

## Reporting Guide for Novell Sentinel®

# Novell® Identity Manager

**3.6**

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# About This Guide

Welcome to the *Identity Manager Integration Guide for Novell Sentinel*. This guide provides the information necessary to integrate Novell® Sentinel™ with Identity Manager to provide auditing and reporting services.

- ♦ Chapter 1, “Overview,” on page 9
- ♦ Chapter 2, “Configuring Novell Sentinel with Identity Manager,” on page 11
- ♦ Chapter 5, “Installing and Configuring the Platform Agent,” on page 21
- ♦ Chapter 6, “Securing the Logging System,” on page 25
- ♦ Chapter 7, “Managing Identity Manager Events,” on page 27
- ♦ Chapter 9, “Querying and Reporting,” on page 41
- ♦ Appendix A, “Identity Manager Events,” on page 43

## Audience

This guide is intended for network administrators.

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## Documentation Updates

For the most recent version of the *Identity Manager 3.6 Integration Guide for Novell Sentinel*, visit the [Identity Manager Documentation Web site](http://www.novell.com/documentation/idm36/) (<http://www.novell.com/documentation/idm36/>).

## Additional Documentation

For the current Sentinel documentation, see the [Sentinel Documentation Web site](http://www.novell.com/documentation/sentinel61/index.html) (<http://www.novell.com/documentation/sentinel61/index.html>).

## Documentation Conventions

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

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



# Overview

# 1

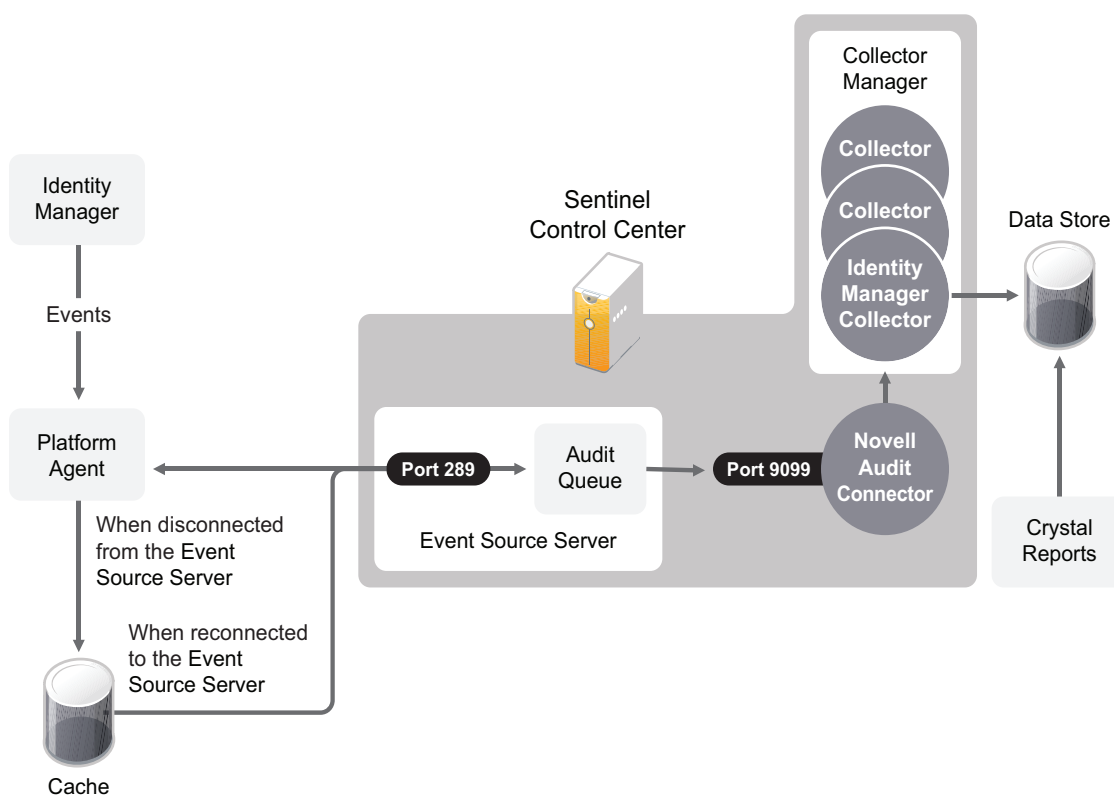
Adding Novell Sentinel™ to your Identity Manager solution provides a reporting services. By adding reporting, you can demonstrate that the business policies are enforced within your Identity Manager solution. This is the last component to add to your Identity Manager solution.

## 1.1 Sentinel Integrated Architecture

Sentinel is a security information management and compliance monitoring solution that monitors, responds to, and reports on security and compliance events. Sentinel easily integrates with Novell Identity Manager so you get automated, real-time security management and compliance monitoring across all systems and networks. The Sentinel-Identity Manager framework provides automatic documenting and reporting of security, systems, and access events across the enterprise; built-in incident management and remediation; and the ability to demonstrate and monitor compliance with internal policies and government regulations.

The following diagram illustrates the Identity Manager logging and reporting architecture when integrated with Sentinel.

**Figure 1-1** Identity Manager and Sentinel Integrated Architecture



1. An Identity Manager event occurs and it is sent to the Platform Agent. To capture all Identity Manager events, the Platform Agent must be installed and configured on each Identity Manager server.

2. (Conditional) If the Platform Agent cannot connect to the Event Source Server, the events are stored in cache until the connection is reestablished.
3. The Platform Agent sends the events to the Event Source Server, which stores the events in the audit queue.
4. The events in the audit queue are sent to the Novell Audit Connector.
5. The Novell Audit Connector sends the events to the Identity Manager Collector, which parses the information and then stores the parsed events in the data store.
6. The stored events are displayed through Crystal Reports\*.

For a thorough discussion of the Sentinel architecture, see “Appendix A Sentinel Architecture” in the *Novell Sentinel User’s Guide* ([http://www.novell.com/documentation/sentinel61/pdfdoc/sentinel\\_61\\_user\\_guide.pdf](http://www.novell.com/documentation/sentinel61/pdfdoc/sentinel_61_user_guide.pdf)).

# Configuring Novell Sentinel with Identity Manager

# 2

Use the following checklist to verify that all of the steps are completed to install and configure Sentinel™ with Identity Manager.

- ☐ Install and configure the Sentinel components. The Sentinel components should be a different server from the Identity Manager server. For more information, see the *Novell Sentinel Installation Guide* ([http://www.novell.com/documentation/sentinel61/pdfdoc/sentinel\\_61\\_installation\\_guide.pdf](http://www.novell.com/documentation/sentinel61/pdfdoc/sentinel_61_installation_guide.pdf)).

- ☐ Install and Configure the Novell Sentinel Identity Manager Collector. For more information, see **Chapter 3, “Installing and Configuring the Identity Manager Collector,”** on page 13.

- ☐ Install and configure the Novell Audit Connector. For more information, see **Chapter 4, “Installing and Configuring the Novell Audit Connector,”** on page 17.

- ☐ Install and configure the Platform Agent.

The Platform Agent (logevent) is the client piece of the Novell auditing architecture. It is automatically installed if either the *Novell Identity Manager Metadirectory Server* or *Novell Identity Manager Connected System* option is selected during the Identity Manager install. It is also installed during the installation of the User Application.

For more information on installing and configuring the Platform Agent, see **Chapter 5, “Installing and Configuring the Platform Agent,”** on page 21.

- ☐ (Optional) Secure the connection between Identity Manager and the Platform Agent.

For more information, see **Chapter 6, “Securing the Logging System,”** on page 25.

- ☐ Select which Identity Manager events you want to log to Novell Audit.

For more information, see **Chapter 7, “Managing Identity Manager Events,”** on page 27.

- ☐ Configure the Sentinel Control Center to access the Crystal Enterprise\* server for the predefined reports for Identity Manager. For more information, see **Chapter 9, “Querying and Reporting,”** on page 41.



# Installing and Configuring the Identity Manager Collector

# 3

The Identity Manager Collector parses and normalizes the raw data passed to it by the Novell® Audit Connector and converts the data into a Sentinel event. The Sentinel event can be visualized in the Active View, processed by the correlation engine, queried in a report, and added to an incident response workflow.

The Identity Manager Collector can also parse non-event data and transform the raw scan data into a format understood by Sentinel. Sentinel then stores the vulnerability data in the database and includes it in the Exploit Detection map. For more detailed information about Sentinel collectors, see the *Sentinel Collector Script User's Guide* ([http://www.novell.com/documentation/sentinel6/pdfdoc/sentinel60\\_collectorguide.pdf](http://www.novell.com/documentation/sentinel6/pdfdoc/sentinel60_collectorguide.pdf)).

## 3.1 Installing the Identity Manager Collector

The Identity Manager Collector must be added to the Event Source Manager to be installed. This step is only done once. The Identity Manager Collector is then displayed as a collector to select during configuration. To install the Identity Manager Collector:

- 1 Download the Identity Manager Collector (Novell\_Identity-Manager\_6.1r1.clz.zip) from the [Sentinel 6.1 Connectors Web site](http://support.novell.com/products/sentinel/secure/sentinel61.html) (<http://support.novell.com/products/sentinel/secure/sentinel61.html>) to the server where the Sentinel Control Center is running.  
The Identity Manager Collector is located under the *Collectors* tab.
- 2 Log in to the Sentinel Control Center.
- 3 Select the *Event Source Management > Live View*, then select *Tools > Import plugin*.
- 4 Browse to and select the Novell\_Identity-Manager\_6.1r1.clz.zip file, then click *Next*.
- 5 Follow the remaining prompts, then click *Finish*.
- 6 Continue with [Section 3.2, “Configuring the Identity Manager Collector,” on page 13](#). The Identity Manager Collect must be configured to work.

## 3.2 Configuring the Identity Manager Collector

- 1 In the Event Source Management live view, right-click the Collection Manager, then click *Add Collector*.
- 2 Select *Novell* in the *Vendor* column.
- 3 Select *Identity Manager* in the *Name* column, then click *Next*.
- 4 From the *Installed Scripts* column, select *Novell\_Identity-Manager\_6.1r1*, then click *Next*.
- 5 Configure the Identity Manager Collector for your needs by using the following information.

Configuration Parameter	Default Value	Description
Alert Unsupported Events	no	Generates an event for the event source data not handled by the Identity Manager Collector.
Default Reporter Name	DEFAULT_RN	Populates the Reporter Name event tag with this text, if not handled in the collector script.
Default Sensor Name	DEFAULT_SN	Populates the Sensor Name event tag with this text, if not handled in the collector script.
Default Severity	3 Medium (3)	The default severity assigned to the events, if the severity mapping is not defined in the collector script.
Event Source Missing Year	yes	Select whether to use the current year if year is not reported in the event source timestamp.
Event Source Time Zone	+0000	Sets the time zone offset UTC (+0000) of the event source data timestamps. This is used if the source data is reported only in local time with no time zone indicated. The format is + or - followed by a two digit hour and minute offset.
Event Source Time uses 24 Hour Clock	yes	Select whether the time reported in the event source data is in the 24 hour format.
Execution Mode	release	<p>Sets the executions mode for the collector. There are three options:</p> <ul style="list-style-type: none"> <li>♦ <b>release:</b> Use this mode for normal operation.</li> <li>♦ <b>custom:</b> Use this mode if the Identity Manager Collector is customized.</li> <li>♦ <b>debug:</b> Use this mode when troubleshooting issues. It generates debug trace files.</li> </ul>
IP To Country Mapping	off	Select whether to determine the source country from the Source IP.
MSSP Customer Name		
Script Error Severity	5 Severe (5)	Sets the severity for a script error event.

Configuration Parameter	Default Value	Description
Send Script Error Message	yes	Sends a script error event when there is an error with the collector script.
Taxonomy Filename	tx_novl_idm_3x.csv	The name of the taxonomy CSV file used by the collector script.
Translate IP and hostname	no	Translates the IP address to the hostname and the hostname to the IP address for the source and destination, if it is missing.  This parameter uses the packages with the collector. These files must be pre-filled with the host information if name resolution is desired.
Unsupported Events Severity	1 Trivial (1)	Assigned severity for unhandled events generated by the collector script.

**6** Click *Next*.

**7** Complete the configuration of the Identity Manager Collector with the following information:

- ♦ **Name:** Specify a name for this connector.
- ♦ **Run:** Select whether the connector is started whenever the Collector Manager is started.
- ♦ **Alert if no data received in specified time period:** (Optional) Select this option to send the No Data Alert event to Sentinel if data is not received by the Connector in the specified time period.
- ♦ **Limit Data Rate:** (Optional) Select this option to set a maximum limit on the rate of data the connector sends to Sentinel. If the data rate limit is reached, Sentinel throttles back on the source in order to limit the flow of data.
- ♦ **Set Filter:** (Optional) Specify a filter on the raw data passing through the connector.
- ♦ **Trust Event Source Time:** (Optional) Select this option if you trust the Event Source server's time.

**8** Click *Finish*.

The next step is to proceed to [Chapter 4, "Installing and Configuring the Novell Audit Connector," on page 17](#).



# Installing and Configuring the Novell Audit Connector

# 4

The Novell® Audit Connector facilitates integration between Identity Manager and Sentinel™. Identity Manager is instrumented to send all events to the Platform Agent for logging purposes. The Novell Audit Connector allows Sentinel to connect to Identity Manager via the Platform Agent. For more detailed information about the Novell Audit Connector, see the [Novell Audit Connector documentation](http://support.novell.com/products/sentinel/doc/connectors/audit_connector.pdf) ([http://support.novell.com/products/sentinel/doc/connectors/audit\\_connector.pdf](http://support.novell.com/products/sentinel/doc/connectors/audit_connector.pdf)).

You must have the Identity Manager Collector installed and configured before proceeding with the installation and configuration of the Novell Audit Connector.

## 4.1 Installing the Novell Audit Connector

- 1 Download the `audit_connector.zip` file from the [Sentinel 6.1 Connectors Web site](http://support.novell.com/products/sentinel/secure/sentinel61.html) (<http://support.novell.com/products/sentinel/secure/sentinel61.html>) to the server where the Sentinel Control Center is running.  
The Novell Audit connector is located under the *Connectors* tab.
- 2 Log in to the Sentinel Control Center.
- 3 Select *Event Source Management > Live View*, then select *Tools > Import plugin*.
- 4 Select *Import Collector Script or Connector plugin package file (.zip)* option, then click *Next*.
- 5 Browse to and select the `audit_connector.zip` file, then click *Next*.
- 6 Follow the remaining prompts, then click *Finish*.
- 7 Continue with [Section 4.2, “Configuring the Novell Audit Connector,” on page 17](#). you must configure the Novell Audit connector for it to work.

## 4.2 Configuring the Novell Audit Connector

The Novell Audit Connector is configured to receive messages sent from Identity Manager to the Platform Agent. These events are then processed by the Identity Manager Collector.

There are multiple ways to configure the Novell Audit Connector. These instructions use the right-click menu items on the Event Source Management Graph view.

- 1 Right-click the Identity Manager Collector, then click *Add Connector*.
- 2 Select *View Compatible Connection Methods Only*.
- 3 Select *Audit* from the list of installed connectors, then click *Next*.
- 4 Click *Add* to add an Event Source server.

The Event Source server is the server that is running the Platform Agent and Identity Manager.

- 5 Select the network interface setting for the server running the Platform Agent and Identity Manager.
  - ♦ **All network interfaces:** Binds the port on all the IP addresses of the server, including the loopback address.

- ♦ **Internal loopback interface:** Only binds the local loopback address.
  - ♦ **Network interface with this IP:** Binds the port only to the specified IP address.
- 6** In the *Port Number* field, specify the SLS port, then click *Next*.  
The default port is 289.
- 7** Select the option for the client authentication type.
- ♦ **Open:** Allows all SSL connections from the Platform Agent. It does not perform any client certificate validation or authentication.
  - ♦ **Loose:** Validates a client certificates to be a valid X.509 certificate, but does not check if the certificate is signed by a Certificate Authority.
  - ♦ **Normal:** Validates the certificate to be a valid X.509 certificate and also checks to see that the client certificate is signed by a Certificate Authority.  
This option requires a trust store to be imported. The trust store must have the client's certificate and the Certificate Authority's certificate. Click the *Import* button to import the trust store.
- 8** Select whether you want to use the built-in server key pair or import server key pair, then click *Next*.  
The Novell Audit connector comes with a built-in certificate. You can use it or overwrite it with your own certificate.
- 9** Select the behavior of the Event Source Server if it receives more events than the Collector can parse. The options are:
- ♦ **Drop connections:** The Event Source Server drops existing connections and stops accepting new connections until the buffer has space for the new messages. This is the default behavior, because the Platform Agent performs caching when a connection is dropped.
  - ♦ **Drop messages:** The Event Source Server drops the oldest message in order to accept the new message. These dropped messages are lost and cannot be recovered.
- 10** Select whether the Event Source Server disconnects an SSL connection with the Platform Agent if the connection is idle and does not send any data within the set number of minutes.  
If you select this option, you must specify the number of minutes to wait before it disconnects. The default value is 15 minutes.
- 11** Select whether you want the Event Source Server to request the Platform Agent to send the signature of the event with the event, then click *Next*.
- 12** Select *Run* to have the Event Source Server automatically start whenever the Collector Manager is restarted, then click *Finish*.
- 13** Repeat **Step 4** through **Step 12** for each Identity Manager server.  
To capture all events in your environment, you must have an Event Source server for each Identity Manager, and the Identity Manager server must have the Platform Agent installed on it.
- 14** Select the Event Source server to add to the Novell Audit Connector, then click *Next*.
- 15** Use the default policy or create a custom policy to automatically add or exclude individual source devices, then click *Next*.

For more information, see “Auto Configuring Event Sources” in the *Novell Audit Connector Guide* ([http://support.novell.com/products/sentinel/doc/connectors/audit\\_connector.pdf](http://support.novell.com/products/sentinel/doc/connectors/audit_connector.pdf))

- 16** Finish the configuration of the connector with the following information, then click *Finish*.
- ♦ **Name:** Specify a name for this connector.
  - ♦ **Run:** Select whether the connector is started whenever the Collector Manager is started.
  - ♦ **Alert if no data received in specified time period:** (Optional) Select this option to send the No Data Alert event to Sentinel if not data is received by the connector in the specified time period.
  - ♦ **Limit Data Rate:** (Optional) Set a maximum limit on the rate of data the connector sends to Sentinel. If the data rate limit is reached, Sentinel throttles back on the source in order to limit the flow of data.
  - ♦ **Set Filter:** (Optional) Specify a filter on the raw data passing through the connector.
  - ♦ **Save Raw Data to a File:** (Optional) Save the raw data passing through this connector to a file for further analysis.

Proceed to **Chapter 5, “Installing and Configuring the Platform Agent,”** on page 21.



# Installing and Configuring the Platform Agent

The Platform Agent is the client portion of the Sentinel™ auditing system for Identity Manager. It receives logging information and system requests from Identity Manager and transmits the information to the Novell® Audit Connector for Novell Sentinel.

- [Section 5.1, “Installing the Platform Agent,” on page 21](#)
- [Section 5.2, “Configuring the Platform Agent Text File,” on page 21](#)

## 5.1 Installing the Platform Agent

The Platform Agent is automatically installed if either the Novell *Identity Manager Metadirectory Server* or *Novell Identity Manager Connected System* option is selected during the Identity Manager install. For more information on the Identity Manager installation, see the [Identity Manager 3.6 Installation Guide](#).

---

**IMPORTANT:** The Platform Agent must be installed on every server running Identity Manager if you want to log Identity Manager events.

---

## 5.2 Configuring the Platform Agent Text File

After you install Identity Manager, you can configure the Platform Agent. The Platform Agent’s configuration settings are stored in a simple, text-based `logevent` configuration file. By default, `logevent` file is located in the following directories:

**Table 5-1** Platform Agent Configuration File

Operating System	File
Linux	<code>/etc/logevent.conf</code>
Solaris*	<code>/etc/logevent.conf</code>
Windows*	<code>/Windows_Directory/logevent.cfg</code>
	The <code>Windows_Directory</code> is usually <code>drive:\windows</code> .

The following is a sample `logevent.cfg` file.

```
LogHost=127.0.0.1
LogCacheDir=c:\logcache
LogCachePort=288
LogEnginePort=289
LogCacheUnload=no
LogReconnectInterval=600
LogDebug=never
LogSigned=always
```

The entries in the `logevent` file are not case sensitive, entries can appear in any order, empty lines are valid, and any line that starts with a hash (#) is commented out.

You must add the following entry into the `logevent.cfg` file to log events for the User Application:

```
LogJavaClassPath=/opt/novell/idm/NAuditPA.jar
```

The User Application installation copies this file into the correct directory, but the entry must be manually added to the `logevent.cfg`.

The following table provides an explanation of each setting in the `logevent` file. The Platform Agent is used by Sentinel and Novell Audit. The documentation for the Platform Agent is in the *Novell Audit 2.0 Administration Guide*.

---

**IMPORTANT:** You must restart the Platform Agent any time you make a change to the configuration.

---

**Table 5-2** *logevent Settings*

Setting	Description
LogHost= <i>dns_name</i>	<p>The hostname or IP address of the Event Source Server where the Platform Agent sends events.</p> <p>In an environment where the Platform Agent connects to multiple hosts—for example, to provide load balancing or system redundancy—separate the IP address of each server with commas in the LogHost entry. For example,</p> <pre>LogHost=192.168.0.1,192.168.0.3,192.168.0.4</pre> <p>The Platform Agent connects to the servers in the order specified. If the first logging server goes down, the Platform Agent tries to connect to the second logging server, and so on.</p>
LogCacheDir= <i>path</i>	The directory where the Platform Agent stores the cached event information if the Event Source Server becomes unavailable.
LogEnginePort= <i>port</i>	The port at which the Platform Agent can connect to the Event Source Server. By default, this is port 289.

Setting	Description
LogCachePort= <i>port</i>	<p>The port at which the Platform Agent connects to the Logging Cache Module.</p> <p>If the connection between the Platform Agent and the Event Source Server fails, Identity Manager continues to log events to the local Platform Agent. The Platform Agent simply switches into Disconnected Cache mode; that is, it begins sending events to the Logging Cache module (<code>lcache</code>). The Logging Cache module writes the events to the Disconnected Mode Cache until the connection is restored.</p> <p>When the connection to the Event Source Server is restored, the Logging Cache Module transmits the cache files to the Event Source Server. To protect the integrity of the data store, the Event Source Server validates the authentication credentials in each cache file before logging its events.</p>
LogCacheUnload=Y N	Set the parameter to <code>N</code> to prevent <code>lcache</code> from being unloaded.
LogCacheSecure=Y N	Set the parameter to <code>Y</code> to encrypt the local cache file.
LogReconnectInterval= <i>seconds</i>	The interval, in seconds, at which the Platform Agent and the Platform Agent Cache try to reconnect to the Event Source Server if the connection is lost.
LogDebug=Never Always	<p>The Platform Agent debug setting.</p> <ul style="list-style-type: none"> <li>♦ Set to <code>Never</code> to never log debug events.</li> <li>♦ Set to <code>Always</code> to always log debug events.</li> </ul>
LogSigned=Never Always	<p>The signature setting for Platform Agent events.</p> <hr/> <p><b>IMPORTANT:</b> Sentinel can receive and map Audit signatures to a Novell Sentinel event field; however, Novell Sentinel does not currently verify event signatures.</p> <hr/> <ul style="list-style-type: none"> <li>♦ Set to <code>Never</code> to never sign or chain events.</li> <li>♦ Set to <code>Always</code> to always log events with a digital signature and to sequentially chain events.</li> </ul>
LogMaxBigData= <i>bytes</i>	The maximum size of the event data field. The default value is 3072 bytes. Set this value to the maximum number of bytes the client allows. Data that exceeds the maximum is truncated or not sent if the application doesn't allow truncated events to be logged.
LogMaxCacheSize= <i>bytes</i>	The maximum size, in bytes, of the Platform Agent cache file.
LogCacheLimitAction=stop logging drop cache	<p>The action that you want the cache module to take when it reaches the maximum cache size limit.</p> <ul style="list-style-type: none"> <li>♦ Set to <code>stop logging</code> if you want to stop collecting new events.</li> <li>♦ Set to <code>drop cache</code> if you want to delete the cache and start over with any new events that are generated.</li> </ul>
LogJavaClassPath	<p>The location of the <code>NAuditPA.jar lcache</code> file. For example:</p> <p><code>LogJavaClassPath=/opt/novell/idm/NAuditPA.jar</code></p>

The next step is to [Chapter 6, “Securing the Logging System,”](#) on page 25.

# Securing the Logging System

# 6

The Novell® Sentinel™ server and Identity Manager Instrumentation utilize embedded certificates generated by an internal Certificate Authority (CA). These SSL certificates ensure that communications between the Identity Manager instrumentation and the Sentinel server are secure.

The next step is to define which events to log. Proceed to [Chapter 7, “Managing Identity Manager Events,”](#) on page 27.



# Managing Identity Manager Events

# 7

The event information sent to Novell® Sentinel™ is managed through product-specific instrumentations, or plug-ins. The Identity Manager Instrumentation allows you to configure which events are logged to your data store. You can select predefined log levels, or you can individually select the events you want to log. You can also add user-defined events to the Identity Manager schema.

The following sections review how to manage Identity Manager events:

- ♦ [Section 7.1, “Selecting Events to Log,” on page 27](#)
- ♦ [Section 7.2, “User-Defined Events,” on page 32](#)
- ♦ [Section 7.3, “eDirectory Objects that Store Identity Manager Event Data,” on page 35](#)

## 7.1 Selecting Events to Log

The Identity Manager Instrumentation allows you to select events to be logged for the User Application, driver set, or a specific driver.

---

**NOTE:** Drivers can inherit logging configuration from the driver set.

---

- ♦ [“Selecting Events for the Driver Set” on page 29](#)
- ♦ [“Selecting Events for a Specific Driver” on page 30](#)
- ♦ [“Identity Manager Log Levels” on page 31](#)

### 7.1.1 Selecting Events for the User Application

The User Application enables you to change the log level settings of individual loggers and enable logging to the Platform Agent:

- 1 Log in to the User Application as the User Application Administrator.
- 2 Select the *Administration* tab.
- 3 Select the *Logging* link.

The Logging Configuration page appears.

**Logging Configuration**

You can change the logging level by selecting a different level for the log and click the submit button.

Log Level	Log Name	Log Level	Log Name
Error ▼	com.metaparadigm.jsonrpc	Info ▼	com.novell
Info ▼	com.novell.afw.portal.aggregation	Info ▼	com.novell.afw.portal.persist
Info ▼	com.novell.afw.portal.portlet	Info ▼	com.novell.afw.portal.util
Info ▼	com.novell.afw.portlet.consumer	Info ▼	com.novell.afw.portlet.core
Info ▼	com.novell.afw.portlet.persist	Info ▼	com.novell.afw.portlet.producer
Info ▼	com.novell.afw.portlet.util	Info ▼	com.novell.afw.theme
Info ▼	com.novell.afw.util	Info ▼	com.novell.common.auth
Info ▼	com.novell.soa.af.impl	Info ▼	com.novell.soa.script
Info ▼	com.novell.soa.ws.impl	Info ▼	com.novell.srvprv.apwa
Info ▼	com.novell.srvprv.impl.portlet	Info ▼	com.novell.srvprv.impl.portlet.util
Info ▼	com.novell.srvprv.impl.servlet	Info ▼	com.novell.srvprv.impl.uictrl
Info ▼	com.novell.srvprv.impl.vdata.definition	Info ▼	com.novell.srvprv.impl.vdata.model
Info ▼	com.novell.srvprv.spi	Info ▼	com.sssw
Info ▼	com.sssw.fw.cachemgr	Info ▼	com.sssw.fw.core
Info ▼	com.sssw.fw.directory	Info ▼	com.sssw.fw.event
Info ▼	com.sssw.fw.factory	Info ▼	com.sssw.fw.persist
Info ▼	com.sssw.fw.resource	Info ▼	com.sssw.fw.security
Info ▼	com.sssw.fw.server	Info ▼	com.sssw.fw.servlet
Info ▼	com.sssw.fw.session	Info ▼	com.sssw.fw.usermgr
Info ▼	com.sssw.fw.util	Info ▼	com.sssw.portal.manager
Info ▼	com.sssw.portal.persist		

☐ Add log level for package

☐ Change log level of all above logs

Logging messages are being sent to Novell Audit as well. Uncheck the box below to stop sending logging messages to Novell Audit.

☒ Also send logging messages to Novell Audit

Logging messages are not sent to Open XDAS. Check the box below to send logging messages to Open XDAS as well

☐ Also send logging messages to Open XDAS

Check the box below to persist the logging changes

☐ Persist the logging changes

4 Select one of the following log levels for the listed logs.

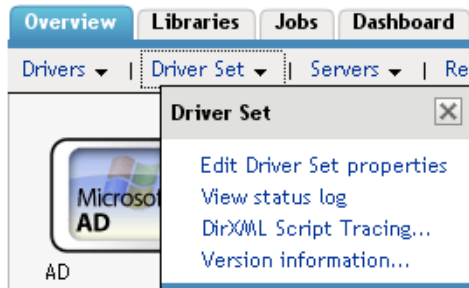
Log Level	Description
Fatal	Writes Fatal level messages to the log.
Error	Writes Fatal and Error level messages to the log.
Warn	Writes Fatal, Error, and Warn level messages to the log.
Info	Writes Fatal, Error, Warn, and Info level messages to the log.
Debug	Writes Fatal, Error, Warn, Info, and debugging information to the log.
Trace	Writes Fatal, Error, Warn Info, debugging, and tracing information to the log.

- 5 Select the *Also send logging messages to Novell Audit* check box to send the events to the Platform Agent.
- 6 (Optional) Select *Also send logging messages to Open XDAS*, if you want to send the messages to Open XDAS.  
For this option to work, you must select the open XDAS option during the installation of the User Application. For more information, see the [User Application Installation Guide \(http://www.novell.com/documentation/idmr bpm361/index.html\)](http://www.novell.com/documentation/idmr bpm361/index.html).
- 7 To save the changes for any subsequent application server restarts, select *Persist the logging changes*.
- 8 Click *Submit*.

The User Application logging configuration is saved in `installdir/jboss/server/IDMProv/conf/idmuserapp_logging.xml`.

## 7.1.2 Selecting Events for the Driver Set

- 1 In iManager, select *Identity Manager > Identity Manager Overview*.
- 2 Browse to and select the driver set object.
- 3 Click the driver set object in the list of driver sets, then click *Driver Set > Edit Driver Set properties*.



- 4 Click the *Log Level* tab, then select a log level for the driver set.  
For an explanation of each log level, see “[Identity Manager Log Levels](#)” on page 31.


**Identity Manager** **General**

Global Config Values | Named Passwords | **Log Level** | Status L

**Log Level**

☒ Log errors

☐ Log errors and warnings

☐ Log specific events 

☐ Only update the last log time

☐ Logging off

☐ Turn off logging to Driver Set, Subscriber and Publisher logs.

Maximum number of entries in the log (50 - 500):

- 5 Click *Apply* or *OK* to save your changes.

---

**NOTE:** Changes to configuration settings are logged by default.

---

### 7.1.3 Selecting Events for a Specific Driver

- 1 In iManager, select *Identity Manager > Identity Manager Overview*.
- 2 Browse to and select the driver set object that contains the driver
- 3 Select the driver set from the list of driver sets.
- 4 Click the upper right corner of the driver icon, then select *Edit properties*.




- 5 Select the *Log Level* tab.

Identity Manager
Server Variables
General
Driver Configuration
Mandatory Parameters
Global Config Values
Named Passwords
Engine Control Values
Log Level
Driver Image

Log Level

☒ Use log settings from the Driver Set, driverset1.idm.services.system  
The following log settings are from the Driver Set and cannot be changed on this page. To modify the Driver Set's settings, [click here](#).

☒ Log errors
☐ Log errors and warnings
☐ Log specific events 
☐ Only update the last log time
☐ Logging off

☐ Turn off logging to Driver Set, Subscriber and Publisher logs.

Maximum number of entries in the log (50 - 500):

- 6 (Optional) By default, the Driver object is configured to inherit log settings from the Driver Set object. To select logged events for this driver only, deselect *Use log settings from the Driver Set*.

☒ Use log settings from the Driver Set, DriverSet.novell  
The following log settings are from the Driver Set and cannot be changed on this page. To modify the Driver Set's settings, [click here](#).

- 7 Select a log level for the current driver.  
For an explanation of each log level, see “Identity Manager Log Levels” on page 31.
- 8 Click *Apply* or *OK* to save your changes.

---

**NOTE:** Changes to configuration settings are logged by default.


---

## 7.1.4 Identity Manager Log Levels

The following table provides an explanation of the Identity Manager Instrumentation log levels:

**Table 7-1** Identity Manager Log Levels

Option	Description
Log errors	<p>This is the default log level. The Identity Manager Instrumentation logs user-defined events and all events with an error status.</p> <p>You receive only events with a decimal ID of 196646 and an error message stored in the Text1 field.</p>
Log errors and warnings	<p>The Identity Manager Instrumentation logs user-defined events and all events with an error or warning status.</p> <p>You receive only events with a decimal ID of 196646 or 196647 and an error or warning message stored in the first text field.</p>

Option	Description
<i>Log specific events</i>	<p>This option allows you to select the Identity Manager events you want to log.</p> <p>Click  to select the specific events you want to log. After you select the events you want to log, click <i>OK</i>.</p> <hr/> <p><b>NOTE:</b> User-defined events are always logged.</p> <hr/> <p>For a list of all available events, see <a href="#">Appendix A, “Identity Manager Events,” on page 43</a>.</p>
<i>Only update the last log time</i>	<p>The Identity Manager Instrumentation logs only user-defined events.</p> <p>When an event occurs, the last log time is updated so you can view the time and date of the last error in the status log.</p>
<i>Logging off</i>	The Identity Manager Instrumentation logs only user-defined events.
<i>Turn off logging to DriverSet, Subscriber and Publisher logs</i>	Turns off logging to the Driver Set object, Subscriber, and Publisher logs.
<i>Maximum Number of Entries in the Log</i>	This setting allows you to specify the maximum number of entries to log in the status logs.

## 7.2 User-Defined Events

Identity Manager enables you to configure your own events to log to Novell Sentinel. Events can be logged by using an action in the Policy Builder, or within a style sheet. Any information you have access to when defining policies can be logged.

User-defined events are logged any time logging is enabled and are never filtered by the Metadirectory engine. There are two different ways to generate user-defined events:

- ♦ [Section 7.2.1, “Using Policy Builder to Generate Events,” on page 32](#)
- ♦ [Section 7.2.2, “Using Status Documents to Generate Events,” on page 35](#)

### 7.2.1 Using Policy Builder to Generate Events


- 1 In the Policy Builder, define the condition that must be met to generate the event, then select the *Generate Event* action.
- 2 Specify an event ID.

Event IDs between 1000 and 1999 are allotted for user-defined events. You must specify a value within this range for the event ID when defining your own events. This ID is combined with the Identity Manager application ID of 003.

- 3 Select a log level.

Log levels enable you to group events based on the type of event being logged. The following predefined log levels are available:

Log Level	Description
log-emergency	Events that cause the Metadirectory engine or driver to shut down.
log-alert	Events that require immediate attention.
log-critical	Events that can cause parts of the Metadirectory engine or driver to malfunction.
log-error	Events describing errors that can be handled by the Metadirectory engine or driver.
log-warning	Negative events not representing a problem.
log-notice	Positive or negative events an administrator can use to understand or improve use and operation.
log-info	Positive events of any importance.
log-debug	Events of relevance for support or for engineers to debug the Metadirectory engine or driver.

- 4 Click the  icon next to the *Enter Strings* field to launch the Named String Builder.  
In the Named String Builder, you can specify the string, integer, and binary values to include with the event.
- 5 Use the Named String Builder to define the event values.

Strings

Edit ▾ | Append New String | Remove...

<input type="checkbox"/> Name: *	text1		String value: *	Operation Attribute("Given Name")
<input type="checkbox"/> Name: *	text2		String value: *	Operation()
<input type="checkbox"/> Name: *	value		String value: *	"1000"

The Identity Manager event structure contains a target, a subTarget, three strings (text1, text2, text3), two integers (value, value3), and a generic field (data). The text fields are limited to 256 bytes, and the data field can contain up to 3 KB of information, unless a larger data field is enabled in your environment.

The following table provides an explanation of the Identity Manager event structure:

Field	Description
<i>target</i>	<p>This field captures the event target.</p> <p>All eDirectory™ events store the event's object in the <i>Target</i> field.</p>
<i>target-type</i>	<p>This field specifies which predefined format the target is represented in. Defined values for this type are as follows:</p> <ul style="list-style-type: none"> <li>♦ 0: None</li> <li>♦ 1: Slash Notation</li> <li>♦ 2: Dot Notation</li> <li>♦ 3: LDAP Notation</li> </ul>
<i>subTarget</i>	<p>This field captures the subcomponent of the target that was affected by the event.</p> <p>All eDirectory events store the event's attribute in the <i>SubTarget</i> field.</p>
<i>text1</i>	The value of this field depends upon the event. It can contain any text string up to 255 characters.
<i>text2</i>	The value of this field depends upon the event. It can contain any text string up to 255 characters.
<i>text3</i>	The value of this field depends upon the event. It can contain any text string up to 255 characters.
<i>value</i>	The value of this field depends upon the event. It can contain any numeric value up to 32 bits.
<i>value3</i>	The value of this field depends upon the event. It can contain any numeric value up to 32 bits.
<i>data</i>	<p>The value of this field depends upon the event. The default size of this field is 3072 characters.</p> <p>You can configure the size of this field in the LogMaxBigData value in <code>logevent.cfg</code>. This value does not set the size of the <i>Data</i> field, but it does set the maximum size that the Platform Agent can log. For more information, see <a href="#">Chapter 5, "Installing and Configuring the Platform Agent," on page 21</a>.</p> <p>The maximum size of the <i>Data</i> field is defined by the database where the data is logged, so the size varies for each database that is used. If the size of the <i>Data</i> field logged by the Platform Agent exceeds the maximum size allowed by the database, the channel driver truncates the data in the <i>Data</i> field.</p> <p>If an event has more data than can be stored in the <i>String</i> and <i>Numeric</i> value fields, it is possible to store up to 3 KB of binary data in the <i>Data</i> field.</p>

**6** Click *OK* to return to the Policy Builder to construct the remainder of your policy.

For more information and examples of the Generate Event action, see “[Generate Event](#)” in the *Policies in Designer 3.0* guide.

## 7.2.2 Using Status Documents to Generate Events

Status documents generated through style sheets using the `<xsl:message>` element are sent to Sentinel with an event ID that corresponds to the status document level attribute. The level attributes and corresponding event IDs are defined in the following table:

**Table 7-2** *Status Documents*

Status Level	Status Event ID
Success	EV_LOG_STATUS_SUCCESS (1)
Retry	EV_LOG_STATUS_RETRY (2)
Warning	EV_LOG_STATUS_WARNING (3)
Error	EV_LOG_STATUS_ERROR (4)
Fatal	EV_LOG_STATUS_FATAL (5)
User Defined	EV_LOG_STATUS_OTHER (6)

The following example generates an event 0x004 and value1=7777, with a level of EV\_LOG\_STATUS\_ERROR:

```
<xsl:message>
  <status level="error" text1="This would be text1" value="7777">This data would
be in the blob and in text 2, since no value is specified for text2 in the
attributes.</status>
</xsl:message>
```

The following example generates an event 0x004 and value1=7778, with a level of EV\_LOG\_STATUS\_ERROR:

```
<xsl:message>
  <status level="error" text1="This would be text1" text2="This would be text2"
value1="7778">This data would be in the blob only for this case, since a value for
text2 is specified in the attributes.</status>
</xsl:message>
```

## 7.3 eDirectory Objects that Store Identity Manager Event Data

The Identity Manager events you want to log are stored in the DirXML-LogEvent attribute on the Driver Set object or Driver object. The attribute is a multi-value integer with each value identifying an event ID to be logged.

You do not need to modify these attributes directly, because these objects are automatically configured based on your selections in iManager.

Before logging an event, the engine checks the current event type against the contents of the DirXML-LogEvent attribute to determine whether the event should be logged.

Drivers can inherit log settings from the driver set. The DirXML-DriverTraceLevel attribute of a Driver object has the highest precedence when determining log settings. If a Driver object does not contain a DirXML-DriverTraceLevel attribute, the engine uses the log settings from the parent driver set.

The next step is to generate reports. Proceed to [Chapter 9, “Querying and Reporting,”](#) on page 41.

# Using Status Logs

# 8

In addition to the functionality provided by Sentinel, Identity Manager logs a specified number of events on the driver set and the driver. These status logs provide a view of recent Identity Manager activity. After the log reaches the set size, the oldest half of the log is permanently removed to clear room for more recent events. Therefore, any events you want to track over time should be logged to Sentinel.

The following sections contain information on the Identity Manager logs:

- [Section 8.1, “Setting the Log Level and Maximum Log Size,” on page 37](#)
- [Section 8.2, “Viewing Status Logs,” on page 39](#)

## 8.1 Setting the Log Level and Maximum Log Size

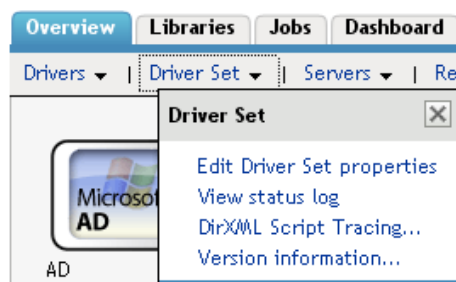
Status logs can be configured to hold between 50 and 500 events. This setting can be configured for the driver set to be inherited by all drivers in the driver set, or configured for each driver in the driver set. The maximum log size operates independently of the events you have selected to log, so you can configure the events you want to log for the driver set, then specify a different log size for each driver in the set.

This section reviews how to set the maximum log size on the driver set or an individual driver:

- [Section 8.1.1, “Setting the Log Level and Log Size for the Driver Set,” on page 37](#)
- [Section 8.1.2, “Setting the Log Level and Log Size for the Driver,” on page 38](#)

### 8.1.1 Setting the Log Level and Log Size for the Driver Set

- 1 In iManager, select *Identity Manager* > *Identity Manager Overview*.
- 2 Browse to and select the driver set.
- 3 Click the driver set name to access the driver set overview page.
- 4 Select *Driver Set* > *Edit Driver Set properties*.



- 5 Select *Log Level*.


**Identity Manager** **General**

Global Config Values | Named Passwords | **Log Level** | Status L

**Log Level**

☒ Log errors

☐ Log errors and warnings

☐ Log specific events 

☐ Only update the last log time

☐ Logging off

☐ Turn off logging to Driver Set, Subscriber and Publisher logs.

Maximum number of entries in the log (50 - 500):

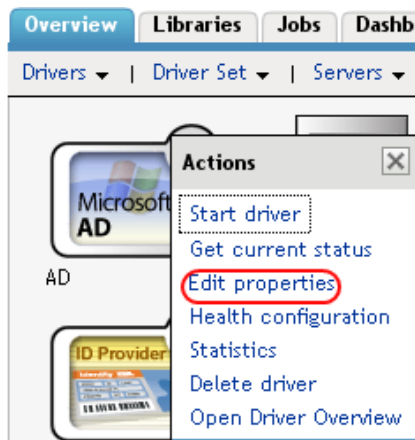
- 6 Specify the maximum log size in the *Maximum number of entries in the log* field:

Maximum number of entries in the log (50 - 500):

- 7 After you have specified the maximum number, click *OK*.

## 8.1.2 Setting the Log Level and Log Size for the Driver

- 1 In iManager select *Identity Manager > Identity Manager Overview*.
- 2 Browse to and select the driver set.
- 3 Click the driver set to access the driver set overview page.
- 4 Click the upper right corner of the driver icon, then select *Edit properties*.



- 5 Select *Log Level*.
- 6 Deselect *Use log settings from the driver set* option, if it is selected.
- 7 Specify the maximum log size in the *Maximum number of entries in the log* field:

Maximum number of entries in the log (50 - 500):

8 After you have specified the maximum number, click *OK*.

## 8.2 Viewing Status Logs

The status logs are short-term logs for the driver set, the Publisher channel, and the Subscriber channel. They are accessed through different locations in iManager.

- ♦ [Section 8.2.1, “Accessing the Driver Set Status Log,” on page 39](#)
- ♦ [Section 8.2.2, “Accessing the Publisher Channel and Subscriber Channel Status Logs,” on page 40](#)

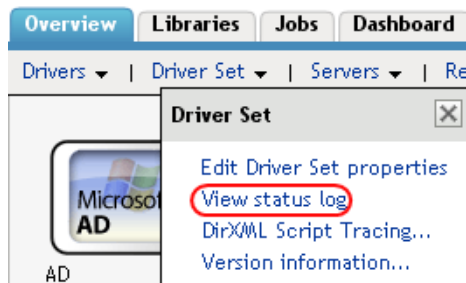
### 8.2.1 Accessing the Driver Set Status Log

The status log for the driver set contains only messages generated by the engine, such as state changes for any drivers in the driver set. All engine messages are logged. There are two ways to access the driver set status log:

- ♦ [“Viewing the Log from the Driver Set Overview Page” on page 39](#)
- ♦ [“Viewing the Log from the Driver Overview Page” on page 39](#)

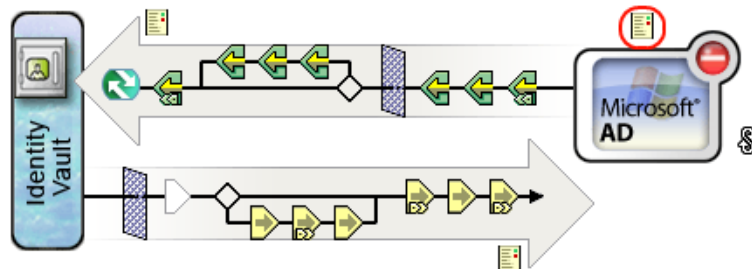
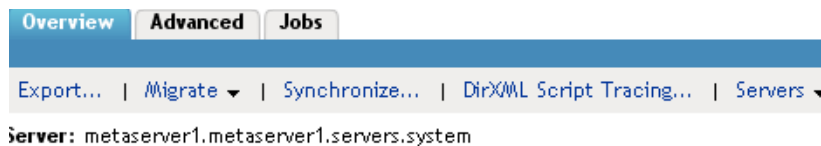
#### Viewing the Log from the Driver Set Overview Page

- 1 In iManager, select *Identity Manager > Identity Manager Overview*.
- 2 Browse to and select the driver set.
- 3 Click the driver set to access the driver set overview page.
- 4 Select *Driver Set > View status log*.



#### Viewing the Log from the Driver Overview Page

- 1 In iManager, select *Identity Manager > Identity Manager Overview*.
- 2 Browse to and select the driver set.
- 3 Click the driver set to access the driver set overview page, then click any driver.  
The status log for the driver is stored on the driver overview page for each driver.
- 4 Click the Driver Set Status Log icon above the driver object.

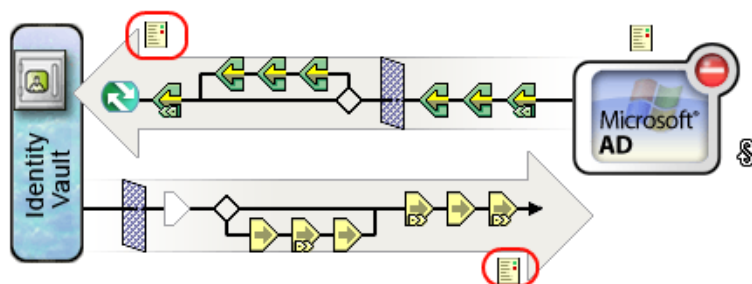
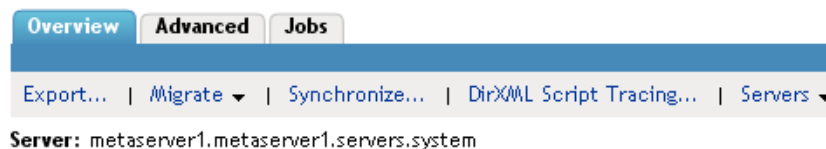


## 8.2.2 Accessing the Publisher Channel and Subscriber Channel Status Logs

The status logs for the Publisher and Subscriber channels report channel-specific messages generated by the driver, such as an operation veto for an unassociated object.

To access the Publisher channel and the Subscriber channel logs:

- 1 In iManager, select *Identity Manager > Identity Manager Overview*.
- 2 Browse to and select the driver set.
- 3 Click the driver set to access the driver set overview page.
- 4 Click the desired driver object.
- 5 Click the Publisher channel or the Subscriber channel status log icon.



# Querying and Reporting

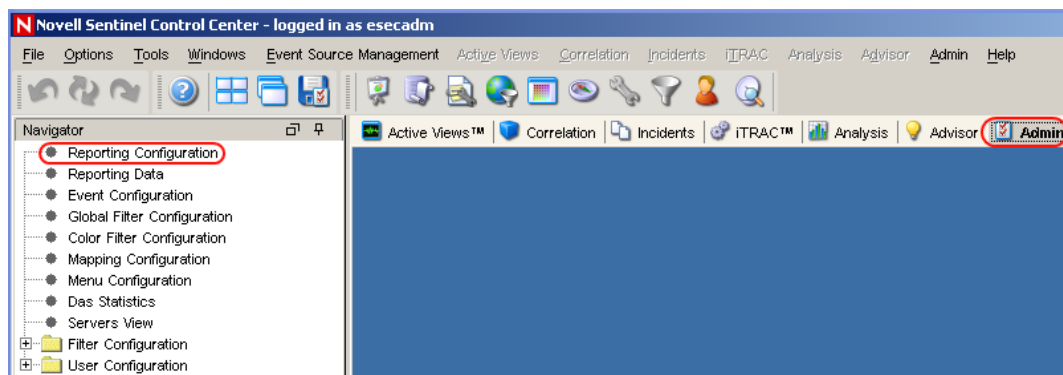
# 9

After you integrate Identity Manager with Novell® Sentinel™, you can log system information to a central data store. However, logging information is only half the battle. Obviously, you have to be able to access and understand your log data for the information to be useful. Queries and reports allow you to view and interpret the information in your data store.

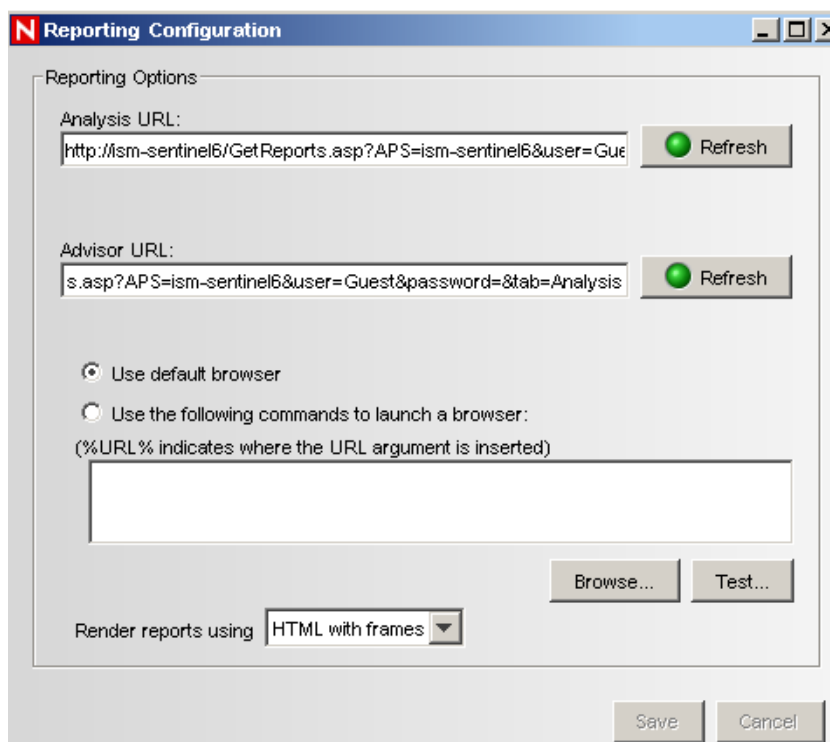
The Identity Manager Collector provides a number of Crystal Decisions\* reports (\*.rpt) that simplify gathering information on common operations performed in Identity Manager. The term “reports” refers specifically to Crystal Decisions report template files (\*.rpt). Crystal Decisions reports graphically summarize specific sets of log data in pie charts, bar charts, and so forth. These reports are included with the current version of the Identity Manager Collector, which can be downloaded from, [Sentinel 6.1 Connectors Web site \(http://support.novell.com/products/sentinel/secure/sentinel61.html\)](http://support.novell.com/products/sentinel/secure/sentinel61.html).

Novell Sentinel is integrated with Crystal Reports to generate and display reports. To run the report templates, you must first configure the location of the Crystal Enterprise Server that publishes reports in the General Options window of the Admin page.

- 1 In the Sentinel Control Center, select the *Admin* tab, then select the *Reporting Configuration* option in the Navigator pane.



- 2 Specify the location of the Crystal Enterprise server, then click *Save*.



The image shows a 'Reporting Configuration' dialog box with a title bar containing a red 'N' icon and standard window controls. The dialog is divided into a main configuration area and a bottom section with 'Save' and 'Cancel' buttons.

**Reporting Options**

**Analysis URL:**

**Advisor URL:**

☒ Use default browser  
☐ Use the following commands to launch a browser:  
 (%URL% indicates where the URL argument is inserted)

Render reports using

After Novell Sentinel is configured to access the Crystal Enterprise server, the Analysis page allows administrators to run historical reports. Vulnerability reports are available from the Advisor page. These reports are published on a Web server, they run directly against the database, and they then appear on the *Analysis* and *Advisor* tabs under the Navigator pane.

The reports are updated regularly. The following is a list of the categories of reports that are available:

- ♦ **Collector Pack Controls:** Contains reports about the Collector Pack setup, dashboard status, and implementation of audit trails.
- ♦ **Collector Controls:** Contains reports about event trends and Collector management.
- ♦ **Account Management Controls:** Contains reports about user account provisioning, user account management, account access management, and user password management.
- ♦ **Trust Management Controls:** Contains reports about trust provisioning, trust management, and trust access management.
- ♦ **Object Management Controls:** Contains reports about object provisioning and object management.
- ♦ **Authentication Controls:** Contains reports about authentication by servers and users.
- ♦ **Workflow Management:** Contains reports that monitor workflows and the resources requested in the workflows.

For more information on running reports in Novell Sentinel, see the “Analysis Tab” and “Advisor Usage and Maintenance” sections in the *Novell Sentinel User’s Guide* ([http://www.novell.com/documentation/sentinel61/pdfdoc/sentinel\\_61\\_user\\_guide.pdf](http://www.novell.com/documentation/sentinel61/pdfdoc/sentinel_61_user_guide.pdf)).

# Identity Manager Events

# A

This section provides a listing of all events logged by Identity Manager.

- ♦ [Section A.1, “Event Structure,” on page 43](#)
- ♦ [Section A.2, “Error and Warning Events,” on page 43](#)
- ♦ [Section A.3, “Job Events,” on page 44](#)
- ♦ [Section A.4, “Remote Loader Events,” on page 44](#)
- ♦ [Section A.5, “Object Events,” on page 44](#)
- ♦ [Section A.6, “Password Events,” on page 44](#)
- ♦ [Section A.7, “Search List Events,” on page 45](#)
- ♦ [Section A.8, “Engine Events,” on page 45](#)
- ♦ [Section A.9, “Server Events,” on page 45](#)
- ♦ [Section A.10, “Security Events,” on page 45](#)
- ♦ [Section A.11, “Workflow Events,” on page 45](#)
- ♦ [Section A.12, “Driver Start and Stop Events,” on page 45](#)

## A.1 Event Structure

All events logged through Sentinel have a standardized set of fields. This allows Sentinel™ to log events to a structured database and query events across all logging applications.

Identity Manager events provide information in the following field structure:

EventID, Description, Originator Title, Target Title, Subtarget Title, Text1 Title, Text2 Title, Text3 Title, Value1 Title, Value1 Type, Value2 Title, Value2 Type, Value3 Title, Value3 Type, Group Title, Group Type, Data Title, Data Type, Display Schema.

For a complete explanation of the event structure, see “[Event Structure](#)” in the *Novell Audit 2.0 Administration Guide*

## A.2 Error and Warning Events

Identity Manager generates an event whenever an error or warning is encountered. The following table lists the Identity Manager error and warning events:

**Table A-1** Error and Warning Events

Event	Log Level	Information
DirXML_Error	LOG_ERROR	<p>All Identity Manager errors log this event. The actual error code encountered is stored in the event.</p> <p>To log errors, select the <i>Log Errors</i> or <i>Log Errors and Warnings</i> log level on the driver set or the individual driver. You can also select the <i>Log Specific Events</i> option and select this event. For more information, see <a href="#">Section 7.1, “Selecting Events to Log,”</a> on page 27.</p>
DirXML_Warning	LOG_WARNING	<p>All Identity Manager warnings log this event. The actual warning code encountered is stored in the event.</p> <p>To log errors, select the <i>Log Errors</i> or <i>Log Errors and Warnings</i> log level on the driver set or the individual driver. You can also select the <i>Log Specific Events</i> option and select this event. For more information, see <a href="#">Section 7.1, “Selecting Events to Log,”</a> on page 27.</p>

## A.3 Job Events

The following link lists the Job events that can be audited through Sentinel:

[Identity Manager Job Events \(../samples/idm\\_combo\\_events.xls\)](#)

## A.4 Remote Loader Events

The following link lists the Remote Loader events that can be audited through Sentinel:

[Identity Manager Remote Loader Events \(../samples/idm\\_combo\\_events.xls\)](#)

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**IMPORTANT:** To log these events, you must select the *Log Specific Events* log level and select the events you want to log. For more information, see [Section 7.1, “Selecting Events to Log,”](#) on page 27.

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## A.5 Object Events

The following link lists the object events that can be audited through Sentinel:

[Identity Manager Detail Events \(../samples/idm\\_combo\\_events.xls\)](#)

## A.6 Password Events

The following link lists the change password events that can be audited through Novell Sentinel:

[Identity Manager Password Events \(../samples/idm\\_combo\\_events.xls\)](#)

## A.7 Search List Events

The following link lists search events that can be audited through Sentinel:

[Identity Manager Search List Events \(../samples/idm\\_combo\\_events.xls\)](#)

## A.8 Engine Events

The following link lists the engine events that can be audited through Sentinel:

[Identity Manager Engine Events \(../samples/idm\\_engine\\_events.xls\)](#)

## A.9 Server Events

The following link lists the server events that can be audited through Sentinel:

[Identity Manager Server Events \(../samples/idm\\_server\\_events.xls\)](#)

## A.10 Security Events

The following link lists security events that can be audited through Sentinel:

[Identity Manager Security Events \(../samples/idm\\_security\\_events.xls\)](#)

## A.11 Workflow Events

The following link provides the list of User Application events that can be audited through Sentinel:

[Identity Manager Work Flow Events \(../samples/idm\\_workflow\\_events.xls\)](#)

## A.12 Driver Start and Stop Events

Identity Manager can generate an event whenever a driver starts or stops. The following table contains details about these events:

**Table A-2** *Driver Start and Stop Events*

Event	Log Level	Information
EV_LOG_DRIVER_START	LOG_INFO	To log driver starts, select the <i>Log Specific Events</i> log level and specify this event. For more information, see <a href="#">Section 7.1, "Selecting Events to Log,"</a> on page 27
EV_LOG_DRIVER_STOP	LOG_WARNING	To log driver stops, select the <i>Log Errors and Warnings</i> log level, or select the <i>Log Specific Events</i> log level and specify this event.