NetIQ® Identity Manager

Setup Guide for Windows

October 2019

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About this Book and the Library

The *Setup Guide* provides instructions for installing the NetIQ Identity Manager (Identity Manager) product. This guide describes the process for installing individual components in a distributed environment.

Intended Audience

This book provides information for identity architects and identity administrators responsible for installing the components necessary for building an identity management solution for their organization.

Other Information in the Library

For more information about the library for Identity Manager, see the Identity Manager documentation website.

About NetIQ Corporation

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

Our Viewpoint

Adapting to change and managing complexity and risk are nothing new

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

Enabling critical business services, better and faster

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

Our Philosophy

Selling intelligent solutions, not just software

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

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Overview of Identity Manager Environment

This guide focuses on the tasks that you must complete in order to install and configure Identity Manager. Before you start with the installation

If you are new to NetIQ Identity Manager, the information in the below sections will acquaint you with the solution and the components that it comprises. The components that you can download and install is determined by your Identity Manager Edition.

- Brief Introduction of Identity Manager Components
- Functional Architecture

1 Brief Introduction of Identity Manager Components

To cover the varying needs of customers, Identity Manager is available in Advanced and Standard Editions. Each edition comprises of a specific set of functionalities and each functionality is handled by multiple components. Therefore, your Identity Manager implementation can include one or all of the following components depending on your requirements:

- Identity Manager Server
- Identity Applications
- Identity Reporting
- Identity Manager Tools

Figure 1-1 lists the components deployed in an Identity Manager Advanced Edition environment.

Figure 1-1 *Components for Identity Manager Advanced Edition*

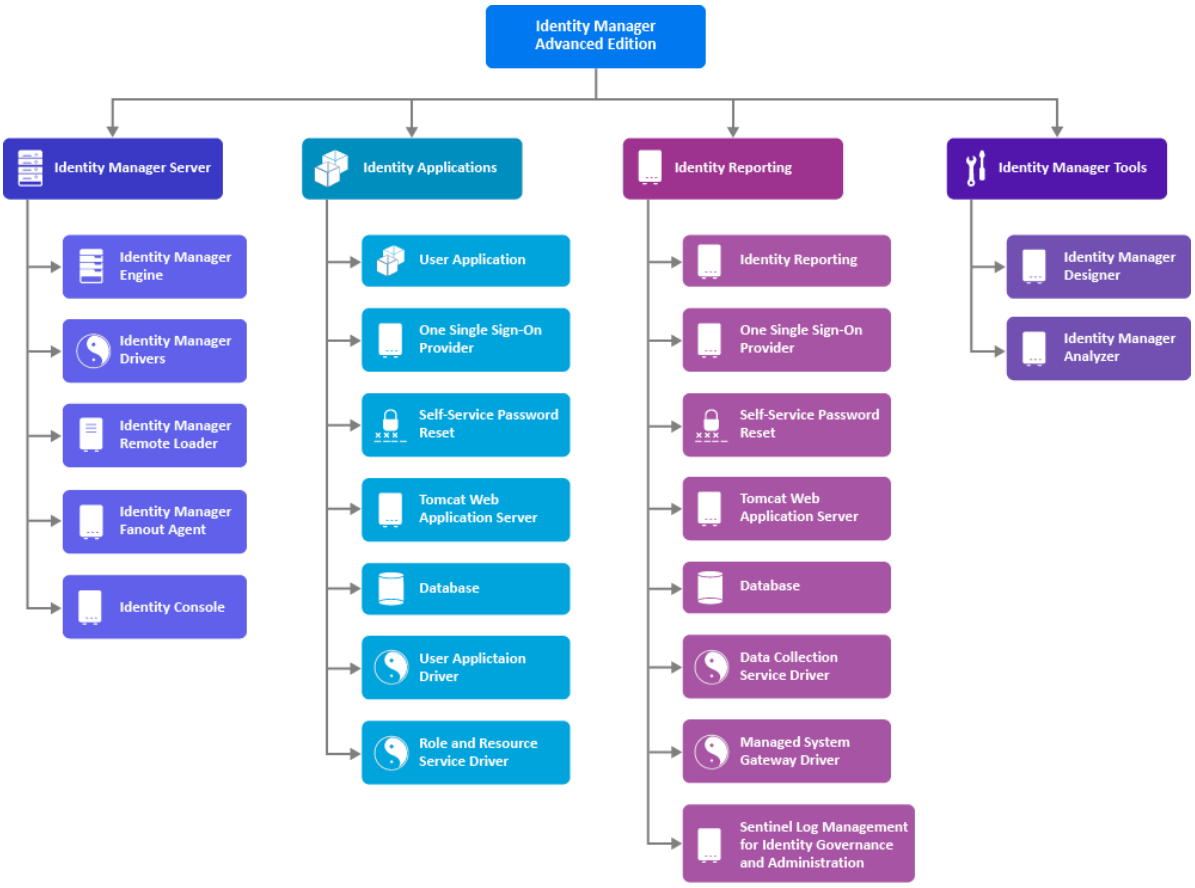
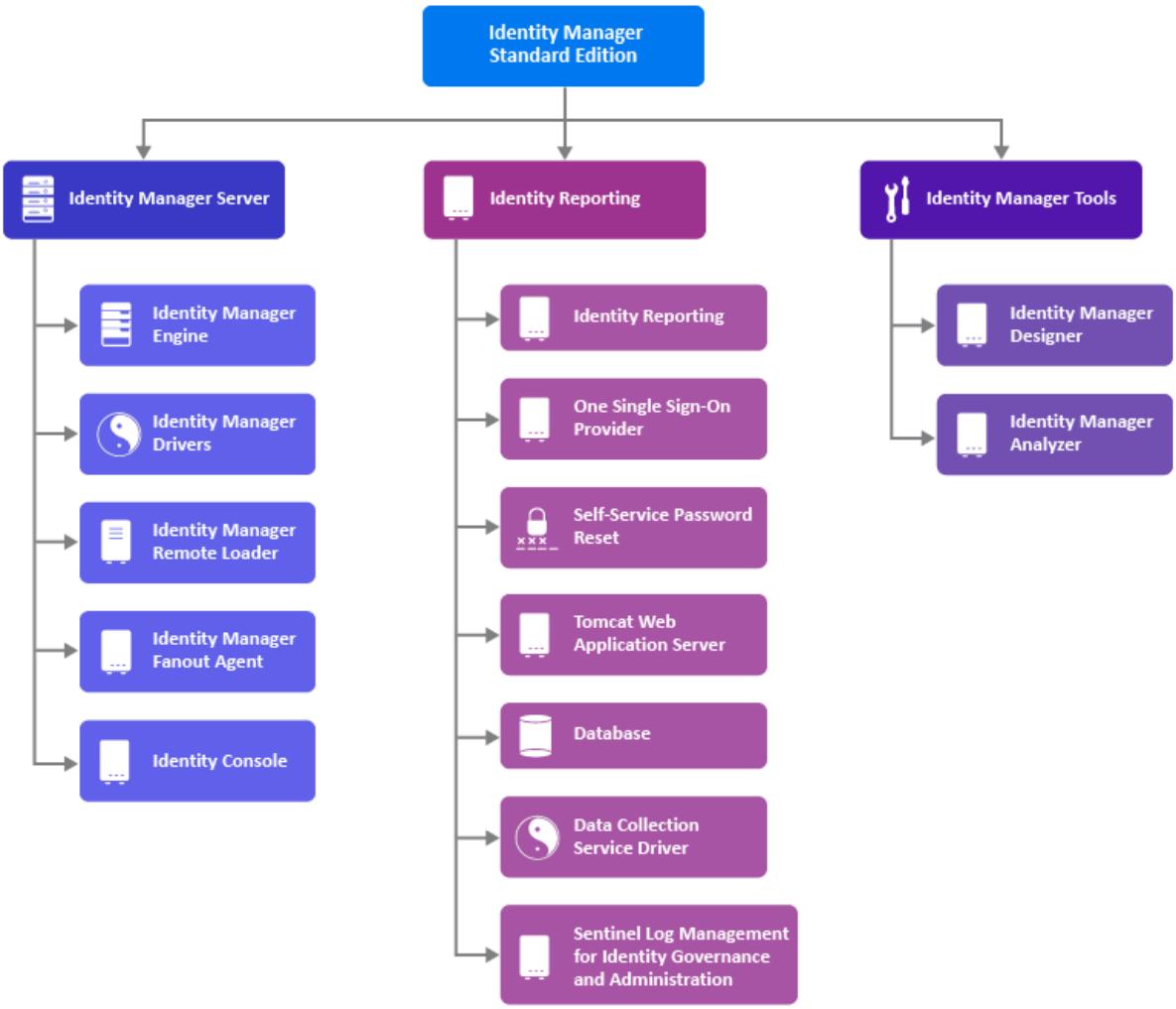


Figure 1-2 lists the components deployed in an Identity Manager Standard Edition environment.

Figure 1-2 *Components for Identity Manager Standard Edition*



Based on how the components interact with each other, some components are logically installed as a group of components. Some components are installed as standalone components to ease the installation experience. For information about how the components interact with each other, see the NetIQ Identity Manager Overview and Planning Guide.

Review the information from the subsequent sections to understand how the components are grouped and how each component or a group of components is installed.

Identity Manager Server Components

Required for all installations

An Identity Manager Server installation comprises of the following components.

Identity Manager Server

The Identity Manager Server executes tasks within Identity Manager. It comprises of Identity Vault, Identity Manager Engine, and Identity Manager drivers.

To support the Identity Manager Server operations, the installation program installs a supported version of Oracle Java Runtime Environment (JRE). To install the Identity Manager Server components, use the **Identity Manager Engine** installation option of the installation program.

Identity Vault

When you install Identity Manager Engine, the installation process creates and configures a connection to Identity Vault. Identity Manager uses Identity Vault as the default repository of all identity data. Identity data includes current state of managed identities, including user account and organizational data.

Identity Manager Engine

The Identity Manager engine processes all data changes that occur in the Identity Vault or a connected application. The server on which the Identity Manager engine runs is referred to as the Identity Manager server.

Identity Manager Drivers

The Identity Manager Server handles provisioning of users, and manages connected system accounts and groups through drivers. A driver is the software interface to a connected system.

Identity Manager Drivers run as part of the Identity Manager Server architecture. A driver acts as a gateway to a native endpoint type system technology. For example, computers running Active Directory Services can be managed only if the Active Directory driver is installed either on the Identity Manager server or the target application server with which the Identity Manager server can communicate. Drivers manage the objects that reside on the connected systems. Managed objects include accounts, groups, and optionally, endpoint-type specific objects.

A driver translates Identity Manager Engine actions into changes on the connected system, such as “Create a new email account on a Microsoft Exchange connected system.” Every driver that is configured in Identity Manager has an associated event cache file (TAO file). Events are cached in the cache file before a driver processes them. By default, the cache files are placed in Identity Vault’s DIB (Data Information Base) directory.

Identity Manager provides several in-built drivers (Java, native, .NET) to manage connections with different types of connected systems. Identity Manager also provides the ability to develop a custom driver to enable data synchronization to a variety of other systems such as a home-grown application or a repository that has no technology interface and cannot leverage out-of-box drivers.

Remote Loader

Drivers can be installed locally on the Identity Manager Server or with a Remote Loader. A Remote Loader loads drivers and communicates with the Identity Manager engine on behalf of drivers installed on remote servers. If the application runs on the same server as the Identity Manager engine, you can install the driver on that server. However, if the application does not run on the

same server as the Identity Manager engine, you must install the driver on the application's server. To help with the workload or configuration of your environment, you can install Remote Loader on a server separate from the servers that have Tomcat and the Identity Manager server. For more information about Remote Loader, see Determining When to Use the Remote Loader in the NetIQ Identity Manager Driver Administration Guide.

Use the **Identity Manager Remote Loader Server** installation option to install the Remote Loader service and the driver instances in the Remote Loader.

Fanout Agent

Identity Manager Fanout Agent is an installation component used by Java Database Connectivity (JDBC) Fanout driver to create multiple JDBC Fanout driver instances. The Fanout driver provisions users, groups, and password to multiple databases with minimal effort. This eliminates the need for the Identity Manager administrator to configure multiple JDBC drivers using the same policies to provision multiple databases of the same type. You can centrally manage user accounts and have them automatically created, configured, maintained, and removed when appropriate. For more information, see the *NetIQ Identity Manager Driver for JDBC Fanout Implementation Guide*.

To install Fanout Agent, use the **Identity Manager Fanout Agent** installation option of the installation program.

Identity Applications Components

Required for Advanced Edition installation

Identity Applications are an interconnected set of browser-based Web applications. They enable your organization to manage the user accounts and permissions associated with the wide variety of roles and resources available to users. You can configure the identity applications to provide self-service support for your users, such as requesting roles or changing their passwords. You can also set up workflows to improve the efficiency in managing and assigning roles and resources. Identity Applications consists of Administration Console (for administration tasks), User Console (Dashboard), and REST services that help you perform these tasks.

NOTE: You must have the Identity Manager Engine installed before installing Identity Applications.

To install Identity Applications components, use the **Identity Applications** installation option of the installation program.

An Identity Applications installation comprises of the following components:

User Application

The User Application is a browser-based web application that gives users the ability to perform a variety of identity self-service and roles provisioning tasks. Some of the tasks that were performed by using the User Application interface in the previous versions of the product have been moved to the new user interface that includes an Administration Console and a User Console. The User Application continues to provide some of the functionality that does not yet exist in the new user interface. For more information, see the NetIQ Identity Manager - Administrator's Guide to the Identity Applications.

Authentication Service

The authentication service provides access to Identity Applications features. For more information about using Single Sign-on access in Identity Manager, see the NetIQ Identity Manager - Administrator's Guide to the Identity Applications.

The authentication service is provided by the NetIQ One Single Sign-On Provider (OSP) component. Identity Applications requires a local installation of OSP. OSP is automatically installed with Identity Applications.

Self-Service Password Reset

The self-service password management service provides access to self-service password management. Identity Applications include NetIQ Self Service Password Reset (SSPR) to help users who have access to the identity applications to reset their passwords without administrative intervention.

The Identity Applications installation process enables SSPR by default. However you can choose to install SSPR on a separate computer if your deployment needs it or if you are installing Standard Edition. When installing SSPR on a separate computer in Advanced Edition, you must define password management settings in the Identity Applications configuration file (`ism-configuration.properties`) after completing the installation of both components, either manually or by using the ConfigUpdate utility.

Web Application Server

The application server provides the runtime framework in which the identity applications components execute. The identity applications are packaged as WAR (Web Application Resource or Web application ARchive) files. The installation process enables you to deploy the WAR files to the application server. The application server runs a Java™ virtual machine, providing the runtime environment for the application code. The following WAR files apply to the URL for a component of the identity applications:

- **IDMProv** for the User Application interface
- **idmdash** for the Dashboard
- **idmadmin** for Identity Applications Administration interface

When a user interacts with `idmdash` or `idmadmin` applications, these applications query the underlying `IDMProv.war` file and fetch the information for the user. `IDMProv.war` exposes the REST and SOAP APIs where `idmdash` and `idmadmin` contain the information that provides the user interface.

The identity applications run on an Apache Tomcat application server, included in the installation kit. To support the Tomcat application server, the installation program installs supported versions of JRE and Apache ActiveMQ.

Identity Applications Database

The Identity Applications database maintains configuration data for the identity applications such as localized labels, entitlement values, and Email server configuration. It also stores workflow state data required by the Workflow Engine. The supported databases for Identity Applications are PostgreSQL, Oracle, and Microsoft SQL Server.

The Identity Applications installation program automatically installs a supported version of PostgreSQL database that acts as the default database for Identity Applications. If you do not want to use PostgreSQL as the database, you can configure a supported version of Oracle or MS SQL database with Identity Applications. Identity Applications require a Java Database Connectivity driver (JDBC type 4 driver) to communicate with the database. The installation program prompts for the location and name of the JDBC driver for the database. Therefore, you must obtain this JDBC driver from your database installation directory before starting the Identity Applications installation.

- For PostgreSQL database, the driver is bundled with the Identity Manager installation program.
- For Oracle database, you can download the driver from the Oracle web site.
- For Microsoft SQL Server database, download the driver from the Microsoft web site.

The database can reside locally on the Identity Applications server or a remote computer. When using a remote database, you must configure a connection to the database.

Drivers for Identity Applications

The Identity Applications components require the following drivers:

User Application Driver

Stores configuration information and notifies the Identity Applications whenever changes occur in the Identity Vault. You can configure the driver to allow events in the Identity Vault to trigger workflows. The driver can also report success or failure of a workflow's provisioning activity to the User Application so that users can view the final status of their requests.

Role and Resource Service Driver

Manages all role assignments, starts workflows for role assignment requests that require approval, and maintains indirect role assignments according to group and container memberships. The driver grants and revokes entitlements for users based on their role memberships, and it performs cleanup procedures for requests that have been completed. The driver also maintains resource requests in addition to role requests.

The **Identity Applications** installation option of the installation program deploys the User Application driver and the Role and Resource Service driver to the Identity Vault.

Identity Reporting Components

(Optional) Install this component only if you plan to implement the reporting functionality

Identity Reporting gives you a complete view of your users' entitlements, providing the knowledge you need to see the past and present state of authorizations and permissions granted to identities in your organization. Identity Manager provides predefined reports that you can use to monitor the status of an Identity Manager environment, including information collected from Identity Vaults and

connected systems. To use the reports provided with Identity Manager, you install Identity Reporting, which is included with Identity Manager. Identity Reporting also includes a report packaging tool that facilitates the process of creating custom reports. The user interface for Identity Reporting makes it easy to schedule reports to run at off-peak times for optimized performance. For more information about Identity Reporting, see the Administrator Guide to NetIQ Identity Reporting.

NOTE: You must install Identity Applications before you install Identity Reporting in an Advanced Edition.

An Identity Reporting installation comprises of the following components:

Identity Reporting

Browser-based application that generates reports by making calls to the reporting service. The reporting service retrieves the data needed to generate reports from the Identity Reporting repository (Identity Information Warehouse), which contains all report management information (such as report definitions and schedules), database views, and configuration information required for reporting.

Authentication Service

The authentication service is provided by the OSP component. For more information, see "Authentication Service" on page 19.

NOTE: OSP is automatically installed with Identity Reporting. However, in an Advanced Edition installation, Identity Reporting can use the same authentication service that is installed with Identity Applications. When using the same authentication service, you must specify the authentication settings during the Identity Reporting configuration.

Self-Service Password Reset

The self-service password management service provides access to self-service password management. For more information, see "Self-Service Password Reset" on page 19.

Identity Reporting Database

The Identity Reporting database (Identity Information Warehouse) stores information about the actual and desired states of the Identity Vault and the connected systems within your organization. You can generate reports from this information to view the relationship between objects, such as users and roles. The database can reside locally on the Identity Reporting server or on a remote computer. Identity Manager uses data sources to connect to the database. Identity Reporting requires a Java Database Connectivity driver (JDBC type 4 driver) to communicate with the database. A JDBC driver enables an Identity Reporting server to communicate with the data source. The supported databases for Identity Reporting are PostgreSQL, Oracle, and Microsoft SQL.

- For PostgreSQL database, this driver is bundled with the Identity Manager installation program.

- For Oracle database, you can download the driver from the Oracle web site.
- For Microsoft SQL Server database, download the driver from the Microsoft web site.

NOTE: You must have the Identity Manager Server installed before installing the Identity Reporting components.

Web Application Server

The application server provides the runtime framework in which the identity reporting components execute. The following WAR files apply to the URL for a component of identity reporting:

- **IDMRPT** for the Identity Reporting application/interface
- **idmdcs** for Identity Manager Data Collection Service

When a user interacts with `IDMRPT` or `idmdcs` applications, these applications query the reporting service and fetch the information for the user. The reporting service exposes the REST APIs where `IDMRPT` and `idmdcs` contains the information that provides the user interface.

For more information on Web Application Server, see "Web Application Server" on page 19.

Drivers for Identity Reporting

The Identity Reporting components require the following drivers:

Managed System Gateway Driver

Queries the Identity Vault to collect the following type of information from managed systems:

- List of all managed systems
- List of all accounts for the managed systems
- Entitlement types, values, and assignments, and user account profiles for the managed systems

Data Collection Service Driver

The Data Collection Service uses the Data Collection Services driver to capture changes to objects stored in an Identity Vault, such as accounts, roles, resources, groups, and team memberships. The driver registers itself with the service and pushes change events (such as data synchronization, add, modify, and delete events) to the service.

The service includes three subservices:

- **Report Data Collector:** Uses a pull design model to retrieve data from one or more Identity Vault data sources. The collection runs on a periodic basis, as determined by a set of configuration parameters. To retrieve the data, the collector calls the Managed System Gateway driver.
- **Event-Driven Data Collector:** Uses a push design model to gather event data captured by the Data Collection Service driver.
- **Non-Managed Application Data Collector:** Retrieves data from one or more non-managed applications by calling a REST end point written specifically for each application. Non-managed applications are applications within your enterprise that are not connected to the Identity Vault.

The **Identity Reporting** installation option of the installation process deploys the Managed System Gateway driver and the Data Collection Service driver to the Identity Vault.

Sentinel Log Management for Identity Governance and Administration

Sentinel Log Management for Identity Governance and Administration (IGA) is a Security Information and Event Management (SIEM) system that receives information from many sources throughout an enterprise, standardizes it, prioritizes it and presents it to you to make threat, risk and policy related decisions. Sentinel Log Management for (IGA) captures log events associated with actions performed in several NetIQ products, including Identity Reporting, Identity Applications, and the Identity Vault. These events are stored in the public schema within the Identity Reporting repository (Identity Information Warehouse).

Identity Manager provides a separate installation program (`SentinelLogManagementForIGA8.2.2.0.tar.gz`) for Sentinel Log Management for IGA.

Identity Manager Tools

Required for all installations

Identity Manager includes a set of management tools to facilitate the implementation, customization and maintenance of the solution. Some of these tools are installed with Identity Manager and some must be installed separately.

Designer for Identity Manager

Designer for Identity Manager (Designer) helps you design, test, document, and deploy Identity Manager solutions in a network or test environment. You can configure your Identity Manager project in an off-line environment, and then deploy to your live system. From a design perspective, Designer helps do the following:

- Graphically view all of the components that comprise your Identity Manager solution and observe how they interact.
- Modify and test your Identity Manager environment to ensure it performs as expected before you deploy part or all of your test solution to your production environment.

Designer keeps track of your design and layout information. With a click of a button, you can print that information in a format of your choice. Designer also enables teams to share work on enterprise-level projects.

Identity Manager provides a separate installation program for Designer.

Analyzer for Identity Manager

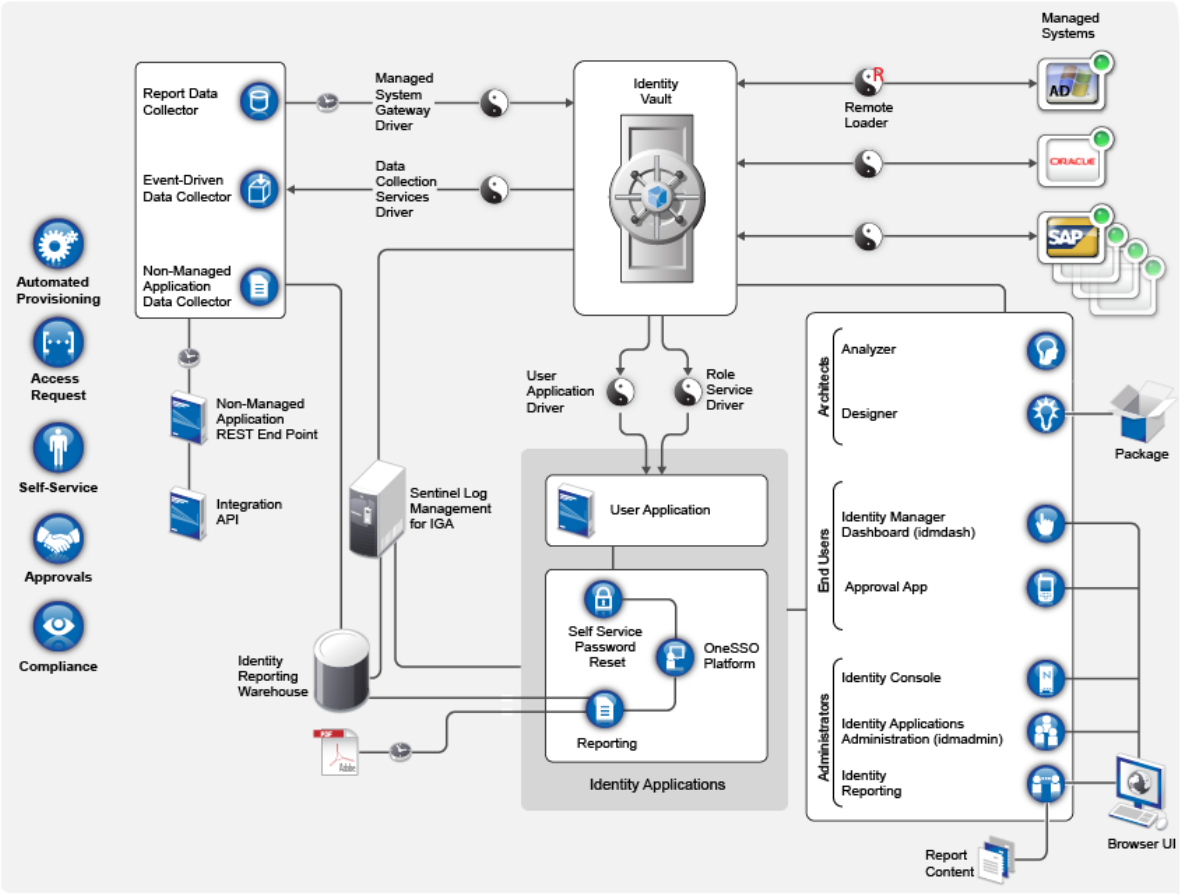
Analyzer for Identity Manager (Analyzer) provides data analysis, cleansing, reconciliation, and reporting to help you adhere to internal data quality policies. Analyzer lets you analyze, enhance, and control all data stores throughout the enterprise. Analyzer includes the following features:

- Analyzer's schema map associates an application's schema attributes to the corresponding schema attributes in Analyzer's base schema. This lets you ensure that your data analysis and cleaning operations properly associate similar values between the disparate systems. To accomplish this, Analyzer leverages the schema mapping features in Designer.
- The Analysis Profile editor lets you configure a profile for analyzing one or more data set instances. Each analysis profile contains one or more metrics against which you can evaluate attribute values to see how the data conforms to your defined data format standards.
- The Matching Profile editor lets you compare values in one or more data sets. You can check for duplicate values within a specified data set and check for matching values between two data sets.

Identity Manager provides a separate installation program for Analyzer.

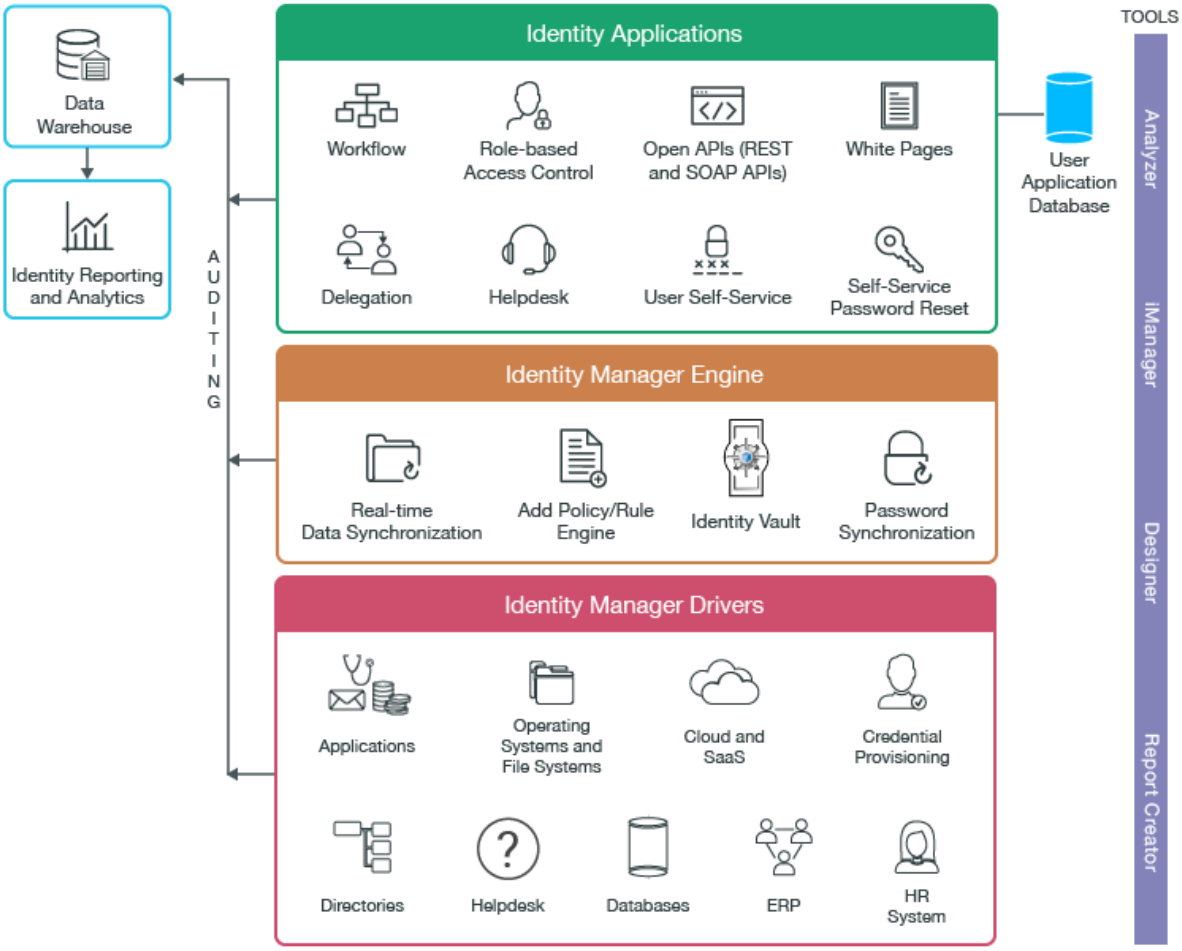
After understanding the purpose of different Identity Manager components and the way they are installed, see Figure 1-3 to understand how the components interact with each other.

Figure 1-3 *Interaction of Identity Manager Components*



Functional Architecture

The following illustration depicts the basic functional architecture for Identity Manager components. This illustration does not cover all possible integrations.



For information about the possible deployment scenarios, see Deployment Options for Identity Manager.

Deployment Options for Identity Manager

Consult the following table to plan the physical environment for your Identity Management solution. These deployment use cases provide an overview of the Identity Management physical architecture and how the component products are connected and communicate with each other and other products. For an introductory overview of the Identity Management functional architecture and the components, see "Functional Architecture" on page 25.

Deployment Option	Summary
Single-server configuration on one computer	The most basic deployment configuration includes Identity Manager server and other required applications on one computer. You must ensure that the computer has the required memory, speed, and available disk space to meet the workload. This is a basic deployment use case and mostly suited for Proof-of-Concept (POC) and demonstration purposes only. It might not be appropriate for a production environment.
Distributed server configuration	This deployment has Identity Manager server on one computer and all other required applications on one or more additional computers. For example, components such as identity applications, OSP, and SSPR can run on a separate computer. You can include an additional computer to host the components for reporting service to suffice the system requirements for running the Sentinel Log Management for IGA component.
High-availability deployment	High availability is a redundancy operation that automatically switches to a standby server if the primary server fails or is temporarily shut down for maintenance. Identity Manager supports installing the following components in a high-availability environment: ◆ Identity Vault ◆ Identity Manager engine ◆ Remote Loader ◆ Identity applications, except Identity Reporting A typical cluster configuration contains Tomcat Application Server nodes hosting the Identity Applications for load balancing and fault tolerance. All the communication is routed through the load balancer. All nodes communicate to the same instance of the Identity Vault and the Identity Applications database. This configuration is scalable. You can easily increase the number of nodes to handle the load.

Sample Identity Manager Deployments

Identity Manager allows you to control user identities and their access to applications and accounts on connected systems. Based on the functionality you need, select which Identity Manager Edition to install, which in turn determines the components to install. The following table lists the features provided by Identity Manager Advanced Edition and Identity Manager Standard Edition.

Feature	Advanced Edition	Standard Edition	Components to Install
Rule-based automated user provisioning	✓	✓	Identity Manager Engine and Designer
Real-time identity synchronization	✓	✓	Identity Manager Engine and Designer
Password management and password self-service	✓	✓	Identity Manager Engine and SSPR

Feature	Advanced Edition	Standard Edition	Components to Install
Uniform identity information tool (Analyzer)	✓	✓	Analyzer
REST APIs and single sign-on support	✓	✓ (limited support only)	Identity Manager Engine, OSP, and Identity Reporting
Current state reporting	✓	✓	Identity Manager Engine and Identity Reporting
Role-based enterprise-level provisioning	✓	✗	Identity Manager Engine and Identity Applications
Automated approval workflows for business policy enforcement	✓	✗	Identity Manager Engine, Designer, and Identity Applications
Advanced self-service in the identity applications	✓	✗	Identity Manager Engine and Identity Applications
Resource model and catalog for easy resource provisioning	✓	✗	Identity Manager Engine and Identity Applications
Historical state reporting	✓	✗	Identity Manager Engine and Identity Reporting
Connected systems reporting	✓	✗	Identity Manager Engine and Identity Reporting
Role and resource administration	✓	✗	Identity Manager Engine and Identity Applications

NOTE: In all Identity Manager installations, Identity Manager Server is the central component. Depending on the Identity Manager edition, only Identity Reporting or both Identity Reporting and Identity Applications are installed on a Tomcat application server. Use the Identity Manager component-specific installer to install other components as needed. For example, install Designer, Analyzer, or Sentinel Log Management for Identity Governance and Administration.

In addition, review the goals for your implementation and pay attention to the physical topology options, such as high availability and scalability before installing Identity Manager. This helps you identify the configuration that matches your organization's requirements.

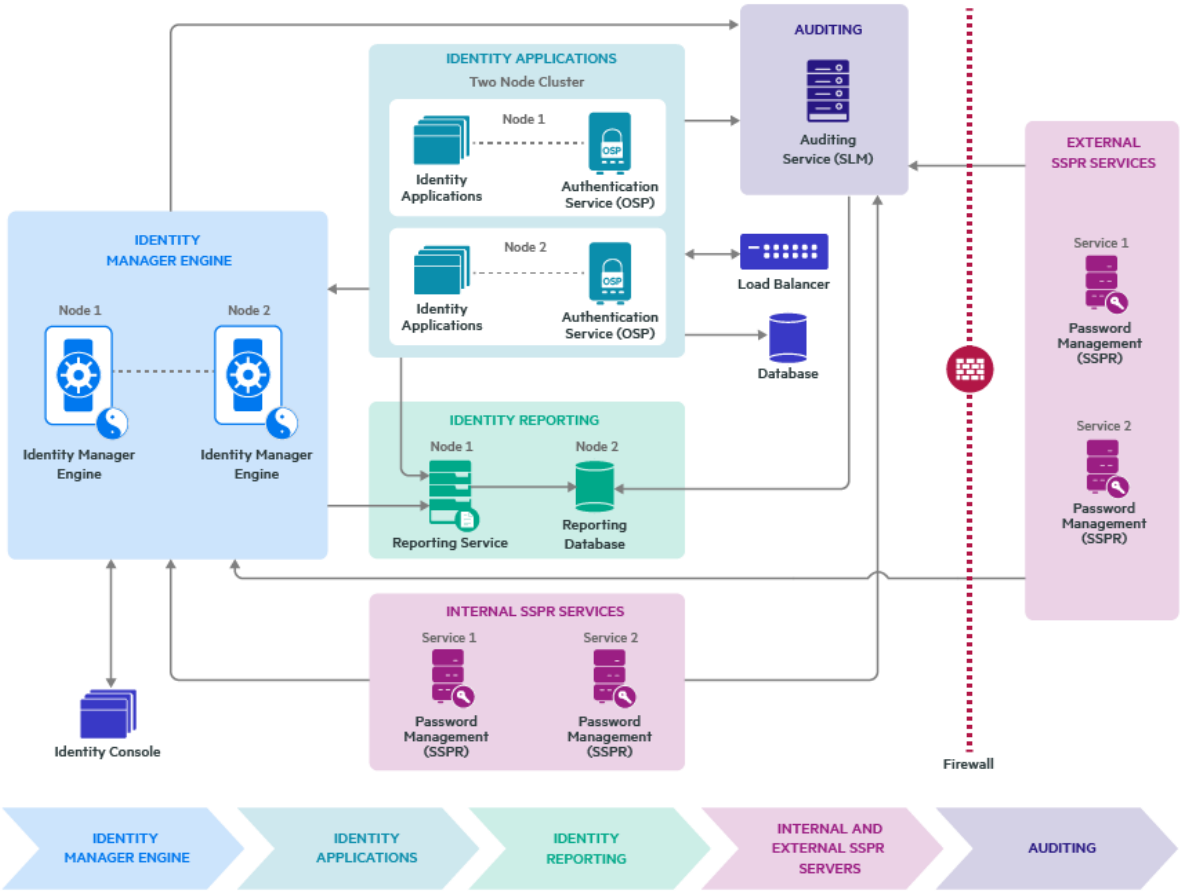
High availability ensures efficient manageability of critical network resources including data, applications, and services. You can implement high availability by reducing any single points-of-failure and by using redundant components. Similarly, connecting multiple instances of identity management components with a load balancer can provide a highly available environment.

This section describes two examples to illustrate Advanced Edition and Standard Edition implementations at a high level. You can use them as a reference to come up with a deployment diagram for your implementation.

Sample Advanced Edition Deployment

Figure 1-4 shows a high-level deployment topology of an Identity Manager Advanced Edition installation.

Figure 1-4 *Sample Advanced Edition Deployment*



- Identity Manager Server components and its underlying repository (Identity Vault) and Web-enabled components (Identity Applications and Identity Reporting) are installed in the intranet zone. The load balancer then routes the traffic to the Identity Applications components. This deployment provides enhanced security because these components are separated from Internet traffic by firewalls.
- The Identity Manager Server components are configured to use a two server (primary/secondary) configuration. A virtual logical IP address is active on the primary server, which acts as the primary (active) node and another server acts as the secondary node. If the primary server fails, the logical IP address is moved to the secondary server. All the processes are then started on the secondary server. The application processes accessing the secondary server may experience a temporary loss of service when the logical IP address is moved over, and all other processes are started. All the components use the same Identity Vault server at any point of time.

- SSPR services are available inside and outside the firewall to address the password management needs of local and mobile users of the organization. The services installed inside the firewall address the local password management needs. In case of forgotten password, the mobile workforce cannot access VPN which will prevent them from accessing the internally placed SSPR services. They can directly access the SSPR services placed outside the firewall to manage their passwords.
- User Application and authentication service (OSP) are deployed in a cluster to handle the load and support the failover process for Identity Applications. The cluster nodes are attached to the same Identity Applications database that is installed on a separate computer. This deployment provides increased scalability by allowing you to add more nodes to the cluster. The cluster configuration is immediately sent to the newly added nodes. The load balancer is typically part of the cluster. It understands the cluster configuration as well as failover policies. In this configuration, all the cluster nodes are active at any point of time. The load balancer distributes the load across the nodes to ensure that the nodes have roughly the same workload. If a node fails, it diverts the requests made to that node to the surviving nodes in the cluster. Because this installation is an intrasite, high availability solution, it provides protection from local hardware and software failures, using a two node hardware-based cluster to achieve high availability for Identity Applications components.

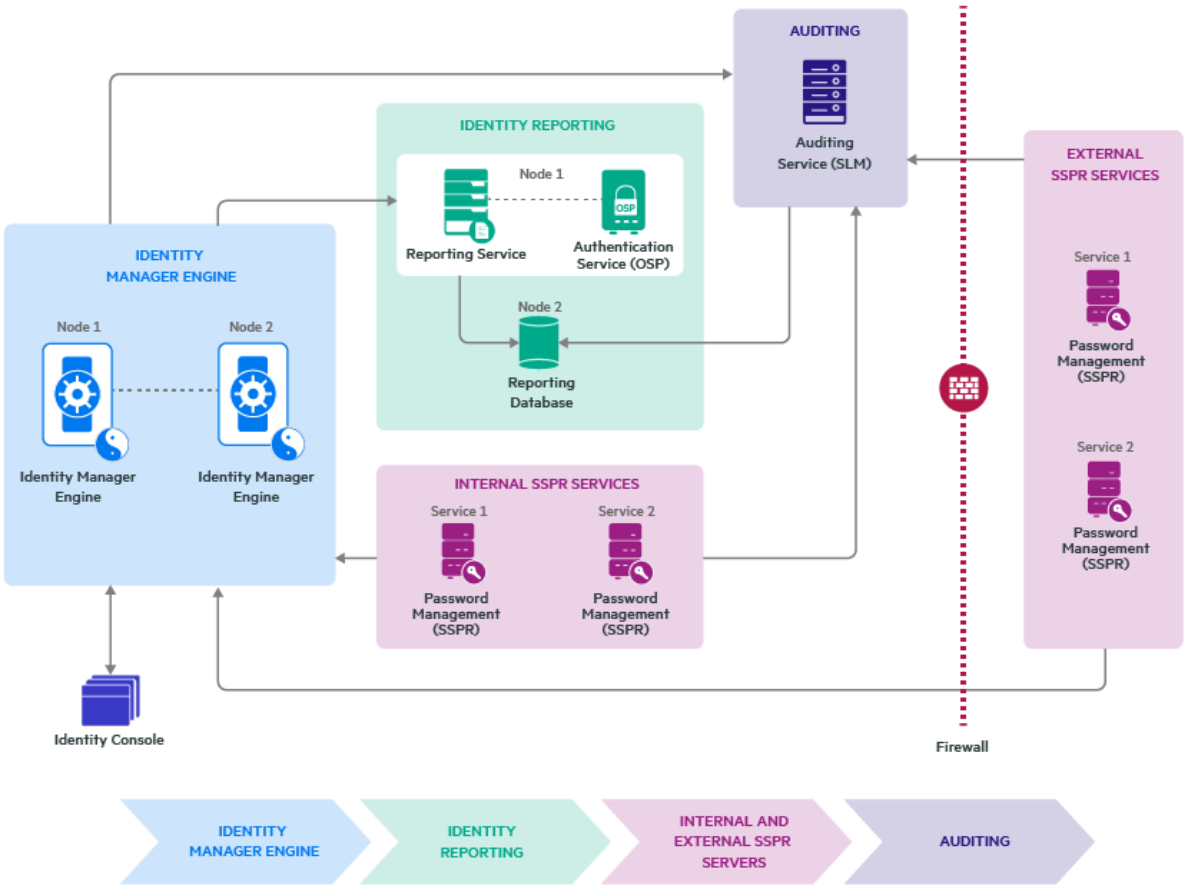
NetIQ has tested and recommends this configuration.

NOTE: Identity Manager does not support clustering the Identity Reporting components.

Sample Standard Edition Deployment

In production deployments, security policies might specify to not expose the authentication service that provides advanced authentication and protection for your environment to the public network. Figure 1-5 shows a high-level deployment topology of an Identity Manager Standard Edition installation .

Figure 1-5 *Sample Standard Edition Deployment*



- Identity Manager Server components and its underlying repository (Identity Vault) and Identity Reporting components are installed in the intranet zone. Internet Web traffic is routed to the Identity Reporting components through the Web servers that are installed behind the firewall for added protection. This deployment provides enhanced security because these components are separated from Internet traffic by firewalls.
- The Identity Manager Server components are configured to use a two-server (primary/secondary) configuration. A virtual logical IP address is active on the primary server, which acts as the active node while another server acts as the secondary node. If the primary server fails, the logical IP address is moved to the secondary server. All the processes are then started on the secondary server. The application processes accessing the secondary server may experience a temporary loss of service when the logical IP address is moved over, and all other processes are started. All the components use the same Identity Vault server at any point of time.
- SSPR services are available inside and outside the firewall to address the password management needs of local and mobile users of the organization. The services installed inside the firewall address the local password management needs. In case of forgotten password, the mobile workforce cannot access VPN which will prevent them from accessing the internally placed SSPR services. They can directly access the SSPR services placed outside the firewall to manage their passwords.

NetIQ has tested and recommends this configuration.

NOTE: Identity Manager does not support clustering the Identity Reporting components.

II Planning to Install Identity Manager

Planning your Identity Manager implementation depends on how you want Identity Manager to manage users and what functionality you need to accomplish your business goals. Consider the following points to help you make decisions:

- How do I manage identities.
- Do I need automated provisioning.
- Which business requirements should I implement using workflow.

The result of your decisions will determine the best way to implement Identity Manager for your requirements.

There are additional tasks that require planning before deploying Identity Manager in a large enterprise. For more information, refer to the Planning section of the NetIQ Identity Manager Overview and Planning Guide.

2 Planning Your Installation

The following table lists the components to install to support the functionality that you want to implement. For instructions on installing these components, see the Installation section.

Functionality	Component to Install
Manage user identities in a corporate directory	Identity Manager Server
Provision accounts in connected systems	Identity Manager Server
	Identity Applications
	User Application Driver
	Role and Resource Service Driver
	Designer
	NOTE: For instructions on installing Identity Manager drivers, see the driver implementation guide for the type of driver that you want to install on the Identity Manager Drivers Documentation Website.
Authentication	Identity Manager Server
	One Single Sign-On Provider
Password management	Identity Manager Server
	Self Service Password Management
Generate reports on Identity Manager activity	Identity Manager Server
	Identity Reporting
	One Single Sign-On Provider

Determine Hardware Requirements

The hardware that you need for your Identity Manager installation is governed by two factors:

- Functionality that you want to implement
- Size of your deployment

The following deployment types can help you estimate the size of the deployment.

Type Of Deployment	Hardware Requirements
Proof of Concept (demonstration)	A single server deployment for use in demonstrations or basic testing in a development environment.

Type Of Deployment	Hardware Requirements
Basic	A multi-server implementation that is suitable for small to medium size implementations. This type of implementation requires one server for running Identity Manager Server and its components and two additional servers for running the Identity Applications and Identity Reporting components.
Intermediate	A high availability implementation that is suitable for medium size implementations.
Large Enterprise	A high availability implementation that includes Identity Manager engine cluster to provide failover capabilities and another cluster of Identity Applications and authentication service to support single sign-on access (OSP on Windows) and load balancing and fault tolerance.

Deployment Planning Worksheet

Use the information in this topic to understand the details of a new implementation of Identity Manager.

Table 2-1 *Planning Worksheet*

Planning Activity	Worksheet
Decide on your implementation type based on use cases and size the deployment	Sizing Worksheet
Design your deployment architecture. List down the number of physical computers/servers and other systems needed to support your environment	Architecture Worksheet
Ensure that your system meets the system requirements	System Requirements Worksheet
Review the network ports to determine whether the default ports will conflict with the ports in use	Reviewing the Ports Used by the Identity Manager Components

Sizing Worksheet

It is important to estimate the size of your deployment correctly because the steps to follow and the design elements vary depending on the size of the deployment. Review sizing and scalability considerations for each component to understand the capacity requirements.

Table 2-2 *Sizing Worksheet*

Characteristic	Value
Number of Physical Computers/Servers	
Number of Drivers Running on the primary Identity Manager Server	

Characteristic	Value
Number of Drivers Running on the secondary Identity Manager Server	
Number of Identity Applications Nodes in the cluster	
Number of Identity Applications Databases	
Number of Self-Service Password Reset Instances inside the firewall	
More to follow...	

Architecture Worksheet

After sizing the deployment, select the appropriate deployment and record the number of physical computers/servers required to support the deployment.

Table 2-3 *Architecture Worksheet*

Deployment use case
Identity Manager Server failover deployment with all drivers
Number of Drivers Running
Identity Applications high availability deployment

System Requirements Worksheet

For information about the recommended hardware, supported operating systems, and supported virtual environments, see the System Requirements for Identity Manager 4.8.

For information about system requirements for a specific release, see the Release Notes accompanying the release at the Identity Manager documentation website.

An Identity Manager implementation can vary based on the needs of your IT environment, so you should contact NetIQ Consulting Services or any of the NetIQ Identity Manager partners prior to finalizing the Identity Manager architecture for your environment.

Reviewing the Ports Used by the Identity Manager Components

Identity Manager components use different ports for proper communication among the Identity Manager components.

NOTE: If a default port is already in use, ensure that you specify a different port for the Identity Manager component.

Port Number	Component	Port Use
389	Identity Vault	Used for LDAP communication in clear text with Identity Manager components
465	Identity Reporting	Used for communication with the SMTP mail server
524	Identity Vault	Used for NetWare Core Protocol (NCP) communication
636	Identity Vault	Used for LDAP with TLS/SSL communication with Identity Manager components
5432	Identity Applications	Used for communication with the identity applications database
7707	Identity Reporting	Used by the Managed System Gateway driver to communicate with the Identity Vault
8000	Remote Loader	Used by the driver instance for TCP/IP communication **NOTE:** Each instance of the Remote Loader should be assigned a unique port.
8005	Identity Applications	Used by Tomcat to listen for shutdown commands
8009	Identity Applications	Used by Tomcat for communication with a web connector using the AJP protocol instead of HTTP
8028	Identity Vault	Used for HTTP clear text communication with NCP communication
8030	Identity Vault	Used for HTTPS communication with NCP communication
8080	Identity Applications	Used by Tomcat for HTTP clear text communication
8090	Remote Loader	Used by the Remote Loader to listen for TCP/IP connections from the remote interface shim **NOTE:** Each instance of the Remote Loader should be assigned a unique port.
8109	Identity Applications	Applies only when using the integrated installation process Used by Tomcat for communication with a web connector using the AJP protocol instead of HTTP
8180	Identity Applications	Used for HTTP communications by the Tomcat application server on which the identity applications run

Port Number	Component	Port Use
8443	Identity Applications	Used by Tomcat for HTTPS (SSL) communication or redirecting requests for SSL communication
8543	Identity Applications	*Not listening, by default* Used by Tomcat to redirect requests that require SSL transport when you do not use TLS/SSL protocol
5432	Identity Reporting	Used for the PostgreSQL database Sentinel
45654	User Application	Used by the server on which the database for the identity applications are installed to listen for communications, when running Tomcat with a cluster group

III Installing and Configuring Identity Manager Components

This section guides you through the process of installing and configuring Identity Manager components. For installation instructions, see "Installation Procedures" on page 45.

After Identity Manager components are installed and basic configuration has been completed, you must perform some additional configuration steps for the components to be fully functional. For more information, see Chapter 4, "Final Steps for Completing the Installation," on page 61.

3 Installation and Configuration Process Overview

This section describes the process of installing and configuring Identity Manager components. You must review the configuration options for each component before beginning the configuration process. For more information, see Understanding the Configuration Settings.

Some components, such as Designer and Analyzer, might not require configuration.

Installation Order

The components must be installed in the following order because the installation programs for some components require information about previously installed components:

- Sentinel Log Management for Identity Governance and Administration (IGA) (installation supported only on Linux computers)
- Identity Manager Server components
- Identity Applications components (only for Advanced Edition)
- Identity Reporting components
- Designer for Identity Manager
- Analyzer for Identity Manager

You must review the installation prerequisites and considerations for each component before installing the component.

Understanding the Installation and Configuration Process for Identity Manager Server, Identity Applications, and Identity Reporting Components

Identity Manager provides a wizard-based installation method for installing and configuring the following Identity Manager components:

- Identity Manager Server
- Identity Applications
- Identity Reporting

The installer allows you to install and configure the components interactively or silently. The installation process allows you to specify the values for the installed components.

The installation process also creates a repository of dependent components such as JRE, Apache Tomcat, PostgreSQL, ActiveMQ, and OpenSSL on your filesystem. When you install multiple Identity Manager components on the same computer, the installation process refers to this repository

instead of creating multiple copies of these components for each Identity Manager component that requires them. For example, Identity Applications and Identity Reporting use the same Tomcat when they are installed on the same computer.

Types of Installation Methods

Identity Manager supports interactive and silent installation methods. A silent (non-interactive) installation does not display a user interface or ask the user any questions.

Interactive Method

Requires you to select the components that you want to install. Based on your selection, the components are installed.

Silent Method

You are required to specify the values for the components you want to install in the properties file. When the installation program is invoked, it reads these values from the properties file. You can use the same properties file to run silent installation on different computers in your environment.

Installation Options

The following table describes the components that are installed with the installation options provided by the installation program.

Table 3-1 *Installation Options*

Installation Option	Components Installed
Identity Manager Engine	Installs the Identity Vault, Identity Manager Engine, Remote Loader Service and Identity plug-ins, Fanout Agent, and drivers.
Identity Applications	Installs Identity Applications, One SSO Provider (OSP), User Application driver, Roles and Resource Service Driver (RRSD), PostgreSQL, and Self Service Password Reset (SSPR). **NOTE:** If you want to install SSPR on a different server than Identity Applications, use the install.exe available at `<iso mounted location>\common\sspr\` directory.
Identity Reporting	Installs Identity Reporting, OSP, PostgreSQL, Data Collection Service Driver (DCS), and Managed System Gateway (MSG) driver.

Types of Configuration Modes

You can configure the Identity Manager components in the following ways:

- Typical
- Custom

A typical configuration assumes default settings for most of the configuration options. In a custom configuration, you can specify custom values according to your requirement. You can configure most of the settings by using this option.

Using Non-Intuitive Passwords During Configuration

Many of the Identity Manager components require you to specify a password during the configuration phase. For faster configuration, you can instruct the process to apply the same password to all the configuration parameters.

The password must be a minimum of six characters. Do not use words that can be found in the dictionary. Dictionary words are vulnerable to freely available password-cracking tools that often come with dictionary lists. If you must use dictionary words, try combining them with numerals and punctuation.

Understanding the Installation Process for Designer and Analyzer

Identity Manager provides separate Windows installation programs for Designer and Analyzer. The installation programs for Designer and Analyzer are available on the product download site.

Designer

You can install Designer using the `Identity_Manager_4.8_Windows_Designer.tar.gz` file. For silent installation, specify the values for installation in the `designerInstaller.properties` file. Otherwise, the installer will assume the default parameter values for the installation.

Designer does not require any configuration.

Analyzer

You can install Analyzer using the `Identity_Manager_4.8_Windows_Analyzer.tar.gz` file. For silent installation, specify the values for installation in the `designerInstaller.properties` file. Otherwise, the installer will assume the default parameter values for the installation.

Analyzer does not require any configuration.

Installation Procedures

Use this topic to understand the installation methods for Identity Manager components.

Installation Procedures for Identity Manager Server, Identity Applications, and Identity Reporting

This section guides you through the process of installing the Identity Manager Server, Identity Applications, and Identity Reporting components through an interactive method or silent method. The **Identity Manager Server** option in the installation program allows you to install the 32-bit, 64-bit and .NET Remote loader.

NOTE: Before installing Identity Manager engine, ensure that your Windows server is updated with the latest Windows patch and the Windows server is restarted.

Interactive Installation

1. Download the `Identity_Manager_4.8_Windows.iso` from the download site.
2. Mount the downloaded iso.
3. Based on the component that you wish to install, run the `install.exe` available at the following locations:
   - **Identity Manager Server:** `<iso mounted location>\IdentityManagerServer`
   - **Identity Applications:** `<iso mounted location>\IdentityApplications`
   - **Identity Reporting:** `<iso mounted location>\IdentityReporting`
4. Select the language that you want to use for the installation and click **OK**.

   The **Introduction** screen displays the components available for installation.
5. Click **Next**.
6. Read and accept the license agreement.
7. Select the components you wish to install and click **Next**.
8. Specify the installation folder and then click **Next**.

   NOTE: The custom installation folder should not contain special characters such as . and _.
9. Select the installation type:
   - Typical Installation
   - Custom Installation
10. Based on the mode of installation that you have selected, the installation parameters will differ. Specify the required details. For information on the configuration parameters, see the following tables:
    - Identity Manager Engine Settings
    - Identity Applications Settings
    - Identity Reporting Settings
11. Review the details on the pre-install summary page and click **Install**.

Silent Installation

To run a silent installation of the Identity Manager components, use the properties files available in the `.iso` for the respective components. The Identity Manager media includes a sample properties file at `<iso_downloaded_location>\<Identity Manager Component>\response-files` location.

To install the component using silent installation, perform the following actions:

1. Download the `Identity_Manager_4.8_Windows.iso` from the NetIQ Downloads website.
2. Mount the downloaded `.iso`.

3 Based on the mode of installation that you want to use for installing the components, use the `typical_install.properties` or `custom_install.properties` files available at the following locations:

- **Identity Manager Server:** `<iso mounted location>\IdentityManagerServer\response-files`
- **Identity Applications:** `<iso mounted location>\IdentityApplications\response-files`
- **Identity Reporting:** `<iso mounted location>\IdentityReporting\response-files`

4 Modify the installation parameters according to your requirement. For information on the configuration parameters, see the following tables:

- Identity Manager Engine Settings
- Identity Applications Settings
- Identity Reporting Settings

5 To run the silent installation, run the following command from the directory of the component to be installed:

```
.\install.exe -i silent -f <path to typical or custom install properties file>
```

For example:

```
.\install.exe -i silent -f C:\Users\Administrator\Desktop typical_install_idmengine.properties
```

6 (Optional) For default installed locations, see the install log. For example, you can check the following files:

```
C:\Program Files\NetIQ\IDM\Install\logs
```

Installing Remote Loader

Identity Manager provides you an option to install Remote Loader on a standalone server. Use this option when you want to install Identity Manager Engine and Remote Loader on separate computers.

NOTE: You can install the 64-bit Remote Loader and `.NET` Remote Loader using this option. To install a 32-bit remote loader, see Installation Procedures for Identity Manager Server, Identity Applications, and Identity Reporting.

Interactive Installation

1 Download the `Identity_Manager_4.8_RL_Windows.iso` from the NetIQ Downloads website.

2 Mount the downloaded `.iso`.

3 From the mounted location, run the `install.exe` file.

4 Select the language that you want to use for the installation and click **OK**.

5 Click **Next**.

6 Read and accept the license agreement.

7 Click **Next**.

8 Specify the installation folder and click **Next**.

9 Click **Install**.

Silent Installation

1 Download the `Identity_Manager_4.8_RL_Windows.iso` from the NetIQ Downloads website.

2 Mount the downloaded `.iso`.

3 Navigate to the `<ISO mounted location>\response-files`.

4 To perform a silent installation, run the following command from the directory of the properties file:

```
install.exe -i silent -f install.properties
```

Installing Java Remote Loader

Identity Manager uses the Java Remote Loader to exchange data between the Identity Manager engine running on one server and the Identity Manager drivers running in another location, where `rdxml` does not run. You can install java remote loader - dirxml_jremote on any supported Windows platform that has a compatible JRE and Java Sockets.

1 On the server that hosts the Identity Manager engine, copy the application shim `.iso` or `.jar` files, in the default location. For example, `C:\NetIQ\idm\NDS\lib` directory.

2 Log in to the computer where you want to install the Java Remote Loader (the target computer).

3 Verify that the target computer has a supported version of JRE.

4 Download the `Identity_Manager_4.8_Windows.iso` from the NetIQ Downloads website.

5 Mount the downloaded `.iso`.

6 Navigate to the `<iso mounted location>\IdentityManagerServer\products\IDM\java_remoteloader` directory.

7 Copy the `dirxml_jremote_dev.tar.gz` file to the desired location on the target computer. For example, copy the file to `C:\NetIQ\idm`.

8 Copy one of the following files to the desired location on the target computer:

- `dirxml_jremote.tar.gz`
- `dirxml_jremote_mvs.tar`

  For information about mvs, untar the `dirxml_jremote_mvs.tar` file, then refer to the `usage.html` document.

9 On the target computer, unzip and extract the `.tar.gz` files.

For example, use 7-Zip or supported software to unzip `.tar.gz` files.

10 Set the `CLASSPATH` environment variable to all jars that are present in `lib` folder. If you have dependent jars specific to any driver, copy those jar files to `lib` folder, then set the `CLASSPATH` environment variable to these jars also.

For example, set:

```
CLASSPATH=E:\RL\JAVARL\lib\activation.jar;E:\RL\JAVARL\lib\commondrive
rshim.jar;E:\RL\JAVARL\lib\delimitedtextshim.jar;E:\RL\JAVARL\lib\deli
mitedtextutil.jar;E:\RL\JAVARL\lib\dirxml.jar;E:\RL\JAVARL\lib\dirxml_
misc.jar;E:\RL\JAVARL\lib\dirxml_remote.jar;E:\RL\JAVARL\lib\jco3envir
onment.jar;E:\RL\JAVARL\lib\mail.jar;E:\RL\JAVARL\lib\mapdb.jar;E:\RL\
JAVARL\lib\nxsl.jar;E:\RL\JAVARL\lib\shimwrapper.jar;E:\RL\JAVARL\lib\
xds.jar;E:\RL\JAVARL\lib\xp.jar
```

11 Set the PATH environment variable to `bin` folder of JDK or JRE for `Java.exe`.

12 You must specify the location of the jar files in the `dirxml_jremote` script from the lib subdirectory of the untarred `dirxml_jremote.tar.gz` directory. For example, `\lib\*.jar`.

13 Configure the sample configuration file `config8000.txt` for use with your application shim.

The `dirxml_jremote.tar.gz` jar file contains this file. For more information, see Configuring the Remote Loader and Drivers in the *NetIQ Identity Manager Driver Administration Guide*.

14 Launch the Remote Loader using following commands:

14a To specify a Remote Loader password:

```
java.exe -classpath %CLASSPATH%
com.novell.nds.dirxml.remote.loader.RemoteLoader -config <config
file name> -sp <Remote Loader Password> <Object Driver Password>
```

For example,

```
java.exe -classpath %CLASSPATH%
com.novell.nds.dirxml.remote.loader.RemoteLoader -config
e:\RL\JAVARL\config8000.txt -sp novell novell
```

14b To start the Remote Loader:

```
java.exe -classpath %CLASSPATH%
com.novell.nds.dirxml.remote.loader.RemoteLoader -config <config
file name>
```

For example,

```
java.exe -classpath %CLASSPATH%
com.novell.nds.dirxml.remote.loader.RemoteLoader -config
e:\RL\JAVARL\config8000.txt
```

14c To stop the Remote Loader:

```
java.exe -classpath %CLASSPATH%
com.novell.nds.dirxml.remote.loader.RemoteLoader -config <config
file name> -unload
```

For example,

```
java.exe -classpath %CLASSPATH%
com.novell.nds.dirxml.remote.loader.RemoteLoader -config
e:\RL\JAVARL\config8000.txt -unload
```

Installing .NET Remote Loader

To install the .NET Remote Loader as an administrative user:

1. Log in as administrator on the computer where you want to install the .NET Remote Loader.
2. To access the installation program, complete one of the following steps:
   - **2a** (Conditional) If you have the `.iso` image file for the Identity Manager installation package, navigate to the directory containing the .NET Remote Loader installation files, located by default in the `\products\idm\windows\setup\` directory.
   - **2b** (Conditional) If you downloaded the .NET Remote Loader installation files from the NetIQ Downloads website, complete the following steps:
     - Navigate to the `.tgz` file for the downloaded image.
     - Extract the contents of the file to a folder on the local computer.
3. Run the `idm_install.exe` program from the installation directory.
4. Accept the license agreement, and then click **Next**.
5. In the Select Components window, specify the .NET Remote Loader.
6. (Optional) To select specific drivers for the individual components, complete the following steps:
   - **6a** Click **Customize the selected components**, and then click **Next**.
   - **6b** Expand **Drivers** under the component that you want to install.
   - **6c** Select the drivers that you want to install.
7. Click **Next**.
8. In the **Activation Notice** window, click **OK**.
9. Select the .NET Remote Loader installation directory on your computer.
10. Review the Summary page, then click **Install** to complete the installation.

Installing SSPR

The installer provides you an option to install SSPR separately. Use this option when you want to install Identity Applications and SSPR on separate computers. This is the only option to install SSPR in a Standard Edition. SSPR is not automatically installed in a Standard Edition.

You can perform an interactive or a silent installation of SSPR.

Interactive Installation

1. Download the `Identity_Manager_4.8_Windows.iso` from the NetIQ Downloads website.
2. Mount the downloaded `.iso`.
3. Navigate to the `<ISO mounted location>\common\sspr` directory.
4. Run the `install.exe` file.
5. Select the language that you want to use for the installation and click **OK**.
6. Click **Next**.
7. Read and accept the license agreement.

8 Click **Next**.

9 Specify the installation folder and click **Next**.

10 Specify the configuration settings for SSPR. For more information, see "Configuration Worksheet for Self-Service Password Reset" on page 57.

11 Click **Next**.

12 Click **Install**.

Silent Installation

1 Download the `Identity_Manager_4.8_Windows.iso` from the NetIQ Downloads website.

2 Mount the downloaded `.iso`.

3 Navigate to the `<ISO mounted location>\common\sspr` directory.

4 To perform a silent installation, run the following command from the directory of the properties file:

```
install.exe -i silent -f sspr_silentinstall.properties
```

Understanding the Configuration Settings

Use the following worksheets to help collect the information that you need to specify when configuring the Identity Manager components.

Configuration Worksheet for Identity Manager Engine

Use the following worksheet to help collect the information that you need to specify when configuring Identity Manager Engine.

Table 3-2 *Identity Manager Engine Settings*

Parameter	Description
Identity Vault DIB Location	Specify the Identity Vault DIB location.
Create a New Tree	Select this option if you want to create a new Identity Vault tree.
Tree Name	*Applies only if you have selected the* **Create a New Tree** *option.* Specify the Identity Vault tree name.
Add to an Existing Tree	Select this option if you want to connect to an Identity Vault tree existing on a remote server. You must only specify an IP address; hostname or FQDN is not supported.
Host	*Applies only if you have selected the* **Add to an Existing Tree** *option.* Specify the IP address for your Identity Vault.

Parameter	Description
Secure LDAP Port	*Applies only if you have selected the* **Add to an Existing Tree** *option.* Specifies the port on which the Identity Vault listens for LDAP requests using Secure Sockets Layer (SSL) protocol. The default value is 636. If a service already loaded on the server (before you install eDirectory) uses the default port, you must specify a different port.
Administrator DN	Specify the administrator name for Identity Manager engine. The default value is `cn=admin,ou=sa,o=system`.
Administrator Password	Specify the password for the Administrator object. For example, `password`.
Identity Vault Server Context (in LDAP format)	Specify the DN for the server container. The default value is `ou=servers, o=system`
Identity Vault Driver Set (in LDAP format)	Specify the context DN for the driver set. The default value is `cn=DriverSet, o=system`.
Clear Text LDAP Port	Specify the port on which the Identity Vault listens for LDAP requests in clear text. The default value is 389.
Secure LDAP Port	Specify the port on which the Identity Vault listens for LDAP requests using Secure Sockets Layer (SSL) protocol. The default value is 636. If a service already loaded on the server (before you install eDirectory) uses the default port, you must specify a different port.
Clear Text HTTP Port	Specify the port on which the HTTP stack operates in clear text. The default value is 8028.
Secure HTTP Port	Specify the port on which the HTTP stack operates using TLS/SSL protocol. The default value is 8030.
RSA Key Size	*Applies only if you have selected the* **Create a New Tree** *option.* Specify the key size for RSA certificates. Allowed values are 2048, 4096, and 8192 bits. The default value is 4096.
EC Curve	*Applies only if you have selected the* **Create a New Tree** *option.* Specify the elliptical curve (EC) limit for EC certificates. Allowed values are P256, P384, and P521. The default value is P384.
Certificate Lifetime	*Applies only if you have selected the* **Create a New Tree** *option.* Specify the certificate life in years.

Configuration Worksheet for Identity Applications

Use the following worksheet to help collect the information that you need to specify when configuring Identity Applications.

Table 3-3 *Identity Applications Settings*

Parameter	Description
Install Self-Service Password Reset	Specify whether you want to install the SSPR component.
Host	Specify the IP address of the server where Identity Vault is installed.
Secure LDAP Port	Specify the port on which the Identity Vault listens for LDAP requests using Secure Sockets Layer (SSL) protocol. The default value is 636. If a service already loaded on the server (before you install eDirectory) uses the default port, you must specify a different port.
Administrator DN	Specify the administrator name for Identity Manager engine. The default value is `cn=admin,ou=sa,o=system`.
Administrator Password	Applies only when installing a new authentication server. Specify the password for the administrator account of the LDAP authentication server.
Root Container DN	Specify the root container. The default value is `o=data`.
User Container DN	*Applies only when installing a new authentication server.* Specify the container in the LDAP authentication server where you store the user accounts that can log in to Access Review. For example, `o=data`.
Administrator Container DN	*Applies only when installing a new authentication server.* Specify the container in the LDAP authentication server where you store the administrator accounts.
Driver Set DN	Specify the driver set DN.
Deploy Identity Applications Drivers	Select this option if you want to deploy the User Application driver and the Roles and Resources Services driver.
Select the Database Platform for Identity Applications	Select the database that you want use with the Identity Applications. The options are PostgreSQL, Oracle, and Microsoft SQL Server.
New PostgreSQL Server	Select this option if you want to install a new instance of the PostgreSQL database.
Existing PostgreSQL Server	Select this option if you want to connect to an existing PostgreSQL database server.
Database Host	Specify the name or IP address of the server.

Parameter	Description
Database Port	Specify the port that you want the server to use for communication with the User Application. By default, the value is set to `5432`.
Identity Applications Database Name	Specify the name of the database for identity applications.
Workflow Engine Database Name	Specify the name of the database for workflow engine.
Database User	Specify the name of an account that allows the User Application to access and modify data in the databases.
Database User Password	Specify the database user password.
Database Driver Jar	Specify the JAR file for the database platform. The database vendor provides the driver JAR file, which represents the Thin Client JAR for the database server. For example, for PostgreSQL, you might specify `postgresql-9.4-1212.jdbc42.jar`, by default in the `C:\NetIQ\idm\apps\Postgres` folder. NetIQ does not support driver JAR files from third-party vendors.
When would you like the schema to be created	Specify when you want to create the database schema as part process. The available options are **Now**, **At Application Startup**, and **Write SQL to a File**.
Application Server Host	Specify the IP address where Tomcat is installed.
Application Server HTTPS Port	Specify the port where Tomcat is installed. By default the value is set to `8543`.
Login Screen Name	Specify the custom name that you want to display on user login screen. The default value is `Identity Access`. When you upgrade Identity Applications, the login screen name automatically changes to `NetIQ Access`.
Identity Applications Administrator	Specify the DN for an administrator account of the LDAP authentication server. For example, `cn=uaadmin,ou=sa,o=data`
Administrator Password	Specify the Identity Applications administrator password.
Set this password as a common password for other settings	Select this option if you want to set a common password. **NOTE:** The default password for Tomcat keystore is `changeit`.
OAuth Keystore Password	*Applies only if you have selected the* **Set this password as a common password for other settings** *check box.* Specify the OAuth keystore password.
SSO Client Password	*Applies only if you have selected the* **Set this password as a common password for other settings** *check box.* Specify the SSO client password.

Parameter	Description
SSPR Configuration Password	*Applies only if you have selected the* **Set this password as a common password for other settings** *check box.* Specify the SSPR configuration password.
Form Renderer HTTPS Port	Specify the form renderer HTTPS port. By default the value is set to `8600`.
Workflow Engine ID	Specify a unique value for the Workflow Engine ID.

Configuration Worksheet for Identity Reporting

Use the following worksheet to help collect the information that you need to specify when configuring Identity Reporting.

Table 3-4 *Identity Reporting Settings*

Parameter	Description
Host	Specify the IP address of the server where Identity Vault is installed.
Secure LDAP Port	Specify the port on which the Identity Vault listens for LDAP requests using Secure Sockets Layer (SSL) protocol. The default value is 636. If a service already loaded on the server (before you install eDirectory) uses the default port, you must specify a different port.
Administrator DN	Specify the administrator name for Identity Manager engine. The default value is `cn=admin,ou=sa,o=system`.
Administrator Password	Specify the password for the administrator account of the LDAP authentication server.
User Container DN	*Applies only when installing a new authentication server.* Specify the container in the LDAP authentication server where you store the user accounts that can log in to Access Review. For example, `o=data`.
Administrator Container DN	*Applies only when installing a new authentication server.* Specify the container in the LDAP authentication server where you store the administrator accounts.
Driver Set DN	Specify the driver set DN.
Deploy Identity Reporting Drivers	Select this option if you want to deploy the Data Collection Services driver and the Managed System Gateway services driver.
Select the Database Platform for Identity Reporting	Select the database that you want to use with the Identity Reporting. The options are PostgreSQL, Oracle, and Microsoft SQL Server.

Parameter	Description
New PostgreSQL Server	Select this option if you want to install a new instance of the PostgreSQL database.
Existing PostgreSQL Server	Select this option if you want to connect to an existing PostgreSQL database server.
Database Host	Specify the name or IP address of the server.
Database Port	Specify the port that you want the server to use for communication with Identity Reporting. By default, the value is set to `5432`.
Database Name	Specify the database name for Identity Reporting.
Database User Password	Specify the database user password.
Database Account Password	Specify the database account password for Identity Reporting.
Application Server Host	Specify the IP address where Tomcat is installed.
Application Server HTTPS Port	Specify the port where Tomcat is installed. By default the value is set to `8543`.
External OSP Server	Select this option if you want to connect to an external OSP server. For example, use this option if you want to connect to a remote OSP which is used by Identity Applications.
OSP Server Host	*Applies only if you have selected the* **External OSP Server** *option.* Specify the IP address of the server where OSP is installed.
OSP Server Port	*Applies only if you have selected the* **External OSP Server** *option.* Specify the OSP server port.
OSP Keystore	*Applies only if you have selected the* **External OSP Server** *option.* Specify the location of the OSP keystore file.
OSP Keystore Password	*Applies only if you have selected the* **External OSP Server** *option.* Specify the OSP keystore password.
OSP Client Password	*Applies only if you have selected the* **External OSP Server** *option.* Specify the OSP client password.
Identity Reporting Administrator	Specifies the administrator name for Identity Reporting. The default value is `cn=uaadmin,ou=sa,o=data`.
Identity Reporting Administrator password	Specifies the administrator password for Identity Reporting.
Set this password as a common password for other settings	Select this option if you want to set a common password.

Configuration Worksheet for Self-Service Password Reset

Use the following worksheet to help collect the information that you need to specify when configuring Self-Service Password Reset (SSPR).

This section applies only when you want to install Identity Applications and SSPR on separate computers.

Table 3-5 *SSPR Settings*

Parameter	Description
Host	Specify the IP address of the server where Identity Vault is installed.
Secure LDAP Port	Specify the port on which the Identity Vault listens for LDAP requests using Secure Sockets Layer (SSL) protocol. The default value is 636. If a service already loaded on the server (before you install eDirectory) uses the default port, you must specify a different port.
Administrator DN	Specify the administrator name for Identity Manager engine. The default value is `cn=admin,ou=sa,o=system`.
Administrator Password	Specify the password for the administrator account of the LDAP authentication server.
User Container DN	*Applies only when installing a new authentication server.* Specify the container in the LDAP authentication server where you store the user accounts that can log in to Access Review. For example, `o=data`.
Administrator Container DN	*Applies only when installing a new authentication server.* Specify the container in the LDAP authentication server where you store the administrator accounts.
Application Server Host	Specify the IP address where Tomcat is installed.
Application Server HTTPS Port	Specify the port where Tomcat is installed. By default the value is set to 8543.
Identity Applications Administrator	Specify the DN for an administrator account of the LDAP authentication server. For example, `cn=uaadmin,ou=sa,o=data`
Administrator Password	Specify the Identity Applications administrator password.
Authentication Server Host	Specify the IP address of the server where OSP is installed.
Authentication Server HTTPS Port	Specify the OSP server HTTPS port.
Authentication Server Client Password	Specify the OSP client password.

Post-Installation Steps

This section provides information about updating your Tomcat environment after you install the identity applications.

- "Passing the preferIPv4Stack Property to JVM" on page 58
- "Checking the Health of the Server" on page 58
- "Monitoring the Health Statistics" on page 58
- "Creating Compound Indexes" on page 59
- "Configuring Identity Application to Reject Client-initiated SSL Renegotiation" on page 60

Passing the preferIPv4Stack Property to JVM

The identity applications use JGroups for the caching implementation. In some configurations, JGroups requires that the preferIPv4Stack property be set to true to ensure that the mcast_addr binding is successful.

Without this option, the following error might occur:

```
[10/1/09 16:11:22:147 EDT] 0000000d UDP           W org.jgroups.util.Util
createMulticastSocket could not bind to /228.8.8.8 (IPv4 address); make
sure
your mcast_addr is of the same type as the IP stack (IPv4 or IPv6).
```

You might also see this error:

```
[3/21/12 10:04:32:470 EDT] 00000024 UDP      E org.jgroups.protocols.TP
down
failed sending message to null (131 bytes)
        java.lang.Exception: dest=/228.8.8.8:45654 (134 bytes)
    at org.jgroups.protocols.UDP._send(UDP.java:353)
```

The parameter `java.net.preferIPv4Stack=true` is a system property that can be set in the same manner as other system properties such as `extend.local.config.dir`.

Checking the Health of the Server

Most loadbalancers provide a healthcheck feature for determining whether an HTTP server is up and listening. The User Application contains a URL that can be used for configuring HTTP healthchecks on your loadbalancer. The URL is:

```
http://<NodeIP>:port/IDMProv/jsps/healthcheck.jsp
```

Monitoring the Health Statistics

The REST API allows you to retrieve information about the health of the User Application. The API can access the system for the currently running threads, memory consumption, cache, and cluster information and returns the information using the GET operation.

- **Memory information (JVM and system memory):** Reads the memory related information such as system memory and memory consumed by the JVM.

For example,

```
http://<ip_addr:port>/IDMProv/rest/monitoring/statistics/memoryinfo
```

- **Thread information:** Reads the information about the CPU-intensive threads and returns the list of top threads that cause heavy utilization of the CPU.

  For example,

  ```
  http://<ip_addr:port>/IDMProv/rest/monitoring/statistics/threadinfo
  ```

  To access the stack trace of threads in the JVM, set the stack parameter to **True**.

  For example,

  ```
  http://<ip_addr:port>/IDMProv/rest/monitoring/statistics/
  threadinfo?stack=true
  ```

  To specify the number of threads in the JVM, specify the value for the **thread-count** parameter.

  For example,

  ```
  http://<ip_addr:port>/IDMProv/rest/monitoring/statistics/
  threadinfo?thread-count=1
  ```

- **Cache information:** Reads the cache information for the User Application.

  For example,

  ```
  http://<ip_addr:port>/IDMProv/rest/monitoring/statistics/cacheinfo
  ```

- **Cluster information:** Reads the cluster related information.

  For example,

  ```
  http://<ip_addr:port>/IDMProv/rest/monitoring/statistics/clusterinfo
  ```

NOTE: You need to be a Security Administrator to view the User Application health statistics by using the REST API.

Creating Compound Indexes

After installing or upgrading the identity applications, manually create the compound indexes for each attribute that you want to use to sort users in the Identity Manager Dashboard. You can create compound indexes using `ndsindex` utility which is located in the eDirectory installed path. You can specify multiple attributes separated using $ sign for compound indexing. Following are the basic attributes that require compound indexing:

- Surname,Given Name
- Given Name,Surname
- cn,Surname
- Title,Surname
- Telephone Number,Surname
- Internet Email Address,Surname

- L,Surname
- OU,Surname

The following command helps you to create compound indexes using `ndsindex` utility:

```
ndsindex add [-h <hostname>] [-p <port>] -D <admin DN> -W|[-w <password>] -
s <eDirectory Server DN> [<indexName1>, <indexName2>.....]
```

For example, to sort users based on **Title**, execute the following command:

```
ndsindex add -h <hostname> -p <ldap port> -D <admin DN> -w <admin passwd> -
s <eDirectory Server DN> Title-SN;Title$Surname;value
```

You can also create compound indexes using Conversion Export Utility.

You must use an LDIF file to create indexes. After the LDIF file is imported, initiate the indexing activity by triggering Limber. Otherwise, indexing takes place when Limber triggers automatically.

Example LDIF file to create compound indexes to sort users on **Title** attribute:

```
dn: cn=osg-nw5-7, o=Novell

changetype: modify

add: indexDefinition

indexDefinition: 0$sntitleindex$0$0$0$1$Title$surname
```

For more information LDIF files, see LDIF Files in *NetIQ eDirectory Administration Guide*.

Configuring Identity Application to Reject Client-initiated SSL Renegotiation

By default, the identity applications installer configures a non-secure connection (http). Under certain circumstances, a non-secure connection can make Identity Manager susceptible to a denial-of-service attack caused by client initiated SSL renegotiation with the identity applications server. To prevent this issue, add the following flag to the `CATALINA_OPTS` entry in `<tomcat-install-directory>\bin\setenv.bat` file.

```
"-Djdk.tls.rejectClientInitiatedRenegotiation=true"
```

4 Final Steps for Completing the Installation

After completing the installation and configuration of Identity Manager components, you must perform certain tasks to make your solution work properly in your environment. For example, configure the drivers you installed to meet the policies and requirements defined by your business processes and configure Sentinel Log Management for IGA to gather audit events.

Post-installation tasks typically include the following items:

- "Configuring the Identity Vault" on page 61
- "Configuring the Remote Loader and Drivers" on page 62
- "Configuring Forgotten Password Management" on page 62
- "Configuring the Database for the Identity Applications" on page 66
- "Configuring Identity Applications" on page 69
- "Configuring the Runtime Environment for Data Collection" on page 94
- "Configuring Identity Reporting" on page 103
- "Activating Identity Manager" on page 108
- "Reviewing the Ports Used by Identity Manager Components" on page 108

Configuring the Identity Vault

- Manually Importing Identity Applications and Identity Reporting Certificates into Identity Vault

Manually Importing Identity Applications and Identity Reporting Certificates into Identity Vault

- If you have custom certificates for Identity Applications and Identity Reporting components, import those certificates into cacerts in the Identity Vault (`C:\NetIQ\eDirectory\jre\lib\security\cacerts`).

  For example, you can use the following keytool command to import certificates into the Identity Vault:

  ```
  keytool -import -trustcacerts -alias <User Application certificate
  alias name> -keystore <cacerts file> -file <User Application
  certificate file>
  ```

- If you install SSPR on a different server than the User Application server, import the SSPR application certificate into idm.jks in the User Application (`C:\NetIQ\idm\apps\tomcat\conf\idm.jks`).

For example, you can use the following keytool command to import certificates into User Application:

```
keytool -import -trustcacerts -alias <SSPR certificate alias name> -
keystore <idm.jks> -file <SSPR certificate file>
```

Configuring the Remote Loader and Drivers

Remote Loader allows Identity Manager drivers to access the connected application without requiring to install Identity Vault and Identity Manager engine on the same server as the application. Using Remote Loader requires you to configure the application shim so that it can securely connect with the Identity Manager engine. You must also configure both the Remote Loader and Identity Manager drivers. This information is provided in detail in Configuring the Remote Loader and Drivers in the *NetIQ Identity Manager Driver Administration Guide*.

Configuring Forgotten Password Management

The Identity Manager installation includes Self Service Password Reset to help you manage the process for resetting forgotten passwords. Alternatively, you can use an external password management system.

- "Using Self Service Password Reset for Forgotten Password Management" on page 62
- "Using an External System for Forgotten Password Management" on page 64
- "Updating SSPR Links in the Dashboard for a Distributed or Clustered Environment" on page 66

Using Self Service Password Reset for Forgotten Password Management

In most cases, you can enable the forgotten password management feature when you install SSPR and the identity applications. However, you might not have specified the URL of the landing page for the identity applications to which SSPR forwards users after a password change. You might also need to enable forgotten password management. This section provides the following information:

- "Configuring Identity Manager to Use Self Service Password Reset" on page 62
- "Configuring Self Service Password Reset for Identity Manager" on page 63
- "Locking the SSPR Configuration" on page 63

Configuring Identity Manager to Use Self Service Password Reset

This section provides information about configuring Identity Manager to use SSPR.

1. Log in to the server where you installed the identity applications.
2. Run the configuration update utility. For more information, see Section 3, "Installation and Configuration Process Overview," on page 43.
3. In the utility, navigate to **Authentication** > **Password Management**.
4. For **Password Management Provider**, specify **Self Service Password Reset (SSPR)**.

5 (Optional) To provide links for resetting the username or password, or activation of a new user account on the Identity Applications login page, select **Other links** from the **User Interface** drop-down list followed by selecting the required check box. Alternatively, you can provide a common link by selecting **"Can't sign in?"** from the **User Interface** drop-down list. The following link will display on the Identity Applications login page: **Click here if you've forgotten your username or password, or if you need to register.**

6 Navigate to **IDM SSO Clients** > **Self Service Password Reset**.

7 For **OAuth client ID**, specify the name that you want to use to identify the single sign-on client for SSPR to the authentication server. The default value is `sspr`.

8 For **OAuth client secret**, specify the password for the single sign-on client for SSPR.

9 For **OAuth redirect URL**, specify the absolute URL to which the authentication server redirects a browser client when authentication is complete.

   Use the following format: `protocol://server:port/path`. For example, `http://10.10.10.48:8180/sspr/public/oauth`.

10 Save your changes and close the utility.

Configuring Self Service Password Reset for Identity Manager

This section provides information about configuring SSPR to work with Identity Manager. For example, you might want to modify the password policies and challenge response questions.

When you installed SSPR with Identity Manager, you specified a password that an administrator can use to configure the application. NetIQ recommends that you modify the SSPR settings, then specify an administrator account or group can configure SSPR.

NOTE: If you install SSPR on a different server than user application server, ensure that SSPR application certificate is added to user application `cacerts`.

---

1 Log in to SSPR by using the configuration password that you specified during installation.

2 In the Settings page, modify the settings for the password policy and challenge response questions. For more information about configuring the default values for SSPR settings, see Configuring Self Service Password Reset in the *NetIQ Self Service Password Reset Administration Guide*.

3 Lock the SSPR configuration file (SSPR`Configuration.xml`). For more information about locking the configuration file, see "Locking the SSPR Configuration" on page 63.

4 (Optional) To modify SSPR settings after you lock the configuration, you must set the `configIsEditable` setting to `true` in the SSPR`Configuration.xml` file.

5 Log out of SSPR.

6 For the changes to take effect, restart Tomcat.

Locking the SSPR Configuration

1 Go to **http://<IP/DNS name>:<port>/sspr**. This link takes you to the SSPR portal.

2 Log in to the Identity Manager with an administrator account or log in with your existing login credentials.

3 Click **Configuration Manager** at the top of the page and specify the configuration password that you specified during installation.

4 Click **Configuration Editor** and navigate to **Settings > LDAP Settings**.

5 Lock the SSPR configuration file (`SSPRConfiguration.xml`).

   5a Under the Administrator Permission section, define a filter in LDAP format for a user or a group that has administrator rights to SSPR in the Identity Vault. By default, the filter is set to `groupMembership=cn=Admins,ou=Groups,o=example`.

   For example, set it to `uaadmin` (`cn=uaadmin`) for the User Application administrator.

   This prevents users from modifying the configuration in SSPR except the SSPR admin user who has full rights to modify the settings.

   5b To ensure LDAP query returns results, click **View Matches**.

   If there is any error in the setting, you cannot proceed to the next configuration option. SSPR displays the error details to help you troubleshoot the issue.

   5c Click **Save**.

   5d In the confirmation window that pops up, click **OK**.

   When SSPR is locked, the admin user can see additional options in the Administration user interface such as Dashboard, User Activity, Data Analysis, and so on that were not available for him before SSPR lock down.

6 (Optional) To modify SSPR settings after you lock the configuration, you must set the `configIsEditable` setting to `true` in the `SSPRConfiguration.xml` file.

7 Log out of SSPR.

8 Log in to SSPR again as an admin user defined in Step 3.

9 Click **Close Configuration**, then click **OK** to confirm the changes.

10 For the changes to take effect, restart Tomcat.

Using an External System for Forgotten Password Management

To use an external system, you must specify the location of a WAR file containing Forgot Password functionality. This process includes the following activities:

- "Specifying an External Forgotten Password Management WAR File" on page 65
- "Testing the External Forgot Password Configuration" on page 65
- "Configuring SSL Communication between Application Servers" on page 66

Specifying an External Forgotten Password Management WAR File

If you did not specify these values during installation and want to modify the settings, you can use either the RBPM Configuration utility or make the changes in the User Application as an administrator.

1 (Conditional) To modify the settings in the RBPM Configuration utility, complete the following steps:

   1a Log in to the server where you installed the identity applications.

   1b Run the RBPM configuration utility. For more information, see Section 3, "Installation and Configuration Process Overview," on page 43.

   1c In the utility, navigate to **Authentication > Password Management**.

   1d For **Password Management Provider**, specify **User Application (Legacy)**.

2 (Conditional) To modify the settings in the User Application, complete the following steps:

   2a Log in as the User Application Administrator.

   2b Navigate to **Administration > Application Configuration > Password Module Setup > Login**.

3 For **Forgotten Password**, specify **External**.

4 For **Forgot Password Link**, specify the link shown when the user clicks **Forgot password** on the login page. When the user clicks this link, the application directs the user to the external password management system. For example:

   `http://localhost:8180/ExternalPwd/jsps/pwdmgt/ForgotPassword.jsp`

5 For **Forgot Password Return Link**, specify the link shown after the user finishes performing the forgot password procedure. When the user clicks this link, the user is redirected to the link specified. For example:

   `http://localhost/IDMProv`

6 For **Forgot Password Web Service URL**, specify the URL for the web service that the external forward password WAR uses to call back to the identity applications. Use the following format:

   `https://idmhost:sslport/idm/pwdmgt/service`

   The return link must use SSL to ensure secure web service communication to the identity applications. For more information, see "Configuring SSL Communication between Application Servers" on page 66.

7 Manually copy `ExternalPwd.war` to the remote application server deploy directory that runs the external password WAR functionality.

Testing the External Forgot Password Configuration

If you have an external password WAR file and want to test the Forgot Password functionality by accessing it, you can access it in the following locations:

- Directly, in a browser. Go to the Forgot Password page in the external password WAR file. For example, `http://localhost:8180/ExternalPwd/jsps/pwdmgt/ForgotPassword.jsp`.
- On the User Application login page, click the link for **Forgot password**.

Configuring SSL Communication between Application Servers

If you use an external password management system, you must configure SSL communication between the Tomcat instances on which you deploy the identity applications and the External Forgotten Password Management WAR file. For more information, refer to the Tomcat documentation.

Updating SSPR Links in the Dashboard for a Distributed or Clustered Environment

The installation process assumes that you deploy SSPR on the same application server as the identity applications and Identity Reporting. By default, the built-in links on the **Applications** page in the Dashboard use a relative URL format that points to SSPR on the local system. For example, `\sspr\private\changepassword`. If you install the applications in a distributed or clustered environment, you must update the URLs for the SSPR links.

For more information, see the *Help for the Identity Applications*.

1. Log in as an administrator to the Dashboard. For example, log in as `uaadmin`.
2. Click **Edit**.
3. In the Edit Home Items page, hover on the item that you want to update, and then click the edit icon. For example, select **Change My Password**.
4. For **Link**, specify the absolute URL. For example, `http://10.10.10.48:8180/sspr/changepassword`.
5. Click **Save**.
6. Repeat for each SSPR link that you want to update.
7. Upon completion, click **I'm done**.
8. Log out, and then log in as a regular user to test the changes.

Configuring the Database for the Identity Applications

The database for the Identity Applications supports tasks such as storing configuration data and data for workflow activities. Before you can install the applications, the database must be installed and configured. For more information about supported databases, see the NetIQ Identity Manager System requirements Page.

NOTE: If you are migrating to a new version of RBPM and the Identity Applications, you must use the same database that you used for the previous installation. That is, the installation from which you are migrating.

- "Configuring an Oracle Database" on page 67
- "Configuring a SQL Server Database" on page 68

Configuring an Oracle Database

This section provides configuration options for using an Oracle database for the User Application. For information about supported versions of Oracle, see the NetIQ Identity Manager Technical Information website.

Checking Compatibility Level of Databases

Databases from different releases of Oracle are compatible if they support the same features and those features perform the same way. If they are not compatible, certain features or operations might not work as expected. For example, creation of schema fails that does not allow you to deploy the identity applications.

To check the compatibility level of your database, perform the following steps:

1. Connect to the Database Engine.
2. After connecting to the appropriate instance of the SQL Server Database Engine, in **Object Explorer**, click the server name.
3. Expand **Databases**, and, depending on the database, either select a user database or expand **System Databases** and select a system database.
4. Right-click the database, and then click **Properties**.

   The **Database Properties** dialog box opens.
5. In the **Select a page** pane, click **Options**.

   The current compatibility level is displayed in the **Compatibility level** list box.
6. To check the **Compatibility Level**, enter the following in the query window and click **Execute**.

   ```
   SQL> SELECT name, value FROM v$parameter
   WHERE name = 'compatible';
   ```

The expected output is: 12.2.0.1

Configuring the Character Set

Your User Application database must use a Unicode-encoded character set. When creating the database, use AL32UTF8 to specify this character set.

To confirm that an Oracle 12c database is set for UTF-8, issue the following command:

```
select * from nls_database_parameters;
```

If the database is not configured for UTF-8, the system responds with the following information:

```
NLS_CHARACTERSET
WE8MSWIN1252
```

Otherwise, the system responds with the following information that confirms the database is configured for UTF-8:

```
NLS_CHARACTERSET
AL32UTF8
```

NOTE: It is recommended to use JDBC JAR version `ojdbc6.jar`.

For more information about configuring a character set, see "Choosing an Oracle Database Character Set".

Configuring the Admin User Account

The User Application requires that the Oracle database user account have specific privileges. In the SQL Plus utility, enter the following commands:

```
CREATE USER idmuser IDENTIFIED BY password
GRANT CONNECT, RESOURCE to idmuser
ALTER USER idmuser quota 100M on USERS;
```

where *`idmuser`* represents the user account.

Configuring a SQL Server Database

This section provides configuration options for using an SQL Server database for the User Application. For information about supported versions of SQL Server, see the NetIQ Identity Manager Technical Information website.

Configuring the Character Set

SQL Server does not allow you to specify the character set for databases. The User Application stores SQL Server character data in a NCHAR column type, which supports UTF-8.

NOTE: The only supported collation for SQL is SQL_Latin1_General_CP1_CI_AS.

Configuring the Admin User Account

After installing a supported version of Microsoft SQL Server, create a database and database user using an application such as SQL Server Management Studio. The database user account must have the following privileges:

- `CREATE TABLE`
- `DELETE`
- `INSERT`
- `SELECT`
- `UPDATE`

NOTE: It is recommended to use JDBC JAR version `sqljdbc4.jar` with Microsoft SQL Server 2014 and `sqljdbc42.jar` with Microsoft SQL Server 2016.

Configuring Identity Applications

- "Configuring the Settings for the Identity Applications" on page 69
- "Deploying REST APIs for Identity Applications" on page 91
- "Accessing the Oracle Database Using Oracle Service Name" on page 91
- "Manually Creating the Database Schema" on page 92
- "Configuring Single Sign-On Settings for the Identity Applications" on page 93
- "Starting the Identity Applications" on page 94
- "Configuration and Usage Considerations for the Identity Applications" on page 94

Configuring the Settings for the Identity Applications

The Identity Applications Configuration utility helps you manage the settings for the User Application drivers and the identity applications. The installation program for the identity applications invokes a version of this utility so that you can more quickly configure the applications. You can also modify most of these settings after installation.

The file to run the Configuration utility (`configupdate.bat`) is located by default in an installation subdirectory for the identity applications (`C:\NetIQ\idm\apps\UserApplication`).

NOTE: In a cluster, the configuration settings must be identical for all members of the cluster.

This section explains the settings in the configuration utility. The settings are organized by tabs. If you install Identity Reporting, the process adds parameters for Reporting to the utility.

- "Running the Identity Applications Configuration Utility" on page 69
- "User Application Parameters" on page 70
- "Reporting Parameters" on page 80
- "Authentication Parameters" on page 82
- "SSO Clients Parameters" on page 86
- "CEF Auditing Parameters" on page 90

Running the Identity Applications Configuration Utility

1. Open the `configupdate.properties` file in a text editor and verify that the following options are configured:

   ```
   edit_admin="true"
   ```

   ```
   use_console="false"
   ```

2. At the command prompt, run the configuration utility (`configupdate.bat`).

   NOTE: You might need to wait a few minutes for the utility to start up.

User Application Parameters

When configuring the identity applications, this tab defines the values that the applications use when communicating with the Identity Vault. Some settings are required for completing the installation process.

By default, the tab displays the basic options. To see all settings, click **Show Advanced Options**. This tab includes the following groups of settings:

- "Identity Vault Settings" on page 70
- "Identity Vault DNs" on page 71
- "Identity Vault User Identity" on page 74
- "Identity Vault User Groups" on page 75
- "Identity Vault Certificates" on page 76
- "Email Server Configuration" on page 76
- "Trusted Key Store" on page 78
- "NetIQ Sentinel Digital Signature Certificate & Key" on page 78
- "Miscellaneous" on page 79
- "Container Object" on page 80

Identity Vault Settings

This section defines the settings that enable the identity applications to access the user identities and roles in the Identity Vault. Some settings are required for completing the installation process.

Identity Vault Server

Required

Specifies the hostname or IP address for your LDAP server. For example: `myLDAPhost`.

LDAP port

Specifies the port on which the Identity Vault listens for LDAP requests in clear text. The default value is 389.

LDAP secure port

Specifies the port on which the Identity Vault listens for LDAP requests using Secure Sockets Layer (SSL) protocol. The default value is 636.

If a service already loaded on the server (before you install eDirectory) uses the default port, you must specify a different port.

Identity Vault Administrator

Required

Specifies the credentials for the LDAP Administrator. For example, `cn=admin`. This user must already exist in the Identity Vault.

The identity applications use this account to make an administrative connection to the Identity Vault. This value is encrypted, based on the master key.

Identity Vault Administrator Password

Required

Specifies the password associated the LDAP Administrator. This password is encrypted, based on the master key.

Use Public Anonymous Account

Specifies whether users who are not logged in can access the LDAP Public Anonymous Account.

Secure Administrator Connection

Specifies whether RBPM uses SSL protocol for all communication related to the admin account. This setting allows other operations that do not require SSL to operate without SSL.

NOTE: This option might have adverse performance implications.

Secure User Connection

Specifies whether RBPM uses TLS/SSL protocol for all communication related to the logged-in user's account. This setting allows other operations that do not require TLS/SSL to operate without the protocol.

NOTE: This option might have adverse performance implications.

Identity Vault DNs

This section defines the distinguished names for containers and user accounts that enable communication between the identity applications and other Identity Manager components. Some settings are required for completing the installation process.

Root Container DN

Required

Specifies the LDAP distinguished name of the root container. This is used as the default entity definition search root when no search root is specified in the directory abstraction layer. For example, o=mycompany.

User Container DN

Required

When showing the advanced options, the utility displays this parameter under Identity Vault User Identity.

Specifies the LDAP distinguished name (DN) or fully qualified LDAP name of the user container. The following considerations apply to this setting:

- Users in this container (and below) are allowed to log in to the identity applications.
- If you have started Tomcat hosting the identity applications, you cannot change this setting with the `configupdate.bat` file.
- This container must include the User Application Administrator that you specified as you set up the User Application driver. Otherwise, the specified account cannot execute workflows.

Group Container DN

Required

When showing the advanced options, the utility displays this parameter under Identity Vault User Groups.

Specifies the LDAP distinguished name (DN) or fully qualified LDAP name of the group container. The following considerations apply to this setting:

- Entity definitions within the directory abstraction layer use this DN.
- If you have started Tomcat hosting the identity applications, you cannot change this setting with the `configupdate.bat` file.

User Application Driver

Required

Specifies the distinguished name of the User Application driver.

For example, if your driver is UserApplicationDriver and your driver set is called myDriverSet, and the driver set is in a context of o=myCompany, specify `cn=UserApplicationDriver,cn=myDriverSet,o=myCompany`.

User Application Administrator

Required

Specifies an existing user account in the Identity Vault that has the rights to perform administrative tasks for the specified user container for User Application. The following considerations apply to this setting:

- If you have started Tomcat hosting the User Application, you cannot change this setting with the `configupdate.bat` file.
- To change this assignment after you deploy the User Application, use the **Administration > Security** pages in the User Application.
- This user account has the right to use the **Administration** tab of the User Application to administer the portal.
- If the User Application Administrator participates in workflow administration tasks exposed in Designer, or the User Application (**Requests & Approvals** tab), you must grant this administrator appropriate trustee rights to object instances contained in the User Application driver. For more information, see the *User Application Administration Guide* for details.

Provisioning Administrator

Specifies an existing user account in the Identity Vault that will manage Provisioning Workflow functions available throughout the User Application.

To change this assignment after you deploy the User Application, use the **Administration > Administrator Assignments** page in the User Application.

Compliance Administrator

Specifies an existing account in the Identity Vault that performs a system role to allow members to perform all functions on the **Compliance** tab. The following considerations apply to this setting:

- To change this assignment after you deploy the identity applications, use the **Administration > Administrator Assignments** page in the User Application.
- During a configuration update, changes to this value take effect only if you do not have a valid Compliance Administrator assigned. If a valid Compliance Administrator exists, then your changes are not saved.

Roles Administrator

Specifies the role that allows members to create, remove, or modify all roles, and grant or revoke any role assignment to any user, group, or container. It also allows its role members to run any report for any user. The following considerations apply to this setting:

- By default, the User Application Admin is assigned this role.
- To change this assignment after you deploy the identity applications, use the **Administration > Administrator Assignments** page in the User Application.
- During a configuration update, changes to this value take effect only if you do not have a valid Roles Administrator assigned. If a valid Roles Administrator exists, then your changes are not saved.

Security Administrator

Specifies the role that gives members the full range of capabilities within the Security domain. The following considerations apply to this setting:

- The Security Administrator can perform all possible actions for all objects within the Security domain. The Security domain allows the Security Administrator to configure access permissions for all objects in all domains within RBPM. The Security Administrator can configure teams, and also assign domain administrators, delegated administrators, and other Security Administrators.
- To change this assignment after you deploy the identity applications, use the **Administration > Administrator Assignments** page in the User Application.

Resources Administrator

Specifies the role that gives members the full range of capabilities within the Resource domain. The following considerations apply to this setting:

- The Resources Administrator can perform all possible actions for all objects within the Resource domain.
- To change this assignment after you deploy the identity applications, use the **Administration > Administrator Assignments** page in the User Application.

RBPM Configuration Administrator

Specifies the role that gives members the full range of capabilities within the Configuration domain. The following considerations apply to this setting:

- The RBPM Configuration Administrator can perform all possible actions on all objects within the Configuration domain. The RBPM Configuration Administrator controls access to navigation items within RBPM. In addition, the RBPM Configuration Administrator configures the delegation and proxy service, the provisioning user interface, and the workflow engine.
- To change this assignment after you deploy the identity applications, use the **Administration > Administrator Assignments** page in the User Application.

RBPM Reporting Administrator

Specifies the Reporting Administrator. By default, the installation program lists this value as the same user as the other security fields.

Identity Vault User Identity

This section defines the values that enable the identity applications to communicate with a user container in the Identity Vault. Some settings are required for completing the installation process.

The utility displays these settings only when you select **Show Advanced Options**.

User Container DN

Required

When not showing the advanced options, the utility displays this parameter under Identity Vault DNs.

Specifies the LDAP distinguished name (DN) or fully qualified LDAP name of the user container. The following considerations apply to this setting:

- Users in this container (and below) are allowed to log in to the identity applications.
- If you have started Tomcat hosting the identity applications, you cannot change this setting with the `configupdate.bat` file.
- This container must include the User Application Administrator that you specified as you set up the User Application driver. Otherwise, the specified account cannot execute workflows.

User Search Scope

Specifies the depth of scope that Identity Vault users can search the container.

User Object Class

Specifies the object class of the LDAP user. Usually the class is `inetOrgPerson`.

Login Attribute

Specifies the LDAP attribute that represents the user's login name. For example, `cn`.

Naming Attribute

Specifies the LDAP attribute used as the identifier when looking up users or groups. This is not the same as the login attribute, which is used only during login. For example, `cn`.

User Membership Attribute

(Optional) Specifies the LDAP attribute that represents the user's group membership. Do not use spaces when specifying the name.

Identity Vault User Groups

This section defines the values that enable the identity applications to communicate with a group container in the Identity Vault. Some settings are required for completing the installation process.

The utility displays these settings only when you select **Show Advanced Options**.

Group Container DN

Required

When not showing the advanced options, the utility displays this parameter under Identity Vault DNs.

Specifies the LDAP distinguished name (DN) or fully qualified LDAP name of the group container. The following considerations apply to this setting:

- Entity definitions within the directory abstraction layer use this DN.
- If you have started Tomcat hosting the identity applications, you cannot change this setting with the `configupdate.bat` file.

Group Container Scope

Specifies the depth of scope that Identity Vault users can search for the group container.

Group Object Class

Specifies the object class of the LDAP group. Usually the class is `groupofNames`.

Group Membership Attribute

(Optional) Specifies the user's group membership. Do not use spaces in this name.

Use Dynamic Groups

Specifies whether you want to use dynamic groups.

You must also specify a value for **Dynamic Group Object Class**.

Dynamic Group Object Class

Applies only when you select **Use Dynamic Groups***.*

Specifies the object class of the LDAP dynamic group. Usually the class is `dynamicGroup`.

Identity Vault Certificates

This section defines the path and password for the JRE keystore. Some settings are required for completing the installation process.

Keystore Path

Required

Specifies the full path to your keystore (`cacerts`) file of the JRE that Tomcat uses to run. You can manually enter the path or browse to the `cacerts` file. The following considerations apply to this setting:

- In environments, you must specify the installation directory of RBPM. The default value is set to the correct location.
- The installation program for the identity applications modifies the keystore file.

Keystore Password

Required

Specifies the password for the keystore file. The default is `changeit`.

Email Server Configuration

This section defines the values that enable email notifications, which you can use for email-based approvals. For more information, see the *NetIQ Identity Manager - Administrator's Guide to the Identity Applications*.

Notification Template Host

Specifies the name or IP address of Tomcat that hosts the identity applications. For example, `myapplication serverServer`.

This value replaces the $HOST$ token in e-mail templates. The installation program uses this information to create a URL to provisioning request tasks and approval notifications.

Notification Template Port

Specifies the port number of Tomcat that hosts the identity applications.

This values replaces the $PORT$ token in e-mail templates that are used in provisioning request tasks and approval notifications.

Notification Template Secure Port

Specifies the secure port number of Tomcat that hosts the identity applications.

This value replaces the $SECURE_PORT$ token in e-mail templates used in provisioning request tasks and approval notifications.

Notification Template Protocol

Specifies a non-secure protocol included in the URL when sending user email. For example, `http`.

This value replaces the $PROTOCOL$ token in e-mail templates used in provisioning request tasks and approval notifications.

Notification Template Secure Protocol

Specifies the secure protocol included in the URL when sending user email. For example, `https`.

This value replaces the $SECURE_PROTOCOL$ token in e-mail templates used in provisioning request tasks and approval notifications.

Notification SMTP Email From

Specifies the email account that the identity applications use to send email notifications.

SMTP Server Name

Specifies the IP address or DNS name of the SMTP email host that the identity applications use for provisioning emails. Do not use `localhost`.

Server requires authentication

Specifies whether you want the server to require authentication.

You must also specify the credentials for the email server.

User name

Applies only when you enable **Server requires authentication***.*

Specifies the name of a login account for the email server.

Password

Applies only when you enable **Server requires authentication***.*

Specifies the password of an login account for the mail server.

Use SMTP TLS

Specifies whether you want to secure the contents of email messages during transmission between the mail servers.

Email Notification Image Location

Specifies the path to the image that you want to include in email notifications.

When the Identity Applications server and the email server are both set to use secure connection, make sure that the following conditions are met:

- The certificate used to establish a secure connection between the Identity Applications server and the email server is a trusted CA certificate
- Use `https` in the image path. For example, `https://localhost:8543/IDMProv/images`

If Identity Applications is operating on a server that use http for plain text communication, replace `https` with `http` in the image path. An example of the image path: `http://localhost:8080/IDMProv/images`

Sign email

Specifies whether you want to add a digital signature to outgoing messages.

If you enable this option, you must also specify settings for the keystore and signature key.

Keystore Path

Applies only when you enable **Sign email***.*

Specifies the full path to the keystore (`cacerts`) file that you want to use for digitally signing an email. You can manually enter the path or browse to the `cacerts` file.

For example, `C:\NetIQ\idm\apps\jre\lib\security\cacerts`.

Keystore Password

Applies only when you enable **Sign email**.

Specifies the password for the keystore file. For example, `changeit`.

Alias of signature key

Applies only when you enable **Sign email**.

Specifies the alias of the signing key in the keystore. For example, `idmapptest`.

Signature key password

Applies only when you enable **Sign email**.

Specifies the password that protects the file containing the signature key. For example, `changeit`.

Trusted Key Store

This section defines the values for the trusted keystore for the identity applications. The utility displays these settings only when you select **Show Advanced Options**.

Trusted Store Path

Specifies the path to the Trusted Key Store that contains all trusted signers' certificates. If this path is empty, the identity applications get the path from System property `javax.net.ssl.trustStore`. If the System property cannot provide the path, the installation program defaults to `jre\lib\security\cacerts`.

Trusted Store Password

Specifies the password for the Trusted Key Store. If you leave this field is empty, the identity applications gets the password from System property `javax.net.ssl.trustStorePassword`. If the System property cannot provide the path, the installation program defaults to `changeit`.

This password is encrypted, based on the master key.

Trusted Store Type

Specifies whether the trusted store path uses a Java keystore (JKS) or PKCS12 for digital signing.

NetIQ Sentinel Digital Signature Certificate & Key

This section defines the values that allows Identity Manager to communicate with Sentinel for auditing events. The utility displays these settings only when you select **Show Advanced Options**.

Sentinel Digital Signature Certificate

Lists the custom public key certificate that you want the OAuth server to use to authenticate audit messages sent to Sentinel.

Sentinel Digital Signature Private Key

Specifies the path to the custom private key file that you want the OAuth server to use to authenticate audit messages sent to Sentinel.

Miscellaneous

The utility displays these settings only when you select **Show Advanced Options**.

OCSP URI

Specifies the Uniform Resource Identifier (URI) to use when the client installation uses the On-Line Certificate Status Protocol (OCSP). For example, `http://host:port/ocspLocal`.

The OCSP URI updates the status of trusted certificates online.

Authorization Config Path

Specifies the fully qualified name of the authorization configuration file.

Identity Vault Indexes

During installation, specifies whether you want the installation program to create indexes on the manager and srvprvUUID attributes. After installation, you can modify the settings to point to a new location of the indexes. The following considerations apply to this setting:

- Without indexes on these attributes, identity applications users can experience impeded performance of the identity applications.
- You can create these indexes manually by using Identity Console after you install the identity applications.
- For best performance, you should create the index during installation.
- The indexes must be in Online mode before you make the identity applications available to users.
- To create or delete an index, you must also specify a value for **Server DN**.

Server DN

Applies only when you want to create or delete an Identity Vault index.

Specifies the eDirectory server where you want the indexes to be created or removed.

You can specify only one server at a time. To configure indexes on multiple eDirectory servers, you must run the RBPM Configuration utility multiple times.

Reinitialize RBPM Security

Specifies whether you want to reset RBPM security when the installation process completes. You must also redeploy the identity applications.

IDMReport URL

Specifies the URL of the Identity Manager Reporting Module. For example, `http://hostname:port/IDMRPT`.

Custom Themes Context Name

Specifies the name of the customized theme that you want to use for displaying the identity applications in the browser.

Log Message Identifier Prefix

Specifies the value that you want to use in the layout pattern for the CONSOLE and FILE appenders in the `idmuserapp_logging.xml` file. The default value is RBPM.

Change RBPM Context Name

Specifies whether you want to change the context name for RBPM.

You must also specify the new name and DN of the Roles and Resource driver.

RBPM Context Name

Applies only when you select **Change RBPM Context Name**.

Specifies the new context name for RBPM.

Role Driver DN

Applies only when you select **Change RBPM Context Name**.

Specifies the DN of the Roles and Resource driver.

Container Object

These parameters apply only during installation.

This section helps you to define the values for container objects or create new container objects.

Selected

Specifies the Container Object Types that you want to use.

Container Object Type

Specifies the container: locality, country, organizationalUnit, organization, or domain.

You can also define your own containers in Identity Console and add them under **Add a new Container Object**.

Container Attribute Name

Specifies the name of the Attribute Type associated with the specified Container Object Type.

Add a New Container Object: Container Object Type

Specifies the LDAP name of an object class from the Identity Vault that can serve as a new container.

Add a New Container Object: Container Attribute Name

Specifies the name of the Attribute Type associated with the new Container Object Type.

Reporting Parameters

When configuring the identity applications, this tab defines the values for managing Identity Reporting. The utility adds this tab when you install Identity Reporting.

By default, the tab displays the basic options. To see all settings, click **Show Advanced Options**. This tab includes the following groups of settings:

- "Email Delivery Configuration" on page 81
- "Report Retention Values" on page 81
- "Modify Locale" on page 82
- "Role Configuration" on page 82
- "Outbound Proxy" on page 82

Email Delivery Configuration

This section defines the values for sending notifications.

SMTP Server Hostname

Specifies the DNS name or IP address of the email server than you want Identity Reporting to use when sending notification. Do not use `localhost`.

SMTP Server Port

Specifies the port number for the SMTP server.

SMTP Use SSL

Specifies whether you want to use TLS/SSL protocol for communication with the email server.

Server Needs Authentication

Specifies whether you want to use authentication for communications with the email server.

SMTP User Name

Specifies the email address that you want to use for authentication.

You must specify a value. If the server does not require authentication, you can specify an invalid address.

SMTP User Password

Applies only when you specify that the server requires authentication.

Specifies the password for the SMTP user account.

Default Email Address

Specifies the email address that you want Identity Reporting to use as the origination for email notifications.

Report Retention Values

This section defines the values for storing completed reports.

Report Unit, Report Lifetime

Specifies the amount of time that Identity Reporting keeps completed reports before deleting them. For example, to specify six months, enter 6 in the **Report Lifetime** field and then select **Month** in the **Report Unit** field.

Location of Reports

Specifies a path where you want to store the report definitions. For example, `C:\NetIQ\idm\apps\IdentityReporting`.

Modify Locale

This section defines the values for the language that you want Identity Reporting to use. Identity Reporting uses the specific locales in searches. For more information, see the Administrator Guide to NetIQ Identity Reporting.

Role Configuration

This section defines the values for the authentication sources that Identity Reporting uses to generate reports.

Add Authentication Source

Specifies the type of authentication source that you want to add for reporting. Authentication sources can be

- **Default**
- **LDAP Directory**
- **File**

Outbound Proxy

Applies only when you use Identity Manager 4.8.1 or later versions.

This section defines the values to use reverse proxy server that Identity Reporting uses to download reports.

Use Proxy

Specifies the option to use Reverse Proxy server for reporting.

- **Hostname or IP address**
- **Port**
- **Use TLS**

  Applies only when you want to use TCP as your network protocol.

Authentication Parameters

When configuring the identity applications, this tab defines the values that Tomcat uses to direct users to the identity application and password management pages.

By default, the tab displays the basic options. To see all settings, click **Show Advanced Options**. This tab includes the following groups of settings:

- "Authentication Server" on page 83
- "Authentication Configuration" on page 83
- "Authentication Method" on page 84
- "Password Management" on page 84
- "Sentinel Digital Signature Certificate and Key" on page 86

Authentication Server

This section defines settings for the identity applications to connect to the authentication server.

OAuth server host identifier

Required

Specifies the relative URL of the authentication server that issues tokens to OSP. For example, 192.168.0.1.

OAuth server TCP port

Specifies the port for the authentication server.

Access Manager is the OAuth provider

Converting from OSP to NAM for OAuth is not supported from Authentication tab of configuration update utility. To hide this option, set the `no_nam_oauth` value to *"true"* in `configupdate.sh.properties` file.

OAuth server is using TLS/SSL

Specifies whether the authentication server uses TLS/SSL protocol for communication.

Optional TLS/SSL truststore file

Applies only when you select **OAuth server is using TLS/SSL** *and the utility is showing the advanced options.*

Optional TLS/SSL truststore password

Applies only when you select **OAuth server is using TLS/SSL** *and the utility is showing the advanced options.*

Specifies the password used to load the keystore file for the TLS/SSL authentication server.

NOTE: If you do not specify the keystore path and password, and the trust certificate for the authentication server is not in the JRE trust store (cacerts), the identity applications fail to connect to the authentication service that uses TLS/SSL protocol.

Authentication Configuration

This section defines settings for the authentication server.

LDAP DN of Admins Container

Required

Specifies the distinguished name of the container in the Identity Vault that contains any administrator User objects that OSP must authenticate. For example, `ou=sa,o=data`.

Duplicate resolution naming attribute

Specifies the name of the LDAP attribute used to differentiate between multiple eDirectory User objects with the same `cn` value. The default value is `mail`.

Restrict authentication sources to contexts

Specifies whether searches in the user and administrator containers in the Identity Vault are restricted to only User objects in those containers or searches should also include subcontainers.

Session Timeout (minutes)

Specifies the number of minutes of inactivity in a session before the server times out the user's session. The default value is 20 minutes.

Access token lifetime (seconds)

Specifies the number of seconds an OSP access token remains valid. The default value is 60 seconds.

Refresh token lifetime (hours)

Specifies the number of seconds an OSP refresh token remains valid. The refresh token is used internally by OSP. The default value is 48 hours.

Authentication Method

This section defines the values that enable OSP to authenticate users who log in to the browser-based components of Identity Manager.

Method

Specifies the type of authentication that you want Identity Manager to use when a user logs on.

- **Name and Password**: OSP verifies authentication with the identity vault.
- **Kerberos**: OSP accepts authentication from both a Kerberos ticket server and the identity vault. You must also specify a value for **Mapping attribute name**.
- **SAML 2.0**: OSP accepts authentication from both a SAML identity provider and the identity vault. You must also specify values for **Mapping attribute name** and **Metadata URL**.

Mapping attribute name

Applies only when you specify **Kerberos** *or* **SAML***.*

Specifies the name of the attribute that maps to the Kerberos ticket server or SAML representations at the identity provider.

Metadata URL

Applies only when you specify **SAML***.*

Specifies the URL that OSP uses to redirect the authentication request to SAML.

Password Management

This section defines the values that enable users to modify their passwords as a self-service operation.

Password Management Provider

Specifies the type of password management system that you want to use.

User Application (Legacy): Uses the password management program that Identity Manager traditionally has used. This option also allows you to use an external password management program.

Self Service Password Reset (SSPR): Use the NetIQ Self Service Password Reset service included with the Identity Applications that helps users to reset their password without administrative intervention. You can select the links that will display on the Identity Applications Dashboard login page, allowing users to select the appropriate action for resetting the login access based on their requirement. For more information, see "User Interface" on page 85.

SSPR is the default selection for the **Password Management Provider** field.

Forgotten Password

This menu list applies only when you select **User Application (Legacy)**.

Specifies whether you want to use the password management system integrated with the User Application or an external system.

- **Internal**: Use the default internal Password Management functionality, `./jsps/pwdmgt/ForgotPassword.jsp` (without the http(s) protocol at the beginning). This redirects the user to the Forgot Password functionality built into the User Application, rather than to an external WAR.
- **External**: Use an external Forgot Password WAR to call back the User Application through a web service. You must also specify the settings for the external system.

Forgotten Password Link

Applies only when you want to use an external password management system.

Specifies the URL that points to the Forgot Password functionality page. Specify a `ForgotPassword.jsp` file in an external or internal password management WAR.

Forgotten Password Return Link

Applies only when you want to use an external password management system.

Specifies the URL for the **Forgot Password Return Link** that the user can click after performing a forgot password operation.

Forgotten Password Web Service URL

Applies only when you want to use an external password management system.

Specifies the URL that the External Forgot Password WAR will use to call back to the User Application to perform core forgot password functionalities. Use the following format:

```
https://<idmhost>:<sslport>/<idm>/
pwdmgt/service
```

User Interface

This menu list applies only when you select **Self Service Password Reset (SSPR)**.

Specifies the links that you want to display on the login page of Identity Applications Dashboard. The default selection, **"Can't sign in?"** displays a common link for resetting the username or password, or to register for the access permission on the login page. If you select **None**, the user will have no option to reset the password on their own.

When you select "**Other links**", the following options are available for selection:

- **Forgot password**: Provides a link that an existing user can click to reset their password in case they have forgotten.

- **Forgot Username**: Provides a link that an existing user can click to reset their username and password in case they have forgotten.
- **Activate account**: Provides a link that the user can click to create a new user account for accessing Identity Applications.

Sentinel Digital Signature Certificate and Key

This section defines the values that allows Identity Manager to communicate with Sentinel for auditing events.

Sentinel Digital Signature Certificate

Specifies a custom public key certificate that you want the OSP server to use to authenticate audit messages sent to the audit system.

For information about configuring certificates for Novell Audit, see "Managing Certificates" in the *Novell Audit Administration Guide*.

Sentinel Digital Signature Private Key

Specifies the path to the custom private key file that you want the OSP server to use to authenticate audit messages sent to the audit system.

SSO Clients Parameters

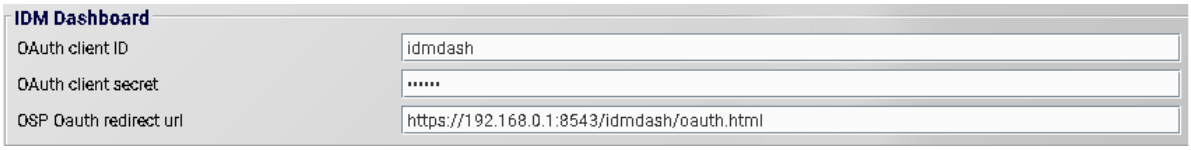
When configuring the identity applications, this tab defines the values for managing single sign-on access to the applications.

By default, the tab displays the basic options. To see all settings, click **Show Advanced Options**. This tab includes the following groups of settings:

- "IDM Dashboard" on page 86
- "IDM Administrator" on page 87
- "RBPM" on page 87
- "Reporting" on page 88
- "IDM Data Collection Service" on page 89
- "DCS Driver" on page 89
- "Self Service Password Reset" on page 90

IDM Dashboard

This section defines the values for the URL that users need to access the Identity Manager Dashboard, which is the primary login location for the identity applications.



OAuth client ID

Required

Specifies the name that you want to use to identify the single sign-on client for the Dashboard to the authentication server. The default value is `idmdash`.

OAuth client secret

Required

Specifies the password for the single sign-on client for the Dashboard.

OSP OAuth redirect URL

Required

Specifies the absolute URL to which the authentication server redirects a browser client when authentication is complete.

Use the following format: `protocol://server:port/path`. For example, `https://192.168.0.1:8543/idmdash/oauth.html`.

IDM Administrator

This section defines the values for the URL that users need to access the Identity Manager Administrator page.

OAuth client ID

Required

Specifies the name that you want to use to identify the single sign-on client for the Identity Manager Administrator to the authentication server. The default value is `idmadmin`.

OAuth client secret

Required

Specifies the password for the single sign-on client for the Identity Manager Administrator.

OSP OAuth redirect URL

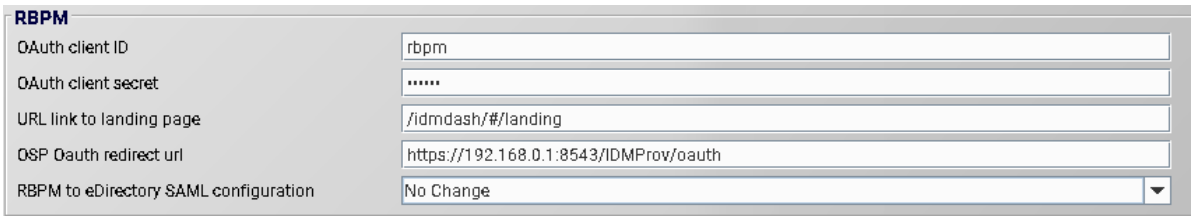
Required

Specifies the absolute URL to which the authentication server redirects a browser client when authentication is complete.

Use the following format: `protocol://server:port/path`. For example, `https://192.168.0.1:8543/idmadmin/oauth.html`.

RBPM

This section defines the values for the URL that users need to access the User Application.



OAuth client ID

Required

Specifies the name that you want to use to identify the single sign-on client for the User Application to the authentication server. The default value is `rbpm`.

OAuth client secret

Required

Specifies the password for the single sign-on client for the User Application.

URL link to landing page

Required

Specifies the relative URL to use to access the Dashboard from the User Application. The default value is `/landing`.

OSP OAuth redirect URL

Required

Specifies the absolute URL to which the authentication server redirects a browser client when authentication is complete.

Use the following format: `protocol://server:port/path`. For example, `https://192.168.0.1:8543/IDMProv/oauth`.

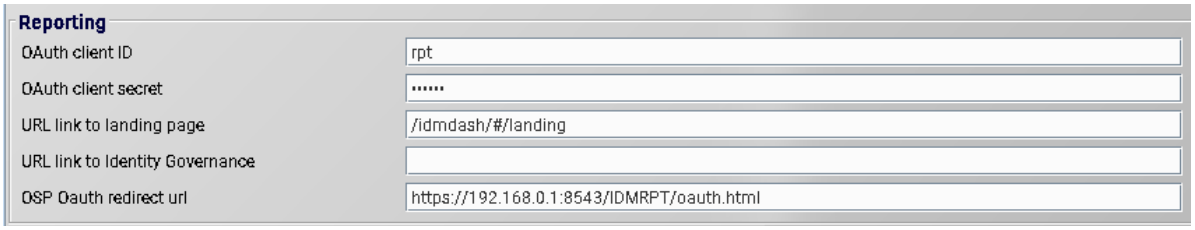
RBPM to eDirectory SAML configuration

Required

Specifies the RBPM to eDirectory SAML settings required for SSO authentication.

Reporting

This section defines the values for the URL that users need to access Identity Reporting. The utility display these values only if you add Identity Reporting to your Identity Manager solution.



OAuth client ID

Required

Specifies the name that you want to use to identify the single sign-on client for the Identity Reporting to the authentication server. The default value is `rpt`.

OAuth client secret

Required

Specifies the password for the single sign-on client for Identity Reporting.

URL link to landing page

Required

Specifies the relative URL to use to access the Dashboard from Identity Reporting. The default value is `/idmdash/#/landing`.

If you installed Identity Reporting and the identity applications in separate servers, then specify an absolute URL. Use the following format: `protocol://server:port/path`. For example, `https://192.168.0.1:8543/IDMRPT/oauth`.

OSP OAuth redirect url

Required

Specifies the absolute URL to which the authentication server redirects a browser client when authentication is complete.

Use the following format: `protocol://server:port/path`. For example, `https://192.168.0.1:8543/IDMRPT/oauth`.

IDM Data Collection Service

This section defines the values for the URL that users need to access the Identity Manager Data Collection Service.

OAuth client ID

Required

Specifies the name that you want to use to identify the single sign-on client for Identity Manager Data Collection Service to the authentication server. The default value is `idmdcs`.

OAuth client secret

Required

Specifies the password for the single sign-on client for the Identity Manager Data Collection Service.

OSP OAuth redirect URL

Required

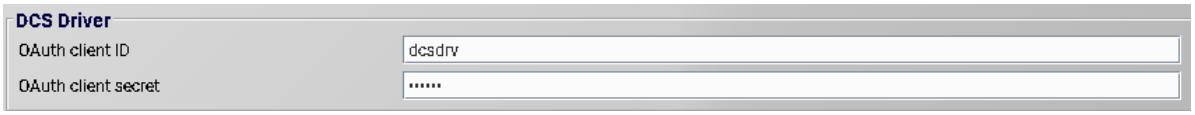
Specifies the absolute URL to which the authentication server redirects a browser client when authentication is complete.

Use the following format: `protocol://server:port/path`. For example, `https://192.168.0.1:8543/idmdcs/oauth.html`.

DCS Driver

This section defines the values for managing the Data Collection Services driver.

Figure 4-1



OAuth client ID

Specifies the name that you want to use to identify the single sign-on client for the Data Collection Service driver to the authentication server. The default value for this parameter is `dcsdrv`.

OAuth client secret

Specifies the password for the single sign-on client for the Data Collection Service driver.

Self Service Password Reset

This section defines the values for the URL that users need to access SSPR.

OAuth client ID

Required

Specifies the name that you want to use to identify the single sign-on client for SSPR to the authentication server. The default value is `sspr`.

OAuth client secret

Required

Specifies the password for the single sign-on client for SSPR.

OAuth redirect URL

Required

Specifies the absolute URL to which the authentication server redirects a browser client when authentication is complete.

Use the following format: `protocol://server:port/path`. For example, `https://192.168.0.1:8543/sspr/public/oauth.html`.

CEF Auditing Parameters

This section defines the values for managing the CEF Auditing parameters.

Send audit events

Specifies whether you want to use CEF for auditing events in Identity Applications.

Destination host

Specifies the DNS name or the IP address of the auditing server.

Destination port

Specifies the port of the auditing server.

Network Protocol

Specifies the network protocol used by the auditing server to receive CEF events.

Use TLS

Applies only when you want to use TCP as your network protocol.

Specifies if the auditing server is configured to use TLS with TCP.

Intermediate event store directory

Specifies the location of the cache directory before the CEF events are sent to the auditing server.

NOTE: Ensure that the `novlua` permissions are set for the Intermediate event store directory. Otherwise, you cannot access the IDMDash and IDMProv applications. Also, none of the OSP events will be logged in the Intermediate event store directory. For example, you can change the permission and ownership of the directory using the `chown novlua:novlua <directorypath>` command, where `<directorypath>` is the Intermediate event store directory.

Deploying REST APIs for Identity Applications

The identity applications components incorporate several REST APIs that enable different features within Identity Applications. The REST services use OAUTH2 protocol to provide authentication. You can invoke these APIs using a browser or curl command in scripts to automate the administrative tasks. The REST APIs and the corresponding documentation are available in the `idmappsdoc.war` file. The war is automatically deployed when Identity Applications are installed. For more information, see the REST API documentation.

To access the REST API documentation on the server where identity applications are installed, specify `https://<identity applications servername>:<Port>/idmappsdoc`, in the address bar of your browser. For example: `https://192.168.0.1:8543/idmappsdoc`.

Accessing the Oracle Database Using Oracle Service Name

You can connect to the Oracle database by using Oracle System ID (SID) or Oracle Service Name. The identity applications installer accepts only SID. If you want to access the database by using a service name, complete the identity applications installation to one database instance by connecting through SID. After the installation is completed, perform the following actions:

1. Create a service name in the Oracle database by running the following command:

   ```
   alter system set service_names='SERVICE1' scope=both sid='*';
   ```

   where `SERVICE 1` is the name of the Oracle service.

   NOTE: You can specify the service name in uppercase or lowercase. It is not case-sensitive.

   ---

2. Define the service name in Tomcat's `server.xml` file by modifying the Oracle data source details in the file:

   ```
   url="jdbc:oracle:thin:@IP:PORT/service1"
   ```

3. Restart Tomcat.
4. Verify that the service name is included in the `catalina.out` log file.
5. Verify that the identity applications are properly connected to the database.

Manually Creating the Database Schema

When you install the identity applications, you can postpone connecting to the database or creating tables in the database. If you do not have permissions to the database, you might need to choose this option. The installation program creates a SQL file that you can use to create the database schema. You can also recreate the database tables after installation without having to reinstall. To do so, you delete the database for the identity applications and create a new database with the same name.

Using the SQL File to Generate the Database Schema

This section assumes that the installation program created a SQL file that you can execute to generate the database schema. If you do not have the SQL file, see "Manually Creating the SQL File to Generate the Database Schema" on page 93.

NOTE: Do not use SQL*Plus to execute the SQL file. The line lengths in the file exceed 4000 characters.

---

1. Stop the Application Server.
2. Login to the Database Server.
3. Delete the database that is used by the identity applications.
4. Create a new database with the same name as the one that was deleted in Step 3.
5. Navigate to the SQL script that the installation process created, by default in the `/installation_path/userapp/sql` directory.
6. (Conditional) For an Oracle database, insert a backslash (/) after the definition of the function `CONCAT_BLOB`. For example:

```
  -- Changeset icfg-data-load.xml::700::IDMRBPM
CREATE OR REPLACE FUNCTION CONCAT_BLOB(A IN BLOB, B IN BLOB) RETURN BLOB
AS
                C BLOB;
            BEGIN
                DBMS_LOB.CREATETEMPORARY(C, TRUE);
                DBMS_LOB.APPEND(C, A);
                DBMS_LOB.APPEND(C, B);
                RETURN c;
            END;
/
```

7. Have the database administrator run the SQL script to create and configure the User Application database.
8. Restart Tomcat.

Manually Creating the SQL File to Generate the Database Schema

You can recreate the database tables after installation without having to reinstall and without having the SQL file. This section helps you create the database schema in the event that you do not have the SQL file.

1. Stop Tomcat.
2. Log in to the server that hosts your identity applications database.
3. Delete the existing database.
4. Create a new database with the same name as the one that you deleted in Step 3.
5. In a text editor, open the `NetIQ-Custom-Install.log` file, located by default at the root of the installation directory for the identity applications. For example:

   ```
   C:\NetIQ\idm\apps\UserApplication
   ```

6. Search and copy the below command from the `NetIQ-Custom-Install.log` file:

   ```
   C:\NetIQ\idm\jre\bin\java -Xms256m -Xmx256m -Dwar.context.name=IDMProv
   -Ddriver.dn="cn=User Application Driver,cn=driverset1,o=system" -
   Duser.container="o=data" -jar C:\NetIQ\idm\jre\liquibase.jar --
   databaseClass=liquibase.database.core.PostgresDatabase --
   driver=org.postgresql.Driver --
   classpath=C:\NetIQ\idm\apps\postgresql\postgresql-9.4.1212jdbc42.jar
   C:\NetIQ\idm\apps\UserApplication\IDMProv.war --
   changeLogFile=DatabaseChangeLog.xml --url="jdbc:postgresql://
   localhost:5432/ idmuserappdb" --contexts="prov,newdb" --logLevel=info -
   - logFile=C:\NetIQ\idm\apps\UserApplication\db.out --username=********
   -- password=******** update
   ```

7. Log in to the server where you installed the database for the identity applications.
8. In a terminal, paste the command string that you copied.

   NOTE: The command should be `updateSQL`. If it is `update`, change the command to `updateSQL`.

9. In the command, replace the asterisks (*) that represent the database username and password with the actual values required to authenticate. Also, ensure the name of the SQL file is unique.
10. Execute the command.
11. (Conditional) If the process generates a SQL file instead of populating the database, provide the file to your database administrator to import into the database server. For more information, see "Using the SQL File to Generate the Database Schema" on page 92.
12. After the database administrator imports the SQL file, start Tomcat.

Configuring Single Sign-On Settings for the Identity Applications

The installation process installs an authentication service (OSP) for single sign-on access in Identity Manager. However, you can also configure the OSP authentication server to accept authentication from the Kerberos ticket server or SAML. To configure the single sign-on settings for the identity applications after installation, Configuring Single Sign-on Access in Identity Manager in the *NetIQ Identity Manager - Administrator's Guide to the Identity Applications*.

Starting the Identity Applications

Ensure that you restart the Tomcat service and ActiveMQ service after you configure the identity applications.

```
systemctl restart netiq-tomcat
```

```
systemctl restart netiq-activemq
```

Configuration and Usage Considerations for the Identity Applications

The following considerations apply to the configurations and initial usage of the identity applications.

- During the installation process, the installation program writes log files to the installation directory. These files contain information about your configuration. After you configure your Identity Applications environment, you should consider deleting these log files or storing them in a secure location. During the installation process, you might choose to write the database schema to a file. Since this file contains descriptive information about your database, you should move the file to a secure location after the installation process is complete.
- (Conditional) To audit the identity applications, you must have Identity Reporting and an auditing service installed in your environment and configured to capture the events. You must also configure the identity applications for auditing.
- Before users can access the identity applications, you must complete the following activities:
  - Ensure that all necessary Identity Manager drivers are installed.
  - Enable cookies on all browsers. The applications do not work when cookies are disabled.
- If you have installed Identity Applications and SSPR on different servers, then you must import the SSPR trusted certificate with the CN as Identity Applications to the `cacerts` of Identity Applications server.

Configuring the Runtime Environment for Data Collection

This section provides information about additional configuration steps you should perform to ensure that the runtime environment is operating correctly. It also provides troubleshooting techniques, as well as some information about database tables that are of particular interest.

This process includes the following activities:

- "Configuring the Data Collection Services Driver to Collect Data from the Identity Applications" on page 95
- "Migrating the Data Collection Service Driver" on page 96
- "Adding Support for Custom Attributes and Objects" on page 98
- "Adding Support for Multiple Driver Sets" on page 100
- "Configuring the Drivers to Run in Remote Mode with SSL" on page 102

If you have problems with one or more of the drivers that are difficult to understand, see "Troubleshooting the Drivers" in the *NetIQ Identity Reporting Module Guide*.

Configuring the Data Collection Services Driver to Collect Data from the Identity Applications

For the identity applications to function properly with Identity Reporting, you must configure the DCS driver to support the OAuth protocol.

NOTE: ◆You only need to install and configure the DCS driver if you use Identity Reporting in your environment.

◆ If you have multiple DCS drivers configured in your environment, you must complete the following steps for each driver.

---

1. Log in to Designer.
2. Open your project in Designer.
3. (Conditional) If you have not already upgraded your DCS driver to the supported patch version, complete the following steps:
   - **3a** Download the latest DCS driver patch file.
   - **3b** Extract the patch file to a location on your server.
   - **3c** In a terminal, navigate to the location of the extracted patch RPM for your environment and run the following command:

     ```
     rpm -Uvh novell-DXMLdcs.rpm
     ```

   - **3d** Restart the Identity Vault.
   - **3e** In Designer, ensure that you have installed a supported version of the Data Collection Service Base package. If necessary, install the latest version before continuing.
   - **3f** Redeploy and restart the DCS driver in Designer.
4. In the **Outline** view, right-click the DCS driver, then select **Properties**.
5. Click **Driver Configuration**.
6. Click the **Driver Parameters** tab.
7. Click **Show connection parameters**, then select **show**.
8. Click **SSO Service Support**, then select **Yes**.
9. Specify the IP address and port for Identity Reporting.
10. Specify a password for the SSO Service Client. The default password is `driver`.
11. Click **Apply**, then click **OK**.
12. In the **Modeler** view, right-click the DCS driver, then select **Driver > Deploy**.
13. Click **Deploy**.
14. If prompted to restart the DCS driver, click **Yes**.
15. Click **OK**.

Migrating the Data Collection Service Driver

For the objects to synchronize into the Identity Information Warehouse, you must migrate the Data Collection Service driver.

1 Log in to Identity Console.

2 In the **IDM Administration** tile, select the Data Collection Service Driver and go to **Data Transformation and Synchronization**.

3 In the Data Synchronization View, select **Migrate From Identity Vault**.

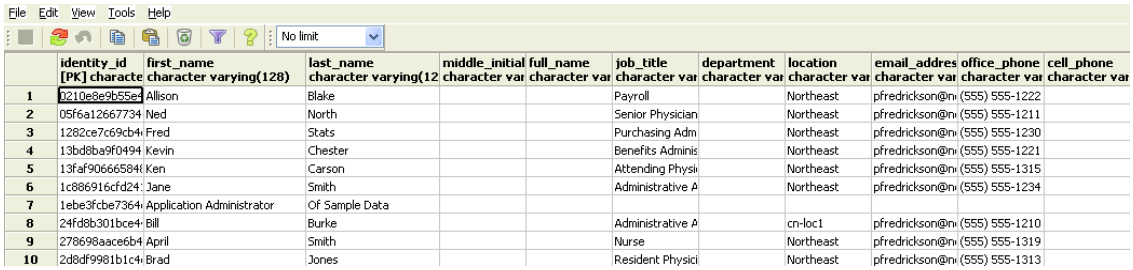
4 Select the organizations that contain relevant data, and click **Start**.

NOTE: Depending on the amount of data that you have, the migration process could take several minutes. Be sure to wait until the migration process is complete before you proceed.

---

5 Wait for the migration process to complete.

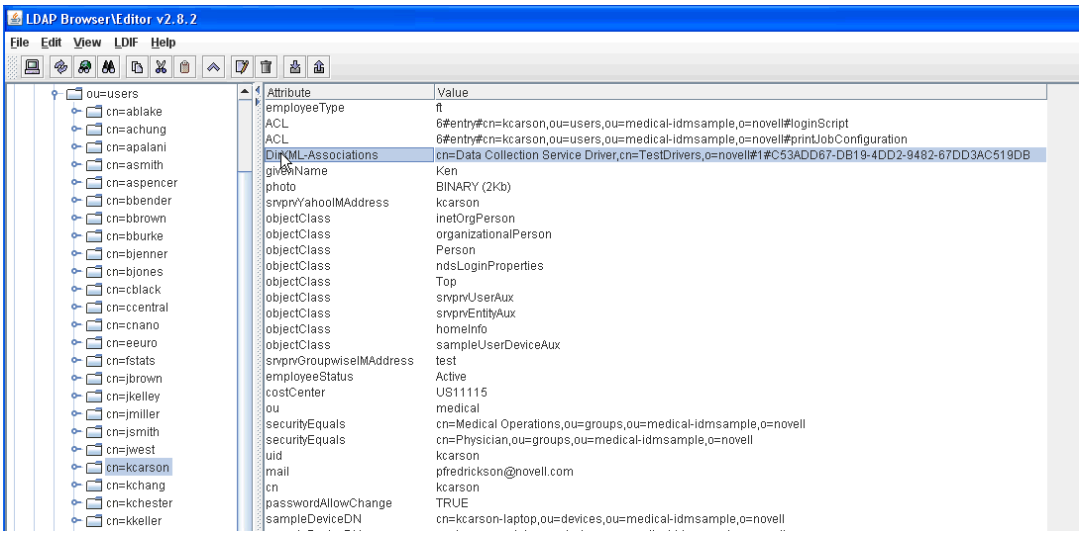
6 In the **idmrpt_identity** and **idmrpt_acct** tables, which provide information about the identities and accounts in the Identity Vault, ensure they contain the following type of information:



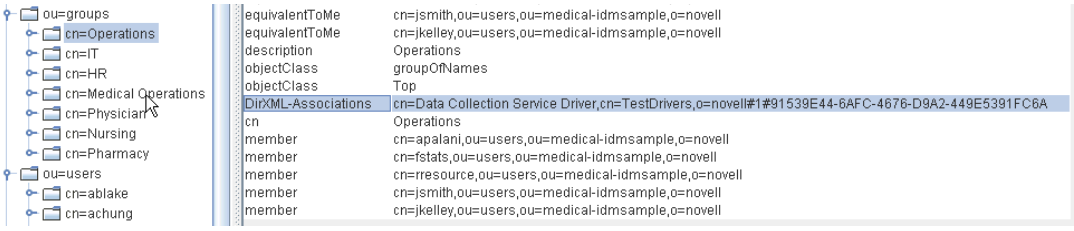
	identity_id [PK] characte	first_name character varying(128)	last_name character varying(12	middle_initial character var	full_name character var	job_title character var	department character var	location character var	email_addres character var	office_phone character var	cell_phone character var
1	0210e8e9b55e4	Allison	Blake			Payroll		Northeast	pfredrickson@n	(555) 555-1222	
2	05f6a12667734	Ned	North			Senior Physician		Northeast	pfredrickson@n	(555) 555-1211	
3	1282ce7c69cb4	Fred	Stats			Purchasing Adm		Northeast	pfredrickson@n	(555) 555-1230	
4	13bd8ba9f0494	Kevin	Chester			Benefits Adminis		Northeast	pfredrickson@n	(555) 555-1221	
5	13faf90666584	Ken	Carson			Attending Physi		Northeast	pfredrickson@n	(555) 555-1315	
6	1c886916cfd24	Jane	Smith			Administrative A		Northeast	pfredrickson@n	(555) 555-1234	
7	1ebe3fcbe7364	Application Administrator	Of Sample Data								
8	24fd8b301bce4	Bill	Burke			Administrative A		cn-loc1	pfredrickson@n	(555) 555-1210	
9	278698aace6b4	April	Smith			Nurse		Northeast	pfredrickson@n	(555) 555-1319	
10	2d8df9981b1c4	Brad	Jones			Resident Physici		Northeast	pfredrickson@n	(555) 555-1313	

7 In the LDAP browser, verify that the migration process adds the following references for DirXML-Associations:

- For each user, verify the following type of information:



- For each group, verify the following type of information:



8 Ensure that the data in the **idmrpt_group** table appears similar to the following information:

group_name character var	group_desc character var	dynamic_grou boolean	dynamic_rule character var	nested_group boolean	idmrpt_valid_from timestamp without tin	idmrpt_deleted boolean	idmrpt_syn_state smallint
Pharmacy	Pharmacy	FALSE		FALSE	2010-07-07 21:28:11	FALSE	1
IT	Information Tec	FALSE		FALSE	2010-07-07 21:28:11	FALSE	1
HR	Human Resourc	FALSE		FALSE	2010-07-07 21:28:11	FALSE	1
Physician	Physician	FALSE		FALSE	2010-07-07 21:28:11	FALSE	1
Operations	Operations	FALSE		FALSE	2010-07-07 21:28:11	FALSE	1
Medical Operatic	Medical Operatic	FALSE		FALSE	2010-07-07 21:28:11	FALSE	1
Nursing	Nursing	FALSE		FALSE	2010-07-07 21:28:11	FALSE	1

This table shows the name for each group, as well as flags indicating whether the group is dynamic or nested. It also shows whether the group has been migrated. The synchronization status (idmrpt_syn_state) could possibly be set to 0 if an object had been modified in the User Application but not yet migrated. For example, if a user were added to a group, and the driver had not been migrated yet, this value might be set to 0.

9 (Optional) Verify the data in the following tables:

- idmrpt_approver
- idmrpt_association
- idmrpt_category
- idmrpt_container
- idmrpt_idv_drivers
- idmrpt_idv_prd
- idmrpt_role
- idmrpt_resource
- idmrpt_sod

10 (Optional) Verify that the **idmrpt_ms_collect_state** table, which shows information about the data collection state for the Managed System Gateway Driver, contains now rows.

This table includes data about which REST endpoints for managed systems have been executed. At this point, the table has no rows because you have not started the collection process for this driver.

Adding Support for Custom Attributes and Objects

You can configure the Data Collection Service driver to gather and persist data for custom attributes and objects that are not part of the default data collection scheme. To do this, you need to modify the Data Collection Service driver filter. Modifying the filter does not trigger object synchronization immediately. Instead, the newly added attributes and objects are sent to the data collection services when add, modify, or delete events occur in the Identity Vault.

When you add support for custom attributes and objects, you need to modify the reports in order to include the extended attribute and object information. The following views provide current and historic data on the extended objects and attributes:

- idm_rpt_cfg.idmrpt_ext_idv_item_v
- idm_rpt_cfg.idmrpt_ext_item_attr_v

This process includes the following activities:

- "Configuring the Driver to Use Extended Objects" on page 98
- "Including a Name and Description in the Database" on page 99
- "Adding Extended Attributes to Known Object Types" on page 99

Configuring the Driver to Use Extended Objects

You can add any object or attribute to the Data Collection Service filter policy. When you add a new object or attribute, you need to make sure you map the GUID (with subscriber sync) and the Object Class (with subscriber notify), as shown in the following example:

```
<filter-class class-name="Device" publisher="ignore" publisher-create-
homedir="true" publisher-track-template-member="false" subscriber="sync">
<filter-attr attr-name="CN" merge-authority="default" publisher="ignore"
publisher-optimize-modify="true" subscriber="sync"/>
<filter-attr attr-name="Description" merge-authority="default"
publisher="ignore" publisher-optimize-modify="true" subscriber="sync"/>
<filter-attr attr-name="GUID" merge-authority="default" publisher="ignore"
publisher-optimize-modify="true" subscriber="sync"/>
<filter-attr attr-name="Object Class" merge-authority="default"
publisher="ignore" publisher-optimize-modify="true" subscriber="notify"/>
<filter-attr attr-name="Owner" merge-authority="default"
publisher="ignore" publisher-optimize-modify="true" subscriber="sync"/>
<filter-attr attr-name="Serial Number" merge-authority="default"
publisher="ignore" publisher-optimize-modify="true" subscriber="sync"/>
<filter-attr attr-name="sampleDeviceModel" from-all-classes="true" merge-
authority="default" publisher="ignore" publisher-optimize-modify="true"
subscriber="sync"/>
<filter-attr attr-name="sampleDeviceType" from-all-classes="true" merge-
authority="default" publisher="ignore" publisher-optimize-modify="true"
subscriber="sync"/>
</filter-class>
```

Including a Name and Description in the Database

If you want the object to have a name and description in the database, you need to add a schema mapping policy for _dcsName and _dcsDescription. The schema mapping policy maps the attribute values on the object instance to the columns idmrpt_ext_idv_item.item_name and idmrpt_ext_idv_item.item_desc, respectively. If you do not add a schema mapping policy, the attributes will be populated in the child table idmrpt_ext_item_attr.

For example:

```
<attr-name class-name="Device">
<nds-name>CN</nds-name>
<app-name>_dcsName</app-name>
</attr-name>
<attr-name class-name="Device">
<nds-name>Description</nds-name>
<app-name>_dcsDescription</app-name>
</attr-name>
```

The following example of SQL allows you to show these object and attribute values in the database:

```
SELECT
    item.item_dn,
    item.item_name,
    item.item_desc,
    attr.attribute_name,
    itemAttr.attribute_value,
    item.idmrpt_deleted as item_deleted,
    itemAttr.idmrpt_deleted as attr_deleted,
    item.item_desc,
    obj.object_class
FROM
    idm_rpt_data.idmrpt_ext_idv_item as item,
idm_rpt_data.idmrpt_ext_item_attr itemAttr, idm_rpt_data.idmrpt_ext_attr
as attr, idm_rpt_data.idmrpt_ext_obj as obj
WHERE
    item.object_id = obj.object_id and itemAttr.attribute_id =
attr.attribute_id and itemAttr.cat_item_id = item.item_id
ORDER BY
    item.item_dn, item.item_name
```

Adding Extended Attributes to Known Object Types

If an attribute is added to the filter policy on the Data Collection Service driver and not explicitly mapped to the reporting database in the XML reference file (`IdmrptIdentity.xml`), the value is populated and maintained in the idmrpt_ext_item_attr table, with an attribute reference in the idmrpt_ext_attr table.

The following example of SQL shows these extended attributes:

```
SELECT
    acct.idv_acct_dn,
    attrDef.attribute_name,
    attribute_value,
    attrVal.idmrpt_valid_from,
    cat_item_attr_id,
    attrVal.idmrpt_deleted,
    attrVal.idmrpt_syn_state
FROM
    idm_rpt_data.idmrpt_ext_item_attr as attrVal,
idm_rpt_data.idmrpt_ext_attr as attrDef, idm_rpt_data.idmrpt_identity as
idd, idm_rpt_data.idmrpt_idv_acct as acct
WHERE attrVal.attribute_id = attrDef.attribute_id and idd.identity_id =
acct.identity_id and attrVal.cat_item_id = acct.identity_id and
cat_item_type_id = 'IDENTITY'
```

In addition to the User object, you can add extended attributes to the filter policy on the following objects and populate the database with these attributes:

- nrfRole
- nrfResource
- Containers

  NOTE: The installed product provides support for organizationUnit, Organization, and Domain. The container types are maintained in the idmrpt_container_types table.

- Group
- nrfSod

You can see the association of the extended attributes to the parent table or object by looking at the idmrpt_cat_item_types.idmrpt_table_name column. This column describes how to join the idm_rpt_data.idmrpt_ext_item_attr.cat_item_id column to the primary key of the parent table.

Adding Support for Multiple Driver Sets

The Data Collection Service Scoping package (NOVLDCSSCPNG) provides static and dynamic scoping capabilities for enterprise environments with multiple driversets and multiple pairs of Data Collection Service Drivers and Managed System Gateway Drivers.

During or after installation, you need to determine the role for the Data Collection Service Driver that the package is being installed on. You need to select one of the following roles:

- **Primary** The driver synchronizes everything except subtrees of other driver sets. A primary Data Collection Service Driver may well service a whole Identity Vault or it may work in conjunction with one or multiple secondary drivers.
- **Secondary** The driver synchronizes only its own driver set, but nothing else. A secondary Data Collection Service Driver usually requires a primary driver to run in a different driverset or no data outside the local driver set is sent to the Data Collection Service.
- **Custom** Allows the administrator to define custom scoping rules. The only implicit scope is the local driver set, everything else is considered out-of-scope, unless it is explicitly added to the list of custom scopes. A custom scope is the distinguished name in slash format of a container in the Identity Vault whose subordinates or subtree should be synchronized.

The scoping package is only required in some configuration scenarios, as described below:

- **Single server with a single driver set Identity Vault:** For this scenario, you do not need scoping, and, therefore, you do not need to install the scoping package.
- **Multiple servers with a single driver set Identity Vault:** For this scenario, you need to follow these guidelines:
  - Make sure the Identity Manager server holds replicas of all partitions from which data should be collected.
  - For this scenario, no scoping is required, so do not install the scoping package
- **Multiple servers with a multiple driver set Identity Vault:** In this scenario, there are two basic configurations:
  - All servers hold a replica of all partitions from which data should be collected.

    For this configuration, you need to follow these guidelines:
    - Scoping is required to avoid the same change being processed by multiple DCS drivers.
    - You need to install the scoping package on all DCS drivers.
    - You need to select one DCS driver to be the Primary driver.
    - You need to configure all other DCS drivers to be Secondary drivers.
  - All servers *do not* hold a replica of all partitions from which data should be collected.

    Within this configuration, there are two possible situations:
    - All partitions from which data should be collected are being held by *only one* Identity Manager server

      In this case, you need to follow these guidelines:
      - Scoping is required to avoid the same change being processed by multiple DCS drivers.
      - You need to install the scoping package on all DCS drivers.
      - You need to configure all DCS drivers to be Primary drivers.
    - All partitions from which data should be collected are *not being held by only one* Identity Manager server (some partitions are held by more than one Identity Manager server).

      In this case, you need to follow these guidelines:
      - Scoping is required to avoid the same change being processed by multiple DCS drivers.
      - You need to install the scoping package on all DCS drivers.
      - You need to configure all DCS drivers to be Custom drivers.

        You need to define custom scoping rules for each driver and be sure not to create any overlapping scopes.

Configuring the Drivers to Run in Remote Mode with SSL

When running in remote mode, you can configure the Data Collection Service and Managed System Gateway drivers to use SSL. This section provides steps for configuring the drivers to run in remote mode with SSL.

To configure SSL using a Keystore for the Managed System Gateway Driver:

1. Create a server certificate in Identity Console.
   - **1a** Under **eDirectory**, click **Certificate Management > Server Certificate Management**.
   - **1b** Browse to and select the server object where the Managed System Gateway Driver is installed.
   - **1c** Specify a certificate nickname.
   - **1d** Select **Standard** as the creation method, then click **Next**.
   - **1e** Click **Finish**, then click **Close**.
2. Export the server certificate using Identity Console.
   - **2a** Under **eDirectory**, click **Certificate Management > Server Certificate Management**.
   - **2b** Select the certificate created in Step 1 on page 102 and click **Export**.
   - **2c** In the **Certificates** menu, select the name of your certificate.
   - **2d** Ensure that **Export private key** is checked.
   - **2e** Enter a password and click **Next**.
   - **2f** Click **Save the exported certificate**, and save the exported pfx certificate.
3. Import the pfx certificate exported in Step 2 on page 102 into the java key-store.
   - **3a** Use the keytool available with Java. You must use JDK 6 or later.
   - **3b** Enter the following command at a command prompt:

     ```
     keytool -importkeystore -srckeystore pfx certificate -srcstoretype
     PKCS12 -destkeystore Keystore Name
     ```

     For example:

     ```
     keytool -importkeystore -srckeystore cert.pfx -srcstoretype PKCS12
     -destkeystore msgw.jks
     ```

   - **3c** Enter the password when prompted to do so.
4. Modify the Managed System Gateway Driver configuration to use the keystore using Identity Console.
   - **4a** From **IDM Adminstration**, click the driverset containing the Managed System Gateway Driver.
   - **4b** Click **Managed System Gateway Driver** icon and go to **configuration**.
   - **4c** Click **Driver Parameters** drop down.
   - **4d** Under **Driver Settings** tab, set **Connection Parameters** to show and set the **Driver configuration mode** to remote.
   - **4e** Enter the complete path of the keystore file and the password.
   - **4f** Save and restart the driver.

5 Modify the Data Collection Service Driver configuration to use the keystore using Identity Console.

   5a From **IDM Adminstration**, click the driverset containing the Data Collection Service Driver.

   5b Click **Data Collection Service Driver** icon and go to **Driver configuration**.

   5c Click **Driver Parameters** drop down and set **Registration Parameters** to show.

   5d Under the **Managed System Gateway Registration** header, set **Managed System Gateway Driver Configuration Mode** to remote.

   5e Enter the complete path of the keystore, password and the alias enter in Step 1c on page 102.

   5f Save and restart the driver.

Configuring Identity Reporting

After installing Identity Reporting, you can still modify many of the installation properties. To make changes, run the configuration update utility (`configupdate.sh`) file.

If you change any setting for Identity Reporting with the configuration tool, you must restart Tomcat for the changes to take effect. However, you do not need to restart the server after making changes in the web user interface for Identity Reporting.

- "Manually Adding the DataSource in the Identity Data Collection Services Page" on page 103
- "Running Reports on an Oracle Database" on page 104
- "Manually Generating the Database Schema" on page 104
- "Deploying REST APIs for Identity Reporting" on page 107
- "Connecting to a Remote PostgreSQL Database" on page 107

Manually Adding the DataSource in the Identity Data Collection Services Page

1. Log in to Identity Reporting application.
2. Click **Data Sources**.
3. Click **Add**.
4. In the **Add Data Source** dialog box, click the **Select from predefined list** radio button.
5. Select **IDMDCSDataSource**.
6. Click **Save**.

Running Reports on an Oracle Database

Identity Reporting provides the ability to run reports against remote Oracle databases. Ensure that you have the ojbc8.jar file on the server where you are running the Oracle Database.

Manually Generating the Database Schema

To manually generate the database schema after installation, perform one of the following procedures for your database:

- "Configuring Create_rpt_roles_and_schemas.sql Schema against PostgreSQL Database" on page 104
- "Configuring Create_rpt_roles_and_schemas.sql Schema against Oracle Database" on page 105
- "Configuring Create_rpt_roles_and_schemas.sql Schema against MS SQL Database" on page 106
- "Clearing the Database Checksums" on page 106

Configuring Create_rpt_roles_and_schemas.sql Schema against PostgreSQL Database

1. Add the required roles to the database using the `create_dcs_roles_and_schemas.sql` and `create_rpt_roles_and_schemas.sql` SQLs located in `C:\NetIQ\idm\apps\IdentityReporting\sql`.
2. Log in to PGAdmin as a postgres user.
3. Run the Query tool.
4. To create `Create_rpt_roles_and_schemas` and `Create_dcs_roles_and_schemas` procedures, copy the content from these SQLs to the Query tool and execute against the connected database.
5. To create `IDM_RPT_DATA`, `IDM_RPT_CFG`, and `IDMRPTUSER` roles, execute the following commands in the given order:

   ```
   Select CREATE_DCS_ROLES_AND_SCHEMAS('<Set pwd for IDM_RPT_DATA>', '<Set pwd for IDMRPTUSER>');
   ```

   ```
   Select CREATE_RPT_ROLES_AND_SCHEMAS('<Set pwd for IDM_RPT_CFG>');
   ```

   For example, if the password for `IDM_RPT_DATA`, `IDMRPTUSER`, and `IDM_RPT_CFG` are *password*, *password1*, and *password2* respectively, then you must execute the following commands:

   ```
   Select CREATE_DCS_ROLES_AND_SCHEMAS('password', 'password1');
   ```

   ```
   Select CREATE_RPT_ROLES_AND_SCHEMAS('password2');
   ```

6. Copy the content of `get_formatted_user_dn.sql` from `C:\NetIQ\idm\apps\IdentityReporting\sql` to the Query tool and execute against the connected database.

NOTE: The `get_formatted_user_dn.sql` function must be added manually when you select database schema creation option as **File**. If you select the database schema creation option as **Now** or **Startup**, the installer will add this function to the database.

Configuring Create_rpt_roles_and_schemas.sql Schema against Oracle Database

1. Add the required roles to the database using `create_dcs_roles_and_schemas-orcale.sql` and `create_rpt_roles_and_schemas-orcale.sql` from `C:\NetIQ\idm\apps\IdentityReporting\sql`.
2. Log in to SQL Developer as a database admin user.
3. To create `Create_rpt_roles_and_schemas` and `Create_dcs_roles_and_schemas` procedures, copy the content from these SQLs to SQL Developer and execute against the connected database.
4. To create `IDM_RPT_DATA`, `IDM_RPT_CFG`, and `IDMRPTUSER` roles, execute the following commands in the given order:

   ```
   begin
   CREATE_DCS_ROLES_AND_SCHEMAS('<Set pwd for IDM_RPT_DATA>', '<Set pwd
   for IDMRPTUSER>');
   end;

   begin
   CREATE_RPT_ROLES_AND_SCHEMAS('<Set pwd for IDM_RPT_CFG>');
   end;
   ```

   For example, if the password for `IDM_RPT_DATA`, `IDMRPTUSER`, and `IDM_RPT_CFG` are *password*, *password1*, and *password2* respectively, then you must execute the following commands:

   ```
   begin
   CREATE_DCS_ROLES_AND_SCHEMAS('password', 'password1');
   end;

   begin
   CREATE_RPT_ROLES_AND_SCHEMAS('password2');
   end;
   ```

5. Copy the content of `get_formatted_user_dn-oracle.sql` to SQL Developer from `C:\NetIQ\idm\apps\IdentityReporting\sql` and execute against the connected database.

NOTE: The `get_formatted_user_dn-oracle.sql` function must be manually added to the database when you select database schema creation option as **File**. If you select the database schema creation option as **Now** or **Startup**, the installer will add this function to the database.

Configuring Create_rpt_roles_and_schemas.sql Schema against MS SQL Database

1. Execute `delete_create_dcs_roles_and_schemas-mssql.sql` and `delete_get_formatted_user_dn-mssql.sql`.
2. Add the required roles to the database using `create_dcs_roles_and_schemas.mssql` and `create_rpt_roles_and_schemas.mssql` from `C:\NetIQ\idm\apps\IdentityReporting\sql`.
3. Log in to SQL Developer as a database admin user.
4. To create `Create_rpt_roles_and_schemas` and `Create_dcs_roles_and_schemas` procedures, copy the content from `create_dcs_roles_and_schemas.mssql` and `create_rpt_roles_and_schemas.mssql` to SQL Developer and execute against the connected database.
5. To create `IDM_RPT_DATA, IDM_RPT_CFG`, and `IDMRPTUSER` roles, execute the following commands in the given order:

   ```
   execute CREATE_DCS_ROLES_AND_SCHEMAS '<Set pwd for IDM_RPT_DATA>',
   '<Set pwd for IDMRPTUSER>'
   ```

   ```
   execute CREATE_DCS_ROLES_AND_SCHEMAS '<Set pwd for IDM_RPT_DATA>',
   '<Set pwd for IDMRPTUSER>'
   ```
6. Copy the content of `get_formatted_user_dn.sql` to SQL Developer from `C:\NetIQ\idm\apps\IdentityReporting\sql` and execute against the connected database.

Clearing the Database Checksums

1. Locate the following `.sql` files in `C:\NetIQ\idm\apps\IdentityReporting\sql`.
   - `DbUpdate-01-run-as-idm_rpt_cfg.sql`
   - `DbUpdate-02-run-as-idm_rpt_cfg.sql`
   - `DbUpdate-03-run-as-idm_rpt_data.sql`
   - `DbUpdate-04-run-as-idm_rpt_data.sql`
   - `DbUpdate-05-run-as-idm_rpt_data.sql`
   - `DbUpdate-06-run-as-idm_rpt_cfg.sql`
2. Clear the database checksums

   2a To run the clearchsum command with each `.sql`, append the following line at the beginning of each file:

   ```
   update DATABASECHANGELOG set MD5SUM = NULL;
   ```

   The modified content should look similar to the following:

```
--
*****************************************************************
**
-- Update Database Script
--
*****************************************************************
**
-- Change Log: IdmDcsDataDropViews.xml
-- Ran at: 2/23/18 5:17 PM
-- Against: IDM_RPT_CFG@jdbc:oracle:thin:@192.99.170.20:1521/orcl
-- Liquibase version: 3.5.1
--
*****************************************************************
**
update databasechangelog set md5sum = null;
```

2b Run each `.sql` with the corresponding user.

3 Commit the changes to the database.

Deploying REST APIs for Identity Reporting

Identity Reporting incorporates several REST APIs that enable different features within the reporting functionality. These REST API uses the OAuth2 protocol for authentication.

On Tomcat, the `rptdoc war` and the `dcsdoc war` are automatically deployed when Identity Reporting is installed.

Connecting to a Remote PostgreSQL Database

If your PostgreSQL database is installed on a separate server, you need to change the default settings in the `postgresql.conf` and `pg_hba.conf` files in the remote database.

1 Change the listening address in the `postgresql.conf` file.

By default, PostgreSQL allows to listen for the localhost connection. It does not allow a remote TCP/IP connection. To allow a remoteTCP/IP connection, add the following entry to the `C:\NetIQ\IDM\apps\postgres\data\postgresql.conf` file:

```
listen_addresses = '*'
```

If you have multiple interfaces on the server, you can specify a specific interface to be listened.

2 Add a client authentication entry to the `pg_hba.conf` file.

By default, PostgreSQL accepts connections only from the `localhost`. It refuses remote connections. This is controlled by applying an access control rule that allows a user to log in from an IP address after providing a valid password (the md5 keyword). To accept a remote connection, add the following entry to the `C:\NetIQ\IDM\apps\postgres\data\pg_hba.conf` file.

```
host all all 0.0.0.0/0 md5
```

For example, 192.168.104.24/26 trust

This works only for IPv4 addresses. For IPv6 addresses, add the following entry:

```
host all all ::0/0 md5
```

If you want to allow connection from multiple client computers on a specific network, specify the network address in the CIDR-address format in this entry.

The pg_hba.conf file supports the following client authentication formats.

- local database user authentication-method [authentication-option]
- host database user CIDR-address authentication-method [authentication-option]
- hostssl database user CIDR-address authentication-method [authentication-option]
- hostnossl database user CIDR-address authentication-method [authentication-option]

Instead of CIDR-address format, you can specify the IP address and the network mask in separate fields using the following format:

- host database user IP-address IP-mask authentication-method [authentication-option]
- hostssl database user IP-address IP-mask authentication-method [authentication-option]
- hostnossl database user IP-address IP-mask authentication-method [authentication-option]

3 Test the remote connection.

3a Restart the remote PostgreSQL server.

3b Log in to the server remotely using the username and password.

Activating Identity Manager

You do not need an activation code to install or initially run Identity Manager. However, without an activation code, Identity Manager stops functioning 90 days after installation. You can activate Identity Manager at any time during the 90 days or afterward. For more information, see Activating Identity Manager in *NetIQ Identity Manager Overview and Planning Guide*.

Reviewing the Ports Used by Identity Manager Components

Identity Manager components use various ports for communicating with one another. The ports are opened on the firewall by default. To review the ports used by Identity Manager components, see Understanding Identity Manager Communication in *NetIQ Identity Manager Security Guide*.

```
kind: PersistentVolume
apiVersion: v1
metadata:
  name: task-pv-volume
  labels:
    type: nfs
spec:
  storageClassName: manual
  capacity:
    storage: 3Gi
  accessModes:
    - ReadWriteMany
  hostPath:
    path: '/mnt'
---
kind: PersistentVolumeClaim
apiVersion: v1
metadata:
  name: task-pv-claim1
spec:
  storageClassName: manual
  accessModes:
    - ReadWriteMany
  resources:
    requests:
      storage: 1Gi
---
apiVersion: v1
kind: Pod
metadata:
  labels:
    name: identity-engine
  name: identity-engine
spec:
  nodeSelector:
    kubernetes.io/hostname:
  hostNetwork: true
  containers:
    -
      image: <image name>
      name: identity-engine-container
      resources:
        limits:
            cpu: "2"
            memory: 4Gi
        requests:
            cpu: "1"
            memory: 1Gi
      volumeMounts:
        - name: data
          mountPath: /config
      env:
      - name: UPGRADE_IDM
        value:
      - name: IS_ADVANCED_EDITION
```

```
        value:
      - name: INSTALL_ENGINE
        value:
      - name: INSTALL_IDVAULT
        value:
      - name: IS_COMMON_PASSWORD
        value:
      - name: COMMON_PASSWORD
        value:
      - name: TREE_CONFIG
        value:
      - name: ID_VAULT_PASSWORD
        value:
      - name: ID_VAULT_EXISTING_SERVER
        value:
      - name: ID_VAULT_EXISTING_NCP_PORT
        value:
      - name: ID_VAULT_EXISTING_LDAPS_PORT
        value:
      - name: ID_VAULT_EXISTING_CONTEXTDN
        value:
      - name: ID_VAULT_TREENAME
        value:
      - name: ID_VAULT_ADMIN_LDAP
        value:
      - name: ID_VAULT_ADMIN
        value:
      - name: ID_VAULT_PASSWORD
        value:
      - name: ID_VAULT_VARDIR
        value:
      - name: ID_VAULT_DIB
        value: '
      - name: ID_VAULT_NCP_PORT
        value:
      - name: ID_VAULT_LDAP_PORT
        value:
      - name: ID_VAULT_LDAPS_PORT
        value:
      - name: ID_VAULT_HTTP_PORT
        value:
      - name: ID_VAULT_HTTPS_PORT
        value:
      - name: ID_VAULT_CONF
        value:
      - name: ID_VAULT_DRIVER_SET
        value:
      - name: ID_VAULT_DEPLOY_CTX
        value:
      - name: ID_VAULT_SERVER_CONTEXT
        value:
    volumes:
      - name: data
        persistentVolumeClaim:
          claimName: task-pv-claim1
```

IV Installing Designer

This section guides you through the process of installing Designer for Identity Manager. By default, the installation program installs the components in `C:\NetIQ`.

IMPORTANT: Ensure that the directory name containing the Designer installation program does not include a space. For example, do not name it `Designer Install`. Instead, it can be `DesignerInstall`.

NetIQ recommends that you review the installation process before beginning. For more information, see Chapter 5, “Planning to Install Designer,” on page 113.

5 Planning to Install Designer

This section provides the prerequisites, considerations, and system setup needed to install Designer. First, consult the checklist to understand the installation process.

- "Checklist for Installing Designer" on page 113

Checklist for Installing Designer

Before beginning the installation, NetIQ recommends that you review the following steps:

	Checklist Items
❑	1. Review the planning information. For more information, see Part II, "Planning to Install Identity Manager," on page 33.
❑	2. Review the considerations for installing Designer to ensure that the computer meets the prerequisites.
❑	3. To install Designer, see one of the following sections: ◆ "Running the Windows Executable File" on page 115 ◆ "Using the Silent Installation Process" on page 115
❑	4. Install the rest of the Identity Manager components.
❑	5. (Optional) To start a project for your Identity Manager solution, see the *NetIQ Designer for Identity Manager Administration Guide*.

6 Installing Designer

You can install Identity Manager Designer using an executable file, binary file, or in text mode, depending on the target computer. You can also perform a silent installation.

Several components of Identity Manager require packages in Designer. When you install Designer, the installation program automatically adds several packages to your new project.

- "Running the Windows Executable File" on page 115
- "Using the Silent Installation Process" on page 115
- "Installing Designer in a Locale Other Than the System Locale" on page 116
- "Modifying an Installation Path that Includes a Space Character" on page 117

Running the Windows Executable File

1. Log in with an administrator account to the computer on which you want to install Designer.
2. Download the `Identity_Manager_4.8_Designer_Windows.zip` from the NetIQ Downloads Website.
3. Extract the `Identity_Manager_4.8_Designer_Windows.zip` file.
4. Navigate to the `designer_install` folder.
5. Run the `install.exe` file.
6. Follow the steps in the wizard until the installation process completes.

Using the Silent Installation Process

You can use scripts to silently install Designer without user interaction. The `-i silent` option uses default parameter values for the installation unless you edit the `designerInstaller.properties` file.

1. Log in with an administrator account to the computer where you want to install Designer.
2. Navigate to the directory containing the installation program.
3. (Optional) To configure the installation directory and the language for Designer, complete the following steps.

   3a Open the `designerInstaller.properties` file, located by default in the *`Path_to_unzipped_Designer_file`*`\designer_install` directory.

   3b In the properties file, modify the values for the following parameters:

   USER_INSTALL_DIR

   Specifies the path to the location where you want to install Designer. For example:

`USER_INSTALL_DIR=C:\designer`

If you specify a path that does not end with the `designer` directory, the Designer installation program automatically appends a `designer` directory.

SELECTED_DESIGNER_LOCALE

Specifies one of the following languages that you want Designer to launch after installation:

- `zh_CN` - Chinese Simplified
- `zh_TW` - Chinese Traditional
- `nl` - Dutch
- `en` - English
- `fr` - French
- `de` - German
- `it` - Italian
- `ja` - Japanese
- `pt_BR` - Portuguese Brazil
- `es` - Spanish

3c Save and close the properties file.

4 Run the following command from the directory of the properties file:

```
install -i silent -f designerInstaller.properties
```

Installing Designer in a Locale Other Than the System Locale

You can use additional prompts with the Windows executable file to install Designer in a language other than the system locale. Consider the following scenario: the system locale on your computer is set to German, but you want to install Designer in English.

To install:

1. Download and extract the `Identity_Manager_4.8_Designer_Windows.zip` file.
2. Navigate to the `designer_install` folder in your computer's **Downloads** folder.

   For example,
   `C:\Users\<username>\Downloads\Identity_Manager_4.8_Designer_Windows\designer_install`
3. Open a command prompt and run the following command:

   ```
   install.exe -i silent -l en_us
   ```

   This command silently installs Designer in the English (United States) locale. For other locale designation supported by Designer, see Step 3b in the "Using the Silent Installation Process" on page 115.

Modifying an Installation Path that Includes a Space Character

You can install Designer to a location that includes spaces in the directory names. However, after you install Designer, you must modify the `StartDesigner.bat` and `Designer.ini` files to ensure that Designer functions properly. Manually replace the space with an escape character ("\"). For example:

Change

```
C:\designer installation
```

to

```
C:\designer\ installation
```

V Installing Analyzer

This section guides you through the process of installing Analyzer for Identity Manager. Analyzer is a thick client component that you install on a workstation. You can use Analyzer to examine and clean the data in the connected systems that you want to add to your Identity Manager solution. By using Analyzer during the planning phase, you can see what changes need to be made and how best to make those changes.

By default, the installation program installs the components in `C:\NetIQ\Analyzer`.

NetIQ recommends that you review the installation process before beginning. For more information, see "Checklist for Installing Analyzer" on page 121.

7 Planning to Install Analyzer

This section provides guidance for preparing to install Analyzer for Identity Manager. NetIQ recommends that you review the installation process before beginning.

- "Checklist for Installing Analyzer" on page 121

Checklist for Installing Analyzer

Before beginning the installation process, NetIQ recommends that you review the following steps:

	Checklist Items
❑	1. Review the planning information. For more information, see Part II, "Planning to Install Identity Manager," on page 33.
❑	2. Review the considerations for installing Analyzer to ensure that the computer meets the prerequisites.
❑	3. To install Analyzer, see the following sections: ◆ To use the installation wizard, see "Running the Windows Executable File" on page 123. ◆ For a silent installation, see "Using the Silent Installation Process" on page 123
❑	4. To activate Analyzer, see Activating Analyzer in the *NetIQ Identity Manager Overview and Planning Guide*.

8 Installing Analyzer

This section guides you through the process of installing Analyzer and configuring your environment for Analyzer.

- "Running the Windows Executable File" on page 123
- "Using the Silent Installation Process" on page 123

Running the Windows Executable File

1. Log in with an administrator account to the computer on which you want to install Analyzer.
2. Download the `Identity_Manager_4.8_Analyzer_Windows.zip` from the NetIQ Downloads Website.
3. Extract the `Identity_Manager_4.8_Analyzer_Windows.zip` file.
4. Navigate to the `analyzer_install` folder.
5. Run the `install.exe` file.
6. Follow the steps in the wizard until the installation process completes.

Using the Silent Installation Process

You can use scripts to silently install Analyzer without user interaction. The `-i silent` option uses default parameter values for the installation unless you edit the `analyzerInstaller.properties` file.

1. Log in with an administrator account to the computer where you want to install Analyzer.
2. Navigate to the directory containing the installation program.
3. (Optional) To configure the installation directory and the language for Analyzer, complete the following steps.

   3a Open the `analyzerInstaller.properties` file, located by default in the *`Path_to_unzipped_Analyzer_file`*`\analyzerInstall` directory.

   3b In the properties file, modify the values for the following parameters:

   USER_INSTALL_DIR

   Specifies the path to the location where you want to install Analyzer. For example:

   `USER_INSTALL_DIR=C:\analyzer`

   If you specify a path that does not end with the `analyzer` directory, the Analyzer installation program automatically appends a `analyzer` directory.

SELECTED_ANALYZER_LOCALE

Specifies one of the following languages that you want Analyzer to launch after installation:

- `zh_CN` - Chinese Simplified
- `zh_TW` - Chinese Traditional
- `nl` - Dutch
- `en` - English
- `fr` - French
- `de` - German
- `it` - Italian
- `ja` - Japanese
- `pt_BR` - Portuguese Brazil
- `es` - Spanish

3c Save and close the properties file.

4 Run the following command from the directory of the properties file:

```
install -i silent -f analyzerInstaller.properties
```

9 Post-Installation Tasks

After Identity Manager installs, you should configure the drivers you installed to meet the policies and requirements defined by your business processes. You also need to configure Sentinel Log Management for IGA to gather audit events. Post-installation tasks typically include the following items:

- "Configuring a Connected System" on page 125
- "Creating and Configuring a Driver Set" on page 125
- "Creating a Driver" on page 128
- "Defining Policies" on page 128
- "Managing Driver Activities" on page 129
- "Activating Identity Manager" on page 129

Configuring a Connected System

Identity Manager enables applications, directories, and databases to share information. For driver-specific configuration instructions, see the Identity Manager Driver Documentation.

Creating and Configuring a Driver Set

A driver set is a container that holds Identity Manager drivers. Only one driver set can be associated with any server at a time. You can use the Designer tool to create a driver set. If a server is already associated to a driver set and then you assign the server to a new driver set, the server will be removed from the original driver set.

To support password synchronization to the Identity Vault, Identity Manager requires that driver sets have a password policy. You can use the Default Universal Password Policy package in Identity Manager or create a password policy based on your existing organizational requirement. However, the password policy must include the `DirMXL-PasswordPolicy` object. If the policy object does not exist in the Identity Vault, you can create the object.

- "Creating Driver Set" on page 126
- "Assigning the Default Password Policy to Driver Sets" on page 126
- "Creating the Password Policy Object in the Identity Vault" on page 126
- "Creating a Custom Password Policy" on page 127
- "Creating the Default Notification Collection Object in the Identity Vault" on page 127

Creating Driver Set

Designer for Identity Manager provides many settings to create and configure a driver set. These settings allow you to specify Global Configurations Values, driver set packages, driver set named passwords, log levels, trace levels, and Java Environment Parameters. For more information, see "Configuring Driver Sets" in the *NetIQ Designer for Identity Manager Administration Guide*.

Assigning the Default Password Policy to Driver Sets

You must assign the DirMXL-PasswordPolicy object to each driver set in the Identity Vault. The Identity Manager Default Universal Password Policy package includes this policy object. The default policy installs and assigns a universal password policy to control how the Identity Manager engine automatically generates random passwords for drivers.

Alternatively, to use a custom password policy, you must create the password policy object and the policy. For more information, see "Creating the Password Policy Object in the Identity Vault" on page 126 and "Creating a Custom Password Policy" on page 127.

1. Open your project in Designer.
2. In the Outline pane, expand your project.
3. Expand **Package Catalog > Common** to verify whether the Default Universal Password Policy package exists.
4. (Conditional) If the password policy package is not already listed in Designer, complete the following steps:
   - **4a** Right-click **Package Catalog**.
   - **4b** Select **Import Package**.
   - **4c** Select **Identity Manager Default Universal Password Policy**, and then click **OK**.

     To ensure that the table displays all available packages, you might need to deselect **Show Base Packages Only**.
5. Select each driver set and assign the password policy.

Creating the Password Policy Object in the Identity Vault

If the `DirMXL-PasswordPolicy` object does not exist in the Identity Vault, you can use Designer or the ldapmodify utility to create the object. For more information about how to do this in Designer, see "Configuring Driver Sets" in *NetIQ Designer for Identity Manager Administration Guide*. To use the ldapmodify utility, use the following procedure:

1. In a text editor, create an LDAP Data Interchange Format (LDIF) file with the following attributes:

```
dn: cn=DirXML-PasswordPolicy,cn=Password Policies,cn=Security
changetype: add
nsimPwdRuleEnforcement: FALSE
nspmSpecialAsLastCharacter: TRUE
nspmSpecialAsFirstCharacter: TRUE
nspmSpecialCharactersAllowed: TRUE
nspmNumericAsLastCharacter: TRUE
nspmNumericAsFirstCharacter: TRUE
nspmNumericCharactersAllowed: TRUE
nspmMaximumLength: 64
nspmConfigurationOptions: 596
passwordUniqueRequired: FALSE
passwordMinimumLength: 1
passwordAllowChange: TRUE
objectClass: nspmPasswordPolicy
```

```
dn: cn=DirXML-PasswordPolicy,cn=Password Policies,cn=Security
changetype: modify
add: nsimAssignments
nsimAssignments: <driverset LDAP dn>
```

NOTE: Copying the content as is might insert some hidden special characters in the file. If you receive a `ldif_record() = 17` error message when you add these attributes to the Identity Vault, insert an extra space between the two DNs.

---

2 To add the DirMXL-PasswordPolicy object in the Identity Vault, import the attributes from the file by running `ldapmodify.exe` from the `install/utilities` directory of the Identity Manager installation kit.

Creating a Custom Password Policy

Rather than using the default password policy in Identity Manager, you can create a new policy based on your organizational requirements. You can assign a password policy to the entire tree structure, a partition root container, a container, or a specific user. To simplify management, NetIQ recommends that you assign password policies as high in the tree as possible. For more information, see Creating Password Policies in the *Password Management 3.3.2 Administration Guide*.

NOTE: You must also assign the DirXML-PasswordPolicy object to the driver sets. For more information, see "Creating the Password Policy Object in the Identity Vault" on page 126.

Creating the Default Notification Collection Object in the Identity Vault

The Default Notification Collection is an Identity Vault object that contains a set of e-mail notification templates and an SMTP server that is used when sending e-mails generated from the templates. If the Default Notification Collection object does not exist in the Identity Vault, use Designer to create the object.

1 Open your project in Designer.

2 In the Outline pane, expand your project.

3 Right-click the Identity Vault, then click Identity Vault **Properties**.

4 Click **Packages**, then click the **Add Packages** icon.

5 Select all the notification templates packages, and then click **OK**.

6 Click **Apply** to install the packages with the **Install** operation.

7 Deploy the notification templates to the Identity Vault.

Creating a Driver

To create drivers, use the package management feature provided in Designer. For each Identity Manager driver you plan to use, 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, install the driver packages and then modify the driver configuration to suit your environment.

The driver packages 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. After you create and configure the driver, deploy it to the Identity Vault and start it. In general, the driver creation process involves the following actions:

1. Importing the Driver Packages
2. Installing the Driver Packages
3. Configuring the Driver Object
4. Deploying the Driver Object
5. Starting the Driver Object

For additional and driver-specific information, refer to the relevant driver implementation guide from the Identity Manager Drivers Web site.

Defining Policies

Policies enable you to customize the flow of information into and out of the Identity Vault, 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 Identity Manager engine what a user is called in each system. Whenever operations affecting users are passed between connected systems, 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.

NetIQ recommends that you use Designer to define policies for drivers to meet your business needs. For a detailed guide to Policies, see *NetIQ Identity Manager - Using Designer to Create Policies* guide and *NetIQ Identity Manager Understanding Policies Guide*. For information about the document type definitions (DTD) that Identity Manager uses, see Identity Manager DTD Reference. These resources contain:

- 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.

Managing Driver Activities

To perform administration and configuration functions of Identity Manager drivers, use Designer. These functions are described in detail in *NetIQ Identity Manager Driver Administration Guide*.

Activating Identity Manager

You do not need an activation code to install or initially run Identity Manager. However, without an activation code, Identity Manager stops functioning 90 days after installation. You can activate Identity Manager at any time during the 90 days or afterward. For more information, see Understanding Licensing and Activation in the *NetIQ Identity Manager Overview and Planning Guide*.

VI Upgrading Identity Manager

This section provides information for upgrading Identity Manager components. To migrate existing data to a new server, see Part VII, “Migrating Identity Manager Data to a New Installation,” on page 167. For more information about the difference between upgrade and migration, see “Understanding Upgrade and Migration” on page 134.

10 Preparing to Upgrade Identity Manager

This section provides information to help you prepare for upgrading your Identity Manager solution to the latest version. You can upgrade most components of Identity Manager using an executable file, binary file, or in text mode, depending on the target computer. To perform the upgrade, you must download and unzip or unpack the Identity Manager installation kit.

WARNING: You must always rely on Identity Manager patch channels to update the components that are installed with Identity Manager 4.8. Otherwise, you can encounter severe conflicts during regular Identity Manager patch updates

- "Checklist for Upgrading Identity Manager" on page 133
- "Understanding Upgrade and Migration" on page 134
- "Upgrade Order" on page 136
- "Supported Upgrade Paths" on page 136
- "Backing Up the Current Configuration" on page 140

Checklist for Upgrading Identity Manager

To perform the upgrade, NetIQ recommends that you complete the steps in the following checklist:

	Checklist Items
❑	1. Review the differences between an upgrade and a migration. For more information, see "Understanding Upgrade and Migration" on page 134.
❑	2. Upgrade to Identity Manager 4.6.4. You cannot upgrade or migrate to version 4.8 from versions before 4.6.4. For more information, see the NetIQ Identity Manager 4.5 Setup Guide.
❑	3. Ensure that you have the latest installation kit to upgrade Identity Manager. For more information, see Where to Get Identity Manager in the *NetIQ Identity Manager Overview and Planning Guide*.
❑	4. Ensure that your computers meet the hardware and software prerequisites for a newer version of Identity Manager.
❑	5. Back up the current project, driver configuration, and databases. For more information, see "Backing Up the Current Configuration" on page 140.
❑	6. Upgrade Designer to the latest version. For more information, see "Upgrading Designer" on page 143.
❑	7. On the server running Identity Manager, upgrade eDirectory to the latest version and patch.

	Checklist Items
❑	8. Stop the drivers that are associated with the server where you installed the Identity Manager engine. For more information, see "Stopping and Starting Identity Manager Drivers" on page 158.
❑	9. Upgrade the Identity Manager engine. For more information, see "Upgrading the Identity Manager Engine" on page 145. **NOTE:** If you are migrating the Identity Manager engine to a new server, you can use the same the eDirectory replicas that are on the current Identity Manager server. For more information, see "Migrating the Identity Manager Engine to a New Server" on page 174.
❑	10. (Conditional) If any of the drivers in the driver set for the Identity Manager Engine are Remote Loader drivers, upgrade the Remote Loader servers for each driver. For more information, see "Upgrading the Remote Loader" on page 147.
❑	11. (Conditional) If you are using packages, upgrade the packages on the existing drivers to get new policies. For more information, see "Upgrading the Identity Manager Drivers" on page 160. This is only required if a newer version of a package is available and there is a new functionality included in the policies for a driver that you want to add to your existing driver.
❑	12. (Conditional) If SSPR is not installed, install SSPR. For more information, see "Installing SSPR" on page 50.
❑	13. Upgrade the Identity Applications. For more information, see "Upgrading Identity Applications" on page 148.
❑	14. Upgrade Identity Reporting. For more information, see "Upgrading Identity Reporting" on page 156.
❑	15. Start the drivers associated with the Identity Applications and the Identity Manager engine. For more information, see "Stopping and Starting Identity Manager Drivers" on page 158.
❑	16. (Conditional) If you migrated the Identity Manager engine or the identity applications to a new server, add the new server to the driver set. For more information, see "Adding New Servers to the Driver Set" on page 162.
❑	17. (Conditional) If you have custom policies and rules, restore your customized settings. For more information, see "Restoring Custom Policies and Rules to the Driver" on page 163.
❑	18. Activate your upgraded Identity Manager solution. For more information, see "Activating Identity Manager" on page 129.

Understanding Upgrade and Migration

When you want to install a newer version of an existing Identity Manager installation, you usually perform an **upgrade**. However, when the new version of Identity Manager does not provide an upgrade path from your existing version, you need to upgrade to a version from which upgrade to

4.8 is possible. Alternatively you can also do a migration to a new machine. NetIQ defines **migration** as the process for installing Identity Manager on a new server, then migrating the existing data to this new server.

During the product evaluation period or after activating Advanced Edition, you might want to **switch** to Standard Edition if you do not want Advanced Edition functionality in your environment. Identity Manager allows you to switch from Advanced Edition to Standard Edition by following a simple procedure.

Upgrade

In general, you can upgrade Identity Manager 4.7 Standard and Advanced Editions.

- **Identity Manager 4.7 Standard Edition:** If you currently have Identity Manager 4.7 Standard Edition, you can directly upgrade it to Identity Manager 4.8 Standard Edition. For more information, see Quick Start Guide for Installing and *Upgrading NetIQ Identity Manager 4.8 Standard Edition*.

  To upgrade Identity Manager 4.7 Standard Edition to Identity Manager 4.8 Advanced Edition, choose one of the following approaches to complete the upgrade:

  - Upgrade Identity Manager 4.7 Standard Edition to Identity Manager 4.8 Standard Edition and then upgrade to Identity Manager 4.8 Advanced Edition.
  - Upgrade Identity Manager 4.7 Standard Edition to Identity Manager 4.7 Advanced Edition and then upgrade to Identity Manager 4.8 Advanced Edition.
- **Identity Manager 4.7 Advanced Edition:** If you currently have Identity Manager 4.7 Advanced Edition, you can directly upgrade it to Identity Manager 4.8 Advanced Edition. For more information, see "Checklist for Upgrading Identity Manager" on page 133.

When you upgrade Identity Manager 4.7.4 that has latest version of NICI to 4.8, the Upgrade.log displays exit code 1603 as the latest version of NICI is already installed. This code can be ignored.

Migration

In some cases you cannot perform a direct upgrade. In such scenarios, migration is preferred. For example, if you previously installed Identity Manager on a server running an operating system that is no longer supported, you must perform a migration instead of an upgrade

If you have multiple servers associated with a driver set, you can perform an upgrade or a migration on one server at a time. If you do not have time to upgrade the servers at the same time, the drivers continue to work with the different versions of Identity Manager until the upgrades for each server can be completed.

IMPORTANT: If you enable features for drivers that are supported only on Identity Manager 4.8 or later, the drivers stop working on the servers with mixed versions. The older engines cannot handle the new functionality. This breaks the drivers until all servers are upgraded to Identity Manager 4.8 or later.

Switch From Advanced Edition to Standard Edition

Identity Manager allows you to switch from Advanced Edition to Standard Edition during the product evaluation period or after activating Advanced Edition.

IMPORTANT: If you have already applied Advanced Edition activation, you need not move to Standard Edition as all Standard Edition functionality is available in Advanced Edition. You must switch to Standard Edition only if you do not want any Advanced Edition functionality in your environment and want to scale down your Identity Manager deployment. For more information, see Chapter 12, "Switching from Advanced Edition to Standard Edition," on page 165.

Upgrade Order

You must upgrade the Identity Manager components in the following sequence:

1. Designer
2. Sentinel Log Management for IGA (can be installed only on Linux computers)
3. Identity Vault
4. Identity Manager Engine
5. Remote Loader
6. Identity Applications (for Advanced Edition)
7. Identity Reporting
8. Analyzer
9. Self Service Password Reset

Supported Upgrade Paths

Identity Manager 4.8 support upgrade from 4.7.x and 4.6.x versions. Before starting the upgrade, NetIQ recommends that you review the information from the release notes for your current version.

NOTE: Upgrading Identity Manager to 4.8 version requires you to apply the Identity Manager 4.8 Upgrade Enablement Patch. Conditions for applying this patch depends on your current version of Identity Manager. For more information, see NetIQ Identity Manager 4.8 Upgrade Enablement Patch Release Notes.

- "Upgrading from Identity Manager 4.7.x Versions" on page 136
- "Upgrading from Identity Manager 4.6.x Versions" on page 138

Upgrading from Identity Manager 4.7.x Versions

The following table lists the component-wise upgrade paths for Identity Manager 4.7.x versions:

Component	Base Version	Upgraded Version
Identity Manager Engine	4.7.x	1. Upgrade the operating system to a supported version. 2. Upgrade Identity Vault to 9.2. 3. Upgrade Identity Manager Engine to 4.8.
Remote Loader/Fanout Agent	4.7.x	Install 4.8 Remote Loader/Fanout Agent
Designer	4.7.x	Install Designer 4.8.
Identity Applications	4.7.x	Before you upgrade Identity Applications, ensure that the Identity Vault and Identity Manager engine are upgraded to 9.2 and 4.8 respectively. 1. Upgrade the operating system to a supported version. 2. Upgrade the database to a supported version. For the supported database versions, see the NetIQ Identity Manager Technical Information website (https://www.netiq.com/products/identity-manager/advanced/technical-information/). 3. (Conditional) If SSPR is installed on a separate server, upgrade the component to 4.8 version. 4. Update the User Application driver and Roles and Resources driver packages. 5. Upgrade Identity Applications to 4.8. 6. Stop Tomcat.

Component	Base Version	Upgraded Version
Identity Reporting	4.7.x	1. Upgrade the operating system to a supported version. 2. Upgrade the database to a supported version. For more information about the supported database versions, see the NetIQ Identity Manager Technical Information website. 3. Upgrade SLM for IGA to a supported version (installation supported only on Linux computers). 4. Update the Data Collection Services and Managed Services Gateway driver packages. 5. Upgrade Identity Reporting 4.8. 6. (Conditional) Create a data synchronization policy from the Identity Manager Data Collection Services page.

Before starting the upgrade, NetIQ recommends that you review the information from the release notes for your version from the Identity Manager documentation page.

Upgrading from Identity Manager 4.6.x Versions

The following table lists component-wise upgrade paths for Identity Manager 4.6.x versions:

Component	Base Version	Intermediate Step	Upgraded Version
Identity Manager Engine	4.6.x (where x is 0 to 3)	Apply the 4.6.4 patch	1. Upgrade the operating system to a supported version. 2. Upgrade Identity Vault to 9.2. 3. Upgrade Identity Manager Engine to 4.8.
Remote Loader/ Fanout Agent	4.6.x, where x is 0 to 3	Apply the 4.6.4 patch	Install 4.8 Remote Loader/Fanout Agent.
Designer	4.6.x, where x is 0 to 3		Install Designer 4.8.

Component	Base Version	Intermediate Step	Upgraded Version
Identity Applications	4.6.x, where x is 0 to 3	Apply the 4.6.4 patch	Before you upgrade Identity Applications, ensure that Identity Vault and Identity Manager engine are upgraded to 9.2 and 4.8 versions respectively. 1. Upgrade the operating system to a supported version. 2. Update the User Application driver and Roles and Resources driver packages. 3. Upgrade the database to a supported version. For the supported database versions, see the NetIQ Identity Manager Technical Information website. 4. (Conditional) If SSPR is installed on a separate server, upgrade the component to 4.8 version. 5. Upgrade Identity Applications to 4.8. 6. Stop Tomcat.
Identity Reporting	4.6.x, where x is 0 to 3	Apply the 4.6.4 patch.	1. Upgrade the operating system to a supported version. 2. Upgrade the database to a supported version. For more information about the supported database versions, see the NetIQ Identity Manager Technical Information website. 3. Upgrade SLM for IGA to a supported version (installation supported only on Linux computers). 4. Update the Data Collection Services and Managed Services Gateway driver packages. 5. Migrate Identity Reporting to 4.8. 6. (Conditional) Create a data synchronization policy from the Identity Manager Data Collection Services page.

Before starting the upgrade, NetIQ recommends that you review the information from the release notes for your version from the Identity Manager documentation page.

Backing Up the Current Configuration

Before upgrading, NetIQ recommends that you back up the current configuration of your Identity Manager solution. There are no additional steps required to back up the User Application. All User Application configuration is stored in the User Application driver. You can create the backup in the following ways:

- "Exporting the Designer Project" on page 140
- "Exporting the Configuration of the Drivers" on page 141

Exporting the Designer Project

A Designer project contains the schema and all driver configuration information. Creating a project of your Identity Manager solution allows you to export all of the drivers in one step instead of creating a separate export file for each driver.

- "Exporting the Current Project" on page 140
- "Creating a New Project from the Identity Vault" on page 140

Exporting the Current Project

If you already have a Designer project, verify that the information in the project is synchronized with what is in the Identity Vault:

1. In Designer, open your project.
2. In the Modeler, right-click the Identity Vault, then select **Live > Compare**.
3. Evaluate the project and reconcile any differences, then click **OK**.

   For more information, see "Using the Compare Feature When Deploying" in the *NetIQ Designer for Identity Manager Administration Guide*.
4. On the toolbar, select **Project > Export**.
5. Click **Select All** to select all resources to export.
6. Select where to save the project and in what format, then click **Finish**.

   Save the project in any location, other than the current workspace. When you upgrade to Designer, you must create a new workspace location. For more information, see "Exporting a Project" in the *NetIQ Designer for Identity Manager Administration Guide*.

Creating a New Project from the Identity Vault

If you do not have a Designer project of your current Identity Manager solution, you must create a project to back up your current solution.

1. Install Designer.
2. Launch Designer, then specify a location for your workspace.
3. Select whether you want to check for online updates, then click **OK**.
4. On the Welcome page, click **Run Designer**.
5. On the toolbar, select **Project > Import Project > Identity Vault**.

6 Specify a name for the project, then either use the default location for your project or select a different location.

7 Click **Next**.

8 Specify the following values for connecting to the Identity Vault:

- **Host Name**, which represents the IP address or DNS name of the Identity Vault server
- **User name**, which represents the DN of the user used to authenticate to the Identity Vault
- **Password**, which represents the password of the authentication user

9 Click **Next**.

10 Leave the Identity Vault Schema and the Default Notification Collection selected.

11 Expand the Default Notification Collection, then deselect the languages you do not need.

The Default Notification Collections are translated into many different languages. You can import all languages or select only the languages that you use.

12 Click **Browse**, then browse to and select a driver set to import.

13 Repeat Step 12 for each driver set in this Identity Vault, then click **Finish**.

14 Click **OK** after the project is imported.

15 If you only have one Identity Vault, you are finished. If you have multiple Identity Vaults, proceed with Step 16.

16 Click **Live > Import** on the toolbar.

17 Repeat Step 8 through Step 14 for each additional Identity Vault.

Exporting the Configuration of the Drivers

Creating an export of the drivers makes a backup of your current configuration. However, Designer currently does not create a backup of the Roles Based Entitlements driver and policies.

Using Designer to Export the Driver Configurations

1 Verify that your project in Designer has the most current version of your driver. For more information, see "Importing a Library, a Driver Set, or a Driver from the Identity Vault" in the *NetIQ Designer for Identity Manager Administration Guide*.

2 In the Modeler, right-click the line of the driver that you are upgrading.

3 Select **Export to a Configuration File**.

4 Browse to a location to save the configuration file, then click **Save**.

5 Click **OK** on the results page.

6 Repeat Step 1 through Step 5 for each driver.

11 Upgrading Identity Manager Components

This section provides specific information for upgrading individual components of Identity Manager. This section also provides steps that you might need to take after performing an upgrade.

- "Upgrading Designer" on page 143
- "Upgrading the Identity Manager Engine Components" on page 144
- "Upgrading Identity Applications" on page 148
- "Upgrading Identity Reporting" on page 156
- "Upgrading Analyzer" on page 158
- "Stopping and Starting Identity Manager Drivers" on page 158
- "Upgrading the Identity Manager Drivers" on page 160
- "Adding New Servers to the Driver Set" on page 162
- "Restoring Custom Policies and Rules to the Driver" on page 163

Upgrading Designer

1. Log in as an administrator to the server where Designer is installed.
2. To create a backup copy of your projects, export your projects.

   For more information about exporting, see "Exporting a Project" in the *NetIQ Designer for Identity Manager Administration Guide*.
3. Launch the Designer installation program from the `Identity_Manager_4.8_Designer_Windows.zip` file. (`<Designer zip extracted location>\designer_install\install.exe`)
4. Select the language to install Designer in, then read and accept the license agreement.
5. Specify the directory where Designer is installed, then click **Yes** in the message stating you already have Designer installed.
6. Select whether the shortcuts should be placed on your desktop and in your desktop menu.
7. Review the summary, then click **Install**.
8. Review the Release Notes, then click **Next**.
9. Select to launch Designer, then click **Done**.
10. Specify a location for your Designer workspace, then click **OK**.
11. Click **OK** in the warning message stating that your project needs to be closed and converted.
12. In the **Project** view, expand the project, then double-click **Project needs conversion**.
13. Review the steps that the Project Converter Wizard performs, then click **Next**.
14. Specify a name for the backup of your project, then click **Next**.
15. Review the summary of what happens during the conversion, then click **Convert**.
16. Review the summary after the conversion finishes, then click **Open**.

After upgrading to the current version of Designer, you must import all Designer projects from the older version. When you initiate the import process, Designer runs the Project Converter Wizard, which converts the older projects to the current version. In the wizard, select **Copy project into the workspace**. For more information about the Project Converter, see the *NetIQ Designer for Identity Manager Administration Guide*.

Upgrading the Identity Manager Engine Components

Ensure that you upgrade Identity Vault before upgrading the Identity Manager engine. The Identity Manager engine upgrade process updates the driver shim files that are stored in the file system on the host computer.

Upgrading the Identity Vault

1. Download the `Identity_Manager_4.8_Windows.iso` as instructed in Where to Get Identity Manager in the *NetIQ Identity Manager Overview and Planning Guide*.
2. Mount the downloaded `.iso`.
3. Navigate to the `<iso mounted location>\IdentityManagerServer\products\eDirectory\x64` directory.
4. Run the `eDirectory_920_Windows_x86_x64.exe` file.
5. In the **Basic** tab, specify the following details:
   - If you select **New Tree**, specify the following details:
     - **Tree Name:** Specify a tree name for Identity Vault.
     - **Server FDN:** Specify a server FDN.

       NOTE: Though Identity Vault allows you to set the NCP server object's FDN up to 256 characters, NetIQ recommends that you restrict the variable to a much lesser value because Identity Vault creates other objects of greater length based on the length of this object.
     - **Tree Admin:** Specify an administrator name for Identity Vault.
     - **Admin Password:** Specify the administrator password.
   - If you select **Existing Tree**, specify the following details:
     - **IP Address:** Specify the IP address of the of the existing tree for Identity Vault.
     - **Port Number:** Specify the port number for the existing tree. The default value is 524.
     - **Server FDN:** Specify a server FDN.
     - **Tree Admin:** Specify the existing administrator name for Identity Vault.
     - **Admin Password:** Specify the administrator password.
6. (Conditional) In the **Advanced** tab, specify the following details:
   - To use IPv6 addresses on the Identity Vault server, select **Enable IPv6**.

     NOTE: NetIQ recommends that you enable this option. To enable IPv6 addressing after installation, you must run the setup program again.

- To enable Enhanced Background Authentication (EBA), select **Enable EBA**.
- Specify the HTTP clear text and secure ports. The default values are 8028 and 8030 respectively.
- Specify the LDAP clear text and secure ports. The default values are 389 and 636 respectively.

7 In the **Install Location** field, specify the location where Identity Vault is installed.

8 In the **DIB Location** field, specify the location where the DIB files are located.

9 Click **Upgrade** and proceed with the upgrade process.

Upgrading the Identity Manager Engine

Verify that the drivers are stopped. For more information, see "Stopping the Drivers" on page 158.

Perform the following steps to upgrade the Identity Manager Engine:

1 Download the `Identity_Manager_4.8_Windows.iso` from the NetIQ Downloads website.

2 Mount the downloaded `.iso`.

3 Navigate to the `<ISO installed location>\IdentityManagerServer` folder and run the `install.exe`.

4 Select the language that you want to use for the installation and click **OK**.

5 In the Introduction page, click **Next**.

6 Read and accept the license agreement and then click **Next**.

The installed components and their versions are displayed.

7 Select **Identity Manager Engine** and click **Next**.

8 Specify the configuration settings for Identity Manager Engine. For more information, see "Configuration Worksheet for Identity Manager Engine" on page 51.

9 In the pre-upgrade summary page, review the settings and click **Upgrade**.

Working with MapDB 3.0.5

The addition to Identity Manager Engine, MapDB is used by the following Identity Manager drivers:

- Data Collection Services
- JDBC
- LDAP
- Managed System Gateway
- Office 365 and Azure Active Directory
- Salesforce

If you are using any of these drivers, you must review the following sections before upgrading the driver:

- "Understanding Identity Manager 4.8 Engine Support for Driver Versions" on page 146
- "Manually Removing the MapDB Cache Files" on page 146

Understanding Identity Manager 4.8 Engine Support for Driver Versions

Review the following considerations before upgrading an Identity Manager driver that uses MapDB:

- Drivers shipped with Identity Manager 4.8 are compatible with Identity Manager 4.8 Engine or Remote Loader. You must follow the driver upgrade steps from the specific driver implementation guide.
- Drivers shipped before Identity Manager 4.8 are not compatible with Identity Manager 4.8 Engine or Remote Loader.
- Drivers shipped with Identity Manager 4.8 are not backward compatible with Identity Manager 4.7.x Engine or Remote Loader.
- Drivers shipped with Identity Manager 4.8 are not backward compatible with Identity Manager 4.6.x Engine or Remote Loader.

Manually Removing the MapDB Cache Files

The Identity Manager Engine upgrade process leaves some of the existing MapDB cache files (`dx*`) in the Identity Vault's DIB directory. You must manually remove these files for your driver after upgrading the driver. This action ensures that your driver works correctly with Identity Manager 4.8 engine.

The following table lists the MapDB cache files that must be removed:

Identity Manager Driver	MapDB State Cache File To Remove
Data Collection Services	`DCSDriver_<driver instance guid>-*`
	`<driver instance guid>-*`
JDBC	`jdbc_<driver instance guid>_*`
LDAP	`ldap_<driver instance guid>*`
Managed System Gateway	`MSGW-<driver-instance-guid>.*`
Office 365 and Azure Active Directory	`<Azure driver name>_obj.db.*`
Salesforce	`<Salesforce driver name>.*`
	`<Salesforce driver name>`

where ***** represents the name of the MapDB state cache file. In case of a Salesforce driver, the MapDB state cache files are also represented by the driver name. Below are some examples of these files.

- `DCSDriver_<driver instance guid>-0.t`, `<driver instance guid>-1.p`
- `jdbc_<driver instance guid>_0.t`, `jdbc_<driver instance guid>_1`
- `ldap_<driver instance guid>b`, `ldap_<driver instance guid>b.p`
- `MSGW-<driver instance guid>.p`, `MSGW-<driver instance guid>.t`

- `<Azure driver name>_obj.db.t`, `<Azure driver name>_obj.db.p`
- `<Salesforce driver name>.p`, `<Salesforce driver name>.t`, `Salesforce driver1`

Upgrading the Remote Loader

If you are running the Remote Loader, you need to upgrade the Remote Loader files.

NOTE: Before upgrading *.NET* Remote Loader, ensure that you have successfully installed all the Windows updates on your system.

---

1. Create a backup of the Remote Loader configuration files. The default location of the files is `C:\...\RemoteLoader\remoteloadername-config.txt`.
2. Verify that the drivers are stopped. For instructions, see Stopping, Starting, or Restarting a Driver in Designer in the *NetIQ Identity Manager Driver Administration Guide*.
3. Stop the Remote Loader service or daemon for each driver.

   In the Remote Loader Console, select the Remote Loader instance, then click **Stop**.
4. Stop the `lcache` process using Windows Task Manager.
5. Download the `Identity_Manager_4.8_Windows.iso` from the NetIQ Downloads website.
6. Mount the downloaded `.iso`.
7. Navigate to the `<ISO installed location>\IdentityManagerServer` folder and run the `install.exe`.
8. Select the language that you want to use for the installation and click **OK**.
9. In the Introduction page, click **Next**.
10. Read and accept the license agreement and then click **Next**.

    The installed components and their versions are displayed.
11. Select **Remote Loader Service** and click **Next**.
12. In the pre-upgrade summary page, click **Upgrade**.
13. After the upgrade is complete, verify that your configuration files contain your environment's information.
14. (Conditional) If there is a problem with the configuration file, copy the backup file that you created in step 1. Otherwise, continue with the next step.
15. Start the Remote Loader service or daemon for each driver.

IMPORTANT: If your driver uses MapDB, manually remove the existing MapDB state cache files for the driver after upgrading the driver. This is required because Identity Manager engine upgrade process does not remove all of these files from the Identity Vault's DIB directory. For more information, see "Working with MapDB 3.0.5" on page 145.

Upgrading the Java Remote Loader

1. Create a backup of the Remote Loader configuration files. The default location of the files is `C:\...\RemoteLoader\remoteloadername-config.txt`.
2. Verify that the drivers are stopped. For instructions, see Stopping, Starting, or Restarting a Driver in Designer in the *NetIQ Identity Manager Driver Administration Guide*.
3. Stop the Remote Loader service or daemon for each driver.

   In the Remote Loader Console, select the Remote Loader instance, then click **Stop**.
4. Stop the `lcache` process using Windows Task Manager.
5. Download the `Identity_Manager_4.8_Windows.iso` from the NetIQ Downloads website.
6. Mount the downloaded `.iso`.
7. Navigate to the `<ISO installed location>\IdentityManagerServer\products\IDM\java_remoteloader` folder.
8. Copy and replace the `dirxml_jremote_dev.tar.gz` file in your existing Java Remote Loader installed directory.
9. Based on the file present in your existing setup, copy and replace one of the following files in your existing Java Remote Loader installed directory:
   - `dirxml_jremote.tar.gz`
   - `dirxml_jremote_mvs.tar`
10. Extract the files that you have copied in step 8 and step 9.

    Use the 7-zip or supported software to unzip the `.tar.gz` file.
11. (Conditional) If there is a problem with the configuration file, copy the backup file that you created in step 1. Otherwise, continue with the next step.

    NOTE: Use the `version.txt` file to ensure that you have the latest version of Java Remote Loader.
12. Start the Remote Loader service or daemon for each driver.

Upgrading Identity Applications

This section provides information about upgrading Identity Applications and supporting software, which includes updating the following components:

- Identity Manager User Application
- One SSO Provider (OSP)
- Self-Service Password Reset (SSPR)
- Tomcat, JDK, and ActiveMQ

After the upgrade, the components are upgraded to the following versions:

- Tomcat – `8.5.40`
- ActiveMQ – `5.15.9`
- Java 8 Update 222

- One SSO Provider – 6.3.4
- Self-Service Password Reset – 4.4.0.3
- Identity Applications – 4.8
- Identity Reporting – 6.5

This section provides information about the following topics:

- "Understanding the Upgrade Program" on page 149
- "Prerequisite for Upgrade" on page 149
- "System Requirements" on page 150
- "Upgrading the PostgreSQL Database" on page 150
- "Upgrading the Driver Packages for Identity Applications" on page 152
- "Upgrading Identity Applications" on page 152
- "Post-Upgrade Tasks" on page 153

Understanding the Upgrade Program

The upgrade process reads the configuration values from the existing components. This information includes `ism-configuration.properties`, `server.xml`, `SSPRConfiguration.xml` and other configuration files. Using these configuration files the upgrade process internally invokes the upgrade program for the components. In addition, this program also creates a backup of the current installation.

Prerequisite for Upgrade

If your database is configured over SSL, replace `ssl=true` with `sslmode=require` in the `server.xml` file from PATH located at `C:\NetIQ\idm\apps\tomcat\conf`.

For example, change

```
jdbc:postgresql://<postgres db>:5432/idmuserappdb?ssl=true
```

to

```
jdbc:postgresql://<postgres db>:5432/idmuserappdb?sslmode=require
```

System Requirements

The upgrade process creates a back-up of the current configuration for the installed components. Ensure that your server has sufficient space to store the back-up and additional free space available for upgrade.

Upgrading the PostgreSQL Database

IMPORTANT: The upgrade process may take time depending on the size of the database. Therefore, plan your upgrade accordingly.

---

1. Stop the PostgreSQL service that is running on your server.
2. Rename the `postgres` directory from `C:\Netiq\idm\apps`.

   For example, rename `postgres` to `postgresql_old`.
3. Remove the old service by executing the following command:

   ```
   sc delete <postgres service name>
   ```
4. Install PostgreSQL version supported on your operating system.

   You must choose a location other than the current installation location of PostgreSQL.

   4a Mount the `Identity_Manager_4.8_Windows.iso` image file and navigate to the `\common\postgres_tomcat` directory.

   4b Run the `TomcatPostgreSQL.exe` file.

   Select only **PostgreSQL** option during installation.

   NOTE: ◆Do not provide any database details in **PostgreSQL details** page. Ensure that **Create database login account** and **Create empty database** are deselected.

   ◆ Ensure that you have the Administrator privileges for the old and new PostgreSQL installation directories.

   ---

5. Stop the newly installed PostgreSQL service. Go to **Services**, search for *<PostgreSQL version number>* service, and stop the service.

   NOTE: Appropriate users can perform stop operations after providing valid authentication.

   ---

6. Change the permissions for the newly installed PostgreSQL directory by performing the following actions:

   Create a `postgres` user:

   1. Go to **Control Panel > User Accounts > User Accounts > Manage Accounts**.
   2. Click **Add a user account**.
   3. In the Add a User page, specify `postgres` as the user name and provide a password for the user.

   Provide permissions to `postgres` user to the existing and newly installed PostgreSQL directories:

   1. Right click the PostgreSQL directory and go to **Properties > Security > Edit**.

2. Select **Full Control** for the user to provide complete permissions.
3. Click **Apply**.

7 Access the PostgreSQL directory as `postgres` user.

1. Log in to the server as `postgres` user.

   Before logging in, make sure that `postgres` can connect to the Windows server by verifying if a remote connection is allowed for this user.
2. Delete the data directory from the new postgres install location. For example, `C:\NetIQ\idm\apps\postgres\data`
3. Open a command prompt and set PGPASSWORD by using the following command:

   ```
   set PGPASSWORD=<your pg password>
   ```
4. Change to the newly installed PostgreSQL directory.
5. Execute `initdb` as `postgres` database user.

   ```
   initdb.exe -D <new_data_directory> -E UTF8 -U postgres
   ```

   For example,

   ```
   initdb.exe -D C:\NetIQ\idm\apps\postgres\data -E UTF8 -U postgres
   ```

8 Upgrade PostgreSQL from new PostgreSQL `bin` directory. Run the following command and click **Enter**.

NOTE: Ensure that you set the **Method** type from `md5` to `trust` in the `pg_hba.conf` located at `C:\NetIQ\idm\apps\postgres\data\` directory.

```
pg_upgrade.exe --old-datadir "C:\NetIQ\idm\apps1\postgres\data" --new-
datadir "C:\NetIQ\idm\apps1\postgresql962\data" --old-bindir
"C:\NetIQ\idm\apps1\postgres\bin" --new-bindir
"C:\NetIQ\idm\apps1\postgresql962\bin"
```

9 After successful upgrade, replace `pg_hba.conf` and `postgresql.conf` files located in the new postgres data directory (`C:\NetIQ\idm\apps\postgres\data`) with the files from the old postgres directory.

10 Start the upgraded PostgreSQL database service.

Go to **Services**, search for *<PostgreSQL version number>* service, and start the service.

NOTE: Appropriate users can perform start operations after providing valid authentication.

---

11 Disable the old PostgreSQL service to ensure that the service does not automatically start.

12 (Optional) Delete the old data files from the `bin` directory of the newly installed PostgreSQL service.

1. Login as `postgres` user.
2. Navigate to the bin directory and run `analyze_new_cluster.bat` and `delete_old_cluster.bat` files.

   For example: `C:\NetIQ\idm\apps\postgresql\bin`

NOTE: You must run this step only if you want to delete the old data files.

Upgrading the Driver Packages for Identity Applications

You must stop Tomcat and update the packages for the User Application Driver and Role and Resource Service drivers to the latest version. For information about upgrading packages to the latest version, see Upgrading Installed Packages of the *NetIQ Designer for Identity Manager Administration Guide*.

After upgrading the User Application driver packages, you must manually add the workflow templates package:

1. In Designer, navigate to the **User Application driver** > **Properties**.
2. Click Packages, then click the ✚.
3. Select the **Create Workflow Templates**.
4. Click **OK** and then click **Finish** to complete the installation.
5. Deploy the User Application driver.

IMPORTANT: If any Email notifications template is installed or upgraded as part of User Application Driver upgrade, then you need to deploy **Default Notification Collection** object.

Upgrading Identity Applications

The following procedure describes how to upgrade the following components:

- Identity Applications
- OSP
- Tomcat
- PostgreSQL
- SSPR (if installed on the same computer as Identity Applications)
- ActiveMQ

Perform the following steps to upgrade Identity Applications:

1. Download the `Identity_Manager_4.8_Windows.iso` from the NetIQ Downloads website.
2. Mount the downloaded `.iso`.
3. Navigate to the `<ISO installed location>\IdentityApplications` folder and run the `install.exe`.
4. Select the language that you want to use for the installation and click **OK**.
5. In the Introduction page, click **Next**.
6. Read and accept the license agreement and then click **Next**.

   The installed components and their versions are displayed.
7. Select **Identity Applications** and click **Next**.
8. Specify the configuration settings for Identity Applications. For more information, see "Configuration Worksheet for Identity Applications" on page 53.

NOTE: ◆NetIQ recommends you to create the Workflow database using the Identity Manager installer, if you have installed the PostgreSQL database on the same server as Identity Applications.

- While Upgrading, you must manually specify the database JDBC JAR file. For example, if you are using PostgresQL database, you need to specify the location of the database JAR file which is located outside the `tomcat\lib` folder.

9 In the pre-upgrade summary page, review the settings and click **Upgrade**.

Depending on where you installed the components, the process creates the backup directory in that location and appends a time stamp (indicating the time of backup) to the backed-up directory.

For example,

- Tomcat – `C:\NetIQ\idm\apps\tomcat_backup_02262018_033634`
- OSP and SSPR - `C:\NetIQ\idm\apps\osp_sspr_backup_02262018_033634`
- ActiveMQ - `C:\NetIQ\idm\apps\activemq_backup_02262018_033634`
- User Application - `C:\NetIQ\idm\apps\UserApplication_backup_02262018_033634`
- Identity Reporting - `C:\NetIQ\idm\apps\IdentityReporting_backup_02262018_033634`

Post-Upgrade Tasks

If you have Identity Applications and SSPR on different servers, then you must import the SSPR trusted certificate with the CN as Identity Applications to the `cacerts` of Identity Applications server.

You must also restore the customized settings for Tomcat, SSPR, OSP, or Identity Applications, manually.

Perform the post-upgrade steps for the required components:

- "Java" on page 153
- "Tomcat" on page 154
- "Identity Applications" on page 155
- "One SSO Provider" on page 155
- "Self-Service Password Reset" on page 155
- "Kerberos" on page 156

Java

Verify the certificates in newly upgrade JRE location: `jre\lib\security\cacerts` with your older JRE location. Manually import the missed certificates into your `cacerts`.

1 Import `java cacerts` using `keytool` command:

```
keytool -import -trustcacerts -file Certificate_Path -alias ALIAS_NAME
-keystore cacerts
```

NOTE: After upgrade, JRE is stored in the identity applications install location. For example: `C:\NetIQ\idm\apps\jre`

2 Restart the Identity Vault.

3 Verify JRE home location is `tomcat\bin\setenv.bat`.

4 Launch **Configuration Update** utility and verify the path of your `cacerts`.

Tomcat

1 (Conditional) To restore the customized files from the backup taken earlier by the upgrade process, perform the following tasks:

- Restore customized https certificates. To restore these certificates, copy the Java Secure Socket Extension (JSSE) contents from the backed up `server.xml` to the new `server.xml` file in the `\tomcat\conf` directory.
- Do not copy the configuration files from the backed-up Tomcat directory to the new Tomcat directory. Start with the default configuration of the new version and make changes as needed. For more information, see this Apache Website.

  Verify that new `server.xml` file has the following entries

  ```
  <Connector port="8543" protocol="HTTP/1.1"
         maxThreads="150" SSLEnabled="true" scheme="https"
  secure="true"
         clientAuth="false" sslProtocol="TLS"
         keystoreFile="path_to_keystore_file"
         keystorePass="keystore_password" />
  <!--
        <Cluster
  className="org.apache.catalina.ha.tcp.SimpleTcpCluster"/>
   -->
  ```

  or

  ```
  <Connector port="8543"
  protocol="org.apache.coyote.http11.Http11NioProtocol"
         maxThreads="150" SSLEnabled="true" scheme="https"
  secure="true"
         clientAuth="false" sslProtocol="TLS"
         keystoreFile="path_to_keystore_file"
         keystorePass="keystore_password" />
  <!--
        <Cluster
  className="org.apache.catalina.ha.tcp.SimpleTcpCluster"/>
   -->
  ```

  NOTE: On a cluster environment, manually uncomment the `Cluster` tag in `server.xml` and copy `osp.jks` on to all nodes from the first node located at `C:\netiq\idm\apps\osp_backup_<date>`.

- If you have customized keystore files, include the correct path in the new `server.xml` file.
- Import identity applications certificates into the Identity Vault at `C:\NetIQ\eDirectory\jre\lib\security\cacerts`.

For example, you can use the following keytool command to import certificates into Identity Vault:

```
keytool -importkeystore -alias <User Application certificate alias>
-srckeystore <backup cacert> -srcstorepass changeit -destkeystore
C:\NetIQ\eDirectory\jre\lib\security\cacerts
```

2 (Conditional) Navigate to the User Application and restore the customized settings manually by reading the backed-up configuration.

Identity Applications

While upgrading Identity Applications from 4.6 SP4 to 4.8, you must ensure that `Dcom.novell.afw.wf.engine-id=IDMProv` parameter is present in the `setenv` file inside `tomcat/bin` folder. In case this parameter is missing after upgrading Identity Applications, you must manually add the parameter in the `setenv` file and restart the Tomcat server.

One SSO Provider

By default, the `LogHost` entry located in the `logevent.conf` file is set to `localhost`.

To modify the `LogHost` entry, manually restore the customized OSP configurations from the backup taken during the upgrade process.

Self-Service Password Reset

After upgrading SSPR, update SSO client parameter using Configuration Update Utility. For more information, see "SSO Clients Parameters" on page 86.

To update the SSPR configuration details, perform the following steps:

1 Log in to SSPR portal as an administrator.

2 Update the audit server details:

   2a Navigate to **YourID > Configuration Editor**, specify the configuration password.

   2b Select **Settings > Auditing > Audit Forwarding > Syslog Audit Server Certificates**.

   2c Import these certificates from the sever and click **Save**.

3 Import the **LocalDB** into SSPR:

   3a Navigate to **YourID > Configuration Manager** from the drop-down menu.

   3b Click **LocalDB**.

   3c Click **Import (Upload) LocalDB Archive File**.

4 (Conditional) To restrict configuration for SSPR:

   4a Navigate to **YourID > Configuration Manager** from the list.

   4b Click **Restrict Configuration**.

5 Configure administrator permissions for SSPR, see "Post-Installation Steps" on page 58.

To verify that the upgrade is successful, launch the upgraded components.

For example, launch the Identity Manager Dashboard, click **About**. Check whether the application displays the new version, such as **4.8.0**.

Kerberos

The upgrade utility creates a new Tomcat folder on your computer. If any of the Kerberos files such as `keytab` and `Kerberos_login.config` resided in the old Tomcat folder, copy these files to the new Tomcat folder from backed-up folder.

Upgrading Identity Reporting

Identity Reporting includes two drivers. Also, you might need to migrate content from NetIQ Event Auditing Service to Sentinel Log Management for IGA. Perform the upgrade in the following order:

1. Upgrade Sentinel Log Management for IGA. For more information, see Upgrading Sentinel Log Management for IGA in the NetIQ Identity Manager Setup Guide for Linux.
2. Upgrade Identity Reporting.

Prerequisite for Upgrade

If your database is configured over SSL, replace `ssl=true` with `sslmode=require` in the `server.xml` file from PATH located at `C:\NetIQ\idm\apps\tomcat\conf`.

For example, change

```
jdbc:postgresql://<postgres db>:5432/idmrptdb?ssl=true
```

to

```
jdbc:postgresql://<postgres db>:5432/idmrptdb?sslmode=require
```

Upgrading Identity Reporting

Before upgrading Identity Reporting, you must upgrade the identity applications and SLM for IGA. To upgrade Identity Reporting, install the new version on top of the older version.

Perform the following steps to upgrade Identity Reporting:

1. Download the `Identity_Manager_4.8_Windows.iso` from the NetIQ Downloads website.
2. Mount the downloaded `.iso`.
3. Navigate to the `<ISO installed location>\IdentityReporting` folder and run the `install.exe`.
4. Select the language that you want to use for the installation and click **OK**.
5. In the Introduction page, click **Next**.
6. Read and accept the license agreement and then click **Next**.

   The installed components and their versions are displayed.
7. Select **Identity Reporting** and click **Next**.
8. Specify the configuration settings for Identity Reporting. For more information, see "Configuration Worksheet for Identity Reporting" on page 55.
9. In the pre-upgrade summary page, review the settings and click **Upgrade**.

NOTE: The `com.netiq.rpt.ssl-keystore.type` property in `ism-configuration.properties` file will retain the value (JKS/PKCS12) that was set prior to upgrade.

Post-upgrade Steps for Reporting

After upgrading Identity Reporting to 4.8, navigate to the `ism-configuration.properties` file located at `/opt/netiq/idm/apps/tomcat/conf/` directory and perform the following actions:

- Change the value of the `com.netiq.rpt.landing.url` property as follows:

  ```
  com.netiq.rpt.landing.url = ${com.netiq.idm.osp.url.host}/idmdash/#/landing
  ```

- Change the value of the `com.netiq.idmdcs.landing.url` property as follows:

  ```
  com.netiq.idmdcs.landing.url = ${com.netiq.idm.osp.url.host}/idmdash/#/landing
  ```

- Specify the value for the `com.netiq.rpt.redirect.url` property in the following format: `https:<hostname>:<port>/path`

  For example, `com.netiq.rpt.redirect.url = https://192.168.0.1:8543/IDMRPT/oauth.html`

Changing the References to reportRunner in the Database

After upgrading Identity Reporting and before starting Tomcat for the first time, ensure that you update the references to reportRunner from the database.

1. Stop Tomcat.
2. Navigate to the Identity Reporting installation directory and rename the `reportContent` folder to `ORG-reportContent`.

   For example: `C:\NetIQ\idm\apps\IdentityReporting`
3. Clean the temporary and work directories under the Tomcat folder.
4. Log in to the PostgreSQL database.

   4a Locate the reportRunner references in the following tables:

   - `idm_rpt_cfg.idmrpt_rpt_params`
   - `idm_rpt_cfg.idmrpt_definition`

   4b Issue the following delete statements:

   ```
   DELETE FROM idm_rpt_cfg.idmrpt_rpt_params WHERE
   rpt_def_id='com.novell.content.reportRunner';
   ```

   ```
   DELETE FROM idm_rpt_cfg.idmrpt_definition WHERE
   def_id='com.novell.content.reportRunner';
   ```

5. Start Tomcat.

   Check the logs to see if the reports are regenerated with the correct reportRunner.
6. Log into Identity Reporting and run the reports.

Verifying the Upgrade for Identity Reporting

1. Launch Identity Reporting.
2. Verify that old and new reports are being displayed in the tool.
3. Look at the **Calendar** to see whether your scheduled reports appear.
4. Ensure that the **Settings** page displays your previous settings for managed and unmanaged applications.
5. Verify that all other settings look correct.
6. Verify whether the application lists your completed reports.

Upgrading Analyzer

To upgrade Analyzer, NetIQ provides patch files in `.zip` format. Before upgrading Analyzer, ensure that the computer meets the prerequisites and system requirements. For more information, see the Release Notes accompanying the update.

1. Download the patch file, such as `Identity_Manager_4.8_Analyzer_Windows`, from the NetIQ download website.
2. Extract the `.zip` file to the directory that contains the Analyzer installation files, such as the plug-ins, uninstallation script, and other Analyzer files.
3. Restart Analyzer.
4. To verify that you successfully applied the new patch, complete the following steps:
   - **4a** Launch Analyzer.
   - **4b** Click **Help > About Analyzer**.
   - **4c** Check whether the program displays the new version, such as **4.6 Update 1** and Build ID **20121128**.

Stopping and Starting Identity Manager Drivers

You might need to start or stop the Identity Manager drivers to ensure that an upgrade or installation process can modify or replace the correct files. This section explains the following activities:

- "Stopping the Drivers" on page 158
- "Starting the Drivers" on page 159

Stopping the Drivers

Before you modify any files for a driver, it is important to stop the drivers.

- "Using Designer to Stop the Drivers" on page 159
- "Using Identity Console to Stop the Drivers" on page 159

Using Designer to Stop the Drivers

1 In Designer, select the Identity Vault object in the **Outline** tab.

2 In the Modeler toolbar, click the **Stop All Drivers** icon.

This stops all drivers that are part of the project.

3 Set the drivers to manual start to ensure that the drivers do not start until the upgrade process is complete:

3a Double-click the driver icon in the **Outline** tab.

3b Select **Driver Configuration > Startup Options**.

3c Select **Manual**, then click **OK**.

3d Repeat Step 3a through Step 3c for each driver.

Using Identity Console to Stop the Drivers

1 In Identity Console, select **Identity Manager Administration**.

2 Click the **Action menu** on the Driver Set object.

3 Click **Stop all drivers**.

4 Repeat through step 3 for each Driver Set object.

5 Set the drivers to manual start to ensure that the drivers do not start until the upgrade process is complete:

5a In Identity Console, select **Identity Manager Administration**.

5b Click the Driver Set object.

5c In the upper right corner of the driver icon, click **Action menu** and select **Startup Options**.

5d Select **Manual**, then click **OK**.

5e Repeat Step 5a through Step 5d for each driver in your tree.

Starting the Drivers

After all of the Identity Manager components are updated, restart the drivers. NetIQ recommends that you test the drivers after they are running to verify that all of the policies still work.

- "Using Designer to Start the Drivers" on page 159
- "Using Identity Console to Start the Drivers" on page 160

Using Designer to Start the Drivers

1 In Designer, select the Identity Vault object in the **Outline** tab.

2 Click the **Start All Drivers** icon in the Modeler toolbar. This starts all of the drivers in the project.

3 Set the driver startup options:

3a Double-click the driver icon in the **Outline** tab.

3b Select **Driver Configuration > Startup Option**.

3c Select **Auto start** or select your preferred method of starting the driver, then click **OK**.

3d Repeat Step 3a through Step 3c for each driver.

4 Test the drivers to verify the policies are working as designed. For information on how to test your policies, see "Testing Policies with the Policy Simulator" in *NetIQ Identity Manager - Using Designer to Create Policies*.

Using Identity Console to Start the Drivers

1 In Identity Console, select **Identity Manager Overview**.

2 Click the **Action menu** icon on the Driver Set object.

3 Click **Start all drivers**.

4 If you have multiple drivers, Repeat through step 3 for each Driver Set object.

5 Set the driver startup options:

5a In Identity Console, select **Identity Manager Administration**.

5b Click the Driver Set object.

5c In the upper right corner of the driver icon, click **Action menu** and select **Startup Options**.

5d Select **Manual**, then click **OK**.

5e Repeat Step 5a and Step 5d for each driver.

6 Test the drivers to verify the policies are working as designed.

Upgrading the Identity Manager Drivers

NetIQ delivers new driver content through **packages** instead of through driver configuration files. You manage, maintain, and create packages in Designer. For more information about managing packages, see "Understanding Packages" in the *NetIQ Designer for Identity Manager Administration Guide*.

You can upgrade your drivers to packages in the following ways:

- "Creating a New Driver" on page 161
- "Replacing Existing Content with Content from Packages" on page 161
- "Keeping the Current Content and Adding New Content with Packages" on page 161

IMPORTANT: If your driver uses MapDB, manually remove the existing MapDB state cache files for the driver after upgrading the driver. This is required because Identity Manager engine upgrade process does not clean all of these files. For more information, see "Working with MapDB 3.0.5" on page 145.

Creating a New Driver

The simplest and cleanest way to upgrade drivers to packages is to delete your existing driver and create a new driver with packages. Add all the functionality you want in the new driver. The steps are different for each driver. For instructions, see the individual driver guides on the Identity Manager Drivers documentation website. The driver now functions as before, but with content from packages instead of from a driver configuration file.

Replacing Existing Content with Content from Packages

If you need to keep the associations created by the driver, you do not need to delete and re-create the driver. You can keep the associations and replace the driver content with packages.

To replace the existing content with content from packages:

1. Create a backup of the driver and all of the customized content in the driver.

   For instructions, see "Exporting the Configuration of the Drivers" on page 141.

2. In Designer, delete all objects stored inside of the driver. Delete the policies, filters, entitlements, and all other items stored inside of the driver.

   NOTE: Designer provides the auto-import facility for importing the latest packages. You do not need to manually import the driver packages into the package catalog.

   For more information, see "Importing Packages into the Package Catalog" in the *NetIQ Designer for Identity Manager Administration Guide*.

   ---

3. Install the latest packages to the driver.

   These steps are specific for each driver. For instructions, see each driver guide at the Identity Manager Drivers documentation website.

4. Restore any custom policies and rules to the driver. For instructions, see "Restoring Custom Policies and Rules to the Driver" on page 163.

Keeping the Current Content and Adding New Content with Packages

You can keep the driver as it currently is and add new functionality to the driver through packages, as long as the functionality in packages does not overlap the current functionality of the driver.

Before you install a package, create a backup of the driver configuration file. When you install a package, it can overwrite existing policies, which might cause the driver to stop working. If a policy is overwritten, you can import the backup driver configuration file and recreate the policy.

Before you begin, make sure that any customized policies have different policy names than the default policies. When a driver configuration is overlaid with a new driver file, the existing policies are overwritten. If your custom policies do not have a unique name, you will lose them.

To add new content to the driver with packages:

1. Create a backup of the driver and all of the customized content in the driver.

   For instructions, see "Exporting the Configuration of the Drivers" on page 141.

NOTE: Designer provides the auto-import facility for importing the latest packages. You do not need to manually import the driver packages into the package catalog.

For more information, see "Importing Packages into the Package Catalog" in the *NetIQ Designer for Identity Manager Administration Guide*.

2 Install the packages on the driver.

For instructions, see each driver guide at the Identity Manager Drivers documentation website.

3 Add the desired packages to the driver. These steps are specific for each driver.

For more information, see the Identity Manager Drivers documentation website.

The driver contains the new functionality added by the packages.

Adding New Servers to the Driver Set

When you upgrade or migrate Identity Manager to new servers, you must update the driver set information. This section guides you through the process. You can use Designer or Identity Console to update the driver set.

Adding the New Server to the Driver Set

If you are using Identity Console, you must add the new server to the driver set. Designer contains a Migration Wizard for the server that does this step for you. If you are using Designer, skip to "Copying the Server-specific Information in Designer" on page 173. If you are using Identity Console, complete the following procedure:

1 In Identity Console, click **IDM Administration**.

2 Select the driver set.

3 Click ⋮.

4 Click **Add Server**.

5 Browse to and select the new Identity Manager server, then click **OK**.

Removing the Old Server from the Driver Set

After the new server is running all of the drivers, you can remove the old server from the driver set.

- "Using Designer to Remove the Old Server from the Driver Set" on page 162
- "Using Identity Console to Remove the Old Server from the Driver Set" on page 163
- "Decommissioning the Old Server" on page 163

Using Designer to Remove the Old Server from the Driver Set

1 In Designer, open your project.

2 In the Modeler, right-click the driver set, then select **Properties**.

3 Select **Server List**.

4 Select the old Identity Manager server in the **Selected Servers** list, then click the **<** to remove the server from the **Selected Servers** list.

5 Click **OK** to save the changes.

6 Deploy the change to the Identity Vault.

For more information, see "Deploying a Driver Set to an Identity Vault" in the *NetIQ Designer for Identity Manager Administration Guide*.

Using Identity Console to Remove the Old Server from the Driver Set

1 In Identity Console, click **IDM Administration**.

2 Select the driver set.

3 Click ⋮.

4 Click **Remove Server**.

5 Browse to and select the new Identity Manager server, then click **OK**.

Decommissioning the Old Server

At this point, the old server is not hosting any drivers. If you no longer need this server, you must complete additional steps to decommission it:

1 Remove the eDirectory replicas from this server.

For more information, see "Deleting Replicas" in the *NetIQ eDirectory Administration Guide*.

2 Remove eDirectory from this server.

For more information, see TID 10056593, "Removing a Server From an NDS Tree Permanently".

Restoring Custom Policies and Rules to the Driver

After installing or upgrading to new packages for your drivers, you must restore any custom policies or rules to the driver after you overlay the new driver configuration file. If these policies have different names, they are still stored in the driver, but the links are broken and need to be reestablished.

- "Using Designer to Restore Custom Policies and Rules to the Driver" on page 163
- "Using Identity Console to Restore Custom Policies and Rules to the Driver" on page 164

Using Designer to Restore Custom Policies and Rules to the Driver

You can add policies into the policy set. You should perform these steps in a test environment before you move the upgraded driver to your production environment.

1 In the **Outline** view, select the upgraded driver, then click the **Show Policy Flow** icon.

2 Right-click the policy set where you need to restore the customized policy to the driver, then select **Add Policy > Copy Existing**.

3 Browse to and select the customized policy, then click **OK**.

4 Specify the name of the customized policy, then click **OK**.

5 Click **Yes** in the file conflict message to save your project.

6 After the Policy Builder opens the policy, verify that the information is correct in the copied policy.

7 Repeat Step 2 through Step 6 for each customized policy you need to restore to the driver.

8 Start the driver and test the driver.

For more information on starting the driver, see Stopping, Starting, or Restarting a Driver in Designer in the *NetIQ Identity Manager Driver Administration Guide*. For more information on testing the driver, see "Testing Policies with the Policy Simulator" in *NetIQ Identity Manager - Using Designer to Create Policies*.

9 After you verify that the policies work, move the driver to the production environment.

Using Identity Console to Restore Custom Policies and Rules to the Driver

Perform these steps in a test environment before you move the upgraded driver to your production environment.

1 In Identity Console, Go to **Identity Manager Administration**.

2 Click the Driver Set object that contains the upgraded driver.

3 Click the driver icon.

4 Go to **Data Transformation and Synchronization > Polices**, then select the policy set where you need to restore the customized policy.

5 Click **Insert Policy**.

6 In the **Use an existing policy** popup, browse and select the custom policy.

7 Click **Save**.

8 Repeat Step 2 through Step 7 for each custom policy you need to restore to the driver.

9 Start the driver and test the driver.

For information on starting the driver, see Stopping, Starting, or Restarting a Driver in Designer in the *NetIQ Identity Manager Driver Administration Guide*. There is no policy simulator in Identity Console. To test the policies, cause events to happen that make the policies execute. For example, create a user, modify a user, or delete a user.

10 After you verify that the policies work, move the driver to the production environment.

12 Switching from Advanced Edition to Standard Edition

You should switch to Standard Edition only if you do not want any Advanced Edition functionality in your environment and want to scale down your Identity Manager deployment.

1. (Conditional) If you have already applied the Advanced Edition activation, remove the activation.
2. (Conditional) To switch to the Standard Edition evaluation mode, perform the following actions:
   - **2a** Navigate to the Identity Vault `dib` directory in `C:\Novell\NDS\DIBFiles`.
   - **2b** Create a new file, name it `.idme`, and add 2 (numeric) to the file.
   - **2c** Restart eDirectory.
   - **2d** Continue with Step 4.
3. (Conditional) If you have already purchased a Standard Edition activation, apply the activation.
4. Stop Tomcat.
5. Remove the following WAR files and Webapps folder from the `C:\NetIQ\idm\apps\tomcat\webapps` directory:
   - `IDMProv*`
   - `IDMRPT*`
   - `dash*`
   - `idmdash*`
   - `landing*`
   - `rra*`
   - `rptdoc*`
6. Move the following existing folders to a backup directory:
   - `IDMReporting`
   - `UserApplication`
7. Copy the `ism-configuration.properties` file from `C:\NetIQ\IDM\apps\tomcat\conf` directory to a backup directory.
8. Install Identity Reporting from the Identity Manager 4.8 iso file.
9. Start `configupdate.bat` from the `<reporting install folder>/bin` directory and specify values for the following parameters:

   Reporting tab: Specify the settings in the following sections:

   - ID Vault
   - Identity Vault User Identity

- Report Administrators
  - **Report Admin Role Container DN**. For example, `ou=sa,o=data`
  - **Report Administrators**. For example, `cn=uaadmin,ou=sa,o=data`

Authentication tab: Specify the settings in the following sections:

- Authentication Server
  - **OAuth server host identifier**. For example, IP address or DNS name of the authentication server such as `192.99.17.22`
  - **OAuth server TCP port**
  - **OAuth server is using TLS/SSL**
- Authentication Configuration
  - **OAuth keystore file**. For example, `C:\NetIQ\idm\apps\osp\osp.jks`
  - **Key alias of key for use by OAuth**
  - **Key password of key for use by OAuth**
  - **Session Timeout (minutes)**. For example, 60 minutes.

SSO Clients tab: Specify the settings in the following sections:

- Reporting
  - **URL link to landing page**. For example, `http://192.168.0.1:8180/IDMRPT`
- Self Service Password Reset
  - **OAuth client ID**. For example, *sspr*
  - OAuth client secret For example, *<sspr client secret>*
  - **OSP OAuth redirect url**. For example, `http://192.168.0.2:8180/sspr/public/oauth`

For more information about Configuration Utility, see "Running the Identity Applications Configuration Utility" on page 69.

10 Save the changes and exit the Configuration Utility.

11 Start Tomcat.

VII Migrating Identity Manager Data to a New Installation

This section provides information on migrating existing data in Identity Manager components to a new installation. Most migration tasks apply to the Identity Applications. To upgrade Identity Manager components, see Part VI, “Upgrading Identity Manager,” on page 131. For more information about the difference between upgrade and migration, see “Understanding Upgrade and Migration” on page 134.

13 Preparing to Migrate Identity Manager

This section provides information to help you prepare for migrating your Identity Manager solution to the new installation.

Checklist for Performing a Migration

To perform a migration, NetIQ recommends that you complete the steps in the following checklist.

	Checklist Items
❑	1. Ensure that you have the latest installation kit to migrate your Identity Manager data.
❑	2. Ensure that your computers meet the hardware and software prerequisites for a newer version of Identity Manager.
❑	3. Upgrade Identity Vault to the latest supported version.
❑	4. Add the eDirectory replicas that are on the current Identity Manager server to the new server. For more information, see Section 14, "Migrating Identity Manager to a New Server," on page 171.
❑	5. Install Identity Manager on the new server. For more information, see "Planning to Install Identity Manager" on page 33.
❑	6. (Conditional) If any of the drivers in the driver set are Remote Loader drivers, upgrade the Remote Loader server for each driver. For more information, see "Upgrading the Remote Loader" on page 147.
❑	7. (Conditional) If you are running the User Application on your old server, update the component and its drivers. For more information, see "Checklist for Migrating Identity Manager" on page 171.
❑	8. Add the new server to the driver set. For more information, see "Adding the New Server to the Driver Set" on page 162.
❑	9. Change the server-specific information for each driver. For more information, see "Copying the Server-specific Information in Designer" on page 173.
❑	10. (Conditional) If you have RBPM, update the server-specific information from the old server to the new server for the User Application. For more information, see "Copying Server-specific Information for the Driver Set" on page 173
❑	11. Update your drivers to the package format. For more information, see "Upgrading the Identity Manager Drivers" on page 160.
❑	12. (Conditional) If you have custom policies and rules, restore your customize settings. For more information, see "Restoring Custom Policies and Rules to the Driver" on page 163.
❑	13. Remove the old server from the driver set. For more information, see "Removing the Old Server from the Driver Set" on page 162.

	Checklist Items
❑	14. Activate your upgraded Identity Manager solution. For more information, see "Activating Identity Manager" on page 129.

14 Migrating Identity Manager to a New Server

This section provides information for migrating from the User Application to the identity applications on a new server. You might also need to perform a migration when you cannot upgrade an existing installation. This section includes the following activities:

- "Checklist for Migrating Identity Manager" on page 171
- "Preparing Your Designer Project for Migration" on page 172
- "Copying Server-specific Information for the Driver Set" on page 173
- "Migrating the Identity Manager Engine to a New Server" on page 174
- "Migrating the User Application Driver" on page 175
- "Upgrading the Identity Applications" on page 176
- "Migrating Identity Applications" on page 176
- "Completing the Migration of the Identity Applications" on page 178

Checklist for Migrating Identity Manager

NetIQ recommends that you complete the steps in the following checklist.

	Checklist Items
❑	1. Back up the directories and databases of your Identity Manager solution.
❑	2. Ensure that you have installed the latest versions of the Identity Manager components, except for the identity applications. **NOTE:** To continue using your current User Application database, specify **Existing Database** in the installation program.
❑	3. Run a health check of the Identity Vault to ensure that the schema extends properly. Use TID 3564075 to complete the health check.
❑	4. Import your existing User Application drivers into Designer.
❑	5. Archive the Designer project. It represents the pre-migration state of the drivers. For more information, see "Preparing Your Designer Project for Migration" on page 172.
❑	6. (Conditional) To migrate the Identity Manager engine to a new server, copy the eDirectory replicas to the new server. For more information, see "Migrating the Identity Manager Engine to a New Server" on page 174.
❑	7. Create a new Designer project in the latest version of Designer, then import the User Application driver to prepare for migration.

	Checklist Items
❑	8. Migrate the User Application driver. For more information, see "Migrating the User Application Driver" on page 175.
❑	9. Deploy the two drivers to the Identity Vault.
❑	10. Upgrade the Identity Applications. For more information, see "Upgrading Identity Applications" on page 148.
❑	11. Ensure that your browsers do not contain content from the previous versions of Identity Manager. For more information, see "Flushing the Browser Cache" on page 179.
❑	12. (Conditional) Reinstate your custom settings for the SharedPagePortlet. For more information, see "Updating the Maximum Timeout Setting for the SharedPagePortlet" on page 179.
❑	13. Ensure that the search option for groups does not display information until the user provides filter parameters. For more information, see "Disabling the Automatic Query Setting for Groups" on page 180.

Preparing Your Designer Project for Migration

Before you migrate the driver, you need to perform some setup steps to prepare the Designer project for migration.

NOTE: If you do not have an existing Designer project to migrate, create a new project by using **File > Import > Project (From Identity Vault)**.

1. Launch Designer.
2. (Conditional) If you have an existing Designer project that contains the User Application that you want to migrate, back up the project:
   - **2a** Right-click the name of the project in Project view, then select **Copy Project**.
   - **2b** Specify a name for the project, then click **OK**.
3. To update the schema for your existing project, complete the following steps:
   - **3a** In the Modeler view, select the Identity Vault.
   - **3b** Select **Live > Schema > Import**.
4. (Optional) To verify that the version number for Identity Manager is correct in your project, complete the following steps:
   - **4a** In the Modeler view, select the Identity Vault and then click **Properties**.
   - **4b** In the left navigation menu, select **Server List**.
   - **4c** Select a server and then click **Edit**.

     The **Identity Manager version** field should show the latest version.

Copying Server-specific Information for the Driver Set

You must copy all server-specific information that is stored in each driver and driver set to the new server's information. This also includes GCVs and other data on the driver set that will not be there on the new server and need to be copied. The server-specific information is contained in:

- Global configuration values
- Engine control values
- Named passwords
- Driver authentication information
- Driver startup options
- Driver parameters
- Driver set data

You can do this in Designer or Identity Console. If you use Designer, it is an automated process. If you use Identity Console, it is a manual process. If you are migrating from an Identity Manager server earlier than 3.5 version to an Identity Manager server greater than or equal to 3.5, you should use Identity Console. For all other supported migration paths, you can use Designer.

- "Copying the Server-specific Information in Designer" on page 173
- "Changing the Server-specific Information in Identity Console" on page 174
- "Changing the Server-specific Information for the User Application" on page 174

Copying the Server-specific Information in Designer

This procedure affects all drivers stored in the driver set.

1. In Designer, open your project.
2. In the **Outline** tab, right-click the server, then select **Migrate**.
3. Read the overview to see what items are migrated to the new server, then click **Next**.
4. Select the target server from the list available servers, then click **Next**.

   The only servers listed are servers that are not currently associated with a driver set and are equal to or newer than the source server's Identity Manager version.
5. Select one of the following options:
   - **Make the target server active:** Copies the settings from the source server to the target server and disables the drivers on the source server. NetIQ recommends using this option.
   - **Keep the source server active:** Does not copy the settings and disables all drivers on the target server.
   - **Makes both target and source servers active:** Copies settings from the source server to the target server without disabling the drivers on the source or target servers. This option is not recommended. If both drivers are started, the same information is written to two different queues and this can cause corruption.
6. Click **Migrate**.
7. Deploy the changed drivers to the Identity Vault.

For more information, see "Deploying a Driver to an Identity Vault" in the *NetIQ Designer for Identity Manager Administration Guide*.

8 Start the drivers.

For more information, see Stopping, Starting, or Restarting a Driver in Designer in the *NetIQ Identity Manager Driver Administration Guide*.

Changing the Server-specific Information in Identity Console

1 In Identity Console, Go to **Identity Manager Administration**.

2 Click the Driver Set object that contains the required drivers.

3 Click the Action menu icon , then click **Stop driver**.

4 Click the driver icon.

5 Go to **Configuration**. tab.

6 Copy or migrate all server-specific driver parameters, global configuration values, engine control values, named passwords, driver authentication data, and driver startup options that contain the old server's information to the new server's information. Global configuration values and other parameters of the driver set, such as max heap size, Java settings, and so on, must have identical values to those of the old server.

7 Click **Save** to save all changes an exit.

8 Click the Action menu, then click **Start driver**.

9 Repeat Step 3 through Step 8 on page 174 for each driver in the driver set.

Changing the Server-specific Information for the User Application

You must reconfigure the User Application to recognize the new server. Run `configupdate.bat`.

1 Navigate to the configuration update utility located by default in the installation subdirectory of the User Application.

2 At a command prompt, launch the configuration update utility (`configupdate.bat`).

3 Specify the values as described in "Configuring the Settings for the Identity Applications" on page 69.

Migrating the Identity Manager Engine to a New Server

When migrating the Identity Manager engine to a new server, you can keep the eDirectory replicas that you currently use on the old server.

1 Install a supported version of eDirectory on the new server.

2 Copy the eDirectory replicas that are on the current Identity Manager server to the new server.

For more information, see "Administering Replicas" in the *NetIQ eDirectory Administration Guide*.

3 Install the Identity Manager engine on the new server.

Migrating the User Application Driver

When upgrading to a new version of Identity Manager or migrating to a different server, you might need to import a new base package for the User Application driver, or upgrade the existing package. For example, **User Application Base Version 2.2.0.20120516011608**.

When you begin working with an Identity Manager project, Designer automatically prompts you to import new packages into the project. You can also manually import the package at that time.

Importing a New Base Package

1 Open your project in Designer.

2 Right-click **Package Catalog > Import Package**, then select the appropriate package.

3 (Conditional) If the Import Package dialog does not list the User Application Base package, complete the following steps:

   3a Click the Browse button.

   3b Navigate to `designer_root/packages/eclipse/plugins/NOVLUABASE_version_of_latest_package.jar`.

   3c Click **OK**.

4 Click **OK**.

Upgrading an Existing Base Package

1 Open your project in Designer.

2 Right-click the User Application Driver.

3 Click **Driver > Properties > Packages**.

   If the base package can be upgraded, the application displays a check mark in the **Upgrades** column.

4 Click **Select Operation** for the package that indicates there is an upgrade available.

5 From the drop-down list, click **Upgrade**.

6 Select the version to which you want to upgrade. Then click **OK**.

7 Click **Apply**.

8 Fill in the fields with appropriate information to upgrade the package. Then click **Next**.

9 Read the summary of the installation. Then click **Finish**.

10 Close the Package Management page.

11 Deselect **Show only applicable package versions**.

Deploying the Migrated Driver

The driver migration is not complete until you deploy the User Application driver to the Identity Vault. After the migration, the project is in a state in which only the entire migrated configuration can be deployed. You cannot import any definitions into the migrated configuration. After the entire migration configuration has been deployed, this restriction is lifted, and you can deploy individual objects and import definitions.

1. Open the project in Designer and run the Project Checker on the migrated objects.

   For more information, see "Validating Provisioning Objects" in the *NetIQ Identity Manager - Administrator's Guide to Designing the Identity Applications*. If validation errors exist for the configuration, you are informed of the errors. These errors must be corrected before you can deploy the driver.
2. In the **Outline** view, right-click the User Application driver.
3. Select **Deploy**.
4. Repeat this process for each User Application driver in the driver set.

Upgrading the Identity Applications

When you run the Upgrade program for the identity applications, ensure that you incorporate the following considerations:

- Use the same database that you used for the previous User Application. That is, the installation from which you are migrating. In the installation program, specify **Existing Database** for the database type.
- You can specify a different name for the User Application context.
- Specify an installation location that is different from the one for the previous installation.
- Point to a supported version of Tomcat.
- Do not use case-sensitive collation for your database. Case-sensitive collation is not supported. The case-insensitive collation might cause duplicate key errors during migration. If a duplicate key error is encountered, check the collation and correct it, then re-install the identity applications. The only supported collation is SQL_Latin1_General_CP1_CI_AS.

For more information about upgrading the Identity Applications, see "Upgrading Identity Applications" on page 148.

Migrating Identity Applications

Do not use case-sensitive collation for your database. Case-sensitive collation is not supported. The case-sensitive collation might cause duplicate key errors during migration. If a duplicate key error is encountered, check the collation and correct it, then re-install the identity applications. The only supported collation is SQL_Latin1_General_CP1_CI_AS.

Before you migrate Identity Applications, you must install the libssl.so.1.0.0 and libcrypto.so.1.0.0 libraries from the /opt/netiq/common/openssl/lib64/ directory.

The migration of Identity Applications involves the following:

- "Migrating the Database to the New Server" on page 177
- "Installing Identity Applications on the New Server" on page 178

Migrating the Database to the New Server

If your User Application database is on **PostgreSQL**, perform the following steps:

1. Log in to the server where **PostgreSQL** is installed.
2. Open command prompt, navigate to `postgres bin directory` and export the data to a `.sql` file.

   Example: `pg_dumpall -U postgres > dump.sql`
3. Log in to the new server where you want to install **PostgreSQL**.
4. Install the **PostgreSQL** as mentioned below:

   4a Download and mount the `Identity_Manager_4.8.x_Windows.iso` from the Software License and Download (https://sldlogin.microfocus.com/) portal.

   4b Navigate to the location where you have mounted the `Identity_Manager_4.8.x_Windows.iso.`

   4c Navigate to: `<Mount location>\common\packages\postgres\ directory.`

   4d Run the `PostgreSQL` installer.
5. Navigate to `C:\NetIQ\IDM\postgres` and delete the Data directory.
6. Create a data directory in the **PostgreSQL** installed location and make sure `postgres` user has access rights to the directory.
7. Open command prompt, navigate to `postgres bin directory` and initialize the database as shown below:

   Example:`initdb.exe -D C:\NetIQ\IDM\postgres\data -E WIN1252 -U postgres.`
8. Ensure that the following entries are present in `pg_hba.conf`file located under `C:\NetIQ\IDM\postgres\data.`

   # IPv6 local connections:

   ```
   host    all     all       ::1/128          trust
   host    all     all       0.0.0.0/0        trust
   ```
9. Ensure that the following is uncommented in `postgresql.conf` file:

   listen_addresses = '*'

   port = 5432
10. Restart `postgres` services from running `services.msc` from `run.`
11. Open command prompt, navigate to `postgres` bin directory, and import the data to the new **PostgreSQL** database, and then use the collected dump as explained in step 2.

    Example: `psql -U postgres < dump.sql.`

Installing Identity Applications on the New Server

The following procedure explains about installing Identity Application on the New Server:

1. Download the `Identity_Manager_4.8.x_Windows.iso` from the NetIQ Downloads Website (https://dl.netiq.com/).
2. Mount the `.iso` file.
3. Navigate to `Identity apps` directory, install **Identity Applications** and skip the deployment of User Application, and Roles & Resources Service driver.
   - **3a** Select the Custom Installation mode.
   - **3b** Enter the Identity Vault details.
   - **3c** Uncheck **Deploy Identity Applications Driver**.
4. Select **Existing PostgreSQL** server, provide the required details, and proceed with the installation.

Completing the Migration of the Identity Applications

After upgrading or migrating the identity applications, complete the migration process.

Preparing an Oracle Database for the SQL File

During the installation process, you might have chosen to write a SQL file to update the identity applications database. If your database runs on an Oracle platform, you must perform some steps before you can run the SQL file.

1. In the database, run the following SQL statements:

```
ALTER TABLE DATABASECHANGELOG ADD ORDEREXECUTED INT;
UPDATE DATABASECHANGELOG SET ORDEREXECUTED = -1;
ALTER TABLE DATABASECHANGELOG MODIFY ORDEREXECUTED INT NOT NULL;
ALTER TABLE DATABASECHANGELOG ADD EXECTYPE VARCHAR(10);
UPDATE DATABASECHANGELOG SET EXECTYPE = 'EXECUTED';
ALTER TABLE DATABASECHANGELOG MODIFY EXECTYPE VARCHAR(10) NOT NULL;
```

2. Run the following `updateSQL` command:

```
C:\NetIQ\idm\jre\bin\java -Xms256m -Xmx256m -Dwar.context.name=IDMProv
-
Ddriver.dn="cn=User Application Driver,cn=driverset1,o=system" -
Duser.container="o=data" -jar C:\NetIQ\idm\jre\liquibase.jar --
databaseClass=liquibase.database.core.PostgresDatabase --
driver=org.postgresql.Driver --
classpath=C:\NetIQ\idm\apps\postgresql\postgresql-9.4.1212jdbc42.jar
C:\NetIQ\idm\apps\UserApplication\IDMProv.war --
changeLogFile=DatabaseChangeLog.xml --url="jdbc:postgresql://
localhost:5432/
idmuserappdb" --contexts="prov,newdb" --logLevel=info --
logFile=C:\NetIQ\idm\apps\UserApplication\db.out --username=******** --
password=******** update
```

3 In a text editor, open the SQL file, by default in the `\installation_path\userapp\sql` directory.

4 Insert a backslash (/) after the definition of the function CONCAT_BLOB. For example

```
  -- Changeset icfg-data-load.xml::700::IDMRBPM
CREATE OR REPLACE FUNCTION CONCAT_BLOB(A IN BLOB, B IN BLOB) RETURN BLOB
AS
                C BLOB;
            BEGIN
                DBMS_LOB.CREATETEMPORARY(C, TRUE);
                DBMS_LOB.APPEND(C, A);
                DBMS_LOB.APPEND(C, B);
                RETURN c;
            END;
/
```

5 Execute the SQL file.

For more information about running the SQL file, see "Manually Creating the Database Schema" on page 92.

NOTE: Do not use SQL*Plus to execute the SQL file. The line lengths in the file exceed 4000 characters.

Flushing the Browser Cache

Before you log in to the identity applications, you should flush the cache on the browser. If you do not flush the cache, you might experience some runtime errors.

Updating the Maximum Timeout Setting for the SharedPagePortlet

If you have customized any of the default settings or preferences for the SharedPagePortlet, then it has been saved to your database and this setting will get overwritten. As a result, navigating to the Identity Self-Service tab might not always highlight the correct Shared Page. To be sure that you do not have this problem, complete the following steps:

1 Log in as a User Application Administrator.

2 Navigate to **Administration > Portlet Administration**.

3 Expand **Shared Page Navigation**.

4 In the portlet tree on the left, click **Shared Page Navigation**.

5 On the right side of the page, click **Settings**.

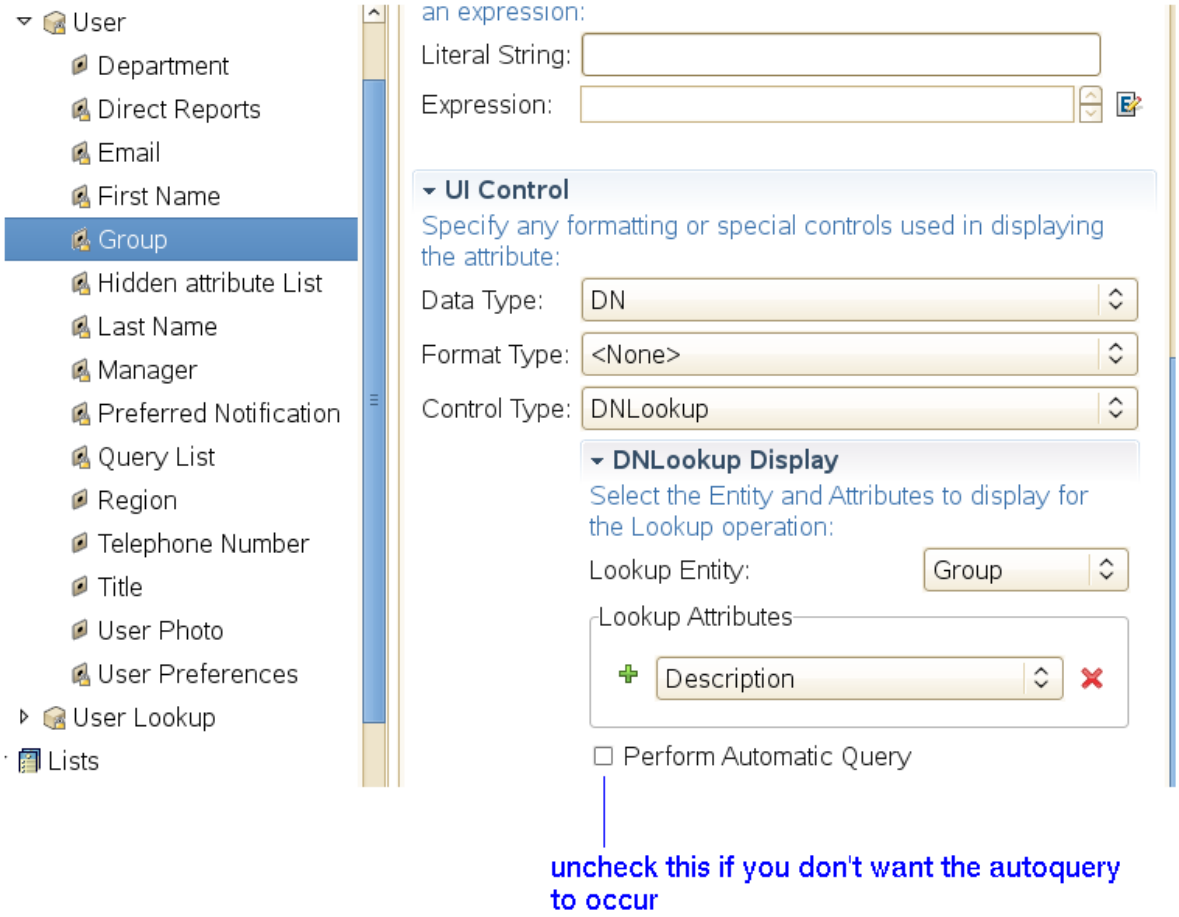
6 Ensure that **Maximum Timeout** is set to 0.

7 Click **Save Settings**.

Disabling the Automatic Query Setting for Groups

By default, the DNLookup Display for the Group entity in the Directory Abstraction Layer is enabled. This means that whenever the object selector is opened for a group assignment, all the groups are displayed by default without the need to search them. You should change this setting, since the window to search for groups should be displayed without any results until the user provides input for search.

You can change this setting in Designer by unchecking **Perform Automatic Query**, as shown below:



VIII Deploying Identity Manager on Microsoft Azure

This section explains the planning and implementation of Identity Manager on the Microsoft Azure cloud.

- Chapter 15, “Planning and Implementation of Identity Manager on Microsoft Azure,” on page 183
- Chapter 16, “Example Scenarios of Hybrid Identity Manager,” on page 193

15 Planning and Implementation of Identity Manager on Microsoft Azure

Identity Manager adds support for deploying the following Identity Manager components on Microsoft Azure.

- Identity Manager engine
- Identity Manager drivers and Remote Loaders
- Designer
- Identity Applications
- Identity Reporting

NOTE: Deployment of Sentinel Log Management is not supported on Microsoft Azure.

Prerequisites

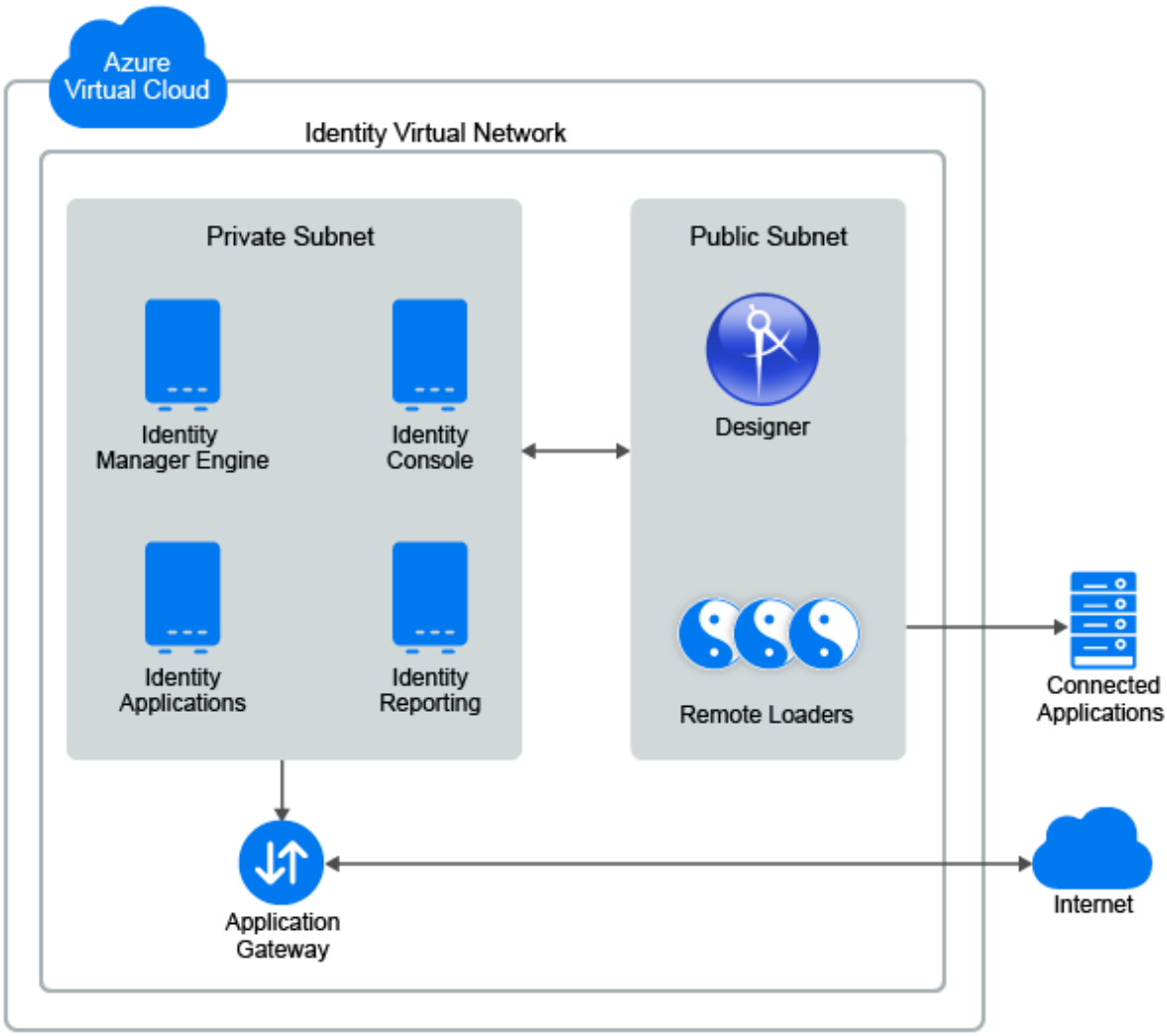
In addition to the system requirements of Identity Manager components, ensure that you meet the following prerequisites:

- An administrative account on Microsoft Azure.
- `Identity_Manager_4.8_Windows.iso` and Designer are downloaded, extracted, and available on Identity Manager component instances.
- Remote desktop to connect to Azure VM instances from your local client machine.

Deployment Procedure

Identity Manager components can be deployed on a private or a public network based on your requirement. Figure 15-1 illustrates a sample deployment that is used in the subsequent sections.

Figure 15-1 *Identity Manager Deployment on Microsoft Azure*



Identity Manager components can be deployed on Microsoft Azure in different combinations depending on how the components are distributed on different servers. However, the deployment procedure is the same for all scenarios.

The deployment procedure consists of the following steps:

- "Creating a Resource Group" on page 185
- "Creating a Virtual Network and Subnet" on page 185
- "Creating an Application Gateway" on page 186
- "Creating a Virtual Machine Instance" on page 187
- "Updating host entries in VM" on page 188
- "Setting Up Designer" on page 190
- "Configuring the Application Gateway" on page 190

Creating a Resource Group

NetIQ recommends you to create a resource group and add the required resources to the group to use with Identity Manager. Perform the following steps to create a new resource group:

1. Log in to the Azure portal.
2. Click **Resource groups**.
3. Click **Create**.
4. In the **Basics** tab:
   - **4a** Select your **Subscription** from the drop-down list.
   - **4b** Enter a new resource group name.
   - **4c** Select the location from the **Region** drop-down list. For example, `Central India`.
   - **4d** Click **Next : Tags >**.
5. In the **Tags** tab, click **Next : Review + Create >**.
6. In the **Review + create** tab, click **Create**.

Creating a Virtual Network and Subnet

1. Log in to the Azure Portal.
2. Type **virtual network** in the search.
3. Under Services, select **Virtual networks**.
4. Click **Create**.
5. In the **Basics** tab, specify the following details:

Field	Description
Subscription	Select your Subscription from the drop-down list.
Resource Group	Select the existing resource group from the drop-down.
Name	Specify the name for virtual network.
Region	Select the location from the drop-down list. For example, `Central India`.

   - **5a** Click **Next : IP Addresses >**.
6. In the IP Addresses tab, click **Add subnet**.
   - **6a** Click **Add subnet**.
     - **6a1** Specify the subnet name. For example, `default`.
     - **6a2** Specify the subnet address range. For example, `10.1.0.0/24`.
     - **6a3** Click **Add**.
   - **6b** Click **Next : Security >**.
7. In the **Security** tab, keep the default values for all the fields, then click **Next : Tags >**.

8 In the **Tags** tab, click **Next : Review + create >**.

9 In the **Review + create** tab, review your settings, then click **create**.

Creating an Application Gateway

1 Log in to the Azure portal.

2 Click **Create a Resource**.

3 Go to **Categories** > **Networking** > **Application Gateway**.

4 In the **Basics** tab, specify the following details:

Field	Description
Subscription	Select your Subscription from the drop-down list.
Resource Group	Select the existing resource group from the drop-down.
Application gateway name	Specify the Application gateway name.
Region	Select the location from the drop-down list. For example, `Central India`.
Tier	Select the required tier. For example, **Standard V2**.
Minimum instance count	Specify the value **0**.
Maximum instance count	Specify the value **10**.
Virtual Network	Select the virtual network and corresponding subnet that is already created. See "Creating a Virtual Network and Subnet" on page 185.

4a Keep the default values for the rest of the fields then click **Next : Frontends >**.

5 In the **Frontends** tab:

5a Select **Public**.

5b Under **Public IP address**, click **Add new**.

5b1 Specify public IP address name. For example, idmgateway.centralindia.cloudapp.azure.com.

5b2 Click **OK**.

5c Click **Next : Backends >**

6 In the **Backends** tab:

6a Click **Add a backend pool**.

6a1 Specify backend pool name.

6a2 Select **Yes** to add a backend pool without targets.

6a3 Click **Add**.

6b Click **Next : Configuration >**.

7 In the Configuration tab:

7a Under Routing rules, click Add a routing rule.

7b Specify the Rule name.

7c In the Listener tab, specify the following details:

Field	Description
Listener Name	Specify the Listener name.
Frontend IP	Select **Public** from the drop-down.
Protocol	Select HTTP.
Port	Specify the value **80**.

7d Keep the default values for the rest of the fields.

7e In the Backend targets tab, specify the following details:

Field	Description
Backend target	Select the backend target from the drop-down.
HTTP Settings	Click Add new, specify the HTTP settings name. Keep the default values for all the fields, then click Add.

7e1 Click Add.

7f Click Next : Tags >.

8 In the Tags tab, click Next : Review + create >.

9 In the Review + create > tab, review your settings, then click Create.

NOTE: For more information related to configuring the application gateway, see "Configuring the Application Gateway" on page 190.

Creating a Virtual Machine Instance

Create a separate virtual machine to host the Identity Manager components.

1 Log in to the Azure portal.

2 Type **virtual machines** in the search.

3 Under Services, select Virtual machines.

4 Click Create, then select Virtual machine.

5 In the Basics tab:

5a Select your Subscription from the drop-down list.

5b Select the existing resource group from the drop-down list (see "Creating a Resource Group" on page 185).

5c Specify the Virtual machine name.

5d Select the location from the **Region** drop-down list. For example, `Central India`.

5e Select the required **Windows Server** from the **Image** drop-down list. For example, `Windows Server 2019`.

5f Select the virtual machine size from the **Size** drop-down list.

5g Specify **Username**, **Password**, and **Confirm password**.

5h Under Licensing, select **Windows Server License**, then select eligible **Windows Server License with Software Assurance** to confirm.

5i Keep the default values for the rest of the fields.

5j Click **Next : Disks >**.

6 In the **Disks** tab:

6a Select the disk type from the **OS disk type** drop-down list. For example, `Premium SSD`.

6b Select the required Encryption type from the drop-down list.

6c Click **Next : Networking >**.

7 In the **Networking** tab:

7a Select the virtual network and corresponding subnet that is already created. See, "Creating a Virtual Network and Subnet" on page 185.

7b Under network security group, select **Advanced**.

7c Select the existing network security group from the drop-down list.

7c1 (Conditional) If network security group is not available, click **Create new**.

7c2 Specify network security group name.

7c3 Click **Add an inbound role**, specify the required details.

7c4 Click **Add an outbound role**, specify the required details.

7c5 Click **OK**.

7d Keep the default values for the rest of the fields.

7e Click **Next : Management >**.

8 In the **Management** tab, keep the default values for all the fields, then click **Next : Advanced >**.

9 In the **Advanced** tab, keep the default values for all the fields, then click **Next : Tags >**.

10 In the **Tags** tab, keep the default values for all the fields, then click **Next : Review + create >**.

11 In the **Review + create** tab, review your settings, then click **Create**.

Updating host entries in VM

You can access the Identity Manager components using the public DNS name of the application gateway or the alias DNS record set. To allow Identity Manager components to communicate with one another, edit the hosts files on each VM and add an entry to resolve its hostname.

Table 15-1 Updating host entries

Components	Description

Identity Engine	Navigate to **hosts** file in Identity engine VM. For example,
	`C:\Windows\System32\drivers\etc\hosts`
	Modify the hosts file with the following entry:
	`<IP address of Identity engine VM> <Private DNS Name of Identity engine VM>`
	For example:
	`10.0.1.1 identityengine.example.com`
	`<IP address of Identity applications VM> <Public DNS Name of application gateway>`
	For example:
	`10.0.1.2 idmgateway.centralindia.cloudapp.azure.com`

Identity Applications	Navigate to **hosts** file in Identity engine VM. For example,
	C:\Windows\System32\drivers\etc\hosts
	Modify the hosts file with the following entry:
	`<IP address of Identity engine VM> <Private DNS Name of Identity engine VM>`
	For example:
	`10.0.1.1 identityengine.example.com`
	`<IP address of Identity applications VM> <Public DNS Name of application gateway>`
	For example:
	`10.0.1.2 idmgateway.centralindia.cloudapp.azure.com`

To update the host entries for Identity Reporting, see **Identity Applications** in Table 15-1 on page 189.

NOTE: For the installation of Identity Manager components, see "Installation Procedures" on page 45.

Setting Up Designer

1 On a public subnet, launch a Virtual Machine instance. See, "Creating a Virtual Machine Instance" on page 187.

   For the Windows security group, use `rdesktop` port only. For example 3389.

2 Install Designer. Refer to Part IV, "Installing Designer," on page 111.

Configuring the Application Gateway

Configure the application gateway to allow external networks to use Identity Manager components that are hosted on the virtual machines.

1 Configure a separate backend pool for Identity Manager components such as Identity Applications, forms and Identity Reporting.

   1a In **Backend pools**, click **Add**.

   1b Specify the following details:

Field	Description
Name	Specify the name of a backend pool to identify the Identity Manager component.
Type	Specify the type in one of the following ways: ◆ **IP address or FQDN:** Specify the IP address or FQDN of the required Identity Manager component. ◆ **Virtual Machine:** Select the Virtual Machine that is hosting the required Identity Manager component.

   1c Click **OK**.

   Repeat this step to configure additional backend pools.

2 Configure separate HTTP settings for Identity Manager components such as Identity Applications, forms and Identity Reporting.

   NOTE: Ensure that you have exported the public certificate for the required Identity Manager components.

   2a In **HTTP Settings**, click **Add**.

   2b Specify the following details:

Field	Description
Name	Specify the name of an HTTP setting to identify the Identity Manager component.
Protocol	Select HTTPS.
Port	Specify the port of the Identity Manager Component. For example: ◆ **Identity Applications:** 8543 ◆ **Forms:** 8600 ◆ **Identity Reporting:** 8643
Backend Authentication Certificates	1. Select Create new. 2. Specify the name of the certificate. 3. Browse and upload the exported public certificate for the corresponding Identity Manager component. 4. Click Add Certificate.

2c Click OK.

Repeat this step to configure additional HTTP settings.

3 Configure a separate listener for each Identity Manager component such as Identity Applications, forms and Identity Reporting.

NOTE: Ensure that you have exported the .PFX certificate from the Identity Vault.

3a In Listeners, click Basic.

3b Specify the following details:

Field	Description
Name	Specify the name of the listener to identify the Identity Manager component.
Frontend IP configuration	1. Select the Virtual Network and subnet that is created earlier. See, "Creating a Virtual Network and Subnet" on page 185. 2. Specify the Name and Port number of the application. For example: **Identity Applications:** 8543 **Forms:** 8600 **Identity Reporting:** 8643
Protocol	Select HTTPS.
Certificate	1. Browse and upload the PFX certificate. 2. Specify the Name and Password of the certificate.

3c Click OK.

Repeat this step to configure additional listeners.

4 Create a basic rule for Identity Manager components such as Identity Applications, forms and Identity Reporting and associate this rule with the respective backend pool, Listener, and HTTP setting.

4a In Rule, click Add.

4b Specify the following details:

Field	Description
Name	Specify the name of a rule that helps in identifying the Identity Manager component.
Listener	Select the respective listener that is created in Step 3.
Backend Pool	Select the respective backend pool that is created in Step 1.
HTTP setting	Select the respective HTTP setting that is created in Step 2.

4c Click OK.

Repeat this step to configure additional rules.

16 Example Scenarios of Hybrid Identity Manager

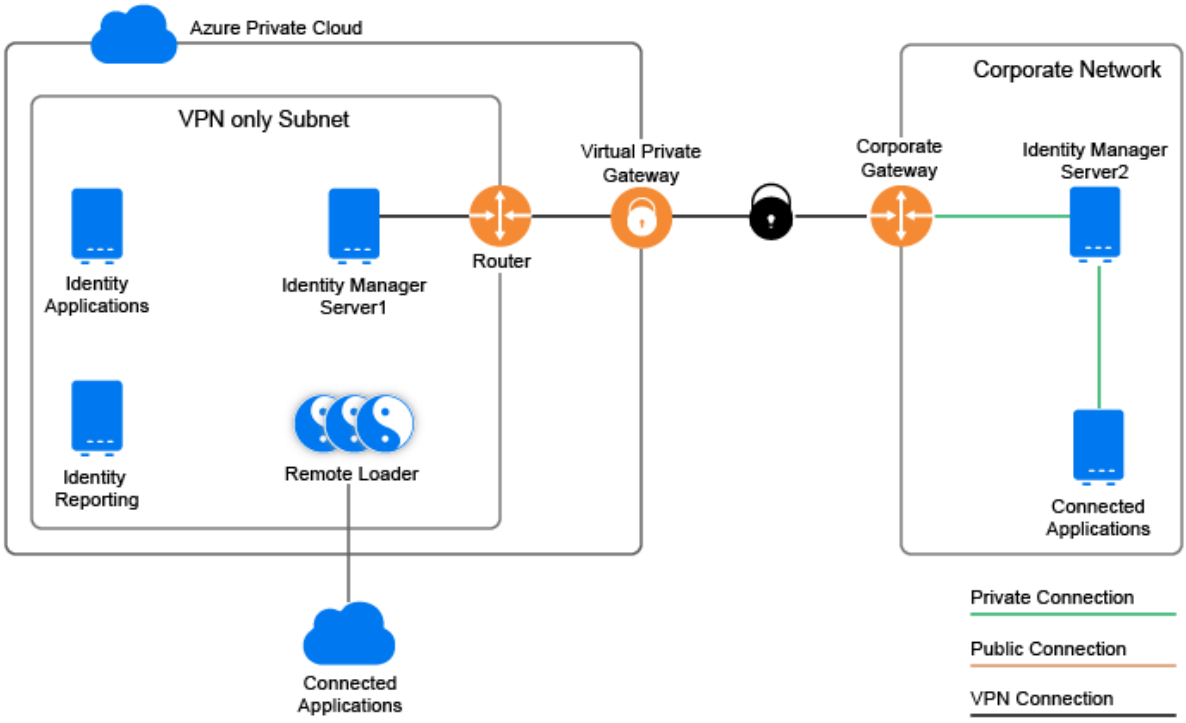
You can configure Identity Manager components where the identities are synchronized seamlessly between your enterprise premise and MS Azure cloud. Implementing this type of a hybrid scenario requires you to configure a VPN connection between the Azure subnet and the enterprise network. This section explains the following hybrid scenarios:

- "Using Multi-Server Driver Set Connection" on page 193
- "Using eDirectory Driver Connection" on page 194

Using Multi-Server Driver Set Connection

In this scenario, at least two Identity Manager servers use the same eDirectory tree and driver set where one server is installed on Azure cloud and the other server is installed on the enterprise premise. This includes full replica servers that use the Identity Vault replication channel to synchronize the identities through VPN connection. The Identity Manager server that is running on the enterprise network or Azure cloud synchronizes the identities across their respective connected applications.

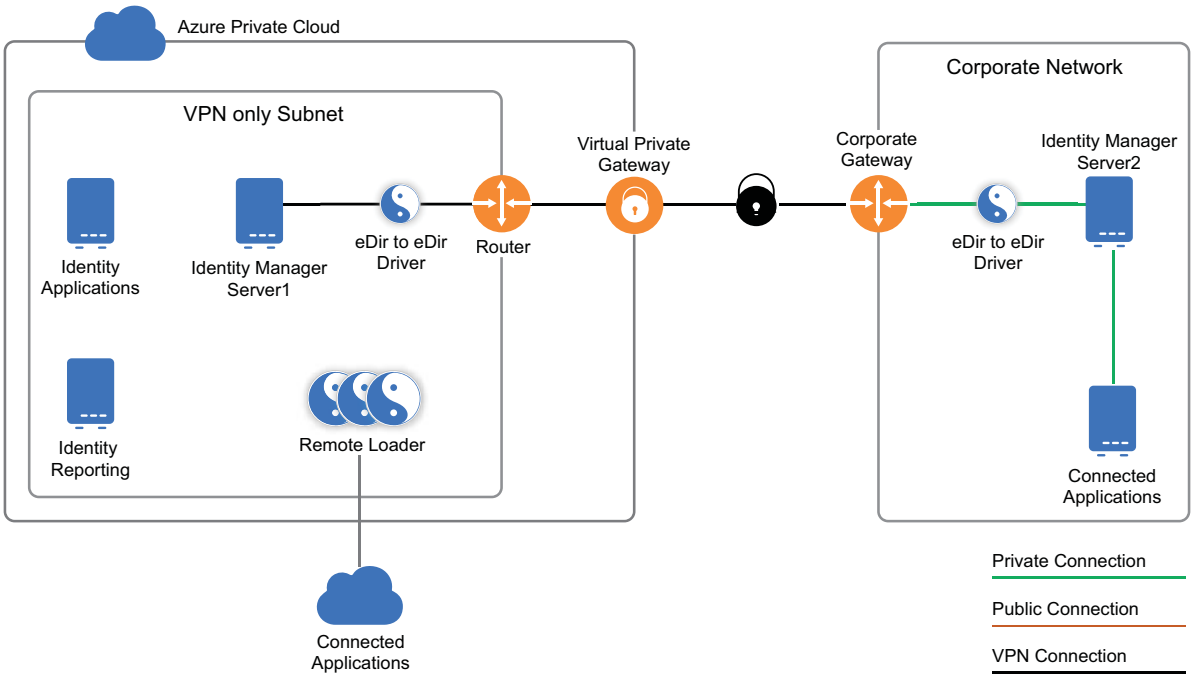
Figure 16-1 *Hybrid Scenario Using Multi-Sever Driver Set Connection*



Using eDirectory Driver Connection

This scenario is suitable if you have Identity Manager servers installed on two separate eDirectory trees where one tree belongs to Azure cloud and the other tree belongs to the enterprise network. This configuration uses eDirectory driver to synchronize identities between Azure cloud and the enterprise network through a VPN connection. The Identity Manager server that is running on the enterprise network or Azure cloud synchronizes the identities across their respective connected applications.

Figure 16-2 *Hybrid Scenario Using eDirectory Driver Connection*



The communication between the Azure cloud and the enterprise network is limited. It only synchronizes the delta changes. You can control the attributes to synchronize by configuring the driver filter. You can also leverage the policy engine to define additional controls for synchronizing attributes. For example, limit the password attribute from synchronizing and allow users to use different passwords to access Identity Manager servers from the Azure cloud and the enterprise network.

17 Uninstalling Identity Manager Components

This section describes the process for uninstalling the components of Identity Manager. Some components have prerequisites for uninstallation. Ensure that you review full section for each component before beginning the uninstallation process.

NOTE: You must stop all services such as Tomcat, PostgreSQL, and ActiveMQ before uninstalling the Identity Manager components.

Uninstalling the Identity Vault

Before you uninstall the Identity Vault, you must understand your eDirectory tree structure and replica placements. For example, you should know whether you have more than one server in the tree.

1. (Conditional) If you have more than one server in your eDirectory tree, complete the following steps:

   1a (Conditional) If the server where you installed eDirectory holds any master replicas, promote another server in the replica ring to be a master before you remove eDirectory.

   For more information, see "Managing Partitions and Replicas" in the *NetIQ eDirectory Administration Guide*.

   1b (Conditional) If the tree on the server where you installed eDirectory holds the only copy of a partition, either merge this partition into the parent partition or add a replica of this partition to another server and make it the master replica holder.

   For more information, see "Managing Partitions and Replicas" in the *NetIQ eDirectory Administration Guide*.

   1c Perform a health check on the eDirectory database. Fix any errors that occur before proceeding.

   For more information, see "Keeping eDirectory Healthy" in the *NetIQ eDirectory Administration Guide*.

2. Uninstall the Identity Vault:

   Use the Control Panel utility for adding and removing programs. For example, on Windows Server 2012 R2, click **Programs and Features**. Right-click **NetIQ eDirectory**, then click **Uninstall**.

3. (Conditional) If you have more than one server in your eDirectory tree, complete the following steps:

   3a Delete any server-specific objects left in the tree.

   3b Perform another health check to verify that the server was properly removed from the tree.

   For more information, see "Keeping eDirectory Healthy" in the *NetIQ eDirectory Administration Guide*.

Removing Objects from the Identity Vault

The first step in uninstalling Identity Manager is to delete all Identity Manager objects from the Identity Vault. When the driver set is created, the wizard prompts you to make the driver set a partition. If any driver set objects are also partition root objects in eDirectory, the partition must be merged into the parent partition before you can delete the driver set object.

To remove objects from the Identity Vault:

1. Perform a health check on the eDirectory database, then fix any errors that occur before proceeding.

   For more information, see "Keeping eDirectory Healthy" in the *NetIQ eDirectory Administration Guide*.

2. Log in to Identity Console as an administrator with full rights to the eDirectory tree.
3. Select **Partitions Management**.
4. Browse to and select the driver set object that is the partition root object, then click .
5. Wait for the merge process to complete, then click **OK**.
6. Delete the driver set object.

   When you delete the driver set object, the process deletes all the driver objects associated with that driver set.

7. Repeat Step 3 through Step 6 for each driver set object that is in the eDirectory database, until they are all deleted.
8. Repeat Step 1 to ensure that all merges completed and all of the objects have been deleted.

Uninstalling the Identity Manager Engine

When you install the Identity Manager engine, the installation process places an uninstallation script on the Identity Manager server. This script allows you to remove all services, packages, and directories that were created during the installation.

NOTE: Before uninstalling the Identity Manager engine, prepare the Identity Vault. For more information, see "Removing Objects from the Identity Vault" on page 196.

To uninstall the Identity Manager engine on a Windows server, use the Control Panel utility for adding and removing programs. For example, on Windows 2012 R2, click **Programs and Features**. Right-click **Identity Manager**, then click **Uninstall**.

Uninstalling the Remote Loader

When you install the Remote Loader, the installation process places an uninstallation script on the server. This script allows you to remove all services, packages, and directories that were created during the installation.

To uninstall the Remote Loader on a Windows server, use the Control Panel utility for adding and removing programs.

Uninstalling the Identity Applications

You must uninstall each component of the Roles Based Provisioning Module (RBPM), such as the drivers and the database.

If you need to uninstall the runtime components associated with RBPM, the uninstallation program automatically reboots your server, unless you are running the uninstall program in silent mode on Windows. You must manually reboot the Windows server.

NOTE: Before uninstalling RBPM, uninstall the Identity Manager engine. For more information, see "Uninstalling the Identity Manager Engine" on page 196.

Deleting the Drivers for the Roles Based Provisioning Module

You can use Designer or Identity Console to delete the User Application driver and the Role and Resource Service driver.

1. Stop the User Application driver and the Role and Resource Service driver. Depending on the component that you use, complete one of the following actions:
   - **Designer:** Right-click the driver line, then click **Live > Stop Driver**.
   - **Identity Console:** On the Driver Set Overview page, click the upper right corner of the driver image, then click **Stop Driver**.
2. Delete the User Application driver and the Role and Resource Service driver. Depending on the component that you use, complete one of the following actions:
   - **Designer:** Right-click the driver line, then click **Delete**.
   - **Identity Console:** On the Driver Set Overview page, click **Drivers > Delete drivers**, then click the driver that you want to delete.

Uninstalling the Identity Applications

You must uninstall the User Application and its database from Tomcat. This procedure explains how to remove the User Application and its database from Tomcat and PostgreSQL. If you are using another application server and database, refer to that product's documentation for instructions.

IMPORTANT: Be cautious when you remove the User Application because the process removes all the folders and files from the folder where the User Application scripts and supporting files were installed. When you remove the files, you might unintentionally uninstall Tomcat or PostgreSQL. For example, the installation folder is typically `C:\NetIQ\idm\apps\UserApplication`. This folder also contains the folders for Tomcat and PostgreSQL.

---

1. Log in to the server where you installed the User Application.
2. Open the Control Panel utility for adding and removing programs. For example, on Windows Server 2012 R2, click **Programs and Features**.
3. Right-click **Identity Manager User Application**, then click **Uninstall**.

Uninstalling the Identity Reporting Components

You must uninstall the Identity Reporting components in the following order:

1. Delete the drivers. For more information, see "Deleting the Reporting Drivers" on page 198.
2. Delete Identity Reporting. For more information, see "Uninstalling Identity Reporting" on page 198.
3. Delete Sentinel. For more information, see Uninstalling Sentinel Log Management for IGA in the NetIQ Identity Manager Setup Guide for Linux.

NOTE: To conserve disk space, the installation programs for Identity Reporting do not install a Java virtual machine (JVM). Therefore, to uninstall one or more components, ensure that you have a JVM available and also make sure that the JVM is in the PATH. If you encounter an error during an uninstallation, add the location of a JVM to the local PATH environment variable, then run the uninstallation program again.

Deleting the Reporting Drivers

You can use Designer or Identity Console to delete the Data Collection and Managed System Gateway drivers.

1. Stop the drivers. Depending on the component that you use, complete one of the following actions:
   - **Designer:** For each driver, right-click the driver line, then click **Live > Stop Driver**.
   - **Identity Console:** On the Driver Set Overview page, click the upper right corner of each driver image, then click **Stop Driver**.
2. Delete the drivers. Depending on the component that you use, complete one of the following actions:
   - **Designer:** For each driver, right-click the driver line, then click **Delete**.
   - **Identity Console:** On the Driver Set Overview page, click **Drivers > Delete drivers**, then click the driver that you want to delete.

Uninstalling Identity Reporting

Before deleting Identity Reporting, ensure you have deleted the Data Collection and Managed System Gateway drivers. For more information, see "Deleting the Reporting Drivers" on page 198.

IMPORTANT: Before running the Identity Reporting uninstallation program, ensure you copied your generated reports from the Reporting installation directory to another location on your computer because the uninstallation process removes all the files and folders from the directory where Reporting was installed. For example, the Reporting installation folder `C:\NetIQ\idm\apps\IDMReporting`.

To uninstall Identity Reporting, use the Control Panel utility for adding and removing programs. For example, on Windows Server 2012 R2, click **Programs and Features**. Right-click **Identity Reporting**, then click **Uninstall**.

Uninstalling Analyzer

1. Close Analyzer.
2. Uninstall Analyzer.

   Use the Control Panel utility for adding and removing programs. For example, on Windows Server 2008, click **Programs and Features**. Right-click **Analyzer for Identity Manager**, then click **Uninstall**.

Uninstalling Designer

1. Close Designer.
2. Uninstall Designer according to the operating system:

   Use the Control Panel utility for adding and removing programs. For example, on Windows Server 2008, click **Programs and Features**. Right-click **Designer for Identity Manager**, then click **Uninstall**.

IX Deploying Identity Manager for High Availability

High availability ensures efficient manageability of critical network resources including data, applications, and services. NetIQ supports high availability for your Identity Manager solution through clustering or Hypervisor clustering, such as VMWare Vmotion. When planning a high-availability environment, the following considerations apply:

- You can install the following components in a high-availability environment:
  - Identity Vault
  - Identity Manager engine
  - Remote Loader
  - Identity applications, except Identity Reporting
- When you run the Identity Vault in a clustered environment, the Identity Manager engine is also clustered.

NOTE: Identity Manager does not support load balancing LDAP or LDAPS communication between Identity Vault and Identity Applications.

For more information about...	See...
Determining the server configuration for Identity Manager components	see High Availability Configuration in *NetIQ Identity Manager Overview and Planning Guide*.
Running the Identity Vault in a cluster	Sample Identity Manager Cluster Deployment Solution Deploying eDirectory on High Availability Clusters in the *NetIQ eDirectory Installation Guide*
Running the identity applications in a cluster	Sample Identity Applications Cluster Deployment Solution

For more information on implementing high availability and disaster recovery in your Identity Manager environment, contact NetIQ Technical Support (https://www.netiq.com/support/).

This following chapters provide the steps for installing and configuring Identity Manager components in a high availability environment:

- Chapter 18, “Preparing for Installing Identity Manager in a Cluster Environment,” on page 203
- Chapter 19, “Sample Identity Manager Cluster Deployment Solution,” on page 207
- Chapter 20, “Sample Identity Applications Cluster Deployment Solution,” on page 209

18 Preparing for Installing Identity Manager in a Cluster Environment

- Prerequisites
- Preparing a Cluster for the Identity Applications

Prerequisites

- Identity Vault
- Identity Applications
- Database for Identity Applications

Identity Vault

Before installing the Identity Vault in a clustered environment, NetIQ recommends reviewing the following considerations:

- You must have two or more Windows servers with clustering software.
- You must have external shared storage supported by the cluster software, with sufficient disk space to store all Identity Vault and NICI data:
  - The Identity Vault DIB must be located on the cluster shared storage. State data for the Identity Vault must be located on the shared storage so that it is available to the cluster node that is currently running the services.
  - The root Identity Vault instance on each of the cluster nodes must be configured to use the DIB on the shared storage.
  - You must also share NICI (NetIQ International Cryptographic Infrastructure) data so that server-specific keys are replicated among the cluster nodes. NICI data used by all cluster nodes must be located on the cluster shared storage.
  - NetIQ recommends storing all other eDirectory configuration and log data on the shared storage.
- You must have a virtual IP address.
- (Conditional) If you are using eDirectory as the support structure for the Identity Vault, the `nds-cluster-config` utility supports configuring the root eDirectory instance only. eDirectory does not support configuring multiple instances and non-root installations of eDirectory in a cluster environment.

For more information about installing the Identity Vault in a clustered environment, see Deploying eDirectory on High Availability Clusters in the *NetIQ eDirectory Installation Guide*.

Identity Applications

You can install the database for the identity applications in an environment supported by Tomcat clusters with the following considerations:

- The cluster must have a unique cluster partition name, multicast address, and multicast port. Using unique identifiers separates multiple clusters to prevent performance problems and anomalous behavior.
  - For each member of the cluster, you must specify the same port number for the listener port of the identity applications database.
  - For each member of the cluster, you must specify the same hostname or IP address of the server hosting the identity applications database.
- You must synchronize the clocks of the servers in the cluster. If server clocks are not synchronized, sessions might time out early, causing HTTP session failover not to work properly.
- NetIQ recommends to not use multiple log ins across browser tabs or browser sessions on the same host. Some browsers share cookies across tabs and processes, so allowing multiple logins might cause problems with HTTP session failover (in addition to risking unexpected authentication functionality if multiple users share a computer).
- The cluster nodes reside in the same subnet.
- A failover proxy or a load balancing solution is installed on a separate computer.

Database for Identity Applications

Database clustering is a feature of each respective database server. NetIQ does not officially test with any clustered database configuration because clustering is independent of the product functionality. Therefore, we support clustered database servers with the following caveats:

- By default, the maximum number of connections is set to 100. This value might be too low to handle the workflow request load in a cluster. You might see the following exception:

  ```
  (java.sql.SQLException: Data source rejected establishment of
  connection, message from server: "Too many connections."
  ```

  To increase the maximum number of connections, set the `max_connections` variable in the `my.cnf` file to a higher value.
- Some features or aspects of your clustered database server might need to be disabled. For example, Transactional Replication must be disabled on certain tables due to constraint violations when trying to insert a duplicate key.
- We do not provide assistance on the installation, configuration, or optimization of the clustered database server, including installation of our products into a clustered database server.
- We exert our best effort to resolve any issues that might arise with the use of our products in a clustered database environment. Troubleshooting methods in a complex environment often require cooperative work to resolve issues. NetIQ provides expertise to analyze, plan, and troubleshoot the NetIQ products. The customer must provide expertise to analyze, plan and troubleshoot any third-party products. We ask customers to reproduce issues or analyze behavior of their components in a non-clustered environment to help isolate potential cluster setup issues from NetIQ product issues.

Preparing a Cluster for the Identity Applications

The identity applications supports HTTP session replication and session failover. If a session is in process on a node and that node fails, the session can be resumed on another server in the cluster without intervention. Before installing the identity applications in a cluster, you should prepare the environment.

- "Understanding Cluster Groups in Tomcat Environments" on page 205
- "Setting System Properties for Workflow Engine IDs" on page 205
- "Using the Same Master Key for Each User Application in the Cluster" on page 205

Understanding Cluster Groups in Tomcat Environments

The User Application cluster group uses a UUID name to minimize the risk of conflicts with other cluster groups that users might add to their servers. You can modify the configuration settings for User Application cluster group using the User Application administration features. Changes to the cluster configuration take effect for a server node only when you restart that node.

Setting System Properties for Workflow Engine IDs

Each server that hosts the identity applications in the cluster can run a workflow engine. To ensure performance of the cluster and the workflow engine, every server in the cluster should use the same partition name and partition UDP group. Also, each server in the cluster must be started with a unique ID for the workflow engine, because clustering for the workflow engine works independently of the cache framework for the identity applications.

To ensure that your workflow engines run appropriately, you must set system properties for Tomcat.

1. Create a new JVM system property for each identity applications server in the cluster.
2. Name the system property `com.novell.afw.wf.`*`engine-id`* where the engine ID is a unique value.

Using the Same Master Key for Each User Application in the Cluster

The identity applications encrypt sensitive data using a master key. All identity applications in a cluster must use the same master key. This section helps you ensure that all identity applications in a cluster use the same master key.

For more information about encrypting sensitive data in the identity applications, see Encrypting Sensitive Identity Applications Data in the *NetIQ Identity Manager - Administrator's Guide to the Identity Applications*.

1. Install the User Application on the first node in the cluster.
2. In the Security - Master Key window of the installation program, note the location of the `master-key.txt` file that will contain the new master key for the identity applications. By default, the file is in the installation directory.
3. Install the identity applications on the other nodes in the cluster.

4 In the Security - Master Key window, click **Yes** and then click **Next**.

5 In the Import Master Key window, copy the master key from the text file that was created in Step 2.

19 Sample Identity Manager Cluster Deployment Solution

This section provides step-by-step instructions on how to configure Identity Manager into a cluster environment on Windows 2016 platform.

- "Prerequisites" on page 207
- "Configuring NetIQ Identity Manager on eDirectory Cluster" on page 207
- "Clustering Remote Loader" on page 208

Prerequisites

Identity Vault 9.2 running in a cluster environment on Windows 2016. For detailed information about setting up an eDirectory cluster, see Clustering eDirectory Services on Windows in the *NetIQ eDirectory Installation Guide*.

NOTE: Identity Vault does not support load balancing by using multiple cluster nodes. eDirectory clustering is only meant for achieving failover capability.

Configuring NetIQ Identity Manager on eDirectory Cluster

This section assumes that you have already set up an eDirectory cluster.

Use the following procedure to configure Identity Manager in an eDirectory cluster environment.

1. In **Cluster Manager**, set the eDirectory clustered roles priority to **No Auto Start** on the primary node.
2. Stop the secondary node.
3. Install Identity Manager engine on the primary node by selecting the **Metadirectory Server** option in the Identity Manager installation wizard.

   IMPORTANT: Ensure that you are installing Identity Manager engine on a local storage.

   ---

4. Identity Manager installation wizard stops the eDirectory cluster role during installation. When this role is stopped, the status of this role may appear as failed. After installation, start the eDirectory cluster role from **Cluster Manager**.
5. Set the required priority for the eDirectory clustered role and make the secondary node active.
6. Install the Identity Manager engine on a secondary node using the `DCLUSTER_INSTALL` command.

   For example, `idm_install.exe -DCLUSTER_INSTALL="true"`

Clustering Remote Loader

1 Install the Remote Loader on the primary and secondary cluster nodes.

NOTE: For both primary and secondary node, ensure that Remote Loader is installed on the same shared storage path.

---

2 (Conditional) If you are using secured communications with the Remote Loader, store all the SSL certificates in a shared storage.

3 Before creating the Remote Loader cluster role, open the Remote Loader console and select **Remote Loader as a Windows Service**.

4 In **Cluster Manager > Roles**, create a new Remote Loader cluster role.

Specify the following information for the role:

Role Type: Generic Service

Select Service: Remote Loader instance registered as a Windows service.

Name: Cluster Role Name

Address: Unique IP address

Select Storage: Shared Cluster Storage

Replicate Registry Settings:

1. `HKEY_LOCAL_MACHINE\SOFTWARE\Novell\RLConsole`
2. `HKEY_LOCAL_MACHINE\SOFTWARE\Novell\DirXML Remote Loader\Command port 8000`

   Specify the registry path for the Remote Loader instance which you want to cluster.
3. `HKEY_LOCAL_MACHINE\SOFTWARE\Novell\PassSync`

NOTE:
- By default, each cluster role accepts only one Windows service. Therefore, specify a command port and a corresponding registry path unique to each Remote Loader instance.
- Active Directory driver's password filter is not supported on a Windows cluster.

---

20 Sample Identity Applications Cluster Deployment Solution

The section provides instructions on how to configure the identity applications into a cluster environment on the Tomcat application server with an example deployment.

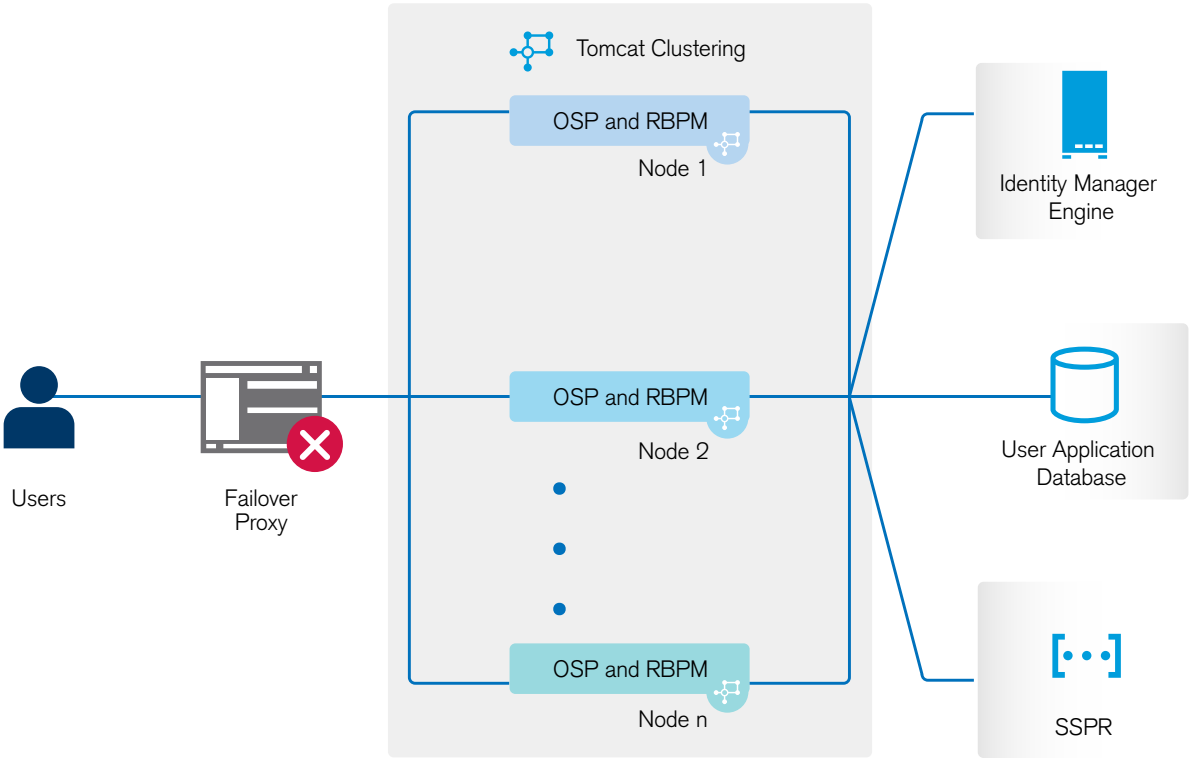
Clustering allows you to run the identity applications on several parallel servers (cluster nodes) and allows you to achieve high availability. To build a cluster, you need to group several Tomcat instances (nodes) together. The load is distributed across different servers, and even if any of the servers fail, the identity applications are accessible through other cluster nodes. For failover, you can create a cluster of Identity Applications and configure them to act as a single server. However, this configuration does not include Identity Reporting.

It is recommended to use a load balancer software that processes all user requests and dispatches them to the server nodes in the cluster. The load balancer is typically part of the cluster. It understands the cluster configuration as well as failover policies. You can select a solution that best suits you.

Figure 20-1 shows a sample deployment with a two-node cluster with the following assumptions:

- All the communication is routed through the load balancer.
- Components such as Identity Manager engine and User Application are installed on separate servers. For a production-level deployment, this is the recommended approach.
- You are familiar with the installation procedures for eDirectory, Identity Manager engine, Identity Applications, Apache Tomcat application server, and databases for the User Application.
- OSP (One Single-Sign On Provider) and User Application are installed on the same cluster node. However, you can install OSP on a different server in a production environment. In this case, you need to perform some configuration changes mentioned in "Installation Procedure" on page 211.
- SSPR (Single Sign-On Password Reset) is installed on a separate computer. For a production-level deployment, this is the recommended approach.
- PostgreSQL is used as a database for the User Application. However, you can use any of the Identity Manager 4.8 supported databases, such as Oracle, SQL Server, or PostgreSQL.
- All the User Application nodes communicate to the same instance of eDirectory and the User Application database. Based on your requirement, you can increase the number of User Application instances.

Figure 20-1 Sample cluster deployment solution



NOTE: A two-node cluster is the minimum configuration used for high availability. However, the concepts in this section can easily be extended to a cluster with additional nodes.

To help you understand the step-by-step configuration, this sample deployment is referred throughout the subsequent sections of the document.

Prerequisites

- Two servers running Windows Server 2012, Windows Server 2012 R2, or Windows Server 2016 for nodes.
- Identity Manager components installed with a minimum version of 4.8. For upgrading to Identity Manager 4.8, see Chapter 11, "Upgrading Identity Manager Components," on page 143.
- All the nodes have the same application server clocks. The easiest way to ensure this is to configure the nodes to use the same network time server for time synchronization using NTP.
- The cluster nodes reside in the same subnet.
- A failover proxy or a load balancing solution is installed on a separate computer.
- To achieve clustering for forms, start two instances of load balancer on the server, one for the Identity Applications and the other for the form renderer.

Installation Procedure

This section provides step-by-step instructions of installing a new instance of the identity applications on Tomcat and then configuring it for clustering.

1. Install the Identity Manager engine. For step-by-step instructions, see "Installation Procedures" on page 45. For a production-level deployment, it is recommended to install Identity Manager engine on a separate server.
2. Create and deploy the following drivers for the Identity Applications:
   - User Application driver
   - Roles and Resource Service driver
3. On Node1, install the following Identity Manager components:
   a. User Application

      During the installation process, configure the following settings:

      i. Select **Tomcat** as the application server.

      ii. Select **PostgreSQL** as the database platform.

      NOTE: You can use any of the Identity Manager 4.8 supported databases.

      iii. Provide the required database details in the subsequent pages.

      iv. Copy the database driver jar file `postgresql-9.4.1212.jar` from the PostgreSQL server to all the User application nodes in the cluster.

      NOTE: If you are using other Identity Manager 4.8 supported databases, such as Oracle or SQL Server, ensure that you copy the respective driver jar files from the server where the database is installed to all the User Application nodes in the cluster. For more information, see "Configuring the Database for the Identity Applications" on page 66.

      v. Browse and select the copied database driver jar file.

      vi. In the New Database or Existing Database details page, select the **New Database** option.

      vii. In the Identity Manager Configuration page, provide a unique name in the **Workflow Engine ID** field. For example, you can use the unique name as Engine1 for Node1.

      viii. To create a new master key, select **No** in the Security – Master Key page.

      The identity applications encrypt sensitive data using a master key. As this is the first instance of the identity applications in a cluster; therefore, you must instruct the installation program to create a new master key by selecting **No**. In a cluster, the User Application clustering requires every instance of the User Application to use the same master key. To ensure that the same master key is used, import the existing key by selecting **Yes** while configuring these instances.
4. On Node2, perform the following actions:
   a. Install Tomcat by using the convenience installer (select only Tomcat during the installation process).

   b. Install OSP.

During the installation process, provide the IP address and port number of the Identity Manager engine (eDirectory) server in the Authentication details page.

c. Install the User Application.

During the installation process, configure the following settings:

i. Select **Tomcat** as the application server.

ii. Select **PostgreSQL** as the database platform.

NOTE: You can use any of the Identity Manager 4.8 supported databases.

---

iii. Provide the required database details in the subsequent pages of the installation procedure.

iv. Copy the database driver jar file `postgresql-9.4.1212.jar` from the PostgreSQL server to Node2.

NOTE: If you are using any other Identity Manager 4.8 supported databases, such as Oracle or SQL Server, ensure that you copy the respective driver jar files from the server where the database is installed to all the User application nodes in the cluster.

---

v. Browse and select the copied database driver jar file.

vi. In the New Database or Existing Database details page, select the **Existing Database** option.

vii. In the Identity Manager Configuration page, provide a unique name in the **Workflow Engine ID** field. For example, you can use the unique name as Engine2 for Node2.

viii. To create a new Master key in the Security – Master Key page, select **Yes**.

The User Application clustering requires every instance of the User Application to use the same master key. To ensure that the same master key is used, import the existing key by selecting **Yes**. This key is created when you installed the first instance of the User Application in Node1.

You can obtain the master key from the ism-configuration properties file located in `C:\NetIQ\IDM\apps\tomcat\conf` on Node1. The parameter that contains the master key is `com.novell.idm.masterkey`.

ix. Click **Install** to complete the installation.

NOTE: For detailed information about installing the Identity Applications, see "Installation Procedures" on page 45.

---

5. In load balancer server, start an instance of load balancer with Identity Applications port number and another instance of load balancer with form renderer port number for all clustered nodes. For example,

   - `./balance 8543 apps1-au.edu.in:8543 ! apps2-au.edu.in:8543`
   - `./balance 8600 apps1-au.edu.in:8600 ! apps2-au.edu.in:8600`

6. Install SSPR on a separate computer.

   Before installing, make a note of the following settings and specify them during installation process:

   a. Install **Tomcat**. For installation instructions, see Step 4a.

   b. Install **SSPR**.

During the SSPR installation, perform the following actions:

i. In the Application Server connection page, select **Connect to external authentication server** and provide the DNS name of the server where the load balancer is installed.

ii. In the Authentication details page, provide the **IP address** and the **port** of the Identity Manager engine server. The password for the CA certificates is `changeit`.

c. After completing the SSPR installation, launch SSPR (`https://<IP>:<port>/sspr/private/config/ConfigEditor`) and log in. Click **Configuration Editor** > **Settings** > **Security** > **Redirect Whitelist**.

i. Click **Add value** and specify the following URL:

```
https:<dns of the failover><port>/osp
```

ii. Save the changes.

iii. In the SSPR Configuration page, click **Settings** > **OAuth SSO** and modify the OSP links by replacing the IP addresses with the DNS name of the server where the load balancer software is installed.

iv. Click **Settings** > **Application** and update the forward and logout URLs by replacing the IP addresses with the DNS name of the server where the load balancer software is installed.

d. To update the SSPR information on Node1, launch the Configuration utility located at `C:\NetIQ\idm\apps\UserApplication\configupdate.bat`.

In the window that opens, click **SSO clients** > **Self Service Password Reset** and enter values for **Client ID**, **Password**, and **OSP Auth redirect URL** parameters.

NOTE: Verify that the values for these parameters are updated in Node2.

---

7. Perform the following configuration tasks on the cluster nodes:

a. Restart Tomcat on all the cluster nodes.

b. To change the Change my password link, see "Updating SSPR Links in the Dashboard for a Distributed or Clustered Environment" on page 66.

c. Verify that the Forgot Password link and Change my password links are updated with the SSPR IP address on Node2.

NOTE: If the Change Password and Forgot Password links are already updated with the SSPR IP address, no changes are required.

---

8. In Node1, stop Tomcat and generate a new `osp.jks` file by specifying the DNS name of the load balancer server by using the following command:

```
C:\NetIQ\Common\JRE\bin\keytool -genkey -keyalg RSA -keysize 2048 -
keystore osp.jks -storepass <password> -keypass <password> -alias osp -
validity 1800 -dname "cn=<loadbalancer IP/DNS>"
```

For example: `C:\NetIQ\idm\apps\jre\bin\ -genkey -keyalg RSA -keysize 2048 -keystore osp.jks -storepass changeit -keypass changeit -alias osp -validity 1800 -dname "cn=mydnsname"`

NOTE: Ensure that the key password is the same as the one provided during OSP installation. Alternatively, this can also be changed using Configuration Update utility including the keystore password.

---

9. (Conditional) To verify if the `osp.jks` file is updated with the changes, run the following command:

   ```
   C:\NetIQ\Common\JRE\bin\keytool -list -v -keystore osp.jks -storepass
   changeit
   ```

10. Take backup of the original `osp.jks` file located at `C:\NetIQ\idm\apps\osp\` and copy the new `osp.jks` file to this location. The new `osp.jks` file was created in Step 8.
11. Copy the new `osp.jks` file located at from Node1 to other User Application nodes in the cluster.
12. On each clustered node,
    a. Navigate to the `C:\netiq\idm\apps\sites` directory and edit the `ServiceRegistry.json` file to add the load balancer details.

       ```
       {"serviceRegisteries":[{"serviceID":"IDM","restUrl":"https://<DNS
       of the load balancer>:8543/IDMProv"}]}
       ```

    b. Navigate to the `C:\netiq\idm\apps\sites\` directory and edit the `config.ini` file to add the load balancer DNS and port number.

       ```
       OSPIssuerUrl=https://<DNS of the load balancer>:8543/osp/a/idm/
       auth/oauth2
       OSPRedirectUrl=https://<DNS of the load balancer>:8600/forms/
       oauth.html
       ClientID=forms
       OSPLogoutUrl=https://<DNS of the load balancer>:8543/osp/a/idm/
       auth/app/logout
       ```

13. Launch the Configuration utility in Node1 and change all of the URL settings, such as URL link to landing page and OAuth redirect URL to the load balancer DNS name under the SSO Client tab.
    a. Save the changes in the Configuration utility. Check the `ism-configuration properties` file for the changes and modify if any URLs are still pointing to Node 1 DNS and port.
    b. To reflect this change in all other nodes of the cluster, copy the `ism-configuration properties` file located in `C:\NetIQ\IDM\apps\tomcat\conf` from Node1 to other User Application nodes in the cluster.

       NOTE: You copied the `ism.properties` file from Node1 to the other nodes in the cluster. If you specified custom installation paths during the User Application installation, ensure that referential paths are corrected by using Configuration update utility in the cluster nodes.

       In this scenario, both OSP and User Application are installed on the same server; therefore, the same DNS name is used for redirect URLs.

       If OSP and User Application are installed on separate servers, change the OSP URLs to a different DNS name pointing to the load balancer. Do this for all the servers where OSP is installed. Doing this ensures that all OSP requests are dispatched through load balancer to the OSP cluster DNS name. This involves having a separate cluster for OSP nodes.

       ---

14. Perform the following actions in the `setevn.sh` file located at `/TOMCAT_INSTALLED_HOME/bin/` directory:
    a. To ensure that the `mcast_addr` binding is successful, JGroups requires that the `preferIPv4Stack property` be set to **true**. To do so, add the JVM property "-Djava.net.preferIPv4Stack=true" in the `setenv.sh` file in all nodes.
    b. Add "`-Dcom.novell.afw.wf.Engine-id=Engine1`" in the `setenv.sh` file on Node1. Similarly, add a unique engine name for each node of the cluster. For example, for Node2, you can add the engine name as Engine2.
15. Enable clustering in the User Application.
    a. Start Tomcat on Node1.

       Do not start any other servers.
    b. Log in to the User Application as a User Application administrator.
    c. Click the **Configuration** > **Caching and Cluster** option.

       The User Application displays the Caching Management page.
    d. Click **Cluster Cache Configuration** and select **True** for the **Cluster Enabled** property.
    e. Click **Save**.
    f. Restart Tomcat.

NOTE: If you have selected Enable Local settings, repeat this procedure for each server in the cluster.

The User Application cluster uses JGroups for cache synchronization across nodes using default UDP. In case you want to change this protocol to use TCP, see Configuring User Application to use TCP.

---

16. Enable the permission index for clustering. For more information see "Enabling the Permission Index for Clustering" on page 216.
17. Enable Tomcat cluster.

    Open the Tomcat `server.xml` file from `/TOMCAT_INSTALLED_HOME/conf/` and uncomment this line in this file on all the cluster nodes:

    ```
    <Cluster  className="org.apache.catalina.ha.tcp.SimpleTcpCluster"/>
    ```

    For advanced Tomcat clustering configuration, follow the steps from the Apache documentation website.
18. Restart Tomcat on all the nodes.
19. Configure the User Application Driver for clustering.

    In a clustered environment, you can use a single User Application driver with multiple instances of the User Application. The driver stores various kinds of information (such as workflow configuration and cluster information) that is application-specific. You must configure the driver to use the host name or IP address of the dispatcher or load balancer for the cluster.
    a. Log in to the instance of Identity Console that manages your Identity Vault.
    b. Under Identity Manager tile, select **Identity Manager Administration**.
    c. Select the driver set that contains your User Application driver.
    d. Click the driver icon.
    e. Go to **Configuration**.

f. Click **Driver Parameters** dropdown.

g. In the **Driver settings** tab, change **Host** to the host name or IP address of the Load Balancer.

h. Click **Save**.

i. Restart the driver.

20. To change the URL of Roles and Resource Service Driver, repeat steps from 19a to 19f and click **Driver Configuration** and update the **User application URL** with the load balancer DNS name.
21. Ensure session stickiness is enabled for the cluster created in the load balancer software for the User Application nodes.

Most loadbalancers provide a healthcheck feature for determining whether an HTTP server is up and listening. The User Application contains a URL that can be used for configuring HTTP healthchecks on your loadbalancer. The URL is:

```
http://<NodeIP>:port/IDMProv/jsps/healthcheck.jsp
```

Enabling the Permission Index for Clustering

This section provides instructions for enabling the permission index for clustering.

1. Log in to Identity Console on Node1 and navigate to **Tree View**.
2. In the left pane of tree view, select **System** > **driver set** containing the User Application driver.
3. Then, select **AppConfig** > **AppDefs**.
4. On the right pane, select **Configuration**.
5. Under **Valued Attributes**, select the XMLData attribute and set the `com.netiq.idm.cis.clustered` property to **true**.

   For example:

   ```
   <property>
   <key>com.netiq.idm.cis.clustered</key>
   <value>true</value>
   </property>
   ```
6. Click **Save**.

21 Troubleshooting

This section provides useful information for troubleshooting problems with installing Identity Manager. For more information about troubleshooting Identity Manager, see the guide for the specific component.

Troubleshooting Identity Manager Engine

The following table lists the issues you might encounter and the suggested actions for working on these issues. If the problem persists, contact your NetIQ representative.

Issue	Suggested Actions
The Identity Manager Engine fails to start when the eDirectory initialization process is in progress. This issue is mostly observed when the eDirectory DIB is very large.	Perform the following steps to workaround this issue: 1. Create a system environment variable called as **SLEEP_BEFORE_ENGINE_STARTUP** and set the value of the variable from 0 to 600. The value is denoted in seconds. **NOTE:** If you provide an invalid value or a value greater than 600, the value defaults to 600. 2. Restart eDirectory. 3. (Conditional) Check the `dhost.log` to view the messages and logs.
In a multi-server environment, an unrecognized extended exception is displayed.	Ensure that the primary server has a read-write partition for the secondary server: 1. Log in to Identity Console. 2. Click **Partition Management**. 3. Select the secondary server. 4. In the **Replica View**, Assign read-write permissions to the server. **NOTE:** Ensure that you have added the secondary server in the driver set.

Troubleshooting the Identity Applications and RBPM Installation

The following table lists the issues you might encounter and the suggested actions for working on these issues. If the problem persists, contact your NetIQ representative.

Issue	Suggested Actions
The **Roles** and **Self tasks** widgets on the Dashboard page do not display any data. If you check in your browser's Console, a 404 error is displayed. This issue is observed when the default `IDMProv` deployment context is changed to a custom context.	To resolve this issue, you must change the REST API URL on the impacted widgets. Perform the following steps: 1. Log in to the Identity Manager Dashboard as an administrator. 2. Navigate to the Dashboard page and click Manage Dashboard. 3. To edit the widget configuration in the **Roles** widget: a. Click ⚙. b. In the **URL** field, change the default `IDMProv` context to a custom context as follows: `/<custom-context>/rest/access/assignments/advanced?nextIndex=1&sortBy=name&sortOrder=ASC&forceRefresh=true&searchScope=role&size=20` Where, `<custom-context>` is the context that you are using in your Identity Manager deployment. c. Click **Apply**. 4. To edit the widget configuration in **Self tasks** widget: a. Click ⚙. b. In the **URL** field, change the default `IDMProv` context to a custom context as follows: `/<custom-context>/rest/access/tasks/list?fromIndex=1&size=10&q=*&sortOrder=asc&sortBy=createTime&assignedTo=assignedTo&recipient=recipientAsMe&expireUnit=weeks&expireWithin=&proxyUser=&assignStatus=&delegatedTasks=false&status=` c. Click **Apply**. 5. Click **Edit Done**.

Issue	Suggested Actions
When Identity Applications installed in a cluster is upgraded and Tomcat is restarted, clustering does not work as expected.	Perform the following actions in all the nodes of the cluster: 1. Navigate to the `server.xml` file located at the `C:\NetIQ\IDM\apps\tomcat\conf` folder. 2. Uncomment the following line in the `server.xml`. `<Cluster className="org.apache.catalina.ha.tcp.SimpleTcpCluster"/>` 3. Restore all the custom configurations from the backed up Tomcat directory. 4. Restart Tomcat.
The upgrade process does not set the default Identity Applications Administrative account as `cn=uaadmin.ou=sa.o=data`. The following error is logged to the `catalina.out` file. `AuthorizationManagerService [RBPM] Error occured calculating effective rights for attribute: nrfAccessMgrRevokeRole on object: cn=complianceAdmin,cn=System,cn=Level20,cn=RoleDefs,cn=RoleConfig,cn=AppConfig,cn=UserApplication,cn=Driver Set,o=system for trustee: cn=uaadmin,ou=sa,o=data.com.novell.srvprv.spi.security.IDMAuthorizationException : Error occured calculating effective rights for attribute: nrfAccessMgrRevokeRole on object: cn=complianceAdmin,cn=System,cn=Level20,cn=RoleDefs,cn=RoleConfig,cn=AppConfig,cn=UserApplication,cn=Driver Set,o=system for trustee: cn=uaadmin,ou=sa,o=data.at com.novell.idm.security.authorization.ldap.LdapRightsUtil.getPropertyRights(LdapRightsUtil.java:152)` `Unable to fetch roles from edirectory in the predefined time set.`	1. Navigate to the `setenv.bat` file and change the value for `-Dncpclient_req_timeout` property to *1150* in the `CATALINA_OPTS` entry. 2. Restart Tomcat.
You want to modify one or more of the following the Identity Applications configuration settings created during installation: ◆ Identity Vault connections and certificates ◆ E-mail settings ◆ Identity Manager Engine User Identity and User Groups ◆ Access Manager or iChain settings	Run the configuration utility independent of the installer. Run the following command from the installation directory (by default, `C:\NetIQ\idm\apps\UserApplication\`): `configupdate.bat`

Issue	Suggested Actions
Starting Tomcat causes the following exception: `port 8180 already in use`	Shut down any instances of Tomcat (or other server software) that might already be running. If you reconfigure Tomcat to use a port other than 8180, edit the `config` settings for the User Application driver.
When Tomcat starts, the application reports it cannot find trusted certificates.	Ensure that you start Tomcat by using the JDK specified during the installation of the Identity Applications.
Cannot log in to the portal admin page.	Ensure that the Identity Applications Administrator account exists. This account is not the same as your Identity Console administrator account.
Cannot create new users even with administrator account.	The Identity Applications Administrator must be a trustee of the top container and should have Supervisor rights. You can try setting the Identity Applications Administrator's rights equivalent to the LDAP Administrator's rights (using Identity Console).
Starting application server throws keystore errors.	Your application server is not using the JDK specified during the installation of the Identity Applications. Use the `keytool` command to import the certificate file: `keytool -import -trustcacerts -alias aliasName -file certFile -keystore ..\lib\security\cacerts -storepass changeit` ◆ Replace *aliasName* with a unique name of your choice for this certificate. ◆ Replace *certFile* with the full path and name of your certificate file. ◆ The default keystore password is `changeit` (if you have a different password, specify it).
Email notification not sent.	Run the `configupdate` utility to check whether you supplied values for the following Identity Applications configuration parameters: **Email From** and **Email Host**. Run the following command from the installation directory (by default, `C:\NetIQ\idm\apps\UserApplication\`): `configupdate.bat`

Troubleshooting Installation and Uninstallation

The following table lists the issues you might encounter and the suggested actions for working on these issues. If the problem persists, contact your NetIQ representative.

Issue	Suggested Actions
Identity Manager authorizes and securely communicates with its components using digital certificates. The Identity Vault certificates must be imported into the `idm.jks` and `tomcat.ks` keystore files. However, when attempting to access Identity Applications after importing the certificates, you might hit the following error: `javax.net.ssl.SSLHandshakeException: PKIX path validation failed: java.security.cert.CertPathValidatorException: Could not determine revocation status.` The certificates are validated by checking the Certificate Revocation Lists (CRLs) specified by the CRL Distribution Point (CDP) field to determine whether the certificate has been revoked or not. The CRLDPs are available in both the root certificate and the intermediate certificates present in the keystore files `tomcat.ks` and `idm.jks`. Certificate revocation checking, however, is disabled by default. As a result, the PKIX trust manager is unable to determine the revocation status of the certificates.	To fix this issue, enable CRL distribution point checking by setting the `-Dcom.sun.security.enableCRLDP` property to `true`. To set the property, perform the following actions: 1. Stop Tomcat. 2. Go to the `setenv.sh` file located in the Tomcat's `bin` folder. For example, `C:\NetIQ\idm\apps\tomcat\bin\setenv.bat`. 3. Add the property `-Dcom.sun.security.enableCRLDP=true` in CATALINA_OPTS as: `export CATALINA_OPTS="-Dcom.sun.security.enableCRLDP=true"` 4. Start Tomcat.
After upgrading Identity Manager, logging in to Identity Manager Dashboard is extremely slow for non-admin users. There is a significant delay in loading the Applications and the Dashboard pages. This issue occurs due to the nested group search, which is enabled by default. The application will look for the permissions inherited by the logged-in user via the nested group membership, regardless of whether there are any nested groups in the environment.	(Conditional) The following steps apply to Identity Manager 4.8.5 and later. 1. Log in to the server where Identity Applications is upgraded to 4.8.5 version. 2. Navigate to the `C:\NetIQ\IDM\apps\tomcat\conf` location. 3. Open the `ism-configuration.properties` file in a text editor. 4. At the end of the file, add the following property: `DirectoryService/realms/jndi/params/USE_NESTED_GROUPS=false` 5. Save the file and restart Tomcat.

Issue	Suggested Actions
After upgrading Identity Applications to 4.8.x version, you are unable to login to the Identity Applications Dashboard. This issue occurs when the Identity Vault truststore path is not updated to proper keystore (`cacerts`) file location during the Identity Applications upgrade. The following exception is logged to the `catalina.out` file: `com.netiq.idm.auth.oauth.AuthenticationCommunicationException: javax.net.ssl.SSLHandshakeException: sun.security.validator.ValidatorException: PKIX path validation failed: sun.security.validator.ValidatorException: TrustAnchor with subject "CN=***, OU=idm, O=***, L=***, ST=***, C=**" is not a CA certificate"`  Identity Applications uses `JAVA_HOME` environment variable which is set to `<install_path>\Common\JRE`. When the truststore path is not set to `cacerts` file at `JAVA_HOME`, the SSL communication fails resulting in SSL error associated with 'TrustAnchor' (Trust anchor is used as enhanced java security check for SSL certificates).	To resolve this issue, perform the following actions: 1. Stop the Tomcat service. 2. Log in to the Identity Applications server and launch the `configupdate` utility located at `<install_path>\idm\apps\configupdate`. 3. In User Application tab, go to **Identity Vault Certificates** and ensure that the **Truststore path** is set to `<install_path>\Common\JRE\lib\security\cacerts`. 4. Start the Tomcat service.

After you upgrade Identity Manager in a distributed environment to 4.8.1 version, login to the Identity Applications fails. The following error message is displayed:
 	
`Your login process did not complete successfully.`
 	
Logging to the Identity Applications requires trust anchor certificates for establishing a secure connection between the Identity Applications and the OSP. A trust anchor certificate must include the Basic Constraints extension with the Subject Type set to CA. Identity Manager makes use of the property `jdk.security.allowNonCaAnchor` to validate the trust anchors in the certificate. By default, this property is set to `false`. Therefore, when the trust anchors are not found in the certificates, the connection between Identity Applications and OSP cannot be established and the login fails. You will also notice the following exception in the `idm-osp.log` file:
 	
`sun.security.validator.ValidatorException: TrustAnchor with subject "CN=***, L=***, O=***" is not a CA certificate`
	To resolve this issue, you must satisfy either of the following conditions:
	
	- Ensure that the certificates used to establish a secure connection between the Identity Applications and the OSP are trusted CA certificates with proper Basic Constraints extension.
	- In case of self signed certificates and custom certificates that are trusted by the clients, you can change the property `jdk.security.allowNonCaAnchor` to allow non CA certificates without Basic Constraints extension. Perform the following actions to modify the Java security settings:
	
	1. Navigate to the `C:\NetIQ\idm\apps\jre\lib\security\java.security` directory.
	2. Set the value of the property `jdk.security.allowNonCaAnchor=true`.
	3. Save the file.

Issue	Suggested Actions
After upgrading to Identity Applications 4.8.1 version, you are not able to open forms while requesting for permissions in the Identity Applications Dashboard.	To resolve this issue, perform the following steps: 1. Press Windows + R on your keyboard, type `services.msc` and select **OK** to open the Windows Services interface. 2. Search for the service names, **NetIQ Nginx Service** and **NetIQ IGA Form Renderer Service**. Right-click the service and select the **Restart** option. The Identity Applications uses NGNIX service for rendering forms in the Identity Applications Dashboard.
After upgrading Identity Applications or Identity Reporting to the 4.8 version, multiple entries of PostgreSQL are displayed in the Control Panel.	Uninstall the previous versions of PostgreSQL from the Control Panel.
Uninstallation process reports as incomplete but the log file shows no failures.	The process failed to delete the `netiq` directory that contains the installation files by default. You can delete the directory if you have removed all NetIQ software from your computer.
After you upgrade Identity Manager, the following property is added to the `ism-configuration.properties` file: `com.netiq.idm.osp.ldap.admin-dn = cn=admin,ou=sa,o=system`	Comment out the property in the `ism-configuration.properties` file and restart Tomcat. It does not cause any functionality loss.
After you upgrade Identity Manager, the following SSPR property is added to the `ism-configuration.properties` file, even if you do not have SSPR in your deployment: `com.netiq.sspr.redirect.url = https://___SSPR_IP___:___SSPR_TOMCAT_HTTPS_PORT___/sspr/public/oauth`	Comment out the property in the `ism-configuration.properties` file and restart Tomcat. It does not cause any functionality loss.

Issue	Suggested Actions
Unable to start Tomcat after Identity Manager upgrade. You will notice few exceptions in tomcat logs and a communication failure between the workflow engine and the Identity Vault.	1. Log in to Identity Console. 2. Navigate to **Certificate Management** > **Server Certificate Management**. 3. Select the **SSL CertificateDNS** check box and click **Export**. 4. In the **Certificates** drop-down list, select the *SSL CertificateDNS*. 5. Clear the **Export private key** check box. Ensure that the **Export format** is set to *DER*. 6. Click **OK** > **Save the exported certificate** to download the certificate in your system. 7. Log in to the Identity Applications server. 8. Stop Tomcat. 9. Navigate to `opt/netiq/common/jre/bin` directory and import the certificate to `idm.jks` file using the following command: `opt/netiq/common/jre/bin/keytool -import -trustcacerts -alias <certificate_alias_name> -keystore /opt/netiq/idm/apps/tomcat/conf/idm.jks -file <certificate_file_downloaded>` 10. Restart Tomcat.
After upgrading Identity Manager from 4.7.4 to 4.8, the Tomcat service does not come up and no errors are reported in the log files. This issue occurs when the Heartbeat timer is not updated properly in afenginestate table in the igaworkflow database.	To resolve this issue, log in to a database admin tool such as pgAdmin. Run the following query to manually update the Heartbeat timer in afenginestate table in the igaworkflow database. `update afenginestate set heartbeat=now()::timestamp;`

Troubleshooting Login

The following table lists the issues you might encounter and the suggested actions for working on these issues. If the problem persists, contact your NetIQ representative.

Issue	Suggested Actions

When Identity Applications and Identity Reporting are installed on the same server and you perform configuration changes using the configuration update utility located at `<reporting install folder>\bin` directory, the Identity Manager Dashboard fails to launch. The following error is reported in `catalina.out` log file:
`EboPortalBootServlet [RBPM] +++++WARNING!!!!: This portal application context, IDMProv, does not match the portal.context property set in the PortalService-conf/config.xml file.`
`Only one portal per database is allowed. Data has been loaded using the previous portal context.`
`To correct this you must revert back to the previous portal name of, NoCacheFilter, please consult the documentation.`
	For any configuration changes, use the configuration update utility located at `C:\NetIQ\idm\apps\UserApplication` directory.

User is unable to login in large scale environment (>2 million objects)	Add an index for `mail (Internet Mail Address)` attribute with the rule set as `Value` in both eDirectory master and replica servers.
When you sign out from Identity Applications page, SSPR shows an error `5053 ERROR_APP_UNAVALIABLE`.	Ignore this error. It does not cause any functionality loss.
Challenge Responses are not prompted at the first login to the Identity Applications.	1. Ensure that the SSPR server has a certificate created using FQDN. 2. Log in to the Identity Application server and launch ConfigUpdate utility (`<installation_path>\apps\UserApplication`). 3. Navigate to **SSO Clients** > **Self Service Password Reset** and make sure the settings are correct. If SSPR is installed on a separate server, make sure that the SSPR certificate is imported into `idm.jks` located in the Identity Applications server at `\netiq\idm\apps\tomcat\conf`.

Issue	Suggested Actions
Browser displays a blank page when SSPR URL is accessing.	This occurs when SSPR is not properly configured with OSP. The SSPR log shows the following information: `2018-01-24T22:24:02Z, ERROR, oauth.OAuthConsumerServlet, 5071 ERROR_OAUTH_ERROR (unexpected error communicating with oauth server: password.pwm.error.PwmUnrecoverableException: 5071 ERROR_OAUTH_ERROR (io error during oauth code resolver http request to oauth server: Certificate for <IP> doesn't match any of the subject alternative names: [IP]))` 1. Verify that the Tomcat server where OSP is running has a valid certificate created using FQDN. Log in to the Identity Applications server and launch ConfigUpdate utility. Navigate to **SSO Clients > Self Service Password Reset** and make sure the settings are correct. 2. Log in to SSPR by overriding the OSP login method. (for example, `https://<sspr sserver ip>:<port>/sspr/private/Login?sso=false`) 3. Navigate to **Configuration Editor** in the top right corner of the page. 4. Specify **Configure Password**, then click **Sign In**. 5. Navigate to **LDAP** > **LDAP Directories** > **Default** > **Connection**. 6. If the LDAP certificate is not correct, click **Clear**. 7. To reimport the certificate, click **Import From Server**. 8. Navigate to **Settings > Single Sign On (SSO)Client > OAuth** and verify that the certificate under **OAUTH Web Service Server Certificate** is correct. 9. If the certificate is not correct, click **Clear**. 10. To reimport the certificate, click **Import From Server**.

Troubleshooting SSPR Page Request Error

The following table lists the issues you might encounter and the suggested actions for working on these issues. If the problem persists, contact your NetIQ representative.

Issue	Suggested Actions
SSPR Reports Out of Order Page Request Error This issue occurs when you click the **Back** button while in an SSPR page. SSPR displays an incorrect sequence message in the SSPR error log similar to the following: `ERROR, password.pwm.servlet.TopServlet, 5035 ERROR_INCORRECT_REQUEST_SEQUENCE (expectedPageID=3, submittedPageID=4, url=<some sspr url>`	Disable the Back button detection from **SSPR Configuration Manager > Settings > Security > Web Security**. **NOTE:** Changing this setting has no effect on end users.

For general issues encountered during authentication or logging in to the identity applications, see the *NetIQ Identity Manager - Administrator's Guide to the Identity Applications*.

Troubleshooting .NET Remote Loader Not Starting Issue on Windows 2016

The following table lists the issues you might encounter and the suggested actions for working on these issues. If the problem persists, contact your NetIQ representative.

Issue	Suggested Actions
This is a random issue. It might occur if the font settings of .NET Remote Loader's command prompt are not same as the default settings of the host operating system.	Change the command prompt settings to match the system default settings by deleting the `HKEY_CURRENT_USER\Console` registry key and then restart the server.

Troubleshooting 502 Bad gateway while loading the forms in Azure deployment

The following table lists the issues you might encounter and the suggested actions for working on these issues. If the problem persists, contact your NetIQ representative.

Issue	Suggested Actions
After deploying the IDM 4.8 components on Azure environment. In IDM dashboard, when you click on helpdesk ticket or when you try approve any task you might see the following error. `502 - Web server received an invalid response while acting as a gateway or proxy server.`	Perform the following steps to resolve this issue: 1. Navigate to `Nginx\conf` location in your system. For example, `C:\NetIQ\Common\Nginx\conf` 2. In the `nginx.conf` file, a. Add the **error_page 404 =200 /404.html** below this line `error_page 502 /502.html;`. b. Set the **proxy_intercept_errors off;** to `proxy_intercept_errors on;`. 3. From Services.msc, restart NetIQ Nginx Service.