Novell
Nsure™ Identity Manager

2.0.1

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ADMINISTRATION GUIDE

May 4, 2005

Novell®

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Novell Nsure Identity Manager 2.0.1 Administration Guide

May 4, 2005

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Contents

About This Guide

Novell® Nsure™ Identity Manager 2, formerly DirXML®, is a data sharing and synchronization service that enables applications, directories, and databases to share information. It links scattered information and enables you to establish policies that govern automatic updates to designated systems when identity changes occur.

Identity Manager provides the foundation for account provisioning, security, single sign-on, user self-service, authentication, authorization, automated workflow and Web services. It allows you to integrate, manage and control your distributed identity information so you can securely deliver the right resources to the right people.

This guide provides an overview of the Identity Manager technologies, and also describes installation, administration, and configuration functions.

Additional Documentation

For documentation on using the DirXML drivers, see the Identity Manager Documentation Web site (http://www.novell.com/documentation/lg/dirxmldrivers/index.html).

Documentation Updates

For the most recent version of this document, see the Identity Manager Documentation Web site (http://www.novell.com/documentation/lg/dirxml20/index.html)

Documentation Conventions

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

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1 Overview

Novell® Nsure™ Identity Manager 2, formerly DirXML®, is an award-winning data-sharing and synchronization solution that revolutionizes how you manage data. This service leverages your identity vault to synchronize, transform, and distribute information across applications, databases, and directories.

When data from one system changes, the DirXML engine detects and propagates these changes to other connected entities based on the business rules you define. This solution enables you to enforce authoritative data sources for any particular piece of data (for example, an HR application owns a user's ID, while a messaging system might own a user's e-mail account information).

Identity Manager lets an application (such as SAP*, PeopleSoft*, Lotus Notes*, Microsoft* Exchange, Active Directory*, and others) do the following:

- Share data with the identity vault (Novell eDirectory™.)
- Synchronize and transform shared data with the identity vault when it is modified in the application database.
- Synchronize and transform shared data with the application database when the data is modified in the identity vault.

Identity Manager does this by providing a bidirectional framework that allows administrators to specify which data will flow from the identity vault to the application and from the application to the identity vault. The framework uses XML to provide data and event translation capabilities that convert identity vault data and events into the specified application-specific format. It also converts application-specific formats into a format that can be understood by the identity vault. All interactions with the application take place using the application's native API.

Identity Manager lets you select only the eDirectory attributes and classes that correspond to relevant application-specific records and fields. For example, an eDirectory database can choose to share User-type objects with a Human Resources database but not share network resource objects such as Servers, Printers, and Volumes. The Human Resources database can in turn share users' given names, surnames, initials, telephone numbers, and work locations with eDirectory but not share the users' family information and employment history.

If eDirectory doesn't have classes or attributes for data you want to share with other applications, you can extend the eDirectory schema to include them. In this case, eDirectory becomes a repository of information that eDirectory does not need, but which other applications can use. The application-specific database maintains the repository for the information that is required only by the application.

Identity Manager accomplishes the following tasks:

- Uses events to capture changes in the identity vault.
- Centralizes or distributes data management by acting as a hub to pull all the data together.

- Exposes directory data in XML format, allowing it to be used and shared by XML applications or applications integrated through Identity Manager.
- Controls the flow of data using specific filters that govern data elements defined in the system.
- Enforces authoritative data sources by using permissions and filters.
- Applies rules to directory data that is in an XML format. These rules govern the interpretation and transformation of the data as changes flow through Identity Manager.
- Transforms the data from XML into virtually any data format. This provides Identity Manager the ability to share data with any application.
- Carefully maintains associations between identity vault objects and objects within all other integrated systems, in order to ensure that data changes are appropriately reflected across all integrated systems.

With Identity Manager, your business can simplify HR processes, reduce data management costs, build customer relationships through highly customized service, and remove interoperability barriers that inhibit success. Below are several example activities that Identity Manager enables:

Activity	Identity Manager Solution
Manage User Accounts	With a single operation: Identity Manager grants or removes access for an employee to resources almost immediately. Identity Manager provides automated employee provisioning capability where a new employee has access to network, e-mail, applications, resources, and so forth. Identity Manager can also restrict or disable access upon termination or leave.
Track and Integrate Asset Inventory	Identity Manager can add profiles for all asset inventory items (computers, monitors, phones, library resources, chairs, desks, etc.) to eDirectory and integrate them with user profiles such as individuals, departments, or organizations.
Automate White/Yellow Page Directories	Identity Manager can create unified directories with varying levels of information for internal and external use. External directories might contain only e-mail addresses; internal directories might include location, phone, fax, cell, home address, etc.
Enhance User Profiles	Identity Manager augments user profiles by adding or synchronizing information such as e-mail address, phone number, home address, preferences, reporting relationships, hardware assets, phone, keys, inventory, and more.
Unify Communications Access	Identity Manager simplifies network, phone, pagers, Web, or wireless access for individual users or groups by synchronizing directories for each to a common management interface.
Strengthen Partner Relationships	Identity Manager strengthens partnerships by creating profiles (employee, customer, etc.) in partner systems outside the firewall to enable partners to provide immediate service as needed.

Activity	Identity Manager Solution
Improve Supply Chain	Identity Manager improves customer services by recognizing and consolidating instances of multiple accounts per customer.
Build Customer Loyalty	Identity Manager offers new services in response to recognizing customer needs as a result of viewing data together that was previously isolated in silos.
Customize Service	Identity Manager provides users (employees, customers, partners, etc.) with profiles complete with synchronized information, including relationships, status, and service records. These profiles can be used to provide varying levels of access to services and information, and offer real-time, customized services based on a customer's standing.

What's New in Identity Manager 2?

In this section:

- "Policy Builder Interface and DirXML Script for Creating Policies" on page 15
- "Password Management" on page 15
- "Role-Based Entitlements" on page 16
- "Reporting and Notification Using Novell Nsure Audit" on page 16
- "Global Configuration Values" on page 17
- "Driver Heartbeat" on page 17
- "Flexible Prompting When Importing Driver Configurations" on page 17

Policy Builder Interface and DirXML Script for Creating Policies

In previous releases of DirXML, the policies used in a driver configuration were called Rule objects and Stylesheet objects. In Identity Manager 2, each part of the driver configuration is called a Policy object, and these policies contain individual rules.

For common tasks, you can now use the new Policy Builder interface to create policies for your drivers without having to write XSLT code. The Policy Builder helps you set up twenty-five of the most common rules using the new DirXML Script. For more information, see "Creating Policies" on page 93.

This release contains expanded functionality of Policy Builder with new conditions, actions, and values. Policy Builder now has an integrated clipboard, the ability to import, export, and reference XML policies, and several other new features. Refer to the *Policy Builder and Driver Customization Guide* (http://www.novell.com/documentation/dirxml20/policies/data/front.html#bktitle).

Password Management

Identity Manager 2 includes new and enhanced password management features:

- New Password Policies let you create rules for passwords and assign them to users, containers, or the whole eDirectory tree. You can enable Universal Password, which lets you enforce detailed criteria for passwords and allows for special characters.
- Identity Manager Password Synchronization is now cross-platform, and it lets you enforce your Password Policies across connected systems. New notification templates let you automatically send messages to users about their password synchronization status.
- Using Password Policies, you can also provide Forgotten Password Self-Service and Reset Password Self-Service to your users. These new features can help you reduce help desk calls. Notification templates are also included for automatically sending forgotten password and password hint messages to users.

For more information, see Chapter 8, "Managing Passwords by Using Password Policies," on page 95 and Chapter 10, "Password Synchronization across Connected Systems," on page 149.

Role-Based Entitlements

Role-Based Entitlements let you grant entitlements on connected systems to a group of Novell eDirectory users. Using Entitlement Policies, you can streamline management of business policies and reduce the need to configure your DirXML drivers.

Role-Based Entitlements is an alternative way to administer Identity Manager. You might choose to use it if you prefer a centralized model of Identity Manager administration.

An Entitlement Policy is an eDirectory dynamic group object with additional features added for connected systems. When you create an Entitlement Policy, you define the membership for the policy and the entitlements that should be granted to the members of the Entitlement Policy.

Role-Based Entitlements let you grant entitlements on connected systems and rights in eDirectory. Entitlements on connected systems can be any of the following:

- Accounts
- Membership in e-mail distribution lists
- Group membership
- Attributes for the corresponding objects in connected systems, populated with values you specify
- Other entitlements on connected systems that you customize

Because Role-Based Entitlements functionality is based on Identity Manager, you must have DirXML drivers installed and configured properly in order to be able to administer connected systems. In addition, to avoid possible conflicts between Entitlement Policy assignments and DirXML driver configurations, you should be aware of your business policies and how they are administered through Identity Manager.

Reporting and Notification Using Novell Nsure Audit

With Identity Manager 2, you can now use Novell Nsure Audit for reporting and notification services. Novell Nsure Audit is a centralized, cross-platform auditing service. It collects event data from multiple applications across multiple platforms and writes the data to a single, non-repudiable data store. Nsure Audit is also capable of creating filtered data stores. Based on criteria you define, Nsure Audit captures specific types of events and writes those events to secondary data stores.

Nsure Audit components have been updated to version 1.0.2. This version provides additional event fields to enhance querying and reporting, as well as an expanded data field to hold large

XML documents. For more information, see Chapter 14, “Logging and Reporting Using Nsure Audit,” on page 259.

Reporting and Notification Service (RNS) is deprecated, though the engine continues to process RNS functions if you are currently using RNS. You should plan to move to Nsure Audit, as Nsure Audit expands the functionality provided by RNS, and RNS might no longer be supported in a future release of Identity Manager. For RNS documentation, see the *DirXML 1.1a Administration Guide* (http://www.novell.com/documentation/lg/dirxml11a/dirxml/data/afae8bz.html).

Global Configuration Values

Global configuration values (GCVs) are new settings that are similar to driver parameters. Global configuration values can be specified for a driver set as well as an individual driver. If a driver does not have a value for a particular GCV, the driver inherits the value for that GCV from the driver set.

GCVs allow you to specify settings for new features such as Password Synchronization, as well as settings that are specific to the function of an individual driver configuration. Some GCVs are provided with the drivers, but you can also add your own. You can refer to these values in a policy to help you customize your driver configuration.

For more information, see “Using Global Configuration Values” on page 79.

Driver Heartbeat

The DirXML engine now accepts driver heartbeat documents from drivers, and drivers can be configured to send them.

For more information, see “Adding Driver Heartbeat” on page 90.

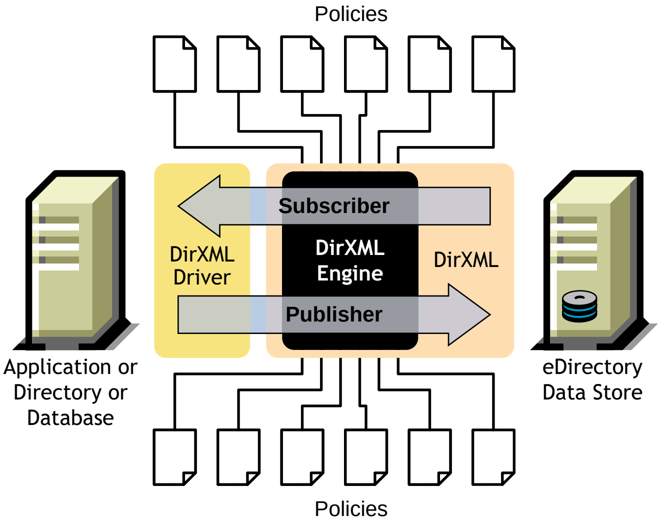
Flexible Prompting When Importing Driver Configurations

Many of the sample driver configuration use a new feature, flexible prompting, to reduce complexity when importing the configuration. For example, one prompt can be provided in the initial import screen to let you choose whether to use a feature such as Remote Loader or Role-Based Entitlements. If you choose yes, another page of import prompts can be displayed in the wizard to let you provide any additional information for those features.

Understanding the Identity Manager Architecture

Identity Manager’s main purpose is to provide for the clean movement of data between the identity vault and any application, directory, or database. To accomplish this, Identity Manager has a well-defined interface that translates directory data and events into XML format. This interface allows the data to flow in and out of eDirectory in a bidirectional manner.

Identity Manager is composed of several components. The following illustration shows the basic components and their relationships.



The DirXML engine is the key module in the Identity Manager architecture. It provides the interface that allows DirXML drivers to synchronize information with eDirectory, allowing even disparate data systems to connect and share data.

The DirXML engine exposes eDirectory data and eDirectory events by using an XML format. The DirXML engine employs a rules processor and a data transformation engine to manipulate the data as it flows between two systems.

When eDirectory initializes, it does the following:

1. Reads the filter for all DirXML drivers.
2. Registers the drivers for the appropriate eDirectory events.
3. Filters the data according to each driver's specifications.
4. Sets up a cache for the eDirectory events passing through to each driver.

After an event is cached, the driver that owns the cache will read the event.

The driver receives eDirectory data in eDirectory native format, translates it into XDS format (the XML vocabulary used by Identity Manager that can be transformed by a policy), and sends the event to the DirXML engine. The engine reads all the policies you have set up for your application driver (Mapping, Matching, Placement, Create, Transformation, and Style Sheets) and creates XML-formatted data according to those policies, then sends the data to your application driver. It then sends the data to the application and monitors the update until it receives a successful completion code.

The Publisher portion of the driver performs the gathering and sending of updates from the external application database to the identity vault. When the application driver is informed of changes to the information the two databases are sharing, the application driver gathers the information, ensures that it has been filtered to the correct set of data, converts the data to DirXML format, and sends the data to the engine.

DirXML Engine

The DirXML engine, sometimes referred to as the Join engine, can be broken down into two components: the NDS® interface and the Join engine.

NDS Interface

The NDS Interface built into the DirXML engine is used to detect events that take place in eDirectory. This interface guarantees the delivery of events to Identity Manager by using the event cache. The NDS interface supports multiple driver loading, which means that only one instance of Identity Manager is running, but it can communicate with multiple applications. Loopback detection is built into this interface to prevent event loops from occurring between eDirectory and the application. Although the interface contains loopback protection, developers are encouraged to build loopback detection into the individual application drivers.

Join Engine

The Join engine applies the Identity Manager XML-based rules (XDS) to each event presented to it. Identity Manager rules can also be in the form of Extensible Stylesheet Language Transformation (XSLT), which is a more powerful XML vocabulary defined for operating on and then transforming XML documents

The Join engine applies each type of rule to the source document. The ability to complete these transformations is one of the most powerful capabilities of Identity Manager. Data is transformed in real time as it is shared between eDirectory and individual applications.

DirXML Driver Shim

The DirXML driver shim, commonly referred to as the driver, is the conduit through which information is transferred between eDirectory and the application, directory, or database. Communication between the DirXML engine and the driver shim is handled through XML documents that describe events, queries, and results.

The shim is written in Java*, C, or C++.

Driver Configuration Files

Driver configurations are preconfigured XML files that are included with Identity Manager. You can import these configuration files through the wizards in iManager.

These driver configurations contain sample policies. They are not intended for use in a production environment, but rather as a template for you to modify.

Identity Manager Event Cache

All of the events generated through eDirectory are stored in an event cache until they are successfully processed. This guarantees that no data will be lost because of a bad connection, loss of system resources, unavailability of a driver, or any other network failure.

Identity Manager Components

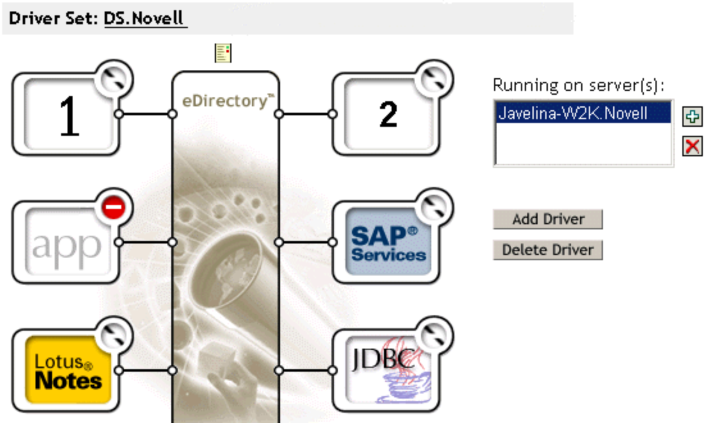
This section introduces the concepts and the components that comprise Identity Manager.

Driver Set

A driver set is a container that holds DirXML drivers. Only one driver set can be active on a server at a time. As a result, all active drivers must be grouped into the same driver set. It is not necessary to activate all of the drivers in a driver set on every server that is using the driver set.

The driver set object must exist in a full read/write replica on any server that is using it, so we recommend partitioning the driver set. This is recommended so that if replicas of users are moved to another server, the driver objects are not.

The following image displays the driver set in iManager.



Driver Set: DS.Novell

Running on server(s): Javelina-W2K.Novell

From the Overview page in iManager (shown above), you can:

- View and modify the driver set and its properties
- View the drivers within the driver set
- Change the status of a driver
- Associate a driver set with a server
- Add or remove drivers
- View activation information for the driver set
- View the status log for the driver set

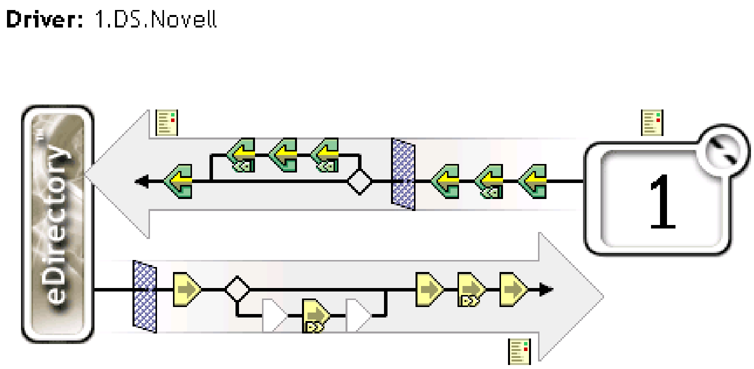
Driver Object

A Driver object represents a driver that connects to an application that integrates with eDirectory. The following components comprise the driver object and its configuration parameters:

- A Driver object in the eDirectory tree contained by a driver set object.
- A Subscriber channel object contained by the Driver object.
- A Publisher object contained by the Driver object.
- Several policy objects that are referenced by the Driver, Subscriber, and Publisher objects.
- An executable driver shim that is referenced by the Driver object.
- Shim-specific parameters that are configured by the administrator.
- An eDirectory password for the Driver object, which can be used by the shim to authenticate a remote part of the shim.
- Authentication parameters used to connect to and authenticate to the supported directory or application.
- A startup option for the driver that includes the following:

  - Disabled: The driver will not run.
  - Manual: The driver must be started manually through iManager.
  - Auto start: The driver will start automatically when eDirectory starts.
- A reference to a Schema Mapping policy.
- An XML representation of the supported application or directory's schema. This is typically obtained automatically from the application or directory through the shim.

In iManager, you can view the DirXML Driver Overview and modify existing driver parameters, rules, and style sheets. The DirXML Driver Overview is shown below.



Driver: 1.DS.Novell

In addition, the Driver object is used for eDirectory rights checking. The Driver object must be granted sufficient eDirectory rights to any object it reads or writes. You can do this by making the Driver object a Trustee of the eDirectory objects the driver will synchronize with, or by granting Security Equivalences to the Driver object.

See eDirectory Rights (http://www.novell.com/documentation/lg/edir87/edir87/data/fbachifb.html) in the *Novell eDirectory 8.7.3 Administration Guide* for more information on rights assignments.

Driver Shim

The driver shim serves as a conduit for information between the application, directory, or database and eDirectory. The shim is written in Java, C, or C++.

The communication between the DirXML engine and the driver shim is in the form of XML documents that describe events, queries, and results.

The following object events are supported by the shim:

- Add (creation)
- Modify
- Delete
- Rename
- Move

In addition, the shim must support a defined query capability so that Identity Manager can query the synchronized application, directory, or database.

When an event occurs in eDirectory that causes an action in the synchronized application or directory, Identity Manager creates an XML document that describes the eDirectory event and submits it through the Subscriber channel to the driver shim.

When an event occurs in the synchronized application, directory, or database, the driver shim generates an XML document that describes the application event. The driver shim then submits the XML document to Identity Manager through the Publisher channel. After processing the event through any application rules, Identity Manager causes eDirectory to take the appropriate action.

Publisher and Subscriber Channels

DirXML drivers contain two channels for processing data: the Publisher channel and Subscriber channel. Each channel contains its own policies that define how to process and transform data.

Events and Commands

The distinction between events and commands in Identity Manager is important. If an element is being sent to a driver, the element is a command. If the element is being sent to Identity Manager, the element is an event notification. When the driver sends an event notification to Identity Manager, the driver is informing Identity Manager of a change that occurred in the application. Based on configurable rules, Identity Manager then determines what commands, if any, must be sent to eDirectory.

When Identity Manager sends a command to the driver, Identity Manager has already taken an eDirectory event as input, applied the appropriate policies, and determined that the change in the application represented by the command is necessary.

Policies and Filters

Policies and filters give you the ability to control how data flows from one system to another. For detailed information on policies and filters, refer to the *Policy Builder and Driver Customization Guide* (http://www.novell.com/documentation/lg/dirxml20/policies/data/boswupw.html).

Associations

Most other identity management products require the connected application to store an identifier of some sort to map objects from an application to the directory. With Identity Manager, no changes are required of the application. Each object in eDirectory contains an association table that maps the eDirectory object with a unique identifier in the connected directories and applications. The table is reverse-indexed so that the connected application does not need to supply an eDirectory identifier (such as a distinguished name) to the integration driver when updating eDirectory.

The creation of an association between two objects happens when an event occurs to an object that has not yet been associated with another object in the network. For an association to be created, the minimum set of definable criteria must match between each object. For example, you can create a rule stating that if any two of four attributes match by more than 90% (full name, telephone number, employee ID, and e-mail address) the object will be associated.

Matching policies define the criteria for determining if two objects are the same. If no match is found for the changed object, a new object can be created. For this to occur, all of the minimum creation criteria must be met. These criteria are defined by a Create policy. Finally, the Placement policy defines where, in the naming hierarchy, the new object is created.

Associations can be created in one of two ways:

- As a match between objects
- As a new creation of an object in a specific location

After an association between objects is formed, this association remains in effect until the objects are deleted or the association is deleted by an eDirectory administrator.

Association Table

In Identity Manager, associations refer to the matching of objects in eDirectory with objects residing in connected systems. When Identity Manager is initially installed, the eDirectory schema is extended on NetWare® and Windows* NT*/2000. If you are using Solaris* or Linux*, the schema is not automatically extended. Part of this extension is a new attribute tied to the base class of all eDirectory objects. This attribute is an association table. Association tables keep track of all the external application objects that an eDirectory object is linked to. This table is built and maintained automatically so there is rarely a reason to manually edit this information, although it is often helpful to view it.

2 Planning

In this section:

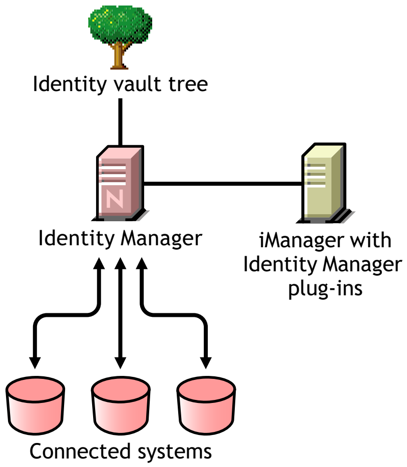
- "Common Installation Scenarios" on page 25
- "Planning the Project Management Aspects of Identity Manager Implementation" on page 32
- "Planning the Technical Aspects of Identity Manager Implementation" on page 38

Common Installation Scenarios

The following scenarios are examples of the environment in which Identity Manager might be used. For each scenario, some guidelines are provided to help you with your implementation.

- "New Installation of Identity Manager" on page 25
- "Using Identity Manager and DirXML 1.1a in the Same Environment" on page 27
- "Upgrading from the Starter Pack to Identity Manager" on page 28
- "Upgrading from Password Synchronization 1.0 to Identity Manager Password Synchronization" on page 30

New Installation of Identity Manager



Nsure™ Identity Manager is a data-sharing solution that leverages your identity vault to automatically synchronize, transform, and distribute information across applications, databases, and directories.

Your Identity Manager solution includes the following components:

Identity Vault Tree with Identity Manager

The identity vault tree contains the user or object data you want to share or synchronize with other connected systems. We recommend that you install Identity Manager in its own tree and use it as your identity vault.

iManager Server with Identity Manager plug-ins

You use Novell® iManager and the Identity Manager plug-ins to administer your Identity Manager solution.

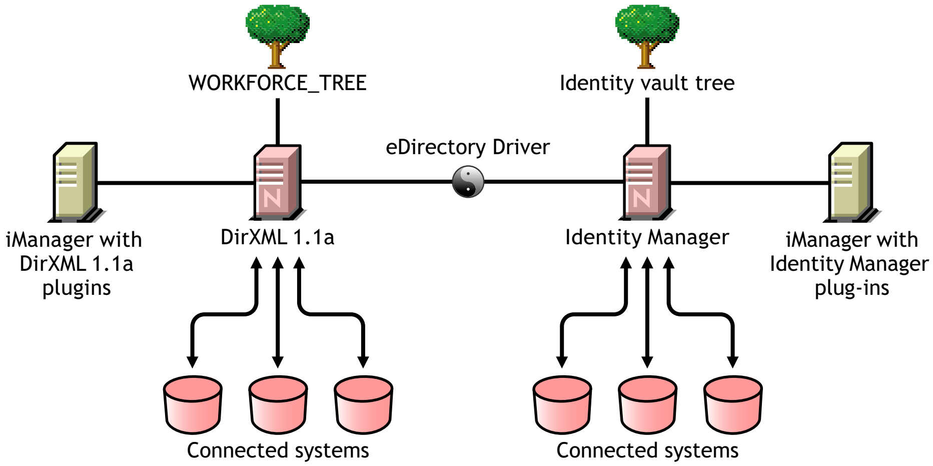
Connected Systems

Connected systems might include other applications, directories, and databases that you want to share or synchronize data with the identity vault. To establish a connection from your identity vault to the connected system, install the appropriate driver for that connected system. Refer to the driver implementation guides (http://www.novell.com/documentation/dirxmldrivers/index.html) for specific instructions.

Common Identity Manager Tasks

- **Install System Components:** Because your Identity Manager solution might be distributed across several computers, servers, or platforms, you should run the installation program and install the appropriate components per system. Refer to "Identity Manager Components and System Requirements" on page 46 for more information.
- **Set Up Connected Systems:** Refer to "Identity Manager Components and System Requirements" on page 46 and the driver implementation guides (http://www.novell.com/documentation/dirxmldrivers/index.html) for specific instructions.
- **Activate Your Solution:** Identity Manager products (professional or server editions and driver groups) require activation within 90 days of installation. See Appendix A, "Activating Novell Identity Manager Products," on page 271.
- **Define Business Policies:** Business policies enable you to customize the flow of information into and out of Novell eDirectory™ for a particular environment. Policies also create new objects, update attribute values, make schema transformations, define matching criteria, maintain Identity Manager associations, and many other things. A detailed guide to Policies is contained in the *Policy Builder and Driver Customization Guide*.
- **Configure Password Management:** Using Password policies, you can increase security by setting rules for how users create their passwords. You can also decrease help desk costs by providing users with self-service options for forgotten passwords and for resetting passwords. For in-depth information on Password Management, refer to Chapter 8, "Managing Passwords by Using Password Policies," on page 95.
- **Configure Role-Based Entitlements:** Role-based entitlements let you grant entitlements on connected systems to a group of Novell eDirectory users. Using Entitlement policies, you can streamline management of business policies and reduce the need to configure your DirXML drivers. See Chapter 11, "Using Role-Based Entitlements," on page 229 for more information.
- **Logging Events with Nsure Audit:** Nsure Identity Manager is instrumented to use Novell Nsure Audit for auditing and reporting. Nsure Audit is a collection of technologies providing monitoring, logging, reporting and notification capabilities. Through integration with Nsure Audit, Identity Manager provides detailed information about the current and historical status of driver and engine activity. This information is provided by a set of preconfigured reports, standard notification services, and user-defined logging. Refer to Chapter 14, "Logging and Reporting Using Nsure Audit," on page 259.

Using Identity Manager and DirXML 1.1a in the Same Environment



If you are running both Identity Manager and DirXML® 1.1a in the same environment, keep in mind the following considerations.

Creating an Identity Vault

- We recommend that you install Identity Manager in a separate tree and use it as your identity vault.

Management Tools

- ConsoleOne® is supported for DirXML 1.1a, but not for Identity Manager.
- Two iManager servers are necessary, one for DirXML 1.1a plug-ins and one for Identity Manager plug-ins. This is because the plug-ins have been enhanced and because Identity Manager drivers use DirXML Script.
- iManager plug-ins for DirXML 1.1a can't read DirXML Script, which is used in the sample driver configurations for most Identity Manager drivers.

Backward Compatibility

- You can run DirXML 1.1a driver shims and configurations on an Identity Manager server, and you can view the drivers in iManager in the DirXML Overview for the driver set. But the Identity Manager plug-ins do not let you view or edit the driver configurations until you convert them to Identity Manager format.

  In the Identity Manager plug-ins, if you click a driver that is in 1.1a format you are prompted to complete the conversion. This is a simple process done with a wizard, and it does not change the functionality of the driver configuration. As part of the process, a backup copy of the DirXML 1.1a version is saved.
- Activation for DirXML 1.*x* drivers is still valid when running them with the Identity Manager engine. However, if you upgrade the driver shim to an Identity Manager version, you need new activation.
- In most cases, an Identity Manager driver shim can run with a DirXML 1.1a configuration. See the individual driver implementation guides (http://www.novell.com/documentation/dirxmldrivers/index.html) for upgrade information.

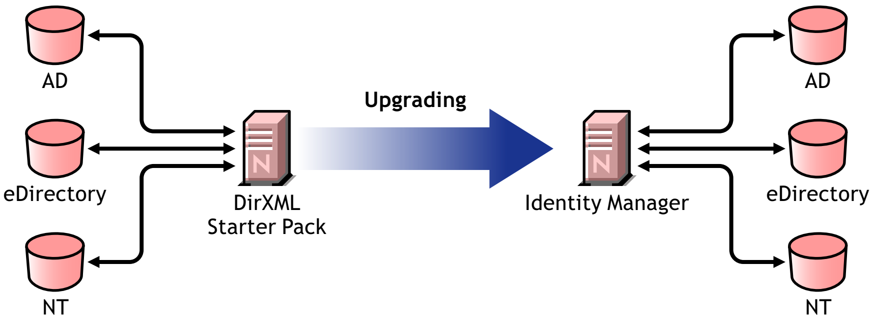
A notable exception is that Password Synchronization 1.0 won't run correctly for AD and NT after you upgrade the driver shim unless you add some additional driver policies. For instructions, see the sections about Password Synchronization in the driver implementation guides (http://www.novell.com/documentation/dirxmldrivers/index.html) for the DirXML Drivers for Active Directory and NT Domain.

- Running Identity Manager driver shims and driver configurations with the DirXML 1.1a engine is not supported.
- Running Identity Manager driver configurations with DirXML 1.1a driver shims is not supported.
- If you run the same DirXML driver configuration on more than one server, make sure the servers are running the same version of DirXML or Identity Manager, and the same version of eDirectory.

Password Management

- You can create Password policies that provide features such as Advanced Password Rules to require stronger passwords, and Forgotten Password Self-Service and Reset Password Self-Service for users. See Chapter 8, "Managing Passwords by Using Password Policies," on page 95 and Chapter 9, "Password Self-Service," on page 115.
- If you began using Universal Password with the initial release of NetWare 6.5, some upgrade steps are necessary before you can use the new Password Policy features. See "(NetWare 6.5 only) Re-Creating Universal Password Assignments" on page 108. The procedure is not necessary if you began using Universal Password with NetWare 6.5 SP2.
- Identity Manager Password Synchronization provides bidirectional password synchronization and supports more platforms than Password Synchronization 1.0.
- If you have been using Password Synchronization 1.0 with AD or NT, make sure you review the upgrade instructions before you install the new driver shims. See "Upgrading from Password Synchronization 1.0 to Identity Manager Password Synchronization" on page 30.
- Driver policy "overlays" are provided to help you add bidirectional Password Synchronization functionality to existing drivers. See "Upgrading Existing Driver Configurations to Support Identity Manager Password Synchronization" on page 174.

Upgrading from the Starter Pack to Identity Manager



The DirXML Starter Pack solutions included with other Novell products provide licensed synchronization of information held in NT Domains, Active Directory, and eDirectory. Additionally, evaluation drivers for several other systems including PeopleSoft*, GroupWise®, and Lotus Notes*, are included to allow you to explore data synchronization for your other systems.

This solution also offers you the ability to synchronize user passwords. With PasswordSync, a user is required to remember only a single password to log in to any of these systems. Administrators can manage passwords in the system of their choice. Any time a password is changed in one of these environments, it will be updated in all of them.

DirXML Starter Packs that shipped with NetWare 6.5 and Nterprise Linux Services 1.0 were based on DirXML 1.1a technology. When upgrading from a Starter Pack to the latest version of Identity Manager, keep in mind the following considerations:

Management Tools

- ConsoleOne is supported for DirXML 1.1a, but not for Identity Manager.

Backward Compatibility

- You can run DirXML 1.1a driver shims and configurations on an Identity Manager server, and you can view the drivers in iManager in the DirXML Overview for the driver set. But the Identity Manager plug-ins do not let you view or edit the driver configurations until you convert them to Identity Manager format.

  In the Identity Manager plug-ins, if you click a driver that is in 1.1a format you are prompted to complete the conversion. This is a simple process done with a wizard, and it does not change the functionality of the driver configuration. As part of the process, a backup copy of the DirXML 1.1a version is saved.
- Activation for DirXML 1.*x* drivers is still valid when running them with the Identity Manager engine. However, if you upgrade the driver shim to an Identity Manager version, you need new activation.
- In most cases, an Identity Manager driver shim can run with a DirXML 1.1a configuration. See the individual driver implementation guides (http://www.novell.com/documentation/dirxmldrivers/index.html) for upgrade information.

  A notable exception is that Password Synchronization 1.0 won't run correctly for AD and NT after you upgrade the driver shim unless you add some additional driver policies. For instructions, see the sections about Password Synchronization in the driver implementation guides (http://www.novell.com/documentation/dirxmldrivers/index.html) for the DirXML Drivers for Active Directory and NT Domain.
- Running Identity Manager driver shims and driver configurations with the DirXML 1.1a engine is not supported.
- Running Identity Manager driver configurations with DirXML 1.1a driver shims is not supported.
- If you run the same DirXML driver configuration on more than one server, make sure the servers are running the same version of DirXML or Identity Manager, and the same version of eDirectory.

Password Management

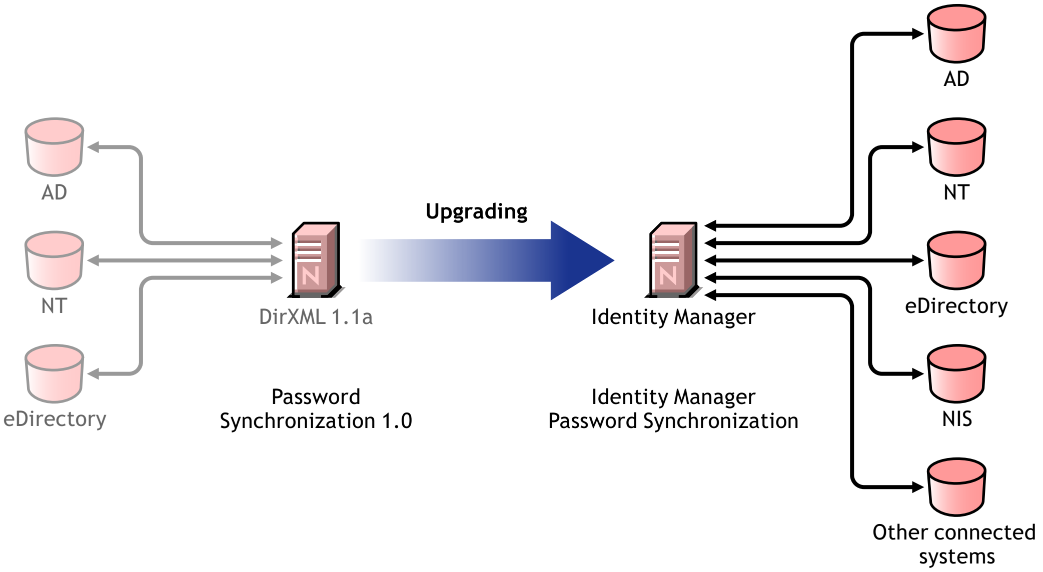
- Password Synchronization 1.0, which shipped with Starter Packs (DirXML 1.1a), won't work correctly for AD and NT after you upgrade the driver shim unless you add some additional driver policies. For instructions, see the sections about Password Synchronization in the driver implementation guides (http://www.novell.com/documentation/dirxmldrivers/index.html) for the DirXML Drivers for Active Directory and NT Domain.
- Refer to "Upgrading from Password Synchronization 1.0 to Identity Manager Password Synchronization" on page 30 for specific instructions surrounding this upgrade process.

Activation

- All Identity Manager and DirXML products must be activated within 90 days. When you purchased other Novell software, the DirXML Starter Pack included activations for the DirXML 1.1a engine and the NT, AD, and eDirectory drivers. When upgrading from the DirXML Starter Pack, you might need to re-apply your activation credentials for those drivers.

  For more information on activation, refer to Appendix A, "Activating Novell Identity Manager Products," on page 271.

Upgrading from Password Synchronization 1.0 to Identity Manager Password Synchronization



Identity Manager Password Synchronization offers many new features, including bidirectional password synchronization, additional platforms, and e-mail notification when password synchronization fails.

If you are using Password Synchronization 1.0 with Active Directory or NT Domain, it's very important that you review the instructions for upgrading before you install the new driver shims.

For information about Identity Manager Password Synchronization in general, see Chapter 10, "Password Synchronization across Connected Systems," on page 149. That section contains conceptual information including a comparison of old and new features, prerequisites, a list of features supported for each connected system, instructions on adding support to existing drivers, and several scenarios showing how you could use the new features.

In this section:

- "Upgrading Password Synchronization for AD or NT" on page 31
- "Upgrading Password Synchronization for eDirectory" on page 31
- "Upgrading Other Connected System Drivers" on page 31
- "Handling Sensitive Information" on page 32

Upgrading Password Synchronization for AD or NT

The new Password Synchronization functionality is done by driver policies, not by a separate agent. This means that if you install the new driver shim without upgrading the driver configuration at the same time, Password Synchronization 1.0 continues to work only for existing users. New, moved, or renamed users do not participate in Password Synchronization until you complete the upgrade of the driver configuration.

Use the following general steps to upgrade:

1. Upgrade your environment so that it supports Universal Password, including upgrading the Novell Client if you are using it.
2. Install the Identity Manager driver shim to replace the DirXML 1.*x* driver shim for AD or NT.
3. Immediately create backward compatibility with Password Synchronization 1.0, by adding a new policy to the driver configuration.

   This step allows Password Synchronization 1.0 to continue to function correctly until you make the switch to Identity Manager Password Synchronization.
4. Add support for the new Identity Manager Password Synchronization, using driver policies.
5. Install and configure new Password Synchronization filters.
6. Set up SSL, if necessary.
7. Turn on Universal Password using Password Policies, if necessary.
8. Set up the Identity Manager Password Synchronization scenario that you want to use.

   See "Implementing Password Synchronization" in the *Novell Nsure Identity Manager 2.0.1 Administration Guide*.
9. Remove Password Synchronization 1.0.

For detailed instructions, see the driver implementation guides (http://www.novell.com/documentation/dirxmldrivers/index.html) for the DirXML Drivers for Active Directory and NT Domain.

Upgrading Password Synchronization for eDirectory

Upgrading for eDirectory is fairly simple, and the new driver shim is intended to work with your existing driver configuration with no changes, assuming that your driver shim and configuration have the latest patches. For instructions, see the DirXML Driver for eDirectory Implementation Guide (http://www.novell.com/documentation/dirxmldrivers/index.html).

Upgrading Other Connected System Drivers

Identity Manager Password Synchronization supports more connected systems than Password Synchronization 1.0.

For a list of the features that are supported for other systems, see "Connected System Support for Password Synchronization" on page 156.

Driver policy "overlays" are provided to help you add bidirectional Password Synchronization functionality to existing drivers for connected systems that were not previously supported. See "Upgrading Existing Driver Configurations to Support Identity Manager Password Synchronization" on page 174.

Handling Sensitive Information

Universal Password is protected by four layers of encryption inside eDirectory, so it is very secure in that environment. If you choose to use bidirectional password synchronization, and you synchronize Universal Password with the Distribution Password, keep in mind that you are extracting the eDirectory password and sending it to other connected systems. You need to secure the transport of the password, as well as the connected systems it is synchronized to. See "Handling Sensitive Information" on page 165.

Planning the Project Management Aspects of Identity Manager Implementation

This section outlines high-level political and project management aspects of implementing Identity Manager. (For the technical aspects, see "Planning the Technical Aspects of Identity Manager Implementation" on page 38.)

This planning material provides an overview of the type of activities that would normally be taken from the inception of an Identity Manager project to its full production deployment. Implementing an identity management strategy requires you to discover what the needs are and who the stakeholders are in your environment, design a solution, get buy-in from stakeholders, and test and roll out the solution. This section is intended to provide you with sufficient understanding of the process so that you can maximize the benefit from working with Identity Manager.

We strongly recommend that an Identity Manager expert be engaged to assist in each phase of the solution deployment. For more information about partnership options, see the Novell® Nsure™ Solution Partner Web site (http://www.novell.com/solutions/nsure/partners). Novell Education also offers courses that address Identity Manager implementation.

This section is not exhaustive; it is not intended to address all possible configurations, nor is it intended to be rigid in its execution. Each environment is different and requires flexibility in the type of activities to be used.

Novell Identity Manager Deployment

There are several activities suggested as best practices when deploying Identity Manager:

- "Discovery" on page 32
- "Requirements and Design Analysis" on page 33
- "Proof of Concept" on page 36
- "Data Validation and Preparation" on page 36
- "Production Pilot" on page 37
- "Production Rollout Planning" on page 37
- "Production Deployment" on page 38

Discovery

You might want to begin your Identity Manager implementation with a discovery process that can do the following:

- Identify the primary objectives in managing identity information
- Define or clarify the business issues being addressed

- Determine what initiatives are required to address outstanding issues
- Determine what it would take to carry out one or more of these initiatives
- Develop a high-level strategy or “solution roadmap” and an agreed execution path

Discovery provides a common understanding of the issues and solutions for all stakeholders. It provides an excellent primer for the analysis phase that requires stakeholders to have a basic knowledge of directories, Novell eDirectory™, Novell Nsure Identity Manager, and XML integration in general.

- It can establish a base level understanding among all stakeholders
- It can capture key business and systems information from stakeholders
- It can enable a solution roadmap to be developed

The discovery also identifies immediate next steps, which might include the following:

- Identifying planning activities in preparation of a requirements and design phase
- Defining additional education for stakeholders

Key Deliverables

- Structured interviews with key business and technical stakeholders
- High-level summary report of the business and technical issues
- Recommendations for the next steps
- An executive presentation outlining the outcome of the discovery

Requirements and Design Analysis

This analysis phase captures both technical and business aspects of the project in detail and produces the data model and high-level Identity Manager architecture design. This activity is a crucial first step from which the solution is implemented.

The focus of the design will be specifically on identity management; however, many of the elements traditionally associated with a resource management directory, such as file and print, can also be addressed. Here is a sample of items that you may want to assess:

- What versions of system software are being used?
- Is the directory design appropriate?
- Is the quality of the data in all systems appropriate? (If the data are not of usable quality, business policy may not be implemented as desired.)

After the requirements analysis, you can establish the scope and project plan for the implementation, and can determine if any prerequisite activities need to occur. To avoid costly mistakes, be as complete as possible in gathering information and documenting requirements.

The following tasks might be completed during the requirements assessment:

- “Define the Business Requirements” on page 34
- “Analyze Your Business Processes” on page 34
- “Design an Enterprise Data Model” on page 35

Define the Business Requirements

Gather your organization's business processes and the business requirements that define these business processes.

For example, a business requirement for terminating an employee might be that the employee's network and e-mail account access must be removed the same day the employee is terminated.

The following tasks can guide you in defining the business requirements:

- Establish the process flows, process triggers, and data mapping relationships.

  For example, if something is going to happen in a certain process, what will happen because of that process? What other processes are triggered?

- Map data flows between applications.
- Identify data transformations that need to take place from one format to another, such as 2/25/2002 to 25 Feb 2002.
- Document the data dependencies that exist.

  If a certain value is changed, it is important to know if there is a dependency on that value. If a particular process is changed, it is important to know if there is a dependency on that process.

  For example, selecting a “temporary” employee status value in a human resources system might mean that the IT department needs to create a user object in eDirectory with restricted rights and access to the network during certain hours.

- List the priorities.

  Not every requirement, wish, or desire of every party can be immediately fulfilled. Priorities for designing and deploying the provisioning system will help plan a roadmap.

  It might be advantageous to divide the deployment into phases that will enable implementation of a portion of the deployment earlier and other portions of the deployment later.

- Define the prerequisites.

  The prerequisites required for implementing a particular phase of the deployment should be documented.

- Identify authoritative data sources.

  Learning early on which items of information system administrators and managers feel belong to them can help in obtaining and keeping buy-in from all parties.

  For example, the account administrator might want ownership over granting rights to specific files and directories for an employee. This can be accommodated by implementing local trustee assignments in the account system.

Analyze Your Business Processes

The analysis of business processes often commences by interviewing essential individuals such as managers, administrators, and employees who actually use the application or system. Issues to be addressed include:

- Where does the data originate?
- Where does the data go?
- Who is responsible for the data?

- Who has ownership for the business function to which the data belongs?
- Who needs to be contacted to change the data?
- What are all the implications of the data being changed?
- What work practices exist for data handling (gathering and/or editing)?
- What types of operations take place?
- What methods are used to ensure data quality and integrity?
- Where do the systems live (on what servers, in which departments)?
- What processes are not suitable for automated handling?

For example, questions that might be posed to an administrator for a PeopleSoft system in Human Resources may include

- What data are stored in the PeopleSoft database?
- What appears in the various panels for an employee account?
- What actions are required to be reflected across the provisioning system (such as add, modify, or delete)?
- Which of these are required? Which are optional?
- What actions need to be triggered based on actions taken in PeopleSoft?
- What operations/events/actions are to be ignored?

Interviewing key people can lead to other areas of the organization that can provide a more clear picture of the entire process.

Design an Enterprise Data Model

After your business processes have been defined, you can begin to design a data model that reflects your current business process.

The model should illustrate where data originates, where they move to, and where they can’t move. It should also account for how critical events affect the data flow.

You might also wish to develop a diagram that illustrates the proposed business process and the advantages of implementing automated provisioning in that process.

The development of this model begins by answering questions such as the following:

- What types of objects (users, groups, etc) are being moved?
- Which events are of interest?
- Which attributes need to be synchronized?
- What data is stored throughout your business for the various types of objects being managed?
- Is the synchronization one-way or two-way?
- Which system is the authoritative source for which attributes?

It is also important to consider the interrelationships of different values between systems.

For example, an employee status field in PeopleSoft might have three set values: employee, contractor, and intern. However, the Active Directory system might have only two values: permanent and temporary. In this situation, the relationship between the "contractor" status in PeopleSoft and the "permanent" and "temporary" values in Active Directory needs to be determined.

The focus of this work should be to understand each directory system, how they relate to each other, and what objects and attributes need to be synchronized across the systems.

Key Deliverables

- Data model showing all systems, authoritative data sources, events, information flow and data format standards
- Appropriate Identity Manager architecture for the solution
- Detail for additional system connection requirements
- Strategies for data validation and record matching
- Directory design to support the Identity Manager infrastructure

Dependencies

- Staff familiar with all external systems (such as HR database administrator, network and messaging system administrator)
- Availability of system schemas and sample data
- Data model from the analysis and design phase
- Availability of basic information such as organizational chart, WAN and server infrastructure

Proof of Concept

The outcome of this activity is to have a sample implementation in a lab environment that reflects your company's business policy and data flow. It is based on the design of the data model developed during the requirement analysis and design and is a final step before the production pilot.

NOTE: This step is often beneficial in gaining management support and funding for a final implementation effort.

Key Deliverables

- A functioning Identity Manager proof of concept with all system connections operational

Dependencies

- Hardware platform
- Necessary software
- Analysis and design phase that identifies the required connections
- Availability and access to other systems for testing purposes
- Data model from the analysis and design phase

Data Validation and Preparation

The data in production systems can be of varying quality and consistency and therefore may introduce inconsistencies when synchronizing systems. This phase presents an obvious point of separation between the Nsure Resources implementation team and the business units or groups who "own" or manage the data in the systems to be integrated. At times, the associated risk and cost factors might not belong in a provisioning project.

Key Deliverables

- Production data sets appropriate for loading into eDirectory (as identified in the analysis and design activities). This includes the likely method of loading (either bulk load or via connectors). The requirement for data that are validated, or otherwise formatted is also identified.

Dependencies

- Data model from analysis and design phase (proposed record matching and data format strategy)
- Access to production data sets

Production Pilot

The purpose of this activity is to begin the migration into a production environment. During this phase, there may be additional customization that occurs. In this limited introduction, desired outcomes of the preceding activities can be confirmed and agreement obtained for production rollout.

NOTE: This phase might provide the acceptance criteria for the solution and/or the necessary milestone en route to full production.

Key Deliverables

- Pilot solution providing live proof of concept and validation for data model and desired process outcomes

Dependencies

- All previous activities (analysis and design, Identity Manager technology platform).

Production Rollout Planning

This phase is where the production deployment is planned. The plan should:

- Confirm server platforms, software revisions, and service packs
- Confirm the general environment
- Confirm introduction of eDirectory and mixed tree coexistence
- Confirm partitioning and replication strategies
- Confirm Identity Manager implementation
- Plan the legacy process cutover
- Plan a rollback contingency strategy

Key Deliverables

- Production rollout plan
- Legacy process cutover plan
- Rollback contingency plan

Dependencies

- All previous activities

Production Deployment

This phase is where the pilot solution is expanded to affect all live data in the production environment. It typically follows agreement that the production pilot meets all the technical and business requirements.

Key Deliverables

- Production solution ready for transition

Dependencies

- All previous activities

Planning the Technical Aspects of Identity Manager Implementation

Replicating the Objects that Identity Manager Needs on the Server

As part of your planning, you need to make sure that certain eDirectory objects are replicated on servers where you want to run DirXML drivers.

You can use filtered replicas, as long as all of the objects and attributes that the driver needs to read or synchronize are included in the filtered replica.

Keep in mind that you must give the DirXML Driver object sufficient eDirectory rights to any objects it is to synchronize, either by explicitly granting it rights or by making the Driver object security equivalent to an object that has the desired rights.

An eDirectory server that is running a DirXML driver (or that the driver refers to, if you are using Remote Loader) must hold a master or read-write replica of the following:

- The Driver Set object for that server.

  You should have one Driver Set object for each server that is running Identity Manager. Unless you have specific needs, don't associate more than one server with the same Driver Set object.

  NOTE: When creating a Driver Set object, the default setting is to create a separate partition, but this is not required.

- The Server object for that server.

  The Server object is necessary because it allows the driver to generate key pairs for objects. It also is important for remote loader authentication.

- The objects that you want this instance of the driver to synchronize.

  The driver can't synchronize objects unless a replica of those objects is on the same server as the driver. In fact, a DirXML driver will synchronize the objects in *all* the containers that are replicated on the server unless you create rules to specify otherwise (rules for "scope filtering").

  If you want a driver to synchronize all user objects, for example, the simplest way is to use one instance of the driver on a server that holds a master or read/write replica of all your users.

  However, many environments don't have a single server that contains a replica of all the users. Instead, the complete set of users is spread across multiple servers. In this case, you have two choices:

  - **Aggregate users onto a single server.** You can create a single server that holds all users by adding replicas to an existing server. Filtered replicas can be used to reduce the size of the eDirectory database if desired, as long as the necessary user objects and attributes are part of the filtered replica.
  - **Use multiple instances of the driver on multiple servers, with scope filtering.** If you *don't* want to aggregate users onto a single server, you will need to determine which set of servers holds all the users, and set up one instance of the DirXML driver on each of those servers.

    To prevent separate instances of a driver from trying to synchronize the same users, you will need to use "scope filtering" to define which users each instance of the driver should synchronize. Scope filtering means that you add rules to each driver to limit the scope of the driver's management to specific containers. See "Managing Users on Different Servers Using Scope Filtering" on page 39.

- The Template objects you want the driver to use when creating users, if you choose to use templates.

  DirXML drivers do not require you to specify eDirectory Template objects for creating users. But if you specify that a driver should use a template when creating users in eDirectory, the Template object must be replicated on the server where the driver is running.

- Any containers you want the DirXML driver to use for managing users.

  For example, if you have created a container named Inactive Users to hold user accounts that have been disabled, you must have a master or read/write replica (preferably master replica) of that container on the server where the driver is running.

- Any other objects that the driver needs to refer to (for example, work order objects for the Avaya PBX driver).

  If the other objects are only to be read by the driver, not changed, the replica for those objects on the server can be a read-only replica.

Managing Users on Different Servers Using Scope Filtering

Scope filtering means adding rules to each driver to limit the scope of the driver's actions to specific containers. The following are two situations in which you would need to use scope filtering:

- You want the driver to synchronize only users that are in a particular container.

  A DirXML driver by default will synchronize objects in all the containers that are replicated on the server where it is running. To narrow that scope, you must create scope filtering rules.

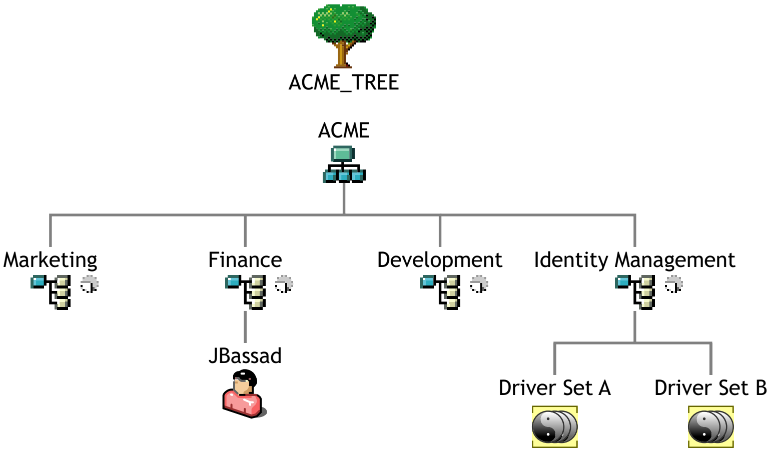
- You want a DirXML driver to synchronize all users, but you don't want all users to be replicated on the same server.

  To synchronize all users without having them replicated on one single server, you need to determine which set of servers holds all the users, and then create an instance of the DirXML driver on each of those servers. To prevent two instances of the driver from trying to synchronize the same users, you will need to use scope filtering to define which users each instance of the driver should synchronize.

  NOTE: You should use scope filtering even if your server's replicas don't currently overlap. In the future, replicas could be added to your servers and an overlap could be created unintentionally. If you have scope filtering in place, your DirXML drivers will not try to synchronize the same users, even if replicas are added to your servers in the future.

Here's an example of how scope filtering is used.

The following illustration shows a tree with three containers that hold users: Marketing, Finance, and Development. It also shows an Identity Manager container that holds the driver sets. Each of these containers is a separate partition.



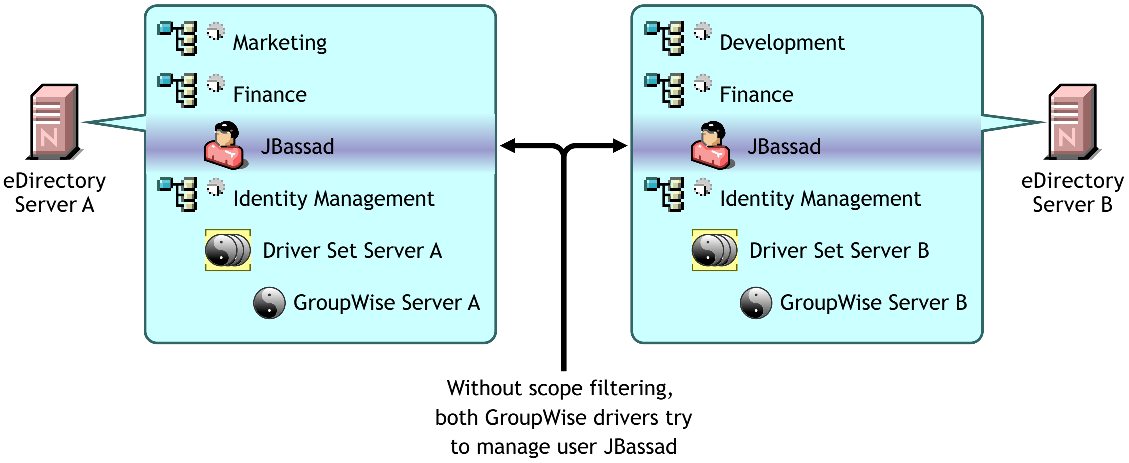
In this example, the eDirectory administrator has two eDirectory servers, Server A and Server B, shown in the next illustration. Neither server contains a copy of all the users. Each server contains two of the three partitions, so the scope of what the servers hold is overlapping.

The administrator wants all the users in the tree to be synchronized by the GroupWise driver, but does not want to aggregate replicas of the users onto a single server. He chooses instead to use two instances of the GroupWise driver, one on each server. He installs Identity Manager and sets up the GroupWise driver on each eDirectory server.

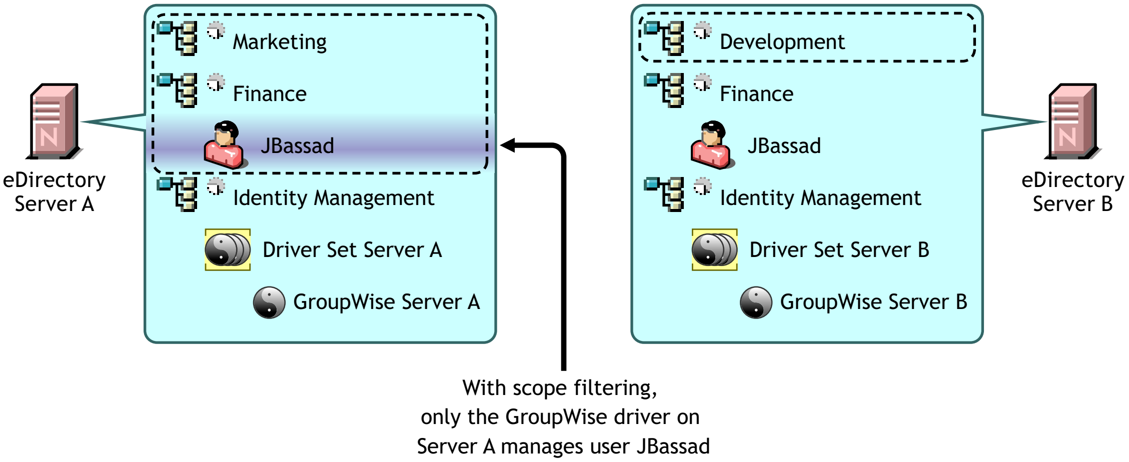
Server A holds replicas of the Marketing and Finance containers. Also on the server is a replica of the Identity Management container, which holds the Driver Set for Server A and the GroupWise Driver object for Server A.

Server B holds replicas of the Development and Finance containers, and the Identity Management container holding the Driver Set for Server B and the GroupWise Driver object for Server B.

Because Server A and Server B both hold a replica of the Finance container, both servers hold the user JBassad, who is in the Finance container. Without scope filtering, both GroupWise Driver A and GroupWise Driver B would synchronize JBassad.



The next illustration shows that scope filtering prevents the two instances of the driver from managing the same user, because it defines which drivers synchronize each container.



Here is a sample of how you would create a rule for scope filtering. You would place the rule in the Subscriber Event Transformation style sheet.

```
<xsl:transform version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
   xmlns:jstring="http://www.novell.com/nxsl/java/java.lang.String"
   exclude-result-prefixes="jstring">

   <!--
   To select different containers for scoping, add/delete/modify the <value>
   elements in the body of the variable "in-scope-containers-rtf"

   Note that if the container is not in the root of the tree, then the DN
   (minus the tree name) of the container must be specified, e.g.,
   Corporate\Executives

   Note: THESE MUST BE ENTERED IN THE TABLE AS ALL UPPERCASE
   -->

   <xsl:variable name="in-scope-containers-rtf">
      <value>CORPORATE\USERS\ACTIVE</value>
      <value>CORPORATE\USERS\INACTIVE</value>
   </xsl:variable>
   <xsl:variable name="in-scope-containers" select="document('')/xsl:transform/
xsl:variable[@name='in-scope-containers-rtf']/value"/>

   <!--
   "identity" transformation - copies unchanged everything not explicitly
   matched by other templates
   -->

   <xsl:template match="node()|@*">
      <xsl:copy>
         <xsl:apply-templates select="@*|node()"/>
      </xsl:copy>
   </xsl:template>

   <!-- throw away events that are out of scope -->

   <xsl:template match="input/*[@src-dn]">
      <xsl:variable name="in-scope">
```

```
         <xsl:call-template name="in-scope"/>
      </xsl:variable>
      <xsl:choose>
         <xsl:when test="$in-scope = '1'">
            <xsl:copy>
               <xsl:apply-templates select="@*|node()"/>
            </xsl:copy>
         </xsl:when>
         <xsl:otherwise>
            <xsl:message>
               <status level="warning">Operation vetoed by Event Transformation
               Rule - out of scope</status>
            </xsl:message>
         </xsl:otherwise>
      </xsl:choose>
   </xsl:template>

   <!--
   check to see if an object is in the scope defined by the variable
   "in-scope-containers"
   -->

   <xsl:template name="in-scope">
      <!-- validate that the container is in scope -->
      <xsl:variable name="src-dn" select="substring-after(substring-after(@src-dn,'\'),'\')"/>
      <xsl:variable name="src-dn-i" select="jstring:lastIndexOf($src-dn,'\')"/>
      <xsl:if test="$src-dn-i != -1">
         <xsl:variable name="src-dn-container" select="jstring:substring($src-dn, 0, $src-dn-
i)"/>

         <!--
         the following test takes advantage of the XPath existential
         quantification semantics:
         basically, if one node in the node-set has a string value that matches
         the string, then the statement is true
         -->

         <xsl:if test="jstring:toUpperCase($src-dn-container) = $in-scope-containers">
            <xsl:value-of select="'1'"/>
         </xsl:if>
      </xsl:if>
   </xsl:template>
</xsl:transform>
```

3 Upgrading

In this section:

- "Upgrading Password Synchronization" on page 43
- "Upgrading from RNS to Nsure Audit" on page 43
- "Upgrading Driver Configurations" on page 43

Some scenarios are explained in "Common Installation Scenarios" on page 25.

Upgrading Password Synchronization

See "Upgrading Password Synchronization 1.0 to Identity Manager Password Synchronization" on page 174.

Upgrading from RNS to Nsure Audit

Reporting and Notification Service (RNS) is deprecated, though the engine continues to process RNS functions if you are currently using RNS. You should plan to move to Nsure Audit, as Nsure Audit expands the functionality provided by RNS, and RNS might no longer be supported in a future release of Identity Manager.

For more information, see Chapter 14, "Logging and Reporting Using Nsure Audit," on page 259.

Upgrading Driver Configurations

Upgrading driver configurations has two aspects:

- Converting the rules to Identity Manager policies. This is done by a conversion tool, and it does not enhance the functionality of the driver. Legacy drivers run without this conversion, but doing the conversion allows you to view the existing driver configuration in the DirXML iManager plugins.
- Upgrading the driver policies to add new functionality. This is best handled by an Identity Manager expert.

See "Upgrading a Driver Configuration from DirXML 1.x to Identity Manager Format" on page 79, and "Managing DirXML 1.x Drivers in an Identity Manager Environment" on page 78.

Another alternative is to begin with the Identity Manager driver configurations and customize them to do the same things your DirXML 1.x configuration does.

4 Installation

This section contains requirements and instructions for installing Nsure ™Identity Manager and DirXML® drivers.

Before You Install

Before you install Identity Manager, review the following information:

- "Common Installation Scenarios" on page 25
- Review the planning information found in "Planning the Project Management Aspects of Identity Manager Implementation" on page 32 and "Planning the Technical Aspects of Identity Manager Implementation" on page 38.
- Ensure that you meet all system requirements. See "Identity Manager Components and System Requirements" on page 46.
- You should back up your Novell® eDirectory™ server. Refer to the Novell documentation for Backing Up and Restoring eDirectory (http://www.novell.com/documentation/lg/edir871/edir871/data/a2n4mb6.html).
- An Identity Manager installation on a server synchronizes only the information that is contained physically in the host eDirectory server's partition replicas. This may necessitate aggregating several partitions onto a single server if a tree-wide view of eDirectory data is desired for a particular synchronization application. For more information, see "Replicating the Objects that Identity Manager Needs on the Server" on page 38.
- The Driverset object must exist in a full read/write replica on the server that is hosting the drivers.
- The Driver object must be granted sufficient eDirectory rights to any objects it is to synchronize, or the Driver object must be made security equivalent to an object that has the desired rights.

Identity Manager Components and System Requirements

Nsure Identity Manager contains components that can be installed within your environment on multiple systems and platforms. Depending on your system configuration, you might need to run the Identity Manager installation program several times to install Identity Manager components on the appropriate systems.

The following table lists the four installation components of Identity Manager and requirements for each system.

System Component	System Requirements	Notes
DirXML Server ◆ DirXML engine ◆ Nsure Audit agent ◆ DirXML Service drivers ◆ DirXML Drivers ◆ Novell Modular Authentication Services (NMAS) components	One of the following operating systems. ◆ NetWare® 6 or 6.5 with the latest Support Pack (you must obtain and install JVM 1.4.2 on NetWare) ◆ Windows NT*, 2000, or 2003 with the latest Service Pack ◆ Linux Red Hat* AS or ES 2.1, or AS 3.0 ◆ SUSE® LINUX Enterprise Server 8 or 9 ◆ Solaris 8 or 9 ◆ AIX 5.2L One of the following versions of eDirectory. ◆ eDirectory 8.6.2 with the latest Support Pack ◆ eDirectory 8.7.3 with the latest Support Pack	◆ To install the DirXML Server on SUSE LINUX Enterprise Server 9, install the patch provided in TID 2969825 (http://support.novell.com/cgi-bin/search/searchtid.cgi?/2969825.htm). ◆ Some features are not supported on eDirectory 8.6.2. For information about specific features and versions of eDirectory, refer to "Feature Support for eDirectory 8.6.2 and eDirectory 8.7.3" on page 279.
Connected System Server ◆ DirXML Remote Loader ◆ Remote Loader configuration tool (Windows only) ◆ Nsure Audit agent ◆ Driver shim for the connected system ◆ Tools for the connected system	Refer to the Identity Manager Driver documentation (http://www.novell.com/documentation/lg/dirxmldrivers) for operating system and connected system requirements specific to each system.	

System Component	System Requirements	Notes
Web-based Administration Server - DirXML and Password Management iManager plug-ins - Driver configurations - End user password self-service - eGuide	One of the following operating systems. - NetWare 6 or 6.5 with the latest Support Pack - Windows 2000, XP, or 2003 with the latest Service Pack - Linux Red Hat AS or ES 2.1 (Glibc version 2.1.1 or later and Kernel version 2.2.*xx* or later.) - Solaris 8 or 9 The following software. - Novell iManager 2.0.2 (includes of Apache 2.0.44 or later and Tomcat 4.1.18 or later)	- Browser support is determined by iManager 2.0.2. For details and known issues, refer to the *Novell iManager 2.0.2 Administration Guide* (http://www.novell.com/documentation/lg/imanager20/imanager20/data/bobxl9n.html). - You must go through the iManager Configuration Wizard to install portal content into eDirectory. This is required to use Identity Manager tasks out of the box, such as Password Self-Service and Forgotten Password features. This can be done during installation of iManager, which is the default. If you choose not to do it during installation, you must do it post-installation. - If you are installing eGuide, you must have a Web server and an Application server installed prior to running the installation program. - If you install iManager 2.0.2 on the same server where eDirectory is installed, the version of eDirectory must be 8.7.3. - (Netware) In order to install Novell eGuide 2.1.2, a valid JVM must be installed on the server. - (Windows) The Novell Client™ 4.83 is available from Novell Software Downloads (http://www.novell.com/download/index.html). - When logging into other trees with iManager to manage remote Identity Manager servers, you might encounter errors if you use the server name instead of the IP address for the remote server. Additionally, the LDAP server group object in NDS must be configured to require TLS on simple binds, and the trusted root certificate of the remote tree must be imported as a trusted certificate onto the Web server.
DirXML Utilities - DirXML License Auditing Tool - Application Tools (AD, Notes, SAP, PeopleSoft, and JDBC) - Nsure Audit Setup tool	Refer to the Identity Manager Driver documentation (http://www.novell.com/documentation/lg/dirxmldrivers) for requirements specific to each system.	

Installing Identity Manager on NetWare

Before you begin, make sure your system meets the requirements listed in "Identity Manager Components and System Requirements" on page 46.

1. At the server console, enter `nwconfig.nlm`.
2. Select Product Options > Install a Product Not Listed.
3. Press F3 (F4 if you're using RCONSOLE), then specify the path to the Identity Manager NetWare installation files.

   The graphical installation utility will start after a few moments.
4. Click Next.

   After the files have finished copying, the DirXML Welcome Screen appears. Click Next to begin the installation.
5. Review the Overview pages describing the system types, then click Next to continue.
6. Read the license agreement, then click I Accept.
7. Select the components you want to install. The following options are available:
   - **DirXML Server:** Installs the DirXML engine and service drivers; DirXML Drivers for eDirectory, LDAP, JDBC*, GroupWise®, Delimited Text, and SIF; NMAS™ components; Nsure Audit agent; and extends the eDirectory schema.

     Novell eDirectory must be installed before you can install this option.
   - **Connected System:** Installs the Remote Loader, and the following drivers: LDAP, JDBC, eDirectory, GroupWise, SIF, and Delimited Text.
   - **DirXML Web Components:** Installs the DirXML plug-ins, DirXML driver configurations, and Novell eGuide.

     Novell iManager must be installed before you can install this option.
   - **Utilities:** Installs additional scripts for the JDBC driver.
8. Click Next.
9. In the Schema Extension page, specify the following:
   - **User Name:** Specify the username (in LDAP format) of a user who has rights to extend the schema.
   - **User Password:** Specify the user's password.
10. Click Next.
11. Read and verify your selections on the Summary page, then click Finish.
12. After the installation completes and displays the Installation Complete dialog box, click Close.

Installing Identity Manager on Windows

Before you begin, make sure your system meets the requirements listed in "Identity Manager Components and System Requirements" on page 46.

1. Download and extract the Identity Manager installation file.
2. Run install.exe from the NT directory.

3. Read the Welcome information, then click Next.
4. Read the License Agreement, then click I Accept.
5. Review the Overview pages about the various systems and components, then click Next to begin the installation.
6. Select the components you want to install
   - **DirXML Server:** Installs the DirXML engine and service drivers, DirXML drivers, NMAS components, Nsure Audit agent, and extends the eDirectory schema.

     Novell eDirectory must be installed before you can install this option.
   - **Connected System:** Installs the Remote Loader and the DirXML drivers you select.
   - **DirXML Web Components:** Installs the DirXML plug-ins, DirXML driver configurations, and Novell eGuide.

     Novell iManager must be installed before you can install this option.
   - **Utilities:** Installs the Application utilities you select.

   The Driver for Java Message Service (JMS) and WebSphere MQ must be installed separately. See the instructions in the driver implementation guide (http://www.novell.com/documentation/dirxmldrivers).
7. In the Schema Extension page, specify the following:
   - **User Name:** Specify the username (in LDAP format) of a user who has rights to extend the schema.
   - **User Password:** Specify the user's password.
8. Select the Web components you want to install, then click Next.
9. Select the utilities you want to install, then click Next. The installation program then displays the install path. If you want to change the default location, type (or browse to) the desired location, then click Next.
10. Select the system components you want to install (JDBC, PeopleSoft, DirXML License Auditing Utility, Active Directory Discovery Tool, Lotus Notes Discovery Tool), then click Next.
11. Review the items listed in the Summary page. If you approve, click Finish to install the components.
12. Click Close to exit the installation program.

Installing Identity Manager on UNIX Platforms

Before you begin, make sure your system meets the requirements listed in "Identity Manager Components and System Requirements" on page 46.

If you are installing on Linux Red Hat AS 3.0, make sure you review the additional instructions in "Considerations for Installing Identity Manager on Linux Red Hat AS 3.0" on page 51.

If you are installing on SUSE Linux Enterprise Server 9, install the patch provided in TID 2969825 (http://support.novell.com/cgi-bin/search/searchtid.cgi?/2969825.htm).

1. Download and extract the tar file to a location of your choice.
2. On the host computer, log in as root.

3 Execute the .bin file from the setup directory.

Change the current working directory to the setup directory, where the install is located. Then enter one of the following commands to run the install.

Platform	Example Path	Installation File
Linux	linux/setup/	dirxml_linux.bin
Solaris	solaris/setup/	dirxml_solaris.bin
AIX	aix/setup/	dirxml_aix.bin

These paths are relative to the root of the install image, which could be anywhere you expanded it or mounted the CD.

The installation program can't find the packages to install unless the current working directory is the directory where the installation program is located.

4 Review the Welcome information, then press Enter to continue the installation.

5 Read the license agreement and enter **Y** if you agree to the usage terms. If not, enter **N** to exit the installation program.

6 Specify the appropriate number (1-4) for the install set you want to install. The install sets contain the following components:

- **DirXML Server:** Installs the DirXML engine and service drivers, DirXML drivers, NMAS components, Nsure Audit agent, and extends the eDirectory schema.

  Novell eDirectory must be installed before you can install this option.

  NOTE: If you want to set up shared storage for high availability, refer to the information found in Chapter 13, "High Availability," on page 253.

- **Connected System Server:** Installs the Remote Loader and the following drivers: LDAP, JDBC, eDirectory, SAP, Delimited Text, GroupWise (only on Linux SUSE 8), and Lotus Notes.

- **Web-Based Administration Server:** Installs the DirXML plug-ins, DirXML driver configurations, and Novell eGuide.

  Novell iManager must be installed before you can install this option.

- **Customize:** Installs the specific components you select from a list of all components.

  NOTE: Enter **prev** to return to previous menus and modify your installation options.

7 (Optional) Depending on the options you entered, you might be prompted to specify the LDAP user name and password, or the Web Server Secure port.

IMPORTANT: (Solaris installations only) If you are installing your Web-based Administration Server on the same server where eDirectory resides, when prompted for the Web Server Secure port, change the default value to 8443.

8 Verify that the information contained in the summary is correct because eDirectory temporarily shuts down (when installing the DirXML Engine and schema files.) If the Install Summary is correct, press Enter to start installing the packages.

9 When finished, enter **OK** to close the installation program.

Considerations for Installing Identity Manager on Linux Red Hat AS 3.0

The Identity Manager installation program does not check for the prerequisite libraries. The DirXML engine requires that these libraries exist, so you should verify that the /usr/lib/libstdc++-1-1.so.2 libraries are installed. The packages are named compat-libstdc++-7.3-2.96.122.i586.rpm and compat-libstdc++-devel-7.3-2.96.122.i586.rpm. The version numbers and names of the rpms might be different depending on your current patch level and support pack. Ensuring that the compat-libstdc++ packages are installed fills this dependency.

You can install the libraries after installing Identity Manager, but you must restart eDirectory.

After installing the prerequisite libraries, you can launch the installation program as described in "Installing Identity Manager on UNIX Platforms" on page 49. You can ignore any initial messages about script errors or the installers inability to locate /tmp.

During the installation of the packages, you might see an error explaining that the novell-NOVLjvm package did not install properly. If this is the case, you should re-install this package manually after the installation has completed. You can do this by opening a terminal window and moving to the package directory of the Identity Manager linux install (for example, type cd /mnt/cdrom/linux/setup/packages). You should then re-install the jvm packages manually by typing rpm --force -Uvh novell-NOVLjvm1-2.0.5-45.i386.rpm . The version number might be different than what is listed, but the package should now install correctly without errors.

Post-Installation Tasks

If eDirectory is running, it automatically launches the Identity Manager module. You do not need to manually load or unload Identity Manager. After Identity Manager is installed, you should configure it (and the drivers you installed) to meet the policies and requirements defined by your business processes. Post-installation tasks typically include the following items:

- Configuring an Application System (refer to the Identity Manager Driver Documentation (http://www.novell.com/documentation/lg/dirxmldrivers) for specific driver configuration instructions.)
- "Creating and Configuring a Driver" on page 77
- "Creating Policies" on page 93
- "Starting, Stopping, or Restarting a Driver" on page 79
- "Activating Identity Manager Products" on page 51

Activating Identity Manager Products

Activation is required for your Identity Manager products. Refer to Appendix A, "Activating Novell Identity Manager Products," on page 271 for more information.

Installing a Custom Driver

A custom driver might consist of the following:

- A set of .jar or native (.dll, .nlm, or .so) files
- XML rules files for configuring the driver
- Documentation

For more information on creating a custom driver or installing one, see the Novell Developer Kit (http://developer.novell.com/ndk/dirxml-index.htm).

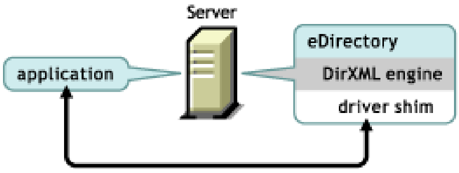
5 Setting Up a Connected System

This section provides information on the following:

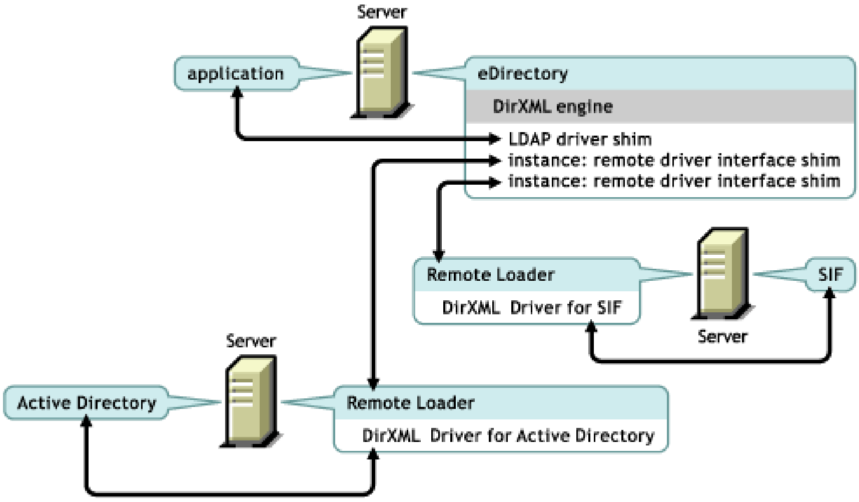
- "Overview" on page 53
- "Providing for Secure Data Transfers" on page 55
- "Setting Up Remote Loaders" on page 57
- "Configuring DirXML Drivers for Use with Remote Loaders" on page 71

Overview

As the following figure illustrates, the DirXML engine runs on a server as part of eDirectory. A DirXML driver shim and its configured driver communicate with an application and with the DirXML engine.



As the following figure illustrates, a connected system extends DirXML functionality across platforms:



A connected system requires a Remote Loader. This service enables the DirXML engine to exchange data with DirXML drivers running as different processes and in different locations, including the following:

- As separate processes on the server where the DirXML engine is running

  The DirXML engine runs as part of the eDirectory process. DirXML drivers can run on the server where the DirXML engine is running. In fact, they can run as part of the same process as the DirXML engine.

  However, for strategic reasons, you might want the DirXML driver to run as a separate process on the server. Typically, though, the DirXML drivers run on separate servers.

  If the driver is running as a separate process, the Remote Loader provides a communication channel between the DirXML engine and the driver.

- On servers other than the one where the DirXML engine is running

  Some DirXML drivers are unable to run where the DirXML engine is running. The Remote Loader enables you to run the DirXML engine in one environment while running a DirXML driver on a server in a different environment.

  Scenario: Separate Servers. The DirXML engine is running on a NetWare server. You need to run the DirXML Driver for Active Directory. This driver is unable to run on a NetWare server because it must run in an Active Directory environment. You install and run the Remote Loader on a Windows 2003 server. The Remote Loader provides a communication channel between the Active Directory driver and the DirXML engine.

  Scenario: Non-Host. The DirXML engine is running on Solaris. You need to communicate with a NIS system where you want to provision user accounts. That system usually doesn't host the DirXML engine. You install the Remote Loader and the DirXML Driver for NIS on the NIS system. The Remote Loader on the NIS system runs the NIS driver and enables the DirXML engine and the NIS driver to exchange data.

Identity Manager 2 provides Remote Loader functionality through dirxml_remote, rdxml, or dirxml_jremote.

Dirxml_remote

Dirxml_remote is an executable that enables the DirXML engine to communicate with DirXML drivers running on Windows.

The Remote Loader Console uses dirxml_remote. If you specify dirxml_remote from the command line, without any parameters, the Remote Loader Application Wizard is launched. If you type dirxml_remote and then pass in parameters, the Remote Loader is started.

Rdxml

Rdxml is an executable that enables the DirXML engine to communicate with DirXML drivers running in Solaris, Linux, or AIX environments.

Rdxml can support both native and Java drivers. To support Java drivers, it loads a JVM.

Dirxml_jremote

Dirxml_jremote is a pure Java Remote Loader. It is used to exchange data between the DirXML engine running on one server and DirXML drivers running in another location, where rdxml doesn't run. It should be able to run on any system with a compatible JRE (1.4.0 minimum, 1.4.2 or higher recommended) and Java Sockets, but is only officially supported on the following:

- HP-UX

- AS/400
- OS/390
- z/OS

Overview: Main Tasks

Using the Remote Loader involves the following tasks:

- If you plan to use the Secure Socket Layer (SSL), provide certificates for secure data transfers.
- Install, configure, and run the Remote Loader.
- Import, configure, and start the DirXML driver.

Some administrators prefer to import and configure the DirXML driver before setting up the Remote Loader. For example, the driver might already be running but you want to enable it to run remotely.

On the other hand, if the Remote Loader is running, you can import, configure, and start the driver, then immediately check whether proper communication is occurring among the DirXML engine, Remote Loader, and DirXML driver.

Providing for Secure Data Transfers

If you plan to use the Secure Socket Layer (SSL) so that you can provide secure data transfers, complete the following tasks:

- Create a server certificate.

  If you are unfamiliar with certificates, create a new one.

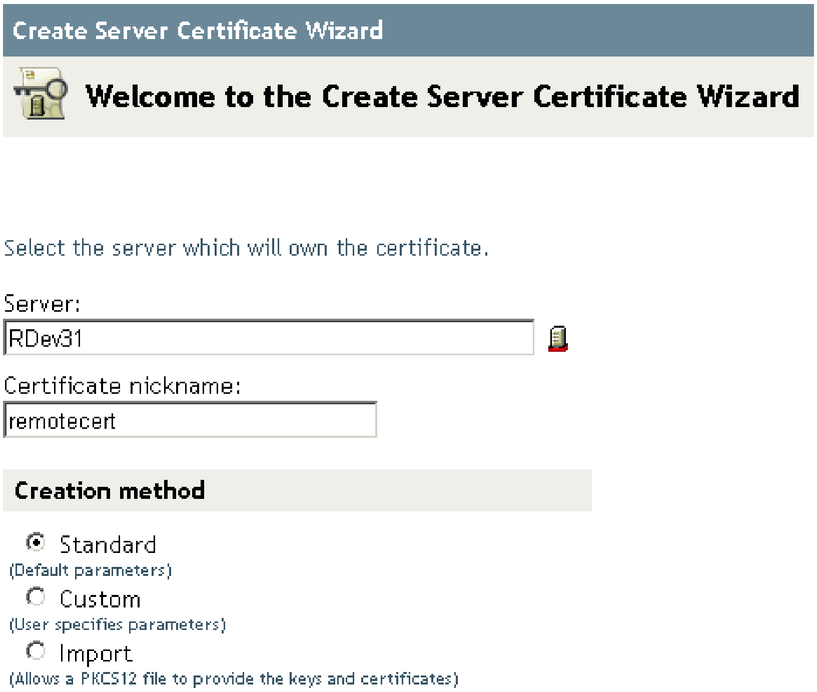
  However, if an SSL server certificate already exists and you have experience with SSL certificates, you can use the existing certificate instead of creating and using a new one.

  When a server joins a tree, eDirectory creates the following default certificates:

  - SSL CertificateIP
  - SSL CertificateDNS
- Export a self-signed certificate.

Creating a Server Certificate

1 In Novell iManager, click Novell Certificate Server > Create Server Certificate.



Create Server Certificate Wizard

Welcome to the Create Server Certificate Wizard

Select the server which will own the certificate.

Server:
RDev31

Certificate nickname:
remotecert

Creation method

● Standard
(Default parameters)

○ Custom
(User specifies parameters)

○ Import
(Allows a PKCS12 file to provide the keys and certificates)

2 Select the server that will own the certificate, and give the certificate a nickname (for example, remotecert).

IMPORTANT: We recommend that you don't use spaces in the certificate nickname. For example, use remotecert instead of remote cert.

Also, make a note of the certificate nickname. You will use this nickname for the KMO name in the driver's remote connection parameters.

3 Leave the Creation method set to Standard, then click Next.

4 Review the Summary, click Finish, then click Close.

You have created a server certificate. Continue with "Exporting a Self-Signed Certificate" on page 56.

Exporting a Self-Signed Certificate

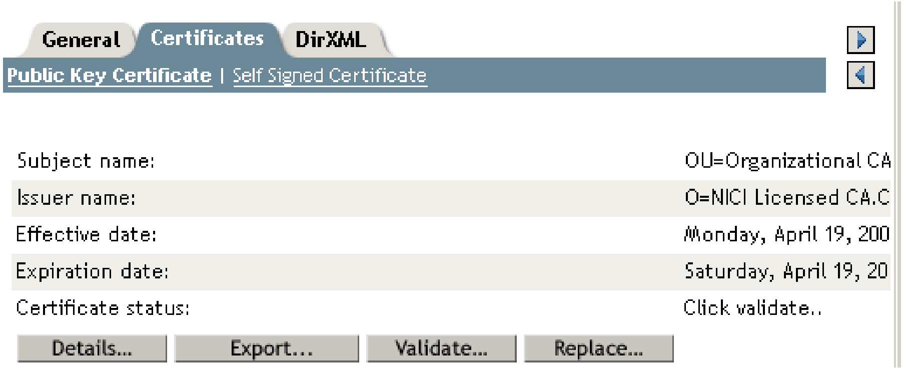
1 Click eDirectory Administration > Modify Object.

2 Browse to and select the Certificate Authority in the Security container, then click OK.

AKRANES - TREE CA

The Certificate Authority (CA) is named after the tree name (Treename-CA.Security).

3 Click the Certificates tab, click Self-Signed Certificate, then click Export.



Subject name: OU=Organizational CA

Issuer name: O=NICI Licensed CA.C

Effective date: Monday, April 19, 200

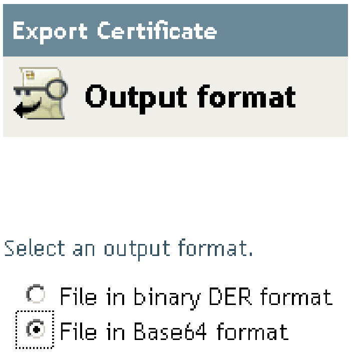
Expiration date: Saturday, April 19, 20

Certificate status: Click validate..

4 In the Export Certificate Wizard, select No, then click Next.

You don't want to export the private key with the certificate.

5 Select to export the file in Base64 format (for example, akranes-tree CA.b64), then click Next.



Export Certificate

Output format

Select an output format.

○ File in binary DER format
● File in Base64 format

6 Click the link to Save the Exported Certificate to a File, specify a filename, specify a location, then click Save.

Rootfile names require .pem as an extension.

7 In the Save As dialog box, copy this file to a local directory.

8 Click Close.

Setting Up Remote Loaders

This section provides information on the following:

- "Installing Remote Loaders" on page 58
- "Configuring Remote Loaders" on page 60
- "Setting Environment Variables on Solaris, Linux, or AIX" on page 68
- "Running Remote Loaders" on page 68"Stopping Remote Loaders" on page 71
- "Stopping Remote Loaders" on page 71

Installing Remote Loaders

This section provides information on the following:

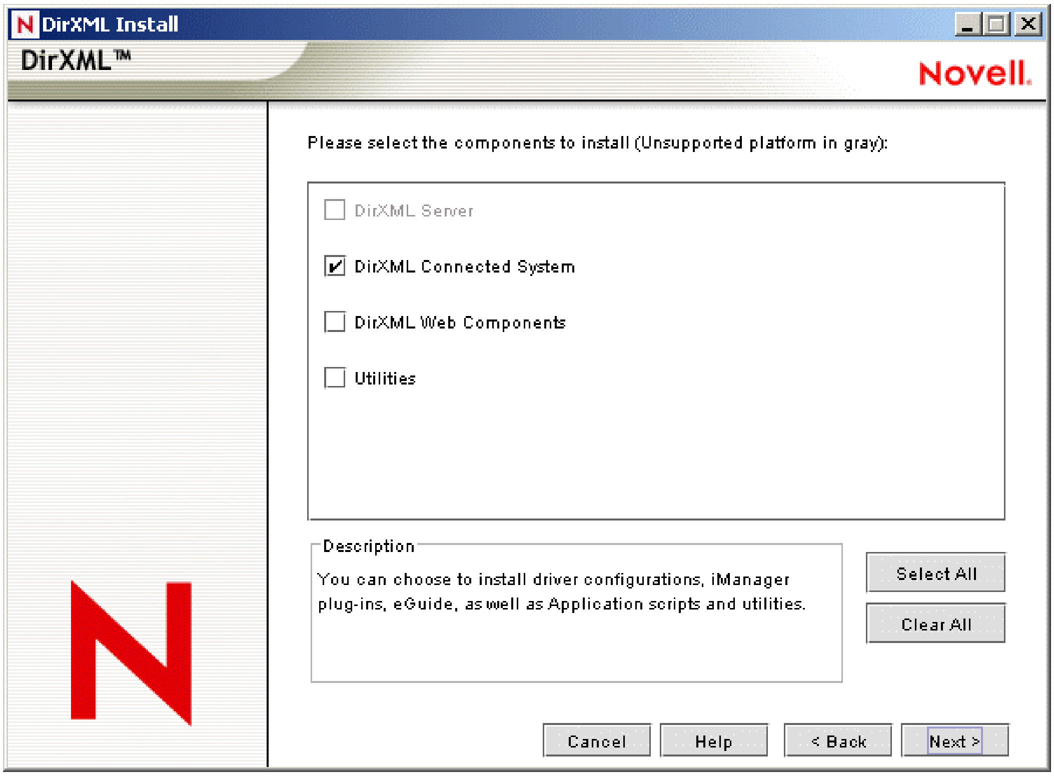
- "Installing a Remote Loader on a Windows Server" on page 58
- "Installing a Remote Loader on HP-UX, AS/400, OS/390, or z/OS" on page 60
- "Installing a Remote Loader on HP-UX, AS/400, OS/390, or z/OS" on page 60

Installing a Remote Loader on a Windows Server

1 Run the Identity Manager 2 installation program (for example, \nt\install.exe).

2 View the Welcome page, accept the license agreement, and view the two Overview pages.

3 In the DirXML Install dialog box, deselect all components except DirXML Connected System, then click Next.



Please select the components to install (Unsupported platform in gray):

□ DirXML Server

☑ DirXML Connected System

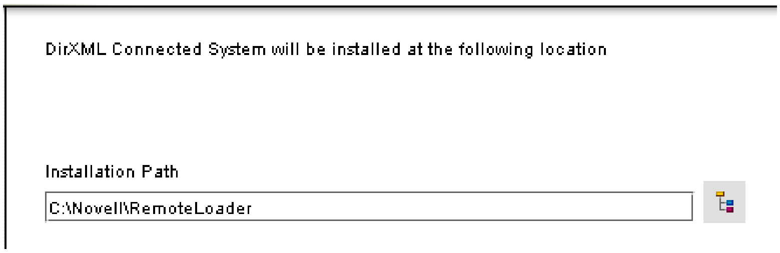
□ DirXML Web Components

□ Utilities

Description

You can choose to install driver configurations, iManager plug-ins, eGuide, as well as Application scripts and utilities.

4 Select a location for the connected system (the Remote Loader and remote driver shims), then click Next.

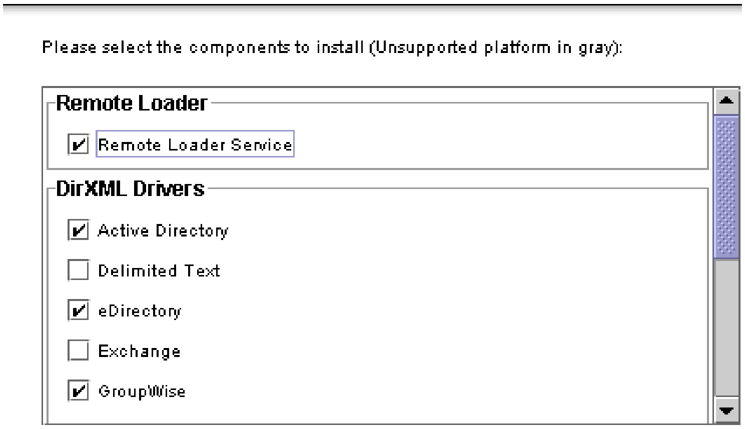


DirXML Connected System will be installed at the following location

Installation Path

C:\Novell\RemoteLoader

5 Select the DirXML Remote Loader Service and remote driver shims (drivers), then click Next.



Please select the components to install (Unsupported platform in gray):

Remote Loader

☑ Remote Loader Service

DirXML Drivers

☑ Active Directory

□ Delimited Text

☑ eDirectory

□ Exchange

☑ GroupWise

6 Acknowledge the activation requirement, view products to be installed, then click Finish.

7 Select whether to place the Remote Loader Console icon on your desktop.

Installing a Remote Loader on Solaris, Linux, or AIX

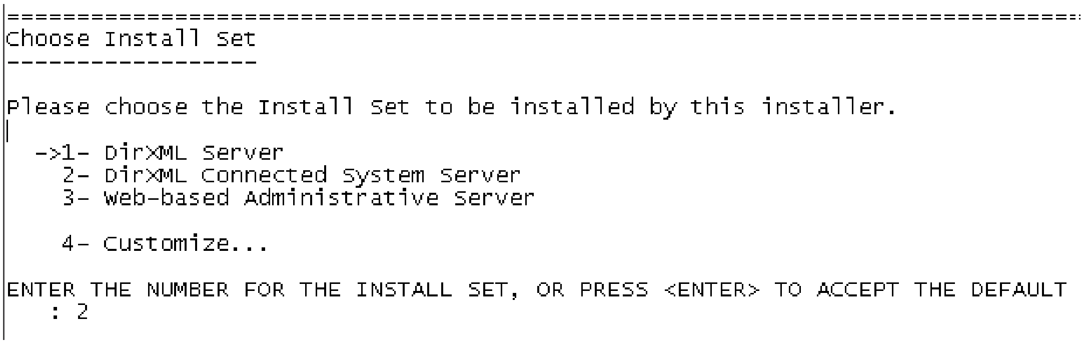
This section assumes that you have downloaded and expanded Identity Manager 2. If you need to download Identity Manager, go to the Novell download Web site (http://download.novell.com).

After you expand the Identity Manager 2 file that you downloaded from the Novell Web site, complete the following steps:

1 Run one of the following installation files, depending on your platform:

- dirxml_solaris.bin
- dirxml_linux.bin
- dirxml_aix.bin

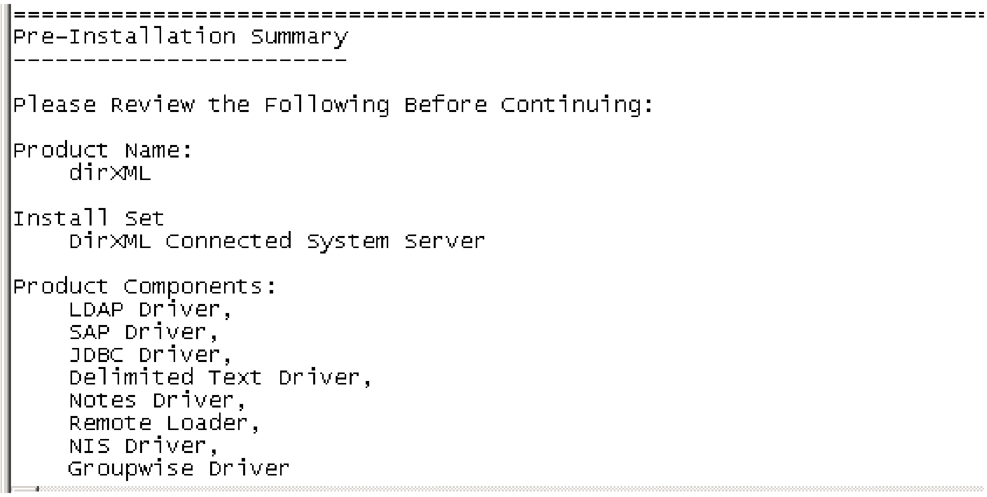
2 After accepting the license agreement, press Enter to arrive at the Choose Install Set page:



```
===============================================================================
Choose Install Set
------------------

Please choose the Install Set to be installed by this installer.

  ->1- DirXML Server
    2- DirXML Connected System Server
    3- Web-based Administrative Server

    4- Customize...

ENTER THE NUMBER FOR THE INSTALL SET, OR PRESS <ENTER> TO ACCEPT THE DEFAULT
   : 2
```

3 Select DirXML Connected System Server by typing 2, then press Enter.

4 At the Pre-Installation Summary screen, review components that you have selected to install, then press Enter.



```
===============================================================================
Pre-Installation Summary
------------------------

Please Review the Following Before Continuing:

Product Name:
    dirXML

Install Set
    DirXML Connected System Server

Product Components:
    LDAP Driver,
    SAP Driver,
    JDBC Driver,
    Delimited Text Driver,
    Notes Driver,
    Remote Loader,
    NIS Driver,
    Groupwise Driver
```

Installing a Remote Loader on HP-UX, AS/400, OS/390, or z/OS

The HP-UX, AS/400, OS/390,and z/OS platforms require the Java Remote Loader.

1 Create a directory on the target system where you want to run the Java Remote Loader.

2 From the Identity Manager 2 CD or download image, copy the appropriate file in the /java_remoteloader directory to the directory that you created in Step 1:

Platform	File
HP-UX	dirxml_jremote.tar.gz
AS/400	dirxml_jremote.tar.gz
z/OS	dirxml_jremote_mvs.tar
OS/390	dirxml_jremote_mvs.tar

3 For HP-UX, AS/400, or z/OS, unzip the dirxml_jremote file.

4 Untar the file that you just copied.

The Java Remote Loader is now ready for configuration. Because the tar file doesn't contain drivers, you must manually copy the drivers into the lib directory. The lib directory is under the directory where the untarring occurred.

For information on MVS, untar the dirxml_jremote_mvs.tar file. Then refer to the usage.html document.

Configuring Remote Loaders

The DirXML Remote Loader can host DirXML application shims contained in .dll, .so, or .jar files. The Java Remote Loader hosts only Java driver shims. It won't load or host a native (C++) driver shim.

Configuring the Remote Loader on Windows

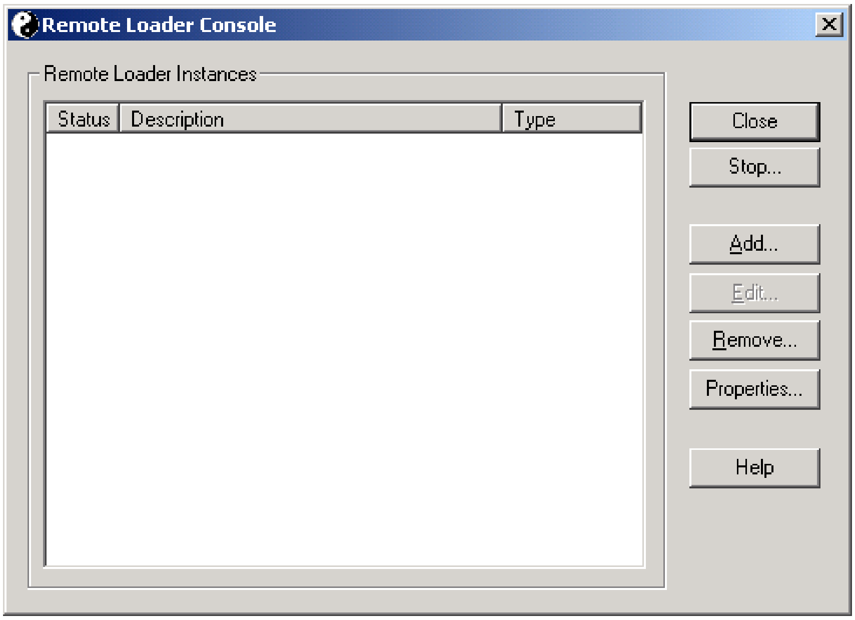
The Remote Loader Console is a new feature in Identity Manager 2. It runs only on Windows. The Console enables you to manage all DirXML drivers running under the Remote Loader on that computer:

- Add and configure new Remote Loader instances on the local computer.

- Edit configuration settings.
- Start and stop Remote Loader instances.
- Start and stop the trace for each driver instance.

If you are upgrading to Identity Manager 2, the Console detects and imports existing instances of the Remote Loader. (To be automatically imported, driver configurations must be stored in the remoteloader directory, typically c:\novell\remoteloader.) You can then use the Console to manage the remote drivers.

To launch the Remote Loader Console, click the Remote Loader Console icon on your desktop. The following figure illustrates the Console.



If you type dirxml_remote from the command line, without any parameters, the Remote Loader Application Wizard is launched.

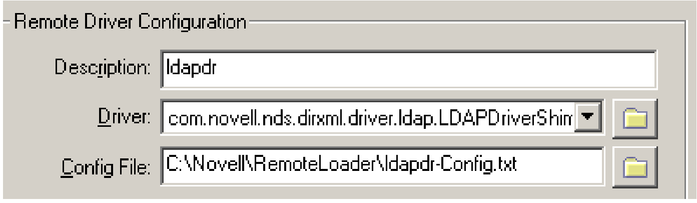
NOTE: Using the wizard and the Console together can cause unexpected behavior. Therefore, we recommend that you use the Remote Loader Console going forward and upgrade your existing configurations into the Console.

To add a Remote Loader instance, click Add, then provide the following information.

To edit a Remote Loader instance:

1. Select it from the Description column.
2. Click Stop, type the Remote Loader password, then click OK.
3. Click Edit, then modify the following information:

Remote Driver Configuration



Remote Driver Configuration

Description: ldapdr

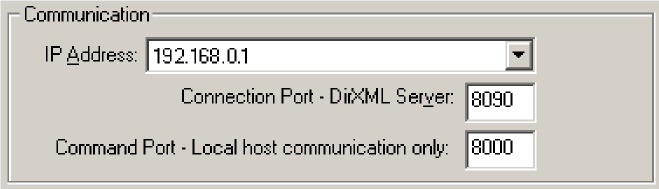
Driver: com.novell.nds.dirxml.driver.ldap.LDAPDriverShim

Config File: C:\Novell\RemoteLoader\ldapdr-Config.txt

- Description: Specify a description to identify the Remote Loader instance.
- Driver: Browse to and select the appropriate shim for your driver.
- Config File: Specify a name for the configuration file.

  The Remote Loader Console places configuration parameters into this text file and uses those parameters when it runs.

Communication



Communication

IP Address: 192.168.0.1

Connection Port - DirXML Server: 8090

Command Port - Local host communication only: 8000

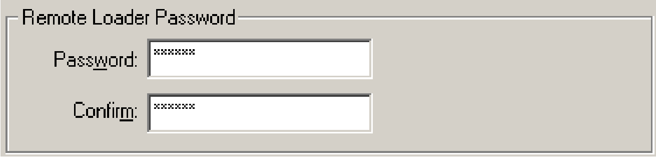
- IP Address: Specify the IP address where the Remote Loader listens for connections from the DirXML server.
- Connection Port - DirXML Server. Specify the TCP port on which the Remote Loader listens for connections from the DirXML server.

  The default TCP/IP port for this connection is 8090. With each new instance you create, the default port number automatically increases by one.
- Command Port - Local Host Communication Only: Specify the TCP port number where a Remote Loader listens for commands such as Stop and Change Trace Level.

  Each instance of the Remote Loader that runs on a particular computer must have a different command port number. The default command port is 8000. With each new instance you create, the default port number automatically increases by one.

  NOTE: By specifying different connection ports and command ports, you can run multiple instances of the Remote Loader on the same server hosting different driver instances.

Remote Loader Password



Remote Loader Password

Password: ******

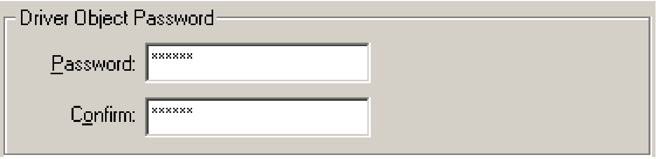
Confirm: ******

- Password: This password is used to control access to a Remote Loader instance for a driver.

  The password must be the same case-sensitive password that you typed in the Enter the Remote Loader Password edit box in the Authentication section on the DirXML Configuration page, when you configured the driver.

- Confirm: Re-enter the password.

Driver Object Password



Driver Object Password

Password: ******

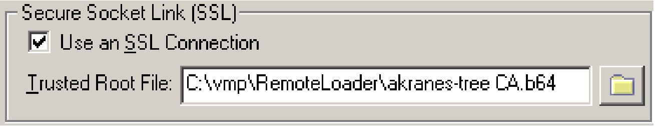
Confirm: ******

- Password: The Remote Loader uses this password to authenticate itself to the DirXML server.

  This password must be the same password you typed in the Driver Object Password edit box on the Driver Configuration page, when you configured the driver.

- Confirm: Re-enter the password.

Secure Socket Link (Secure Socket Layer)



Secure Socket Link (SSL)

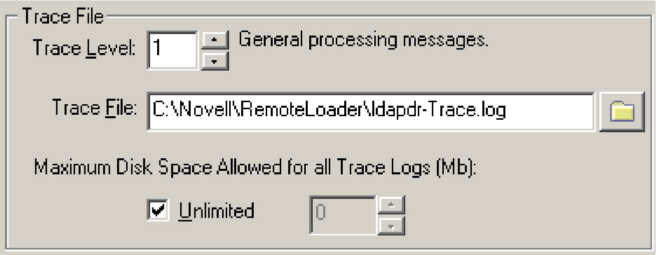
☑ Use an SSL Connection

Trusted Root File: C:\vmp\RemoteLoader\akranes-tree CA.b64

- Use an SSL Connection: To specify an SSL connection, select this option.
- Trusted Root File: Browse to and select the certificate file that contains the appropriate trusted root certification.

  This is the exported self-signed certificate from the eDirectory tree's Organization Certificate Authority. See "Exporting a Self-Signed Certificate" on page 56.

Trace File



Trace File

Trace Level: 1 General processing messages.

Trace File: C:\Novell\RemoteLoader\ldapdr-Trace.log

Maximum Disk Space Allowed for all Trace Logs (Mb):

☑ Unlimited 0

- Trace Level: For the Remote Loader instance to display a trace window that contains informational messages from both the Remote Loader and the driver, set a trace level greater than zero.

  If the trace level is set to 0, the trace window won't appear or display messages.

- Trace File Specify a trace filename where trace messages are written.

  Each Remote Loader instance running on a particular machine must use a different trace file. Trace messages are written to the trace file only if the trace level is greater than zero.

- Maximum Disk Space Allowed for all Trace Logs (MB): Specify the approximate maximum size that trace file data for this instance can occupy on disk.

Establish a Remote Loader Service

☑ Establish a Remote Loader service for this driver instance.

- To configure the Remote Loader instance as a service, select this option. When the option is enabled, the operating system automatically starts the Remote Loader when the computer starts.

Configuring the Remote Loader by Using Command Line Options

To run the Remote Loader, all platforms use a configuration file (for example, LDAPShim.txt). You can create or edit a configuration file by using command-line options. The following steps provide information on basic parameters for the configuration file. For information on additional parameters, see Appendix C, “Options to Configure a Remote Loader,” on page 283.

1 Open a text editor.

2 (Optional) Specify a description by using the -description option.

Option	Secondary Name	Parameter	Description
-description	-desc	short description	Specify a short description string (for example, SAP) to be used for the trace window title and for Nsure Audit logging. Example: -description SAP -desc SAP The Remote Loader Console places long forms in the configuration files. You can use either a long form (for example, -description) or a short form (for example, -desc).

3 Specify a TCP/IP port that the Remote Loader instance will use by using the -commandport option.

Option	Secondary Name	Parameter	Description
-commandport	-cp	port number	Specifies the TCP/IP port that the Remote Loader instance uses for control purposes. If the Remote Loader instance is hosting an application shim, the command port is the port on which another Remote Loader instance communicates with the instance that is hosting the shim. If the Remote Loader instance is sending a command to an instance that is hosting an application shim, the command port is the port on which the hosting instance is listening. If not specified, the default command port is 8000. Multiple instances of the Remote Loader can run on the same server hosting different driver instances by specifying different connection ports and command ports. Example: -commandport 8001 -cp 8001

4 Specify the parameters for the connection to the DirXML server running the DirXML remote interface shim by using the -connection option.

Type -connection "*parameter* [parameter] [parameter]".

For example, type one of the following:

```
-connection "port=8091 rootfile=server1.pem"
-conn "port=8091 rootfile=server1.pem"
```

All the parameters must be included within quotation marks. Parameters include the following:

Option	**Secondary Name**	**Parameter**	**Description**
-connection	-conn	connection configuration string	Specifies the connection parameters for the connection to the DirXML server running the DirXML remote interface shim. The default connection method for the Remote Loader is TCP/IP using SSL. The default TCP/IP port for this connection is 8090. Multiple instances of the Remote Loader can run on the same server. Each instance of the Remote Loader hosts a separate DirXML application shim instance. Differentiate multiple instances of the Remote Loader by specifying different connection ports and command ports for each Remote Loader instance. Example: -connection "port=8091 rootfile=server1.pem" -conn "port=8091 rootfile=server1.pem"
port		decimal port number	A required parameter. It specifies the TCP/IP port on which the Remote Loader listens for connections from the remote interface shim. Example: port=8090
address		IP address	An optional parameter. Specifies that the Remote Loader listens on a particular local IP address. This is useful if the server hosting the Remote Loader has multiple IP addresses and the Remote Loader must listen on only one of the addresses. You have three options: address=*address number* address='localhost' Don't use this parameter. If you don't use the -address, the Remote Loader listens on all local IP addresses. Example: address=137.65.134.83
rootfile			A conditional parameter. If you are running SSL and need the Remote Loader to communicate with a native driver, type `rootfile='`*`trusted certname`*`'`

Option	Secondary Name	Parameter	Description
keystore			Conditional parameters. Used only for DirXML application shims contained in .jar files. Specifies the filename of the Java keystore that contains the trusted root certificate of the issuer of the certificate used by the remote interface shim. This is typically the Certificate Authority of the eDirectory tree that is hosting the remote interface shim. If you are running SSL and need the Remote Loader to communicate with a Java driver, type a key-value pair: `keystore='keystorename' storepass='password'`
-storepass		storepass	Used only for DirXML application shims contained in .jar files. Specifies the password for the Java keystore specified by the keystore parameter. Example: storepass=mypassword This option applies only to the Java Remote Loader.

5 (Optional) Specify a trace parameter by using the -trace option.

Option	Secondary Name	Parameter	Description
-trace	-t	integer	Specifies the trace level. This is only used when hosting an application shim. Trace levels correspond to those used on the DirXML server. Example: -trace 3 -t 3

6 (Optional) Specify a tracefile by using the -tracefile option.

Option	Secondary Name	Parameter	Description
-tracefile	-tf	filename	Specify a file to write trace messages to. Trace messages are written to the file if the trace level is greater than zero. Trace messages are written to the file even if the trace window is not open. Example: -tracefile c:\temp\trace.txt -tf c:\temp\trace.txt

7 (Optional) Limit the size of the tracefile by using the -tracefilemax option.

For example, type one of the following:

```
-tracefilemax 1000M
-tfm 1000M
```

In this example, the tracefile can be only 1 GB.

Option	Secondary Name	Parameter	Description
-tracefilemax	-tfm	size	Specifies the approximate maximum size that trace file data can occupy on disk. If you specify this option, there will be a trace file with the name specified using the tracefile option and up to 9 additional "roll-over" files. The roll-over files are named using the base of the main trace filename plus "_*n*", where n is 1 through 9. The size parameter is the number of bytes. Specify the size by using the suffixes K, M, or G for kilobytes, megabytes, or gigabytes. If the trace file data is larger than the specified maximum when the Remote Loader is started, the trace file data remains larger than the specified maximum until roll-over is completed through all 10 files Example: -tracefilemax 1000M -tfm 1000M In this example, the tracefile can be only 1 GB.

8 Specify the class by using the -class option or module by using the -module option.

Option	Secondary Name	Parameter	Description
-class	-cl	Java class name	Specifies the Java class name of the DirXML application shim that is to be hosted. For example, for a Java driver, type one of the following: -class com.novell.nds.dirxml.driver.ldap.LDAPDriverShim -cl com.novell.nds.dirxml.driver.ldap.LDAPDriverShim Java uses a keystore to read certificates. The -class option and the -module option are mutually exclusive.
-module	-m	modulename	Specifies the module containing the DirXML application shim that is to be hosted. For example, for a native driver, type one of the following: -module "c:\Novell\RemoteLoader\Exchange5Shim.dll" -m "c:\Novell\RemoteLoader\Exchange5Shim.dll" or -module "usr/lib/dirxml/NISDriverShim.so" -m "usr/lib/dirxml/NISDriverShim.so" The -module option uses a rootfile certificate. The -module option and the -class option are mutually exclusive.

9 Name and save the file.

You can change some settings while the Remote Loader is running. For information on these settings, refer to Appendix C, "Options to Configure a Remote Loader," on page 283.

Parameter	Description
-commandport	Specifies an instance of the Remote Loader.
-config	Specifies a configuration file.
-javadebugport	Specifies that the Remote Loader instance is to enable Java debugging on the specified port.
-password	Enables you to send in commands.
-service	Installs an instance as a service. Windows only.
-tracechange	Changes the trace level.
-tracefilechange	Changes the name of the trace file being written to.
-unload	Unloads the Remote Loader instance.
-window	Turns the trace window on or off in a Remote Loader instance. Windows only.

Setting Environment Variables on Solaris, Linux, or AIX

After installing the Remote Loader, you can set the environment variable RDXML_PATH, which changes the current directory for rdxml. This directory is then taken as the base path for files that are subsequently created. To set the value of the RDXML_PATH variable, enter the following commands:

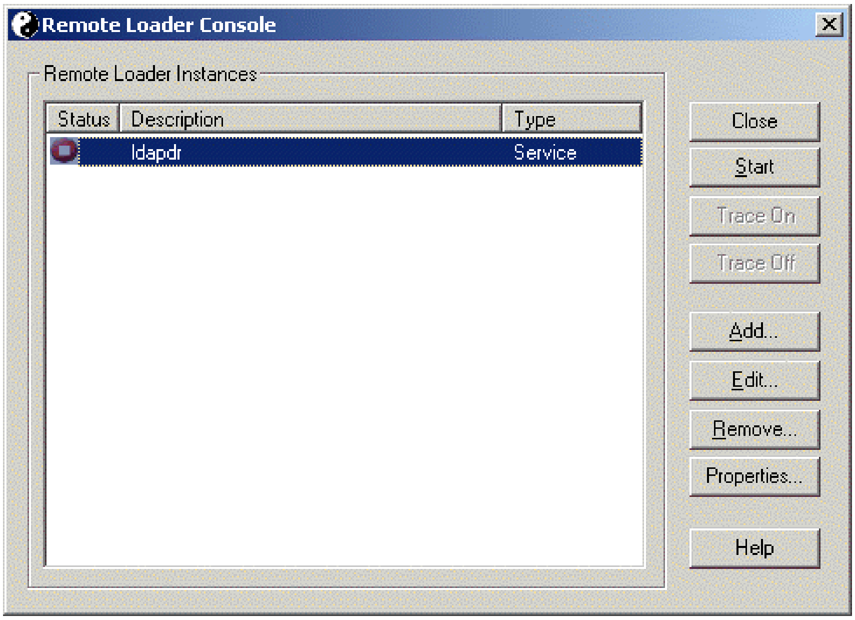
- set RDXML_PATH=*path*
- export RDXML_PATH

Running Remote Loaders

The Remote Loader on Windows

To run the Remote Loader on Windows:

1. Click the Remote Loader Console icon on the desktop.



2 Select a driver instance, then click Start.

Running the Remote Loader from the Command Line

On Solaris, Linux, or AIX, the binary component rdxml provides the Remote Loader functionality. This component is located in the /usr/bin/ directory. On Windows, the default is c:\novell\RemoteLoader.

To run the Remote Loader:

1 Set the password.

Platform	Command
Windows	**`dirxml_remote`** -config *path_to_config_file* -sp *password password*
Solaris LInux AIX	**`rdxml`** -config *path_to_config_file* -sp *password password*
HP-UX AS/400 OS/390 z/OS	**`dirxml_jremote`** -config *path_to_config_file* -sp *password password*

Option	Secondary Name	Parameter	Description
-password	-p	password	Specifies the password for command authentication. This password must be the same as the first password specified with *setpasswords* for the loader instance being commanded. If a command option (for example, unload or tracechange) is specified and the *password* option isn't specified, the user is prompted to enter the password for the loader that is the target of the command. Example: -password novell4 -p novell4
-setpasswords	-sp	password password	Specifies the password for the Remote Loader instance and the password of the DirXML Driver object of the remote interface shim that the Remote Loader communicates with. The first password in the argument is the password for the Remote Loader. The second password in the optional arguments is the password for the DirXML Driver object associated with the remote interface shim on the DirXML server. Either no password or both passwords must be specified. If no password is specified, the Remote Loader prompts for the passwords. This is a configuration option. Using this option configures the Remote Loader instance with the passwords specified but doesn't load a DirXML application shim or communicate with another loader instance. Example: -setpasswords novell4 staccato3 -sp novell4 staccato3

2 Start the Remote Loader.

Platform	Command
Windows	**`dirxml_remote`** -config *path_to_config_file*
Solaris LInux AIX	**`rdxml`** -config *path_to_config_file*
HP-UX AS/400 OS/390 z/OS	**`dirxml_jremote`** -config *path_to_config_file*

3 Using iManager, start the driver.

4 Confirm that the Remote Loader is operating properly.

The Remote Loader loads the DirXML application shim only when the Remote Loader is in communication with the remote interface shim on the DirXML server. This means, for example, that the application shim will be shut down if the Remote Loader loses communication with the DirXML server.

For Linux, Solaris, or AIX, use the ps command or a trace file to find out whether the command and connection ports are listening.

For HP-UX and similar platforms, monitor the Java Remote Loader by using the tail command on the tracefile:

```
tail -f trace filename
```

If the last line of the log shows the following, the loader is successfully running and awaiting connection from the DirXML remote interface shim:

```
TRACE: Remote Loader: Entering listener accept()
```

To configure the Remote Loader (rdxml) to start automatically on UNIX, see TID 10097249 (http://support.novell.com/cgi-bin/search/searchtid.cgi?/10097249.htm).

Stopping Remote Loaders

Platform	Command
Windows	Use the Remote Loader Console to stop a driver instance.
Solaris LInux AIX	**rdxml** -config *path_to_config_file* -u
HP-UX AS/400 OS/390 z/OS	**dirxml_jremote** -config *path_to_config_file* -u

If multiple instances of the Remote Loader are running on the computer, pass the -cp *command port* option so that the Remote Loader can stop the appropriate instance.

When you stop the Remote Loader, you must have sufficient rights or enter the Remote Loader password.

Scenario: Sufficient Rights. The Remote Loader is running as a Windows service. You have sufficient rights to stop it. You enter a password, but realize that it is incorrect. The Remote Loader stops anyway.

The Remote Loader isn't "accepting" the password. Instead, it is ignoring the password because the password is redundant in this case. If you run the Remote Loader as an application rather than as a service, the password is used.

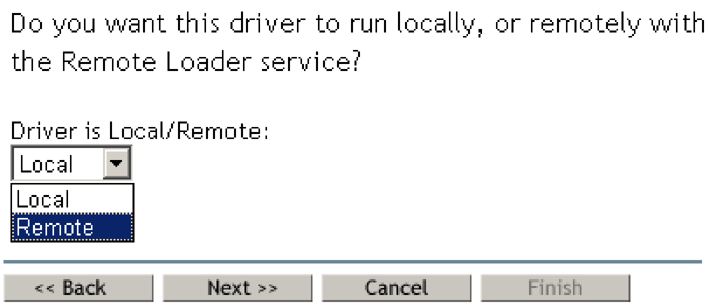
Configuring DirXML Drivers for Use with Remote Loaders

You can configure a new driver or enable an existing driver to communicate with the Remote Loader. This section provides general information on configuring drivers so that they communicate with the Remote Loader. For additional and driver-specific information, refer to the the relevant driver implementation guide.

Importing and Configuring a New Driver

1 In Novell iManager, import or create and configure a new driver.

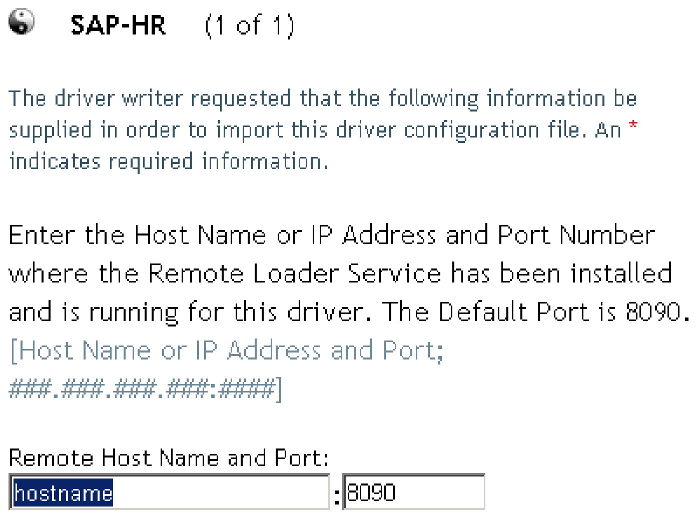
2 Scroll to the bottom of the configuration options, select Remote from the drop-down list, then click Next.



Do you want this driver to run locally, or remotely with the Remote Loader service?

Driver is Local/Remote: Local

3 Type a remote hostname and port.



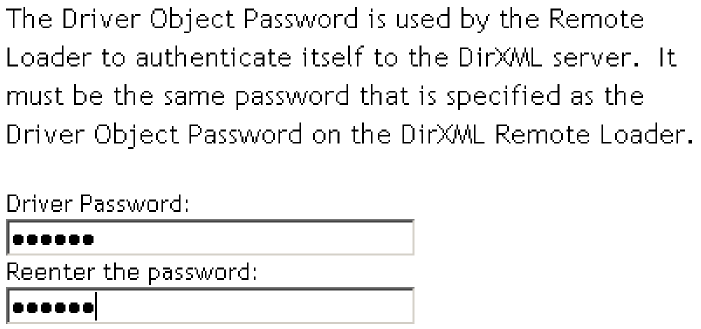
SAP-HR (1 of 1)

The driver writer requested that the following information be supplied in order to import this driver configuration file. An * indicates required information.

Enter the Host Name or IP Address and Port Number where the Remote Loader Service has been installed and is running for this driver. The Default Port is 8090. [Host Name or IP Address and Port; ###.###.###.###:####]

Remote Host Name and Port: hostname : 8090

4 Type and re-enter a password for the Driver object.

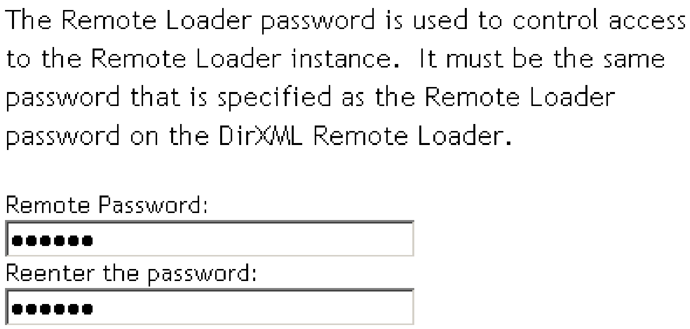


The Driver Object Password is used by the Remote Loader to authenticate itself to the DirXML server. It must be the same password that is specified as the Driver Object Password on the DirXML Remote Loader.

Driver Password: ●●●●●●

Reenter the password: ●●●●●●

5 Type and re-enter the Remote Loader password, then click Next.



The Remote Loader password is used to control access to the Remote Loader instance. It must be the same password that is specified as the Remote Loader password on the DirXML Remote Loader.

Remote Password:
●●●●●●
Reenter the password:
●●●●●●

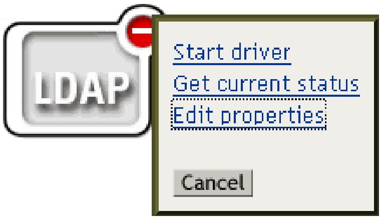
6 Define a security-equivalent user, click Next, then click Finish.

Configuring an Existing Driver

Specify parameters on the Driver object for connecting to the Remote Loader.

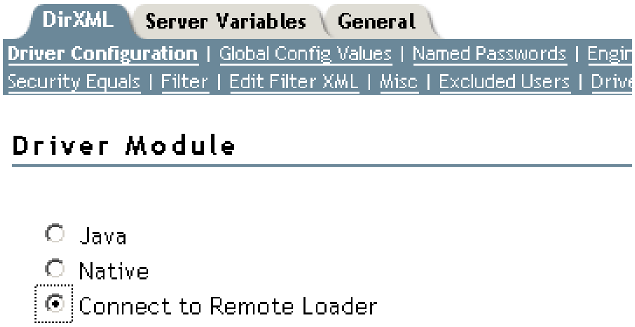
1 In Novell iManager, click DirXML Management > Overview.

2 Browse to and select the driver that you want to modify.



3 Click the driver status icon, then click Edit Properties.

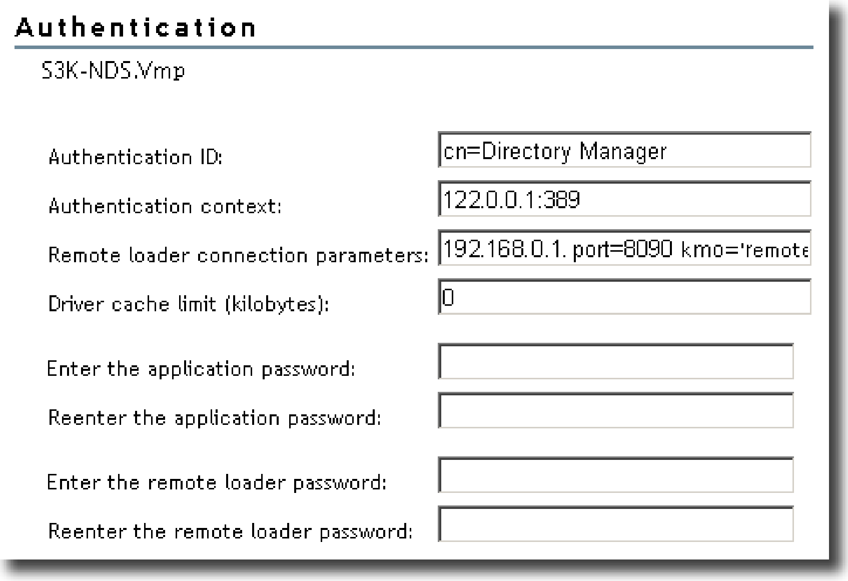
4 In the Driver Module section, select Connect to Remote Loader.


DirXML
Server Variables
General
Driver Configuration | Global Config Values | Named Passwords | Engin
Security Equals | Filter | Edit Filter XML | Misc | Excluded Users | Drive

Driver Module

○ Java
○ Native
● Connect to Remote Loader

5 In the Authentication section, enter parameters for the Remote Loader.



Authentication

S3K-NDS.Vmp

Authentication ID: cn=Directory Manager

Authentication context: 122.0.0.1:389

Remote loader connection parameters: 192.168.0.1. port=8090 kmo='remote

Driver cache limit (kilobytes): 0

Enter the application password:

Reenter the application password:

Enter the remote loader password:

Reenter the remote loader password:

- Remote Loader Connection Parameters

  Earlier, you exported the self-signed certificate. (See "Exporting a Self-Signed Certificate" on page 56.) For SSL, you need the nickname of the self-signed certificate.

  In the Remote Loader Connection Parameters edit box, type parameters in key-value pairs. For example, type

  ```
  hostname=192.168.0.1 port=8090 kmo=remotecert
  hostname=192.168.0.1 port=8090 kmo='remote cert'
  ```

  - hostname

    The host name or IP address (for example, 190.162.0.1). Specifies the address or name of the computer that the Remote Loader runs on. If you don't specify the IP address or server name, this value defaults to localhost.

  - port

    Where the Remote Loader accepts connections from the remote interface shim. If you don't specify this communication parameter, this value defaults to 8090.

  - kmo

    Specifies the Key Name (for example, kmo=remotecert) of the Key Material Object (KMO) containing the keys and certificate used for SSL.

    If you used spaces in the certificate name, you need to enclose the KMO object nickname in single quotation marks.

    TIP: The KMO object name is the nickname value you specified in Step 2 of "Creating a Server Certificate" on page 55.

- Enter the Application Password

  Specify the password of the application user ID. Typically, the driver shim needs this password so that the driver can connect to the application.

- Enter the Remote Loader Password

  Specify the password for the Remote Loader. The remote interface shim uses this password to authenticate itself to the Remote Loader.

NOTE: Set or reset both the application password and the Remote Loader password at the same time.

6 Click OK.

Creating a Keystore Script

A keystore is a Java file that contains encryption keys and, optionally, certificates. If you want to use SSL between the Remote Loader and the DirXML engine, and you are using a Java shim, you need to create a keystore file.

Keystore on Windows

On Windows, run the Keytool utility, typically found in the c:\novell\remoteloader\jre\bin directory.

Keystore on Solaris, Linux, or AIX

On Solaris, Linux, or AIX environments, use the create_keystore file. Create_keystore is installed with rdxml and is also included in the dirxml_jremote.tar.gz file, found in the \dirxml\java_remoteloader directory. The create_keystore file is a shell script that calls the Keytool utility.

On UNIX, when the self-signed certificate is used to create the keystore, the certificate can be exported in Base64 or binary .der format.

Enter the following at the command line:

`create_keystore` *self-signed_certificate_name keystorename*

For example, type one of the following

```
create_keystore tree-root.b64 mystore
create_keystore tree-root.der mystore
```

The create_keystore script specifies a hard-coded password of "dirxml" for the keystore password. This is not a security risk because only a public certificate and public key are stored in the keystore.

Keystore on All Platforms

To create a keystore on any platform, you can enter the following at the command line:

`keytool` -import -alias trustedroot -file *self-signed_certificate_name* -keystore *filename* -storepass

Filename can be any name (for example, rdev_keystore).

6 Managing DirXML Drivers

This section contains information that will help you create and manage your DirXML® driver. Topics include:

- "Creating and Configuring a Driver" on page 77
- "Managing DirXML 1.x Drivers in an Identity Manager Environment" on page 78
- "Upgrading a Driver Configuration from DirXML 1.x to Identity Manager Format" on page 79
- "Starting, Stopping, or Restarting a Driver" on page 79
- "Using Global Configuration Values" on page 79
- "Using the DirXML Command Line Utility" on page 80
- "Viewing Versioning Information" on page 80
- "Using Named Passwords" on page 84
- "Reassociating a Driver Object with a Server" on page 89
- "Adding Driver Heartbeat" on page 90

Creating and Configuring a Driver

For each DirXML driver you plan to use, you should create a driver object and import a driver configuration. The driver object contains configuration parameters and policies for that driver. As part of creating a driver object, you import a driver-specific configuration file. Driver configurations contain a default set of policies. These policies are intended to give you a good start as you implement your data sharing model. Most of the time, you will set up a driver using the shipping default configuration, and then modify the driver configuration according to the requirements of your environment.

There are two methods you can use for creating driver objects.

- The Create Driver task lets you create a single driver and import its driver configuration. For more information, refer to "Creating a Driver Object" on page 77.
- The Import Driver task lets you create multiple drivers at the same time and import their configurations. For more information, refer to "Creating Multiple Drivers" on page 78.

Creating a Driver Object

The driver configuration (XML) file creates and configures the objects needed in order for a driver to work properly. It also includes basic policies you can modify for your implementation.

1. In iManager, select DirXML Utilities > Create Driver.
2. Select a driver set where you want to create the driver, then click Next.

If you place this driver in a new driver set, you must specify a driver set name, context, and associated server.

3 Mark Import a Driver Configuration from the Server and select the.xml file.

The driver configuration file is installed on the Web server when you set up iManager.

4 Follow the prompts to finish importing the driver configuration.

The necessary Nsure™ Identity Manager objects are created. If you didn't define security equivalences or exclude administrative users during the import, you can complete these tasks by modifying the properties of the driver object.

Creating Multiple Drivers

Identity Manager provides the capability to create several drivers at once. The process is similar to creating a single driver in that the driver configuration (XML) files still create and configure the objects needed in order for drivers to work properly.

To import several drivers at the same time:

1. In iManager, select DirXML Utilities > Import Drivers.
2. Select a driver set where you want to create new drivers, then click Next.

   If you place these drivers in a new driver set, you must specify a driver set name, context, and associated server.
3. Select the application drivers to add to the driver set, then click Next.
4. Follow the prompts and specify the requested data, then click Next.

The necessary Identity Manager objects for each driver are created. If you didn't define security equivalences or exclude administrative users during the import, you can complete these tasks by modifying the properties of the driver object.

Managing DirXML 1.*x* Drivers in an Identity Manager Environment

Existing drivers that were created for DirXML 1.*x* will continue to run with Identity Manager.

The DirXML engine that ships with Nsure Identity Manager 2 is backward compatible with older drivers (as long as the older driver shims and configurations have been updated with all the latest product updates and patches). It accomplishes this by converting their driver configurations to Identity Manager format, on the fly. This conversion is only for the use of the engine, and does not make any permanent changes to existing DirXML 1.*x* driver configurations. Because the engine is backward compatible, you can run DirXML 1.*x* drivers on Identity Manager servers as long as you want to, without making any changes to them.

However, the iManager plug-ins have only limited backward compatibility. Older drivers can be viewed in the Overview of a driver set, but the driver configuration can't be viewed or edited. When you click a DirXML 1.*x* driver in the driver set Overview, the DirXML plug-ins discover that the driver is in 1.*x* format, and prompt you to convert the driver to 2.0 format using the wizard.

If you don't want to make any changes to an existing driver yet, you can cancel out of the wizard.

To edit a 1.*x* driver in 1.*x* format, you must use the DirXML 1.*x* plug-ins. To do this, you must use a separate iManager Web server with the 1.*x* plug-ins installed on it. You can't use the DirXML plug-ins that ship with Identity Manager to edit a driver configuration without converting the driver to Identity Manager 2 format.

Upgrading a Driver Configuration from DirXML 1.*x* to Identity Manager Format

The Identity Manager installation installs new driver shims, but it does not change existing driver objects or driver configurations.

Existing driver configurations that were created for DirXML 1.*x* will continue to run with Identity Manager. However, the iManager DirXML plug-ins for Identity Manager let you edit only drivers that are in Identity Manager format.

IMPORTANT: Running an Identity Manager DirXML driver shim or driver configuration with a DirXML 1.*x* Engine is not supported.

A wizard is provided to help you convert DirXML 1.*x* drivers to Identity Manager format.

To start the wizard:

1. In iManager, click DirXML Management > Overview. Select the driver set that contains the driver you want to convert.
2. Click the icon for the driver you want to convert.

   You are prompted to convert the driver to the new format.
3. Follow the steps in the wizard to complete the conversion.

Starting, Stopping, or Restarting a Driver

1. In iManager, click DirXML Management > Overview.
2. Browse to the driver set where the driver exists.
3. Click the driver whose status you want to change, then choose the appropriate option (start, stop, restart.)

Using Global Configuration Values

Global configuration values (GCVs) are new settings that are similar to driver parameters. Global configuration values can be specified for a driver set as well as an individual driver. If a driver does not have a GCV value, the driver inherits the value for that GCV from the driver set.

GCVs allow you to specify settings for new Identity Manager features such as password synchronization and driver heartbeat, as well as settings that are specific to the function of an individual driver configuration. Some GCVs are provided with the drivers, but you can also add your own. You can refer to these values in a policy to help you customize your driver configuration.

IMPORTANT: Password synchronization settings are GCVs, but it's best to edit them in the graphical interface provided on the Server Variables page for the driver, instead of the GCV page. The Server Variables page that shows Password Synchronization settings is accessible as a tab like other driver parameters, or by clicking Password Management > Password Synchronization, searching for the driver, and clicking the driver name. The page contains online help for each Password Synchronization setting.

To add, remove, or edit GCVs that are not related to Identity Manager Password Synchronization:

1. In iManager, click DirXML Management > Overview.
2. Browse to and click the driver set or driver object, then click the Global Config Values tab.
3. Add, remove, or edit the XML, then click OK to apply your changes.

Using the DirXML Command Line Utility

The DirXML Command Line Utility provides access to all DirXML subverbs and allows you to perform common driver management tasks, such as starting and stopping a driver, from the command line. It's installed with Identity Manager, but also works with DirXML 1.*x* implementations.

Although we recommend using iManager to administer Identity Manager, the DirXML Command Line Utility is another option available to perform common operations. You can use the utility in an interactive mode or in a pure command line mode.

The utility and scripts are installed on all platforms during the Identity Manager installation. The utility is installed to the following locations:

Windows: \Novell\Nds\dxcmd.bat

NetWare: sys:\system\dxcmd.ncf

UNIX: /usr/bin/dxcmd

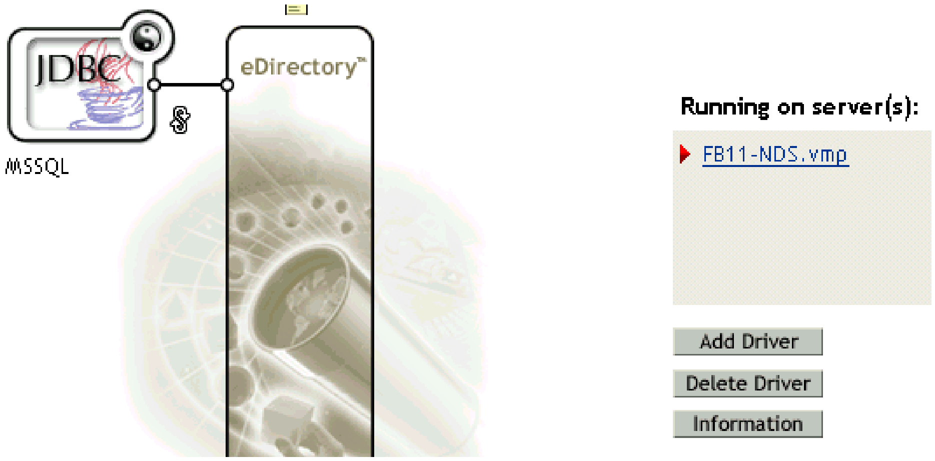
Viewing Versioning Information

The Versioning Discovery Tool enables you to do the following:

- View a hierarchical display of versioning information about your DirXML configuration.
- View a text file of the same information that's available in the hierarchical display.
- Save versioning information to a file on a local or network drive.

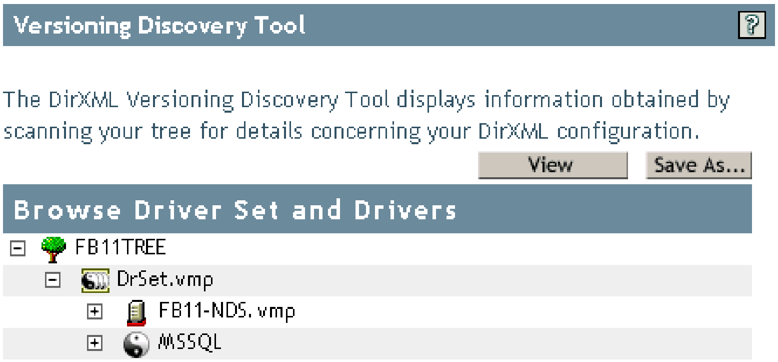
Viewing a Hierarchical Display of Versioning Information

1 In the DirXML Overview dialog box for a driver set, click Information.



You can also select DirXML Utilities > Versioning Discovery Tool, browse to and select the driver set, then click Information.

2 View a top-level or unexpanded display of versioning information.



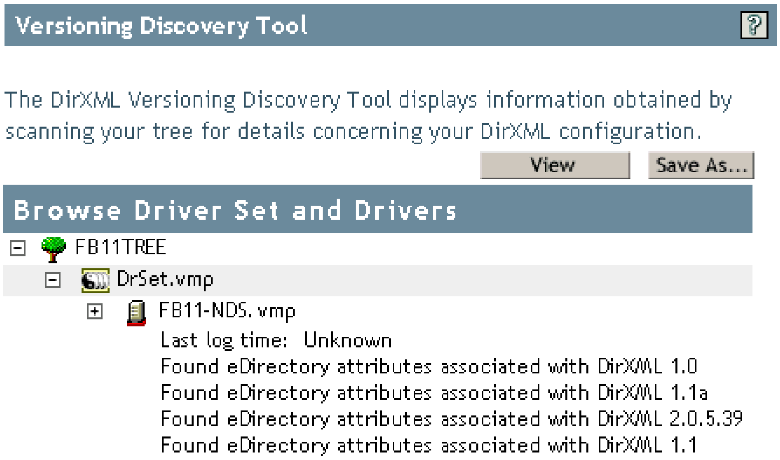
The DirXML Versioning Discovery Tool displays information obtained by scanning your tree for details concerning your DirXML configuration.

The unexpanded hierarchical view displays the following:

- The tree that you are authenticated to
- The driver set that you selected
- Servers that are associated with the driver set

  If the driver set is associated with two or more servers, you can view DirXML information on each server.
- Drivers

3 View versioning information related to servers by expanding the server icon.



The DirXML Versioning Discovery Tool displays information obtained by scanning your tree for details concerning your DirXML configuration.

```
Last log time:  Unknown
Found eDirectory attributes associated with DirXML 1.0
Found eDirectory attributes associated with DirXML 1.1a
Found eDirectory attributes associated with DirXML 2.0.5.39
Found eDirectory attributes associated with DirXML 1.1
```

The expanded view of a top-level server icon displays the following:

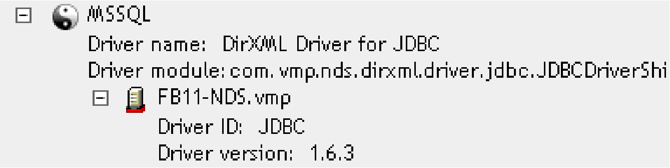
- Last log time
- Versions of DirXML that are running on or have run on the server

  In the Versioning Discovery Tool, Identity Manager 2 is called DirXML 2.x.x.x. In this example, Found eDirectory Attributes Associated with DirXML 2.0.5.39 is the version of DirXML running on the server.

  DirXML earlier than 2.x.x.x didn't store version numbers. If the DirXML engine doesn't respond to a version number query, the Versioning Discovery Tool displays the numbers of all the versions of the engines that might have run on that server. In this example, three “Found” lines identify markers of earlier versions of DirXML: 1.0, 1.1a, and 1.1. If the

DirXML engine returns a version number, the Versioning Discovery Tool displays that version number but not earlier versions of DirXML.

4 View versioning information related to drivers by expanding the driver icon.



```
⊟ MSSQL
    Driver name:  DirXML Driver for JDBC
    Driver module: com.vmp.nds.dirxml.driver.jdbc.JDBCDriverShi
  ⊟ FB11-NDS.vmp
      Driver ID:  JDBC
      Driver version:  1.6.3
```

The expanded view of a top-level driver icon displays the following:

- The driver name
- The driver module (for example, com.vmp.nds.dirxml.driver.jdbc.JDBCDriverShim)

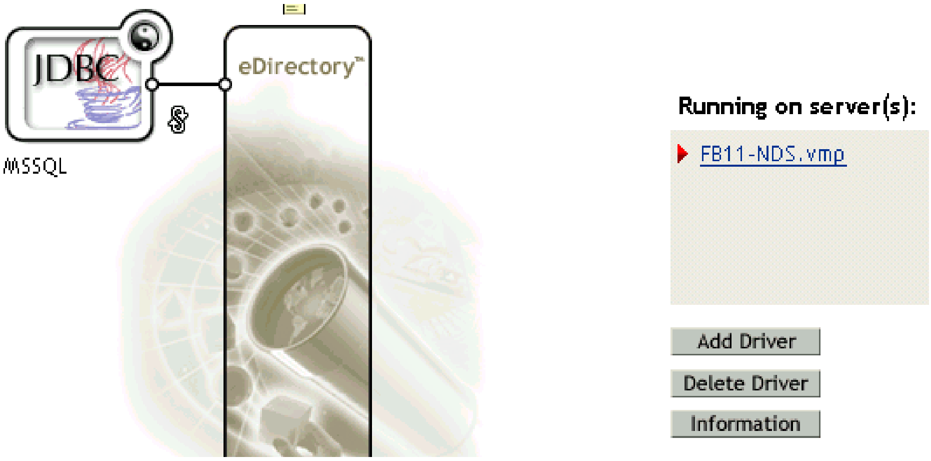
The expanded view of a server under a driver icon displays the following:

- The driver ID
- The version of the instance of the driver running on that server

Viewing a Text File

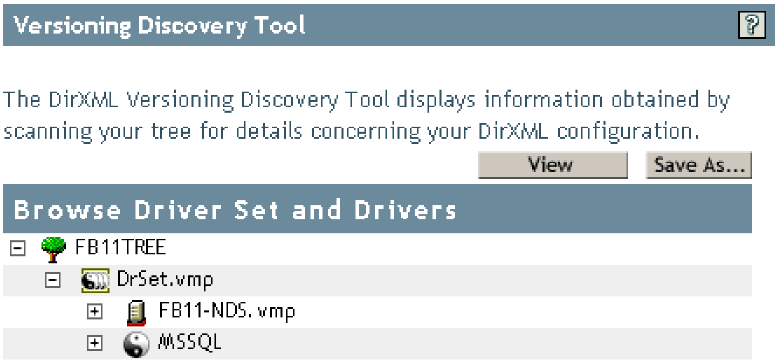
DirXML publishes versioning information to a file. You can view this information in text format. The textual representation is the same information contained in the hierarchical view.

1 In the DirXML Overview dialog box for a driver set, click Information.



You can also select DirXML Utilities > Versioning Discovery Tool, browse to and select the driver set, then click Information.

2 In the Versioning Discovery Tool dialog box, click View.

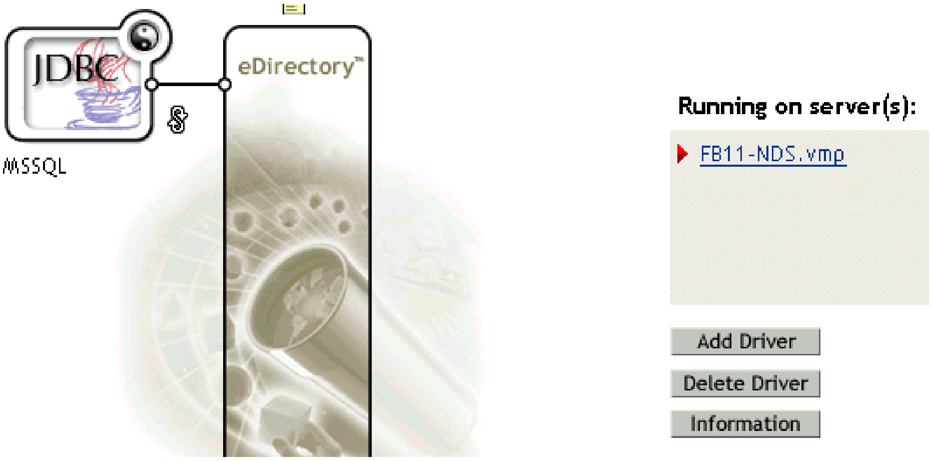

Versioning Discovery Tool

The DirXML Versioning Discovery Tool displays information obtained by scanning your tree for details concerning your DirXML configuration.

Saving Versioning Information

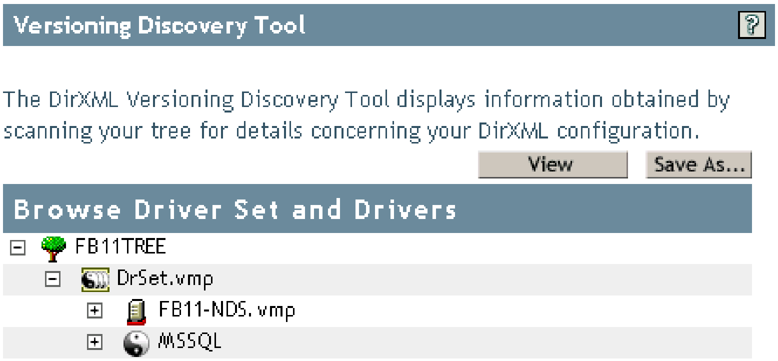
You can save versioning information to a text file on your local or network drive.

1 In the DirXML Overview dialog box for a driver set, click Information.



You can also select DirXML Utilities > Versioning Discovery Tool, browse to and select the driver set, then click Information.

2 In the Versioning Discovery Tool dialog box, click Save As.


Versioning Discovery Tool

The DirXML Versioning Discovery Tool displays information obtained by scanning your tree for details concerning your DirXML configuration.

3 In the File Download dialog box, click Save.

4 Navigate to the desired directory, type a filename, then click Save.

Identity Manager saves the data to a text file.

Using Named Passwords

DirXML 1.*x* provided the ability to store a single password securely, so that a driver could use that password without having it hard-coded in clear text in the driver policies.

Identity Manager allows you to store multiple passwords securely for a particular driver. This new functionality is referred to as Named Passwords. Each different password is accessed by a key, or name.

You can also use the Named Passwords feature to store other pieces of information securely, such as a username.

To use a named password in a driver policy, you refer to it by the name of the password, instead of using the actual password, and the DirXML engine sends the password to the driver. The method described in this section for storing and retrieving Named Passwords can be used with any driver without making changes to the driver shim.

NOTE: The sample configurations provided for the DirXML Driver for Lotus Notes include an example of using Named Passwords in this way. The Notes driver shim has also been customized to support other ways of using Named Passwords, and examples of those methods are also included. For more information, see the section on Named Passwords in the *DirXML Driver for Lotus Notes Implementation Guide* (http://www.novell.com/documentation/lg/dirxmldrivers).

In this section:

- "Configuring Named Passwords Using iManager" on page 84
- "Configuring Named Passwords Using the DirXML Command Line Utility" on page 86
- "Using Named Passwords in Driver Policies" on page 89

Configuring Named Passwords Using iManager

1. In iManager, click DirXML Management > Overview. Search for the driver sets, or browse and select a container that holds the driver set.

   A graphical representation of the driver set appears.

2. In the DirXML Overview, click the icon for the driver.

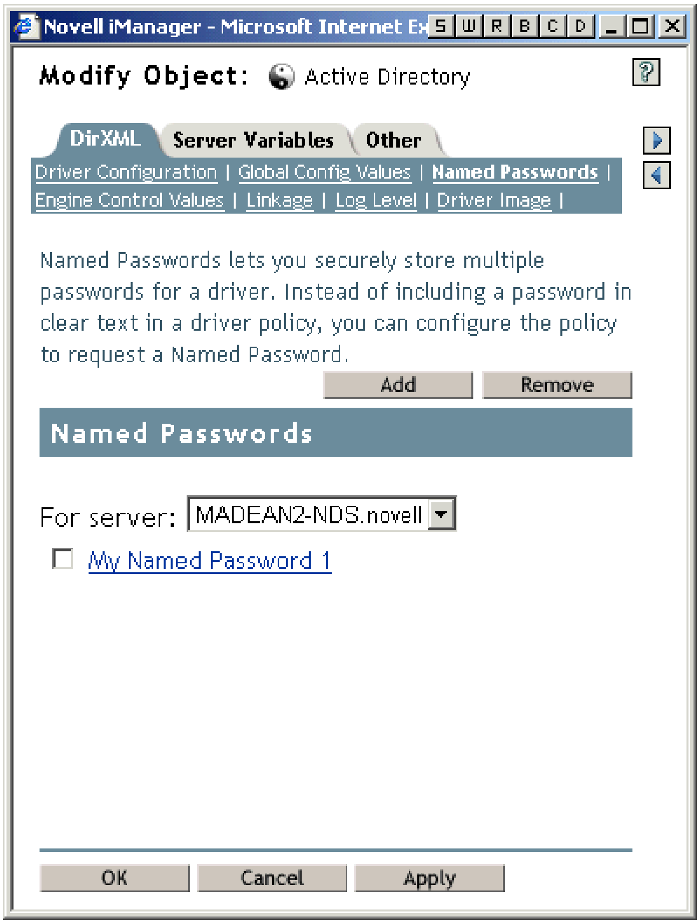
   A graphical representation of the driver configuration appears.

3. In the DirXML Driver Overview, click the driver icon.

   The Modify Object page appears.

4. On the Modify Object page on the DirXML tab, click Named Passwords.

   The Named Passwords page appears, listing the current Named Passwords for this driver. If you have not set up any Named Passwords, the list is empty.


Novell iManager - Microsoft Internet Ex
Modify Object: Active Directory
DirXML
Server Variables
Other
Driver Configuration | Global Config Values | Named Passwords |
Engine Control Values | Linkage | Log Level | Driver Image |

Named Passwords lets you securely store multiple passwords for a driver. Instead of including a password in clear text in a driver policy, you can configure the policy to request a Named Password.

Add
Remove
Named Passwords

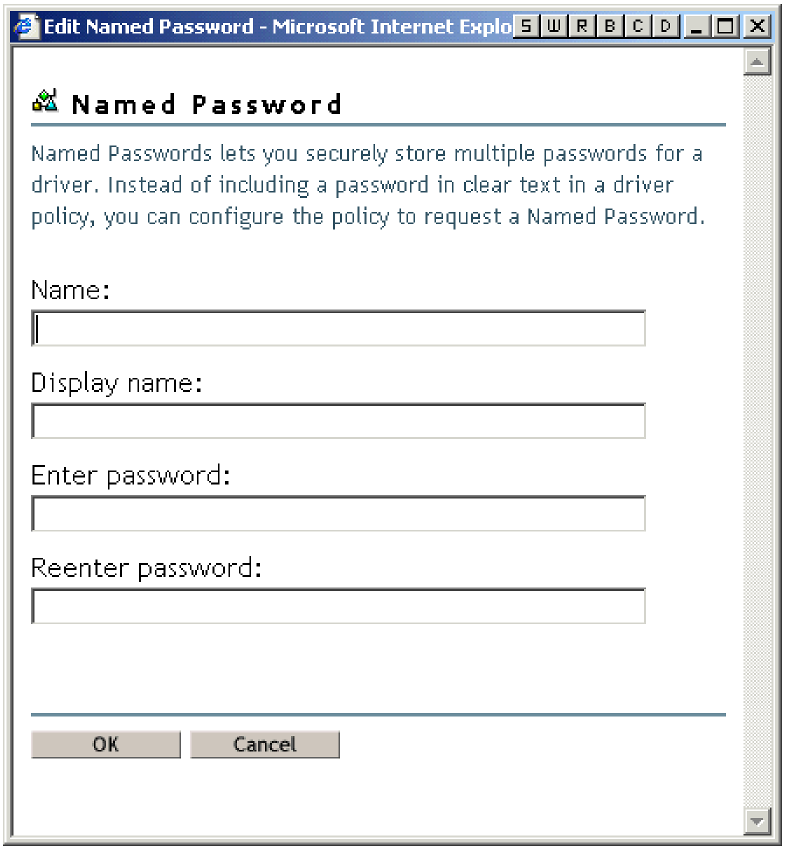
For server: MADEAN2-NDS.novell

□ My Named Password 1

5 To add a Named Password, click Add, complete the fields, and click OK.

A page appears that lets you specify the name, display name, and password.

Keep in mind that you can use this feature to store other kinds of information securely, such as a username.



Named Password

Named Passwords lets you securely store multiple passwords for a driver. Instead of including a password in clear text in a driver policy, you can configure the policy to request a Named Password.

Name:

Display name:

Enter password:

Reenter password:

6 To remove a Named Password, click Remove.

The password is removed without prompting you to confirm the action.

Configuring Named Passwords Using the DirXML Command Line Utility

- "Creating a Named Password in the DirXML Command Line Utility" on page 86
- "Removing a Named Password in the DirXML Command Line Utility" on page 87

Creating a Named Password in the DirXML Command Line Utility

1 Run the DirXML Command Line Utility.

For information, see "Using the DirXML Command Line Utility" on page 80.

2 Enter your user name and password.

The following list of options appears.

```
DirXML commands

 1: Start driver
 2: Stop driver
 3: Driver operations...
 4: Driver set operations...
 5: Log events operations...
 6: Get DirXML version
99: Quit

Enter choice:
```

3. Enter 3 for driver operations.

   A numbered list of drivers appears.

4. Enter the number for the driver you want to add a Named Password to.

   The following list of options appears.

   ```
   Select a driver operation for:
   driver_name

    1: Start driver
    2: Stop driver
    3: Get driver state
    4: Get driver start option
    5: Set driver start option
    6: Resync driver
    7: Migrate from application into DirXML
    8: Submit XDS command document to driver
    9: Check object password
   10: Initialize new driver object
   11: Passwords operations
   12: Cache operations
   99: Exit

   Enter choice:
   ```

5. Enter 11 for password operations.

   The following list of options appears.

   ```
   Select a password operation

    1: Set shim password
    2: Reset shim password
    3: Set named password
    4: Clear named password(s)
    5: List named passwords
   99: Exit

   Enter choice:
   ```

6. Enter 3 to set a new Named Password.

   The following prompt appears:

   ```
   Enter password name:
   ```

7. Enter the name by which you want to refer to the Named Password.

8. Enter the actual password that you want to secure, at the following prompt that appears:

   ```
   Enter password:
   ```

   The characters you type for the password are not displayed.

9. Confirm the password by entering it again, at the following prompt that appears:

   ```
   Confirm password:
   ```

10. After you enter and confirm the password, you are returned to the password operations menu.

After completing this procedure, you can use the 99 option twice to exit the menu and quit the DXCommand utility.

Removing a Named Password in the DirXML Command Line Utility

This option is useful if you no longer need Named Passwords you previously created.

1. Run the DirXML Command Line Utility.

   For information, see "Using the DirXML Command Line Utility" on page 80.

2. Enter your user name and password.

   The following list of options appears.

   ```
   DirXML commands

    1: Start driver
    2: Stop driver
    3: Driver operations...
    4: Driver set operations...
    5: Log events operations...
    6: Get DirXML version
   99: Quit

   Enter choice:
   ```

3. Enter 3 for driver operations.

   A numbered list of drivers appears.

4. Enter the number for the driver you want to remove Named Passwords from.

   The following list of options appears.

   ```
   Select a driver operation for:
   driver_name

    1: Start driver
    2: Stop driver
    3: Get driver state
    4: Get driver start option
    5: Set driver start option
    6: Resync driver
    7: Migrate from application into DirXML
    8: Submit XDS command document to driver
    9: Check object password
   10: Initialize new driver object
   11: Passwords operations
   12: Cache operations
   99: Exit

   Enter choice:
   ```

5. Enter 11 for password operations.

   The following list of options appears.

   ```
   Select a password operation

    1: Set shim password
    2: Reset shim password
    3: Set named password
    4: Clear named password(s)
    5: List named passwords
   99: Exit

   Enter choice:
   ```

6. (Optional) Enter 5 to see the list of existing Named Passwords.

   The list of existing Named Passwords is displayed.

   This step can help you make sure you are removing the correct password.

7 Enter 4 to remove one or more Named Passwords.

8 Enter No to remove a single Name Password, at the following prompt that appears:

```
Do you want to clear all named passwords? (yes/no):
```

9 Enter the name of the Named Password you want to remove, at the following prompt that appears:

```
Enter password name:
```

After you enter the name of the Named Password you want to remove, you are returned to the password operations menu:

```
Select a password operation

 1: Set shim password
 2: Reset shim password
 3: Set named password
 4: Clear named password(s)
 5: List named passwords
99: Exit

Enter choice:
```

10 (Optional) Enter 5 to see the list of existing Named Passwords.

The list of existing Named Passwords is displayed.

This step lets you verify that you have removed the correct password.

After completing this procedure, you can use the 99 option twice to exit the menu and quit the DXCommand utility.

Using Named Passwords in Driver Policies

The following example shows how a named password can be referenced in a driver policy on the Subscriber channel in XSLT:

```
<xsl:value-of select=”query:getNamedPassword($srcQueryProcessor,’mynamedpassword’)”
xmlns:query=”http://www.novell.com/java/com.novell.nds.dirxml.driver.XdsQueryProcessor/>
```

Reassociating a Driver Object with a Server

A driver object is associated with a server.

If the association becomes invalid for some reason, it is indicated by one of the following:

- When upgrading eDirectory on your DirXML (Identity Manager 2) server, you get the error “UniqueSPIException error -783.”
- No server is listed next to the driver in the DirXML Overview
- A server is listed next to the driver in the DirXML Overview, but the name is garbled text

To resolve this issue, you must disassociate the driver object and the server, and then reassociate them.

Log into iManager and go to the Driver object in the DirXML Overview. Use the icons to remove and then add a server to the server name list next to the driver icon. Removing and then adding re-associates the server and the Driver object.

Adding Driver Heartbeat

The driver heartbeat is a new feature of DirXML drivers that ship with Identity Manager 2, and its use is optional. Driver heartbeat is configured by using a driver parameter with a time interval specified. If a heartbeat parameter exists and has an interval value other than 0, the driver sends a heartbeat document to the DirXML engine if there is no communication on the Publisher channel for the specified interval of time.

The intent of the driver heartbeat is to give you a trigger to allow you to initiate an action at regular intervals, in case the driver does not communicate on the Publisher channel as often as you want the action to occur. You must customize your driver configuration or other tools if you want to take advantage of the heartbeat. The DirXML engine accepts the heartbeat document but does not take any action because of it.

For most drivers, a driver parameter for heartbeat is not used in the sample configurations, but you can add it.

A custom driver that is not provided with Identity Manager can also provide a heartbeat document, if the driver developer has written the driver to support it.

To configure the heartbeat, do the following:

1. In iManager, click DirXML Management > Overview. Search for your driver, and click the driver icon.
2. In the graphical view of the driver configuration, click the driver icon.
3. On the DirXML page, scroll down to Driver Parameters, and look for Heart Beat or a similar display name.

   If a driver parameter already exists for heartbeat, you can change the interval and save the changes, and configuration is complete.

   The value of the interval cannot be less than 1. A value of 0 means the feature is turned off.

   The unit of time is usually minutes; however, some drivers might choose to implement it differently, such as using seconds.
4. If a driver parameter does not exist for heartbeat, click Edit XML.
5. Add a driver parameter entry like the following example, as a child of <publisher-options>. (For an AD driver, make it a child of <driver-options>.)

   ```
   <pub-heartbeat-interval display-name="Heart Beat">10</pub-heartbeat-
   interval>
   ```

   TIP: If the driver does not produce a heartbeat document after being restarted, check the placement of the driver parameter in the XML.
6. Save the changes, and make sure the driver is stopped and restarted.

After you have added the driver parameter, you can edit the time interval using the graphical view. Another option is to create a reference to a global configuration value (GCV) for the time interval. Like other global configuration values, the driver heartbeat can be set at the driver set level instead of on each individual driver object. If a driver does not have a particular global configuration value, and the driver set does have it, the driver inherits the value from the driver set.

The following is an example heartbeat status document sent by the Notes driver:

```
<nds dtdversion="2.0" ndsversion="8.x">
  <source>
    <product build="20031112_1037" instance="blackcap" version="2.0">DirXML
```

```
Driver for Lotus Notes</product>
    <contact>Novell, Inc.</contact>
  </source>
  <input>
    <status level="success" type="heartbeat"/>
  </input>
</nds>
```

7 Creating Policies

Policies enable you to customize the flow of information into and out of Novell® eDirectory™, for a particular environment.

For example, one company might use the inetorgperson as the main user class, and another company might use User. To handle this, a policy is created that tells the DirXML engine what a user is called in each system. Whenever operations affecting users are passed between connected systems, Nsure™ Identity Manager applies the policy that makes this change.

Policies also create new objects, update attribute values, make schema transformations, define matching criteria, maintain Identity Manager associations, and many other things.

A detailed guide to Policies is contained in the *Policy Builder and Driver Customization Guide*. This guide contains:

- A detailed description of each available policy
- An in-depth Policy Builder user guide and reference, including examples and syntax for each condition, action, noun, and verb.
- A discussion on creating policies using XSLT style sheets.

Please refer to the *Policy Builder and Driver Customization Guide* for information on policies.

8 Managing Passwords by Using Password Policies

Using Password Policies, you can increase security by setting rules for how users create their passwords. You can also decrease help desk costs by providing users with self-service options for forgotten passwords and for resetting passwords.

In this section:

- "Overview of Password Policy Features" on page 95
- "Planning for Password Policies" on page 103
- "Prerequisites for Using Password Policies" on page 107
- "Creating Password Policies" on page 110
- "Assigning Password Policies to Users" on page 110
- "Finding Out Which Policy a User Has" on page 111
- "Setting A User's Password" on page 111
- "Creating or Editing Challenge Sets" on page 112
- "Configuring Notification for Password Features" on page 112
- "Preventing Legacy Novell Clients from Changing Passwords" on page 106
- "Troubleshooting Password Policies" on page 112

For information on Forgotten Password Self-Service and Reset Password Self-Service, see Chapter 9, "Password Self-Service," on page 115.

Overview of Password Policy Features

A password policy is a collection of administrator-defined rules that specify the criteria for creating and replacing end-user passwords. Nsure™ Identity Manager takes advantage of NMAS™ to enforce Password Policies that you assign to users in Novell® eDirectory™. Using Password Synchronization, you can also enforce Password Policies on connected systems, as explained in Chapter 10, "Password Synchronization across Connected Systems," on page 149.

Password Policies also include Forgotten Password Self-Service features, to reduce help desk calls for forgotten passwords. Another self-service feature is Reset Password Self-Service, which lets users change their passwords while viewing the rules the administrator has specified in the Password Policy. Users access these features through the iManager self-service console.

Most features of password management require Universal Password to be enabled. Ideally, you would also integrate the iManager self-service console into your existing company portal, if you have one, to give users easy access to Forgotten Password Self-Service and Reset Password Self-service.

You create Password Policies using a wizard: in iManager, Password Management > Manage Password Policies > New.

The new Password Management features let you do the following:

- "Enabling Universal Password" on page 96
- "Setting Advanced Password Rules" on page 97
- "Adding Your Own Password Change Message to Password Policies" on page 100
- "Providing Users with Forgotten Password Self-Service" on page 116
- "Providing Users with Reset Password Self-Service" on page 116
- "Assigning Policies to eDirectory Users" on page 100
- "Enforcing Policies in eDirectory" on page 101
- "Enforcing Policies on Connected Systems" on page 102
- "Viewing Which Password Policy Is in Effect for a User" on page 103
- "Setting Universal Password for a User" on page 103

Enabling Universal Password

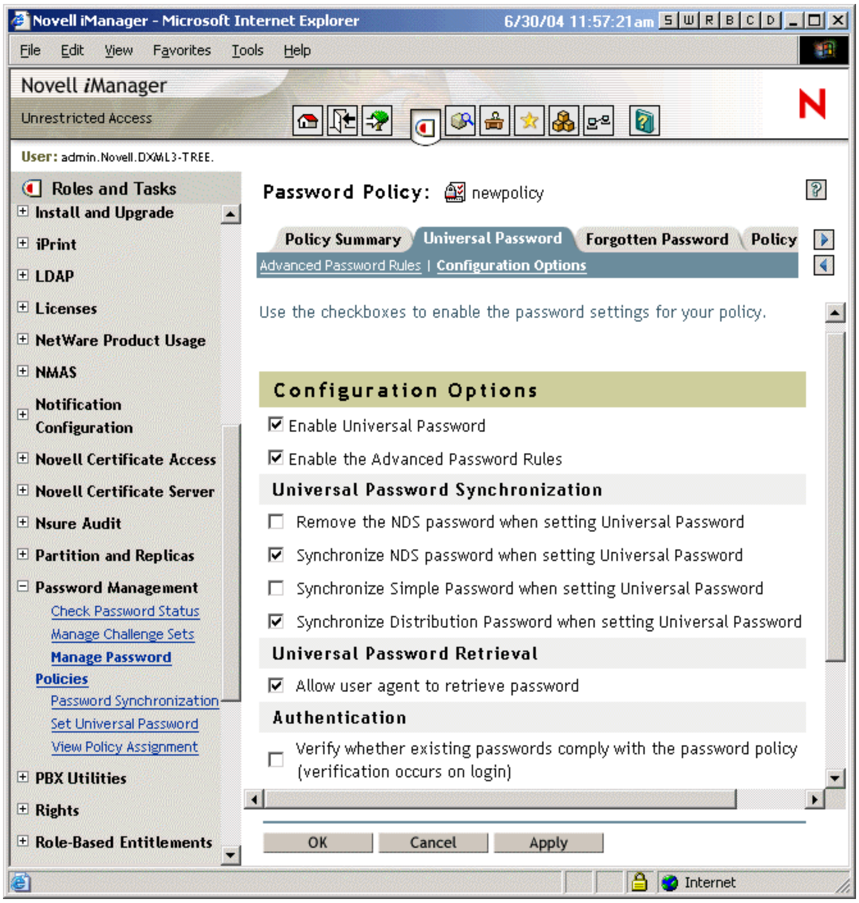
Universal Password is the new password capability in eDirectory 8.7.1. You must enable Universal Password for your users if you want to use Advanced Password Rules, Password Synchronization, and many of the Forgotten Password features.

A Password Policy lets you specify whether Universal Password is enabled. You can then assign the Password Policy to users (the whole tree, a container or partition, or specific user). Universal Password does not need to be on for the whole tree. Using different Password Policies, you can tailor your use of Universal Password to your needs. We recommend assigning Password Policies as high in the tree as possible to simplify administration.

Some additional planning is required to prepare your environment for Universal Password, such as upgrading the Novell Client™ if you use it, and upgrading eDirectory.

You can also edit other Universal Password and NMAS settings in a Password Policy, such as whether NDS or Simple Password are synchronized with Universal Password.

The following figure shows an example of the property page where you specify Universal Password configuration options for a Password Policy.



Password Policy: newpolicy

Use the checkboxes to enable the password settings for your policy.

Configuration Options

☑ Enable Universal Password

☑ Enable the Advanced Password Rules

Universal Password Synchronization

☐ Remove the NDS password when setting Universal Password

☑ Synchronize NDS password when setting Universal Password

☐ Synchronize Simple Password when setting Universal Password

☑ Synchronize Distribution Password when setting Universal Password

Universal Password Retrieval

☑ Allow user agent to retrieve password

Authentication

☐ Verify whether existing passwords comply with the password policy (verification occurs on login)

Setting Advanced Password Rules

Advanced Password Rules let you define the following criteria for the Universal Password:

- Change password
  - Allow the user to initiate password change
  - Require unique passwords

    You can specify how unique passwords are enforced by using one or both of the following two values.
  - Limit the number of passwords to store in the history list (1-255)

    If you require unique passwords, you can indicate how many passwords are stored in the history list for comparison. For example, if you specified 3, then the user's previous three passwords are stored. If a user tries to change his or her password and reuse one that is in the history list, the Password Policy rejects the password and the user is prompted to specify a different one.
  - Limit the number of days to store a password in the history list (0-365)

    If you require unique passwords, you can specify how many days a previous password remains stored in the history list for comparison.

    For example, if you specified 30, and the user's previous password was "mountains99," that password would remain in the history list for 30 days. During that time, if the user tries to change his or her password and reuse "mountains99," the Password Policy rejects that password and the user is prompted to specify a different one. After the 30-day period, the old password is no longer stored for comparison, and the Password Policy allows it to be reused.

- Password lifetime
  - Number of days before the password can be changed (0-365)

    For example, if this value is set to 30, a user must keep the same password for 30 days before he or she can change it. The Password Policy does not allow the Universal Password to be changed by the user before that time has elapsed.
  - Number of days before the password expires (0-365)

    For example, if this value is set to 90, a user's password expires 90 days after it has been set. If grace logins are not enabled, the user cannot log in after a password has expired, and he or she requires administrator assistance to reset the password. However, if you enable grace logins, described in the next item, the user can log in with the expired password the specified number of times.

    NOTE: A security enhancement was added to NMAS™ 2.3.4 regarding Universal Passwords changed by an administrator. It works in much the same way as the feature previously provided for NDS® Password. If an administrator changes a user's password, such as when creating a new user or in response to a help desk call, for security the password is automatically expired if you have enabled the setting to expire passwords in the Password Policy. For this particular feature, the number of days is not important, but this setting must be enabled.
  - Number of grace logins allowed after the password has expired (0-254)

    When the password expires, this value indicates how many times a user is allowed to log in to eDirectory using the expired password. If grace logins are not enabled, the user cannot log in after a password has expired, and he or she requires administrator assistance to reset the password. If the value is 1 or more, the user has a chance to log in additional times before being forced to change the password. However, if the user does not change his or her password before all the grace logins are used, he or she is locked out and is unable to log in to eDirectory.
- Password length
  - Minimum number of characters in the password (1-512)
  - Minimum number of characters in the password (1-512)
- Repeating characters
  - Minimum number of unique characters (1-512)
  - Maximum number of times a specific character can be used (1-512)
  - Maximum number of times a specific character can be repeated sequentially (1-512)
- Case sensitivity
  - Minimum number of uppercase characters required in the password (1-512)
  - Maximum number of uppercase characters allowed in the password (1-512)
  - Minimum number of lowercase characters required in the password (1-512)
  - Maximum number of lowercase characters allowed in the password (1-512)
- Numeric characters
  - Allow numeric characters in the password
  - Disallow a numeric character as the first character

    - Disallow a numeric character as the last character
    - Minimum number of numerals in the password (1-512)
    - Maximum number of numerals in the password (1-512)
- Special characters

  Special characters are the characters that are not numbers (0-9) and are not alphabetic characters. (The alphabetic characters are a-z, A-Z, and alphabetic characters in the Latin-1 code page 850.)

    - Allow special characters in the password
    - Disallow a special character as the first character
    - Disallow a special character as the first character
    - Minimum number of special characters (1-512)
    - Maximum number of special characters (1-512)
- Password exclusions

  The passwords that you exclude are case insensitive, so if you specify the word “test” as a word that cannot be used as a password, then “Test” and “TEST” are also excluded.

  At this time, the list of excluded passwords must be typed manually, one at a time. Also, you can exclude only specific words, not a pattern or an eDirectory attribute.

  NOTE: Keep in mind that password exclusions can be useful for a few words that you think would be security risks. Although an exclusion list feature is provided, it is not intended to be used for a long list of words such as a dictionary. Long lists of excluded words can affect server performance. Instead of a long exclusion list to protect against "dictionary attacks" on passwords, we recommend that you use the Advanced Password Rules to require numbers to be included in the password.

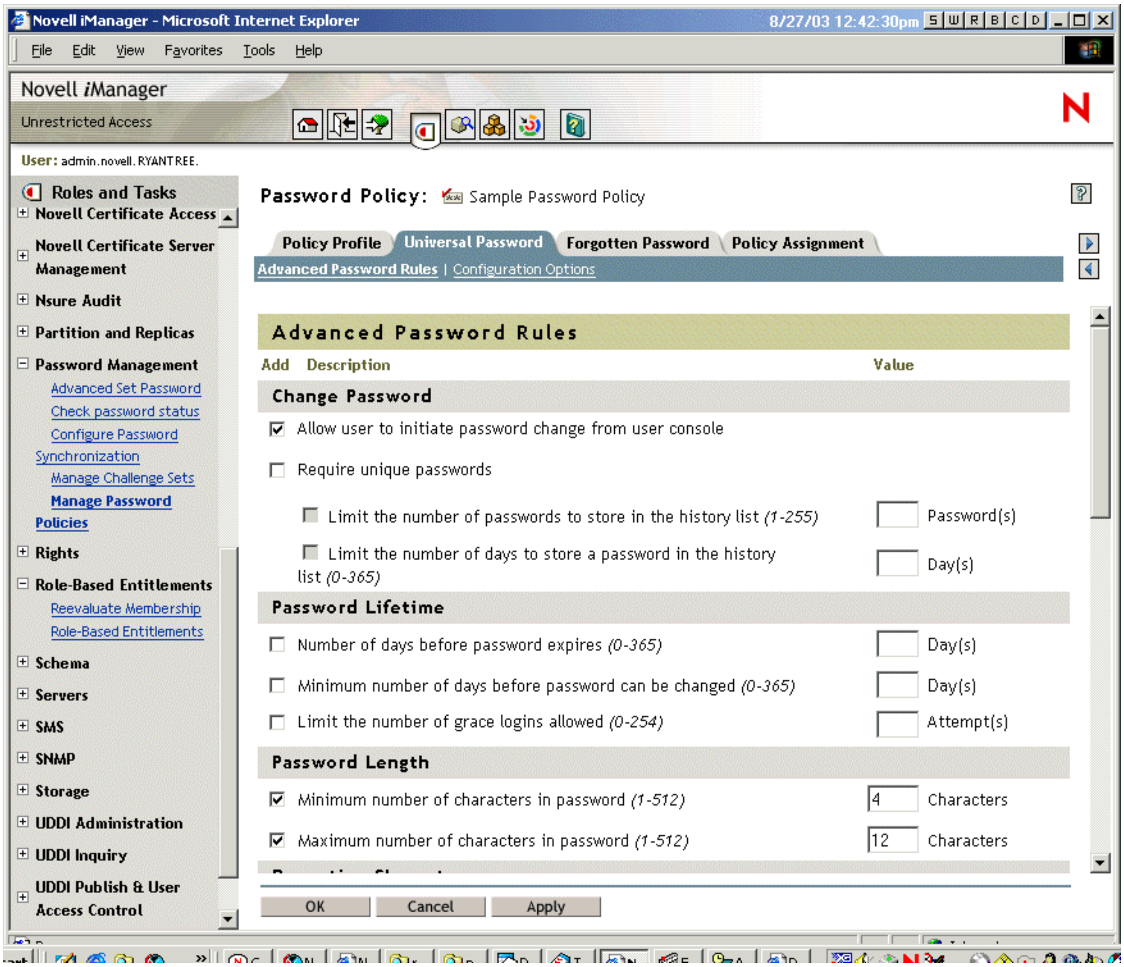
To use Advanced Password Rules in a Password Policy, you must enable Universal Password. If you don’t enable Universal Password for a policy, the password restrictions set for NDS® Password are enforced instead.

NOTE: When you create a Password Policy and enable Universal Password, the Advanced Password Rules are enforced instead of any existing password settings for NDS Password. The legacy password settings are ignored. No merging or copying of previous settings is done automatically when you create Password Policies.

For example, if you have a setting for the number of grace logins that you use with the NDS Password, when you enable Universal Password you need to re-create the grace logins setting in the Advanced Password Rules in the Password Policy.

If you later disabled Universal Password in the Password Policy, the existing password settings that you had are no longer ignored. They would be enforced for NDS Password.

The following figure shows an example of the property page where you specify Advanced Password Rules for a Password Policy.



Password Policy: Sample Password Policy

Advanced Password Rules

Add	Description	Value
	Change Password	
☑	Allow user to initiate password change from user console	
☐	Require unique passwords	
☐	Limit the number of passwords to store in the history list *(1-255)*	□ Password(s)
☐	Limit the number of days to store a password in the history list *(0-365)*	□ Day(s)
	Password Lifetime	
☐	Number of days before password expires *(0-365)*	□ Day(s)
☐	Minimum number of days before password can be changed *(0-365)*	□ Day(s)
☐	Limit the number of grace logins allowed *(0-254)*	□ Attempt(s)
	Password Length	
☑	Minimum number of characters in password *(1-512)*	4 Characters
☑	Maximum number of characters in password *(1-512)*	12 Characters

Adding Your Own Password Change Message to Password Policies

See "Adding Your Own Password Change Message to Password Policies" on page 137.

Providing Users with Forgotten Password Self-Service

See "Providing Users with Forgotten Password Self-Service" on page 116.

Providing Users with Reset Password Self-Service

See "Providing Users with Reset Password Self-Service" on page 116.

Assigning Policies to eDirectory Users

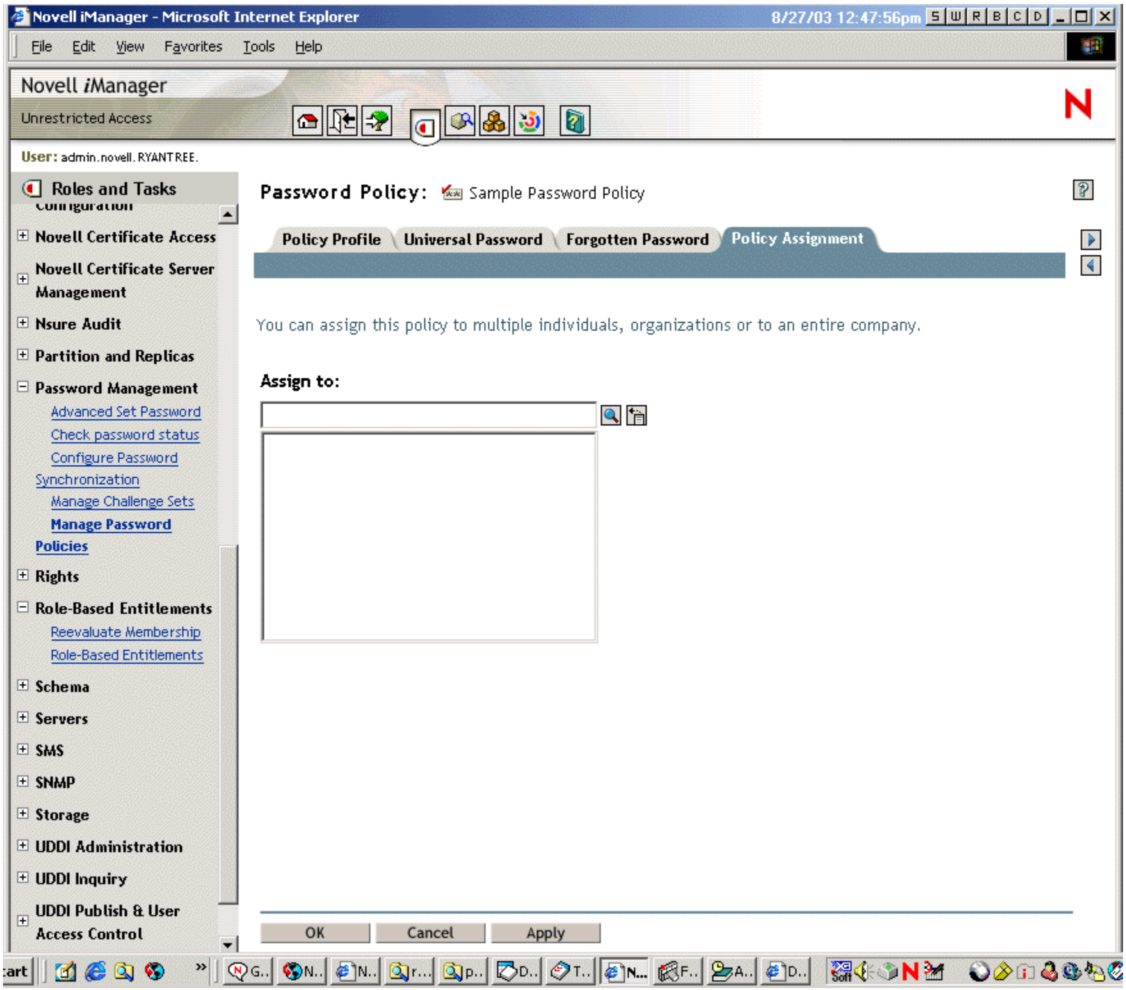
You can assign a Password Policy to users in eDirectory by assigning the policy to the whole tree (using the Login Policy object), specific partitions or containers, or specific users.

We recommend that you assign a default policy to the whole tree, and assign any other policies you use as high up in the tree as possible, to simplify administration.

NMAS determines which Password Policy is in effect for a user. See "Assigning Password Policies to Users" on page 110 for more information on how to assign password policies to users.

If you are using Password Synchronization, keep in mind that you must make sure that the users who are assigned Password Policies match up with the users you want to participate in Password Synchronization for connected systems. Password Policies are assigned with a tree-centric perspective. By contrast, Password Synchronization is set up per driver, on a per-server basis. To get the results you expect from Password Synchronization, make sure the users that are in a read/write or master replica on the server running the drivers for Password Synchronization match with the containers where you have assigned Password Policies with Universal Password enabled. Assigning a Password Policy to a partition root container ensures that all users in that container and subcontainers are assigned the Password Policy.

The following figure shows an example of the property page where you specify which object Password Policy is assigned to.



You can assign this policy to multiple individuals, organizations or to an entire company.

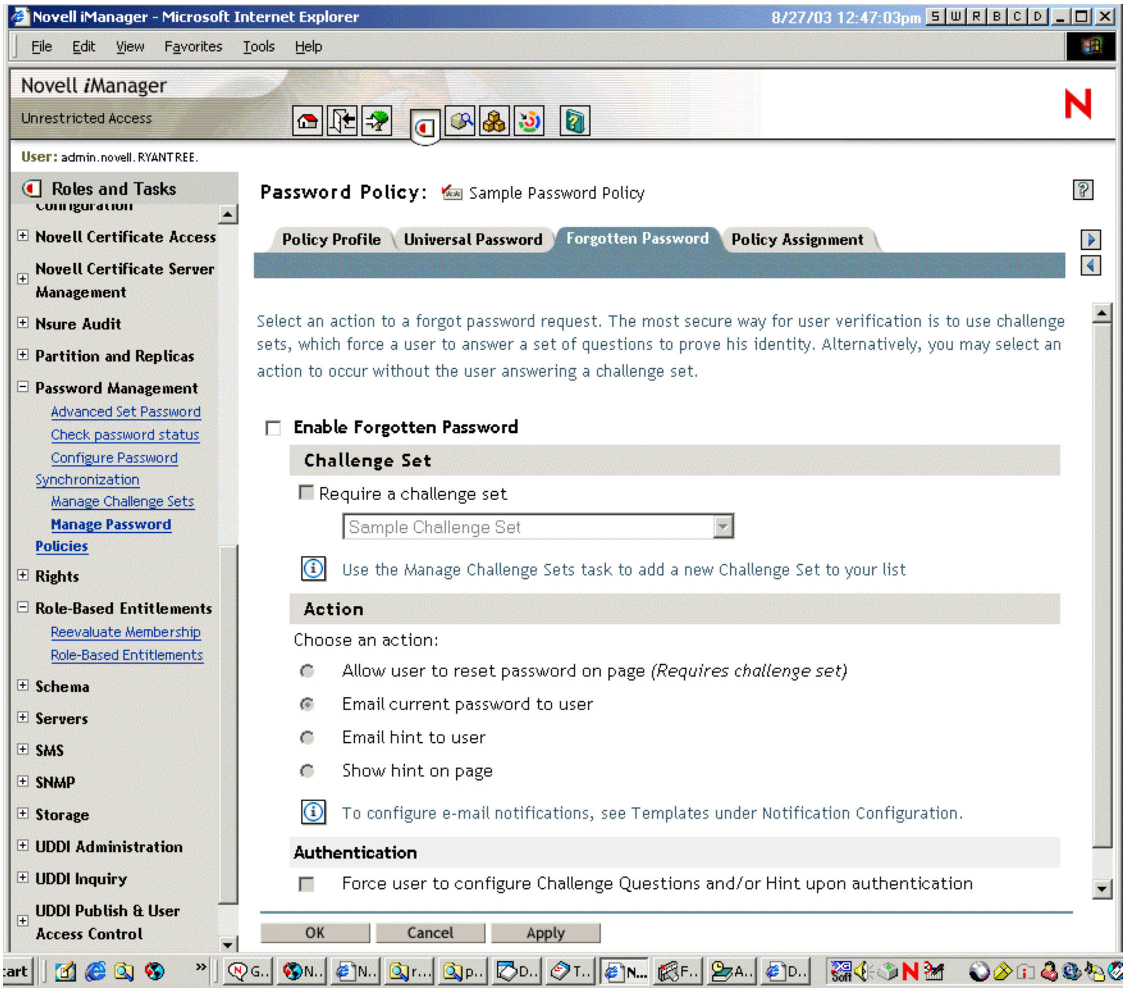
Enforcing Policies in eDirectory

When you assign a Password Policy to users in the tree, any password changes going forward must comply with the Advanced Password Rules in that policy. In the browser, the password rules are displayed in the page where the user changes the password. In the Novell Client 4.9 SP2 or later, the rules are also displayed. In both methods, a noncompliant password is rejected. NMAS is the application that enforces these rules.

You can specify that existing passwords are checked for compliance and users are required to change existing noncompliant passwords.

You can also specify that when users authenticate through iManager or the iManager self-service console, they are prompted to set up any Forgotten Password features you have enabled. This is called post-authentication services. For example, if you want users to create a Password Hint that can be e-mailed to them when they forget a password, you can use post-authentication services to prompt users to create a Password Hint at login time.

The post-authentication setting is the last option in the Forgotten Password property page, as shown in the following figure.



Password Policy: Sample Password Policy

Select an action to a forgot password request. The most secure way for user verification is to use challenge sets, which force a user to answer a set of questions to prove his identity. Alternatively, you may select an action to occur without the user answering a challenge set.

□ Enable Forgotten Password

Challenge Set

□ Require a challenge set

Sample Challenge Set

Use the Manage Challenge Sets task to add a new Challenge Set to your list

Action

Choose an action:

○ Allow user to reset password on page *(Requires challenge set)*

● Email current password to user

○ Email hint to user

○ Show hint on page

To configure e-mail notifications, see Templates under Notification Configuration.

Authentication

□ Force user to configure Challenge Questions and/or Hint upon authentication

Enforcing Policies on Connected Systems

If you are using Password Synchronization, settings are provided for each driver to let you enforce the Advanced Password Rules in a Password Policy.

You can do the following:

- Decide whether Identity Manager should accept passwords published by a connected system, as a general rule.
- Enforce policy on passwords coming in from a connected system. If the password doesn’t comply, Identity Manager does not accept it.

- Enforce policies on the connected system by resetting noncompliant passwords. If the password coming in to Identity Manager is noncompliant, Identity Manager can reject the password change to the identity vault, and it can also use the existing Identity Manager Distribution Password to reset the password on the connected system.
- Notify users when password synchronization is not successful. For example, if the user created a noncompliant password on a connected system and Identity Manager did not accept it, the user could be informed by e-mail so she knows the password change was not synchronized.

If you are using Advanced Password Rules and are using Identity Manager Password Synchronization, we recommend that you research the password policies for all the connected systems to make sure the Advanced Password Rules in the eDirectory Password Policy are compatible, so that passwords can be synchronized successfully.

Keep in mind that you must make sure that the users who are assigned Password Policies match with the users you want to participate in Password Synchronization for connected systems.

Password Policies are assigned with a tree-centric perspective. By contrast, Password Synchronization is set up per driver, and drivers are installed on a per-server basis and can manage only those users who are in a master or read/write replica. To get the results you expect from Password Synchronization, make sure the users that are in a master or read/write replica on the server running the drivers for Password Synchronization match with the containers where you have assigned Password Policies with Universal Password enabled. Assigning a Password Policy to a partition root container ensures that all users in that container and subcontainers are assigned the Password Policy.

For more information on how you specify password flow, see "Password Synchronization Settings You Create Using Global Configuration Values" on page 159.

Viewing Which Password Policy Is in Effect for a User

In iManager, you can check to see which policy is in effect for a user. See "Finding Out Which Policy a User Has" on page 111.

Setting Universal Password for a User

To allow administrators or help desk personnel to set the Universal Password for a user, a new iManager plugin is provided. This plugin displays the Advanced Password Rules from the users' Password Policy, to help the administrator or help desk user create a compliant Universal Password. The Set Universal Password task is located in the Password Management role.

Planning for Password Policies

In this section:

- "Planning How to Assign Password Policies in the Tree" on page 104
- "Planning the Rules for Your Password Policies" on page 104
- "Planning Login and Change Password Methods for your Users" on page 104

Planning How to Assign Password Policies in the Tree

We recommend that you assign a default policy to the whole tree, and assign any other policies you use as high up in the tree as possible, to simplify administration.

NMAS determines which Password Policy is in effect for a user. See "Assigning Password Policies to Users" on page 110 for more information on how to assign password policies to users.

Planning the Rules for Your Password Policies

You can use the Advanced Password Rules in a password policy to enforce your business policies for passwords.

Keep in mind that only the Novell Client (4.9 SP2) and the iManager self-service console display the password rules from the Password Policy. If your users will be changing their passwords through the LDAP server or on a connected system, you need to make the password rules readily available to users to help them be successful in creating a compliant password.

If you are using Password Synchronization, keep in mind that you must make sure that the users who are assigned Password Policies match with the users you want to participate in Password Synchronization for connected systems. Password Policies are assigned with a tree-centric perspective. By contrast, Password Synchronization is set up per driver, on a per-server basis. To get the results you expect from Password Synchronization, make sure the users that are in a read/write or master replica on the server running the drivers for Password Synchronization match with the containers where you have assigned Password Policies with Universal Password enabled. Assigning a Password Policy to a partition root container ensures that all users in that container and subcontainers are assigned the Password Policy.

Planning Login and Change Password Methods for your Users

There are several different ways a user can log in or change a password.

For all of them, you need to upgrade your environment to eDirectory 8.7.1 or later with the associated LDAP server, NMAS 2.3 or later, and iManager 2.0.2 or later. For more information about upgrading to support Universal Password, see "Deploying Universal Password" in the *Novell Modular Authentication Services (NMAS) 2.3 Administration Guide* (http://www.novell.com/documentation/nmas23/index.html).

This section explains the additional requirements for supporting Universal Password in each case.

- "Novell Client" on page 104
- "iManager and the iManager Self-Service Console" on page 105
- "Other Protocols Such As LDAP" on page 105
- "Connected Systems" on page 106

Novell Client

Upgrade the Novell Client to version 4.9 SP2 or later, if you are using the Client.

Keep in mind that using the Novell Client is not required, because users can log in through the iManager self-service console or other company portals depending on your environment. Also, the Novell Client is no longer required for Password Synchronization on AD or NT.

The following table describes the differences in Novell Client versions in regard to Universal Password, and gives suggestions for how to handle legacy Clients.

Novell Client version	Login	Change Password
before 4.9	Does not go through NMAS, so it does not support Universal Password. Instead, it logs in directly using the NDS Password.	Changes the NDS Password directly, instead of going through NMAS. If you are using Universal Password, this can create a problem called "password drift,“ meaning that the NDS Password and the Universal Password are not kept synchronized. To prevent this, you have three choices: ◆ Upgrade all the clients to version 4.9 or later. ◆ Block legacy clients from changing passwords, using an attribute value on a container. With this solution, legacy clients can still log in, but they cannot change the password. Password changes must be done using a later Client or iManager. See "Preventing Legacy Novell Clients from Changing Passwords" on page 106. ◆ Use the Password Policy setting, Remove the NDS Password when Setting Universal Password. This is a rather drastic measure, because it prevents both login and password change using NDS Password.
4.9	Supports Universal Password.	Enforces Password Policy rules for Universal Password. If a user tries to create a password that is not compliant, the password change is rejected. However, the list of rules is not displayed to the user.
4.9 SP2	Supports Universal Password.	Enforces Password Policy rules for Universal Password. In addition, it displays the rules to the user to help them create compliant passwords.

iManager and the iManager Self-Service Console

The iManager self-service console provides Password Self-Service, so users can reset passwords and set up Forgotten Password Self-Service if the Password Policy provides it. The iManager self-service console is accessible to users on your iManager server using a URL such as https://www.*servername*.com/nps. For example, https://www.myiManager.com/nps.

- Make sure users have a browser that supports iManager 2.0.2 or later.
- We recommend that in your Password Policies you select Synchronize NDS password When Setting Universal Password. It is the default setting.
- Make sure you have the NMAS Simple Password login method installed. You can install it when you install eDirectory, or you can manually install it afterward.

Other Protocols Such As LDAP

As noted above, make sure that eDirectory, LDAP server, NMAS, and iManager are upgraded to support Universal Password.

For information about using AFP, CIFS, and other protocols with Universal Password, see "Deploying Universal Password" in the *Novell Modular Authentication Services (NMAS) 2.3 Administration Guide* (http://www.novell.com/documentation/nmas23/index.html).

Connected Systems

If you are using Identity Manager Password Synchronization, make sure the following requirements are met so that user password changes are successful.

- The DirXML driver for the system has been upgraded to Identity Manager format
- The DirXML driver configuration includes the new Password Synchronization Policies, as described in "New Driver Configuration and Identity Manager Password Synchronization" on page 172 and "Upgrading Existing Driver Configurations to Support Identity Manager Password Synchronization" on page 174.
- The Password Synchronization settings specify that Universal Password should be used, and Distribution Password as well if bidirectional Password Synchronization is desired.
- Password filters have been deployed on the connected system to capture passwords, if necessary.

For more information, see Chapter 10, "Password Synchronization across Connected Systems," on page 149.

Preventing Legacy Novell Clients from Changing Passwords

For versions of the Novell Client previous to 4.9, login and password changes go straight to the NDS Password instead of through NMAS, so Universal Password is not supported.

If you are using Universal Password, using legacy Clients to change passwords can create a problem called "password drift,“ meaning that the NDS Password and the Universal Password are not kept synchronized.

To prevent this issue, one option is to block password changes from Clients older than version 4.9. This is done using an eDirectory attribute on a partition root container, class, or object. The attributes are part of the schema in eDirectory 8.7.1 or later, and are not supported on eDirectory 8.7.0 or earlier.

The method used by legacy Clients to change the NDS Password is called NDAP password management. The following list explains how you can use an attribute to disable NDAP password management at the partition level. You can still enable it per class or object if necessary, using other attributes.

- **ndapPartitionPasswordMgmt.** For partition-level containers. If the attribute is not present or the value is not set at the partition level, then NDAP password management is enabled.

  To disable NDAP password management, add this attribute to the partition and set it to 0. To enable it again, set the attribute to 1.

  You can use the other attributes listed below to let classes or objects use NDAP password management even if it is disabled at the partition level. However, if NDAP password management is enabled at the partition level, then NDAP password management is enabled for all objects in that partition regardless of the class and entry level policies.
- **ndapClassPasswordMgmt.** For a class. If you add this attribute to a class definition, the class can use NDAP password management even if the partition-level policy specifies that it is disabled. (The presence of this attribute is what enables is NDAP password management; the value is not important.)

- **ndapPasswordMgmt.** For a specific object. If you add this attribute to a specific object and set the value to 1, the object can use NDAP password management even if the partition or class specifies that it is disabled.

  A setting of 0 disables NDAP password management, but only if it is also disabled at the partition level.

IMPORTANT: Remember that eDirectory 8.7.0 or earlier does not support this feature. If a tree exists with an eDir 8.7.1 server or later and an eDir 8.7.0 server or earlier, and the two servers share a partition, disabling NDAP password management on that partition will have unreliable results. The 8.7.1 server enforces the setting, preventing legacy Clients from changing the NDS Password. However, the 8.7.0 server does not enforce the setting, so if a user tries to change the NDS Password via the 8.7.0 server, the change succeeds.

Prerequisites for Using Password Policies

If you want to take advantage of all the features of Password Policies, you need to complete some steps to prepare your environment.

1. Upgrade your environment to support Universal Password.

   For more information, see "Deploying Universal Password" in the *Novell Modular Authentication Services (NMAS) 2.3 Administration Guide* (http://www.novell.com/documentation/nmas23/index.html).

   If you are not yet ready to deploy Universal Password, or you have eDirectory 8.6.2, find out which Password Policy features you can use without Universal Password in "Feature Support for eDirectory 8.6.2 and eDirectory 8.7.3" on page 279.

2. Upgrade your client environment to support Universal Password.

   See "Planning Login and Change Password Methods for your Users" on page 104, and "Deploying Universal Password" in the *Novell Modular Authentication Services (NMAS) 2.3 Administration Guide* (http://www.novell.com/documentation/nmas23/index.html).

3. If you have not run the iManager Configuration Wizard previously when you set up iManager (either as part of the iManager install or post-installation), you must run it.

   IMPORTANT: After you run the iManager Configuration Wizard, iManager runs in RBS mode. This means that administrators do not see any tasks unless they have assigned themselves to specific roles. Make sure you assign administrators to roles to give them access to all the iManager tasks.

4. Install Identity Manager, as explained in Chapter 4, "Installation," on page 45.

   The Password Management plug-ins are part of this installation on the iManager web server.

   For Password Policies, no changes are necessary to driver configurations unless you are using Password Synchronization to enforce Password Policies when synchronizing passwords between Identity Manager and connected systems.

5. Make sure that SSL is configured between the iManager Web server and eDirectory, even if they are running on the same machine.

   This is a requirement for NMAS 2.3 or later, and for Step 6.

6. Make sure the LDAP Group-Server object in eDirectory is configured to require TLS for simple bind.

   This is the default setting when you configure iManager. Requiring TLS for simple bind is strongly recommended for Password Self-Service functionality, and is required for using the iManager task, Password Management > Set Universal Password.

If you are requiring TLS for simple bind, no additional configuration is needed for the LDAP SSL port.

IMPORTANT: If you choose not to require TLS for simple bind, this means that users are allowed to log in to the iManager self-service console using a clear-text password.

You can use this option, but another step is required.

By default, the Password Self-Service functionality assumes that the LDAP SSL port is the one specified in the System.DirectoryAddress setting in the PortalServlet.properties file. If your LDAP SSL port is different, you must indicate the correct port by adding the following key pair to the PortalServlet.properties file:

LDAPSSLPort=your_port_number

For example, if you are running Tomcat, you would add this keypair in the PortalServlet.properties file in the tomcat\webapps\nps\WEB_INF directory.

7. To enable e-mail notification for Forgotten Password features, complete the steps in "Configuring E-Mail Notification" on page 214.

   You must set up the SMTP server and customize the e-mail templates.

8. (NetWare 6.5 users only) If you have previously set up Universal Password for use with NetWare 6.5, complete the steps in "(NetWare 6.5 only) Re-Creating Universal Password Assignments" on page 108.

You are now ready to use all the features of Password Policies. Create policies as described in "Creating Password Policies" on page 110.

Deploying Password Policies without Universal Password

We recommend that you prepare your environment and turn on Universal Password so you can use all the features of Password Policies and Password Synchronization. However, if you are not ready to do so, there are some features you can use without deploying Universal Password.

For a list, see "Feature Support for eDirectory 8.6.2 and eDirectory 8.7.3" on page 279. It explains what you can use with eDirectory 8.6.2, or with eDirectory 8.7.3 if you have Universal Password disabled.

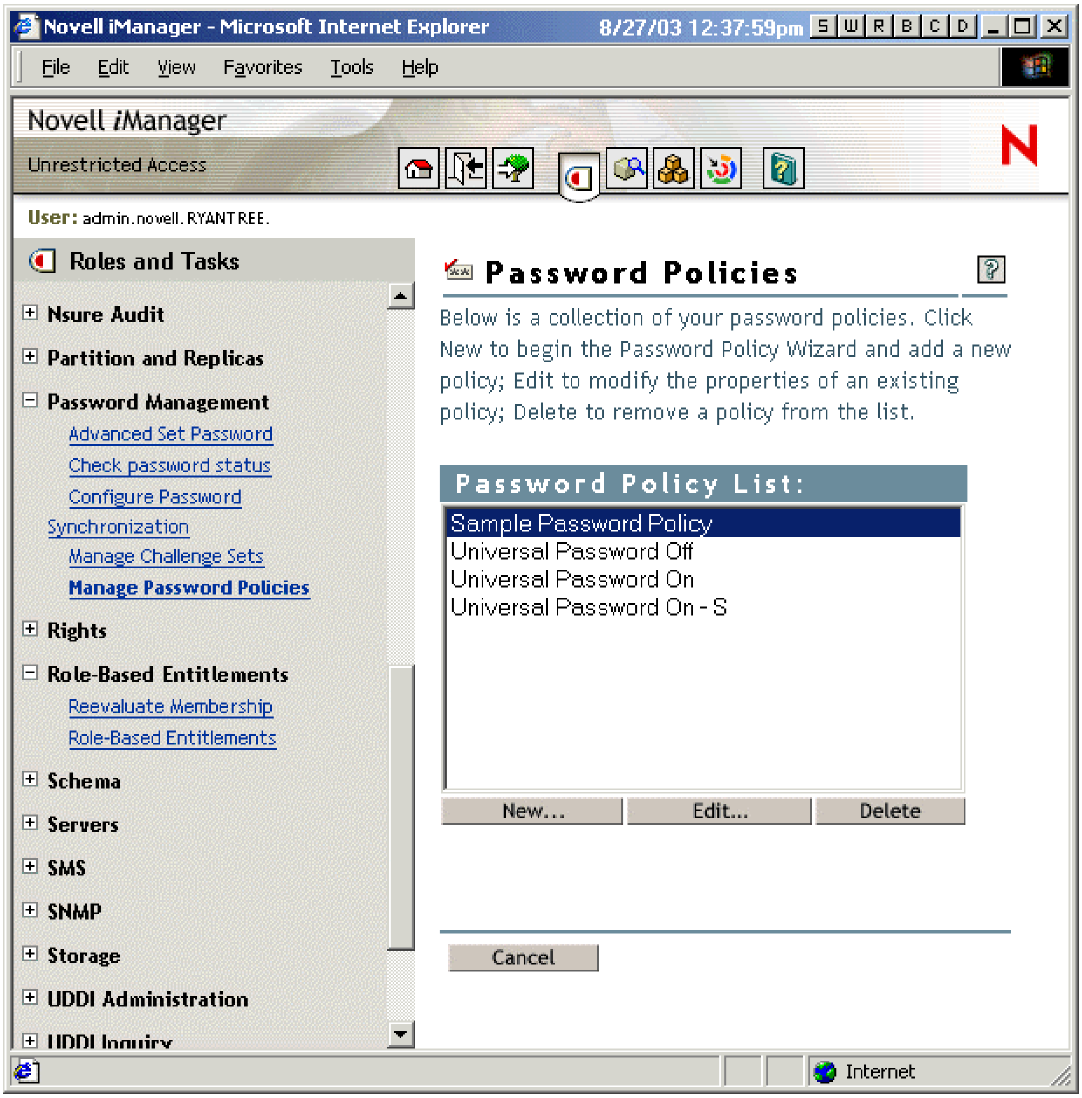
(NetWare 6.5 only) Re-Creating Universal Password Assignments

If you have previously set up Universal Password for use with NetWare 6.5, you must remove the old password policies, and use the new plug-ins and password policies.

- After you install Identity Manager, the NMAS plugins that were used in NetWare 6.5 for Universal Password are no longer available. Instead you use Password Management > Manage Password Policies, which offers more features.
- The first time you use the Manage Password Policies in the new plug-ins, you see three policy objects in the list that cannot be edited:
  - Universal Passsword On
  - Universal Passsword Off
  - Universal Passsword On - S

  These objects were used for the NetWare 6.5 implementation of Universal Password. To take advantage of the additional benefits of Password Policies provided by Identity Manager , you need to remove them.

The following figure shows an example:



Below is a collection of your password policies. Click New to begin the Password Policy Wizard and add a new policy; Edit to modify the properties of an existing policy; Delete to remove a policy from the list.

Sample Password Policy
Universal Password Off
Universal Password On
Universal Password On - S

To remove the old policy objects and re-create your policies using Password Policies:

1 Decide where you want Universal Password enabled in your tree.

- If you want it turned on for the same containers as when you set up Universal Password the first time with the NetWare 6.5 plugins, continue with Step 2.
- If you want it turned on everywhere in your tree, simply create a new Password Policy with Universal Password enabled, and assign it to the Login Policy object. Then continue with Step 4 to remove the old policies.

2 Find out where in the tree you had previously enabled Universal Password when you set it up using the plug-ins that shipped with NetWare 6.5.

This step is necessary because the plug-ins do not display where the assignments were made using the old plug-ins. Instead, you find out by searching the tree.

2a Search the tree for objects that have the nspmPasswordPolicyDN attribute populated with one of the following values:

    - Universal Password On
    - Universal Password On - S

    2b Make a note of all the containers that are the results of the search. These are the containers where Universal Password is turned on.

3. If you want Universal Password assigned in the same containers where you had assigned it previously, create one or more new Password Policies with Universal Password enabled, and assign them to the same containers.

   Refer to the list of containers from Step 2, to make sure your assignments match.

4. Go into Password Management > Manage Password Policies and remove the policy objects that remain from the first NetWare 6.5 implementation:

   - Universal Password Off
   - Universal Password On
   - Universal Password On - S

After removing the old policy objects, you can use new Password Policies to meet your password needs.

Creating Password Policies

1. Make sure you have completed the steps in "Prerequisites for Using Password Policies" on page 107. These steps prepare you to use all the features of Password Policies.
2. In iManager, click Password Management > Manage Password Policies.
3. Click New to create a new Password Policy.
4. Follow the steps in the wizard to create Advanced Password Rules, Universal Password Configuration Options, and Forgotten Password selections for the policy.

   See the online help for information about each step, as well as the information in Chapter 8, "Managing Passwords by Using Password Policies," on page 95 and in Chapter 9, "Password Self-Service," on page 115.

Assigning Password Policies to Users

We encourage you to set Password Policies as high up in the tree as you can, to simplify administration.

A policy is not in effect until you assign it to one or more objects. You can assign a password policy to the following objects:

- Login Policy object

  We recommend that you create a default Password Policy for all users in the tree, which you do by creating a policy and assigning it to the Login Policy object. The Login Policy object is located in the Security container just below the root of the tree.

- A container that is a partition root

  If you assign a policy to a container that is the root of a partition, the policy assignment is inherited by all users in that partition, including users in subcontainers. To determine whether a container is a partition root, browse for the container and note whether a partition icon displayed beside it, like the following example:

- A container that is not a partition root

  If you assign a policy to a container that is not the root of a partition, the policy assignment is inherited only by users held in that specific container. It is not inherited by users that are held in subcontainers. If you want the policy to apply to all users below a container that is not a partition root, you must assign the policy to each subcontainer individually.

- A specific user

NOTE: Special Password Policies are automatically created for Driver Set objects.

Only one policy is effective for a user at a time. Novell Modular Authentication Services (NMAS) determines which policy is effective for a user by looking for policies in this order, and applying the first one it finds.

1. Specific user assignment: If a password policy has been assigned specifically to the user, that policy is applied.
2. Container: If the user has no specific assignment, NMAS applies the policy that is assigned to the container which holds the user.
3. Partition root container: If no policy is assigned to the user or to the container directly above the user, the policy assigned to the partition root container is applied.
4. Login Policy object: If no policy is assigned to the user or other containers, the policy assigned to the Login Policy object is applied. It is the default policy for all users in the tree.

Finding Out Which Policy a User Has

Only one policy is in effect for a user at a time. To find out which policy is in effect for a particular user or container, go to iManager > Password Management > View Policy Assignment.

If there are multiple policies in the tree, NMAS determines which policy to apply to a user as described in "Assigning Password Policies to Users" on page 110.

Setting A User's Password

Administrators or help desk personnel can set a user's Universal Password using a new task in iManager. The task shows the password rules for the Password Policy that is in effect for the user.

1 In iManager, click Password Management > Set Universal Password.

If the user has a password policy assigned, and Universal Password enabled, you are allowed to change the password using this task.

If the Advanced Password Rules are enabled in the policy, you see a list of rules that must be followed.

NOTE: If Universal Password is not enabled for a user, the Advanced Password Set task displays an error and the password is not changed. You must either assign a policy to the user and then return to this task, or change the user's NDS password using the eDirectory Administration > Modify Object task.

2 Create a password for the user, making sure it is compliant with all password rules that are displayed.

The Universal Password is changed for the user.

If Password Synchronization is set up in your environment, the user's new password is distributed to the connected systems that are configured to accept it.

NOTE: A security enhancement was added to NMAS 2.3.4 regarding Universal Passwords changed by an administrator. It works basically the same way as the feature previously provided for NDS Password. If an administrator changes a user's password, such as when creating a new user or in response to a help desk call, for security the password is automatically expired if you have enabled the setting to expire passwords in the Password Policy. The setting in the Password Policy is in Advanced Password Rules, named "Number of days before password expires (0-365)." For this particular feature, the number of days is not important, but the setting must be enabled.

Creating or Editing Challenge Sets

See "Creating or Editing Challenge Sets" on page 138.

Configuring Notification for Password Features

Follow the instructions in "Configuring E-Mail Notification" on page 214.

Troubleshooting Password Policies

- iManager self-service login requiring full DN: If you have to type a full DN at the login prompt, the user object probably does not reside under the container specified during iManager/Portal configuration. You need to run the Portal Servlet Configuration Wizard (http://*your_iManager_server*/nps/servlet/), and specify additional login containers for the contextless login. The Forgotten Password feature also uses this setting to resolve a user's DN.
- Errors about Password Policy not assigned to a user: If you see an error saying that a Password Policy is not assigned to a user from the Set Universal Password task, and you know that the user does have a Password Policy assigned, SSL might be the issue.
    - To help confirm that SSL configuration is the problem, use the View Policy Assignment task to check the policy for that user. If the View Policy Assignment task displays an NMAS Transport error, this also can be an indicator that SSL is not configured properly.
    - Make sure that SSL is configured correctly between the Web server running iManager and the primary eDirectory tree. Confirm that you have a certificate configured between the Web server and eDirectory.

      This can be a problem if you are running iManager on Windows 2000 machine with IIS as the web server, since iManager install doesn't automatically configure the certificate for you in that scenario.
    - If you are not requiring TLS for simple bind, you must make sure you indicate the correct LDAP SSL port as explained in the note in Step 6, in "Prerequisites for Using Password Policies" on page 107.
- Using Challenge Response questions: Make sure that you are using a browser that iManager 2.02 supports.
- Giving access to users in new containers: When you set up iManager, or one of Novell's portal products such as exteNd™ Director™ Standard Edition, you specify the portal users container. Usually you specify a container at a high level in the tree, so that all users in the tree can access portal features. If all your users are below that container, then all users have access to Forgotten Password and Reset Password Self-Service.

  If you later create a container with users outside the portal users container, and these users can't access Forgotten Password and Reset Password features, you'll need to specifically assign rights to the following gadgets for that new container: Challenge Response Setup, Change Universal Password, Hint Setup.

For instructions on adding new users to the portal users container, see Portal User in the *Novell exteNd Director Platform Edition Installation and Configuration Guide* (http://www.novell.com/documentation/lg/nedpe41/configure/data/ajhotzv.html#ajhotzv).

- NMAS LDAP Transport Error: If you are installing Identity Manager in a multi-server environment, and use some of the Password Management plug-ins in iManager, you might see an error that begins with "NMAS LDAP Transport Error."

  One common cause of this error is that the PortalServlet.properties file is pointing to an LDAP server that does not have the NMAS™ extensions that are needed for Identity Manager. Open the PortalServlet.properties file and make sure the address for the LDAP server is the same server where you installed Identity Manager.

  Other possible causes:

  - The LDAP server is not running.
  - SSL is not configured for LDAP between the iManager server running the plug-ins and the LDAP server.
  - When logging into other trees with iManager to manage remote Identity Manager DirXML servers, you might encounter errors if you use the server name instead of the IP address for the remote server.
  - The trusted root certificate of the tree you authenticate to must be imported as a trusted certificate onto the Web server. You can use keytool.exe to export the certificate to the Web server. (If you install eGuide, the certificate is exported to the Web server during the configuration process.)
  - The LDAP server group object in eDirectory must be configured to require TLS on simple binds. You set this option by editing the LDAP server object properties in iManager.
- If you are using Identity Manager Password Synchronization, also see the following sections:
  - "Troubleshooting Password Synchronization" on page 227.
  - The troubleshooting sections for each scenario in "Implementing Password Synchronization" on page 179.
  - Documentation for the specific driver involved, on the Drivers Documentation Web site (http://www.novell.com/documentation/lg/dirxmldrivers).

9 Password Self-Service

Using Password Policies, you can decrease help desk costs by providing users with self-service options for forgotten passwords and for resetting passwords.

Before using Password Self-Service, review the information about Password Policies in Chapter 8, “Managing Passwords by Using Password Policies,” on page 95.

In this section:

Overview of Self-Service Features

Password Policies include Forgotten Password Self-Service, to reduce help desk calls for forgotten passwords, and Reset Password Self-Service, which lets users change their passwords while viewing the rules the administrator has specified in the Password Policy. Users access these features through the iManager self-service console.

Most features of password management require Universal Password to be enabled. Ideally, you would also integrate the iManager self-service console into your existing company portal, to give users easy access to Forgotten Password Self-Service and Reset Password Self-service.

The new Password Self-Service features let you do the following:

- “Providing Users with Forgotten Password Self-Service” on page 100
- “Providing Users with Reset Password Self-Service” on page 100

Providing Users with Forgotten Password Self-Service

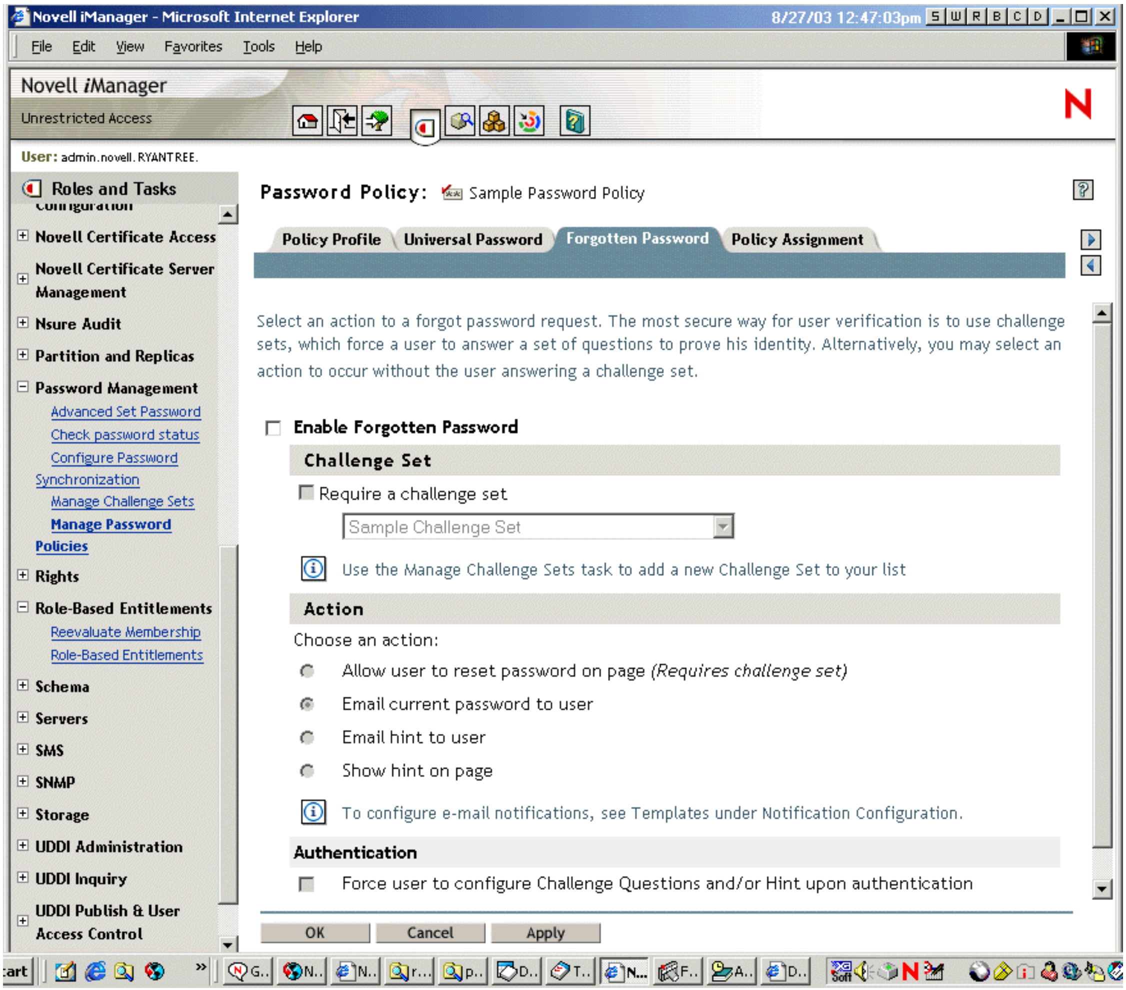
Using a Password Policy, you can provide users with the ability to recover from a forgotten password without contacting the help desk. The “Forgot your password?” link is available when users log in to the iManager self-service console.

The Forgotten Password Self-Service features include the following:

- Challenge Sets, to let user answer questions to prove identity
- Ability to e-mail a password hint or the forgotten password to the user
- Ability to let user reset a password in the browser during a forgotten password request

To see examples of what the user will experience using the “Forgot your password?” link, see “Providing End Users with Forgotten Password Self-Service” on page 118.

The following figure shows an example of the property page where you specify Forgotten Password settings for a Password Policy.



Password Policy: Sample Password Policy

Select an action to a forgot password request. The most secure way for user verification is to use challenge sets, which force a user to answer a set of questions to prove his identity. Alternatively, you may select an action to occur without the user answering a challenge set.

□ Enable Forgotten Password

Challenge Set

□ Require a challenge set

Sample Challenge Set

Use the Manage Challenge Sets task to add a new Challenge Set to your list

Action

Choose an action:

○ Allow user to reset password on page *(Requires challenge set)*

● Email current password to user

○ Email hint to user

○ Show hint on page

To configure e-mail notifications, see Templates under Notification Configuration.

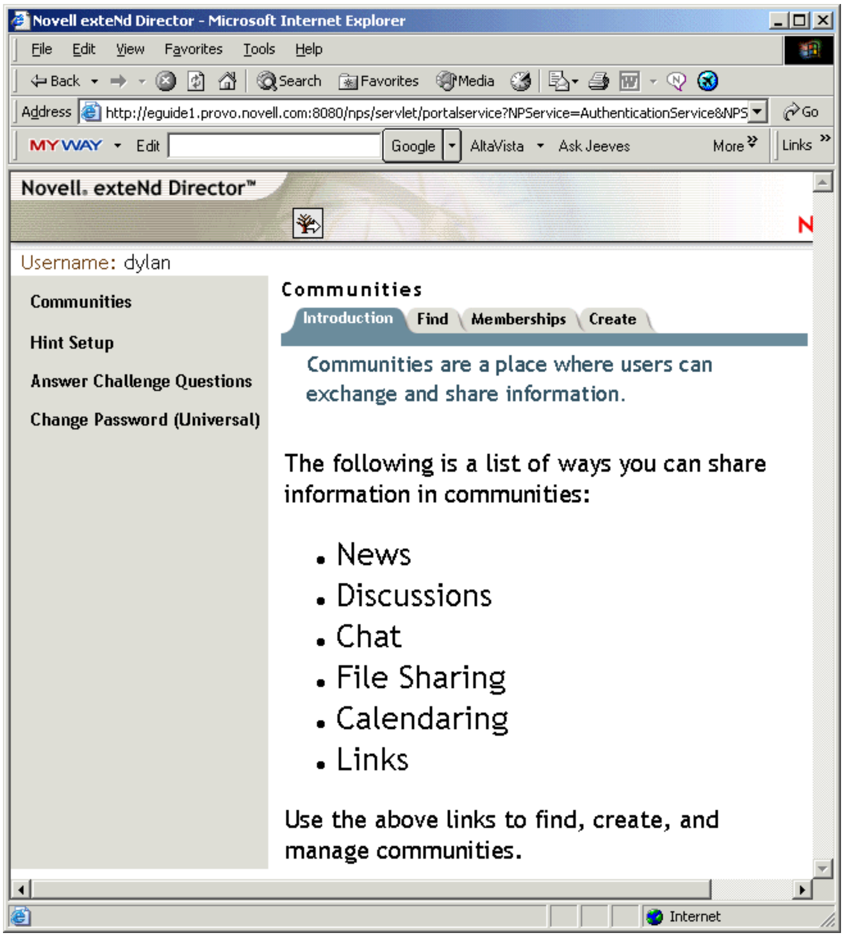
Authentication

□ Force user to configure Challenge Questions and/or Hint upon authentication

Providing Users with Reset Password Self-Service

Using the iManager self-service console, users can reset their passwords while viewing the Advanced Password Rules. They do this using the Change Password (Universal) gadget.

Here’s an example of the screen they see when they log in to the iManager self-service console on your iManager web server, using a URL like https://www.*servername*.com/nps.


Novell exteNd Director - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
MY WAY Edit Google AltaVista Ask Jeeves More Links
Novell. exteNd Director™
Communities
Hint Setup
Answer Challenge Questions
Change Password (Universal)
Introduction Find Memberships Create
Internet

Address http://eguide1.provo.novell.com:8080/nps/servlet/portalservice?NPService=AuthenticationService&NPS

Username: dylan

Communities

Communities are a place where users can exchange and share information.

The following is a list of ways you can share information in communities:

- News
- Discussions
- Chat
- File Sharing
- Calendaring
- Links

Use the above links to find, create, and manage communities.

To see examples of what the user will experience using the Change Password (Universal) link, see “Providing End Users with Password Reset Self-Service” on page 136.

Prerequisites for Using Password Self-Service

Review the information in Chapter 8, “Managing Passwords by Using Password Policies,” on page 95, and meet the prerequisites in “Prerequisites for Using Password Policies” on page 107.

We recommend that you prepare your environment and turn on Universal Password so you can use all the features of Password Policies. However, if you are not ready to do so, there are some features you can use without deploying Universal Password.

For a list, see “Feature Support for eDirectory 8.6.2 and eDirectory 8.7.3” on page 279. It explains what you can use with Novell® eDirectory™ 8.6.2, or with eDirectory 8.7.3 if you have Universal Password disabled.

Planning for Login Methods for Password Self-Service

The iManager self-service console is accessible to end users on your iManager server using a URL such as https://www.*my_iManager_server*.com/nps.

Upgrade your client environment to support Universal Password, as described in "Planning Login and Change Password Methods for your Users" on page 104.

For more information, see "Deploying Universal Password" in the *Novell Modular Authentication Services (NMAS) 2.3 Administration Guide* (http://www.novell.com/documentation/nmas23/index.html).

Providing End Users with Forgotten Password Self-Service

When you use the New Password Policy wizard to create a Password Policy, you are prompted to decide what Forgotten Password features you want to provide to your end users.

This section gives more detail about your options and shows examples of the end-user experience when using the "Forgot your password?" link.

In this section:

Challenge Sets

A Challenge Set is a set of questions that can be answered by a user to prove his or her identity, instead of using a password. The Challenge Set is assigned to a Password Policy and is used as part of a Password Policy's method of authentication. You can use Challenge Sets as part of providing Forgotten Password self-service for your users. Requiring a user to answer Challenge Set questions before receiving forgotten password help provides an additional level of security. To use a Challenge Set, use the Manage Password Policies task to create a Password Policy and set up Forgotten Password.

When you create a Password Policy, you can enable Forgotten Password self-service so that users can get help without calling the help desk. To make self-service more secure, you can create a Challenge Set and specify that users must answer the Challenge Set questions before obtaining forgotten password help. You also specify what action takes place to help users after they answer the questions, such as displaying a Password Hint to the user. These self-service features are available to users through the Novell iManager self-service console. Your choices are explained in "Forgotten Password Actions" on page 119.

You define the structure of the Challenge Set questions, using the following choices:

Admin-Defined: The administrator can create questions that are presented to every user. Each user's answer, however, is unique.

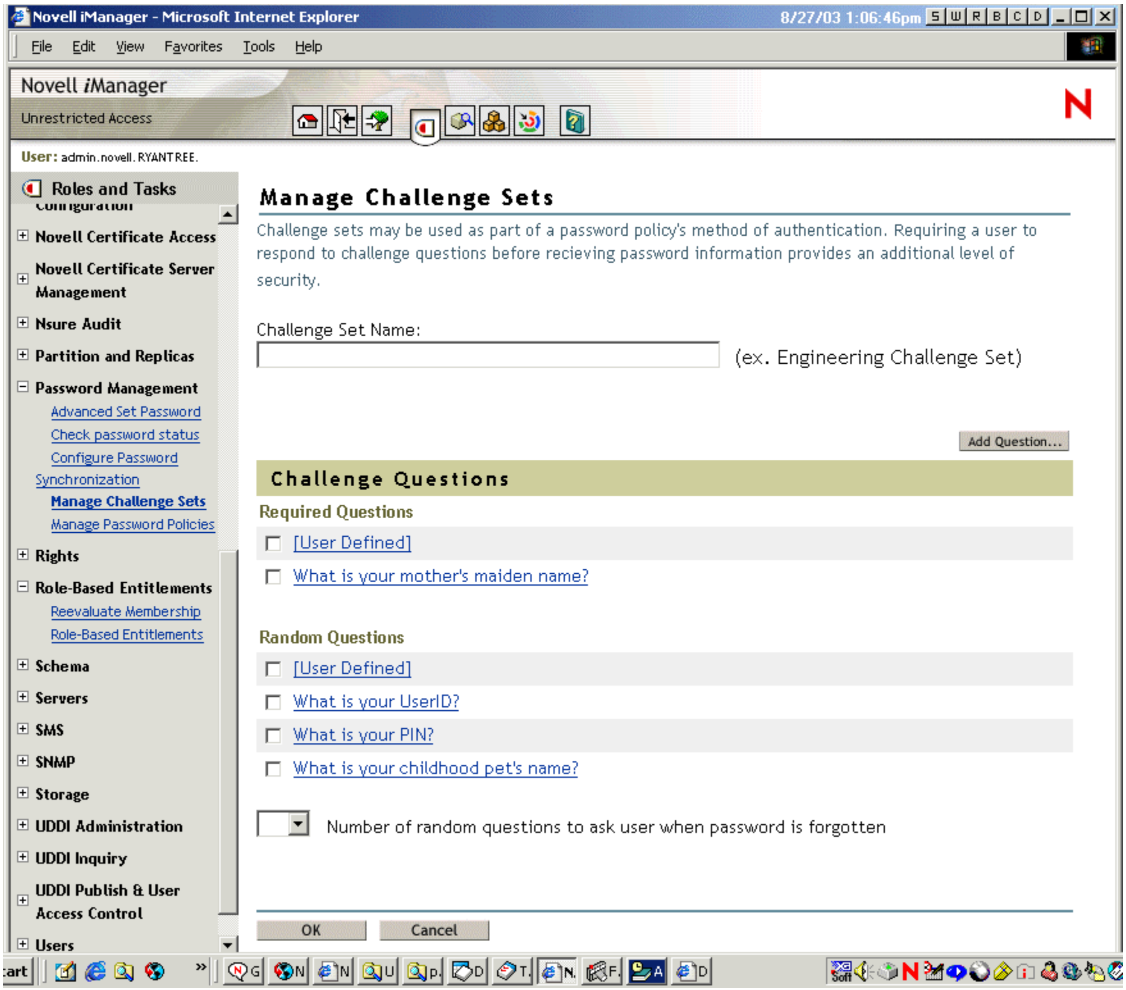
User-Defined: The administrator can specify that one or more questions are created by the user. In this case, both the questions and the answers for each user will be unique.

Required: Questions in this list are always presented to users when they use the Forgotten Password self-service feature.

Random: Questions in this list are presented to the user as a complete set only once, when the user sets up Forgotten Password by answering the Challenge Set questions the first time. When the user needs to access the Forgotten Password, only a few of the questions are presented for the user to answer. The number of random questions presented is determined by the administrator.

A user's responses and user-defined questions are stored in Novell eDirectory by Novell Modular Authentication Services (NMAS).

Here's an example of the screen where you create a new Challenge Set. You can choose from some sample questions that are provided by default, or add your own.



Manage Challenge Sets

Challenge sets may be used as part of a password policy's method of authentication. Requiring a user to respond to challenge questions before recieving password information provides an additional level of security.

Challenge Set Name: (ex. Engineering Challenge Set)

Add Question...

Challenge Questions

Required Questions

□ [User Defined]

□ What is your mother's maiden name?

Random Questions

□ [User Defined]

□ What is your UserID?

□ What is your PIN?

□ What is your childhood pet's name?

Number of random questions to ask user when password is forgotten

OK Cancel

Forgotten Password Actions

The following Forgotten Password Actions are provided in a Password Policy, if you enable Forgotten Password:

- **Allow user to reset password on page:** After answering the Challenge Set questions to prove his or her identity, the user is allowed to change to a new password. Because the user has authenticated through answering the challenge questions, the user is allowed to change the password without being required to provide the old password. To use this option, the administrator must require a Challenge Set, and the user must have previously set up Forgotten Password in the iManager self-service console by answering the Challenge Set questions.

- **E-mail current password to user:** After answering the Challenge Set questions to prove his or her identity, the user receives the current password in an e-mail. To use this option, the administrator must enable Universal Password for the policy and enable the option “Allow user to retrieve password” (both are found in Universal Password > Configuration Options), and must set up e-mail notification as described in “Configuring E-Mail Notification” on page 214. Also, the user must have previously set up Forgotten Password in the iManager self-service console by answering the Challenge Set questions.
- **E-mail hint to user:** The user receives the Password Hint in an e-mail. To use this option, the administrator must set up e-mail notification as described in “Configuring E-Mail Notification” on page 214, and the user must have previously set up Forgotten Password in the iManager self-service console by providing a Password Hint.
- **Show hint on page:** The user is shown the Password Hint in the iManager self-service console. To use this option, the user must have previously set up Forgotten Password in the iManager self-service console by providing a Password Hint.

Password Hints

If you specify a Forgotten Password Action that requires Password Hint, the user can enter a hint that is a reminder of the password. The Password Hint is checked to make sure that it does not contain the users’s password.

The Password Hint attribute (nsimHint) is publicly readable, to allow unauthenticated users who have forgotten a password to access their own hint. Password Hints can be a big help in reducing help desk calls.

For security, Password Hints are checked to make sure they do not contain the user’s actual password. However, a user could still create a Password Hint that gives too much information about the password.

To increase security when using Password Hints,

- Allow access to the nsimHint attribute only on the LDAP server used for Password Self-Service.
- Require that users answer Challenge Questions before receiving the Password Hint.
- Remind users to create Password Hints that only they would understand. The Password Change Message in the Password Policy is one way to do that. See “Adding Your Own Password Change Message to Password Policies” on page 137.

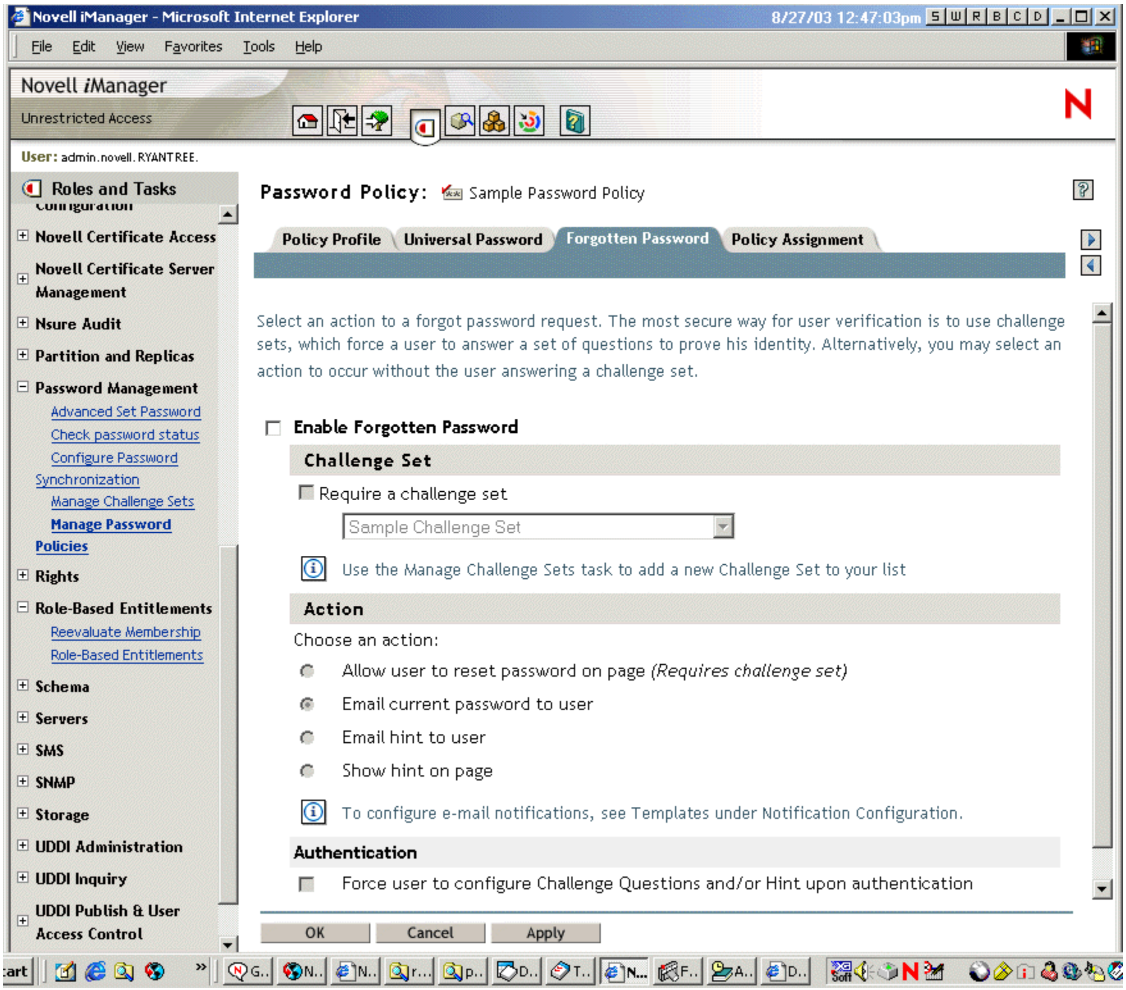
If you choose not to use Password Hint at all, make sure you don’t use it in any of the Password Policies. To prevent Password Hints from being set, you can go a step further and remove the Hint Setup gadget completely, as described in “Disabling Password Hint by Removing the Hint Gadget” on page 135.

Prompting End Users to Set Up Forgotten Password

For some Forgotten Password actions, the end user must do some setup before he or she can use the Forgotten Password self-service. For example, if the Password Policy specifies that a Challenge Set is used to allow a user to prove identity, and if the forgotten password action is to e-mail a Password Hint to the user, then the user must first answer Challenge Set questions and create a Password Hint before being able to use Forgotten Password Self-Service.

Users can initiate setting up these features in the iManager self-service console, or you can require that users set them up using post-authentication services (pages displayed when users log in to the iManager self-service console).

To prompt users to set up these features at login time, select the option in the Password Policies interface at the bottom of the Forgotten Password page, named “Force users to configure Challenge Questions and/or Hint upon authentication.” This is selected by default when you create a policy.



Password Policy: Sample Password Policy

Select an action to a forgot password request. The most secure way for user verification is to use challenge sets, which force a user to answer a set of questions to prove his identity. Alternatively, you may select an action to occur without the user answering a challenge set.

□ Enable Forgotten Password

Challenge Set

□ Require a challenge set

Sample Challenge Set

Use the Manage Challenge Sets task to add a new Challenge Set to your list

Action

Choose an action:

○ Allow user to reset password on page *(Requires challenge set)*

● Email current password to user

○ Email hint to user

○ Show hint on page

To configure e-mail notifications, see Templates under Notification Configuration.

Authentication

□ Force user to configure Challenge Questions and/or Hint upon authentication

To let users set up Forgotten Password at a time of their choice, you need to give them the URL for the iManager self-service console, such as https://www.*my_iManager_server*.com/nps.

End User Setup for Forgotten Password Self-Service

Clicking the “Forgot your password?” link when logging in to the iManager self-service console (such as https://www.*servername*.com/nps) does not work for the user unless the following conditions are met:

- The administrator has set up a Password Policy with Forgotten Password enabled.
- The user has set up Challenge Questions or Password Hint, if either of them are specified in the Forgotten Password setting.

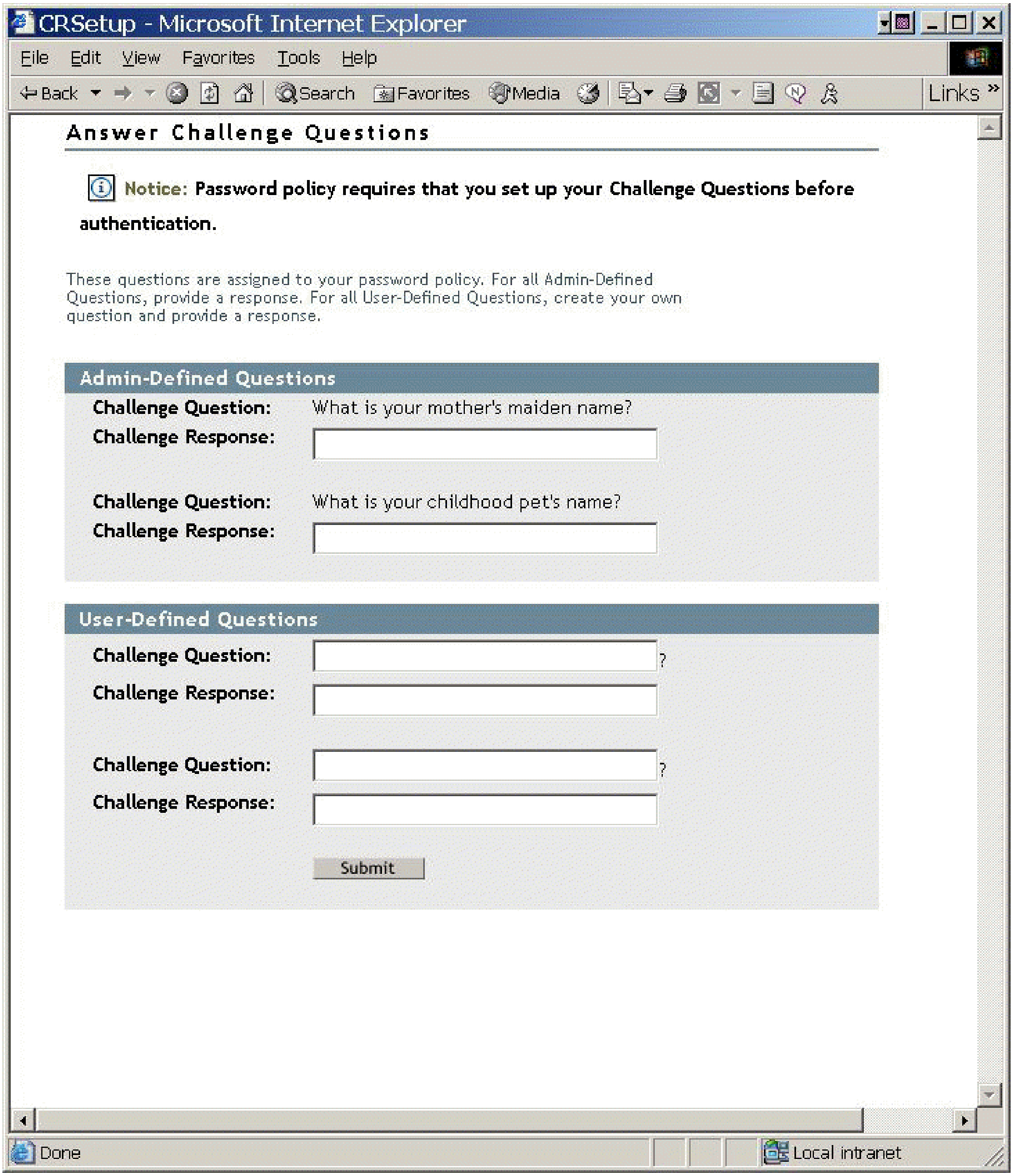
There are two ways the user's part of the configuration can be accomplished:

- "User Setup for Forgotten Password, Post Authentication" on page 122
- "User Setup for Forgotten Password in the iManager Self-Service Console" on page 124

User Setup for Forgotten Password, Post Authentication

The administrator can require the user to set up Forgotten password features after a successful login by checking the Forgotten Password option to force the user to configure Challenge Questions and/or Hint upon authentication. If this option is selected, and a user does not have questions or a hint set up, then Forgotten Password configuration gadgets are displayed to the user the next time he or she logs in through the iManager self-service console (such as https://www.*servername*.com/nps). This is called post-authentication setup.

The following screen shows Challenge Set setup, post-authentication.


CRSetup - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back
Search
Favorites
Media
Links
Done
Local intranet

Answer Challenge Questions

Notice: **Password policy requires that you set up your Challenge Questions before authentication.**

These questions are assigned to your password policy. For all Admin-Defined Questions, provide a response. For all User-Defined Questions, create your own question and provide a response.

Admin-Defined Questions

Challenge Question: What is your mother's maiden name?
Challenge Response:

Challenge Question: What is your childhood pet's name?
Challenge Response:

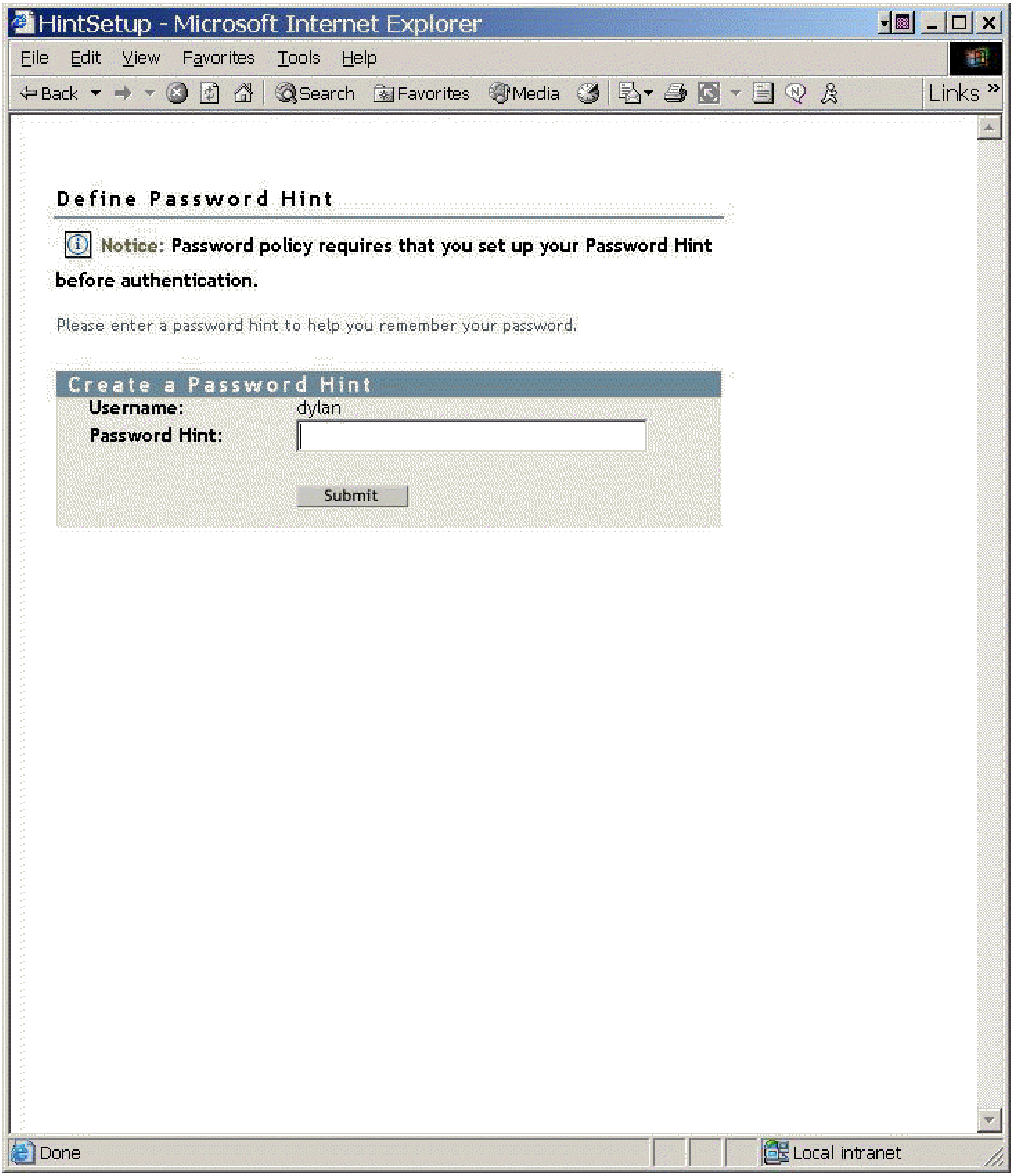
User-Defined Questions

Challenge Question: ?
Challenge Response:

Challenge Question: ?
Challenge Response:

Submit

The following screen shows Password Hint setup, post-authentication.


HintSetup - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Links
Done
Local intranet

Define Password Hint

Notice: Password policy requires that you set up your Password Hint before authentication.

Please enter a password hint to help you remember your password.

Create a Password Hint

Username: dylan

Password Hint:

Submit

User Setup for Forgotten Password in the iManager Self-Service Console

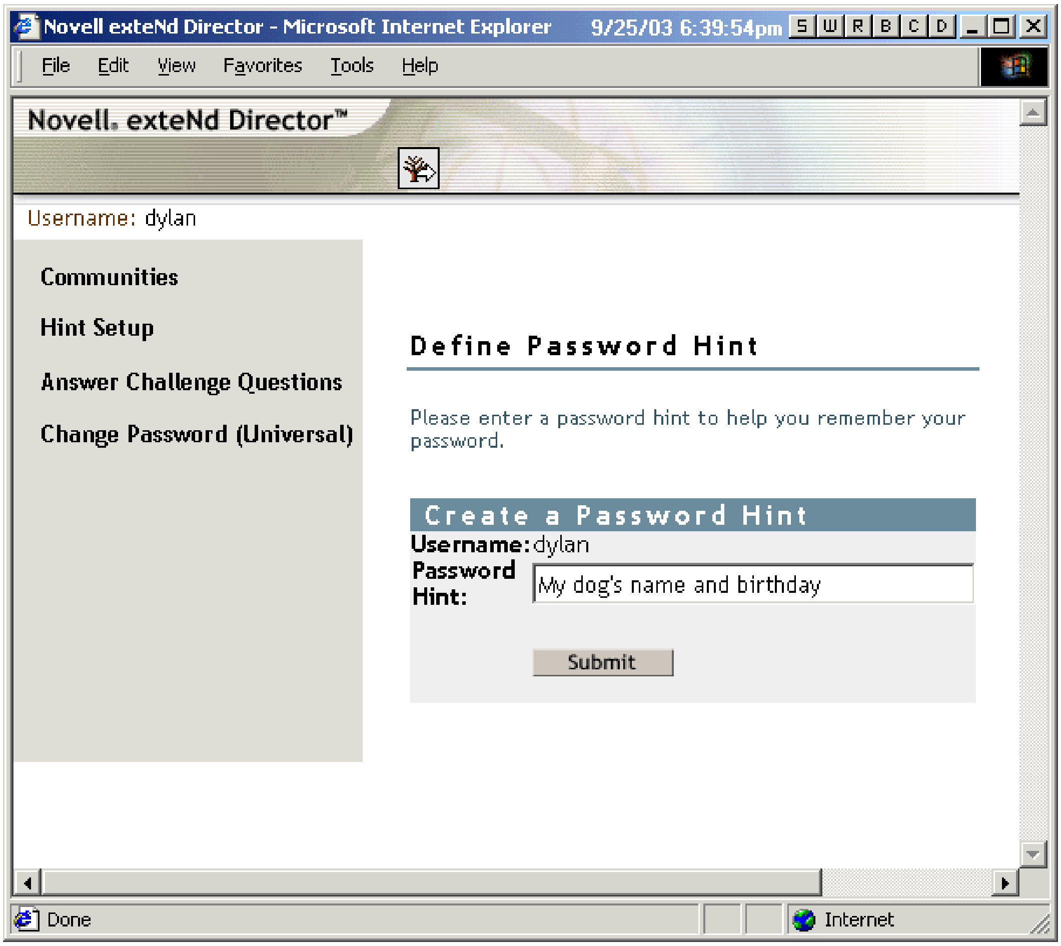
When users log in through the portal, they enter the iManager self-service console, which gives the user access to the gadgets for setting up or changing Challenge Sets and Password Hints for Forgotten Password Self-Service. This is the same place where the user can initiate a password change. The names of the gadgets the user can access here are

- Hint Setup

- Answer Challenge Questions
- Change Password (Universal)

The user can initiate changing these at any time. If a hint or Challenge Set is not required for the user's Password Policy, then the user cannot set them up. The page will display a message indicating that the options are not accessible.

The following figure shows the Hint Setup page:


Novell exteNd Director - Microsoft Internet Explorer
9/25/03 6:39:54pm
S W R B C D
File Edit View Favorites Tools Help
Novell. exteNd Director™
Communities
Hint Setup
Answer Challenge Questions
Change Password (Universal)
Submit
Done
Internet

Username: dylan

Define Password Hint

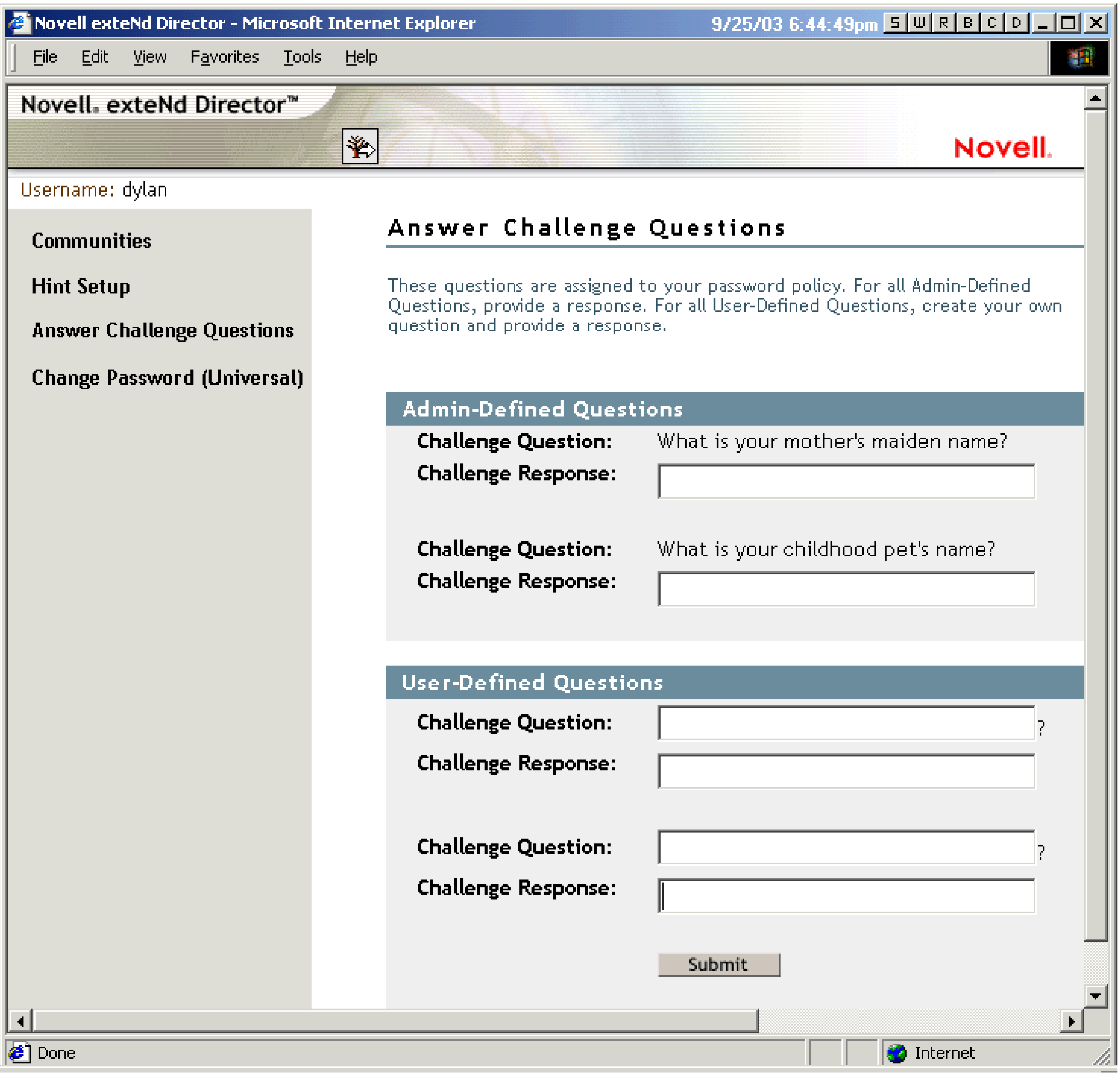
Please enter a password hint to help you remember your password.

Create a Password Hint

Username: dylan

Password Hint: My dog's name and birthday

The following figure shows the Answer Challenge Questions page:


Novell exteNd Director - Microsoft Internet Explorer
9/25/03 6:44:49pm
File Edit View Favorites Tools Help
Novell. exteNd Director™
Novell.

Username: dylan

Communities
Hint Setup
Answer Challenge Questions
Change Password (Universal)

Answer Challenge Questions

These questions are assigned to your password policy. For all Admin-Defined Questions, provide a response. For all User-Defined Questions, create your own question and provide a response.

Admin-Defined Questions

Challenge Question: What is your mother's maiden name?
Challenge Response:

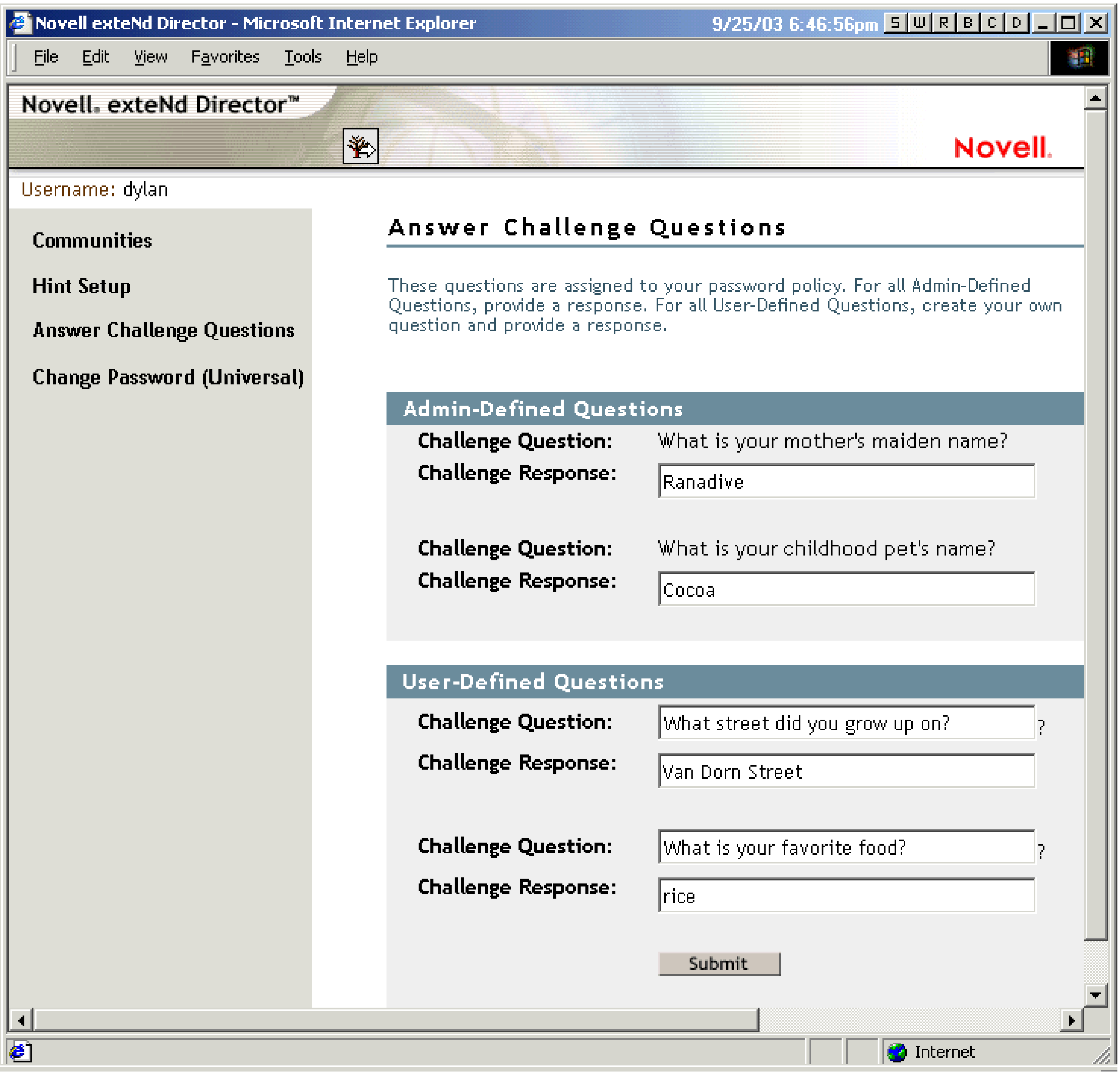
Challenge Question: What is your childhood pet's name?
Challenge Response:

User-Defined Questions

Challenge Question: ?
Challenge Response:

Challenge Question: ?
Challenge Response:

The first questions listed in this example are administrator-defined, and the others are user-defined. The user answers the administrator questions, and creates both a question and answer for the user-defined questions, as in the following example:


Novell exteNd Director - Microsoft Internet Explorer
9/25/03 6:46:56pm
File Edit View Favorites Tools Help
Novell. exteNd Director™
Novell.
Communities
Hint Setup
Answer Challenge Questions
Change Password (Universal)
Submit
Internet

Username: dylan

Answer Challenge Questions

These questions are assigned to your password policy. For all Admin-Defined Questions, provide a response. For all User-Defined Questions, create your own question and provide a response.

Admin-Defined Questions

Challenge Question: What is your mother's maiden name?
Challenge Response: Ranadive

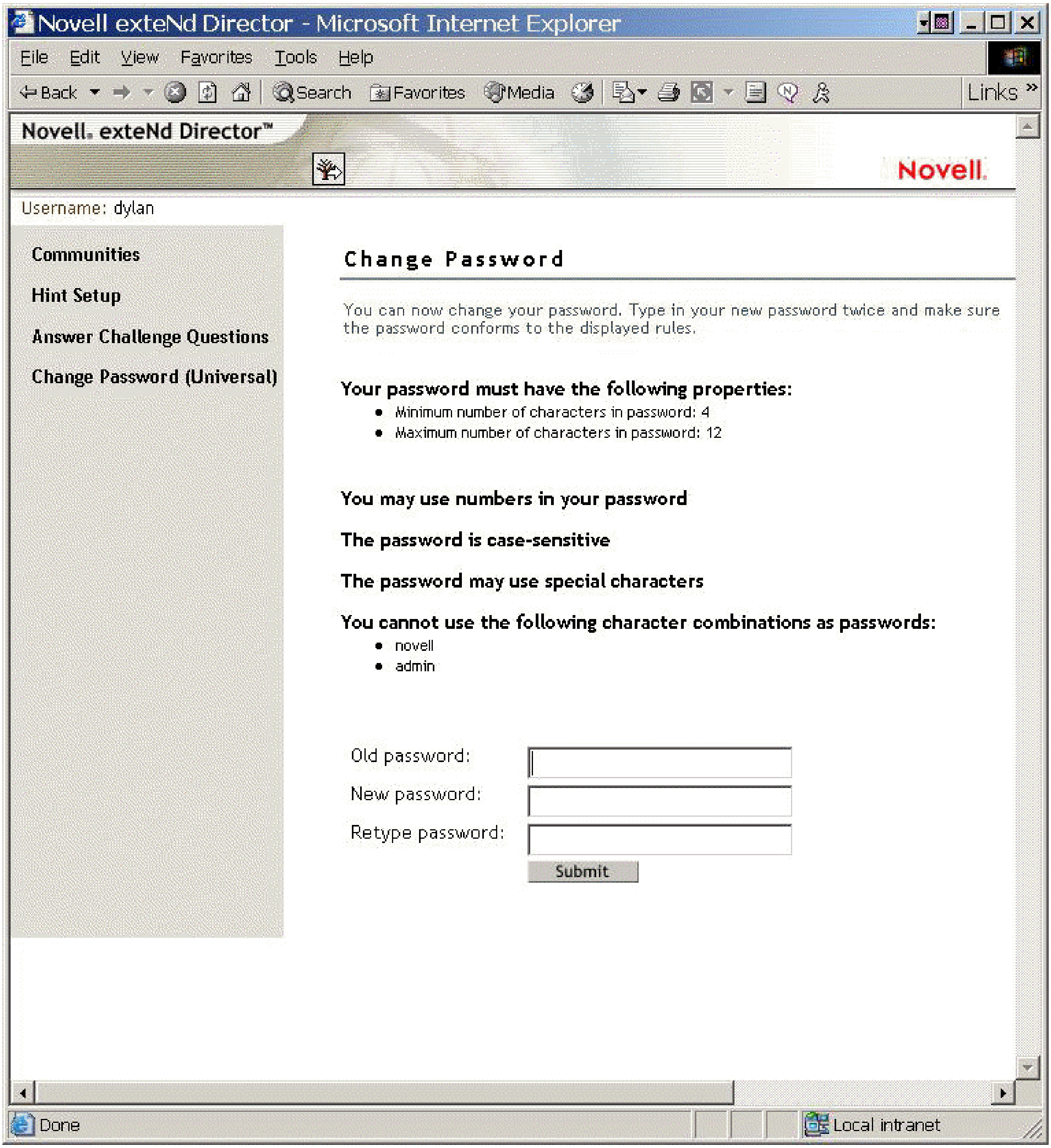
Challenge Question: What is your childhood pet's name?
Challenge Response: Cocoa

User-Defined Questions

Challenge Question: What street did you grow up on? ?
Challenge Response: Van Dorn Street

Challenge Question: What is your favorite food? ?
Challenge Response: rice

The following figure shows the Change Password (Universal) page:


Novell exteNd Director - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Links
Novell. exteNd Director™
Novell.
Done
Local intranet

Username: dylan

Communities

Hint Setup

Answer Challenge Questions

Change Password (Universal)

Change Password

You can now change your password. Type in your new password twice and make sure the password conforms to the displayed rules.

Your password must have the following properties:

- Minimum number of characters in password: 4
- Maximum number of characters in password: 12

You may use numbers in your password

The password is case-sensitive

The password may use special characters

You cannot use the following character combinations as passwords:

- novell
- admin

Old password:

New password:

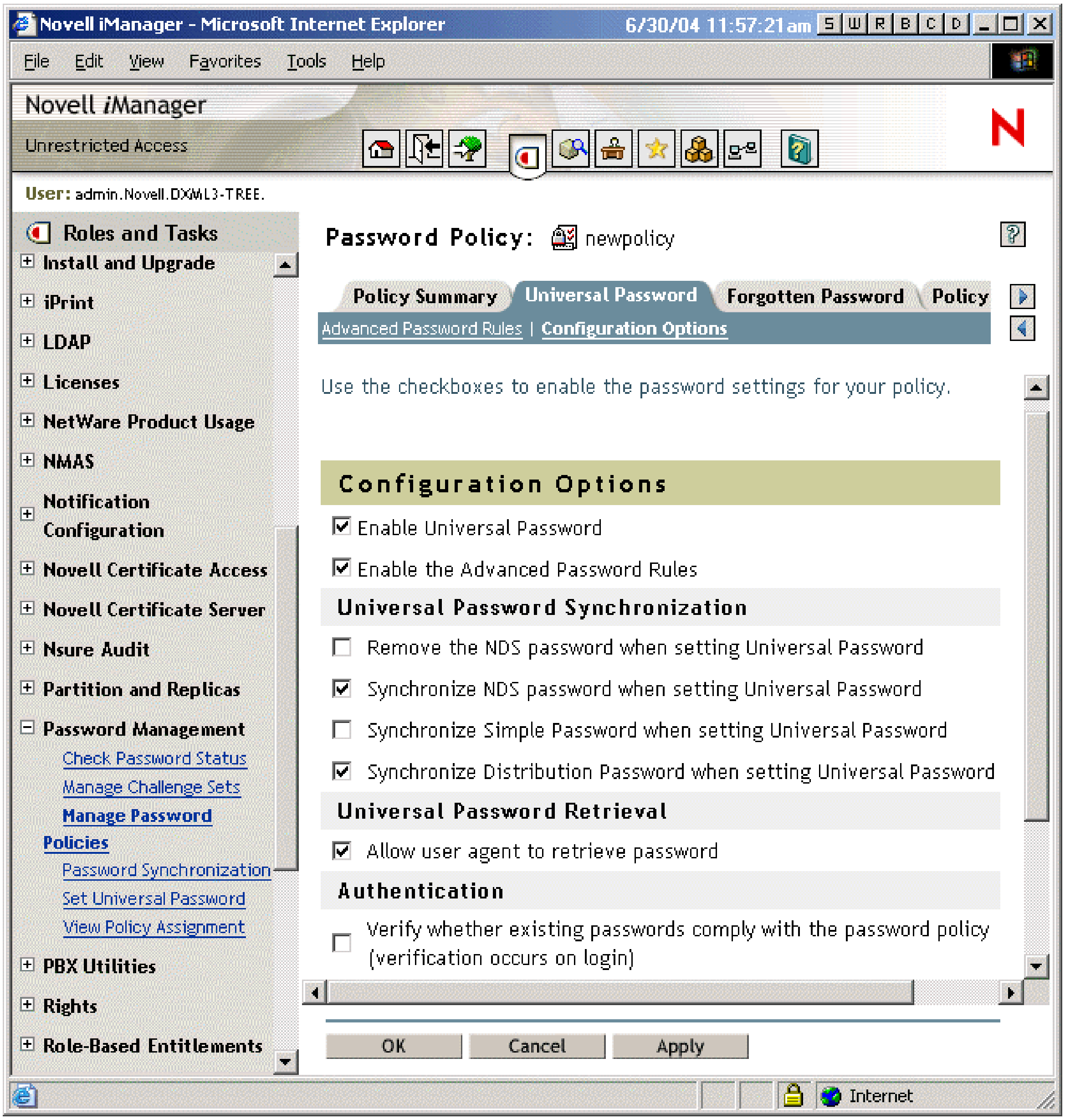
Retype password:

Submit

Requiring Existing Passwords to Comply

If an administrator creates or changes a Password Policy, he or she can require users to change existing passwords that don't comply, the next time they log in through the portal.

This is done by setting an option in the Password Policy, in the Universal Password tab under Configuration Options. The option is called "Verify whether existing passwords comply with the password policy (verification occurs on login).” By default, this option is turned off when you create a new Password Policy. The following figure shows the page where you set this option:



Password Policy: newpolicy

Use the checkboxes to enable the password settings for your policy.

Configuration Options

☑ Enable Universal Password

☑ Enable the Advanced Password Rules

Universal Password Synchronization

☐ Remove the NDS password when setting Universal Password

☑ Synchronize NDS password when setting Universal Password

☐ Synchronize Simple Password when setting Universal Password

☑ Synchronize Distribution Password when setting Universal Password

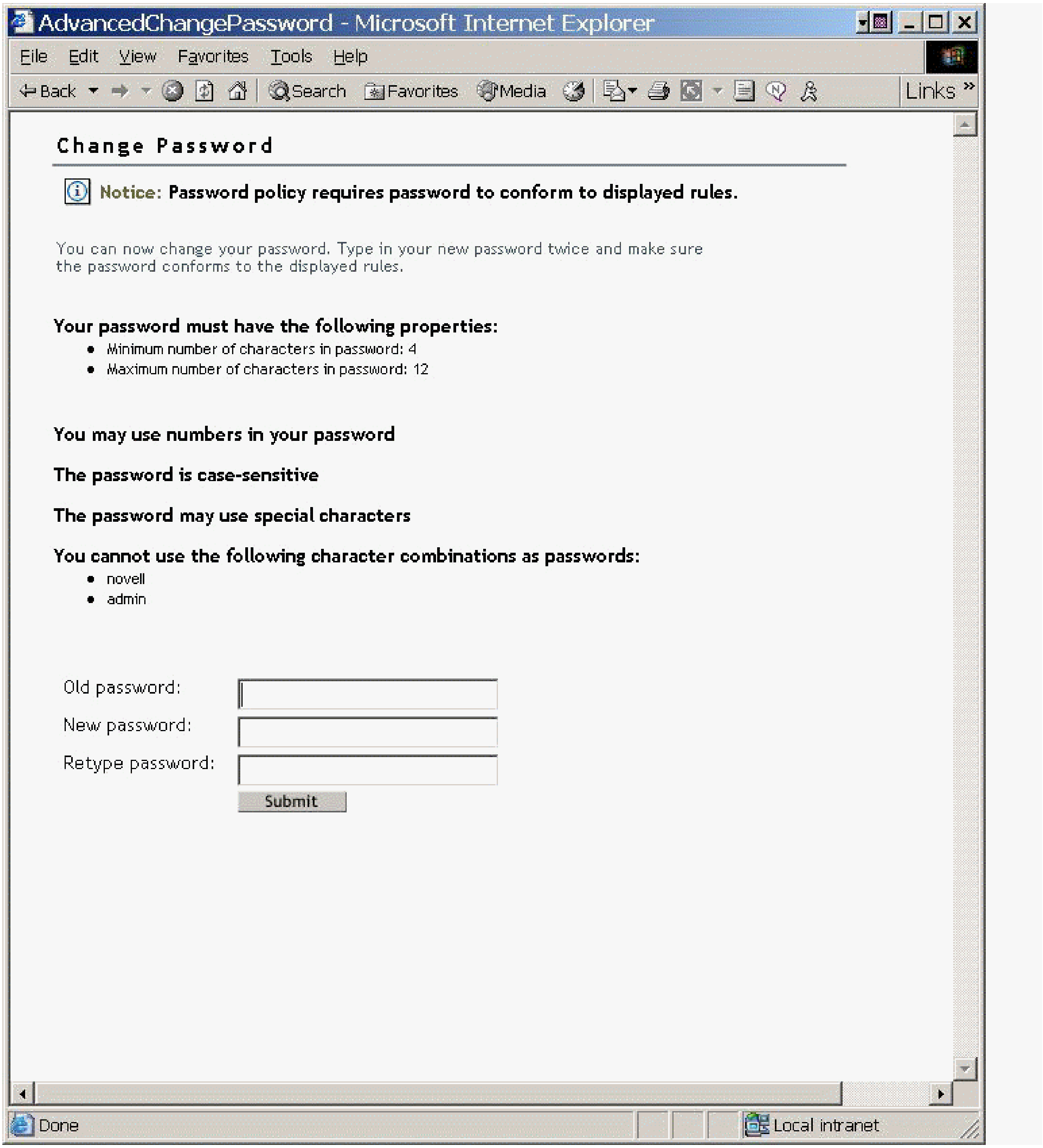
Universal Password Retrieval

☑ Allow user agent to retrieve password

Authentication

☐ Verify whether existing passwords comply with the password policy (verification occurs on login)

If this option is set, the next time users log in through the portal, their passwords will be checked for compliance with the Password Policy. If the password does not comply, a page like the following is displayed, and the user is not allowed to log in without changing the password.


AdvancedChangePassword - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back
Search
Favorites
Media
Links
Done
Local intranet

Change Password

Notice: Password policy requires password to conform to displayed rules.

You can now change your password. Type in your new password twice and make sure the password conforms to the displayed rules.

Your password must have the following properties:

- Minimum number of characters in password: 4
- Maximum number of characters in password: 12

You may use numbers in your password

The password is case-sensitive

The password may use special characters

You cannot use the following character combinations as passwords:

- novell
- admin

Old password:

New password:

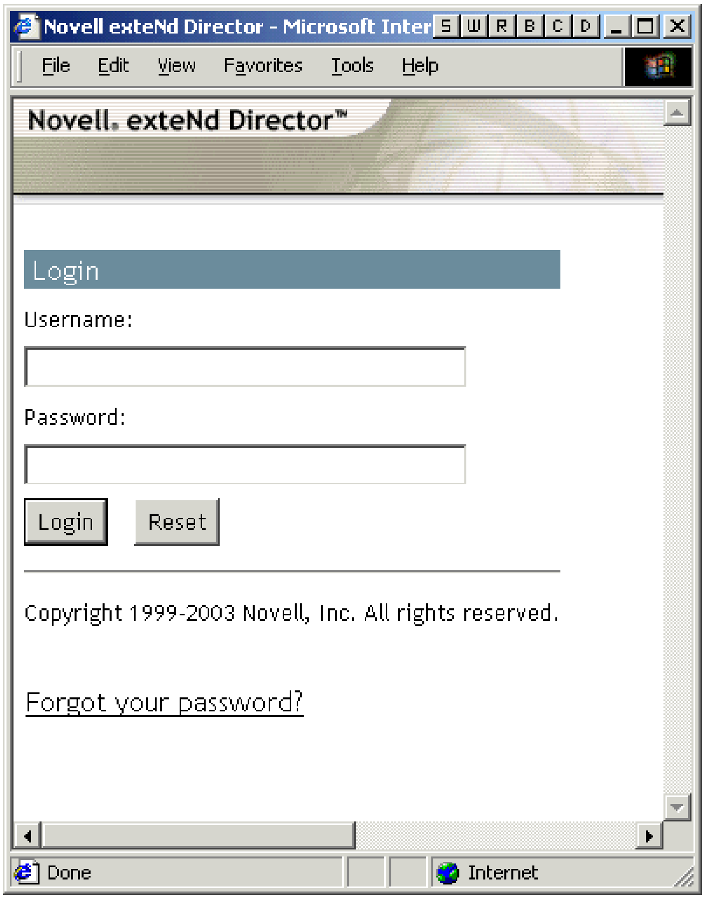
Retype password:

Submit

What End Users See When They Forget Passwords

This section explains the user's experience when using Forgotten Password Self-Service.

After you have installed the iManager plug-ins that shipped with Identity Manager, the Forgotten Password link shows up in the iManager self-service console (such as https://www.*servername*.com/nps), as shown in the following figure.



Novell exteNd Director - Microsoft Inter

Novell. exteNd Director™

Login

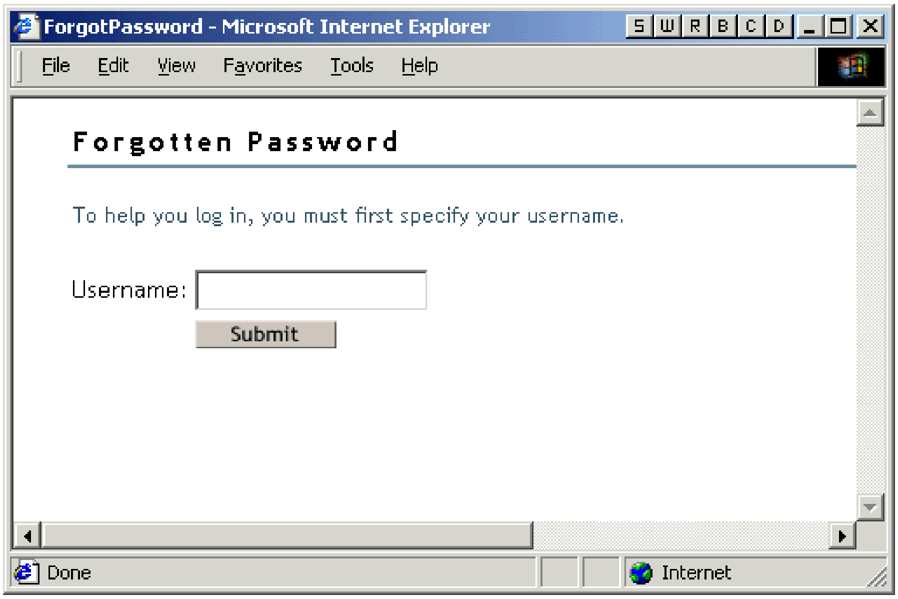
Username:

Password:

Copyright 1999-2003 Novell, Inc. All rights reserved.

Forgot your password?

If a user clicks this link, the following page is displayed, asking for the username:



ForgotPassword - Microsoft Internet Explorer

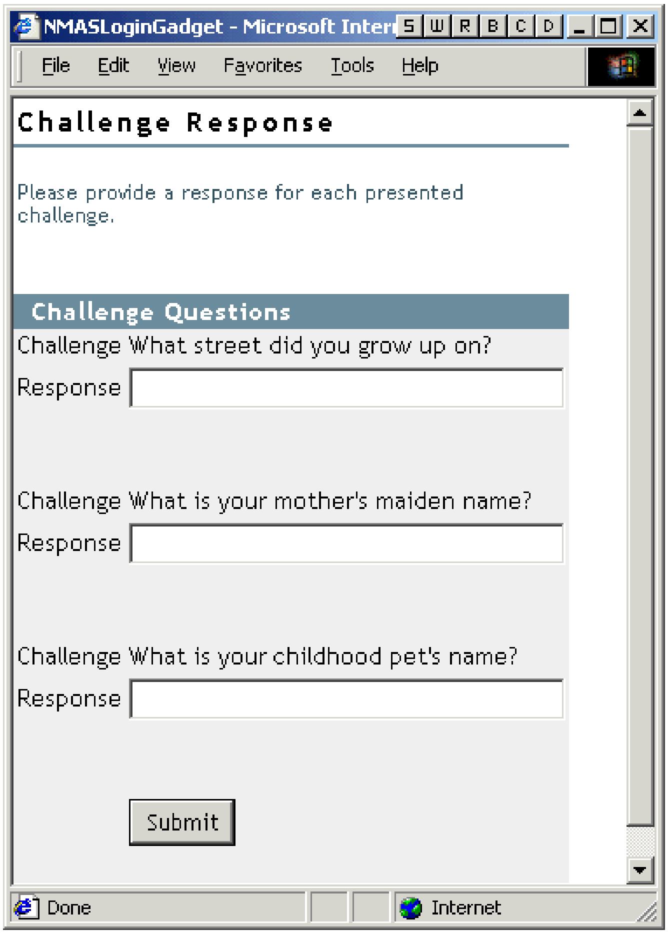
Forgotten Password

To help you log in, you must first specify your username.

Username:

After the username is entered, the Forgotten Password settings determine what the user sees.

For example, if the administrator specified in the Password Policy that a Challenge Set is used, then a page like the following is displayed, and the user must answer Challenge Set questions to prove his or her identity.


NMASLoginGadget - Microsoft Inter
File Edit View Favorites Tools Help

Challenge Response

Please provide a response for each presented challenge.

Challenge Questions

Challenge What street did you grow up on?

Response

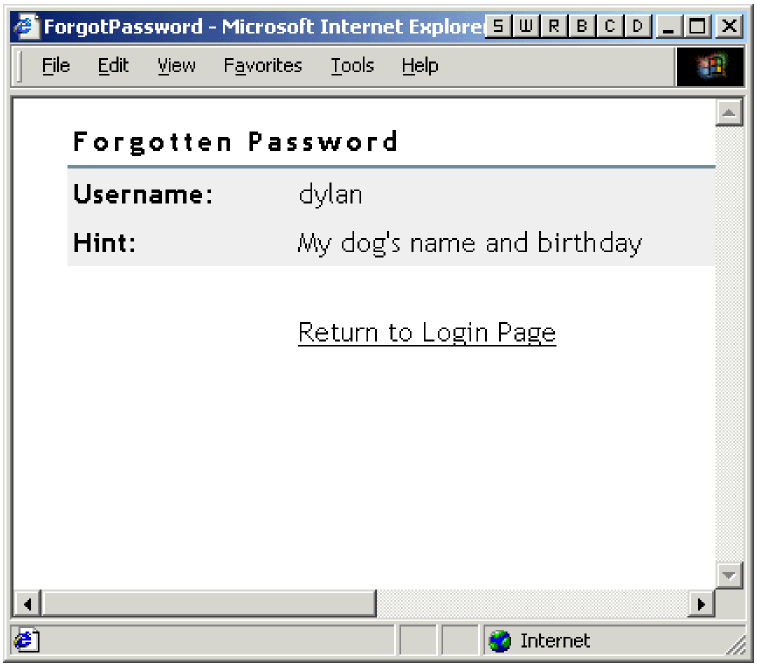
Challenge What is your mother's maiden name?

Response

Challenge What is your childhood pet's name?

Response

If the administrator specified that the Forgotten Password action is "Show hint on page," a page like the following is displayed:

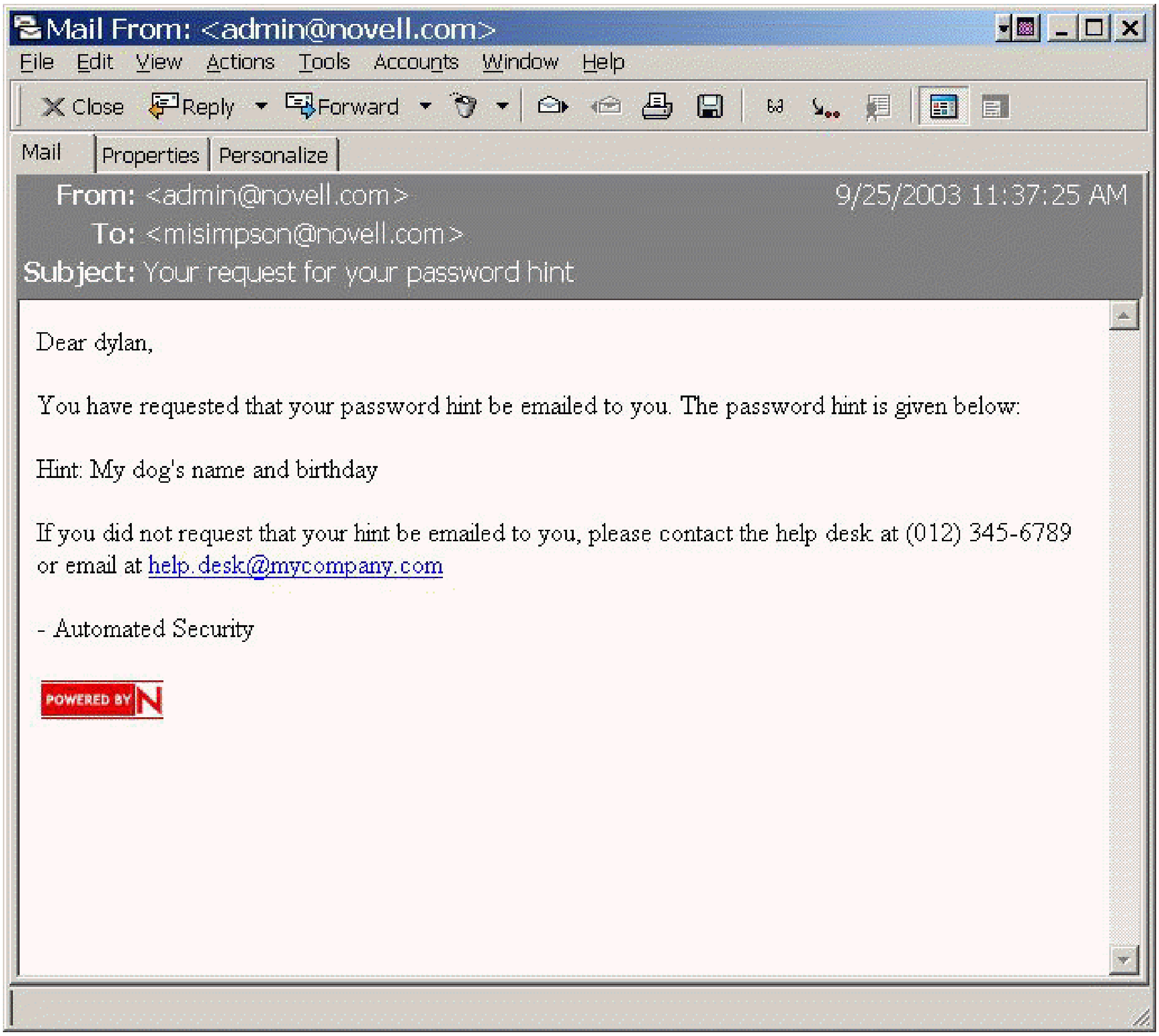

ForgotPassword - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Internet

Forgotten Password

Username:	dylan
Hint:	My dog's name and birthday

Return to Login Page

If the administrator specified that the Forgotten Password action is “E-mail current password to user,” or “E-mail hint to user,” a message is displayed on the page saying that the password or hint has been e-mailed. The user receives an e-mail like the following:


Mail From: <admin@novell.com>
File Edit View Actions Tools Accounts Window Help
Close Reply Forward
Mail Properties Personalize

From: <admin@novell.com> 9/25/2003 11:37:25 AM
To: <misimpson@novell.com>
Subject: Your request for your password hint

Dear dylan,

You have requested that your password hint be emailed to you. The password hint is given below:

Hint: My dog's name and birthday

If you did not request that your hint be emailed to you, please contact the help desk at (012) 345-6789 or email at help.desk@mycompany.com

- Automated Security

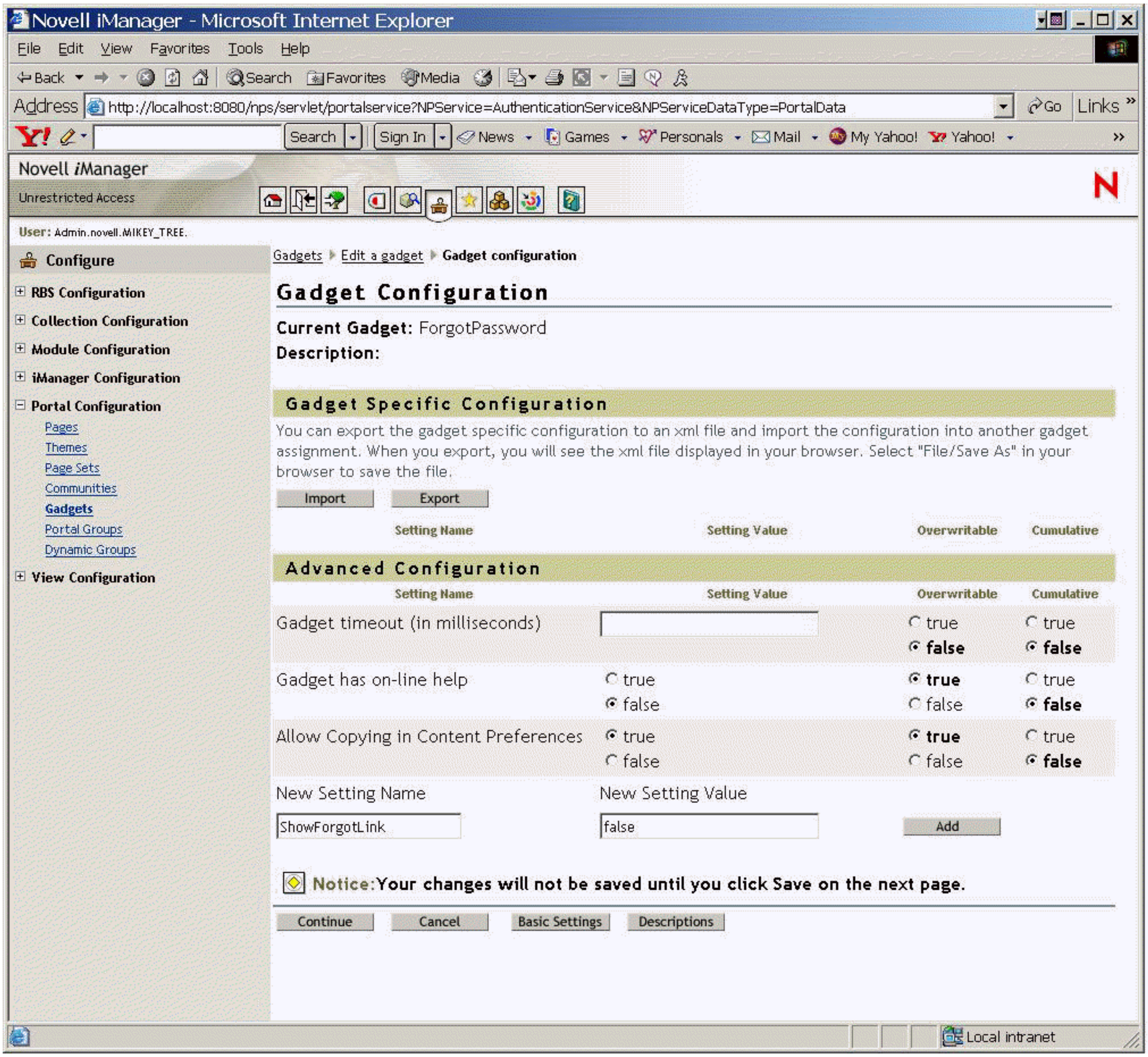
Turning Off the Forgotten Password Link

If you don’t want the “Forgot your password?” link to appear in the portal, you can turn it off using the following steps:

1. In iManager, click the Configure icon to enter the Administration gadget.
2. Click Portal Platform Configuration > Gadgets.
3. In the list of Gadgets, select the Forgot Password gadget.
4. Click the Edit button, then click Configuration. Click the All Settings button.
5. Add a keypair in the gadget settings, as shown in the figure.

   ```
   ShowForgotLink=false
   ```

   If this keypair does not exist at all in the gadget settings, the default behavior is true.


Novell iManager - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://localhost:8080/nps/servlet/portalservice?NPService=AuthenticationService&NPServiceDataType=PortalData
Go Links
Search Sign In News Games Personals Mail My Yahoo! Yahoo!
Novell iManager
Unrestricted Access
User: Admin.novell.MIKEY_TREE.
Configure
RBS Configuration
Collection Configuration
Module Configuration
iManager Configuration
Portal Configuration
Pages
Themes
Page Sets
Communities
Gadgets
Portal Groups
Dynamic Groups
View Configuration
Local intranet

Gadgets ▸ Edit a gadget ▸ Gadget configuration

Gadget Configuration

Current Gadget: ForgotPassword

Description:

Gadget Specific Configuration

You can export the gadget specific configuration to an xml file and import the configuration into another gadget assignment. When you export, you will see the xml file displayed in your browser. Select "File/Save As" in your browser to save the file.

Import Export

Setting Name	Setting Value	Overwritable	Cumulative

Advanced Configuration

Setting Name	Setting Value	Overwritable	Cumulative
Gadget timeout (in milliseconds)		○ true ● false	○ true ● false
Gadget has on-line help	○ true ● false	● true ○ false	○ true ● false
Allow Copying in Content Preferences	● true ○ false	● true ○ false	○ true ● false

New Setting Name	New Setting Value	
ShowForgotLink	false	Add

Notice: Your changes will not be saved until you click Save on the next page.

Continue Cancel Basic Settings Descriptions

6 Click Continue, and click Save on the next page to save the changes.

7 Restart the Web server so the change will take effect.

Disabling Password Hint by Removing the Hint Gadget

Password Hint is one method of helping users remember a password as part of Forgotten Password Self-Service. In the Password Policy, the Forgotten Password actions that use Password Hint are named “E-mail hint to user” or “Show hint on page.”

In order for Password Hint to be useful to a user who has forgotten a password, unauthenticated users must have public access to the Password Hint attribute (nsimHint). Although the Password Hint is checked to make sure the user has not included the actual password when creating the hint, you might still consider this public access to be a security issue.

If you don’t want to use Password Hints, choose a different option for the Forgotten Password action in the Password Policy.

In addition, you can remove the Hint Setup gadget completely, if desired.

After installing the Identity Manager plug-ins for iManager, use the Configure view to remove the Hint Setup gadget.

1. In iManager, click the Configure icon .
2. Click Portal Platform Configuration > Gadgets.
3. In the list of gadgets, select Hint Setup.
4. Click Delete.

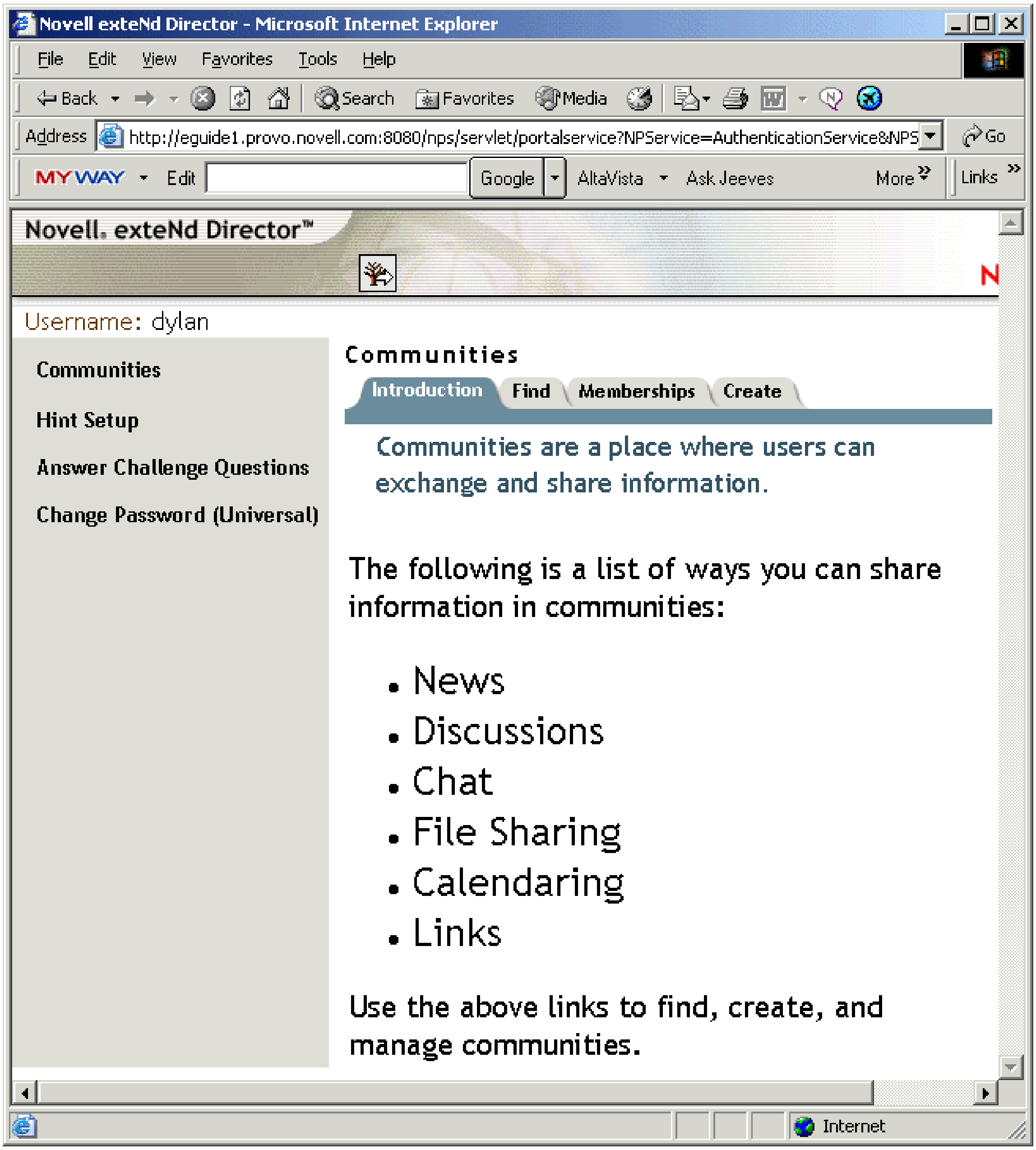
After deleting the gadget, Hint Setup is no longer available to the user. The post-authentication services query for the existing gadgets before adding them to the delegation list. Regardless of what the policy states for post-authentication services, if the gadget does not exist, the service is not presented to the user by the post-authentication services or in the iManager self-service console.

After you delete the Hint gadget, make sure you don’t select E-mail Hint or Display Hint as the forgotten password action in the Password Policy.

Providing End Users with Password Reset Self-Service

Users can reset their passwords in the iManager self-service console, accessed using a URL such as https://www.*servername*.com/nps. For example, https://www.myiManager.com/nps.

Here’s an example of the iManager self-service console after login.



Novell exteNd Director - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://eguide1.provo.novell.com:8080/nps/servlet/portalservice?NPService=AuthenticationService&NPS
Go
MY WAY Edit Google AltaVista Ask Jeeves More Links
Novell. exteNd Director™
Internet

Username: dylan

Communities

Hint Setup

Answer Challenge Questions

Change Password (Universal)

Communities

Introduction | Find | Memberships | Create

Communities are a place where users can exchange and share information.

The following is a list of ways you can share information in communities:

- News
- Discussions
- Chat
- File Sharing
- Calendaring
- Links

Use the above links to find, create, and manage communities.

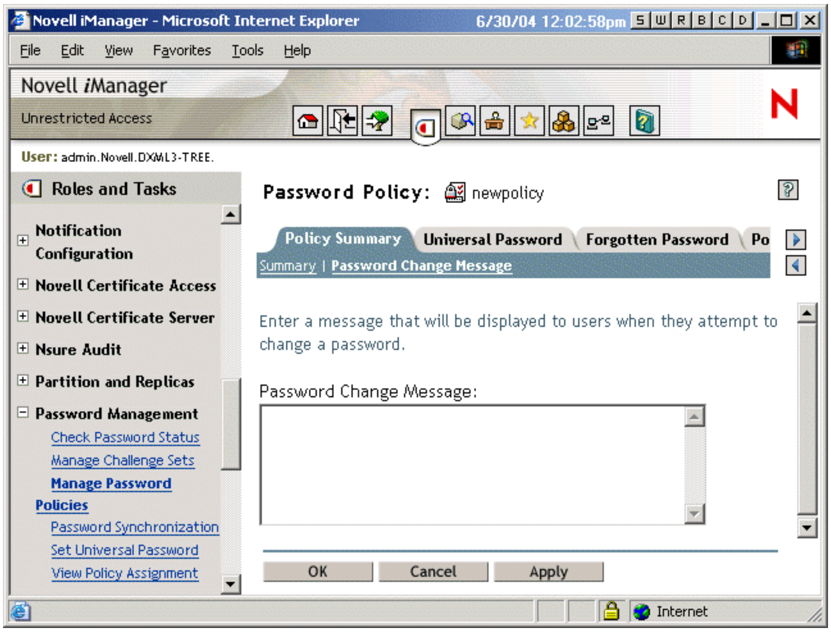
Adding Your Own Password Change Message to Password Policies

In a Password Policy, you have the option to create a Password Change Message that is displayed to users along with the password rules you specify in the policy. Users see the message and the password rules each time they initiate or are prompted to make a password change.

To create this message, edit the Password Policy:

1. In iManager, click Password Management > Manage Password Policies.
2. Click the Password Policy you want to add a message to, then click Edit.
3. On the Policy Summary tab, click Password Change Message.

The following page appears.



Enter a message that will be displayed to users when they attempt to change a password.

Password Change Message:

4 Type the message you want users to see along with the password rules, then click OK.

Creating or Editing Challenge Sets

Challenge Sets are a feature of Password Policies that can help you set up Forgotten Password self-service for your users. A Challenge Set is a set of questions that can be answered by a user to prove his or her identity, instead of using a password.

When you create a Password Policy, you can enable Forgotten Password self-service so that users can get help without calling the help desk. To make self-service more secure, you can create a Challenge Set and specify that users must answer the Challenge Set questions before obtaining forgotten password help.

You can create a Challenge Set when you are creating a Password Policy. In iManager, go to Password Management > Manage Password Policies > New.

You can also manage them as a separate task. In iManager, go to Password Management > Manage Challenge Sets.

Before a user can use Challenge Sets, he or she must set up the questions and answers. You can require that users set them up the next time they log in to iManager or the iManager self-service console using an option in the Password Policy on the Forgotten Password tab. The option is named “Force user to configure Challenge Questions and/or Hint upon authentication.” A user can initiate this setup or change it in the iManager self-service console.

You define the structure of the Challenge Set questions. A user’s responses and user-defined questions are stored in Novell eDirectory by Novell Modular Authentication Services (NMAS).

Configuring Notification for Password Self-Service

Follow the instructions in "Configuring E-Mail Notification" on page 214.

Test-Driving Password Self-Service

To verify that the features are set up correctly, you can complete the following tasks as part of testing Password Self-Service:

1. Create a policy with the following characteristics:
   - Enable Forgotten Password
   - Require Challenge Set
   - Select the option to verify that the Challenge Response and Hint are configured on login
   - Assign the Password Policy to a container with at least one user you can use to test with, a user who has the e-mail address indicated on the user object in the Internet EMail Address attribute.
2. Make sure you have another user to test with who does not have a Password Policy assigned.
3. Log to Virtual Office as a user with the Password Policy assigned and verify that you are taken through the post-authentication steps of answering the challenge questions and setting a hint.
4. Return to the iManager self-service console login page again, and click "Forgot your password?" With the user ID for the same user, verify that the challenge questions are correctly presented and that answering them correctly executes the correct action (display hint, allow user to reset password, etc.).
5. Return to the iManager self-service console login page again, and click "Forgot your password?" Enter the User ID for the user who does not have a Password Policy assigned. Verify that the appropriate errors are given, advising the user that Forgotten Password functionality is not available to them.

Adding Password Self-Service to Your Company Portal

Most of the procedures in the Password Self-Service section assume that you are using the Password Self-Service features on an iManager 2.0.2 server.

Refer to the following table for instructions on how Password Self-Service features can be used with portal products, including products other than iManager.

Product	Support for Password Self-Service	Use the following instructions…
iManager 2.0.2	You can integrate the features. This product supports Password Self-Service features if you install the password management plug-ins. These plug-ins are included with the DirXML 2 plug-ins and are also available separately from download.novell.com.	Follow the steps in ◆ "Prerequisites for Using Password Policies" on page 107. These instructions are in Chapter 8, "Managing Passwords by Using Password Policies," on page 95 ◆ The other procedures in the Password Self-Service section. The information in "Adding Password Self-Service to Your Company Portal" on page 139 is not necessary for iManager 2.02.
exteNd™ Director™ Standard Edition 4.1 with Support Pack 1	You can integrate the features. This version of exteNd Director supports Password Self-Service features if you install the necessary Novell portal modules (.npm files). To support the features, you must have Support Pack 1 or later.	"Integrating Password Self-Service with exteNd Director 4.1" on page 141
Virtual Office, provided with NetWare 6.5 Support Pack 2, running on an iManager server	You can integrate the features. You can use the Password Self-Service features on the same NetWare server used for Virtual Office and iManager by installing the plug-ins and completing some additional steps.	"Integrating Password Self-Service with Virtual Office" on page 142
exteNd Director 5	You must link to the features. Because exteNd Director 5 is based on portlets, and Password Self-Service is based on Novell portal modules (NPMs), you can't use the Password Self-Service features directly in another product. To use this product with Password Self-Service, create links from your company portal to the end-user password features on an iManager server.	"Linking to Password Self-Service from a Company Portal" on page 143
Novell Portal Services (NPS) versions earlier than 4.1	You must link to the features. Although these legacy NPS products run Novell portal modules (NPMs), they don't have some of the enhancements that are required for the Password Self-Service features of the ForgottenPassword.npm. To use this product with Password Self-Service, create links from your company portal to the end-user password features on an iManager server.	"Linking to Password Self-Service from a Company Portal" on page 143

Product	Support for Password Self-Service	Use the following instructions…
Third-party products	You must link to the features. Because third-party products don't run Novell portal modules, you can't use the Password Self-Service features directly in another product. To use third-party products with Password Self-Service, create links from your company portal to the end-user password features on an iManager server.	"Linking to Password Self-Service from a Company Portal" on page 143

Integrating Password Self-Service with exteNd Director 4.1

If you are using exteNd Director Standard Edition 4.1 with Support Pack 1 for a company portal, you can add the Forgotten Password module to your portal like any other Novell portal module. This module provides the same features that are available when using it on iManager 2.0.2:

- New portal user tasks for Password Self-Service:
  - Hint Setup
  - Answer Challenge Questions
  - Change Password (Universal)
- Forgotten Password Self-Service, accessed from the "Forgot your password?" link on the portal login page
- Post-authentication features to prompt users to change non-compliant passwords, or update Forgotten Password items such as Hint or Challenge Questions

To add these features:

1. Make sure you have installed Support Pack 1.

   It includes enhancements that are necessary for the ForgottenPassword.npm.

2. Make sure that SSL is configured between the exteNd Director Web server and eDirectory, even if they are running on the same machine.

   This is a requirement of NMAS 2.3 or later.

3. To ensure security for the Forgotten Password gadgets, check your LDAP SSL port number.

   If you are using an LDAP SSL port other than 636, the following configuration step must be completed:

   Add the following key pair into the PortalServlet.properties file:

   LDAPSSLPort=*your_port_number*

   For example, if your Web server is running Active Directory you will need to make this change, because Active Directory uses port 636. If you are running Tomcat, change the setting in the PortalServlet.properties file in the tomcat\webapps\nps\WEB_INF directory.

   This setting takes a higher precedence than the default value of 636 if that value exists in the file.

4. After changing the setting, restart the Web server.

5. Make sure all the eDirectory users in the portal users container have rights to self for the Hint attribute, named nsimHint.

When you install the DirXML plug-ins on an iManager Web server, this step is automatically completed for the tree that iManager is configured for.

However, if you are pointing to a different tree, you must complete this step manually.

A utility is provided to help you do this, which you can download and run by doing the following:

5a Go to http:\\download.novell.com.

5b Fill in the following fields:

- **Search by:** Product
- **Choose a Product:** Nsure Identity Manager

5c Download the item named “2.0 Password Management Plug-in for iManager 2.0.*x*.”

5d Follow the instructions in the nsimhintreadme.txt file.

If users do not have rights to self for the nsimHint attribute, they get an error like the following when they try to create a Hint:

```
“Could not write user hint” (Task could not be completed).
```

6 (Conditional) If you have not installed Identity Manager on the server that holds eDirectory and NMAS, install the Challenge Response Login Method for NMAS.

This Login Method is installed automatically with Identity Manager, and is provided as part of the eDirectory 8.7.3 product.

One way to install a Login Method is on Windows, using the Method Installer:

6a Locate the MethodInstaller.exe file in the \nmas\NmasMethods\ directory of the eDirectory CD.

6b Run the executable on a workstation and check the Challenge Response method.

6c Accept the agreement and the defaults for the Login Sequence.

The method is added to the Authorized Login Methods.Security.*tree_name* container.

For more information on installing a Login Method, including installing on UNIX, see “Installing a Login Method” (http://www.novell.com/documentation/lg/nmas23/admin/data/a49tuwk.html#a49tuwk) in the *NMAS 2.3 Administration Guide* (http://www.novell.com/documentation/lg/nmas23).

7 Add the following modules to exteNd Director:

- ForgottenPassword.npm
- nmasclient.npm

They are included with the DirXML product distribution.

For instructions on adding a module, see the *Novell exteNd Director Standard Edition Installation and Configuration Guide* (http://www.novell.com/documentation/lg/nedse41/configure/data/ajhotzv.html).

Integrating Password Self-Service with Virtual Office

In NetWare 6.5 Support Pack 2, Virtual Office supports all the features of Password Self-Service. There are some steps you must complete before you can use the features, but some of them are done for you automatically when you install Identity Manager in your eDirectory tree and install the Identity Manager plugins on your iManager server.

For instructions, see the *Novell Virtual Office for NetWare 6.5 Configuration Guide* (http://www.novell.com/documentation/nw65/virtualoffice/data/ac6spye.html). The items that are already completed if you have installed Identity Manager are the following:

- Extending the schema for Password Management
- Installing the Password Management plug-ins
- Installing the Challenge Response Login Method
- Giving users rights to Password Hint

  NOTE: When you install the DirXML plug-ins on an iManager server, giving rights to users for Password Hint is automatically completed for the tree that iManager is configured for. If you are pointing to a different tree, you must complete this step manually.

Linking to Password Self-Service from a Company Portal

For products that can't provide the Password Self-Service features by running the ForgottenPassword.npm (as noted in the table in "Adding Password Self-Service to Your Company Portal" on page 139), you can use the Password Self-Service features by creating another iManager server with the password management plug-ins installed, and then linking from your portal home page to the iManager self-service console on the other server, such as https://*iManager_server_IP_address*/nps.

The password management plug-ins are included with the DirXML 2 plug-ins, and are available separately by downloading the 2.0 Password Management Plug-in for iManager 2.0.*x* from http:\\download.novell.com.

The one feature that is not easy to incorporate is post-authentication services, which prompts users to update their passwords to comply with password policies, and prompts them to set up Forgotten Password Self-Service according to the Password Policy, such as creating a Password Hint. To make sure that users have compliant passwords and are set up to use Forgotten Password Self-Service, you need to make sure that users log in to the iManager self-service console at least once to create compliant passwords and complete password management setup, and again whenever you make changes to Password Policies.

Complete the items in these sections:

- "Prerequisites" on page 143
- "Linking to Forgotten Password Self-Service" on page 144
- "Linking to End-User Password Management Tasks" on page 144
- "Returning Self-Service Users to the Company Portal" on page 145
- "Making Sure Users Have Configured Password Features" on page 146

Prerequisites

The iManager server and the tree you are using must be prepared as follows:

- Meet the requirements noted in Chapter 4, "Installation," on page 45
- Meet the prerequisites described in "Prerequisites for Using Password Policies" on page 107
- Make sure you have set up Password Policies for your eDirectory users

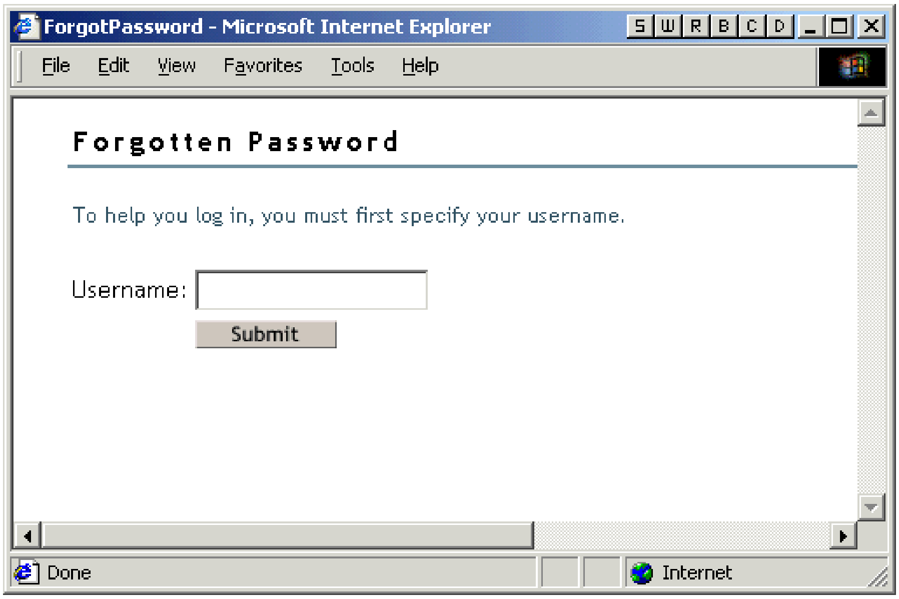
Linking to Forgotten Password Self-Service

To give users access to Forgotten Password Self-Service from your company portal, you can link to that service on a separate iManager Web server.

1 Create a link such as "Forgot your password?" on the login page for your company portal, and point it to the following URL on your iManager Web server:

http://*iManager_server_IP_address*/nps/servlet/fullpageservice?NPService=ForgotPassword&nextState=getUserID

This URL takes the user to the following page, where you begin the Forgotten Password process. For examples of the other pages in the process, see "Providing End Users with Forgotten Password Self-Service" on page 118.


ForgotPassword - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Submit
Done
Internet

Forgotten Password

To help you log in, you must first specify your username.

Username:

2 Complete the steps in "Returning Self-Service Users to the Company Portal" on page 145.

Linking to End-User Password Management Tasks

1 Make sure all the eDirectory users in the portal users container have rights to self for the Hint attribute, named nsimHint.

When you install the DirXML plug-ins on an iManager Web server, this step is automatically completed for the tree that iManager is configured for.

If you are pointing to a different tree, you must complete this step manually.

A utility is provided to help you do this, which you can download and run by doing the following:

1a Go to http:\\download.novell.com.

1b Fill in the following fields:

- **Search by:** Product
- **Choose a Product:** Nsure Identity Manager

1c Download the item named "2.0 Password Management Plug-in for iManager 2.0.*x*."

1d Follow the instructions in the nsimhintreadme.txt file.

If users do not have rights to self for the nsimHint attribute, they get an error like the following when they try to create a Hint:

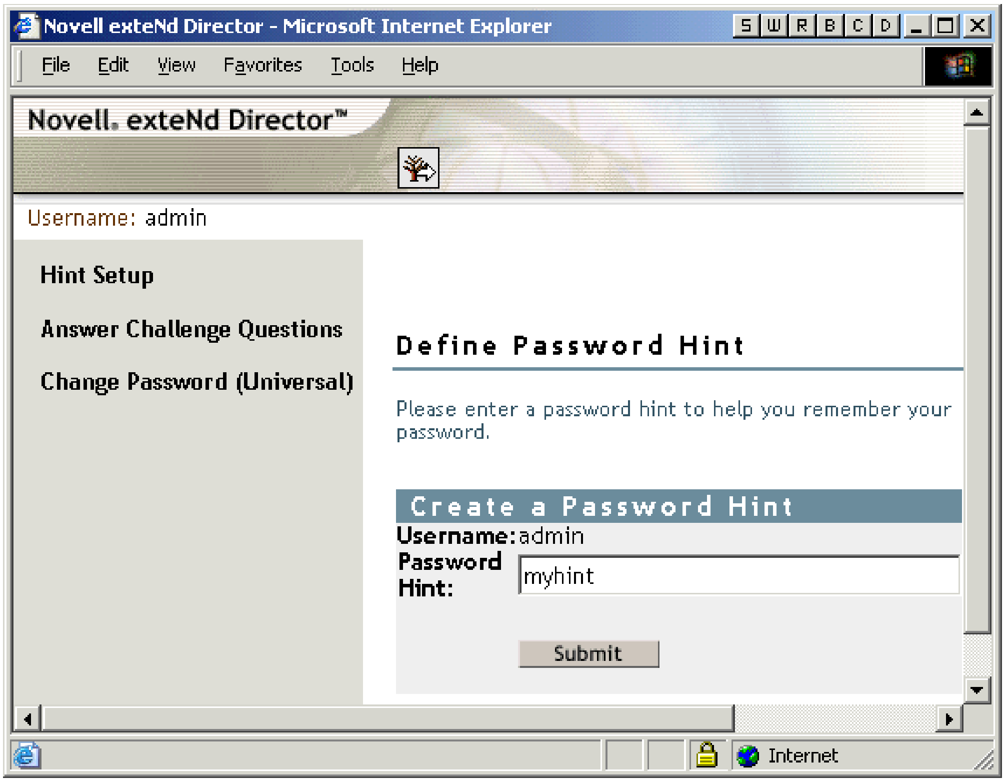
```
"Could not write user hint" (Task could not be completed).
```

2 Provide users with a link from your company portal to the password management tasks.

You can create a Manage Passwords link from the company portal, and link to https://*other_iManager_server*/nps. This link would provide access to the Password Management end-user tasks:

- Hint Setup
- Answer Challenge Questions
- Change Password (Universal)

A user who clicks on the link would first need to log in, and then would see a page like the following example.


Novell exteNd Director - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Novell. exteNd Director™
Hint Setup
Answer Challenge Questions
Change Password (Universal)
Submit
Internet

Username: admin

Define Password Hint

Please enter a password hint to help you remember your password.

Create a Password Hint

Username: admin

Password Hint: myhint

3 Complete the steps in "Returning Self-Service Users to the Company Portal" on page 145.

Returning Self-Service Users to the Company Portal

The Password Self-Service features include scenarios in which users are provided with a link that lets them return to the login page. For example, when a user changes a password using the Forgotten Password Self-Service, a page is displayed that says "Your password has been successfully changed. Click here to return to login page."

If you point from your company portal to Password Self-Service on a separate iManager server, you might want to customize the default return page so that users are returned to the login page for your company portal when they complete password tasks. By default, clicking the button returns the user to a page on the iManager Web server.

A link to return to the login page is provided in these three places:

- The page where a user can set a new password
- The page displayed after a user successfully changes a password
- The page where a user views a Hint

To customize the return page to go to the login page for your company portal:

1. On the iManager Web server you are using for Forgotten Password Self-Service, locate the following directory:

   \tomcat\webapps\nps\portal\modules\ForgottenPassword\skins\default\devices\default

2. Locate the following file in that directory:

   forgottenpassword.xsl

3. Edit the forgottenpassword.xsl file to customize the default return page.

   Replace the following code

   ```
   href="{LoginURL}"
   ```

   with a hard-coded URL such as

   ```
   href="(http:\\www.your_company_portal_home_page.com)"
   ```

   You need to make this change in three places in the file.

4. Stop and restart Tomcat on the iManager server.

   The “Return to Login Page” links now redirect users to your company’s portal login pag

Making Sure Users Have Configured Password Features

When users log in to the iManager self-service console at https://*iManager_server_IP_address*/nps, they are prompted to take action through a series of post-authentication pages if conditions such as the following are true:

- The user password doesn’t comply with Advanced Password Rules in the Password Policy
- The Password Policy requires Challenge Questions when using Forgotten Password Self-Service, and the user has not configured them
- The Password Policy is using Forgotten Password with Display Password Hint as the action, and the user has not created a Hint

For example, these prompts are necessary to make sure that the user can use Forgotten Password Self-Service. If the Password Policy requires users to answer Challenge Questions, and the user has never configured them initially, the user can’t access Forgotten Password Self-Service. If the user has not created a Password Hint, the user can’t retrieve it to help in remembering the password.

Because other portal products won’t automatically provide the post-authentication features, you need to make sure that users log in to the iManager self-service console at least once to create compliant passwords and complete password management setup, and periodically thereafter whenever you make changes to Password Policies.

This can be done by making sure that users go to a Manage Passwords link you provide as described in “Linking to End-User Password Management Tasks” on page 144, which requires users to log in to the iManager self-service console.

Troubleshooting Password Self-Service

- To use Challenge Response questions, make sure that you are using a browser that iManager 2.02 supports.
- If you don't have SSL set up properly, you won't be able to log in to iManager or the self-service console. But if you can log in successfully to iManager, and you are requiring TLS for Simple Bind, SSL is set up properly and you can rule out SSL-related issues when troubleshooting Password Self-Service.
- See also the following sections:
  - "Troubleshooting Password Policies" on page 112
  - If you are using Identity Manager Password Synchronization, see "Troubleshooting Password Synchronization" on page 227, the troubleshooting sections for each scenario in "Implementing Password Synchronization" on page 179, and documentation for the specific driver involved, on the Drivers Documentation Web site (http://www.novell.com/documentation/lg/dirxmldrivers).

10 Password Synchronization across Connected Systems

Nsure™ Identity Manager Password Synchronization offers several new benefits:

- Bidirectional password synchronization
- Enforcement of Password Policies on connected systems
- E-mail notification when synchronization fails
- The ability to check password synchronization status for a user

To help you understand your options, some scenarios are described in "Implementing Password Synchronization" on page 179.

In this section:

Overview

Identity Manager introduces bidirectional password synchronization, by taking advantage of Universal Password and connected system support for publishing or subscribing to passwords.

As with other attributes for a user account, you can choose your authoritative data sources.

- "Overview of Passwords" on page 150
- "Comparison of Password Synchronization 1.0 and Identity Manager Password Synchronization" on page 151
- "What is Bidirectional Password Synchronization?" on page 152
- "Features of Identity Manager Password Synchronization" on page 152
- "Diagrams of Password Synchronization Flow" on page 155

Overview of Passwords

eDirectory has several passwords that are used for different purposes. In previous versions of eDirectory and DirXML, connected systems could update only the NDS password, and it was a one-way synchronization.

Universal Password, introduced in eDirectory 8.7.1, is a reversible password that can be synchronized with the other eDirectory passwords if desired. Universal Password is protected by four layers of encryption.

NMAS controls the relationship between Universal Password and the other eDirectory passwords, such as whether Universal Password is kept synchronized with NDS Password, Simple Password, or Distribution Password. NMAS intercepts incoming requests to change passwords and handles them according to your settings in Password Policies (with the exception of some legacy methods, see "Planning Login and Change Password Methods for your Users" on page 104). For an example of the Password Policy interface where you control the relationship between eDirectory passwords, see the figure in "Enabling Universal Password" on page 96.

Identity Manager controls the relationship between eDirectory passwords and connected system passwords. To do this, it uses the Distribution Password, which is the password in eDirectory that you can provide to connected systems. Like Universal Password, Distribution Password is protected by four layers of encryption, and is reversible.

In the Password Policy you can specify whether the Distribution Password should be the same as the Universal Password (the setting is "Synchronize Distribution Password when setting Universal Password"). If the Distribution Password is the same as the Universal Password, and you choose to use bidirectional Password Synchronization with connected systems, keep in mind that you are using Identity Manager to extract the Universal Password from eDirectory and send it to other connected systems. You need to secure the transport of the password, as well as the connected systems it will be stored on. (See "Handling Sensitive Information" on page 165.) If the Distribution Password is not the same as the Universal Password (because you disable the setting in the Password Policy), you can "tunnel" passwords among connected systems using the Distribution Password, without using or affecting the Universal Password or NDS Password.

For more information on the various eDirectory passwords, see the *Novell Modular Authentication Services (NMAS) 2.3 Administration Guide* (http://www.novell.com/documentation/nmas23/index.html). For examples of different ways of using password synchronization with Identity Manager, see "Implementing Password Synchronization" on page 179.

Comparison of Password Synchronization 1.0 and Identity Manager Password Synchronization

	Password Synchronization 1.0	Password Synchronization with Identity Manager 2
Product delivery	A product separate from DirXML.	Included with Identity Manager, not sold separately.
Platforms	- Active Directory - NT Domain - eDirectory	Full bidirectional password synchronization is supported on these platforms: - Active Directory - eDirectory - NIS - NT Domain These connected systems support publishing user passwords to Identity Manager. Because Universal Password (and Distribution Password) is reversible, Identity Manager can distribute passwords to connected systems. Any connected system that supports the Subscriber password element can subscribe to passwords from Identity Manager. See "Connected System Support for Password Synchronization" in the *Novell Nsure Identity Manager 2.0.1 Administration Guide*.
Password used in eDirectory	NDS® Password (non-reversible)	Universal Password (reversible), or Distribution Password (also reversible). The NDS password can also be kept synchronized, if desired. For example scenarios, see "Implementing Password Synchronization" in the *Novell Nsure Identity Manager 2.0.1 Administration Guide*.
Main functionality for Windows connected systems	To send passwords to DirXML so the eDirectory password is synchronized with the Windows password. Because the NDS password is not reversible, passwords were not sent back to NT or AD.	To provide bidirectional password synchronization. Because Universal Password (and Distribution Password) is reversible, passwords can be synchronized in both directions.
LDAP changes	Not supported.	Supported
Novell Client™	Required.	Not required.
nadLoginName attribute	Used for keeping passwords updated.	Not used.
The component that contains the password synchronization functionality	The DirXML driver contained the functionality for updating nadLoginName.	Policies in the driver configuration provide the password synchronization functionality. The driver simply carries out the tasks given by the DirXML engine, which come from logic in the policies. The driver manifest, global configuration values, and driver filter settings must also support password synchronization. These are included in the sample driver configurations, or can be added to an existing driver. See "Upgrading Existing Driver Configurations to Support Identity Manager Password Synchronization" on page 174.
Agents	A separate piece of software.	No agents are installed; instead, the functionality is now part of the driver.

What is Bidirectional Password Synchronization?

Bidirectional password synchronization is the combination of Identity Manager accepting passwords from the connected systems you specify, and distributing passwords to the connected systems you specify.

The ability to have bidirectional password synchronization with a particular connected system depends on what the connected system supports.

Some connected systems can accept new and modified passwords from Identity Manager, and can also provide the user's actual password to Identity Manager. These connected systems are the ones that support bidirectional password synchronization with Identity Manager. They are the following:

- Active Directory
- Novell® eDirectory™
- NIS
- NT Domain

For these connected systems, the user can change a password in one of the systems and have that password synchronized to the other systems through Identity Manager. However, if you are using Advanced Password Rules in your Password Policies, it's best to have users make password changes in the iManager self-service console. This is the best place for password changes because it lists all the rules that the user's password must comply with.

Other connected systems can't provide the user's actual password, so they can't support full bidirectional password synchronization. But they can provide data that can be used to create passwords and send them to Identity Manager, by defining policies within the driver configuration.

Several other systems can accept passwords from Identity Manager, including setting an initial password for a new user, modifying a password, or both.

See "Connected System Support for Password Synchronization" on page 156.

Features of Identity Manager Password Synchronization

To explain the features offered by Identity Manager Password Synchronization, we can divide the subject of bidirectional password synchronization into the two directions: passwords sent from connected systems and accepted by Identity Manager, and passwords distributed by Identity Manager and accepted by connected systems.

The following sections explain the password synchronization features of Identity Manager:

- "Identity Manager Can Accept Passwords from Connected Systems" on page 153
- "Identity Manager Can Distribute Passwords to Connected Systems" on page 153
- "Identity Manager Can Enforce Password Policies, in the Data Store and on Connected Systems" on page 153
- "Identity Manager Offers Several Scenarios for Synchronizing Passwords" on page 154
- "Identity Manager Can Notify Users of Password Synchronization Failures" on page 155
- "Identity Manager Can Check the Password Synchronization Status for a User" on page 155

Identity Manager Can Accept Passwords from Connected Systems

As in previous versions of DirXML®, any connected system can publish a password to the identity vault.

You can specify which connected system applications Identity Manager will accept passwords from. You can even choose whether Identity Manager updates the password for users in the same eDirectory tree where Identity Manager is running, or whether Identity Manager simply acts as a conduit or “tunnel,” synchronizing passwords only between connected systems. This means that it is possible to keep the eDirectory password separate from the password that Identity Manager distributes to connected systems, if desired.

Some connected systems (AD, other eDirectory trees, NT, and NIS) can provide the user’s actual password, which means that when a user changes a password on a connected system, the change can be synchronized to Identity Manager and back out to other connected systems.

Other connected systems don’t support providing the user’s actual password, but you can configure them to provide a password to Identity Manager that is manufactured in a style sheet, such as an initial password based on last name or employee ID.

Identity Manager Can Distribute Passwords to Connected Systems

Identity Manager Password Synchronization introduces the ability to distribute a common password to connected systems.

In previous versions of DirXML, a driver could send passwords to DirXML from a user account on a connected system, and the password could be used to update the corresponding user in eDirectory. But because the NDS® password in eDirectory is non-reversible, you couldn’t push a password out from the central Identity Manager identity vault to multiple connected systems. You could obtain the eDirectory password only by capturing the password before it was stored in eDirectory, such as through the Novell Client™.

The new Universal Password provided by eDirectory 8.7.3 is reversible, so it can be distributed.

Identity Manager can accept a password from a connected system, and because Universal Password is reversible, Identity Manager can distribute the password from the identity vault to connected systems that support setting initial passwords for new accounts and modifying password.

Regardless of where the password comes from, Identity Manager uses the Distribution Password as the repository from which it distributes passwords to connected systems. The Distribution Password, like the Universal Password, lets you enforce Password Policies.

For information about using Universal Password and Distribution Password in when synchronizing passwords, see “Implementing Password Synchronization” on page 179.

As with other attributes of a user, you can decide which systems are authoritative sources for passwords, and Identity Manager will distribute the passwords from the authoritative source to the other connected systems.

You can set up bidirectional password synchronization among connected systems that support it.

Identity Manager Can Enforce Password Policies, in the Data Store and on Connected Systems

By making calls to NMAS™, Identity Manager lets you enforce Password Policies on incoming passwords. If the password being published from a connected system to Identity Manager does not comply, you can specify that Identity Manager does not accept the password into the identity vault.

This also means that passwords that don't comply with your policies are not distributed to other connected systems.

In addition, Identity Manager lets you enforce Password Policies on connected systems. If the password being published to Identity Manager does not comply, you can specify that Identity Manager not only does not accept the password for distribution, but actually resets the noncompliant password on the connected system using the current Distribution Password in the identity vault.

For example, if you want to require passwords to include at least one numeric character, but the connected system does not itself have the ability to enforce such a policy, you can specify that Identity Manager resets passwords from the connected system that don't comply.

If you are using Advanced Password Rules and are using Identity Manager Password Synchronization, to help ensure that passwords are synchronized successfully we recommend that you research the password policies for all the connected systems to make sure the Advanced Password Rules in the eDirectory Password Policy are compatible.

Keep in mind that you must make sure that the users who are assigned Password Policies match with the users you want to participate in Password Synchronization for connected systems.

Password Policies are assigned with a tree-centric perspective. By contrast, Password Synchronization is set up per driver, and drivers are installed on a per-server basis and can manage only those users who are in a master or read/write replica. To get the results you expect from Password Synchronization, make sure the containers that are in a master or read/write replica on the server running the drivers for Password Synchronization match the containers where you have assigned Password Policies with Universal Password enabled. Assigning a Password Policy to a partition root container ensures that all users in that container and subcontainers are assigned the Password Policy.

For information about how Password Policies are assigned to users, see "Assigning Password Policies to Users" on page 110.

Identity Manager Offers Several Scenarios for Synchronizing Passwords

As with other object attributes, Identity Manager lets you decide which systems should be authoritative sources for passwords. Identity Manager gives you flexibility in deciding how you want passwords to flow.

Much of the new functionality of Identity Manager Password Synchronization relies on Universal Password, the new reversible password functionality provided by eDirectory.

However, there are scenarios that don't require you to deploy Universal Password.

Identity Manager Password Synchronization also relies on the Distribution Password, which is the repository from which Identity Manager distributes passwords to connected systems. Like Universal Password, a policy can be enforced on the Distribution Password.

For a basic list of the ways you can implement password synchronization, see "Implementing Password Synchronization" on page 179. These scenarios can be combined to meet the needs of your environment.

Identity Manager Can Sync Passwords on Windows without the Novell Client

A Novell Client is no longer required for password synchronization with Active Directory and NT Domain.

Identity Manager Can Notify Users of Password Synchronization Failures

The previous section, "Identity Manager Can Enforce Password Policies, in the Data Store and on Connected Systems" on page 153, explains that Identity Manager can enforce Password Policies by not accepting passwords that don't comply from connected systems.

Using the new e-mail notification feature, you can specify that Identity Manager notifies the user when a password change they made was not successful.

For example, suppose you have set Identity Manager to not accept an incoming password from NT Domain if it doesn't comply with your Password Policy, and you have enabled e-mail notification. One rule in your Password Policy says that the company name can't be used as a password, and a user changes the password on the NT Domain connected system to be the company name. In this case, NMAS would not accept the password, and Identity Manager would send an e-mail message to the user stating that the password change was not synchronized.

You must set up the e-mail server and templates before you can use this feature. You can customize the text of the messages that Identity Manager sends, and you can customize the notification to send a copy to the administrator. For more information, see "Configuring E-Mail Notification" on page 214.

Identity Manager Can Check the Password Synchronization Status for a User

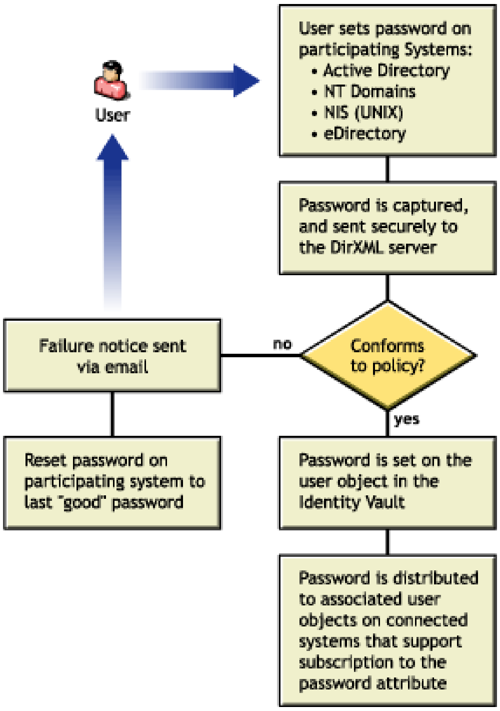
Identity Manager lets you query connected systems to check the password synchronization status for a user. If the connected system supports the check password feature, you can see whether passwords are synchronizing successfully.

For how to check passwords, see "Checking the Password Synchronization Status for a User" on page 214.

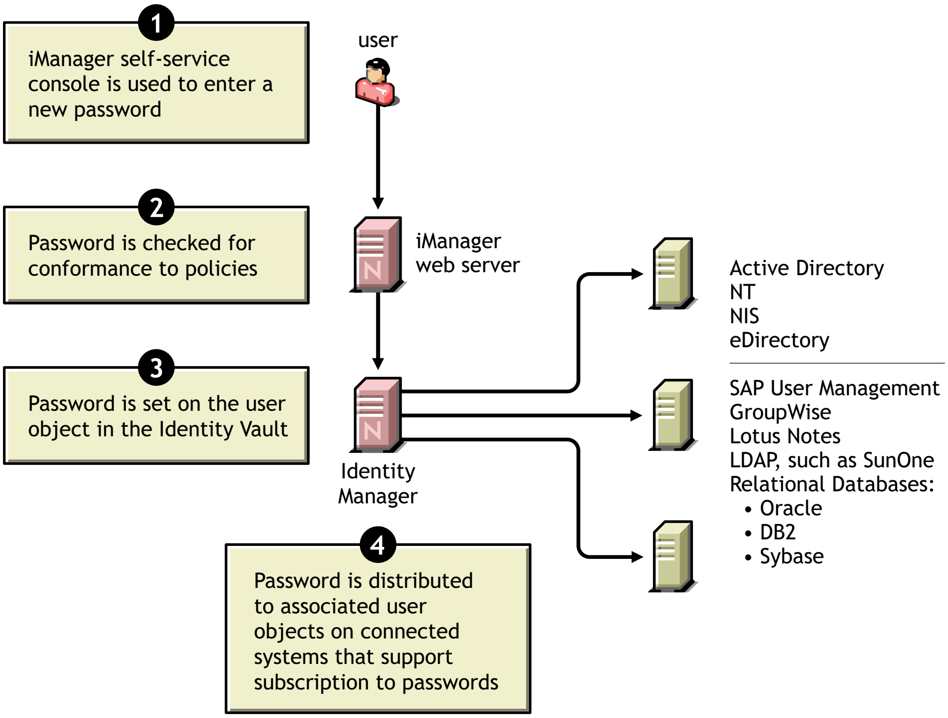
For a list of which systems support checking passwords, see "Connected System Support for Password Synchronization" on page 156.

Diagrams of Password Synchronization Flow

Here's an overview of connected systems publishing passwords to Identity Manager.


User
User sets password on participating Systems:
• Active Directory
• NT Domains
• NIS (UNIX)
• eDirectory
Password is captured, and sent securely to the DirXML server
Conforms to policy?
no
yes
Failure notice sent via email
Reset password on participating system to last "good" password
Password is set on the user object in the Identity Vault
Password is distributed to associated user objects on connected systems that support subscription to the password attribute

Here's an overview of Identity Manager distributing passwords to connected systems.


1
iManager self-service console is used to enter a new password
2
Password is checked for conformance to policies
3
Password is set on the user object in the Identity Vault
4
Password is distributed to associated user objects on connected systems that support subscription to passwords
user
iManager web server
Identity Manager
Active Directory
NT
NIS
eDirectory
SAP User Management
GroupWise
Lotus Notes
LDAP, such as SunOne
Relational Databases:
• Oracle
• DB2
• Sybase

Connected System Support for Password Synchronization

Identity Manager is always capable of accepting a password from a connected system, even if the connected system does not support providing the user's actual password from that system.

AD, NT, eDir, and NIS can accept a password from Identity Manager and also support sending the user's actual password to Identity Manager. This means they offer full support for bidirectional password synchronization.

Other systems can provide data that can be used to create passwords, by defining a policy within the driver configuration on the Publisher channel. The sample driver configurations for most of the drivers show an example of this; a policy is included that provides a default password based on Surname.

Connected systems have varying abilities to accept a password from Identity Manager. Some connected systems support setting an initial password set for new accounts, but not password modify events.

This section contains a list of the connected systems and what the sample driver configurations support.

The capabilities of the sample driver configurations are noted in the driver manifest. This table provides the following additional information that is not in the driver manifest:

- Regarding the application's ability to accept a password, this table indicates whether an application accepts initial password set for a new account, versus whether it can accept a modification to an existing password.

  The manifest indicates only that the connected system is capable of accepting a password, and doesn't show this distinction.

- Grouping the drivers together so you can see which of the sample driver configurations have similar abilities.

Connected System Driver	**Subscriber Channel**	**Subscriber Channel**	**Subscriber Channel**	**Publisher Channel**
	Application Can Accept Setting of Initial Password	**Application Can Accept Modification of Password**	**Application Supports Check Password**	**Application Can Provide (sync) Password**
The following connected systems support bidirectional password synchronization.				
They can provide the user's actual password on the connected system, and accept passwords from Identity Manager.				
Active Directory	Yes	Yes	Yes	Yes
eDirectory[1]	Yes	Yes	Yes	Yes
NT Domain	Yes	Yes	No	Yes
NIS	Yes	Yes	Yes	Yes
SIF	Yes	Yes	No	Yes
The following connected systems can accept passwords from Identity Manager to some degree. They can't provide a user's actual password on the connected system to Identity Manager.				
Although they can't provide the user's actual password, they can be configured to create a password using a policy on the Publisher channel, based on other user data in the connected system. (The sample driver configurations demonstrate default password based on surname.)				
Groupwise®	Yes	Yes	No	No[2]
JDBC	Yes[3]	No4	No	No[5]
LDAP	Yes[6]	Yes[6]	Yes	No

Connected System Driver	Subscriber Channel	Subscriber Channel	Subscriber Channel	Publisher Channel
	Application Can Accept Setting of Initial Password	Application Can Accept Modification of Password	Application Supports Check Password	Application Can Provide (sync) Password
Notes	Yes	Yes[7]	Yes[7]	No
SAP User Management	Yes	Yes	No	No
The following connected systems can't accept passwords or provide a user's password on the connected system using the sample driver configuration.				
Although they can't provide the user's password to Identity Manager, they can be configured to create a password using a policy on the Publisher channel, based on other user data in the connected system. (The sample driver configurations demonstrate default password based on surname.)				
Delimited Text	No[8]	No[8]	No[8]	No[8]
Exchange 5.5	No	No	No	No
PeopleSoft 3.6	No	No	No	No
PeopleSoft 4.0	No	No	No	No
SAP HR	No	No	No	No
The following connected systems are not intended to be used with password synchronization.				
Avaya* PBX	No	No	No	No
Entitlements Service Driver	No	No	No	No
LoopBack Service Driver	No	No	No	No
Manual Task Service Driver	No	No	No	No

[1] Between eDirectory trees, you can have bidirectional password synchronization for users even if Universal Password is not enabled for those users. See "Scenario 1: eDirectory to eDirectory Password Synchronization Using NDS Password" on page 181.

[2] GroupWise supports two authentication methods. 1) GroupWise provides its own authentication and maintains user passwords. 2) GroupWise authenticates against eDirectory using LDAP and does not maintain passwords. When using option 2, driver-synchronized passwords are ignored by GroupWise.

[3] The ability to set an initial password is available on all databases where the OS user account is distinct from the database user account, such as Oracle*, MS SQL, MySQL*, and Sybase*.

[4] The DirXML Driver for JDBC can be used to modify a password on the connected system, but that feature is not demonstrated in the sample driver configuration.

[5] Passwords can be synchronized as data when stored in a table.

[6] If the target LDAP server allows setting the userpassword attribute.

[7] The Notes driver can accept a password modification and check passwords only for the HTTPPassword field in Lotus Notes.

[8] The DirXML Driver for Delimited Text does not have features in the driver shim that directly support Password Synchronization. However, the driver can be configured to handle passwords, depending on the connected system you are synchronizing with.

Prerequisites for Password Synchronization

Password Synchronization depends on the following elements being in place:

- "Support for Universal Password" on page 159
- "Password Synchronization Capabilities Declared in the Driver Manifest" on page 159
- "Password Synchronization Settings You Create Using Global Configuration Values" on page 159
- "Policies Required in the Driver Configuration" on page 163
- "Filters You Install on the Connected System to Capture Passwords" on page 164
- "Password Policies You Create for Your Users" on page 165
- "NMAS Login Methods" on page 165

Support for Universal Password

See "Preparing to Use Universal Password" on page 171.

Password Synchronization Capabilities Declared in the Driver Manifest

The driver manifest declares whether a connected system supports the following password synchronization functions:

- Publishing the user's actual password to Identity Manager
- Accepting a password from Identity Manager (the manifest does not distinguish between accepting the creation of an initial password versus accepting password modifications)
- Letting Identity Manager check the password on the connected system, to determine the password synchronization status for a user

NOTE: The driver manifest is written by the driver developer, or the Identity Manager expert who creates the driver configuration. It is not meant to be edited by a network administrator. It represents the true capabilities of the driver shim and configuration, so changing the manifest alone does not change functionality. To add functionality, the driver shim, connected system, or driver configuration would need to be enhanced.

The driver configurations delivered with Identity Manager contain driver manifest entries. To add them to an existing driver, see "Upgrading Existing Driver Configurations to Support Identity Manager Password Synchronization" on page 174.

Password Synchronization Settings You Create Using Global Configuration Values

New in Identity Manager are global configuration values, which let you set a constant value that you can reference in a policy. (They are sometimes called server variables, because they are held in an attribute that is per replica.)

For Password Synchronization, they allow you to create settings for the flow of passwords to and from Identity Manager.

Because the password synchronization policies in the driver configuration are written to behave differently based on your settings in the global configuration value, it's easy to change the flow of passwords without having to edit policies.

You control the following settings for each connected system separately, using global configuration values. Note that in the interface, Identity Manager is referred to as DirXML.

- Whether Identity Manager accepts passwords from the connected system.

  This setting applies to a password provided by the connected system, as well as a password that could be created by policies in the driver configuration on the Publisher channel. If you disable this setting, both kinds of passwords are stripped out so they don't reach Identity Manager.

- Which method of synchronization Identity Manager uses, updating Universal Password directly, or Distribution Password directly. Identity Manager controls the entry point, meaning which password Identity Manager updates. NMAS controls the flow of passwords between each different kind of password, based on what you have set in the Password Policy in Universal Password > Configuration Options.

  See "Implementing Password Synchronization" on page 179 for examples of scenarios using these methods.

- Whether Password Policies are enforced on passwords coming in to Identity Manager from a connected system.

  If they are enforced, this means that passwords coming in are not written to the Identity Manager data store if they don't comply.

- Whether Identity Manager enforces Password Policies on a connected system by resetting passwords that don't comply, using the Identity Manager password.

  This option is dimmed in the interface if the connected system doesn't support it (as declared in the driver manifest).

- Whether the connected system accepts passwords.

  This setting applies to both a password distributed by Identity Manager and a password that could be created by policies in the driver configuration on the subscriber channel. If you disable this setting, both kinds of passwords are stripped out so they don't reach the connected system.

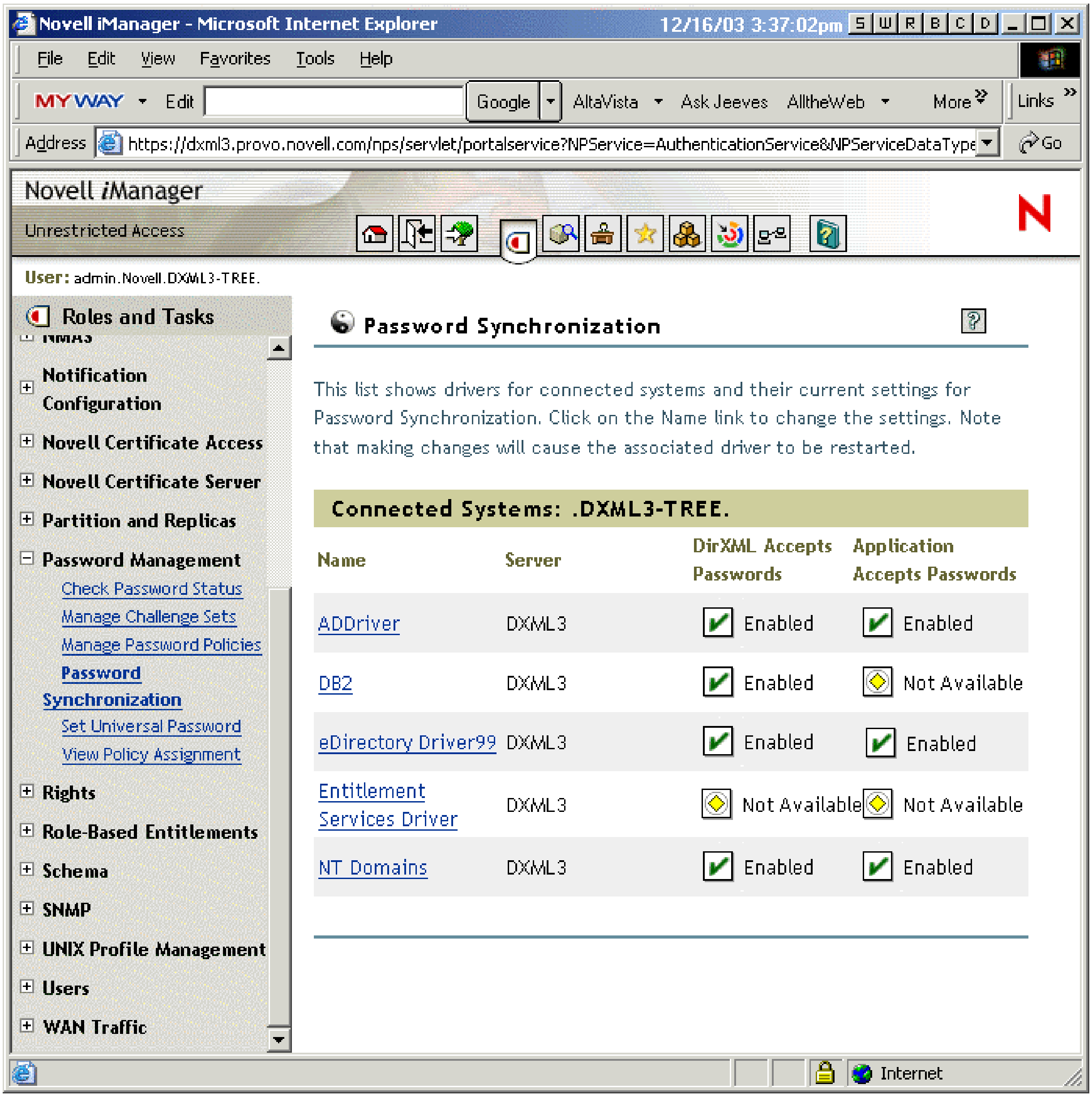
  This option is dimmed in the interface if the connected system doesn't support it (as declared in the driver manifest).

- Whether users are notified by e-mail when a password is not synchronized

The driver configurations delivered with Identity Manager contain driver manifest entries. To add them to an existing driver, see "Upgrading Existing Driver Configurations to Support Identity Manager Password Synchronization" on page 174.

The Password Synchronization task in iManager (Password Management > Password Synchronization) is where you should edit these GCVs. This graphical interface lets you specify how you want passwords to flow among connected systems and Identity Manager.

After you specify where you want to search for connected system drivers, the interface displays an overview of the password flow settings for all the connected system drivers it finds. Here's an example of the overview page:



Address https://dxml3.provo.novell.com/nps/servlet/portalservice?NPService=AuthenticationService&NPServiceDataType

User: admin.Novell.DXML3-TREE.

Password Synchronization

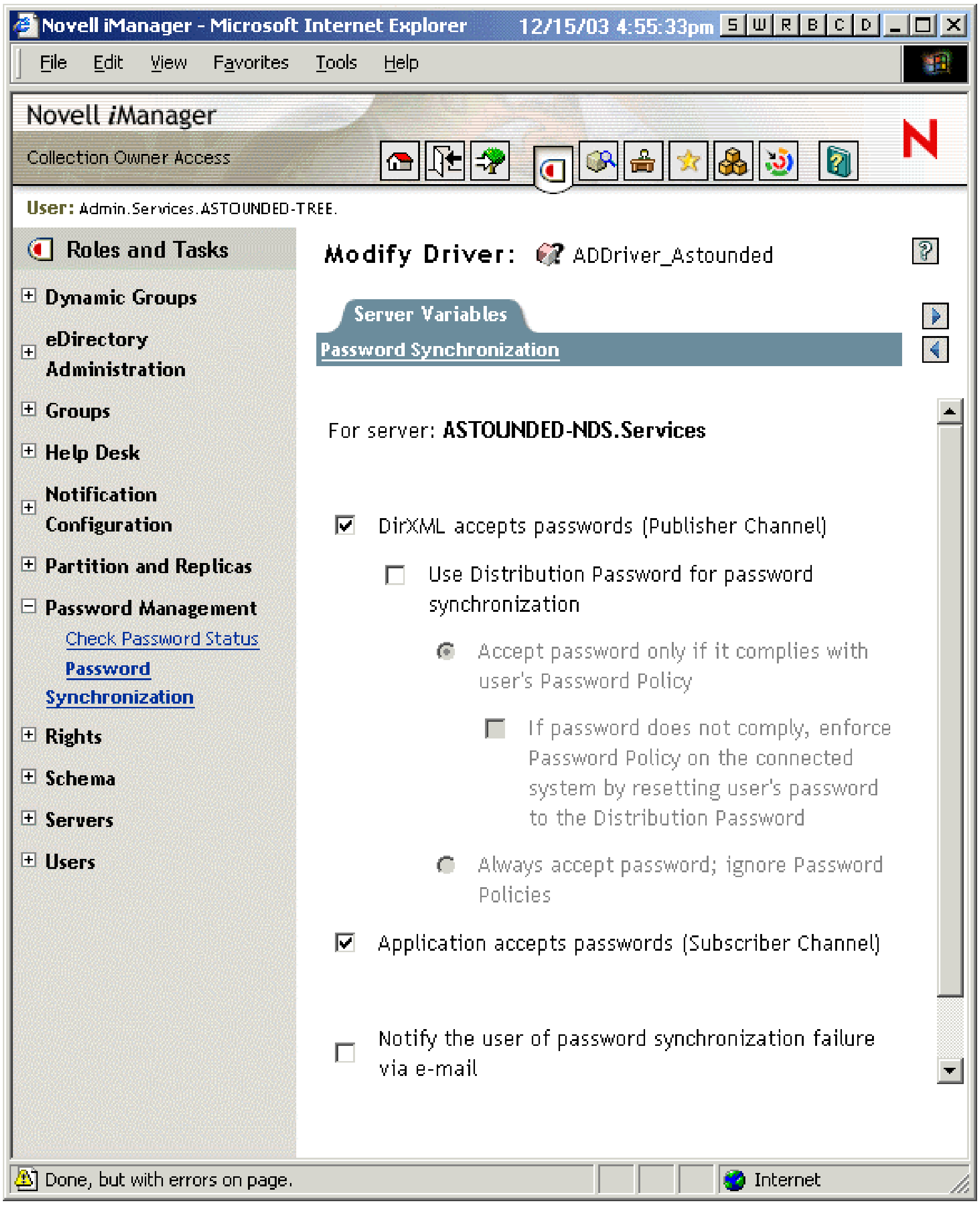
This list shows drivers for connected systems and their current settings for Password Synchronization. Click on the Name link to change the settings. Note that making changes will cause the associated driver to be restarted.

Connected Systems: .DXML3-TREE.

Name	Server	DirXML Accepts Passwords	Application Accepts Passwords
ADDriver	DXML3	☑ Enabled	☑ Enabled
DB2	DXML3	☑ Enabled	◇ Not Available
eDirectory Driver99	DXML3	☑ Enabled	☑ Enabled
Entitlement Services Driver	DXML3	◇ Not Available	◇ Not Available
NT Domains	DXML3	☑ Enabled	☑ Enabled

On this page, you can click a driver name to drill down and see all the settings you control.

The following figure shows the page that appears. This is the graphical interface for setting the global configuration values for Password Synchronization.



Novell iManager - Microsoft Internet Explorer 12/15/03 4:55:33pm
File Edit View Favorites Tools Help
Novell iManager
Collection Owner Access
User: Admin.Services.ASTOUNDED-TREE.
Roles and Tasks
Dynamic Groups
eDirectory Administration
Groups
Help Desk
Notification Configuration
Partition and Replicas
Password Management
Check Password Status
Password Synchronization
Rights
Schema
Servers
Users
Done, but with errors on page.
Internet

Modify Driver: ADDriver_Astounded

Server Variables

Password Synchronization

For server: **ASTOUNDED-NDS.Services**

☑ DirXML accepts passwords (Publisher Channel)

□ Use Distribution Password for password synchronization

● Accept password only if it complies with user's Password Policy

□ If password does not comply, enforce Password Policy on the connected system by resetting user's password to the Distribution Password

○ Always accept password; ignore Password Policies

☑ Application accepts passwords (Subscriber Channel)

□ Notify the user of password synchronization failure via e-mail

If an option on this page is dimmed, it is because the driver manifest shows that the connected system does not support it.

NOTE: This interface lets you set global configuration values on each driver separately. Global configuration values on a driver override those on the driver set, and setting them on a specific driver gives you more granular control. This page can display only the global configuration values that are present on the individual driver.

Global configuration values can be set on the driver set object, and can be inherited by a driver in that driver set if the driver does not have values of its own. If a driver has no settings of its own and instead inherits the global configuration values from the driver set, this interface does not display them. Although this interface does not display inherited global configuration values, they are still honored by the password synchronization policies.

Policies Required in the Driver Configuration

Policies on the Publisher and Subscriber Channels for each driver govern the password flow, based on your settings in the global configuration variables explained above.

These policies are included in the driver configurations in Identity Manager.

If you are upgrading an existing driver configuration instead of replacing it, you must add these policies to the configuration. (See "Upgrading Existing Driver Configurations to Support Identity Manager Password Synchronization" on page 174.)

These policies must be in your driver configuration in the correct location for password synchronization to work.

Location in the Driver Configuration	Password Synchronization Policy Name	What the Policy Does
Publisher Command Transformation These policies must be present in this order, a they must be the last policies in the Publisher Command Transformation policy set.	Password(Pub)-Default Password Policy	Adds a default password to an add object if the add does not already contain a password. This policy and the Password(Sub)-Default Password Policy are the only policies that you can modify or remove. The others should be used without changes, in order for password synchronization functionality to work properly.
	Password(Pub)-Check Password GCV	Checks the GCV to determine whether you have specified that Identity Manager accepts passwords from this connected system. If not, it strips out all password elements. The name of the GCV is enable-password-publish, and the display name is "DirXML accepts passwords from application."
	Password(Pub)-Publish Distribution Password	Transforms the <password> element to the form that allows it to update Universal Password. This policy references the following GCVs: publish-password-to-dp, and enforce-password-policy.
	Password(Pub)-Publish NDS Password	Allows the <password> element to go through if you have specified that the NDS password should be updated. If not, it strips out the <password> element. This policy references the GCV named publish-password-to-nds.
	Password(Pub)-Add Password Payload	Puts in payload data that is passed around in the engine for purposes of e-mail notification.

Location in the Driver Configuration	Password Synchronization Policy Name	What the Policy Does
Publisher Input Transformation We recommend that this policy be listed last if there are multiple policies in the Input Transformation.	Password(Pub)-Sub Email Notifications	If the payload information comes through, and the status shows a problem, it sends e-mail to the user. It sends the mail to the user's e-mail address indicated in the Internet EMail Address attribute in eDirectory. This policy references the GCV named notify-user-on-password-dist-failure to determine whether to send notification e-mails.
Subscriber Command Transformation These policies must be present in this order, and they must be the last policies in the Subscriber Command Transformation policy set.	Password(Sub)-Transform Distribution Password	Transforms the Universal Password to a <password> element.
	Password(Sub)-Default Password Policy	Adds a default password to an add object if the add does not already contain a password. This policy and the Password(Pub)-Default Password Policy are the only policies that you can modify or remove. The others should be used without changes, in order for password synchronization functionality to work properly.
	Password(Sub)-Check Password GCV	Checks the GCV to determine whether you have specified that the connected system accepts passwords. If not, it strips out all password elements. The name of the GCV is enable-password-subscribe, and the display name is "Application accepts passwords from DirXML data store."
	Password(Sub)-Add Password Payload	Puts in payload data that is passed around in the engine for purposes of e-mail notification.
Subscriber Output Transformation We recommend that this policy be listed last if there are multiple policies in the Output Transformation.	Password(Sub)-Pub Email Notifications	If the payload information comes through, and the status shows a problem, it sends e-mail to the user. This policy references the GCV named notify-user-on-password-dist-failure to determine whether to send notification e-mails.

Filters You Install on the Connected System to Capture Passwords

For AD, NT Domain, and NIS, filters must be installed to capture the user's password.

See "Setting Up Password Filters" on page 210.

Password Policies You Create for Your Users

Password Policies must be used to enable Universal Password for your users (although you can use some features of Password Synchronization without Universal Password). The Password Policy also lets you specify Advanced Password Rules, and specify whether user's existing passwords are checked for compliance with the rules.

You must understand Password Policies to use Identity Manager Password Synchronization.

Password Policies are explained in Chapter 8, "Managing Passwords by Using Password Policies," on page 95.

NMAS Login Methods

For some situations, you must have the NMAS Simple Password Login Method in place to be able to do password functions. For example, LDAP requires it.

For information about login methods, see the *Novell Modular Authentication Services (NMAS) 2.3 Administration Guide* (http://www.novell.com/documentation/nmas23/index.html).

Handling Sensitive Information

Identity Manager Password Synchronization is provided to let you simplify user passwords and reduce help desk costs. One of the new features is bidirectional password synchronization, which lets you share passwords among eDirectory and connected systems in multiple ways, as described in the scenarios in "Implementing Password Synchronization" on page 179.

When you choose to exchange information between connected systems, you should take precautions to make sure the exchange is secure. This is especially true for passwords.

As part of your planning for using Identity Manager and Password Synchronization, you should review the following security suggestions.

- "Use SSL" on page 165
- "Secure Access to eDirectory and to Identity Manager objects" on page 166
- "Review the Security Considerations for Password Management Features" on page 166
- "Create Strong Password Policies" on page 167
- "Secure Connected Systems That Participate in Password Synchronization" on page 167
- "Follow Industry Best Practices for Security" on page 168
- "Use Nsure Audit to Track Changes to Sensitive Information" on page 168

Use SSL

You should enable SSL for all transports, where it is available. SSL should be enabled for communication between the DirXML engine and Remote Loader (see "Providing for Secure Data Transfers" on page 55), and between the DirXML engine or Remote Loader and the connected systems.

If you don't enable SSL, you are sending information such as passwords in the clear.

Secure Access to eDirectory and to Identity Manager objects

Physical Security. Protect access to the physical location of the servers where Novell eDirectory is installed.

Access Rights. Administrative rights are needed to create Identity Manager objects and configure drivers. Monitor and control who has rights to create or modify the following:

- DirXML driver set
- DirXML driver
- Driver configuration objects (filters, style sheets, policies), especially policies that are used for password retrieval or synchronization
- Password Policy objects (and the iManager task for editing them), because they control which passwords are synchronized to each other, and which Password Self-Service options are used

Review the Security Considerations for Password Management Features

- Password Policy objects are publicly readable, to allow applications to check whether passwords are compliant. This means that an unauthenticated user could query eDirectory and find out what Password Policies you have in place. If your Password Policies require users to create strong passwords, this should not pose a risk, as noted in "Create Strong Password Policies" on page 167.
- The Password Hint attribute (nsimHint) is also publicly readable, to allow unauthenticated users who have forgotten a password to access their own hint. Password Hints can be a big help in reducing help desk calls.

  For security, Password Hints are checked to make sure they do not contain the user's actual password. However, a user could still create a Password Hint that gives too much information about the password.

  To increase security when using Password Hints,

  - Allow access to the nsimHint attribute only on the LDAP server used for Password Self-Service.
  - Require that users answer Challenge Questions before receiving the Password Hint.
  - Remind users to create Password Hints that only they would understand. The Password Change Message in the Password Policy is one way to do that. See "Adding Your Own Password Change Message to Password Policies" on page 137.

  If you choose not to use Password Hint at all, make sure you don't use it in any of the Password Policies. To prevent Password Hints from being set, you can go a step further and remove the Hint Setup gadget completely, as described in "Disabling Password Hint by Removing the Hint Gadget" on page 135.
- Challenge Questions are publicly readable, to allow unauthenticated users who have forgotten a password to authenticate another way. Requiring Challenge Questions increases the security of Forgotten Password Self-Service, because a user must prove his or her identity by giving the correct responses before receiving a forgotten password or a Password Hint, or resetting a password.

  The intruder lockout setting is enforced for Challenge Questions, so the number of incorrect attempts an intruder could make is limited.

  However, a user could create Challenge Questions that hold clues to the password. Remind users to create Challenge Questions and Responses that only they would understand. The

Password Change Message in the Password Policy is one way to do that. See "Adding Your Own Password Change Message to Password Policies" on page 137.

- For security, the Forgotten Password actions of "E-mail password to user" and "Allow user to reset password" are available only if you require the user to answer Challenge Questions.
- A security enhancement was added to NMAS 2.3.4 regarding Universal Passwords changed by an administrator. It works basically the same way as the feature previously provided for NDS Password. If an administrator changes a user's password, such as when creating a new user or in response to a help desk call, for security the password is automatically expired if you have enabled the setting to expire passwords in the Password Policy. The setting in the Password Policy is in Advanced Password Rules, named "Number of days before password expires (0-365)." For this particular feature, the number of days is not important, but the setting must be enabled.

Create Strong Password Policies

Using Universal Password and Password Policies allows you to enforce strong password requirements for your users. Use the Advanced Password Rules in Password Policies to follow industry best practices for passwords.

For example, you can require user passwords to comply with rules such as the following:

- Requiring unique passwords. You can prevent users from reusing passwords, and control the number of passwords the system should store in the history list for comparison.
- Requiring a minimum number of characters in password. Requiring longer passwords is one of the best ways to make passwords stronger.
- Requiring a minimum number of numerals in password. Requiring at least one numeric character in a password helps protect against "dictionary attacks," in which intruders try to log in using words in the dictionary.
- Excluding passwords of your choice. You can exclude words that you consider to be security risks, such as the company name or location, or the words test or admin. Although the exclusion list is not meant to import an entire dictionary, the list of words you exclude can be quite long. Just keep in mind that a long list of exclusions makes login slower for your users. A better protection from "dictionary attacks" is probably to require numerals or special characters.

Keep in mind that you can create multiple Password Policies if you have different password requirements in different parts of the tree. You can assign a Password Policy to the whole tree, a partition root container, container, or even an individual user. (To simplify administration, we recommend you assign Password Policies as high up in the tree as possible.)

In addition, you can use intruder lockout. As always, this eDirectory feature lets you specify how many failed login attempts are allowed before an account is locked. This is a setting on the parent container instead of in the Password Policy. See "Managing User Accounts" in the *Novell eDirectory 8.7.3 Administration Guide* (http://www.novell.com/documentation/edir873/edir873/data/afxkmdi.html#amm7bjv).

Secure Connected Systems That Participate in Password Synchronization

Keep in mind that the connected systems that you are synchronizing data to might store or transport that data in a compromising manner.

Secure the systems to which you exchange passwords. For example LDAP, NIS, and Windows each have security concerns that you must consider before enabling password synchronization with those systems.

Many software vendors provide specific security guidelines that you should follow for their products.

Follow Industry Best Practices for Security

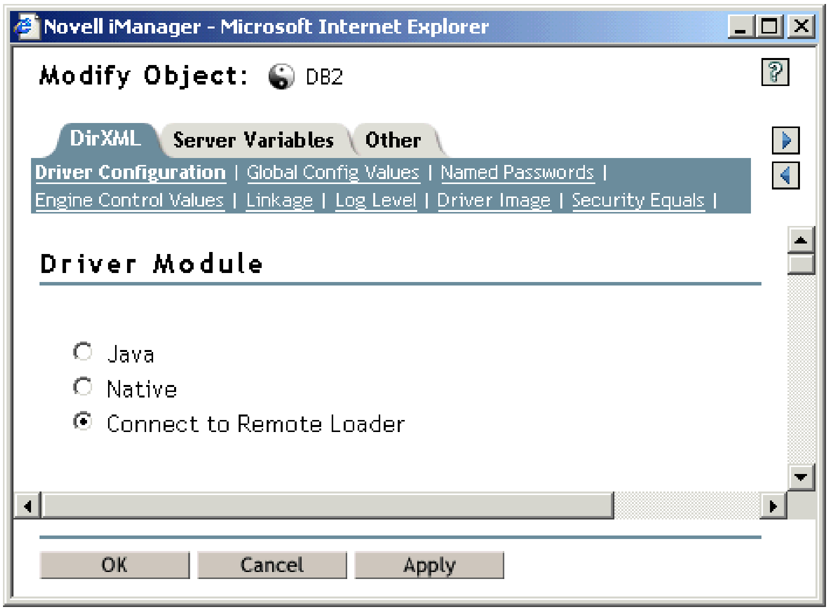
Make sure to follow industry best practices for security measures, such as blocking unused ports on the server.

Use Nsure Audit to Track Changes to Sensitive Information

You can use Nsure Audit to log events that you consider important for security. For information on Nsure Audit, see Chapter 14, "Logging and Reporting Using Nsure Audit," on page 259.

For example, you could log password changes for a particular DirXML driver (or driver set) by doing the following:

1 In the properties for a driver (or driver set), on the DirXML tab click Log Level.

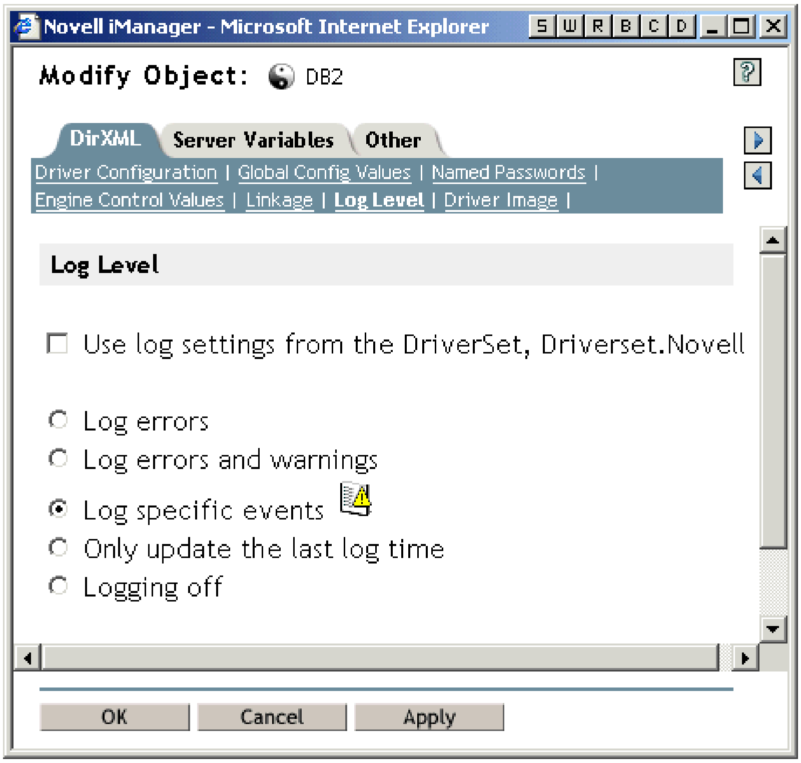

Novell iManager - Microsoft Internet Explorer
Modify Object:
DB2
DirXML
Server Variables
Other
Driver Configuration | Global Config Values | Named Passwords |
Engine Control Values | Linkage | Log Level | Driver Image | Security Equals |
OK
Cancel
Apply

Driver Module

○ Java
○ Native
● Connect to Remote Loader

2 On the Log Level page that appears, click Log Specific Events.

Note that this is the page where you specify whether the driver has its own settings or uses the settings from the driver set.


Novell iManager - Microsoft Internet Explorer
DirXML
Server Variables
Other
Driver Configuration | Global Config Values | Named Passwords |
Engine Control Values | Linkage | Log Level | Driver Image |
OK
Cancel
Apply

Modify Object: DB2

Log Level

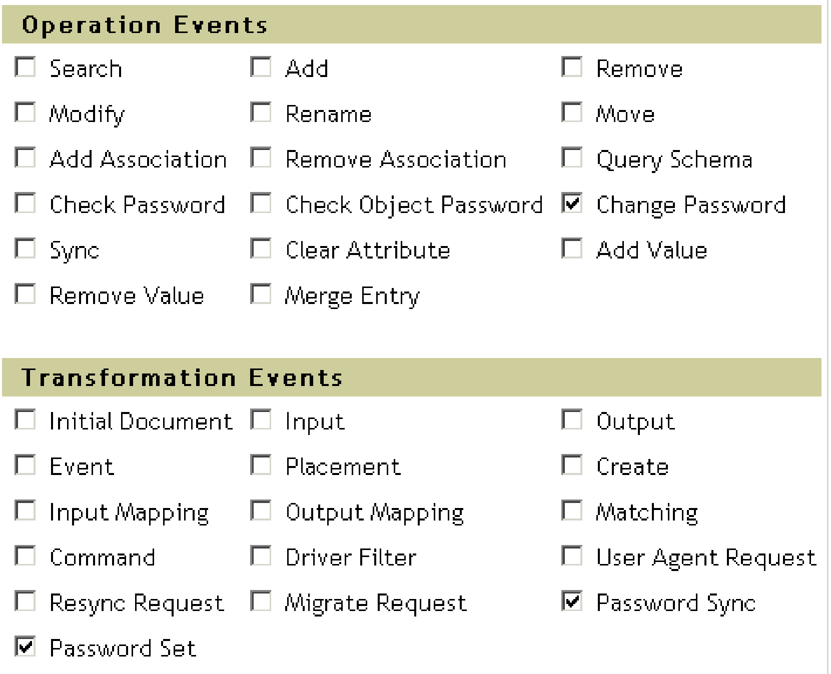
□ Use log settings from the DriverSet, Driverset.Novell

○ Log errors
○ Log errors and warnings
● Log specific events
○ Only update the last log time
○ Logging off

3 To select the specific events, click the log events icon ⚠.

4 On the Events page that appears, select the following check boxes:

- In Operation Events, Change Password. This item monitors direct changes to the NDS password.
- In Transformation Events, both Password Set and Password Sync. These two items monitor events for the Universal Password and Distribution Password.



Operation Events

□ Search	□ Add	□ Remove
□ Modify	□ Rename	□ Move
□ Add Association	□ Remove Association	□ Query Schema
□ Check Password	□ Check Object Password	☑ Change Password
□ Sync	□ Clear Attribute	□ Add Value
□ Remove Value	□ Merge Entry	

Transformation Events

□ Initial Document	□ Input	□ Output
□ Event	□ Placement	□ Create
□ Input Mapping	□ Output Mapping	□ Matching
□ Command	□ Driver Filter	□ User Agent Request
□ Resync Request	□ Migrate Request	☑ Password Sync
☑ Password Set		

5 Click OK on the Events page and on the Log Level page.

Preparing to Use Identity Manager Password Synchronization and Universal Password

In this section:

Switching Users from NDS Password to Universal Password

When you turn on Universal Password for a group of users by using a Password Policy, the user needs the Universal Password to be populated.

If you have previously been using Password Synchronization to update the NDS password, you need to plan for the transition of user's passwords. To switch to using Universal Password, you can do one of the following things to have your users create a Universal Password:

- If you use the Novell Client (it is not required for Identity Manager Password Synchronization), roll out the new Novell Client that supports Universal Password. The next time users log in using the new Novell Client, the client captures the NDS password before it is hashed, and uses it to populate the Universal Password. (See "Planning Login and Change Password Methods for your Users" on page 104.)
- If you are not using the Novell Client, have users log in to the iManager self-service console. That login method populates Universal Password. To access the iManager self-service console, go to /nps on your iManager server. For example, https://www.myiManager.com/nps.
- Have users log in using through any service that is authenticating using a Universal Password enabled LDAP server. For example, a company portal.

Changing Passwords Using the iManager Self-Service Console or Novell Client

When a user changes a password in iManager, the iManager self-service console, and the Novell Client, the Advanced Password Rules from the Password Policy are displayed. This allows the user to create a compliant password without needing to guess at the rules.

Depending on how your password flow is set up, a user could change a password on a connected system and it would be synchronized to Identity Manager and other connected systems. However, the connected systems don't display the Advanced Password Rules when the user changes a password.

If you want to enforce Advanced Password Rules and avoid noncompliant passwords, it's best to require users to change the password only in the iManager self-service console or Novell Client, or at least make sure the Advanced Password Rules are well publicized for users.

On a connected system, the user is allowed to change the password without viewing the Password Policy rules, and might not remember the rules correctly. Only the policies of the connected system itself will be enforced when users first make the change. The following issues might occur for the user when creating a noncompliant password on a connected system, depending on your Identity Manager settings:

- If you have enabled the setting that enforces the policy on passwords coming in to Identity Manager from connected systems, the user's new password won't be synchronized to eDirectory. If you have set Identity Manager to notify users of failure, they find out by e-mail that their password didn't synchronize.
- If you also have set Identity Manager to replace noncompliant passwords on connected systems, the user cannot log in with the new password he or she chose on the connected system.

  Identity Manager resets the password on the connected system to the Distribution Password, which is probably the last compliant password the user created.

Preparing to Use Universal Password

Most of the information you need is in "Deploying Universal Password" in the *Novell Modular Authentication Services (NMAS) 2.3 Administration Guide* (http://www.novell.com/documentation/nmas23/index.html).

In addition, keep in mind the following:

- eDirectory 8.7.1 or later is required for using Universal Password. NetWare 6.5 is not required, and the NetWare documentation has been updated to reflect this.
- Identity Manager Password Synchronization relies on both Universal Password and another new kind of password, the Distribution Password, which is the repository from which Identity Manager distributes passwords to connected systems. Like Universal Password, policies can be enforced on the Distribution Password.
- The DirXML iManager plug-ins, which ship with Identity Manager, include the new Password Management plug-ins that let you create Password Policies. These plug-ins let you determine how you want Universal Password to be synchronized with NDS Password, Simple Password, and Distribution Password.

  These plug-ins replace the ones for Universal Password that shipped with NetWare 6.5. They are described in Chapter 8, "Managing Passwords by Using Password Policies," on page 95.
- eDirectory 8.6.2 can't be used for the tree that Identity Manager is using. However, eDirectory 8.6.2 is supported for a subset of password synchronization features, so it can be used for other trees if you are not yet ready to upgrade your whole environment.
- One way to reduce the impact when you are upgrading software for deploying Universal Password is to create a separate tree for Identity Manager as an identity vault. Many environments already use an identity vault for DirXML and the drivers.
- Universal Password gives you new capabilities that were not supported with previous password management tools, such as enforcement of Password Policies and the ability to use special characters.
- It's very important to update the Novell Client and other utilities, to avoid having the NDS Password get out of sync with the Universal Password (sometimes referred to as "password drift"). See "Planning Login and Change Password Methods for your Users" on page 104.
- The latest version of the Novell Client supports Universal Password, can populate it for a user when you first enable Universal Password for that user, and can display and enforce password policies when users are changing passwords.

- A connected system does not display the Advanced Password Rules that you create in a Password Policy. At this time, neither does the Novell Client, although it enforces them.

  Instead, it's best to require users to change the password only in the iManager self-service console.

  If you allow users to change their passwords on a connected system or by using the latest version of the Novell Client, help users be successful in creating a compliant password by making sure your Password Policy rules are well publicized for your users.

- For administrators and help desk users, make them aware that ConsoleOne® supports Universal Password only if it is used on a NetWare® 6.5 server or later, or is used on a machine that has the latest Novell Client.

- Make sure administrators and help desk users understand the implications of using utilities that support only NDS Password. These utilities can be used to log in, but they should not be used to change passwords. This measure avoid "password drift," a situation in which the NDS Password gets out of sync with the Universal Password.

  The *Novell Modular Authentication Services (NMAS) 2.3 Administration Guide* (http://www.novell.com/documentation/nmas23/index.html) references a TID that lists utilities and their support for Universal Password.

Replica Planning and Password Policies

Password Policies are assigned with a tree-centric perspective. By contrast, Password Synchronization is set up per driver, and drivers are installed on a per-server basis and can manage only those users who are in a master or read/write replica. To get the results you expect from Password Synchronization, make sure the containers that are in a master or read/write replica on the server running the drivers for Password Synchronization match the containers where you have assigned Password Policies with Universal Password enabled. Assigning a Password Policy to a partition root container ensures that all users in that container and subcontainers are assigned the Password Policy.

Setting Up E-Mail Notification

To use the e-mail notification feature, you must do the following:

- Use the Notification Configuration task in iManager to set up the e-mail server
- Use the Notification Configuration task in iManager to customize the e-mail templates if desired.
- Make sure that eDirectory users have the Internet EMail Address attribute populated.

Follow the instructions in "Configuring E-Mail Notification" on page 214.

New Driver Configuration and Identity Manager Password Synchronization

If you have not used Password Synchronization 1.0 in your environment, and you are creating a new driver or replacing an existing configuration with a new Identity Manager configuration, use the following instructions to set up the new Identity Manager Password Synchronization functionality.

1 Make sure your environment is ready to use Universal Password. See "Preparing to Use Identity Manager Password Synchronization and Universal Password" on page 170.

2 Create a new driver, or replace an existing driver's configuration with the Identity Manager 2 configuration.

The Identity Manager configurations contain the policies and other items necessary for Identity Manager Password Synchronization. See the individual DirXML Driver Guides (http://www.novell.com/documentation/beta/dirxmldrivers) for information on importing the new sample driver configurations.

3 Turn on Universal Password for users by creating Password Policies with Universal Password enabled.

See "Creating Password Policies" on page 110. If you previously used Universal Password with NetWare 6.5, note that there are some extra steps described in "(NetWare 6.5 only) Re-Creating Universal Password Assignments" on page 108.

We recommend that you assign Password Policies as high up in the tree as possible.

In the Password Policy, Universal Password > Configuration Options, there are options for how you want NMAS to keep the different kinds of passwords synchronized.

For examples of scenarios for using Password Synchronization, and how Password Policies fit in, see "Implementing Password Synchronization" on page 179. See also the online help.

4 (Active Directory, NIS, or NT Domain only) Install new Password Synchronization filters and configure them if you want the connected systems to provide user passwords to Identity Manager:

For instructions, see the driver implementation guide for each of these drivers, at DirXML Drivers (http://www.novell.com/documentation/lg/dirxmldrivers/index.html).

5 Make sure your password flow is set the way you want it for each connected system.

5a In iManager, click Password Management > Password Synchronization, and search for the drivers for connected systems you want to manage.

5b View the current settings for password flow. This is a graphical interface for the global configuration values (GCVs). Edit them by clicking the name of a driver.

You can edit settings for

- Whether Identity Manager accepts passwords from this system
- Which password you want Identity Manager to update: Universal Password directly, or Distribution Password directly. Identity Manager controls the entry point, meaning which password Identity Manager updates. NMAS controls the flow of passwords between each different kind of password, based on what you have set in the Password Policy in Universal Password > Configuration Options.
- Whether the Password Policy for the user is enforced on password changes coming in to Identity Manager
- Whether the Password Policy for the user is enforced on the connected system by resetting passwords that don't comply
- Whether passwords are accepted by this connected system
- Whether e-mail notifications are sent when password synchronization fails

For more information and screen captures for these options, see "Implementing Password Synchronization" on page 179. See also the online help.

6. Test password synchronization:
   - Confirm that the Identity Manager password is distributed to the systems you specified
   - Confirm that the connected systems you specified are publishing passwords to Identity Manager.

   For troubleshooting tips, see "Implementing Password Synchronization" on page 179.

Upgrading Password Synchronization 1.0 to Identity Manager Password Synchronization

This task applies only to existing DirXML Drivers for Active Directory and NT Domain that are being used with Password Synchronization 1.0.

It's very important that you follow the correct procedure when upgrading from Password Synchronization 1.0.

For instructions, see the driver implementation guides for the DirXML Drivers for Active Directory and NT Domain, at DirXML Drivers (http://www.novell.com/documentation/lg/dirxmldrivers/index.html).

Upgrading Existing Driver Configurations to Support Identity Manager Password Synchronization

This section explains the process for adding support for Identity Manager Password Synchronization to existing driver configurations, instead of replacing your existing driver configurations with the Identity Manager sample configurations.

IMPORTANT: If you are upgrading a DirXML Driver for AD or NT Domain, and it is being used with Password Synchronization 1.0, you should follow the upgrade instructions in the driver implementation guides for the DirXML Drivers for Active Directory and NT Domain, at DirXML Drivers (http://www.novell.com/documentation/lg/dirxmldrivers/index.html).

NOTE: The policies added in this procedure are for supporting Password Synchronization using Universal Password and Distribution Password. If you are using the eDirectory driver to synchronize only the NDS Password, you should not use these policies in the eDirectory driver configuration. NDS Password is synchronized using Public Key and Private Key attributes instead of these policies, as described in "Scenario 1: eDirectory to eDirectory Password Synchronization Using NDS Password" on page 181.

The following is an overview of the tasks you must complete, using the procedure in this section:

- Convert the driver to Identity Manager 2 format.
- Add driver manifest, global configuration values, and password synchronization policies to the driver configuration. For a list of the policies you add, see "Policies Required in the Driver Configuration" on page 163.
- Change the Filter settings for the nspmDistributionPassword attribute.
- Set up password synchronization flow.

Prerequisites

❑ Create a backup of your existing driver using the Export Drivers Wizard.

❑ Make sure you have installed the new driver shim. Some password synchronization features such as Check Password Status won't work without the new Identity Manager driver shim.

IMPORTANT: If you are upgrading a DirXML Driver for AD or NT Domain, and it is being used with Password Synchronization 1.0, don't install the driver shim until you have reviewed the upgrade instructions. Follow the upgrade instructions in the driver implementation guides for the DirXML Drivers for Active Directory and NT Domain, at DirXML Drivers (http://www.novell.com/documentation/lg/dirxmldrivers/index.html).

Procedure

1 Make sure your environment is ready to use Universal Password. See "Preparing to Use Identity Manager Password Synchronization and Universal Password" on page 170.

2 Convert the driver to Identity Manager format using a wizard. See "Upgrading a Driver Configuration from DirXML 1.x to Identity Manager Format" on page 79.

3 In iManager, click DirXML Utitities > Import Drivers.

You add support for Identity Manager Password Synchronization to each driver you want to participate in password synchronization, by importing an "overlay" configuration file to add the policies, driver manifest, and the GCVs, all at once.

After adding them, you must also add the nspmDistributionPassword attribute to the Filter.

These tasks are described in subsequent steps.

4 Select the driver set where your existing driver resides.

5 In the list of driver configurations that appears, select only the item labeled Password Synchronization 2.0 Policies. It is listed under Additional Policies. Click Next.

A list of import prompts appears.

6 Select your existing driver to update.

7 Select the driver type from the drop-down list.

Based on the type of driver, the Import Driver Wizard makes entries in the driver manifest that indicate the capabilities of the driver configuration and the connected system:

- Whether the connected system can provide passwords to Identity Manager. This refers to the users's actual password on the connected system, not to a password that can be created using a style sheet. Only AD, eDirectory, and NIS can do this.
- Whether the connected system can accept passwords from Identity Manager
- Whether the connected system can check a password to see if it matches the password in Identity Manager.

Correct entries in the driver manifest are required for Password Synchronization policies to work. The driver manifest indicates the combined ability of the connected system, the Identity Manager DirXML driver shim, and the driver configuration policies, and usually should not be edited by the network administrator.

8 Click Next. Choose to update everything about the driver.

This option gives you the driver manifest, global configuration values (GCVs), and policies necessary for password synchronization.

The driver manifest and GCVs overwrite any values that already exist, but these kinds of driver parameters are new in Identity Manager 2, so for a DirXML 1.*x* driver there should be no existing values to be overwritten.

The password synchronization policies don't overwrite any existing policy objects. They are simply added to the Driver object.

NOTE: If you do have driver manifest or GCV values that you want to save, choose the option named Update Only Selected Policies in That Driver, and select the check boxes for all the policies. This option imports the password policies but does not change the driver manifest or GCVs. You need to manually paste in any additional values.

9 Click Next, then click Finish to complete the wizard.

At this point, the new policies have been created as policy objects under the driver object, but are not yet part of the driver configuration. To link them in, you must manually insert each of them at the right point in the driver configuration on the Subscriber and Publisher channels.

10 Insert each of the new policies into the correct place on your existing driver configuration. If there are multiple policies in a policy set, make sure these password synchronization policies are listed last.

The list of the policies and where to insert them is in "Policies Required in the Driver Configuration" on page 163.

Repeat the following steps for each policy.

10a Click DirXML Management > Overview. Select the driver set for the driver you are updating.

10b Click the driver you just updated. A page opens showing a graphical representation of the driver configuration.

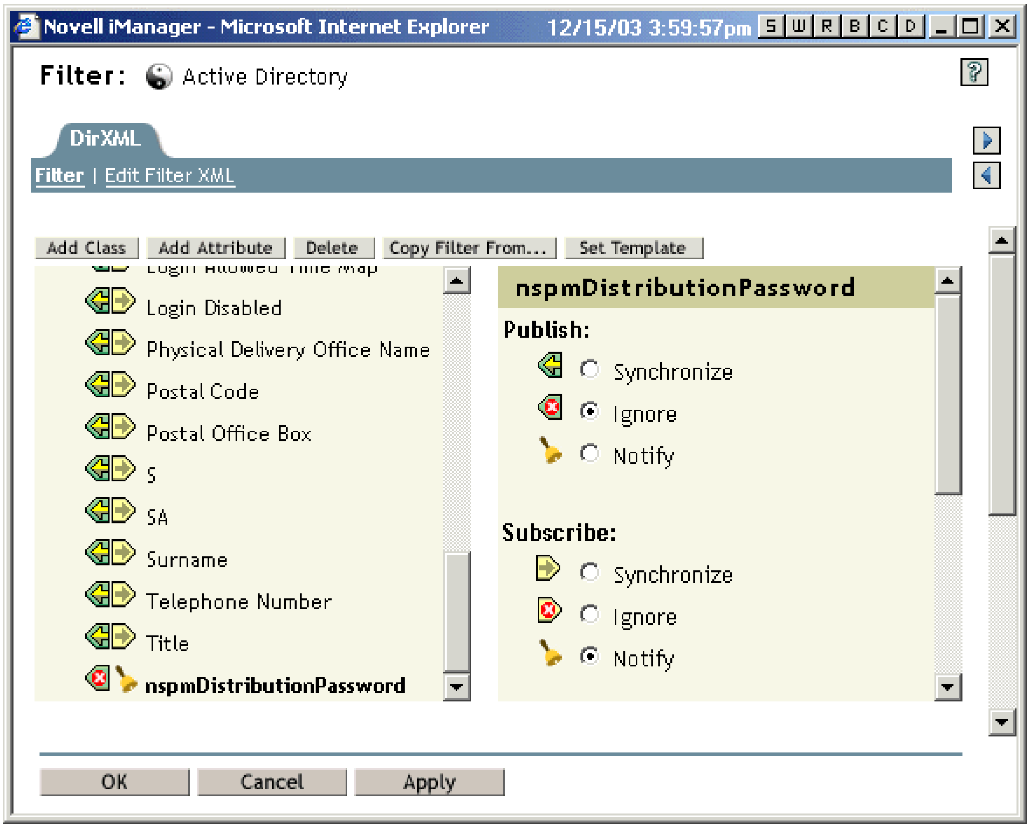
10c Click the icon for the place where you need to add one of the new policies.

10d Click Insert to add the new policy. In the Insert page that appears, click Use an Existing Policy and browse for the new policy object. Click OK.

10e If you have more than one policy in the list for any of the new policies, use the arrow buttons ▲ ▼ to move the new policies to the correct location in the list. Make sure the policies are in the order listed in "Policies Required in the Driver Configuration" on page 163.

11 For the object classes that you want to synchronize passwords for (such as User), make sure that nspmDistributionPassword attribute is in the filter and has the following settings:

- For the Publisher channel, set the Filter to Ignore for the nspmDistributionPassword attribute.
- For the Subscriber channel, set the Filter to Notify for the nspmDistribution Password attribute.



Filter: Active Directory

Login Allowed Time Map
Login Disabled
Physical Delivery Office Name
Postal Code
Postal Office Box
S
SA
Surname
Telephone Number
Title
nspmDistributionPassword

nspmDistributionPassword

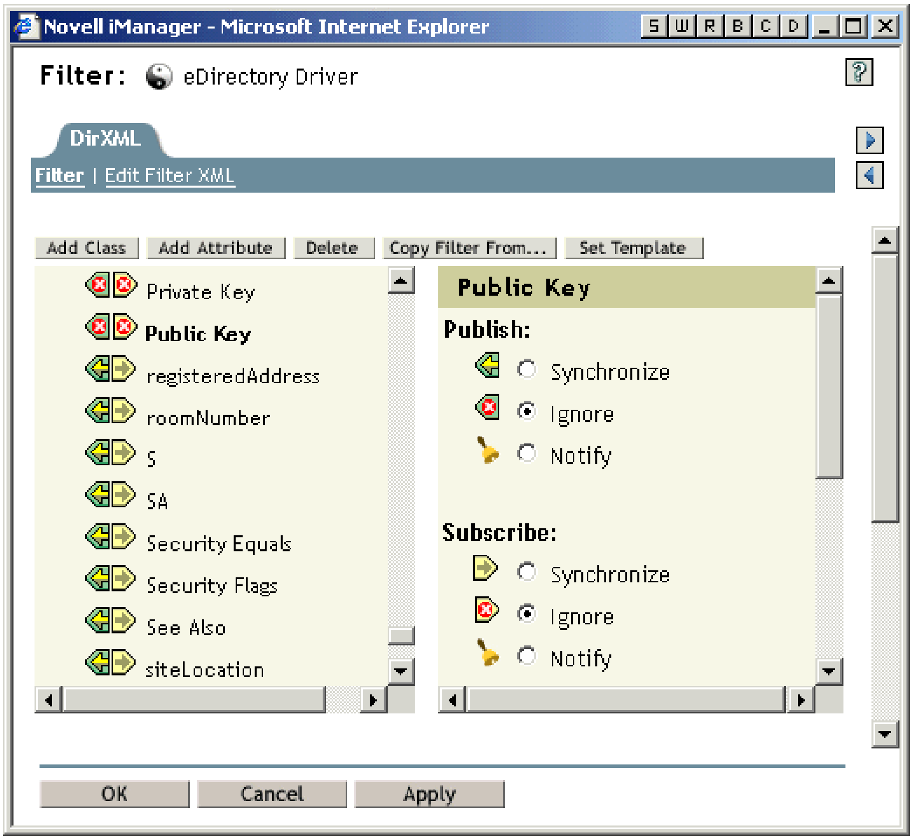
Publish:

○ Synchronize
● Ignore
○ Notify

Subscribe:

○ Synchronize
○ Ignore
● Notify

12 Ignore both the Public Key and Private Key attributes in the driver Filter for all objects that have Notify set for the nspmDistributionPassword attribute.



Public Key

Publish:

○ Synchronize
● Ignore
○ Notify

Subscribe:

○ Synchronize
● Ignore
○ Notify

13 Repeat Step 2 through Step 12 for all the drivers that you want to upgrade to participate in password synchronization.

At this point, the driver has the new driver shim, Identity Manager format, and the other elements that are necessary in the driver configuration to support password synchronization: driver manifest, GCVs, password synchronization policies, and filter settings.

14 Check the individual driver implementation guides to see if there are any additional steps or information for setting up Identity Manager Password Synchronization, at DirXML Drivers (http://www.novell.com/documentation/lg/dirxmldrivers/index.html).

15 Turn on Universal Password for users by creating Password Policies with Universal Password enabled.

See "Creating Password Policies" on page 110. If you previously used Universal Password with NetWare 6.5, note that there are some extra steps described in "(NetWare 6.5 only) Re-Creating Universal Password Assignments" on page 108.

We recommend that you assign Password Policies as high up in the tree as possible.

In the Password Policy, Universal Password > Configuration Options, there are options for how you want NMAS to keep the different kinds of passwords synchronized. The default settings should work for most implementations. See the online help for that page for more information.

For examples of scenarios for using Password Synchronization, and how Password Policies fit in, see "Implementing Password Synchronization" on page 179.

Password Policies are assigned with a tree-centric perspective. By contrast, Password Synchronization is set up per driver, and drivers are installed on a per-server basis and can manage only those users who are in a master or read/write replica. To get the results you expect from Password Synchronization, make sure the containers that are in a master or read/write replica on the server running the drivers for Password Synchronization match the containers where you have assigned Password Policies with Universal Password enabled. Assigning a Password Policy to a partition root container ensures that all users in that container and subcontainers are assigned the Password Policy.

16 Make sure your password flow is set the way you want it for each connected system.

16a In iManager, click Password Management > Password Synchronization, and search for the drivers for connected systems you want to manage.

16b View the current settings for password flow. This is a graphical interface for the global configuration values (GCVs). Edit them by clicking the name of a driver.

You can edit settings for

- Whether Identity Manager accepts passwords from this system
- Which password you want Identity Manager to update: Universal Password directly, or Distribution Password directly. Identity Manager controls the entry point, meaning which password Identity Manager updates. NMAS controls the flow of passwords between each different kind of password, based on what you have set in the Password Policy in Universal Password > Configuration Options.
- Whether the Password Policy for the user is enforced on password changes coming in to Identity Manager
- Whether the Password Policy for the user is enforced on the connected system by resetting passwords that don't comply
- Whether passwords are accepted by this connected system
- Whether e-mail notifications are sent when password synchronization fails

For more information and screen captures for these options, "Implementing Password Synchronization" on page 179. See also the online help.

17 Test password synchronization:

- Confirm that the Identity Manager password is distributed to the systems you specified
- Confirm that the connected systems you specified are publishing passwords to Identity Manager.

For troubleshooting tips, see "Implementing Password Synchronization" on page 179.

Implementing Password Synchronization

The Password Synchronization functionality provided in Identity Manager allows you to implement several different scenarios. This section outlines some basic scenarios, to help you understand how the settings in Password Synchronization and Password Policies affect the way passwords are synchronized. You can use one or more of the scenarios to meet the needs of your environment.

In this section:

- “Scenario 3: Synchronizing eDirectory and Connected Systems with Identity Manager Updating the Distribution Password” on page 193
- “Scenario 4: Tunneling — Synchronizing Connected Systems but not eDirectory, with Identity Manager Updating the Distribution Password” on page 201
- “Scenario 5: Synchronizing Application Passwords to the Simple Password” on page 206

Overview of Identity Manager Relationship to NMAS

In this section:

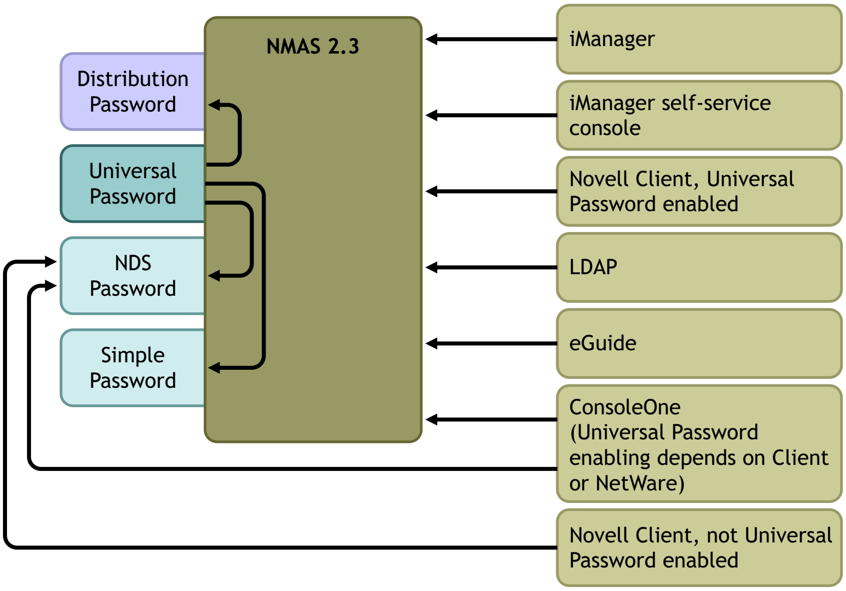
- “Utilities and NMAS” on page 180
- “Identity Manager and NMAS” on page 180

Utilities and NMAS

The latest utilities such as iManager and the Novell Client communicate with NMAS rather than directly updating a specific password, and NMAS is the entity that determines which passwords are updated.

NMAS synchronizes passwords within eDirectory, based on your settings in Password Policies.

Legacy utilities that are not Universal Password-enabled update the NDS password directly, instead of communicating with NMAS and letting NMAS determine which passwords are updated. Be aware of how legacy utilities are used in your environment by users and help desk administrators; they can cause “password drift” (Universal Password and NDS password getting out of sync) if you are using Universal Password and NMAS 2.3, because legacy utilities update the NDS password directly instead of going through NMAS. For example, you should make sure users upgrade the Novell Client, and make sure that help desk users use ConsoleOne only with the latest Novell Client or NetWare release to ensure support of Universal Password.


NMAS 2.3
Distribution Password
Universal Password
NDS Password
Simple Password
iManager
iManager self-service console
Novell Client, Universal Password enabled
LDAP
eGuide
ConsoleOne (Universal Password enabling depends on Client or NetWare)
Novell Client, not Universal Password enabled

Identity Manager and NMAS

Identity Manager controls the “entry point” (updating either Universal or Distribution Password directly). NMAS controls the flow of synchronizing passwords inside eDirectory.

In Scenario 1, the DirXML Driver for eDirectory can be used to update the NDS password directly. This scenario is basically the same as the one provided in DirXML 1.*x*.

In Scenario 2, Scenario 3, and Scenario 4, described later in the section, Identity Manager is used to update either Universal Password or Distribution Password, and Identity Manager goes through NMAS to make password changes. This allows NMAS to update other eDirectory passwords as determined by Password Policy settings, and allows NMAS to enforce Advanced Password Rules from Password Policies for passwords being synchronized with connected systems. In these scenarios, the password that Identity Manager distributes to connected systems is always the Distribution Password. The difference between the scenarios lies in the different combinations of NMAS Password Policy settings, and Identity Manager Password Synchronization settings for each connected system driver.

Scenario 1: eDirectory to eDirectory Password Synchronization Using NDS Password

As in Password Synchronization 1.0, you can synchronize NDS Password between two eDirectory trees using the eDirectory driver. This scenario does not require Universal Password to be implemented, and can be used with eDirectory 8.6.2 or later. Another name for this kind of password synchronization is synchronizing the public/private key pair.

This method should only be used to synchronize passwords from eDirectory to eDirectory. It does not use NMAS and therefore cannot be used to synchronize passwords to connected applications.

In this section:

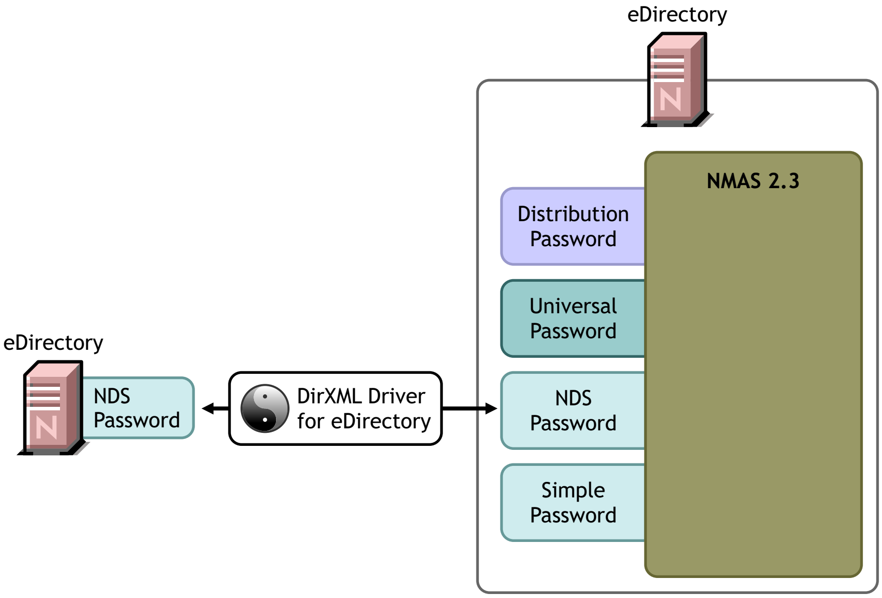
- "Advantages and Disadvantages of Scenario 1" on page 181
- "Scenario 1 Diagram" on page 182
- "Setting Up Scenario 1" on page 182
- "Troubleshooting Scenario 1" on page 183

Advantages and Disadvantages of Scenario 1

Advantages	Disadvantages
Simple configuration. Just include the correct attributes in the driver filter. If you are deploying Identity Manager 2 and eDirectory 8.7.3 in stages, this method can help you deploy gradually. ◆ You don't need to add the new password synchronization policies to driver configurations. ◆ Does not require Universal Password to be implemented in the Identity Manager 2 tree. ◆ Can be used with connected trees running eDirectory 8.6.2 or later. ◆ Does not require NMAS 2.3. Enforces the basic password restrictions you can set for NDS Password.	This method synchronizes passwords between eDirectory trees. Passwords cannot be synchronized to other connected systems. Does not update Universal Password or Distribution Password. Because this method does not use NMAS, you can't validate passwords against Advanced Password Rules in Password Policies for passwords coming from another tree. Because this method does not use NMAS, you can't reset passwords on the connected eDirectory tree if they don't comply with Password Policy. E-mail notifications are not provided for password synchronization failures. Check Password Status operations from the iManager task are not supported (Distribution Password is required for this feature).

Scenario 1 Diagram

The diagram shows that, as in DirXML 1.*x*, the DirXML Driver for eDirectory can be used to synchronize the NDS password between two eDirectory trees. This scenario does not go through NMAS.



Setting Up Scenario 1

To set up this kind of password synchronization:

Universal Password Deployment

Not necessary.

Password Policy Configuration

None.

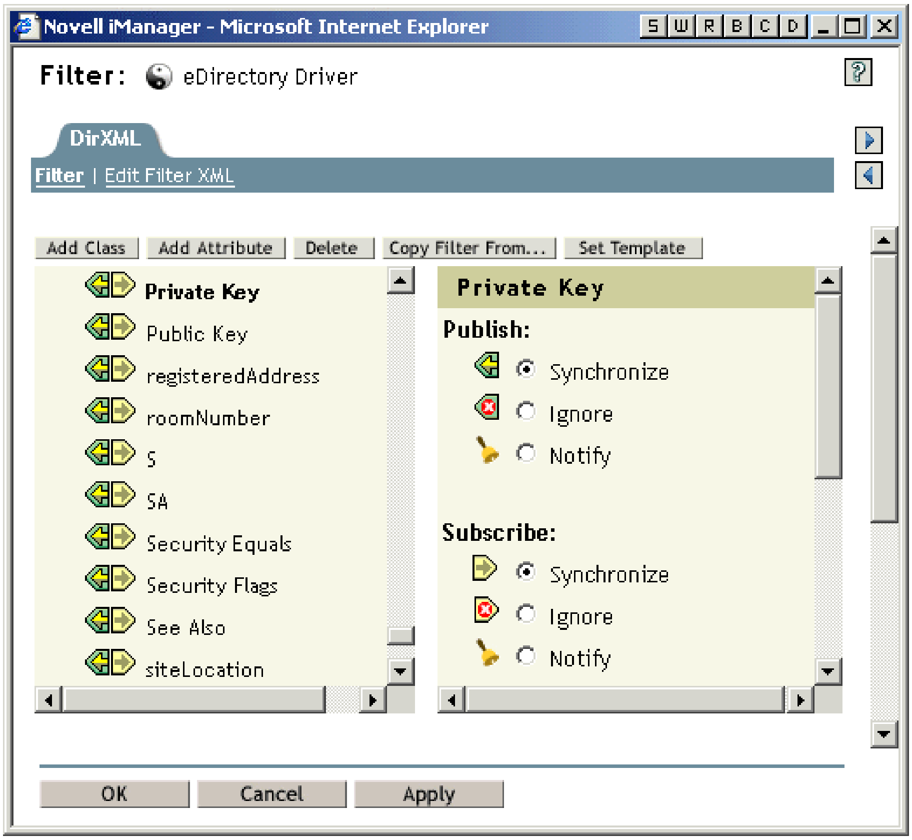
Password Synchronization Settings

None. The settings on the Password Synchronization page for a driver have no effect on this method of synchronizing NDS Password.

Driver Configuration

Remove the Password Synchronization policies listed in "Policies Required in the Driver Configuration" on page 163. Those policies are intended to support Universal Password and Distribution Password. NDS Password is synchronized using Public Key and Private Key attributes instead of these policies.

Make sure that the Filter for both eDirectory drivers is synchronizing the Public Key and Private Key attributes for all object classes for which passwords should be synchronized. The following figure shows an example.



Filter: eDirectory Driver

Private Key

Publish:

● Synchronize
○ Ignore
○ Notify

Subscribe:

● Synchronize
○ Ignore
○ Notify

Troubleshooting Scenario 1

- Turn on the DXML Dstrace option.
- Check the driver Filter to make sure the Public Key and Private Key attributes are being synchronized, not ignored.
- See also the tips in "Troubleshooting Password Synchronization" on page 227.

Scenario 2: Synchronizing Universal Password

With Identity Manager, you can synchronize a connected system password with the Universal Password in eDirectory.

When Universal Password is updated, the NDS Password, Distribution Password, or Simple Password can also be updated, depending on your settings in the Password Policy.

Any connected system can publish passwords to Identity Manager, though not all connected systems can provide the user's actual password. For example, Active Directory can publish a user's actual password to Identity Manager. Although PeopleSoft does not provide a password from the PeopleSoft system itself, it can provide an initial password created in a policy in the driver configuration, such as a password based on the user's employee ID or last name. Not all drivers can subscribe to password changes from Identity Manager. See "Connected System Support for Password Synchronization" on page 156.

In this section:

- "Advantages and Disadvantages of Scenario 2" on page 184
- "Scenario 2 Diagram" on page 184

- "Setting Up Scenario 2" on page 185
- "Troubleshooting Scenario 2" on page 190

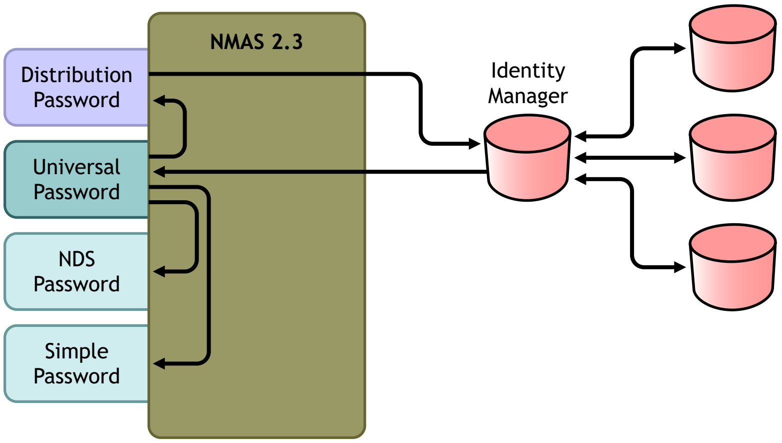
Advantages and Disadvantages of Scenario 2

Advantages	Disadvantages
Allows synchronization of passwords to and from eDirectory and the connected system. Allows passwords to be validated against the NMAS Password Policy. Allows e-mail notifications for failed password operations, such as when a password coming from a connected system does not comply with Password . Supports the Check Password Status task in iManager, if Universal Password is being synchronized with Distribution Password and if the connected system supports checking passwords. NMAS enforces the Advanced Password Rules in your Password Policies, if you have the rules enabled. If a password coming from a connected system does not comply, an error is generated, and an e-mail notification is sent if you have specified that option. If you don't want Password Policy rules enforced, you can uncheck Enable Advanced Password Rules in the Password Policy.	By design, resetting passwords in the connected system is not supported with this method because the Distribution Password and Universal passwords might not be the same, depending on your settings in the Password Policies.

Scenario 2 Diagram

The digram shows that in this scenario, passwords come in through Identity Manager, which goes through NMAS to directly update Universal Password. Then, NMAS synchronizes the Universal Password with the Distribution Password and other passwords according to the Password Policy settings. Finally, Identity Manager retrieves the Distribution Password to distribute to connected systems that are set to accept passwords.

Although multiple connected systems are shown as connecting to Identity Manager in this digram, keep in mind that you individually create the settings for each connected system driver.



Setting Up Scenario 2

To set up this kind of password synchronization:

- "Universal Password Deployment" on page 185
- "Password Policy Configuration" on page 185
- "Password Synchronization Settings" on page 186
- "Driver Configuration" on page 188

Universal Password Deployment

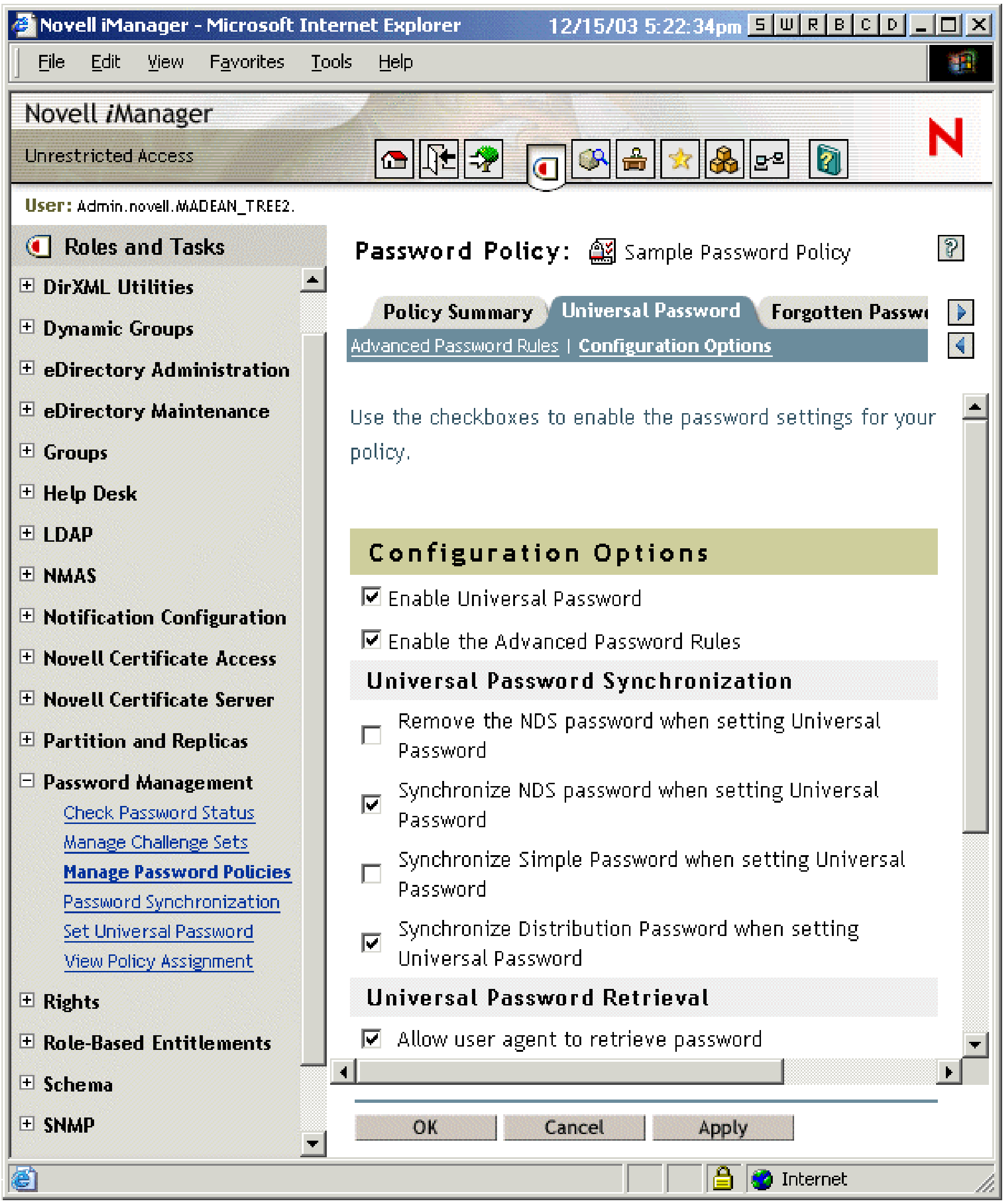
Make sure your environment is ready to use Universal Password. See "Preparing to Use Identity Manager Password Synchronization and Universal Password" on page 170.

Password Policy Configuration

In Password Management > Manage Password Policies, do the following:

1. Make sure a Password Policy is assigned to the parts of the eDirectory tree that you want to have this kind of password synchronization. You can assign it to the whole tree (using Login Policy object), a partition root container, a container, or a specific user. We recommend that you assign Password Policies as high in the tree as possible to simplify management.
2. In the Password Policy, make sure the following are selected:
    - Enable Universal Password
    - Synchronize NDS Password when Setting Universal Password
    - Synchronize Distribution Password when Setting Universal Password

      Because Identity Manager retrieves the Distribution Password to distribute passwords to connected systems, it's important that this option be checked to allow bidirectional password synchronization.



Password Policy: Sample Password Policy

Use the checkboxes to enable the password settings for your policy.

Configuration Options

☑ Enable Universal Password

☑ Enable the Advanced Password Rules

Universal Password Synchronization

☐ Remove the NDS password when setting Universal Password

☑ Synchronize NDS password when setting Universal Password

☐ Synchronize Simple Password when setting Universal Password

☑ Synchronize Distribution Password when setting Universal Password

Universal Password Retrieval

☑ Allow user agent to retrieve password

3 Complete your Password Policy as desired.

NMAS enforces the Advanced Password Rules in your Password Policies, if you have the rules enabled. If you don't want Password Policy rules enforced, deselect Enable Advanced Password Rules.

4 If you are using Advanced Password Rules, make sure they don't conflict with the password policies on any connected systems that are subscribing to passwords.

Password Synchronization Settings

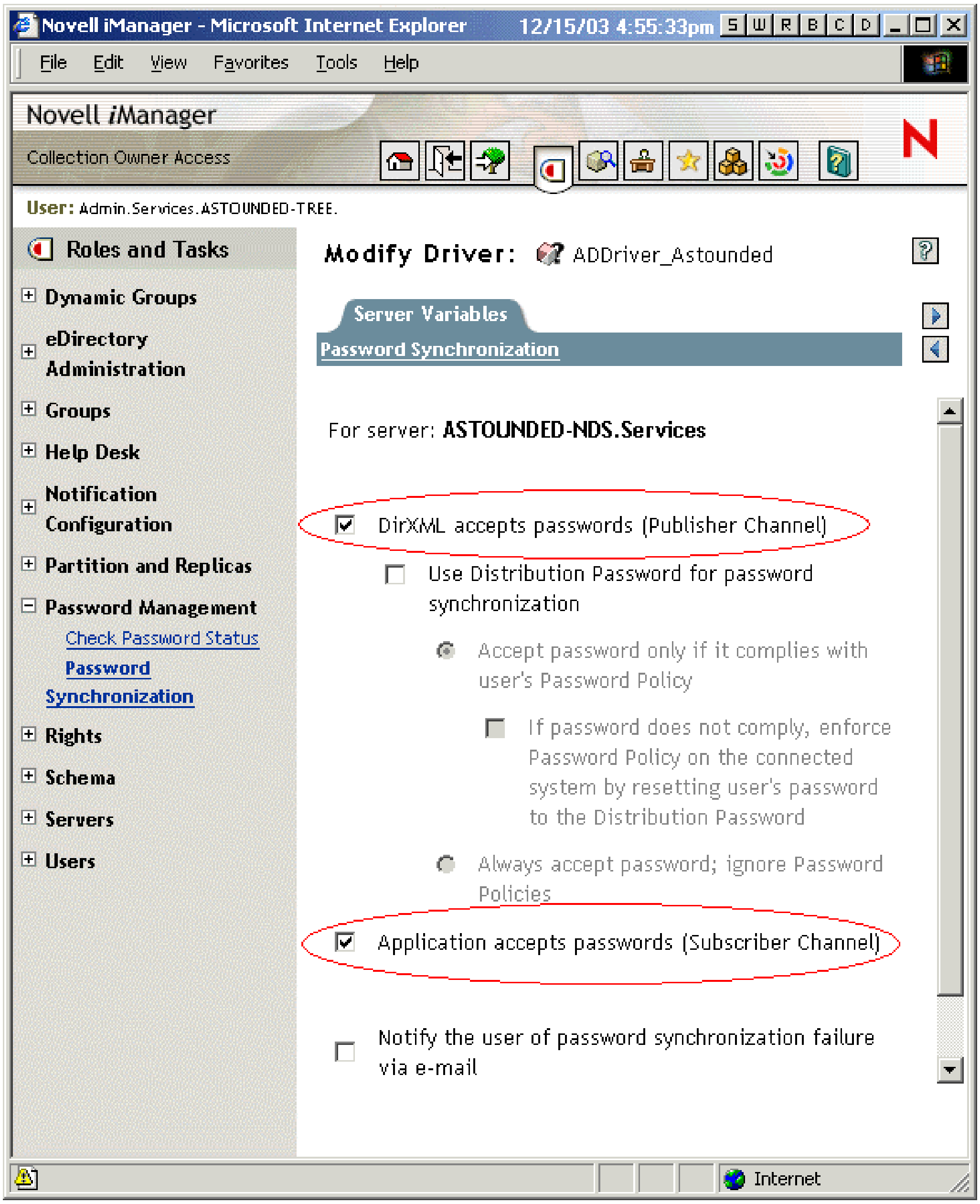
In Password Management > Password Synchronization, create these settings for the driver for the connected system:

1 Make sure the following are selected:

- DirXML Accepts Passwords (Publisher Channel)

  A message is displayed on the page if the driver manifest does not contain a "password-publish" capability. This is to inform users that passwords cannot be retrieved from the application and can only be published by creating a password in a the driver confguration using a policy.
- Application Accepts Passwords (Subscriber Channel)

  If the connected system does not support accepting passwords, the option is dimmed.



Modify Driver: ADDriver_Astounded

For server: **ASTOUNDED-NDS.Services**

☑ DirXML accepts passwords (Publisher Channel)

☐ Use Distribution Password for password synchronization

● Accept password only if it complies with user's Password Policy

☐ If password does not comply, enforce Password Policy on the connected system by resetting user's password to the Distribution Password

○ Always accept password; ignore Password Policies

☑ Application accepts passwords (Subscriber Channel)

☐ Notify the user of password synchronization failure via e-mail

These settings allow for bidirectional password synchronization if it is supported by the connected system.

You can adjust the settings to match your business policies for the authoritative source for passwords. For example, if a connected system should subscribe to passwords but not publish, select only Application Accepts Passwords (Subscriber Channel).

2. Make sure the following is not checked:

   - Use Distribution Password for Password Synchronization

   In this scenario, Identity Manager updates the Universal Password directly. The Distribution Password is still used to distribute passwords to connected systems, but is updated from the Universal Password by NMAS instead of by Identity Manager.

3. (Optional) Select the following if desired:

   - Notify the User of Password Synchronization Failure via E-mail

     Keep in mind that e-mail notifications require the Internet EMail Address attribute on the eDirectory user object to be populated.

     E-mail notifications are non-invasive. They do not affect the processing of the XML document that triggered the e-mail, and if they fail they are not retried unless the operation itself is retried.

     However, debug messages for e-mail notifications are written to the trace file.

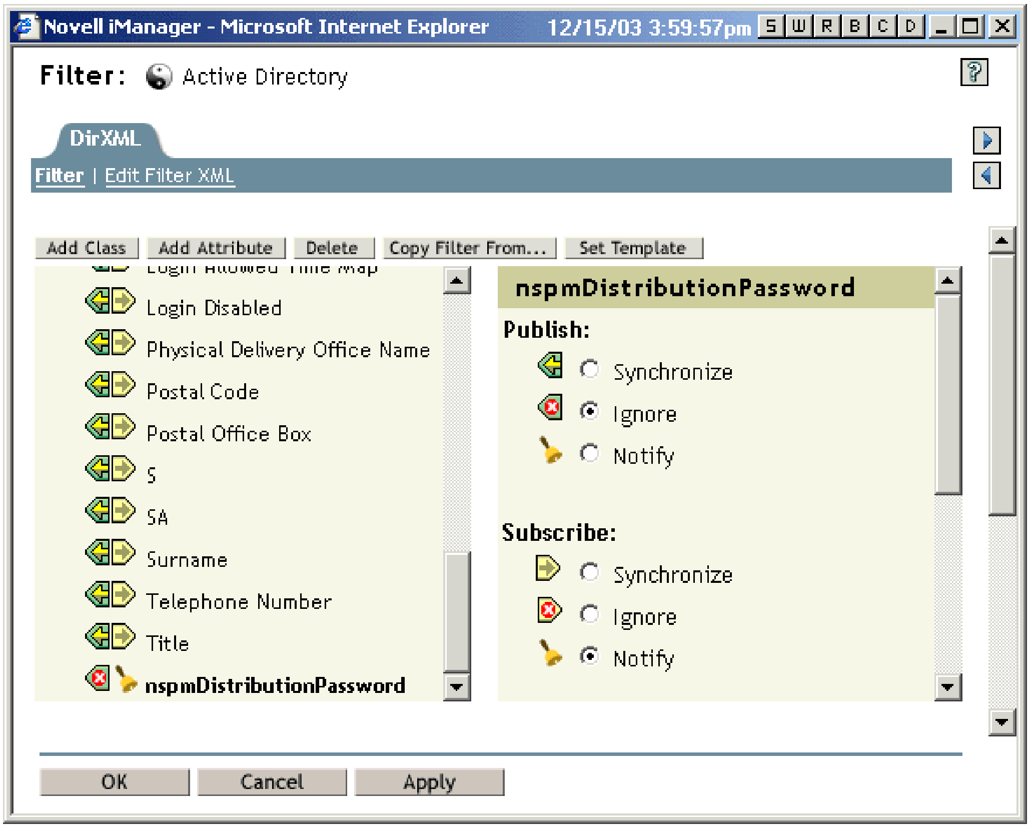
Driver Configuration

1. Make sure the required Identity Manager script password synchronization policies are included in the driver configurations for each driver that should participate in password synchronization. The policies must be in the correct location and the correct order in the driver configuration. For the list of policies, see "Policies Required in the Driver Configuration" on page 163.

   The Identity Manager sample configurations already contain the policies. If you are upgrading an existing driver, you can add the policies using the instructions in "Upgrading Existing Driver Configurations to Support Identity Manager Password Synchronization" on page 174.

2. Set the filter correctly for nspmDistributionPassword attribute:

   - For the Publisher channel, set the Filter to Ignore for the nspmDistributionPassword attribute for all object classes.
   - For the Subscriber channel, set the Filter to Notify for the nspmDistribution Password attribute for all object classes that should subscribe to password changes.



Filter: Active Directory

Login Allowed Time Map
Login Disabled
Physical Delivery Office Name
Postal Code
Postal Office Box
S
SA
Surname
Telephone Number
Title
nspmDistributionPassword

nspmDistributionPassword

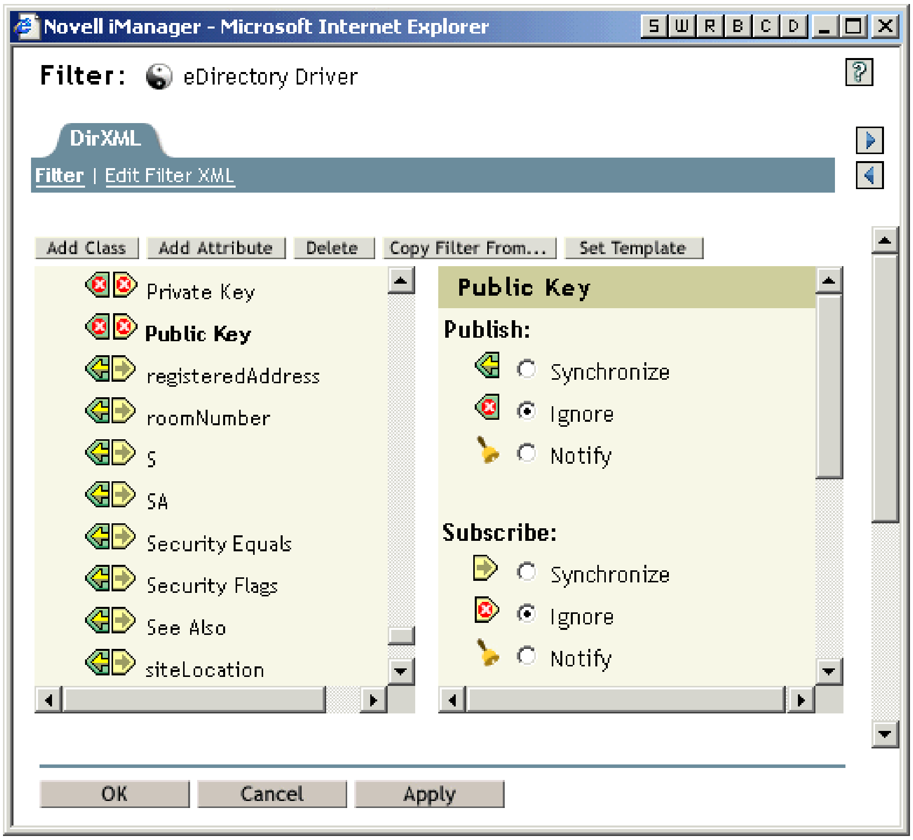
Publish:

○ Synchronize
● Ignore
○ Notify

Subscribe:

○ Synchronize
○ Ignore
● Notify

3 Ignore both the Public Key and Private Key attributes in the driver filter for all objects that have Notify set for the nspmDistributionPassword attribute.



Private Key
Public Key
registeredAddress
roomNumber
S
SA
Security Equals
Security Flags
See Also
siteLocation

Public Key

Publish:

○ Synchronize
● Ignore
○ Notify

Subscribe:

○ Synchronize
● Ignore
○ Notify

4 To ensure password security, make sure you control who has rights to Identity Manager objects.

Troubleshooting Scenario 2

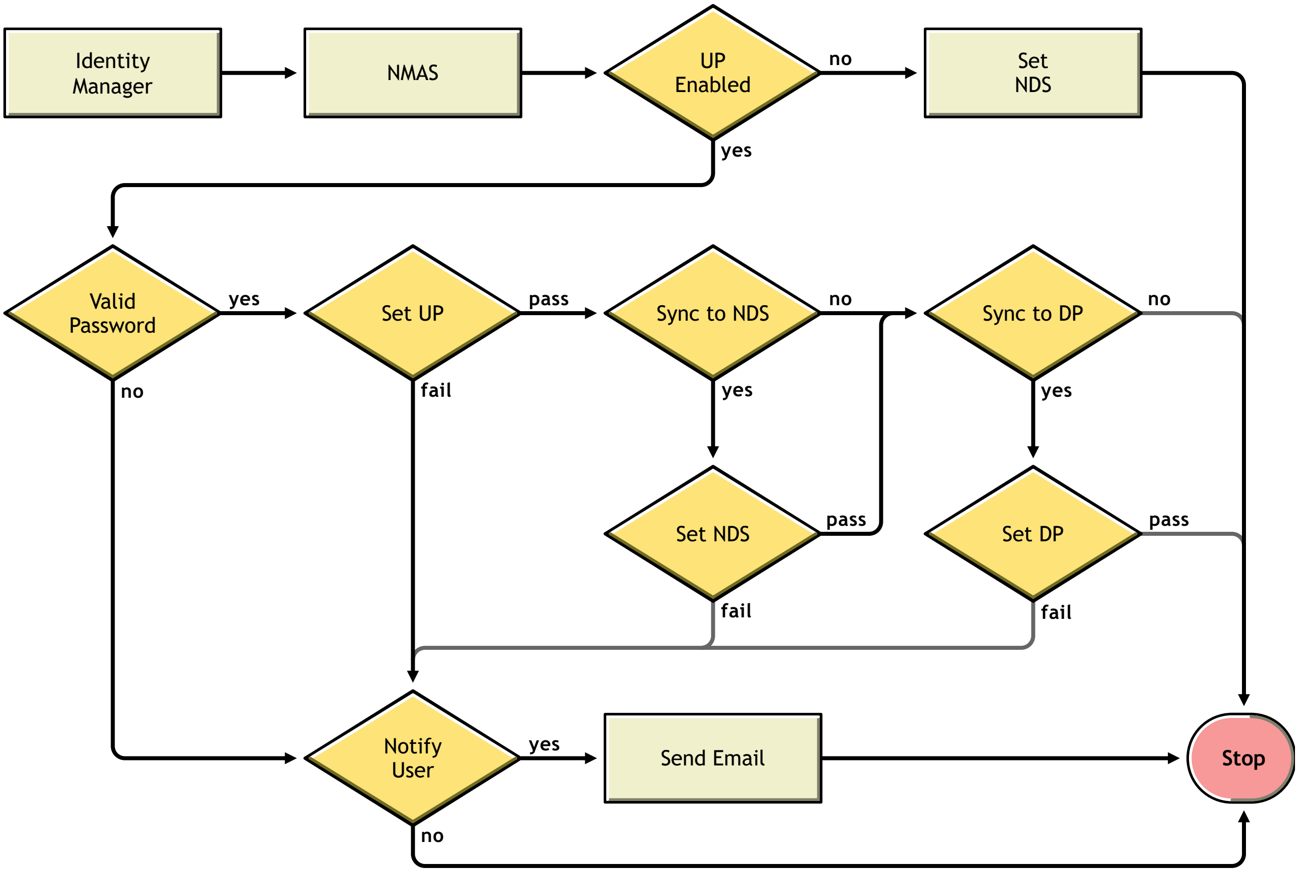
In this section:

- "Flowchart for Scenario 2" on page 190
- "Trouble Logging in to eDirectory" on page 191
- "Trouble Logging in to Another Connected System that Subscribes to Passwords" on page 191
- "E-Mail Not Generated on Password Failure" on page 192
- "Error When Using Check the Object Password" on page 192
- "Helpful DSTrace Commands" on page 192

See also the tips in "Troubleshooting Password Synchronization" on page 227.

Flowchart for Scenario 2

The following flowchart shows how NMAS handles the password it receives from Identity Manager. The password is synchronized to Universal Password in this scenario, and NMAS decides how to handle the password based on whether Universal Password is enabled in the Password Policy, whether Advanced Password Rules are enabled that incoming passwords must comply with, and what the other settings are in the Password Policy for synchronizing Universal Password with the other passwords.



Trouble Logging in to eDirectory

- Turn on the +AUTH, +DCLN, +DXML, and +DVRS settings in DSTrace
- Verify that the <password> or <modify-password> elements are being passed to Identity Manager. To verify that they are being passed, watch the trace screen with those options turned on.
- Verify that the password is valid according to the rules of the Password Policy.
- Check NMAS Password Policy configuration and assignment. Try assigning the policy directly to user make sure the correct policy is being used.
- On the Password Synchronization page for the driver, make sure “DirXML Accepts Passwords” is selected.
- In the Password Policy, make sure Synchronize Distribution Password when Setting Universal Password is selected.

Trouble Logging in to Another Connected System that Subscribes to Passwords

This section is for troubleshooting cases where this connected system is publishing passwords to Identity Manager, and another connected system that is subscribing to passwords does not appear to be receiving the changes from this system. Another name for this relationship is a secondary connected system, meaning that it receives passwords from the first connected system through Identity Manager.

- Turn on the +DXML and +DVRS settings in DSTrace to see Identity Manager rule processing
- Set the DirXML trace level for the driver to 3.

- Make sure the Password Synchronization “DirXML Accepts Passwords” option is selected.
- Check the driver filter to make sure the nspmDistributionPassword attribute is set correctly, as explained in Step 2 on page 188.
- Verify that the <password> for an add or <modify-password> element is being sent to the connected system. To verify, watch the DSTRACE screen or file with the trace options turned on as noted in the first items.
- Verify that the driver configuration includes the DirXML script password policies in the correct location and correct order, as described in “Policies Required in the Driver Configuration” on page 163.
- Compare the Password Policy in eDirectory with any password policies enforced by the connected system, to make sure they are compatible.

E-Mail Not Generated on Password Failure

- Turn on the +DXML setting in DSTrace to see DirXML rule processing
- Set the DirXML trace level for the driver to 3.
- Verify that the rule to generate e-mail is selected.
- Verify that the eDirectory object contains the correct user e-mail address in the Internet EMail Address attribute.
- In the Notification Configuration task, make sure the SMTP server and the e-mail template are configured correctly. See “Configuring E-Mail Notification” on page 214.

Error When Using Check the Object Password

The Check Password Status task in iManager causes the driver to be given a check object password action to perform. If you have problems, review the following:

- If the Check Object Password returns -603, the eDirectory object does not contain an nspmDistributionPassword attribute. Check the driver filter for the correct settings for the nspmDistributionPassword attributes, and make sure the Password Policy has Synchronize Distribution Password when Setting Universal Password selected.
- If the Check Object Password returns “Not Synchronized,” verify that the driver configuration contains the appropriate Password Synchronization policies.
- Compare the Password Policy in eDirectory with any password policies enforced by the connected system, to make sure they are compatible.
- Check Object Password operates from the Distribution Password. If the Distribution Password is not being updated, Check Object Password might not report that passwords are synchronized.
- Keep in mind that for the eDirectory driver only, Check Password Status is checking the NDS Password instead of the Distribution Password.

Helpful DSTrace Commands

+DXML: To view DirXML rule processing and potential error message

+DVRS: To view DirXML driver messages

+AUTH: To view NDS password modifications

+DCLN: To view NDS DClient messages

Scenario 3: Synchronizing eDirectory and Connected Systems with Identity Manager Updating the Distribution Password

In this method, Identity Manager updates the Distribution Password directly, and allows NMAS to determine how the other eDirectory passwords are synchronized.

Any connected system can publish passwords to Identity Manager, though not all connected systems can provide the user's actual password. For example, Active Directory can publish a user's actual password to Identity Manager. Although PeopleSoft does not provide a password from the PeopleSoft system itself, it can provide an initial password created in a policy in the driver configuration, such as a password based on the user's employee ID or last name. Not all drivers can subscribe to password changes from Identity Manager. See "Connected System Support for Password Synchronization" on page 156.

In this section:

- "Advantages and Disadvantages of Scenario 3" on page 193
- "Scenario 3 Diagram" on page 193
- "Setting Up Scenario 3" on page 194
- "Troubleshooting Scenario 3" on page 198

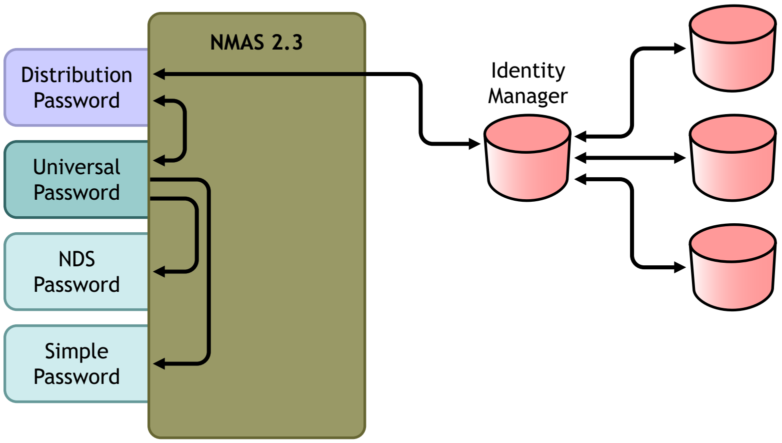
Advantages and Disadvantages of Scenario 3

Advantages	Disadvantages
Allows synchronization of passwords between eDirectory and connected systems. Lets you choose whether or not to enforce Password Policies for passwords coming from connected systems. You can specify that notification be sent if password synchronization fails. If you are enforcing Password Policies, you can choose to reset a password on the connected system to the Distribution Password if the password doesn't comply.	

Scenario 3 Diagram

The diagram shows that in this scenario, passwords come in through Identity Manager, which goes through NMAS to directly update Distribution Password. Identity Manager also uses the Distribution Password to distribute to connected systems that you have specified should accept passwords. NMAS synchronizes Universal Password with the Distribution Password, and with other passwords according to the Password Policy settings.

Although multiple connected systems are shown as connecting to Identity Manager in this diagram, keep in mind that you individually create the settings for each connected system driver.



Setting Up Scenario 3

To set up this kind of password synchronization:

- "Universal Password Deployment" on page 194
- "Password Policy Configuration" on page 194
- "Password Synchronization Settings" on page 195
- "Driver Configuration" on page 197

Universal Password Deployment

Make sure your environment is ready to use Universal Password. See "Preparing to Use Identity Manager Password Synchronization and Universal Password" on page 170.

Password Policy Configuration

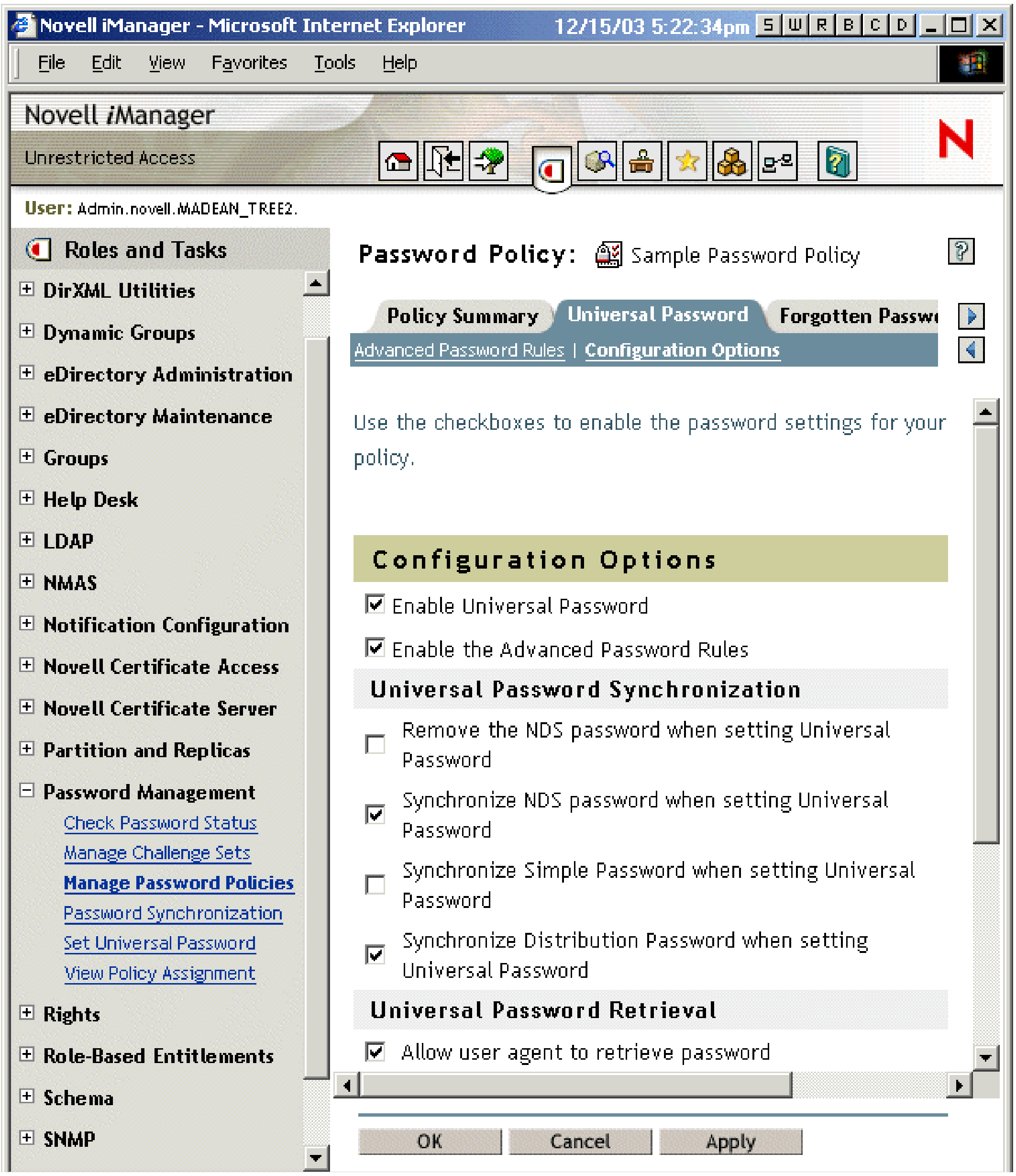
In Password Management > Manage Password Policies, do the following:

1 Make sure a Password Policy is assigned to the parts of the eDirectory tree that you want to have this kind of password synchronization. You can assign it to the whole tree, a partition root container, a container, or a specific user. We recommend that you assign Password Policies as high in the tree as possible to simplify management.

2 In the Password Policy, make sure the following are selected:

   - Enable Universal Password
   - Synchronize NDS Password When Setting Universal Password
   - Synchronize Distribution Password When Setting Universal Password

     Because Identity Manager retrieves the Distribution Password to distribute passwords to connected systems, it's important that this option be selected to allow bidirectional password synchronization.



Password Policy: Sample Password Policy

Use the checkboxes to enable the password settings for your policy.

Configuration Options

☑ Enable Universal Password

☑ Enable the Advanced Password Rules

Universal Password Synchronization

□ Remove the NDS password when setting Universal Password

☑ Synchronize NDS password when setting Universal Password

□ Synchronize Simple Password when setting Universal Password

☑ Synchronize Distribution Password when setting Universal Password

Universal Password Retrieval

☑ Allow user agent to retrieve password

3 If you are using Advanced Password Rules, make sure they don't conflict with the password policies on any connected systems that are subscribing to passwords.

Password Synchronization Settings

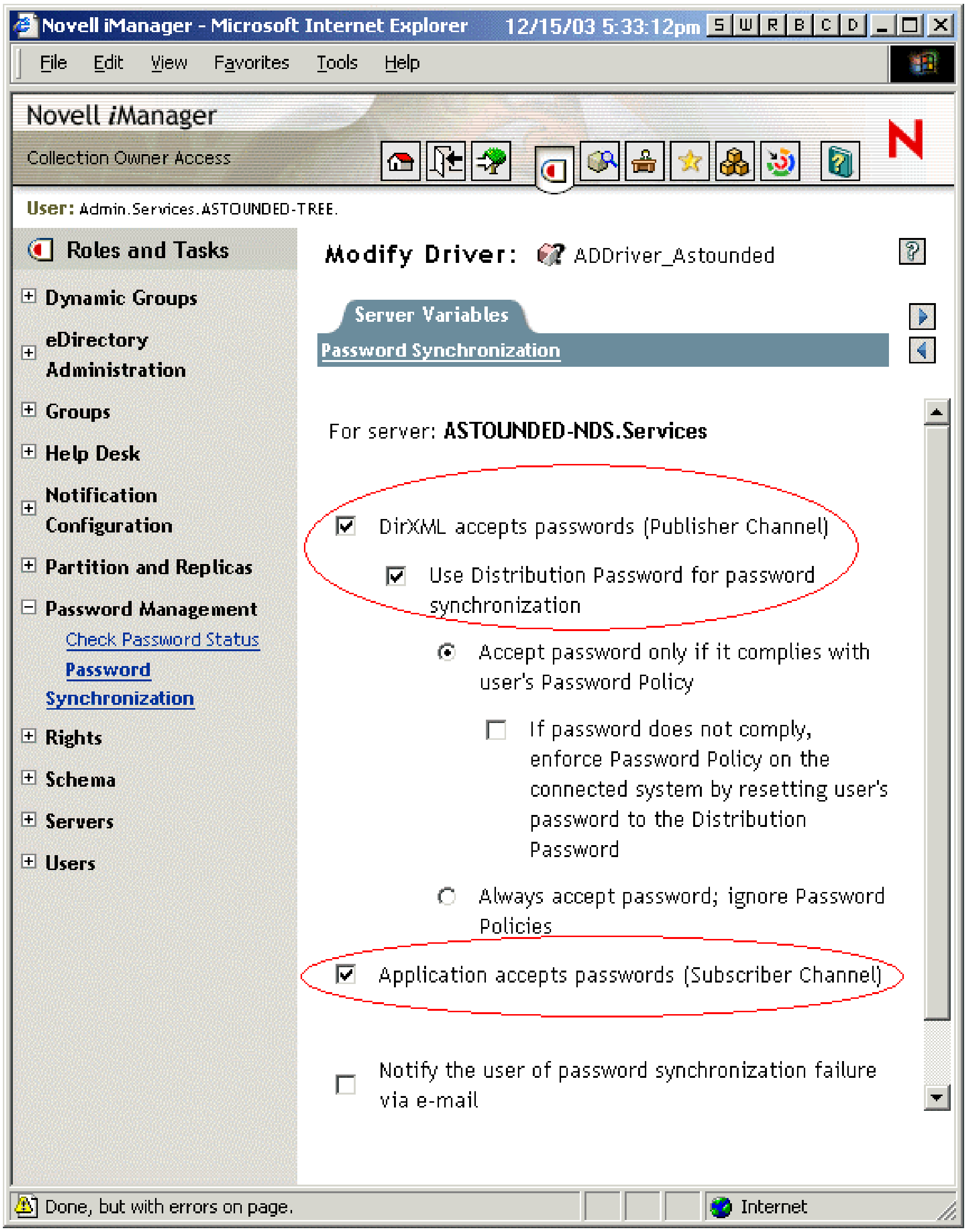
In Password Management > Password Synchronization, use these settings:

1 Make sure the following are selected:

- DirXML Accepts Passwords (Publisher Channel)
  - Use Distribution Password for Password Synchronization

  A message is displayed on the page if the driver manifest does not contain a "password-publish" capability. This is to inform users that passwords cannot be retrieved from the application and can only be published by creating a password in the driver configuration using a policy.

- Application accepts passwords (Subscriber Channel)



Modify Driver: ADDriver_Astounded

For server: **ASTOUNDED-NDS.Services**

☑ DirXML accepts passwords (Publisher Channel)

☑ Use Distribution Password for password synchronization

● Accept password only if it complies with user's Password Policy

□ If password does not comply, enforce Password Policy on the connected system by resetting user's password to the Distribution Password

○ Always accept password; ignore Password Policies

☑ Application accepts passwords (Subscriber Channel)

□ Notify the user of password synchronization failure via e-mail

These settings allow for bidirectional password synchronization if it is supported by the connected system.

You can adjust the settings to match your business policies for the authoritative source for password. For example, if a connected system should subscribe to passwords but not publish, select only Application Accepts Passwords (Subscriber Channel).

2 Specify whether you want Password Policies to be enforced or ignored, using the options under Use Distribution Password for password synchronization.

3 (Conditional) If you have specified that you want Password Policies to be enforced, also specify whether you want Identity Manager to reset the connected system password if it does not comply.

4 (Optional) Select the following if desired:

- Notify the User of Password Synchronization Failure via E-mail

  Keep in mind that e-mail notifications require the Internet EMail Address attribute on the eDirectory user object to be populated.

  E-mail notifications are noninvasive. They do not affect the processing of the XML document that triggered the email and if they fail they are not retried unless the operation itself is retried.

  However, debug messages for e-mail notifications are written to the trace file.

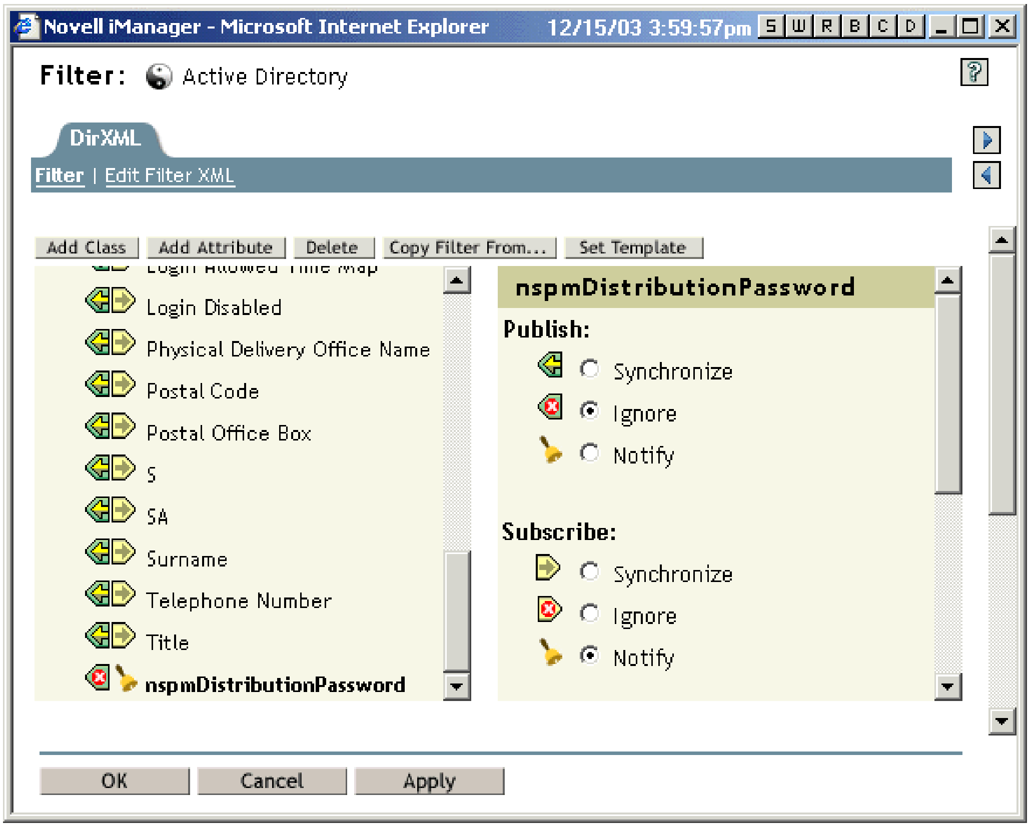
Driver Configuration

1 Make sure the required DirXML script password synchronization policies are included in the driver configurations for each driver that should participate in password synchronization. The policies must be in the correct location and the correct order in the driver configuration. For the list of policies, see "Policies Required in the Driver Configuration" on page 163.

The Identity Manager sample configurations already contain the policies. If you are upgrading an existing driver, you can add the policies using the instructions in "Upgrading Existing Driver Configurations to Support Identity Manager Password Synchronization" on page 174.

2 Set the filter correctly for nspmDistributionPassword attribute:

- For the Publisher channel, set the driver filter to Ignore for the nspmDistributionPassword attribute for all object classes.
- For the Subscriber channel, set the driver filter to Notify for the nspmDistribution Password attribute for all object classes that should subscribe to password changes.



Filter: Active Directory

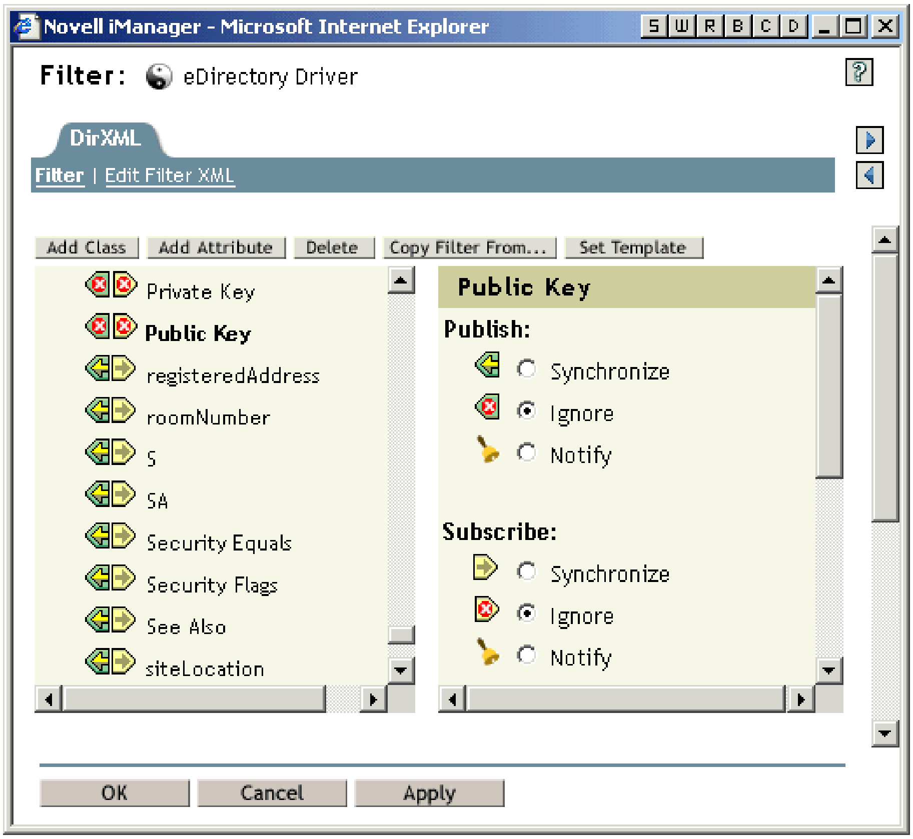
Login Allowed Time Map
Login Disabled
Physical Delivery Office Name
Postal Code
Postal Office Box
S
SA
Surname
Telephone Number
Title
nspmDistributionPassword

nspmDistributionPassword

Publish:
○ Synchronize
● Ignore
○ Notify

Subscribe:
○ Synchronize
○ Ignore
● Notify

3. Ignore both the Public Key and Private Key attributes in the driver filter for all objects that have Notify set for the nspmDistributionPassword attribute.



Filter: eDirectory Driver

- Private Key
- **Public Key**
- registeredAddress
- roomNumber
- S
- SA
- Security Equals
- Security Flags
- See Also
- siteLocation

Public Key

Publish:

○ Synchronize
● Ignore
○ Notify

Subscribe:

○ Synchronize
● Ignore
○ Notify

4. To ensure password security, make sure you control who has rights to DirXML objects.

Troubleshooting Scenario 3

In this section:

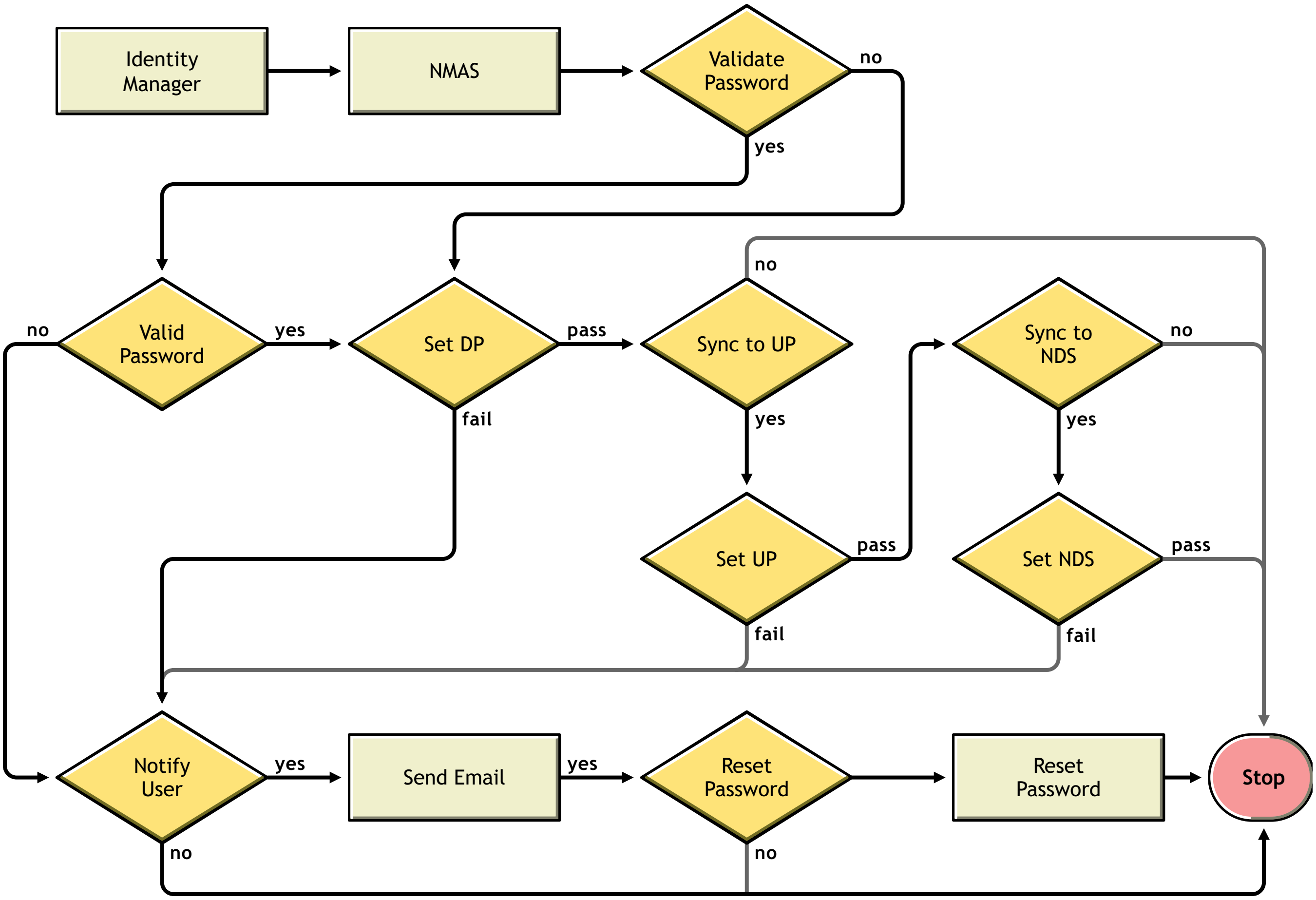
- "Flowchart for Scenario 3" on page 198
- "Trouble Logging in to eDirectory" on page 199
- "Trouble Logging in to Another Connected System that Subscribes to Passwords" on page 200
- "E-Mail Not Generated on Password Failure" on page 200
- "Error When Using Check Password Status" on page 201
- "Helpful DSTrace Commands" on page 201

See also the tips in "Troubleshooting Password Synchronization" on page 227.

Flowchart for Scenario 3

The following flowchart shows how NMAS handles the password it receives from Identity Manager. The password is synchronized to the Distribution Password in this scenario, and NMAS decides how to handle the password based on whether you have specified that incoming passwords should be validated against Password Policy rules (if Universal Password and Advanced Password

Rules are enabled), and what the other settings are in the Password Policy for synchronizing Universal Password with the other passwords.



Trouble Logging in to eDirectory

- Turn on the +AUTH, +DCLN, +DXML, and +DVRS settings in DSTrace
- Verify that the <password> or <modify-password> elements are being passed to Identity Manager. To verify, watch the DSTRACE screen or file with the trace options turned on as noted in the first item.
- Verify that the password is valid according to the rules of the Password Policy.
- Check Password Policy configuration and assignment. Try assigning the policy directly to the user to make sure the correct policy is being used.
- On the Password Synchronization page for the driver, make sure that DirXML Accepts Passwords (Publisher Channel) is selected.
- In the Password Policy, make sure that Synchronize Distribution Password when Setting Universal Password is selected.
- In the Password Policy, make sure that Synchronize NDS Password when Setting Universal Password is selected, if this is desired.
- If users are logging in through the Novell Client or ConsoleOne, check the version. Legacy Novell Clients and ConsoleOne might not be able to log in to eDirectory if the Universal Password is not synchronized with the NDS Password.

Versions of the Novell Client and ConsoleOne are available that are aware of the Universal Password. See the *NMAS 2.3 Administration Guide* (http://www.novell.com/documentation/lg/nmas23).

- Some legacy utilities authenticate using the NDS Password, and also cannot log in to eDirectory if the Universal Password is not synchronized with the NDS Password. If you don't want to use the NDS Password for most users, but you have administrator or help desk users who need to authenticate with legacy utilities, try using a different Password Policy for help desk users so you can specify different Universal Password synchronization options for them.

Trouble Logging in to Another Connected System that Subscribes to Passwords

This section is for troubleshooting situations where this connected system is publishing passwords to Identity Manager, and another connected system that is subscribing to passwords does not appear to be receiving the changes from this system. Another name for this relationship is a secondary connected system, meaning that it receives passwords from the first connected system through Identity Manager.

- Turn on the +DXML and +DVRS settings to see DirXML rule processing and potential errors
- Set the DirXML trace level for driver to 3.
- Make sure that the DirXML Accepts Passwords (Publisher Channel) option is selected in the Password Synchronization page.
- In the Password Policy, make sure that Synchronize Distribution Password when Setting Universal Password is selected.

  Identity Manager uses the Distribution Password to synchronize passwords to connected systems. Universal Password must be synchronized with the Distribution Password for this synchronization method.
- Check the driver filter for the nspmDistributionPassword attribute.
- Verify that the <password> element for an add or a <modify-password> element have been converted to add and modify attribute operations for the nspmDistributionPassword. To verify, watch the DSTRACE screen or file with the options turned on as noted in the first item.
- Verify that the driver configuration includes the Identity Manager script password policies in the correct location and correct order, as described in "Policies Required in the Driver Configuration" on page 163.
- Compare the Password Policy in eDirectory with any password policies enforced by the connected system, to make sure they are compatible.

E-Mail Not Generated on Password Failure

- Turn on the +DXML setting in DSTrace to see DirXML rule processing
- Set the DirXML trace level for the driver to 3.
- Verify that the rule to generate e-mail is selected.
- Verify that the eDirectory object contains the correct value in the Internet EMail Address attribute.
- In the Notification Configuration task, make sure the SMTP server and the e-mail template are configured. See "Configuring E-Mail Notification" on page 214.

E-mail notifications are non-invasive. They do not affect the processing of the XML document that triggered the e-mail, and if they fail they are not retried unless the operation itself is retried.

However, debug messages for e-mail notifications are written to the trace file.

Error When Using Check Password Status

The Check Password Status task in iManager causes the driver to be given a check object password action to perform.

- Make sure the connected system supports checking passwords. See "Connected System Support for Password Synchronization" on page 156.

  This operation is not available through iManager if the driver manifest does not indicate that the connected system supports password-check capability.
- If the Check Object Password returns -603, the eDirectory object does not contain an nspmDistributionPassword attribute. Check the driver filter, and the "Synchronize Universal to Distribution" option within the Password Policy.
- If the Check Object Password returns "Not Synchronized", verify that the driver configuration contains the appropriate Identity Manager Password Synchronization policies.
- Compare the Password Policy in eDirectory with any password policies enforced by the connected system, to make sure they are compatible.
- Check Object Password checks the Distribution Password. If the Distribution Password is not being updated, Check Object Password might not report that passwords are synchronized
- Keep in mind that for eDirectory, the Check Password Status checks the NDS Password instead of the Universal Password. This means that if the user's Password Policy does not specify to synchronize the NDS Password with the Universal Password, the passwords are always reported as being not synchronized. In fact, the Distribution Password and the password on the connected system might be in sync, but Check Password Status won't be accurate unless both the NDS Password and the Distribution Password are synchronized with the Universal Password.

Helpful DSTrace Commands

+DXML: To view DirXML rule processing and potential error message.

+DVRS: To view DirXML driver messages

+AUTH: To view NDS password modifications

+DCLN: To view NDS DCLient messages

Scenario 4: Tunneling — Synchronizing Connected Systems but not eDirectory, with Identity Manager Updating the Distribution Password

Identity Manager allows you to synchronize passwords among connected sytems while keeping the eDirectory password separate. In this documentation, this is referred to as "tunneling."

In this method, Identity Manager updates the Distribution Password directly. This method is almost the same as the previous one, "Scenario 3: Synchronizing eDirectory and Connected Systems with Identity Manager Updating the Distribution Password" on page 193. The difference is that you make sure the Universal Password and the Distribution Password are not being synchronized. You do this either by not using Password Policies, or by using Password Policies with the option disabled for Synchronize Distribution Password When Setting Universal Password.

In this section:

Advantages and Disadvantages of Scenario 4

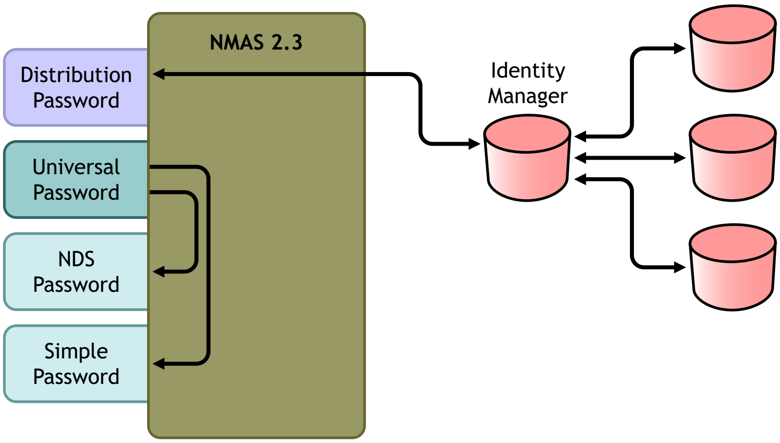
Advantages	Disadvantages
Allows synchronization of passwords among connected systems, while keeping eDirectory password separate. Password Policies are not required. If you are using a Password Policy, the policy does not need to have Universal Password enabled. However, the environment must support Universal Password. Supports the Check Password Status task in iManager, if the connected system supports it. You can specify that notification be sent if password synchronization fails. You can reset a connected system password that does not comply with Password Policy. If Universal Password and Advanced Password Rules are enabled, Password Policies are enforced if you specify that they should be enforced, and passwords on connected systems can be reset.	If Universal Password or Advanced Password Rules are not enabled, Password Policies are not enforced, and passwords on connected systems cannot be reset.

Scenario 4 Diagram

The diagram shows that in this scenario, passwords come in through Identity Manager, which goes through NMAS to directly update the Distribution Password. Identity Manager also uses the Distribution Password to distribute to connected systems that you have specified should accept passwords.

The key to this scenario is that in the Password Policy, the setting is disabled for Synchronize Universal Password with Distribution Password. Because the Distribution Password is not synchronized with the Universal Password, Identity Manager synchronizes passwords among connected systems without affecting passwords in eDirectory.

Although multiple connected systems are shown as connecting to Identity Manager in this figure, keep in mind that you individually create the settings for each connected system driver.



Setting Up Scenario 4

To set up this kind of password synchronization:

- "Universal Password Deployment" on page 203
- "Password Policy Configuration" on page 203
- "Password Synchronization Settings" on page 204
- "Driver Configuration" on page 204

Universal Password Deployment

Although you don't need to have Password Policies with Universal Password enabled, your environment must still must be using eDirectory 8.7.3, which supports Universal Password. See "Preparing to Use Identity Manager Password Synchronization and Universal Password" on page 170.

Password Policy Configuration

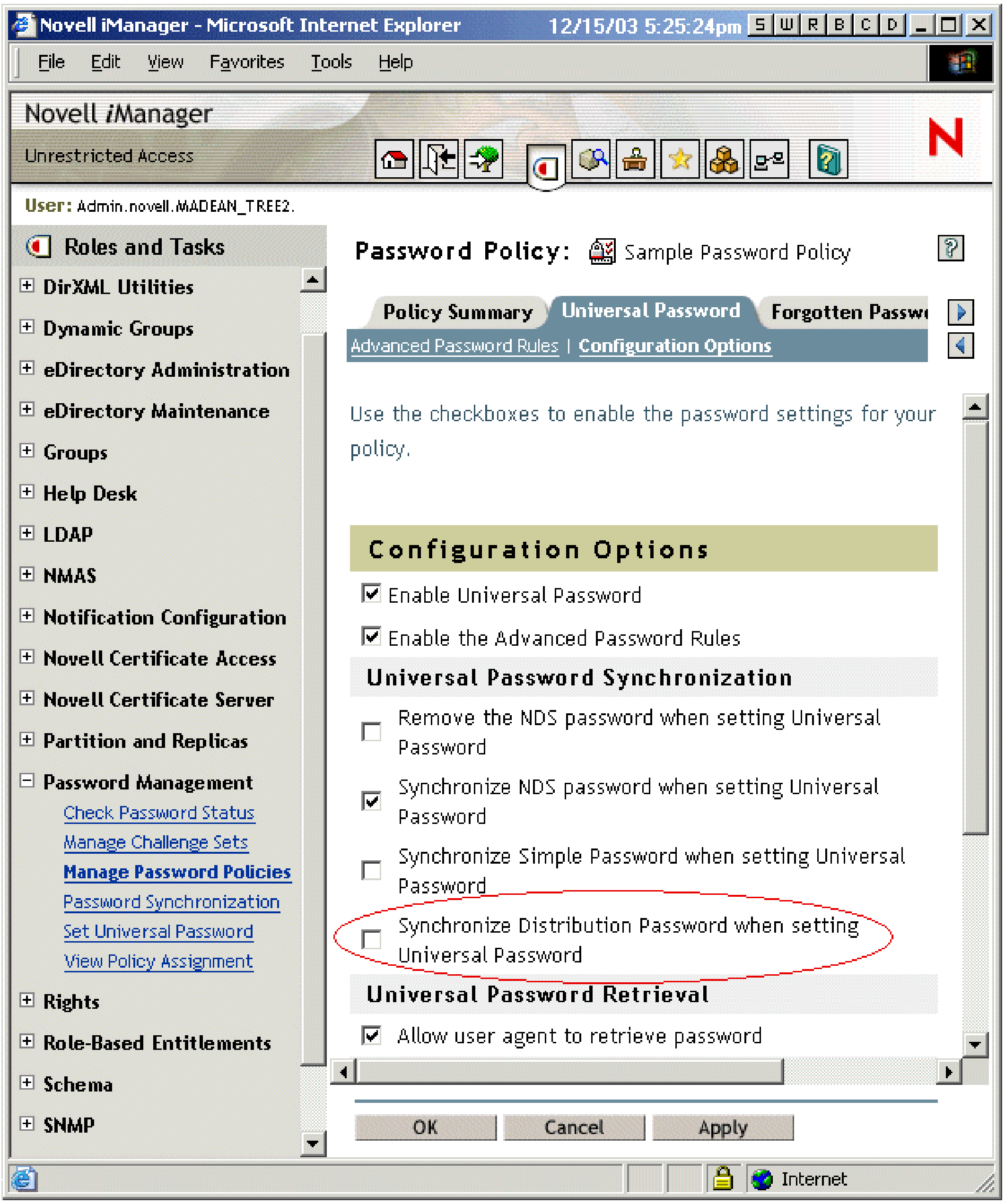
No Password Policy is required for eDirectory users for this method.

However, if you use a Password Policy, you must do the following:

1 Make sure the following is not checked:

- Synchronize Distribution Password when Setting Universal Password

  This is the key to tunneling passwords without the eDirectory password being affected. By not synchronizing the Universal Password with the Distribution Password, you keep the Distribution Password separate, for use only by Identity Manager for connected systems. Identity Manager acts as a conduit, distributing passwords to and from other connected systems, without affecting the eDirectory password.



Password Policy: Sample Password Policy

Use the checkboxes to enable the password settings for your policy.

Configuration Options

☑ Enable Universal Password

☑ Enable the Advanced Password Rules

Universal Password Synchronization

□ Remove the NDS password when setting Universal Password

☑ Synchronize NDS password when setting Universal Password

□ Synchronize Simple Password when setting Universal Password

□ Synchronize Distribution Password when setting Universal Password

Universal Password Retrieval

☑ Allow user agent to retrieve password

2 Complete the other Password Policy settings as desired.

The other password settings in the Password Policy are up to you.

Password Synchronization Settings

Use the same settings as Password Synchronization Settings in "Scenario 3: Synchronizing eDirectory and Connected Systems with Identity Manager Updating the Distribution Password" on page 193.

Driver Configuration

Use the same settings as Driver Configuration in "Scenario 3: Synchronizing eDirectory and Connected Systems with Identity Manager Updating the Distribution Password" on page 193.

Troubleshooting Scenario 4

If password synchronization is set up for tunneling, the Distribution Password is different than the Universal Password and the NDS Password.

In this section:

- "Trouble Logging in to Another Connected System that Subscribes to Passwords" on page 205
- "E-Mails Not Generated on Password Failure" on page 205
- "Error When Using Check Password Status" on page 206
- "Helpful DSTrace Commands" on page 206

See also the tips in "Troubleshooting Password Synchronization" on page 227.

Trouble Logging in to Another Connected System that Subscribes to Passwords

This section is for troubleshooting situations where this connected system is publishing passwords to Identity Manager, and another connected system that is subscribing to passwords does not appear to be receiving the changes from this system. Another name for this relationship is a secondary connected system, meaning that it receives passwords from the first connected system through Identity Manager.

- Turn on the +DXML and +DVRS settings in DSTrace to see DirXML rule processing and potential errors
- Set the DirXML trace level for the driver to 3.
- Make sure that the DirXML Accepts Passwords (Publisher Channel) option is selected on the Password Synchronization page.
- In the Password Policy, make sure that "Synchronize Distribution Password When Setting Universal Password" is selected.

  Identity Manager uses the Distribution Password to synchronize passwords to connected systems. The Universal Password must be synchronized with the Distribution Password for this synchronization method.
- Make sure the driver filter has the correct settings for the nspmDistributionPassword attribute.
- Verify that the <password> element for an add or a <modify-password> element have been converted to add and modify attribute operations for the nspmDistributionPassword. To verify, watch the DSTRACE screen or file with the trace options turned on as noted in the first item.
- Verify that the driver configuration includes the DirXML script password policies in the correct location and correct order, as described in "Policies Required in the Driver Configuration" on page 163.
- Compare the Password Policy in eDirectory with any password policies enforced by the connected system, to make sure they are compatible.

E-Mails Not Generated on Password Failure

- Turn on the +DXML setting in DSTrace to see DirXML rule processing
- Set the DirXML trace level for driver to 3.
- Verify that the rule to generate e-mail is selected.

- Verify that the eDirectory object contains the correct value in the Internet EMail Address attribute.
- In Notification Configuration task, check the SMTP server and the e-mail template. See "Configuring E-Mail Notification" on page 214.

E-mail notifications are non-invasive. They do not affect the processing of the XML document that triggered the e-mail, and if they fail they will not be retried unless the operation itself is retried.

However, debug messages for e-mail notifications are written to the trace file.

Error When Using Check Password Status

The Check Password Status task in iManager causes the driver to be given a Check Object Password action to perform.

- Make sure the connected system supports checking passwords. See "Connected System Support for Password Synchronization" on page 156.

  This operation is not available through iManager if the driver manifest does not indicate that the connected system supports password-check capability.
- If the Check Object Password returns -603, the eDirectory object does not contain an nspmDistributionPassword attribute. Check the DirXML attribute filter, and the Synchronize Universal to Distribution option within the Password Policy.
- If the Check Object Password returns Not Synchronized, verify that the driver configuration contains the appropriate DirXML password synchronization policies.
- Compare the Password Policy in eDirectory with any password policies enforced by the connected system, to make sure they are compatible.
- Check Object Password checks the Distribution Password. If the Distribution Password is not being updated, Check Object Password might not report that passwords are synchronized

Helpful DSTrace Commands

+DXML: To view DirXML rule processing and potential error messages.

+DVRS: To view DirXML driver messages

+AUTH: To view NDS password modifications

+DCLN: To view NDS DCLient messages

Scenario 5: Synchronizing Application Passwords to the Simple Password

This scenario is a specialized use of password synchronization features. Using Identity Manager and NMAS, you can take a password from a connected system and synchronize it directly to the eDirectory Simple Password. If the connected system provides only hashed passwords, you can synchronize them to the Simple Password without reversing the hash. Then, other applications can authenticate to eDirectory using the same clear text or hashed password through LDAP or the Novell Client, with NMAS components configured to use the Simple Password as the login method.

If the password in the connected system is in clear text, it can be published as it is from the connected system into the eDirectory Simple Password store.

If the connected system provides only hashed passwords (MD5, SHA, or UNIX crypt are supported), you must publish them to the Simple Password with an indication of the kind of hash, such as {MD5}.

For another application to authenticate with the same password, you need to customize the other application to take the user's password and authenticate to the Simple Password using LDAP.

NMAS compares the password value from the application with the value in the Simple Password. If the password stored in the Simple Password is a hash value, NMAS first uses the password value from the application to create the correct type of hash value, before comparing. If the password from the application and the Simple Password are the same, NMAS authenticates the user.

In this scenario, Universal Password cannot be used.

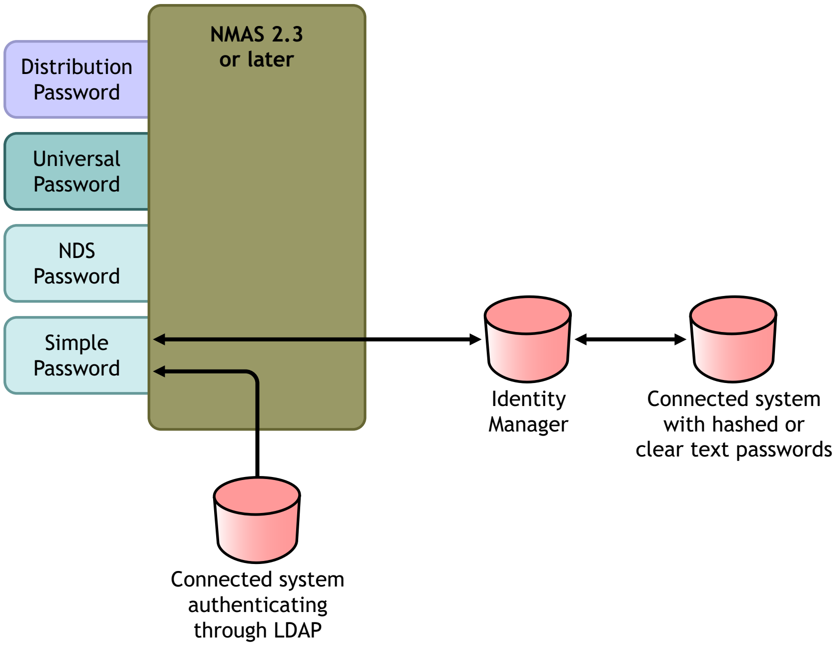
In this section:

- "Advantages and Disadvantages" on page 207
- "Scenario 5 Diagram" on page 208
- "Setting Up Scenario 5" on page 208

Advantages and Disadvantages

Advantages	Disadvantages
◆ Lets you update the Simple Password directly. ◆ Lets you synchronize a hashed password and use it to authenticate for more than one application, without reversing the hash.	◆ This scenario does not allow the use of Universal Password. ◆ Forgotten Password and Password Self-Service features can still be used to the extent they are supported for the NDS Password, but they do not work for the Simple Password. ◆ Because the Password Management > Set Universal Password task is dependent on Universal Password, the Administrator cannot set a user's password in eDirectory using that task.

Scenario 5 Diagram



Setting Up Scenario 5

- "Password Policy Configuration" on page 208
- "Password Synchronization Settings" on page 208
- "Driver Configuration" on page 208

Password Policy Configuration

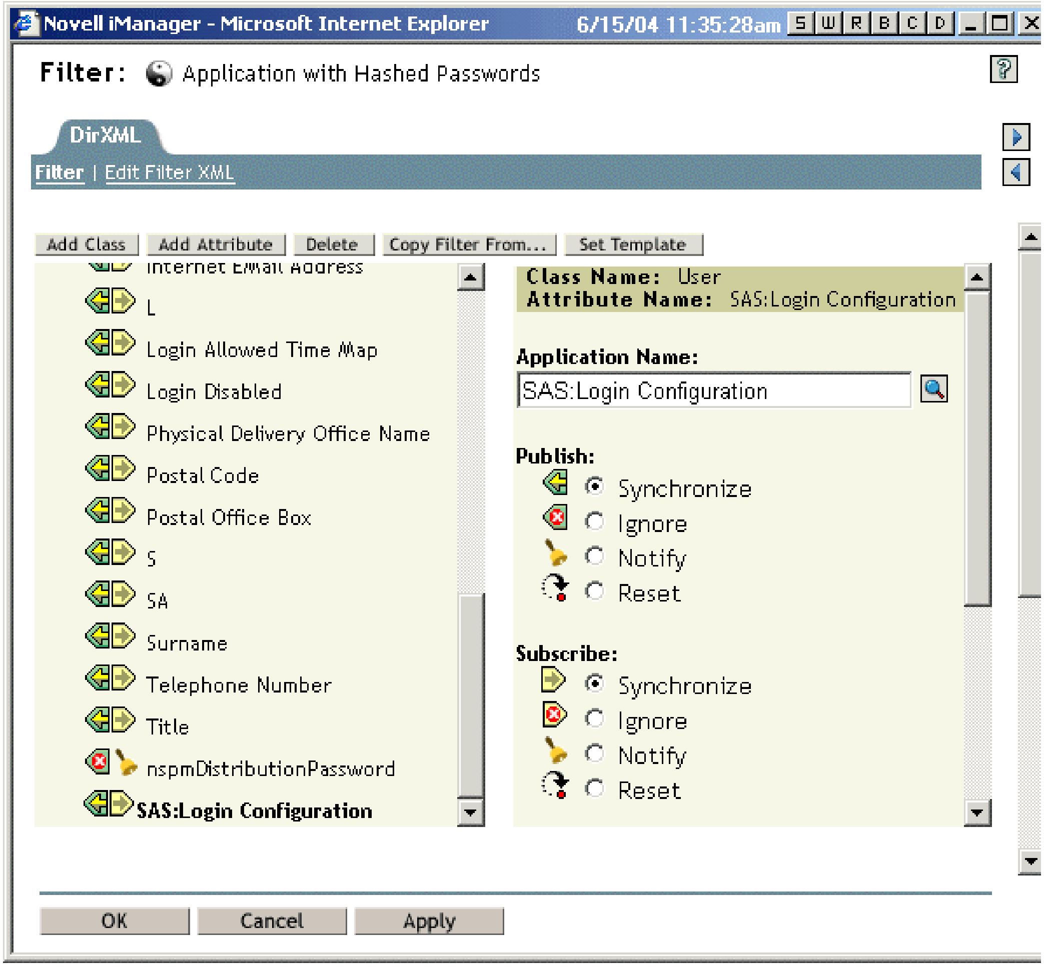
No Password Policy is required for users for this scenario. Universal Password cannot be used.

Password Synchronization Settings

For this scenario, you use DirXML Script to directly modify the SAS:Login Configuration attribute. This means that the Password Synchronization global configuration values (GCVs), which are set using the Password Management > Password Synchronization task in iManager, have no effect.

Driver Configuration

1 Make sure the filter has the setting of Sync for both Publisher and Subscriber channels for the SAS:Login Configuration attribute.



Filter: Application with Hashed Passwords

Class Name: User
Attribute Name: SAS:Login Configuration

Application Name: SAS:Login Configuration

Publish:
● Synchronize
○ Ignore
○ Notify
○ Reset

Subscribe:
● Synchronize
○ Ignore
○ Notify
○ Reset

2 Configure the driver policies to publish the password from the connected system.

3 For hashed passwords, configure the driver policies to prepend the type of hash (if it is not already provided by the application):

- {MD5}*hashed_password*

  This password is Base 64 encoded.

- {SHA}*hashed_password*

  This password is Base 64 encoded.

- {CRYPT}*hashed_password*

Clear text passwords and Unix Crypt password hashes are not Base64 encoded.

4 To place the password into the Simple Password, configure the driver policies to modify the SAS:Login Configuration attribute.

For example, this is how you would use a modify-attr element within a modify operation to change the Simple Password to an MD5 hashed password.

```
<modify-attr attr-name="SAS:Login Configuration>
    <add-value>
        <value>{MD5}2tEgXrIHtAnGHOzH3ENslg==</value>
    </add-value>
</modify-attr>
```

For clear text passwords, follow this example.

```
<modify-attr attr-name="SAS:Login Configuration>
    <add-value>
        <value>clearpwd</value>
    </add-value>
</modify-attr>
```

For add operations, the add-attr element would contain one of the following:

```
<add-attr attr-name="SAS:Login Configuration>
    <value>{MD5}2tEgXrIHtAnGHOzH3ENslg==</value>
</add-attr>
```

or

```
<add-attr attr-name="SAS:Login Configuration>
    <value>clearpwd</value>
</add-attr>
```

Setting Up Password Filters

Some connected systems can provide the user's actual password to Identity Manager.

To capture passwords on Active Directory, NIS, and NT Domain, you must do some minor setup to install password filters on connected systems.

- "Setting Up Password Synchronization Filters for Active Directory and NT Domain" on page 210
- "Setting Up Password Synchronization Filters for NIS" on page 210

Setting Up Password Synchronization Filters for Active Directory and NT Domain

This information is in the "Password Synchronization" sections in the driver implementation guides for the DirXML Drivers for Active Directory and NT Domain, at DirXML Drivers (http://www.novell.com/documentation/lg/dirxmldrivers/index.html).

The DirXML driver for AD or NT Domain needs to be installed on only one Windows machine. The other domain controllers don't need the driver installed, but each domain controller does need a pwfilter.dll file installed to capture passwords so they can be sent to Identity Manager. To simplify your setup and administration, a utility is provided that lets you do this for all domain controllers from the Windows machine where the driver is installed.

Setting Up Password Synchronization Filters for NIS

The DirXML Driver for NIS 2.0 can operate with three UNIX authentication data stores: files, NIS and NIS+. A PAM module is provided to capture passwords and send them to the DirXML Driver for NIS.

The deployment of the PAM module for the NIS Driver is explained in the *DirXML Driver for NIS Implementation Guide*, at DirXML Drivers (http://www.novell.com/documentation/lg/dirxmldrivers/index.html).

Managing Password Synchronization

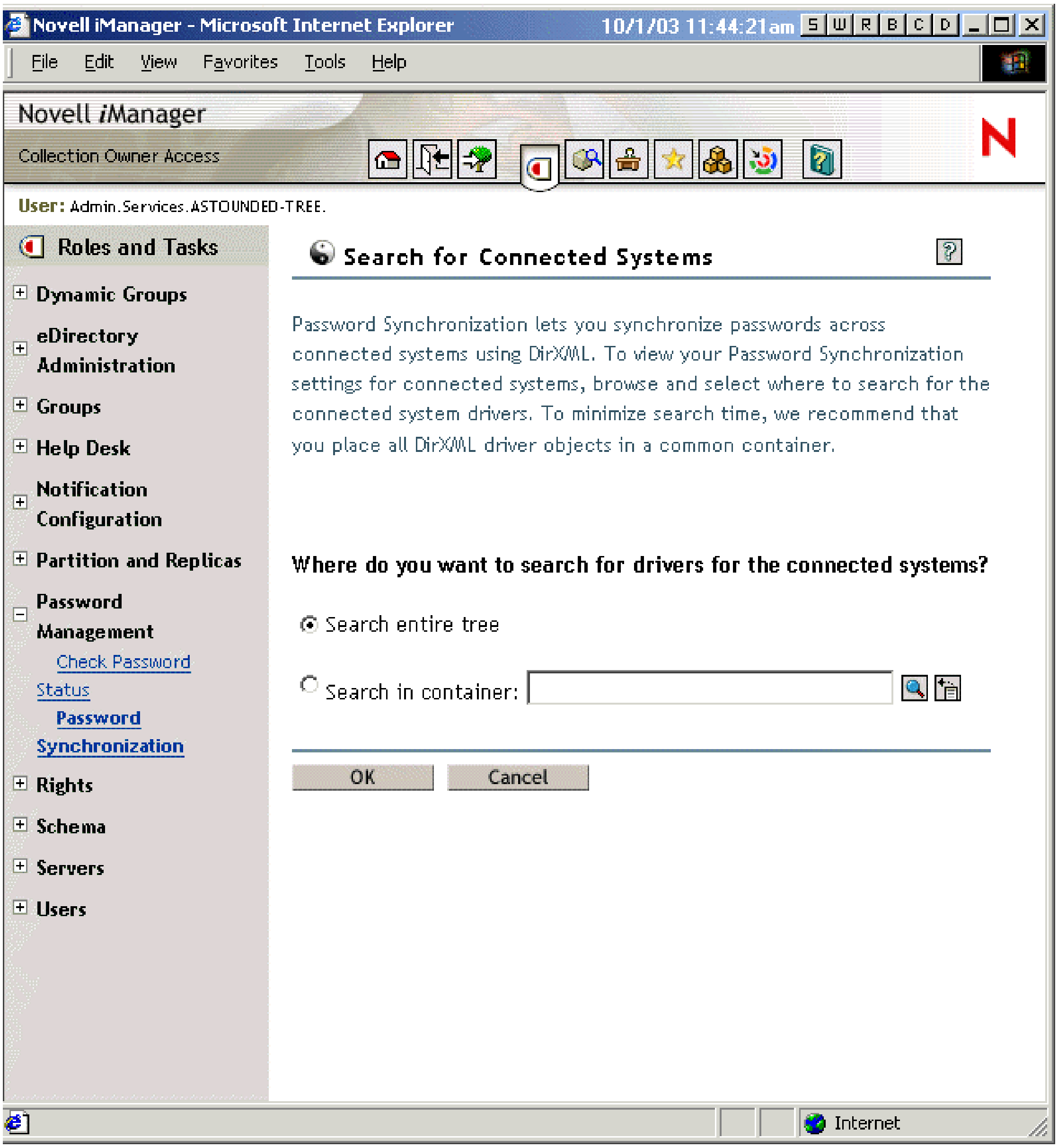
In this section:

- "Setting the Flow of Passwords Across Systems" on page 211
- "Enforcing Password Policies on Connected Systems" on page 214
- "Keeping the eDirectory Password Separate from the Synchronized Password" on page 214

Setting the Flow of Passwords Across Systems

The following interface lets you see how your systems are set up to accept or publish passwords. It's available in the Password Synchronization task under the Password Management role.

The first page you see lets you search for drivers for connected systems.



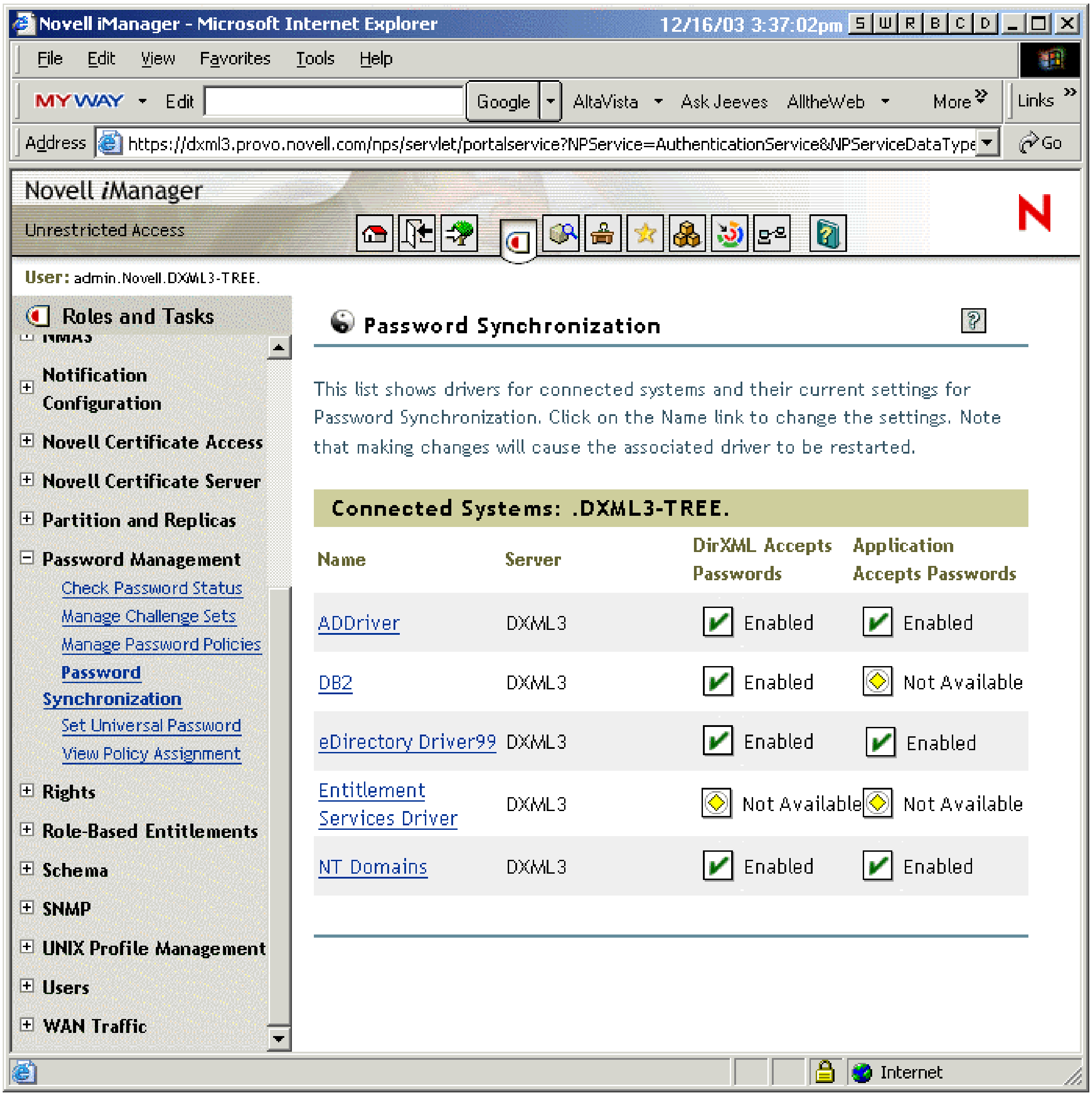
Password Synchronization lets you synchronize passwords across connected systems using DirXML. To view your Password Synchronization settings for connected systems, browse and select where to search for the connected system drivers. To minimize search time, we recommend that you place all DirXML driver objects in a common container.

Where do you want to search for drivers for the connected systems?

● Search entire tree

○ Search in container:

The search results show the settings for password flow to and from Identity Manager and the connected systems.


Novell iManager - Microsoft Internet Explorer
12/16/03 3:37:02pm
File Edit View Favorites Tools Help
MY WAY Edit Google AltaVista Ask Jeeves AlltheWeb More Links
Address https://dxml3.provo.novell.com/nps/servlet/portalservice?NPService=AuthenticationService&NPServiceDataType
Go
Novell iManager
Unrestricted Access
User: admin.Novell.DXML3-TREE.
Roles and Tasks
NMAS
Notification Configuration
Novell Certificate Access
Novell Certificate Server
Partition and Replicas
Password Management
Check Password Status
Manage Challenge Sets
Manage Password Policies
Password Synchronization
Set Universal Password
View Policy Assignment
Rights
Role-Based Entitlements
Schema
SNMP
UNIX Profile Management
Users
WAN Traffic
Internet

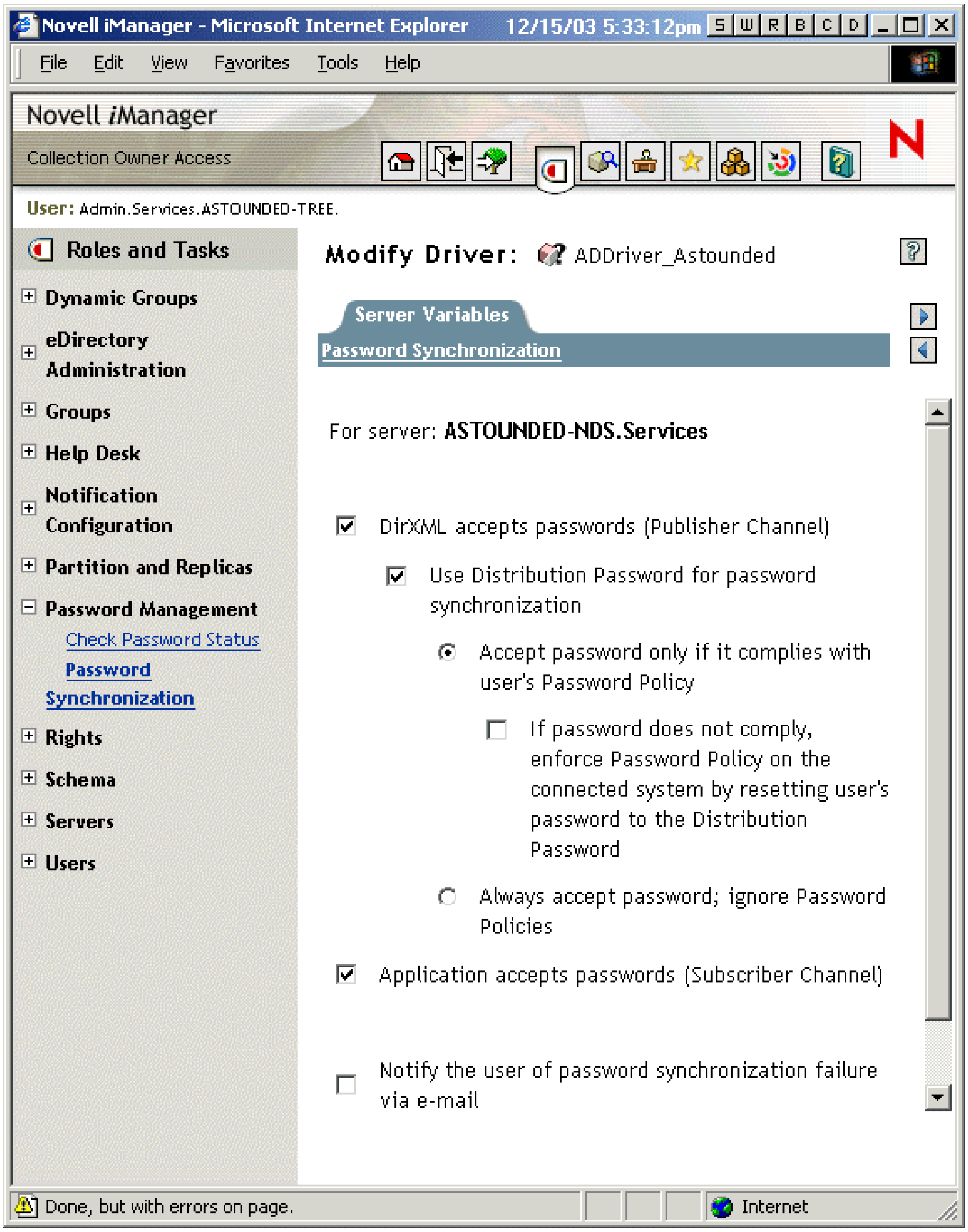
Password Synchronization

This list shows drivers for connected systems and their current settings for Password Synchronization. Click on the Name link to change the settings. Note that making changes will cause the associated driver to be restarted.

Connected Systems: .DXML3-TREE.

Name	Server	DirXML Accepts Passwords	Application Accepts Passwords
ADDriver	DXML3	✓ Enabled	✓ Enabled
DB2	DXML3	✓ Enabled	◇ Not Available
eDirectory Driver99	DXML3	✓ Enabled	✓ Enabled
Entitlement Services Driver	DXML3	◇ Not Available	◇ Not Available
NT Domains	DXML3	✓ Enabled	✓ Enabled

To make changes to these settings, you click a connected system driver name. The following page appears, where you can see more detail and change the settings:


Novell iManager - Microsoft Internet Explorer 12/15/03 5:33:12pm
File Edit View Favorites Tools Help
Novell iManager
Collection Owner Access
User: Admin.Services.ASTOUNDED-TREE.
Roles and Tasks
Dynamic Groups
eDirectory Administration
Groups
Help Desk
Notification Configuration
Partition and Replicas
Password Management
Check Password Status
Password Synchronization
Rights
Schema
Servers
Users
Done, but with errors on page.
Internet

Modify Driver: ADDriver_Astounded

Server Variables

Password Synchronization

For server: **ASTOUNDED-NDS.Services**

☑ DirXML accepts passwords (Publisher Channel)

☑ Use Distribution Password for password synchronization

● Accept password only if it complies with user's Password Policy

□ If password does not comply, enforce Password Policy on the connected system by resetting user's password to the Distribution Password

○ Always accept password; ignore Password Policies

☑ Application accepts passwords (Subscriber Channel)

□ Notify the user of password synchronization failure via e-mail

On this page, you can set whether Password Policy is enforced for passwords coming in to Identity Manager, and whether Password Policy is enforced on the connected system by resetting the connected system password.

The settings on this page are global configuration values (GCVs), which are stored per server. See "Password Synchronization Settings You Create Using Global Configuration Values" on page 159.

Enforcing Password Policies on Connected Systems

If you are using Advanced Password Rules and are using Identity Manager Password Synchronization, we recommend that you research the password policies for all the connected systems, and then make sure the Advanced Password Rules are compatible.

Keeping the eDirectory Password Separate from the Synchronized Password

This scenario is described in "Scenario 4: Tunneling — Synchronizing Connected Systems but not eDirectory, with Identity Manager Updating the Distribution Password" on page 201.

Checking the Password Synchronization Status for a User

An iManager task is provided to let you determine whether the Distribution Password for a specific user is the same as the password in the connected system.

In iManager, click Password Management > Check Password Status.

The Check Password Status task in iManager causes the driver to be given a Check Object Password action to perform.

Not all drivers support password check. Those that do must contain a password-check capability in the driver's manifest. iManager does not allow password check operations to be sent to drivers that do not contain this capability in the manifest.

Check Object Password checks the Distribution Password. If the Distribution Password is not being updated, Check Object Password might report that passwords are not synchronized.

The Distribution Password is not updated if

- You are using the synchronization method described in "Scenario 1: eDirectory to eDirectory Password Synchronization Using NDS Password" on page 181.
- You are synchronizing Universal Password (as in "Scenario 2: Synchronizing Universal Password" on page 183), but you have not enabled the Password Policy configuration option to synchronize Universal Password to Distribution Password.

NOTE: Keep in mind that for eDirectory, the Check Password Status checks the NDS Password instead of the Universal Password. This means that if the user's Password Policy does not specify to synchronize the NDS Password with the Universal Password, the passwords are always reported as being not synchronized. In fact, the Distribution Password and the password on the connected system might be in sync, but Check Password Status won't be accurate unless both the NDS Password and the Distribution Password are synchronized with the Universal Password.

Configuring E-Mail Notification

The iManager role named Notification Configuration lets you specify the e-mail server and customize the templates for e-mail notifications.

E-mail templates are provided to allow Password Synchronization and Password Self-Service to send automated e-mails to users.

You don't create the templates; they are provided by the application that uses them. The e-mail templates are Template objects in eDirectory, and they are placed in the Security container, usually found at the root of your tree. Although they are eDirectory objects, you should edit them only through the iManager interface.

This is a modular framework; as new applications are added that use e-mail templates, the templates can be installed along with the applications that use them.

Identity Manager provides templates for Password Synchronization and Forgotten Password notifications. You control whether e-mail messages are sent, based on your choices in the iManager interface.

For Forgotten Password, e-mail notifications are sent only if you choose to use one of the Forgotten Password actions that causes an e-mail to be sent: e-mail password to user, or e-mail password hint to user. The page you use to set this option is shown in "Providing Users with Forgotten Password Self-Service" on page 100.

Password Synchronization is configured to send e-mail only for failed password sync operations, and only for the drivers you specify. The page you use to set this option is shown in the last figure in "Password Synchronization Settings You Create Using Global Configuration Values" on page 159. In addition, you need to make sure the SMTP authentication information is included in the driver policies.

In this section:

- "Prerequisites" on page 215
- "Setting Up the SMTP Server To Send E-Mail Notification" on page 215
- "Setting Up E-Mail Templates for Notification" on page 217
- "Providing SMTP Authentication Information in Driver Policies" on page 217
- "Adding Your Own Replacement Tags to E-Mail Notification Templates" on page 219
- "Sending E-Mail Notifications to the Administrator" on page 226
- "Localizing E-Mail Notification Templates" on page 226

Prerequisites

❑ Make sure that your eDirectory users have the Internet EMail Address attribute populated.

❑ If you are using e-mail notifications for Password Synchronization, make sure that the Password Synchronization driver policies contain the password for the SMTP server. See "Providing SMTP Authentication Information in Driver Policies" on page 217.

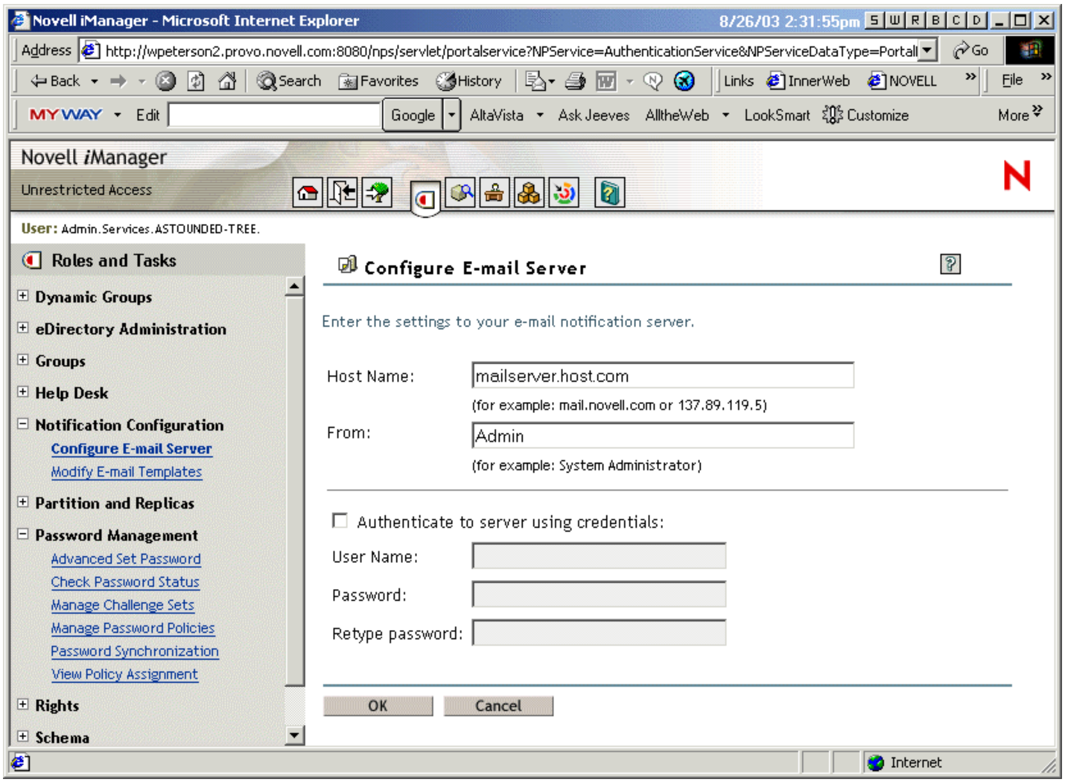
❑ If you are concerned that some users might not have the e-mail address populated, or you want an e-mail record of all failure notifications, consider choosing a password administrator account that all e-mail notifications are sent to, in addition to the user. This e-mail address should be in the To field of the DirXML script policy. For more information, see "Sending E-Mail Notifications to the Administrator" on page 226.

❑ If eDirectory and Identity Manager are on a UNIX server, the server must hold a replica of the e-mail template objects. They are located in the Security container, at the root, which means the server would need a replica of the root partition.

Setting Up the SMTP Server To Send E-Mail Notification

1 In iManager, click Notification Configuration > Configure E-mail Server.

The following page appears.



Configure E-mail Server

Enter the settings to your e-mail notification server.

Host Name: mailserver.host.com

(for example: mail.novell.com or 137.89.119.5)

From: Admin

(for example: System Administrator)

☐ Authenticate to server using credentials:

User Name:

Password:

Retype password:

2 Type the following information:

- The host name
- The name you want to appear in the From field of the e-mail message, such as Administrator
- The username and password for authenticating to the server, if necessary.

3 Click Close.

4 If you are using Password Synchronization with your DirXML drivers and want to use the e-mail notification feature, you must also do the following:

4a If your SMTP server requires authentication before sending e-mail, make sure the driver policies contain the password. See "Providing SMTP Authentication Information in Driver Policies" on page 217 for instructions.

Specifying the authentication information in the Configure E-Mail Server page in Step 2 is sufficient for Forgotten Password notifications, but not for Password Synchronization notifications.

4b Restart DirXML drivers that need to be updated with the changes.

The driver reads the templates and SMTP server information only at startup time.

5 Customize the e-mail templates as described in "Setting Up E-Mail Templates for Notification" on page 217.

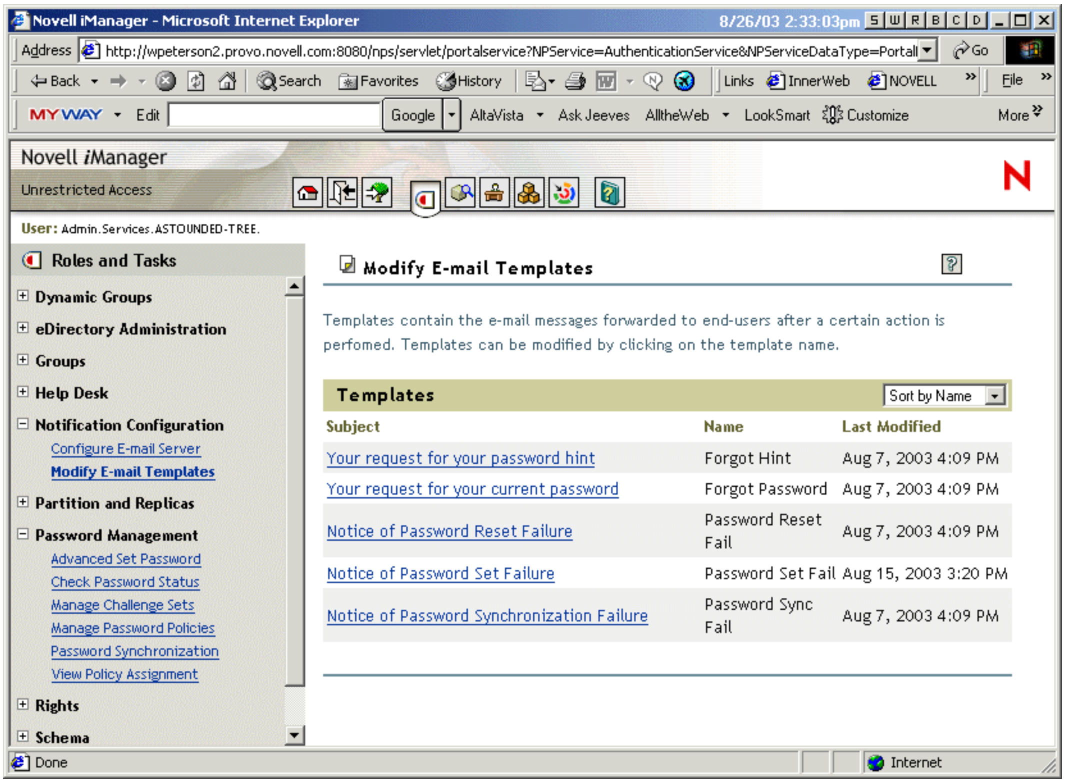
After the e-mail server is set up, e-mail messages can be sent by the applications that use them, if you are using the features that cause messages to be sent.

Setting Up E-Mail Templates for Notification

You can customize these templates with your own text. The name of the template indicates what it is used for.

1 In iManager, click Notification Configuration > Modify E-mail Templates.

A list of templates appears, like the following example.



Address http://wpeterson2.provo.novell.com:8080/nps/servlet/portalservice?NPService=AuthenticationService&NPServiceDataType=PortalI

User: Admin.Services.ASTOUNDED-TREE.

Modify E-mail Templates

Templates contain the e-mail messages forwarded to end-users after a certain action is perfomed. Templates can be modified by clicking on the template name.

Templates

Subject	Name	Last Modified
Your request for your password hint	Forgot Hint	Aug 7, 2003 4:09 PM
Your request for your current password	Forgot Password	Aug 7, 2003 4:09 PM
Notice of Password Reset Failure	Password Reset Fail	Aug 7, 2003 4:09 PM
Notice of Password Set Failure	Password Set Fail	Aug 15, 2003 3:20 PM
Notice of Password Synchronization Failure	Password Sync Fail	Aug 7, 2003 4:09 PM

2 Edit the templates as desired. Keep in mind that if you want to add any replacement tags, some additional tasks might be required. Follow the instructions in "Adding Your Own Replacement Tags to E-Mail Notification Templates" on page 219.

3 Restart DirXML drivers that need to be updated with the changes.

The driver reads the templates and SMTP server information only at startup time.

Providing SMTP Authentication Information in Driver Policies

You specify the username and password for the SMTP server in "Setting Up the SMTP Server To Send E-Mail Notification" on page 215. For Forgotten Password e-mail notifications, this is sufficient.

However, for Password Synchronization e-mail notifications, you also need to include the password in the driver policies. The DirXML engine can access the username, but not the password, so the driver policy must provide it.

You must complete this procedure if the following conditions exist:

- The SMTP server is secured and requires authentication before sending e-mail.
- You are using Identity Manager Password Synchronization with a DirXML driver

- In the Password Synchronization settings for the driver, you have selected "Notify the user of password synchronization failure via e-mail."

To add the SMTP server password to the driver policy:

1 Make sure the driver has the policies that are necessary for using Password Synchronization.

These policies are provided in the sample driver configurations, or can be added as described in "Upgrading Existing Driver Configurations to Support Identity Manager Password Synchronization" on page 174.

2 In iManager, click DirXML Management > Overview. Search for the driver sets, or browse and select a container that holds the driver set.

A graphical representation of the driver set appears.

3 In the DirXML Overview, click the icon for the driver.

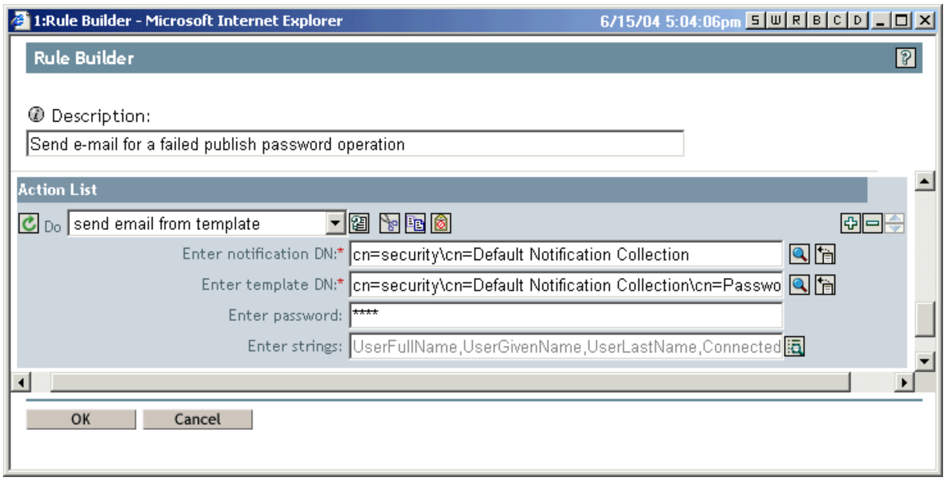
A graphical representation of the driver configuration appears.

4 Specify the password for the SMTP server in the rules that include Do Send E-mail from Template actions.

For example, if you are using the sample driver configurations, the following Password Synchronization policies need to be modified.

Policy Set	Policy Name	Rule Name
Input Transformation	Password(Pub)-Sub Email Notifications	◆ Send e-mail on a failure when subscribing to passwords ◆ Send e-mail on failure to reset the connected system password using the DirXML data store password
Output Transformation	Password(Sub)-Pub Email Notifications	◆ Send e-mail for a failed publish password operation

The following figure shows an example of a Do Send E-mail from Template action that requires the password.



Description:
Send e-mail for a failed publish password operation

Do send email from template
Enter notification DN:* cn=security\cn=Default Notification Collection
Enter template DN:* cn=security\cn=Default Notification Collection\cn=Passwo
Enter password: ****
Enter strings: UserFullName,UserGivenName,UserLastName,Connected

The password is obfuscated when it is stored in eDirectory.

Adding Your Own Replacement Tags to E-Mail Notification Templates

The e-mail notification templates have some tags defined by default, to help you personalize the message for the user. You can also add your own tags.

Your ability to add tags is dependent on the application that is using the e-mail template.

In this section:

- "Adding Replacement Tags to Password Synchronization E-Mail Notification Templates" on page 219
- "Adding Replacement Tags to Forgotten Password E-Mail Notification Templates" on page 225

Adding Replacement Tags to Password Synchronization E-Mail Notification Templates

You can add replacement tags to the e-mail notification templates for Password Synchronization, but these tags won't work unless you also define them in every password synchronization policy rule that refers to the e-mail notification template. When using a DoSendEmailFromTemplate action, all replacement tags declared within the template must be defined as child arg-strings elements of the action.

For example, Identity Manager provides default replacement tags that are included with the e-mail notification templates. Identity Manager also provides default password synchronization policies in the driver configurations. Each default tag provided with the e-mail template is also defined in each rule of the password synchronization policy that uses that e-mail template. For example, the UserGivenName tag is one of the default tags defined in the e-mail template named Password Set Fail. A policy rule named "Send e-mail on a failure when subscribing to passwords" refers to that e-mail template in a DoSendEmailFromTemplate action. This rule is used in a policy to send notification to a user about a password synchronization failure. The same UserGivenName tag is defined as an arg-string element in that rule.

Like this example, each new tag you add must be defined in both the e-mail template and the policy rules that refer to the e-mail template, so that the DirXML engine knows how to insert the correct data in place of the replacement tag when sending the e-mail to the user.

You can refer to the tags in the DirXML driver configurations that shipped with Identity Manager as examples.

Keep in mind the following guidelines:

- The items called replacement tags in the e-mail templates are called tokens in the context of Policy Builder.
- You should use Policy Builder to make it easier to define the argument strings for the replacement tags, as explained in the steps in this section.
- The tags you add might be defined to be any of the following:
  - Any Source or Destination attribute for the user

    Unlike adding tags for the e-mail templates for Forgotten Password, simply adding a tag that has the same name as an attribute on the user object in eDirectory does not cause the tag to work. As with all tags used in password synchronization e-mail notification templates, you must also define the tag in the policy that is referring to the e-mail template.
  - A global configuration value

- An XPATH expression

  This is in contrast to tags for the e-mail templates for Forgotten Password, which are limited to eDirectory user attributes.

- Unlike adding tags for the e-mail templates for Forgotten Password (which require you to use the exact name of an eDirectory user attribute), you can name the replacement tags any name you choose, as long as it matches the name used to define the tag in the policies that reference the e-mail template.

To define the tags in a policy, find all the policies that refer to the e-mail notification template, and use Policy Builder to add the tags to them:

1. Find all the policies that refer to the e-mail notification template.

   One way to make sure you find all the policies that refer to the e-mail notification templates is to export your driver configurations, and search the XML for a do-send-e-mail action that has the template equal to the name of the e-mail notification template.

2. In each policy, edit each rule that refers to the template. In iManager, click DirXML Management > Overview. Select the driver set that contains the driver with the policy you want to edit.

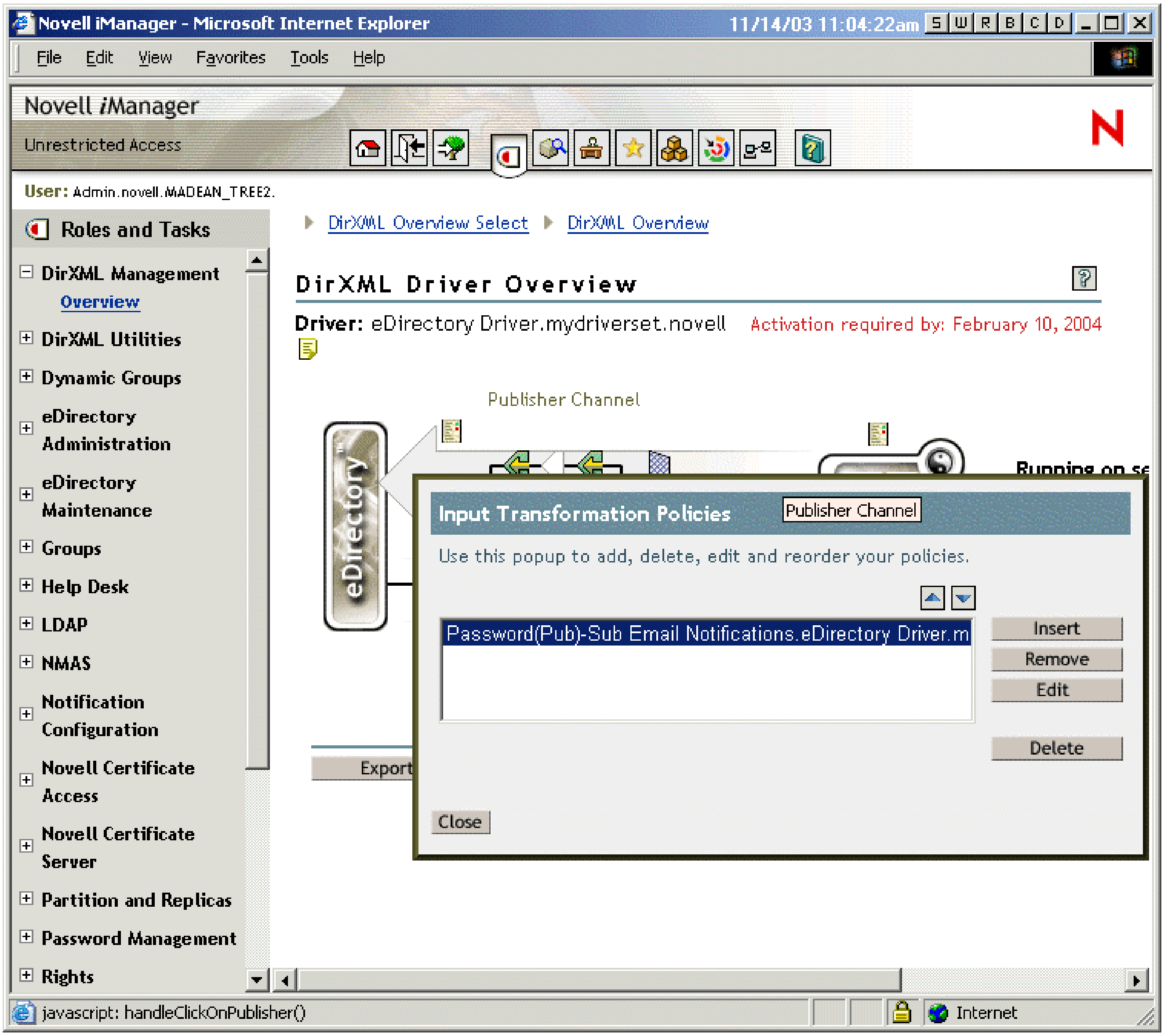
3. Click the icon for the driver that has the policy you want to edit.

4. Click the set of policies that contains the policy you want to edit.

   For example, the driver configuration for the eDirectory driver that ships with Identity Manager contains a policy in the Input Transformation policy set which references both password synchronization e-mail notification templates.

5. Click the policy, then click Edit.

   For example, if you were editing the Password(Pub)-Sub Email Notifications policy for the eDirectory driver, this is the page where you would click Edit:



User: Admin.novell.MADEAN_TREE2.

DirXML Driver Overview

Driver: eDirectory Driver.mydriverset.novell Activation required by: February 10, 2004

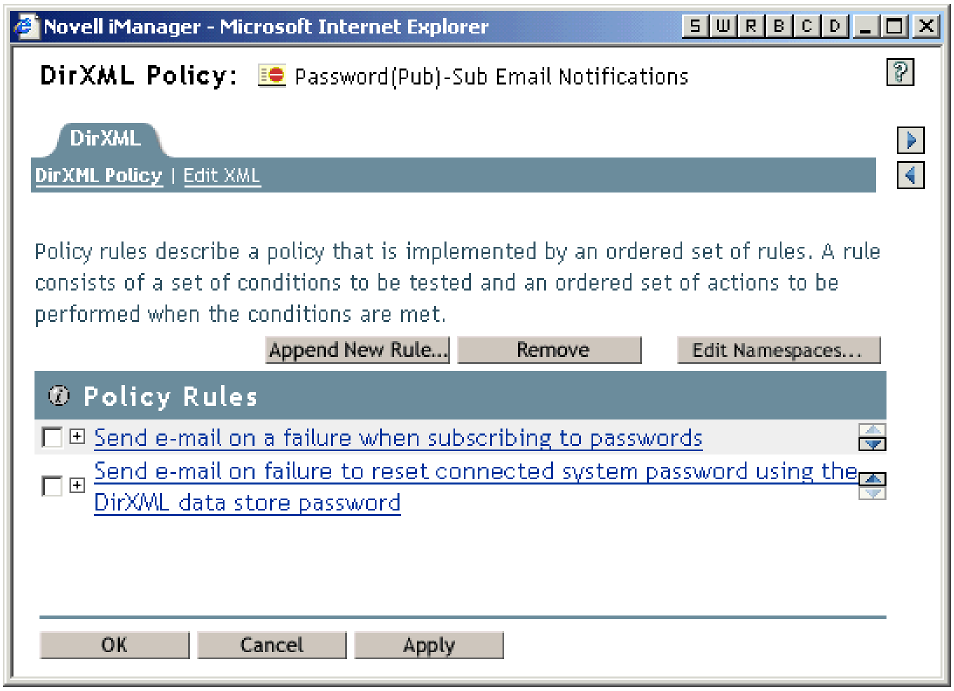
Use this popup to add, delete, edit and reorder your policies.

Password(Pub)-Sub Email Notifications.eDirectory Driver.m

javascript: handleClickOnPublisher()

6 In the list of rules that opens, click the rule that refers to the e-mail notification template.

For example, in the Password(Pub)-Sub Email Notifications policy, you would see this list of rules. Both of these rules reference one of the password synchronization e-mail templates. You need to edit both rules if you are adding tags to both templates.



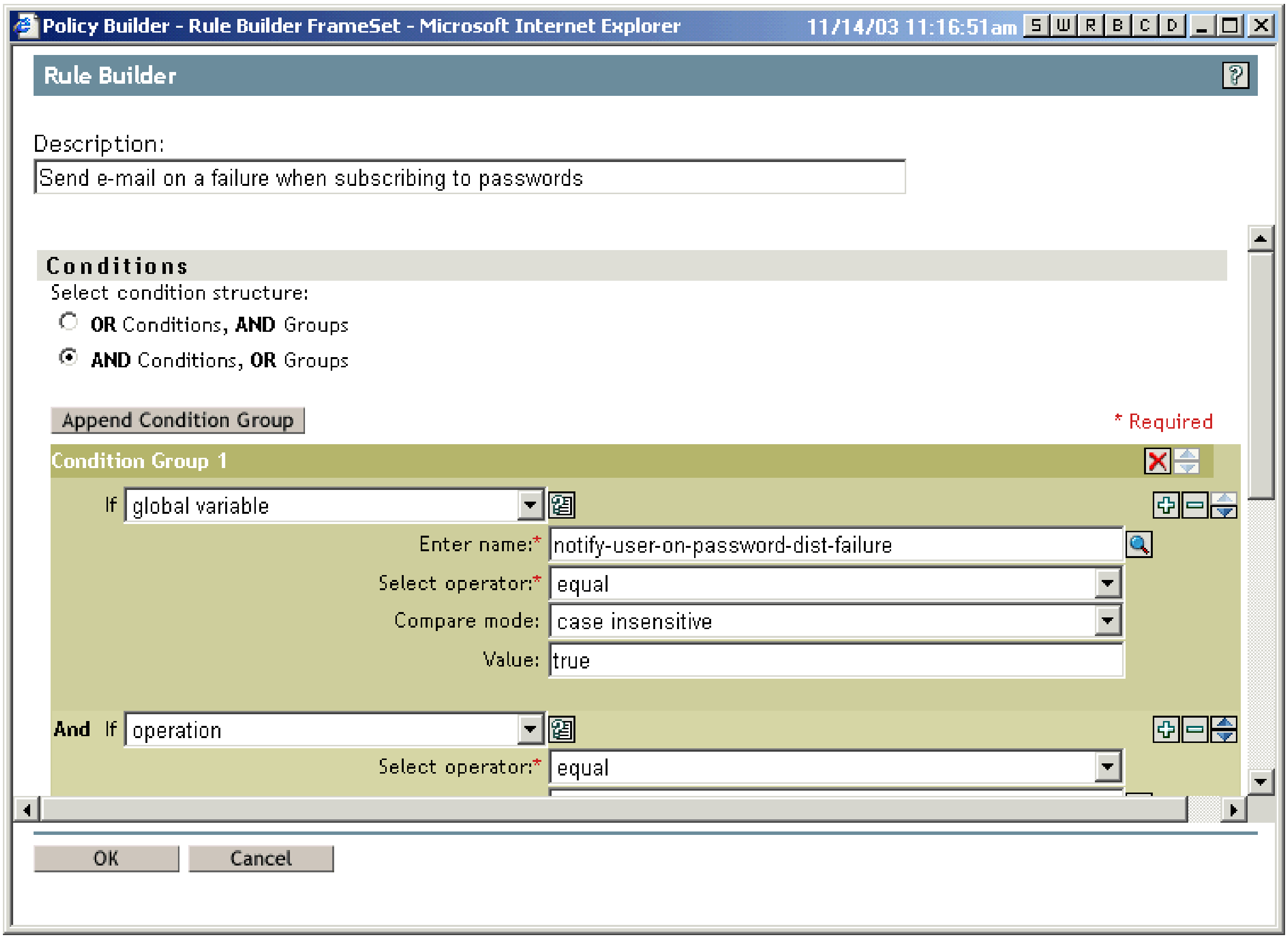
DirXML Policy: Password(Pub)-Sub Email Notifications

Policy rules describe a policy that is implemented by an ordered set of rules. A rule consists of a set of conditions to be tested and an ordered set of actions to be performed when the conditions are met.

Policy Rules

- □ ⊞ Send e-mail on a failure when subscribing to passwords
- □ ⊞ Send e-mail on failure to reset connected system password using the DirXML data store password

If you click the first rule, the following page appears:


Policy Builder - Rule Builder FrameSet - Microsoft Internet Explorer
11/14/03 11:16:51am
Rule Builder
Append Condition Group
OK
Cancel

Description: Send e-mail on a failure when subscribing to passwords

Conditions

Select condition structure:

○ **OR** Conditions, **AND** Groups

● **AND** Conditions, **OR** Groups

* Required

Condition Group 1

If global variable

Enter name:* notify-user-on-password-dist-failure

Select operator:* equal

Compare mode: case insensitive

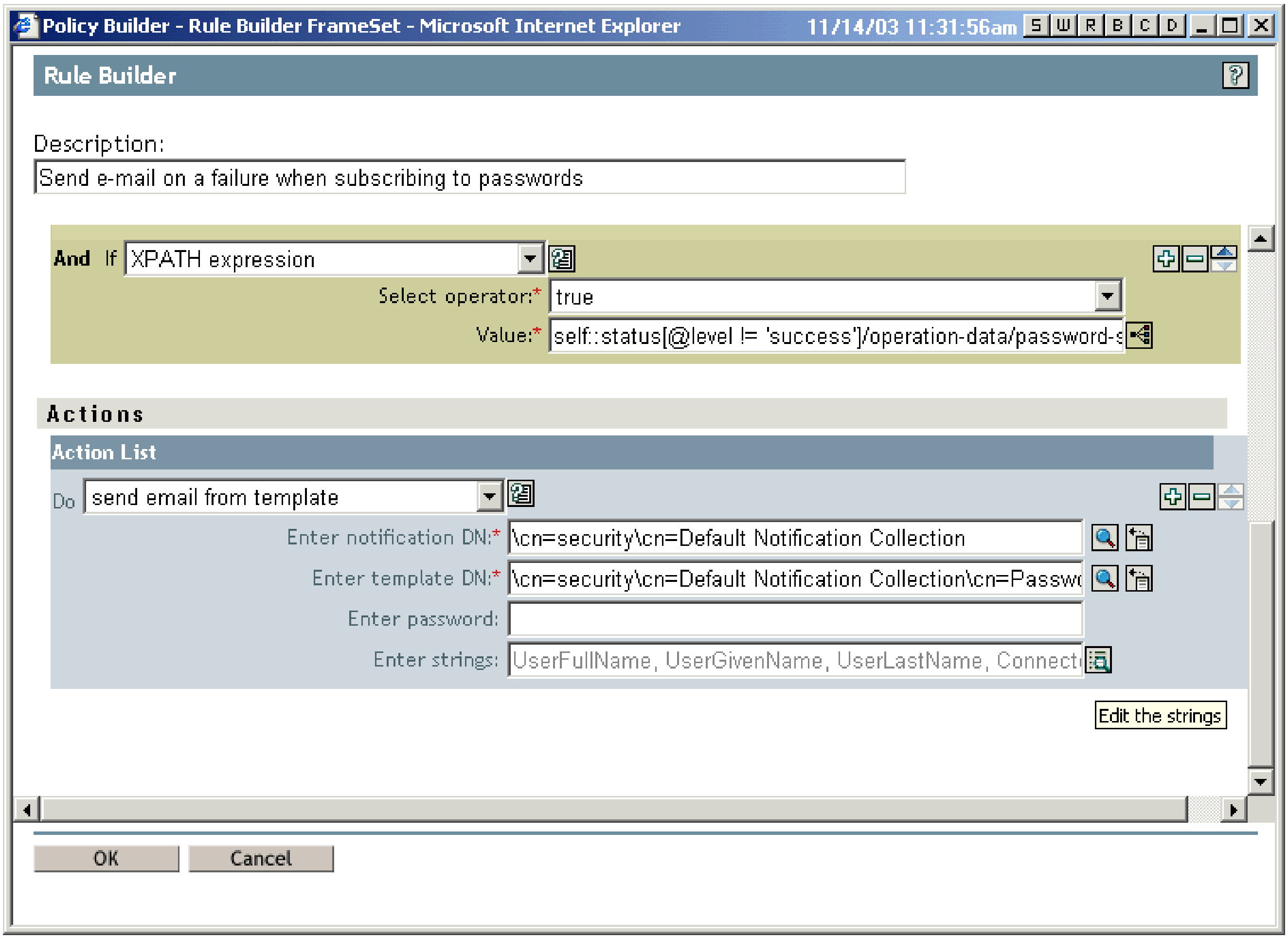
Value: true

And If operation

Select operator:* equal

7 Scroll down to the section of the rules that displays the actions.

For the example rule, you would scroll down to this section:



Policy Builder - Rule Builder FrameSet - Microsoft Internet Explorer
11/14/03 11:31:56am
Rule Builder

Description:
Send e-mail on a failure when subscribing to passwords

And If XPATH expression
Select operator:* true
Value:* self::status[@level != 'success']/operation-data/password-s

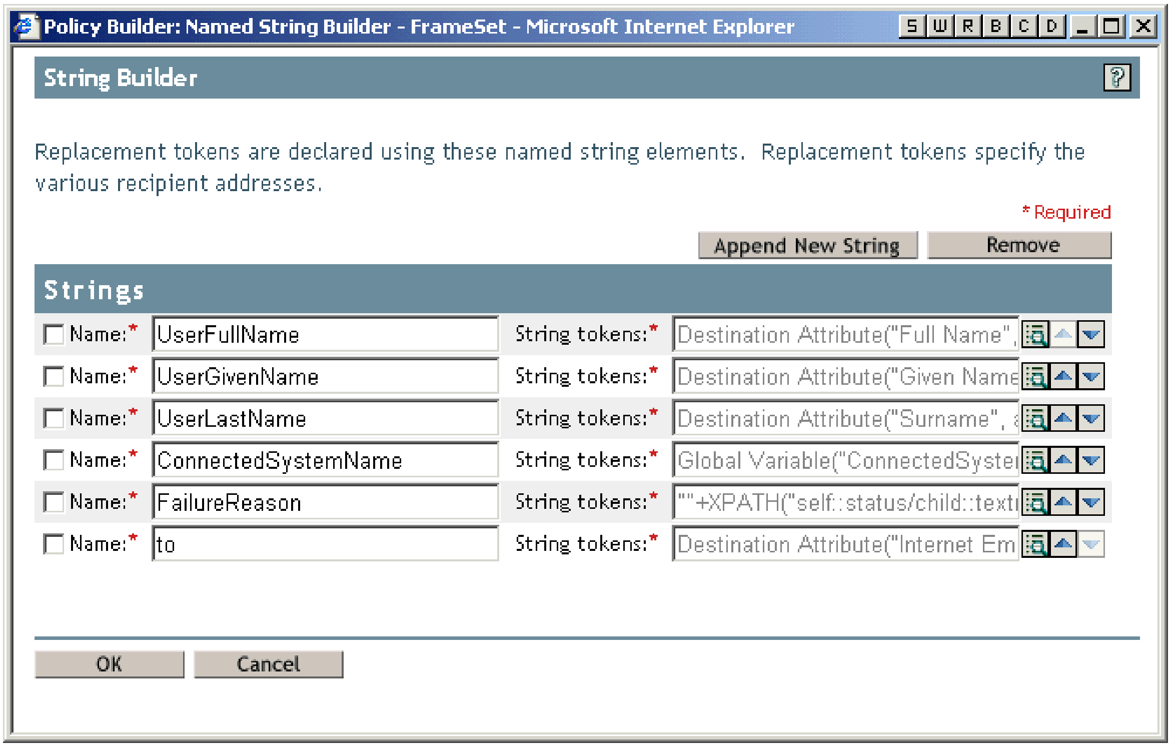
Actions

Action List

Do send email from template
Enter notification DN:* \cn=security\cn=Default Notification Collection
Enter template DN:* \cn=security\cn=Default Notification Collection\cn=Passwo
Enter password:
Enter strings: UserFullName, UserGivenName, UserLastName, Connect

8 For the Do Send Email from Template rule, click the browse button 🔍 for the Enter strings field. This opens the string builder.

For the example rule, the following figure shows the list of strings you would see. Note that the default tags that are used in the e-mail notification templates are already defined in the password synchronization policies that are part of the DirXML driver configurations, like this one. You can use the default tags as an example.


Policy Builder: Named String Builder - FrameSet - Microsoft Internet Explorer
S W R B C D
String Builder
?

Replacement tokens are declared using these named string elements. Replacement tokens specify the various recipient addresses.

* Required
Append New String
Remove
Strings

□ Name:*	UserFullName	String tokens:*	Destination Attribute("Full Name",
□ Name:*	UserGivenName	String tokens:*	Destination Attribute("Given Name
□ Name:*	UserLastName	String tokens:*	Destination Attribute("Surname", a
□ Name:*	ConnectedSystemName	String tokens:*	Global Variable("ConnectedSyster
□ Name:*	FailureReason	String tokens:*	""+XPATH("self::status/child::text(
□ Name:*	to	String tokens:*	Destination Attribute("Internet Em

9 Click Append New String to define a tag that you could use in an e-mail notification template. Enter a name for the tag, making sure it is exactly the same name you use in the e-mail notification template.

10 In the String tokens field, click the browse button to help you define the tag.

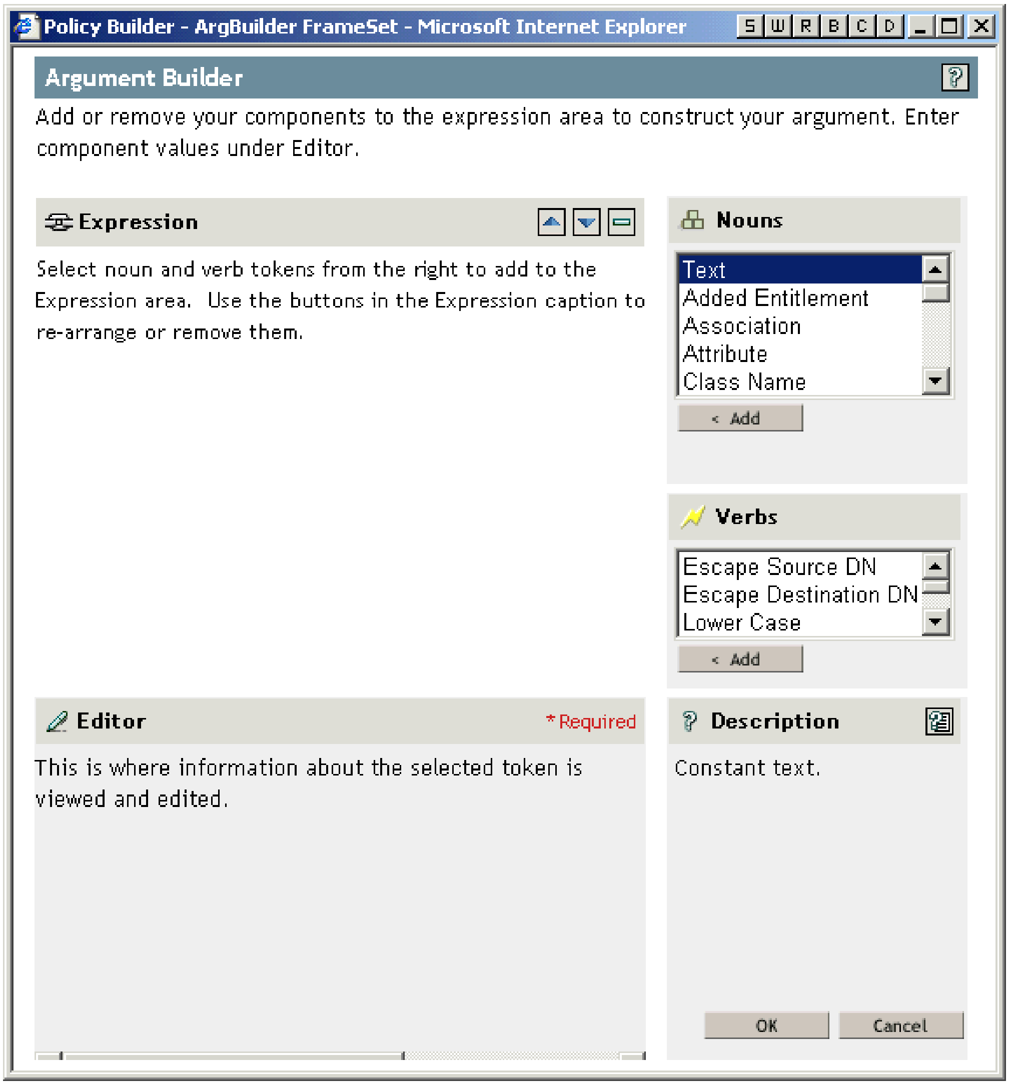
The Argument Builder page appears. This is where you specify what value should be brought in when this tag is used in an e-mail notification template. You can define the tag to be any of the following:

- Any Source or Destination attribute for the user

  Unlike adding tags for the e-mail templates for Forgotten Password, simply adding a tag that has the same name as an attribute on the user object in eDirectory does not cause the tag to work. As with all tags used in password synchronization e-mail notification templates, you must also define the tag in the policy that is referring to the e-mail template.

- A global configuration value
- An XPATH expression

The following figure shows an example of the page that helps you define the tag.


Policy Builder - ArgBuilder FrameSet - Microsoft Internet Explorer
Argument Builder

Add or remove your components to the expression area to construct your argument. Enter component values under Editor.

Select noun and verb tokens from the right to add to the Expression area. Use the buttons in the Expression caption to re-arrange or remove them.

This is where information about the selected token is viewed and edited.

Constant text.

After you define the tag and click OK, it shows up as one of the strings in the String Builder page.

11 Make sure you click OK to complete all the pages, so that your changes to the policy are saved.

12 Repeat the steps to edit the rules in all the policies that refer to the e-mail notification template.

13 Add the tag you defined in the policy to the e-mail notification template, using the exact name you used in the policies.

At this point, you can use the tag name in the body of the e-mail notification template.

14 Save the changes and restart the driver.

Adding Replacement Tags to Forgotten Password E-Mail Notification Templates

You can add tags to the e-mail notification templates for Forgotten Password, using the following guidelines:

- You can add only tags that correspond to LDAP attributes on the user object that the message is being sent to.

- The name of the tag you add must be exactly the same as the LDAP attribute name on the user object.

  To see how LDAP attributes correspond to eDirectory attribute names, you can refer to the Schema Mapping Policy that is provided in the DirXML Driver for LDAP.
- No other configuration is necessary.

Sending E-Mail Notifications to the Administrator

The default configuration is for the e-mail notification to go only to the user. The policies shipped with Identity Manager use the e-mail address from the eDirectory object for the user that is affected.

However, you can configure the password synchronization policies so that e-mail notifications also go to the administrator. To do this, you must modify the DirXML script for one of the policies.

Send a Blind Copy to the administrator by defining the token with the administrator's e-mail address.

To copy an administrator, you need to modify the policy that generates the e-mail (such as PublishPasswordEmails.xml, in which the policy looks up the e-mail address to send notifications) and add an additional <arg-string> element with the administrator's e-mail address. Here's an example of the additional arg-string element.

```
<arg-string name="to">

     <token-text>Admin@company.com</token-text>

</arg-string>
```

Make sure to restart the driver after making these changes.

Localizing E-Mail Notification Templates

Keep in mind the following:

- The default templates are in English, but you can edit the text to use other languages.
- The names and the definitions of the replacement tags must remain in English, so that the arg-string token definitions in the policies match the names of the replacement tags.
- For Forgotten Password e-mail notifications only, to specify what encoding you want on your mail item, you need to add a setting in the portalservlet.properties file. For example:

  ```
  ForgottenPassword.MailEncoding=EUC-JP
  ```

  If this setting doesn't exist, then no encoding is used on the mail transformation.
- For Password Synchronization e-mail messages, an XML attribute named charset can be specified on the following elements: <mail>, <message>, and <attachment>.

  For information on using these elements, see the *DirXML Driver for Manual Task Service Implementation Guide* (http://www.novell.com/documentation/dirxmldrivers/index.html), which gives more detail on the e-mail templates.

Troubleshooting Password Synchronization

- See the tips in "Implementing Password Synchronization" on page 179.
- Make sure you have the Simple Password Login Method installed with NMAS.
- Make sure you have a copy of the root of the tree on the servers where you need to NMAS to enforce Password Policies on eDirectory login methods or on passwords from connected systems being synchronized by Identity Manager.
- Make sure the users that you want to do password synchronization for are replicated on the same server with the driver that is synchronizing the passwords. As with other driver functions, the driver can manage only the users that are in a master or read/write replica on the same server.
- Make sure SSL is configured properly between the Web server and eDirectory.
- If you see an error about a password not complying when a user is initially created, but the password is set correctly in eDirectory, this might be an issue with the default password in the driver policy not conforming to the Password Policy that applies to that user.

  Here's an example using the Active Directory driver, although the same issue could occur for another driver.

  Example: Suppose you want the Active Directory driver to provide the initial password for user when it creates a new user object in eDirectory to match a user in Active Directory. The sample configuration for the Active Directory driver sends the initial password as a separate operation than adding the user, and the sample configuration also includes a policy that provides a default password for a user if no password is provided by Active Directory. Because adding the user and setting the password are done separately, in this case a new user always receives the default password, even if only momentarily, and it is soon updated because the Active Directory driver sends the password immediately after adding the user. If the default password does not comply with the eDirectory Password Policy for the user, an error is displayed. For example, if a default password created using the user's surname is too short to comply with the Password Policy, you might see a -216 error saying the password is too short. However, the situation is soon rectified if the Active Directory driver then sends an initial password that does comply.

  Regardless of the driver you are using, if you want a connected system that is creating user objects to provide the initial password, consider doing one of the following. These measures are especially important if the initial password does not come with the add event and instead comes in a subsequent event.

  - Change the policy on the Publisher channel that creates default password, so that the default password conforms to the Password Policies (created using Password Management > Manage Password Policies) that have been defined for your organization in eDirectory. When the initial password comes from the authoritative application, it replaces the default password.

    This option is preferable because we recommend that a default Password Policy exists in order to maintain a high level of security within the system.

    or

  - Remove the policy on the Publisher channel that creates default password. In the sample configuration, this policy is provided in the Command Transformation policy set. Adding a user without a password is allowed in eDirectory. The assumption for this option is that the password for the newly created user object eventually comes through the Publisher channel, so the user object exists without a password for only a short time.

- Password Policies are assigned with a tree-centric perspective. By contrast, Password Synchronization is set up per driver, and drivers are installed on a per-server basis and can manage only those users who are in a master or read/write replica. To get the results you expect from Password Synchronization, make sure the containers that are in a master or read/write replica on the server running the drivers for Password Synchronization match the containers where you have assigned Password Policies with Universal Password enabled. Assigning a Password Policy to a partition root container ensures that all users in that container and subcontainers are assigned the Password Policy.
- Helpful DSTrace commands:

  +DXML: To view DirXML rule processing and potential error messages.
  +DVRS: To view DirXML driver messages
  +AUTH: To view NDS password modifications
  +DCLN: To view NDS DCLient messages

11 Using Role-Based Entitlements

Role-Based Entitlements let you grant entitlements on connected systems to a group of Novell® eDirectory™ users. Using Entitlement policies, you can streamline management of business policies and reduce the need to configure your DirXML® drivers.

In this section:

Overview

Role-Based Entitlements enable you to define business policies about who should be granted entitlements in your environment. Using an Entitlement Policy (an enhanced eDirectory dynamic group), you define the users who should be granted entitlements based on dynamic search criteria, such as a job title of "Tester." You can manage exceptions using a static inclusion and exclusion list for the policy.

After defining the users for whom the policy should apply, you specify the entitlements you want those users to be granted on connected systems. You can also grant rights in eDirectory, as you can for any dynamic group.

Entitlements on connected systems are granted by DirXML drivers that are configured to support Role-Based Entitlements.

This model of administering business policies is different from the traditional method of provisioning with Identity Manager, because you specify the business policies upstream from the DirXML driver configuration.

Traditionally, entitlements on connected systems are administered on a per-driver basis, solely by creating and editing driver configuration policies such as the ones you create with Policy Builder. In this traditional distributed model, a different administrator often controls each DirXML driver and connected system, and the business policies that determine whether a user gets resources on that system are "hard-coded" separately in the driver configuration policies for each connected system driver.

The Role-Based Entitlement model fits an environment where one or a few administrators have authority to control business policies. This kind of administrator needs to understand Identity Manager in general but does not necessarily need much Identity Manager or XSLT expertise to use the Role-Based Entitlements interface.

Another difference between Role-Based Entitlements and traditional Identity Manager administration is that Entitlement Policies make changes directly in a production environment. Traditionally, changes to driver configurations are tested in a lab first. Entitlement Policies make it easier to make changes to business policies, but you should use caution when making these changes in your production environment. (For suggestions, see "Keeping Accounts Safe" on page 241.)

To help you understand the differences, consider this scenario.

Scenario: Setting Up a Business Policy

You want to automatically provision new employees with the job title of "Tester" by giving them two accounts:

- A GroupWise® e-mail account
- An account in an Oracle database used for tracking defects

Setting Up the Business Policy

With the traditional method, an Identity Manager developer uses Policy Builder or a style sheet to "hard-code" the business policy in the driver configurations for the DirXML Driver for JDBC and the DirXML Driver for GroupWise. However, using Role-Based Entitlements, you create an Entitlement Policy and define dynamic membership for the job title of "Tester."

You also need to have the DirXML Driver for GroupWise and the DirXML Driver for JDBC configured to support Role-Based Entitlements. The drivers grant accounts to users who meet the dynamic membership criteria.

The result is the same up to this point. Using either method, users with the job title of "Tester" are automatically granted an account. However, using Role-Based Entitlements to change this business policy requires less Identity Manager expertise.

Changing the Business Policy

After setting up the business policy, you find out that you also need to grant the same kinds of accounts to users with the title of "Testing Manager."

Using the traditional method, an Identity Manager developer would use Policy Builder to "hard-code" the changes to business policy in two places:

- The driver configuration for GroupWise
- The driver configuration for JDBC

However, using Role-Based Entitlements, you apply your knowledge of LDAP filters to easily add the additional user criteria to the dynamic membership in the Entitlement Policy, without editing the DirXML script. Both the JDBC Driver and the GroupWise driver grant the accounts to the correct users without changes to the driver configurations.

How Role-Based Entitlements Work

Role-Based Entitlements relies on the Entitlements Service driver. This driver is an engine service that monitors whether users have membership in an Entitlement Policy. If a user meets the dynamic membership criteria of an Entitlement Policy dynamic group, or is statically included, the Entitlements Service driver adds information to the DirXML-SPEntitlements attribute on the User object. The entitlement that a user should receive is written to the attribute.

For the systems listed in "Configuring Drivers to Use Entitlement Policies" on page 233, you can choose the Role-Based Entitlements option when importing the Identity Manager sample driver configuration. You can then review the policies provided. These policies support Role-Based Entitlements by monitoring the DirXML-SPEntitlements attribute and granting or revoking entitlements.

The Entitlements Service driver updates the DirXML-SPEntitlements attribute only when one of the following happens:

- You use the Reevaluate Membership task

  You can specify in which part of the tree users should be reevaluated.
- A user is moved
- A user is renamed
- Any attribute used for membership in an Entitlement Policy is modified

Entitlement Policies enable you to grant entitlements on connected systems and rights in eDirectory. Entitlements on connected systems can be any of the following:

- Accounts
- Membership in e-mail distribution lists
- Group membership
- Attributes for the corresponding objects in connected systems, populated with values you specify
- Placement
- Other entitlements that you customize

Some of the options are demonstrated in the sample driver configurations.

Because one Entitlements Service driver is used per driver set, an Entitlement Policy can manage only users that are in a read/write or master replica on the server that is associated with that driver set.

Role-Based Entitlements functionality is based on Identity Manager. Therefore, to administer connected systems, you must have DirXML drivers installed and configured properly.

In addition, to avoid possible conflicts between Entitlement Policy assignments and DirXML driver configurations, you should be aware of your business policies and how they are administered through Identity Manager. DirXML Entitlement Policies and policies in a driver configuration should not overlap or conflict while they manage an attribute.

Prerequisites

❑ eDirectory 8.7.3

This feature does not support eDirectory 8.7.1.

❑ Identity Manager

❑ An Entitlements Service driver

You must have an Entitlements Service driver in each driver set where you want to use Role-Based Entitlements. This requires a very simple, one-time setup for each driver set. See "Creating a Driver Object for the Entitlements Driver" on page 232.

❑ A driver configuration that supports Role-Based Entitlements

Before you can use Role-Based Entitlements with a connected system, do one of the following:

- Import the Identity Manager sample driver configuration for the driver and specify that the driver is to be used with Role-Based Entitlements.
- Create your own driver configuration that supports Role-Based Entitlements.

See "Configuring Drivers to Use Entitlement Policies" on page 233.

Creating an Entitlements Service Driver Object and Configuring Connected System Drivers

In this section:

- "Creating a Driver Object for the Entitlements Driver" on page 232
- "Configuring Drivers to Use Entitlement Policies" on page 233

Creating a Driver Object for the Entitlements Driver

Before you can create Entitlement Policies, you need an Entitlements Service Driver object. You must create one for each driver set.

If you don't have one, you are prompted to create one when you click the Role-Based Entitlements role and task.

1 Find out whether you already have an Entitlements Service driver.

In iManager, click Role-Based Entitlements > Role-Based Entitlements, then select the driver set.

- If the No Entitlements Service Driver page appears, continue with Step 2 to create an Entitlements Service Driver object.
- If a Role-Based Entitlements page appears with a list of Entitlement Policies, you already have an Entitlements Service Driver object. You don't need to complete this procedure.

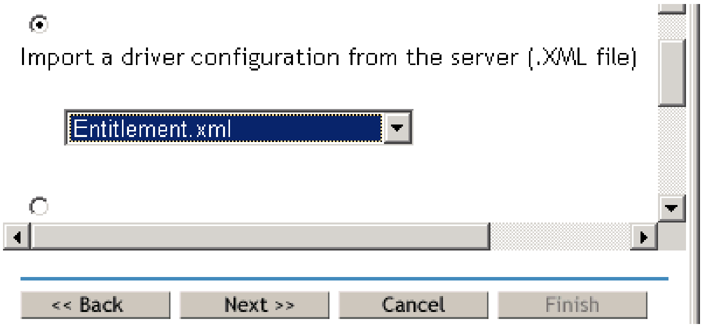
2 In the No Entitlements Service Driver page, click Yes.

The Create Driver Wizard opens.

You can also click DirXML Utilities > Import Drivers.

3 Select In an Existing Driver Set, then click Next.

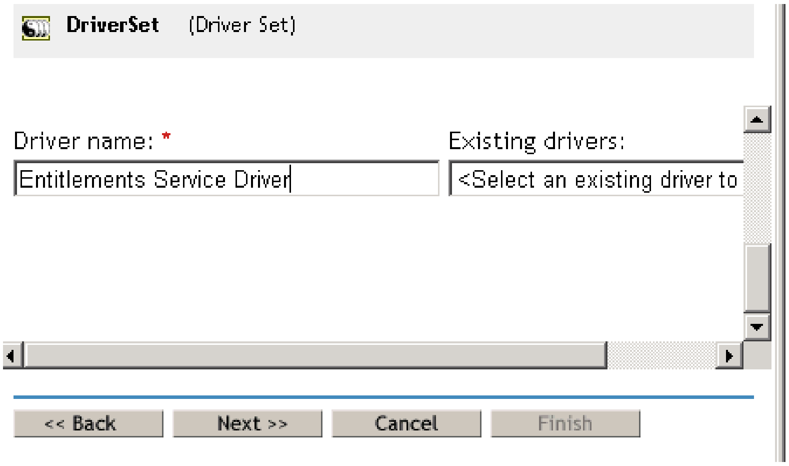
4 In the Import a Driver Configuration from the Server (.XML file) drop-down list, select Entitlement.xml.


● Import a driver configuration from the server (.XML file)

Entitlement.xml

○

5 Name the Entitlements Service Driver object (or accept the default name), then click Next.


DriverSet (Driver Set)

Driver name: * Entitlements Service Driver

Existing drivers: <Select an existing driver to

The correct driver configuration file is chosen automatically. Just specify a name for the Driver object.

6 Define security equivalences and exclude administrative roles, then click Next.

7 Review the summary, then click Finish.

The driver shim for the Entitlements Driver is installed by default when DirXML is installed. The Entitlements Driver configuration file is installed by default when you install the DirXML plug-ins on your iManager server.

After completing the Wizard, you can access the plug-ins for Role-Based Entitlements and begin creating Entitlement Policies for this driver set.

Configuring Drivers to Use Entitlement Policies

To use Role-Based Entitlements with a connected system, you must have an Identity Manager driver shim installed.

The driver must be configured to support Role-Based Entitlements. The configuration must have the correct entries in the driver manifest.

You can either import an Identity Manager sample driver configuration for the driver and choose the option to use Role-Based Entitlements, or customize a driver configuration yourself by following the examples in the sample driver configuration.

The following sample driver configurations include support for Role-Based Entitlements as an option:

- Active Directory
- Exchange
- GroupWise
- LDAP
- NIS
- Notes
- NT Domain

These driver configurations demonstrate a sample of what you can do with Role-Based Entitlements. You can configure other connected system drivers and other kinds of entitlements and interpretive variables.

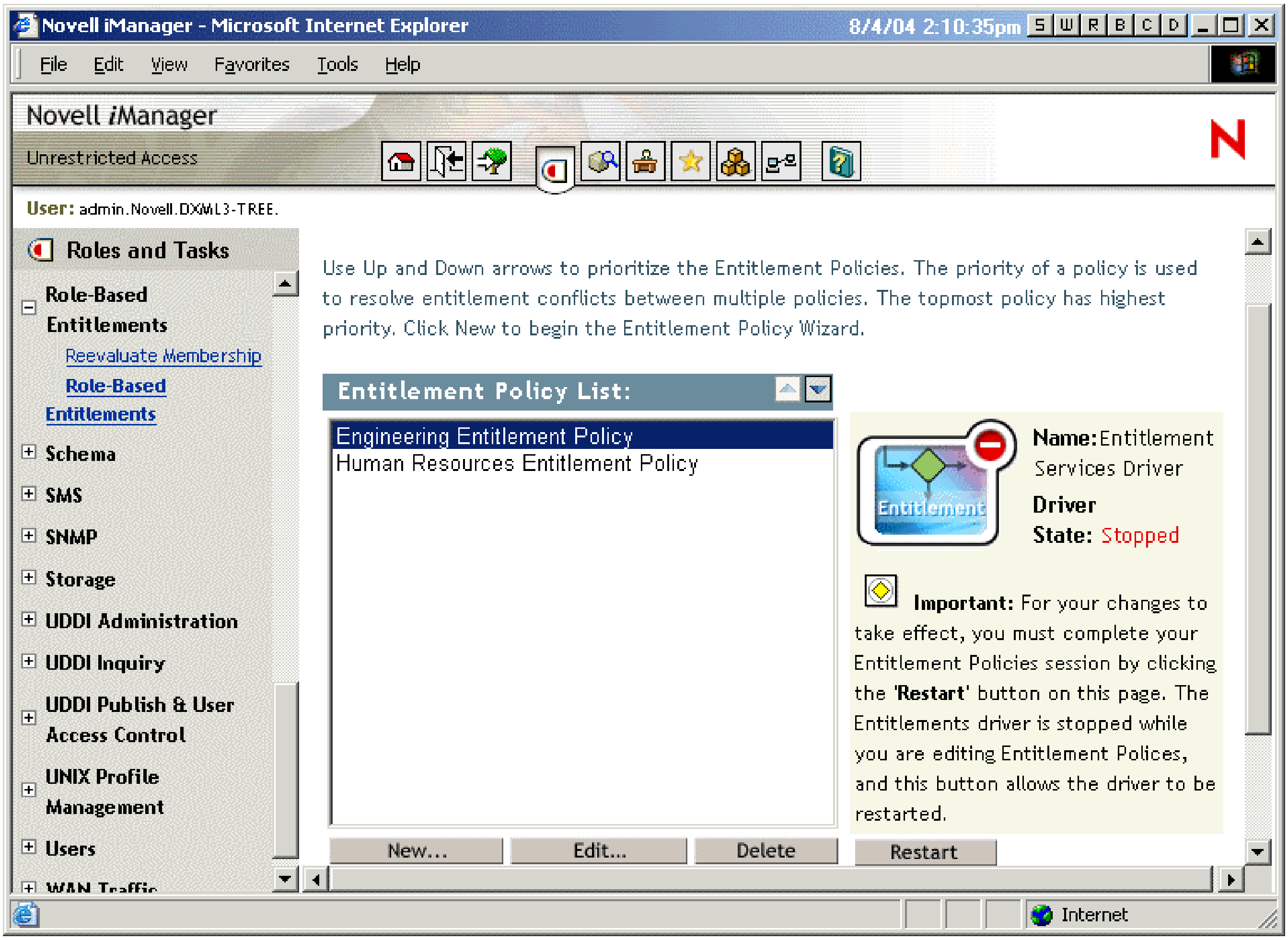
Creating Entitlement Policies

To create an Entitlement Policy, you can use the wizard provided.

1. Make sure you have set up the Entitlements Service Driver and created the driver configurations that are necessary.
2. In iManager, click Role-Based Entitlements > Role-Based Entitlements.
3. Select a driver set.

   Entitlement Policies are per driver set.

   The list of existing Entitlement Policies opens, like the page in the following figure. If you are using Role-Based Entitlements for the first time, no policies are listed.



User: admin.Novell.DXML3-TREE.

Use Up and Down arrows to prioritize the Entitlement Policies. The priority of a policy is used to resolve entitlement conflicts between multiple policies. The topmost policy has highest priority. Click New to begin the Entitlement Policy Wizard.

Entitlement Policy List:

Engineering Entitlement Policy
Human Resources Entitlement Policy

Name: Entitlement Services Driver

Driver State: Stopped

Important: For your changes to take effect, you must complete your Entitlement Policies session by clicking the 'Restart' button on this page. The Entitlements driver is stopped while you are editing Entitlement Polices, and this button allows the driver to be restarted.

4 Click New.

The Create New Entitlement Policy Wizard opens.

5 Follow the steps in the wizard to create a new policy.

Refer to the online help for information about each step in the wizard.

Defining Membership for an Entitlement Policy

Like a DirXML driver, each Entitlement Policy can manage only objects that are in a master or read/write replica on the server to which is it assigned. Each Entitlement Policy is associated with a single Driver Set object, which is assigned to a particular server.

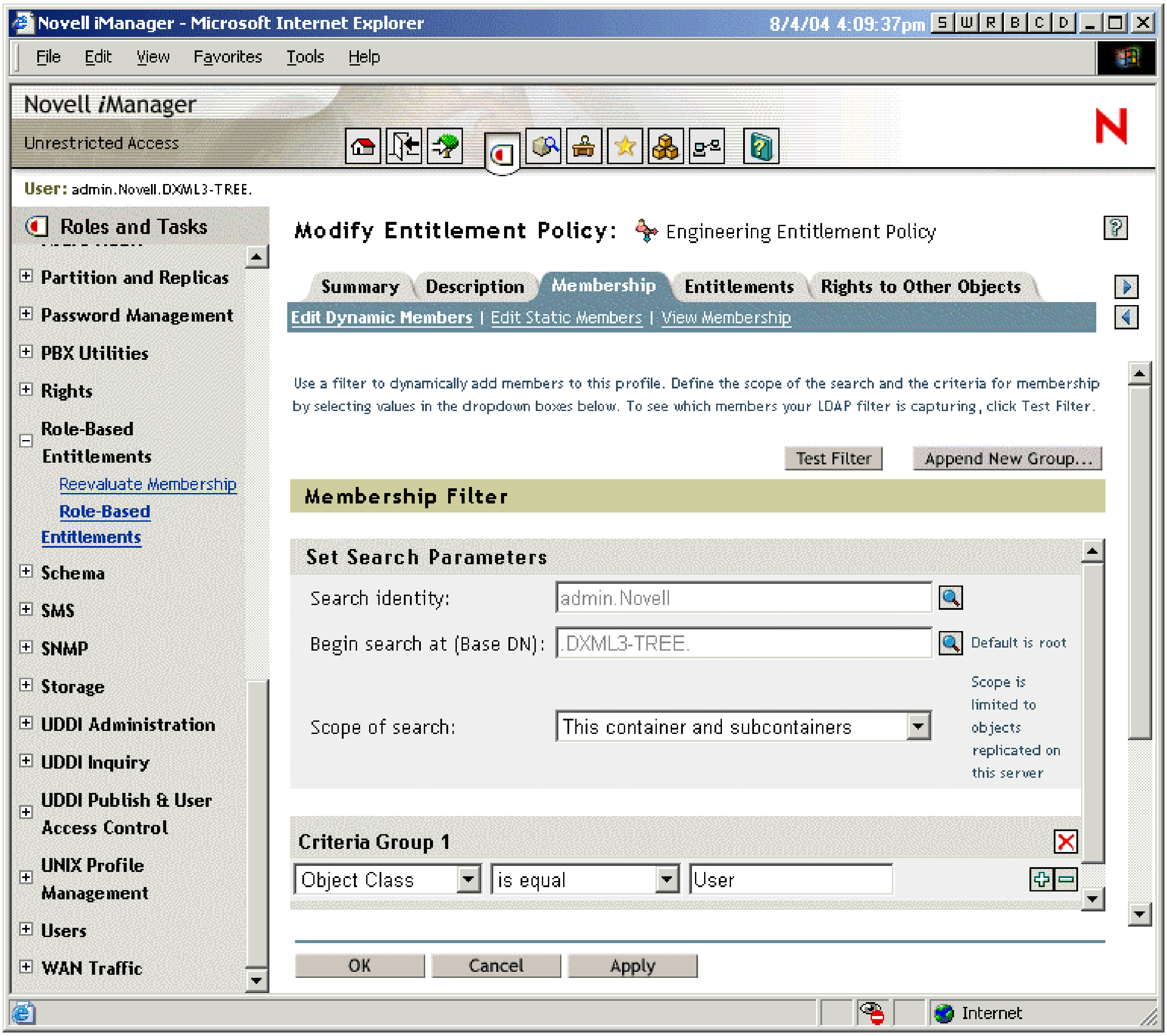
Only User objects (and other object types derived from the class of User) can be members of an Entitlement Policy.

An Entitlement Policy is a dynamic group object. You can define membership for an Entitlement Policy by using two methods, dynamic and static. You can use both methods in the same Entitlement Policy.

- **Dynamic:** You can define criteria for membership based on values of attributes of the object, such as whether the job title includes the word “Manager.” The criteria you specify are converted into an LDAP filter.

Users who meet the criteria are automatically part of the Entitlement Policy, without requiring you to specifically add each user to the policy. The dynamic membership is the same as a Dynamic Group object.

If an object changes so that it no longer meets the criteria for dynamic membership, the entitlements are automatically revoked.



User: admin.Novell.DXML3-TREE.

Modify Entitlement Policy: Engineering Entitlement Policy

Use a filter to dynamically add members to this profile. Define the scope of the search and the criteria for membership by selecting values in the dropdown boxes below. To see which members your LDAP filter is capturing, click Test Filter.

Membership Filter

Set Search Parameters

Search identity: admin.Novell

Begin search at (Base DN): .DXML3-TREE. Default is root

Scope of search: This container and subcontainers

Scope is limited to objects replicated on this server

Criteria Group 1

Object Class | is equal | User

- **Static:** In addition to creating criteria for dynamic membership (an LDAP filter), you can include or exclude specific users.

  You can add statically members who don’t meet the criteria of the filter. You can exclude members who meet the filter's criteria but should not be included in the Entitlement Policy.

Choosing Entitlements for an Entitlement Policy

Role-Based Entitlements enables you to grant entitlements on connected systems and rights in eDirectory.

Drivers that support Role-Based Entitlements offer a list of entitlements that can be assigned using an Entitlement Policy. The entitlements that the driver can provide are listed in the driver manifest, which is created by the driver developer to represent the capability of the driver and connected system. (The driver manifest should not be edited by an Identity Manager administrator.)

Trustee rights to objects in eDirectory are immediately granted to members of the Entitlement Policy. By default, entitlements in connected systems are granted to each member of the Entitlement Policy the next time an attribute used for Entitlement Policy membership is modified for that user, or when a user is moved to a different container or renamed.

Entitlements on connected systems can be any of the following:

- Accounts
- Membership in e-mail distribution lists
- Group membership in NOS lists
- Attributes for the corresponding objects in connected systems, populated with values you specify
- Other entitlements that you customize

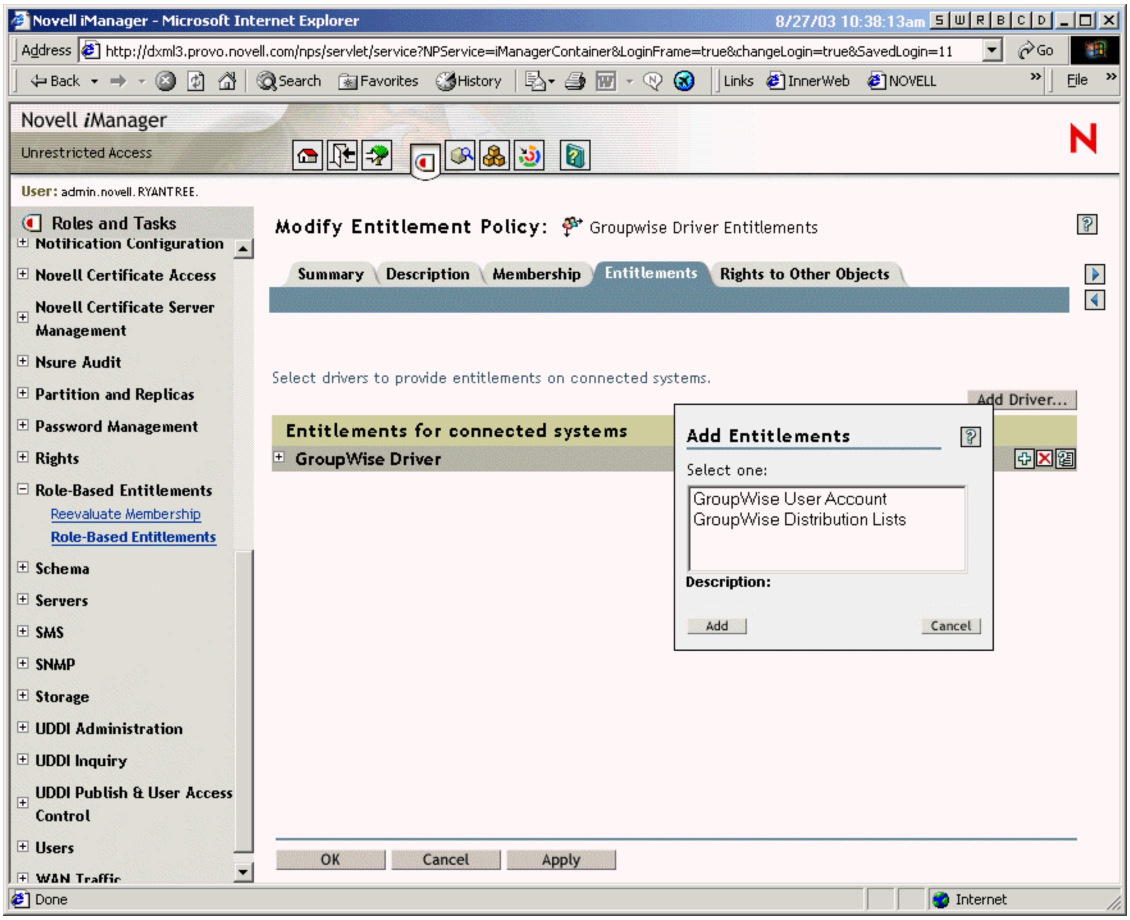
In this section:

- "Accounts on Connected Systems" on page 237
- "Membership in E-Mail Distribution Lists and NOS Lists" on page 238
- "Attribute Values on Connected Systems" on page 240

Accounts on Connected Systems

To add entitlements to an Entitlement Policy, go to the Entitlements page and select a driver. A pop-up window displays what entitlements that driver offers.

For example, in the following figure, you can see two kinds of entitlements being offered by a GroupWise driver, and the first one in the list is a GroupWise User Account.



http://dxml3.provo.novell.com/nps/servlet/service?NPService=iManagerContainer&LoginFrame=true&changeLogin=true&SavedLogin=11

User: admin.novell.RYANTREE.

Modify Entitlement Policy: Groupwise Driver Entitlements

Select drivers to provide entitlements on connected systems.

Entitlements for connected systems

GroupWise Driver

Add Entitlements

Select one:

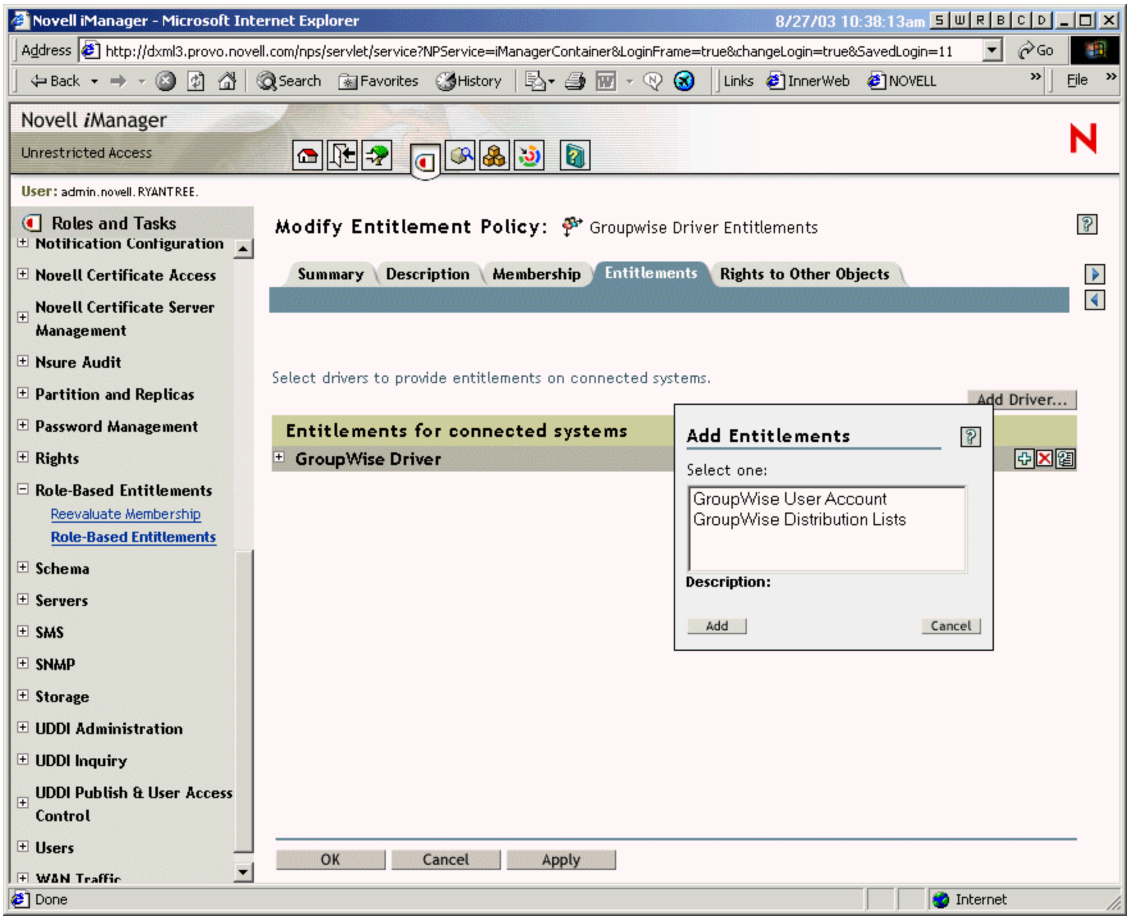
GroupWise User Account
GroupWise Distribution Lists

Description:

Membership in E-Mail Distribution Lists and NOS Lists

To assign membership in groups on connected systems, you choose the membership entitlement from the list of entitlements offered by a driver.

The following figure shows an example, with GroupWise Distribution Lists shown second in the list.



Modify Entitlement Policy: Groupwise Driver Entitlements

Select drivers to provide entitlements on connected systems.

Entitlements for connected systems

GroupWise Driver

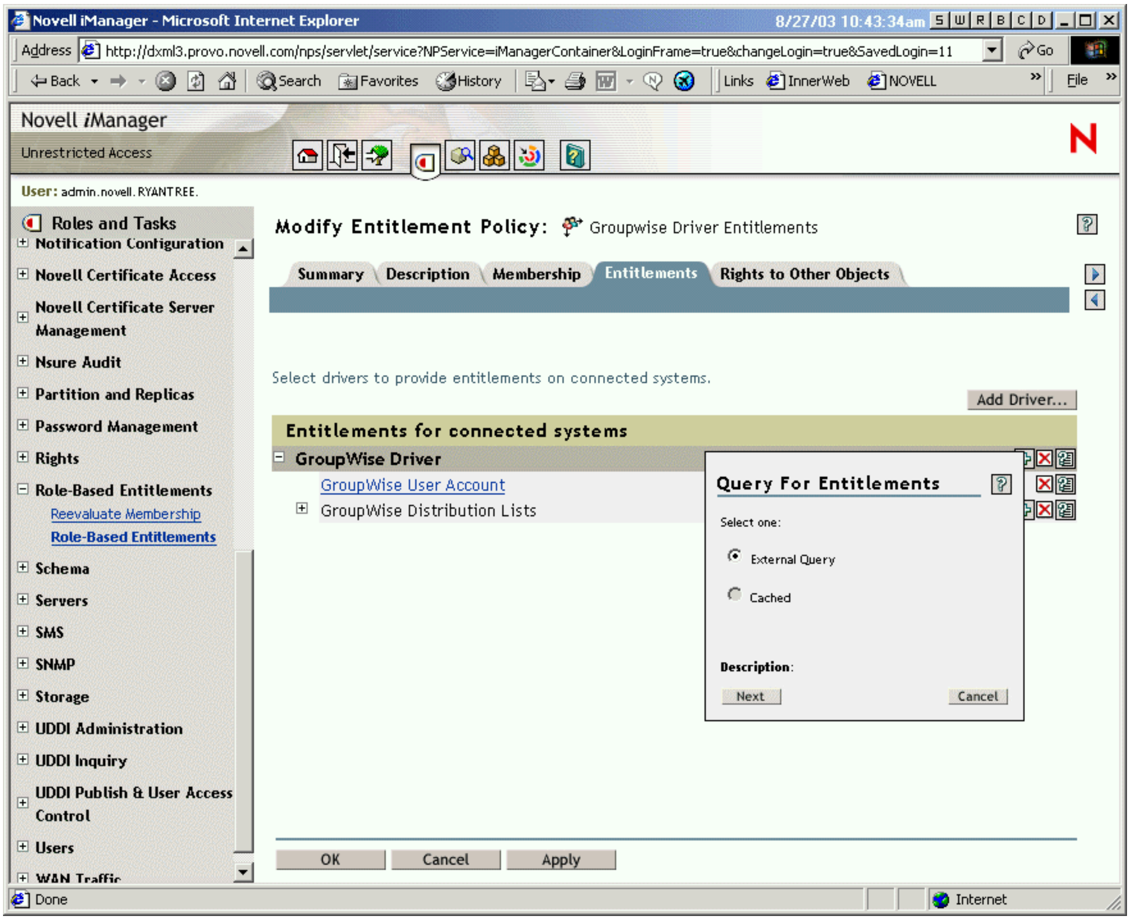
Add Entitlements

Select one:

GroupWise User Account
GroupWise Distribution Lists

Description:

If you choose GroupWise Distribution Lists in this example, a query pop-up is displayed, like the example in the following figure.



Modify Entitlement Policy: Groupwise Driver Entitlements

Select drivers to provide entitlements on connected systems.

Query For Entitlements

Select one:

● External Query

○ Cached

Description:

The Entitlement Policy interface lets you query for the list of e-mail distribution lists or NOS lists. After a query has been performed, you can choose to view the cached list.

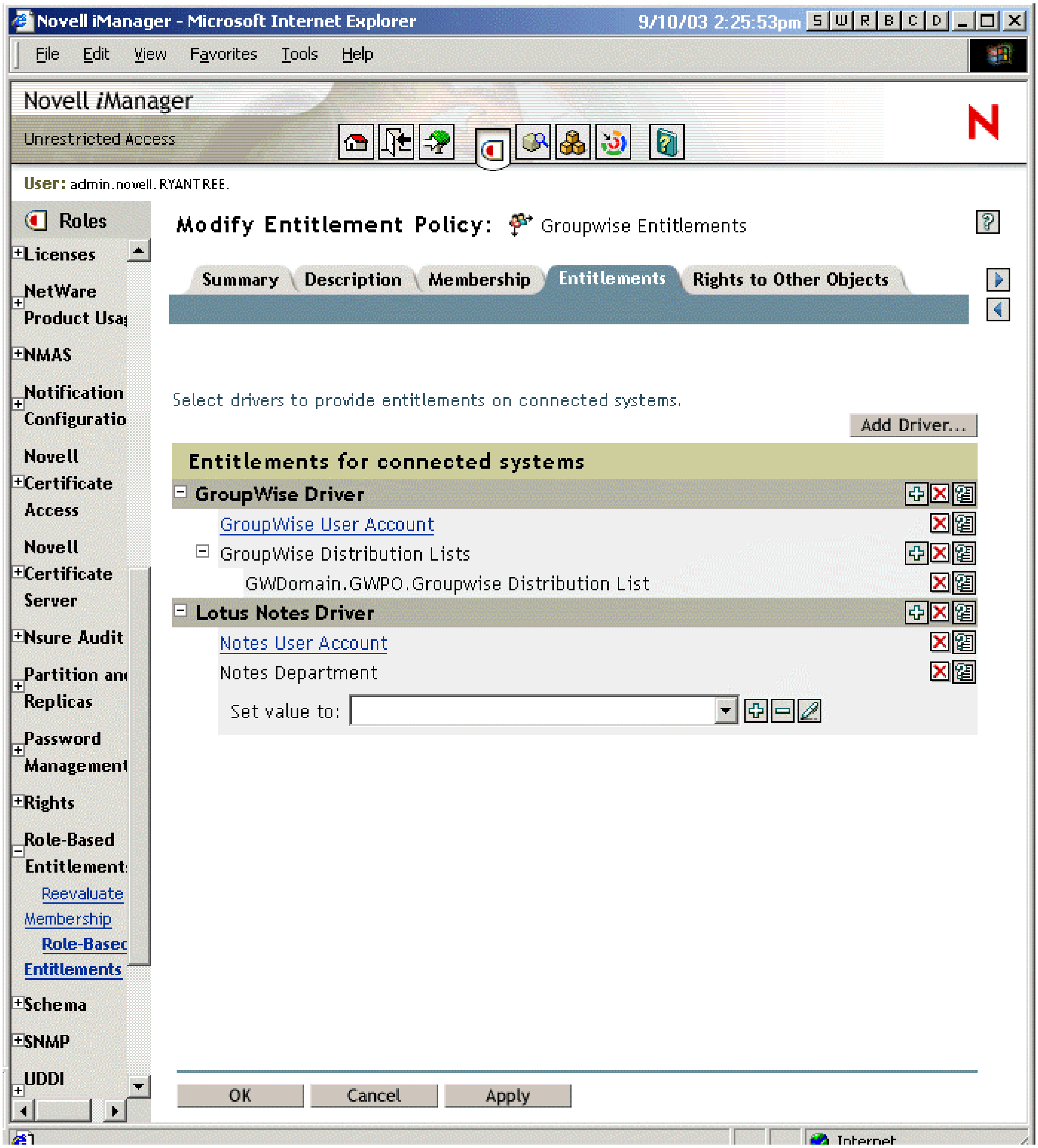
The drivers are configured to return the complete list, so you can choose from the lists that exist on the connected system.

NOTE: A driver could be customized to limit the list to group names you type in, rather than a query that returns the complete list.

Attribute Values on Connected Systems

You can assign attribute values for user accounts on connected systems. The interface provided lets you type in the value you want the user accounts to have.

The following figure shows an example of adding an attribute value for a Notes attribute, Department.



User: admin.novell.RYANTREE.

Modify Entitlement Policy: Groupwise Entitlements

Select drivers to provide entitlements on connected systems.

Entitlements for connected systems

- GroupWise Driver
  - GroupWise User Account
  - GroupWise Distribution Lists
    - GWDomain.GWPO.Groupwise Distribution List
- Lotus Notes Driver
  - Notes User Account
  - Notes Department
    - Set value to:

Keeping Accounts Safe

Role-Based Entitlements is designed to allow you to make sweeping changes to entitlements such as accounts, based on membership in the policy. This means, however, that mistakes made in changing policies could be a concern. The driver configurations that ship with Identity Manager use the most benign settings. You should understand which settings help to avoid loss of data.

The two kinds of settings that make the most difference are interpretive variables and conflict resolution. For more information, see "Controlling the Meaning of Adding or Removing Entitlements" on page 242 and "Conflict Resolution between Entitlement Policies" on page 243.

For example, we recommend that you never use delete as the value for the interpretive variable for removing an account. Role-Based Entitlements allows you to make major changes in your production environment without going through a test cycle, and it's possible you could make a mistake that would remove an account entitlement from someone without meaning to.

An administrator could safeguard data by making sure the interpretive variable for revoking accounts is set to disable instead of delete.

As another measure to protect your data when you edit or create a new entitlement policy, the driver is turned off so that changes are not made while your editing of policies is incomplete. You can then manually restart the driver when you are finished, using the Restart button in the Entitlement Policies interface. Similarly, if another user appears to be editing Entitlement Policies, and you try to restart the driver using the Restart button, you are prompted not to restart the driver until the other user is finished making changes.

Controlling the Meaning of Adding or Removing Entitlements

You can control the consequences of granting or revoking an entitlement. Each driver provides a list of supported choices that control the meaning of "add" or "remove."

For example, when adding a GroupWise account, you could specify that add actually means to grant the user an account in a disabled state, so that the administrator must intervene before the user can access the account. Or, you could choose to enable the account, which is the default.

By default, the driver configurations use the option that is most likely to preserve data. For example, the default meaning of remove for a GroupWise account is set to "disable," to avoid unintentionally losing accounts if a mistake is made when the administrator is making changes to policies. As another example, the DirXML driver configurations don't remove entitlements that have values from a user account in another system. If a user is granted membership in an e-mail distribution list, and if later the user no longer meets the criteria for the Entitlement Policy, he or she is simply dropped from the policy membership. Accounts are disabled, but group membership and attribute values are not removed. An Identity Manager expert could customize the driver configurations if you wanted a different result.

The interpretation of removing an entitlement is especially important because Role-Based Entitlements functionality gives you the ability to make sweeping changes in an organization's entitlements in a production environment, without testing the results in a lab.

You can change the settings for interpreting add or remove by clicking the account entitlement on the Entitlements page in Entitlement Policy. The page that appears lets you edit the global configuration values, which are part of the driver parameters. Keep in mind that although you can edit the interpretation settings on the Entitlement page for an individual Entitlement Policy, the change affects all Entitlement Policies that grant that particular entitlement from that particular DirXML driver and connected system, not just the Entitlement Policy you were editing when you made the change. The settings are per entitlement and driver, not per Entitlement Policy.

See also "Conflict Resolution between Entitlement Policies" on page 243.

In the Identity Manager 2 driver configurations, interpretive variables are used only on account entitlements. However, you could configure the driver to have interpretive variables for other types of entitlements.

NOTE: The actions that a driver supports are declared in the driver manifest. The manifest is created by the driver developer to represent the capability of the driver configuration. These options should not be edited by a network administrator. Changing the driver manifest alone does not cause the driver to support a new interpretation; the driver or connected system needs to be enhanced as well.

Conflict Resolution between Entitlement Policies

In this section:

- "Overview" on page 243
- "Changing the Conflict Resolution Method for an Individual Entitlement" on page 244
- "Prioritizing Entitlement Policies" on page 245

Overview

When you are creating Entitlement Policies, it's possible that the policies that affect a particular user might conflict in assigning entitlements to that user.

Here's how those conflicts are resolved. For some entitlements, you can change the conflict resolution.

- **Entitlements that don't have values are additive.** In most cases an account is an entitlement that doesn't have values. If a user is granted an account on a connected system by any Entitlement Policy, the user receives an account on that system. It does not matter whether another Entitlement Policy conflicts; the result is additive.

  This is always true; the method of conflict resolution for granting accounts cannot be changed.

  One metaphor for entitlements that don't have values is a light switch; it's either "on" or "off;" granted or not granted.

  For example, if the Manager Entitlement Policy grants Jean Chandler an Exchange account, but Jean Chandler is excluded from the Mail Room Employees Entitlement Policy that also grants Exchange accounts, Jean still gets an Exchange account.

- **Entitlements that have values are additive by default, but you can choose to resolve by priority.** These are entitlements such as group membership with a list of group names for the values, or an attribute with a value. By default, these kinds of entitlements are also additive.

  You can change the conflict resolution for these kinds of entitlements, if desired.

  The setting that governs conflict resolution for each entitlement type is in the driver manifest for a driver. Each kind of entitlement that a driver offers is listed separately in the manifest. Entitlements that have values have a conflict-resolution attribute, which is set for each entitlement independently. The default setting is `conflict-resolution="union"`. The other possible value is `conflict-resolution="priority"`.

  - **conflict-resolution="union"** — A value of "union" means the entitlements are additive. A user is granted all the entitlements that he or she is assigned by membership in any policy. The differing entitlement values are simply added together and the user gets them all.

    For example, if Jameel is a member of the Trade Show Contractors Policy that grants membership in a GroupWise e-mail distribution list named Trade Show Mailing List, and he is excluded from membership in the Trade Show Managers Policy that also assigns the e-mail distribution list named Trade Show Mailing List, he will still receive membership in the e-mail distribution list.

    As another example, if Consuela is granted membership in the AD group named Mailroom Staff by the Mailroom Policy, and also granted membership in the AD group named Emergency Response by the Emergency Volunteers Policy, she is granted membership in both groups in AD.

With this setting, the order of an Entitlement Policy in the list of policies is not important for the entitlement.

- **conflict-resolution="priority" —** By contrast, a value of "priority" means that if the values in two different policies conflict, or if one policy includes the user and another excludes the user, the entitlements granted to the user are only those in the Entitlement Policy that is listed higher in the list of Entitlement Policies.

  The previous examples would have a different result with this setting.

  In the example above for Jameel, if the GroupWise e-mail distribution list entitlement had a value of "priority," and the Trade Show Managers Policy was higher in the list than the Trade Show Contractors Policy, Jameel would not be granted membership in the Trade Show Mailing List.

  In the example above for Consuela, if the AD NOS group membership entitlement had a value of "priority," and the Mailroom Policy was higher in the list than the Emergency Volunteers Policy, Consuela would be granted membership in only the Mailroom Staff group. She would not be granted membership in the Emergency Response group because the conflict resolution is by priority, not additive.

  This functionality would be useful if, for example, you configured your environment to use Role-Based Entitlements to place users in a hierarchical structure on another system. You would want the user to be placed in either one place or another, not two places at the same time.

  Keep in mind that the setting is independent for each entitlement offered by each driver.

  As a general rule, if you use the "priority" setting, you should place administrator or manager policies higher in the list than policies for end users or individual contributors. You should put groups with narrower membership higher than groups with broader membership.

Changing the Conflict Resolution Method for an Individual Entitlement

1. In iManager, click DirXML Management > Overview, then select a driver set.

   A page appears with a graphical representation of all the drivers in the driver set.

2. Stop the driver.

3. Click the driver icon for the driver that offers the entitlement you want to change.

   A page appears showing icons for the driver's policies and the driver.

4. Click the driver icon to open the driver parameters page.

5. Click Driver Manifest.

   The driver manifest is displayed in XML, but it is dimmed because it is not in editable mode.

6. Select the check box for Enable XML editing.

7. In the XML, find the definition of the entitlement you want to change.

   Here's an example of the line you should look for:

   ```
   <entitlement conflict-resolution="union" description="Grants membership
   to GroupWise Distribution lists" display-name="GroupWise Distribution
   Lists" name="gwDistLists">
   ```

8. Change the conflict-resolution value. The two possible values are the following:

```
conflict-resolution="union"
```

```
conflict-resolution="priority"
```

For information about these values, see "Conflict Resolution between Entitlement Policies" on page 243.

9 Restart the Entitlements Service driver.

Prioritizing Entitlement Policies

By default, the order of the list of Entitlement Policies does not matter. This is because the driver configurations shipped with Identity Manager 2 have `conflict-resolution="union"` as the method of conflict resolution for each entitlement.

If you change any of the entitlements to `conflict-resolution="priority,"` then the order of the list of Entitlement Policies matters, but only for those entitlements you changed. For information about these values, see "Conflict Resolution between Entitlement Policies" on page 243.

You change the order of the Entitlement Policies by using the arrow buttons next to the list of Entitlement Policies. The policy first in the list is the highest priority.

1 In iManager, click Role-Based Entitlements > Role-Based Entitlements.

2 Search for and select a driver set.

A page appears with a list of the Entitlement Policies.

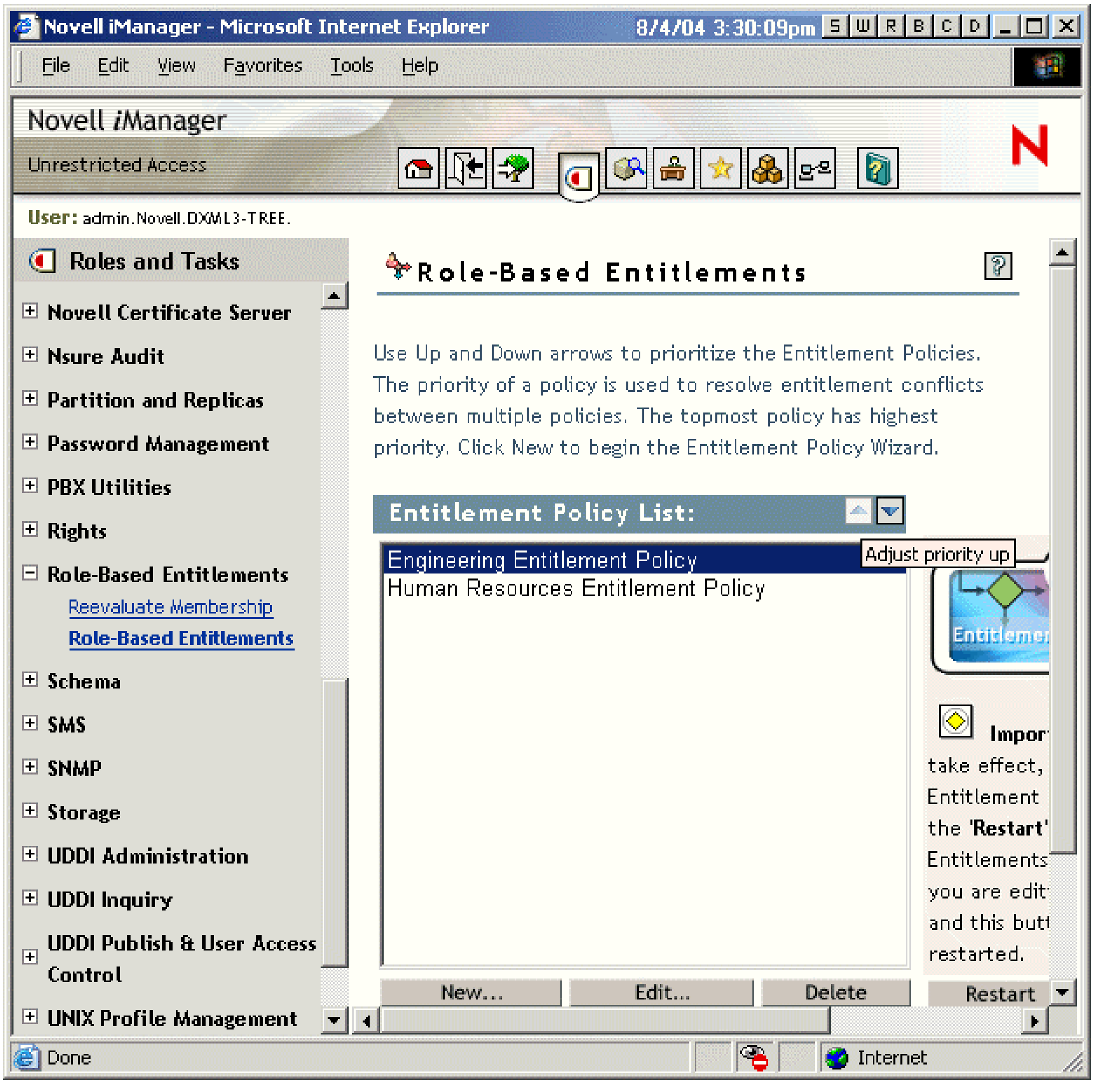
3 Change the priority of the Entitlement Policies by using the arrow buttons to move the policies up and down in the list.

Moving an Entitlement Policy higher in the list gives it a higher priority.

4 Click the Close button to restart the driver.

Changes in priority don't take effect until the driver is restarted.

See the figure below for an example of the policy list page showing the arrow buttons. With the mouse over the Up arrow, the text "Adjust priority up" is displayed.



Use Up and Down arrows to prioritize the Entitlement Policies. The priority of a policy is used to resolve entitlement conflicts between multiple policies. The topmost policy has highest priority. Click New to begin the Entitlement Policy Wizard.

Engineering Entitlement Policy
Human Resources Entitlement Policy

Impor
take effect,
Entitlement
the 'Restart'
Entitlements
you are edit
and this butt
restarted.

Password Synchronization and Role-Based Entitlements

Password Synchronization is managed the same way for drivers that are using Role-Based Entitlements as it is for other drivers, as described in Chapter 10, "Password Synchronization across Connected Systems," on page 149.

Troubleshooting Role-Based Entitlements

When troubleshooting, keep in mind these issues:

- When you make any changes to policies by clicking New, Edit, or Remove on the page where the policies are listed, the Entitlements Service Driver is stopped. The driver is not restarted unless you click the Close button on that page.

  This feature prevents the driver from granting or revoking entitlements in your production environment while your changes to policies are incomplete.

- Similarly, the Entitlements Service Driver won't start if more than one person appears to be editing Entitlement Policies at the same time.

- The Entitlements Service Driver won't start if the driver object is associated with more than one server. This configuration is not supported.
- The Entitlement Policy grants entitlements on connected systems through a DirXML driver, and the driver is identified by the GUID of the driver object in eDirectory, not the name of the object. This means that if you replace a driver object with another driver object of the same name, the Entitlement Policy won't work for entitlements on that driver because the object has a new GUID.
- Because one Entitlements Service Driver is used per driver set, an Entitlement Policy can manage only users that are in a read/write or master replica on the server that is associated with that driver set.

12 Managing Engine Services

Some drivers are used only for DirXML® Engine services, not for external connected systems.

In this section:

- "Entitlements Service Driver" on page 249
- "Loopback Service Driver: Facilitating Moving Objects Using the Move Proxy Service" on page 249
- "Manual Task Service Driver (Workflow Service Request Driver)" on page 252

Entitlements Service Driver

See Chapter 11, "Using Role-Based Entitlements," on page 229.

Loopback Service Driver: Facilitating Moving Objects Using the Move Proxy Service

DirXML drivers can synchronize objects that are replicated on the same server, in either a master or read/write replica. One of the things a driver can do is to move objects from one container to another. For example, you can set up a driver to place users in Novell® eDirectory™ based on the organization they are assigned to in a human resources application. When the organization for a user is changed in the human resources application, the driver can move the eDirectory user object to the corresponding container.

If you want a driver to be able to move objects from one container to another, you need to do one of the following:

- Place the driver on a server that holds master replicas of all the source or destination containers.
- Place the driver on a server with read/write replicas, and set up the Move Proxy service on the servers with the master replicas, to facilitate moving objects. Then configure the driver to delegate moves to the Move Proxy service.

The Move Proxy service is a particular configuration that you can run with the Loopback Service Driver shim. This section explains the Move Proxy service and how to set it up and configureother connected system drivers to take advantage of the service.

In this section:

- "Understanding the Move Proxy Service" on page 250
- "Setting Up the Move Proxy Service" on page 250
- "Configuring Other Drivers To Delegate Moves to the Move Proxy Service" on page 251

Understanding the Move Proxy Service

With Nsure™ Identity Manager and eDirectory, moving an object is best done on the master replica, especially if any other modifications are being made to the object at the same time.

If you want a driver to be able to move objects from one container to another, you need to do one of the following:

- Place the driver on a server that holds master replicas of all the source or destination containers.
- Place the driver on a server with read/write replicas, and set up the Move Proxy service on the servers with the master replicas, to facilitate moving objects. Then configure the driver to delegate moves to the Move Proxy service.

The Move Proxy service is a Driver object with a special configuration that you run on the server with the master replica. The purpose of the Move Proxy service is to move objects on behalf of DirXML drivers that are running on servers that hold read/write replicas. Delegation of the move allows object modifications that were performed by the delegating driver to replicate to the master server before the move is performed.

The following steps take place when a move is delegated from a driver to the Move Proxy service:

1. A driver delegates the move by setting a value for the moveProxyTrigger attribute of the object that needs to be moved. The driver sets the moveProxyTrigger attribute to the DN of the destination container to which the object should be moved.
2. The Move Proxy service monitors "add value" events for the moveProxyTrigger attribute, and converts the events into a custom commands that specify the source DN of the object to be moved and the DN of the destination container.

   The custom command is created by the Subscriber Event Transformation Rule of the Move Proxy service driver.
3. The Move Proxy service driver initiates the actual object move on its Publisher channel. Then the Move Proxy service driver removes the destination DN value from the object moveProxyTrigger attribute.

   If the move fails with a "retry" status (usually because a previous move of the same object has not yet completed), the status is returned to Identity Manager via the Subscriber channel. Identity Manager will resubmit the original event every 30 seconds or until the move succeeds or fails for other reasons.

Setting Up the Move Proxy Service

Set up the Move Proxy service on the server that holds the master replica. For an overview of when you might need this service, see "Understanding the Move Proxy Service" on page 250.

After completing this procedure, configure drivers that are running on other servers to delegate their moves to the Move Proxy driver, so the moves can be performed on the master replica.

1 Install Identity Manager on the server with the master replicas, if it is not already installed.

2 Confirm that the following files for the Move Proxy service have been installed with Identity Manager. If they have not been installed, obtain them from your product distribution or from Novell Support (http://support.novell.com/cgi-bin/search/searchtid.cgi?/2964749.htm).

- loopback.jar

This is the Loopback Driver shim file needed to run the Move Proxy service. This driver shim file should be placed in the /lib directory of the respective OS.

- moveproxy.xml

  This is the driver configuration file. If it is not placed in the default location where the other driver configuration files are located, you need to browse to it when you are creating the Driver object in Step 4.

- moveproxy.xlf

  This file creates the prompts you see when importing the driver configuration moveproxy.xml.

- mvproxy_client_publisher_command_transformation.xsl

  This file provides the Command Transformation style sheet that you add to each driver that delegates moves to the Move Proxy service, as explained in "Configuring Other Drivers To Delegate Moves to the Move Proxy Service" on page 251.

3. Confirm that your eDirectory schema includes the attribute named DirXML-moveProxyTrigger. If it does not, extend the eDirectory schema using the mvproxy.sch file and the appropriate utility depending on your platform (nwconfig on NetWare, install.dlm on Win32, and ndssch on UNIX).

   Obtain the mvproxy.sch file from Novell Support (http://support.novell.com/cgi-bin/search/searchtid.cgi?/2964749.htm).

   NOTE: If the schema already includes the DirXML-moveProxyTrigger attribute, your product distribution should also contain the files listed in Step 2. If your schema does not include the attribute, and you obtain the mvproxy.sch schema extension file and the other files listed in Step 2 from Novell Support, keep in mind that the files from Novell Support use an attribute named moveProxyTrigger instead of DirXML-moveProxyTrigger. The setup is the same but the attribute name is slightly different.

4. Create a new DirXML Driver object for the server holding the master replica, importing moveproxy.xml to create the driver configuration.

   The DirXML Engine runs this Driver object using the Loopback Driver shim.

5. For the new Driver object you just created, edit the Subscriber and Publisher filters to include the object classes for which you want moves to be proxied. Then add the DirXML-moveProxyTrigger (or moveProxyTrigger) attribute to the filter for each of those classes.

   Do not add any other attributes for the classes in the filters.

6. Set the desired Driver Startup Option for the Driver object, and start the driver.

   After the driver has been configured and is operating correctly, Automatic is the preferred Driver Startup Option.

7. Make sure the drivers on other servers are set up to take advantage of the Move Proxy service, by setting them up as clients of the Move Proxy service, as explained in "Configuring Other Drivers To Delegate Moves to the Move Proxy Service" on page 251.

Configuring Other Drivers To Delegate Moves to the Move Proxy Service

For an overview of when you might need this service, see "Understanding the Move Proxy Service" on page 250.

1. Make sure you have completed "Setting Up the Move Proxy Service" on page 250.
2. Create a DirXML-Stylesheet object in the driver's DirXML-Publisher object.

3. Confirm that the file named mvproxy_client_publisher_command_transformation.xsl has been installed with Identity Manager.

   This style sheet is one of the Move Proxy files that you checked for in Step 2 on page 250. If it has not been installed, obtain it from your product distribution or from Novell Support (http://support.novell.com/cgi-bin/search/searchtid.cgi?/2964749.htm).

4. In the new Stylesheet object you just created, go to the Edit XML property page and paste in the contents of the file named mvproxy_client_publisher_command_transformation.xsl.

5. Make the style sheet part of the Command Transformation Rule by doing one of the following:

   - If the DirXML-Publisher object does not have a Command Transformation Rule, make the new style sheet the Command Transformation Rule.

   - If the DirXML-Publisher object already has a Command Transformation Rule, use rule chaining and set the next transformation of the existing Command Transformation Rule to be the new style sheet.

6. If any style sheets used in either the Subscriber or Publisher channel are generating and sending moves to eDirectory via the srcCommandProcessor or destCommandProcessor, modify those style sheets to send a modify event similar to the one generated by the new Command Transformation Rule you created in Step 5.

Manual Task Service Driver (Workflow Service Request Driver)

To better represent the use of the driver, the name is changed in Identity Manager from Workflow Request Service Driver to Manual Task Service Driver.

The Manual Task Service Driver is designed to notify one or more users that a data event has occurred and whether any action is required on the users' part. In an employee provisioning scenario, the data event might be the creation of a new User object and the user action might include assigning an office number by entering data into Novell eDirectory or by entering data in an application. Other scenarios include notifying an administrator that a new user object has been created, notifying an administrator that a user has changed data on an object, etc.

Configuring the Manual Task Service Driver usually consists of configuring two separate but related subsystems: the Subscriber channel rules and e-mail templates, and the Publisher channel Web server templates and rules.

In addition, driver parameters such as SMTP server name, Web server port number, etc., must be configured.

For more information, see the *Manual Task Service Driver Implementation Guide* (http://www.novell.com/documentation/lg/dirxmldrivers/index.html).

13 High Availability

You can use Identity Manager with shared storage to provide high availability. Some steps are required to use Novell® eDirectory™ and Identity Manager in a clustering environment.

In this section:

- "Configuring eDirectory and Identity Manager for Use with Shared Storage on Linux and UNIX" on page 253
- "Case Study for SuSE Linux" on page 257

Configuring eDirectory and Identity Manager for Use with Shared Storage on Linux and UNIX

This section provides steps for configuring eDirectory and Identity Manager for failover in a high availability cluster using shared storage. The information in this section is generalized for shared storage high availability clusters on any Linux or UNIX platform; the information is not specific to a particular cluster manager.

The basic concept to understand is that state data for eDirectory and Identity Manager must be located on the shared storage so that it is available to the cluster node that is currently running the services. In practice, this means the eDirectory datastore, typically located in /var/nds/dib, must be relocated to the cluster shared storage. The Identity Manager state data is also located in /var/nds/dib. Each eDirectory instance on the cluster nodes must be configured to use the datastore on the shared storage. Other eDirectory configuration data must also reside on shared storage.

In addition to the eDirectory datastore, it is also necessary to share NICI (Novell International Cryptographic Infrastructure) data so that server-specific keys are replicated among the cluster nodes. Rather than move the NICI data to shared storage, it is generally better to copy the NICI data to local storage on each cluster node. This is preferable so that client NICI functionality is available on a cluster node even when the cluster node is in a secondary state and is not hosting the shared storage.

Sharing eDirectory and NICI data is discussed in the following sections, and is based on these assumptions:

- You are using the default install locations for NICI, eDirectory, and Identity Manager data and configuration.

  Identity Manager data is not discussed separately from eDirectory data because the Identity Manager data of interest is located with the eDirectory data
- You are familiar with eDirectory and Identity Manager installation procedures.
- You are using a two-node cluster.

  A two-node cluster is by far the most common configuration used for high-availability. However, the concepts in this section can easily be extended to an *n*-node cluster.

In this section:

- "Installing eDirectory" on page 254
- "Installing Identity Manager" on page 254
- "Sharing NICI Data" on page 254
- "Sharing eDirectory and Identity Manager Data" on page 255
- "DirXML Driver Considerations" on page 256

Installing eDirectory

NOTE: NICI is installed as part of the eDirectory install process.

1. Install eDirectory on the primary cluster node.
2. Configure eDirectory on the primary cluster node. Either create a new tree on the primary cluster node or install the server into an existing tree. For the eDirectory server name, use something other than the name of the UNIX server. Use a name that is common to the cluster, rather than specific to one of the cluster nodes.
3. Install the same version of eDirectory on the secondary cluster node. Do not configure eDirectory on the secondary cluster node.

   The secondary node does not have a separate tree.

Installing Identity Manager

1. Install Identity Manager 2.0.1 (DR1) or later on the primary cluster node using the "DirXML Server" option.

   The installation process installs the DirXML files and configures the eDirectory tree for use with Identity Manager.
2. Install the same version of Identity Manager on the secondary cluster node using the secondary cluster switch, by entering

   ```
   dirxml_platform.bin -DCLUSTER_INSTALL="true"
   ```

   During the install, choose the "DirXML Server" option.

   Using the secondary cluster switch installs the DirXML files but does not attempt to perform any additional eDirectory configuration. No configuration is necessary, because the secondary node does not have a separate tree.

Sharing NICI Data

NICI provides cryptographic services used by eDirectory, Identity Manager, and Novell client applications. When used with eDirectory, NICI provides server-specific keys. These server-specific keys must be the same on all cluster nodes where eDirectory runs as a cluster service.

There are two possible ways of sharing the NICI data:

- Placing the NICI data on the cluster shared storage.

  The disadvantage of this method is that applications that depend on NICI will fail on a cluster node when the cluster node is not hosting the shared storage.
- Copying the NICI data from the primary server to the secondary server's local storage.

To copy the NICI data:

1. Rename /var/novell/nici on the secondary cluster node to something else (such as /var/novell/nici.sav).
2. Copy the /var/novell/nici directory from the primary cluster node to the secondary cluster node.

   This can be done using scp or by creating a tar file of the /var/novell/nici directory on the primary node, transferring it to the secondary node, and untarring the directory on the secondary node.

Sharing eDirectory and Identity Manager Data

By default, eDirectory stores its datastore in /var/nds/dib. Other items of configuration and state are also stored in /var/nds and its subdirectories. The default configuration directory for eDirectory is /etc. The following steps are necessary to configure eDirectory and Identity Manager for use with the shared storage in a high availability cluster. These steps assume that the shared storage is mounted at /shared.

- "On the Primary Node" on page 255
- "On the Secondary Node" on page 256

On the Primary Node

1. Copy the /var/nds directory subtree to /shared/var/nds.
2. Rename the /var/nds directory (for example, to /var/nds.sav).

   This is not required, but creating a backup at this stage gives you the ability to start over, if necessary, without reinstalling eDirectory.
3. Create a symbolic link from /var/nds to /shared/var/nds (for example, `ln -s /shared/var/nds /var/nds`).
4. Create the following symbolic links:

Link from	Link to
/shared/var/nds/class16.conf	/etc/class16.conf
/shared/var/nds/class32.conf	/etc/class32.conf
/shared/var/nds/help.conf	/etc/help.conf
/shared/var/nds/ndsimonhealth.conf	/etc/ndsimonhealth.conf
/shared/var/nds/miscicon.conf	/etc/miscicon.conf
/shared/var/nds/ndsimon.conf	/etc/ndsimon.conf
/shared/var/nds/macaddr	/etc/macaddr

5. Make a backup copy of /etc/nds.conf.
6. Move /etc/nds.conf to /shared/var/nds.
7. Edit /shared/var/nds/nds.conf and place the following entries into the file (overwriting any current entries with the same names):

- n4u.nds.dibdir=/shared/var/nds/dib
- n4u.server.configdir=/shared/var/nds
- n4u.server.vardir=/shared/var/nds
- n4u.nds.preferred-server=localhost

For the following entries, replace eth0:0 with the interface name of the cluster-shared ethernet interface. Also replace lo with the interface name of the localhost ethernet interface.

- n4u.nds.server.interfaces=eth0:0@524,lo@524
- http.server.interfaces=eth0:0@8008,lo@8008
- https.server.interfaces=eth0:0@8009,lo@8009

8. Create a symbolic link from /etc/nds.conf to /shared/var/nds/nds.conf.
9. Start ndsd and verify that ndsd runs with the shared storage.
10. Stop ndsd.
11. Place ndsd in the cluster manager's list of resources to be hosted.
12. Remove ndsd from the list of daemons to be started by the init process at boot time.

On the Secondary Node

1. Rename the /var/nds directory (e.g., to /var/nds.sav). This is not strictly necessary, but backups provide a way of starting over at a point beyond the installation of eDirectory.
2. Create a symbolic link from /var/nds to /shared/var/nds
3. Make a backup copy of /etc/nds.conf.
4. Remove /etc/nds.conf.
5. Create a symbolic link from /etc/nds.conf to /shared/var/nds/nds.conf.
6. Place ndsd in the cluster manager's list of resources to be hosted.
7. Remove ndsd from the list of daemons to be started by the init process at boot time.

After the steps for the primary and secondary nodes are completed, start the cluster services. eDirectory and Identity Manager will start on the primary node.

DirXML Driver Considerations

Most DirXML drivers can run in a clustered configuration. However, the following items need to be considered:

- The driver executables (.jar files and/or shared objects) must be installed on each cluster node.
- If the driver must run on the same server as the application that the driver supports, then the application must also be configured to run as part of the cluster services.
- If the driver has a configurable location for driver-specific state data, then the location must be on the cluster shared storage.

  An example of this is the LDAP driver when used without a change log, or the JDBC driver when used in triggerless mode.
- If the driver has configuration data stored outside of eDirectory, then the configuration data must be on the shared storage or must be duplicated on each cluster node. An example of this is the Manual Task Driver's template directories.

Case Study for SuSE Linux

For a description of running Identity Manager on shared storage with SuSE LINUX Enterprise Server 8, see TID10093317 (http://support.novell.com/cgi-bin/search/searchtid.cgi?/10093317.htm).

14 Logging and Reporting Using Nsure Audit

Nsure™ Identity Manager is instrumented to use Novell® Nsure Audit for auditing and reporting.

Nsure Audit is a collection of technologies providing monitoring, logging, reporting and notification capabilities. Through integration with Nsure Audit, Identity Manager provides detailed information about the current and historical status of driver and engine activity. This information is provided by a set of preconfigured reports, standard notification services, and user-defined data logging.

You can monitor real-time Identity Manager events, send e-mail notifications for any Identity Manager event, and generate reports of Identity Manager activity using Nsure Audit.

The types of messages sent to Nsure Audit are controlled using plug-ins similar to those provided with the Reporting and Notification Service (RNS). Additional levels are added to these plug-ins, to select the type of operations or debug information you would like to track, such as status, add entry, search, and so on.

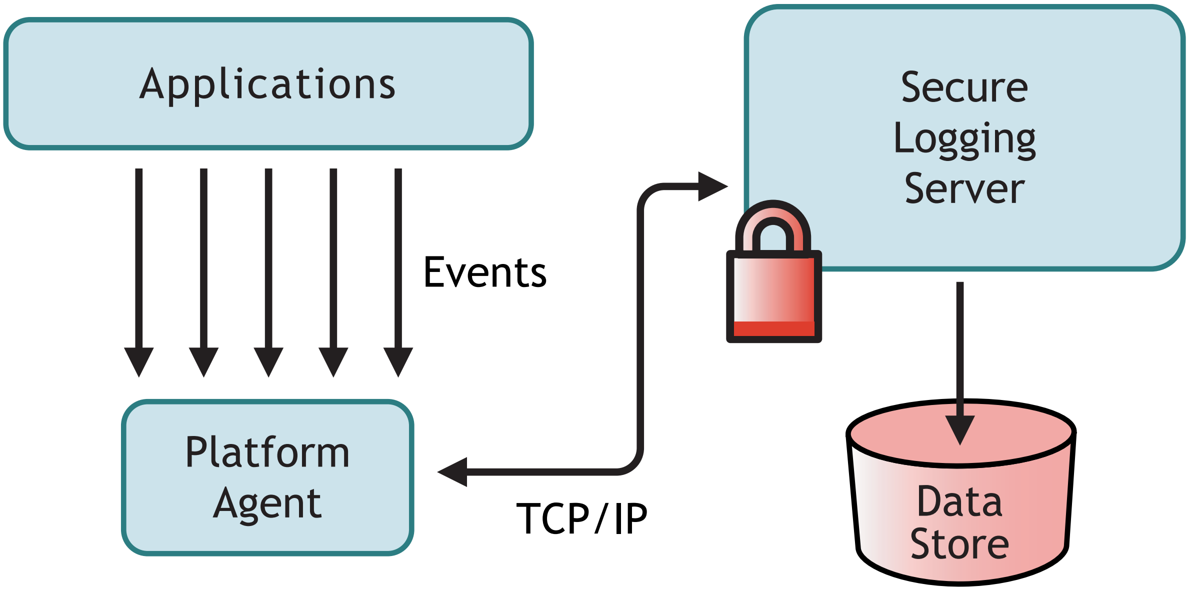
Reporting and Notification Service

Reporting and Notification Service (RNS) is deprecated, though the engine continues to process RNS functions if you are currently using RNS. You should plan to move to Nsure Audit, as Nsure Audit expands the functionality provided by RNS, and RNS might no longer be supported in a future release of Identity Manager. For RNS documentation, see the *DirXML 1.1a Administration Guide* (http://www.novell.com/documentation/lg/dirxml11a/dirxml/data/afae8bz.html).

Overview

Nsure Audit is a centralized, cross-platform logging service that can log data from mutiple applications to a centralized data store. After event data is logged, you can run detailed reports, custom queries, and trigger notifications based on the logged events.

The following figure illustrates the high-level architecture of Nsure Audit:



In this illustration, Identity Manager is one of the applications that uses the Platform Agent to report events to the Nsure Audit Secure Logging Server.

Setting Up Nsure Audit

As described in the Overview, Nsure Audit consists of two fundamental components:

- Platform Agent
- Secure Logging Server

The Platform Agent is the component that runs with Identity Manager to communicate events to the Secure Logging Server. It is installed with Identity Manager. The Secure Logging Server is the component that receives event data from Identity Manager and other applications, and is installed separately from Identity Manager as part of Nsure Audit 1.0.2.

Setting Up the Platform Agent

The platform agent is installed by selecting the Novell Nsure Audit System Components for DirXML option during install. The platform agent can be installed with Identity Manager, or it can be installed later.

NOTE: If you install the Platform Agent after the DirXML® engine has been started, Identity Manager must be restarted before the Platform Agent and Identity Manager are linked. Identity Manager attempts to connect to the Platform Agent only during startup.

After the platform agent is installed, complete the following steps to configure the Platform Agent:

1 Open the Nsure Audit configuration file, logevent.cfg, in a text editor. The default location for this file is:

Operating System	Path
NetWare®	sys:\etc\logevent.cfg
Windows	*windows_directory*\logevent.cfg

Operating System	Path
Linux\Solaris	/etc/logevent.conf

2 Change the value of the *LogHost* parameter to the IP address or DNS name of your Secure Loggging Server.

3 Restart Identity Manager.

Setting Up the Secure Logging Server

NOTE: The Nsure Audit Secure Logging Server is not included with DirXML. The Secure Logging Server is part of Nsure Audit 1.0.2. For information on downloading Nsure Audit 1.0.2, see the Nsure Audit Product Page (http://www.novell.com/products/nsureaudit).

The Secure Logging Server runs on NetWare® 5.1 or later, Windows* NT 4.0, Windows 2000 Server, Windows 2003 Server, Solaris* 8 or 9, and several versions of Linux*, including SUSE Enterprise Linux Server 8.

The Secure Logging Server can log events to MySQL*, Oracle*, Microsoft* SQL Server, Java* Applications, and several other locations, including a flat file. Nsure Audit includes a custom application designed to query databases for event data, called Nsure Audit Report. A datastore that has an ODBC connector is required to use this advanced reporting tool.

A Quick Start Guide containing Secure Logging Server setup instructions is available for each platform, and is included with the Nsure Audit 1.0.2 installation. The Quick Start guides are also viewable on the Web along with the *Nsure Audit 1.0.2 Administration Guide* on the Novell Nsure Audit Documentation Web site (http://www.novell.com/documentation/lg/nsureaudit).

Logging Configuration

Identity Manager enables you to configure the events that are logged using several predefined levels, or by individually selecting each event you want to log. Changes to the configuration settings are also logged.

User-defined events, discussed in "User-Defined Events" on page 265, are logged any time logging is enabled, and are never filtered by the DirXML engine.

Logging is configured on a driver set or on an individual driver. Drivers can inherit logging configuration from the driver set. For information on the eDirectory attributes containing log information, see "eDirectory Objects" on page 266.

By default, only critical and user-defined events are logged.

Selecting Events to Log

On the Driver Set:

1 In iManager, open the DirXML Driver Management role, then select the Overview task.

2 Click the Driver Set name link. The Modify Object window appears.

3 Click the log Level link on the DirXML tab. The following logging options are available:

Option	Description
Log Errors	This is the default log level. This option logs all events with an error status, and also user-defined events. With this option selected, you receive only events with a decimal ID of 196646, with an error message stored in the first text field.
Log Errors and Warnings	This option logs all events with an error or warning status, and also user-defined events. With this option selected, you receive only events with a decimal ID of 196646 and 196647, with an error or warning message stored in the first text field.
Log Specific Events	This option enables you to select specific events to log from a list. Click the icon to select events. User-defined events are always logged. To log any event other than an error or warning, you must select it from this list. If you select this option, you must select errors and warnings if you want to continue to log them. For a list of all available events, see "DirXML Events" on page 263.
Only Update the Last Log Time	Only user-defined events are logged. 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.
Logging Off	Only user-defined events are logged.
Maximum Number of Entries in the Log	This setting allows you to specify the maximum number of entries to log in the status logs. See "Viewing Status Logs" on page 269 for details.

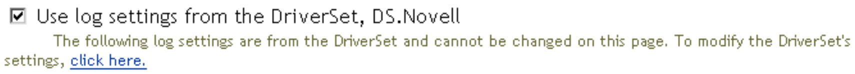
4 After you have selected the events you want to log, click OK.

On the Driver:

1 In iManager, open the DirXML Driver Management role, then select the Overview Task.

2 Click the driver status icon, then select Edit properties.

3 Click the Log Level link on the DirXML tab. By default, the driver is configured to inherit log settings from the driver set. To select logged events for this driver only, deselect the following:



☑ Use log settings from the DriverSet, DS.Novell

The following log settings are from the DriverSet and cannot be changed on this page. To modify the DriverSet's settings, click here.

4 The following logging options are available:

Option	Description
Log Errors	This is the default log level. This option logs all events with an error status, and also user-defined events. With this option selected, you receive only events with a decimal ID of 196646, with an error message stored in the first text field.

Option	Description
Log Errors and Warnings	This option logs all events with an error or warning status, and also user-defined events. With this option selected, you receive only events with a decimal ID of 196646 and 196647, with an error or warning message stored in the first text field.
Log Specific Events	This option enables you to select specific events to log from a list. Click the ⚠ icon to select events. User-defined events are always logged. To log any event other than an error or warning, you must select it from this list. If you select this option, you must select errors and warnings if you want to continue to log them. For a list of all available events, see “DirXML Events” on page 263.
Only Update the Last Log Time	Only user-defined events are logged. 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.
Logging Off	Only user-defined events are logged.
Maximum Number of Entries in the Log	This setting allows you to specify the maximum number of entries to log in the status logs. See “Viewing Status Logs” on page 269 for details.

5 After you have selected the events you want to log, click OK.

DirXML Events

A listing of all events logged by DirXML is contained in a separate HTML file, DirXML Events (dirxml_events.html).

Driver Start and Stop Events

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

Event	Log Level	Information
EV_LOG_DRIVER_START	LOG_INFO	To log driver starts, you must use the Log Specific Events option and select this event.
EV_LOG_DRIVER_STOP	LOG_WARNING	To log driver stops, select Log Errors and Warnings, or use the Log Specific Events option and select this event.

For details on creating Nsure Audit notifications based on these events, see “Sending Notifications Based on Events” on page 267.

Error and Warning Events

Identity Manager generates an event whenever an error or warning is encountered. The following table contains details on these events:

Event	Log Level	Information
DirXML_Error	LOG_ERROR	All DirXML errors log this event. The actual error code encountered is stored in the event. To log errors, select Log Errors, Log Errors and Warnings, or use the Log Specific Events option and select this event.
DirXML_Warning	LOG_WARNING	All DirXML warnings log this event. The actual warning code encountered is stored in the event. To log driver stops, select Log Errors and Warnings, or use the Log Specific Events option and select this event.

For details on creating Nsure Audit notifications based on these events, see "Sending Notifications Based on Events" on page 267.

Remote Loader Events

The following events are logged from the remote loader:

Event	Log Level	Information
Remote Loader Start	LOG_INFO	All DirXML errors log this event. The actual error code encountered is stored in the event. To log errors, select Log Errors, Log Errors and Warnings, or use the Log Specific Events option and select this event.
Remote Loader Stop	LOG_INFO	All DirXML warnings log this event. The actual warning code encountered is stored in the event. To log driver stops, select Log Errors and Warnings, or use the Log Specific Events option and select this event.
Remote Loader Connection Established	LOG_INFO	All DirXML warnings log this event. The actual warning code encountered is stored in the event. To log driver stops, select Log Errors and Warnings, or use the Log Specific Events option and select this event.
Remote Loader Connection Dropped	LOG_INFO	All DirXML warnings log this event. The actual warning code encountered is stored in the event. To log driver stops, select Log Errors and Warnings, or use the Log Specific Events option and select this event.

For details on creating Nsure Audit notifications based on these events, see "Sending Notifications Based on Events" on page 267.

User-Defined Events

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

Event IDs

Event IDs between 1000 and 1999 are alloted for user-defined events. You must specify a value within this range for the event ID when defining your own events. In Nsure Audit, this ID is combined with the DirXML application ID of 003.

Log Levels

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 DirXML engine or driver to shut down.
log-alert	Events that require immediate attention.
log-critical	Events that can cause parts of the DirXML engine or driver to malfunction.
log-error	Events describing errors that can be handled by the DirXML 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 engineers to debug operation of the DirXML engine or driver.

Generating Events Using Policy Builder

In Policy Builder, events are logged by selecting the Generate Event action.

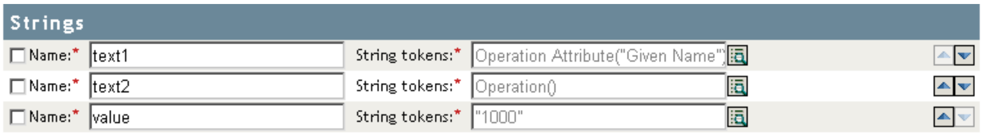
1 Select the condition to be met before the event is generated, then select the Generate Event action.

2 Specify an event ID.

3 Select a log level.

4 Click the ▤ icon next to the Enter Strings field to launch the Named String Builder.

5 Use the Named String Builder to construct named strings corresponding to the custom data fields:



Strings

□ Name:* text1 String tokens:* Operation Attribute("Given Name")

□ Name:* text2 String tokens:* Operation()

□ Name:* value String tokens:* "1000"

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

Generating Events Using Status Documents

Status documents generated through style sheets using the <xsl:message> element are sent to Nsure Audit with an event ID corresponding to the level attribute of the status document as specified in the following table:

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 Nsure Audit 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 Nsure Audit 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" value="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>
```

eDirectory Objects

This section provides details on the Novell eDirectory™ attributes that store log data. You do not need to modify these attributes directly, because these objects are automatically configured based on your selections in iManager.

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 multivalued integer with each value identifying an event ID to be logged.

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

Previous versions of Identity Manager used the DirXML-DriverTraceLevel attribute to set up logging levels. The logging level was specified on each Driver object, and did not support inheritance. For Identity Manager 2, Driver objects can inherit this information from the Driver Set object.

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 object.

Querying and Reporting

Nsure Audit provides two tools to query for events in the Nsure Audit database: The Nsure Audit iManager plug-in, and Nsure Audit Report (LReport).

The Nsure Audit iManager plug-in is a Web-based, JDBC database querying application that enables you to quickly create and store queries using drop-down lists and macros.

Nsure Audit Report is a Windows-based, ODBC-compliant application that can use SQL query statements or Crystal Decisions Reports to query Oracle and MySQL data stores (or any other database that has ODBC driver support).

Follow the instructions in the *Nsure Audit 1.0.2 Administration Guide* to access the Nsure Audit iManager plug-in, or to set up Nsure Audit Report. This guide is available on the Novell Nsure Audit Documentation Web site (http://www.novell.com/documentation/lg/nsureaudit)

Identity Manager Reports

Identity Manager provides a number of Crystal Decisions Reports (*.rpt) that simplify gathering information on common operations performed in Identity Manager. These reports are included on the Identity Manager installation CD.

After you have configured Nsure Audit Report, these reports, along with any custom queries and reports you have defined, can be executed. See Working with Reports in Nsure Audit Report (http://www.novell.com/documentation/nsureaudit/nsureaudit/data/alsn2fj.html) in the *Nsure Audit 1.0.2 Administration Guide* for information on using these reports in Nsure Audit Report.

Viewing Identity Manager Events

1. In the Nsure Audit Report Workspace, click the Events tab, then expand the DirXML folder. This list contains all predefined DirXML events. Double-click any event in the list to view event properties.
2. To query for a DirXML event, right-click the event in the Workspace, then select Define Query.
3. When the Query Expert appears, specify a time frame and verify the event.
4. To run this query, select the Query tab in the Workspace, right-click the query name, then select Run.

Queries can also be created using SQL statements. All DirXML events have a decimal Event ID between 109608 and 262144.

Sending Notifications Based on Events

Nsure Audit provides the ability to send a notification when a specific event occurs, or does not occur. Notifications can be sent based on one or more events and any values contained within these events. Notifications can be sent to any logging channel, enabling you to log notifications to a database, a Java application or SNMP management system, or several other locations.

For information on creating notifications, see "Configuring Filters and Event Notifications" in the *Nsure Audit 1.0.2 Administration Guide* (http://www.novell.com/documentation/lg/nsureaudit/nsureaudit/data/al0lg08.html#al0lg08)

Using Status Logs

In addition to the functionality provided by Nsure Audit, Identity Manager logs a specified number of events on the Driver Set object and Driver object. 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 Nsure Audit or the Report and Notification Service.

Setting the Maximum Log Size

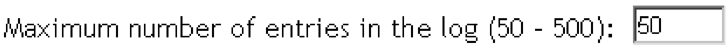
Status logs can be configured to hold between 50 and 500 events. This setting can be configured on the Driver Set object to be inherited by all drivers in the set, or configured for each driver in the set. The maximum log size operates independently of the events you have selected to log, so you can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

Setting the Log Size on the Driver Set:

1 in iManager, open the DirXML Driver Management role, then select the Overview Task.

2 Click the Driver Set name link. The Modify Object window appears.

3 Click the Log Level link on the DirXML tab. Specify the maximum log size in the Maximum number of entries in the log field:



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

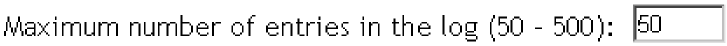
4 After you have specified the maximum number, click OK.

Setting the Log Size on the Driver:

1 In iManager, open the DirXML Driver Management Role and select the Overview task.

2 Click the driver status icon, then select Edit properties.

3 Click the Log Level link on the DirXML tab. Specify the maximum log size in the Maximum number of entries in the log field:



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

4 After you have specified the maximum number, click OK.

Viewing Status Logs

Status log entries are represented in iManager with a status log icon 🗒. Anywhere you see this icon in iManager, you can view a short-term log. The following status logs are available:

- On the driver set.
- On the Publisher Channel for each driver in the set.
- On the Subscriber Channel for each driver in the set.

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

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.

A Activating Novell Identity Manager Products

The following information explains how activation works for products based on Novell® Nsure™ Identity Manager. The Identity Manager Professional or Server edition and driver groups must be activated within 90 days of installation, otherwise they will shut down. At any time during the 90 days, or afterward, you can choose to activate Identity Manager products.

NOTE: Activating a driver does not change your current configuration or install a newer version of the driver shim. It simply changes the driver to an activated state.

You can activate Identity Manager and driver groups by using one of two methods. The first method involves the following tasks:

- Purchasing an Identity Manager Product License
- Activating Identity Manager Products Using a Generic Credential
- Installing a Product Activation Credential

The second method involves the following tasks:

- Purchasing an Identity Manager Product License
- Generating a Product Activation Request
- Submitting a Product Activation Request
- Installing a Product Activation Credential

This section also contains the following topic:

- "Viewing Product Activations for Identity Manager and DirXML Drivers" on page 277

Purchasing an Identity Manager Product License

To purchase an Identity Manager product license, see the Novell Nsure Identity Manager How to Buy Web page (http://www.novell.com/products/nsureidentitymanager/howtobuy.html)

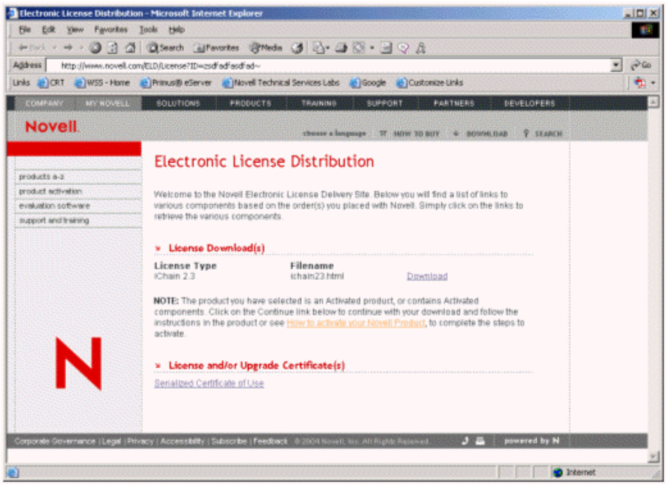
After you purchase a product license, Novell sends you a Customer ID via e-mail. The e-mail also contains a URL to the Novell site where you can obtain a generic credential. If you do not remember or do not receive your Customer ID, please call the Novell Activation Center at 1-800-418-8373 in the U.S. In all other locations, call 1-801-861-8373. (You will be charged for calls made using the 801 area code.)

Activating Identity Manager Products Using a Generic Credential

1 After purchasing a license, you will receive an e-mail from Novell with your Customer ID. The e-mail also contains a link under the Order Detail section to the site where you can obtain your generic credential. Click the link to go to the site.

IMPORTANT: Only three differing e-mail addresses can be used to access the link where you can obtain the generic credential. If you try to access the link with more than three e-mail addresses, it is considered as a security risk and you are denied access. Additionally, only the e-mail address designated as the owner/contract for the Customer ID receives the e-mail containing the Order Detail section with the information on obtaining the generic license. If your response e-mail does not contain the Order Detail section, you need to contact the Customer ID person within your organization to obtain the generic credential.

After clicking the link, you should see a page similar to the illustration below: :


Electronic License Distribution - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://www.novell.com/ELD/License?ID=zsdfadfasdfad~
Go
Links CRT WSS - Home Primus® eServer Novell Technical Services Labs Google Customize Links
COMPANY MY NOVELL SOLUTIONS PRODUCTS TRAINING SUPPORT PARTNERS DEVELOPERS
Novell.
choose a language HOW TO BUY DOWNLOAD SEARCH
products a-z
product activation
evaluation software
support and training
N
Corporate Governance | Legal | Privacy | Accessibility | Subscribe | Feedback © 2004 Novell, Inc. All Rights Reserved.
powered by N
Internet

Electronic License Distribution

Welcome to the Novell Electronic License Delivery Site. Below you will find a list of links to various components based on the order(s) you placed with Novell. Simply click on the links to retrieve the various components.

License Download(s)

License Type	Filename	
iChain 2.3	ichain23.html	Download

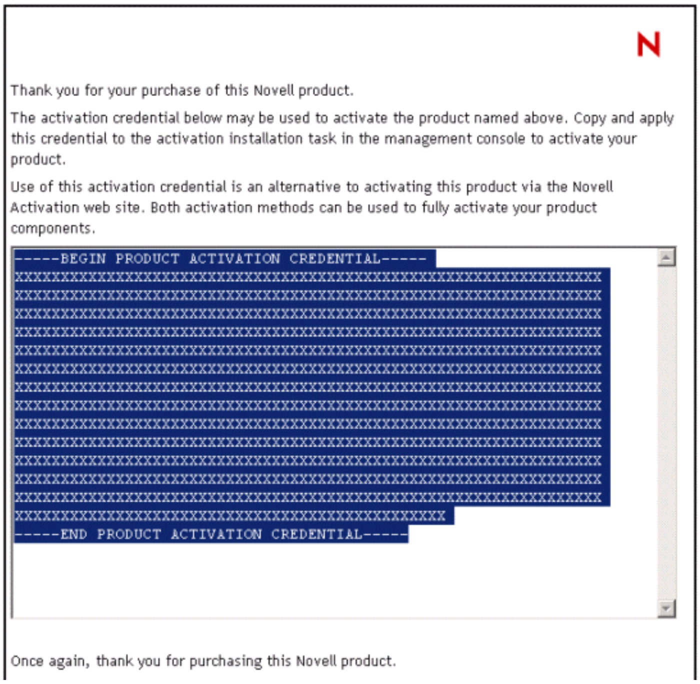
NOTE: The product you have selected is an Activated product, or contains Activated components. Click on the Continue link below to continue with your download and follow the instructions in the product or see How to activate your Novell Product, to complete the steps to activate.

License and/or Upgrade Certificate(s)

Serialized Certificate of Use

2 Click the license download link and either save (download) or open the .html file.

After the file is opened, its content should be similar to the content shown in the illustration below: :



Thank you for your purchase of this Novell product.

The activation credential below may be used to activate the product named above. Copy and apply this credential to the activation installation task in the management console to activate your product.

Use of this activation credential is an alternative to activating this product via the Novell Activation web site. Both activation methods can be used to fully activate your product components.

```
-----BEGIN PRODUCT ACTIVATION CREDENTIAL-----
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
-----END PRODUCT ACTIVATION CREDENTIAL-----
```

Once again, thank you for purchasing this Novell product.

3 Proceed to "Installing a Product Activation Credential" on page 275 for instructions on how to activate Identity Manager and drivers.

Generating a Product Activation Request

You use your Customer ID to generate a Product Activation Request. When you purchase your Identity Manager product, Novell sends an e-mail to your company's primary contact (the person who purchased the product license) that includes a customer ID.

If you do not remember or do not receive your Customer ID, please call the Novell Activation Center at 1-800-418-8373 in the U.S. In all other locations, call 1-801-861-8373. (If applicable, you will be charged long distance fees for calls made using the 801 area code.)

NOTE: The individual who purchases the product license receives an e-mail containing the Customer ID. If your company uses its purchasing agent to handle this transaction, you might need to check with this individual to obtain your Customer ID.

You should create a Driver Set object before you generate a Product Activation Request to activate Identity Manager.

1 Launch iManager by going to http://*serveripaddress*/nps/iManager.html.

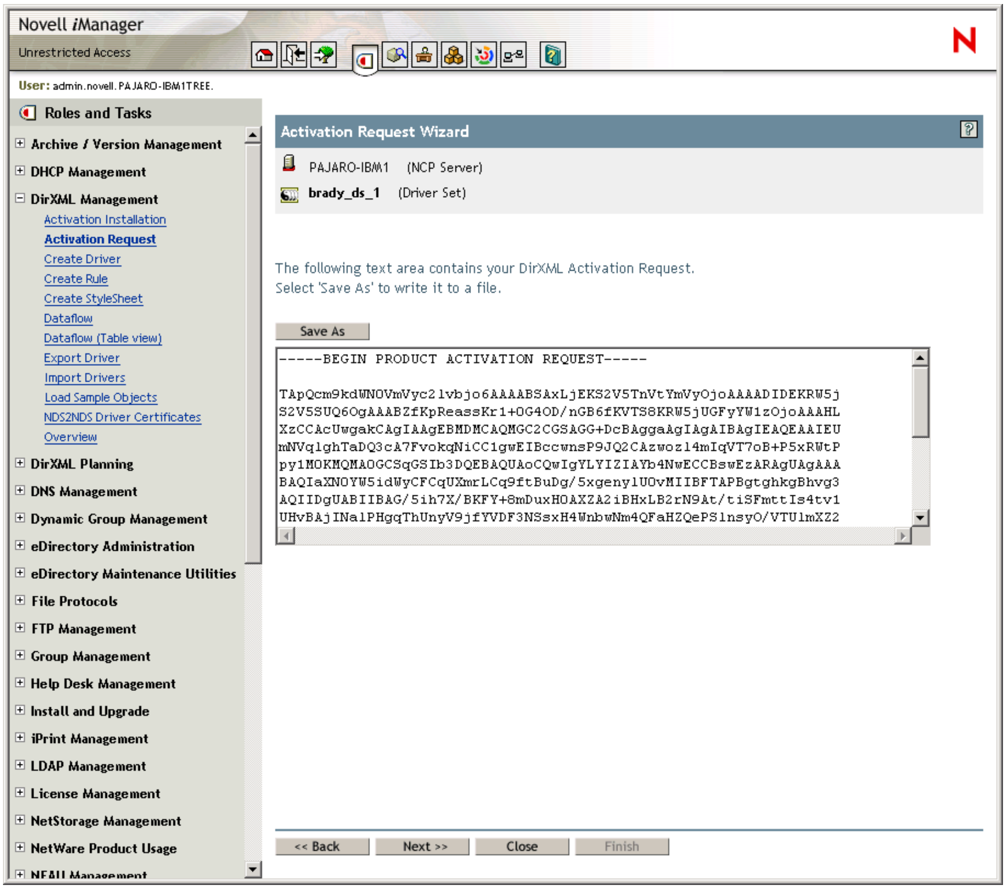
2 Click DirXML Management > Activation Request.

3 Browse to the driver set that you want to activate, then click Next.

NOTE: If the driver set is not associated with a server or is associated with multiple servers, you are prompted to select a server to associate with a driver set.

4 Enter your Novell Customer ID, then click Next to build your Activation Request file.

Your customer ID and identifying information about the server's tree are stored in the Product Activation Request.



PAJARO-IBM1 (NCP Server)
brady_ds_1 (Driver Set)

The following text area contains your DirXML Activation Request.
Select 'Save As' to write it to a file.

```
-----BEGIN PRODUCT ACTIVATION REQUEST-----

TApQcm9kdWNOVmVyc2lvbjo6AAAABSAxLjEKS2V5TnVtYmVyOjoAAAADIDEKRW5j
S2V5SUQ6OgAAABZfKpReassKr1+OG4OD/nGB6fKVTS8KRW5jUGFyYW1zOjoAAAHL
XzCCAcUwgakCAgIAAgEBMDMCAQMGC2CGSAGG+DcBAggaAgIAgAIBAgIEAQEAAIEU
mNVqlghTaDQ3cA7FvokqNiCC1gwEIBccwnsP9JQ2CAzwozl4mIqVT7oB+P5xRWtP
py1MOKMQMAOGCSqGSIb3DQEBAQUAoCQwIgYLYIZIAYb4NwECCBswEzARAgUAgAAA
BAQIaXNOYW5idWyCFCqUXmrLCq9ftBuDg/5xgenylUOvMIIBFTAPBgtghkgBhvg3
AQIIDgUABIIBAG/5ih7X/BKFY+8mDuxHOAXZA2iBHxLB2rN9At/tiSFmttIs4tv1
UHvBAjINalPHgqThUnyV9jfYVDF3NSsxH4WnbwNm4QFaHZQePSlnsyO/VTUlmXZ2
```

5. Copy the Product Activation Request that is in the text area to the clipboard or save the request directly to a file, then click Next.

   You will need this information later at the Novell Product Activation Web site.

   IMPORTANT: Do not edit the content of the Product Activation Request.

6. Click the hyperlink to launch the Novell Product Activation Web site (http://www.novell.com/products/activation).

   or

   Click Finish to return to the main menu of iManager.

NOTE: To continue the activation process, you need to submit this Product Activation Request to Novell at the Novell Product Activation Web site (http://www.novell.com/products/activation). For information, see "Submitting a Product Activation Request" on page 274.

Submitting a Product Activation Request

After you create a Product Activation Request, you submit it to Novell through the Novell Product Activation Web site (http://www.novell.com/products/activation). Novell then sends an e-mail containing a Product Activation Credential. Use this credential to activate the suite or driver groups.

1. Go the Product Activation Web site (http://www.novell.com/products/activation) site, then click the Identity Manager product(s).

2. Follow through the introductory screens, then when prompted, log in to your MyNovell account.

   You must have a MyNovell account to access the Product Activation Web site. If you don't already have an account, you can create this free account when you visit the Product Activation site.

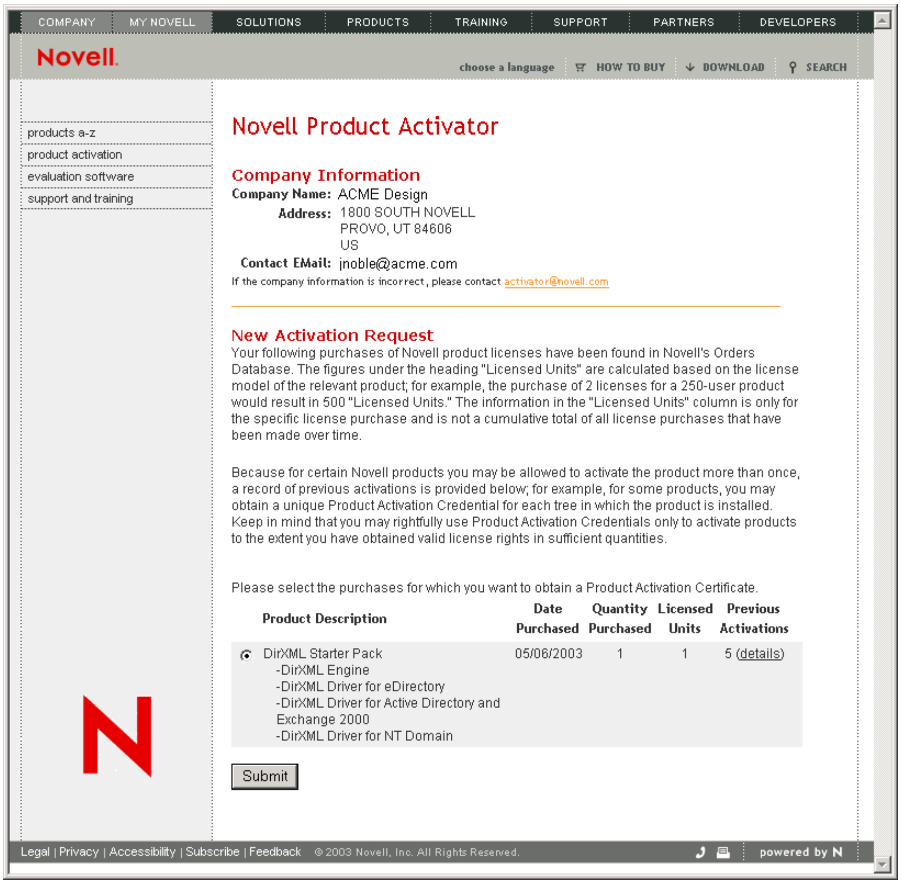
3. Click Browse to specify the path to the Product Activation Request file or paste the text of the Product Activation Request into the text area.

   If you copied the Product Activation Request to a diskette, make sure you have the request available on the computer you are working on.

   IMPORTANT: Do not edit the content of the Product Activation Request.

4. Click Submit.

   Your product purchases available for activation are displayed.



Novell Product Activator

Company Information

Company Name: ACME Design

Address: 1800 SOUTH NOVELL
PROVO, UT 84606
US

Contact EMail: jnoble@acme.com

If the company information is incorrect, please contact activator@novell.com

New Activation Request

Your following purchases of Novell product licenses have been found in Novell's Orders Database. The figures under the heading "Licensed Units" are calculated based on the license model of the relevant product; for example, the purchase of 2 licenses for a 250-user product would result in 500 "Licensed Units." The information in the "Licensed Units" column is only for the specific license purchase and is not a cumulative total of all license purchases that have been made over time.

Because for certain Novell products you may be allowed to activate the product more than once, a record of previous activations is provided below; for example, for some products, you may obtain a unique Product Activation Credential for each tree in which the product is installed. Keep in mind that you may rightfully use Product Activation Credentials only to activate products to the extent you have obtained valid license rights in sufficient quantities.

Please select the purchases for which you want to obtain a Product Activation Certificate.

Product Description	Date Purchased	Quantity Purchased	Licensed Units	Previous Activations
● DirXML Starter Pack -DirXML Engine -DirXML Driver for eDirectory -DirXML Driver for Active Directory and Exchange 2000 -DirXML Driver for NT Domain	05/06/2003	1	1	5 (details)

Submit

5 Mark the product purchase you are activating.

You can activate only one purchase at a time. Mark the purchase you are currently activating. If you need to activate any of the other products listed and they will be used in the same tree, submit the Product Activation Request again. If they will be used in a different tree, you must create a new Product Activation Request and submit that request to obtain a credential.

6 Click Submit.

Novell generates a Product Activation Credential based on the Product Activation Request you submitted and sends that credential to you via e-mail. A copy of the credential is sent to the primary contact as well.

NOTE: Some companies limit the list of employees authorized to receive credentials. You might not have rights to use the customer ID. In this case, after you click Submit, a notification is sent to the primary contact. The primary contact must approve your usage of the customer ID before you receive the credential by e-mail.

Installing a Product Activation Credential

You should install the Product Activation Credential via iManager. The following procedures explain how to install the Product Activation Credential.

1 Open the Novell e-mail that contains the Product Activation Credential.

2 Do one of these steps:

- Save the Product Activation Credential file.

or

- Open the Product Activation Credential file, then copy the contents of the Product Activation Credential to your clipboard.

  IMPORTANT: Do not edit the contents of the Product Activation Credential.

3 Open iManager.

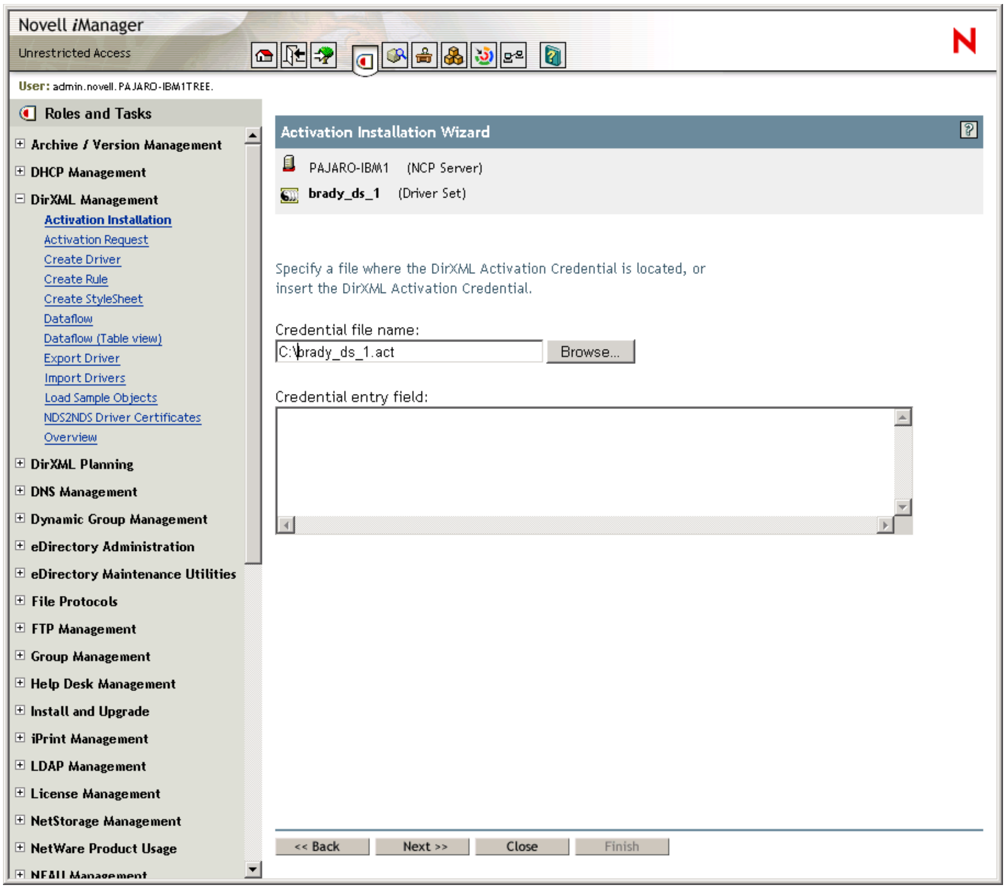
4 Choose DirXML Utilities > Activation Installation.

5 Select the driver set or browse to a driver set, then click Next.

IMPORTANT: Make sure you choose a driver set that is in the same tree that the Product Activation Request was created from initially.

6 If the driver set is not associated with a server or is associated with multiple servers, select a server to associate with a driver set, then click Next.

The installation dialog box appears:



Activation Installation Wizard

PAJARO-IBM1 (NCP Server)

brady_ds_1 (Driver Set)

Specify a file where the DirXML Activation Credential is located, or insert the DirXML Activation Credential.

Credential file name: C:\brady_ds_1.act

Credential entry field:

7 Do one of these steps:

- Specify where you saved the DirXML Activation Credential, then click Next.

  or

- Paste the contents of the DirXML Activation Credential into the text area, then click Next.

8 Click Finish.

NOTE: You need to activate each driver set that has a driver. You can use the same Product Activation Credential to activate other driver sets as long as the driver sets are in the same tree. A Product Activation Credential can only be used in the tree from which the Product Activation Request was created.

Viewing Product Activations for Identity Manager and DirXML Drivers

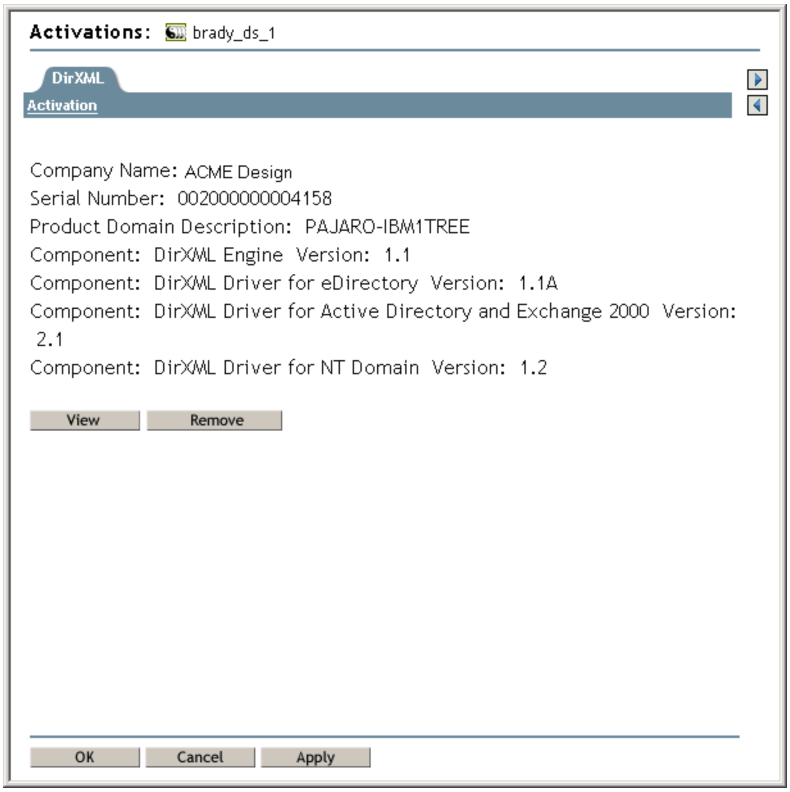
For each of your driver sets, you can see the Product Activation Credentials you have installed for the DirXML engine and drivers. To view Product Activation Credentials:

1. Open iManager.
2. Click eDirectory Administration > Modify Object.
3. Enter the driver set or the driver you want to view activation information for in the object name field.

   or

   Browse to the driver set or the driver you want to view activation information on.
4. From the DirXML tab, select Activation.

   DirXML and DirXML Driver activation credentials display on this page.



Activations: brady_ds_1

Company Name: ACME Design
Serial Number: 002000000004158
Product Domain Description: PAJARO-IBM1TREE
Component: DirXML Engine Version: 1.1
Component: DirXML Driver for eDirectory Version: 1.1A
Component: DirXML Driver for Active Directory and Exchange 2000 Version: 2.1
Component: DirXML Driver for NT Domain Version: 1.2

You can view the text of the activation credential or, if an error is reported, you can remove an activation credential.

NOTE: After installing a valid Product Activation Credential for a driver set, you might still see “Activation Required” next to the driver name. If this is the case, restart the driver and the message should then disappear.

B Feature Support for eDirectory 8.6.2 and eDirectory 8.7.3

The following table lists the features that are not supported when running eDirectory 8.6.2, and also points out a few considerations for eDirectory 8.7.3.

NOTE: Versions earlier than eDirectory 8.6.2 are referred to as legacy NDS®. The DirXML engine that ships with Identity Manager cannot run on legacy NDS.

Identity Manager has not been tested with eDirectory 8.7, so it is not supported. However, eDirectory 8.7.3 is supported, and it is a free upgrade for eDirectory 8.7.

Feature	eDirectory 8.6.2	eDirectory 8.7.3
Policy Builder	Supported.	Supported.
DirXML Script	Supported.	Supported.
Password Policies: Advanced Password Rules	Not supported by Identity Manager on eDirectory 8.6.2, because the password rules require Universal Password. However, in a mixed environment, Advanced Password Rules could be enforced for an 8.6.2 tree if you are synchronizing between two trees and one is eDirectory 8.7.3. For example, if you have an identity vault running 8.7.3, and you only allow users to change passwords in that tree, you could turn on Universal Password in the identity vault and then synchronize one-way to the eDirectory 8.6.2 tree. You could synchronize the Universal Password to the NDS password, and enforce the password rules. If eDirectory 8.6.2 is being used, the password restrictions you can use are the ones available for the NDS password.	Supported, if Universal Password is enabled in a Password Policy. You can also enforce Password Policies on connected systems.

Feature	eDirectory 8.6.2	eDirectory 8.7.3
Password Policies: Forgotten Password Self-Service	All the features are supported except the following: ◆ Allow user to reset password on page ◆ E-mail current password to user This feature requires a reversible password. Because eDirectory 8.6.2 does not support Universal Password, this feature is not available.	All features supported if Universal Password is enabled for the Password Policy. If Universal Password is disabled for a Password Policy, the administrator cannot provide the following options for users of that policy: ◆ Allow user to reset password on page ◆ E-mail current password to user These features require a reversible password, so they can't be used if Universal Password is not enabled.
Password Policies: Challenge Sets	Supported.	Supported.
Password Policies: Reset Password Self-Service	Supported. The Reset Password gadget changes the NDS password if the Universal Password is not available, so it can be used on eDirectory 8.6.2.	Supported. The Reset Password gadget changes the NDS password if the Universal Password is not available, so it can be used even if the Universal Password is not enabled in a user's Password Policy.
Password Policies: Set Universal Password task	Not supported for changing the NDS password; instead, use the Modify Object task or other help desk task to change the user's NDS password.	Supported, if Universal Password is enabled. Unlike the Reset Password gadget, the Set Universal Password task works only if Universal Password is enabled in the user's Password Policy.
Password Synchronization	Only password publishing to Identity Manager is supported. Using 8.6.2, you can configure your drivers to mimic the same functionality that is provided with Password Synchronization 1.0, with the addition of support for new platforms. Identity Manager can accept passwords from connected systems to update the NDS password. But without Universal Password, Identity Manager can't distribute passwords to connected systems unless the system is another eDirectory tree.	Supported. However, if Universal Password is not enabled in a Password Policy, passwords can't be distributed to connected systems, and password policies can be enforced on incoming passwords but can't be enforced on the connected systems.
Role-Based Entitlements	Not supported. Entitlement Policies are dynamic groups, and some features of dynamic groups were not supported in eDirectory 8.6.2.	Supported.

Feature	eDirectory 8.6.2	eDirectory 8.7.3
Reporting and Notification	Supports Novell Nsure Audit. For upgrade customers only. It also supports RNS, which is the legacy reporting and notification service. The RNS plug-ins are included with Identity Manager; the RNS components for the DirXML engine are not included.	Supports Novell Nsure Audit. For upgrade customers only. It also supports RNS, which is the legacy reporting and notification service. The RNS plug-ins are included with Identity Manager; the RNS components for the DirXML engine are not included.
eGuide	Supported.	Supported.

C Options to Configure a Remote Loader

The options in the following table enable you to configure a Remote Loader.

Option	Secondary Name	Parameter	Description
address		IP address	An optional parameter. Specifies that the Remote Loader listens on a particular local IP address. This is useful if the server hosting the Remote Loader has multiple IP addresses and the Remote Loader must listen on only one of the addresses. You have three options: address=*address number* address='localhost' Don't use this parameter. If you don't use the -address, the Remote Loader listens on all local IP addresses. Example: address=137.65.134.83
-class	-cl	Java class name	Specifies the Java class name of the DirXML application shim that is to be hosted. For example, for a Java driver, type one of the following: -class com.novell.nds.dirxml.driver.ldap.LDAPDriverShim -cl com.novell.nds.dirxml.driver.ldap.LDAPDriverShim Java uses a keystore to read certificates. The -class option and the -module option are mutually exclusive.
-commandport	-cp	port number	Specifies the TCP/IP port that the Remote Loader instance uses for control purposes. If the Remote Loader instance is hosting an application shim, the command port is the port on which another Remote Loader instance communicates with the instance that is hosting the shim. If the Remote Loader instance is sending a command to an instance that is hosting an application shim, the command port is the port on which the hosting instance is listening. If not specified, the default command port is 8000. Multiple instances of the Remote Loader can run on the same server hosting different driver instances by specifying different connection ports and command ports. Example: -commandport 8001 -cp 8001

Option	Secondary Name	Parameter	Description
-config	None	filename	Specifies a configuration file. The configuration file can contain any command line options except *config*. Options specified on the command line override options specified in the configuration file. Example: -config config.txt
-connection	-conn	connection configuration string	Specifies the connection parameters for the connection to the DirXML server running the DirXML remote interface shim. The default connection method for the Remote Loader is TCP/IP using SSL. The default TCP/IP port for this connection is 8090. Multiple instances of the Remote Loader can run on the same server. Each instance of the Remote Loader hosts a separate DirXML application shim instance. Differentiate multiple instances of the Remote Loader by specifying different connection ports and command ports for each Remote Loader instance. Example: -connection "port=8091 rootfile=server1.pem" -conn "port=8091 rootfile=server1.pem"
-description	-desc	short description	Specify a short description string (for example, SAP) to be used for the trace window title and for Nsure Audit logging. Example: -description SAP -desc SAP The Remote Loader Console places long forms in the configuration files. You can use either a long form (for example, -description) or a short form (for example, -desc).
-help	-?	None	Displays help. Example: -help -?
-java	-j	None	Specifies that the passwords are to be set for a Java shim instance. This option is only useful in conjunction with the setpasswords option. If -class is specified with -setpasswords, this option isn't necessary.
-javadebugport	-jdp	Port number	Specifies that the Remote Loader instance is to enable Java debugging on the specified port. This is useful for developers of DirXML application shims. Example: -javadebugport 8080 -jdp 8080

Option	Secondary Name	Parameter	Description
keystore			Conditional parameters. Used only for DirXML application shims contained in .jar files. Specifies the filename of the Java keystore that contains the trusted root certificate of the issuer of the certificate used by the remote interface shim. This is typically the Certificate Authority of the eDirectory tree that is hosting the remote interface shim. If you are running SSL and need the Remote Loader to communicate with a Java driver, type a key-value pair: `keystore='`*`keystorename`*`' storepass='`*`password`*`'`
-module	-m	modulename	Specifies the module containing the DirXML application shim that is to be hosted. For example, for a native driver, type one of the following: -module "c:\Novell\RemoteLoader\Exchange5Shim.dll" -m "c:\Novell\RemoteLoader\Exchange5Shim.dll" or -module "usr/lib/dirxml/NISDriverShim.so" -m "usr/lib/dirxml/NISDriverShim.so" The -module option uses a rootfile certificate. The -module option and the -class option are mutually exclusive.
-password	-p	password	Specifies the password for command authentication. This password must be the same as the first password specified with *setpasswords* for the loader instance being commanded. If a command option (for example, unload or tracechange) is specified and the *password* option isn't specified, the user is prompted to enter the password for the loader that is the target of the command. Example: -password novell4 -p novell4
port		decimal port number	A required parameter. It specifies the TCP/IP port on which the Remote Loader listens for connections from the remote interface shim. Example: port=8090
rootfile			A conditional parameter. If you are running SSL and need the Remote Loader to communicate with a native driver, type `rootfile='`*`trusted certname`*`'`

Option	Secondary Name	Parameter	Description
-service	-serv	None, or install/ uninstall	To install an instance as a service, use the install argument together with any other arguments necessary to host an application shim. For example, the arguments used must include -module, but any argument can include -connection, -commandport, and so forth. This option installs the Win32 service but doesn't start the service. To uninstall an instance running as a service, use the uninstall argument together with any other arguments necessary to host the application shim. The no-argument version of this option is only used on the command line to an instance being run as a Win32 service. This is automatically set up when installing an instance as a service. Example: -service install -serv uninstall This option isn't available on rdxml or the Java Remote Loader.
-setpasswords	-sp	password password	Specifies the password for the Remote Loader instance and the password of the DirXML Driver object of the remote interface shim that the Remote Loader communicates with. The first password in the argument is the password for the Remote Loader. The second password in the optional arguments is the password for the DirXML Driver object associated with the remote interface shim on the DirXML server. Either no password or both passwords must be specified. If no password is specified, the Remote Loader prompts for the passwords. This is a configuration option. Using this option configures the Remote Loader instance with the passwords specified but doesn't load a DirXML application shim or communicate with another loader instance. Example: -setpasswords novell4 staccato3 -sp novell4 staccato3
-storepass		storepass	Used only for DirXML application shims contained in .jar files. Specifies the password for the Java keystore specified by the keystore parameter. Example: storepass=mypassword This option applies only to the Java Remote Loader.

Option	Secondary Name	Parameter	Description
-trace	-t	integer	Specifies the trace level. This is only used when hosting an application shim. Trace levels correspond to those used on the DirXML server. Example: -trace 3 -t 3
-tracechange	-tc	integer	Commands a Remote Loader instance that is hosting an application shim to change its trace level. Trace levels correspond to those used on the DirXML server. Example: -tracechange 1 -tc 1
-tracefile	-tf	filename	Specify a file to write trace messages to. Trace messages are written to the file if the trace level is greater than zero. Trace messages are written to the file even if the trace window is not open. Example: -tracefile c:\temp\trace.txt -tf c:\temp\trace.txt
-tracefilechange	-tfc	None, or filename	Commands a remote Loader instance that is hosting an application shim to start using a trace file, or to close one already in use and use a new one. Using the no-argument version of this option causes the hosting instance to close any trace file being used. Example: -tracefilechange c:\temp\newtrace.txt tfc c:\temp\newtrace.txt

Option	Secondary Name	Parameter	Description
-tracefilemax	-tfm	size	Specifies the approximate maximum size that trace file data can occupy on disk. If you specify this option, there will be a trace file with the name specified using the tracefile option and up to 9 additional “roll-over” files. The roll-over files are named using the base of the main trace filename plus “_*n*”, where n is 1 through 9. The size parameter is the number of bytes. Specify the size by using the suffixes K, M, or G for kilobytes, megabytes, or gigabytes. If the trace file data is larger than the specified maximum when the Remote Loader is started, the trace file data remains larger than the specified maximum until roll-over is completed through all 10 files Example: -tracefilemax 1000M -tfm 1000M In this example, the tracefile can be only 1 GB.
-unload	-u	None	Unloads the Remote Loader instance. If the Remote Loader is running as a Win32 Service, this command stops the service. Example: -unload -u
-window	-w	On/Off	Turns the trace window on or off in a Remote Loader instance. Example: -window on -w off This option is available only on Windows platforms. It isn’t available on the Java Remote Loader.
-wizard	-wiz	None	Launches the Configuration Wizard. Running dirxml_remote.exe with no command line parameters also launches the wizard. This option is useful if a configuration file is also specified. In this case, the wizard starts with values from the configuration file and the wizard can be used to change the configuration without editing the configuration file directly. Example: -wizard -wiz This option is available only on Windows platforms. It isn’t available on the Java Remote Loader.

D Updates

March 2004

- The following new sections were added:
  - "Using the DirXML Command Line Utility" on page 80.
  - "Using Named Passwords" on page 84.
  - "Global Configuration Values" on page 17 and "Driver Heartbeat" on page 17 in the section about new features.
- References to Password Synchronization 2.0 have been changed to Identity Manager Password Synchronization, to indicate that the new Password Synchronization functionality is not a separate product, but is a feature of Identity Manager.
- References to DirXML® 2.0 have been changed to Nsure™ Identity Manager 2. The engine and drivers are still referred to as the DirXML engine and DirXML drivers.

April 1, 2004

- The Password Self-Service information is now in a separate chapter, to make that information easier to find. Information about NMAS™ Password Policies is now in two chapters:
  - Chapter 8, "Managing Passwords by Using Password Policies," on page 95
  - Chapter 9, "Password Self-Service," on page 115

April 13, 2004

Made minor editing changes.

June 30, 2004

Updated the book for Identity Manager 2.0.1.

- The following sections were added:
    - "Overview of Passwords" on page 150
    - "Handling Sensitive Information" on page 165
    - Chapter 13, "High Availability," on page 253
    - "Adding Your Own Password Change Message to Password Policies" on page 137
    - "Disabling Password Hint by Removing the Hint Gadget" on page 135
    - "Configuring Named Passwords Using iManager" on page 84
    - "Scenario 5: Synchronizing Application Passwords to the Simple Password" on page 206
    - "Providing SMTP Authentication Information in Driver Policies" on page 217
- In the Password Management section, the section named "Making Sure Password Policies Are Correct for Identity Manager" has been removed. It is no longer necessary to manually create a Password Policy especially for driver sets, because the policy is now created automatically.
- The information for the section named "Integrating Password Self-Service with Virtual Office" on page 142 has been moved to the *Novell Virtual Office for NetWare 6.5 Configuration Guide* (http://www.novell.com/documentation/nw65/virtualoffice/data/ac6spye.html).
- Information was added to "Planning Login and Change Password Methods for your Users" on page 104, including how to block old clients from changing the NDS Password directly, in "Preventing Legacy Novell Clients from Changing Passwords" on page 106.
- Information was added to "Localizing E-Mail Notification Templates" on page 226.

August 3, 2004

Made the following changes:

Location	Change
Chapter 5, "Setting Up a Connected System," on page 53	Corrected and reorganized content.

August 14, 2004

Made the following changes:

Location	Change
"Case Study for SuSE Linux" on page 257	Updated the link.

September 10, 2004

Made the following changes:

Location	Change
Chapter 4, "Installation," on page 45	Updated the chapter to reflect that SUSE® LINUX Enterprise Server 9 and Linux Red Hat AS 3.0 are now supported.
"Considerations for Installing Identity Manager on Linux Red Hat AS 3.0" on page 51	Added this topic.

October 4, 2004

Made the following changes:

Location	Change
"Setting Advanced Password Rules" on page 97	Added more specifics about the rules that are supported.

May 4, 2005

Made the following changes:

Location	Change
"Installing Identity Manager on UNIX Platforms" on page 49	Revised Step 3 to correct information on the install path.
"Scenario: Setting Up a Business Policy" on page 230	Revised information on the scenario.
"Creating a Driver Object for the Entitlements Driver" on page 232	Added missing steps and updated references to the user interface.