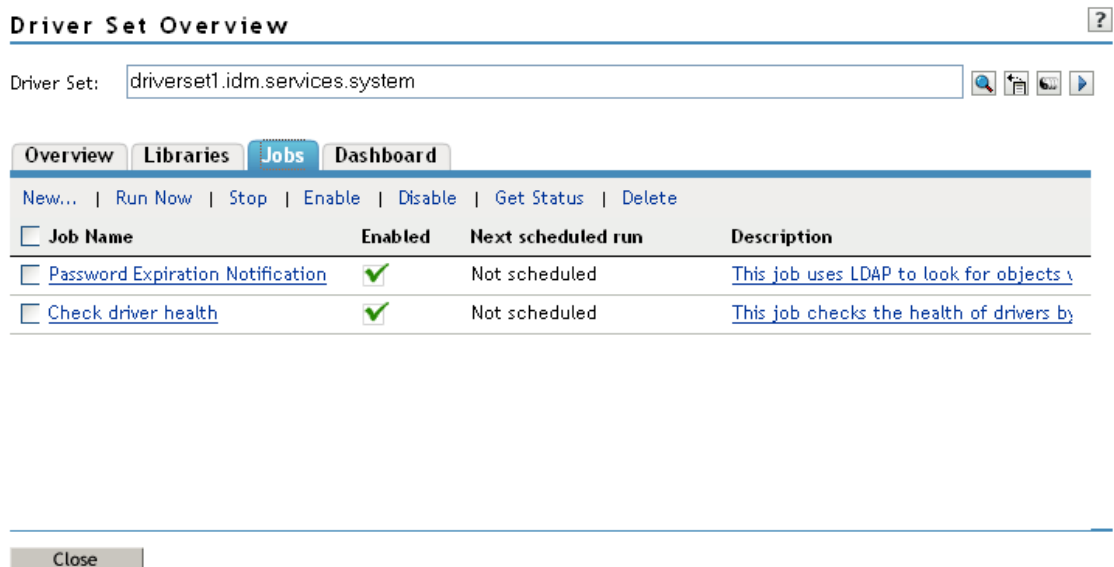
8 Checking a Job's Status


You can ensure that a job is configured correctly by checking its status. If it is not configured correctly, the status provides error messages instructing you what needs to be done for the job to run properly.





The following steps provide instructions for using iManager to check a job's status. For information about using Designer to check the status of a job, see “Scheduling Jobs” in the *NetIQ Designer for Identity Manager Administration Guide*.

- 1 In iManager, click  to display the Identity Manager Administration page.
- 2 Open the Overview page for the driver or driver set where the job is defined:
 - 2a In the **Administration** list, click **Identity Manager Overview** to display the Identity Manager Overview page.
 - 2b In the **Search in** field, specify the fully distinguished name of the container where you want to start searching for driver sets and then click , or leave [root] in the field and click  to search from the root of the tree.

You can also click  to browse for and select the container in the tree structure, or click  to select the container from a list of previously selected objects.
 - 2c After the available driver sets are displayed on the Driver Sets page, click the desired driver set to display the Driver Set Overview page.
 - 2d (Conditional) If you are checking the job for a driver (rather than a driver set), click the driver to display the Driver Overview page.
- 3 Click the **Jobs** tab.



Driver Set Overview 

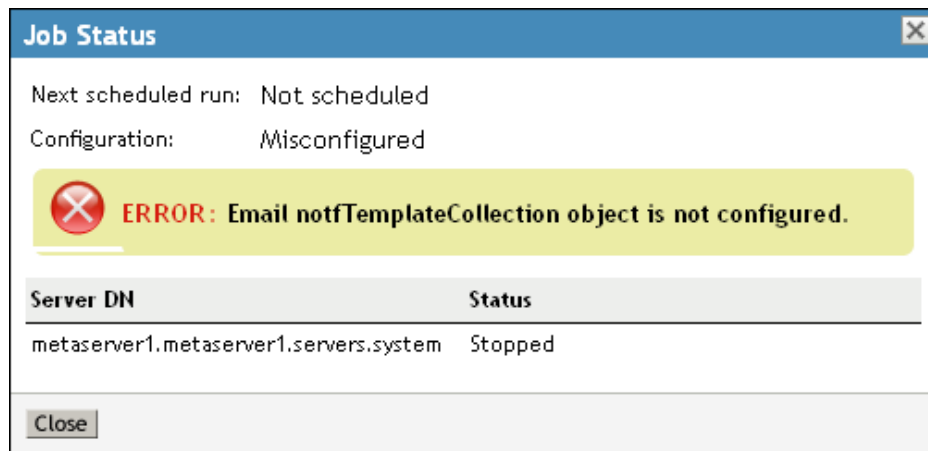
Driver Set:    

Overview **Libraries** **Jobs** **Dashboard**

[New...](#) | [Run Now](#) | [Stop](#) | [Enable](#) | [Disable](#) | [Get Status](#) | [Delete](#)

<input type="checkbox"/> Job Name	Enabled	Next scheduled run	Description
<input type="checkbox"/> Password Expiration Notification	✓	Not scheduled	This job uses LDAP to look for objects \
<input type="checkbox"/> Check driver health	✓	Not scheduled	This job checks the health of drivers by

- 4 Select the check box in front of the job you want to check, then click **Get Status**.








- 5 Click **Close** when you've finished reviewing any errors.

9 Tracing a Job

You can add trace levels to a job manually. The following steps provide instructions for manually tracing a job in iManager.

For information about adding a trace level to a job in Designer, see “[Configuring Jobs](#)” in the *Net/Q Designer for Identity Manager Administration Guide*.

- 1 In iManager, click  to display the Identity Manager Administration page.
- 2 Open the Overview page for the job where the job is defined:
 - 2a In the **Administration** list, click **Identity Manager Overview** to display the Identity Manager Overview page.
 - 2b In the **Search in** field, specify the fully distinguished name of the container where you want to start searching for driver sets and then click , or leave [root] in the field and click  to search from the root of the tree.

You can also click  to browse for and select the container in the tree structure, or click  to select the container from a list of previously selected objects.
 - 2c After the available driver sets are displayed on the Driver Sets page, click the desired driver set to display the Driver Set Overview page.
 - 2d (Conditional) If you want to trace the job for a driver (rather than a driver set), click the driver to display the Driver Overview page.
- 3 Click the **Jobs** tab.
- 4 Click the job for which you want to add trace level.

The Jobs dialog is displayed.
- 5 Select the **Misc** tab.
- 6 Set the parameters for tracing, then click **OK**. For information about the trace properties, see [Table 9-1 on page 39](#).

Table 9-1 Job Trace Parameters




Parameter	Description
Trace level	<p>As the job trace level increases, the amount of information displayed in DSTrace increases.</p> <p>Trace level one shows errors, but not the cause of the errors. If you want to see password synchronization information, set the trace level to five.</p> <p>If you select Use setting from Driver Set, the value is taken from the driver set.</p>
Trace file	<p>Specify a file name and location of where the Identity Manager information is written for the selected job.</p> <p>If you select Use setting from Driver Set, the value is taken from the driver set.</p>



Parameter	Description
Trace file encoding	The trace file uses the system's default encoding. You can specify another encoding if desired.
Trace file size limit	<p>Allows you to set a limit for the Java trace file. If you set the file size to unlimited, the file grows in size until there is no disk space left.</p> <p>NOTE: The trace file is created in multiple files. Identity Manager automatically divides the maximum file size by ten and creates ten separate files. The combined size of these files equals the maximum trace file size.</p> <p>If you select Use setting from Driver Set, the value is taken from the driver set.</p>
Trace name	The job trace messages are prepended with the value entered instead of the job name. Use if the job name is very long.

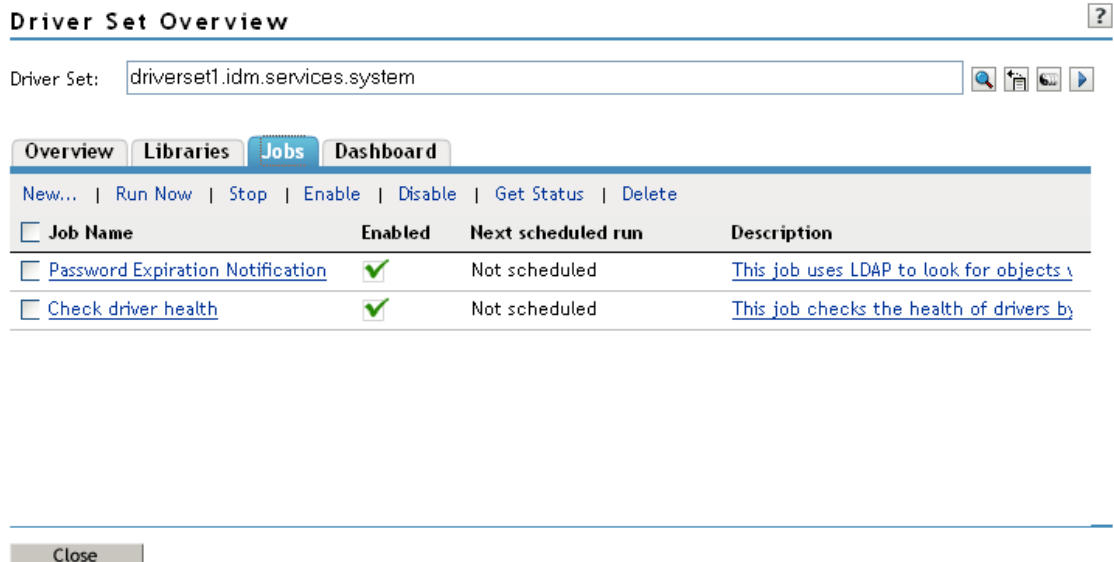
10 Deleting a Job


You can configure a job to run once and then be deleted, or you can delete a job manually. The following steps provide instructions for manually deleting a job in iManager. For information about configuring a job to run once and then be deleted, see [Chapter 3, “Configuring the Properties of Predefined Jobs,”](#) on page 15.





For information about deleting a job in Designer, see “[Scheduling Jobs](#)” in the *NetIQ Designer for Identity Manager Administration Guide*.

- 1 In iManager, click  to display the Identity Manager Administration page.
- 2 Open the Overview page for the driver or driver set where the job is defined:
 - 2a In the **Administration** list, click **Identity Manager Overview** to display the Identity Manager Overview page.
 - 2b In the **Search in** field, specify the fully distinguished name of the container where you want to start searching for driver sets and then click , or leave [root] in the field and click  to search from the root of the tree.

You can also click  to browse for and select the container in the tree structure, or click  to select the container from a list of previously selected objects.
 - 2c After the available driver sets are displayed on the Driver Sets page, click the desired driver set to display the Driver Set Overview page.
 - 2d (Conditional) If you are deleting the job for a driver (rather than a driver set), click the driver to display the Driver Overview page.
- 3 Click the **Jobs** tab.



Driver Set Overview 

Driver Set:    

Overview | **Libraries** | **Jobs** | **Dashboard**

[New...](#) | [Run Now](#) | [Stop](#) | [Enable](#) | [Disable](#) | [Get Status](#) | [Delete](#)

<input type="checkbox"/> Job Name	Enabled	Next scheduled run	Description
<input type="checkbox"/> Password Expiration Notification	✓	Not scheduled	This job uses LDAP to look for objects \
<input type="checkbox"/> Check driver health	✓	Not scheduled	This job checks the health of drivers by

- 4 Select the check box in front of the job you want to delete, then click **Delete**.
- 5 Click **OK** to confirm the deletion.

Sometimes a deleted job continues to run if it is not stopped before being deleted.

To delete an already running job:

- 1 Stop the job.
- 2 Delete the job.

If you don't stop the job before deleting it, it continues to run.