AUTHORIZED DOCUMENTATION

Driver for SAP* User Management (JCo 3) Implementation Guide

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Novell, Inc.
404 Wyman Street, Suite 500
Waltham, MA 02451
U.S.A.
www.novell.com

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Contents

About This Guide

This guide explains how to install and configure the SAP User Management (JCo 3) driver. It also explains how the SAP User Management driver works.

Audience

This guide is intended for SAP and Identity Manager consultants.

Feedback

We want to hear your comments and suggestions about this manual and the other documentation included with this product. Please use the User Comments feature at the bottom of each page of the online documentation, or go to www.novell.com/documentation/feedback.html and enter your comments there.

Documentation Updates

For the most recent version of the *Identity Manager Driver for SAP User Management (JCo 3) Implementation Guide*, visit the Novell Compliance Management Platform Extension for SAP Environments Web site (http://www.novell.com/documentation/ncmp_sap10/index.html).

Additional Documentation

For documentation on other Identity Manager drivers, see the Identity Manager Documentation Web site (http://www.novell.com/documentation/idm36drivers/index.html).

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

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

Overview

1

The SAP User Management (JCo 3) driver provisions users and password to SAP application servers or child systems. This version of the User Management driver provides fan-out capabilities. A single driver can synchronize users to CUA systems and child systems.

1.1 Terminology

This section gives you essential information about terminology used with SAP. If you need further help with SAP terminology, see the Glossary for the SAP Library (http://help.sap.com/saphelp_46c/helpdata/En/35/2cd77bd7705394e10000009b387c12/frameset.htm).

ABAP: Advanced Business Application Programming. A programming language designed for creating large-scale business applications.

ALE: Application Link Enabling. Technology that enables communication between SAP and external systems such as the Identity Vault. For more information, see Appendix B, “Application Link Enabling (ALE),” on page 65.

BAPI: Business Application Programming Interface. SAP business APIs for the SAP business object types. For more information, see Appendix C, “Business Application Programming Interfaces (BAPIs),” on page 69.

CCMS: Computer Center Management System. A set of tools to monitor, control, and configure an SAP system.

client: In an SAP system, a self-contained unit with its own set of users and data.

CUA: Central User Administration. The SAP tool used to centrally maintain user master records.

ERP: Enterprise resource planning. A software system for planning and automating enterprise-wide business processes.

GRC: Governance, risk, and compliance. Software or business processes that facilitate conformity to legal requirements.

IDocs: Intermediate document. A data exchange format used between SAP systems and between SAP systems and external applications. For more information, see Section B.3, “IDoc Type,” on page 66.

JCo: SAP Java* Connector. A toolkit that allows Java applications to communicate with any SAP system.

SPML: Service Provisioning Markup Language. An XML-based framework for managing the provisioning and allocation of identity information and system resources within and between organizations.

SSCR: SAP Software Change Registration. A procedure for registering manual changes to SAP source code and dictionary object.s

UME: User Management Engine. Provides central user administration for Java applications.

XAL: External interface for alert management. Enables external system management software to read and set properties in order to integrate with SAP administration tools.

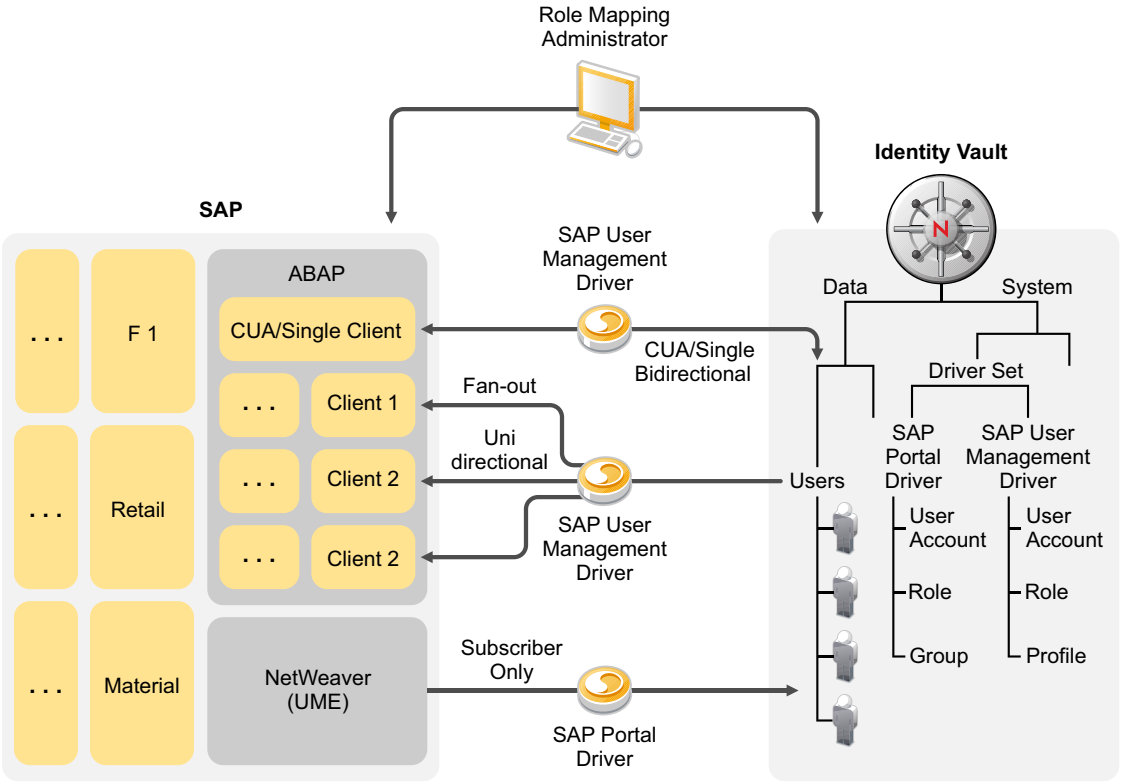
1.2 Supported Versions

This driver supports the same platforms that are supported by JCo 3. Use JCo 3.0.2 or later. Full driver functionality is available only when it is used with a fully patched SAP Basic 7.00 system or later.

1.3 How It Works

The SAP User Management driver can be configured to work with a single client (standalone non-CUA, CUA, central client, or a CUA child client). In this configuration, the synchronization is bidirectional if the client is a CUA central client and it is unidirectional (from the Identity Vault to SAP) in all other configurations. In all cases, the driver can subscribe passwords. It can also be configured to connect to multiple clients in a fan-out configuration. In this configuration, the synchronization is bidirectional to the client on the primary connection, if the client is a CUA central client, and it is unidirectional (from the Identity Vault to SAP) in all other configurations. Each additional connection the fan-out driver makes is a secondary connection, and each secondary connection is also unidirectional. The driver can subscribe passwords in all configurations. For more information about the fan-out configuration, see Chapter 2, “Fan-Out Configuration,” on page 17.

Figure 1-1 *SAP User Management Driver Configurations*



1.4 Driver Components

This section contains information about the following driver components:

- **Driver Configuration File:** The driver configuration file contains policies and entitlements that make the driver work. It is what allows the driver to become a fan-out driver or a traditional driver.

  The driver configuration filename is `SAPUser-CMP-IDM3_6_0-V3.xml`.

  For more information, see Chapter 7, “Creating a New Driver,” on page 39.

- **Driver Shim:** The driver shim handles communication between the SAP clients and the Metadirectory engine.

  The driver shim file name is `sapumshim.jar`.

  For installation information, see Chapter 3, “Installing the Driver Files,” on page 21.

- **SAP User Java Connector Test Utility:** In order to use the driver, you must download and install SAP JCo version 3. The SAP JCo 3 Test utility enables you to check for JCo installation and configuration issues prior to configuring the driver. You can use the JCo 3 test utility to validate the installation of JCo 3, connectivity to the SAP host system, as well as testing for the accessibility of the user management BAPIs used by the driver.

  The JCo 3 test utility file name is `UserJCO3Test.class`.

  For more information, see Chapter 6, “Testing the SAP JCo Client Connection,” on page 33.

1.5 Support for Standard Driver Features

The following sections provide information about how the SAP User Management (JCo 3) driver supports standard driver features:

1.5.1 Local Platforms

The SAP User Management (JCo 3) driver can be installed on the same operating systems supported by the Metadirectory server and JCo 3. For information, see “Metadirectory Server” in “System Requirements” in the *Identity Manager 3.6 Installation Guide*.

1.5.2 Remote Platforms

If you don’t want to install the Metadirectory engine and Identity Vault (eDirectory™) on the SAP server, you can use the Remote Loader service to run the driver on the SAP server, and have the Metadirectory engine and Identity Vault on another server.

The SAP User Management (JCo 3) driver can be installed on the same operating systems supported by the Remote Loader and JCo 3. For information, see “Configuring the Remote Loader” in the *Identity Manager 3.6 Remote Loader Guide*.

1.5.3 Entitlements

Entitlements are a way to set up a list of criteria to grant or revoke users, roles, and groups access to resources. The SAP User Management (JCo 3) driver contains preconfigured entitlements. For more information, see Chapter 8, “Implementing the Preconfigured Entitlements,” on page 47.

1.5.4 Password Synchronization

The SAP User Management (JCo 3) driver supports setting passwords in the SAP system. You can configure the driver to automatically assign passwords to users when they are provisioned to the SAP systems and child systems. For configuration information, see “Managing Passwords” in the *Novell Compliance Management Platform Extension for SAP Environments 1.0 Solutions Guide*.

1.5.5 Account Tracking

Account Tracking allows you to manage all of the identities each user account has in each system connected to the Identity Vault. Account Tracking is a feature included with the Novell® Compliance Management Platform. For more information, see the Novell Compliance Management Platform Web site (http://www.novell.com/products/compliancemanagementplatform/).

1.5.6 Identity Manager Role Mapping Administrator

The SAP User Management (JCo 3) driver can be configured to work with the Identity Manager Role Mapping Administrator, which is a tool that allows you to map business roles to IT roles. The Role Mapping Administrator is included with the Novell Compliance Management Platform extension for SAP environments. For more information, see the Novell Compliance Management Platform extension for SAP environments Web site (http://www.novell.com/products/).

Fan-Out Configuration

2

The fan-out configuration of the SAP User Management driver provisions one object in the Identity Vault to multiple SAP clients. The SAP User Management (JCo 3) driver supports publishing only on the primary connection and not to any additional connections in the fan-out configuration. To support the Publisher channel, the primary connection must be made to a CUA central client.

The SAP User Management (JCo 3) driver does fan-out by associations and the destination DN. The policies use entitlements to generate the correct event format for the driver to consume. There are many aspects that make fan-out possible.

2.1 Association Format

The association format has changed in the SAP User Management (JCo 3) driver. Table 2-1 shows the changes in the association format. The new driver is backwards compatible. The older drivers do not support the newer format.

Table 2-1 *Association Format*

Old Association Format	New Association Format
USd<USERNAME> • **US:** The class. • **d:** A delimiter. • **<USERNAME>:** The unique identifier and username in the SAP system. For example: USdBERG	<LSNAME>USd<USERNAME> • **<LSNAME>:** The logical system name where events are sent. • **US:** The class • **d:** A delimiter. • **<USERNAME>:** It is the unique identifier and username in the SAP system. For example: \S71CLNT800\USdABERG

The two main points to remember the association format are:

- The association is very close to a DN format.
- The first part of the association contains an identifier that tells the shim which logical system receives the event.

The following is an example of the association format in a trace:

```
<nds dtdversion="3.5" ndsversion="8.x">
  <source>
    <product version="3.6.0.4294">DirXML</product>
    <contact>Novell, Inc.</contact>
  </source>
 <input>
   <modify class-name="US" event-id="metaserver1#20090513130202#1#2#0" from-
merge="true" src-dn="\META\data\company\users\aberg" src-entry-id="40801">
      <association>\S7ICLNT800\USdABERG</association>
      <modify-attr attr-name="ADDRESS:FULLNAME">
        <add-value>
          <value timestamp="1234481823#65" type="string">Berg Andrea</value>
        </add-value>
      </modify-attr>
   </modify>
 </input>
</nds>
```

If the driver is running in fan-out mode, there are multiple associations added to the user object. They are required for fan-out to work correctly. The format of the association is:

```
fanout1-xTFRgkLOmElpuMUxUYJCzg==
fanout2-xTFRgkLOmElpuMUxUYJCzg==
```

The `xTFRgkLOmElpuMUxUYJCzg==` value is the GUID of the driver.

2.2 DN Format

The legacy SAP User driver did not have a concept of DNs. Placement was not done using the DN, and the username of an account in SAP was not determined through the destination-dn, but from the value of the USERNAME:BAPINAME attribute. This attribute was required and contained a value for every add event going to the SAP system.

The User Management (JCo 3) driver introduces the concept of a DN in a format similar to the one already used by the association. The DN format is \<LSNAME>\<USERNAME>, where <LSNAME> is the name of the logical system where events are sent and <USERNAME> is a unique identifier and username in the SAP system.

The DN format does not contain a class identifier. To determine the correct object type when only a destination DN is available, the driver relies on the class-name attribute of the event.

Placement is done through regular placement policies. The placement policies specify the logical system and the username, then the driver places the account in the correct system with the correct name.

For backward compatibility, the driver still supports the legacy way of naming new accounts in SAP. If an add event contains an attribute USERNAME:BAPINAME, the value of the attribute always `SAPUser-CMP-IDM3_6_0-V1.xml` takes precedence over the leaf portion of the destination DN. The policies in the driver configuration file use the new destination DN placement method exclusively. The USERNAME:BAPINAME attribute is not populated on outgoing events.

The following is an example of the DN format in a trace:

```
<nds dtdversion="3.5" ndsversion="8.x">
  <source>
    <product version="3.6.0.4294">DirXML</product>
    <contact>Novell, Inc.</contact>
  </source>
  <input>
    <add class-name="US" dest-dn="\S7ICLNT800\ABERG" event-
id="metaserver1#20090513131408#1#2#0" src-
dn="\META\data\company\users\aberg">
      <add-attr attr-name="UCLASS:LIC_TYPE">
        <value timestamp="1235208846#1" type="string"/>
      </add-attr>
      <add-attr attr-name="ADDRESS:FULLNAME">
        <value timestamp="1234481823#65" type="string">Berg Andrea</value>
      </add-attr>
      <add-attr attr-name="ADDRESS:FIRSTNAME">
        <value timestamp="1241800246#8" type="string">Andrea</value>
      </add-attr>
      <add-attr attr-name="ADDRESS:LASTNAME">
        <value timestamp="1234410222#28" type="string">Berg</value>
      </add-attr>
      <add-attr attr-name="LOGONDATA:USTYP">
        <value type="string">A</value>
      </add-attr>
      <add-attr attr-name="LOCKUSER">
        <value type="state">0</value>
      </add-attr>
      <password><!-- content suppressed --></password>
    </add>
  </input>
</nds>
```

2.3 User Account Entitlement

The SAP User Management (JCo 3) driver configuration file introduces entitlement policies and a set of preconfigured entitlements. The User Account entitlement is used with the fan-out configuration.

Most Identity Manger drivers support the User Account entitlement as an entitlement that can only be granted once and does not take any parameters. It is like an on/off switch for the account in the application. There is a one-to-one relationship between the User Account entitlement and one account in the application. The fan-out configuration requires that a single User object in the Identity Vault be granted multiple User Account entitlements for accounts in different systems. A parameter is added to the User Account entitlement, so each time the entitlement is granted it is a unique event. The parameter indicates the system where the account is granted.

The SAP User Management (JCo 3) driver configuration file contains a new version of the User Account entitlement and the policies that implement the entitlement. The entitlement can be granted multiple times and uses the parameter that tells the policies where to send the events.

The format of the parameter is:

```
LSNAME=<LSNAME>
```

Where the LSNAME is the same system identifier (SAP logical system name) that is found in the association and in the destination DN.

The following is an example of the User Account entitlement in a trace:

```
<nds dtdversion="3.5" ndsversion="8.x">
  <source>
    <product version="3.6.0.4294">DirXML</product>
    <contact>Novell, Inc.</contact>
  </source>
  <input>
    <add class-name="User" event-id="metaserver1#20090513130202#1#2#0" src-
dn="\META\data\company\users\aberg">
      ...
      <add-attr attr-name="DirXML-EntitlementRef">
        <value timestamp="1242219722#1" type="structured">
          <component name="nameSpace">1</component>
          <component name="volume">\META\system\services\idm\driverset1\SAP-
USER\UserAccount</component>
          <component name="path.xml">
            <ref>
              <src>NRF</src>
              <id>1242219722981</id>
              <param>LSNAME=S7ICLNT800</param>
            </ref>
          </component>
        </value>
      </add-attr>
      ...
    </add>
  </input>
</nds>
```

2.4 Fan-out Life Cycle Process

The fan-out process works as follows:

1. A user in the Identity Vault is granted a User Account entitlement.
2. Based on the entitlement parameter value, the policies create the destination DN that places a new account in the corresponding SAP client.
3. The driver adds an association to the user in the Identity Vault.
4. All changes to the object in the Identity Vault are fanned out based on the specific association.

Installing the Driver Files

3

3.1 Prerequisites

The following prerequisites must be completed before installing the driver files:

- ❑ Install the updated Designer that supports structured GCVs. If Designer is not updated, you cannot manage the driver through Designer. For installation instructions, see “Installing the 3.0.1 Designer Auto Update” in the *Novell Compliance Management Platform Extension for SAP Environments 1.0 Overview*.
- ❑ Install the updated iManager plug-ins that support structured GCVs. If the iManager plug-ins are not updated, you cannot manage the driver through iManager. For installation instructions, see “Installing the Updated iManager Plug-Ins for Identity Manager” in the *Novell Compliance Management Platform Extension for SAP Environments 1.0 Overview*.

3.2 Installing

The SAP User Management (JCo 3) driver is installed when the drivers for the extension for SAP environments are installed. If you have not installed these drivers, the installation instruction are located in “Installing the Identity Manager Drivers for the extension for SAP environments” in the *Novell Compliance Management Platform Extension for SAP Environments 1.0 Overview*.

Upgrading

4

4.1 What’s New

The SAP User Management (JCo 3) driver contains the following new features:

- Supports JCo 3.0.2 or later
- Supports fan-out, which allows one driver to synchronize to multiple SAP clients. This creates multiple associations per user for each client.
- Contains the following preconfigured entitlements:
  - User Account
  - Role (Activity Group)
  - Profile

  For more information, see Chapter 8, “Implementing the Preconfigured Entitlements,” on page 47.
- Supports Role-Based Entitlements if you use the Role-Based Entitlements fan-out configuration for roles. Profiles are not supported.
- Supports Account Tracking, which is a feature of the Novell® Compliance Management Platform. For more information, see the Novell Compliance Management Platform Web site (http://www.novell.com/products/compliancemanagementplatform/).
- Supports the Roles Mapping Administrator, which is a feature of the Novell Compliance Management Platform extension for SAP environments. For more information, see the Novell Compliance Management Platform extension for SAP environments Web site (http://www.novell.com/products/compliancemanagementplatform/sap).

4.2 Upgrading the Driver

The SAP User Management (JCo 3) driver has had significant changes for this release. The changes do not make it possible to upgrade the driver. If you want to use the new features in the driver, use the following process:

1. Create a new driver in the same driver set as the old driver.
2. Move any custom policies from the old driver to the new driver.
3. Stop the old driver.
4. Start and test the new driver.
5. To re-associate the user object, do a migration. For more information, see “Synchronizing Objects” in the *Identity Manager 3.6 Common Driver Administration Guide*.

   The new associations follows the new format. The new driver is backward compatible with the old association format.
6. After everything is working with the new driver, delete the old driver.

Configuring the SAP System

5

You must configure the SAP system parameters to enable Application Link Enabling (ALE) and Central User Administration (CUA) processing of USERCLONE IDocs if you want to publish real-time changes of SAP User data to the Identity Vault. Before you continue, make sure you have sufficient rights to configure the distribution model and to distribute user data via ALE.

5.1 Clients and Logical Systems

In the SAP configuration for the driver, a logical system is a representation of either a SAP system or an external system. The logical system is used to distribute data to and from SAP. To use ALE, every SAP system needs to have a base logical system associated with a client. There is a one-to-one relationship between the client and the logical system.

The driver uses an outbound ALE interface. In an outbound ALE interface, the base logical system becomes the *sender* for outbound messages and the *receiver* of inbound messages. A SAP user is likely logged into the base logical system/client when making changes to the database (for example, modifying User profiles or logon preferences). A logical system/client must also be defined for the receiving client. This logical system acts as the receiver of outbound messages.

5.2 Defining Sending and Receiving Systems

In order to distribute data between systems you must first define both the sending and receiving systems as unique logical systems.

For this particular solution, we recommend defining two logical systems. One logical system represents the driver and acts as the *receiver* system. The other logical system represents the SAP system and acts as the *sender* system. Because only one of these clients is used as a data source (that is, the client/logical system where SAP User data is stored and “actions” occur), there is no need to assign a client to the receiving logical system.

NOTE: Depending on your current SAP environment, you might not need to create a logical system. You might only need to modify an existing Distribution Model by adding the USERCLONE message type to a previously configured Model View. For more information, see “Creating a Distribution Model” on page 26.

It is important, however, that you follow SAP's recommendations for logical systems and configuring your ALE network. The following instructions assume that you are creating new logical systems and a new model view.

5.2.1 Creating a Logical System

1. In SAP, enter transaction code `BD54`.
2. Click *New Entries*.
3. Type an easily identifiable name to represent the SAP *sender* system.

   SAP recommends the following format for logical systems representing R/3 clients: *systemID*CLNT*client number* (such as ADMCLNT100).
4. Type a description for the logical system (such as Central System for SAP User Distribution).
5. Add a second logical system name to represent the Identity Manager external *receiver* system (such as DRVCLNT100).
6. Type a description for the logical system (such as Identity Manager User Management Integration).
7. Save your entries.

5.2.2 Assigning a Client to the Logical System

1. In SAP, enter transaction code `SCC4`.
2. Click *Table View* > *Display* > *Change* to switch from display to change mode.
3. Select the client from which you want User information distributed (such as 100).
4. Click *Goto* > *Details* > *Client Details*.
5. In the *Logical System* field, browse to and select the *sender* logical system you want to assign to this client (such as ADMCLNT100).
6. Save your entry.

5.3 Creating a Distribution Model

The distribution model contains essential information about message flow. The model view defines the systems that will communicate with each other and the messages that will flow between them. The distribution model forms the basis of distribution and controls it directly.

To create a distribution model:

1. Verify that you are logged in to the sending system/client.
2. In SAP, enter transaction code `BD64`. Ensure that you are in Change mode (click *Table View* > *Display* > *Change*.)
3. Click *Edit* > *Model View* > *Create*.
4. Type the short text to describe the distribution model (such as Client 100 Distribution to Identity Manager).
5. Type the technical name for the model (such as SAP2IDM).
6. Accept the default start and end dates or specify valid values. Click the check mark icon to save your entry.

7 Select the view you created, then click *Add BAPI*.

8 In the *Sender/Client* field, type the name of the *sender* logical system (such as ADMCLNT100).

9 In the *Receiver/Client* field, type the name of the *receiver* logical system (such as DRVCLNT100).

10 In the *Obj. Name/Interface* field, add the USER object name.

Ensure that you add the USER object name with all capital letters.

11 In the *Method* field, add Clone.

12 Click the check mark icon to save the BAPI.

13 Select the SAP2IDM model view.

14 Click *Add BAPI*.

15 Define the sender (logical system ADMCLNT100).

16 Define the receiver (logical system DRVCLNT100).

17 In the *Obj. Name/Interface* field, add the UserCompany object name.

18 In the *Method* field, add Clone.

19 Click the check mark icon to save your BAPI entries.

20 Save the Distribution Model entries.

5.4 Creating a Port Definition

The port is the communication channel to which IDocs are sent. The port describes the technical link between the sending and receiving systems.

The driver can be configured to support a connection via a TRFC port or to consume IDocs distributed via a File port. The default driver configuration assumes that you use the TRFC port configuration.

- Section 5.4.1, “Creating a TRFC Port Definition,” on page 27
- Section 5.4.2, “Creating a File Port Definition,” on page 28

5.4.1 Creating a TRFC Port Definition

A Transactional Remote Function Call (TRFC) can be used in the integration solution. IDocs are transferred to a specified application process (such as the driver) via the SAP Gateway.

Complete the following two tasks to create a TRFC port definition:

- “Creating the RFC Destination” on page 27
- “Creating the TRFC Port Definition” on page 28

Creating the RFC Destination

If you are distributing data to multiple drivers, each driver must have a unique RFC destination and program ID.

1 In SAP, enter transaction code `SM59`.

2 Click the *Create* icon.

3 Name the RFC destination (use the driver's logical system name, such as, DRVCLNT100.)

4 Select *T* as the connection type (for a TCP/IP connection.)

5 Add a description for the destination (such as JCo Server in IDM User Driver.)

6 Save your entry.

7 Select the option for *Registration* or *Registered Server Program*. Type the program ID to be used for the driver. In the default driver configuration, this value is set to *IDMUser100*.

8 (Conditional) If the SAP server is configured to use a Unicode* database, complete the following steps:

8a Select the *Special Options* tab.

8b Select *Unicode*.

9 Save your entry.

Creating the TRFC Port Definition

If you are distributing data to multiple drivers, each driver must have a unique TRFC port.

1 In SAP, enter transaction code *WE21*.

2 Select *Transactional RFC*, then click the *Create* icon.

3 Select *Own Port Option Name*.

3a Type a port name (such as IDMPORT).

3b Type a description for the port definition (such as Port to IDM User Driver).

3c Select a version (such as IDoc record types SAP release 4.X)

3d Specify the RFC destination. This is the name of the RFC destination representing the driver (such as DRVCLNT100.)

4 Save your entry.

5.4.2 Creating a File Port Definition

A file port can be used in the integration solution. IDocs are transferred to a file in a specified file system location accessible by the SAP host system.

If you are distributing data to multiple drivers, each driver must have a unique file port.

1 In SAP, type transaction code `WE21`.

2 Select *File*, then click the *Create* icon.

2a Type a port name (such as IDMFILE).

2b Type a port description (such as File Port to IDM User Driver).

2c Select a version (such as SAP release 4.X).

3 Define the outbound file:

3a Select the physical directory. This is the directory where you want IDocs placed. You might need to create this directory.

Type the directory where the outbound files are written, for example: `\\sapdev\nov\sys\global\sapndsconnector`.

3b Type the function module name. This names the IDoc file in a specific format. Use the following format: `EDI_PATH_CREATE_CLIENT_DOCNUM`.

4 Save your changes.

You do not need to configure the other three tabs for the port properties (outbound:trigger, inbound file, and status file).

5.5 Generating Partner Profiles

The system automatically generates a partner profile or you can manually maintain the profile.

NOTE: If you are using an existing distribution model and partner profile, you do not need to generate a partner profile. Instead, you can modify it to include the USERCLONE BAPI.

- Section 5.5.1, "Generating a Profile," on page 29
- Section 5.5.2, "Modifying the Port Definition," on page 29

5.5.1 Generating a Profile

1. In SAP, enter transaction code `BD82`.
2. Select the *Model View*. This should be the Model View previously created in "Creating a Distribution Model" on page 26.
3. Ensure that the *Transfer IDoc Immediately* and *Trigger Immediately* option buttons are selected.
4. Click the *Execute* icon.

   When the status screen appears, ignore any red error or warning messages related to the driver's logical system.

5.5.2 Modifying the Port Definition

The port definition might have been generated incorrectly. For your system to work properly, you might need to modify the port definition.

1. In SAP, enter transaction code `WE20`.
2. Select *Partner Type LS*.
3. Select your *receiver* logical system (such as DRVCLNT100).
4. Click the *Create Outbound Parameter* icon, then select message type *USERCLONE*.
5. Modify the receiver port so it is the *file* or *TRFC port name* you created earlier (such as IDMPORT or IDMFILE).
6. Under *Output Mode*, select *Transfer IDoc Immediately* to send IDocs immediately after they are created.
7. In the IDoc Type section, select the *Basic type* and the appropriate *USERCLONE*:
   - For SAP 4.5, select USERCLONE01
   - For SAP 4.6a, select USERCLONE02

- For SAP 4.6c, select USERCLONE03
- For SAP 6.10, select USERCLONE04
- For SAP 6.20 or greater, select USERCLONE05

8 Save your entries.

NOTE: The following procedures are necessary only if you want to distribute company address data.

---

9 Click the *Create Outbound Parameter* icon, then select message type *CCLONE*.

10 Modify the receiver port so it is the *file* or *TRFC port name* you created earlier (such as IDMPORT or IDMFILE.)

11 (Conditional) If you are using a TRFC port, modify the packet size. Select *Packet Size = 1*.

12 Under *Output Mode*, select *Transfer IDoc Immediately* to send IDocs immediately after they are created.

13 In the *IDoc type* section, select *Basic type* and the appropriate *CCLONE*. (For all SAP versions, select *CCLONE01*.)

14 Save your entries.

5.6 Activating Central User Administration

Central User Administration (CUA) is the process that activates the distribution model.

1 In SAP, enter transaction code `SCUA`.

2 In the Maintain System Landscape dialog box, select the distribution *Model View* previously created (such as SAP2IDM).

3 Save your entry.

You might see a message stating `Unable to distribute the system landscape to system IDMDRV`. This is an informative message and is not an error or issue of concern.

On some versions of SAP, all systems in the distribution, including the Identity Manager driver, must be accessible during this step. If a TRFC port is being used for the driver Publisher channel, the driver should be running to ensure connectivity and completion of the CUA configuration.

5.7 Creating a Communication (CPIC) User

Users are client-independent. For each client that uses the driver, a system user with CPIC access must be created.

1 In SAP, enter transaction code `SU01`.

2 From *User Maintenance*, enter a username in the User dialog box (such as IDM_CPIC), then click the *Create* icon.

3 Click the *Address* tab, then type data in the last name fields (Last_IDM).

4 Click the *Logon Data* tab, then define the *initial password* and set the user type to *CPIC* (Communication).

5 Click the *Profiles* tab, then add the *S_A.CPIC profile*. The driver must also have sufficient rights to perform required operations, which might include *SAP_ALL* and *SAP_NEW* depending on your company's system security policy.

We recommend using the most restrictive rights possible.

6 Click the *Systems* tab. Add the *logical name* of the *sender* system (such as ADMCLNT100). This enables the CPIC user to authenticate to the client system.

7 Click *Save*.

NOTE: Initially, you can create a dialog user to test your SAP system configuration. If there are processing problems, you can analyze the dialog user in the debugger. You should also log into the SAP system once to set this user's password. After the system is tested and works properly, you should switch to a CPIC user for security measures.

5.8 Configuring SAP Gateway Ports

The SAP system expects to use ports 3300 through 3399 for SAP gateways. If the Publisher channel of the SAP User driver connects as a JCo server and that server is configured to connect to a gateway on System 01, then SAP tries to connect to the driver on port 3301. If the System is 11, then port 3311 is expected.

The automatic configuration of these ports is prohibited in SUSE® Linux Enterprise Server. The ports must be manually configured in the `/etc/services` file.

For example, if the SAP System is 01, the following entry must be added to the `/etc/services` file.:

```
sapgw01   3301/tcp  # SAP Gateway for IDM User Driver JCO
```

Testing the SAP JCo Client Connection

6

The driver uses the SAP Java Connector (JCo 3) and Business Application Programming Interface (BAPI) technologies to connect to and integrate data with the Identity Vault. The SAP JCo is a SAP client that creates service connections to a SAP application server. After the driver is connected to the SAP application server, it calls methods on business objects within the SAP application server via BAPI.

The SAP Java Connector Test utility enables you to check for JCo installation and configuration issues. Use the JCo Test utility to validate installation and connectivity to the SAP JCo client, as well as testing for accessibility to the BAPIs used by the driver.

Ensure that you are using JDK*/JRE* version 1.6 or later, and JCo version 3.0.2 or later:

6.1 About the Utility

The JCo Test utility completes the following checks:

- Ensures the presence of the file `sapjco3.jar` file, which contains the exported JCo interface.
- Ensures that the JCo native support libraries are properly installed.
- Ensures that connection parameters to the SAP target system are correct.
- Ensures that the authentication parameters to the SAP target system are correct.
- Ensures that the selected language code is valid.
- Ensures that the BAPIs used by the driver are present as expected for the version of the SAP target system.

The following sections help you use the utility.

6.1.1 Utility Prerequisites

Before you run the JCo Test utility, you must install the SAP JCo client for the desired platform. The JCo can only be obtained from the SAP Service Marketplace Web site (http://www.sap-ag.de/services). The download is free to any SAP software customer or development partner, but you are required to log in.

In order to configure the driver, you must first download the SAP JCo 3 and install it. For installation instructions, refer to the documentation accompanying the SAP JCo.

Follow the installation instructions for your platform. Each installation requires you to set one or two environment variables, such as CLASSPATH for the `sapjco3.jar` file location. For the UNIX platforms, set either the LD_LIBRARY_PATH or LIBPATH variables for the location of native support libraries. Ensure that these variables are set in the shell environment to run this test and for the subsequent use of the Identity Manager Driver for User Management of SAP Software.

You must also make sure that you have your PATH environment variable set to include the path to your Java executable file. For Win32* platforms, the environment variables are set via the System configuration in the Control Panel. On UNIX systems, edit the appropriate `.profile` or `.bash_profile` to include and export these path variables.

6.1.2 Components

The JCo Test utility consists of the `UserJCO3Test.class` file. The format of an execution batch or script file varies, depending on the platform on which the JCo client has been installed.

The basic content of the file includes a path to the Java executable (or just `java` if your PATH is appropriately configured), and the name of the `UserJCO3Test.class` file. A sample UNIX script file and Win32 batch file are listed below, where `sapjco3.jar` is in the executable directory of the `UserJCOTest3.class` file and the batch file:

```
Win32 jcotest.bat file
java -classpath %CLASSPATH%;. UserJCO3Test

Unix jcotest file
java UserJCO3Test
```

You must use proper slash notation when specifying pathnames, and you must use the proper classpath delimiter for the platform. You must also remember that the name of the `sapjco3.jar` file is case-sensitive on UNIX platforms and that the name of the test class, UserJCO3Test, must be specified with proper case for any platform.

6.1.3 Running and Evaluating the Test

- "Running the Test" on page 34
- "Evaluating the Test" on page 35
- "Post-Test Procedures" on page 36

Running the Test

To run the JCo Test utility on a Win32 platform:

1. From Windows Explorer, double-click `UserJCO3Test.bat`.
   or
   From a command prompt, run the `UserJCO3Test.bat` script.

To run the JCo Test utility on a UNIX platform:

1. From your preferred shell, run the `userjco3test` script file.

NOTE: When you run the test program, an error message might appear before any test output is displayed. This indicates an improper installation of the JCo client components. The error messages are documented for each platform in "Understanding Test Error Messages" on page 36.

Evaluating the Test

If the JCo client is installed properly, the following output is displayed:

```
**The SAP JCO client installation has been verified to be correct.

Version of the JCO-library: version information

Input SAP Server Connection Information
---------------------------------------
```

You then receive a series of prompts for connection and authentication information. All data must be provided unless a default value, identified by [] delimiters, is provided. Failure to fill in a response value to each prompt ends the test. Enter the following when prompted:

- Application server name or IP address
- System number [00]
- Client number
- User
- User password
- Language code [EN]

The values you provide are the same values that could be used to authenticate via the SAPGUI client. Based on the validity of the input, the test either displays error messages with solution suggestions or runs to completion. At the end of the test, a status message displays. If the test indicates full functionality as required by the driver, the following status message appears (it describes valid values that can be used as the configuration parameters for the driver):

```
JCO Test Summary
----------------
The following parameters might be used for SAP User Management Driver
Configuration

Authentication ID: Username
Authentication Context: SAP Host Name/IP Address
Application Password: User password
SAP System Number: System Number
SAP User Client Number: Client Number
SAP User Language: Language Code
SAP System ID: System ID
Character Set Encoding: Encoding
All required BAPI and RFC Functionality has been verified.
```

If the test indicates that the functionality required by the driver is not available, the following status message is displayed:

```
JCO Test Summary
----------------
BAPI and RFC support is not complete. Review function list for details.
```

Full driver functionality is not possible if all functions are not available on the target SAP server. Patch the SAP server as needed.

Post-Test Procedures

After the JCo Test utility has successfully passed all tests, you can then begin to configure the driver. Make sure that the `sapjco3.jar` file is copied to the location where the `sapumshim.jar` file has been installed.

On UNIX systems, ensure that the environment variables used for the successful completion of the User JCo Test are also in the environment of the driver. If these conditions are met, there should be no driver errors that are related to the JCo.

6.1.4 Understanding Test Error Messages

Use the information in this section to analyze error messages that might display during the User JCo Test.

Table 6-1 *General Errors*

Error Message	Problem
`Caught Exception during connection: java.ang.Exception: SAP Connection Exception: com.sap.coon.jco.JCoException: (102) RFC_ERROR_COMMUNICATION: Connect to SAP gateway failed`	Bad address or system number.
`Caught Exception during connection: java.lang.Exception: SAP Connection Exception: com.sap.conn.jco.JCoException: (101) RFC_ERROR_PROGRAM: 'client' needs to be a three digit number string instead of '<input>'`	Bad client number format.
`Caught Exception during connection: java.lang.Exception: SAP Connection Exception: com.sap.conn.jco.JCoException: (101) RFC_ERROR_PROGRAM: 'sysnr' needs to be a two digit number string instead of '<input>'`	Bad number format.
`Caught Exception during connection: java.lang.Exception: SAP Connection Exception: com.sap.conn.jco.JCoException: (109) RFC_ERROR_CANCELLED: Handle closed pending`	Invalid credentials (JCo 3.0.1).
`Caught Exception during connection: java.lang.Exception: SAP Connection Exception: com.sap.conn.jco.JCoException: (103) RFC_ERROR_LOGON_FAILURE: Name or password is incorrect (repeat logon) on <host> sysnr <system number>`	Invalid credentials (JCo 3.0.2+).

Error Message	Problem
`Caught Exception during connection: java.lang.Exception: SAP Connection Exception: com.sap.conn.jco.JCoException: (103) RFC_ERROR_LOGON_FAILURE: Selection one of the installed languages on <host> sysnr <system number>`	Invalid Language code.
`.java.lang.UnsatisfiedLinkError: no sapjco3 in java.library.path`	Native middleware library not installed properly 3.0.1.
`Caught Exception during connection: java.lang.Exception: SAP Connection Exception: java.lang.NoClassDefFoundError: com.sap.conn.rfc.driver.CpicDriver`	
`java.lang.ExceptionInInitializerError: Error getting the version of the native layer: java.lang.UnsatisfiedLinkError: com.sap.conn.rfc.driverCpicDriver.nativeCpicGetVerstion([I)I Verify proper installation of JCo Native support libraries packaged with JCo client`	Exception while initializing JCo client 3.0.2+.

Creating a New Driver

7

After the SAP User Management driver files are installed on the server where you want to run the driver (see Chapter 3, “Installing the Driver Files,” on page 21), you can create the driver in the Identity Vault. You do so by importing the basic driver configuration file and then modifying the driver configuration to suit your environment. The following sections provide instructions:

- Section 7.1, “Using Designer to Create and Configure the Driver,” on page 39
- Section 7.2, “Using iManager to Create and Configure the Driver,” on page 42
- Section 7.3, “Activating the Driver,” on page 46

7.1 Using Designer to Create and Configure the Driver

The following sections provide steps for using Designer to create and configure a new SAP User Management driver. For information about using iManager to accomplish these tasks, see Section 7.2, “Using iManager to Create and Configure the Driver,” on page 42.

- Section 7.1.1, “Using Designer to Import the Driver Configuration File,” on page 39
- Section 7.1.2, “Using Designer to Adjust the Driver Settings,” on page 40
- Section 7.1.3, “Using Designer to Deploy the Driver,” on page 41
- Section 7.1.4, “Using Designer to Start the Driver,” on page 42

7.1.1 Using Designer to Import the Driver Configuration File

Importing the SAP User Management driver configuration file creates the driver in the Identity Vault and adds the policies needed to make the driver work properly.

1. In Designer, open your project.
2. In the Modeler, right-click the driver set where you want to create the driver, then select *New* > *Driver* to display the Driver Configuration Wizard.
3. In the *Driver Configuration* list, select *SAP User Management CMP*, then click *Run*.
4. On the Import Information Requested page, fill in the following fields:

   Driver name: Specify a unique name for the driver in this driver set.

   System ID: Specify the SAP system ID of the SAP Application Server. The system ID is found in the SAP GUI status bar in the lower right corner of the main window.

   SAP System Number: Specify the SAP system ID of the SAP Application Server. This is the System Number in the SAP logon properties. The default value is 00.

   SAP User Client Number: Specify the client number on the SAP Application Server. This the *Client* field in the SAP logon screen.

   Logical System Name: If this is a central client, specify the name of the logical system as it is configured in SAP. If this is not a central client, specify a unique name for the logical system.

   Publisher IDoc Directory: Specify the file system location where the SAP User IDoc files are placed by the SAP ALE system (for a file port) or by the driver (for a TRFC port).

Default Reset Password: Specify a default password to be set for users when the driver resets a user's password in the SAP system. It is set during password changes if the user-supplied password is not accepted by the SAP server. This is only used if the driver resets the password.

Use User Account Entitlement: Select *True* if you have entitlements enabled in your environment. Select *False* if entitlements are not enabled. The SAP User Management driver contains preconfigured entitlements. For more information, see Chapter 8, "Implementing the Preconfigured Entitlements," on page 47.

Enable Account Tracking: Select *True* to enable Account Tracking, which is a feature of the Novell® Compliance Management Platform. For more information, see *Identity Manager 3.6 Driver for Sentinel 6.1 and the Identity Vault Collector Implementation Guide*.

Enable Role Mapping: Select *Yes* to enable the driver to work with the Role Mapping Administrator. For more information, see *Identity Manager Role Mapping Administrator 1.0 Installation and Configuration Guide*.

User Container: Specify the container where the users are stored. Use the slash format. The driver wizard automatically converts the DN in the dot format to the slash format.

If you are using a flat placement rule, this is the container where the users are place. If you are using a mirrored placement rule, this is the root container.

Driver is Local/Remote: Select whether the driver is running locally or is using the Remote Loader. For more information, see the *Identity Manager 3.6 Remote Loader Guide*.

SAP User ID: Specify the ID of the user the driver uses for SAP Logon. This is the *User* field in the SAP logon screen.

SAP User Password: Specify the password the driver users for SAP Logon. This is the *Password* field in the SAP logon screen.

SAP Application Server: Specify the hostname or IP address of the appropriate SAP Application Server. In the SAP logon properties it is referred to as the Application Server.

5 Click *Next* to import the driver configuration.

At this point, the driver is created from the basic configuration file. To ensure that the driver works the way you want it to for your environment, you must review and modify (if necessary) the driver's default configuration settings.

6 To modify the default configuration settings, click *Configure*, then continue with the next section, Using Designer to Adjust the Driver Settings.

or

To skip the configuration settings at this time, click *Close*. When you are ready to configure the settings, continue with the next section, Using Designer to Adjust the Driver Settings.

7.1.2 Using Designer to Adjust the Driver Settings

The information specified on the Import Information Requested page is the minimum information required to import the driver. However, the base configuration might not meet your needs, or you might need to change the configuration you created when you imported the driver.

- You might need to change whether the driver is running locally or remotely.
- You might need to change whether the driver is using entitlements.

If you need to do additional configuration for the driver, you must access the properties page of the driver. If you do not have the Driver Properties page displayed:

1. In Designer, open your project.
2. In the Modeler, right-click the driver icon or the driver line, then select *Properties*.

   This opens the properties page for the driver. Use the information in Appendix A, "Driver Properties," on page 55 to adjust the configuration.
3. Continue with Section 7.1.3, "Using Designer to Deploy the Driver," on page 41, to deploy the driver into the Identity Vault.

7.1.3 Using Designer to Deploy the Driver

After a driver is created in Designer, it must be deployed into the Identity Vault, because Designer is an offline tool.

1. In Designer, open your project.
2. In the Modeler, right-click the driver icon or the driver line, then select *Live* > *Deploy*.
3. If you are authenticated to the Identity Vault, skip to Step 5; otherwise, specify the following information to authenticate:
   - **Host:** Specify the IP address of DNS name of the server hosting the Identity Vault.
   - **Username:** Specify the DN of the user object used to authenticate to the Identity Vault.
   - **Password:** Specify the user's password.
4. Click *OK*.
5. Read through the deployment summary, then click *Deploy*.
6. Read the successful message, then click *OK*.
7. Click *Define Security Equivalence* to assign rights to the driver.

   The driver requires rights to objects within the Identity Vault. The Admin user object is most often used to supply these rights. However, you might want to create a DriversUser (for example) and assign security equivalence to that user. Whatever rights that the driver needs to have on the server, the DriversUser object must have the same security rights.

   7a Click *Add*, then browse to and select the object with the correct rights.

   7b Click *OK* twice.
8. Click *Exclude Administrative Roles* to exclude users that should not be synchronized.

   You should exclude any administrative User objects (for example, Admin and DriversUser) from synchronization.

   8a Click *Add*, then browse to and select the user object you want to exclude.

   8b Click *OK*.

   8c Repeat Step 8a and Step 8b for each object you want to exclude.

   8d Click *OK*.
9. Click *OK*.

7.1.4 Using Designer to Start the Driver

When a driver is created, it is stopped by default. To make the driver work, you must start the driver and cause events to occur. Identity Manager is an event-driven system, so after the driver is started, it won't do anything until an event occurs.

To start the driver after the driver is deployed:

1. In Designer, open your project.
2. In the Modeler, right-click the driver icon or the driver line, then select *Live* > *Start Driver*.

For information about management tasks with the driver, see Chapter 9, "Managing the Driver," on page 51.

7.2 Using iManager to Create and Configure the Driver

The following sections provide steps for using iManager to create and configure a new SAP User Management driver. For information about using Designer to accomplish these tasks, see Section 7.1, "Using Designer to Create and Configure the Driver," on page 39.

- Section 7.2.1, "Using iManager to Import the Driver Configuration File," on page 42
- Section 7.2.2, "Using iManager to Configure the Driver Settings," on page 45
- Section 7.2.3, "Using iManager to Start the Driver," on page 45

7.2.1 Using iManager to Import the Driver Configuration File

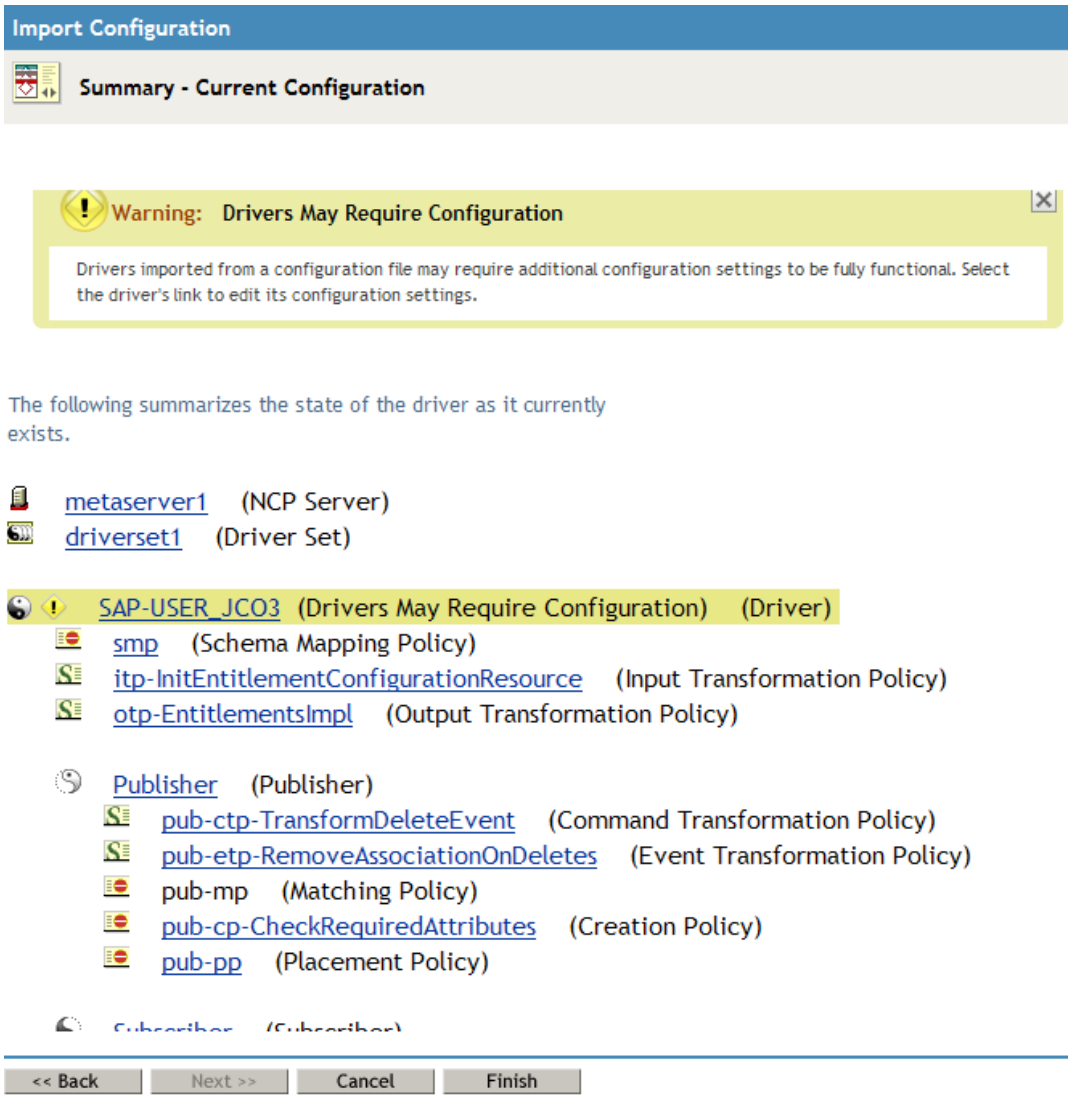
Importing the SAP User Management driver configuration file creates the driver in the Identity Vault and adds the policies needed to make the driver work properly.

1. In iManager, click to display the Identity Manager Administration page.
2. In the *Administration* list, click *Utilities* > *Import Configuration* to launch the Import Configuration Wizard.
3. Use the following information to complete the wizard and create the driver.

Prompt	Description
Where do you want to place the imported configuration?	You can add the driver to an existing driver set, or you can create a new driver set and add the driver to the new set. If you choose to create a new driver set, you are prompted to specify the name, context, and server for the driver set.
Import a configuration into this driver set	Use the default option, *Import a configuration from the server (.XML file)*. In the *Show* field, select *Identity Manager 3.6 configurations*. In the *Configurations* field, select the `SAPBL-CMP-IDM3_6_0-V1.xml` file.
Driver name	Specify a name that is unique within the driver set.
System ID	Specify the SAP system ID of the SAP Application Server.

Prompt	Description
SAP System Number	Specify the SAP system number on the SAP Application Server. This is the System Number in the SAP logon properties.
SAP User Client Number	Specify the client number that is used on the SAP Application Server. This is the *Client* field in the SAP logon screen.
Publisher IDoc Directory	Specify the file system location where the SAP User IDoc files are placed by the SAP ALE system (for a file port) or by the driver (for a TRFC port).
Use User Account Entitlement	Select *True* if you have entitlements enabled in your environment. Select *False* if entitlements are not enabled. The SAP User Management driver contains preconfigured entitlements. For more information, see Chapter 8, "Implementing the Preconfigured Entitlements," on page 47.
Enable Account Tracking	Select *True* to enable Account Tracking, which is a feature of the Novell Compliance Management Platform. For more information, see the *Identity Manager 3.6 Driver for Sentinel 6.1 and the Identity Vault Collector Implementation Guide*.
Enable Role Mapping	Select *Yes* to enable the driver to work with the Role Mapping Administrator. For more information, see the *Identity Manager Role Mapping Administrator 1.0 Installation and Configuration Guide*.
User Container	Specify the container where the users are stored. Use the slash format. The driver wizard automatically converts a DN in the dot format to the slash format. If you are using a flat placement rule, this is the container where the users are placed. If you are using a mirrored placement rule, this is the root container.
Driver is Local/Remote	Select whether the driver is running locally or is using the Remote Loader. For more information, see the *Identity Manager 3.6 Remote Loader Guide*.
SAP User ID	Specify the ID of the user the driver uses for SAP Logon. This is the *User* field in the SAP logon screen.
SAP User Password	Specify the password the driver users for SAP Logon. This is the *Password* field in the SAP logon screen.
SAP Application Server	Specify the hostname or IP address of the appropriate SAP Application Server. In the SAP logon properties it is referred to as the Application Server.
Define Security Equivalences	The driver requires rights to objects within the Identity Vault. The Admin user object is most often used to supply these rights. However, you might want to create a DriversUser (for example) and assign security equivalence to that user. Whatever rights that the driver needs to have on the server, the DriversUser object must have the same security rights.
Exclude Administrative Roles	You should exclude any administrative User objects (for example, Admin and DriversUser) from synchronization.

When you finish providing the information required by the wizard, a Summary page similar to the following is displayed.



At this point, the driver is created from the basic configuration file. To ensure that the driver works the way you want it to for your environment, you must review and modify (if necessary) the driver's default configuration settings.

4 To modify the default configuration settings, click the linked driver name, then continue with the next section, Using iManager to Configure the Driver Settings.

or

To skip the configuration settings at this time, click *Finish*. When you are ready to configure the settings, continue with the next section, Using iManager to Configure the Driver Settings.

WARNING: Do not click *Cancel* on the Summary page. This removes the driver from the Identity Vault and results in the loss of your work.

7.2.2 Using iManager to Configure the Driver Settings

The information specified during the creation of the driver is the minimum information required to import the driver. However, the base configuration might not meet your needs.

- You might need to change whether the driver is running locally or remotely.
- You might need to change whether the driver is using entitlements.

To configure the settings:

1. Make sure the Modify Object page for the SAP User Management driver is displayed in iManager. If it is not:
   - **1a** In iManager, click  to display the Identity Manager Administration page.
   - **1b** Click *Identity Manager Overview*.
   - **1c** Browse to and select the driver set object that contains the new SAP User Management driver.
   - **1d** Click the driver set name to access the Driver Set Overview page.
   - **1e** Click the upper right corner of the driver, then click *Edit properties*.

     This displays the properties page of the driver.
2. Review the settings for the driver parameters, global configuration values, or engine control values. The configuration settings are explained in Appendix A, “Driver Properties,” on page 55.
3. After modifying the settings, click *OK* to save the settings and close the Modify Object page.
4. (Conditional) If the driver’s Summary page for the Import Configuration Wizard is still displayed, click *Finish*.

You do not need to deploy the driver because iManager is live tool. It works directly with the Identity Vault.

7.2.3 Using iManager to Start the Driver

When a driver is created, you must start the driver. Identity Manager is an event-driven system, so after the driver is started, it processes events as they occur.

To start the driver after the additional configuration is completed:

1. In iManager, click  to display the Identity Manager Administration page.
2. Click *Identity Manager Overview*.
3. Browse to and select the driver object that contains the SAP User Management driver you want to start.
4. Click the driver set name to access the Driver Set Overview page.
5. Click the upper right corner of the driver, then click *Start driver*.

For information about management tasks with the driver, see Chapter 9, “Managing the Driver,” on page 51.

7.3 Activating the Driver

The extension for SAP environments contains its own activation that you receive from the customer center. The drivers that are part of the extension for SAP environments require this new activation within 90 days of creating the driver. Otherwise, the driver stops working.

For more information on activation, refer to "Activating Novell Identity Manager Products" in the *Identity Manager 3.6 Installation Guide*.

Implementing the Preconfigured Entitlements

8

Entitlements are a way to set up a list of criteria to grant or revoke users, groups, and roles access to resources in SAP systems. The SAP User Management (JCo 3) driver comes with three preconfigured entitlements, which work with an entitlement agent. The entitlement usage is controlled through Global Configuration Values (GCVs) on the driver.

This section explains each preconfigured entitlement, how to enable the entitlement, and what an entitlement agent is.

8.1 Entitlement Agents

An entitlement agent grants an entitlement to a user when criteria are met. You must create and configure one of the following entitlement agents for use with the preconfigured entitlements in the SAP User Management (JCo 3) driver.

- **Role-Based Entitlements (RBE):** Manages entitlements based on the events that occur in the Identity Vault. It is used for simple automation. For example, when a user is added to the HR system, the user is automatically granted accounts in other systems. This requires an Entitlements driver created with policies that define the desired action. For instructions, see the “Checklist for Implementing Entitlements” in the *Identity Manager 3.6 Driver for Role-Based Entitlements: Implementation Guide*.
- **Workflow:** Manages entitlements through provisioning workflows. It is used when approvals are required. For example, when a user is added to the HR system, the manager must approve the accounts for the user. This requires a workflow that contains the desired actions. For instructions, see *“Configuring and Managing Provisioning Workflows”* (http://www.novell.com/documentation/idmrbpm361/agpro/index.html?page=/documentation/idmrbpm361/agpro/data/b88n0ju.html).
- **Roles Based Provisioning Module (RBPM):** Manages entitlements based on roles that are assigned to users. For example, when a user is added to the Accounting role, the user automatically receives all accounts associated with the Accounting role. This requires that the Roles Based Provisioning Module be installed and configured for roles. For installation instructions, see the “Installation Checklist” (http://www.novell.com/documentation/idmrbpm361/install/data/bf8up4w.html) for the Roles Based Provisioning Module.

If you are using the fan-out configuration of the driver, the RBPM is the only supported entitlement agent.

8.2 Preconfigured Entitlements

- Section 8.2.2, “Role (Activity Group) Entitlement,” on page 48
- Section 8.2.3, “Profile Entitlement,” on page 49

8.2.1 User Account Entitlement

Most Identity Manager drivers support the User Account entitlement as an entitlement that can only be granted once and does not take any parameters. It is like an on/off switch for the account in the application. There is a one-to-one relationship between the User Account entitlement and one account in the application. The fan-out configuration requires that a single User object in the Identity Vault be granted multiple User Account entitlements for accounts in different systems. A parameter is added to the User Account entitlement, so each time the entitlement is granted it is a unique event. The parameter indicates the system where the account is granted.

This entitlement also has Subscriber policies that define actions to take when the entitlement is revoked. When an entitlement is revoked, there are two actions that can be taken:

- **Disable:** When the entitlement is revoked, the user account is locked in the connected SAP system.
- **Delete:** An attempt is made to delete the account.

To enable this entitlement:

1. Verify that an entitlement agent that contains your list of criteria to grant or revoke a user’s access to resources in SAP exists. For more information, see Section 8.1, “Entitlement Agents,” on page 47.
2. If you have an existing driver, skip to Step 3; otherwise, during the creation of a driver, select *True* for the *Use User Account Entitlement* option.

   This sets the entitlement GCVs to True.
3. Access the GCVs page for the driver.
4. Select *show* for the *Show entitlements configuration* option.
5. Enable the user account entitlement by selecting *true*.
6. Select what to do when the user account entitlement is revoked by indicating whether you want the account disabled, deleted, or nothing done to the account.
7. Click *OK* to save the changes.

The entitlement is now enabled. However, a new user account is not provisioned until the entitlement is granted through one of the entitlement agents.

8.2.2 Role (Activity Group) Entitlement

The Role (activity group) entitlement adds users to the SAP roles (activity groups), and it is enabled by default if you selected to use entitlements during the creation of the driver. This entitlement contains parameters, which means it can be granted multiple times. The parameters for the entitlement are roles returned by the entitlement query to the SAP system. When the entitlement is granted with an SAP ActivityGroup as the parameter, the SAP User is added to the corresponding role.

For example, assume there is an RBPM role that contains two role entitlements, one with a parameter of User Admins and the second with a parameter of HR Admin. When the RBPM role is granted and the entitlements are granted, the user is added to the User Admins and the HR Admin roles in the SAP system.

The parameter for this entitlement differs depending upon which entitlement agent you used. Only one agent, the RBPM, supports the fan-out configuration.

- **RBE:** <AG name>

  For example: User Admins

  This format does not support the fan-out configuration to individual systems or to the CUA child systems.

- **RBPM:** AG=<AG name>|LSNAME=<LSNAME>

  For example: AG=User Admins|LSNAME=S7ICLNT800

  This format supports the fan-out configuration to individual systems, including the CUA child systems.

With this difference, multiple parameters are supported for multiple systems.

To manually enable this entitlement:

1. Verify that an entitlement agent that contains your list of criteria to grant or revoke role (ActivityGroup) assignments in SAP exists. For more information, see Section 8.1, “Entitlement Agents,” on page 47.
2. If you have an existing driver, skip to Step 3; otherwise, during the creation of a driver, select *True* for the *Use User Account Entitlement* option.

   This sets the entitlement GCVs to True.
3. Access the GCVs page for the driver.
4. Select *True* for the *Use Role (ActivityGroup) Entitlement* option.
5. Click *OK* to save the changes.

The entitlement is now enabled. When a user is granted a role through one of the entitlement agents, the associated ActivityGroup assignments are automatically made for the user by the SAP User Management (JCo 3) driver.

8.2.3 Profile Entitlement

The Profile entitlement adds users to the SAP profiles, and it is enabled by default. This entitlement contains parameters, which means it can be granted multiple times. The parameters for the entitlement differs, depending upon which entitlement agent you used. Only one agent supports the fan-out configuration.

- **RBE:** <Profile name>

  For example: SAP_NEW

  This format does not support the fan-out configuration to individual systems or to the CUA child systems.

- **RBMP:** PROF=<profile name>|LSNAME=<LSNAME>

For example: PROF=SAP_NEW|LSNAME=ADMCLNT301

This format supports the fan-out configuration to individual systems including the CUA child systems.

To manually enable this entitlement:

1. Verify that an entitlement agent that contains your list of criteria to grant or revoke profile assignments in SAP exists. For more information, see Section 8.1, “Entitlement Agents,” on page 47.
2. If you have an existing driver, skip to Step 3; otherwise, during the creation of a driver, select *True* for the *Use User Account Entitlement* option.

   This sets the entitlement GCVs to True.
3. Access the GCVs page on the driver.
4. Select *True* for the *User Profile Entitlement* option.
5. Click *OK* to save the changes.

The entitlement is now enabled. When a user is granted a profile entitlement through one of the entitlement agents, the SAP User Management (JCo 3) driver automatically adds the user to the associated profiles.

Managing the Driver

9

As you work with the SAP User Management (JCo 3) driver, there are a variety of management tasks you might need to perform, including the following:

- Starting, stopping, and restarting the driver
- Viewing driver version information
- Using Named Passwords to securely store passwords associated with the driver
- Monitoring the driver's health status
- Backing up the driver
- Inspecting the driver's cache files
- Viewing the driver's statistics
- Using the DirXML® Command Line utility to perform management tasks through scripts
- Securing the driver and its information
- Synchronizing objects
- Migrating and resynchronizing data

Because these tasks, as well as several others, are common to all Identity Manager drivers, they are included in one reference, the *Identity Manager 3.6 Common Driver Administration Guide*.

For information about securing your Identity Manager system, see the *Identity Manager 3.6 Security Guide*.

Troubleshooting the Driver

10

Viewing driver processes is necessary to analyze unexpected behavior. To view the driver processing events, use DSTrace. You should only use it during testing and troubleshooting the driver. Running DSTrace while the drivers are in production increases the utilization on the Identity Manager server and can cause events to process very slowly. For more information, see "Viewing Identity Manager Processes" in the *Identity Manager 3.6 Common Driver Administration Guide*.

Driver Properties

A

This section provides information about the Driver Configuration and Global Configuration Values properties for the SAP User Management driver. These are the only unique properties for this driver. All other driver properties (Named Password, Engine Control Values, Log Level, and so forth) are common to all drivers. Refer to "Driver Properties" in the *Identity Manager 3.6 Common Driver Administration Guide* for information about the common properties.

The information is presented from the viewpoint of iManager. If a field is different in Designer, it is marked with an icon.

A.1 Driver Configuration

In Designer:

1. Open a project in the Modeler.
2. Right-click the driver icon or line, then select click *Properties* > *Driver Configuration.*

In iManager:

1. In iManager, click to display the Identity Manager Administration page.
2. Open the driver set that contains the driver whose properties you want to edit:
   - **2a** In the *Administration* list, click *Identity Manager Overview*.
   - **2b** If the driver set is not listed on the *Driver Sets* tab, use the *Search In* field to search for and display the driver set.
   - **2c** Click the driver set to open the Driver Set Overview page.
3. Locate the SAP User Management (JCo 3) driver icon, then click the upper right corner of the driver icon to display the *Actions* menu.
4. Click *Edit Properties* to display the driver's properties page.

   By default, the properties page opens with the *Driver Configuration* tab displayed.

The Driver Configuration options are divided into the following sections:

A.1.1 Driver Module

The driver module changes the driver from running locally to running remotely or the reverse.

Table A-1 *Driver Modules*

Option	Description
Java	Used to specify the name of the Java class that is instantiated for the shim component of the driver. This class can be located in the `classes` directory as a class file, or in the `lib` directory as a `.jar` file. If this option is selected, the driver is running locally. The name of the Java class is: `com.novell.nds.dirxml.driver.sapumshim.SAPDriverShim`
Native	This option is not used with the SAP User Management driver.
Connect to Remote Loader	Used when the driver is connecting remotely to the connected system. Designer includes two suboptions: ◆ *Driver Object Password*: Specifies a password for the Driver object. If you are using the Remote Loader, you must enter a password on this page. Otherwise, the remote driver does not run. The Remote Loader uses this password to authenticate itself to the remote driver shim. ◆ *Remote Loader Client Configuration for Documentation*: Includes information on the Remote Loader client configuration when Designer generates documentation for the SAP User Management (JCo 3) driver.

A.1.2 Authentication

The authentication section stores the information required to authenticate to the connected system.

Table A-2 *Authentication Options*

Option	Description
Authentication ID	Specify an SAP account that the driver can use to authenticate to the SAP system. Example: `SAPUser`
Authentication Context or *Connection Information*	Specify the IP address or name of the SAP server the driver should communicate with.

Option	Description
Remote Loader Connection Parameters or *Host name* Port *KMO* *Other parameters*	Used only if the driver is connecting to the application through the Remote Loader. The parameter to enter is `hostname=xxx.xxx.xxx.xxx port=xxxx kmo=certificatename`, when the hostname is the IP address of the application server running the Remote Loader server and the port is the port the Remote Loader is listening on. The default port for the Remote Loader is 8090. The `kmo` entry is optional. It is only used when there is an SSL connection between the Remote Loader and the Metadirectory engine. Example: `hostname=10.0.0.1 port=8090 kmo=IDMCertificate`
Driver Cache Limit (kilobytes) or *Cache limit (KB)*	Specify the maximum event cache file size (in KB). If it is set to zero, the file size is unlimited. Click *Unlimited* to set the file size to unlimited in Designer.
Application Password or *Set Password*	Specify the password for the user object listed in the *Authentication ID* field.
Remote Loader Password or *Set Password*	Used only if the driver is connecting to the application through the Remote Loader. The password is used to control access to the Remote Loader instance. It must be the same password specified during the configuration of the Remote Loader on the connected system.

A.1.3 Startup Option

The startup option allows you to set the driver state when the Identity Manager server is started.

Table A-3 *Startup Options*

Option	Description
Auto start	The driver starts every time the Identity Manager server is started.
Manual	The driver does not start when the Identity Manager server is started. The driver must be started through Designer or iManager.
Disabled	The driver has a cache file that stores all of the events. When the driver is set to Disabled, this file is deleted and no new events are stored in the file until the driver state is changed to Manual or Auto Start.
Do not automatically synchronize the driver	This option applies only if the driver is deployed and was previously disabled. If this option is not selected, the driver re-synchronizes the next time it is started.

A.1.4 Driver Parameters

The Driver Parameters section lets you configure the driver-specific parameters. When you change driver parameters, you tune driver behavior to align with your network environment.

The parameters are presented by category:

- Table A-4, “Driver Settings,” on page 58
- Table A-5, “Subscriber Settings,” on page 60
- Table A-6, “Publisher Settings,” on page 61

Table A-4 *Driver Settings*

Parameter	Description

System ID	Specify the SAP system ID of the SAP application server. The system ID is found in the SAP GUI status bar located in the lower right corner of the main window.
	
	This parameter is used to generate the realm for Account Tracking. The system ID is usually a three-character string that uniquely identifies a SAP system in the SAP system landscape. The realm must be unique per application type.
	
	For example:
	
	`\<system ID>\<system number>\<client number>`
	`\S71\00\800`

SAP System Number	Specify the SAP system number of the SAP application server. This is referred to as the *System Number* in the SAP logon properties. The default value is 00.
SAP User Client Number	Specify the client number to be used on the SAP application server. This is referred to as the *Client* in the SAP logon screen.
SAP Client Type	Select the client type the driver is connecting to: ◆ **Non-CUA Client:** If the client you are connecting to is not a CUA central client and is it not CUA child client, select this option. ◆ **CUA Central:** If you are connecting to the CUA central client, select this option. ◆ **CUA Child:** If you are connecting to a CUA child client, select this option. The fan-out policies must know what type of client they are communicating to so they can generate the correct events. For example, most of the attributes in a CUA child client are synchronized through the CUA central client.

Parameter	Description
SAP Client Type > CUA Child > Logical System Name of CUA Central Client	This option is only displayed if you select *CUA Child*. Specify the logical system name of the CUA central client that manages this client. The fan-out policies must know which client is the central client of a CUA child client, so that they can generate correct events. For example, most of the attributes in a CUA child client are synchronized through the CUA central client.
SAP Client Type > CUA Child > Filter	This option is only displayed if you select *CUA Child*. Add an attribute name in the Identity Vault namespace that you want to synchronize directly to the CUA child client, instead of sending it to the CUA central client. This filter is evaluated after the driver's Subscriber filter is applied. For an attribute to encounter this filter, it must also be set to Subscribe or Notify in the regular driver filter. This filter is implemented in the Event Transformation policy set. For most deployments, you should leave the two default attributes of Login Disabled and nspmDistributionPassword in the filter. The fan-out policies must know which attributes to send directly to a CUA child client.
Logical System Name	Specify the Logic System Name for the client as it appears in the SAP system, if the SAP client is the central client in a CUA landscape. Otherwise, specify a unique name for this system. The driver uses the logical system names from both the primary connection and all of the secondary connections to uniquely identify a connection. The driver looks up the connection information based on this value.
SAP User Language	Specify the language code this driver will use for the SAP session. This is referred to as the *Language* in the SAP logon screen.
Available Languages	Specify all of the languages installed on your SAP system. All of the languages you specify in the list are made available to the Role Mapping Administrator, so that Role Mapping Administrator can render the UI accordingly.
Character Set Encoding	The code for the character set to translate IDoc byte-string data into Unicode strings. An empty value causes the driver to use the host JVM* default.
Publish all Communication Table Values	Set this to *Publish Primary* if only the primary value of Communicate tables should be synchronized. or Set this to *Publish All* if all values should be synchronized.
Publish Company Address Data	Select whether the driver populates the User Company Address data for the Publisher channel and for the Subscriber queues.

Parameter	Description
Change retry status to error on Subscriber events	Select *Yes* to have the driver shim issue an error instead of a retry on Subscriber operation results. Use this setting when running the driver in fan-out mode. If you are not using the fan-out mode, select *No* to disable this feature. If you are using the standard mode, select *Yes* to enable this.

Table A-5 *Subscriber Settings*

Parameter	Description
Communication Table Comments	The communication table comment is a text comment the driver adds to all Communication table entries added by the Subscriber channel. This is a useful method for determining where an entry originated from when viewing values via the SAP GUI. Leaving this field blank provides no comment to the table entries.
Require User to Change Set Passwords	This parameter specifies the methodology used by the driver to set User account passwords. Passwords can be set by the driver's administrative User account or by the affected User's account (this sets a password on new accounts or modifies passwords for existing Users.) Select *Change Required* if passwords must be changed immediately at the user's next login. or Select *No Change Required* if you do not want users to change passwords immediately at login.
Password Set Method (Conditional)	If you select the *No Change Required* option above, you should specify a Password Set Method: *Administrator Set* or *User Set.* **Administrator Set:** Passwords are set by the driver's administrative User account. This method is deprecated and does not comply with SAP security best practices. The method works only for SAP systems that are version 4.6c or older. **User Set:** Passwords are supplied by the affected users. The following parameters must be set if you select User Set: ◆ **Default Reset Password:** This parameter specifies a default password reset value. It is set during password changes if the user-supplied password is not accepted by the SAP server. There is an 8-character size limit for this value. (SAP 7.0 does not require an 8-character size limit on passwords.) ◆ **Reset Password Delay (seconds):** Specify the number of seconds between the setting of the administrative default password and the setting of the user's new password. ◆ **Force Passwords to Uppercase:** This option defines if passwords are forced to uppercase. Uppercase is the default value; however, SAP 7.0 allows for mixed-case passwords.
Support Password Set for Non-Dialog Users	Select whether to allow the driver to set password for non-dialog user types, such as Communications, System, Service, and Reference on the Subscriber channel.

Parameter	Description
Use local locking	Select *Yes* to lock accounts locally in the client. Local locking requires additional configuration in the SAP system. Select *No* to lock accounts globally, which locks all accounts in the CUA child clients if the account in the CUA central client is locked. For more information, see Appendix G, “Setting and Clearing Granular Locks,” on page 83.
SAP Server Secondary Connection Information	If you are configuring the driver for fan-out, click the plus icon  , then add the information for the additional SAP system. The information requested is listed in Table A-4, “Driver Settings,” on page 58. Repeat this process for each system you want to fan out to from this driver.

Table A-6 *Publisher Settings*

Parameter	Description
Publisher Channel Enabled	Select whether or not you want to enable the driver’s Publisher channel.
Publisher Channel Port Type	Select *TRFC* if the driver instantiates a JCo 3 Server to receive data distribution broadcasts from the SAP ALE system. Select *FILE* if the driver consumes text file IDocs distributed by the SAP ALE system.
SAP Gateway ID	Specify the SAP Gateway ID that distributes user data to the driver.
TRFC Program ID	Specify the registered program ID that is used by the driver. This value is specified in the SAP port definition.
Generate TRFC Trace Files	Select whether the JCo 3 server TRFC tracing is enabled.
Logical System for User Distribution	Specify the logical system name configured in the SAP system for user distribution to the Identity Manager driver. Publication only works if the Publisher channel is enabled and the driver’s primary connection is to a CUA central client.
Poll Interval (seconds)	Specify how often the Publisher channel polls for unprocessed IDocs. The default value is 10 seconds.

Parameter	Description
Future-dated Event Handling Option	The behavior of this option is based on the values of the User record's Logon Data "Valid From" date (LOGONDATA:GLTGV) when IDocs are processed by the Publisher channel. This field does not need to be in the Publisher filter for this processing to occur. Choose one of the following options: ◆ **Publish Immediately:** Indicates that all attributes are processed by the driver when the IDoc is available. No future-dated processing is performed. ◆ **Publish on Future Date:** Indicates that only attributes that have a current or past time stamp are processed by the driver when the IDoc is available. Future-dated infotype attributes are cached in a `.futr` file to be processed at a future date. ◆ **Publish Immediately and on Future Date:** Indicates that the driver blends the first two options. All attributes with a current or past time stamp are processed at the time the IDoc is available. All future-dated infotype attributes are cached in a `.futr` file to be processed at a future date. ◆ **Publish Immediately and Daily through Future Date:** Indicates that the driver processes all events at the time the IDoc is made available. All future-dated infotype attributes are cached in a `.futr` file to be processed again on the next calendar day. This continues until the attributes are sent for a final time on the future date.
Publisher IDoc Directory	Specify the file system location where the SAP User IDoc files are placed by the SAP ALE system (file port configuration) or by the driver (TRFC configuration.) This setting is only used if the Publisher channel is enabled.
Publisher Heartbeat Interval	Specify how many minutes of inactivity can elapse before this channel sends a heartbeat document. In practice, more than the number of minutes specified can elapse. That is, this parameter defines a lower bound.

A.2 Global Configuration Values

Global configuration values (GCVs) are values that can be used by the driver to control functionality. GCVs are defined on the driver or on the driver set. Driver set GCVs can be used by all drivers in the driver set. Driver GCVs can be used only by the driver on which they are defined.

The SAP User Management (JCo 3) driver includes several predefined GCVs. You can also add your own if you discover you need additional ones as you implement policies in the driver.

To access the driver's GCVs in iManager:

1. Click  to display the Identity Manager Administration page.
2. Open the driver set that contains the driver whose properties you want to edit:
   2a. In the *Administration* list, click *Identity Manager Overview*.

2b If the driver set is not listed on the *Driver Sets* tab, use the *Search In* field to search for and display the driver set.

2c Click the driver set to open the Driver Set Overview page.

3 Locate the driver icon, click the upper right corner of the driver icon to display the *Actions* menu, then click *Edit Properties*.

or

To add a GCV to the driver set, click *Driver Set*, then click *Edit Driver Set properties*.

To access the driver's GCVs in Designer:

1 Open a project in the Modeler.

2 Right-click the driver icon or line, then select *Properties* > *Global Configuration Values*.

or

To add a GCV to the driver set, right-click the driver set icon  , then click *Properties* > *GCVs*.

Table A-7 *Global Configuration Values*

Option	Description
Driver parameters > Connected System or Driver Name	The name of the connected system, application or Identity Manager driver. This value is used by the e-mail notification templates.
Driver parameters > Logical System for User Distribution	Specify the logical system name configured in the SAP system for user data distribution to the Identity Manager driver. Publication only works if the Publisher channel is enabled and the driver's primary connection is to a CUA central client.
Password Management > Show password management policy	Select *Show* to display the password management policies. You should edit the Password Management options on the *Server Variable* tab rather than under the *GCVs* tab. The *Server Variable* tab has a better view of the relationship between the different GCVs. For more information about how to use the Password Management GCVs, see "Configuring Password Flow " in the *Identity Manager 3.6 Password Management Guide*.
Entitlements Options > Show Entitlements	Select show to display the entitlements configuration for this driver.
Entitlements Options > Use User Account Entitlement	Entitlements act like an on/off switch to control access. When the driver is enabled for entitlements, accounts are only created and removed or disabled when the account entitlement is granted to or revoked from users. Select *True* to enable the user account entitlement. You must have an entitlement agent configured in your environment. For more information about entitlements, see the *Identity Manager 3.6 Entitlements Guide*.
Entitlement Options > When account entitlement revoked	Select which action is taken in the SAP system when a User Account Entitlement is revoked. The options are to disable the account or to delete the account.

Option	Description
Entitlement Options > Use Role (Activity Group) Entitlement	Enables the Role entitlement that is included with the driver. Select *True* to enable this entitlement.
Use Profile Entitlement	Enables the Profile entitlement that is included with the driver. Select *True* to enable this entitlement.
Credential Provisioning > Show credential provisioning configuration	Select *show* to display the configuration options for credential provisioning. For more information, see "Novell Credential Provisioning for Identity Manager 3.6".
Account Tracking > Show Account Tracking Configuration	Select *show* to display the configuration options for enabling Account Tracking through Novell Sentinel. Account tracking is a feature included with the Novell Compliance Management Platform. For more information, see the *Novell Compliance Management Platform Web site*" (http://www.novell.com/products/compliancemanagementplatform/).
Role Mapping > Show Role Mapping Configuration	Select *show* to display the configuration options that enable the driver to work with the Role Mapping Administrator. The Role Mapping Administrator is an application that is part of the Novell® Compliance Management Platform extension for SAP environments. For more information, see the Novell Compliance Management Platform extension for SAP environments Documentation Web site (http://www.novell.com/documentation/ncmp_sap10/).

Application Link Enabling (ALE)

B

Application Link Enabling (ALE) technology enables communication between SAP and external systems such as the Identity Vault (eDirectory). ALE is comprised of various components. If you want to distribute User modification data automatically from the SAP system to the Identity Vault, you must configure the ALE and CUA systems. If your integration requires only reading and writing data to the SAP system, this configuration is not necessary.

When you configure the SAP system to enable the driver, you should consider the following ALE components and their relationship to the driver:

Refer to Chapter 5, “Configuring the SAP System,” on page 25 for instructions on how to configure these SAP system parameters.

B.1 Clients and Logical Systems

In the SAP configuration for the driver, a logical system is a representation of either a SAP system or an external system. The logical system is used to distribute data to and from SAP. To use ALE, every SAP system needs to have a base logical system associated with a client. There is a one-to-one relationship between the client and the logical system.

The driver uses an outbound ALE interface. In an outbound ALE interface, the base logical system becomes the *sender* for outbound messages and the *receiver* of inbound messages. A SAP user is probably logged into the base logical system/client when making changes to the database (for example, modifying User profiles or logon preferences). A logical system/client must also be defined for the receiving client. This logical system acts as the receiver of outbound messages.

B.2 Message Type

A message type represents the type of data that is exchanged between the two systems. For this driver, the USERCLONE message type is used. A message type characterizes data being sent across the systems and relates to the structure of the data, also known as an IDoc type (for example, USERCLONE03).

B.3 IDoc Type

Intermediate Document (IDoc) Type represents the structure of the data associated with a message type. ALE technology uses IDocs to exchange data between logical systems. An IDoc is an object with the data of a specific message type in it. IDocs consist of three record types:

- The control record
- The data record
- The status record

The control record contains information about the IDoc, such as what IDoc type it is, the message type, the sending and receiving systems, or the direction.

The data record contains the application data. Data records consist of several fields that describe the content of the specific object.

The status record contains data on the state of the processing of the IDoc.

B.4 Distribution Model

The distribution model is a tool that stores information about the flow of message types between systems. A distribution model must be configured when setting up the driver. After the two logical systems have been defined and you have a general understanding of message types and IDocs, you can configure your distribution model.

The distribution model determines what message types can be sent from a logical system to another logical system.

B.5 Partner Profiles

Partner profiles specify the components used in an outbound process. Some of these components include the IDoc type, message type, IDoc size, mode, and the person to be notified in case of errors.

B.6 Port

A port is the communication link between the two logical systems.

B.7 Port Definition

A port definition is used in an outbound process to define how documents are transferred to the destination system.

B.8 File Port

A file port can be used in the integration solution. IDocs are transferred to a file in a specified file system location accessible by the SAP host system.

B.9 TRFC Port

A Transactional Remote Function Call (TRFC) can be used in the integration solution. IDocs are transferred to a specified application process (such as the driver) via the SAP Gateway.

B.10 CUA

Central User Administration (CUA) is a process provided by SAP to distribute and manage User object data between a Central SAP logical system and one or more Client logical systems. The client logical systems might be SAP or external systems. The base technology used for the CUA is ALE.

Business Application Programming Interfaces (BAPIs)

C

Table C-1 contains a list of the BAPIs used by the driver.

Table C-1 *Driver BAPIs*

BAPI Name	Description
BAPI_PDOTYPES_GET_DETAILEDLIST	Used to obtain lists and minimal detailed information for SAP USER objects and other specified business object types.
BAPI_USER_ACTGROUPS_ASSIGN	Used to assign the Activity Groups (Roles) to SAP USER objects in a non-CUA landscape.
BAPI_USER_ACTGROUPS_DELETE	Used to delete the Activity Groups (Roles) from SAP USER objects in a non-CUA landscape.
BAPI_USER_PROFILES_ASSIGN	Used to assign Profiles to SAP USER objects in a non-CUA landscape.
BAPI_USER_PROFILES_DELETE	Used to delete Profiles from SAP USER objects in a non-CUA landscape.
BAPI_USER_CHANGE	Used to modify SAP USER object attributes (fields, structures, and general tables) and non-persistent passwords.
BAPI_USER_CREATE1	Used to create a new SAP USER object.
BAPI_USER_DELETE	Used to delete an SAP USER object.
BAPI_USER_GETDETAIL	Used to read the current data field values, structures, and general table attributes of an SAP USER object.
BAPI_ADDRESSORG_GETDETAIL	Used to read the Company Address attributes of an SAP USER object.
BAPI_USER_LOCK	Used to lock an SAP USER object account. On a CUA Central system this is a global lock. On a CUA child system or on a non-CUA system, this is a local lock.
BAPI_USER_UNLOCK	Used to unlock an SAP USER object account. On a CUA Central system this is a global lock. On a CUA child system or on a non-CUA system this is a local lock.
BAPI_USER_SYSTEM_ASSIGN	Used to assign the user to the specified logical system in a CUA landscape.

BAPI Name	Description
SUSR_BAPI_USER_LOCK	Used to set granular locks on an SAP USER object account. The granular lock types available are LOCK_LOCAL and LOCK_GLOBAL. By default, this BAPI is not a remote-enabled module and is thus not accessible to the driver. An ABAP developer must modify the Processing Type attribute of the BAPI on the target SAP system. This is accomplished via the SAP Function Builder (Transaction SE37).
SUSR_BAPI_USER_UNLOCK	Used to clear granular locks on an SAP USER object account. The granular lock types available are LOCK_LOCAL, LOCK_GLOBAL, and LOCK_WRONG_LOGON. By default, this BAPI is not a remote-enabled module and is thus not accessible to the driver. An ABAP developer must modify the Processing Type attribute of the BAPI on the target SAP system. This is accomplished via the SAP Function Builder (Transaction SE37).
SUSR_USER_CHANGE_PASSWORD_RFC	Used to set a persistent password for an SAP USER object.
BAPI_USER_LOCACTGROUPS_ASSIGN	Used to assign client-specific Activity Groups (Roles) to SAP USER objects in a CUA landscape.
BAPI_USER_LOCACTGROUPS_READ	Used to read the current client-specific Activity Groups (Roles) assignments of SAP USER objects in a CUA landscape.
BAPI_USER_LOCACTGROUPS_DELETE	Used to delete the client-specific Activity Groups (Roles) assignments from SAP USER objects in a CUA landscape.
BAPI_USER_LOCPROFILES_ASSIGN	Used to assign client-specific Profiles to SAP USER objects in a CUA landscape.
BAPI_USER_LOCPROFILES_READ	Used to read the current client-specific Profile assignments of SAP USER objects in a CUA landscape.
BAPI_USER_LOCPROFILES_DELETE	Used to delete the client-specific Profile assignments from SAP USER objects in a CUA landscape.
BAPI_USER_CLONE	Sent from the SAP ALE subsystem to communicate SAP-initiated changes of USER objects to the driver Publisher channel.
BAPI_COMPANY_CLONE	Sent from the SAP ALE subsystem to communicate SAP-initiated changes of company address information to the driver Publisher channel.

Configuration and Deployment Notes

D

The following information can be valuable when modifying the driver configuration or when trying to understand SAP system behavior. Many of these notes relate to data value restrictions on the User record. You should investigate the system configuration thoroughly, because some values might have been modified or extended by the SAP administrator.

D.1 SAP Object Types

The following SAP object types of interest might be referenced in <query> operations to SAP.

Table D-1 *SAP Object Types*

User Profile	Pseudo-object type: PROFILE
USER	Object Type: US
Activity Groups	Object Type: AG
Standard Roles	Object Type: AC
Company	Object Type: U
User Groups	Object Type: UG

D.2 User Types: LOGONDATA:USTYP

- A - Dialog
- C - Communication (CPIC)
- B - System (BDC)

- S - Service
- L - Reference

D.3 Output Controller Options

Table D-2 *Output Controller Options*

G - Output immediately	DEFAULTS: SPDB
H - Don’t output immediately	DEFAULTS: SPDB
D - Delete after output	DEFAULTS: SPDA
K - Don’t delete after output	DEFAULTS: SPDA

D.4 Communication Types: ADDCOMREM:COMM TYPE

- INT - EMail Address type (SMTP)
- LET - Letter (Standard Post)
- PAG - Pager
- FAX - Facsimile
- PRT - Printer
- RML - Remote Mail
- TEL - Telephone
- TLX - Telex
- TTX - Teletex
- SSF - Secure Store and Forward

D.5 Date Formats: DEFAULTS:DATAFM

1. DD.MM.YYYY
2. MM/DD/YYYY
3. MM-DD-YYYY
4. YYYY.MM.DD
5. YYYY/MM/DD
6. YYYY-MM-DD

D.6 Decimal Formats: DEFAULTS:DCPFM

- “X” - The decimal divider is a dot, and the thousands divider is a comma (NN,NNN.NN)
- “Y” - The decimal divider is a comma, and the thousands divider is a blank (NNN NNN,NN)
- “ “ - The decimal divider is a comma, and the thousands divider is a dot (NN.NNN,NN)

D.7 Computer Aided Test (CATT): DEFAULTS:CATTKENNZ

- “X” - CATT: Test status set
- “ ” - CATT: Test status not set
- “.” - CATT: CATT status set

D.8 Communication Comment Type to Table Mappings

Table D-3 *Communication Comment Type to Table Mappings*

Table: ADDTEL	Comment Type: TEL	Key Field: TELEPHONE
Table: ADDFAX	Comment Type: FAX	Key Field: FAX
Table: ADDPAG	Comment Type: PAG	Key Field: PAGER
Table: ADDSMTP	Comment Type: INT	Key Field: E_MAIL
Table: ADDTTX	Comment Type: TTX	Key Field: TELETEX
Table: ADDPRT	Comment Type: PRT	Key Field: PRINT_DEST
Table: ADDTLX	Comment Type: TLX	Key Field: TELEX_NO
Table: ADDRML	Comment Type: RML	Key Field: R_MAIL
Table: ADDURI	Comment Type: URI	Key Field: URI

D.9 Language Codes

Language	Two-Letter Code	One-Letter Code
Afrikaans	AF	a
Arabic	AR	A
Bulgarian	BG	W
Czech	CS	C
Danish	DA	K
German	DE	D
Greek	EL	G
English	EN	E
Spanish	ES	S
Estonian	ET	9
Finnish	FI	U

Language	Two-Letter Code	One-Letter Code
French	FR	F
Hebrew	HE	B
Croatian	HR	6
Hungarian	HU	H
Indonesian	ID	i
Italian	IT	I
Japanese	JA	J
Korean	KO	3
Lithuanian	LT	X
Latvian	LV	Y
Malaysian	MS	7
Dutch	NL	N
Norwegian	NO	O
Polish	PL	L
Portuguese	PT	P
Romanian	RO	4
Russian	RU	R
Slovak	SK	Q
Slovene	SL	5
Serbian	SR	0 (zero)
Swedish	SV	V
Thai	TH	2
Turkish	TR	T
Ukrainian	UK	8
Customer Reserve	Z1	Z
Chinese Traditional	ZF	M
Chinese	ZH	1

D.10 Configuration Parameters

Comment text for configuration parameters is limited to a maximum length of 50 bytes.

D.11 Design Comments and Notes

When specifying either USER or COMPANY names in BAPI calls, the name field must be in all-caps format, even if the naming field is not specified as such.

NOTE: The ADMIN_SET mode is deprecated prior to R/3 4.7. You need to use USER_SET mode with SAP 4.7 and above.

In BAPI_USER_CHANGE (ADDRESS table)

- The COMM-TYPE attribute in SAP has defined, acceptable values. Invalid input generates an exception and an error message stating, `The communication type <commType> is not defined`. Valid fields are the abbreviations for the supported communication types on the SAP Host.
- The TITLE_ACA1 and TITLE_ACA2 attributes have predefined, acceptable values. Invalid input results in the value in SAP being set to a null string (“ ”).
- The PREFIX1 and PREFIX2 attributes have predefined, acceptable values. Invalid input results in the value in SAP being set to a null string (“ ”).
- The TEL1_NUMBR is linked to the primary, or Standard, Telephone number in the Telephone communication table.

In BAPI_USER_CHANGE (ADDFAX table)

- The Facsimile Telephone Number attribute in the Identity Vault is a structured attribute. An output transformation converts it to a single-attribute format.

In BAPI_USER_CHANGE (ADDTEL table)

- Must have a CONSNUMBER (either the number of the one you want to change or a new, non-000 number.)
- The STD_NO field must be set to X if you are synchronizing a single field or if the number is the only number present.
- The primary data field is TELEPHONE.

In BAPI_USER_CHANGE (ADDTLX table)

- By default, this table is mapped to the Organizational Person; telexNumber attribute. This syntax is OCTET_STRING, which is encoded by Identity Manager into Base64 string encoding. A Java function is provided in the driver `sapusershim.jar` file that can decode this into the proper string format in the Output Transformation prior to submission to SAP. If you are using the driver on a remote system, place the driver shim in the same file system container with the Identity Manager library in the Input Transformation for the Publisher channel.
- The primary data field is TELEX_NO.
- Other rules apply as described for the ADDTEL table.

In BAPI_USER_CHANGE (ADDFAX table)

- The primary data field is FAX.
- Other rules apply as described for the ADDTEL table.

In BAPI_USER_CHANGE (GROUPS table)

- The USERGROUP is the only field in this table.

In BAPI_USER_CHANGE (ALIAS structure)

- The USERALIAS is the only field in this table.
- The SAP system guarantees that alias names are unique among all users. If an alias value is already assigned to another user, the modification fails.

In BAPI_USER_CHANGE (REF_USER structure)

- The REF_USER is the only field in this table.
- The value specified as REF_USER must be an existing User object on the SAP client, and the Reference User's type flag must be set to Reference (User Type L)

In BAPI_USER_CHANGE (DEFAULTS structure)

- The SPDB field can only be populated with a G (GO or Output Immediately), or an H (Hold output), or a null string " ", which sets the value to H. All other values generate an error message. This field is case sensitive.
- The SPDA field can only be populated with a D (Delete after print), a K (Keep), or a null string " ", which sets the value to K. All other values generate an error message. This field is case sensitive.
- The KOSTL (Cost center) field is automatically truncated to 8 bytes by the SAP system.
- The SPLG field does not appear to be utilized. Any value is accepted but does not relate to any attribute shown in the SAP GUI.
- The START_MENU field can be set to any value up to 30 characters whether or not a valid menu exists for the value being set.
- The SPLD (Output Controller) field accepts only a null string value (" ") or a valid output device that is available via the SAP GUI drop-down list for this field. Invalid selections return an error.
- The LANGU field must be set to one of the one-letter language codes defined in Section D.9, "Language Codes," on page 73 or to a null string (" "). The null string defaults to the language of the SAP system default language. This field is case sensitive. Non-defined fields result in an error.

In BAPI_USER_CHANGE (LOGONDATA structure)

- The USTYP field only accepts the valid User Types defined in Section D.2, "User Types: LOGONDATA:USTYP," on page 71 or a null string (" "). Other input generates an exception and an error message stating `Invalid user type<type>`.
- The TZONE field accepts only valid, selectable fields from the SAP GUI drop-down list. Invalid input generates an exception and an error message stating `Invalid time zone`. The Time Zone setting is displayed under the *Defaults* tab in the SAP client Display User dialog box.
- The CLASS field represents the User's User Group for the Authorization Check setting. Only fields that are selectable from the SAP GUI drop-down list are accepted. Invalid input generates an exception and error message stating `User group <class> does not exist`.

- The GLTGV (Validity Begin Date) and GLTGB (Validity End Date) values exist as a set of data.
- The Begin Date must always be less than the End date.
- Invalid date input generates an exception and an error message stating `Invalid time interval: Begin date after end date`.

In BAPI_USER_CHANGE (GROUPS table)

- Only valid groups that exist in the SAP User Groups table can be added to a user. Invalid input generates an exception and an error message stating `User group<name> does not exist`.

In BAPI_USER_CHANGE (ADDCOMREM table)

- The LANGU and LANGU_ISO fields are set with the driver's language parameter value.

Example XML Document Received from the Driver

E

The following example is a typical XML document received from the default driver configuration.

```
<nds dtdversion="1.0" ndsversion="8.5">
       <source>
              <product build="20050509_1030" instance="SAP-USER-REMOTE-46C"
version="1.0">Identity
     Manager Driver for User Management of SAP Software</product>
<contact>Novell, Inc.</contact>
       </source>
       <input xmlns:sapshim="http://www.novell.com/dirxml/drivers/
sapusershim">
             <modify class-name="US" event-id="0_001_0000000000216097" src-
dn="SSAMPLE"
          timestamp="20030509">
                    <association>USdJSMITH</association>
                  <modify-attr attr-name="PROFILES:BAPIPROF">
                          <remove-all-values/>
                    </modify-attr>
                    <modify-attr attr-name="USERNAME:BAPIBNAME">
                          <remove-all-values/>
                    </modify-attr>
                 <modify-attr attr-name="ACTIVITYGROUPS:AGR_NAME">
                          <remove-all-values/>
                    </modify-attr>
                    <modify-attr attr-name="PROFILES:BAPIPROF">
                          <add-value>
                                <value>SAP_ALL</value>
                                <value>SAP_NEW</value>
                          </add-value>
                    </modify-attr>
                      <modify-attr attr-name="USERNAME:BAPIBNAME">
                             <add-value>
                                   <value>JSMITH</value>
                             </add-value>
                      </modify-attr>
                      <modify-attr attr-name="ACTIVITYGROUPS:AGR_NAME">
                             <add-value>
                                     <value>SAP_EMPLOYEE</value>
                             </add-value>
                       </modify-attr>
                </modify>
          </input>
</nds>
```

Some characteristics to note:

- All XML documents received from the SAP system are translated into `<modify>` documents. This translation occurs because it is not possible to determine whether the object described by the document has been modified or is new. Additional modification or translation of the document is accomplished through policies and the Metadirectory engine.

- The <modify> element contains the classname of the object described in the SAP namespace (that is, US=User). The event-id attribute contains the IDoc number from which the data is derived. The src-dn attribute contains the SAP Object name value. The timestamp attribute contains the date that the IDoc was processed by the driver.
- The <association> element data always contains the format USd*SAPobjectID*. Usernames in SAP are always uppercase.
- The <modify-attr> element contains the attr-name described in SAP format (Structure or Table name:Attribute Name).
- Because multivalue attributes cannot be consistently mapped across systems, the <remove-all-values> element is used prior to all <add-value> tags on Publisher channel documents. This instructs the Metadirectory engine to remove all existing values for the attribute prior to assigning the new values. If this functionality is not desired, one of the policies can be used to modify the document.
- All values are in a string format.
- All values for DirXML-locSapRoles and DirXML-locSapProfiles require that you set two fields in SAP. In order to map from a single string value to a structured format, default policies use a colon ":" delimiter in the Identity Vault values (such as ADMCLNT100:SAP_ESSUSER), which are then transformed to (or from) the SAP structured format. The Schema Mapping policy indicates the structure components to set for these values.

Structured Format Examples

F

```
// Single value field
//
<modify-attr attr-name="LOCKUSER">
     <add-value>
          <value>1</value>
     </add-value>
</modify-attr>
//
// Single field from Structure
//
<modify-attr attr-name="ADDRESS:E_MAIL">
     <add-value>
          <value>UGRANT@uniongenerals.org</value>
     </add-value>
</modify-attr>
//
// Single field, multi-values from Table
//
<modify-attr attr-name="ACTIVITYGROUPS:AGR_NAME">
     <add-value>
          <value>SAP_ESSUSER</value>
          <value>SAP_EMPLOYEE</value>
     </add-value>
</modify-attr>
//
// All fields, multi-values from Table
//
<modify-attr attr-name="LOCACTIVITYGROUPS">
     <add-value>
          <value type="structured">
                 <component name="FROM_DAT">2005-04-01</component>
                 <component name="TO_DAT">9999-12-31</component>
                 <component name="ORG_FLAG"></component>
                 <component name="AGR_NAME">SAP_ESSUSER</component>
                 <component name="SUBSYSTEM">ADMCLNT500</component>
                 <component name="AGR_TEXT"></component>
          </value>
          <value type="structured">
                 <component name="FROM_DAT">2005-04-01</component>
                 <component name="TO_DAT">9999-12-31</component>
                 <component name="ORG_FLAG"></component>
                 <component name="AGR_NAME">SAP_EMPLOYEE</component>
                 <component name="SUBSYSTEM">ADMCLNT100</component>
                 <component name="AGR_TEXT"></component>
          </value>
     </add-value>
</modify-attr>
```

Setting and Clearing Granular Locks

G

The granular lock functionality is available for SAP systems that support the concept of granular locks via the `SUSR_BAPI_USER_LOCK` and `SUSR_BAPI_USER_UNLOCK` functions. These locks relate to the account locking mechanisms that are available from the Central System of an SAP Central User Administration (CUA) environment.

This functionality is only available through the SAP User Management driver if the BAPI functions are configured to be a Remote-Enabled Module and the driver is configured to support locking.

G.1 Configuring the SAP System for Granular Locking

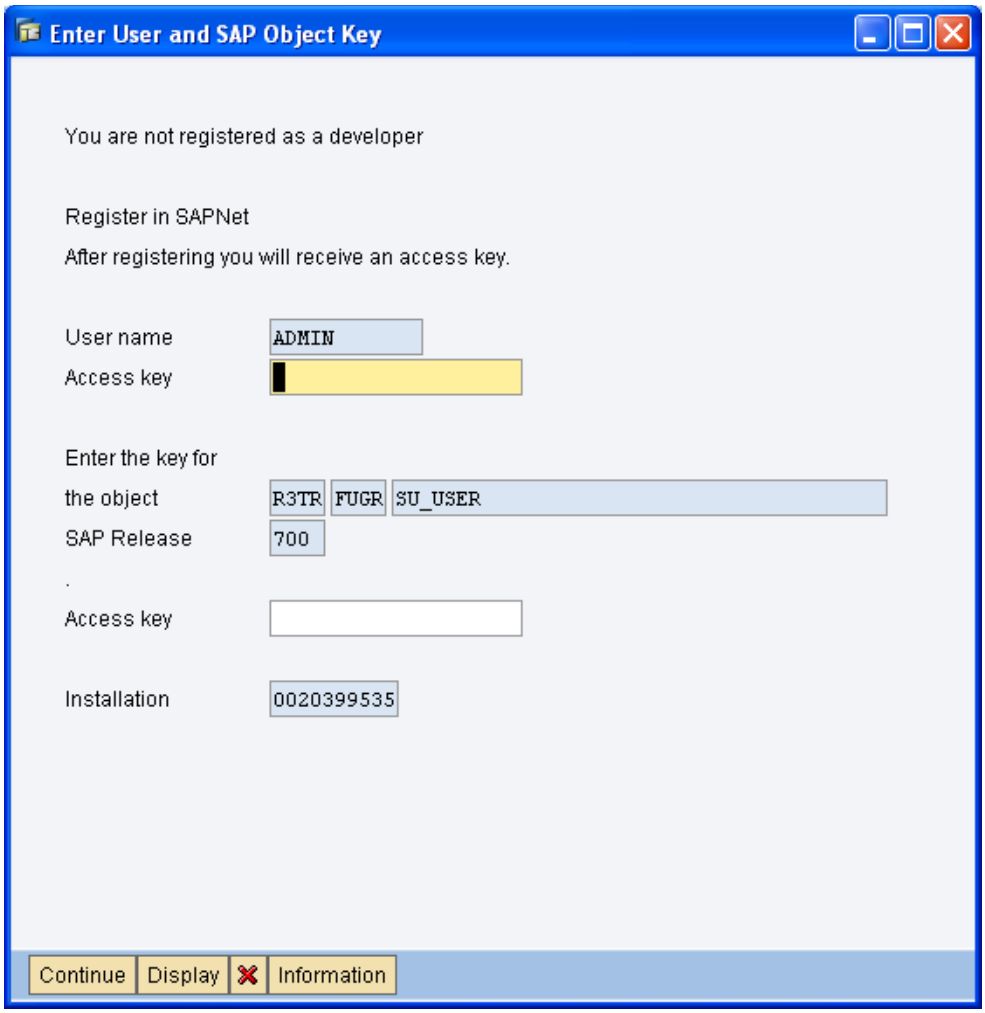
To enable the SAP system for locking, you must enable two BAPIs for remote access by setting the Remote-Enabled Module attribute in the SAP Fuction Builder transaction (SE37) on each BAPI. The BAPIs are:

- SUSR_BAPI_USER_LOCK
- SUSR_BAPI_USER_UNLOCK

You must add this attribute to each SAP system that you want to enable locking for.

Use the following steps to configure the BAPIs:

1. In the SAP GUI, specify *SE37* in the search field to launch the Function Builder, then press Enter.
2. In the Function Builder, specify SUSR_BAPI_USER_LOCK, then click *Change* to search for this BAPI.
3. Leave this page up and make note of the username, the installation number, and the object key number.



4 Register the developer and an object on the SAP Service Marketplace Web site:

5 From a Web browser, access the SAP Support Portal, then log in to your account.

6 Click *Keys and Requests* > *SSCR Keys*.

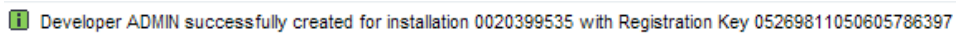
7 Click *Register Developer*.

8 Specify the user ID from Step 3.

9 Specify the installation number from Step 3.

10 Click *Register*.

11 Record the Registration Key number that appears at the bottom of the screen.



12 Click the *SSCR Keys* link at the top of the page to return to the main page.

13 Click *Register an Object*.

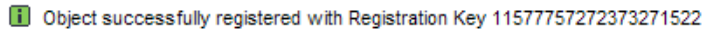
14 In the *PgmID Type Object name* field, specify the object key number `R3TR FUGR SU_USER` from Step 3, then click *Check*.

15 Select the base release number for your system.

16 Select the Installation number from Step 3.

17 Click *Register*.

18 Record the registration number that appears at the bottom of the screen.



19 Log out of the SAP Service Market place Web site.

20 Back in Function Builder, specify the developer registration number in the *Access Key* field under the *User name* field.

21 Specify the registration number for the object in the *Access Key* field under the *SAP Release* field.

22 Click *Continue*, then click *Continue* in the warning message.

23 Click the *Attributes* tab, then click *Remote Enable Object* under the Processing Type.

24 Click *Save* in the toolbar.

25 If you are the system user, skip to Step 26. If you are not the system user, click *Own Requests* to create a work bench request.

This prompt appears only if you are not the system user.

25a Click *Create Request*.

25b Specify a description, then click *Save*.

25c Select the request, then click *Choose*.

25d Click *Continue*.

26 From the toolbar, click *Function Module* > *Activate* to active the BAPI.

27 Click the *Back* icon in the toolbar to access the Function Builder.

28 Specify SUSR_BAPI_USER_UNLOCK, then click *Change*.

29 Click the *Attributes* tab, then click *Remote Enable Object* under the Processing Type.

30 Click *Save* in the toolbar.

31 Click *Continue*.

32 From the toolbar, click *Function Module* > *Activate* to active the BAPI.

G.2 Configuring the Driver for Locking

After the SAP systems are configured for locking, you need to configure the driver. This is a driver setting on the Subscriber channel.

1 In Designer or iManager, access the properties of the driver.

2 Access the *Subscriber Settings*, under the *Driver Options*.

3 Set the *User Local Locking* option to *Yes*.

4 Click *OK* to save the change, then restart the driver for the change to take effect.

The driver can set or clear the supported lock types by using two pseudo-attributes called `SETGRANULARLOCKS` and `CLEARGRANULARLOCKS`.

The supported lock types for SETGRANULARLOCKS are:

- LOCK_LOCAL
- LOCK_GLOBAL

The supported lock types for CLEARGRANULARLOCKS are:

- LOCK_LOCAL
- LOCK_GLOBAL
- LOCK_WRONG_LOGON

To set or clear a particular lock, simply use a value of X or x for the desired lock type value. Any unspecified lock type sets to a value of ' ', which implies the lock type is not set or cleared.

NOTE: It is not valid to use these pseudo-attributes in a <remove-value> element.

The following is an example of what to add to a policy in a driver, if you did not set the Subscriber parameter.

```
//
// Example - Set Local Lock on User
//
<modify-attr attr-name="SETGRANULARLOCKS">
  <add-value>
    <value type="structured">
      <component name="LOCK_LOCAL">X</component>
    </value>
  </add-value>
</modify-attr>

//
// Example - Set Local and Global Locks on User
//
<modify-attr attr-name="SETGRANULARLOCKS">
  <add-value>
    <value type="structured">
      <component name="LOCK_LOCAL">X</component>
      <component name="LOCK_GLOBAL">X</component>
    </value>
  </add-value>
</modify-attr>

//
// Example - Clear Local and Wrong Logon Locks on User
//
<modify-attr attr-name="CLEARGRANULARLOCKS">
  <add-value>
    <value type="structured">
      <component name="LOCK_LOCAL">X</component>
      <component name="LOCK_WRONG_LOGON">X</component>
    </value>
  </add-value>
</modify-attr>
```

Using Wildcard Search Capabilities

H

Releases of this driver prior to version 1.0.5 had issues related to the implementation of the default Subscriber Matching policy. The default Subscriber Matching policy issues a query to the SAP server for matches of the Given Name and Surname attributes (mapped to ADDRESS:FIRSTNAME and ADDRESS:LASTNAME) prior to processing the creation of a new User object. The following XDS query illustrates the output of this policy.

```
<nds dtdversion="1.1" ndsversion="8.6">
   <source>
      <product version="1.1.2">DirXML</product>
         <contact>Novell, Inc.</contact>
   </source>
   <input>
      <query class-name="US" event-id="0">
         <search-class class-name="US"/>
         <search-attr attr-name="ADDRESS:LASTNAME">
            <value timestamp="1114621366#3" type="string">Smith</value>
         </search-attr>
         <search-attr attr-name="ADDRESS:FIRSTNAME">
            <value timestamp="1114621375#1" type="string">Joe</value>
         </search-attr>
         <read-attr/>
      </query>
   </input>
</nds>
```

This is a problem because SAP does not provide the capability to search for a User account based on attribute values. Therefore, the driver needs to obtain a list of all User objects, then read each object, compare the FIRSTNAME and LASTNAME attributes to the search values, and return a list of matching objects. In a database with hundreds or thousands of User objects, this process takes a very long time.

To eliminate this problem, starting with version 1.0.5, the driver now has the capability to use a wildcard syntax for queries that contain the User name field (USERNAME:BAPIBNAME). This allows you to write policies that take advantage of the known account naming policies of the SAP system to reduce the number of objects that need to be read and compared during matching operations.

For example, the default Subscriber Create rule uses the first initial of the Given Name attribute value appended with the Surname attribute value to create a proposed account name. A new User with Given Name “John” and Surname “Smith” generates a proposed SAP User account name of JSMITH. Any duplicates of this proposed name are appended with numeric values (for example, JSMITH1, JSMITH2, etc.) The default Output Transformation policy now contains a template that takes advantage of the USERNAME:BAPIBNAME wildcard capabilities of the driver and appends this additional search attribute to the query. When the driver receives a query containing a USERNAME:BAPIBNAME search attribute, it determines if the value is a wildcard or a literal value. Any value that is contained within single-quote characters is evaluated for wildcard syntax. If the single-quote characters do not exist, the driver attempts to read the specified User object.

The supported variations of the wildcard syntax are:

- “Starts-with” syntax (for example, JSmith*). Restricts attribute matching to User account names starting with JSMITH.
- “Ends-with” syntax (for example, *ith). Restricts attribute matching to User account names ending with ITH.
- “Contains” syntax (for example, *SMIT*). Restricts attribute matching to User account names containing SMIT.

When the list of objects to be matched has been restricted, the remaining search attributes are used to determine a match.

The output from the default Output Transform policy converts the Matching Rule query shown above to the following query. This policy is only applied to queries that do not already contain a USERNAME:BAPIBNAME search attribute.

```
<nds dtdversion="1.1" ndsversion="8.6">
   <source>
      <product version="1.1.2">DirXML</product>
      <contact>Novell, Inc.</contact>
   </source>
   <input>
      <query class-name="US" event-id="0">
         <search-class class-name="US"/>
         <search-attr attr-name="ADDRESS:LASTNAME">
            <value timestamp="1114621366#3" type="string">Smith</value>
         </search-attr>
         <search-attr attr-name="ADDRESS:FIRSTNAME">
            <value timestamp="1114621375#1" type="string">Joe</value>
         </search-attr>
         <read-attr/>
         <search-attr attr-name="USERNAME:BAPIBNAME">
            <value>’JSmith*’</value>
         </search-attr>
      </query>
   </input>
</nds>
```

With this query, the driver searches only User objects whose name starts with JSMITH for the matching ADDRESS:LASTNAME value “Smith” and matching ADDRESS:FIRSTNAME value “Joe.”