SAS® Solutions Adapter 1.4 for SAP
User's Guide

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Introduction to the SAS Solutions Adapter for SAP

Introduction to the SAS Solutions Adapter for SAP

Based on the requirements of your source SAP system and your business needs, you can customize the extract, transform, and load (ETL) jobs that make up the SAS Solutions Adapter for SAP. The architecture of SAS Data Integration Studio and SAS Data Integration Server provides the environment for these ETL jobs. As a result, you can use SAS Data Integration Studio to view and edit your ETL jobs as needed.

Data Flow Architecture

The SAS Solutions Adapter for SAP facilitates the beginning of a data flow that moves data from an SAP source system into a format that businesses manage and use with SAS solutions.

Source system data must flow through a series of ETL steps to convert it into a usable format for SAS solution data marts, such as SAS Human Capital Management. The figure details the basic architecture of this data flow. The SAS Solutions Adapter for SAP acts in the first step.

Figure 1.1   Data Flow Architecture: Source Data to SAS Solution Data Marts
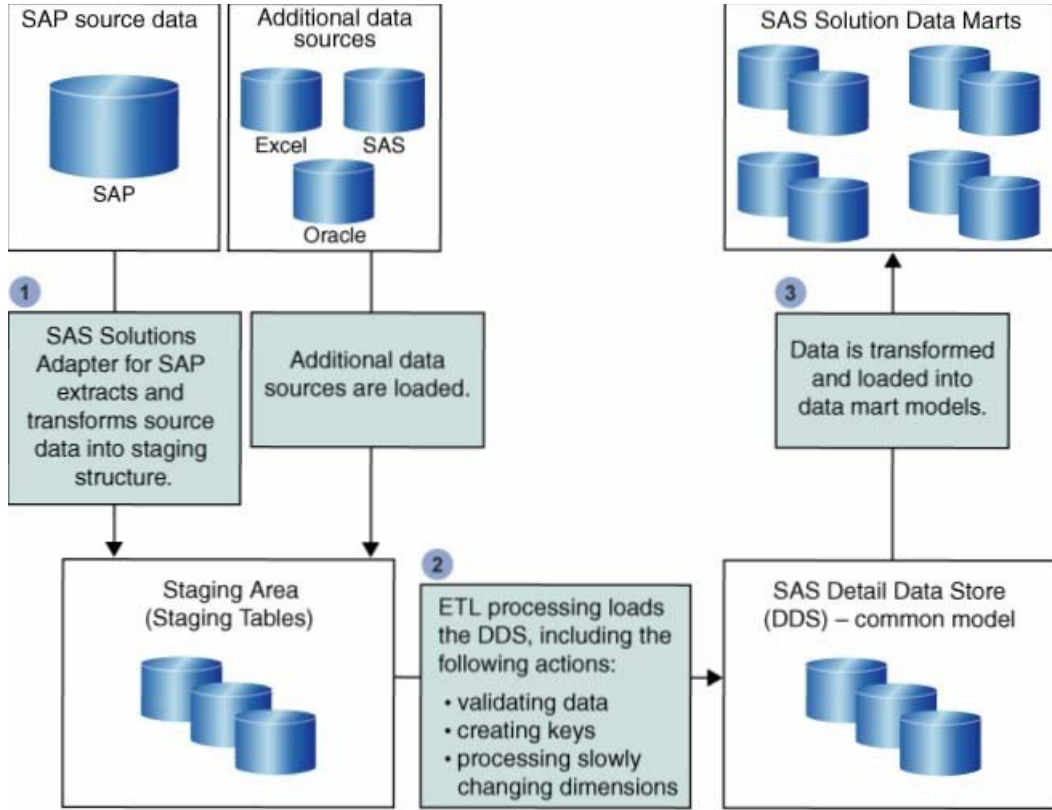
1   The SAS Solutions Adapter for SAP extracts and transforms the SAP source data into a staging area. The staging area is the first target after the data is extracted from a system. This staging area is a repository for raw data that is extracted from a system and prepared for transformation and loading into the DDS.

2   Once source data is loaded into the staging area, it is ready for ETL processing that loads it into the DDS. The following actions occur during ETL processing:

❑   validating the data

❑   creating surrogate keys instead of system IDs to identify the data

❑   introducing date-and-time stamps to reflect data validity if differences in dimensional information arise

The transformed data is stored in the DDS, a lightly denormalized relational data model that provides storage flexibility. The DDS is a specific detail data model that represents a standard business function and supports SAS solution data marts. Some of the data that the DDS captures includes current and historical information such as temporal data (event data that occurs at a particular date and time such as an account inquiry) and nontemporal data (non-event data such as a customer or a financial account).

3   Once data is cleansed, validated, and stored in the DDS, it is ready for transforming and loading into a data mart model.

Benefits

The SAS Solutions Adapter for SAP enables SAS solutions to turn SAP data into business intelligence that is manageable on an enterprise scale. By automating and streamlining parts of the data conversion from SAP to SAS, the adapter decreases the time it takes to retrieve business intelligence from source data. Primarily, it reduces the time needed to set up SAP ETL by 80% or more. This gives you more time to concentrate on generating business intelligence from your SAP data.

The SAS Solutions Adapter for SAP includes SAP knowledge that streamlines the data conversion process. This built-in knowledge reduces your dependence on SAP resources to help you understand how SAP works. It saves you time and valuable SAP resources so that the resources are available to work on other projects.

Configuration and Administration

The SAS Solutions Adapter for SAP is configured using the Solution Package Deployment Wizard and SAS Data Integration Studio.

The Solution Package Deployment Wizard, a plug-in for SAS Management Console, enables you to specify the adapter configurations that are required for your unique business environment.

After you have configured the SAS Solutions Adapter for SAP, you can use SAS Data Integration Studio to manage and customize the adapter.

Components

The SAS Solutions Adapter for SAP includes components that you can configure and manage using the Solution Package Deployment Wizard. This wizard enables you to configure and manage the following components that you need to import a SAS Solutions Adapter for SAP environment for SAS Data Integration Studio:

SAS Data Integration Studio jobs

> extract SAP tables into a partial mirror image of the SAP tables. These jobs mirror only the necessary tables and, in many cases, transfer only the required data rows and columns. This limited transfer places a smaller load on the SAP system. The extractions are typically run as SAP batch processes that do not use complex logic so that the jobs can run in a short time during off-peak SAP system load.

transformation jobs

> create intermediate tables or populate tables in the SAP staging area.

table metadata

> include the standard tables that are needed by the SAS solutions. Intermediate tables are defined to enable flexibility in customizing the jobs to fit local requirements.

new SAS Data Integration Studio transformations

work in the default SAS Data Integration Studio jobs or new jobs. Additional transformations are available.

SAS code files

install on the SAS Application Server. These open source code files are automatically copied to a location where they can be modified.

SAS macros

include simple macros that are provided as open source code, and complex macros that are provided without source code so that SAS can maintain them easily.

SAS libraries

provide storage for administration and data tables.

Job Organization and Names

The SAS Solutions Adapter for SAP is a collection of ETL jobs that extract, transform, and load data from standard SAP tables into standard SAS tables. These jobs are organized into the following two groups:

❑ extraction jobs

❑ transformation jobs

To help identify job functions and streamline the extraction process, extraction job names begin with the letter E, and transformation job names begin with T. This naming structure enables all extraction jobs to occur without waiting for follow-on transformation jobs to complete. As a result, extraction jobs can complete in a shorter time period.

Extraction jobs and transformation jobs are grouped into several SAS Data Integration Studio job groups. Once they are grouped, each job name in a job group begins with the same initial letter and number. This enables quick navigation on the **Custom** tab of SAS Data Integration Studio.

To help identify the job functions of a job group, the group name begins with a structure that is similar to the job name. The extraction job group names begin with the letter E, followed by a two-digit number. The transformation job group names begin with T, followed by a four-digit number.

The numbering of transformation jobs within a job group generally implies the order of execution, unless a specific job does not depend on another. As a result, the specific numbers assigned to jobs within a group allow for new jobs to be inserted numerically between existing jobs.

Unlike transformation jobs, extraction jobs generally do not depend on each other. Exceptions to this rule are jobs that extract new or changed data and that must run after jobs that did the initial extract.

Accessibility

The SAS Solutions Adapter for SAP does not have a stand-alone GUI. It is configured and managed using features of SAS Data Integration Studio and SAS Management Console.

SAS Data Integration Studio and SAS Management Console include accessibility and compatibility features that improve their usability for users with disabilities. These features are related to accessibility standards for electronic information technology that were adopted by the U.S. Government under Section 508 of the U.S. Rehabilitation Act of 1973, as amended.

For more information about specific accessibility features of SAS Data Integration Studio and SAS Management Console, refer to their respective documentation available from http://support.sas.com.

SAS is committed to improving the accessibility and usability of our products. If you have questions or concerns about the accessibility of SAS products, send e-mail to accessibility@sas.com.

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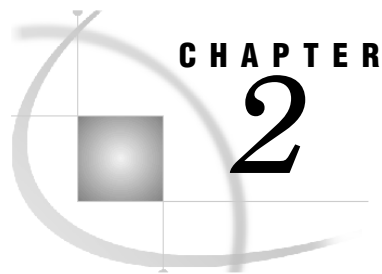
SAP Administration Tasks

Customizing for the Installation Environment

The SAS Solutions Adapter for SAP requires some customization to work in your unique installation environment. When customizing the SAS Solutions Adapter for SAP for your site, you must configure SAS/ACCESS Interface to R/3 software and customize the SAS Solutions Adapter for SAP for the assigned libraries in your installation environment.

Configuring SAS/ACCESS Interface to R/3 Software

Install Transports and Customize the Installation Environment

The SAS Solutions Adapter for SAP uses SAS/ACCESS Interface to R/3 software. This software requires extensive installation setup before use. For detailed installation instructions and configuration information, see the SAS/ACCESS Interface to R/3 installation documentation that is included in your installation package.

In addition to configuring SAS/ACCESS Interface to R/3 software, the following transport must be copied and installed on the SAP server to accommodate the SAS Solutions Adapter for SAP:

Transport: SAPKA91303INSAS

Object: Development class /SAS/ADDDS

Applied to: SAP R/3 Systems

Objects: Function group /SAS/ADDDS1 includes function modules /SAS/FI_IMPORT_BAL_SHEET_POS and /SAS/FI_IMPORT_BAL_SHEET_TEXT

Purpose: ADDDS1 retrieves balance sheet information

Objects: Function group /SAS/ADDDS2 includes function modules /SAS/HR_READ_SALDO, /SAS/HR_READ_ZES, and /SAS/HR_EVALUATE_WAGES

Purpose: ADDDS2 retrieves salary information

Objects: Referenced structures /SAS/HR_CLUSTER_STRUCT_01 and /SAS/HR_EVALUATE_WAGES

You can locate this transport in the **\soladaptsap\sasmisc** directory that is relative to the location where your Foundation SAS software is installed (for example, **x:\Program Files\SAS\SAS 9.1\soladaptsap\sasmisc**).

To customize the installation environment for the SAS Solutions Adapter for SAP, the SAP administrator must complete the following four tasks:

- ❏ Define a role for SAS_HR_CLUSTER_EXTRACTOR.
- ❏ Define a destination to enable the extraction of HR cluster tables.
- ❏ Define a variant to enable the extraction of HR cluster tables.
- ❏ Define user permissions.

The following sections provide general instructions about how to perform these tasks. The specific steps that you must follow to complete each task might vary from these general instructions based on your version of SAP software. For more information about how to perform these tasks in your specific environment, see the appropriate documentation for your SAP software.

Define a Role for SAS_HR_CLUSTER_EXTRACTOR

The steps provide general instructions about how to define a role for SAS_HR_CLUSTER_EXTRACTOR:

1   Issue the transaction PFCG in the SAP GUI.

2   Create a role with the title SAS_HR_CLUSTER_EXTRACTOR.

3   Select **Authorizations** to assign/change the authorization data for the particular cluster.

4   Manually provide the following data:
- ❏   **P_ORGIN**
- ❏   **P_PCLX**

5   In the HR: Master Data branch of the resulting tree, provide the following values:
- ❏   **Authorization level - R**
- ❏   **Infotype - 0001**
- ❏   **All remaining fields - ***

6   In the HR: Clusters branch of the resulting tree, provide the following values:
- ❏   **Authorization level - R**
- ❏   **Area Identifier for Cluster - ***

7   Save the role.

Define a Destination

The steps provide general instructions about how to define a destination to enable the extraction of HR cluster tables.

1 Issue the transaction SM59 in the SAP GUI and provide the following values:

❑ **RFC Destination - SAS_HR_CL_EXTRACT**

❑ **Connection Type - T**

❑ **Description - Destination for SAS HR cluster extraction**

2 Select the **Registered Server Program** option and specify the value **Program ID - SAS_HR_CL_EXTRACT**.

Define a Variant

The steps provide general instructions about how to define a variant to enable the extraction of HR cluster tables. You must complete these steps twice to create both the GENERAL and LIMITED variants. The LIMITED variant is used for testing purposes.

1 Issue the transaction SE38 in the SAP GUI and provide the value **Program Name - /SAS/HRCL_EXTRACT**.

2 Under **Subobjects**, select **Variants**.
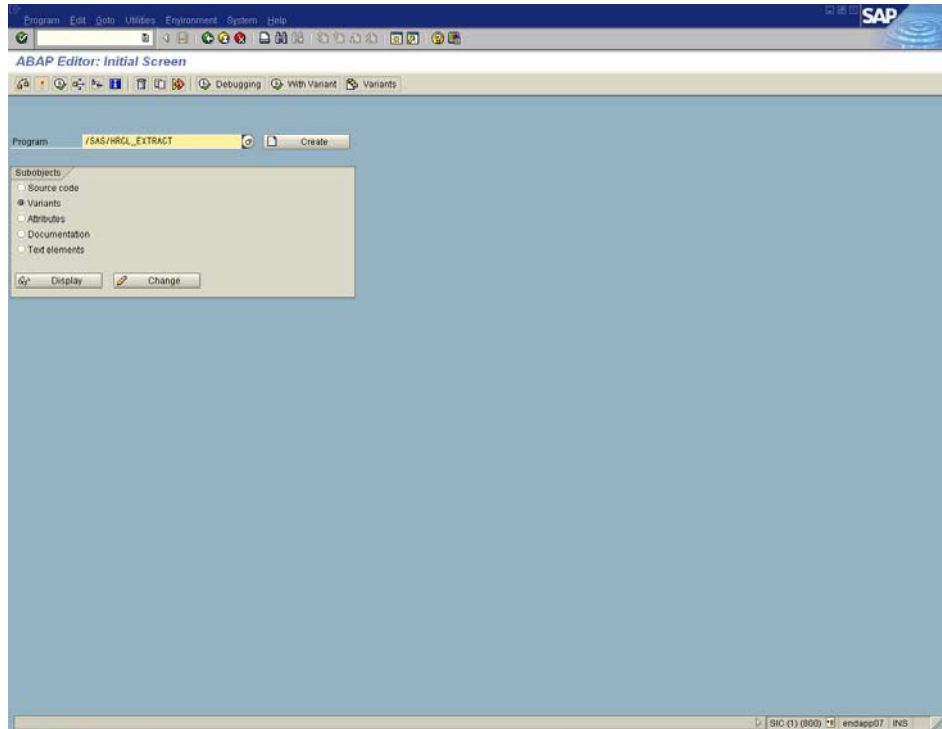
3 Click **Display**.

4 Enter a variant name of GENERAL or LIMITED. The macro variable HR_PAYROLL_ABAP_VARIANT in preprocparms12.sas should be set accordingly.

5 Click **Create**.

6 Change the **RFC Destination** from **BACK** to **SAS_HR_CL_EXTRACT**.

7 Manually provide the following data:

❑ **S_CST – RT**

❑ **S_SRTZA – A**

❑ **All other fields – blank**

8 Subset the conditions based on the variant.

❑ For the GENERAL variant, subset on the wage type parameter S_WTP to reduce the volume of data by an order of magnitude. For example, derived wage types starting with a forward slash (/) might not be of interest.

❑ For the LIMITED variant, additional subsetting might enable faster testing.

9 Save the variant.

Define User Permissions

The SAP administrator defines authorizations for the SAP users who can log on and extract data using the SAS Solutions Adapter for SAP. The SAS administrator configures the SAS Solutions Adapter for SAP so that only the authorized SAP users can log on.

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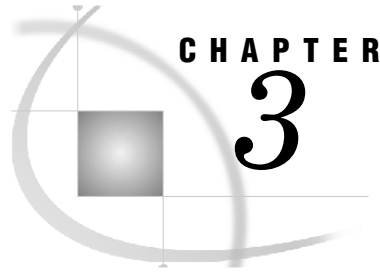
Customizing the SAS Solutions Adapter for SAP

Preparing to Import the SAS Solutions Adapter for SAP

Before you import the SAS Solutions Adapter for SAP, you must prepare your environment by completing the following tasks:

❑ Define user and SAP login details in a Foundation repository in SAS Management Console.

❑ Define an SAP library and SAP server in a Custom repository in SAS Management Console.

❑ Test and verify the resulting connection in SAS Data Integration Studio.

These tasks are required to ensure that the SAS Solutions Adapter for SAP works properly when it is imported. The remaining sections in this chapter provide instructions on how to complete the required tasks.

Defining the Environment

Define a User

To define a user for the SAS Solutions Adapter for SAP, complete the following steps:

1 Open SAS Management Console.
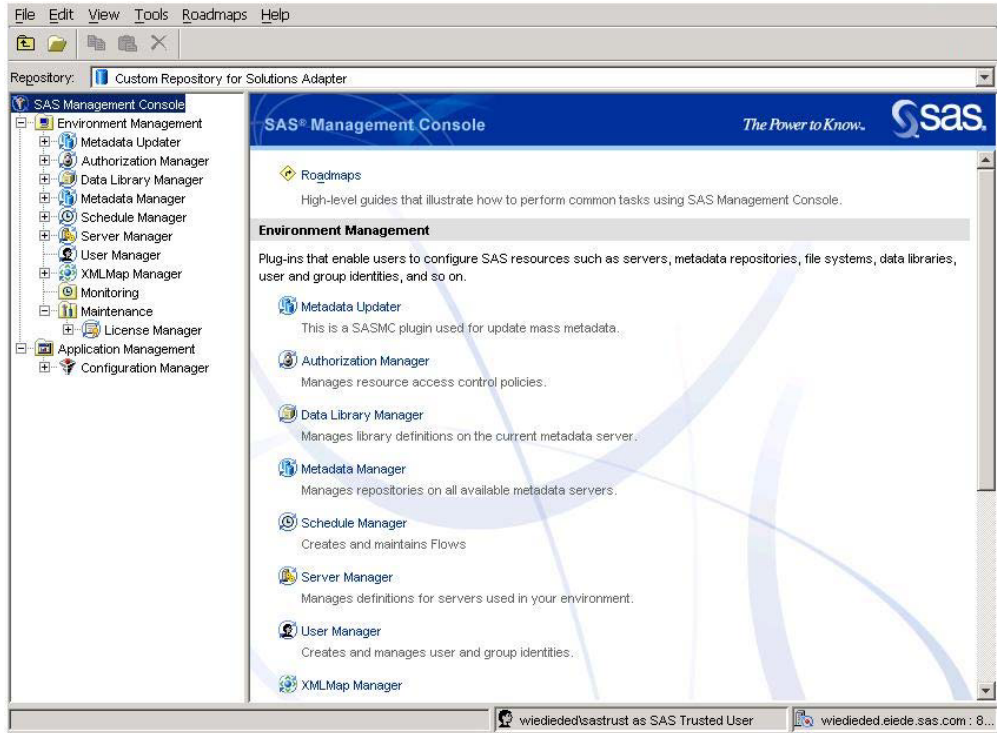
2 Select **Foundation** in the **Repository** field to connect to the metadata server at the foundation level. You must have administrator access to complete this task.

3 Right-click **User Manager** in the tree on the left of the SAS Management Console window, and then select **New➔Group**. The New Group Properties dialog box appears.
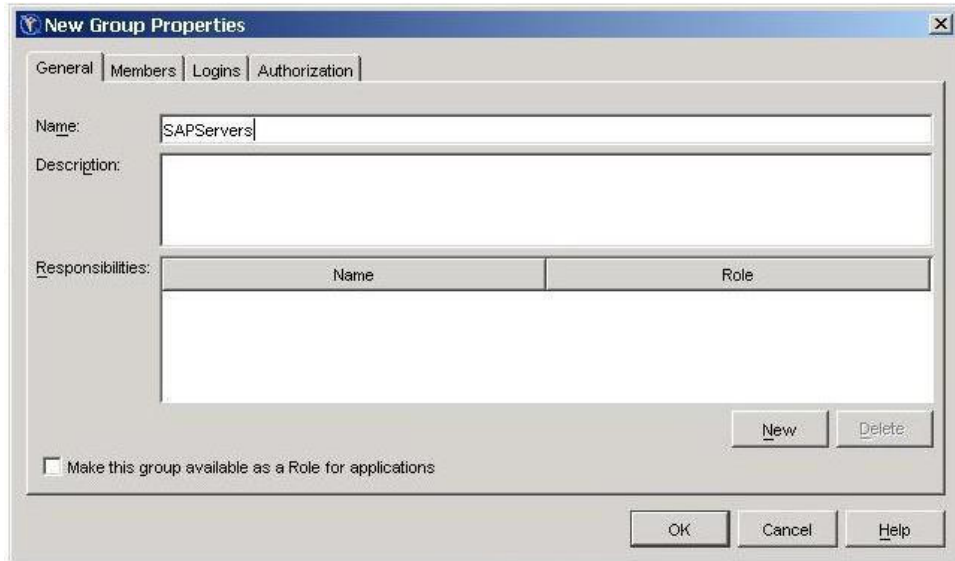
4 Enter **SAPServers** in the **Name** field.

5 Select the **Members** tab.
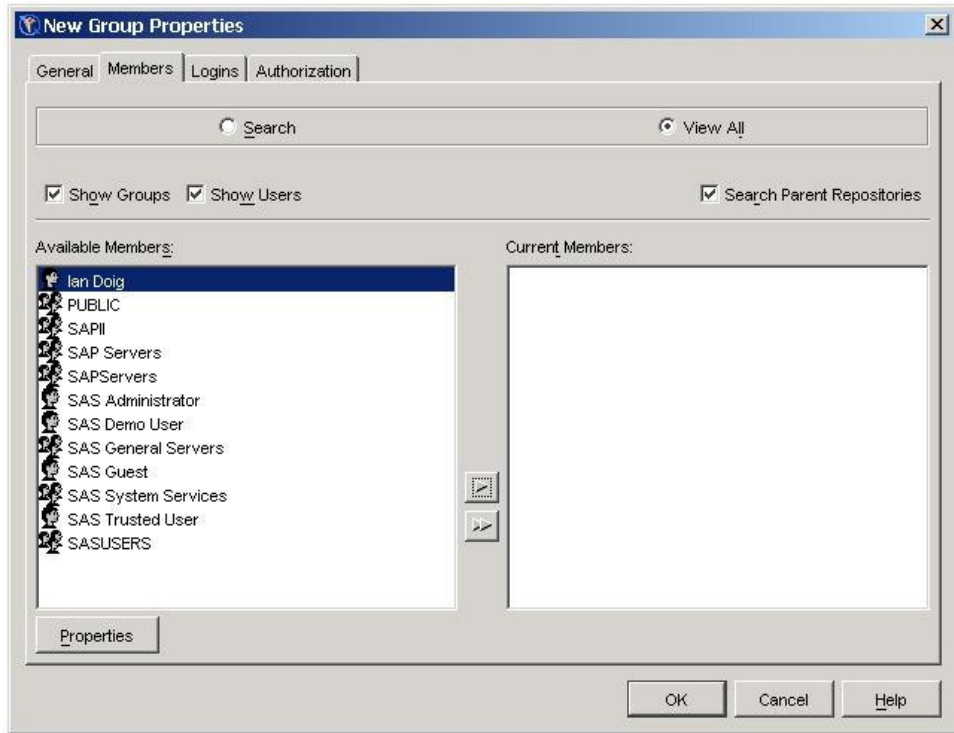
6 Select **SAS Trusted User** in the **Available Members** box. Click the single arrow button that is pointing to the **Current Members** box. The selection moves to the **Current Members** box.

7 Select the **Logins** tab.
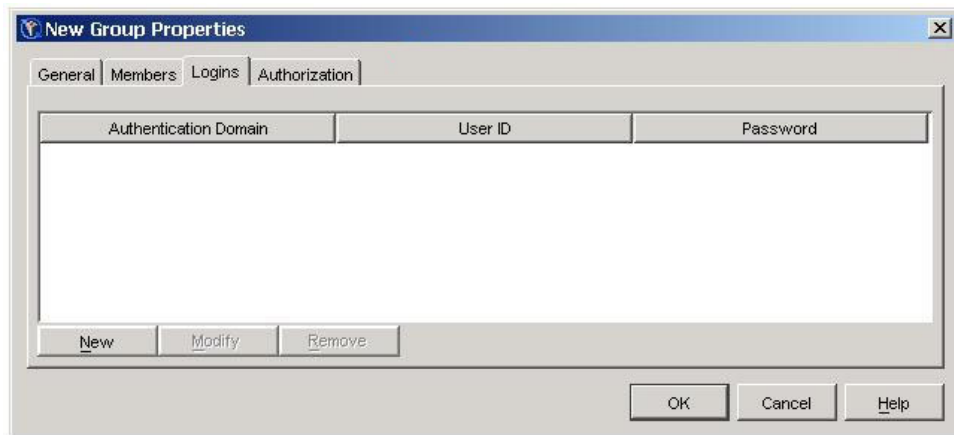
8 Click **New**. The New Login Properties dialog box appears.

9 Complete the following steps to provide the necessary information for the New Login Properties dialog box:

    a Enter the user ID for the SAP server.

    b Enter the password for the SAP server.

    c Select **SAPAuth** from the **Authentication Domain** menu. If this option is not already available on the menu, click **New**, enter **SAPAuth** as the name of the new authentication domain, and then enter a short description. Click **OK** to save the new authentication domain.

    d Click **OK** to save the new login properties.

    e Click **OK** to save the user definitions.

Define an SAP Library and SAP Server

To define an SAP library and SAP server, complete the following steps:

1 Open SAS Management Console.

2 In the **Repository** field, select a repository that is solely dependent on the Foundation repository to connect to the metadata server at the foundation level.

    Note: Defining an SAP library and an SAP server should occur in a Custom repository that is solely dependent on the Foundation repository. If you do not have a defined repository that meets this requirement, then you must add one. To add one, use the Metadata Manager in SAS Management Console to access the Active Server node and add a repository.

3 Expand **Data Library Manager** in the tree on the left of the SAS Management Console window.

4 Right-click **SAS Libraries**, and then select **New Library**. The New Library Wizard appears.
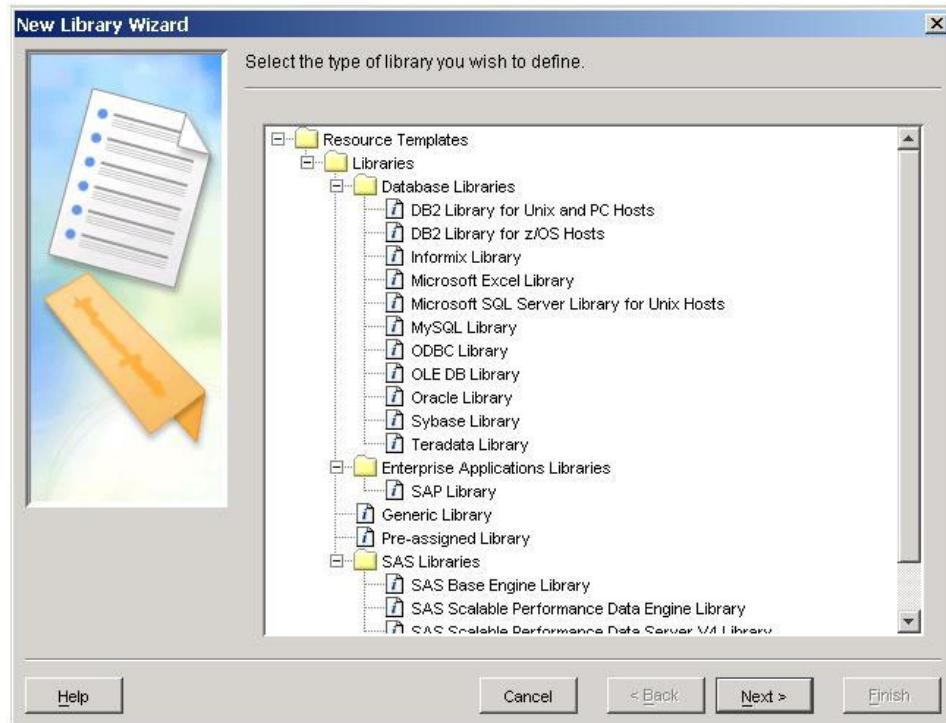
5 Select **SAP Library** from the **Enterprise Applications Libraries** folder.

6 Click **Next** to name the new SAP library.
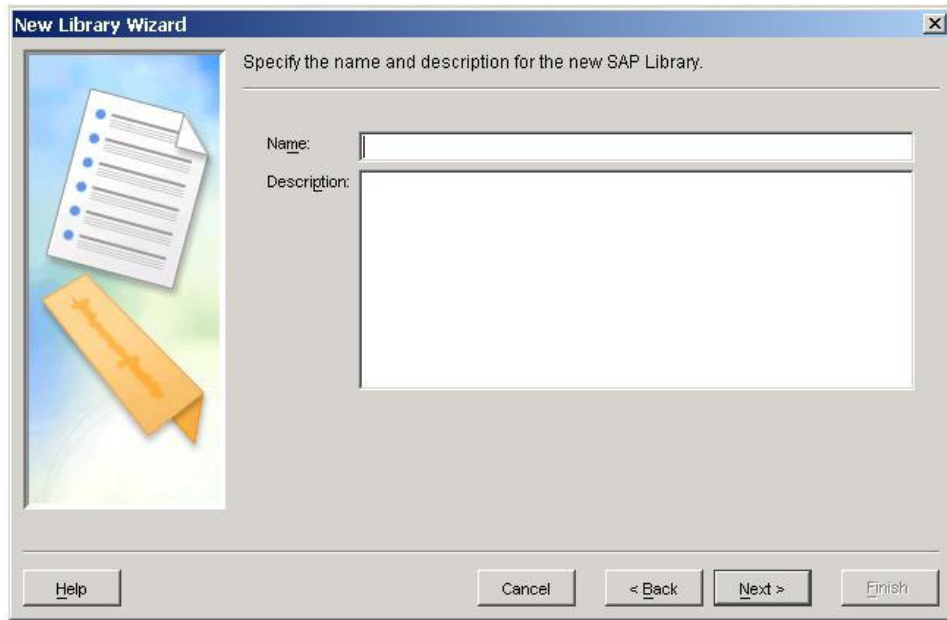
7   Enter a name and description for the SAP library.

8   Click **Next** to specify library properties.
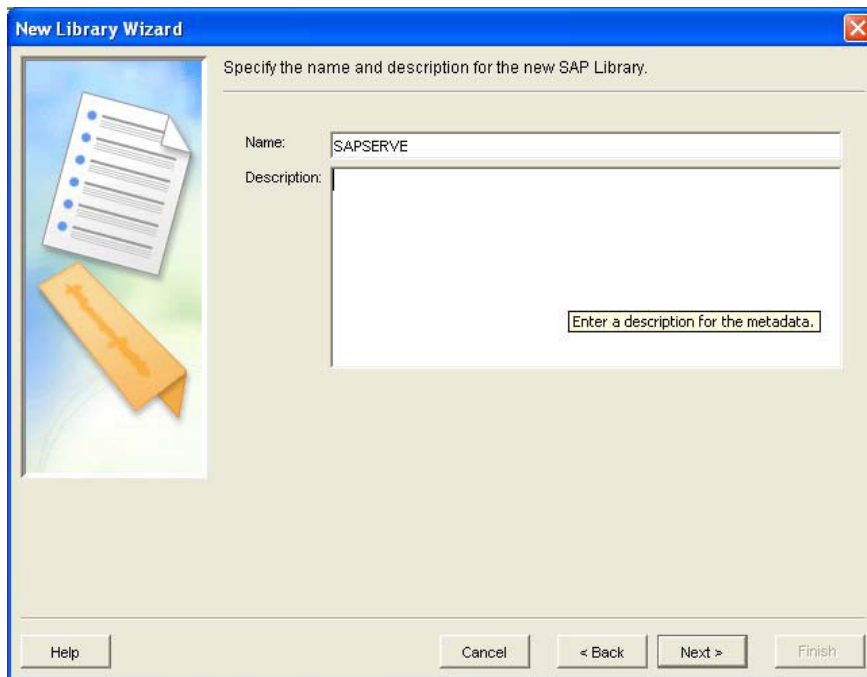
9   Enter **SAPSERVE** in the **Libref** field. SAPSERVE is the default value that the imported metadata uses.

10 Click **Next** to select a database server.
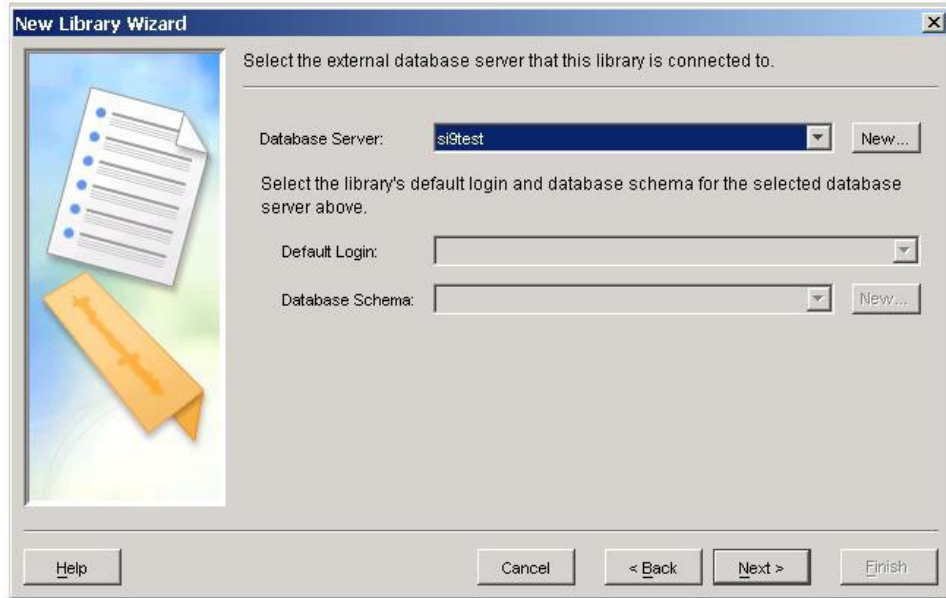
11 In the **Database Server** field, select a database server that contains parameters that connect to the SAP server. If an appropriate database server is not already available in the menu, complete the following steps to create one:

    a   Click **New** to open the New SAP Server Wizard.
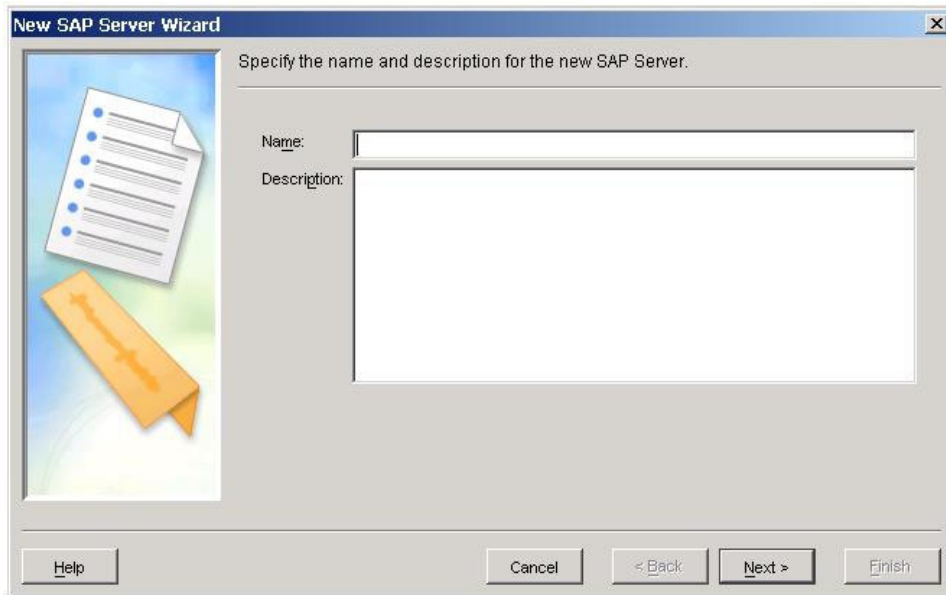
    b   Enter a name and description for the server.

    c   Click **Next** to enter information about your SAP software.
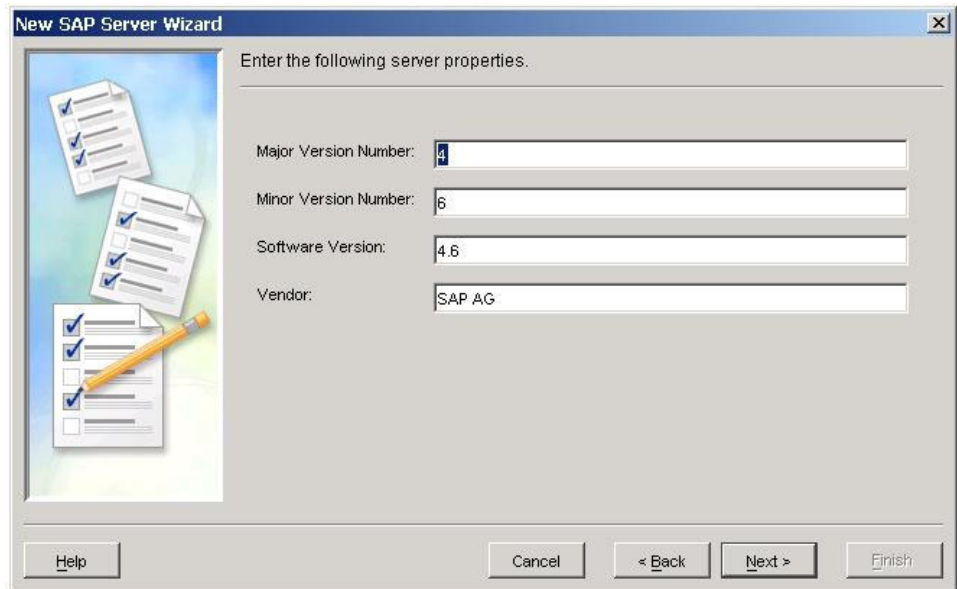
d   Enter the version numbers for your SAP software. These values are optional.

e   Click **Next** to enter connection properties.
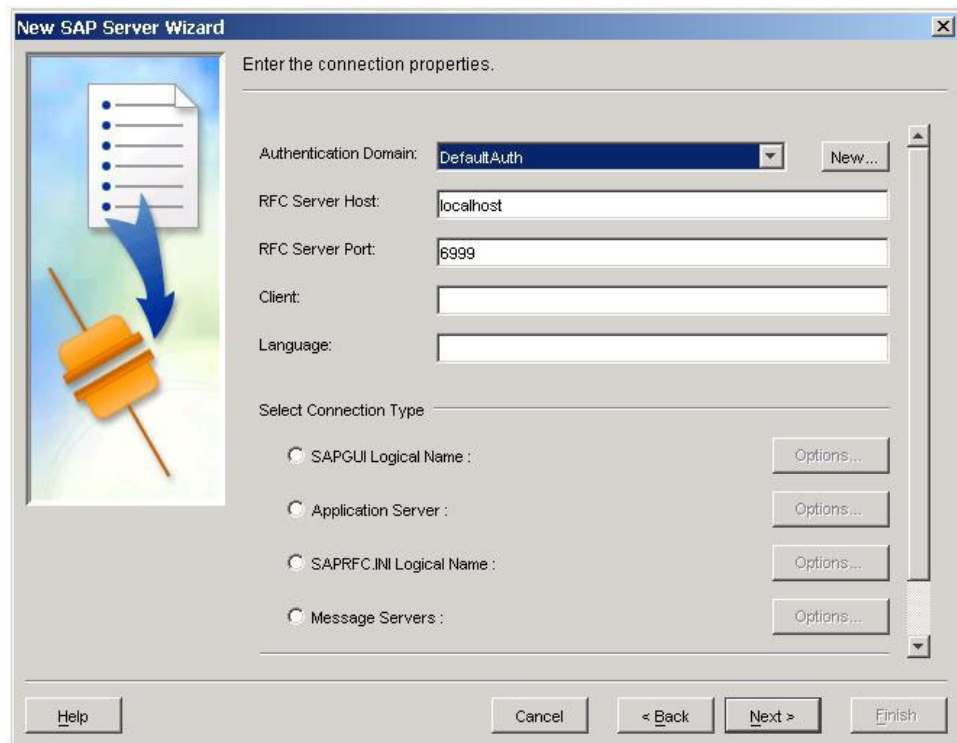
f   Select **SAPAuth** from the **Authentication Domain** menu.

g   Specify the RFC server host, RFC server port, SAP client, and SAP language.

h   Select the connection type that corresponds to a normal SAP GUI connection for your system. Click **Options** for your selection, and then enter the required values.

i Scroll down the page to access the **Advanced Options** button. If you have defined batch servers or processes, you might need to specify some of the advanced options that are available.

j Click **Next** to display a summary of your new specifications.
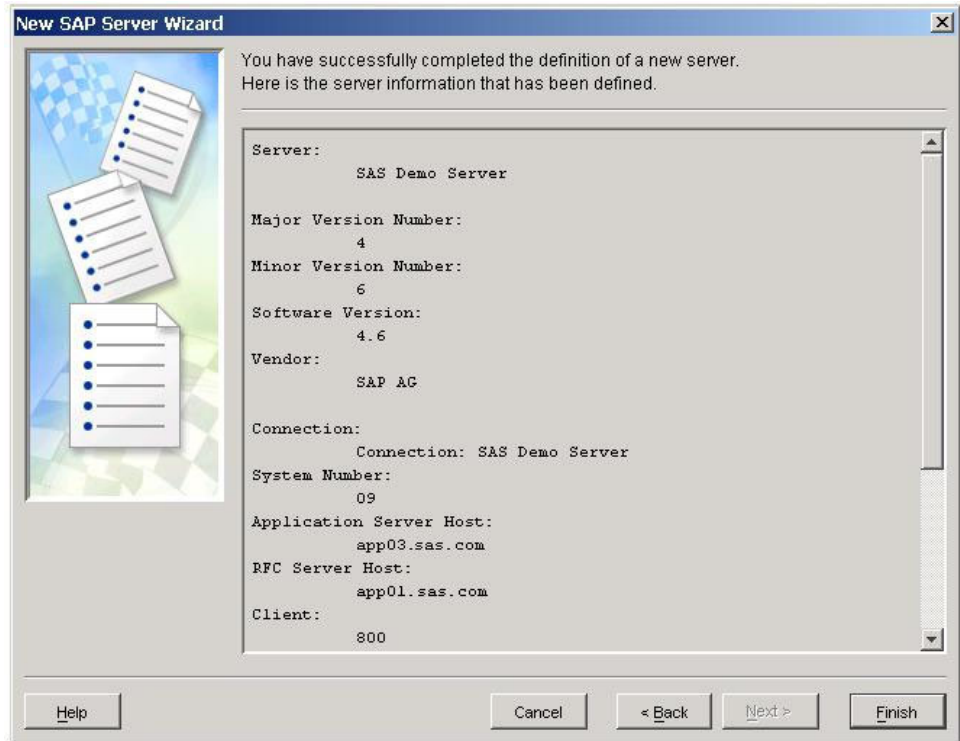
k Review the information and click **Finish** to save the new SAP server and to return to the New Library Wizard. Based on your specifications up to this point, the wizard might prompt you to select a SAS server where the SAP library is to be assigned. If you are prompted, select **SASMain**, and then click **Next** to continue.

12 Click **Next** to review the library parameters.
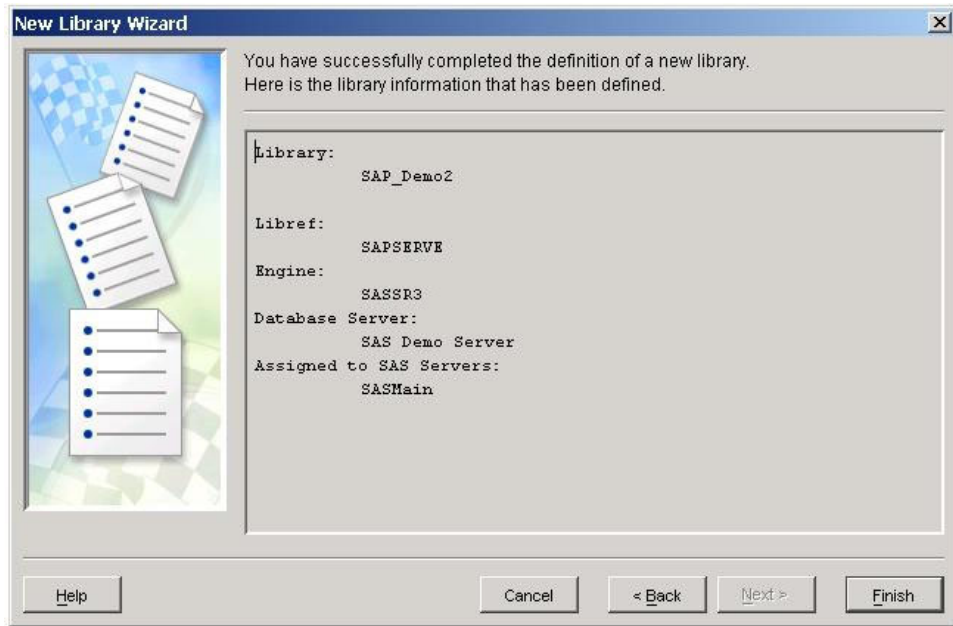
13 Click **Finish** to save.

Test the SAP Connection

To test the SAP connection, complete the following steps:

1 Open SAS Data Integration Studio.
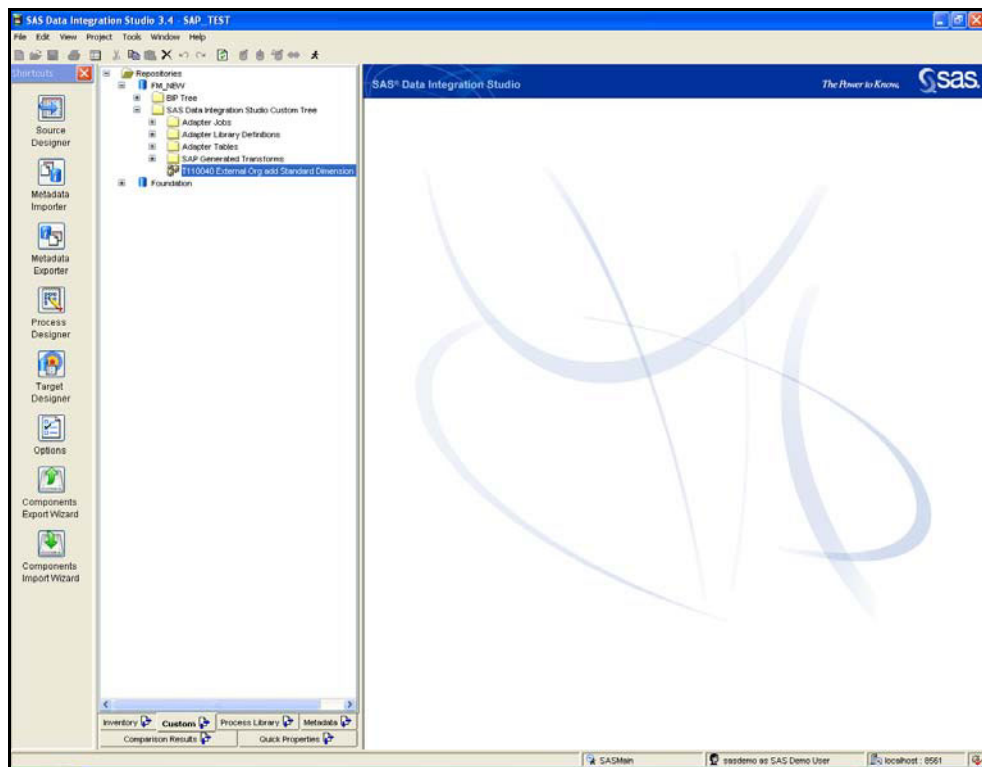
2 Open the metadata profile for the user with access to the Custom repository.

3 Select **Tools→Source Designer**. The Source Designer dialog box appears.
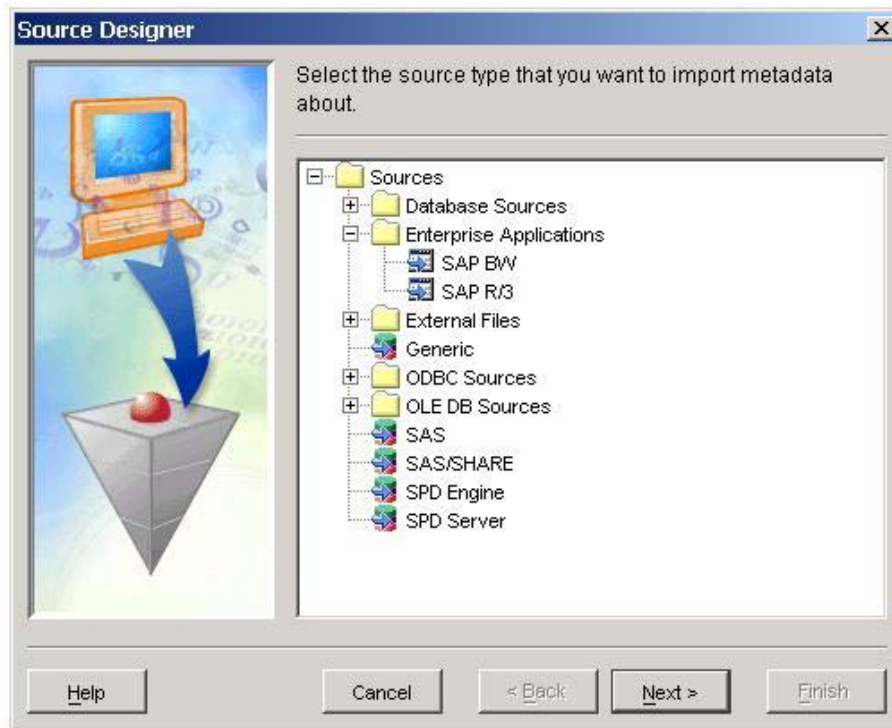
4 Expand `Enterprise Applications` and select the `SAP R/3` source type.

5 Click `Next` to select an SAP server.

   Note: Based on your specifications up to this point, the wizard might prompt you to select a SAS server. If you are prompted, select `SASMain`, and then click `Next` to continue.
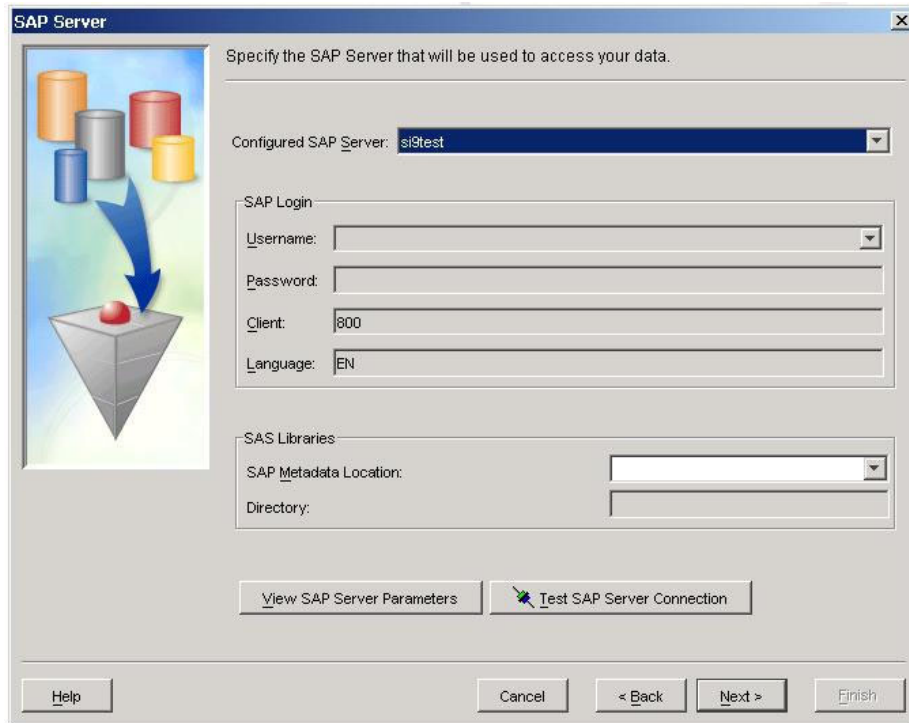
6 In the **Configured SAP Server** field, select the name of the SAP server that you defined in SAS Management Console.

7 Click **Test SAP Server Connection**. If the connection is successful, then the following message appears:

Note: If the connection is not successful, the SAS log indicates the problem. For example, RFC server errors might indicate that the RFC server is not running, or an invalid user ID might indicate that the password is incorrect. For more information about troubleshooting connection problems, see the SAS/ACCESS Interface to R/3 installation documentation that is included in your installation package.

8 Click **Yes** to view the SAS log.
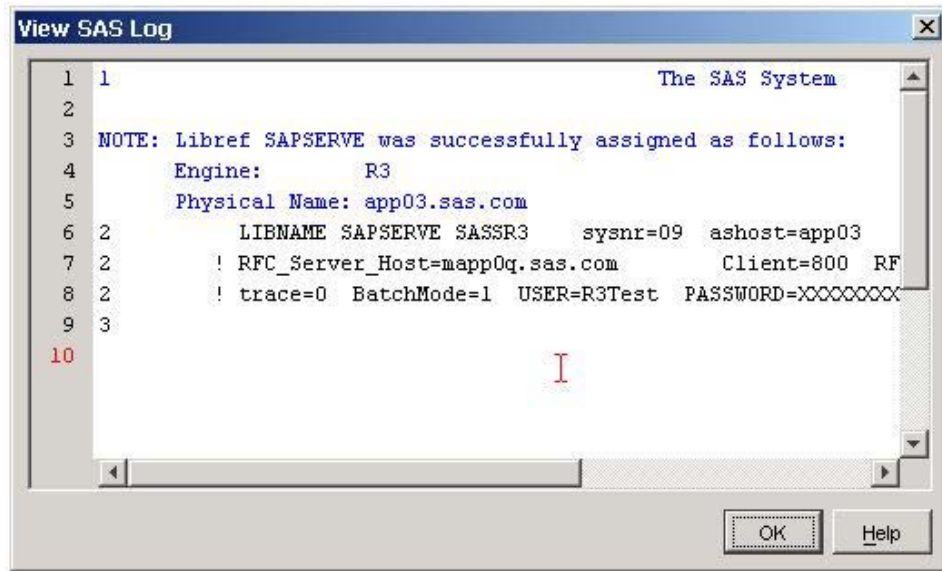
The View SAS Log dialog box displays the LIBNAME statement that is generated using the specified parameters.

9 Click **OK** to exit the SAS log.

10 Click **Cancel** to exit the Source Designer.

Deploying the SAS Solutions Adapter for SAP Jobs and Tables Metadata

To deploy metadata for objects (in this case, jobs and tables) for the SAS Solutions Adapter for SAP, you can use the standard metadata import and export features of SAS Data Integration Studio. Objects should be deployed in the following sequence—groups, libraries, transformations, tables, and jobs. The components for the SAS Solutions Adapter for SAP are stored as package files. A package file is available in the location from which the file was extracted at the time of installation. The standard location for storing the package file is
C:\ProgramFiles\SAS\SASSolutionsAdapterSAP\1.4\ETLComponentsPackage.

To deploy tables and jobs, complete the following steps:

1 Open SAS Data Integration Studio with the metadata profile for the user with access to the Custom repository. In the metadata profile, select the Custom repository that you defined when you added the SAP server and SAP library in the previous sections. The SAS Solutions Adapter for SAP is imported to the repository that you select in this step.

2 To import tables and jobs, right-click **SAS Data Integration Studio Custom Tree**, and then click **Import**.

Note: Groups refer to the folder structure defined for the SAS Solutions Adapter for SAP.
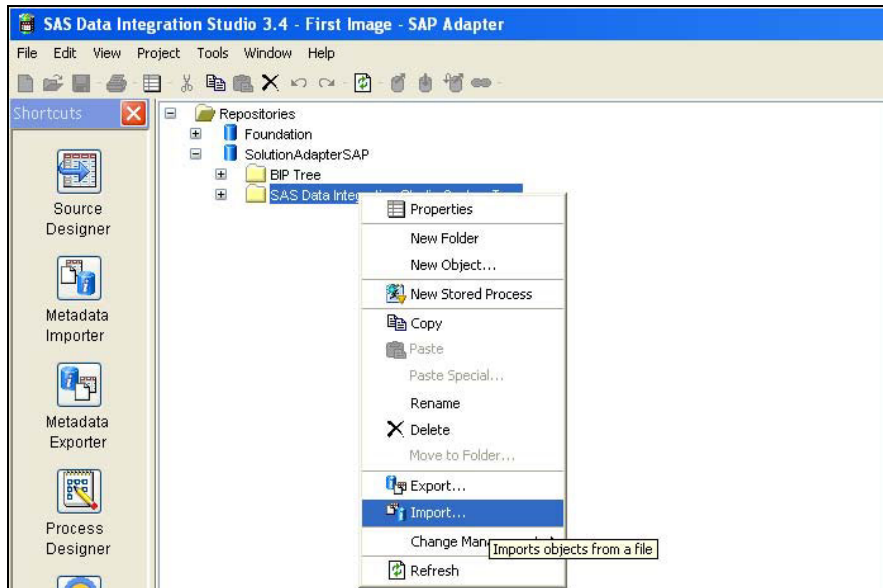
3 The Import Wizard is displayed. Click **Browse**, and then open the **Groups** folder, which is within the **ETLComponentsPackage** folder, which was created at installation. Under **Import Options**, select **All Objects**, and then click **Next**. Retain the default options and continue.
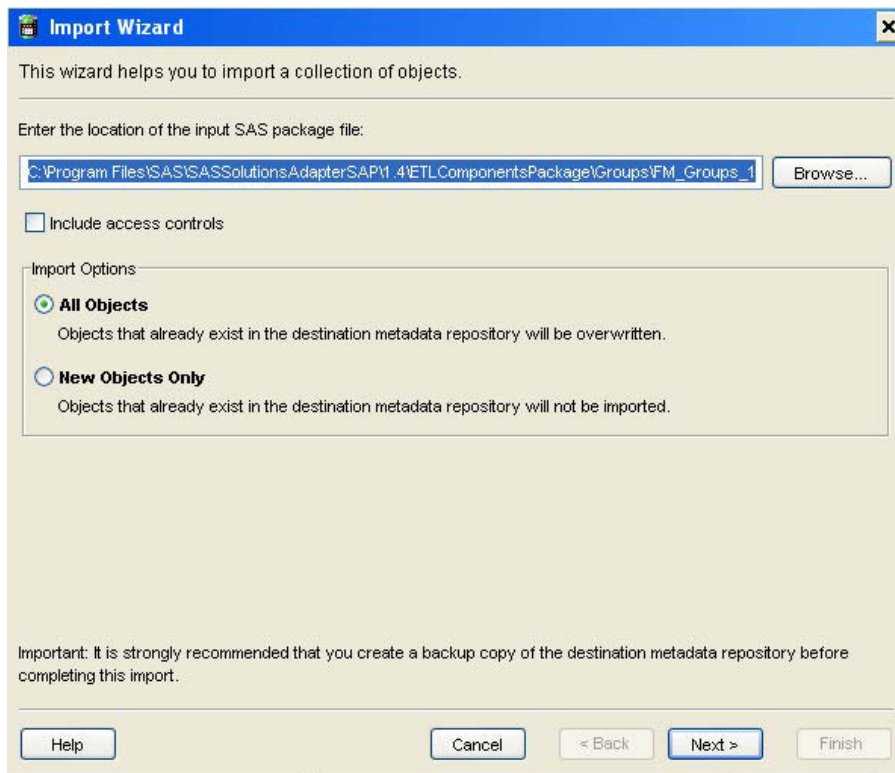
Note: SAS Human Capital Management and SAS Financial Management adapters use an identical installation procedure. Therefore, all components for both of these adapters are installed in one common location. Components are

named after their adapters. You must select the components that correspond to the adapter. For example, you should import FM_Groups_14.spk, FM_tables_14.spk, and Financial_Management_jobs_14.spk when installing the SAS Financial Management adapter.

4   The objects to be imported are displayed.
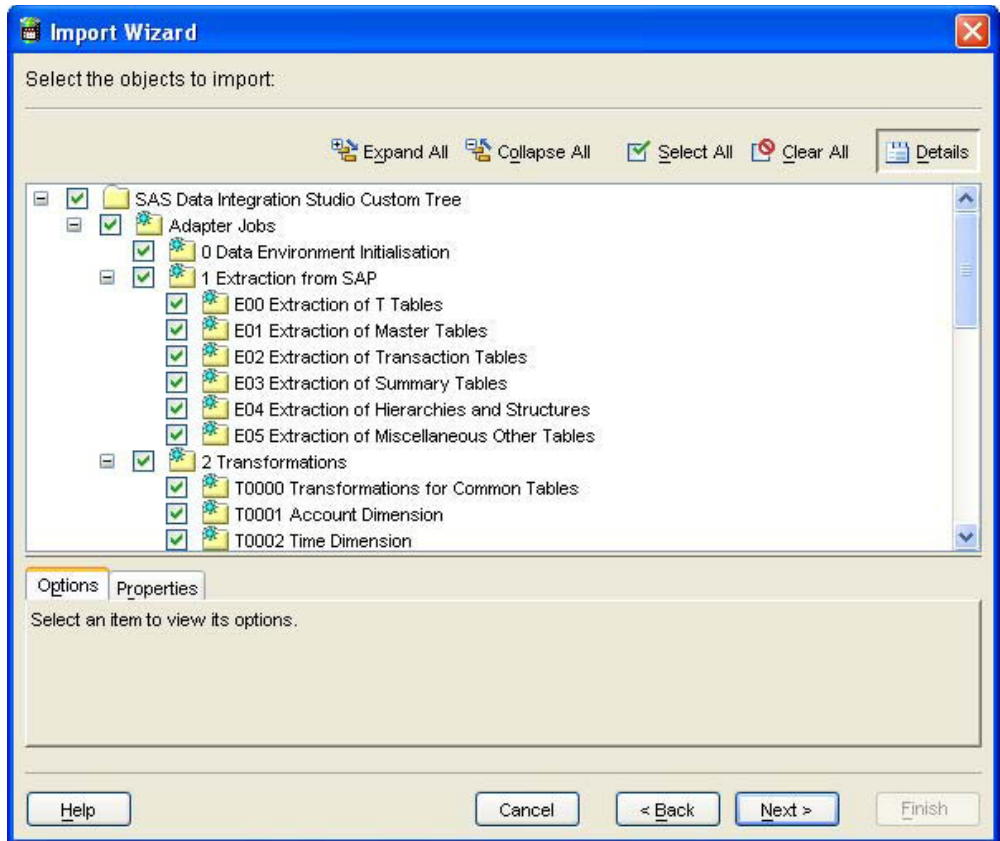
5 Click **Next** to continue. A summary of values is displayed.
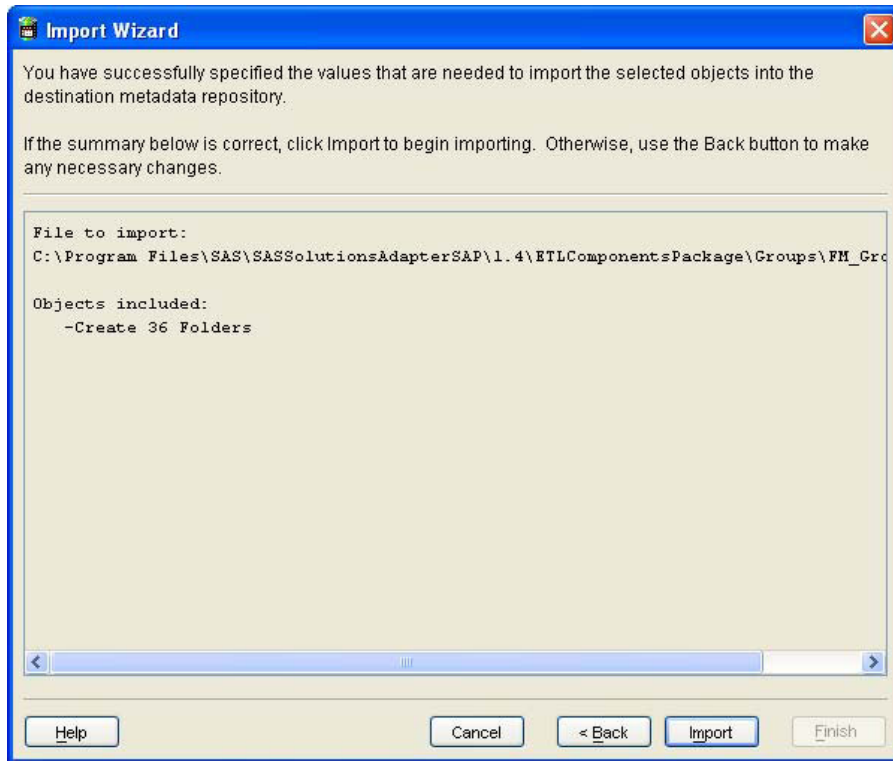
6 Review the summary, and then click **Import**. A progress indicator is displayed.
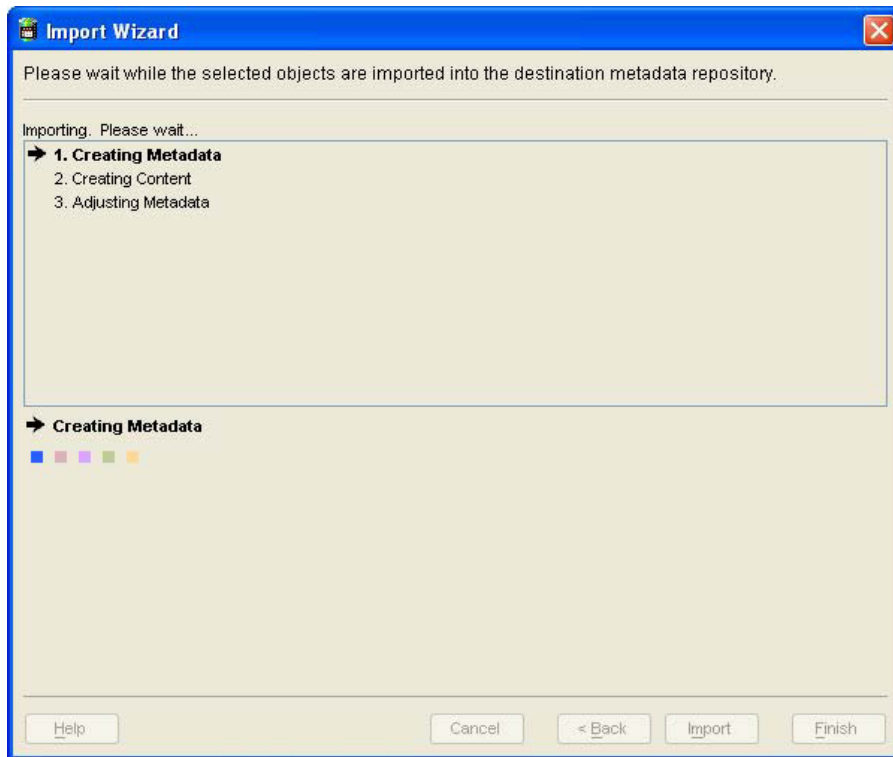
7   Once the import is finished, the Import Wizard displays a completion message. If the import process fails, click **View Log**, check for messages, and take appropriate action.
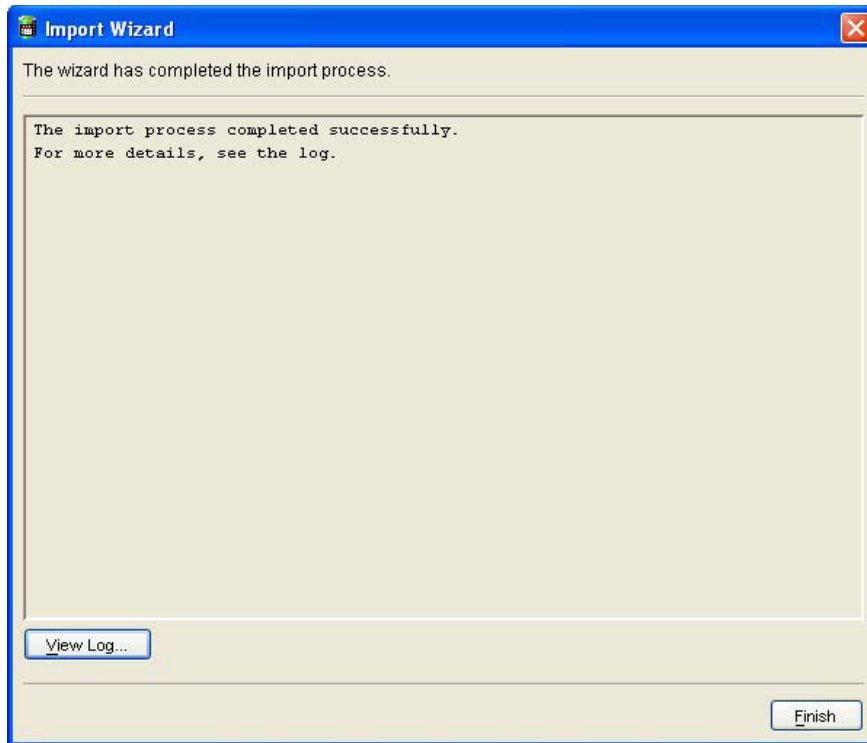
The environment for data extraction and transformation from SAP is now installed. You can customize your environment further in the SAS Data Integration Studio environment as needed.

Note: Use the process described in steps 1 through 7 to deploy groups, libraries, and transformations.

Customizing SAS Data Integration Studio Jobs and Programs

To customize the SAS Solutions Adapter for SAP to fit into your unique environment, you must review and change several jobs in SAS Data Integration Studio. Several SAS programs within these jobs also require your review and changes.

Although many of the jobs and programs do not require changes, you must review each one to ensure the results that you want. This section provides information about each job and program that requires your review and changes. It describes each job in SAS Data Integration Studio, and explains whether the job or program requires changes to work successfully.

Customizing the preprocparms12.sas Program

About the preprocparms12.sas Program

SAS Solutions Adapter for SAP jobs use several global macro variables that are initialized in the SAS program preprocparms12.sas. This program serves as the preprocessing step in each job.

The following section describes each part of the preprocparms12.sas program, and explains the parts of the program that you must change for your environment.

Note: Be sure to make a backup copy of the program before changing it.

File Location

The preprocparms12.sas program is in the install directory. The file is located where you specified in the field **Enter the path for SAS source code** on the Enter Parameters page of the Solution Package Deployment Wizard in SAS Management Console.

Note: For more information about where and how this location is specified, see the following two sections of this document:

❑ "Deploying the SAS Solutions Adapter for SAP Jobs and Table Metadata"
❑ Appendix 1: "Solution Package Deployment Parameters"

The preprocparms12.sas program file is called by the preprocglobal.sas program. The preprocglobal.sas program does not require any changes for your local environment.

```
/***************************************************************************/
/* Copyright (c) 2008 by SAS Institute Inc., Cary, NC 27513, USA   */
/*                                                                         */
/* Name:         preprocglobal.sas                                        */
/*                                                                         */
/***************************************************************************/

%put NOTE: Executing SAS Solutions Adapter for SAP - Implementation-Version 20051004;

/* Global Preprocessing */

proc display c=sashelp.adptsap.startup.scl batch;
run;

options mstored mrecall;

filename macro '$SAPDDSSOURCE$';
options sasautos = (macro sasautos);

%global spras ktopl versn sakln gjahr _ktopl _versn _start
        dds_source_system_id
        wanted_controlling_areas operating_concern ;


%include "$SAPDDSSOURCE$/preprocparms12.sas";

options fmtsearch = (fmtsearch library.fmt&lang library.fmt&_ktopl.&lang);

/*
 * End of preprocglobal.sas
 */
```

After you open preprocparms12.sas, you will see the banner for the SAS program file. You do not need to change any settings for your local environment.

SAP System Parameters

Data Source

After the banner, the next section of preprocparms12.sas designates the data source location.

```
%let dds_source_system_id=800; * 3 char ID to tell DDS where info
                                * is coming from.  It could be SAP,
                                * or client number - or SAP sysid - anything
                                * that uniquely represents the current
                                * ETL ;
```

The macro variable DDS_SOURCE_SYSTEM_ID is a three-character ID that tells the SAS detail data store (DDS) where the data is coming from. The value can be anything that uniquely represents the current ETL environment, such as SAP, the SAP client number, or the SAP system ID.

This variable populates the SOURCE_SYSTEM_CD column that occurs in multiple DDS tables. If data originates from multiple SAP systems, multiple extracts are necessary, with each extract having its own preprocparms12.sas file and unique value set for the variable DDS_SOURCE_SYSTEM_ID.

SAP Queries

The SAP queries section of the program enables you to view information about queries that are passed directly to SAP.

```
* Use only when testing to see what is passed to SAP ;
* options debug=dbms_select;
```

The statement **options debug=dbms_select** shows detailed information about queries that are passed directly to SAP. Generally, the SAP queries section is not needed unless you think that SAP server-side JOINs are taking longer than expected to run. This section provides additional tracking that might help solve problems.

SAP Language Codes

Use the SAP language codes section of the program to designate the language that SAP uses.

```
%let spras    = 'E';     * single-char SAP language with quotes;
%let lang     = E;       * language without quotes;
* set valid SAS language value to be used in the
* solution data mart ;
%let sas_lang_for_sdm='en';
```

Set the macro variables SPRAS and LANG to the single-character language code that corresponds to the main language that SAP uses. This is also the language that the program uses to maintain text. Versions enclosed or not enclosed in quotation marks exist for easily including them in the code and for making the code easy to understand.

Use the following language code table to determine the valid language value for your local environment.

Table 3.1   Language Codes for preprocparms12.sas

Code	Language	Code	Language
0	Serbian	I	Italian
1	Chinese	J	Japanese
2	Thai	K	Danish
3	Korean	L	Polish
4	Romanian	M	Chinese (Traditional)
5	Slovenian	N	Dutch
6	Croatian	O	Norwegian
7	Malaysian	P	Portuguese
8	Ukrainian	Q	Slovakian
9	Estonian	R	Russian
A	Arabic	S	Spanish
B	Hebrew	T	Turkish
C	Czech	U	Finnish
D	German	V	Swedish
E	English	W	Bulgarian
F	French	X	Lithuanian
G	Greek	Y	Latvian
H	Hungarian	Z	Customer Reserve

The macro variable SAS_LANG_FOR_SDM sets the main language that SAS uses. The two-character language code must be in lowercase and in the table SASHELP.LANGUAGE that is supplied by SAS.

The new macro variable DEFAULT_LANG is a two-digit ISO code that sets the default language flag in the STAGE_CODE_LANGUAGE table.

SAP Client

The value of the LET CLIENT macro variable is the SAP client (column MANDT) that is usually part of the SAP R/3 logon.

```
%let client   = 800 ;    * = MANDT  ;
```

Common Extraction Parameters

E-mail Contact for Error Reports

The e-mail contact for error reports section of preprocparms12.sas includes the e-mail address of the contact who receives error notifications for any extractions or transformation flows that use a publish-to-e-mail transformation. The initial value is obtained from the parameters that are supplied in the import steps.

```
*---Email contact for error reports---*;
%let emailerror=xxx@yyy.zzz.domain;
```

Cost Center/Profit Center Hierarchies

By default, the SAS Solutions Adapter for SAP extracts the standard hierarchies for the cost center and the profit center. You can select a different hierarchy by specifying alternative hierarchy roots in the macro variables COST_CENTER_HIER_ROOT and PROFIT_CENTER_HIER_ROOT.

To accept the default standard hierarchies, leave the macro variables blank.

```
* Set values if you want to override the default hierarchy;
%global cost_center_hier_root profit_center_hier_root;
%let cost_center_hier_root=;
%let profit_center_hier_root=;
```

Company

If you want to extract data from SAP for only selected companies, you can specify the WANTED_COMPANY_CODES macro variable to select company codes. The list of valid company code values is in the SAP R/3 table TKA02. The companies that you specify should all belong to controlling areas that are selected by the macro variable WANTED_CONTROLLING_AREAS.

```
* Select wanted company codes from TKA02 -
  List must be entered as quoted company codes
  separated by commas ;
%let wanted_company_codes='1000' , '2000' , '6000';
```

Euro Currency Conversion

The SAS Solutions Adapter for SAP can convert employee compensation amounts that are paid to employees in pre-Euro currencies so that all of the amounts are in Euros. The macro variables CONVERT_CURRENCY_TO_EURO and PRE_EURO_CURRENCY control this conversion. This conversion is performed because the salary results table does not explicitly contain currency information.

The macro CONVERT_CURRENCY_TO_EURO needs to have a value of YES or NO. The macro PRE_EURO_CURRENCY must be set to one of the standard international currency codes. These codes are three-characters in length. The macro PRE_EURO_CURRENCY is used only when the macro CONVERT_CURRENCY_TO_EURO is set to YES.

Note: The SAS Solutions Adapter for SAP does not use the Euro currency conversion macro variables in areas other than the calculation of employee compensation. However, you can use these macros elsewhere.

```
/*
 * Currency amount before 2001 might be converted from pre-euro currencies
 * to euro using the standard fixed exchange rates.
 * To switch on this conversion the macro variable convert_currency_to_euro
 * has to be set to YES, pre_euro_currency has to be set to the pre-euro currency
 * as 3-character ISO code like DEM, FFR, BEF,...
 * Note that only a single currency is assumed.
 */
%let convert_currency_to_euro = NO;
%let pre_euro_currency = DEM;
```

SAS Financial Management Parameters

Chart of Accounts

The SAS Solutions Adapter for SAP handles a single chart of accounts at a time. You must specify this chart of accounts in the macro variables KTOPL and _KTOPL.

A chart of accounts in SAP is a list of all general ledger accounts that one or more company codes use. For each general ledger account, the chart of accounts contains the account number, account name, and information that control how an account functions and how it is created in a company code.

```
%let ktopl   = 'INT';   * chart of accounts ;
%let _ktopl  = INT;     * chart of accounts without quotes;
```

If you need more than one chart of accounts for your environment, you must set up additional instances of the SAS Solutions Adapter for SAP and specify the relevant values. Be sure to select unique values for the data source macro variable DDS_SOURCE_SYSTEM_ID as shown in the data source section of the preprocparms12.sas file.

To specify a correct value for the chart of accounts, see the contents of the SAP R/3 table T004T. This table contains the names of the charts of accounts based on language dependency. You can use a WHERE clause to select the appropriate language. The value of KTOPL must also appear in the KTOPL column in the T001 table.

After you have determined the correct variable for the chart of accounts, enter the value. You must enclose the KTOPL value in single quotation marks. Do not enclose the _KTOPL value in quotation marks.

Digits in the Account Number

The value for SAKLN determines the number of digits in the account number. If you do not know this value, see the contents of the SAP R/3 table T004. The SAKLN column in this table corresponds to the chart of accounts KTOPL previously chosen.

You should remember that valid account numbers often contain leading zeros. You can delete these leading zeros from the account digit value.

```
%let sakln   = 6;        * number of digits in the account number;
```

Operating Concern

The preprocparms12.sas program file enables you to specify the operating concern in the macro variable OPERATING_CONCERN, and a corresponding country code in the macro variable OPERATING_CONCERN_COUNTRY_CD.

```
* List of valid operating concerns is in
* TKEB,  language-dependent descriptions are in TKEBT ;
%let operating_concern=IDEA;
* specify country where the operating concern HQ is located;
%let operating_concern_country_cd=DEU;
```

To specify a correct value for the operating concern and country code, see the contents of the SAP R/3 table TKEB. Descriptions based on language dependencies are in the TKEBT table.

External Organizations

The macro variable EXT_ORG_ASSOC_TYPE_CD specifies the default value for external organizations that are not found in the customer and vendor hierarchies from SAP. This value populates the EXTERNAL_ORG_ASSOC_TYPE_CD column in the EXTERNAL_ORG_ASSOC_TYPE table of the staging area.

```
* Specify ext_org_assoc_type_cd to use as the default value for
  external organizations that are not found in the customer and
  vendor (supplier) hierarchies from SAP;
%let ext_org_assoc_type_cd=A;
```

The default SAP value for EXT_ORG_ASSOC_TYPE_CD is A. For other valid values, see the contents of the SAP R/3 tables THITT and TLHITT.

Controlling Areas

You can use controlling areas to form the second level of the internal organizational hierarchy. You can use them to select cost center and profit center standard hierarchies. You must specify the corresponding country for each controlling area.

```
%let wanted_controlling_areas=1000 6000;
%let controlling_area_countries=DEU MEX;
```

To set the variables for the controlling area, you first need to specify a list of controlling areas that are required in the macro variable WANTED_CONTROLLING_AREAS. This list should contain values from the KOKRS column in the TKA01 table. When specifying the list, make sure that the controlling areas are all in the same operating concern. For example, select values for KOKRS only where ERKRS="&OPERATING_CONCERN".

After you have specified the controlling areas that are required, you need to specify the corresponding country for each controlling area. Each country is identified with a three-digit ISO code in SASHELP.SAS_COUNTRY.

Use the macro variable CONTROLLING_AREA_COUNTRIES to specify the corresponding country for each controlling area. The first country code must correspond to the first controlling area. The second country code must correspond with the second controlling area, and so on.

SAP R/3 Table GLT0 Data Subsets

Use the macro variables RLDNR, RRCTY, and RVERS to subset the data that is extracted from the SAP R/3 table GLT0. The GLT0 table contains figures that are summed by transaction.

```
* Define macro variables used as "constants" in the
* where clause of R/3 table GLT0 .    ;
%let rldnr=00;   * Ledger ;        * see T881 or T881T for value ;
%let rrcty=0;    * Record Type ;   * 0=Actual,  1=Planned;
%let rvers=001;  * Version ;       * see T894 or T894T
                                   * (apply WHERE clause where rldnr="&rldnr");
```

Although the default settings are generally acceptable, check them against valid values.

❑ For valid ledger values, see the contents of the SAP R/3 tables T881 and T881T.

❑ For the record type value, 0 is the typical value for actual data.

❑ For valid version values, see the contents of the SAP R/3 table T894. The version descriptions are in the T894T table.

Period Type for Exchange Rates

Use the macro variable PERIOD_TYPE_CD_FOR_EXRATES to specify the period type that will be associated with exchange rates. A list of valid values is in the SASHELP.SAS_PERIOD_TYPE table that is supplied by SAS.

```
%let period_type_cd_for_exrates=MO; * This value must be chosen from the table
                                    * sashelp.sas_period_type. This is used
                                    * in the jobs that build table
                                    * STAGE_CURRENCY_EXCHANGE_RATE;
```

Financial Statement

The SAS Solutions Adapter for SAP handles one financial statement at a time. You must specify this financial statement in the macro variables VERSN and _VERSN as shown:

```
* Versn is a value taken from T011;
%let versn    = 'ERL';    * Financial statement version Version ;
%let _versn   = ERL;      * Financial statement version without quotes;
```

To specify a correct value for the financial statement, see the contents of the SAP R/3 table T011. You can use the T011 table for text descriptions as well. You can use a WHERE clause in the T011 table to select the KTOPL value.

Using these references, you can choose and enter one of the matching VERSN values. You must enclose the VERSN value in single quotation marks. Do not enclose the _VERSN value in quotation marks.

The financial statement that is extracted from SAP is used to build the accounts dimension hierarchy. This hierarchy has no common root because it consists of disjointed subtrees. You can add a common root by specifying a description for it in the macro variable FINANCIAL_STATEMENT_ROOT_TXT.

Note: It is recommended that you leave this macro variable blank.

```
* The following macro variable is used to specify text for the
* top combination node of financial hierarchy (root)-
* Otherwise the hierarchy contains disjoint subtrees.;
%let Financial_statement_root_txt = %nrquote(Financial Statement);
```

Fiscal Year Variant

SAP enables companies to have multiple fiscal year variants, although most companies only use one variant. If your organization uses multiple variants, you must include the variant name in period IDs and descriptions to avoid ambiguity. For best results, be sure to use clear period IDs and descriptions that do not include the variant information.

The macro variable USE_FISCAL_YR_VARIANT_IN_TIME can control behavior based on the following two values:

□   The value N causes the variant not to be used.
□   The value Y forces the variant information into the period IDs and descriptions.

```
* The use_fiscal_yr_variant_in_time macro variable determines whether the
*  fiscal variant name is used in the time dimension ID and descriptions.
* In most cases, only one fiscal variant is used, and the default is
* therefore N ;
%let use_fiscal_yr_variant_in_time=N;
```

Extraction Starting Date

You can use the macro variables START and STARTFINYEAR to set the starting date for the extraction of financial transactions. These values help reduce the amount of data that is extracted in the initial load by not extracting financial transactions with dates before the specified date.

```
* If the financial year starts in January then use value 1,
  February then use 2, and so on ;
%let finyear_startmonth=1;

* The following macro variables determine from which date financial
* transactions
* should be extracted from SAP.  This is IMPORTANT when
* initializing the data
* during the initial load phase.  In subsequent extracts,
* only new/changed data
* is extracted;
%let _start = 01JAN2000;   * Start date - First extraction to
                           * take transactions after this date;
%let _startfinyear = 2000;

%let _opening_balance_period=200001; * Opening balance period.
                                     * This must be in the
                                     * format YYYYMM - It should usually
                                     * be the period of _start macro
                                     * variable above.
                                     * If it is set to blank, then no
                                     * opening balance
                                     * is extracted.  ;
```

Set the extraction variables based on your environment.

❑ The FINYEAR_STARTMONTH value is the number of the month in which the financial year starts. January is represented by 1, February by 2, and so on.

❑ The _START value is the first day of your organization's financial year. This value must be in SAS DATE9 format.

❑ The _STARTFINYEAR value is your organization's financial year. For example, if your organization's financial year for 2005 begins on 01 December 2004, then you must set the _STARTFINYEAR value to 2005. Choose a value that reflects the year after which detailed transaction data is to be extracted from SAP.

Determine Current Fiscal Year

The current fiscal year and time period is derived from the current date.

```
*--- Determine the current Fiscal year ---- and period *;
data _null_;
today=today(); * FOR TESTING PURPOSES can be set to a fixed date for
example'01JAN2000'd;
fiscal_year=year(today);
call symput('GJAHR',put(fiscal_year,4.));
month=month(today);
if month=1 then do;
   prevmonth=12;
   prevmonth_fiscal_year=fiscal_year-1;
end;
else do;
   prevmonth=month-1;
   prevmonth_fiscal_year=fiscal_year;
end;
call symput('current_time_period',put(fiscal_year,4.)!!put(month,z2.));
call symput('previous_time_period',
              put(prevmonth_fiscal_year,4.)!!put(prevmonth,z2.));
run;

* Set the number of years into the future the time dimension should
  cover ;
%let time_dim_future_yrs=10;
```

Buffer for Re-Extraction

The macro variable OVERLAP enables you to re-extract data that has changed during the overlap since the last extraction of financial transactions.

The OVERLAP value, specified in number of days, should not be set to less than 2 because that is the minimum time needed to handle overnight processing and time zone differences. The default value is 4 days.

```
%let overlap=4;  * Set number of days to re-extract financial documents;
                 * This might be needed to catch late processing, long
                 * running processes, and so on ;
                 * The value should not be made lower than 2!;
```

SAS Human Capital Management Parameters

HR Start Date and Buffer for Re-Extraction

This section of the preprocparms12.sas file enables you to limit HR extractions so that they include records only after a certain date. You can specify the overlap period for extractions. The default overlap period for extractions is 400 days, slightly more than one year. This default value is based on the assumption that historical HR data is correct after it has been on record for more than one year.

```
%let hr_start = 01JAN1900;  * Select an initial date for HR delta extractions.
                            * The date is used to limit HR infotype extractions
                            * with change / begin dates after &hr_start ;

%let hr_overlap=400; * Set number of days to re-extract HR infotype documents;
                     * This should be set to be in range such
                     * that records that were last changed more than
                     * the specified number of days ago will not be re-extracted.
                     * It is necessary to re-extract, since the begda/endda are
                     * keys, but might change between extracts, thereby losing the
                     * link to the initially extracted record.
                     * A value of 400 days is used so that it is slightly longer
                     * than a year;

* Start date for initial extraction of base salaries;
%let hr_base_salary_start = 01Jan1994;

%let absence_unit = DAY; * Unit for employee absences. Must be DAY or HOUR;
%* ISOLANDS: relevant countries in two-char quoted ISO codes as comma-separated list;
%let isolands = %str('DE', 'US', 'GB', 'IT', 'FR', 'ES', 'CA', 'JP', 'PT');
%let isolands = %str('DE');
```

Employee General Information

This section of the preprocparms12.sas file enables you to include, exclude, or flag attributes of the employee data by supplying values to the macro variables from the corresponding tables. This section begins with the line shown:

```
*---Employee General Information Macro Variables---*;
```

Ethnicity Codes

To create ethnicity codes, the SAS Solutions Adapter for SAP uses the concatenation of the columns MOLGA and RACKY in the SAP lookup table T505S. The macro variable MINORITY_ETHNIC_TYPES must be initialized to identify the ethnic groups that are considered to be minorities.

```
* Ethnic Minorities - list groups considered to be ethnic minorities;
%let minority_ethnic_types='1001','1002';
```

Union Codes

The SAS Solutions Adapter for SAP uses the column EMFSL in infotype 57 (SAP R/3 table PA0057) to populate the employee's labor union affiliation. You can use a WHERE clause (for example, INFTY='0057') to find a list of valid values in the contents of the SAP R/3 tables T521B or T521C.

Because infotype can contain codes that are not related to labor unions, you must specify the codes that identify labor unions. To do this, create a comma-separated list of text strings, each enclosed in quotation marks, representing labor unions. To set the macro variable, see the contents of the SAP R/3 table T521B, apply the WHERE clause

INFTY='00057', select the rows with codes that represent labor unions, and enter the codes into the macro variable.

```
*Union - select only certain codes;
%let labour_union_codes='DIG CHEM','MMETAL';
```

Mobile and Daytime Telephone Numbers

The SAS Solutions Adapter for SAP populates employee telephone numbers from the columns NUM01 to NUM06 in the HR infotype 0006 (SAP R/3 table PA0006). The SAS Solutions Adapter for SAP needs to know the type of communication that represents the daytime telephone number. Communication types are in the values in the associated columns COM01 to COM06.

You can find the list of valid values for COM0n columns in the SAP R/3 table T536B. To select daytime telephone numbers for NUM0n columns, you must set the macro variable DAYTIME_PHONE_COM_TYPE_CODES to identify the appropriate daytime codes. You must set the macro variable MOBILE_PHONE_COM_TYPE_CODES to identify the appropriate mobile phone number codes.

```
*Mobile phone label - list of values in SAP table T536B;
%let mobile_phone_com_type_codes='CELL';


*Daytime Telephone label - list of values in SAP table T536B;
%let daytime_phone_com_type_codes='WORK','TEL2';
```

Disciplinary Action Codes

You need to specify the appropriate value for the macro variable DISCIPLINARY_ACTION_CODES so that it lists all of the action codes that are considered to be disciplinary actions. The SAP R/3 tables T548T and T549T provide lists of valid action codes with descriptions.

```
*Disciplinary Action Codes - SAP tables T548t & T549T describe PA0041 & PA0000,PA302
respectively;
*codes to be listed in Macro variable should be in single quotes '' and the list
comma separated;
%let disciplinary_action_codes=;
```

Applicant Information Parameters

This section of the preprocparms12.sas file enables you to specify code and status numbers that match those used by the SAP system.

To set the APPLICANT_INTERVIEWED_FLG column, the SAS Solutions Adapter for SAP needs to know the appropriate value of APSTA in the Applicant HR infotype PB4000. The SAP R/3 table T751B contains a list of possible values with text descriptions. You need to set the macro variable APPLICANT_INTERVIEWED_STATUS to an appropriate value based on this list.

To populate the REJECTION_REASON_CD column, the SAS Solutions Adapter for SAP needs to know which applicant action code means a rejection. Make sure that the macro variable APPLICANT_REJECTION_CODE is set to one of the action codes in the SAP R/3 table T751E.

```
*---Applicant Information Macro Variables---*
* Applicant Interview Status;
%let applicant_interviewed_status='1';

*Applicant Rejected Flag;
%let applicant_rejection_code='03';
```

HR Job Position Parameters

This section of the preprocparms12.sas file enables you to specify the BENEFIT_PERCENT variable for benefits that are expressed as percentages. This value is processed in the user-written code of job T270080. The selected value must come from the CTYPE or CTYPE001-006 fields in the SAP R/3 table HRP1015.

```
*---HR Job Position Macro Variables---*;
%let benefit_percent='US-BENEFITS %';
```

Version 8 Style Data Extraction

This section of the preprocparms12.sas file enables you to uncomment the necessary code to supply profile, remote, and LIBNAME parameters that correspond to your SAS Version 8 configuration.

```
* Options required if SAS/CONNECT when v8 style extract required;
%let use_v8_extract=NO;

* Uncomment the following section when "use_v8_extract=YES";
* Supply parameters and paths for target environment        ;
/*
%let r3profile=SIX;
options remote=server01;
LIBNAME r3lib 'D:\ETLDATA\SolutionFlows\Data\SAPAdapter\R3Lib\R3Lib47';
*/
```

Additional Customizations

This section of the preprocparms12.sas file enables you to add customizations to other data areas. You can add these customizations to a new SAS program that can be called by an INCLUDE statement.

```
*--- Further customization or overriding parameters can be made in an alternative SAS
program*;
*--- Use %include to reference the appropriate program for example
*;
*--- %include 'x:\overridingparms.sas'
*;
```

Customizing the preprocparms13.sas Program

Non-Leaf Text

The preprocparms13.sas program enables you to specify parameters that identify leaf nodes and non-leaf nodes in the cost center and profit center standard hierarchies for your site. This program is called by the preprocglobal.sas program that is specified in the pre-processing section of every SAS Solutions Adapter for SAP extract and transformation.

You can use the preprocparms13.sas program to prepend a string to non-leaf node IDs in the cost center and profit center standard hierarchies. This enables you to easily identify non-leaf nodes in the hierarchies.

CHAPTER

4

Transformations Provided by the SAS Solutions Adapter for SAP

Transformations Provided by the SAS Solutions Adapter for SAP

The SAS Solutions Adapter for SAP provides extraction jobs and transformation jobs that integrate data from standard SAP tables into standard SAS tables for SAS Financial Management and SAS Human Capital Management. Some of these jobs use transformations that are not part of SAS Data Integration Studio, but are provided as part of the SAS Solutions Adapter for SAP.

Transformations that are provided and used by the SAS Solutions Adapter for SAP can be categorized into two types:

❑ transformations that are specific to applications related to SAP

❑   generic transformations that are not specific or exclusive to applications related to SAP

This chapter describes these transformations. This information can help you better understand the existing SAS Solutions Adapter for SAP jobs that use these transformations. You can use this information to determine whether the transformation can be used for other jobs that you might create.

Add Standard Dimension Rows and Add Standard Dimension ASSOC Rows

The Add Standard Dimension Rows transformation and the Add Standard Dimension ASSOC Rows transformation add standard row values to dimension and dimension ASSOC tables. These two transformations work with each other.

These transformations are necessary because the DDS does not allow fact tables to have blank values for dimension foreign key columns. As a result, the transformations convert blank values to standard or special values.

Some dimension tables might need additional standard rows. For example, a financial transaction in SAP that does not involve a cost center has a blank value in the cost center column. This blank value is converted to UNASSIGNED.

The following list describes the standard row values and their corresponding meanings or instances:

ALL   represents the root node in the hierarchy of certain dimensions. The hierarchy is stored in the _ASSOC table.

UNASSIGNED   means that the original value in the transaction was blank.

OPENBAL   means that the transaction was obtained from the opening balance summary information for which there is no detail information for all dimensions.

EXT   is a required row for the internal organization dimension.

Using the Add Standard Dimension Rows Transformation

This section describes how to use the Add Standard Dimension Rows transformation in a way that might overlap with basic SAS Data Integration Studio usage.

Note: This section explains in detail the specific steps that you must complete to perform the corresponding tasks. Other sections describe transformations that are provided by the SAS Solutions Adapter for SAP, but they do not explain the specific steps. Use this section as a reference and generalize the steps for use with other transformations.

Complete the following steps to use the Add Standard Dimension Rows transformation:

1   Add the transformation to a job.
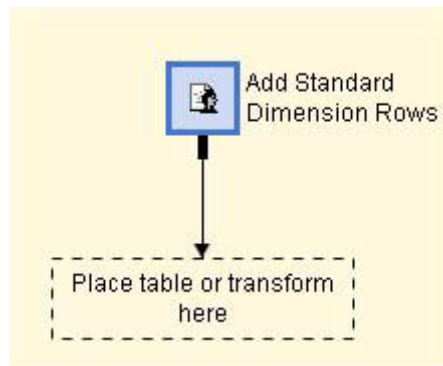
2 Add an output table.

To add an output table, drag and drop a dimension table. The dimension table must have a key column ending in _ID.
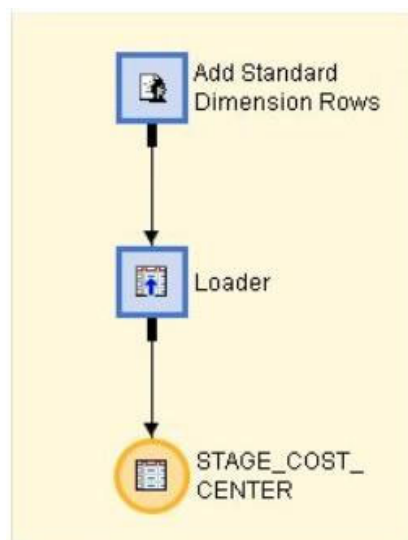
3 Select the **Mapping** tab. Make sure all columns in the output table are in the input table. Complete the following steps to check the tables:

    a Right-click the **Column** box under **Target tables**.

    b Select **Import**.
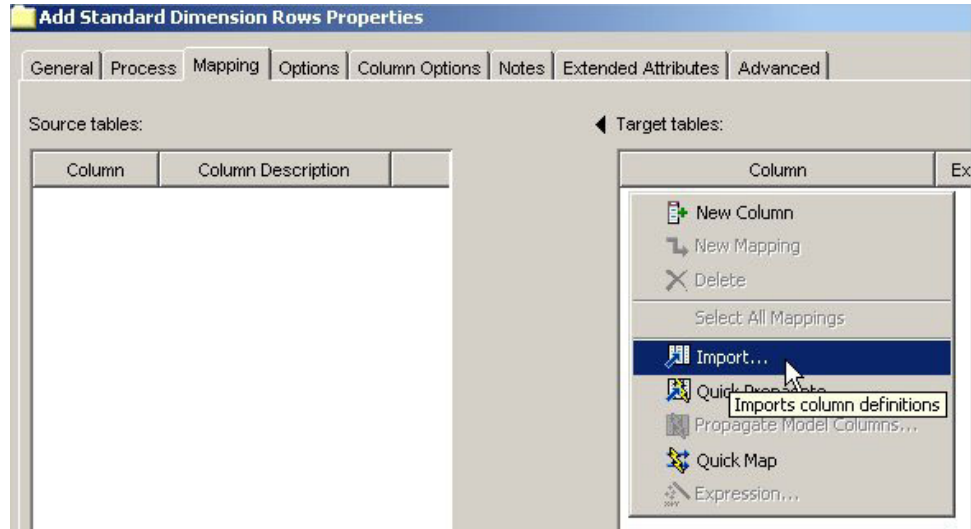
c   Select all of the columns from the output table that you just dragged and dropped. The result should look similar to the following:
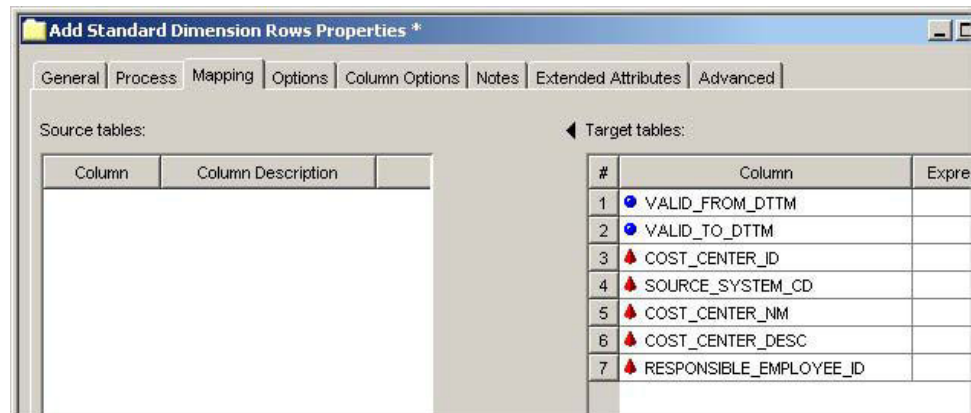
4   Select the **Options** tab.
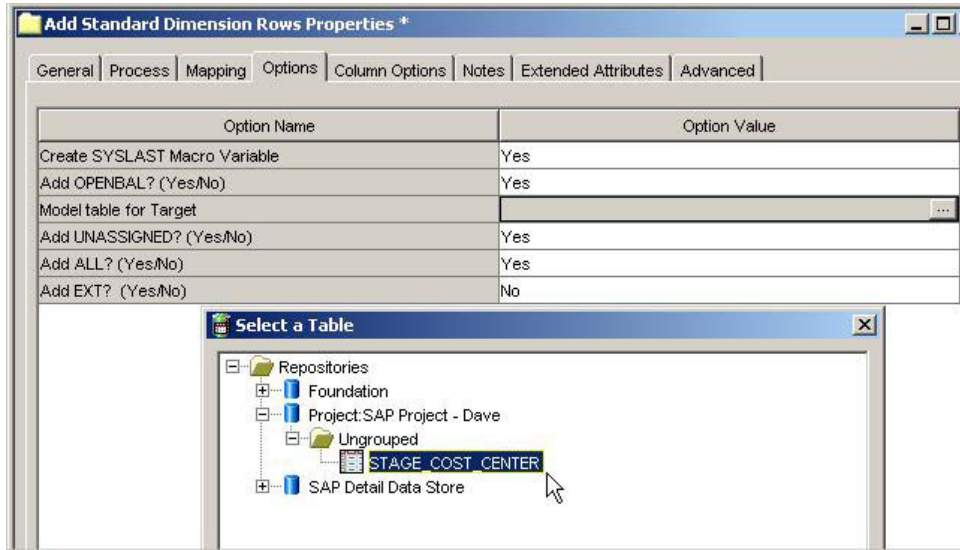
5   Enter **Yes** or **No** as the option value for the following option names:

   ❑ **Add OPENBAL**
   ❑ **Add UNASSIGNED**
   ❑ **Add ALL**
   ❑ **Add EXT**

   A **Yes** option value adds the corresponding row to the target table.

6   From the **Model table for Target** menu, select the table that you dragged and dropped.

   Note: The model table must physically exist before you run the job. Only the structure, not the content, is used as a model for all of the column definitions.

7   Select the **Column Options** tab.

8   From the **Option** menu, select column options and map the columns to their predefined roles.

Dimension Description column	ends in DESC and describes the dimension.
Dimension Id column	ends in ID and is the primary key of the dimension table.
Dimension Name Column	ends in NM and is the name of the dimension.

   Generated code checks for invalid selections, but not immediately.
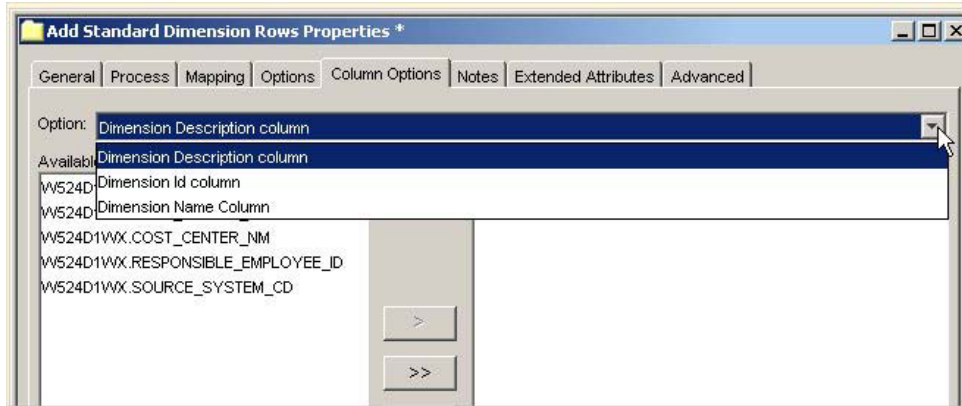
9   Select the `Load Technique` tab to review the load step. The generated code creates a table with the requested rows in the correct structure. Add these rows to the dimension table.
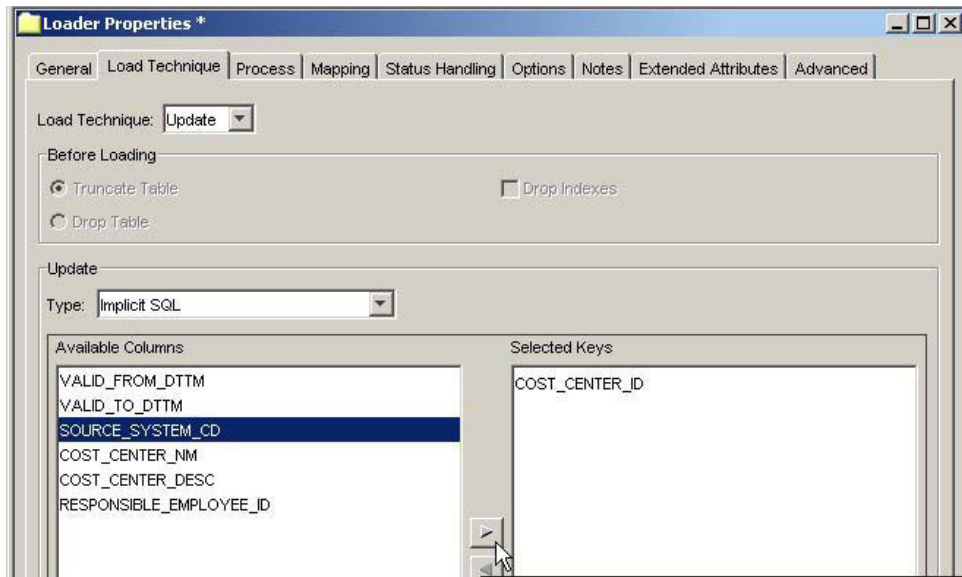
10   Enable the job so that it can run multiple times. To do this, modify the default settings for the load step.

   a   Set `Load Technique` to `Update`.

   b   Select an update type.

   c   Select the ID column option from `Available Columns`, and then click the right arrow to move it to `Selected Keys`. The ID column is the only column that you must move to `Selected Keys`.

Using the Add Standard Dimension ASSOC Rows Transformation

Using the Add Standard Dimension ASSOC Rows transformation is very similar to using the Add Standard Dimension Rows transformation. Complete the following steps:

1   Drag and drop the Add Standard Dimension ASSOC Rows transformation onto a job.

2   Drag and drop a dimension _ASSOC_TYPE table as the input table. Drag and drop a dimension _ASSOC table as the output table.
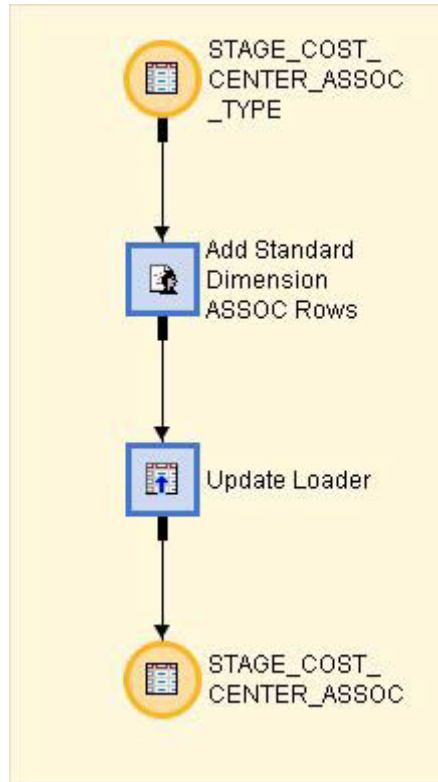
3   Select the **Mapping** tab. Make sure all columns in the output table are in the input table.

4   Select the **Options** tab.
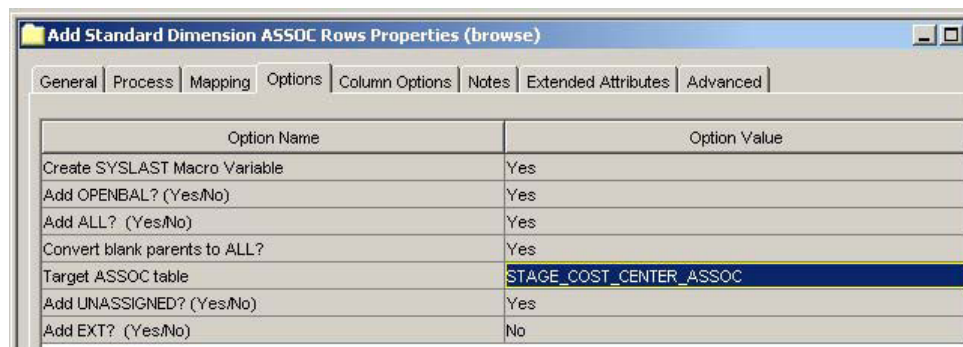
5   Enter **Yes** or **No** as the option value for the following option names:

❑   **Add OPENBAL**

❑   **Add UNASSIGNED**

❑ **Add ALL**

❑ **Add EXT**

A **Yes** option value adds the corresponding row to the target table.

6 Enter **Yes** or **No** for **Convert blank parents to ALL**. A **Yes** option value changes blank parent IDs to ALL. The DDS requires that a parent ID is not blank. This requirement includes the root node. In that case, the root becomes its own parent.

7 From the **Target ASSOC table** menu, select the _ASSOC table that you dragged and dropped.

Note: The model table must physically exist before you run the job. Only the structure, not the content, is used as a model for all of the column definitions.

8 Select the **Column Options** tab. Select available columns and map the columns to their predefined roles. The **Dimension Id column** ends in _ID and is the primary key of the dimension table.

Note: The name of the parent column is derived from the name of the ID column.

9 Select the **Load Technique** tab to review the load step. The load technique should be **Update**.

Add Parent to Hierarchy Table Based on Level and Position

The Add Parent to Hierarchy Table Based on Level and Position transformation adds a parent column to a table that already has a specified hierarchy in the form of a level and position. This is a common SAP hierarchy storage form.

The level and position use the root node as the first record. To establish the parent of a row, a preceding row with a lower level is used. Therefore, preceding rows with identical levels are siblings.

The macro %ADPT_LEVEL_TO_PARENT_CHILD represents the level and position hierarchy by including the following parameters:

❑ IN_DSN=&_INPUT0

❑ OUT_DSN=&_OUTPUT0

❑ LEVEL=&LEVEL

❑ PARENT=&PARENT

❑ CHILD=&CHILD

❑ DSTYPE=&DSTYPE

❑ KEEP=&KEEP

❑ ROOTLEVEL=&ROOTLEVEL

❑ GENERATED_SEQUENCE_VAR=&GENERATED_SEQUENCE_VAR

You can define each of these parameters.

Using the Add Parent to Hierarchy Table Based on Level and Position Transformation

Complete the following steps to use the Add Parent to Hierarchy Table Based on Level and Position transformation:

1 Drag and drop the Add Parent to Hierarchy Table Based on Level and Position transformation onto a job. This transformation requires a single input table. It returns a single output table.

2 Drag and drop an input table and output table.

The input table must include an ID or key column that contains unique values. The input table must include a column that stores the level. This level column can contain either numeric- or character-based content. However, character-based content must contain numeric strings. The names of the columns must be associated with the roles in the column options.

The output table must include an ID or key column and a PARENT_ID column. The PARENT_ID column must be the same type and length as the ID column. The parent of the root node can be blank.
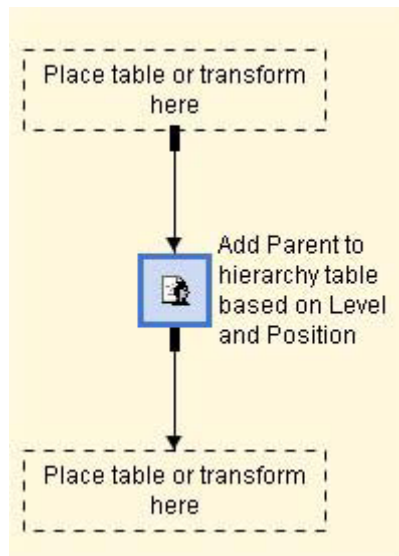
3 Select the **Mapping** tab. Make sure all columns in the output table are in the input table. The generated code copies all columns that are in both the input table and output table. Although mapping in this transformation is not required, you should resolve any inconsistencies so that the impact analysis tool has more information if needed.
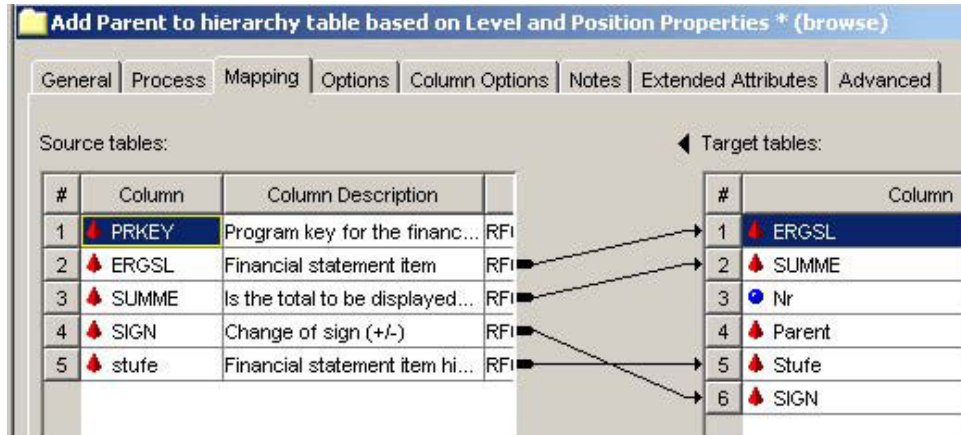
In the example, four of the original five columns are propagated to the output table. Two new columns are added (numeric column **Nr** and character column **Parent**).

Do not add target table columns that do not exist in the input table or that are not assigned a parent role or sequence number. For more information, review the **Column Options** tab.

4   Select the **Options** tab.
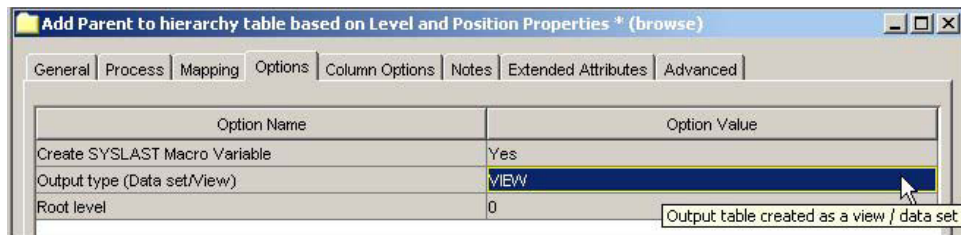
5 Enter option values for the following option names:

Output type Select **VIEW** if the output table is loaded through a standard load step. Select **DATA** if the output table is loaded through a load step with code generation turned off (a null loader).

Root level Use the default value. If the input table contains multiple, disjointed hierarchies (many root nodes), then the root level forces the parent to be blank.

6 Select the **Column Options** tab.
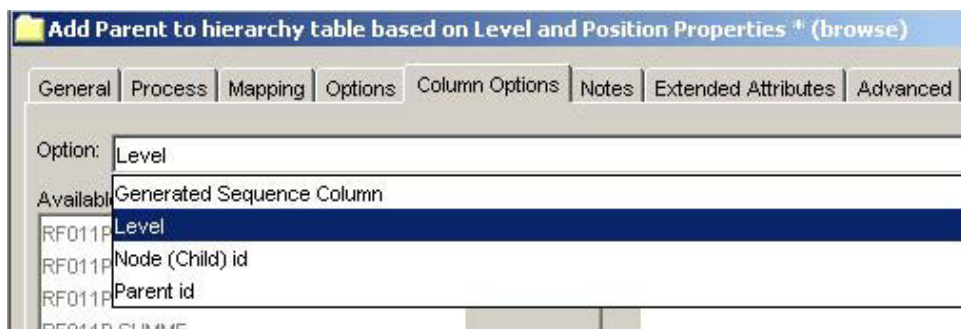
7 From the **Option** menu, select column options and map the columns to their predefined roles.

Generated Sequence Column contains a value that is equal to the row number of the input table. This is a generated column that is numeric. You must add or import this column to the target table before you can select it.

Level contains the level information. This column is in the input table.

Node (Child) id identifies each node in the hierarchy. This column is in the input table and output table. It should be the primary key of the input table.

Parent id identifies the parent ID (node ID of the parent) in the hierarchy. This column is in the output table. It must be the same type and length as the node ID. You must add or import this column to the target table before you can select it.

Format Generator

The Format Generator transformation creates code that generates a format from a single input table. This transformation uses the generic transformation generator. The transformation can run multiple times on a single input table to generate multiple SAS formats.

You can access information about this transformation's options on the **Options** and **Column Options** tabs.

The code that the Format Generator transformation creates must handle several table properties. These properties include specifications such as format, library catalogs, creating and managing CNTLIN tables, and managing duplicate values.

The following list details format issues and properties that the generated code must address:

❑ The format of the generated code can have a description that is also in the description of the format library catalog entry.

❑ The format must be stored in a library catalog that is available in the current metadata repository. In a project repository, you must check out the library.

❑ The format does not have to be saved in a catalog that exists. When the transformation creates a format, it can also create a catalog in which to save it. A string that includes a macro variable such as FORMATS&LOCALE_LANGUAGE can specify the catalog.

The generated code must conform to the following properties and requirements for defining library catalogs:

❑ The default library should be LIBRARY.FORMATS if the library LIBRARY is available.

❑ If metadata does not define the library LIBRARY, then this default library cannot be used. Only libraries that are available in the current metadata repository can be checked. In this case, a message notifies the user to define and use the LIBNAME LIBRARY.

The Format Generator transformation creates a temporary format CNTLIN table from the underlying table. (For a description of the CNTLIN table, see the online Help for PROC FORMAT.) This process uses metadata to generate each column of the CNTLIN table. When creating this table, the transformation must address the following issues for the CNTLIN table columns:

❑ The format must have a name (with a maximum of 30 characters) that is unique within the format catalog. Because the Format Generator transformation does not verify uniqueness, a new format will overwrite an existing format with the same name.

❑ The START column must be an expression of the columns in the underlying table.

❑ The END column is optional. It can be an expression of the columns in the underlying table.

❑ The LABEL column must be an expression of the columns in the underlying table.

❑ A row can be added to map missing values into a specified value. The specified value can be any expression. For example, START can be set to a missing value such as a blank value for characters or a . value for numerics. LABEL can be set

to MISSING, UNKNOWN, or an expression such as PUT('MISSING', $FORMAT_WORDS.). In this case, you need to enter the expression to specify the label for MISSING. If you are using an expression that another format uses, the format must already be defined.

❑ A row can be added to handle the OTHER concept. The CNTLIN table column HLO must be O. START can be set to a missing value. LABEL can be set to OTHER, UNKNOWN, or an expression such as PUT('OTHER', $FORMAT_WORDS.). In this case, you need to enter the expression to specify the label for MISSING.

❑ The rows in the CNTLIN : WHERE clause must be controlled so that the WHERE clause subsets the underlying table into the CNTLIN table. It might be necessary to base a format on only some rows of the underlying table such as LANGUAGE="&LOCALE_LANGUAGE". The WHERE clause is an expression on the columns in the underlying table.

The Format Generator transformation must consider removing duplicate values. The generated CNTLIN table can contain duplicate START values or overlapping ranges. The START value is inside the range of a START-END combination of another row. The following variables eliminate duplicates in the START value:

❑ NODUP generates a PROC SORT NODUP by START value. Because this might remove the wrong rows, you should consider using more controlled variables such as FIRST and LAST.

❑ FIRST and LAST variables assume that there are additional columns in the underlying table that enable determination of which rows are best to keep. These additional columns are kept in the temporary CNTLIN table. The subsequent SORT variable has these additional columns in the BY statement. A second DATA step keeps only the required rows. The FIRST variable keeps the first row in each BY group. The LAST variable keeps the last row in each BY group.

Using the Format Generator Transformation

Complete the following steps to use the Format Generator transformation:

1 Drag and drop the Format Generator transformation onto a job that loads the table on which the format is to be based. If possible, use the same job that created or loaded the table. That way, any changes to or reloading of the table automatically regenerates the formats based on the table.

2 Drag and drop the table as the input table.

3 Select the **General** tab. Change the name of the transformation to $FORMATNAME Format Generator or to a similar name.
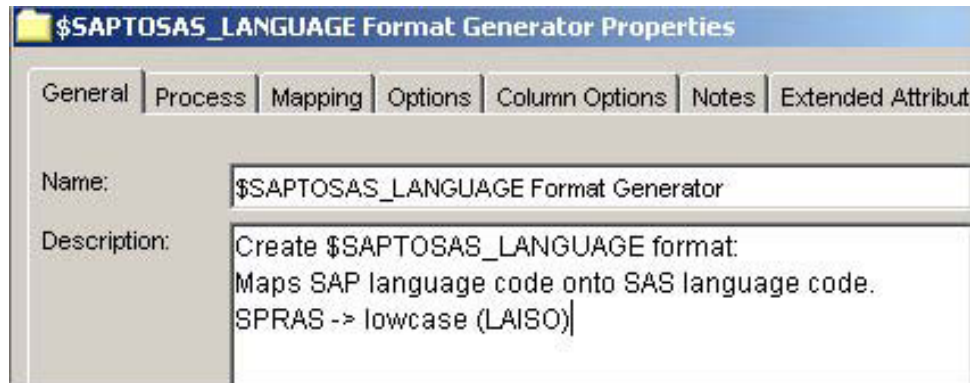
4 Select the **Options** tab.
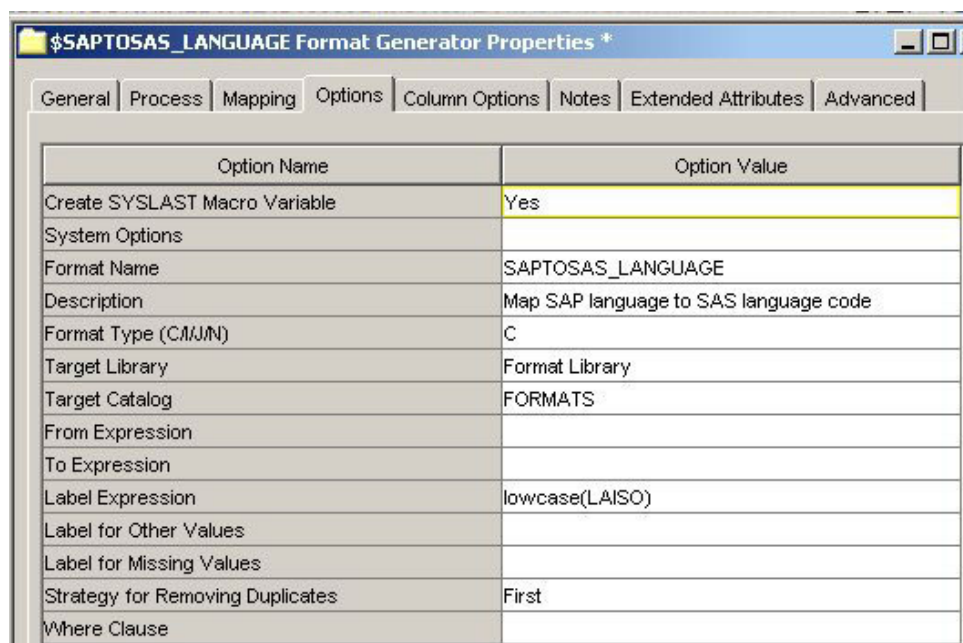
The following information describes the option names and option values that are available. Use this information to verify and edit your Format Generator transformation properties.

Label: System Options
Macro Variable: OPTIONS
Description: Options on a SAS OPTIONS statement.
Type: String
Required?   N

Label: Format Name
Macro Variable: FORMATNAME
Description: Name of the format.
Type: String
Required?   Y

Label: Description
Macro Variable: FORMATDESCRIPTION

Description:	Description of the format.
Type:	String
Required?	N

Label:	Format Type (C/I/J/N)
Macro Variable:	FORMATTYPE
Description:	Type of format. Possible values are `C` for character format, `I` for numeric informat, `J` for character informat, and `N` for numeric format (excluding pictures). Picture formats are not supported.
Type:	String
Required?	Y
Default:	C
Valid Values:	C N J I

Label:	Target Library
Macro Variable:	TARGETLIBRARY
Description:	Target library for the generated format.
Type:	Metadata Library
Required?	Y

Label:	Target Catalog
Macro Variable:	TARGETCATALOG
Description:	Name of the target catalog for the format.
Type:	String
Required?	Y
Default:	FORMATS
Constraints:	Minimum string length is 1; maximum string length is 32

Label:	From Expression
Macro Variable:	FROMEXPRESSION
Description:	Expression to be used for the range's starting value. Use this field to enter an expression or use the **From Column(s)** option on the **Column Options** tab to select columns
Type:	String
Required?	N

Label:	To Expression
Macro Variable:	TOEXPRESSION
Description:	Expression to be used for the range's ending value. Use this field to enter an expression or use the **To Column(s)** option on the **Column Options** tab to select columns.
Type:	String
Required?	N

Label:	Label Expression
Macro Variable:	LABELEXPRESSION
Description:	Expression to build the informatted or formatted value. Use this field to enter an expression or use the **Label Column(s)** option on the **Column Options** tab to select columns.
Type:	String
Required?	N

Label:	Label for Other Values
Macro Variable:	OTHERLABEL
Description:	String or expression to be used as the label for the range OTHER. This range includes all values that are not in one of the specified ranges.
Type:	String
Required?	N

Label:	Label for Missing Values
Macro Variable:	MISSINGLABEL
Description:	String or expression to be used as the label for missing values.
Type:	String
Required?	N

Label:	Strategy for Removing Duplicates
Macro Variable:	DUPSTRATEGY
Description:	Specify NODUP to remove duplicates (unordered), FIRST to keep the first duplicate, and LAST to keep the last duplicate. Used with the **Sort By Column(s) to Remove Dups** option on the **Column Options** tab.
Type:	String
Required?	N
Default:	FIRST
Valid Values:	FIRST LAST NODUP

Label:	WHERE Clause
Macro Variable:	WHERECLAUSE
Description:	WHERE clause to be applied to the input data set.
Type:	String
Required?	N

5 Select the **Column Options** tab. You can specify the range's starting and ending values and formatted or informatted values in two different ways:

❑ If the values are a concatenation of columns in the input table, you can use the **From Column(s)**, **To Column(s)**, and **Label Column(s)** options on the **Column Options** tab.

❑ If the values are a more complicated expression of columns, you can use the **From Expression**, **To Expression**, and **Label Expression** options on the **Column Options** tab. If specified, these values take precedence over the selected columns.
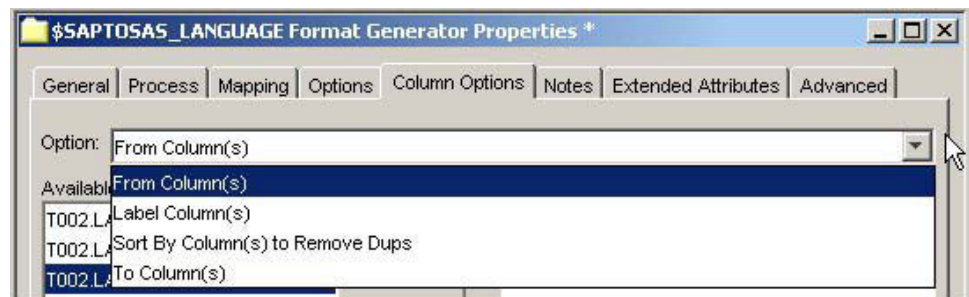
The following information describes the option names and options values that are available. Use this information to verify and edit your Format Generator transformation properties.

Label:	From Column(s)
Macro Variable:	FROMCOLUMNS
Description:	Selects columns for the format's starting value. Multiple columns are concatenated. Specify either **From Column(s)** or **From Expression**.
Constraint:	No limit on number of selectable columns
Label:	To Column(s)
Macro Variable:	TOCOLUMNS
Description:	Selects columns for the format's ending value. Multiple columns are concatenated. Specify either **To Column(s)** or **To Expression**.
Constraint:	No limit on number of selectable columns
Label:	Label Column(s)
Macro Variable:	LABELCOLUMNS
Description:	Selects columns for the informatted or formatted value. Multiple columns are stripped and concatenated with a blank between the columns. Specify either **Label Column(s)** or **Label Expression**.
Constraint:	No limit on number of selectable columns
Label:	Sort By Cols to Remove Dups
Macro Variable:	SORTBYCOLUMNS
Description:	Sorts the control data set by the selected columns and removes duplicate keys according to the Strategy for Removing Duplicates option.

User Written Code for Multiple Input/Output Tables

The User Written Code for Multiple Input/Output Tables transformation is a generic, user-written code transformation. Use this transformation instead of the standard user-written code transformation that SAS Data Integration Studio provides in the following two cases:

❑ when there is more than one input table or output table

❑ when the user-written code needs additional LIBNAME statements to be available or generated

Using the User Written Code for Multiple Input/Output Tables Transformation

Complete the following steps to use the User Written Code for Multiple Input/Output Tables transformation:

1 Drag and drop the User Written Code for Multiple Input/Output Tables transformation onto a job.

2 Right-click on the transformation and select the following options:

- ❑ **Add Input** to add drop zones for the input tables.
- ❑ **Add Output** for each required output tables.
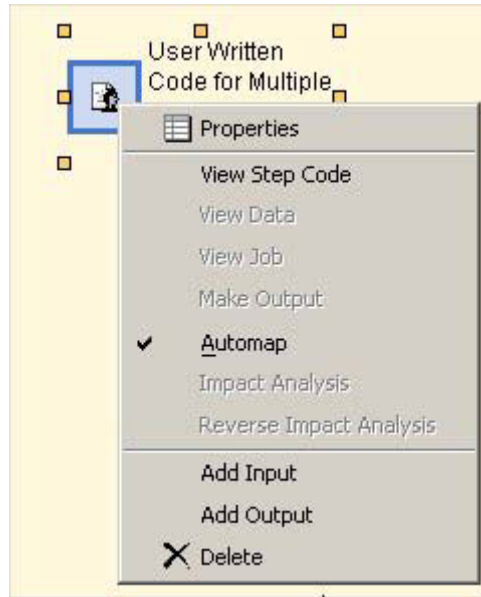
3 Drag and drop tables or transformations into the drop zone.

4 Select the **General** tab. Replace the default transformation name with a more specific name.

5 Select the **Process** tab. Complete the following steps:

    a Do not modify the default settings for **Code Generation**.

    b Make sure that **Automatically create source code** is selected.
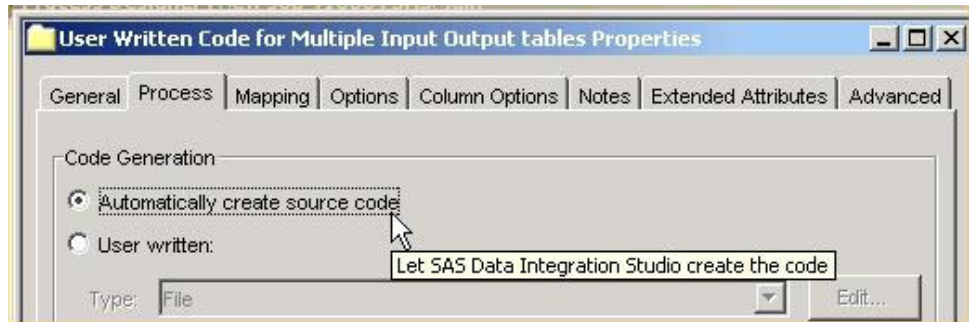
    c Review the registered target tables. Specify parameters for the target tables based on the following three scenarios:

        ❑ If the source code refers to tables that are using a macro variable such as &_OUTPUT or &_OUTPUT0, then the default target table names can remain unchanged. Make sure that the load steps of the output tables do, in fact, load the output tables from these temporary target tables.
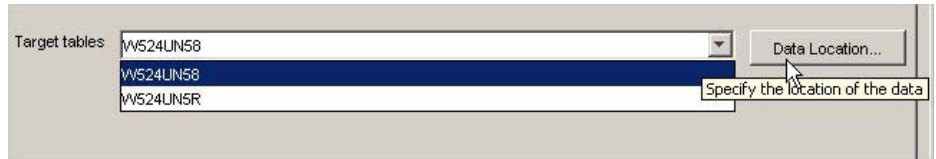
❑ If the source code creates tables with more logical names, register these tables as target tables. In the following example, **my_logical_name** is replacing the default target table name **W524UN58**.
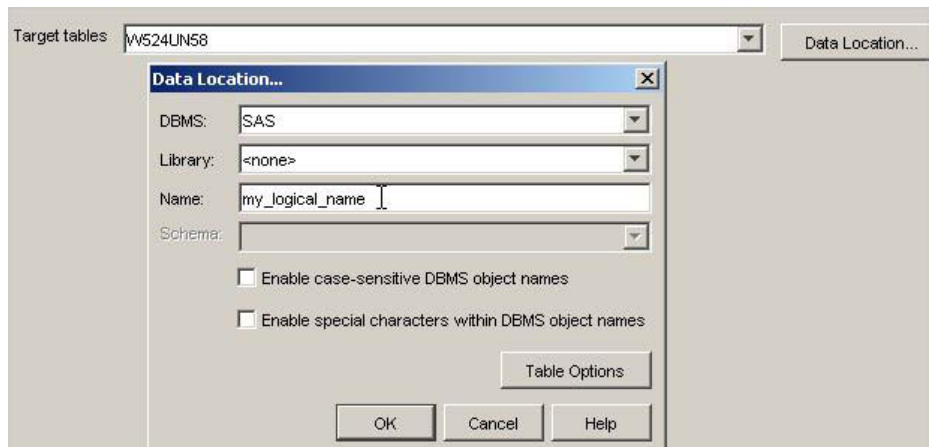
❑ If the source code directly loads the output tables that you dragged and dropped onto the transformation, then specify the physical name of the target table and select the library accordingly. When you finish reviewing the properties, change the load step to not automatically generate code.

6   Select the **Mapping** tab.

For the subsequent load step to automatically generate code for the load, you must import all of the columns in the output tables into the corresponding target tables.

Although mapping in this transformation is not required to generate code, you should use the mapping assignments to document the mapping that is made in the source code. This provides the impact analysis tool with more information if needed.

7   Select the **Options** tab.
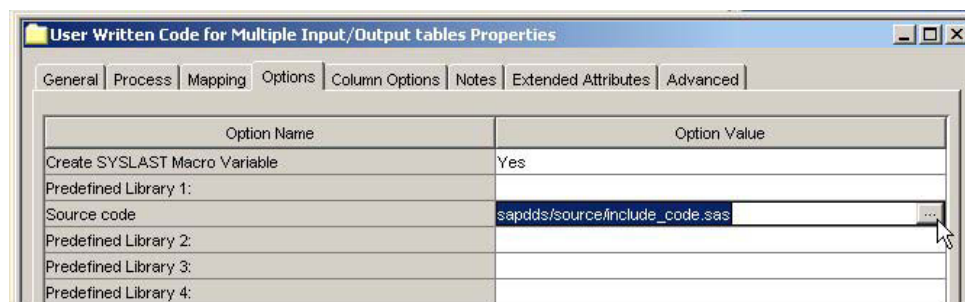
8   Replace the default **Source code** option value **sapdds/source/include_code.sas** with a valid path and name of the source

code that you want to include. The path must be relative to the server environment.

Four additional parameters (**Predefined Library 1**, **Predefined Library 2**, **Predefined Library 3,** and **Predefined Library 4**) can force library assignments to occur before your source code executes. The automatic code generation assigns libraries for all input tables and all libraries that are entered in the Data Location dialog box for the target tables on the **Process** tab. However, some libraries, such as SAP server libraries, need to be assigned by specifying them in one of these four parameters.

Changed Data Extraction Using Date or Timestamp and Overlap

The Changed Data Extraction Using Date or Time-stamp and Overlap transformation creates a SAS Data Integration Studio transformation that extracts changed data. This transformation uses key, datestamp, and timestamp information to identify new or changed data from a source table. Then, it extracts the data and stores the results in a target table that is conceptually a mirror image of the source table. The target table can have fewer columns than the source table.

This transformation is often required when extracting all of the data from the source table would be a very time-consuming task. For example, extracting 20 million rows of data across an entire network might take many hours. Extracting only the changed data and merging it with the previous extraction might take only minutes.

The logic for this transformation can be used only with source tables that contain a timestamp, datestamp, or other key column value that increases over time. A new extraction will occur for all records with a key or timestamp that is greater than the largest value that was previously extracted. The resulting data is then appended to the previous data.

The timestamp or key does not need to exclusively increase to work in this transformation. You can use an overlap to re-extract data that is in the overlap range. For example, you might have financial transactions that change in an operational system before the books are closed for a period. But, the operational system does not create a real datestamp or timestamp for the changed financial transactions. In this case, there is an overlap when two or more financial periods are open, and the data can change. To manage this overlap, an extraction needs to re-extract data from all open periods. The new records can replace the previous records that have the same keys. If records can be deleted, or if records have keys that are modified, then it is not always possible to match the new records with the previous records. All records previously extracted from an open period need to be removed from the main target table.

After newly extracted data has been successfully appended to or merged with the target table, the record must be updated. In addition, a record of previous extractions must be kept to create the next extraction. If the extract, append, or merge step fails, then the data should remain unchanged. This ensures that the next extraction gets the data that would have been extracted if the previous extraction had not failed.

Date Join

The Date Join transformation creates a SAS Data Integration Studio transformation that works with tables that have date range columns. This transformation joins two input tables that have a common key into a single output table so that the date ranges interweave.

Many fields, such as HR, contain historical information. This information can be true for past periods and extend into future periods. For example, SAP HR infotypes contain effective starting dates and effective ending dates for past and current employees. The Date Join transformation uses a macro that can be used with any effective date, including the HR data that is extracted from SAP.

To join tables that have effective dates, consider that the dates are basically keys. A logical match can occur when periods overlap, even if they only partially overlap. To join tables for a fixed date, you can select the date from each contributing table to simplify the join. The algorithm for joining tables with effective dates is not trivial considering the date ranges might partially overlap. A join algorithm that loops for all fixed dates can cause the volume of data to increase exponentially, based on the validity of records that can span from one to 10 years.

The Date Join transformation and the underlying %DATEJOIN macro are an efficient alternative. You can join tables accurately by introducing a time dimension. A list of dates is used, with each date selecting a record from the contributing tables. This is effective if you want to capture a snapshot of results, such as employee head count at the beginning of each month. However, the drawback is that the number of selected records could increase dramatically. For example, to prepare a table for ad hoc date queries, you might need to duplicate a table row 365 times per year. As a result, unless you need to represent only a few fixed dates, use the Date Join transformation and %DATEJOIN macro for exploitation time.

The following example shows how two input tables with a common key value are joined into a single output table. Notice the new begin dates and end dates in the tables. Notice how the values in Var1 from Input Table 1 and Var2 from Input Table 2 are populated respectively.

Figure 4.1   Input Tables and Output Table Using Date Join Transformation

Input Table 1

Key	Begin Date	End Date	Var1
1	01JAN06	15FEB06	1
1	16FEB06	20APR06	2
1	01JUN06	31JUL06	3
1	01AUG06	31AUG06	4

Input Table 2

Key	Begin Date	End Date	Var2
1	01FEB06	31MAR06	A
1	01APR06	31JUL06	B
1	01AUG06	30SEP06	C

Output Table

Key	Begin Date	End Date	Var1	Var2
1	01JAN06	31JAN06	1	
1	01FEB06	15FEB06	1	A
1	16FEB06	31MAR06	2	A
1	01APR06	30APR06	2	B
1	01MAY06	31APR06		B
1	01JUN06	31JUL06	3	B
1	01AUG06	31AUG06	4	C
1	01SEP06	30SEP06		

Period Consolidation

The Period Consolidation transformation creates a SAS Data Integration Studio transformation that works with tables that have date range columns. This transformation identifies single key values in which there are no changes in the corresponding, non-key columns that are specified. The similar and sequential data is consolidated into a single date range. The transformation uses the generic transformation generator.

The Period Consolidation transformation uses the %CONSOLIDATE_PERIOD macro. This macro consolidates into a single record consecutive date ranges for a key that is passed as a parameter.

The following example shows a data table before and after the Period Consolidation transformation. The key values are represented by Key1 and Key2. Begin Date and End Date specify the date range. The important columns for consolidation are non_key1 and

non_key3. The non_key2 column is dropped from the output table because its value might not be correct for the full and consolidated date ranges.

Figure 4.2   Input Table and Output Table Using Period Consolidation Transformation

Input Table

	Key1	Key2	Begin Date	End Date	non_key1	non_key2	non_key3
1	123	A	01JAN2006	31JAN2006	21	ABC	XYZ
2	123	A	01FEB2006	15FEB2006	21	DEF	XYZ
3	123	A	16FEB2006	15JUL2006	21	DEF	XYZZY
4	123	A	16JUL2006	31OCT2006	21	BCD	XYZZY
5	123	A	01NOV2006	31DEC2006	21	CEF	XYZZY
6	125	A	01JAN2006	31AUG2006	21	ABC	CCC
7	125	A	01SEP2006	31DEC2006	22	ABC	CCC
8	126	A	01JAN2006	15FEB2006	22	FED	DDD
9	126	A	16FEB2006	31MAR2006	22	DEF	DDD
10	126	A	01AUG2006	31DEC2006	22	DEF	DDD

Output Table

	Key1	Key2	Begin Date	End Date	non_key1	non_key3	contributing rows from input table
1	123	A	01JAN2006	15FEB2006	21	XYZ	1,2
2	123	A	16FEB2006	31DEC2006	21	XYZZY	3-5
3	125	A	01JAN2006	31DEC2006	21	CCC	6,7
4	126	A	01JAN2006	31MAR2006	22	DDD	8,9
5	126	A	01AUG2006	31DEC2006	22	DDD	10*

*This row is not concatenated to the ninth row because there is a gap between the end date of the ninth row a the tenth row.

Repeat Record for Date Range Overlap

The Repeat Record for Date Range Overlap transformation reads an input table and writes to an output table with the same structure. In the output table, the records are repeated so that the values in the date column exist for all dates in a time range.

The time range starts at the date that is specified in the date column and is adjusted by the overlap and interval values. For missing values, the time range starts at the date that is specified by the INITIAL START parameter. The time range ends on the later of

two dates: either the current date as adjusted with the interval value, or the specified date in the Date Column as adjusted with the overlap and interval values.

Here are the parameters that you can specify for this transformation:

OPTION NAME	describes the transformation option.
DATE COLUMN	specifies date values that determine begin date for a time range.
OVERLAP	specifies the number of intervals to go back (negative value) or to go forward (positive value) when determining begin date and end date for a time range.
INTERVAL	specifies the calendar interval (month, day, or year) to go back when determining begin date and end date for a time range. This parameter specifies the calendar interval for adding records within a time range. For example, if the INTERVAL parameter is monthly, one record is added for each month between the begin date and end date.
ALIGNMENT	specifies if new date values are aligned at the beginning, midpoint, or end of the interval. The default value is BEGINNING.
INITIAL START	specifies the begin date of a time range for missing values.
CREATE OUTPUT AS VIEW	specifies the output as a view or a table. Specify YES to create the output as a view.

The following example shows a data table before and after the Repeat Record for Date Range Overlap transformation. In this example, the overlap is -2, the interval is MONTH, the INITIAL START date is 01JAN2006, and the transformation was run on April 19, 2006.

Figure 4.3   Input Table and Output Table Using Repeat Record for Date Range Overlap Transformation

Input Table

	DATECOL
A	
B	01JAN2006
C	01MAR2006
D	01JUL2006

Output Table

	DATECOL
A	01JAN2006
A	01FEB2006
A	01MAR2006
A	01APR2006
B	01NOV2005
B	01DEC2005
B	01JAN2006
B	01FEB2006
B	01MAR2006
B	01APR2006
C	01JAN2006
C	01FEB2006
C	01MAR2006
C	01APR2006
D	01MAY2006
D	01JUN2006
D	01JUL2006

HR Clean Personnel Numbers

The HR Clean Personnel Numbers transformation makes consistent HR personnel numbers (PERNR) in SAP for a single employee. For example, if an employee has multiple personnel numbers, this transformation consolidates the numbers into a single number. The employee is represented with a single and unique personnel number. Additional PERNR numbers are considered superfluous. Only one number is preferred per employee.

This transformation uses a specific format that is specified as an option. This format combines personnel numbers with an expression such as PUT(PUT(PERNR,Z10.),$R3_TO_HRID.).

Some personnel numbers might map to a value that is defined through the DELETEFLG option. The data is moved to a separate table for personnel numbers that are deleted. For best results, create the specific format with the HR Create PERNR Cleaning Format transformation. See the T200080 Create SAS Format for Personnel Number Clean job as an example.

The HR Clean Personnel Numbers transformation uses the %ADPT_CLEAN_PERSONNEL_NUMBERS macro. In addition, an exit by a user might execute additional site-specific code.

The HR Clean Personnel Numbers transformation uses one input table to which it applies the personnel number cleansing. The following table describes the parameters that you can specify for the input table.

Table 4.4   Parameters for Input Table for HR Clean Personnel Numbers Transformation

Parameter Prompt	Macro Variable	Description
User Exit Location	USER_EXIT_CODE	Fully qualified path and name of user exit code on the SAS server. Code is included in the DATA step that maps the personnel numbers. It can use the following options: WHAT – description &P_OUTDELETED – name of output data set for records that are deleted CLEANED – intermediate view for the cleaned table &P_INPUT – input table NEW_PERNR – intermediate DATA step variable that contains mapped personnel number PERNR – DATA step variable that contains input personnel number
Begin Date	BEGDA	Start of date range.
End Date	ENDDA	End of date range.
Comparison Column List	COMPVAR_LIST	List of comparison columns. Date range is consolidated so that each unique combination of comparison columns has a single period.
Should Gaps be Filled	FILLGAPS	Specify YES if gaps in the date range should be padded with new records and missing values in the comparison columns.
Non-date-Range Key(s)	SORTKEY	List of columns on which the input table is sorted or needs to be sorted.
Additional Columns to Keep	KEEPVARS	Additional columns to keep with the latest value in each consolidated period. Differences in values do not trigger a new period.
Output Table Type (VIEW | DATA)	VIEW	Enables you to specify VIEW if the output table created by the transformation should be a view. Needed when used with a load step or follow-on transformation. Specify DATA to create a table.
Format Name	FMTNAME	Name of SAS format to use. Format must be in the format search path that is set on the SAS Workspace Server. Default is R3_TO_HRID.
Delete Flag	DELETEFLG	Value of formatted personnel number to be deleted.

The HR Clean Personnel Numbers transformation creates two output tables:

❑ One table with the prompt **Place table or transform here**. This table contains the cleaned personnel numbers.

❑ One table with the prompt **Place table or transform here for deleted records**. This table contains personnel numbers that were not propagated from the input table to the main output table because of the DELETEFLG option.

HR Payroll Extraction

The HR Payroll Extraction transformation extracts HR payroll data from SAP. This transformation has explicit input that contains the payroll area and date combinations for which the payroll data needs to be extracted. It has implicit input from SAP. The transformation does not perform any delta processing because other steps perform delta processing as needed.

This transformation uses the %ADPT_PAYROLL_XTRACT macro. See the E08040A Extract HR Historical Compensation Data job and E08040B Extract Historical Compensation Data job as examples.

Using the HR Payroll Extraction Transformation

Complete the following steps to use the HR Payroll Extraction transformation:

1 Drag and drop the HR Payroll Extraction transformation onto a job. This transformation requires two input tables. It creates a single output table.
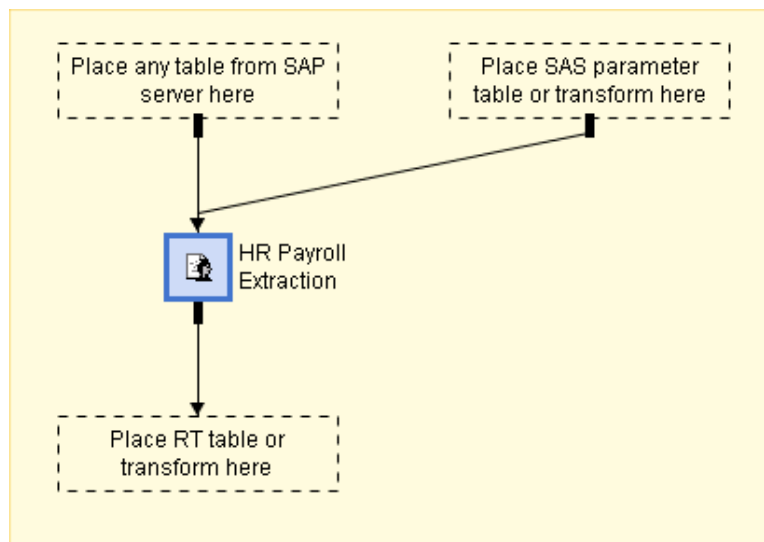
2 Drag and drop two input tables. These two input tables have specific purposes:

❑ One input table can be any table that is associated with the SAP library on the server from which the extraction is to be made. This table is required so that the transformation generates the correct LIBNAME statement that is needed by the CALLRFC in the source code.

❑ The other input table is the SAS parameter table that tells the transformation which HR payroll data to extract. This input table provides a structure with the following columns:

Table 4.5   Structure of Input Table for HR Payroll Extraction Transformation

Column	Type	Description
COUNTRY_CLUSTER	$2	Required column. If blank, the corresponding row is ignored. To calculate salaries, it is important to know the country group for wages and salaries (MOLGA). The SAS Solutions Adapter for SAP associates MOLGA with an employee by looking up the MOLGA code for the company code (BUKRS) that is stored in PA0001. SAP has a separate cluster table for different countries. The cluster name takes the form Rx, where x represents the country. For example, U=USA, D=Germany, J=Japan, C=Switzerland, I=Italy, and so on. See the SAP R/3 table T500L for the country character.
PAYROLL_AREA	$2	A separate row should be created for each payroll area that is used in each country.
IN_PERIOD	$6	The IN_PERIOD is in the form YYYYPP, where YYYY represents the financial year, and PP represents the pay period. The pay period can be 01 to 12 for employees paid monthly, and 01 to 53 for employees paid weekly.

Note: All other columns are ignored by the transformation.

3 Drag and drop an output table. The output table (RT) must contain at least the subset of columns that are in the following table:

Table 4.6 Structure of Input Table for HR Current Payroll Extract Log

Column	Type	Description
ABKRS	$2	Payroll area
FPPER	$6	Pay period for payroll
FPBEG	Date	Begin date of pay period for payroll
FPEND	Date	End date of pay period for payroll
IABKRS	$2	Payroll area
INPER	$6	In pay period for payroll
SRTZA	$1	Indicator: status of record
RUNDT	Date	Date of payroll run
PAYDT	Date	Pay date for payroll
PERNR	$8	Personnel number
LGART	$4	Wage type
BETRG	Numeric 8	HR payroll: amount
AMT_CURR	$5	Currency key

The output table must be used with a null loader because the transformation populates the table directly. The data location must refer to the output table. As a result, the output table must be a permanent table, not a work table.

4   Select the **Mapping** tab. Make sure all columns in the output table are in the input tables.

5   Select the **Options** tab.

6   Enter the following parameters:

ABAP Job   is the name of the ABAP job that is started on the SAP system. It cannot be blank. You can enter the name of the ABAP job directly, or you can use a global macro variable.

ABAP Variant   is the ABAP variant for reports. This parameter must correspond to a variant that the SAP administrator created when customizing the SAP environment for the SAS Solutions Adapter for SAP.

Euro Conversion	converts currency amounts from pre-Euro currencies to Euros using standard fixed exchange rates. Must be set to YES or NO (default).
Pre-Euro Currency	is the currency before the Euro, such as marks (DEM) or francs (BEF). The conversion assumes single pre-Euro currency. This data is needed because the output table does not always have a currency stored. An amount of 100 for Pre-Euro Currency would not represent EUR 100; it would represent 100 in the specified currency. If this parameter is specified and if Euro Conversion is set to YES, the transformation converts the amounts to Euros.

HR Current Pay Extraction

The HR Current Pay Extraction transformation extracts the current base salary from SAP HR using the SAP function /SAS/HR_EVALUATE_WAGES.

This transformation uses the %ADPT_CALLRFC_EVALUATE_WAGES macro. See the E08030 Extract Current Pay Data job for an example.

This transformation uses the following input tables:

❑ INPUT_SAP_TABLE

❑ _INPUT_PARAMETER_TABLE

❑ _INCLUDE_LIB1

❑ _INCLUDE_LIB2

❑ _INCLUDE_LIB3

❑ _INCLUDE_LIB4

Note: The DEFAULTINFOTYPE parameter uses an INPUT_ table. DEFAULTINFOTYPE specifies the SAP infotype that is used for extraction, unless the infotype is specified differently in the _INPUT_PARAMETER_TABLE.

The HR Current Pay Extraction transformation can have six input tables. Two of these input tables are required. After you drag and drop the transformation onto a job, the drop zones of the two required input tables appear.
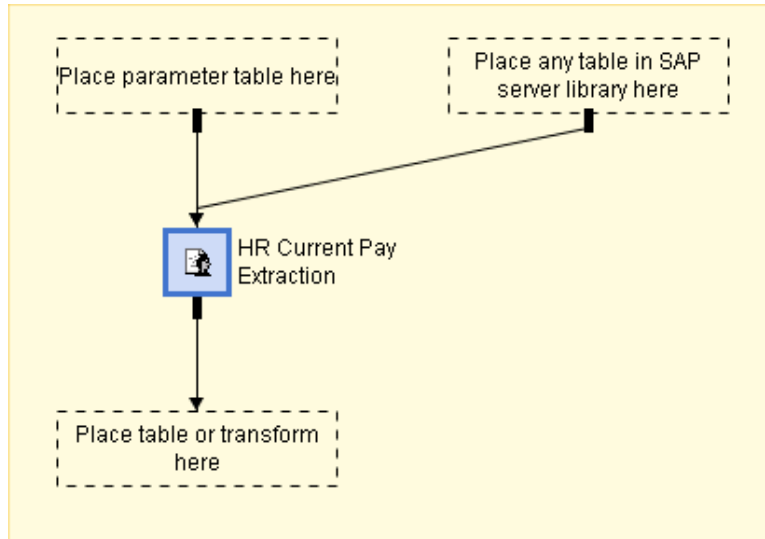
The following two input table types are required:

❑ An input table with the prompt **Place any table in SAP server library here**, which provides important information that the transformation uses. This prompt specifies the SAP server library that calls the SAP function /SAS/HR_EVALUATE_WAGES. The transformation does not use the actual input table.

❑ An input table with the prompt **Place parameter table here**, which is used to specify input parameters for the ABAP function. This function is called once for each row in the parameter table. The parameters for each call are taken from the values of the corresponding columns in the parameter table.

The columns in the parameter table are required, although the content of the columns can be blank. For best results, create and maintain this parameter table with the I0040 Initialize Current Pay Extraction Parameter job.

The following table describes the columns that you can specify for the parameter table.

Table 4.7   Columns in Parameter Table for HR Current Pay Extraction Transformation

Column	Type	Description
PAY_INFOTYPE	$4	Infotype from which pay data is to be extracted. This is an optional column. The default is 0008.
FROM_PERNR	$8	Specifies the lower limit of personnel numbers. This column can be used with TO_PERNR to subset the results to a group of employees (which can be used if the ABAP function cannot execute in a single run for all employees). This is an optional column. The default is no minimum.
TO_PERNR	$8	Specifies the upper limit of personnel numbers. This column can be used with FROM_PERNR. This is an optional column. The default is no minimum.
INCL_EXCL_TABLE	$41	Specifies the two-level name of a SAS table that contains wage types (in column LGART) to include or exclude. Each SAS library for this table has to be an input table of the transformation so that it generates the correct LIBNAME statement. The optional input table with the prompt **Place any table from an include/exclude library here** has to be used for this purpose. This is an optional column.
INCL_EXCL_FLG	$1	Specifies whether to include or exclude the wage types that are specified in INCL_EXCL_TABLE. Use an **E** to exclude wage types, or an **I** to include wage types. This is an optional column. The default is **I**.

You can add up to four additional input tables that specify libraries from which wage types are to be included or excluded.
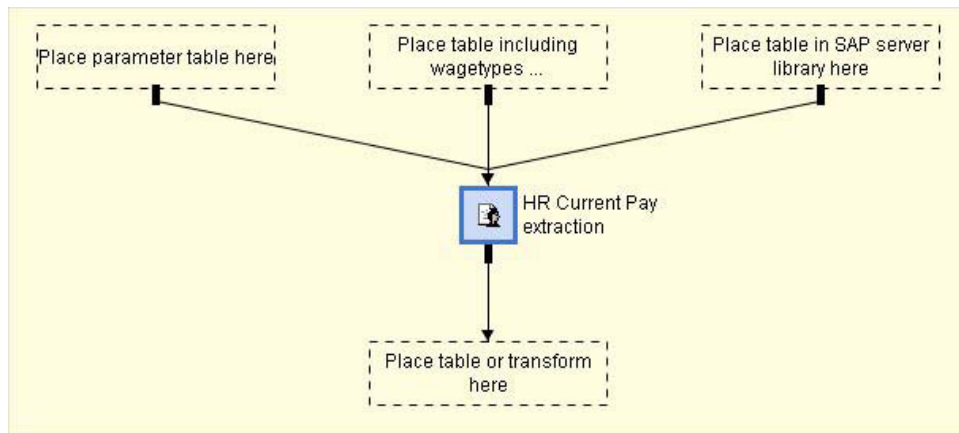
The table with the prompt **Place any table from an include/exclude library here** defines the libraries in which the tables are listed in the INCL_EXCL_TABLE column of the parameter table. This table is used by the library, not the transformation. The table that is used to determine which wage types to include or exclude has a single column. This LGART column has a type of $4 and specifies the wage type.
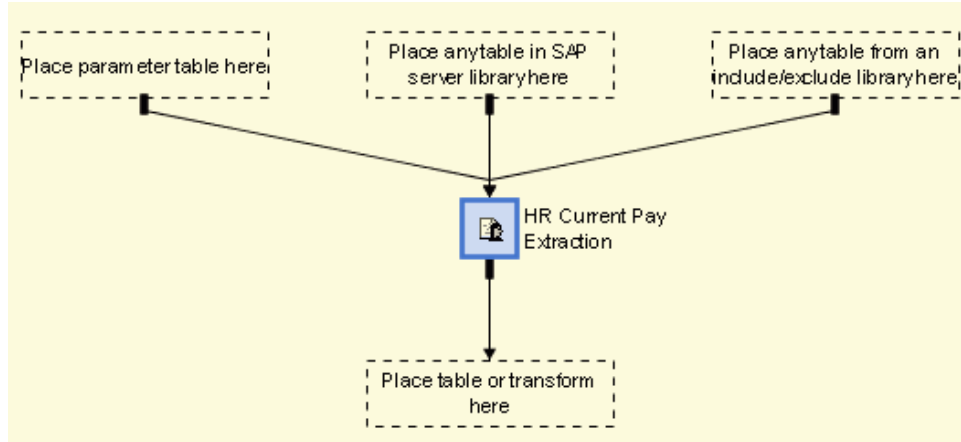
Note: A different table to include or exclude wage types can be used for each row in the parameter table. Therefore, any number of this type of table can be added as input tables to the transformation. However, this table is tied to the extraction through the parameter table. Dragging and dropping the table onto the job ensures the assignments of the required SAS libraries.

The HR Current Pay Extraction transformation creates an output table with the following structure:

Table 4.8   Structure of Output Table from the HR Current Pay Extraction Transformation

Name	Type	Description
PERNR	$8	Unique personnel number for the employee.
INFTY	$4	Infotype for wage type.
LGART	$4	Wage type.
SEQNR	$3	Number of infotype records with the same key.
OPKEN	$1	Operation indicator for wage type.
INDBW	$1	Indicator for indirect evaluation.
BETRG	NUMBER	Salary amount.
WAERS	$5	Currency of the salary amount (BETRG).
VALUE_DATE	DATE	Date that the salary amount is valid.

Another output table can be added that specifies a logging table with extracted log information. With the HR Current Pay Update transformation, this table prevents re-extraction of data that was previously extracted. The structure of the logging table is the same as the parameter table, with additional RUNDATE and EVALDATE columns.

Table 4.9   Structure of Logging Table from the HR Current Pay Extraction Transformation

Column	Type	Description
RUNDATE	DATE	Date that the extract was performed.
PAY_INFOTYPE	$4	Infotype from which pay data is to be extracted.
EVALDATE	DATE	Date for the pay information to be valid.
FROM_PERNR	$8	Specifies the lower limit of personnel numbers.

TO_PERNR	$8	Specifies the upper limit of personnel numbers.
INCL_EXCL_TABLE	$41	Specifies the two-level name of a SAS table that contains wage types (in column LGART) to include or exclude.
INCL_EXCL_FLG	$1	Specifies whether to include or exclude the wage types that are specified in INCL_EXCL_TABLE. Use an **E** to exclude wage types, or an **I** to include wage types. This is an optional column. The default is **I**.

See Appendix 2, "Tables Extracted from SAP," for more information about the ABAP function SAS/HR_EVALUATE_WAGES.

HR Current Pay Update

The HR Current Pay Update transformation is used with the HR Current Pay Extraction transformation. This transformation updates the output tables with the current pay records from the latest extraction. It ensures that only later pay records are extracted in the subsequent extraction.

This transformation uses the %ADPT_UPDATE_PAY_RESULTS macro. See the T230000 Update Current Pay job for an example.

Using the HR Current Pay Update Transformation

Complete the following steps to use the HR Current Pay Update transformation:

1   Drag and drop the HR Current Pay Update transformation onto a job.

2   Drag and drop input tables and output tables.
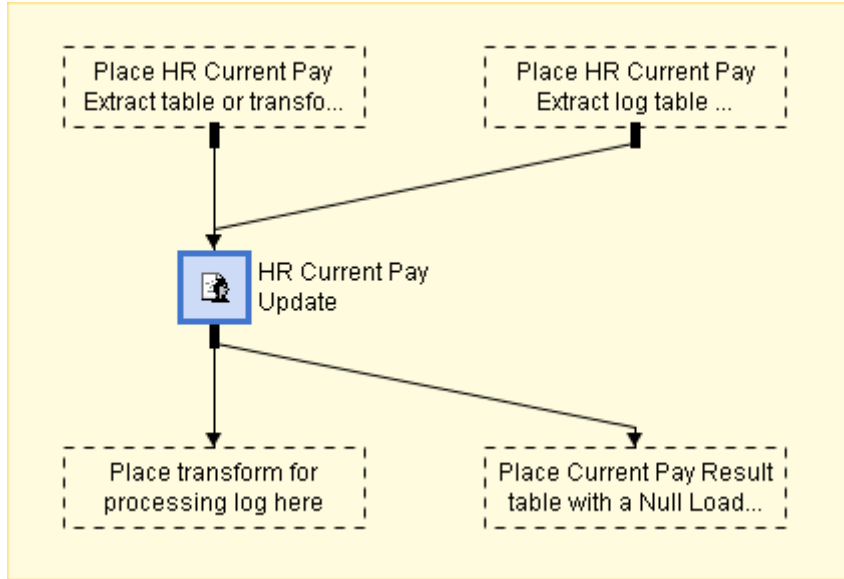
The input tables must be the output tables of an HR Current Pay Extraction transformation. The input table has the following structure:

Table 4.10 Structure of Input Table for HR Current Pay Update Transformation

Column	Type	Description
PERNR	$8	Unique personnel number for the employee.
INFTY	$4	Infotype for wage type.
LGART	$4	Wage type.
SEQNR	$3	Number of infotype records with the same key.
OPKEN	$1	Operation indicator for wage type.
INDBW	$1	Indicator for indirect evaluation.
BETRG	NUMBER	Salary amount.
WAERS	$5	Currency of the salary amount (BETRG).
VALUE_DATE	DATE	Date that the salary amount is valid.

The logging table from the HR Current Pay Extraction transformation has the following structure:

Table 4.11 Structure of Logging Table from the HR Current Pay Extraction Transformation

Column	Type	Description
RUNDATE	DATE	Date that the extract was performed.
PAY_INFOTYPE	$4	Infotype from which pay data is to be extracted.
EVALDATE	DATE	Date for the pay information to be valid.
FROM_PERNR	$8	Specifies the lower limit of personnel numbers.
TO_PERNR	$8	Specifies the upper limit of personnel numbers.

INCL_EXCL_TABLE	$41	Specifies the two-level name of a SAS table that contains wage types (in column LGART) to include or exclude.
INCL_EXCL_FLG	$1	Specifies whether to include or exclude the wage types that are specified in INCL_EXCL_TABLE. Use an **E** to exclude wage types, or an **I** to include wage types. This is an optional column. The default is **I**.

3   Select the **Process** tab. Provide specifications for the following two target tables for output data:
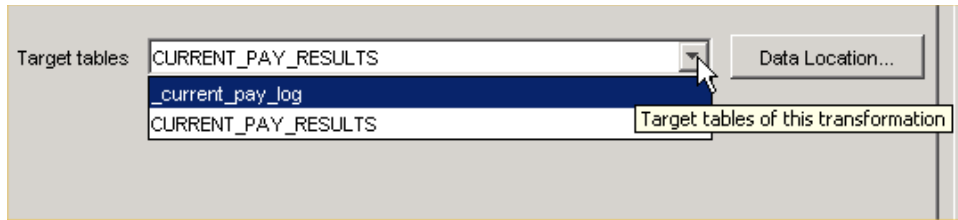
- ❑ The main target table for output data is CURRENT_PAY_RESULTS. This table must contain all of the data for all of the extractions. The update process adds new records and replaces records (by VALUE_DATE) with the new extracted data. Because the HR Current Pay Update transformation handles loading, a null loader must be used.

    The structure of the CURRENT_PAY_RESULTS target table must be the same as the structure of the HR Current Pay Extraction input table.

- ❑ The other target table for output data is _CURRENT_PAY_LOG. This table has the same structure as the logging table for the HR Current Pay Extraction input table. The output table or transformation must use columns in its structure.

    Additional processing for the _CURRENT_PAY_LOG table is necessary. Use a transformation that calculates the maximum EVALDATE and RUNDATE. See the T230000 Update Current Pay job as an example. This job uses the following mapping:
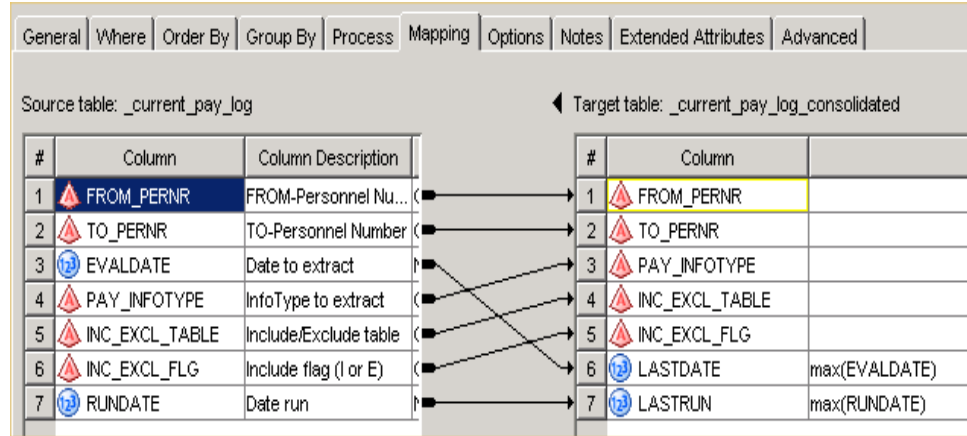
4 Select the **Mapping** tab.

5 Set the transformation to use 1:1 mapping for all columns.
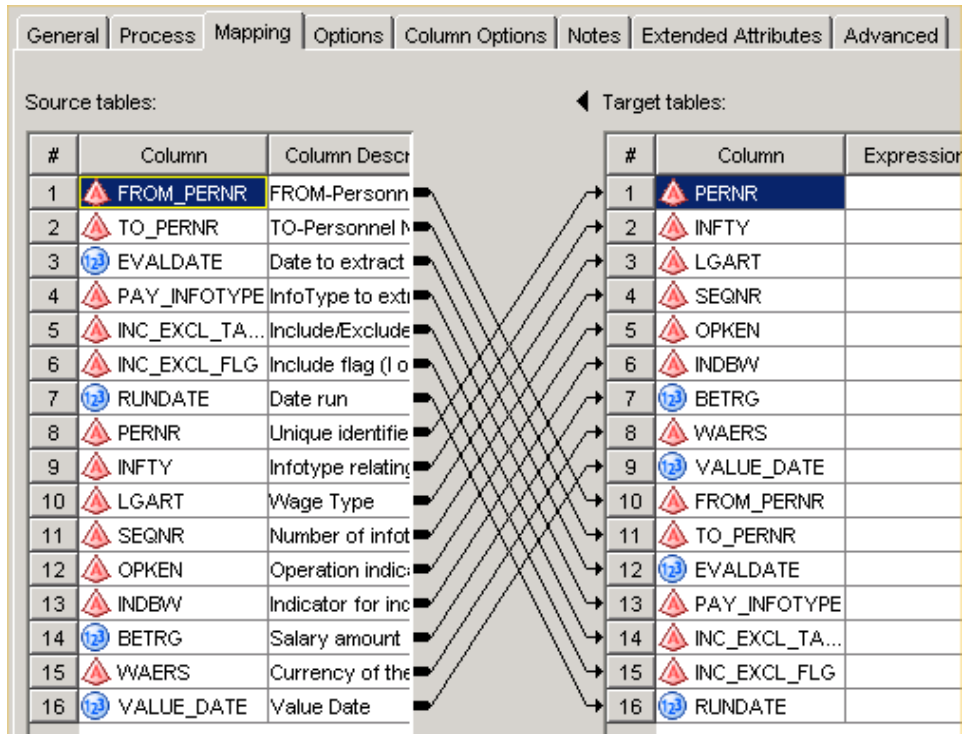
6 Select the **Options** tab.
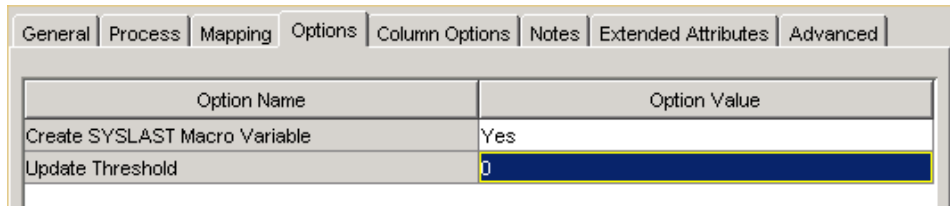
7 Specify the **Update Threshold** option. **Update Threshold** sets the upper percentage of deleted records in the output table before the table is purged. For

example, with each update, old data is deleted from the main output table and new data is added. Updating can increase the number of unused records (records marked for deletion) that are in the output table. A value of 25 indicates that the main output table is updated until 25% of its records are marked for deletion. Then, the main output table is recreated to free this unused space.

The default value for the **`Update Threshold`** is 0. This value indicates that no records that are marked for deletion are kept in the main output table. This option is comparable to the generic drop table load property of the Table Loader transformation.

Split the NLS Data

The Split the NLS Data transformation splits the data of the dimension member table into two tables. One table stores the default language-specific data, and the other table stores the non-default, language-specific data.

You can store names and descriptions in multiple languages and locales. The DDS has a three-character language code that differs from the locale used by the Solution Data Mart (SDM) and the operating system.

The DDS language code can identify differences in the languages and their descriptions in the DDS. Different procedures are used depending on the type of table. Language code is part of the primary key in a DDS _ASSOC_TYPE table. However, in some _ASSOC_TYPE tables, there can be multiple records for the same _ASSOC_TYPE code, which is differentiated by the language code.

For a dimension member table such as DDS.GL_ACCOUNT, it is more complicated. The language code is not represented in a dimension member table. For example, a dimension member table such as GL_ACCOUNT should contain the name and description of the default language code in the DDS.CODE_LANGUAGE table. If more than one language code is required, then the names and descriptions are added to the GL_ACCOUNT_NLS table.

Here is a sample DDS.CODE_LANGUAGE table:

LANGUAGE_CD	LOCALE_LANGUAGE_CD	LOCALE_COUNTRY_CD	LOCALE_VARIANT_CD	DEFAULT_LANGUAGE_FLG
zh	Zh	CN		Y
zhx	Zh	TW		N
en	En			N

In the table, names and descriptions for account members for language code **`zh`** are added to the GL_ACCOUNT table. Language codes **`zhx`** and **`en`** are added to the GL_ACCOUNT_NLS table.

Based on this action, the transformation splits the data in the DDS.

Using the Split the NLS Data Transformation

Complete the following steps to use the Split the NLS Data transformation:

1   Drag and drop the Split the NLS Data transformation onto a job.
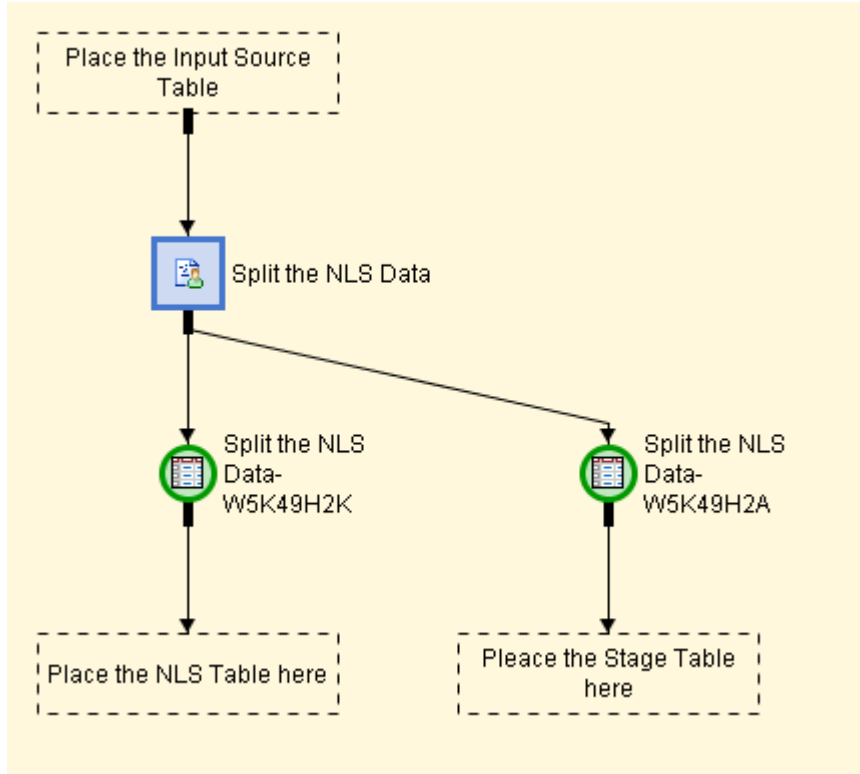
2 Drag and drop one input table and two output tables. The input table stores data
   that corresponds to all of the languages. The two output tables store the default
   language-specific data and the non-default language-specific data.

3 Select the **Options** tab. Provide specifications for the input table and output
   tables.
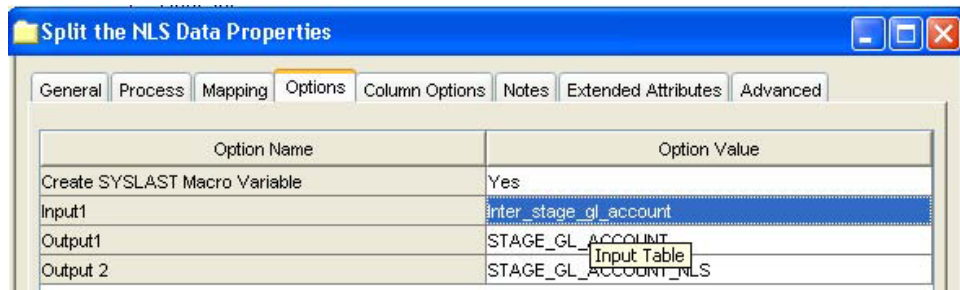
The following table types are required:

❑ An input table with the prompt **Place the Input Source table**. This table
   has data that corresponds to all of the languages. In most scenarios, this input
   table is an intermediate table that contains the dimension member data in all
   languages.

❑ An output table with the prompt **Place the NLS table here**. This table
   specifies the NLS table, which stores the non-default language-specific data (non-
   default languages are languages that have DEFAULT_LANGUAGE_FLG set to
   blank in the table STAGE_CODE_LANGUAGE).

❑ An output table with the prompt **Place the Stage Table here**. This table
   specifies the stage dimension table, which stores the default language-specific

data (default language is the language that has DEFAULT_LANGUAGE_FLG set to Y in the table STAGE_CODE_LANGUAGE).

Additional Generic Transformations

A group of transformations called data transforms are based on the generic transformation generator. These transformations process data for the SAS Solutions Adapter for SAP, but not only SAP data. These transformations are not restricted to SAP functionality and can be used in jobs outside of the SAS Solutions Adapter for SAP.

Keep First or Last Record in Group

This transformation keeps the first record or last record in a group. It differs from SORT NODUPKEY in that it can control which record is kept.

DATA Step Merge

This transformation includes a DATA step that merges a master table (left table) with one or more additional tables. A single parse goes through all tables, which is not possible using an SQL left join.

Convert Number Order to Integer Value

Some columns depict numerical order using floating-point numbers. In this case, it might be necessary to convert the numbers to unique integer values so that they are accepted in a subsequent data model. The Convert Number Order to Integer Value transformation accepts a single table as input.

On the **Column Options** tab, a single column must be selected. This column has its existing order changed to an integer value. The Convert Number Order to Integer Value transformation sorts the input table by the column that was selected. An update step substitutes the existing column value with an integer value that corresponds to the DATA step iteration. The value of each subsequent row in the input table is then incremented by 1.

This transformation does not have an output table because all work is performed on the input table.

Map SAP Address Lines to SAS Address Lines

SAS data models use the field names ADDRESS_LINE_1 through ADDRESS_LINE_4 to store address data that appears after the addressee or company name, but before the city and ZIP code. SAP has many fields that are available to store address data. The Map SAP Address Lines to SAS Address Lines transformation enables you to select between one and four relevant address columns from SAP data and map them to the SAS columns ADDRESS_LINE_1 to ADDRESS_LINE_4.

On the **Column Options** tab, select the SAP address columns that correspond to the required SAS address columns. For example, you can define SAP columns CNAME, STRAS, and STR2 to pass to SAS as ADDRESS_LINE_1, ADDRESS_LINE_2, and ADDRESS_LINE_3, respectively. If a particular data record has missing STRAS data, then the STR2 value populates the ADDRESS_LINE_2 column, and the ADDRESS_LINE_3 column is blank.

C H A P T E R

5
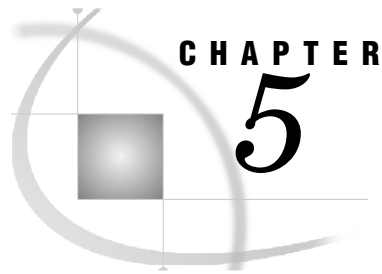
Initialization Jobs

Introduction to Initialization Jobs

Initialization jobs create administration tables that extraction jobs and transformation jobs use. Initialization jobs need to be run only once.

These jobs initialize your environment and provide data for SAS Human Capital Management.

I0010 Initialize Admin Base Wage Type Groups

This initialization job selects a wage type group that is used to determine the wage types for base salaries. To ensure that all correct wage type groups are selected, review the WHERE clause of the extraction.

I0020 Load Additional HR Action Types

This initialization job creates additional HR action types for actions that are automatically detected. These action types are used when SAP does not explicitly record an action, but information columns have changed for an employee who is affected by the action. The additional action types represent what type of change was detected in the information columns.

Additional action types include the following action codes:

`action_type_cd='APPRAISAL'`
is the action code for a performance appraisal.
`action_type_cd='0007'`
indicates a change in working time.
`action_type_cd='0008'`
indicates a change in pay.

Note: Descriptions provided in the i0020_init_additional_action_types.sas source code are in English. You can substitute or use another language as needed.

I0030 Load Admin Work Hours in Payfrequency

This initialization job is site-dependent and must be reviewed for each local implementation. The job links the number of hours per pay period, and a value needs to be created for each value in the SAP R/3 table T549. Because these values might change over time, a date range can be specified for each value. The source code for this job is in i0030_load_payfreq_hours.sas**.**

I0040 Initialize Current Pay Extraction Parameter

This initialization job controls what is extracted by the E08030 Extract Current Pay Data job, a job that returns the wages for each employee on a specified date. This initialization job is an example and should be reviewed for applicability to your local site.

To control what is extracted by the E08030 Extract Current Pay Data job:

❑ Select a remuneration infotype. The following infotypes are supported:
  ❑ 0008 = base salary (default value)
  ❑ 0014 = recurring payments or deductions
  ❑ 0015 = additional payments
  ❑ 0052 = wage maintenance
❑ Specify a range of personnel numbers to process with minimum and maximum values.
❑ Specify wage types that should be included or excluded in the results.

The source code i0040_create_current_pay_xparms.sas creates a table that specifies the parameters.

Because the extraction is performed through CALLRFC, which runs interactively, each extraction must be a reasonable size so that it runs without timing out in SAP. To limit the size of each extraction, add multiple rows in the parameter table. Each row launches a separate extraction. If running multiple extractions is necessary, each row in the parameter table can specify a subset of the employees. Subsets are specified by a range of personnel numbers (PERNR) in the columns FROM_PERNR and TO_PERNR.
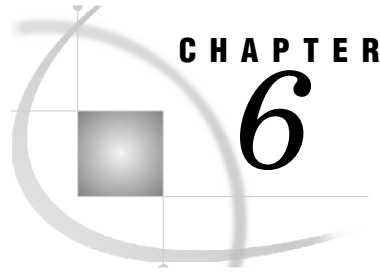
You can control the wage types (LGART) that are extracted. To do this, create a wage type parameter table that contains a single column called LGART. The name of the wage type parameter table must be specified in the main parameter table. The INCL_EXCL_FLAG option is set to **I** (include) or **E** (exclude). Although this option is not included in the source code, you should use it to reduce the amount of extracted data.

I0050 Set Blank Business Area Name

This initialization job assigns text descriptions to business areas that do not have descriptions in the transaction data from SAP. The SAS Solutions Adapter for SAP requires business area descriptions when creating default internal organization dimensions. However, descriptions can be missing in the transaction data from SAP because SAP allows blank descriptions in business area text tables.

The initialization job assigns a default text description **`Business Area not specified`** when a business area description is missing in the transaction data from SAP. The source code for this job is in i0050_set_blank_busarea.sas.

Note: This initialization job is site dependent and must be reviewed for each local implementation. You can substitute or use another language as needed.

6

Extraction Jobs

Extraction Jobs

The SAS Solutions Adapter for SAP uses several extraction jobs to extract data from SAP R/3. Here are the four essential types of extractions that the SAS Solutions Adapter for SAP uses:

Simple complete extractions

> extract and load all rows of a table from the SAP server into a mirror SAS table. Rerunning these extractions re-extracts the entire table and automatically retrieves all new information.

Simple partial extractions

> extract and load a subset of an SAP table (not all rows and not all columns) into a partial mirror SAS table. Rerunning these extractions re-extracts the same logical parts of the table and automatically retrieves all new information that is relevant.

Change data capture extractions

extract and load data that was added or changed in SAP since the previous extraction. These extractions are subsequent loads that are used after an initial load is completed by a simple complete extraction or a simple partial extraction. Change data capture extractions are important for large transaction tables. This extraction's complexity is not needed for small amounts of data.

Extractions done through SAP remote-callable functions

is the easiest way to extract SAP data in some cases.

Job Group: E00 Extract T Tables

This job group includes common jobs that extract data for SAS Financial Management and SAS Human Capital Management. A mirror SAS table is created in the R3mirror library for each of the Jobs below.

E00010 Extract R3 General and FI T*nnn* Tables

This job extracts general and financial tables from SAP R/3 that are small and have a name with a T prefix. For each table, a mirror SAS table is created in the R3mirror library. Individual extractions are independent of each other.

This job extracts the following tables from SAP:

- ❑ T001 – Company Codes
- ❑ T002 – Language Keys
- ❑ T002T – Language Key Texts
- ❑ T003 – Document Types
- ❑ T003T – Document Type Texts
- ❑ T004 – Directory of Charts of Accounts
- ❑ T004T – Charts of Account Names
- ❑ T005T – Country Names
- ❑ T011 – Financial Statement Versions
- ❑ T011T – Financial Statement Version Names
- ❑ T880 – Global Company Data (for KONS ledger)

This job uses the following input tables from the SAP server:

- ❑ T001
- ❑ T002
- ❑ T002T
- ❑ T003
- ❑ T003T
- ❑ T004
- ❑ T004T
- ❑ T005T
- ❑ T011
- ❑ T011T
- ❑ T880

This job creates the following output:

- ❑ R3mirror.T001
- ❑ R3mirror.T002
- ❑ R3mirror.T002T
- ❑ R3mirror.T003
- ❑ R3mirror.T003T
- ❑ R3mirror.T004
- ❑ R3mirror.T004T
- ❑ R3mirror.T005T
- ❑ R3mirror.T011
- ❑ R3mirror.T011T
- ❑ R3mirror.T880
- ❑ $LOCALCR
- ❑ $COM2CAC
- ❑ $BUKRS
- ❑ $COMPANY_TO_FY_VARIANT
- ❑ $TRAD_PTNR_TO_BUKRS
- ❑ $SAPTOSAS_LANGUAGE

E00011 Formats from R3 General and FI T*nnn* Tables

This job creates formats from the tables that are extracted in the E00010 job. Run this job immediately after the E00010 job so that the formats are as current as the tables on which they are based.

This job uses the following input tables from SAS:

- ❑ R3mirror.T001
- ❑ R3mirror.T002
- ❑ R3mirror.T011

This job creates the following output formats:

- ❑ $LOCALCR
- ❑ $COM2CAC
- ❑ $BUKRS
- ❑ $COMPANY_TO_FY_VARIANT
- ❑ $TRAD_PTNR_TO_BUKRS
- ❑ $SAPTOSAS_LANGUAGE
- ❑ $unassigned_accounts_parent
- ❑ $company_to_country

E00020 Extract T*xxx* General and FI Tables

This job extracts general and financial tables from SAP R/3 that have a name with a T prefix. These tables are generally text description tables. Individual extractions are independent of each other.

This job extracts the following tables:
- ❑ TBSLT – Posting Key Names
- ❑ TGSBT – Business Area Names
- ❑ TKA01 – Controlling Areas
- ❑ TKA02 – Controlling Area Assignment
- ❑ T077X – Account Group Names (Table T077D)
- ❑ TKA00 – Control Parameters for Controlling Areas

This job uses the following input tables from the SAP server:
- ❑ TBSLT
- ❑ TGSBT
- ❑ TKA01
- ❑ TKA02
- ❑ T077X
- ❑ TKA00

This job creates the following output:
- ❑ R3mirror.TBSLT
- ❑ R3mirror.TGSBT
- ❑ R3mirror.TKA01
- ❑ R3mirror.TKA02
- ❑ R3mirror.T077X
- ❑ R3mirror.TKA00
- ❑ $CC2CA format converts Company Code $BUKRS to Controlling Area $KOKRS

E00030 Extract Financial Period T Tables

This job extracts financial tables from SAP R/3 that have a name with a T009 prefix.

This job extracts the following tables:
- ❑ T009 – Fiscal Year Variants
- ❑ T009T – Fiscal Year Variant Names
- ❑ T009Y – Shortened Fiscal Years in Asset Accounting
- ❑ T009B – Fiscal Year Variant Periods
- ❑ T009C – Period Names

This job uses the following input (tables are from the SAP server):
- ❑ T009
- ❑ T009T
- ❑ T009Y

❏   T009B

❏   T009C

❏   &LANG (set in the preprocessing step)

This job creates the following output:

❏   R3mirror.T009

❏   R3mirror.T009T

❏   R3mirror.T009Y

❏   R3mirror.T009B

❏   R3mirror.T009C

E00031 Formats from Financial Period T Tables

This job creates formats from the tables that are extracted in the E00030 job. Run this job immediately after the E00030 job so that the formats are as current as the tables on which they are based.

This job uses the following input:

❏   R3mirror.T009C

❏   &LANG (set in the preprocessing step)

This job creates the following output formats:

❏ $PERIOD_DESCRIPTION converts concatenated Fiscal Year Variant (PERIV) and Posting Period (POPER) to Period Name Long Text (LTEXT)

❏ $PERIOD_NAME output converts concatenated Fiscal Year Variant (PERIV) and Posting Period (POPER) to Period Name Short Text (KTEXT)

E00050 Extract Currency T Tables

This job extracts currency tables from SAP R/3 that have a name with a TCUR prefix.

This job extracts the following tables:

❏   TCURR – Exchange Rates

❏   TCURT – Currency Code Names

❏   TCURW – Usage of Exchange Rate Types

This job uses the following input tables from the SAP server:

❏   TCURR

❏   TCURT

❏   TCURW

This job creates the following output:

❏   R3mirror.TCURR

❏   R3mirror.TCURT

❏   R3mirror.TCURW

E00060 Extract Account T Tables

This job extracts general and financial tables from SAP R/3 that have a name with a T030 prefix and are related to accounts.

This job extracts the following tables:

❑   T030R – Rules for Determination of Standard Account
❑   T030 – Standard Account Table
❑   T030C – Global Standard Account Table
❑   T030D – Account Determination for Open Item Exchange Rate Differences
❑   T030H – Account Determination for Open Item Exchange Rate Differences
❑   T030W – Transaction Key Names

This job uses the following input tables from the SAP server:

❑   T030R
❑   T030
❑   T030C
❑   T030D
❑   T030H
❑   T030W

This job creates the following output:

❑   R3mirror.T030R
❑   R3mirror.T030
❑   R3mirror.T030C
❑   R3mirror.T030D
❑   R3mirror.T030H
❑   R3mirror.T030W

E00070 Extract Material Hierarchy Tables

This job extracts material hierarchy tables from SAP R/3 that have a name with a T179 prefix.

This job extracts the following tables:

❑   T179 – Materials: Product Hierarchies
❑   T179T – Materials: Product Hierarchy Texts

This job uses the following input tables from the SAP server:

❑   T179
❑   T179T

This job creates the following output:

❑   R3mirror.T179
❑   R3mirror.T179T

E00090 Extract Operating Concern T Tables

This job extracts operating concern tables prefixed with T from SAP R/3.

This job extracts the following tables:
- ❑ TKEB – Management for Operating Concerns (Client Specific)
- ❑ TKEBT – Management for Operating Concern (Client Specific) Texts

This job uses the following input tables from the SAP server:
- ❑ TKEB
- ❑ TKEBT

This job creates the following output:
- ❑ R3mirror.TKEB
- ❑ R3mirror.TKEBT

E00100 Extract Additional Tables for Formats

This job extracts miscellaneous tables from SAP R/3 that are required for formats and have not been already extracted.

This job extracts the table DD07T – DD: Domain Fixed Values (Language Dependent) Texts.

This job uses the following input:
- ❑ DD07T from the SAP server
- ❑ &LANG (set in the preprocessing step)

This job creates the following output:
- ❑ R3mirror.DD07T
- ❑ $SHKZG uses R3mirror.DD07T to create the format $SHKZG. It converts Values for Domains: Single Value/Lower Limit (DOMVALUE_L) to short text for fixed values (DDTEXT). $SHKZG is stored in the LIBRARY.FMT&LANG catalog, which is language dependent.

E00110 Extract Payroll T Tables

This job extracts tables from SAP R/3 that are related to payroll.

This job extracts the following tables:
- ❑ T549A – Payroll Areas
- ❑ T549Q – Payroll Periods
- ❑ T549R – Period Parameters

This job uses the following input tables from the SAP server:
- ❑ T549A
- ❑ T549Q
- ❑ T54

This job creates the following output:

❑ R3mirror.T549A

❑ R3mirror.T549Q

❑ R3mirror.T549R

❑ $PAYROLL_AREA_TO_PERIOD uses R3mirror.T549A to create the format
$PAYROLL_AREA_TO_PERIOD

E00120 Extract Time Frequency Measurement Tables

This job extracts miscellaneous tables from SAP R/3 that are required for formats and have not been already extracted.

This job extracts the table T538T – Units of Time/Measurement Texts.

This job uses the input table T538T from the SAP server.

This job creates the output R3mirror.T538T.

Job Group: E01 Extract Master Tables

This job group includes common jobs that extract data for SAS Financial Management and SAS Human Capital Management.

E01000 Extract R3 Profit Center Master Tables

This job extracts profit center master tables from SAP R/3.

This job extracts the following tables:

❑ CEPC – Profit Center Master Data

❑ CEPCT – Profit Center Master Data Texts

This job uses the following input tables from the SAP server:

❑ CEPC

❑ CEPCT

This job creates the following output:

❑ R3mirror.CEPC

❑ R3mirror.CEPCT

E01010 Extract R3 Cost Center Master Tables

This job extracts cost center master tables from SAP R/3. For each table, a mirror SAS table is created in the R3mirror library.

This job extracts the following tables:

❑ CSKS – Cost Center Master Data

❑   CSKST – Cost Center Master Data Texts

This job uses the following input tables from the SAP server:

❑   CSKS
❑   CSKST

This job creates the following output:

❑   R3mirror.CSKS
❑   R3mirror.CSKST
❑ $responsible_employee_id_to_name uses the user-written SAS program
     e01010_responsible_employee_to_id_mapping.sas to create the format
     $responsible_employee_id_to_name. It converts the employee name to employee
     ID, which is used in the RESPONSIBLE_EMPLOYEE_ID column of the
     STAGE_COST_CENTER, STAGE_PROFIT_CENTER, and
     STAGE_INTERNAL_ORG tables.
     e01010_responsible_employee_to_id_mapping.sas is a site-dependant program.
     Therefore, this program has to be customized during the implementation of the
     SAS Solutions Adapter for SAP.

E01100 Extract R3 Customer Master Table

This job extracts the customer master table from SAP R/3. This job extracts the table
KNA1 – Customer Master Data.

This job uses the input table KNA1 from the SAP server.

This job creates the output R3mirror.KNA1.

E01200 Extract R3 Vendor Master Table

This job extracts the vendor master table from SAP R/3.

This job extracts the table LFA1 – Vendor Master Data (General Section).

This job uses the input table LFA1 from the SAP server.

This job creates the output R3mirror.LFA1.

E01400 Extract R3 Account Master Tables

This job extracts the account master tables from SAP R/3.

This job extracts the following tables:

❑   SKA1 – G/L Account Master (Chart of Accounts)
❑   SKAT – G/L Chart of Accounts Description
❑   SKB1 – Account Master (Company Code)

This job uses the following input tables from the SAP server:

❑   SKA1
❑   SKAT

❑   SKB1

This job creates the following output:

❑   R3mirror.SKA1
❑   R3mirror.SKAT
❑   R3mirror.SKB1
❑ $ACCBALS uses R3mirror.SKA1 to create the format $ACCBALS. It converts
     Values for G/L Account Number (SAKNR) to Indicator: Account is a Balance
     Sheet Account (XBILK). $ACCBALS is stored in the
     LIBRARY.FMT&_KTOPL&LANG catalog, which is for the chart of accounts and
     is language dependent.

Job Group: E02 Extract Transaction Tables

This job group includes jobs that extract data for SAS Financial Management.

E02000 Extract Financial Documents (Initial)

This job extracts financial documents from SAP R/3. The E00010 job must execute before
the E02000 job. The E02005 job must run immediately after this job to create a consolidated
table of financial document data. See the related E02210 job for more information.

This job extracts the following tables:

❑   BKPF – Accounting Document Header
❑   BSEG – Accounting Document Segment

This job uses the following input:

❑   BKPF from the SAP server
❑   BSEG from the SAP server
❑ $LOCALCR (created in the E00010 job)
❑ $COM2CAC (created in the E00010 job)
❑ $BUKRS (created in the E00010 job)
❑ $TRAD_PTNR_TO_BUKRS (created in the E00010 job)
❑   &_STARTFINYEAR (set in preprocessing step)
❑   &OVERLAP (set in preprocessing step)

This job creates the following output:

❑   R3mirror.BKPF
❑   R3mirror.BSEG
❑   Intermed.Financial_Documents

Additional Notes

This job does a complete extraction. In addition, it executes the SAS macro
%ADPT_UPDATE_BKPF_DELTA to update the delta control date record for the BKPF
table.

Although this job should be run during the first run of the job suite for SAS Data Integration Studio, you might need to refresh data later if you think that there is incomplete data.

You must run the E02210 job in all subsequent cases. The initial extraction by the E02000 job does a complete extraction of the financial document data from the BKPF and BSEG tables, depending on the date in the macro variable &_STARTFINYEAR. However, subsequent extractions by the E02210 job save time by extracting only changes made to the tables.

The initial extraction by the E02000 job works in two stages:

❑ The first stage extracts data from SAP to SAS data sets. This stage fully extracts the BSEG table, but only partially extracts the BKPF table. From the BKPF table, extraction is restricted to rows that have a fiscal year (GJAHR) not less than the value specified in the macro variable _STARTFINYEAR.

❑ The second stage joins the two resulting SAS data sets. Because the BKPF table extraction is restricted by date, an SQL left join is run. Information from the BSEG table is joined with information from the BKPF table.

E02005 Merge Financial Documents

This job merges the results of the E02000 job and provides a consolidated table of the SAP R/3 financial document tables. If customization is required, you can rerun the E02005 job. Because the E02000 job is a complete extraction of the input tables, rerunning the E02005 job does not create any load on the SAP server.

The E02000 job must be run before this job.

This job joins the following tables:

❑ R3mirror.BKPF

❑ R3mirror.BSEG

This job uses the following input tables:

❑ R3mirror.BKPF

❑ R3mirror.BSEG

This job creates the output Intermed.Financial_Documents.

E02010 Extract Controlling Objects Table (Initial)

This job extracts the controlling objects master table from SAP R/3. This data is not used, but is available.

This job extracts the following tables:

❑ COBK – Object Document Header

❑ COEP – Object Line Items

This job uses the following input tables from the SAP server:

❑ COBK

❑ COEP

This job creates the following output:

- ❑ R3mirror.COBK
- ❑ R3mirror.COEP

E02210 Extract Financial Documents (Changes)

This job extracts changes made to the financial document tables. See the related E02000 job for more information.

The following jobs must run before this job:

- ❑ E00010
- ❑ E02000

This job extracts the following tables:

- ❑ BKPF
- ❑ BSEG

This job uses the following input:

- ❑ BKPF from SAP server
- ❑ BSEG from SAP server
- ❑ $LOCALCR (created in the E00010 job)
- ❑ $COM2CAC (created in the E00010 job)
- ❑ $BUKRS (created in the E00010 job)
- ❑ $TRAD_PTNR_TO_BUKRS (created in the E00010 job)
- ❑ &_STARTFINYEAR (set in preprocessing step)
- ❑ &OVERLAP (set in preprocessing step)

This job creates the following output:

- ❑ R3mirror.BKPF
- ❑ R3mirror.BSEG

Additional Notes

This job includes E02210_CHECK_DELTA_CONTROL_DATE.SAS. In addition, it executes the SAS macro %ADPT_DELTACTL2 to get the latest delta control date record for the BKPF table. This job includes E02210_UPDATE_BKPF_DELTA_CONTROL_DATE.SAS, which calls the macro %ADPT_UPDATE_BKPF_DELTA to update the delta control date record for the BKPF table.

If you require a complete refresh of financial document data, you can run the E02000 job. The E02210 job extracts only changes that were made since the last extraction.

Extracting changes to the BKPF and BSEG tables efficiently is one of the most technically demanding tasks for the SAS Solutions Adapter for SAP. Because a complete extraction takes many hours and uses a significant amount of SAP R/3 and network resources, it should not be done frequently.

There is no perfect approach to this task because SAP does not use a perfect process to create timestamps for the tables. However, you can use the following columns in the BKPF table to identify changes:

❑ CPUDT (Accounting Document Entry Date)

❑ AEDAT (Date of Last Document Change by Transaction)

❑ UPDDT (Date of Last Document Update)

Likewise, the BSEG table has no date-and-time stamps that are useful for extraction. The SAS Solutions Adapter for SAP must identify the new and changed records in the heading table BKPF. It then extracts the matching records from the BSEG table. A server-side JOIN extracts the new and changed records in the BKPF and BSEG tables.

This process restricts the extraction by checking the three dates in the columns previously listed against an extract date. The extract date is stored in a SAS data set named deltacontrol in the Admin library. This extract date helps identify changed records. The SAS Solutions Adapter for SAP uses this date to subset the extraction. It updates the latest extract date in a postprocessing step. The macro %ADPT_DELTACTL updates deltacontrol.

You can use the macro variable &OVERLAP to specify a value of overlap days. This variable subtracts the specified number of days from the last extract date, and, thus, increases the amount of data extracted.

Job Group: E03 Extract Summary Tables

This job group includes jobs that extract data for SAS Financial Management.

E03000 Extract R3 GLT0 Account Transaction Summary Tables

This job extracts account transaction summary tables from SAP R/3. For each table, a mirror SAS table is created in the R3mirror library.

This job extracts the table GLT0 – G/L Account Master Record Transaction.

This job uses the input table GLT0 from the SAP server.

This job creates the output R3mirror.GLT0.

Job Group: E04 Extraction of Hierarchies and Structures

This job group includes jobs that extract, transform, and load data for SAS Financial Management.

E04010 Extract R3 Balance Sheet and Financial Statement

This job extracts financial statement data from SAP R/3. The easiest way to get to this data is by calling remote-enabled SAP functions. However, the SAP functions that produce

this data are not remote-enabled. The SAS Solutions Adapter for SAP provides functions that are remote enabled and can call the relevant SAP functions.

This job uses the following input:

❑ T011 from the SAP server

❑ Macro variables such as the following:

   ❑ _VERSN   Financial statement version from T011 without quotation marks
   ❑ SPRAS   Language code

This job creates the following output:

❑ R3mirror.RF011P

❑ R3mirror.RF011Q

❑ R3mirror.RF011Z

This job calls E04010_CALLRFC_IMPORT_BALANCE_SHEET.SAS and submits a PROC CALLRFC to execute the following SAP functions:

❑ /SAS/FI_IMPORT_BAL_SHEET_POS

❑ /SAS/FI_IMPORT_BAL_SHEET_TEXT

E04050 Extract R3 Work Breakdown Structure

This job extracts data from the table PRPS - Work Breakdown Structure. This data is not used, but is available.

This job uses the input table PRPS from the SAP server.

This job creates the output R3mirror.PRPS.

E04060 Extract Supplier Hierarchy Tables

This job extracts supplier hierarchy tables from SAP R/3. For each table, a mirror SAS table is created in the R3mirror library.

This job extracts the following tables:

❑ LFMH – Vendor Hierarchy

❑ TLHITT – Vendor Hierarchy Category Texts

This job uses the following input tables from the SAP server:

❑ LFMH

❑ TLHITT

This job creates the following output:

❑ R3mirror.LFMH

❑ R3mirror.TLHITT

E04070 Customer Hierarchy

This job extracts customer hierarchy tables from SAP R/3. For each table, a mirror SAS table is created in the R3mirror library.

This job extracts the following tables:
- ❑ KNVH – Customer Hierarchy
- ❑ THITT – Customer Hierarchy Types Texts

This job uses the following input tables from the SAP server:
- ❑ KNVH
- ❑ THITT

This job creates the following output:
- ❑ R3mirror.KNVH
- ❑ R3mirror.THITT

Job Group: E05 Extraction of Miscellaneous Other Tables

This job group includes jobs that extract data for SAS Financial Management.

E05000 Extraction of Number Ranges NRIV

This job extracts the table NRIV – Number Range Intervals.

This job uses the input table NRIV from the SAP server.

This job creates the output R3mirror.NRIV.

Job Group: E06 Extract HR PA Infotype Tables

This job group includes jobs that extract data for SAS Human Capital Management.

E06010 Extract General Employee Infotypes Tables

This job extracts tables from SAP R/3 that have a name with a PA prefix and are related to general employee information. The deltacontrol data set in the Admin library prevents a complete extraction if the job is rerun.

This job extracts the following tables:
- ❑ PA0001 Org. Assignment
- ❑ PA0002 Personnel Data
- ❑ PA0006 Addresses
- ❑ PA0016 Contract Elements
- ❑ PA0022 Education

❑   PA0057 Membership Fees
❑   PA0077 Additional Personnel Data

This job uses the following input:

❑   PA0001 from the SAP server
❑   PA0002 from the SAP server
❑   PA0006 from the SAP server
❑   PA0016 from the SAP server
❑   PA0022 from the SAP server
❑   PA0057 from the SAP server
❑   PA0077 from additional personnel data

This job creates the following output:

❑   R3mirror.PA0001
❑   R3mirror.PA0002
❑   R3mirror.PA0006
❑   R3mirror.PA0016
❑   R3mirror.PA0022
❑   R3mirror.PA0057
❑   R3mirror.PA0077

E06020 Extract Employee Actions PA0000 Table

This job extracts the table from SAP R/3 that is related to employee actions. The deltacontrol data set in the Admin library prevents a complete extraction if the job is rerun.

This job extracts the table PA0000 – Actions.

This job uses the input table PA0000 from the SAP server.

This job creates the output R3mirror.PA0000.

E06021 Extract Additional Employee Actions PA0302 Table

This job extracts the table from SAP R/3 that is related to additional employee actions. The deltacontrol data set in the Admin library prevents a complete extraction if the job is rerun.

This job extracts the table PA0302 – Additional Actions.

This job uses the input table PA0302 from the SAP server.

This job creates the output R3mirror.PA0302.

E06022 Extract Employee Event Dates PA0041 Table

This job extracts the table from SAP R/3 that is related to employee event dates. The deltacontrol data set in the Admin library prevents a complete extraction if the job is rerun.

This job extracts the table PA0041 – Date Specifications.

This job uses the input table PA0041 from the SAP server.

This job creates the output R3mirror.PA0041.

E06030 Extract Employee Work Schedule Infotype 7 Table

This job extracts the table from SAP R/3 that is related to employee work schedules. The deltacontrol data set in the Admin library prevents a complete extraction if the job is rerun.

This job extracts the table PA0007 – Planned Working Time.

This job uses the input table PA0007 from the SAP server.

This job creates the output R3mirror.PA0007.

E06040 Extract Employee Compensation Infotype 8 Table

This job extracts the table from SAP R/3 that is related to employee compensation. The deltacontrol data set in the Admin library prevents a complete extraction if the job is rerun.

This job extracts the table PA0008 – Basic Pay.

This job uses the input table PA0008 from the SAP server.

This job creates the output R3mirror.PA0008.

E06050 Extract HR Time Record Infotype 2001 Table

This job extracts the table from SAP R/3 that is related to employee absences. The deltacontrol data set in the Admin library prevents a complete extraction if the job is rerun

This job extracts the table PA2001 – Absences.

This job uses the input table PA2001 from the SAP server.

This job creates the output R3mirror.PA2001.

E06060 Extract Additional HR Infotypes Table

This job extracts the tables from SAP R/3 that are related to maternity and compensation data.

This job extracts the following tables:
- ❑ PA0080 – Maternity Protection
- ❑ PA0029 – Workers Compensation

This job uses the following input tables from the SAP server:
- ❑ PA0080
- ❑ PA0029

This job creates the following output:

❑   R3mirror.PA0080
❑   R3mirror.PA0029

E06070 Extract German HR Infotypes Table

This job extracts the tables from SAP R/3 that are related to employee absences.

This job extracts the following tables:
❑   PA0521 – Altersteilzeit
❑   PA0597 – Teilzeitarbeit waehrend Elternzeit

This job uses the following input tables from the SAP server:
❑   PA0521
❑   PA0597

This job creates the following output:
❑   R3mirror.PA0521
❑   R3mirror.PA0597

E06080 Extract Appraisal HR Infotype 25 Table

This job extracts the table PA0025 from SAP R/3 that is related to appraisal data.

This job uses the input table PA0025 from the SAP server.

The job creates the output R3mirror.PA0025.

E06090 Extract Qualifications Infotype 24 Table

This job extracts the table PA0024 from SAP R/3 that is associated with employee qualifications data.

This job uses the input table PA0024 from the SAP server.

This job creates the output R3mirror.PA0024.

Job Group: E07 Extract HR T Lookup Tables

This job group includes jobs that extract data for SAS Human Capital Management.

E07010 Extract HR Action and Date Lookups Table

This job extracts the tables from SAP R/3 that are related to HR action and date lookups.

This job extracts the following tables:
❑   T548T – Data Types
❑   T529T – Personnel Action Texts

This job uses the following input tables from the SAP server:

❑ T548T

❑ T529T

This job creates the following output:

❑ R3mirror.T548T

❑ R3mirror.T529T

E07020 Extract HR Education, Ethnicity, Disability Lookups Tables

This job extracts the tables from SAP R/3 that are related to HR education, ethnicity, and disability lookups.

This job extracts the following tables:

❑ T523T – Challenge Types

❑ T519T – Final Certificates

❑ T505S – Ethnic Origin Texts

This job uses the following input tables from the SAP server:

❑ T523T

❑ T519T

❑ T505S

This job creates the following output:

❑ R3mirror.T523T

❑ R3mirror.T519T

❑ R3mirror.T505S

E07030 Extract HR Country Lookup Tables

This job extracts the tables from SAP R/3 that are related to HR country lookups.

This job extracts the following tables:

❑ T500P – Personnel Area

❑ T500L – Personnel Country Grouping

This job uses the following input tables from the SAP server:

❑ T500P

❑ T500L

This job creates the following output:

❑ R3mirror.T500P

❑ R3mirror.T500L

E07031 Formats from HR Country Lookup Tables

This job creates formats from the tables that are extracted in the E07030 job. Run this job immediately after the E07030 job so that the formats are as current as the tables on which they are based.

This job uses the following input tables from SAS:

❑   R3mirror.T500P

❑   R3mirror.T500L

This job creates the following output:

❑ $COMPANY_TO_MOLGA from T500P maps $BUKRS to $MOLGA

❑ $MOLCLUS from T500L maps Country Grouping ($MOLGA) to the area identifier for cluster in tables PCL*x* ($RELID)

❑ $COUNTRY_TO_MOLGA from T500L maps $INTCA to $MOLGA

❑ $MOLGA_TO_COUNTRY from T500L maps Country Grouping in SAP to ISO Country Code in SAS tables

E07040 Extract HR Contract Lookup Tables

This job extracts the tables from SAP R/3 that are related to HR contract date lookups.

This job extracts the following tables:

❑   T542T – Employment Contracts

❑   T547S – Contract Type Texts

This job uses the following input tables from the SAP server:

❑   T542T

❑   T547S

This job creates the following output:

❑   R3mirror.T542T

❑   R3mirror.T547S

E07050 Extract HR Union Lookup Tables

This job extracts the tables from SAP R/3 that are related to HR union lookups.

This job extracts the following tables:

❑   T521B – Payee Keys

❑   T521C – Check Table for Payees

This job uses the following input tables from the SAP server:

❑   T521B

❑   T521C

This job creates the following output:

❑   R3mirror.T521B

❑ R3mirror.T521C

E07060 Extract HR Communication Type Lookup Table

This job extracts the table from SAP R/3 that is related to HR communication type.

This job extracts the table T536B – Payee Keys.

This job uses the input table T536B from the SAP server.

This job creates the output R3mirror.T536B.

E07080 Extract Marital Data - T502T Tables

This job extracts the tables from SAP R/3 that are related to marital data.

This job extracts the table T502T – Marital Status.

This job uses the input table T502T from the SAP server.

This job creates the output R3mirror.T502T.

E07090 Extract State Region County Data - T005U Tables

This job extracts the tables from SAP R/3 that are related to state, region, and county.

This job extracts the table T005U – State/Region/County.

This job uses the input table T005U from the SAP server.

This job creates the output R3mirror.T005U.

E07100 Extract Military Experience Data - T505N Tables

This job extracts the tables from SAP R/3 that are related to military experience data.

This job extracts the table T005U – State/Region/County.

This job uses the following input tables from the SAP server:
❑ T005U
❑ PA0081
❑ T591S
❑ T505N

This job creates the following output:
❑ R3mirror.T005U
❑ R3mirror.PA0081
❑ R3mirror.T591S
❑ R3mirror.T505N

E07110 Extract Absence and Attendance Text - T554T Tables

This job extracts the tables from SAP R/3 that are related to absence and attendance data.

This job extracts the table T554T – Absence and Attendance Texts.

This job uses the input table T554T from the SAP server.

This job creates the output R3mirror.T554T.

E07120 Extract Personnel Area, Subarea - T001P Tables

This job extracts the tables from SAP R/3 that are related to personnel area data.

This job extracts the following tables:
- ❑ T001P – Personnel Area/Subarea
- ❑ T503 – Employee Group Subgroup

This job uses the following input tables from the SAP server:
- ❑ T001P
- ❑ T503

This job creates the following output:
- ❑ R3mirror.T001P
- ❑ R3mirror.T503
- ❑ SAS Format $personnel_subarea_absence
- ❑ SAS Format $personnel_subarea_mobur
- ❑ SAS Format $subarea_group_for_time
- ❑ SAS Format $personnel_subarea_molga
- ❑ SAS Format $employee_group_appraisal_subgrp
- ❑ SAS Format $employee_group_subgroup

E07121 Formats from Personnel Area, Subarea

This job creates formats from the tables that are extracted in the E07120 job. Run this job immediately after the E07120 job so that the formats are as current as the tables on which they are based.

This job uses the following input tables from SAS:
- ❑ R3mirror.T001P
- ❑ R3mirror.T503

This job creates the following output:
- ❑ SAS Format $personnel_subarea_absence
- ❑ SAS Format $personnel_subarea_mobur
- ❑ SAS Format $subarea_group_for_time
- ❑ SAS Format $personnel_subarea_molga

❑   SAS Format $employee_group_appraisal_subgrp

❑   SAS Format $employee_group_subgroup

E07130 Extract Jobs Data - T5U13 and T513S Tables

This job extracts the tables from SAP R/3 that are related to jobs data.

This job extracts the following tables:

❑   T513S – Job Titles

❑   T5U13 – Jobs

This job uses the following input tables from the SAP server:

❑   T513S

❑   T5U13

This job creates the following output:

❑   R3mirror.T513S

❑   R3mirror.T5U13

E07150 Extract AAP Occupational Categories - T5UAA Tables

This job extracts the tables from SAP R/3 that are related to occupational categories.

This job extracts the table T5UAA – AAP Occupational Categories.

This job uses the input table T5UAA from the SAP server.

This job creates the output R3mirror.T5UAA.

E07160 Extract EEO Occupational Categories - T5UEE Tables

This job extracts the tables from SAP R/3 that are related to occupational categories.

This job extracts the table T5UEE – EEO Occupational Categories.

This job uses the input table T5UEE from the SAP server.

The job creates the output R3mirror.T5UEE.

E07170 Extract Recruitment Text Tables

This job extracts the tables from SAP R/3 that are related to recruitment data.

This job extracts the table T751F – Text for Applicant Event Type.

This job uses the input table T751F from the SAP server.

The job creates the output R3mirror.T751F.

E07180 Extract Wage Type Texts - T512T Tables

This job extracts the tables from SAP R/3 that are related to wage type data.

This job extracts the table T512T – Wage Type Texts.

This job uses the input table T512T from the SAP server.

This job creates the output R3mirror.T512T.

E07185 Extract Base Wage Type Grouping Tables

This job extracts the tables from SAP R/3 that are related to base wage type data.

This job extracts the table T52D7 – Assign Wage Types to Wage Type Groups.

This job uses the following input:
- T52D7 from the SAP server
- Admin Base Wage Type Groups

This job creates the output R3mirror.T52D7.

E07190 Extract HR Relationship T Tables

This job extracts the tables from SAP R/3 that are related to HR relationship data.

This job extracts the following tables:
- T777V – Relationship Texts
- T777T – Infotypes
- T777U – Subtype Texts

This job uses the following input tables from the SAP server:
- T777V
- T777T
- T777U

This job creates the following output:
- R3mirror.T777V
- R3mirror.T777T
- R3mirror.T777U

E07200 Extract Job Position - T528*x* Tables

This job extracts the tables from SAP R/3 that are related to job position data.

This job extracts the following tables:
- T528B – Positions
- T528T – Positions Texts

- ❑ T528C – Wage Type Catalog
- ❑ T510N – Pay Scale for Annual Salaries
- ❑ T510F – Assign Pay Scale to Currency
- ❑ DD03T – Fields Texts
- ❑ DD04T – Data Element Texts
- ❑ T549N – Period Modifiers
- ❑ T5U29 – Position Attributes for US
- ❑ T510 – Pay Scale Groups

This job uses the following input tables from the SAP server:

- ❑ T528B
- ❑ T528T
- ❑ T528C
- ❑ T510N
- ❑ T510F
- ❑ DD03T
- ❑ DD04T
- ❑ T549N
- ❑ T5U29
- ❑ T510

This job creates the following output:

- ❑ R3mirror.T528B
- ❑ R3mirror.T528T
- ❑ R3mirror.T528C
- ❑ R3mirror T510N
- ❑ R3mirror.T510F
- ❑ R3mirror.DD03T
- ❑ R3mirror.DD04T
- ❑ R3mirror.T549N
- ❑ R3mirror.T5U29
- ❑ R3mirror.T510

E07210 Extract Action Reasons T530F and T530T Tables

This job extracts the tables from SAP R/3 that are related to action reasons data.

This job extracts the following tables:

- ❑ T530F – Reasons for Actions
- ❑ T530T – Reason for Action Texts

This job uses the following input tables from the SAP server:

- ❑ T530F
- ❑ T530T

This job creates the following output:

❑ R3mirror.T530F
❑ R3mirror.T530T

E07220 Extract Employee Grp-SubGrp Info Tables

This job extracts the tables from SAP R/3 that are related to employee grouping data.

This job extracts the following tables:

❑ T503T – Employee Subgroup Names
❑ T503Z – Country Assignment for Emp Grp-SubGrp

This job uses the following input tables from the SAP server:

❑ T503T
❑ T503Z

This job creates the following output:

❑ R3mirror.T503T
❑ R3mirror.T503Z

E07230A Extract Employee Country Association Tables

This job extracts the tables from SAP R/3 that are related to employee country associations.

This job uses the following input tables from SAS:

❑ R3mirror.PA0001
❑ R3mirror.T500P

This job creates the output Intermed.EMPLOYEE_COUNTRY_ASSOCIATION.

E07230B Extract Employee Country Association Tables

This job extracts the tables from SAP R/3 that are related to employee country associations.

This job uses the input table R3mirror.PA0001.

This job creates the output Intermed.EMPLOYEE_COUNTRY_ASSOCIATION.

E07240 Extract Appraisal Lookups Tables

This job extracts the tables from SAP R/3 that are related to appraisal lookup data.

This job extracts the following tables:

❑ T777Q – Proficiency Tests
❑ T513H – Appraisal Criteria

This job uses the following input tables from the SAP server:

❑ T777Q
❑ T513H

This job creates the following output:

❑ R3mirror.T777Q
❑ R3mirror.T513H
❑ SAS Format $appraisal_criteria_weight

E07300 Extract New Competency Primary Tables

This job extracts the tables from SAP R/3 that are related to employee-competency data.

This job extracts the following tables:

❑ T574B – Employee Qualification Names
❑ T77TS – HR-PD: Competency Scale Names
❑ T77TP – HR-PD: Proficiency Texts for Quality Scale

This job uses the following input tables from the SAP server:

❑ T574B
❑ T77TS
❑ T77TP

This job creates the following output:

❑ R3mirror.T574B
❑ R3mirror.T77TS
❑ R3mirror.T77TP

E07400 Extract New Education History Tables

This job extracts the tables from SAP R/3 that are related to employee education history data.

This job extracts the following tables:

❑ T517T – Educational Establishment Type Designations
❑ T517X – Branches of Study
❑ T519T – Education Final Certificates
❑ T5J67 – HR Institution/School Type Texts JP
❑ T5J65 – HR School Japan

This job uses the following input from the SAP server:

❑ T517T
❑ T517X
❑ T519T
❑ T5J67
❑ T5J65

This job creates the following output:

- ❑ R3mirror.T517T
- ❑ R3mirror.T517X
- ❑ R3mirror.T519T
- ❑ R3mirror.T5J67
- ❑ R3mirror.T5J65

Job Group: E08 Extract HR Tables Using ABAP Calls

This job group includes jobs that extract tables from SAP R/3 that are extracted using ABAP calls. These jobs rely on functionality that is delivered with the transport files that are detailed in Chapter 7, "Transformation Jobs." These jobs extract data for SAS Human Capital Management.

E08010A Extract Employee Time Info – SALDO Tables

This job extracts the tables from SAP R/3 that are related to employee time information from the SALDO cluster table.

Based on how working hours are processed within your SAP R/3 system, you must choose to extract SALDO data (accumulated monthly working hours) or ZES data (daily working hours). The E08010A job is the extraction job for SALDO data. E08010 job performance efficiency is superior.

The deltacontrol data set in the Admin library prevents a complete extraction if the job is rerun. The SALDO table contains accumulated balances of the hours worked in a month.

This job extracts the table T554T – Absence and Attendance Texts.

This job uses the following input:

- ❑ T554T from the SAP server
- ❑ R3mirror.SALDO Employee Time Balance Monthly

This job creates the output Inter.SALDO Employee Time Balance Monthly.

E08010B Extract Employee Time Info – ZES Tables

This job extracts the tables from SAP R/3 that are related to employee time information from ZED data. This job is similar to the E08010A job, except that it extracts the detailed information in the table ZES, instead of extracting summarized data in SALDO.

This job extracts the table T554T – Absence and Attendance Texts.

This job uses the following input:

- ❑ T554T from the SAP server
- ❑ R3mirror.ZES Employee Time Balances

This job creates the output Inter.ZES Employee Time Balances.

E08020 Build Current Pay Extract Parameters

This job builds parameters that enable the extraction of current pay information. The Admin Current Pay Extraction table controls the creation of an intermediate table. The intermediate table contains the basic selection in the Admin table. It includes the selection date that prevents a new extraction from re-extracting data that was previously extracted.

This job creates the output Intermed.Current_pay_extraction_parms. The E08030 job uses this table.

E08030 Extract Current Pay Data

This job extracts current pay information. The Admin Current Pay Extraction table controls the extraction with help from the HR Current Pay Extraction transformation.

The E08030 job is run with other jobs. The following list describes each of these jobs and how they work together.

- ❑ The I0040 job performs a one-off initialization.
- ❑ The E08020 job uses the Admin Current Pay Extraction History table to create the extraction parameters, which prevents re-extraction of values that have already been extracted.
- ❑ The E08030 job writes the results. It writes to the Inter Current Pay Extract log what it has done. If this job is rerun, the complete extraction is repeated until the follow-up job (T230000) is run.
- ❑ The T230000 job updates the results table. It uses the log to work with the Admin Current Pay Extraction History, which prevents re-extraction of data that has already been extracted.

The job extracts the table PA0001 – HR Master Record.

This job uses the following input:

- ❑ PA0001 from the SAP server
- ❑ Admin.Admin Current Pay Extraction parameter
- ❑ Intermed.Current_pay_extraction_parms

This job creates the following output:

- ❑ Intermed.Current_Pay_Results
- ❑ Intermed.Current_Pay_Extract_Log

E08040A Extract HR Historical Compensation Data

This job extracts data about payments made to employees since the previous extraction. It stores the results in the Intermed.RT table. This job is the preferred way of extracting historical compensation data. However, it requires that the SAP system populate the HRPY_RGDIR table, which is an action that is not performed in all SAP system implementations.

Here are the steps that the E08040A job performs:

1 Prepare the parameter table Intermed.RT_CLUSTER_PARMS.

❑ Data about payments made is taken from the HRPY_RGDIR table.

❑ Data about what was previously extracted is taken from the deltacontrol data set in the Admin library.

❑ The Intermed.EMPLOYEE_COUNTRY_ASSOCIATION table is required to determine when an employee was associated with a particular country. This information is important because the historical salary data in SAP is stored in country-dependent cluster tables.

   The combined information from these tables is used to determine what needs to be extracted. This information creates the parameter table Intermed.RT_CLUSTER_PARMS. The source code that combines the information and creates the table is in the macro E08040_GET_CLUSTER_COMBINATIONS.SAS.

2 Use the HR Payroll Extraction transformation to perform the extraction.

   Note: This step can be dramatically more efficient using the SAP ABAP program variant. See Chapter 2, "SAP Administration Tasks," for more information about defining a variant.

This job uses the following input:

❑ Intermed.EMPLOYEE_COUNTRY_ASSOCIATION

❑ deltacontrol data set in the Admin library

❑ HRPY_RGDIR from the SAP Server

❑ macro variable &HR_OVERLAP

❑ macro variable &_START

This job creates the following output:

❑ Intermed.RT

❑ deltacontrol data set in the Admin library

E08040B Extract HR Historical Compensation Data

This job extracts data about payments made to employees since the previous extraction. It stores the results in the Intermed.RT table. The E08040A job is the preferred way of extracting historical compensation data. However, it requires that the SAP system populate the HRPY_RGDIR table, which is an action that is not performed in all SAP system implementations.

The E08040B job differs from the E08040A job in that E08040B determines extraction parameters by deriving the unique combinations of parameters that are possible. This can result in extractions of no data.

Here are the steps that the E08040B job performs:

1 Prepare the parameter table Intermed.RT_CLUSTER_PARMS.

❑ From the input tables, derive the unique combinations of parameters that are possible. The source code that derives the combinations is in the macro E08040_GET_CLUSTER_COMBINATIONS.SAS.

2 Use the HR Payroll Extraction transformation to perform the extraction.

> *Note:* This step can be dramatically more efficient using the SAP ABAP program variant. See Chapter 2, "SAP Administration Tasks," for more information about defining a variant.

This job uses the following input:
❑ Intermed.EMPLOYEE_COUNTRY_ASSOCIATION
❑ deltacontrol data set in the Admin library
❑ R3mirror.T549Q
❑ R3mirror.PA0001
❑ PA0001 from the SAP server
❑ HRPY_RGDIR from the SAP server
❑ macro variable &HR_OVERLAP
❑ macro variable &_START

This job creates the following output:
❑ Intermed.RT
❑ deltacontrol data set in the Admin library

Job Group: E09 Extract HR Applicant Tables

This job group includes jobs that extract data for SAS Human Capital Management.

E09010 Extract Applicant T*nnn* Tables

This job extracts the tables from SAP R/3 that are related to HR applicant data.

This job extracts the following tables:
❑ T750B – Recruitment Advertisement
❑ T750C – Recruitment Instrument
❑ T750H – Recruitment Medium Texts
❑ T750iI – Unsolicited Application Group Texts
❑ T751B – Applicant Status Texts
❑ T7501C – Applicant Status Reason
❑ T750A – Vacancy Published in Advertisement

This job uses the following input tables from the SAP server:
❑ T750B
❑ T750C
❑ T750H
❑ T750i
❑ T751B
❑ T750C
❑ T750A

This job creates the following output:

❑ R3mirror.T750B

❑ R3mirror.T750C

❑ R3mirror.T750H

❑ R3mirror.T750i

❑ R3mirror.T751B

❑ R3mirror.T750C

❑ R3mirror.T750A

❑ $RECRUITMENT_MEDIA

❑ $AD_TO_RECRUITMENT_INS

E09020 Extract General Applicant Infotypes Tables

This job extracts the tables from SAP R/3 that are related to general HR applicant data.

This job extracts the following tables:

❑ PB0001 – HR Master Record Org. Assignment

❑ PB0002 – HR Master Record Personal Data

❑ PB0006 – HR Master Record Addresses

❑ PB0007 – HR Master Record Planned Working Time

❑ PB0008 – Applicant Master Recruitment Basic Pay

❑ PB0016 – Applicant Master Recruitment Contract Elements

❑ PB0022 – HR Master Record Education

❑ PB0077 – HR Master Record

❑ PB4000 – Applicant Events

❑ PB4001 – Applications

❑ PB4002 – Vacancy Assignment

This job uses the following input tables from the SAP server:

❑ PB0001

❑ PB0002

❑ PB0006

❑ PB0007

❑ PB0008

❑ PB0016

❑ PB0022

❑ PB0077

❑ PB4000

❑ PB4001

❑ PB4002

This job creates the following output:

❑ R3mirror.PB0001

❑ R3mirror.PB0002

❑ R3mirror.PB0006

❑ R3mirror.PB0007

❑ R3mirror.PB0008

❑ R3mirror.PB0016

❑ R3mirror.PB0022

❑ R3mirror.PB0077

❑ R3mirror.PB4000

❑ R3mirror.PB4001

❑ R3mirror.PB4002

Job Group: E10 Extract HR HRP Infotype Tables

This job group includes jobs that extract data for SAS Human Capital Management.

E10010 Extract HR Hierarchy - Infotype 1000 and 1001 Tables

This job extracts the tables from SAP R/3 that are related to HR hierarchies.

This job extracts the following tables:

❑ HRP1000

❑ HRP1001

❑ HRP1015

This job uses the following input tables from the SAP server:

❑ HRP1000

❑ HRP1001

❑ HRP1015

This job creates the following output:

❑ R3mirror.HRP1000

❑ R3mirror.HRP1001

❑ R3mirror.HRP1015

E10020 Extract HR Object Address and E-mail Tables

This job extracts the tables from SAP R/3 that are related to HR addresses and e-mail.

This job extracts the following tables:

❑ HRP1028

❑ HRP1032

This job uses the following input tables from the SAP server:

❑ HRP1028

❑ HRP1032

This job creates the following output:

❑   R3mirror.HRP1028

❑   R3mirror.HRP1032

❑   R3mirror.HRP1015

E10030 Extract HRP1045 and HRT1045 Emp Appraisal Tables

This job extracts the tables from SAP R/3 that are related to employee appraisal.

This job extracts the following tables:

❑   HRP1045

❑   HRT1045

This job uses the following input tables from the SAP server:

❑   HRP1045

❑   HRT1045

This job creates the following output:

❑   R3mirror.HRP1045

❑   R3mirror.HRT1045

E10040 Extract Competency Scale Assignments - HRP1033 Tables

This job extracts the tables from SAP R/3 that are related to employee competency scale assignments.

This job extracts the following tables:

❑   HRP1033

❑   HRPAD31

This job uses the following input tables from the SAP server:

❑   HRP1033

❑   HRPAD31

This job creates the following output:

❑   R3mirror.HRP1033

❑   R3mirror.HRPAD31

C H A P T E R

7

Transformation Jobs

Transformation Jobs

The SAS Solutions Adapter for SAP uses several transformation jobs that transform data extracted from SAP R/3 into the structure that is needed for the staging area.

Job Group: T0000 Transformations for Common Tables

This job group includes common jobs that transform data for SAS Financial Management and SAS Human Capital Management.

This job group includes jobs that logically fit into more than one job group.

T000010 Load INTERNAL_ORG_ASSOC_TYPE

This job loads the STAGE_INTERNAL_ORG_ASSOC_TYPE table with constant values. The figure shows the values that are required for the internal organization dimensions.

#	Internal Organization Association Type Code	Language Code	Internal Organization Association Type Description
1	OCC	en	Op Concern, Controlling Area, Company, Cost Center
2	HRG	en	HR Work Groups

You can use the following statement to create and specify the language:

```
LANGUAGE_CD = PUT ("&lang", $SAPTOSAS_LANGUAGE.);
```

The actual descriptions are in English. For descriptions in other languages, you can modify the source code in T000010_Load_Staging_Internal_Org_Assoc_Type.sas.

This job uses the following input:

- ❑ &LANG
- ❑ $SAPTOSAS_LANGUAGE

This job creates the output StageSAP.STAGE_INTERNAL_ORG_ASSOC_TYPE.

T000020 Populate Organization Types

This job loads the STAGE_ORG_TYPE table with constant values. The figure shows the StageSAP.ORG_TYPE values that are required for the internal and external organization dimensions.

#	Organization Type Code	Language Code	Organization Type Description
1	ALL	en	All types
2	BA	en	Business Area in Company
3	CAR	en	Controlling Area
4	COM	en	Company
5	CUS	en	Customers
6	HR	en	Human Resources Group
7	NA	en	Not applicable
8	OPC	en	Operating Concern
9	SUP	en	Suppliers

You can use the following statement to create and specify the language:

```
LANGUAGE_CD = PUT ("&lang", $SAPTOSAS_LANGUAGE.);
```

The actual descriptions are in English. For descriptions in other languages, you can modify the source code in T000020_Populate_Org_Type.sas.

This job uses the following input:

❑ &LANG
❑ $SAPTOSAS_LANGUAGE

This job creates the output StageSAP.ORG_TYPE.

T000030 Set Exchange Rate

This job uses user-written code to populate the corresponding table. The table contains the sources of exchange rates. The code gets the SAP exchange rate value and description in English.

You can alter the code to support another language or an alternative exchange rate.

This job uses the input T000030_Set_Exch_Rate_Set.sas.

This job creates the output StageSAP.CURRENCY_EXCH_RATE_SET.

T000040 SAS to Stage Code Language Table

This job uses the following input:

❑ R3mirror.T002
❑ R3mirror.T002T
❑ SAS_LANGUAGE_ISO0639

This job creates the output StageSAP.CODE_LANGUAGE.

The StageSAP.CODE_LANGUAGE table is used to split the non-default language texts into NLS dimension tables.

T000050 State Region

This job populates the reference table STAGE_STATE_REGION by concatenating the country code and the region code.

This job uses the following input:

❑ R3mirror.T005U

❑ $SAPTOSAS_LANGUAGE

This job creates the output StageSAP.STATE_REGION.

Job Group: T0001 Account Dimension

The general ledger account hierarchy is based on SAP financial statement reports. The financial statement reports include profit and loss (P&L) and balance sheet reports. In SAP, the financial statement depends on the language and the chart of accounts.

There is no standard SAP hierarchy to display account structure. As a result, the financial statement is extracted using the RFC version of the SAP function modules FI_IMPORT_BALANCE_SHEET_POS and FI_IMPORT_BALANCE_SHEET_TEXT.

There is no generic way to accurately populate some of the classification columns, such as ACCOUNT_TYPE_CD, for all of the rows of the STAGE_GL_ACCOUNT table. To prepare the account dimension data for import into the DDS, nonstandard and user-specific code must incorporate the additional attributes.

The SAS Solutions Adapter for SAP provides example code that you can customize. If you do not customize the code for your environment, an error message will be returned.

Note: The value of ACCOUNT_TYPE_CD (in the STAGE_GL_ACCOUNT table) must be a predefined value in the SAS_GL_ACCOUNT_TYPE table.

This job group includes jobs that transform data for SAS Financial Management.

Input and Output (Tables, Formats, and Macro Variables)

This job group uses the following input:

❑ Descriptions must be in the language that is specified by SPRAS or LANG, which are specified in the global parameters. SPRAS includes quotation marks. LANG does not include quotation marks.

❑ The value of the SOURCE_SYSTEM_ID column is set to the value of &DDS_SOURCE_SYSTEM_ID.

❑ &VERSN is the financial statement version. &_VERSN is the financial statement version enclosed in quotation marks.

This job group uses the following SAP data sources as input:

- ❏ SKA1 – G/L Account Master (Chart of Accounts)
  This source is used directly as a table and creates format $ACCBALS.
- ❏ SKAT – G/L Chart of Accounts Description
- ❏ T011 – Financial Statement Versions
- ❏ T011T – Financial Statement Version Names
- ❏ T030C – Global Standard Account Table (contains retained earnings specification)
- ❏ T002 – Language Keys (uses format $SAPTOSAS_LANGUAGE)

This input is extracted from SAP R/3 using ABAP functions and PROC CALLRFC for a balance sheet report. The following code calls ABAP functions:

```
PROC CALLRFC libref=sapserve;
call function Z_SAS_FI_IMPORT_BAL_SHEET_POS
EXPORTING version=&_versn
OUTTABLES X011P=R3mirror.RF011P
I011Z=R3mirror.RF011Z;
call function Z_SAS_FI_IMPORT_BAL_SHEET_TEXT
EXPORTING sprache=&spras version=&_versn
OUTTABLES X011Q=R3mirror.RF011Q;
run;
```

This job group uses the following input:

- ❏ R3mirror.RF011P
- ❏ R3mirror.RF011Q
- ❏ R3mirror.RF011Z

This job group creates the following output:

StageSAP.GL_ACCOUNT_ASSOC_TYPE

> The T000140 job creates this output table. This table lists codes that identify the types of hierarchies that are represented in the association table.

StageSAP.GL_ACCOUNT_ASSOC

> The T000140 job creates this output table. This table lists hierarchical parent/child relationships for the GL_ACCOUNT member IDs. The GL_ACCOUNT_ASSOC_TYPE_CD table distinguishes each unique hierarchy type.

StageSAP.GL_ACCOUNT

> The T000150 job creates this output table. This table lists general ledger account members. The table includes the parent and child general ledger account members that are used in traditional hierarchies or dimensions. Examples include cash, accounts receivable, current assets, and assets.

Financial Statement Nodes

The SAP financial statement consists of a series of nodes. There are predefined root nodes, such as asset and liability. The child nodes of the asset root node are also assets. At the lowest level, the node has a list of accounts or intervals of accounts. At the

highest level, there is a node named UNASSIGNED. The UNASSIGNED node contains accounts that are not assigned to other parts of the financial statement.

Account Hierarchies and Numbering

In a SAP R/3 table, the base column is SKA1.SAKNR. This base column is used during mapping to create ACCOUNT_ID. This is unique in SAP within a chart of accounts. The SAS Solutions Adapter for SAP can get a financial statement (same as a balance sheet, which is used to build the hierarchy) for a single chart of accounts, so it uses SAKNR. SAKNR is shortened to show only the significant digits, which is controlled by the macro variable &SAKLN that is set in PREPROCPARMS12.SAS. For example, if SAKNR contains the account number 0000012345, and the &SAKLN variable is 6, then the account number is 012345.

SAKNR is used for the leaves of the hierarchy, but not for the intermediate structure nodes. The structure nodes are the financial statement keys from RF011Z.ERGSO and RF011Z.ERGHB. Actual accounts are the leaves of the hierarchy.

It is important to understand account hierarchies and naming structures. SAP puts some accounts into different parent nodes, depending on the sign on the summarized data. For example, a sign can be the sum of all transactions for that account during the specified period. RF011Z.ERGSO and RF011Z.ERGHB indicate that the child accounts (VONKT to BILKT) might be in two different nodes in the hierarchy. For example, a positive bank balance is an asset, and an overdrawn account is a liability. The roll-up rules for the DDS specify that accounts must be unique, and that they cannot appear in two different nodes in the hierarchy. To avoid this, credit account numbers have a C suffix, and debit account numbers have a D suffix. One SAP account is split into two different SAS accounts, but only one of the accounts can be used within the same period. This requires summarizing the data from SAP before deciding what account a transaction has. All transactions, both negative and positive, must post into the same account so that the totals in SAS are consistent with the totals on the balance sheet.

Profit and Loss Accounts

To distinguish between a profit and loss account and a balance account, the SAS Solutions Adapter for SAP uses the column XBILK in the SKA1 table. If an X is returned, it is a balance account. SKA1 XBILK is used to create the format $ACCBALS.

In SAP, an account can belong to the profit-and-loss part of the balance sheet. The financial statement makes it possible to distinguish whether a balance sheet is an asset or a liability account. The SAS Solutions Adapter for SAP handles only a single financial statement or a single value of VERSN. Therefore, companies that do not use the same chart of accounts on which the financial statement was based are excluded.

Other Transactions and Account Considerations

You can use the SAP transaction OB53 – Define Retained Earnings Account to check that RETAINED_EARNINGS_FLG is defined from the T030C table. Most companies use one retained earnings account. For this reason, X is used as an indicator.

SAP represents the financial statement report as a collection of disjointed hierarchies or top-level items. All disjointed hierarchies are combined into a single hierarchy in the STAGE_GL_ACCOUNT_ASSOC output table. In this table, the ORDER_NO column reflects the order in which the items appear in the financial statement.

Accounts that are in the SKA1 table in SAP, but are not in the financial statement hierarchy, are added to the UNASSIGNED node.

The value of NORMAL_BALANCE_CD in STAGE_GL_ACCOUNT must be one of the predefined account type values in the SAS_GL_NORMAL_BALACE table. These predefined values are D for debit and C for credit. The value of LANGUAGE_CD must be one of the predefined language values in the SAS_LANGUAGE table. This is accomplished by using the format $SAPTOSAS_LANGUAGE based on the T002 table.

T000100 Select Row in T011 According to VERSN

This job selects a single row from the T011 table. This job helps to select the relevant records that contribute to the account dimension.

This job uses the following input:

❑ R3mirror.T011
❑ &_VERSN

This job creates the output Intermed.T011.

T000105 Create Accounts with Text

This job uses the following input:

❑ Intermed.T011
❑ R3mirror.SKA1
❑ R3mirror.SKAT
❑ &LANG

This job creates the output Intermed.T011.

T000110 Account Item Mappings

Accounts can have only one parent in the general ledger account dimension hierarchy. SAP uses a methodology in which an account can appear in different places in the financial statement based on the balance. For example, a bank account with a positive balance can be an asset, and a bank account with a negative balance can be a liability. As a result, these accounts can appear in two different places in the hierarchy. To enable a fixed place in the hierarchy, the SAS Solutions Adapter for SAP creates two accounts. One account is a credit account, and the other is a debit account. The SAS Solutions Adapter for SAP, in turn, adjusts the original SAP account number by appending a C or D suffix.

This job uses the following input:

❑ Intermed.T001
❑ Intermed.Accounts_with_text

❑   R3mirror.RF011Z

❑   &SAKLN

This job creates the following output:

❑   Intermed.One2many

❑   Intermed.AccItem

❑   Intermed.ACCITEM_TRANSFORMED

❑   Intermed.SAP_Account_plus_flag

The source T000110_Add_Debit_Credit_Suffix_To_Accno.sas reads the Intermed.One2many table. For all records in which the credit item key (ERGHB) is not equal to the debit item key (ERGSO), two records are output. These records include one with a negative value with a D suffix at the end of account interval lower limit (VONKT). The other record has a positive value with a C suffix. All other records are rewritten.

T000120 Account Hier from Financial Statement

The hierarchy is based on financial statement items and their associated text. Because extracted text will create a reporting template, text includes formatting lines, such as **--------** and **========**. As a result, the mapping process excludes these lines with the following command:

Clean '-----' lines, select each line according to preference

To create the correct parent/child structure, subsequent processes perform the required customizations. Additional transformations identify the account items that were not assigned in the financial statement, and then add them to the hierarchy.

For hierarchy structure nodes, the ACCOUNT_ID is the financial statement key. In the leaf nodes, which are actual accounts, the key is from SAKNR. A C or a D suffix, based on the balance, distinguishes the accounts that can appear in two different places in the hierarchy. For example, a positive bank balance needs to appear as an asset. A negative bank balance needs to appear as a liability.

The macro variable &SAKLN is used to shorten the ACCOUNT_ID of leaf nodes by calling the macro %ADPT_ADJ_TO_SIGNIF_ACCOUNT_LEN.

This job uses the following input:

❑   R3mirror.RF011P

❑   R3mirror.RF011Q

❑   R3mirror.T011

❑   ACCITEM_TRANSFORMED

❑   ACCOUNTS_WITH_TEXT

This job creates the following output:

❑   Intermed.TRF011Q

❑   Intermed.TRF011P

❑   Intermed.NOTASS

❑   Intermed.ACCNT_ITEM_HIER

❑ Intermed.ACCHIER_WITH_ITEMS

❑ Intermed.ACCHIER_WITH_UNASSIGNED

❑ Intermed.ACCOUNT_HIERARCHY (main results)

This job uses the following user-written sources:

❑ T000120_Account_Hier_Addroot.sas

❑ T000120_Not_Assigned_Account.sas

❑ T000120_Transform_RF011Q_TR011Q.sas

❑ T000120_Add_Number_For_Sort.sas

T000125 Get Balances for GL Accounts

The general ledger account master transaction balance values (GLT0) are used for defining the general ledger account type for a general ledger account in SAP. This job creates an intermediate table, which contains the balances of the general ledger accounts.

This job uses the following input:

❑ R3mirror.GLT0

❑ R3mirror.SKA1

This job creates the following output:

❑ Intermed.GLT0_Bal

❑ Intermed.GL_Account_Balances

This job uses the following user-written sources:

❑ T000125_make_glt0_vertical.sas

❑ T000125_summarise_gl_account_balances.sas

T000128 Assign types to GL Accounts

In SAP, there are only two general ledger account types—P&L account and balance sheet account. In SAS Financial Management, there are several account types, such as asset, liability, revenue, expense, and so on. GLT0 balances, along with the cost element assignment to the general ledger account in the SAP CO module, are used for defining the general ledger account type for a general ledger account extracted from SAP.

This job uses the following input:

❑ Intermed.GL_Account_Balances

❑ R3mirror.CSKB

This job creates the following output:

❑ Intermed.GL_Account_type_CO

    Intermed.GL_Account_type_co_balances

T000130 Account Dimension

This job retrieves and joins information from various sources. This information helps determine the account classification columns.

This job uses the following input:

❑ Intermed.ACCOUNT_HIERARCHY
❑ Intermed.T011
❑ R3mirror.T030C
❑ Intermed.ACCITEM_TRANSFORMED
❑ &_KTOPL
❑ &_OUTPUT

This job creates the output Intermed.GL_ACCOUNT_WITH_SAP_INFO.

This job uses the user-written source T000130_Sap_Account_Type.sas.

T000130B Load Account Dimension

This is an alternative job for the T000130 job. This job is site specific. It can be used only by sites that do not have correct general ledger account groups. In SAP financial accounting, general ledger account groups are defined in the initial stage of SAP implementation. The T000130B job can be used if the account groups are not assigned correctly in SAP based on the general ledger account number ranges. The user-written SAS program T000130b_Sap_Account_Type.sas is used to assign the correct general ledger account type based on the document structures defined in the SAP financial statement version.

This job retrieves and joins information from various sources. This information helps determine the account classification columns.

This job uses the following input:

❑ Intermed.ACCOUNT_HIERARCHY
❑ Intermed.T011
❑ R3mirror.T030C
❑ Intermed.ACCITEM_TRANSFORMED
❑ &_KTOPL
❑ &_OUTPUT

This job creates the output Intermed.GL_ACCOUNT_WITH_SAP_INFO.

This job uses the following user-written sources:

❑ T000130b_Sap_Account_Type.sas
❑ T000130b_sap_account_type_site_specific.sas

T000135 Load Statistical Accounts - Site Specific

This job creates intermediate tables from statistical accounts. Because statistical accounts are generally site specific, this job is an example. The output tables are examples as well, and they do not flow into other tables.

If you use statistical accounts, each table must be appended to its counterpart. For example, StageSAP.GL_ACCOUNT corresponds with StageSAP.GL_ACCOUNT_ASSOC.

This job uses the following input:

❑ &DDS_SOURCE_SYSTEM_ID

❑ &_VERSN

This job creates the following output:

❑ Intermed.GL_ACCOUNT_statistical

❑ Intermed.GL_ACCOUNT_ASSOC_statistical

This job uses the user-written source T000135_Stat_Accounts.sas.

T000140 GL Account Association Tables

This job creates the structure of the staging area tables for the general ledger account dimension hierarchy.

This job uses the following input:

❑ Intermed.ACCOUNT_HIERARCHY

❑ R3mirror.T011T

This job creates the following output:

❑ StageSAP.GL_ACCOUNT_ASSOC_TYPE

❑ StageSAP.GL_ACCOUNT_ASSOC

This job uses the user-written source T000140_Gl_Account_Add_Dds_Assoc_Type.sas. This source executes the SAS macro %ADPT_ADD_DDS_ASSOC_TYPE using GL_ACCOUNT as the dimension.

T000145 GL Account Association Tables

This job creates the structure of the staging area tables for the general ledger account types.

This job uses the input SAS_GL_ACCOUNT_TYPE from SAS.

This job creates the output StageSAP.GL_ACCOUNT_TYPE.

T000150A Create Stage GL Account with Site Specifics

This job is an example. You must customize the code for your site because it cannot accurately derive the general ledger account type for all SAP installations.

This job uses the input Intermed.GL_ACCOUNT_WITH_SAP_INFO.

This job creates the output StageSAP.GL_ACCOUNT.

This job uses the user-written source T000150_Site_Specific_Code.sas.

T000150B Create Stage GL Account with Site Specifics

This is an alternative job for the T000150A job. This job is site specific. It uses the GLT0 balances to assign an appropriate general ledger account type. You must customize the code for your site because it cannot accurately derive the general ledger account type for all SAP installations.

This job uses the input Intermed.GL_ACCOUNT_WITH_SAP_INFO.

This job creates the output StageSAP.GL_ACCOUNT.

This job uses the following user-written sources:

❑   T000150a_standard_settings.sas
❑   T000150b_site_specific_code.sas

Job Group: T0002 Time Dimension

In the default behavior for the SAS Solutions Adapter for SAP, the time dimension splits time into financial years, splits financial years into quarters, and splits quarters into financial periods or weeks. If a week spans two quarters, the SAS Solutions Adapter for SAP determines that the week is in the quarter in which the week ends. You can customize this behavior. The financial period information is derived from the SAP T009*x* tables.

This job group includes common jobs that transform data for SAS Financial Management and SAS Human Capital Management.

Input and Output (Tables, Formats, and Macro Variables)

This job group uses the following input:

❑   Descriptions must be in the language that is specified by SPRAS or LANG**,** which are specified in the global parameters. SPRAS includes quotation marks. LANG does not include quotation marks.
❑   The value of the SOURCE_SYSTEM_ID column is set to the value of &DDS_SOURCE_SYSTEM_ID.
❑   &KTOPL (or &_KTOPL) subsets the T001 table to select the financial period variant.

This job group uses the following SAP data sources as input:

❑   T001 – PERIV column contains the financial period variant
❑   T009 – Fiscal Year Variants

- ❑ T009B – Fiscal Year Variant Periods
- ❑ T009T – Fiscal Year Variant Names

This job group creates the following output:

- ❑ StageSAP.TIME_PERIOD
- ❑ StageSAP.TIME_PERIOD_ASSOC
- ❑ StageSAP.TIME_PERIOD_ASSOC_TYPE

> This includes important intermediate output tables. The start and end date of each financial year must be in a table that is in the intermediate library table. The intermediate library table helps build the time dimension tables, such as in Intermed.FinYear_Start_and_End_Dates. Other processes consume this function.

This job group includes the following output SAS formats:

- ❑ $PERIOD_DESCRIPTION
  - ❑ R3mirror.T009C(where SPRAS="&LANG")
  - ❑ START=TRIM(left(PERIV!!poper))
  - ❑ LABEL=TRIM(left(LTEXT))
  - ❑ Time Period Descriptions (long text)
- ❑ $PERIOD_NAME
  - ❑ R3mirror.T009C(where SPRAS="&LANG")
  - ❑ START=TRIM(left(PERIV!!poper))
  - ❑ END=TRIM(left(PERIV!!poper))
  - ❑ LABEL=TRIM(left(KTEXT))
  - ❑ Time Period Name (short text)

This job group uses the following SAS formats:

- ❑ $PERIOD_DESCRIPTION
- ❑ $PERIOD_NAME

Administration Factors

Account Hierarchies and Numbering

It is important to understand hierarchy values and structure. PERIOD_TYPE_CD is one of the values in the PERIOD_TYPE_CD column of the SAS_PERIOD_TYPE table. There is a separate hierarchy for each used fiscal year variant (PERIV in T001 for companies that have KTOPL=&KTOPL). PERIV is the TIME_PERIOD_ASSOC_TYPE_CD, and TIME_PERIOD_ASSOC_TYPE_DESC is the fiscal year variant name (as in T009T). As a result, all of the separate hierarchies for different PERIV values are concatenated into STAGE_TIME_PERIOD_ASSOC. If there is a fixed PERIV value, then no row is in the hierarchy more than one time. Finally, the root of each hierarchy has an ALL value. And, PARENT_TIME_ID has an ALL value pointing back to itself. The root node is valid for all time periods.

The time periods in the leaf layer of each hierarchy must have no gaps and no overlapping periods, except for special periods. The SAS Solutions Adapter for SAP defines SAP special periods (13 to 16) to start and end on the last day of the financial

year. These special periods are for closing the end of the year. Because SAP does not represent periods in a hierarchy, the SAS Solutions Adapter for SAP creates a hierarchy by adding levels. The top (root) level is ALL and is assigned to be the parent of the next level, which consists of years. A level for quarters is added below the year level. Actual periods are assigned as children of one of the quarter levels.

Other Transactions and Account Considerations

The LANGUAGE_CD value must be set to one of the predefined language values in the SAS_LANGUAGE table. You specify the language value as needed, using the format $SAPTOSAS_LANGUAGE, which is based on the T002 table in SAP.

In the STAGE_TIME_PERIOD table, the PERIOD_TYPE_CD column uses the values that are in the PERIOD_TYPE_CD column of the SAS_PERIOD_TYPE table. Likewise, in the STAGE_TIME_PERIOD table, the SOURCE_SYSTEM_ID column must be the value of &DDS_SOURCE_SYSTEM_ID.

The SAS Solutions Adapter for SAP includes special handling for financial years and periods that do not start on the first day of a month. This enables it to handle the calendar year and fiscal year, based on the various situations that can occur in SAP. For example, the SAS Solutions Adapter for SAP adjusts the dated terms as needed. If a financial year is shortened, then the last quarter is shortened appropriately. If the financial year is lengthened, then the final quarter is lengthened.

T000200 Transform Financial Period Info from R3

This job transforms SAP R/3 financial period tables into fiscal year periods by company. It handles financial years that are calendar years and non-calendar years. Typically, you need to use only one type.

This job uses the following input:
- ❑ R3mirror.T001
- ❑ R3mirror.T009
- ❑ R3mirror.T009B
- ❑ &_KTOPL

This job creates the following output:
- ❑ Intermed.Used_Fiscal_Year_Variants
- ❑ Intermed.Fiscal_Year_Variants_unlike_cal
- ❑ Intermed.fiscal_periods_non_calendar
- ❑ Intermed.Fiscal_Year_Variants_like_cal
- ❑ Intermed.FISCAL_YEAR_LIKE_CALENDAR_YEAR
- ❑ Intermed.Fiscal_Year_Periods_with_dates

This job uses the following user-written sources:
- ❑ T000200_FISCAL_YEAR_NON_CAL.SAS
- ❑ T000200_ADD_REAL_CALENDAR_DATA.SAS

T000210 Load Staging Time Period

This job loads the STAGE_PERIOD_TYPE table from the values that SAS supplies. It adds SAP special periods and sets up records for SAP special periods to be appended to the SASSupplied.PERIOD_TYPE data set.

This job includes the following values:

❑ special periods, record type SP
❑ half months, record type HMO

This job uses the input SAS_Supplied.SAS_PERIOD_TYPE.

This job creates the output StageSAP.PERIOD_TYPE.

This job uses the user-written source T000210_ADD_SAP_SPECIAL_PERIODS.SAS.

T000220 Determine FinYear Begin and End Dates

This job creates a table that has the start and end dates for each financial year. Several other jobs use this intermediate table. For example, other jobs use this table to establish the correct date parameters for extracting cost center hierarchies for each year.

This job uses the input Intermed.Fiscal_Year_Periods_with_dates (created in the T000200 job).

This job creates the output Intermed.FinYear_Start_and_End_dates.

The format $FISCAL_START_MTH converts the concatenation of financial year (Financial_Year) and time period association type code (TIME_PERIOD_ASSOC_TYPE_CD) to financial year start (Fin_year_start_dt). The format is stored in the Library.formats catalog.

The user-written source T000220_DETERMINE_FY_BEGIN_END_DATES.SAS uses the Intermed.Fiscal_Year_Periods_with_dates table to determine the start date and end date for each financial year that is within each combination of time period association type, financial year, and time period ID.

T000230 Add Time Hierarchy Layers

This job adds top (root) level ALL, year level, and quarter level to the time dimension.

This job uses the following input:

❑ Intermed.FinYear_Start_and_End_dates
❑ Intermed.Fiscal_Year_Periods_with_dates

This job creates the following output:

❑ Intermed.FinYear_Quarters
❑ Intermed.Fiscal_Year_Periods_with_parents
❑ Intermed.Time_period_dimension

This job uses the $COMPANY_TO_FY_VARIANT.

This job uses the user-written source
T000230_ADD_TIME_HIERARCHY_LAYERS.SAS.

T000240 TIME PERIOD Dimension Tables

This job loads the main time period dimension tables.

This job uses the input Intermed.Time_period_dimension (created in the T000230 job).

This job creates the following output:

❑ StageSAP.TIME_PERIOD_ASSOC
❑ StageSAP.TIME_PERIOD

T000250 TIME PERIOD ASSOC TYPE

This job loads the staging area structure for STAGE_TIME_PERIOD_ASSOC_TYPE.

This job uses the input R3mirror.T009T.

This job creates the output StageSAP.TIME_PERIOD_ASSOC_TYPE.

T000260 Create Controlling Area Fin Year Combos

This job creates the output Intermed.CONTROL_AREA_YEARS_COMBOS. This table represents all combinations of all controlling areas that are wanted with the start and end dates of each financial year.

Because cost center and profit center hierarchies change over time, the SAS Solutions Adapter for SAP extracts hierarchies for each financial year. The output table of this job is required to determine the queries to SAP. Profit center and cost center dimensions depend on this job.

This job uses the following input:

❑ R3mirror.TKA01
❑ Intermed.FinYear_Start_and_End_dates

This job creates the output Intermed.CONTROL_AREA_YEARS_COMBOS.

Job Group: T0003 Tables Supplied by SAS

This job group includes the jobs that read the tables that SAS supplies. Then, the jobs load the tables into the staging area structure. You can also load records. When the follow-up jobs use these tables, the staging tables merge again with the original tables that SAS provided. Duplicate tables are discarded.

This job group includes common jobs that transform data for SAS Financial Management and SAS Human Capital Management.

T000300 SAS + SAP Country + Currency + Language to Staging

This job uses the following input:

❑ R3mirror.T005T

❑ R3mirror.TCURT

❑ R3mirror.T002

❑ R3mirror.T002T

❑ $SAPTOSAS_LANGUAGE

This job creates the following output:

❑ StageSAP.COUNTRY

❑ StageSAP.CURRENCY

❑ StageSAP.LANGUAGE

This job uses the following formats:

❑ $SAPTOSAS_COUNTRY

❑ $COUNTRY_NAME

T000310 SAS + SAP Exrate Types to Staging

This job loads the staging area structure for CURRENCY_EXCH_RATE_TYPE and creates the $SAPTOSAS_CURRENCY_EXCH_TYPE format. You must review this format every time it is installed to ensure that the mappings are correct. The exchange rate types do not automatically convert in a one-to-one manner. As a result, the SAS Solutions Adapter for SAP does not use the format. The format is useful for subsetting the exchange rates in SAP.

This job uses the input SAS_Supplied.SAS_CURRENCY_EXCH_RATE_TYPE.

This job creates the following output:

❑ StageSAP.CURRENCY_EXCH_RATE_TYPE

❑ Intermed.SAPTOSAS_EXRATE_TYPE

❑ $SAPTOSAS_CURRENCY_EXCH_TYPE

T000330 SAS to Stage GL_NORMAL_BAL

This job loads the values of GL_NORMAL_BAL. These values might not change, but additional language descriptions might be needed.

This job uses the input SAS_Supplied.SAS_GL_NORMAL_BAL.

This job creates the output StageSAP.GL_NORMAL_BAL.

T000340 SAS to Stage Source System

This job loads the stage table STAGE_SOURCE_SYSTEM from SAS_SOURCE_SYSTEM, which adds the value set by the global macro variable &DDS_SOURCE_SYSTEM_ID to the list of valid values.

This job uses the following input:

❑ SAS_SUP.SAS_SOURCE_SYSTEM

❑ &DDS_SOURCE_SYSTEM_ID

This job creates the output StageSAP.SOURCE_SYSTEM.

This job uses the user-written source T000340_ADD_SAP_SOURCE.SAS.

Job Group: T0004 Cost Center Dimension

Mapping SAP cost centers to the DDS cost center dimension is relatively easy because both models include similar concepts. However, the hierarchy extraction requires special attention. Because the hierarchies change over time, a separate hierarchy is extracted for each financial year. As a result, the start of the financial year is stored in the VALID_FROM_DTTM column. The end of the financial year is stored in the VALID_TO_DTTM column.

The hierarchy extraction in the SAS Data Surveyor for SAP generates code on which the cost center hierarchy extraction is based. First, the extraction gets the start date and end date of each financial year from an intermediate table that was used to build the time dimension tables (in Intermed.FinYear_Start_and_End_dates). The SAS Solutions Adapter for SAP extracts the cost centers per wanted controlling areas in SAP, as specified by the macro variable &WANTED_CONTROLLING_AREAS.

It is important to understand the table factors of this job group. This job group includes the following factors:

❑ Descriptions must be in the language that is specified by SPRAS or LANG.

❑ The value of the SOURCE_SYSTEM_ID column is set to the value of &DDS_SOURCE_SYSTEM_ID.

❑ The TIME_PERIOD_ASSOC_TYPE_CD for the controlling area is COST_CENTER_ASSOC_TYPE_CD.

❑ The macro %ADPT_COST_CENTER_ID_MAP is used to set the cost center ID. The default behavior creates the cost center ID as a concatenation of the controlling area (KOKRS) and cost center (KOSTL). You can change this macro based on your organization.

   This macro is used in the following jobs:

   ❑ T000400 (called within the compiled macro %ADPT_GET_HIER_OVERYEARS.SAS)

   ❑ T000410

   ❑ T100100

❑ The SAS Solutions Adapter for SAP creates separate hierarchies for controlling areas and financial years. It joins them into a single table. Within a controlling area (COST_CENTER_ASSOC_TYPE_CD) and date range, no row is in the hierarchy more than once. In other words, no node appears twice in the same time period, although you might find duplicates if the time period is ignored.

❑ The value of PARENT_COST_CENTER_ID references the COST_CENTER_ID of a row in the table.

❑ The RESPONSIBLE_EMPLOYEE_ID column does not populate correctly from SAP. The name from the VERAK column in the SAP R/3 table CSKS populates the column, but the name is not an employee ID and cannot be used in validation.

❑ The SAP R/3 transaction code OKENN can be used to compare the extracted data with the data in SAP R/3. OKENN shows only a hierarchy for a single controlling area, but there can be different start and end dates.

This job group includes common jobs that transform data for SAS Financial Management and SAS Human Capital Management.

T000400 Cost Center Hierarchy Over Years Extraction

This job extracts one cost center hierarchy for each financial year and controlling area combination.

This job uses the following input:

❑ Intermed.CONTROL_AREA_YEARS_COMBOS

❑ R3mirror.TKA01

❑ Calls to ABAP functions

This job creates the following output:

❑ Intermed.cost_center_hierarchy

❑ StageSAP.COST_CENTER_ASSOC_TYPE

This job uses the user-written source T000400_COST_CENTER_HIERARCHY_EXTRACT.SAS.

T000410 Load Stage Cost Center + Cost Center ASSOC Tables

This job loads the staging area structure for the main cost center dimension tables. This job creates the following error-checking tables:

❑ Intermed.COST_CENTER_ONLY_HIER (contains cost centers that are in the SAP cost center hierarchy, but are not in the SAP cost center master table extraction for the relevant time period)

❑ Intermed.COST_CENTER_ONLY_MASTER (represents records that are in the SAP cost center master table, but are not in the SAP cost center hierarchy; you must review the SAP data if these tables are not blank)

This job uses the following input:

❑ Intermed.FinYear_Start_and_End_dates

❑ Intermed.cost_center_hierarchy

❑ R3mirror.CSKS

❑ R3mirror.CSKST

❑ &LANG

❑ &WANTED_CONTROLLING_AREAS

This job creates the following output:

❑ Intermed.COST_CENTER_ONLY_HIER

- ❑ Intermed.COST_CENTER_ONLY_MASTER
- ❑ StageSAP.COST_CENTER_ASSOC
- ❑ StageSAP.COST_CENTER

This job uses the user-written source T000410_SEP_MATCHES.SAS.

T000420 Cost Center Add Standard Dim Values

The SAS Solutions Adapter for SAP adds fixed row records in dimension tables for the OPENBAL, UNASSIGNED, and ALL keys, which ensures that the references in GL_JRNL and GL_JRNL_DETAILS always reference existing rows. For more information, see the description in the GL_JRNL job group.

This job uses the following transformations:

- ❑ Add Standard Dimension ASSOC Rows
- ❑ Add Standard Dimension Rows

This job uses the following input:

- ❑ StageSAP.COST_CENTER_ASSOC_TYPE
- ❑ StageSAP.COST_CENTER_ASSOC
- ❑ StageSAP.COST_CENTER
- ❑ &DDS_SOURCE_SYSTEM_ID

This job creates the following output:

- ❑ StageSAP.COST_CENTER_ASSOC
- ❑ StageSAP.COST_CENTER

Job Group: T0005 Profit Center Dimension

Mapping SAP profit centers to the DDS profit center dimension is relatively easy because both models include similar concepts. The profit center processes are similar to the cost center processes. However, the hierarchy extraction requires special attention. Because the hierarchies change over time, a separate hierarchy is extracted for each financial year, which records the dates for which the hierarchy nodes are valid. As a result, the start of the financial year is stored in the VALID_FROM_DTTM column. The end of the financial year is stored in the VALID_TO_DTTM column.

The hierarchy extraction in the SAS Data Surveyor for SAP generates code on which the profit center hierarchy extraction is based. First, the extraction gets the start date and end date of each financial year from an intermediate table that was used to build the time dimension tables (in Intermed.FinYear_Start_and_End_dates). The SAS Solutions Adapter for SAP extracts the profit centers per wanted controlling areas in SAP, as specified by the macro variable &WANTED_CONTROLLING_AREAS.

It is important to understand the table factors of this job group. This job group includes the following factors:

- ❑ Descriptions must be in the language that is specified by SPRAS or LANG.
- ❑ The value of the SOURCE_SYSTEM_ID column is set to the value of &DDS_SOURCE_SYSTEM_ID.

❑ The TIME_PERIOD_ASSOC_TYPE_CD for the controlling area is PROFIT_CENTER_ASSOC_TYPE_CD.

❑ The macro %ADPT_PROFIT_CENTER_ID_MAP is used to set the profit center ID. The default behavior creates the profit center ID as a concatenation of the controlling area (KOKRS) and profit center (PRCTR). You can change this macro based on your organization.

This macro is used in the following jobs:

   ❑ T000500 (called within the compiled macro %ADPT_GET_HIER_OVERYEARS.SAS)

   ❑ T000510

   ❑ T100100

❑ The SAS Solutions Adapter for SAP creates separate hierarchies for controlling areas and financial years. It joins them into a single table. Within a controlling area (PROFIT_CENTER_ASSOC_TYPE_CD) and date range, no row is in the hierarchy more than once. In other words, no node appears twice in the same time period, although you might find duplicates if the time period is ignored.

❑ The value of PARENT_PROFIT_CENTER_ID references the PROFIT_CENTER_ID of a row in the table.

❑ The RESPONSIBLE_EMPLOYEE_ID column does not populate correctly from SAP. The name from the VERAK column in the SAP R/3 table CEPC populates the column, but the name is not an employee ID and cannot be used in validation.

❑ The SAP R/3 transaction code K6HCN can be used to compare the extracted data with the data in SAP R/3. K6HCN shows only a hierarchy for a single controlling area, but there can be different start and end dates.

This job group includes jobs that transform data for SAS Financial Management.

T000500 Profit Center Hierarchy Over Years Extraction

This job extracts one profit center hierarchy for each financial year and controlling area combination.

This job uses the following input:

❑ Intermed.CONTROL_AREA_YEARS_COMBOS

❑ R3mirror.TKA01

❑ Calls to ABAP functions

This job creates the following output:

❑ Intermed.profit_center_hierarchy

❑ StageSAP.PROFIT_CENTER_ASSOC_TYPE

This job uses the user-written source T000500_PROFIT_CENTER_HIERARCHY_EXTRACT.SAS.

T000510 Load Stage Profit Center + Profit Center ASSOC Tables

This job loads the staging area structure for the main profit center dimension tables. This job creates the following error-checking tables:

Intermed.PROFIT_CENTER_ONLY_HIER (contains profit centers that are in the SAP profit center hierarchy, but are not in the SAP profit center master table extraction for the relevant time period)

❑ Intermed.PROFIT_CENTER_ONLY_MASTER (represents records that are in the SAP profit center master table, but are not in the SAP profit center hierarchy; you must review the SAP data if these tables are not blank)

This job uses the following input:

❑ Intermed.FinYear_Start_and_End_dates

❑ Intermed.profit_center_hierarchy

❑ R3mirror.CEPC

❑ R3mirror.CEPCT

❑ &LANG

❑ &WANTED_CONTROLLING_AREAS

This job creates the following output:

❑ Intermed.PROFIT_CENTER_ONLY_HIER

❑ Intermed.PROFIT_CENTER_ONLY_MASTER

❑ StageSAP.PROFIT_CENTER_ASSOC

❑ StageSAP.PROFIT_CENTER

This job uses the user-written source T000510_SEPARATE_MATCHES.SAS.

T000520 Profit Center Add Standard Dim Values

The SAS Solutions Adapter for SAP adds fixed row records in dimension tables for the OPENBAL, UNASSIGNED, and ALL keys, which ensures that the references in GL_JRNL and GL_JRNL_DETAILS always reference existing rows. For more information, see the description in the GL_JRNL job group.

This job uses the following transformations:

❑ Add Standard Dimension ASSOC Rows

❑ Add Standard Dimension Rows

This job uses the following input:

❑ StageSAP.PROFIT_CENTER_ASSOC_TYPE

❑ StageSAP.PROFIT_CENTER_ASSOC

❑ StageSAP.PROFIT_CENTER

❑ &DDS_SOURCE_SYSTEM_ID

This job creates the following output:

❑ StageSAP.PROFIT_CENTER_ASSOC

❑ StageSAP.PROFIT_CENTER

Job Group: T0006 Analysis Dimension

This job group creates an analysis dimension that is not derived from SAP. The SAS Solutions Adapter for SAP extracts actual amounts that are related to actual dimensions. Therefore, the analysis dimension is hardcoded. The extraction might require adjustments, based on your installation.

The Analysis Dimension Population job is the only job in this group. It does not depend on any previous jobs.

This job group includes jobs that transform data for SAS Financial Management.

T000600 Analysis Dimension Population

This job creates the three minimum structures of the analysis dimension.

This job creates the following output:

❑ StageSAP.ANALYSIS
❑ StageSAP.ANALYSIS_ASSOC
❑ StageSAP.ANALYSIS_ASSOC_TYPE

This job uses the following user-written sources:

❑ T000600_POPULATE_ANALYSIS_TABLE.SAS
❑ T000600_POPULATE_ANALYSIS_ASSOC_TABLE.SAS
❑ T000600_POPULATE_ANALYSIS_ASSOC_TYPE_TABLE.SAS

T000610 Analysis NLS Dimension Population

This job creates the NLS table for the analysis dimension.

This job creates the output StageSAP.STAGE_ANALYSIS_NLS.

This job uses the user-written source T000610_POPULATE_ANALYSIS_NLS_TABLE.SAS.

Job Group: T0007 Exchange Rates

This job group takes data from the exchange rate tables in SAP R/3 (TCURR and TCURRT).

The exchange rate types must match the types that are accepted as valid simple exchange rate types in the DDS. The historic (HIS) and derived (DER) exchange rate types form a group of complex exchange rate types. All of the other types are valid simple exchange rate types. The following figure shows a sample of exchange rate types:

By default, the SAS Solutions Adapter for SAP does not derive exchange rate from SAP. During implementation, the job has to be customized to extract the site-specific exchange rate from SAP (for example, type M). The job distributes the exchange rates to all days for which they are valid. The job loops through all time periods, looks up the start and end dates, and picks all of the exchange rates that were valid on those days.

For example, the SAS Solutions Adapter for SAP loads the rates for the DDS exchange rate types PeriodOpen and PeriodClose. The SAS Solutions Adapter for SAP loads the exchange rates into the Stage Currency Exchange Rates table. Additional exchange rates might need to be loaded for exchange rate type PeriodAverage, and the user-defined exchange rates C1 and C2. You must manually load these exchange rates; the SAS Solutions Adapter for SAP does not complete this task.

The SAS Solutions Adapter for SAP creates a sample analysis dimension because the exchange rate references the analysis dimension. A user-specific JOIN must join the analysis table and the exchange rates. This is a simple join that provides an analysis dimension that can be adapted.

This job group includes jobs that transform data for SAS Financial Management.

T000700 Exchange Rate Transform

This job creates StageSAP.CURRENCY_EXCH_RATE_SRC with a constant key that is equal to SAP.

This job creates the output StageSAP.CURRENCY_EXCH_RATE_SRC.

This job uses the user-written source T000350_POPULATE_CURRENCY_EXCH_RATE_SRC_TABLE.SAS.

T000720 Exchange Rate Population

This job uses the main logic that calculates the PeriodOpen and PeriodClose exchange rates.

This job uses the following input:

❑ StageSAP.TIME_PERIOD

❑ R3mirror.TCURR

This job creates the following output:

❑ Intermed.DAILY_EXCHANGE_RATES

This job uses the following user-written sources:

❑ T000720_IDENTIFY_TCURR_END_DATES.SAS

❑ T000720_DERIVE_PERIODS_FOR_EXRATES.SAS

Job Group: T0008 Currency Dimension

This job group creates currency dimension reference tables. These jobs are loaded into the tables and the staging area structure. When the follow-up jobs use these tables, the staging tables merge again with the original tables that SAS provided. Records can be added to these tables.

This job group includes common jobs that transform data for SAS Financial Management and SAS Human Capital Management.

T000800 Currency Dimension Population

This job creates tables related to currency.

This job uses the following input:

❑ R3mirror.TCURT

❑ R3mirror.T002

❑ SAS_SUP.SAS_CURRENCY

This job creates the following output:

❑ StageSAP.CURRENCY_ASSOC_TYPE

❑ StageSAP.CURRENCY_ASSOC

This job uses the user-written source T000800_POPULATE_STAGE_CURRENCY_ASSOC_TYPE_TABLE.SAS.

Job Group: T1000 Financial Documents

This job group transforms the data from the SAP R/3 tables into the DDS staging are format. The GL_JRNL and GL_JRNL_DETAILS tables are involved.

The financial documents are based on an initial load of the SAP financial documents, such as BKPF and BSEG. This initial load includes all data after the first start date, and subsequent change-data-capture (CDC) loads.

After the data loads, the SAS Solutions Adapter for SAP ensures that all of the columns that reference dimensions or foreign keys use the correct keys. For example, the COST_CENTER_ID column is not equal to the KOSTL column in SAP. The COST_CENTER_ID column maps from KOKRS!!KOSTL.

This job group includes jobs that transform data for SAS Financial Management.

Input and Output (Tables, Formats, and Macro Variables)

This job group uses the following input:

- ❑ $COMPANY_TO_FY_VARIANT
- ❑ $ACCBALS
- ❑ $XRANGE
- ❑ $LOCALCR

Note: Only the controlling areas that are specified by the global macro variable &WANTED_CONTROLLING_AREAS include documentation. Document numbers identify the internal documents that are filtered out of what is passed to the target data model. Document numbers within certain ranges are internal. When SAP R/3 allocates document numbers, it chooses the next number in sequence from pre-allocated ranges. The ranges are stored in the SAP R/3 table NRIV. You can identify internal documents using NRIV.OBJECT='RF_BELEG'. The $XRANGE format identifies the document numbers accordingly, so PUT(BUKRS!!GJAHR!!BELNR,$XRANGE.)='INTERNAL' identifies the document as internal.

This job group works with all of the data in Intermed.Financial_Documents. This data includes all detailed transactions starting from the beginning of the &_STARTFINYEAR global macro variable, or BKPF.GJAHR>=&_STARTFINYEAR and BSEG.GJAHR>=&_STARTFINYEAR. After reading the data from the Intermed.Financial_Documents file into the DDS, you should empty the file.

Dimension Foreign Keys

This job group has the following rules for foreign keys:

- ❑ Dimension column values cannot be blank.
- ❑ Each value in each dimension column must be in the corresponding dimension table. If this is not the case, the records are rejected during import into the DDS.
- ❑ In all records from the standard financial documents (with a BKPS or BSEG derivative), a dimension column that does not have a value in SAP must get the value UNASSIGNED. This implies that there must be a row with ID UNASSIGNED in all of the dimensions. UNASSIGNED should not have a parent in the _ASSOC tables.

Opening Balance Considerations

It is important to understand the characteristics of an opening balance:

- ❑ The opening balance for the initial period is included to ensure correct balances. These balances are derived from the SAP R/3 table GLT0. The SAS Solutions Adapter for SAP must add a single row for each opening balance account with a TIME_PERIOD=PERIOD 1 in the financial year &_STARTFINYEAR.
- ❑ The SAS Solutions Adapter for SAP puts in a constant code OPENBAL for the cost centers, profit centers, and other dimension columns in GLT0.
- ❑ The information used for the opening balance should be used only for balance sheet accounts, and not for profit-and-loss accounts. The format $ACCBALS identifies balance sheet accounts. Opening balance amounts are included only for accounts where PUT(GLT0.RACCNT,$ACCBALS.)='X'. This implies that there

    must be a row with ID OPENBAL in all of the relevant dimensions. OPENBAL has the parent ALL in the _ASSOC tables.

❑ The general ledger account dimension IDs mostly derive from the SAP account number. However, some accounts are in the financial statement in different places based on the balance. Therefore, a single SAP account number maps to two accounts: one with a C suffix and one with a D suffix. Because all transactions within the same financial year must be booked in the same account, the SAS Solutions Adapter for SAP uses the totals from GLT0 to decide whether to append a C or a D to the account number for each transaction.

    Note: Balances might change from positive to negative, or vice versa, during a financial year. This means that the C or D in a transaction account ID might change over the course of the financial year. If this is the case, data might need to be re-imported into the DDS and follow-up data marts that use the data.

T100010 Internal Number Ranges

This job reads the number range table in SAP and creates the format $XRANGE to identify internal document numbers.

This job uses the input R3mirror.NRIV.

This job creates the following output:

❑ Intermed.INTERNAL_NUMBER_RANGES

❑ $XRANGE

T100020 Create Opening Balances

This job summarizes the GLT0 table to find the opening balance for all balance sheet accounts. This job creates a SAS view as a subset of R3mirror.GLT0. Using the format $ACCBALS on the account number (RACCT) gets the balance sheet accounts or all records that translate to X. This job fills in default values of OPENBAL for all unavailable columns. It adds time dimension values to previous SAS views. And, it outputs the data set Intermed.Opening_Balances.

For each financial period, this job concatenates the previous summary data set with the SAS view. It summarizes this data and creates a temporary data set. This temporary data set is appended to the Intermed.Opening_Balances data set.

This job uses the following input:

❑ Intermed.Financial_Documents

❑ R3mirror.GLT0

❑ $ACCBALS

❑ $LOCALCR

❑ $COMPANY_TO_FY_VARIANT

❑ $XRANGE

This job creates the output Intermed.Opening_Balances.

This job uses the user-written source T100020_CREATE_OPENING_BALANCES.SAS.

T100030 Make GLT0 Vertical

This job creates a new version of data set GLT0, converting each row that contains 16 period values into 16 rows; each row contains one period value. This job uses the data set Intermed.GLT0_Vertical to summarize the following parameters:

- ❑ Value of Posting (WRBTR) by Local Currency (WAERS)
- ❑ Company Code (BUKRS)
- ❑ Account Number (HKONT)
- ❑ Credit/Debit Indicator (SHKZG)
- ❑ Fiscal Period (MONAT)

The job subsets the summary of the value of macro variable &GJAHR and the nonzero values of Fiscal Period (MONAT).

This job reads the data set R3mirror.GLT0 and writes an output record for each of the 16 occurrences of nonzero total transactions in the period in local currency (HSL*nn*). The job creates a temporary data set that is loaded into Intermed.GLT0_Vertical.

This job uses the following input:

- ❑ R3mirror.GLT0
- ❑ $SHKZG
- ❑ $COM2CAC
- ❑ $LOCALCR
- ❑ &KTOPL
- ❑ &GJAHR

This job creates the following output:

- ❑ Intermed.GLT0_Vertical
- ❑ Intermed.GLT0_Vertical_Summary

This job uses the following user-written sources:

- ❑ T100030_MAKE_GLT0_VERTICAL.SAS
- ❑ T100030_SUMMARISE_GLT0_VERTICAL.SAS

T100040 Level to Account

This job decides whether an account must have a C or D appended, based on the balance. The job uses the data set Intermed.GLT0_Vertical to summarize the Value of Posting (WRBTR) by Company Code (BUKRS), Account Number (HKONT), and Fiscal Year (GJAHR).

This job joins the KTOPL and WAERS columns from the R3mirror.T001 table.

This job uses the following input:

- ❑ R3mirror.T001
- ❑ Intermed.GLT0_Vertical
- ❑ Intermed.One2many

This job creates the output Intermed.Level_to_Account.

This job uses the user-written source T100040_SUMMARY_ON_LEVEL.SAS.

T100100 Stage GL Journal

This job populates the GL_JRNL and GL_JRNL_DETAILS tables in the staging area structure.

This job uses the following input:

- ❑   Intermed.Opening_Balances
- ❑   Intermed.Financial_Documents
- ❑   Intermed.Level_to_Account
- ❑ $COMPANY_TO_FY_VARIANT
- ❑ $COM2CAC
- ❑ $CC2CA
- ❑ $XRANGE
- ❑   &_OPENING_BALANCE_PERIOD
- ❑   &KTOPL
- ❑   &SAKLN

This job creates the following output:

- ❑   Intermed.Financial_Fact_Table
- ❑   StageSAP.GL_JRNL
- ❑   StageSAP.GL_JRNL_DETAILS

If partial cost center IDs are used to create the internal organization dimension, then column mappings in the financial documents need to be adjusted to correspond in the T100100 job. These adjustments should be made in the load step of the STAGE_GL_JRNL_DETAILS table for the columns INITIATING_INTERNAL_ORG_ID and AFFECTED_INTERNAL_ORG_ID.

Because the macro variable &SAKLN is used to shorten the ACCOUNT_ID of leaf nodes in the account dimension, the account number must be shortened in the transaction table STAGE_GL_JRNL_DETAILS. This action is performed by calling the macro %ADPT_ADJ_TO_SIGNIF_ACCOUNT_LEN in the load step of the transaction table.

T100200 Summarize Financial Docs

The transformation jobs T100200 and T100210 work together to detect discrepancies in the financial document data that is extracted from SAP.

The T100200 job calculates the local currency totals for each financial period based on the columns BUKRS, BUSAREA, HKONT, and SHKZG. The input data is the financial document detail that is extracted from SAP. This input data represents a join of data from SAP tables BKPF and BSEG.

This job uses the input Intermed.Financial_Documents.

This job creates the output Intermed.FI_Sum.

This job uses the user-written source T100200_SUMM_FI_DOCS.SAS.

T100210 Compare Financial Docs with GLT0

The transformation jobs T100200 and T100210 work together to detect discrepancies in the financial document data that is extracted from SAP.

The T100210 job compares the arithmetical summary of the financial data (calculated in the T100200 job) with the summary data that is stored in the SAP R/3 table GLT0. The totals should be identical.

A discrepancy between the totals can mean that the data is incorrect. If any discrepancies are found, then a discrepancy report is e-mailed to the user ID &EMAILERROR. This user ID is initialized in the PREPROCPARMS12.SAS file.

A discrepancy can occur if the appropriate changes are not detected and extracted from the financial document tables. This can happen if the triggering date stamps are not updated when a change occurs. If this is the case, re-extract the data with a WHERE clause that selects the mismatched category. Use the re-extracted data to replace the data in the financial documents table (Intermed.Financial_Documents).

This job uses the following input:

❑ Intermed.FI_Sum

❑ Intermed.GLT0_Vertical_Summary

❑ Macro variable &EMAILERROR

This job creates the output Intermed.FI_Docs_vs_GLT0__vert_SUM_Diffs.

This job uses the user-written source T100210_GET_DIFFS.SAS.

Job Group: T1100 External Org

This job group is a collection of SAS Data Integration Studio jobs that transform a combination of customer and supplier data from SAP R/3 tables into the DDS staging area format. Customer external organization jobs take data from the customer master data in SAP R/3 (such as KNA1) and load it into an intermediate structure. Then, the data can join with supplier external data to form the DDS stage external organization dimension.

Customers are individuals who or entities that buy goods or services from your organization. These customers might be general consumers in a retail store. Or, they might be other vendors and organizations about which you maintain detailed records in SAP R/3.

SAP can maintain basic or complex customer records that reflect the specific customers and their relationships with your organization. This flexibility covers the various types of customers and their complexities. In SAP, you might have created customer records for internal customers, such as a department or committee that uses company goods or services within your organization. For example, each site registers as a customer.

In SAP, a customer hierarchy provides a structure of customer nodes. These nodes define specific characteristics or parts of the customer that are tracked. For example, one customer node might be a specific customer's distribution center. In the customer hierarchy, nodes are in a top-down structure, in which the top-most customer node corresponds to the highest level of the hierarchy, and so on.

In addition to traditional customers, vendors might need to be represented in the customer and supplier hierarchies. Vendors are typically businesses or organizations that provide a service or product to your organization. You must consider your unique environment to determine which businesses serve you as a vendor. If necessary, you can choose to register a vendor as a supplier.

In SAP, a supplier hierarchy provides a structure of supplier nodes. These nodes define specific characteristics or parts of the supplier that are tracked. For example, one supplier node might be a specific supplier's distribution center. In the supplier hierarchy, nodes are in a top-down structure, in which the top-most node corresponds to the highest level of the hierarchy, and so on.

This job group includes jobs that transform data for SAS Financial Management.

T110010 Customer External Org

This job prepares the customer part of the external organization dimension.

This job uses the following input:

❑ R3mirror.KNA1

❑ R3mirror.KNVH

❑ R3mirror.THITT

This job creates the following output:

❑ Intermed.Customer_External_Org

❑ Intermed.Customer_External_Org_Addr

❑ Intermed.Customer_External_Org_Assoc

❑ Intermed.Customer_External_Org_Assoc_Type

❑ Intermed.Customer_Org_Type

This job uses the following user-written sources:

❑ T110010_ADD_ORDER_NO_TO_KNA1.SAS adds a unique number for each customer number (KUNNR) as order number (ORDER_NO). This is an incremented count for each new customer number that is required because the KUNNR field contains character values.

❑ T110010_LOAD_CUSTOMER_ORG_TYPE.SAS

T110020 Supplier External Org

This job prepares the supplier part of the external organization dimension.

This job uses the following input:

❑ R3mirror.LFA1

❑ R3mirror.LFMH

❑ R3mirror.TLHITT

This job creates the following output:

❑ Intermed.Supplier_External_Org

❑ Intermed.Supplier_External_Org_Addr

❑ Intermed.Supplier_External_Org_Assoc

❑ Intermed.Supplier_External_Org_Assoc_Type

❑ Intermed.Supplier_Org_Type

This job uses the following user-written sources:

❑ T110010_ADD_ORDER_NO_TO_LFA1.SAS adds a unique number for each
account number of vendor or creditor (LIFNR) as order number (ORDER_NO).
This is an incremented count for each new supplier number that is required
because the LIFNR field contains character values.

❑ T110010_LOAD_SUPPLIER_ORG_TYPE.SAS

T110030 Load EXTERNAL_ORG Group

This job populates the external organization dimension tables from the customer and
supplier intermediate tables.

This job uses the following input:

❑ Intermed.Customer_External_Org

❑ Intermed.Supplier_External_Org

❑ Intermed.Customer_External_Org_Assoc

❑ Intermed.Supplier_External_Org_Assoc

❑ Intermed.Customer_External_Org_Assoc_Type

❑ Intermed.Supplier_External_Org_Assoc_Type

❑ Intermed.Customer_External_Org_Addr

❑ Intermed.Supplier_External_Org_Addr

This job creates the following output:

❑ StageSAP.EXTERNAL_ORG

❑ StageSAP.EXTERNAL_ORG_ASSOC

❑ StageSAP.EXTERNAL_ORG_ASSOC_TYPE

❑ StageSAP.EXTERNAL_ORG_ADDRESS

This job uses the following user-written sources:

❑ T110030_ADD_C_AND_S_NODES.SAS adds a C to a customer ID and an S to a
supplier ID in the STAGE_EXTERNAL_ORG table so that the IDs are unique.

❑ T110030_ADD_C_AND_S_ASSOC_NODES.SAS adds a C to a customer ID and an
S to a supplier ID in the STAGE_EXTERNAL_ORG_ASSOC table so that the IDs
are unique.

T110040 External Org Add Standard Dimension Values

This job adds rows for OPENBAL, UNASSIGNED, and ALL to the dimension.

This job uses the following input:

❑ StageSAP.EXTERNAL_ORG

❑ StageSAP.EXTERNAL_ORG_ASSOC

This job creates the following output:

❑ StageSAP.EXTERNAL_ORG

❑ StageSAP.EXTERNAL_ORG_ASSOC

Job Group: T1200 FM Internal Org

A combination of logical SAP data sources populates the internal organization job group for SAS Financial Management.

This job group is a collection of SAS Data Integration Studio jobs that transform data from SAP R/3 tables into the DDS staging area format. These jobs create a hierarchy by assigning the first level for an operating concern, the second level for controlling areas, and the other levels in the following ways:

❑ a third level for company codes and a fourth level for business areas

❑ the other levels as cost center hierarchies

The internal organization dimension includes the following hierarchical levels:

operating concern (first level)

determined by the global macro variable &OPERATING_CONCERN. The SAS Solutions Adapter for SAP works with a single operating concern.

controlling areas (second level)

assigned as parents of their respective companies based on the SAP R/3 table TKA02.

company codes (third level)

the simplest identifier of a balancing or legal accounting entity. For example, if a large corporation consists of several individual companies, a unique company code identifies each company within the larger corporate structure.

business areas (fourth level)

facilitates reporting across company codes, covering a company's main areas of operation. These main areas might represent divisions, branches, product lines, and so on. Not all companies have the same business areas. If your company has only one business area, you can exclude the business area level.

cost center hierarchies (additional levels)

included in the internal organization dimension if applicable. If an internal organization dimension includes cost center hierarchies, then the parents of the higher cost center levels are controlling area levels.

You must create the cost center hierarchy before copying the data into the internal organization dimension tables.

Note: In most cases, only profit and loss transactions that are obtained from BKPF or BSEG tables in SAP reference cost centers. Other transactions reference business areas.

Note: The cost center dimension does not include all of the information that is required for the internal organization dimension. See the source code in T120050_LOAD_INTERNAL_ORG_FROM_CC.SAS for more information.

The Stage_INTERNAL_ORG table is a simple concatenation of the contributing tables and a set of standard values. The hierarchy for the ASSOC table is created by linking the

operating concern (first level) to the controlling areas (second level) by using TKA01.KOKRS and TKA01.ERKRS. The controlling areas (second level) link to the company codes (third level) by using TKA02.BUKRS and TKA02.KOKRS.

This job group includes jobs that transform data for SAS Financial Management.

T120010 Operating Concern Internal Org

This job creates the first level of the hierarchy, the operating concern level.

This job creates the $OP_CONCERN_CURRENCY format that the SAS Human Capital Management T290080 job uses. The prefix OPC is added to the operating concern to form the INTERNAL_ORG_ID. For example, an operating concern of 1000 becomes OPC1000. This ID ensures a unique value.

This job uses the following input:

❑ R3mirror.TKEB
❑ R3mirror.TKEBT
❑ &OPERATING_CONCERN_COUNTRY_CD
❑ &DDS_SOURCE_SYSTEM_ID
❑ $SAPTOSAS_COUNTRY

This job creates the output Intermed.Operating_Concern_Internal_Org.

This job uses the format **$OP_CONCERN_CURRENCY**.

T120020 Controlling Area Internal Org

This job creates the second level of the hierarchy, the controlling areas level.

The prefix CAR is added to the controlling area to form the INTERNAL_ORG_ID. For example, a controlling area of 1000 becomes CAR1000. This ID ensures a unique value.

This job uses the following input:

❑ R3mirror.TKA01
❑ R3mirror.TKA00
❑ &OPERATING_CONCERN_COUNTRY_CD
❑ &DDS_SOURCE_SYSTEM_ID
❑ $SAPTOSAS_COUNTRY

This job creates the output Intermed.Controlling_Area_Internal_Org.

T120030 Company Internal Org

This job creates the third level of the hierarchy, the company codes level.

This job uses the following input:

❑ R3mirror.T001
❑ R3mirror.T880

❑   &DDS_SOURCE_SYSTEM_ID

❑ $SAPTOSAS_COUNTRY

This job creates the output Intermed.Company_Internal_Org.

T120040 Business Area Internal Org

This job creates the fourth level of the hierarchy, the business areas level.

Because source data from SAP might not have a description for the business area, the initialization job I0050 enables you to enter a description. You can modify the setting for INTERNAL_ORG_ID in the transaction data so that if the business area is blank, then INTERNAL_ORG_ID defaults to the company code. The prefix BA is added to the business area to form the INTERNAL_ORG_ID. For example, a business area of 1000 becomes BA1000. This ID ensures a unique value.

This job uses the following input:

❑   R3mirror.TGSBT

❑   Intermed.TGSBT_Blank

❑   Intermed.Company_Internal_Org

❑   &DDS_SOURCE_SYSTEM_ID

❑ $SAPTOSAS_COUNTRY

This job creates the following output:

❑   Intermed.Business_Area_Internal_Org

❑   Intermed.Busarea_Internal_Org_Assoc

T120050 INTERNAL_ORG Layer from Cost Center

This job creates internal organization records that can be used as alternative levels of the internal organization hierarchy if the T0004 job group has already created the cost center dimension.

All cost centers in SAP are associated with a controlling area. As a result, the cost center hierarchy slots in the internal organization hierarchy are under the controlling areas level. This structure offers an alternative to the company codes and business areas levels.

Note: This job has a site-dependent user exit (T120050_LOAD_INTERNAL_ORG_FROM_CC.SAS). Review the code in this file to ensure the proper administration of the job.

This job uses the following input:

❑   StageSAP.STAGE_COST_CENTER

❑   &OPERATING_CONCERN_COUNTRY_CD

This job creates the output Intermed.INTERNAL_ORG_from_Cost_Center.

T120060 INTERNAL_ORG_ASSOC Layer from Cost Center

This job creates records that can be used as alternative levels of the internal organization hierarchy if the T0004 job group has already extracted the cost center hierarchy.

All cost centers in SAP are associated with a controlling area. As a result, the cost center hierarchy slots in the internal organization hierarchy are under the controlling areas level. This structure offers an alternative to the company codes and business areas levels.

This job creates the Intermed.INTERNAL_ORG_ASSOC_from_Cost_C table from the corresponding cost center tables.

This job uses the following input:

❑ StageSAP.STAGE_COST_CENTER_ASSOC
❑ Intermed.Cost_Center_Hierarchy

This job creates the output Intermed.INTERNAL_ORG_ASSOC_from_Cost_C.

T120100 Load INTERNAL_ORG

This job merges the levels into a single table and loads STAGE_INTERNAL_ORG.

This job uses the following input:

❑ Intermed.Operating_Concern_Internal_Org
❑ Intermed.Company_Internal_Org
❑ Intermed.Controlling_Area_Internal_Org
❑ Intermed.Business_Area_Internal_Org
❑ Intermed.INTERNAL_ORG_from_Cost_Center

This job creates the output StageSAP.INTERNAL_ORG.

T120110 Load FM INTERNAL_ORG_ASSOC

This job loads the INTERNAL_ORG_ASSOC staging area table.

The logic for this job is in the T120110_LOAD_STAGING_INTERNAL_ORG_ASSOC.SAS program. This program creates the links between the levels of the table by setting the appropriate values in the PARENT_INTERNAL_ORG_ID column.

This job uses the following input:

❑ R3mirror.TKEB
❑ R3mirror.TKA01
❑ R3mirror.TKA02
❑ Intermed.Busarea_Internal_Org_Assoc
❑ Intermed.INTERNAL_ORG_ASSOC_from_Cost_C

This job creates the output StageSAP.INTERNAL_ORG_ASSOC.

T120120 Internal Org Add Standard Dimension Values

This job adds standard rows such as OPENBAL, UNASSIGNED, ALL, and EXT to the internal organization dimension tables.

This job uses the following input:

❑ StageSAP.INTERNAL_ORG_ASSOC_TYPE

❑ StageSAP.INTERNAL_ORG

❑ StageSAP.INTERNAL_ORG_ASSOC

This job creates the following output:

❑ StageSAP.INTERNAL_ORG

❑ StageSAP.INTERNAL_ORG_ASSOC

Job Group: T2000 HR Common Reference Tables

The HR Common Reference Tables job group is a collection of SAS Data Integration Studio jobs that transform data from SAP R/3 tables into the DDS staging area format. These jobs create tables that enable the pay level, pay level structure, and exempt status DDS staging tables to populate.

This job group includes jobs that transform data for SAS Human Capital Management.

T200020A Get Base Wage Types from PA0008

This job provides the preferred method for populating the Intermed.SAP_Base_Wage_types table. The intermediate table that is created is used in the T2400 job group.

Not all payments that are made to employees are considered to be part of their base salaries. The payment information that is extracted from SAP can include a very large amount of data that is irrelevant, depending on the extraction parameters. For example, the data can include values such as calculated values, cumulative annual values, and deductions. These values should not be included in the base salary amounts.

This job assumes that the base salary wage types that are recorded in infotype 8 are the desired values.

Note: The T200020B job provides an alternative method for populating the table.

This job uses the following input:

❑ R3mirror.PA0008

❑ Intermed.Employee_Country_Association

This job creates the output Intermed.SAP_Base_Wage_types.

T200020B Get Base Wage Types from Wage Type Groups

This job provides an alternative method for populating the Intermed.SAP_Base_Wage_types table. The intermediate table that is created is used in the T2400 job group.

You can use this job if the T52D7 table is maintained in SAP.

Note: This job is an alternative to the T200020A job.

This job uses the input R3mirror.T52D7.

This job creates the output Intermed.SAP_Base_Wage_types.

T200030 SAP to SAS Wagetypes

This job creates the staging compensation type table and a format that maps SAP wage types to SAS wage types.

This job uses the SAS code that is in T200030_SAP2SAS_WAGE_TYPES.SAS. It groups wage types that have identical text descriptions. And, it removes calculated wage types, such as those starting with a slash (*/*).

This job uses the following input:

❑ R3mirror.T512T
❑ Intermed.SAP_Base_Wage_types

This job creates the output Intermed.STAGE_COMPENSATION_TYPE.

This job uses the format $SAPTOSAS_WAGE_TYPE.

T200040 Create Inter T510 Label Texts

This job gets the label texts that are related to the T510 table. The texts and their descriptions are added to the staging pay level and pay level structure data.

This job uses the input R3mirror.DD04T.

This job creates the output Intermed.T510_label_TextJoin.

T200045 Employee Pay Info

This job creates unique pay level structures that are used in infotype 8 (PA0008). It also creates a version that contains descriptions that are derived from the column labels.

In addition, this job derives the payment information that is needed to populate employee actions.

This job uses the following input:

❑ R3mirror.PA0008
❑ Intermed.Employee_Country_Association

❑ Intermed.label

This job creates the following output:

❑ Intermed.Employee_action_pay_info_PA0008

❑ Intermed.PAY_LEVEL_STRUCTURE_from PA0008

❑ Intermed.PAY_LEVEL_STRUCTURE_PA0008_hold

T200050 Load Stage Pay Level

This job creates the load the stage pay level table. The pay level is assumed to be the same as the pay level structure, as populated in the T200060 job. Pay level and pay level structure are used synonymously. Therefore, similar jobs are used. Some sites might choose a different behavior. If so, one of the two jobs and the references to the relevant columns must be modified.

Pay level and pay level structure are especially important where salary ranges are associated with the codes. Not all companies maintain salary range information, especially companies outside of North America. Therefore, it is possible that not all sites maintain this information in the T510N table in SAP. It might be necessary to populate the output table by using only information from the table Intermed.PAY_LEVEL_STRUCTURE_fromPA0008 that is used in infotype 8.

This job uses the following input:

❑ R3mirror.T510

❑ R3mirror.T510N

❑ Intermed.label

❑ R3mirror.T510F

❑ Intermed.PAY_LEVEL_STRUCTURE_fromPA0008

❑ &LANG

This job creates the output StageSAP.PAY_LEVEL.

T200060 Load Stage Pay Level Structure

This job loads the stage pay level structure. The pay level structure is assumed to be the same as the pay level, as populated in the T200050 job.

See the description for the T200050 job for more information.

This job uses the following input:

❑ R3mirror.T510

❑ R3mirror.T510N

❑ Intermed.label

❑ Intermed.PAY_LEVEL_STRUCTURE_PA0008_hold

This job creates the output StageSAP.PAY_LEVEL_STRUCTURE.

T200070 Load Stage Exempt Status

This job creates and loads the stage exempt status table. The user-written code for this job creates a two-row table to record the values of non-exempt and exempt.

This job uses the user-written source T200070_POPULATE_EXEMPT_STATUS.SAS.

This job creates the output StageSAP.EXEMPT_STATUS.

T200080 Create SAS Format for Personnel Number Clean

This job creates a table that can be used to clean personnel numbers. It uses the HR Clean Personnel Numbers transformation.

Each individual has a single and unique Social Security number or national identity number, as shown in SAP R/3 table PA0002.PERID. If multiple personnel numbers have been allocated for the same person in SAP, information might require consolidation. This job enables you to map the multiple personnel numbers to a single personnel number.

Note: Although a format is created, the SAS Solutions Adapter for SAP does not use it. However, if your site requires information consolidation, the format can be used.

This job uses the following input:

❑ R3mirror.PA0001
❑ R3mirror.PA0002

This job creates the output Intermed.PA0002_Anomalies.

This job uses the format $R3_to_HRID.

Job Group: T2100 HR Employee General Information

This job group selects processes and joins tables that are related to employee general information. The objective of these jobs is to populate the StageSAP.EMPLOYEE table. Many jobs perform discrete stages to enable customization. It would be difficult for a single job to perform all processing.

The SAS Solutions Adapter for SAP classifies employee general information into date-dependent and date-independent categories. An example of date-independent information is an employee's birthdate. For example, it is possible that birthdate data in SAP was changed because it was initially entered incorrectly. In this case, the SAS Solutions Adapter for SAP takes the latest value and assumes that it is the best value.

Other information can change logically where previous values are of no real interest. In these cases, the current version of the information is preferable, and historical information is not collected. One example of this type of information is an employee's educational level. If you decide that historical information is important, you need to adjust the jobs.

This job group includes jobs that transform data for SAS Human Capital Management.

Creating Consolidated and Subset Tables

The first set of transformations create consolidated and subsetted tables in the intermediate library. The names of the tables are the same as the names of the R3mirror tables, unless stated otherwise.

The steps describe the general process for creating the consolidated and subsetted tables in the intermediate library.

1   The Period Consolidation transformation is performed on PA0008, on key PERNR, and on the date range that is specified by BEGDA and ENDDA.

- ❑   Differences are important in the BSGRD column.
- ❑   No latest values for columns need to be kept.

2   The Period Consolidation transformation is performed on PA0016, on key PERNR, and on the date range that is specified by BEGDA and ENDDA. This is the default behavior. This transformation uses a WHERE clause that selects CCTYPE in &Temporary_Contract_types.

- ❑   Differences are important in the CTTYP column.
- ❑   No latest values for columns need to be kept.

3   The latest record per employee is used with PA0022, on key PERNR, and on the date range that is specified by BEGDA and ENDDA.

- ❑   The SLABS column is important.

4   The Period Consolidation transformation is performed on PA0057, on key PERNR, and on the date range that is specified by BEGDA and ENDDA. This transformation uses a WHERE clause that selects EMFSL in &labour_union_codes.

- ❑   Differences are important in the EMFSL column.
- ❑   No latest values for columns need to be kept.

5   The Period Consolidation transformation is performed on PA0077, on key PERNR, and on the date range that is specified by BEGDA and ENDDA. This transformation assumes that disability status (DISAB) can change, but that ethnicity cannot.

- ❑   Differences are important in the DISAB column.
- ❑   The latest value for the RACKY column is important.

After the initial preprocessing and consolidation are complete, all of the date-independent tables are merged.

The Date Join transformation is also used in this job group. This transformation performs pairwise joins on date-range tables. For these joins, it is more efficient to start with the tables that might not have records for all employees, such as consolidated PA0057 and consolidated PA0077, because each pairing might increase the resulting data volume.

The other consolidated date-range tables that are joined are PA0002, the latest PA0006, PA0008, and PA0016. Creating an intermediate table based on a date join of PA0002 and PA0006 (for example, PA0002_PA0006) at an earlier stage is useful. Pairwise joining can follow the same order shown in the following examples:

- ❑   PA0057 and PA0077 join to form PA0057_PA0077

❑ PA0057_PA0077 and PA0002_PA0006 join to form
PA0057_PA0077_PA0002_PA0006

The resulting tables that are date independent are left-joined to the date-dependent
results.

T210010 Hire Date

This job creates internal hire date data. Based on SAP help file descriptions, the preferred
source for the hire date is PA0000. However, hiring dates are often entered only for
employees that were hired after SAP HR was introduced and used at the company.
Therefore, the SAS Solutions Adapter for SAP uses the lower of the two dates,
PA0000.BEGDA and PA0001.BEGDA, per employee for hire date.

This job uses the following input:

❑ R3mirror.PA0000

❑ R3mirror.PA0001

This job creates the output Intermed.Hire_Date.

T210020 Service Date

This job creates internal service date data. The service date is calculated so that KONDT
precedes HIREDATE. For example, HIREDATE is used only if KONDT is missing.

This job uses the following input:

❑ R3mirror.PA0016

❑ Intermed.Hire_Date

This job creates the output Intermed.Service_Date.

T210025 Populate_Stage_Position_Permanence

This job populates the STAGE_POSITION_PERMANENCE table from data in
R3mirror.T547S.

This job uses the input R3mirror.T547S.

This job creates the output StageSAP.POSITION_PERMANENCE.

T210030 Employee Info from Infotype 2 PA0002

This job selects employee information. A Period Consolidation transformation is performed
on FAMST to identify marital status. The latest values of the following basic data are
retained:

❑ forename

❑ middle

❑ name

❑ surname

❑ nationality

❑ gesch

❑ language

❑ perid

❑ birthdate

This job uses the following input:

❑ R3mirror.PA0002

❑ $SAPTOSAS_COUNTRY

❑ $SAPTOSAS_LANGUAGE

This job creates the output Intermed.PA0002_employee_info.

T210040 Employee Address from PA0006

This job selects the current employee address. An Address transformation enables specific SAP address fields to map to address lines 1 through 4 of the SAS data model. Three SAP columns are selected by default: LOCAT, STRAS, and ADR04. A fourth column can be added or the selection can be changed by changing the column options of the transformation. This flexibility enables compliance with local address standards.

This job uses the input R3mirror.PA0006.

This job creates the output Intermed.PA0006_Addresses.

T210050 Employee Contract Info from PA0016

This job consolidates contract data by period.

This job uses the input R3mirror.PA0016.

This job creates the output Intermed.PA0016_employee_contract_type.

T210070 Populate Staging Education Level from T519T

This job's certificate and certificate text fields populate the education level code and description fields.

This job uses the following input:

❑ R3mirror.T519T

❑ $SAPTOSAS_LANGUAGE

This job creates the output StageSAP.EDUCATION_LEVEL.

T210075 Load Stage Gender

This job populates the reference table STAGE_GENDER with gender codes and text.

This job uses the following input:

❑ R3mirror.DD07T

❑ $SAPTOSAS_LANGUAGE

This job creates the output StageSAP.GENDER.

T210080 Load Stage Marital Status

This job populates the reference table STAGE_MARITAL_STATUS with codes and text.

This job uses the following input:

❑ R3mirror.T502T

❑ $SAPTOSAS_LANGUAGE

This job creates the output StageSAP.MARITAL_STATUS.

T210100 Load Stage Ethnicity

SAP ethnicity data includes the classification of disabled. The disability flag for the StageSAP table is located in the PA0077.DISAB field. The PA0004 table provides details of the disability. This data can be a site-specific requirement. For more information, see the descriptions of disability types in the T523T table.

This job uses the following input:

❑ R3mirror.T505S

❑ $SAPTOSAS_LANGUAGE

This job creates the output StageSAP.ETHNICITY.

T210110 Load Stage Employee Union

Employee union affiliation can be derived when a company pays union dues for employees. The SAP HR infotype 57 (PA0057) captures this information. However, not all information in PA0057 relates to unions. In addition, the related information that is needed to build the employee union reference in SAP tables T521B and T521C also contains information that does not relate to infotype 57. As a result, this job selects only the relevant information from infotype 57 data.

This job uses the following input:

❑ R3mirror.T521B

❑ R3mirror.T521C

❑ &LANG

This job creates the output StageSAP.EMPLOYEE_UNION.

T210115 Employee Email

This job retrieves the employee e-mail information from SAP HR infotype 105 (R3mirror.PA0105). If this infotype is not available, an alternative source is SAP HR infotype 1032 (R3mirror.HRP1032).

This job uses the input R3mirror.PA0105.

This job creates the output Intermed.Employee_email.

T210120 Infotype 2 and 6 Date Join

This job uses the Date Join transformation to join data from infotypes 2 (R3mirror.PA0002) and 6 (and R3mirror.PA0006) on the personnel number.

This job uses the following input:

❑ Intermed.PA0006
❑ Intermed.PA0002

This job creates the output Intermed.PA0002_and_addresses.

T210130 Consolidate Full Time Equivalent

This job creates the full-time-equivalent column from the BSGRD column in infotype 8. A Period Consolidation transformation is performed because the value of BSGRD usually remains constant for most employees.

This job uses the input R3mirror.PA0008.

This job creates the output Intermed.Full_Time_Equivalent.

T210140 Include Full Time Equivalent Data

This job joins by date the results of previous jobs, such as infotype 2, infotype 6, and full-time-equivalent information from previous jobs.

This job uses the following input:

❑ Intermed.Full_Time_Equivalent
❑ R3mirror.PA0002_and_addresses

This job creates the output Intermed.employee_and_fte.

T210150 Merge HireDate ServiceDate + Education

This job performs a SAS DATA step on the results of previous jobs to merge date-independent information.

This job uses the following input:

❑ Intermed.HireDate

❑ Intermed.Service_Date

❑ R3mirror.PA0002

This job creates the output Intermed.ServiceDate.

T210160 DateJoin1 - Infotype 77 and 57 - PA0077 and PA0057

This job is the first of three jobs that joins by date the tables that have relevant date-dependent employee general information. These jobs could be consolidated into fewer jobs, but, by having more intermediate results, it is easier to apply local modifications because they can be added as intermediate jobs.

This job uses the following input:

❑ R3mirror.PA0077

❑ R3mirror.PA0057

This job creates the output Intermed.Dj_join_77and57.

T210170 DateJoin2 - 77_57 with PA0016_employee_contract_

This job is the second of three jobs that joins by date the tables that have relevant date-dependent employee general information.

This job uses the following input:

❑ Intermed.Dj_join_77and57

❑ Intermed.PA0016_employee_contract_type

This job creates the output Intermed.Dj_join2_77_57and16.

T210180 DateJoin3 - 77_57_16 with Date Dependant EE & FTE

This job is the third of three jobs that joins by date the tables that have relevant date-dependent employee general information.

This job uses the following input:

❑ Intermed.Dj_join2_77_57and16

❑ Intermed.Employee_and_FTE

This job creates the output Intermed.DJ_77_57_16_EE_FTE.

T210190 Join Date Independent & Date Dependent

This job takes all of the date-dependent and date-independent tables and populates the EMPLOYEE tables.

This job uses the following input:

❑ Intermed.DJ_77_57_16_EE_FTE

❑ Intermed.join_date_independant_table

❑   &DDS_SOURCE_SYSTEM_ID

❑ $SAPTOSAS_COUNTRY

This job creates the output StageSAP.EMPLOYEE.

Job Group: T2200 HR Employee Absences

Absences are periods when an employee is absent from work for vacation, illness, special leave, and so on. This information is collected and categorized into absence types and descriptions in order to analyze the data.

The SAS Solutions Adapter for SAP extracts absences that are recorded. In SAP, absence information can be stored in infotype 2001 or in HR cluster tables, such as the time-recording tables SALDO and ZES. The absence types in infotype 2001 can differ in personnel sub-areas. As a result, the SAS Solutions Adapter for SAP uses organizational assignments that recognize each unique absence type.

This job group includes jobs that transform data for SAS Human Capital Management.

T220010 Create DDS Staging Table Employee Absence Type

This job creates the main reference table for absences. This table provides descriptions of absence codes. The absence code is created by concatenating the SAP absence code column (AWART) and the personnel sub-area for the absence column (MOABW) to guarantee uniqueness. This procedure is important because the meanings of some AWART values are different in the various personnel sub-areas.

Some companies might use only a single personnel sub-area. As a result, the absence code could be derived directly from the AWART column. This can reduce the complexity of follow-up steps because the personnel sub-area is generally not stored in all tables that have AWART transaction information. The personnel sub-area must be derived from the sub-area that is associated with the employee. This is a complex relationship because employees can move between sub-areas over time.

This job uses the input R3mirror.T554T.

This job creates the output StageSAP.ABSENCE_TYPE.

T220020 Create DDS Table STAGE_EMPLOYEE_ABSENCE

This job creates the employee absence fact table from infotype 2001 (PA2001). The personnel sub-area for absences is joined with infotype 1 (PA0001).

This job uses the following input:

❑   R3mirror.PA2001

❑   R3mirror.PA0001

❑ $PERSONNEL_SUBAREA_ABSENCE

This job creates the output StageSAP.EMPLOYEE_ABSENCE.

T220030 Load Staging Time_unit_of_measure

This job populates the time units for recording employee time. It processes employee base compensation. The values are hardcoded in T220030_CREATE_TIME_UNIT_OF_MEASURE.SAS with the values DAY for days and H for hours.

This job uses the input T220030_CREATE_TIME_UNIT_OF_MEASURE.SAS.

This job creates the output StageSAP.STAGE_TIME_UNIT_OF_MEASURE.

Job Group: T2300 HR Employee Base Compensation

This job group processes employee base compensation. It creates intermediate tables that are used in the T3500 job group.

Employee base compensation is not always handled by SAP. If this is the case, the output tables of these jobs should be populated from an alternative data source. New SAS Data Integration Studio process flows should be created.

Note: There are distinguishing factors between base compensation current pay and compensation history. Both are extracted from SAP and handled separately.

Base compensation current pay is the theoretical base salary that an employee should receive, or should have received, at any given point in time. The employee's theoretical base salary has a value that might be different from the amount that was actually paid. In general, amounts from the past should be identical because the SAS Solutions Adapter for SAP always extracts the value that is considered to be the most recent or correct. For the current month or pay period, the employee's base compensation has a value that is the amount that is paid in the next payroll run. If an employee is new, or will receive payment that is different from what was received in the past, it is not possible to use compensation history to deduce the amount. The SAS Solutions Adapter for SAP uses the current pay information to populate the payment information when an employee action occurs.

Compensation history is used to populate the DDS staging compensation table.

This job group includes jobs that transform data for SAS Human Capital Management.

T230000 Update Current Pay

This job uses the user-written transformation HR Current Pay Update. See this transformation's description for more information.

This job uses the following input:
❑ Intermed.Inter_Current_Pay_Extract_Log
❑ Intermed.Inter_Current_Pay_Results

This job creates the following output:

❑ R3mirror.Current_Pay_Results

❑ Admin.Current_Pay_Extraction_History

T230005 Actions from Infotype 0

This job creates two output tables with information from infotype 0 (PA0000).

This job uses the input R3mirror.PA0000.

This job creates the following output:

❑ Intermed.emp_actions_what_when_why

❑ Intermed.Employee_status

T230010 Period Consolidation of Base Compensation

This job's input contains multiple records for each employee. These records represent payment information for multiple occasions. This job consolidates the information so that date ranges are created for periods in which employees' payments remain unchanged.

This job uses the input R3mirror.Current_Pay_Results.

This job creates the output Intermed.Base_Compensation.

Job Group: T2400 HR Employee Compensation History

You can obtain the input data for this transformation group in many ways. The E08040A job is the more common method, but the E08040B job can be used instead.

Each installation needs to populate the Intermed.SAP_TO_SAS_WAGETYPES mapping table. This table maps SAP R/3 wage types to SAS compensation types and identifies base salaries. SAS compensation types are defined as the categories that need to be in the SAS report.

This job group includes jobs that transform data for SAS Human Capital Management.

T240020 HR Consolidate RT Delta

This job consolidates the historical payments that were extracted in either the E08040A job or the E08040B job. The SQL JOIN maps SAP R/3 wage types to SAS compensation types and consolidates amounts. Rows that have a consolidated amount BETRG=0, or rows that do not have a payment date, or rows that do not have a target wage type are discarded.

This job uses the following input:

❑ Intermed.Employee_Country_Association

❑ Intermed.RT

This job creates the output StageSAP.COMPENSATION.

Job Group: T2500 HR Applicants General Information

Most data that is related to applicants is in PB*xxxx* tables, which are structurally identical to the corresponding PA*xxxx* tables used for employee general data. Not every PA*xxxx* table has a PB*xxxx* equivalent. For example, the PA0000 table relates only to employees.

The jobs in this job group follow the numbering scheme in the employee general job group, where appropriate.

This job group includes jobs that transform data for SAS Human Capital Management.

T250010 PB0001 and PB0016 Join

This job uses the following input:

❑ R3mirror.PB0001

❑ R3mirror.PB0016

This job creates the output Intermed.PB0001_and_PB0016_join.

T250030 Applicant Info from PB0002

This job uses the input R3mirror.PB0002.

This job creates the output Intermed.PB0002.

T250040 Applicant Addresses from PB0006

This job uses the input R3mirror.PB0006.

This job creates the output Intermed.Applicant_Addresses.

T250050 Info from PB0016

This job uses the input R3mirror.PB0016.

This job creates the output Intermed.PB0016.

T250080 Populate APPLICATION_STATUS

This job uses the input R3mirror.T751B.

This job creates the output StageSAP.APPLICATION_STATUS.

T250090 Populate Rejection Reason

This job uses the input R3mirror.T751C.

This job creates the output StageSAP.REJECTION_REASON.

T250100 Populate Recruitment Source

This job uses the following input:
- ❑ SAPSERVE.T750C
- ❑ SAPSERVE.T750H
- ❑ R3mirror.T750i

This job creates the output StageSAP.RECRUITMENT_SOURCE.

T250115 Inter PB4000 Applicant Status

This job uses the following input:
- ❑ R3mirror.PB4000
- ❑ R3mirror.PB4001
- ❑ R3mirror.PB4002

This job creates the following output:
- ❑ Intermed.PB4000
- ❑ Intermed.PB4001
- ❑ Intermed.PB4002

T250120 Inter PB0002 and Inter PB0006 Date Join

This job uses the following input:
- ❑ Intermed.PB0002
- ❑ Intermed.Applicant_Addresses

This job creates the output Intermed.PB0002_and_addresses.

T250130 Consolidate Applicant Basic Pay Information

This job uses the input R3mirror.PB0008.

This job creates the output Intermed.PB0008.

T250150 InterPB0001 InterPB000_PB10016 PB0022 Join

This job uses the following input:

❑ R3mirror.PB0022

❑ Intermed.PB0001_and_PB0016_join

❑ Intermed.PB0001

This job creates the output Intermed.merge_01_16__22_01.

T250160 DateJoin1 - PB0077 and Inter PB0016

This job uses the following input:

❑ Intermed.PB0016

❑ R3mirror.PB0077

This job creates the output Intermed.DJ_Infotypes_PB0077_PB0016.

T250170 DateJoin2 - Inter Address with Date Dependent Join 1

This job uses the following input:

❑ Intermed.PB0002_and_addresses

❑ Intermed.DJ_Infotypes_PB0077_PB0016

This job creates the output Intermed.DJ_77_16_and_address.

T250190 Stage Employment Application Population

This job uses the following input:

❑ Intermed.PB4000

❑ Intermed.PB4001

❑ Intermed.PB4002

❑ Intermed.DJ_77_16_and_address

❑ Intermed.merge_01_16__22_01

This job creates the output StageSAP.EMPLOYMENT_APPLICATION.

Job Group: T2600 HR Job

This job group processes tables that relate to HR job information. These tables include JOB tables and the reference tables JOB_GROUP and EEO_CLASS. Some information for these tables might not be available or relevant for all countries. The data processed by this job group includes job title and job grouping. For example, a secretary (job code 20) belongs to the clerical job group (job group 20).

This job group includes jobs that transform data for SAS Human Capital Management.

T260010 Populate Stage Job

This job populates the staging JOB table based on SAP R/3 table T513S. The output table does not have a language code, so only one description per job is supported, even though SAP might have descriptions in multiple languages. It is possible that SAP does not have a description for each job in each language. For this reason, the preferred language transformation selects the description that is in the preferred language. If the description is not available in the preferred language, the transformation selects it in an available language. The transformation always selects the latest description for the job.

The job group code is based on a concatenation of the EEOCT and AAPCT columns from the SAP R/3 table T5U13. All jobs in T513S are used. If no matching record is found in T5U13, or if the EEOCT and AAPCT columns are blank, then the job group code is set to UNKNOWN. The reason for this is because information for the EEO and AAP are generally maintained at SAP installations only in the United States.

This job uses the following input:

❑ R3mirror.T513S

❑ R3mirror.T5U13

This job creates the output StageSAP.JOB.

T260020 Populate Staging EEO_CLASS & JOB_GROUP

This job creates the reference tables for the JOB table. It takes valid values for EEO and AAP from the SAP R/3 tables T5UEE and T5UAA, respectively. In addition, this job uses the SAS source code T260020_CREATE_UNKNOWN_JOBGROUP.SAS and T260020_CREATE_UNKNOWN_EEO_CLASS.SAS to add the value UNKNOWN as a valid code.

This job uses the following input:

❑ R3mirror.T5UEE

❑ R3mirror.T5UAA

❑ Intermed.JOB_GROUP

This job creates the following output:

❑ StageSAP.EE_CLASS

❑ StageSAP.JOB_GROUP

Job Group: T2700 HR Job Position

This job group populates information that relates to employee positions. Employee positions can be instances of jobs, and many positions can be defined from the same job. As a result, employee positions need to reference a job. The data describes the permanence, pay level, and benefits that are associated with an employee position.

This job group includes jobs that transform data for SAS Human Capital Management.

T270010 HR Employee x Position

This job creates tables that use the organizational assignments that are stored in infotype 1 (PA0001) to identify relationships. The cost centers associated with employees are populated, as well as the Staging_Employee_*x*_job table. This table identifies the position that each employee has.

Most SAP systems do not have perfect data for all employees for their entire employment history. This is especially true for data from time periods before SAP HR was implemented in the company. Therefore, many employees have data records that indicate that they held positions 00000000 or 99999999, which are not real positions. The SAS Solutions Adapter for SAP removes false records. Or, you can choose an alternative approach and add the false positions to the reference tables. This is a site-specific customization step. The false positions can be filtered or allowed.

This job populates the Intermed.Filled_Positions table. The table is combined with the defined positions. It can be used to deduce when positions were filled or vacant.

This job uses the following input:

❑ R3mirror.PA0001
❑ R3mirror.PA0016

This job creates the following output:

❑ Intermed.Position_*x*_Cost_Center
❑ StageSAP.EMPLOYEE_*x*_JOB
❑ Intermed.Filled_Positions

T270020 HR Position Title

This job populates the Intermed.Position_Title table with the position title in the preferred language. If the preferred language is not available, this job uses an available language.

This job uses the input R3mirror.T528T.

This job creates the output Intermed.Position_Title.

T270030 - Inter Pay Frequency

This job populates the Intermed.Pay_frequency table from the most recent record for each position in the Intermed.Filled_Positions table.

This job uses the input Intermed.Filled_Positions.

This job creates the output Intermed.Pay_Frequency.

T270040 Load Stage Time Frequency

An attribute of an employee position is the amount of time that an employee needs to work to completely fill the position. For example, a position might be defined as a part-time position. It could be filled by someone working part-time. SAP does not have direct information about the required working time needed to fill the position. SAP provides information that specifies the number of hours (DIVGV) an employee works in each payment period in infotype 8 (PA0008).

This job uses the unique values of working hours to create a reference table. This job reduces the number of codes by rounding periods that are over 100 hours to a full hour. It rounds periods that are under 100 hours to a tenth of an hour.

This job uses additional time frequency codes from the SAP R/3 table R3mirror.T549N. The two logically different time frequencies are combined into a single reference table named StageSAP.TIME_FREQUENCY.

This job uses the following input:

❑ R3mirror.T549N

❑ R3mirror.PA0008

This job creates the following output:

❑ Intermed.Time_Frequency_T548N

❑ Intermed.Time_Frequency_PA0008

❑ StageSAP.TIME_FREQUENCY

T270050 Inter Position Open and Close

This job derives the position opening date from the lowest date that is found in the SAP R/3 table R3mirror.T528B. It derives the position closing date from the highest date that is found in the table.

This job uses the input R3mirror.T528B.

This job creates the following output:

❑ Intermed.Position_Close

❑ Intermed.Position_Open

T270070 Load Inter Position x Cost Center

This job creates a table that identifies which cost centers are associated with each position.

This job uses the input R3mirror.PA0001.

This job creates the output Intermed.Position_*x*_Cost_Center.

T270080 Load Inter Cost Benefits

This job populates requisition cost and benefit information that is related to positions. The SAS source code in T270080_LOAD_INTER_COST_BENEFITS.SAS gets data from R3mirror.HRP1015. This site-dependent code needs to be reviewed to ensure that it meets the needs of your specific environment. It is possible that the requisition cost and benefit information is not directly stored in SAP. An alternative method is to extract from SAP the benefit information that is related to employees, and to deduce that the benefits are associated with the position. This alternative method is not supported by the SAS Solutions Adapter for SAP.

Some benefits are expressed as percentages. To ensure that the output table is populated correctly, the benefit should be defined in the BENEFIT_PERCENT macro variable of PREPROCPARMS12.SAS. When a match to the macro variable is made, the user-written code ensures that a value is provided in the BENEFIT_PERCENT_NO field.

All non-percentage values are totaled and used to populate the REQUISITION_COST_AMT field.

This job uses the input R3mirror.HRP1015.

This job creates the output Intermed.Cost_Benefits.

T270090 Load Inter Position x Int Org

This job populates a table that relates positions to internal organizations.

This job uses the input R3mirror.HRP1001.

This job creates the output Intermed.Position_*x*_Int_Org.

T270100 Load Inter Filled Position + Consolidated 52

This job derives the position status as filled or open. For the best results, you should ensure that the following mappings are correct in the LOADER step of the Intermed.Position_Status_Info table:

❑ ACTUALPERIOD_BEGIN maps to COALESCE(BEGDA ,VALID_FROM_DTTM)
❑ ACTUALPERIOD_END maps to COALESCE(ENDDA ,VALID_TO_DTTM)

This job includes an example of how anomalies can be reported through e-mail. For this action to work correctly, the SAS server has to be configured to send e-mail.

This job uses the following input:

❑ R3mirror.T528B
❑ Intermed.Filled_Positions

This job creates the output Intermed.Position_Status_Info.

T270110 Load Inter Job Position

This job populates an intermediate table that contains information that is required in the final staging JOB_POSITION table. It merges EEO and AAP information from the SAP R/3 table R3mirror.T5U29. Because EEO and AAP information is generally maintained by companies in the United States, you might simplify the job by removing the MERGE step. However, this is not always necessary because if R3mirror.T5U29 is empty, the results are not affected.

This job uses the following input:

❑ R3mirror.T528B
❑ R3mirror.T5U29

This job creates the output Intermed.JOB_POSITION.

T270120 Populate Inter Position Stage 2

This job merges all of the intermediate tables that are date independent with Intermed.JOB_POSITION. The Intermed.JOB_POSITION table contains date range columns. The intermediate tables need to contribute to the final JOB_POSITION table.

This job uses the following input:

❑ Intermed.Position_*x*_Cost_Center
❑ Intermed.Position_Open
❑ Intermed.Position_Close
❑ Intermed.Position_Title
❑ Intermed.Cost_Benefits
❑ Intermed.JOB_POSITION
❑ Intermed.Pay_Frequency

This job creates the output Intermed.JOB_POSITION_STAGE2.

T270130A Load Stage Job Position

This is the last job in the sequence of jobs that create StageSAP.JOB_POSITION. This job joins by date the date-dependent results of the previous steps. This job populates the reference table StageSAP.POSITION_STATUS with constant values using the SAS source code in T270130_LOAD_POSITION_STATUS.SAS.

This job uses the following input:

❑ Intermed.JOB_POSITION_STAGE2
❑ Intermed.Position_Status_Info

This job creates the following output:

❑ StageSAP.JOB_POSITION
❑ StageSAP.POSITION_STATUS

T270130B Load Stage Job Position

This is an alternative job for the T270130A job. This job has user-written code for correcting any erroneous records in SAP. If the customer has a person assignment in SAP that was made after the position creation date, then the T270130A job does not retrieve the position creation date before the person assignment. This causes a disconnect between the dates of employee action and employee position assignment. This job resolves the problem.

This job populates the reference table StageSAP.POSITION_STATUS with constant values using the SAS code in T270130B_LOAD_POSITION_STATUS.sas.

This job uses the following input:

❑ Intermed.JOB_POSITION_STAGE2

❑ Intermed.Position_Status_Info

This job creates the following output:

❑ StageSAP.JOB_POSITION

❑ StageSAP.POSITION_STATUS

Job Group: T2800 HR Military Experience

This job group populates tables that relate to military experience. Military experience information can be stored in different country-dependent locations in SAP HR. The SAS Solutions Adapter for SAP provides a few alternatives. You can select the most appropriate alternative for your environment.

This job group includes jobs that transform data for SAS Human Capital Management.

T280000A Load Stage Military Experience and Type

This job populates the reference table Stage_Military_Experience_Type. The format $SAPTOSAS_LANGUAGE needs to be used in the mapping step to convert the one-character language value in SAP to the equivalent SAS value.

This job uses the following input:

❑ R3mirror.PA0081

❑ R3mirror.T591S

❑ $SAPTOSAS_LANGUAGE

This job creates the output StageSAP.MILITARY_EXPERIENCE_TYPE.

T280000B Load Stage Military Experience Type

This job is an alternative to the T280000A job. It populates the reference table Stage_Military_Experience_Type.

This job uses the following input:

❑ R3mirror.T505N

❑ $SAPTOSAS_LANGUAGE

This job creates the output StageSAP.MILITARY_EXPERIENCE_TYPE.

T2800010B Military Experience from PA0001 and PA0077

This job must be used with the T280000B job. The military experience code is based on the MILSA column in infotype 77 (PA0077).

This job uses the following input:

❑ R3mirror.PA0001

❑ R3mirror.PA0077

❑ $COMPANY_TO_COUNTRY

❑ $COUNTRY_TO_MOLGA

This job creates the output Intermed.Inter_Military_Experience.

Job Group: T2900 HR Internal Org

This job group populates the tables that relate to the internal organization association information from SAP HR. These tables include EMPLOYEE_*x*_INTERNAL_ORG, INTERNAL_ORG, INTERNAL_ORG_ASSOC, and other related reference tables.

Not every site has current data with which to record this information. For example, data about group manager positions might not be maintained. If there is no current data, it is recommended that you leave the process and code intact in case the data is maintained later.

The SAP HR organization hierarchy is represented differently from financial dimensional data. It is difficult to relate financial data to the SAP HR hierarchy. The tables that this job group populates are populated for SAS Financial Management from different sources. In addition, the two approaches that are used to load the INTERNAL_ORG dimension are not interdependent.

In these jobs, the main input tables in SAP describe HR objects and the relationships among them. Here are the input tables that are used:

❑ HRP1000 contains text descriptions of HR objects.

❑ HRP1001 describes relationships among HR objects such as employees, organizational entities, positions, and so on.

❑ R3mirror.HRP1028 contains addresses of HR objects.

❑ T777V contains text descriptions of possible relationships.

This job group includes jobs that transform data for SAS Human Capital Management.

T290010 HR Work Group Hierarchy Join SAP HR Hier Tables

The core logic of this job is an SQL JOIN of two SAP R/3 tables—R3mirror.HRP1000 and R3mirror.HRP1001. Because these tables can both contain nonrelevant information, the SQL JOIN conditions select the information that is required. The relationship that is used to select information is 002 (reports to).

This job uses the following input:

❑ R3mirror.HRP1000
❑ R3mirror.HRP1001

This job creates the output Intermed.HR_Org_Structure.

T290020 Select HR Employee Work Group Manager

This job extracts the position IDs for managers of groups from the R3mirror.HRP1001 table using the relationship 012 (manages).

This job uses the input R3mirror.HRP1001.

This job creates the output Intermed.Workgroup_Manager_Positions.

T290030 Get Manager Employee_id

This job combines the results of the T290020 job with the StageSAP.EMPLOYEE_x_JOB information to derive the employee ID of group managers.

This job uses the following input:

❑ Intermed.Workgroup_Manager_Positions
❑ StageSAP.EMPLOYEE_x_JOB

This job creates the output Intermed.Workgroup_Manager_Employee_ids.

T290040 Load EMPLOYEE_INVOLVEMENT_TYPE

This job loads the StageSAP.EMPLOYEE_INVOLVEMENT_TYPE reference table. It loads this table from the SAP R/3 table that contains descriptions of the relationships among HR objects in the HRP1001 table.

This job uses the input R3mirror.T777V.

This job creates the output StageSAP.EMPLOYMENT_INVOLVEMENT_TYPE.

T290060A Load EMPLOYEE_X_INTERNAL_ORG Method A

This job is one of two alternative approaches to populate the output table StageSAP.EMPLOYEE_x_INTERNAL_ORG. This job uses infotype 1 (PA0001) as its source.

This job uses the input R3mirror.PA0001.

This job creates the output StageSAP.EMPLOYEE_*x*_INTERNAL_ORG.

T290060B Load EMPLOYEE_X_INTERNAL_ORG Method B

This job is one of two alternative approaches to populate the output table StageSAP.EMPLOYEE_*x*_INTERNAL_ORG. It uses the HRP1001 table. It also uses StageSAP.EMPLOYEE_*x*_JOB, which is derived from PA0001, the source that is used in the first alternative.

This job uses the following input:

❑ R3mirror.HRP1001
❑ StageSAP.EMPLOYEE_*x*_JOB

This job creates the output StageSAP.EMPLOYEE_*x*_INTERNAL_ORG.

T290070 Load HR Org Address

This job loads the latest addresses for HR organizations.

This job uses the input R3mirror.HRP1028.

This job creates the output Intermed.Org_Address.

T290080 Load HR INTERNAL ORG

This job combines the results of previous jobs in the job group to populate the output table StageSAP.INTERNAL_ORG.

Note: This job uses the $OP_CONCERN_CURRENCY format that the T120010A job creates. The T120010A job must be run before the T290080 job.

This job uses the following input:

❑ Intermed.Org_Address
❑ Intermed.HR_Org_Structure
❑ Intermed.Workgroup_Manager_Employee_ids

This job creates the output StageSAP.INTERNAL_ORG.

T290090 Load HR INTERNAL_ORG_ASSOC

This job combines the results of previous jobs in the job group to populate the output table StageSAP.INTERNAL_ORG_ASSOC.

This job uses the input Intermed.HR_Org_Structure.

This job creates the output StageSAP.INTERNAL_ORG_ASSOC.

T290100 Internal Org Add Standard Dimension Values

This job adds integer order numbers to the output table StageSAP.INTERNAL_ORG_ASSOC and populates the table StageSAP.INTERNAL_ORG.

This job uses the following input:

❑ StageSAP.INTERNAL_ORG_ASSOC_TYPE
❑ Add Standard Dimension Rows transformation

This job creates the following output:

❑ StageSAP.INTERNAL_ORG_ASSOC
❑ StageSAP.INTERNAL_ORG

Job Group: T3500 HR Employee Actions

This job group populates tables that relate to actions and events in an employee's career. The main table is EMPLOYEE_ACTION and there are several reference tables.

The EMPLOYEE_ACTION table defines current and historical action information related to employees. This table defines types of employee actions, such as pay increases, probations, suspensions, and so on. This table represents valid combinations of action types and reason types, and status information that was valid at the time of the action or event.

There is a specific logic flow in this job group. First, the job group creates a table that contains status information and joins by date all relevant information. Then, the jobs join all employee action information with the action date that is in the begin and end date range of the status information table. If the action date is not at the beginning of the date range, a derived action is used to indicate that the status was changed. For example, if salary data changed, but there is no explicit action for this change, then an action that means "change in salary" is created.

This job group includes jobs that transform data for SAS Human Capital Management.

T350010 Load Stage Employee Status

This job loads the StageSAP.EMPLOYEE_STATUS reference table from the SAP R/3 table that contains data element texts in SAP.

This job uses the input R3mirror.DD07T.

This job creates the output StageSAP.EMPLOYEE_STATUS.

T350020 Load Stage Employee Type

This job populates the StageSAP.EMPLOYEE_TYPE table from the SAP_Employee_Subgroup_Names table.

This job uses the input R3mirror.T503T.

This job creates the output StageSAP.EMPLOYEE_TYPE.

T350030 Load Stage Action Type

This job populates the StageSAP.ACTION_TYPE reference table from the SAP action type text tables and actions that represent implicitly detected actions.

This job uses the following input:

- ❑ R3mirror.T530F
- ❑ R3mirror.T529T
- ❑ Admin.Additional_ACTION_TYPES

This job creates the output StageSAP.ACTION_TYPE.

T350040 Employee Working Time

This job derives the working time from the WOSTD column in infotype 7 (PA0007).

This job uses the input R3mirror.PA0007.

This job creates the output Intermed.Working_Times.

T350060 Load Stage Action Reason

This job populates the StageSAP.ACTION_REASON reference table from the SAP action type text tables and actions that represent implicitly detected actions. Action reasons are the reasons for employee actions.

This job uses the following input:

- ❑ R3mirror.T530T
- ❑ R3mirror.T530F

This job creates the output StageSAP.ACTION_REASON.

T350070 DateJoin PayInfo

This job combines tables that are created in other job groups to prepare the payment status information at the time of actions or events.

This job uses the following input:

- ❑ Intermed.Base_Compensation
- ❑ Intermed.Employee_action_payinfo

This job creates the output Intermed.Payinfo_for_employee_actions.

T350080 DateJoin PayInfo and Working Time for Actions

This job joins by date working time and payment information to create a table that shows both sets of information with date ranges.

This job uses the following input:

❑ Intermed.Payinfo_for_employee_actions

❑ Intermed.Working_Times

This job creates the output Intermed.Pay_info_and_work_time.

T350090 DateJoin PayInfor-Worktime with PA001

This job joins by date the previous intermediate results to create a table about the employee at the time of an action.

This job uses the following input:

❑ Intermed.Pay_info_and_work_time

❑ R3mirror.PA0001

This job creates the output Intermed.Status_info_for_employee_actions.

T350105B Employee Appraisal Groupings for Infotype 25

SAP supports two methods that record information about employee appraisals. The SAS Solutions Adapter for SAP extracts the data from both methods. This job must be used with the T350110B job. You can choose the appropriate method for your environment.

This job creates an intermediate table that stores employee appraisal groupings. These groupings are needed to derive the appraisal criteria weightings for appraisals in PA0025.

This job uses the following input:

❑ R3mirror.PA0001

❑ $PERSONNEL_SUBAREA_MOBUR

❑ $EMPLOYEE_GROUP_APPRAISAL_SUBGRP

This job creates the output Intermed.EMPLOYEE_APPRAISAL_GROUPINGS.

T350110A Appraisal (Evaluation Result) Using HRP1045

This job is an alternative to the T350105B job and the T350110B job. This job creates an intermediate table that stores employee appraisal groupings. These groupings are needed to derive the appraisal criteria weightings for appraisals in PA0025.

This job uses the following input:

❑ R3mirror.HRP1045

❑ R3mirror.HRT1045

❑ R3mirror.HRP1001

This job creates the output Intermed.Evaluation_results.

T350110B Appraisal (Evaluation Result) Using Infotype 25

This job creates the appraisal results. The job must be used with the T350105B job.

This job uses the following input:

❑ R3mirror.PA0025

❑ Intermed.EMPLOYEE_APPRAISAL_GROUPINGS

This job creates the output Intermed.Evaluation_results.

T350120 Append Additional Actions from Infotype 302

This job combines results from previous jobs and appends additional actions from infotype 302 (PA0302). Infotype 302 is used as an overflow table when more than one action occurs on the same day. More than one action on the same day would cause problems with the date ranges (specified by the BEGDA and ENDDA columns) in HR infotypes.

Note: Not all SAP sites activate infotype 302. If a site does activate infotype 302, the table can be removed from the job.

The source code that combines the results and actions is T350120_COMBINE.SAS.

This job uses the following input:

❑ R3mirror.PA0302

❑ Intermed.Evaluation_results

❑ Intermed.emp_actions_what_when_why

This job creates the output Intermed.emp_actions_what_when_why2.

T350130 EEO Exemption (USA) Status

This job creates a table that contains EEO exemption information that is relevant for United States employees. Only exempt employee information is kept in the table.

Note: This job should be run for all countries at least once to create the correct structure.

This job uses the input R3mirror.PA0077.

This job creates the output Intermed.USA_EEO_Exemption.

T350200 Join Action Status with Action Dates

This job combines the results of previous jobs to create the final employee action table.

This job uses the following input:

❑ Intermed.emp_actions_what_when_why2

❑ Intermed.State_info_employee_actions

❑ StageSAP.EMPLOYEE_ACTION

This job creates the output StageSAP.EMPLOYEE_ACTION .

T350220 Update Employee Actions with Exempt Status

This job updates the StageSAP.EMPLOYEE_ACTION table with USA EEO exempt status. This job is optional for companies that are not based in the United States.

Because this job uses an UPDATE LOAD step, the output table is used as input and output.

This job uses the following input:

❑ StageSAP.EMPLOYEE_ACTION.

❑ Intermed.USA_EEO_Exemption

This job creates the output StageSAP.EMPLOYEE_ACTION.
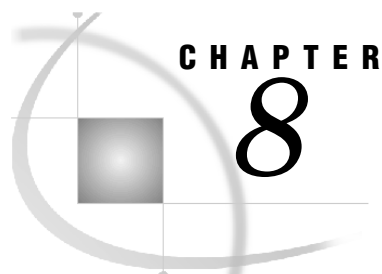
Integrating into the DDS

Integrating Data into the DDS

The SAS Solutions Adapter for SAP loads staging area tables for SAS Financial Management and SAS Human Capital Management. Later releases of the SAS Solutions Adapter for SAP loads other subject-area tables for other SAS solutions.

The SAS Solutions Adapter for SAP creates tables that must be incorporated into the overall data architecture. The staging area tables that are created as output have the same names and structure as the input tables of the jobs in the SAS Detail Data Store repository. After you run the SAS Solutions Adapter for SAP jobs, you can run the SAS DDS jobs that use the SAS Solutions Adapter for SAP output tables as input.

Note: For more information about how to incorporate data into the DDS for SAS Data Integration Studio jobs, see the *SAS Solutions Services: Data Administration Guide*.

There are two basic ways to incorporate the SAP staging area tables into the SAS DDS jobs.

1 Use one physical location for stage libraries.

2 Use multiple sources.

Method 1: Use One Physical Location for Stage Libraries

To use one physical location for stage libraries, you must define the STAGESAP and STAGEDSS libraries to represent the same physical location.

Note: This method might not apply if the data that needs to be loaded is from various sources, such as multiple SAP systems and other operational sources. In this case, consider method 2.

Method 2: Use Multiple Sources

To use multiple sources, you can build additional jobs that combine the multiple sources into a new library in the STAGEDDS structure. These new jobs might consist of a simple step that appends all of the data from the various sources.

If a simple append of data from different sources does not produce the required results, you must resolve the issue with site-specific code that replaces or augments the APPEND step.

Customizing the Validation Steps in the Load DDS Jobs

Certain data checks must be removed to successfully incorporate SAP data into the DDS. For example, some checks might need to be removed from the data validation step. Or, the lookup steps for fact tables might need to be turned off.

The following table details actions that might be required for successful loading to the DDS. This table provides a general guide, but it is not an all-inclusive list for your specific site. Your site might have some data by default and some data by customization within the SAS Solutions Adapter for SAP jobs that create or get data from additional tables. You do not need to run all jobs to populate the DDS for a particular solution.

Note: The SAS Solutions Adapter for SAP creates stage tables when relevant data is available in SAP. You must create alternative jobs to populate other tables if they are required.

Table 8.1   Actions Required for Successful Loading to the DDS

Job Group	Job Name	Action
Reference Table Jobs	103800 Load DDS GL_ACCOUNT_TYPE Table	Delete the APPEND step. The input table should be STAGE_GL_ACCOUNT_TYPE that is prepared in the SAS Solutions Adapter for SAP.
Dimension Table Job	102400 Load DDS CURRENCY Table	Delete the input tables and the APPEND step above the STAGE_CURRENCY table. The input table is the STAGE_CURRENCY table that is prepared in the SAS Solutions Adapter for SAP.
Reference Table Jobs	102700 Load DDS CURRENCY_EXCH_RATE_TYPE Table	Delete the APPEND step. The input table should be STAGE_CURRENCY_EXCH_RATE_TYPE that is prepared in the SAS Solutions Adapter for SAP.
	1003900 Load DDS GL_NORMAL_BAL Table	Delete the APPEND step. The input table should be STAGE_GL_NORMAL_BAL that is prepared in the SAS Solutions Adapter for SAP.
	100500 Load DDS PERIOD_TYPE Table	Get the data from the STAGESAP library. Delete the APPEND step because the SAP table includes all entries that are held in the SAS table. See the T000210 job.
	100600 Load DDS SOURCE_SYSTEM Table	Delete the APPEND step because the SAP table includes all entries that are held in the SAS table. The input table should be STAGE_SOURCE_SYSTEM that is prepared in the SAS Solutions Adapter for SAP.

Job Group	Job Name	Action
	106300 Load DDS JOB_POSITION Table	Change the data validation for POSITION_STATUS_CD, FLSA_STATUS_CD, EXEMPT_STATUS_CD, PAY_FREQUENCY_CD, and CURRENCY_CD to allow blank spaces.
		Turn off the lookup for ALLOCATED_TO_COST_CENTER_ID.
Dimension Table Jobs		
	106100 Load DDS COST_CENTER Table	Change the data validation for RESPONSIBLE_EMPLOYEE_ID to allow blank spaces.
	106700 Load DDS EXTERNAL_ORG Table	Delete the INDUSTRY_CD data validation.
	106200 Load DDS INTERNAL_ORG Table	Delete the STATE_REGION_CD data validation. Turn off the lookup for EMPLOYEE.
	106500 Load DDS GL_ACCOUNT Table	Turn off the lookup for INTERNAL_ORG_ID.
Fact Table Jobs		
	106740 Load DDS EXTERNAL_ORG_ADDRESS Table	Change the data validation for STATE_REGION_CD to allow blank spaces.
	107700 Load DDS EMPLOYMENT_APPLICATION Table	Change the data validation.
	107600 Load DDS EMPLOYEE_ACTION Table	Remove data validation for PAY_LEVEL_CD, CURRENCY_CD, EMPLOYEE_ACTION_REASON_CD, EMPLOYEE_STATUS_CD, EMPLOYEE_TYPE_CD, ACTION_TYPE_CD, PAY_LEVEL_STRUCTURE_CD, PAY_FREQUENCY_CD, and EMPLOYEE_PAID_FREQUENCY_CD.

Here are some examples of customizations that might be required to ensure that the data checks do not reject valid records:

❑ In the 106100 job and the 106900 job, turn off the lookup for the employee table that is removed. This customization is necessary for the following reasons:

❑ The employee number is not in the relevant SAP table. These tables include an unchecked string that often contains a name or initials of the responsible employee.

❑ The SAS Solutions Adapter for SAP might not load the employee dimension table.

❑ In the 107910 job, remove the data check against the Item_Category table because the SAS Solutions Adapter for SAP does not load it.

❑ In the 106200 job, remove the data checks against the COUNTY, STATE_REGION, and EMPLOYEE columns. This information is not loaded into the INTERNAL_ORG table. You might consider populating the COUNTY and STATE_REGION columns in an additional step.

❑ The 106700 job should not validate against INDUSTRY because the SAS Solutions Adapter for SAP does not load INDUSTRY.

❑ The 106740 job should not validate against STATE_REGION for data not in the United States because this column is not populated for other countries.

❑ Do not reject blank address types. Replace them with a standard value. The SAS Solutions Adapter for SAP does not populate the ADDRESS_TYPE reference table. Add an ADDRESS_TYPE table and enter the appropriate values.

Implementation Notes for SAS Human Capital Management Users

After loading the DDS, you must load the SAS Human Capital Management data mart if it is the solution that you are using. Preparing for this task includes reviewing the SAS source code in PREBUILD.SAS.

To enable smooth interaction with the SAS Solutions Adapter for SAP, be sure to replace the corresponding macro variable code with the following statements:

```
%let number_of_hiers = 1;
%let hiers = HRG;
```

SAS Human Capital Management represents the text in only one language (for example, the default language for all reference tables). The stage tables to be loaded by the SAS Solutions Adapter for SAP should have text in a single language.

In addition, SAS Human Capital Management represents employee salary information in only one currency. SAS Human Capital Management does not have currency-translation methodology. The stage tables to be loaded by the SAS Solutions Adapter for SAP should have salaries in a single currency.

APPENDIX
1
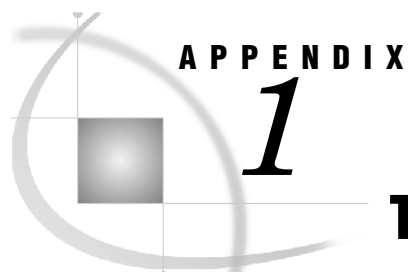
Tables Extracted from SAP

Tables Extracted from SAP

Table	Description
BKPF	Accounting Document Header
BSEG	Accounting Document Segment
CEPC	Profit Center Master Data
CEPCT	Profit Center Master Data Texts
COBK	Object Document Header
COEP	Object Line Items (by Period)
CSKS	Cost Center Master Data
CSKT	Cost Center Master Data Texts
CURRENT_PAY_RESULTS	Employee current compensation information, as extracted by the ABAP program from SAP R/3
DD03T	Fields Texts (Language Dependent)
DD04T	Data Element Texts
DD07T	Domain Fixed Values (Language Dependent) Texts
GLT0	G/L Account Master Record Transaction Figure
HRP1000	Infotype 1000 DB Table
HRP1001	Infotype 1001 DB Table
HRP1005	Infotype 1005 DB Table
HRP1015	Infotype 1015 DB Table
HRP1028	Infotype 1028 HR Object Address
HRP1032	Infotype 1032 E-mail Address
HRP1033	Infotype 1033 DB Table
HRPAD31	Additional Data PAD31
HRP1045	Infotype 1045 DB Table
HRT1045	Infotype 1045 Table Section
KNA1	Customer Master Data
KNVH	Customer Hierarchy
LFA1	Vendor Master Data (General Section)
LFMH	Vendor Hierarchy
MAKT	Material Descriptions

Table	Description
MARA	General Material Data
NRIV	Number Range Intervals
PA0000	HR Master Record: Infotype 0000 (Actions)
PA0001	HR Master Record: Infotype 0001 (Org. Assignment)
PA0002	HR Master Record: Infotype 0002 (Personnel Data)
PA0006	HR Master Record: Infotype 0006 (Addresses)
PA0007	HR Master Record: Infotype 0007 (Planned Working Time)
PA0008	HR Master Record: Infotype 0008 (Basic Pay)
PA0016	HR Master Record: Infotype 0016 (Contract Elements)
PA0022	HR Master Record: Infotype 0022 (Education)
PA0024	HR Master Record: Infotype 0024 (Qualifications)
PA0025	HR Master Record: Infotype 0025 (Appraisals)
PA0029	HR Master Record: Infotype 0029 (Workers Compensation)
PA0041	HR Master Record: Infotype 0041 (Date Specifications)
PA0057	HR Master Record: Infotype 0057 (Membership Fees)
PA0077	HR Master Record: Infotype 0077 (Additional Personnel Data)
PA0080	HR Master Record: Infotype 0080 (Maternity Protection)
PA0081	HR Master Record: Infotype 0081 (Military Service)
PA0105	HR Master Record: Infotype 0105 (Communications)
PA0302	HR Master Record: Infotype 0302 (Additional Actions)
PA0521	HR Master Record: Infotype 0521 (Altersteilzeit)
PA0597	HR Master Record: Infotype 0597 (Teilzeitarbeit waehrend Elternzeit)
PA2001	HR Time Record: Infotype 2001 (Absences)
PB0001	HR Master Record: Infotype 0001 (Org. Assignment)
PB0002	HR Master Record: Infotype 0002 (Personal Data)
PB0006	HR Master Record: Infotype 0006 (Addresses)
PB0007	HR Master Record: Infotype 0007 (Planned Working Time)
PB0008	HR Master Record: Infotype 0008 (Basic Pay)
PB0016	HR Master Record: Infotype 0016 (Contract Elements)
PB0022	HR Master Record: Infotype 0022 (Education)
PB0077	HR Master Record: Infotype 0077 (Additional Personal Data)
PB4000	HR Master Record: Infotype 4000 (Applicant Events)
PB4001	HR Master Record: Infotype 4001 (Applications)
PB4002	HR Master Record: Infotype 4002 (Vacancy Assignment)
PRPS	WBS (Work Breakdown Structure) Element Master Data
RF011P	Items in Financial Statement for a Selected Balance Sheet Report
RF011Q	Financial Statement Text

Table	Description
RF011Z	Balance Sheet Line Assignment
SALDO	HR Time Recording Cluster Table – Accumulated Monthly Working Hours
SKA1	G/L Account Master (Chart of Accounts)
SKAT	G/L Chart of Accounts Description
SKB1	Account Master (Company Code)
T001	Company Codes
T001P	Personnel Area/Subarea
T002	Language Keys
T002T	Language Key Texts
T003	Document Types
T003T	Document Type Texts
T004	Directory of Charts of Accounts
T004T	Charts of Account Names
T005T	Country Names
T005U	State/Region/County
T009	Fiscal Year Variants
T009B	Fiscal Year Variant Periods
T009C	Period Names
T009T	Fiscal Year Variant Names
T009Y	Shortened Fiscal Years in Asset Accounting
T011	Financial Statement Versions
T011T	Financial Statement Version Names
T030	Standard Account Table
T030C	Global Standard Account Table
T030D	Account Determination for Open Item Exchange Rate Differences
T030H	Account Determination for Open Item Exchange Rate Differences
T030R	Rules for Determination of Standard Accounts
T030W	Transaction Key Names
T077X	Account Group Names (Table T077D)
T179	Materials: Product Hierarchies
T179T	Materials: Product Hierarchy Texts
T500L	Personnel Country Grouping
T500P	Personnel Areas
T502T	Marital Status
T503	Employee Group Subgroup
T503T	Employee Subgroup Names

Table	Description
T503Z	Country Assignment for Emp Grp-SubGrp
T505N	Type of Military Experience
T505S	Ethnic Origin Texts
T510	Pay Scale Groups
T510F	Assign Pay Scale to Currency
T510N	Pay Scales for Annual Salaries (NA)
T512T	Wage Type Texts
T513H	Appraisal Criteria
T513S	Job Titles
T519T	Education Final Certificates
T521B	Payee Keys
T521C	Check Table for Payees
T523T	Challenge Types
T528B	Positions
T528C	Wage Type Catalog
T528T	Positions Texts
T529T	Personnel Action Texts
T52D7	Assign Wage Types to Wage Type Groups
T530F	Reasons for Actions
T530T	Reason for Action Texts
T536B	Payee Keys
T538T	Units of Time/Measurement Texts
T542T	Employment Contracts
T547S	Contract Type Texts
T548T	Date Types
T549A	Payroll Areas
T549N	Period Modifiers
T549Q	Payroll Periods
T549R	Period Parameters
T554T	Absence and Attendance Texts
T574B	Qualification Names
T591S	Subtype Texts
T5U13	Jobs
T5U29	Position Attributes for US
T5UAA	AAP Occupational Categories
T5UEE	EEO Occupational Categories
T750B	Recruitment Advertisement
T750C	Recruitment Instrument

Table	Description
T750H	Recruitment Medium Texts
T750iI	Unsolicited Application Group Texts
T751B	Applicant Status Texts
T751C	Applicant Status Reason
T751F	Text for Applicant Event Type
T777Q	Proficiency Texts
T777T	Infotypes
T777U	Subtype Texts
T777V	Relationship Texts
T880	Global Company Data (for KONS Ledger)
TBSLT	Posting Key Names
TCURR	Exchange Rates
TCURT	Currency Code Names
TCURW	Usage of Exchange Rate Types
TGSBT	Business Area Names
THITT	Customer Hierarchy Types Texts
TKA00	Control Parameters for Controlling Areas
TKA01	Controlling Areas
TKA02	Controlling Area Assignment
TKEB	Management for Operating Concerns (Client Specific)
TKEBT	Management for Operating Concern (Client Specific) Texts
TLHITT	Vendor Hierarchy Category Texts
ZES	HR Detailed Time Recording Cluster Table – Daily Working Hours

A P P E N D I X

2
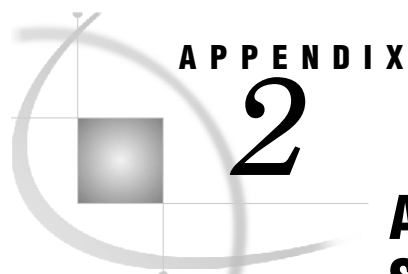
ABAP Function Module
SAS/HR_EVALUATE_WAGES

ABAP Function Module SAS/HR_EVALUATE_WAGES Overview

The ABAP function module SAS/HR_EVALUATE_WAGES indirectly evaluates wages for people employed on a given date. This module returns the wages for each person that was employed on the given date for the requested infotype. The specified country grouping is required to check which wage types are indirectly evaluated, and to retrieve the associated evaluation module.

Note: Currently, only infotypes 0008, 0014, 0015, and 0052 are supported.

You can use the table parameters LGART_INCL and LGART_IGNORE to limit the wage types that are retrieved from table T511. Here are three specific ways that you can limit the wage types:
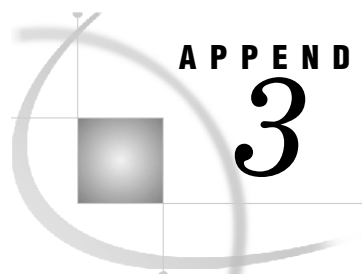
❑ Specify a range of personnel numbers to process, including minimum and maximum values for personnel numbers.

❑ Specify a list of wage types that should be included. Wage types that are not listed are not evaluated or returned. This action is associated with the table parameter LGART_INCL.

❑ Specify a list of wage types that should be excluded. In this case, only the types that are not listed are evaluated and returned. This action is associated with the table parameter LGART_IGNORE, and used only if LGART_INCL is the initial parameter.

The resulting table lists the wages per personnel number, infotype, and wage type whether the wage has been computed. It is possible for wages to be overwritten during indirect evaluation of master data maintenance. In SAP, you can see the overwrite indicator flag by using the SAP transaction OH13. This corresponds to the behavior of the SAP transaction PA30.

The following figure provides an example of a call from SAS that retrieves all indirectly evaluated base wages (infotype 0008) for employees with personnel numbers less than or equal to 5000.

```
    PROC CALLRFC libref=SAPSERVE;
  CALL FUNCTION '/SAS/HR_EVALUATE_WAGES '
     EXPORTING pevaldate = '20060731'
               P_MAX_PERNR = '00005000'
               pinftype = '0008'
               tables result = results;
QUIT;
```

After this call, you can process the results to determine which of the wage types have been computed (INDBW = 'I').

A P P E N D I X

*3*

Job Groups and SAS Solution Data Marts

Job Groups and SAS Solution Data Marts

The job groups that are described in this document extract, transform, and load data from standard SAP tables into standard SAS tables in the DDS. The data is then available in a usable format for solution data marts such as SAS Financial Management and SAS Human Capital Management.

Each job group provides ETL functions that are required for or relate to one or more SAS solution data marts. The table provides a list of each job group and the SAS solution data marts for which it extracts, transforms, and loads data.

Job Group	Corresponding SAS Solution Data Marts
Initialization Job Group	
0 Data Environment Initialization	SAS Human Capital Management
Extraction Job Groups	
E00 Extraction of T Tables	SAS Financial Management
	SAS Human Capital Management
E01 Extraction of Master Tables	SAS Financial Management
	SAS Human Capital Management
E02 Extraction of Transaction Tables	SAS Financial Management
E03 Extraction of Summary Tables	SAS Financial Management
E04 Extraction of Hierarchies and Structures	SAS Financial Management
E05 Extraction of Miscellaneous Other Tables	SAS Financial Management
E06 Extraction of HR PA Infotype Tables	SAS Human Capital Management
E07 Extraction of HR T Lookup Tables	SAS Human Capital Management
E08 Extraction of HR Tables Using ABAP Calls	SAS Human Capital Management
E09 Extraction of HR Applicant Tables	SAS Human Capital Management
E10 Extraction of HR HRP Infotype Tables	SAS Human Capital Management

Job Group	Corresponding SAS Solution Data Marts
Transformation Job Groups	
T0000 Transformations for Common Tables	SAS Financial Management
	SAS Human Capital Management
T0001 Account Dimension	SAS Financial Management
T0002 Time Dimension	SAS Financial Management
	SAS Human Capital Management
T0003 Tables Supplied by SAS	SAS Financial Management
	SAS Human Capital Management
T0004 Cost Center Dimension	SAS Financial Management
	SAS Human Capital Management
T0005 Profit Center Dimension	SAS Financial Management
T0006 Analysis Dimension	SAS Financial Management
T0007 Exchange Rates	SAS Financial Management
T1000 Financial Documents	SAS Financial Management
T1100 External Org	SAS Financial Management
T1200 FM Internal Org	SAS Financial Management
T2000 HR Common Reference Tables	SAS Human Capital Management
T2100 HR Employee General Information	SAS Human Capital Management
T2200 HR Employee Absences	SAS Human Capital Management
T2300 HR Employee Base Compensation	SAS Human Capital Management
T2400 HR Employee Compensation History	SAS Human Capital Management
T2500 HR Applicant's General Information	SAS Human Capital Management
T2600 HR Job	SAS Human Capital Management
T2700 HR Job Position	SAS Human Capital Management
T2800 HR Military Experience	SAS Human Capital Management
T2900 HR Internal Org	SAS Human Capital Management
T3500 HR Employee Actions	SAS Human Capital Management

A P P E N D I X

4
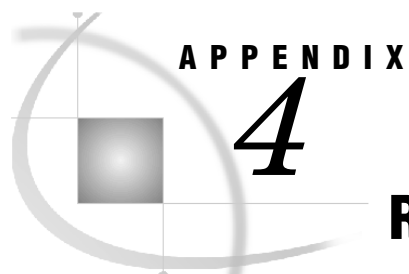
Recommended Reading

Recommended Reading

Here is the recommended reading list for this title:

- ❑ *Customer Data Integration: Reaching a Single Version of the Truth*
- ❑ *SAS Data Integration Studio: User's Guide*
- ❑ *SAS Data Surveyor for SAP: Help*
- ❑ *SAS Management Console: User's Guide*
- ❑ *SAS Solutions Services: Data Administration Guide*
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