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SAS/ACCESS® 4.2
Interface to R/3
User's Guide

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Contents

What's New

Overview

SAS/ACCESS 4.2 Interface to R/3 has the following new features and enhancements:

- simplified logon process
- enhanced authorization checks
- enhanced RFC server
- enhanced creation of an RFC server destination
- new RFC server options
- new %CALLRFC macro
- new Unicode support for SAS servers
- new SAP transport files for simplified ABAP installation
- new SAP LIBNAME engine

These changes are from SAS/ACCESS 9.1 Interface to SAP 9.1 and later. For information about changes to SAS Data Surveyor 4.2 for SAP, see the What's New Section in SAS OnlineDoc.

Simplified Logon Process

In previous versions, you were required to enter CPI-C parameters in the logon utility when you log on to your R/3 system. You no longer need to use these parameters. You can instead enter your logon parameters in the Logon to R/3 and Advanced Parameters windows. For more information, see Using the Logon Utility.

Enhanced Authorization Checks

You can develop alternative authorization schemes for reading R/3 tables by using enhanced authorization checks through the /SAS/AUTH01 Business Add-In (BAdI). By default, this BAdI performs the same authorization checks as it did previously on S_TABU_DIS, so no further action is necessary.

Enhanced RFC Server

The command-line syntax for the RFC server supports two operation modes for extracting data from your SAP R/3: UNIX and Windows NT. For more information, see "Using the RFC Server on UNIX" on page 58 and "Using the RFC Server on Windows NT" on page 62.

Enhanced Creation of an RFC Server Destination

simpler process for creating an RFC server destination for a small SAP configuration Beginning with 4.1, you can omit gateway information when creating an RFC server destination for a small SAP configuration. For more information, see "Using the RFC Server in Batch Mode" on page 64.

New RFC Server Options

The following RFC server options are new:

-b

[for 4.1] enables batch compatibility so that you can process V8 ACCR3 requests using a V9 RFC server.

-B

[for 4.1] boosts performance when you use it to increase the minimum buffer size for data transfers.

-S

[for 4.2] registers the SAS RFC server at an SAP gateway, enabling it to receive requests for information from the SAS RFC Server Monitor in the SAP Netweaver Portal.

For more information about the RFC server, see Chapter 5, "Using the RFC Server," on page 57.

New %CALLRFC Macro

You can call RFC-enabled ABAP functions by using the new CALLRFC procedure, which the %CALLRFC macro uses internally. The CALLRFC procedure uses the RFC server to communicate with the SAP system. For more information, see "%CALLRFC" on page 66.

New Unicode Support for RFC Servers

SAS/ACCESS 4.2 Interface to R/3 and later supports Unicode SAP servers on Windows and UNIX. For details about UNIX platform support, see the *Installation Instructions for SAS/ACCESS Interface to R/3*. For information about starting a Unicode RFC server, see "Using the RFC Server on UNIX" on page 58 and "Using the RFC Server on Windows NT" on page 62.

New SAP Transport Files for Simplified ABAP Installation

To simplify installation of the required ABAP function modules and programs, it is recommended that you import the SAP transport files rather than installing these manually. For more information, see the *Installation Instructions for SAS/ACCESS Interface to R/3*.

As a result of this change, the new RFC server and RFC dialog server no longer use the following ABAP function modules and programs:

- **Z_SAS_BATCH_INTERFACE_4**
- **Z_SAS_READ_TABLE_CPIC**
- **ZSASRDBT**
- **ZSASRDTB**

Note: Because the transport files for the SAS/ACCESS 4.2 Interface to R/3 require different ABAP function modules and programs than the transport files for the SAS/ACCESS Interface to SAP BW, be sure to use the correct files when you install your application. △

New SAP LIBNAME Engine

The new SAP LIBNAME engine is a read-only engine that you can use to access tables and views from SAP R/3 and SAP BW systems. It accesses an SAP system through a connection to the SAS RFC server and is part of the SAS solution to access data in an SAP system. It supports new features such as load balancing, user validation at logon, more efficient handling of projections, server-side joins, and directory processing.

Unlike other LIBNAME engines in SAS, these interfaces are read-only and do not support any forms of data set creation, deletion, or modification.

For more information about the new SAP LIBNAME engine, see "Overview of the LIBNAME Engine for SAP" on page 79.
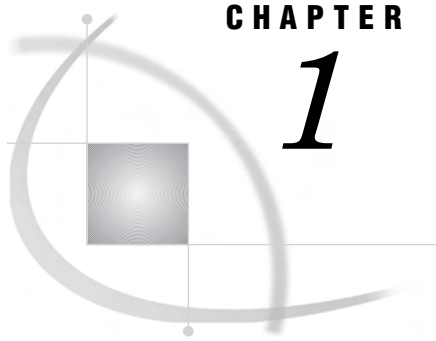
CHAPTER

1

How to Use This Document

Introduction

SAS/ACCESS® 4.2 Interface to R/3: User's Guide describes SAS/ACCESS Interface to R/3 from SAP AG. It provides primary support for SAS/ACCESS 4.2 Interface to R/3.

Audience

This document is intended for applications programmers and other users who are comfortable with their own operating environment and are reasonably familiar with either SAS or with R/3. It is assumed that users are completely unfamiliar with using both of the systems together. The glossary provides definitions of terms that might be new to a user who is unfamiliar with either system.

This document provides tutorial instruction for a novice user of SAS/ACCESS Interface to R/3. After you have mastered the tutorial, you can use this document for reference.
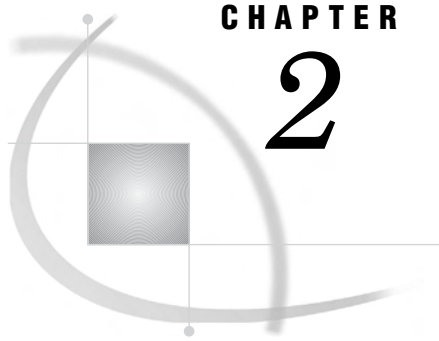
2

Overview

Introduction

This chapter provides a brief introduction to SAS/ACCESS Interface 4.2 to R/3. For more detailed information, consult the references that are listed in "Recommended Reading" on page 101 or contact your SAS Support Consultant.

Getting Started with SAS/ACCESS Interface 4.2 to R/3

This section provides a brief tutorial on how to use SAS/ACCESS Interface 4.2 to R/3. For more detailed information, consult the additional references that are listed in "Recommended Reading" on page 101 or contact your SAS Support Consultant.

To get started with SAS/ACCESS Interface 4.2 to R/3:

1 Open a SAS session.

2 Enter `%r3access` in the command line to start SAS/ACCESS Interface 4.2 to R/3.

Display 2.1   SAS/ACCESS to R/3 Window
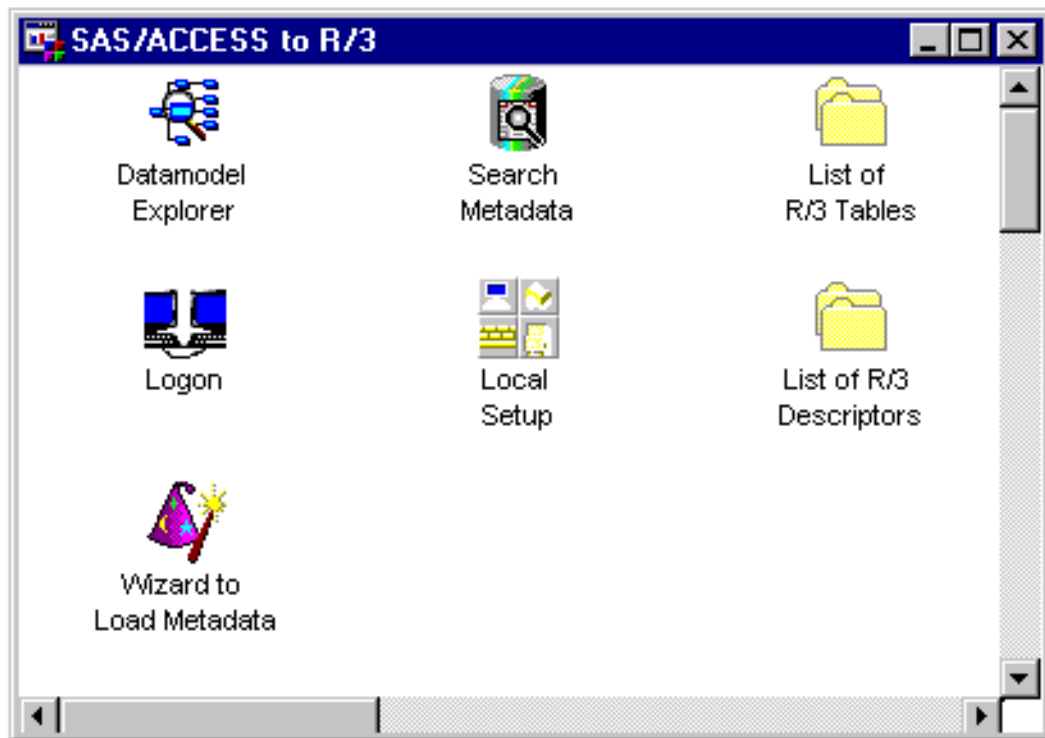
3 Double-click the Logon icon to open the Logon to R/3 window.

Display 2.2   Logon to R/3 Window
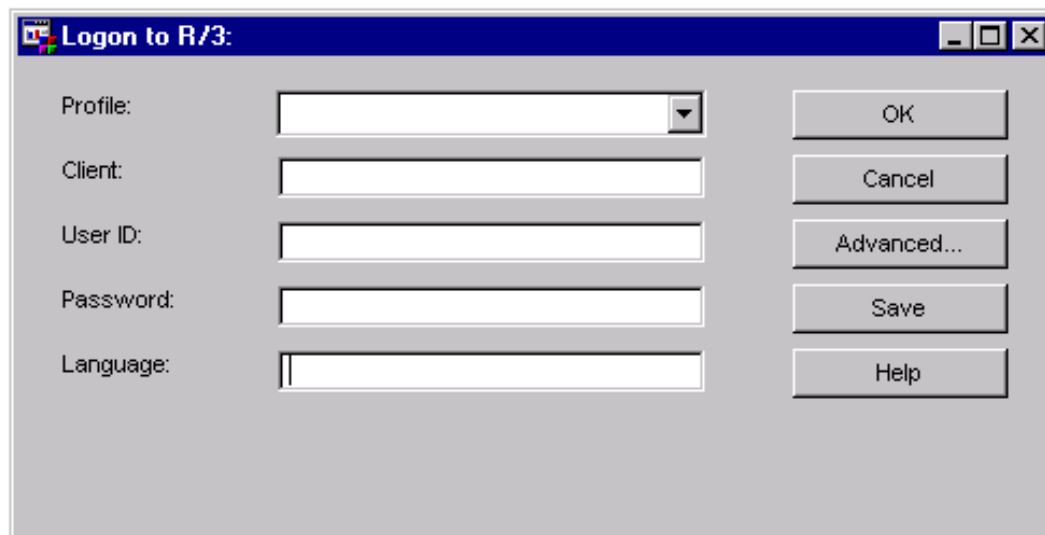
Existing pre-defined profiles are available from the **Profile** field drop-down list.

To use a pre-defined profile:

a Select a profile from the **Profile** field drop-down list.
b Click $\boxed{\text{OK}}$ to connect to R/3.

If there are no pre-defined profiles, you will need to create one.

To create a new profile:

a Open the Logon to R/3 window as described earlier.

b If you want to save the connection information for later use, enter a name for the **Profile**.

c Enter a three-digit identification number for the R/3 **Client**.

d Enter a valid R/3 **User ID**.

e Enter the corresponding R/3 **Password** for the user ID.

f Click ⬚Advanced⬚ in the Logon to R/3 window to display the Advanced Parameters window that is shown in Display 2.3.

Display 2.3 Advanced Parameters Window
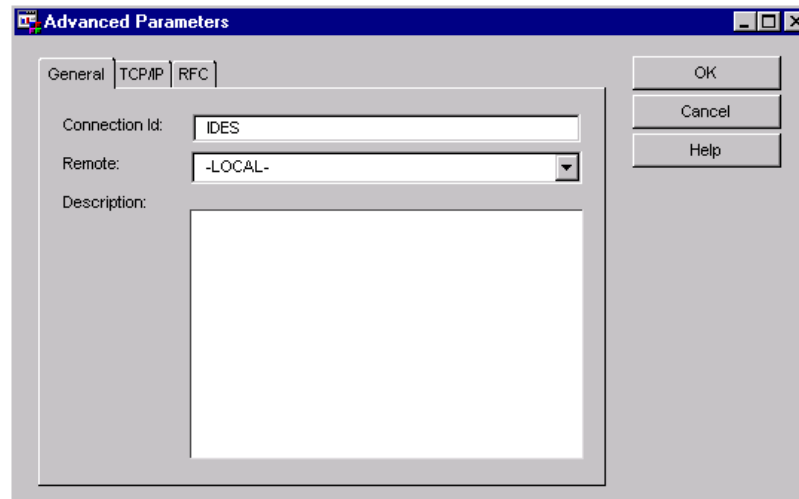
g From the TCP/IP tab, enter the RFC server name in the **Host** field. The default is **localhost**; a fully qualified domain name might not be required, depending on the DNS configuration for the network. Enter an appropriate port number in the **Port** field.

h From the RFC tab, enter the host name in the **Host** field.

i Click ⬚OK⬚ to close the Advanced Parameters window and return to the Logon to R/3 window.

j If you want to use this log on information later, click ⬚Save⬚ to save the profile information.

k Click ⬚OK⬚ to connect to R/3.

Searching R/3 Metadata

SAS/ACCESS Interface 4.2 to R/3 provides a robust search capability that you can use to search your metadata for specific information.

For example, to search for all tables that contain the word "scrap" in their metadata:

1 From SAS, start SAS/ACCESS Interface 4.2 to R/3 to display the SAS/ACCESS to R/3 window that is shown in Display 2.1.

2 Double-click the Search Metadata icon to display the Data Dictionary Search Facility window.

Display 2.4 Data Dictionary Search Facility Window
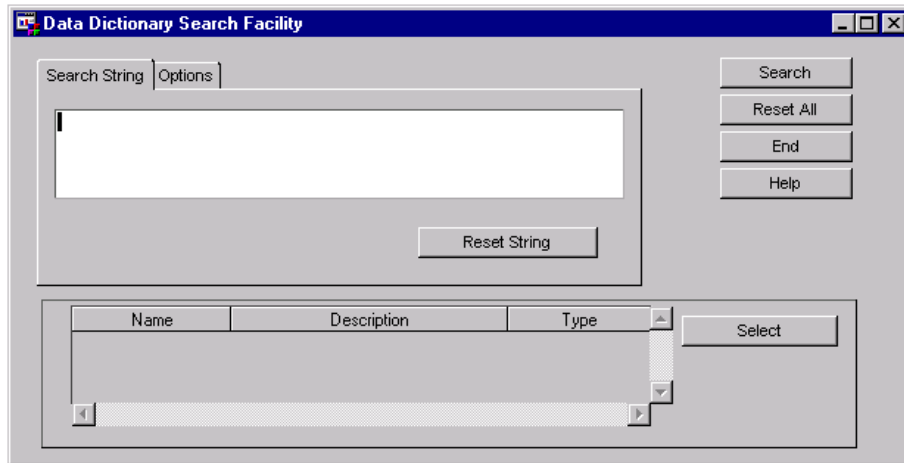
3 Click inside the text entry field on the Search String tab, and then enter text to search for, such as the word "scrap". Click ⌐Search⌐. A list of tables will display in the table in the bottom of the Search String tab as shown in Display 2.5.

Display 2.5 Data Dictionary Search Facility Window (Searching for 'scrap')
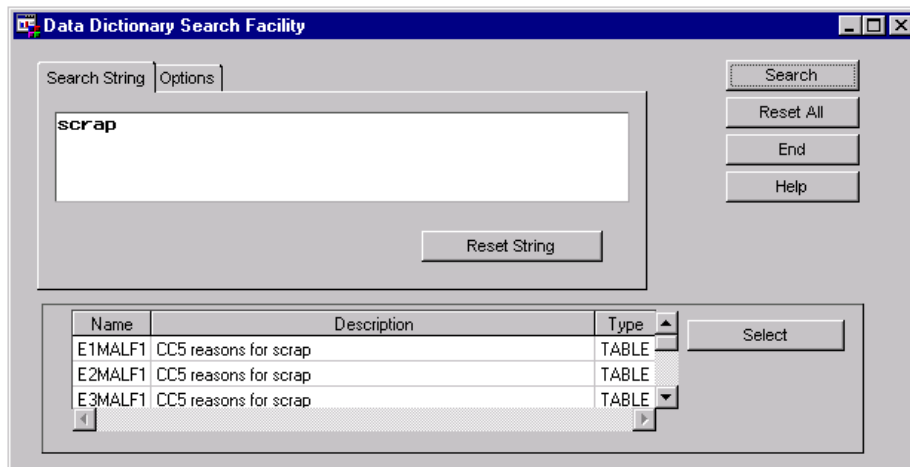
4 Double-click one of the tables in the list. The General Attributes for a List of Tables window displays to give you more detailed information about the selected table as shown in Display 2.6.

Display 2.6   General Attributes for a List of Tables Window
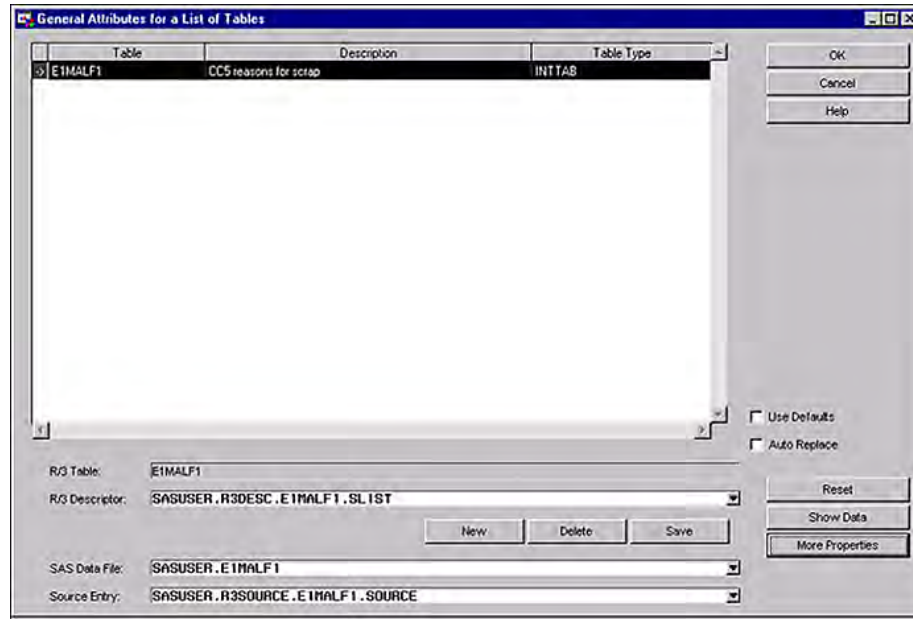
5   Click OK to return to the Data Dictionary Search Facility window.

Exporting R/3 Metadata to SAS/Warehouse Administrator

SAS/ACCESS Interface 4.2 to R/3 enables you to export metadata from R/3 tables to a warehouse environment in SAS/Warehouse Administrator.

To export R/3 metadata:

1 From SAS, open SAS/ACCESS Interface 4.2 to R/3 to display the SAS/ACCESS to R/3 window that is shown in Display 2.1.

2 Double-click the Datamodel Explorer icon to display the Datamodel Explorer window.

Display 2.7   Datamodel Explorer Window
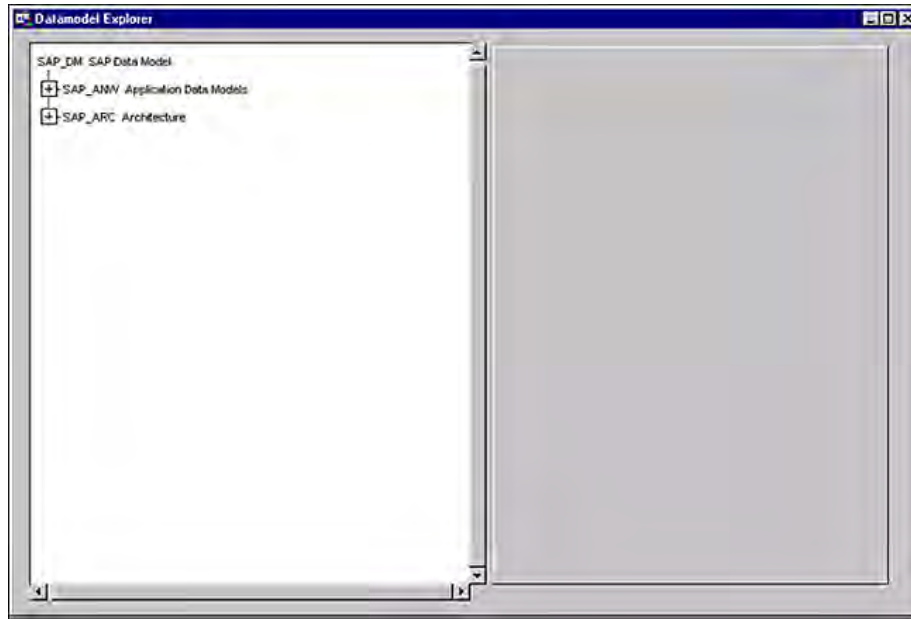
3 For this example, click the plus sign (+) for the application data models topic in the Datamodel Explorer. Then, click the plus sign (+) beside the Industry Solutions and Industry Solutions Public Sector subtopics. Single-click ISPS_HR IS-PS Human Resources to select this subtopic.

4 From the main menu of the Datamodel Explorer window, select **File ▶ Export Metadata ▶ SAS/Warehouse Administrator** as shown in Display 2.8 to display the SAS/ACCESS to R/3: Export Metadata to SAS/Warehouse Administrator window.

Display 2.8   File Menu for the Datamodel Explorer Window
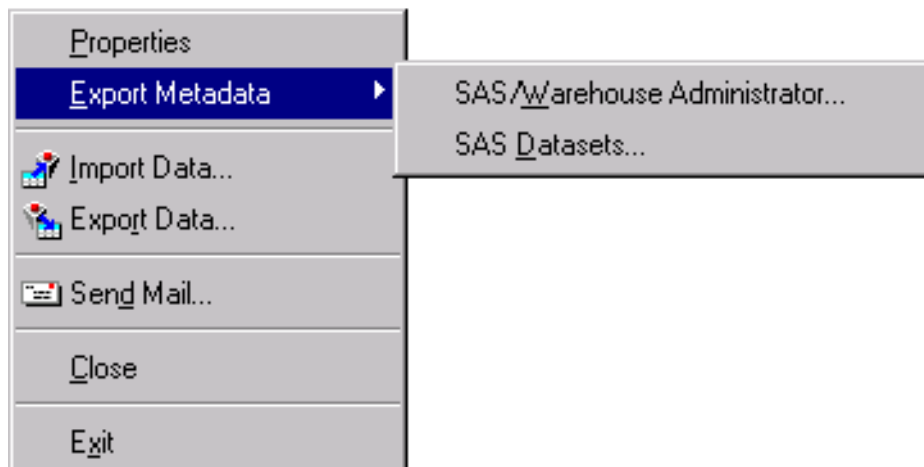
Display 2.9 SAS/ACCESS to R/3: Export Metadata to SAS/Warehouse Administrator Window
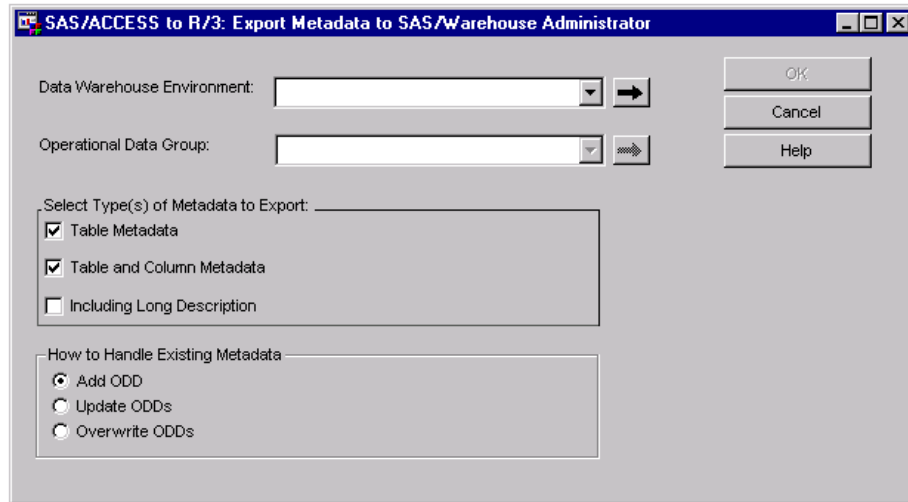
5 From the **Data Warehouse Environment** drop-down list, select a pre-defined environment from the SAS/ACCESS to R/3 folder.

6 From the **Operational Data Group** drop-down list, select an operational data group from the selected data warehouse environment. The **Operational Data Group** field is disabled until you select a data warehouse environment.

7 Click [OK] to export the metadata to the selected data warehouse environment in SAS/Warehouse Administrator.
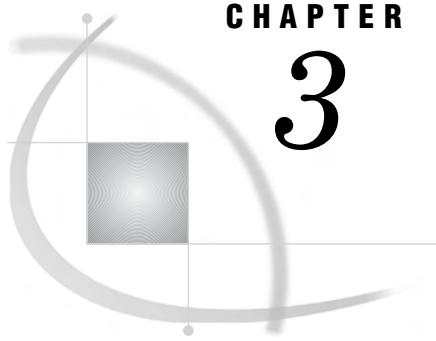
C H A P T E R
3

Accessing and Using R/3 Data

Introduction

This chapter describes the methods you can use to access R/3 data: direct access and ODBC, which do not require the use of the interface, and SAS/ACCESS Interface 4.2 to R/3.

The chapter also includes an overview of the Remote Function Call (RFC) and extract management methods.

Accessing Data Using Direct Access and ODBC

There are two methods of accessing data that do not require SAS/ACCESS Interface 4.2 to R/3: direct access and ODBC.

□ Direct Access

This is a form of transparent access that does not require additional programming or intermediate operations. This form of access is possible because the R/3 system is an Open Systems-compliant application.

Direct access uses an intermediate SAS/ACCESS product to the specific database, which can be ORACLE, INFORMIX, ADABAS, or DB/2.

□ ODBC (Open Data Base Connectivity)

This method allows direct data access in a PC environment by using SAS/ACCESS Interface to the ODBC.

Accessing Data Using SAS/ACCESS Interface 4.2 to R/3

You can use SAS/ACCESS Interface 4.2 to R/3 to access R/3 data by using two different methods: Remote Function Call (RFC) or extract management.

☐ Remote Function Call

The Remote Function Call method is normally used. It offers online access to the R/3 data.

☐ Extract Management

The extract management method is the original method that has now largely been superseded. It offers off-line access to the R/3 data that can be useful when

☐ there is a poor or slow communication link between SAS and R/3

☐ a backup file is required

☐ there is a lot of data.

Note: Both methods generate a SAS DATA step. △

Remote Function Call (RFC) Method

The Remote Function Call (RFC) is a SAP AG implementation of the Remote Procedure Call. RFC allows access to R/3 from external applications, such as SAS or other R/3 systems.

An overview of the Remote Function Call method for accessing data from R/3 is shown in Figure 3.1. Two modules (ABAP Function and ABAP Report, which are provided with the interface) attach to the R/3 system. Communication between the ABAP Function module and the interface itself uses RFC. On the other side, the interface uses TCP/IP to communicate with the RFC Server. For more details about the RFC Server, see Chapter 5, "Using the RFC Server," on page 57.

Figure 3.1 Remote Function Call (RFC) Method of Accessing Data from the R/3 system
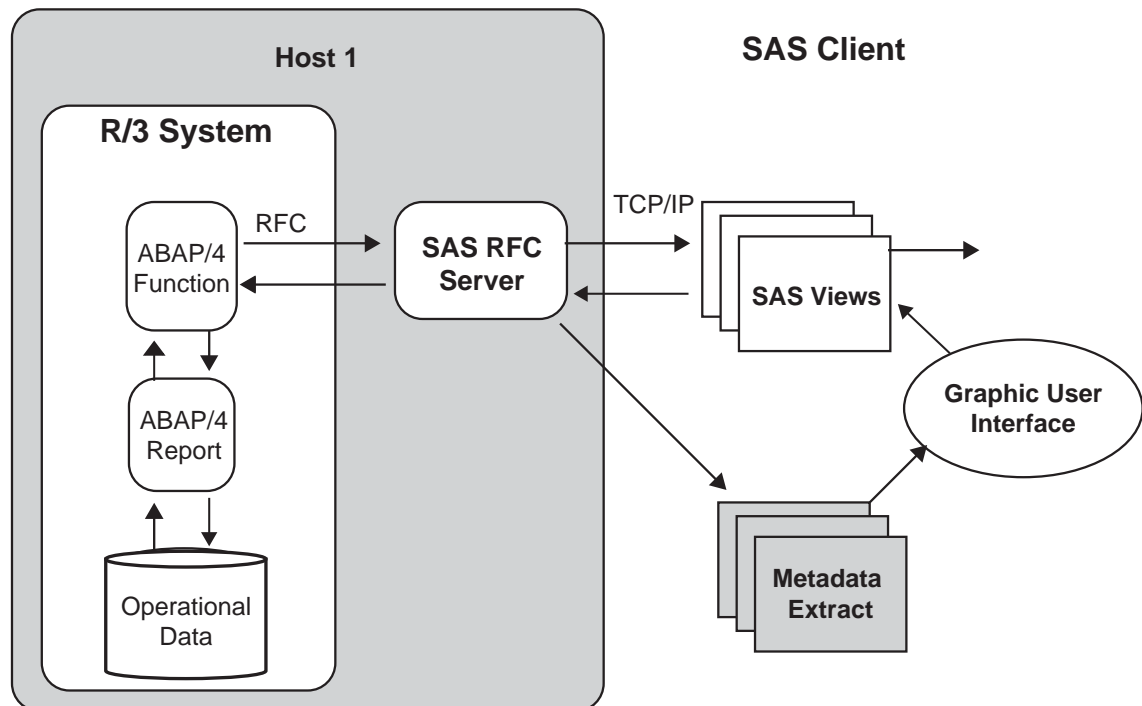
In general, the RFC method consists of generating a SAS DATA step to access the R/3 data, and then it uses the DATA step to create either

□ a data set that is a SAS copy of the R/3 data

□ a View that reads the R/3 data each time it is required.

Extract Management Method

The extract management method creates an ABAP query that copies the data from R/3 to an external file. It also creates a SAS DATA step that then reads the external file into SAS. After the R/3 data has been exported to SAS, the data can be held either temporarily for discrete analysis or permanently in a SAS data warehouse. The interface generates all of the necessary programs for both ABAP and SAS (based on the R/3 data dictionary tables).

The extract management method to access R/3 data is discussed in the following sections: Installation and Setup; Data Transfer and Use.

Installation and Setup

1 Generate an ABAP report.

Use the descriptor file to create an ABAP report and write it to a text file. The ABAP report is used later to copy the R/3 data to an external intermediate data file.

2 Generate a DATA step.

Generate a SAS DATA step to read the intermediate data file.

3 Install the ABAP report in R/3.

This step is independent of SAS/ACCESS Interface 4.2 to R/3 and SAS, and you can perform it simultaneously with Step 2.

4 Install the ABAP text file from Step 1 into R/3.

Data Transfer and Use

Note: After installation and setup, you can perform the following steps as many times as required. △

1 Run the ABAP report in R/3.

Run the installed ABAP report on R/3. This creates the external intermediate data file.

2 Use the DATA step.

Use the DATA step to read in or copy the external intermediate data file into SAS.

Note: Depending on your situation, it might be possible to simplify or streamline the outlined process. For example, in UNIX a named pipe or other external file can enable ABAP to write data to the external intermediate data file so that SAS can read it simultaneously. △
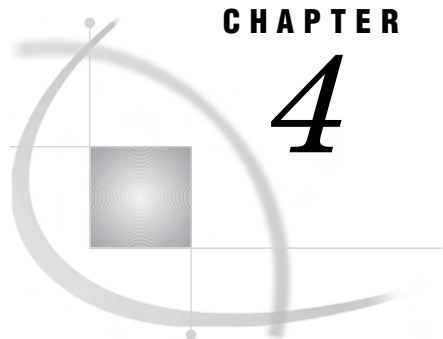
CHAPTER

4

Using SAS/ACCESS Interface 4.2 to R/3

Introduction

SAS/ACCESS Interface 4.2 to R/3 is an interactive application that supports data extraction from the R/3 data tables and stores this data in SAS data sets. It simplifies the process of issuing ABAP queries and executing the SAS DATA step for reading the R/3 tables.

This chapter outlines the pull-down menus and various windows in SAS/ACCESS Interface 4.2 to R/3. Several tasks are included with the window that is most closely associated with that task.

Using the Logon Utility

You use the logon utility to connect to the R/3 system. You can save connection settings in *profiles* and then reuse them at a later time.

Logon to R/3 Window

Follow these steps to open the Logon window:

1 Go to the SAS desktop, and open the SAS/ACCESS to R/3 desktop.

Display 4.1 SAS/ACCESS to R/3 Desktop
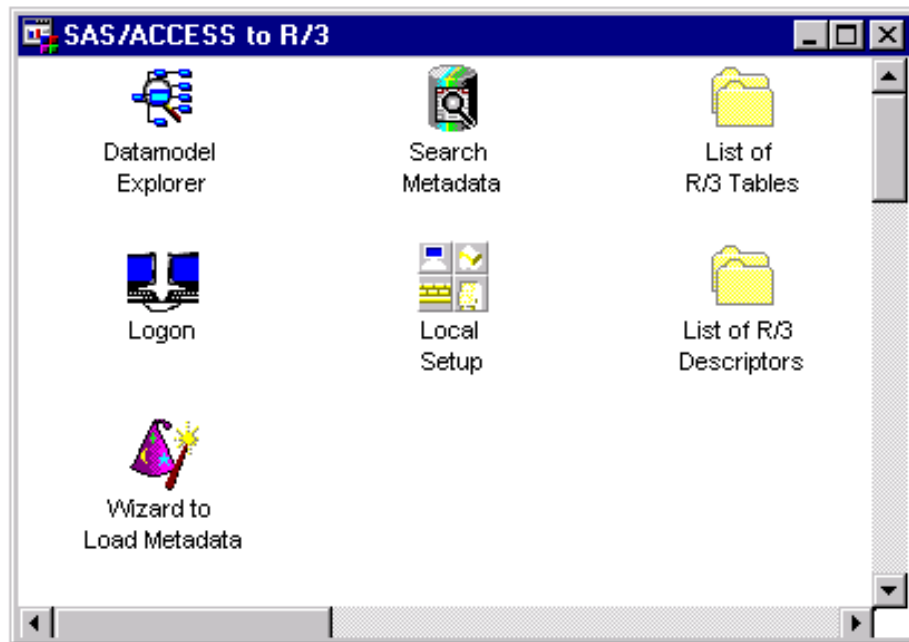
2 Double-click the **Logon** icon to open the Logon to R/3 window.

Display 4.2 Logon to R/3 Window

The Logon to R/3 window has multiple elements that you must specify to log on successfully.

The Logon to R/3 window contains the following fields:

Profile   displays the text label that you assign to the profile that is defined in this window and the Advanced Parameters window.

Client   displays the R/3 client identification number. The client ID must be three numeric characters with zeros as filler. For example, **10** will fail but **010** also works.

User ID   displays the R/3 user ID.

Password	displays the R/3 system password.
Language	determines the human language in which to display R/3 data. For example, entering the letter **E** in this field sets the language as English, entering **D** sets the language as German, and so on. The text and help screens display in the chosen language as long as language support is installed.

The Logon to R/3 window contains the following buttons:

OK	logs on to the R/3 system by using the user-supplied information in the fields.
Cancel	closes the Logon to R/3 window without trying to log on to R/3.
Save	saves the user-specified information from the fields of the Logon to R/3 window in the profile.
Advanced	displays the Advanced Parameters window, which is described in "Advanced Parameters Window" on page 19.
Help	displays the SAS Help for the Logon to R/3 window.

Logon to R/3 File Menu

Opening the Logon to R/3 window changes the File menu on the main SAS window and adds a Connections menu. The File menu contains the following commands:

Display 4.3   File Menu of the Logon to R/3 Window
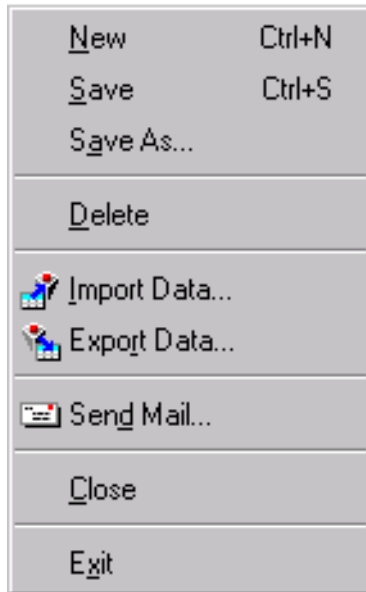
New	clears the fields in the Logon to R/3 window.
Save	saves the user-specified information from the fields of the Logon to R/3 window in the profile.
Save As	displays the Save As window. This window allows you to enter a libref name in which to save the profile.

Display 4.4 Save As Window

Delete	deletes the profile that is shown in the Logon to R/3 window.
Import Data	displays the SAS Import Wizard.
Export Data	displays the SAS Export Wizard.
Send Mail	Opens the standard SAS mail window to let you distribute electronic mail from SAS.
Close	closes the Logon to R/3 window and returns you to the SAS/ACCESS to R/3 desktop.
Exit	ends the SAS session and closes all open SAS applications.

Logon to R/3 Connections Menu

Opening the Logon to R/3 window also adds the Connections menu.

Display 4.5 Connections Menu of the Logon to R/3 Window
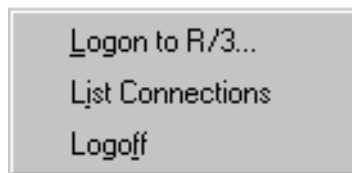
The Connections menu contains the following items:

Logon to R/3	logs on to R/3 by using the user-supplied information in the fields.
List Connections	displays the List of Connections window that is shown in Display 4.21 on page 33.
Logoff	disconnects the current logon from R/3.

Advanced Parameters Window

The Advanced Parameters window contains tabs that you can use to define additional R/3 connection information. While all required fields have default values, not all fields display those default values.

Click [Advanced] in the Logon to R/3 window to display the Advanced Parameters window. The Advanced Parameters window contains these tabs: General, TCP/IP, and RFC.

Display 4.6   Advanced Parameters Window
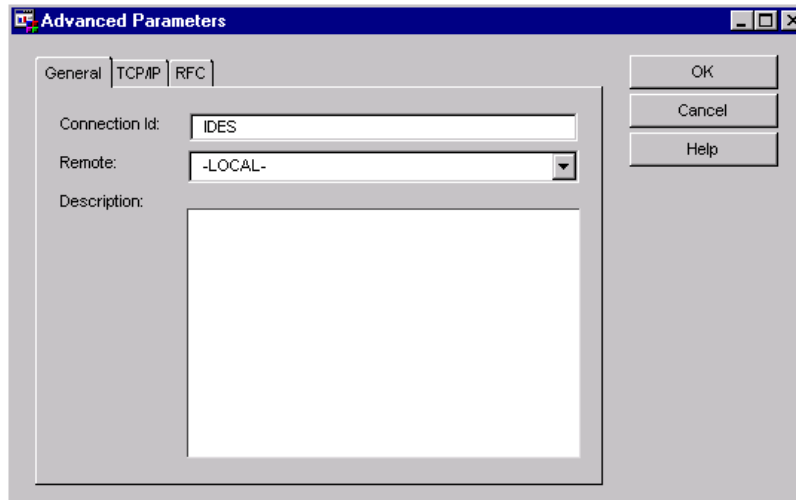
The Advanced Parameters window contains the following buttons:

[OK]   closes the Advanced Parameters window and returns you to the Logon to R/3 window, saving your entered information.

[Cancel]   closes the Advanced Parameters window and returns you to the Logon to R/3 window without saving any change that you might have made to the fields in the window.

[Help]   displays the SAS Help for the Advanced Parameters window.

General Tab

When the Advanced Parameters window displays, the `General` tab is selected by default. This tab contains general connection information in the following fields:

`Connection Id`   displays a text name that you assign for the connection ID. The connection ID is used for filerefs and macros in the SAS program to manage the connection to R/3 and to access the R/3 tables. The name must follow standard SAS syntax.

`Remote`   displays the remote SAS session. So that R/3 tables can be read into SAS DATA sets on a remote SAS session, you must establish a connection to R/3 in a remote SAS session.

`Description`   displays a text description of the connection profile.

TCP/IP Tab

The **TCP/IP** tab contains network address information. To display this tab, select it in the Advanced Parameters window.

Display 4.7   TCP/IP Tab of the Advanced Parameters Window

This tab contains the following fields:

Host   specifies the network location of the RFC server. The default is
                       localhost. A fully qualified domain name is not required. For
                       example, if the RFC server can be reached by using the DNS name
                       rfc.example.com and is on the local area network, the **Host** field
                       accepts either **rfc** or **rfc.example.com**. It also accepts numeric
                       addresses.

Port   specifies the TCP/IP port to use for communicating with the RFC
                       server. The default port number is **6991**.

RFC Tab

The **RFC** tab contains information that the RFC server uses to connect to the SAP R/3 application server. To display this tab, select it in the Advanced Parameters window.

Display 4.8 RFC Tab of the Advanced Parameters Window

This tab contains the following fields:

Host	defines the R/3 server to which the RFC server connects. This field has no predefined default value.
Destination	logical name that the sideinfo file uses. Note: If a destination is set here, other fields on this tab are ignored because the sideinfo file overrides them. If you use sideinfo files to communicate with R/3, enter the correct symbolic destination. The sideinfo file is discussed in "Sideinfo File" on page 22.
Gateway Host	gateway host that the RFC server uses to communicate with the R/3 system. The default value is **Host**.
Gateway Service	the communication gateway service that R/3 uses.
System Number	the system number that identifies which R/3 system to access if more than one R/3 system resides on the same host. At times, more than one R/3 system operates on the same host. For example, a development or test R/3 system can operate on the same host hardware as a production R/3 system. In this case, multiple R/3 systems can be accessed separately by using system numbers. The default value for this field is **0** (zero).
Function	the SAS function to call as part of the R/3 logon process. You can specify the R/3 function module that is used for RFC.

Sideinfo File

The sideinfo file is a text file that you can use to set logon parameters for R/3 users, including the RFC host, system number, gateway service, and gateway host. Placement of the sideinfo file is host- and release-dependent. In general, the sideinfo file defaults to the current directory, but an environment variable can override this. Refer to R/3 system documentation for specific platform and release-level details.

If you are using a sideinfo file, you need to set only the `Destination` field on the `RFC` tab in the Advanced Parameters window of the Logon to R/3 utility before entering information for other parameters in the sideinfo file.

Using the Local Setup Utility

Use the local setup utility to display the Application Setup window, which you can then use to define various application parameters. You can use the local setup utility to specify the default location from which data is extracted and the default location where data is stored. The utility also defines several other parameters that determine how the SAP data is extracted and where the extracted metadata is stored in SAS.

Application Setup Window

Use the Application Setup window to set parameters for logging on and accessing data using SAS/ACCESS Interface 4.2 to R/3.

Follow these steps to display the Application Setup window:

1   From the SAS desktop, open the SAS/ACCESS to R/3 desktop that is shown in Display 4.1 on page 17.

2   To open the Application Setup window, double-click the `Local Setup` icon.

   You can also display the Application Setup window from the Datamodel Explorer. From the pull-down menu, select**Tools ▶ Options ▶ ACCESS to R/3**

Display 4.9   Application Setup Window
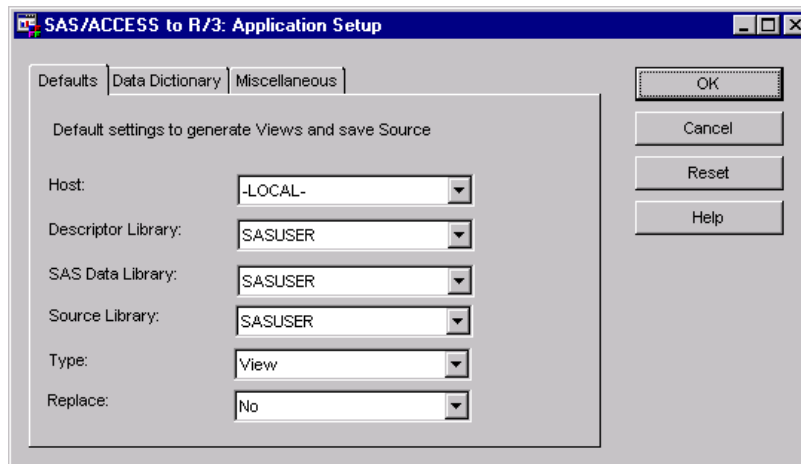
The Application Setup window contains the following buttons:

OK   closes the window, saving any entered parameters.

Cancel   closes the window without saving any entered parameters.

Reset   resets the parameters on the window to their defaults.

Help   displays the SAS Help for the Application Setup window.

Defaults Tab

The **Defaults** tab presents default settings to generate the views and save the source. This tab contains the following items:

Host	specifies the target machine where extracted data is saved. Select either **–LOCAL–** (the default value) or a remote host, if defined. A remote host is the session ID of a running SAS/CONNECT session.
Descriptor Library	specifies the location on the selected host where descriptors are saved. Select a library. The default value is **SASUSER**.
SAS Data Library	specifies the location on the selected host where the SAS view or data file is saved. Select a library. The default value is **SASUSER**.
Source Library	specifies the location on the selected host in which the source is saved. Select a library. The default value is **SASUSER**.
Type	specifies whether the extracted SAP BW metadata is stored in a SAS view or a SAS data file. Select either **View** (the default value) or **Data**.
Replace	determines whether to overwrite the existing view or data file when performing a new extraction. Select **Yes** to overwrite existing views or data sets. Select **No** (the default avlue) to leave existing views or data sets untouched.

Data Dictionary Tab

Use the **Data Dictionary** tab to enter values that specify where the extract of the R/3 Data Dictionary is located and how to access it.

Display 4.10   Data Dictionary Tab of the Application Setup Window

This tab contains the following items:

Access Type	specifies the location of the data dictionary that contains the SAP source data that you want to extract. Select either **Local to the Application** (the default value) or **Remote to the Application**. If the selected access is **Local to the Application**, then the **Remote Host** and **Local Copy of the SAS Library** fields are disabled.

Remote Host   specifies the remote machine that contains the source data that you want to extract if the data dictionary is remote to the application. The remote host is the session ID of a running SAS/CONNECT session. If the data dictionary is local to the application, this field is disabled.

SAS Library   enables you to select the SAS library that identifies the location of the data dictionary. If you are using a local host, this is the same library to which you extract metadata. If you are using a remote host, then you should specify a SAS library that references the location of the metadata on the remote host. The default value is **R3LIB**.

Local Copy of the SAS Library   enables you to select the SAS library that identifies the local copy of the data dictionary. If the data dictionary extract resides on a remote host, the (accessed) information can be stored in a local copy for better performance. If the data dictionary is local to the application, this field is disabled.

Miscellaneous Tab

Use the **Miscellaneous** tab to define a limit for the number of observations to display when showing SAP data in the Datamodel Explorer.

Display 4.11   Miscellaneous Tab of the Application Setup Window
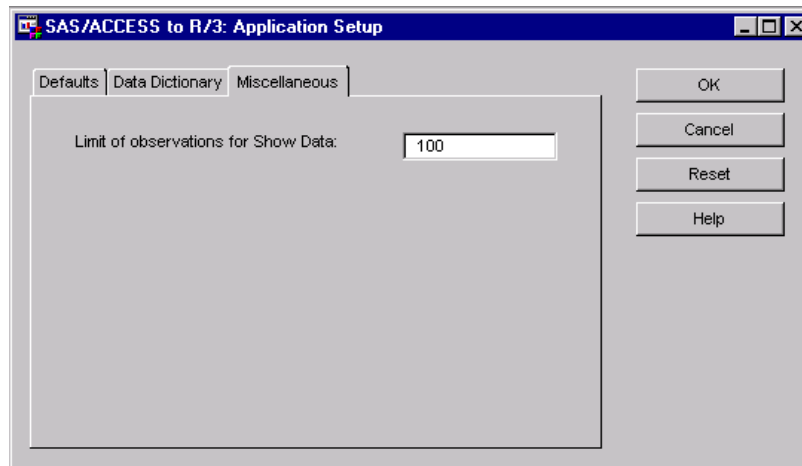
This tab contains the following item:

Limit of observations for Show Data   enables you to define the maximum number of observations to display for a data query. The default value is **100**.

Using the Datamodel Explorer

Use the Datamodel Explorer window to visually explore data models of the R/3 database, similar to a tree diagram of directory files and subdirectories. The Datamodel Explorer helps you navigate through the R/3 data model and its many subordinate data models.

The Datamodel Explorer window shows a tree diagram of data models in the R/3 database. The R/3 data model is at the top of the tree, and the subordinate data models branch from it. End nodes on the tree diagram are entities. Each entity type can contain one or more tables. By using the Datamodel Explorer, you can find the table that SAS/ACCESS Interface 4.2 to R/3 is accessing. After you identify a table, you can perform the following tasks:

☐ modify the field selection

☐ set a ABAP WHERE clause on that table

☐ create SAS views for that table

☐ display table information directly in the Datamodel Explorer

☐ display additional meta-information about the identified table

Datamodel Explorer Window

To start the Datamodel Explorer, go to the SAS desktop and open the SAS/ACCESS to R/3 desktop that is shown in Display 4.1 on page 17.

To open the Datamodel Explorer window, double-click the **Datamodel Explorer** icon:

Display 4.12   Datamodel Explorer Window
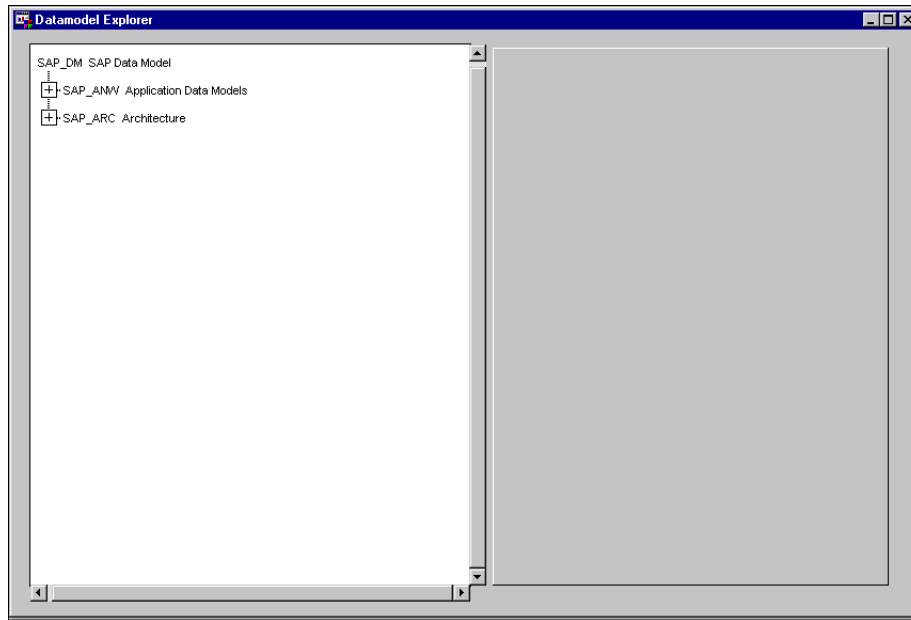
The Datamodel Explorer window opens with the collapsed tree diagram in the left half of the window. When you select a data model from the tree diagram, the **Sub Data Models** tab displays in the right half of the window as shown in Display 4.13 on page 28.

To expand the tree diagram, click the plus sign [+] or double-click the corresponding data model name. You can also open and close data models by clicking with the right mouse button on a data model and selecting **Expand** or **Collapse** from the pop-up menu.

Sub Data Models Tab

The **Sub Data Models** tab in the right half of the Datamodel Explorer window shows the name and a short description for all subdata models in the data model that you selected in the tree diagram. Selecting a data model in the left half of the Datamodel Explorer window displays the **Sub Data Models** tab in the right half of the window.

Display 4.13   Sub Data Models Tab of the Datamodel Explorer Window
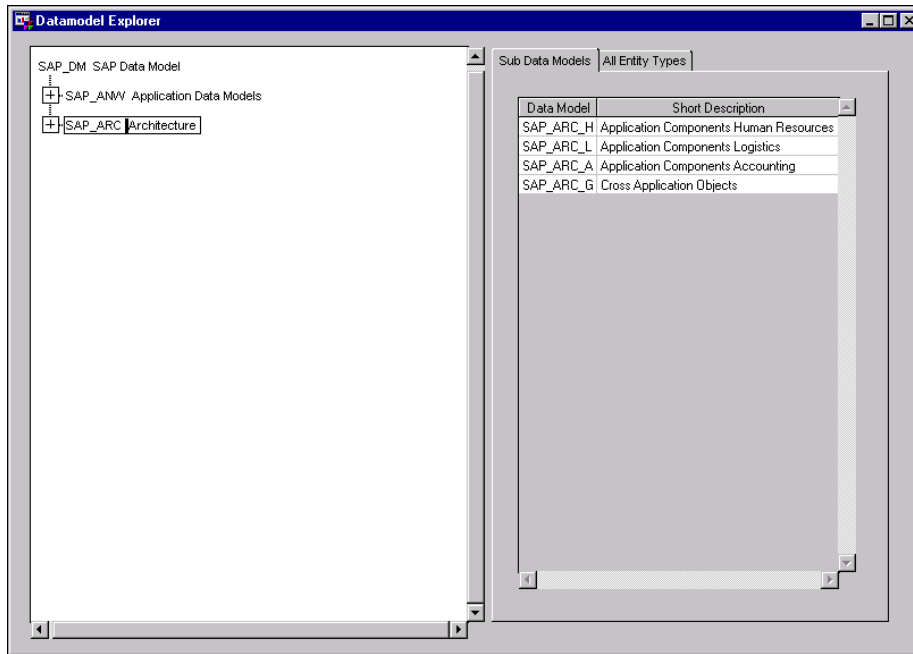
All Entity Types Tab

The **All Entity Types** tab in the right half of the Datamodel Explorer window displays a table that describes the entity types within the data model that was selected in the tree diagram. For each entity type, the table displays its name and a short text description, as shown here:

Display 4.14   All Entity Types Tab of the Datamodel Explorer Window
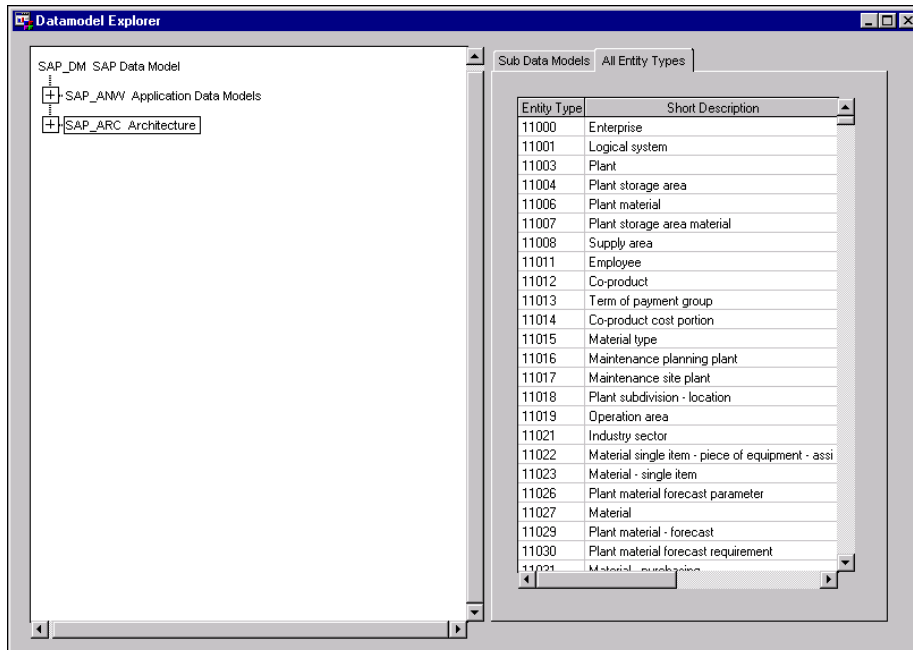
Assigned Tables Tab

To display the `Assigned Tables` tab, from the `All Entity Types` tab double-click any line item.

By selecting an entity type and double-clicking it, the Datamodel Explorer searches for the entity type, expands the tree diagram, and scrolls until the selected entity type is visible and then highlights that entity type. The right half of the Datamodel Explorer window changes to show information about that entity type with the `Assigned Tables` tab (the default value, shown below) and `Attributes` tab.

Display 4.15   Assigned Tables Tab of the Datamodel Explorer Window
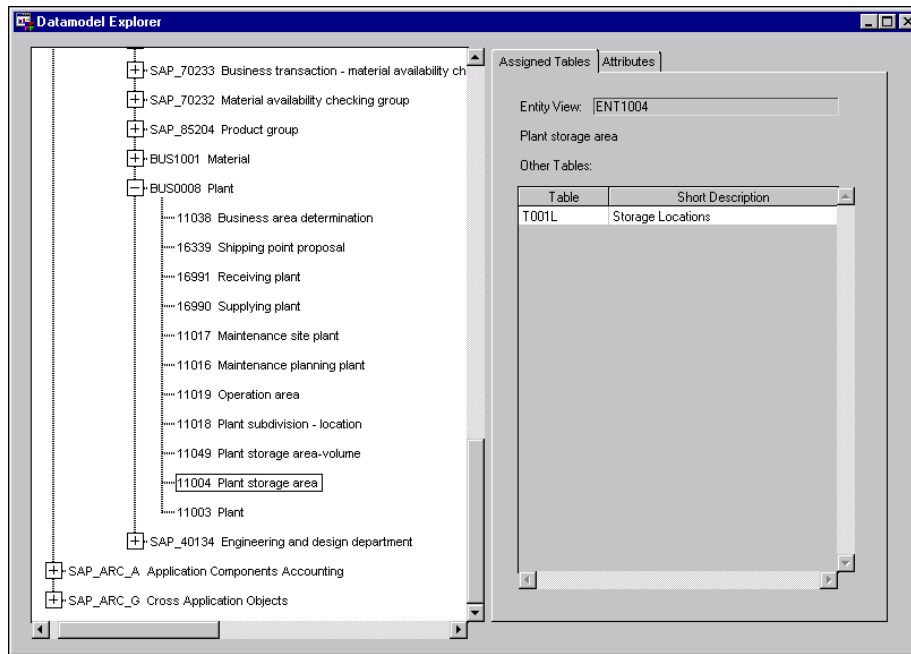
The `Assigned Tables` tab displays the Entity View name and a table that lists one or more tables that the entity type contains.

Attributes Tab

To display the `Attributes` tab, from the `All Entity Types` tab, double-click any line item and then click the `Attributes` tab.

Display 4.16   Attributes Tab of the Datamodel Explorer Window
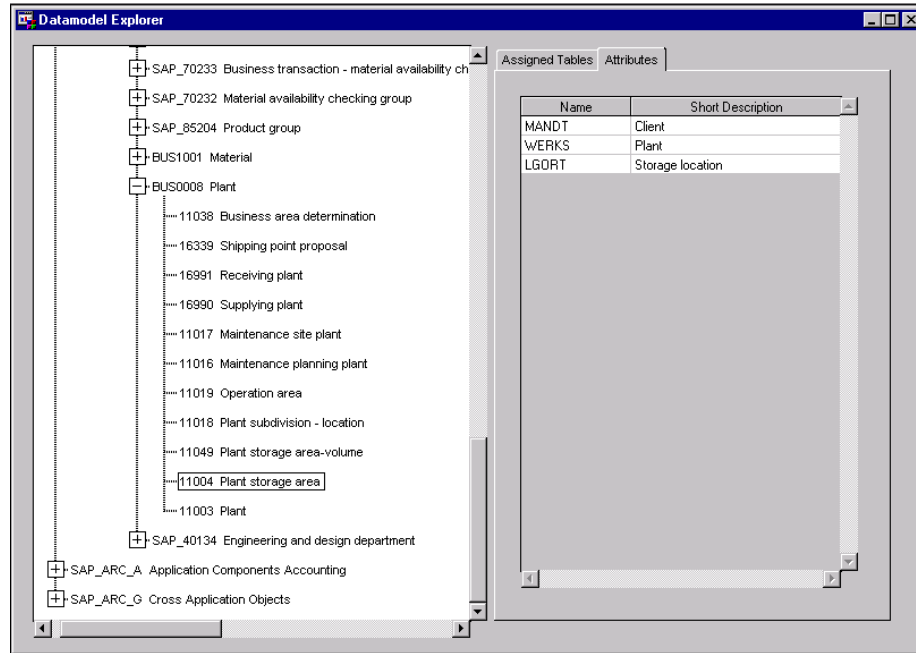
An attribute is a field of an entity view. The **Attributes** tab displays a table that contains the name and a short description of the fields in the selected table.

Datamodel Explorer Window Menus

The Datamodel Explorer window contains several menus. While **Edit**, **Solutions**, **Window**, and **Help** menus are part of the standard SAS environment and are fully documented in your SAS reference manuals, the **File**, **View**, **Tools**, and **Connections** menus have commands that are specific to SAS/ACCESS Interface 4.2 to R/3.

File Menu

Display 4.17   File Menu of the Datamodel Explorer Window
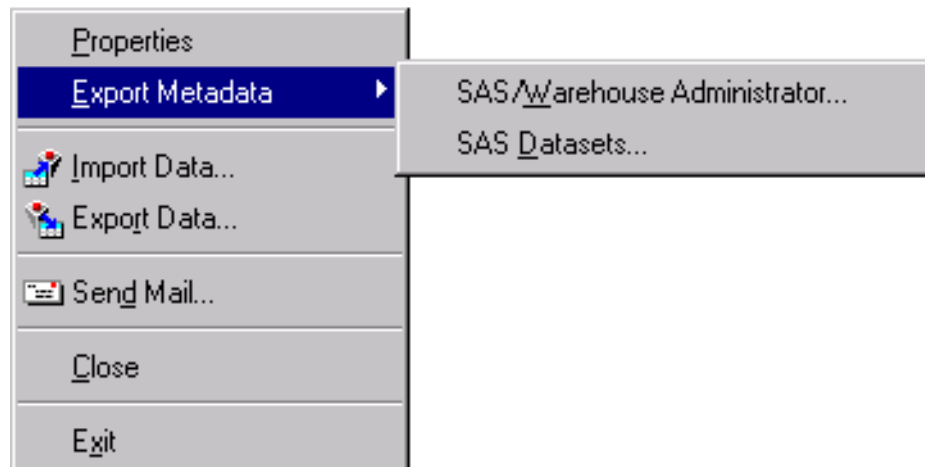
The R/3 File menu contains the following commands:

Properties	displays the General Attributes for a List of Tables window that is shown in Display 4.22 on page 36.
Export Metadata	refines the choice to export to either **SAS/Warehouse Administrator** or to **SAS Datasets**.
	Select **SAS/Warehouse Administrator** to display the Export Metadata to SAS/Warehouse Administrator window that is shown in Display 4.34 on page 50. Select **SAS Datasets** to display the Export Metadata window that is shown in Display 4.33 on page 49.

View Menu

Display 4.18   View Menu of the Datamodel Explorer Window
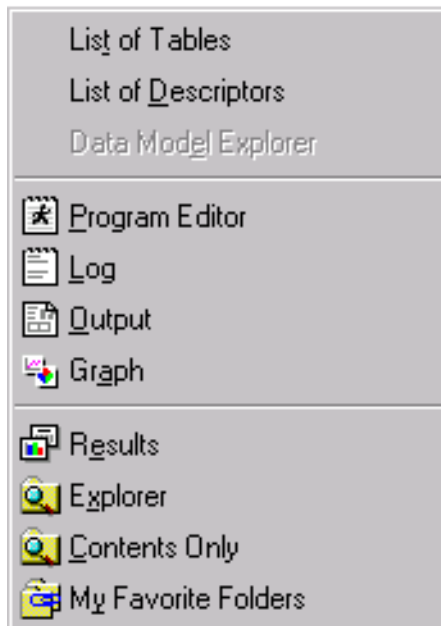
The R/3 View menu contains the following commands:

List of Tables	displays the List of R/3 Tables window that is shown in Display 4.31 on page 47.
List of Descriptors	displays the List of R/3 Descriptors window that is shown in Display 4.32 on page 48.

Tools Menu

Display 4.19   Tools Menu of the Datamodel Explorer Window

The R/3 Tools menu contains the following commands:

Create Views	creates SAS data views to the R/3 tables. If the views already exist, a dialog box prompts you to decide whether you want to cancel, overwrite all currently existing views or to decide on an individual view basis. A data set type of ACCR3 is added to all data sets and views that SAS/ACCESS Interface 4.2 to R/3 creates.
Create R/3 Descriptors	creates the R/3 descriptors. You should only use SAS/ACCESS Interface 4.2 to R/3 to delete descriptors that were created using the interface. Internal tables track the descriptors, and using external tools to delete descriptors can make the tables inconsistent.
Search Metadata	displays the Data Dictionary Search Facility window that is shown in Display 4.36 on page 52.

Connections Menu

Display 4.20   Connections Menu of the Datamodel Explorer Window
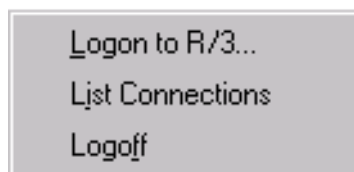
The R/3 Connections menu contains the following commands:

`Logon to R/3`	displays the Logon to R/3 window that is shown in Display 4.2 on page 17.
`List Connections`	displays the SAS/ACCESS to R/3: List of Connections window that is shown in Display 4.21 on page 33.
`Logoff`	disconnects the current logon profile from the R/3 system.

List of Connections Window

Use the List of Connections window to display the current and available user profiles for connecting to the R/3 systems. You can also use the List of Connections window to log on to the systems.

Follow these steps to display the List of Connections window:

1 From the SAS/ACCESS to R/3 desktop, start the Datamodel Explorer.

2 From the Datamodel Explorer menu, select **Connections ▶ List Connections**.

The List of Connections window displays.

Display 4.21 List of Connections Window
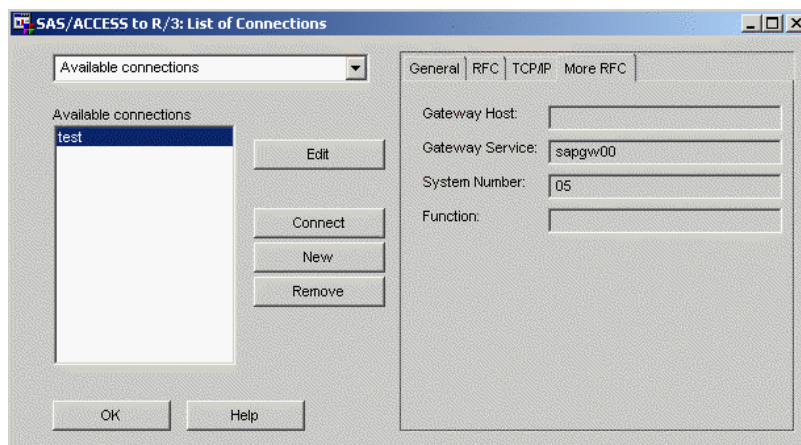
The drop-down list on the upper left side of the window displays the type of connection that is shown in the connection list box. Click the down arrow icon to view the `Available connections` or `Open connections` connection types. The connection list box on the lower left side of the window then displays a list of connections for that connection type.

When you select `Available connections`, the following buttons are available:

Edit	displays the Logon to R/3 window, which allows you to edit the profiles.
Connect	connects to an R/3 database by using the connection parameters that are selected in the connection list box. If no connection is selected in the connection list box, this button is disabled.
New	displays the Logon to R/3 window that is shown in Display 4.2 on page 17.
Remove	deletes the connection that is selected in the connection list box. If no connection is selected in the connection list box, this button is disabled.

OK   saves your changes, closes the List of Connections window, and
                returns you to the Datamodel Explorer window.

Help   displays the SAS Help for the List of Connections window.

When you select **Open Connections**, the following buttons are available:

Disconnect   disconnects the open connection that is selected in the connection
                list box. If no connection is open, this button is disabled.

OK   saves your changes, closes the List of Connections window, and
                returns you to the Datamodel Explorer window.

Help   displays the SAS Help for the List of Connections window.

When you select a connection in the connection list box, the following tabs display in
the right half of the window. Information that is contained in these tabs is similar to
the information that displays in the Advanced Parameters window.

- □ **General**
- □ **RFC**
- □ **TCP/IP**
- □ **More RFC**

You can only view the information that is contained in these tabs; you cannot edit
information from this window.

General Tab

The **General** tab of the List of Connections window contains the following fields:

Connection Id   displays the text label for the connection ID. The label must follow
                     standard SAS syntax.

Remote   displays the remote host if one is specified. To read R/3 tables into
                     SAS data sets on a remote SAS session, you must establish the
                     connection to the R/3 session in the remote SAS session.

Profile   displays the connection profile name.

Description   displays a text description of the connection profile.

RFC Tab

The **RFC** tab of the List of Connections window contains the following items:

Client   displays the three-digit R/3 client identification number.

User   displays the R/3 user ID.

Language   displays the language that the RFC logon uses.

Host   displays the R/3 server to which the RFC server connects. No
                     default value is set for this field.

Destination   is a logical name used by the sideinfo file, if one is defined. If a
                     destination is set here, the sideinfo file overrides information that
                     you entered in other fields on the **RFC** tab.

TCP/IP Tab

The `TCP/IP` tab of the List of Connections window contains the following fields:

Host   displays the network location of the RFC server. The default is `localhost`, and a fully qualified domain name is not required. For example, if the RFC server is reachable by using the DNS name rfc.example.com and is on the local area network, the `Host` field accepts either `rfc` or `rfc.example.com`. It also accepts numeric addresses.

Port   displays the TCP/IP port to use for communicating with the RFC server. The default port number is `6991`.

More RFC Tab

The `More RFC` tab of the List of Connections window contains the following fields:

Gateway Host   displays the gateway host that the RFC server uses to communicate with the R/3 system. The default value is `Host`.

Gateway Service   displays the communication gateway service that is used by R/3.

System Number   displays the system number that identifies which R/3 system to access if more than one R/3 system resides on the same host. At times more than one R/3 system can operate on the same host, such as a development or test R/3 system that runs on the same host hardware as a production R/3 system. The default value is `0`.

Function   specifies a SAS function to call as part of the R/3 logon process.

General Attributes for a List of Tables Window

Use the General Attributes for a List of Tables window to display the descriptor, SAS data view, and source entry for selected tables of the data model that you selected in the main window of the Datamodel Explorer.

To display the General Attributes for a List of Tables window that is shown in Display 4.22 on page 36, start the Datamodel Explorer and select a data model from the tree diagram and then perform one of the following actions:

□ Select **File ▶ Properties**.

□ Select **View ▶ List of Tables** to display the List of R/3 Tables window that is shown in Display 4.31 on page 47, and then select a table and click Properties .

□ Right-click the selected data model and select `Properties` from the pop-up menu.

Display 4.22   General Attributes for a List of Tables Window
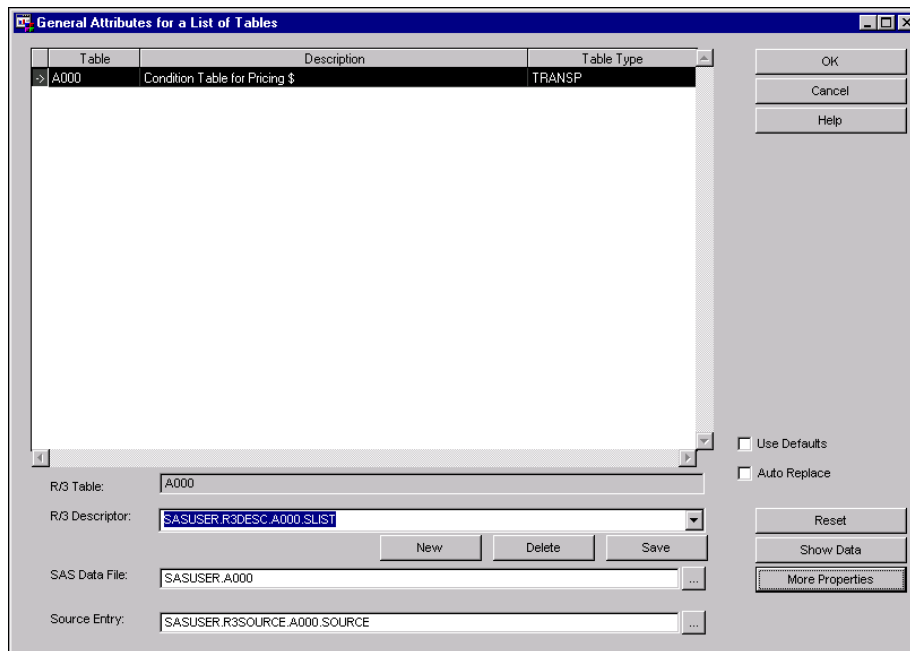
The window displays all tables that are associated with the data model that is selected in the main window of the Datamodel Explorer window. The three columns of the table display the table identifier, the text description of the table, and the table type.

The General Attributes for a List of Tables window contains the following items:

Use Defaults   resets the values for the selected table to the default values.

Auto Replace   specifies whether you want to automatically overwrite the existing descriptor, data file (either a view or a data set), and source library for the selected table with any changes you have made on the General Attributes for a List of Tables window. Select the check box to automatically save changes to the descriptor, data file, and source library and to overwrite the existing table information when you click ⌷Save⌷. Do not select the check box if you want to be prompted whether to overwrite the existing table information when you click ⌷Save⌷.

R/3 Table   displays the table identifier in the **Table** column on the General Attributes for a List of Tables window. You cannot edit this field.

R/3 Descriptor   enables you to specify a descriptor for the selected table. Click the down arrow to display a pull-down list of previously saved descriptors. Right-click inside the field to display a pop-up menu that enables you to perform the following actions:

   □ Enter a new catalog entry name for the selected descriptor using the Enter Catalog Entry Name window that is shown in Display 4.25 on page 40.

   □ Save the selected descriptor.

   □ Load the selected descriptor.

   □ Delete the selected descriptor.

SAS Data File enables you to perform the following actions:

- □ Enter a new data set name for the selected descriptor using the Enter Dataset Name window that is shown in Display 4.24 on page 39.
- □ Save the specified SAS data file.
- □ Delete the specified SAS data file.

Click the ellipsis (...) icon at the right of the field to display the Enter Dataset Name window. Right-click inside the field to display a pop-up menu that enables you to save or delete the SAS data files.

Source Entry enables you to perform the following actions:

- □ Enter a new catalog entry name using the Enter Catalog Entry Name window that is shown in Display 4.25 on page 40.
- □ Save the specified source entry.
- □ Delete the specified source entry.

Click the ellipsis (...) icon at the right of the field to display the Enter Catalog Entry Name window. Right-click inside the field to display a pop-up menu that enables you to save or delete the source entry.

This window contains the following buttons:

| OK | closes the General Attributes for a List of Tables window and returns you to the Datamodel Explorer window. |

| Cancel | closes the window without saving any changes that you have made. |

| Help | displays the SAS Help for the General Attributes for a List of Tables window. |

| Reset | applies default values. |

| Show | displays the System R/3 table. |

| More Properties | displays the Attributes for a Table (Edit) window. |

| New | displays the Enter Catalog Entry Name window. |

| Delete | deletes the descriptor that is shown in the **R/3 Descriptor** field. |

| Save | creates and saves a descriptor of the same name as the selected item in the **R/3 Descriptor** field. A dialog box displays to indicate that the R/3 descriptor was created. If the descriptor already exists, a dialog box prompts you to replace the existing descriptor file or to cancel the operation. |

The General Attributes for a List of Tables window also contains additional R/3 features that are available from the **Tools** menu.

Display 4.23 Tools Menu of the General Attributes for a List of Tables Window

The R/3 **Tools** menu contains the following commends:

Create Views creates SAS data views to the R/3 tables. If the views already exist, a dialog box prompts you to decide whehter you want to cancel, overwrite all currently existing views, or to decide on an individual view basis. A data set type of ACCR3 is added to all data sets and views that SAS/ACCESS Interface 4.2 to R/3 creates.

Create R/3 Descriptors creates the R/3 descriptors that were the base element of SAS/ ACCESS Interface 4.2 to R/3 in previous releases.

Save Source saves the generated source code to the specified source entry.

Create Extract Programs displays the Create Extract Programs window that is shown in Display 4.26 on page 41.

Options ▷ Access to R/3 displays the Application Setup window that is shown in "Application Setup Window" on page 23.

Enter Dataset Name Window

Use the Enter Dataset Name window to select or create a data set and to specify the host and library associated with the data set. You can also use it to specify whether the data set is a view or a data file.

Display 4.24   Enter Dataset Name Window
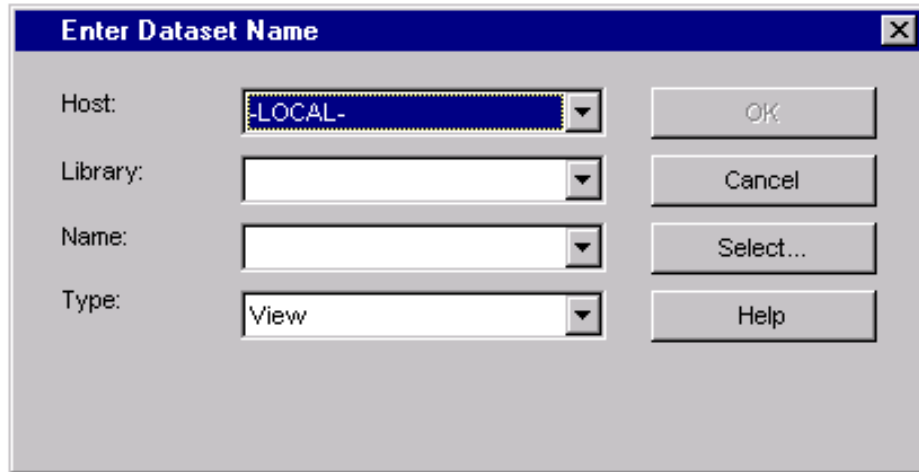
To display the Enter Dataset Name window, from the General Attributes for a List of Tables window, select a table and select the down arrow icon to the right of the **SAS Data File** field.

This window contains the following items:

OK	closes the window, creating the specified data set.
Cancel	closes the window.
Select	displays a window that you can use to browse for a library.
Help	displays the SAS Help for the window.
Host	specifies the host where the data set is stored.
Library	specifies the library where the data set is saved.
Name	specifies the name of the data set.
Type	specifies the information type for the data set. Valid values are **View** and **Data Set**.

Enter Catalog Entry Name Window

Use the Enter Catalog Entry Name window to select or create a SAS catalog entry, to specify the host and library associated with the entry, and to specify the type of the catalog entry.

Display 4.25 Enter Catalog Entry Name Window
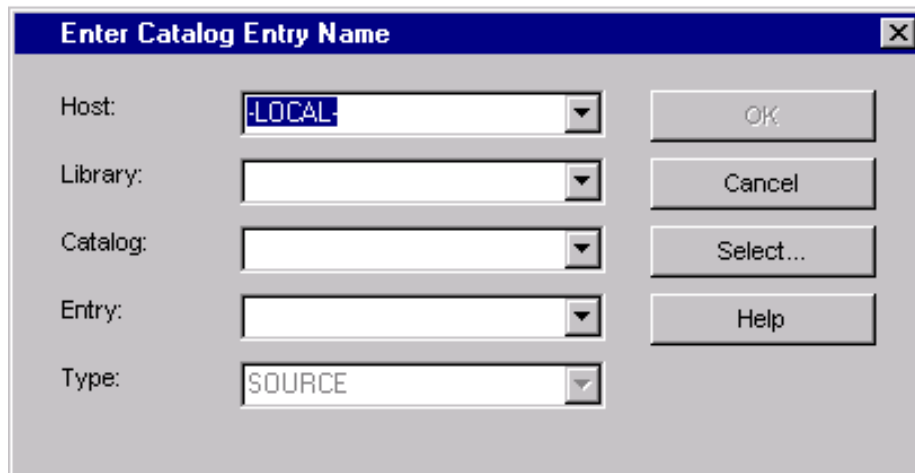
To display the Enter Catalog Entry Name window, from the General Attributes for a List of Tables window, select a table, and select the down arrow icon to the right of the **Source Entry** field.

This window contains the following items:

OK	closes the window, creating the specified catalog entry.
Cancel	closes the window.
Select	displays a window that is used to browse for a catalog.
Help	displays the SAS Help for the window.
Host	specifies the host where the catalog entry is stored.
Library	specifies the library whierethe catalog entry is saved.
Catalog	specifies the catalog where the catalog entry is saved.
Entry	specifies the name for the catalog entry.
Type	displays the information type for the catalog entry. The default is **SOURCE**.

Create Extract Programs Window

Use the Create Extract Programs window to help you to generate SAS and R/3 programs for extracting data with an intermediate external file. To display the Create Extract Programs window, from the General Attributes for a List of Tables window, select an R/3 table, select **Tools**, and then select **Create Extract Programs**.

Display 4.26 Create Extract Programs Window
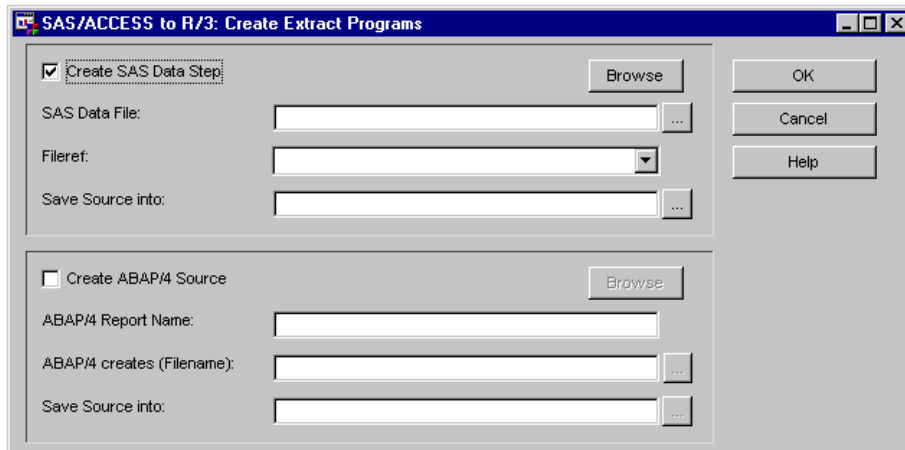
The Create Extract Programs window contains the following items:

OK	generates the source and saves it into the specified catalog entries.
Cancel	closes the window.
Help	displays the SAS Help for the Create Extract Programs window.

The two display areas are for defining parameters for creating SAS DATA steps and ABAP source files. The following items are available for creating DATA steps:

Create SAS Data Step	enables the fields for creating a DATA step. If this check box is not selected, the associated fields are disabled.
SAS Data File	specifies the name of the resulting SAS data set or SAS data set view. Click the icon to the right of the field to open the Enter Dataset Name window that is shown in Display 4.24 on page 39.
Fileref	specifies the SAS file reference to the intermediate external file. It can also be a PIPE to read directly in the output of an ABAP program. Click the down arrow icon to the right of the field to display a drop-down list of available filerefs.
Save Source into	specifies the four-level name of a SAS catalog in which to save the source code of the SAS DATA step. Click the icon to the right of the field to display the Enter Catalog Entry Name window that is shown in Display 4.25 on page 40.
Browse	displays the SAS data file that is generated from the selections.
Create ABAP Source	enables the fields for creating an ABAP source. If this check box is not selected, the associated fields are disabled.
ABAP Report Name	specifies the name of the ABAP report that is being generated. The filename should begin with the letter Z.
ABAP creates (Filename)	specifies an external filename. Click the icon to the right of the field to display the Save As window.

Display 4.27   Save As - SAS/ACCESS to R/3: Create Extract Programs Window
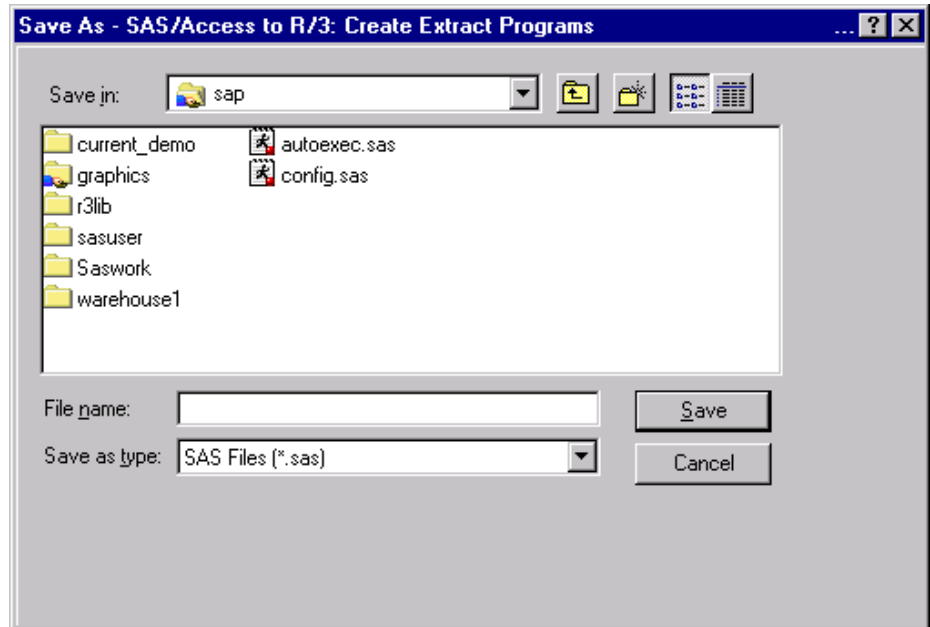
Save Source into	specifies the four-level name of a SAS catalog in which to save the source code of the ABAP report. Click the icon to the right of the field to display the Enter Catalog Entry Name window that is shown in Display 4.25 on page 40.
Browse	displays the generated ABAP program.

Attributes for a Table (Edit) Window

The Attributes for a Table (Edit) window provides information about the characteristics of specific tables within the R/3 database. To display the Attributes for a Table (Edit) window, from the General Attributes for a List of Tables window, select an R/3 table. Click More Properties to display the Attributes for a Table (Edit) window. The Attributes for a Table (Edit) window contains the **General Attributes**, **Fields**, **Where**, and **Related Tables** tabs.

Display 4.28 Attributes for a Table (Edit) Window
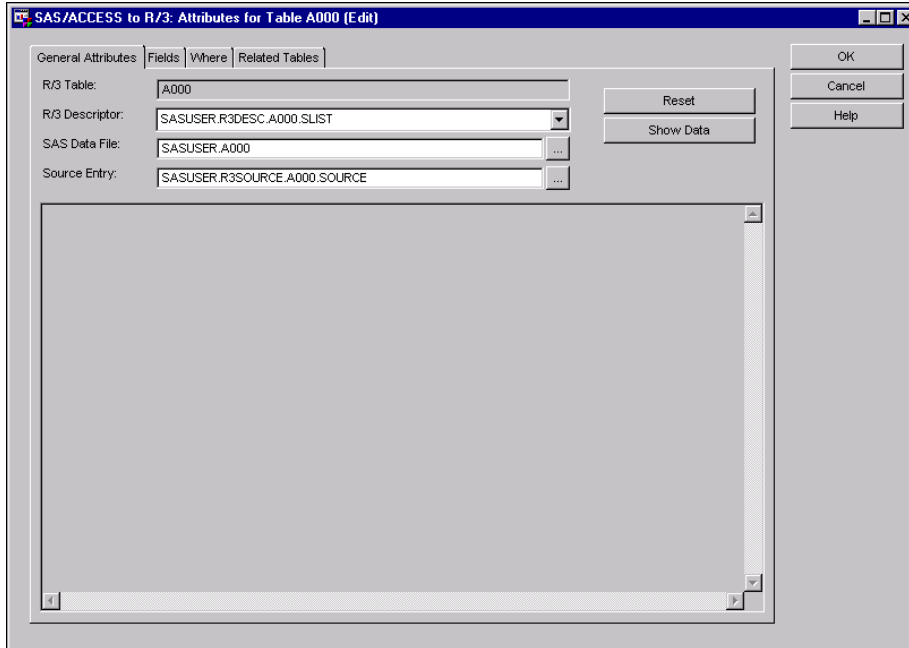
This window contain the following buttons:

OK	closes the Attributes for a Table (Edit) window and returns you to the General Attributes for a List of Tables window, saving your changes.
Cancel	closes the Attributes for a Table (Edit) window and returns you to the General Attributes for a List of Tables window without saving any change that you might have made.
Help	displays the SAS Help for the Attributes for a Table (Edit) window.

General Attributes Tab

The **General Attributes** tab of the Attributes for a Table (Edit) window describes the source for the data and the SAS view.

This tab contains the following items:

R/3 Table specifies the R/3 table from which to read the data.

R/3 Descriptor enables you to specify a descriptor for the selected table. Click the down arrow to display a pull-down list of previously saved descriptors. Right-click inside the field to display a pop-up menu that enables you to

□ enter a new catalog entry name for the selected descriptor using the Enter Catalog Entry Name window that is shown in Display 4.25 on page 40.

□ save the selected descriptor.

□ load the selected descriptor.

□ delete the selected descriptor.

SAS Data File specifies the SAS data view to use with the table. Click the icon to the right of the field to display the Enter Dataset Name window that is shown in Display 4.24 on page 39.

|	
Source Entry	specifies the source to which the DATA step is saved. Click the icon to the right of the field to display the Enter Catalog Entry Name window that is shown in Display 4.25 on page 40.
Reset	resets the drop-down lists to their default settings.
Show Data	shows the data from the R/3 table.

Fields Tab

The **Fields** tab is the default tab that is selected when the Attributes for a Table (Edit) window display. This tab displays the field names and descriptions for the selected table.

The table on this tab displays the information for each field in the selected table. For each field in the table, the table and the lower part of the tab display these items:

- **Field Name**
- **Primary Key**
- **Description**
- **SAS Name**
- **Format**
- **Informat**

You can edit the SAS name, the format, and the informat in the lower part of the tab. During the import process, special characters in the Field Name such as a forward slash (/) are converted to an underscore (_) in the SAS Name. Also, if a numeric field has more than 10 decimal places, the decimal places are omitted from the informat and the affected field is multiplied by 10^{**} (-d) in the data set.

This tab contains the following buttons:

Select Fields	displays the Select Fields for a table window shown in Display 4.29 on page 45, which allows you to choose which fields of the table display or are hidden in this tab.
Apply	saves changes made to the SAS name, the format, and the informat in the lower part of the tab.
Long Desc.	displays the Long Description window, which displays the long description for the selected field.

Where Tab

The **Where** tab enables you to edit or build a clause to query the rows that are extracted from the R/3 table. You can use SAS/ACCESS Interface 4.2 to R/3 to generate an ABAP WHERE clause that the application passes to the R/3 system, along with other parameters such as table name, record length, and so on.

This tab contains the following buttons:

|	
Check	checks the syntax of the entered WHERE clause.
Reset	discards any changes made to the WHERE clause.
Clear	removes the WHERE statement from the entry field.
Build	displays the ABAP Where Expression Builder window that is shown in Display 4.30 on page 46.

Related Tables Tab

The **Related Tables** tab of the Attributes for a Table (Edit) window presents a cross-reference of R/3 tables (if any) that share a field with the selected table.

The Related Tables tab contains two tables. The table on the left half of the tab displays the abbreviation and description for all R/3 system tables that share a field with the selected table. Select a table name in the left-hand table to display a second table on the right half of the tab that displays the field or fields that the two tables have in common. Double-click a table to display the General Attributes for a List of Tables window and the properties for the selected table.

Select Fields for a Table Window

To display the Select Fields for a Table window, display the Attributes for a Table (Edit) window, select the **Fields** tab, and then click Select Fields . Use the Select Fields for a Table window to select fields for viewing and querying.

Display 4.29 Select Fields for a Table Window
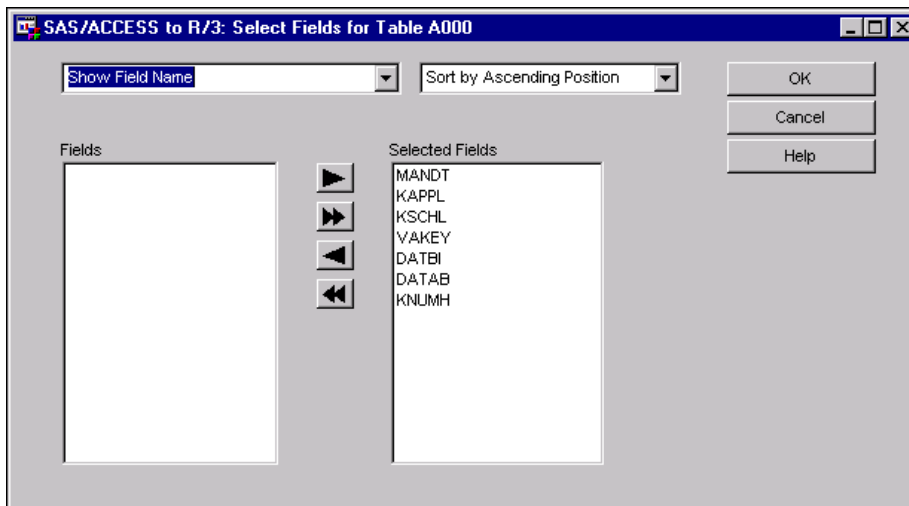
The buttons available on the Select Fields for a Table window are

 OK closes the Select Fields for a Table window and returns you to the Attributes for a Table (Edit) window, saving your changes.

 Cancel closes the Select Fields for a Table window and returns you to the Attributes for a Table (Edit) window without saving any changes.

 Help displays the SAS Help for the window.

Use the drop-down list on the left-hand side of the window to select either **Show Field Name** or **Show Field Description**. Use the drop-down list on the right-hand side of the window to specify how the fields are sorted in the **Fields** and **Selected Fields** lists. The **Selected Fields** list shows the fields that are listed in the General Attributes for a List of Tables window. The **Fields** list shows the fields that are not listed in the General Attributes for a List of Tables window.

Use the buttons between the **Fields** and **Selected Fields** lists to move fields between the two list boxes. To move a field from one list box to the other, select the field name, and then click the left arrow or the right arrow button. To move all of the fields in a list box to the other list box, click the left double arrow button or the right double arrow button.

ABAP Where Expression Builder Window

The ABAP Where Expression Builder window enables you to create queries in ABAP syntax. To display the ABAP Where Expression Builder window, from the General Attributes for a List of Tables window, select an R/3 table. Then, click More Properties to display the Attributes for a Table (Edit) window, as shown in Display 4.28 on page 43, and select the **Where** tab. From the **Where** tab, click Build to display the ABAP Where Expression Builder window.

Display 4.30 ABAP Where Expression Builder Window
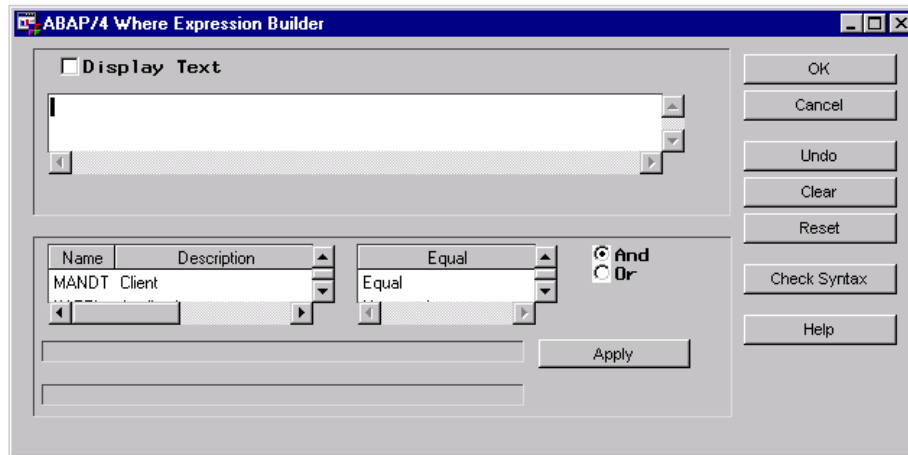
This window contains the following items:

Display Text controls whether the label name or description displays in the text entry field. If you select the check box, the description displays. You cannot edit the text description.

R/3 Table Variables list box displays the available variables for the selected R/3 table. Use these variables to write the WHERE statement.

Logical Operator list box displays the logical operators for the WHERE statement: equal, less than, greater than, null, and so on.

And/Or controls the relation of a query clause to the following query clause. The default value is **And**.

OK closes the window and saves the query.

Cancel closes the window without saving any changes.

Undo deletes the last change made in the window.

Clear clears the current WHERE query.

Reset resets the query parameters to their previously saved status.

Check Syntax checks the syntax of the query as currently constructed.

Help displays the SAS Help for the ABAP Where Expression Builder window.

Apply controls the insertion of the Where clause. Select on of the valid actions from the pop-up window: `Insert before current line`, `Insert after current line`, `Replace current line`, `Insert at the top`, and `Append at the bottom`.

Using the List of R/3 Tables

Use the List of R/3 Tables window to view all R/3 system tables and information about those tables. To display the List of R/3 Tables, go to the SAS Desktop and open the SAS/ACCESS to R/3 desktop that is shown in Display 4.1 on page 17. Double-click the List of R/3 Tables icon to open the List of R/3 Tables window that is shown in Display 4.31 on page 47.

To display the List of R/3 Tables window from the Datamodel Explorer, start the Datamodel Explorer and select **View ▶ List of Tables**.

List of R/3 Tables Window

The List of R/3 Tables window displays a table that lists all available R/3 system tables.

Display 4.31   List of R/3 Tables Window

The table shows the name, type, and a short text description for every table in R/3. Use the `Table Name` field to enter a SAS text label for the name of the table. To display further details for a table, you can use the General Attributes for a List of Tables window by either double-clicking a table line item or by selecting a table line item from the list and then clicking Properties .

Using the List of Descriptors

Use the List of R/3 Descriptors window to view all R/3 descriptors and information about those descriptors. To display the List of R/3 Descriptors, go to the SAS Desktop and open the SAS/ACCESS to R/3 desktop that is shown in Display 4.1 on page 17. Double-click the List of R/3 Descriptors icon to open the List of R/3 Descriptors window that is shown in Display 4.32 on page 48.

To display the List of R/3 Descriptors window from the Datamodel Explorer, start the Datamodel Explorer and select **View ▶ List of Descriptors**.

List of R/3 Descriptors Window

The List of R/3 Descriptors window displays all descriptors that are associated with a data model that you selected using the Datamodel Explorer window. In addition to displaying the descriptors, the List of R/3 Descriptors window shows the tables that are related to each descriptor and the date when the descriptor was last updated.

Display 4.32   List of R/3 Descriptors Window
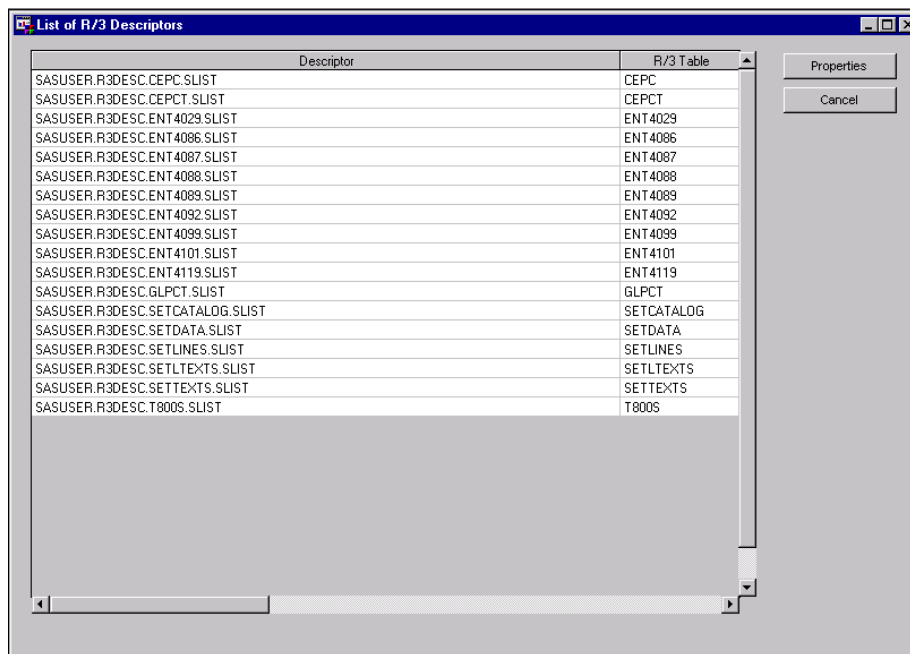
Selecting a line item in the table and clicking `Properties` displays the General Attributes for a List of Tables window that is shown in Display 4.31 on page 47.

Export Metadata Window

Use the Export Metadata window to define parameters for exporting metadata from R/3 tables to a SAS library.

Follow these steps to display the Export Metadata window:

1 Start the Datamodel Explorer.

2 Select a data model and entity type.

3 Select **File ▶ Export Metadata ▶ SAS Datasets** from the pull-down menu.

The Export Metadata window displays.

Display 4.33   Export Metadata Window
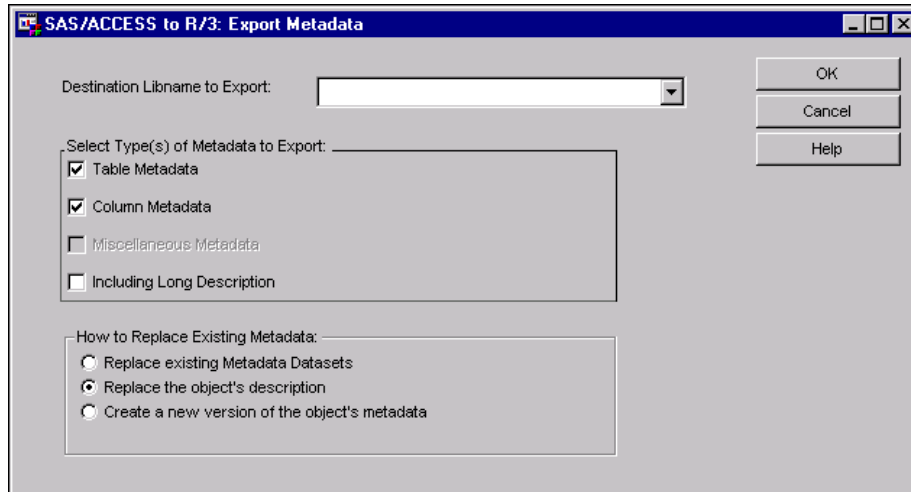
From the **Destination Libname to Export** drop-down list, select the library where you want to export metadata. A data set type of ACCR3 is added to all data sets and views that SAS/ACCESS Interface 4.2 to R/3 creates. Then select the type of metadata to export and whether to replace existing data sets or create new data sets for the metadata that you are exporting.

Export Metadata to SAS/Warehouse Administrator Window

Use the Export Metadata to SAS/Warehouse Administrator window to define parameters for exporting metadata from R/3 tables to a SAS data warehouse environment.

Follow these steps to display the Export Metadata to SAS/Warehouse Administrator window:

1 Start the Datamodel Explorer.

2 Select a data model and entity type.

3 Select **File ▶ Export Metadata ▶ SAS/Warehouse Administrator** from the pull-down menu.

The Export Metadata to SAS/Warehouse Administrator window displays.

Display 4.34   Export Metadata to SAS/Warehouse Administrator Window

From the **Data Warehouse Environment** drop-down list, select the environment to which you want to export metadata. To define or view properties for the selected environment, click the ellipses (…) button to display the Data Warehouse Environment Properties window, as shown in Display 4.35 on page 51. From the **Operational Data Group** drop-down list, select the ODD group name, and select or specify the ODD in the **ODD Name** field. Then select the type of metadata to export and whether to replace existing ODDs or create new ODDs for the metadata that you are exporting.
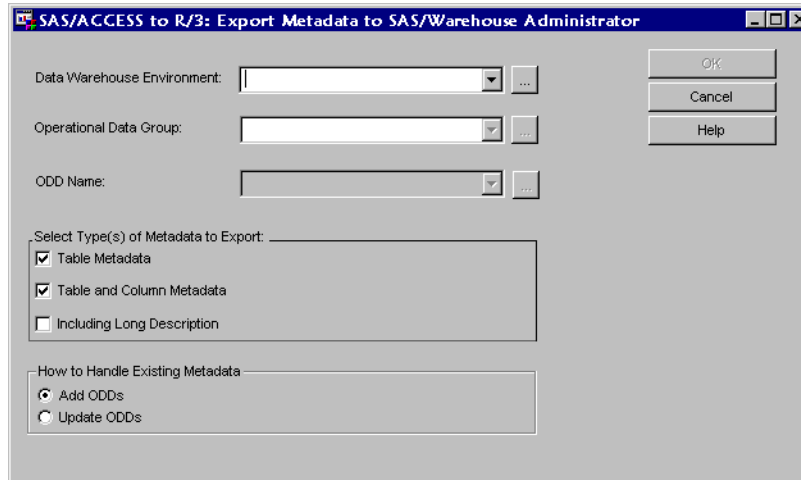
The following information is exported from SAS/ACCESS Interface 4.2 to R/3 to create SAS/Warehouse Administrator operational data definitions (ODDs). An ODD is created from each Entity View and Assigned Table. Any new ODD group that SAS/ACCESS Interface 4.2 to R/3 created in a SAS data warehouse has the Access to R/3 extended attribute.

Table 4.1   ODD to Warehouse Administrator Correspondences

ODD	SAS/Warehouse Administrator
ODD Name	Table/Entity Name
ODD Description	Table/Entity Description
ODD Notes	Table/Entity Long Description
ODD Data Location	SAS Library
ODD Data Location	Table/View Name

Fields are exported to columns in an ODD, which should include the name, short description, format, and informat. If a field has a defined long description, it is exported as a column note. Finally, the CREATED BY, CVALUE, and DATAMODEL_OR_ENTITY_TYPE extended attributes are created for each ODD.

Long descriptions cannot be exported by themselves. They can be exported only with table or table column metadata.

Selecting the ellipses (…) button at the right of the **Data Warehouse Environment** field displays the Data Warehouse Environment Properties window, which you can use to specify or view detailed information about the data warehouse environment.

Display 4.35 Data Warehouse Environment Properties Window
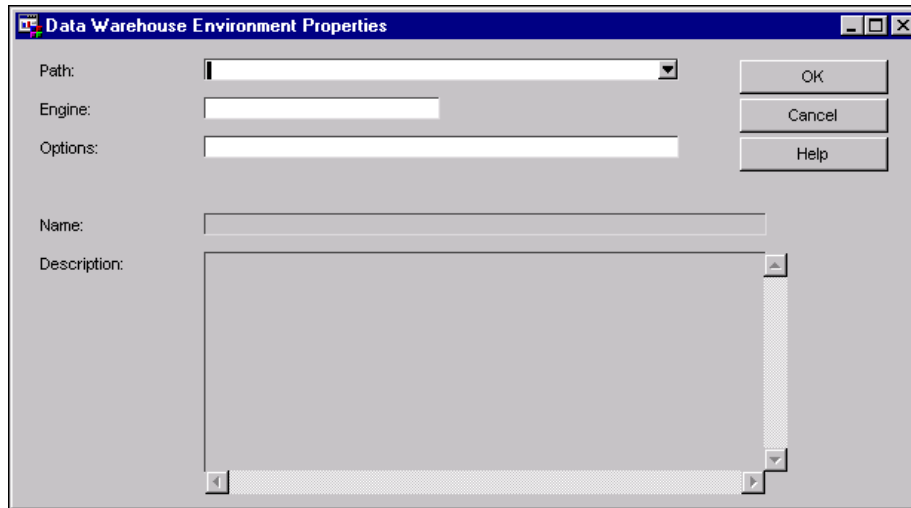
This window contains the following items:

Path
specifies the physical pathname of the directory for the data warehouses in the environment.

Engine
specifies the engine that you want to use to access the environment. The default engine is **V8**.

Options
specifies any LIBNAME statement options for the environment.

Name
displays the name of the selected data warehouse environment.

Description
displays a description of the environment, if present.

OK
closes the window, saving any entered properties.

Cancel
closes the window without saving any entered properties.

Help
displays the SAS Help for the Data Warehouse Environment Properties window.

Using the Search Metadata Utility

Use the Search Metadata utility to search the entire R/3 database for a given text string. You can optionally limit the search to tables, entities, data models, and other filtering choices.

Data Dictionary Search Facility Window
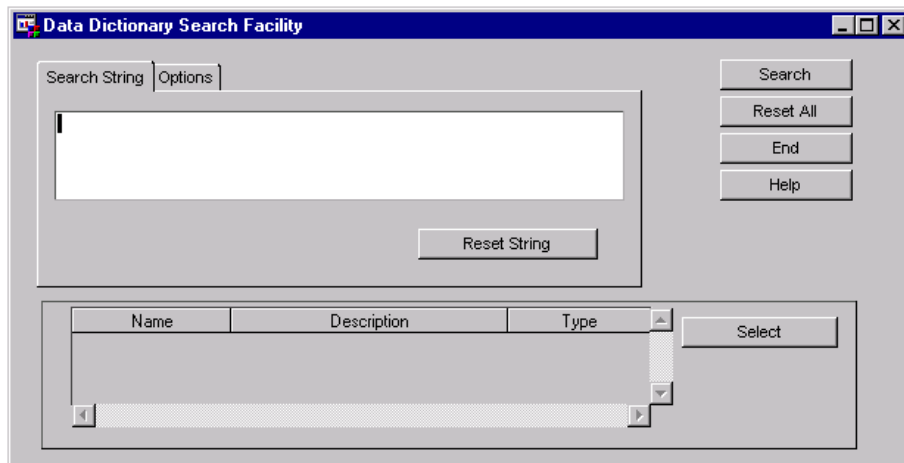
Use the Data Dictionary Search Facility window to search the R/3 database by using SAS/ACCESS Interface 4.2 to R/3.

Follow these steps to display the Data Dictionary Search Facility window:

1 From the SAS desktop, open the SAS/ACCESS to R/3 desktop that is shown in Display 4.1 on page 17.

2 Double-click the Search Metadata icon to open the Data Dictionary Search Facility window.

Display 4.36 Data Dictionary Search Facility Window

Note: You can also display the Data Dictionary Search Facility window from the Datamodel Explorer by selecting **Tools ▶ Search Metadata** from the pull-down menu. △

This window contains the following items:

Search	searches for the entered string and uses the current options.
Reset All	clears the search string from the entry field and resets the parameters on the **Options** tab to their defaults.
End	closes the Data Dictionary Search Facility window and returns you to the Datamodel Explorer window.
Help	displays the SAS Help for the Data Dictionary Search Facility window.
Select	displays the Datamodel Explorer and expands the tree diagram to show a selected data model or entity type that was found by the query. If a table in the results table is selected when you click Select, the General Attributes for the List of Tables window displays.

Search String Tab

The **Search String** tab enables you to query the data dictionary using a text search string. Use the **Search String** tab when you are searching the data dictionary for one or more specific data models.

Text field	specifies a text string with which to search the R/3 system. Searching with a special character such as a forward slash (/) requires single quotation marks around the special character. For example, enter **and'/'or** to search for the and/or string.
Reset String	clears the text field.

Options Tab

Use the **Options** tab to set parameters for a query against the data dictionary. You can specify the elements and fields that you want to include in the search, as well as the number of matches you want to display in the list of results.

Display 4.37 Options Tab of the Data Dictionary Search Facility Window
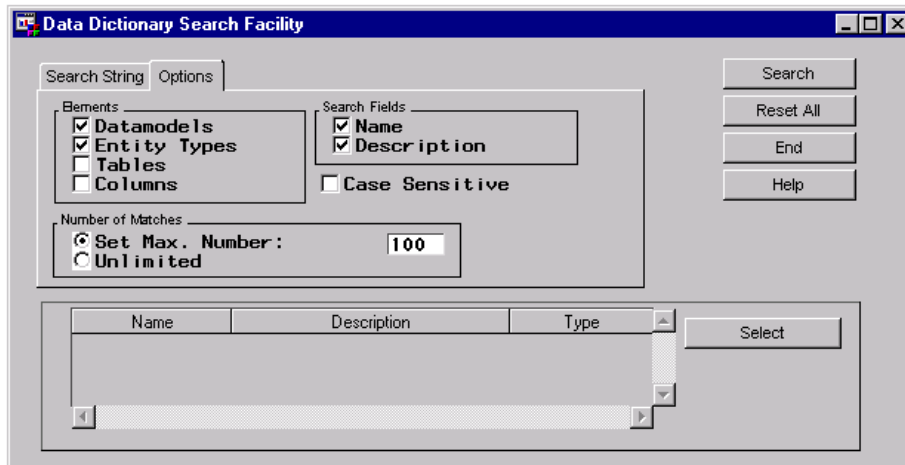
This tab contains the following items:

Datamodels	searches the data model element for the search string. This check box is selected by default.
Entity Types	searches the entity element for the search string. This check box is selected by default.
Tables	searches the table element for the search string. This check box is selected by default if the window displayed from the Search Metadata icon on the desktop. However, if you displayed this window from the Datamodel Explorer, the check box is not automatically selected.
Columns	searches the column element for the search string. By default, this check box is not selected.
Set Max. Number	enables you to customize the number of matches to display from the query. If you select this option, enter the maximum number of matches in the entry field to the right of the radio button. The default is **100** matches.
Unlimited	displays all matches for the query.
Name	searches the name field for the search string. This check box is selected by default.
Description	searches the description field for the search string. This check box is selected by default.
Case Sensitive	requires that the case match the query specifications.

Performing Batch Operations

You can use batch operations to automate processes; for example, you can use them for overnight operations or to simplify connections for end users.

To open the connection for a batch operation, use the following code:

```
%r3connb(profile=profile-name, libref=SAS-libref, function=OPEN);
```

profile-name	specifies the name of the profile that is used to save the info in the Logon to R/3 window.
SAS-libref	specifies the SAS library where the profile was saved. If this parameter is not specified, the profile will be looked for in the SAS libraries WORK, SASUSER, and R3LIB (in that order).
function=OPEN	opens the connection.

To close the connection, use the following code:

```
%r3connb(profile=profile-name, libref=SAS-libref, function=CLOSE);
```

or

```
%r3connb(id=connection-id, function=CLOSE);
```

profile-name	specifies the name of the profile that is used to save the info in the Logon to R/3 window.
SAS-libref	specifies the SAS library where the profile was saved. If this parameter is not specified, the profile is searched for in the SAS libraries WORK, SASUSER, and R3LIB (in that order).
function=CLOSE	disconnects from the R/3 system.
connection_id	specifies the connection ID.

Source Parameter

Previous versions of SAS/ACCESS Interface 4.2 to R/3 included the use of a source parameter in the batch connection. For backward compatibility, use of the source parameter as described below is still supported, although not recommended.

Submit the following macro in SAS to set up the connection for batch:

```
%r3connb (source = libref.catalog.entry.SOURCE );
```

If operating in batch mode, disconnect before exiting by issuing the following command in SAS:

```
%r3connb (source = libref.catalog.entry.SOURCE, function = close);
```

Passwords

In batch processing, all parameters to log on to an R/3 system are generally stored in permanent SAS catalog entries. If you do not want to store all parameters, particularly the user ID, password, and client, you can use the following SAS code to prompt the user for this information. In this scenario, all other connection information—the function module name, the gateway host, or the gateway service—have to be entered in the Application Setup window when you create the SAS DATA step view.

```
/*--------------------------------------------------*/
/* This SAS program demonstrates how to prompt a user */
/* for the R/3 user ID, password, client, and        */
/* language information.                              */
/* The remote processing is enclosed in comments.     */
/*--------------------------------------------------*/

*--- reset password ---*;
   %let pwd=;
```

```
*--- set the message text ---*;
   %let message=Please enter the R/3 logon parameter;

*--- prompt the user for the parameters ---*;
   %macro secure;
   %global usr pwd cli lng;
   %window R3 columns=80 rows=15
     #2  @5 message 50 protect=yes
     #4  @5 "User    : " usr 10 required=yes
     #6  @5 "Password: " pwd 10 display=no required=yes
     #8  @5 "Client   : " cli 3 required=yes
     #10 @5 "Language : " lng 1 required=yes;
   %display R3;
   %mend secure;

   %secure;

/* === for remote processing =====================  */

*--- macro to pass macro variables to ---*;
*--- a remote SAS session ---*;
   %macro syslput(macvar,macval,remote=);
   %let str=%str(rsubmit &remote ;);
   %nrstr(%let) %str(&macvar = &macval ; endrsubmit;);
   &str ;
   %mend syslput;

*--- pass macro variables to the remote SAS session ---*;
   %syslput(usr,&usr);
   %syslput(pwd,&pwd);
   %syslput(cli,&cli);
   %syslput(lng,&lng);

*--- submit the code to the remote SAS session ---*;
   rsubmit;

=== end of remote processing =========================== */

*--- a temporary catalog entry for the connection ---*;
*--- parameters ---*;
   %let source=work.r3conn.conn1.source;

*--- the connection id ---*;
*--- ATTENTION: This has to be the same connection ID ---*;
*--- as the one that was used to create the views.    ---*;
   %let cconn=conn1;

*--- the host/port where the RFC server program ---*;
*--- is running ---*;
   %let tcphost=cafe7.eur.sas.com;
   %let port=6991;

*--- set the R/3 host parameter ---*;
```

```
   %let hst=hostname;

*--- save the parameters to the temporary catalog ---*;
*--- entry ---*;
   proc display c=sapr3.sr3dbi.savconnb.scl;
   run;

*--- connect to the R/3 system ---*;
   %r3connb(source=&source);

*--- use the Data Step view you have created with the ---*;
*--- SAS/ACCESS Interface 4.2 to R/3 ---*;

*--- close the connection to the R/3 system ---*;
   %r3connb(source=&source, function=close);

/* === for remote processing
=================================
   endrsubmit;

=== end of remote processing

=============================== */
*--- end of sample program ---*;
```
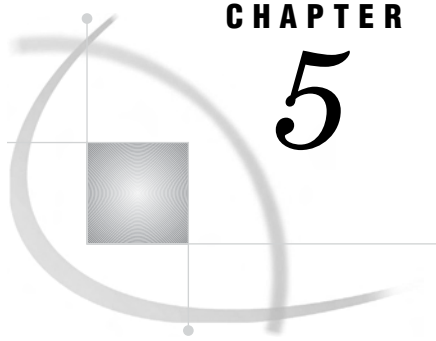
C H A P T E R

5

Using the RFC Server

Overview of the RFC Server

The RFC server is part of SAS/ACCESS Interface 4.2 to R/3 as described in Chapter 3, "Accessing and Using R/3 Data," on page 11. The RFC server is a component of the SAP LIBNAME engine that provides access to the data in SAP R/3 and SAP BW systems. The RFC server also supports calling ABAP RFC functions. The RFC server uses the TCP/IP protocol for communication with the SAP LIBNAME engine. For more information about the SAP LIBNAME engine, see "Overview of the LIBNAME Engine for SAP" on page 79.

The RFC server has the following features:

☐ It runs independently of SAS as a background process on the SAS host, the R/3 host, and another machine entirely.

☐ It can be configured to listen on any TCP/IP port (default **6999**).

☐ It can have more than one concurrent instance on a given machine (but each instance must have a unique port number). Each instance can communicate with many SAP R/3 or SAP BW system servers.

☐ It can process requests from multiple SAP application servers.

☐ It can support Unicode and non–Unicode SAP R/3 servers. The Unicode RFC server can be started from Windows only, but it can support Unicode SAP R/3 and SAS on all platforms. See "Using the RFC Server on Windows NT" on page 62 for information on starting a Unicode RFC server.

ABAP Function Modules and Programs

Some of the ABAP function modules and programs that were available in SAS/ACCESS Interface to R/3, Release 8.2, are no longer used in version 9 and later of SAS/ACCESS Interface 4.2 to R/3. These function modules and programs were used by the RFC server and the dialog RFC server that were included in the software prior to these releases. The new RFC server and RFC dialog server no longer use the following ABAP function modules and programs:

- □ **Z_SAS_BATCH_INTERFACE_4**
- □ **Z_SAS_READ_TABLE_CPIC**
- □ **ZSASRDTB**
- □ **ZSASRDBT**

Version 9 and later of SAS/ACCESS Interface 4.2 to R/3 also include SAP transport files that you can use to install the ABAP function modules and programs. It is recommended that you import the SAP transport files rather than installing the ABAP function modules and programs manually. For more information about installing ABAP function modules and programs using version 9 and later of SAS/ACCESS Interface 4.2 to R/3, refer to the *Installation Instructions for SAS/ACCESS Interface to R/3*.

Note: The transport files for SAS/ACCESS Interface 4.2 for R/3 contain different ABAP function modules and programs than the transport files for SAS/ACCESS Interface 4.2 to SAP BW. Make sure you use the correct files when installing your application. △

Using the RFC Server on UNIX

In a UNIX environment, the SAS RFC server for SAP is installed in the **!SASROOT/saspgm/dbi/bin** directory. You must add this directory to the **PATH** environment variable and add the location of the shared libraries to the appropriate environment variable. For more detailed information about how to set up the environment variables, see *Installation Instructions for SAS/ACCESS Interface to R/3*.

To start the SAS RFC server in a UNIX environment, use the following command

```
sasrfc_server [-d 0|1|2|3|4|5|6] [-n name] [-p port] [-w workdir] [-N namespace]
      [-V variant] [-help] [-c dialog_compat_port]
      [-b "-p port_number -V variant_name -R report_name"]
      [-B number_of_bytes] [-S "-a program_id -g gateway_host -x gateway_service"]
```

where optional parameters are enclosed in brackets [ ].

To stop the RFC server in a UNIX environment, use the following command

```
sasrfc_server [-k] [-p port]
```

where optional parameters are enclosed in brackets [ ].

The SAS RFC server command for UNIX has the following options:

-d *n*
    specifies whether to run the server as a daemon process or as an application and specifies the diagnostic level.

The server is run as a daemon process when you specify -d*n* where *n*=0 or when you do not specify the -d*n* option. After successful initialization, all messages are routed to **syslog**.

When you specify the -d*n* option where *n*= any number between **1** and **6**, the program runs as an application and messages are routed to standard error. Higher diagnostic levels route more detailed messages to standard error.

-k

stops the service.

-n *name*

specifies the name of the service. This option is used to distinguish multiple daemon processes. For example, a test service might be started as -n *test*.

-p *port*

identifies the port number on which the service listens. The default port number is **6999**.

-w *workdir*

specifies the working directory. For example, if your working directory is named **tmp**, specify the option as follows: **-w /tmp**.

-N *namespace*

specifies the namespace for ABAP functions and programs that are used by SAS. The default value is **/SAS/**. If the ABAP programs are installed in the customer namespace rather than in the **/SAS/** namespace, then this parameter identifies where the ABAP programs are installed.

-V *variant*

specifies the R/3 report variant that is assigned to this server. You must assign a report variant for each RFC server that accesses an R/3 application server in batch mode. The variant parameter G_DEST specifies a unique destination to call back to the RFC server.

-help

specifies that you want to display command line Help.

-c *dialog_compat_port*

identifies the option that, when specified, runs the RFC server in V8 compatibility mode on the port indicated by the *dialog_compat_port* parameter. The port number must be different than the one used for the V9 requests. If the -c option is omitted, no dialog compatibility will be available.

-b "-p *port_number* –V *variant_name* –R *report_name*"

enables batch compatibility so that you can process V8 ACCR3 requests while you are using a V9 RFC server. You must use the double quotation marks in the batch compatibility option in order to separate the batch compatibility parameters from the V9 parameters that use the same syntax.

The port parameter is optional. If omitted, the port number defaults to **6995**.

The report variant parameter is required and must be a valid variant of the report.

The report parameter is optional and normally is omitted. If the report parameter is omitted, then *report_name* defaults to /SAS/ZSASV8COMPAT.

The values in *port_number*, *variant_name*, and *report_name* must be different from the values used by V9 and different from the values used by dialog compatibility.

-B *number_of_bytes*

sets the minimum buffer size for data transfers in batch and dialog modes. The *number of bytes* should be greater than 10000 and no more than eight digits, or it will be ignored. If the –B option is omitted, the default is 10000 bytes.

If you specify a value for the G_BUFMAX parameter that is less than the value of –B in batch mode, then the –B value is used.

The options for the SAS RFC server command and the options for the Unicode RFC server on Windows NT are as follows:

–i *n*
  installs the program as a Windows service and specifies the startup option for a new service. Startup options are

  n=2   starts the service automatically

  n=3   starts the service on demand

  n=4   disables the service.

–r
  removes the program from the Service Manager.

–s
  starts the service.

–k
  stops the service.

–t *n*
  sets the startup option for an existing service. Startup options are

  n=2   starts the service automatically

  n=3   starts the service on demand

  n=4   disables the service.

-d *n*
  specifies the diagnostic level. When you specify the -d *n* option where *n*= any number between **1** and **6**, the program runs as an application and messages are routed to standard error. Higher diagnostic levels route more detailed messages to standard error.

–n *name,desc*
  specifies the name and description of the service.

–p *port*
  specifies the port number on which the server listens. The default port number is **6999**.

-N *namespace*
  specifies the namespace for ABAP functions and programs that are used by SAS. The default value is **/SAS/**. If the ABAP programs are installed in the customer namespace rather than in the **/SAS/** namespace, then this parameter identifies where the ABAP programs are installed.

-V *variant*
  specifies the R/3 report variant that is assigned to this server. You must assign a report variant for each RFC server that accesses an R/3 application server in batch mode. The variant parameter G_DEST specifies a unique destination to call back to the RFC server.

–help
  specifies that you want to display command line Help.

-c *dialog_compat_port*
  identifies the option that, when specified, runs the RFC server in V8 compatibility mode on the port indicated by the *dialog_compat_port* parameter. The port

number for a 9.1 request must be different than the one used for the version 9 requests. If the -c option is omitted, no dialog compatibility will be available.

-b "-p *port_number* –V *variant_name* –R *report_name*"
enables batch compatibility so that you can process V8 ACCR3 requests while you are using a V9 RFC server. You must use the double quotation marks in the batch compatibility option in order to separate the batch compatibility parameters from the V9 parameters that use the same syntax.

The port parameter is optional. If omitted, the port number defaults to **6995**.
The report variant parameter is required and must be a valid variant of the report.
The report parameter is optional and normally is omitted. If the report parameter is omitted, then *report_name* defaults to /SAS/ZSASV8COMPAT.
The values in *port_number*, *variant_name*, and *report_name* must be different from the values used by V9 and different from the values used by dialog compatibility.

-B *number_of_bytes*
sets the minimum buffer size for data transfers in batch and dialog modes. The *number of bytes* should be greater than 10000 and no more than eight digits, or it will be ignored. If the –B option is omitted, the default is 10000 bytes.

If you specify a value for the G_BUFMAX parameter that is less than the value of –B in batch mode, then the –B value is used.

-S "-a *program_id* -g *gateway_host* -x *gateway_service*"
permanently registers the SAS RFC server at an SAP gateway. You must specify the -S option in order to use the SAS RFC Monitor in the SAP Netweaver Portal. The option enables the server to receive requests for information from the RFC Server Monitor through a remote function call that uses an SM59 destination.

To register the server at more than one gateway, specify the –S option multiple times.

-a *program_id*
the *program_id* that you specify must match the program ID that you assign in the SM59 destination of type **registration**. The destination that you use must not be the same as other destinations that are used for batch extractions.

-g *gateway_host*
A valid SAP gateway host.

-x *gateway_service*
A valid SAP service.
For information about other setup requirements for using the SAS RFC Server Monitor, see the SAS RFC Server Monitor help in the SAP Netweaver Portal.

For example, to start the SAS RFC server as a daemon process with the name of **test** on port number **6991**, use the following command:

```
sasrfc_server -n test -p 6991
```

The following example command shows how to display command line Help:

```
sasrfc_server
```

To start the SAS RFC server with debug level **4** on port number **6991**, use the following command:

```
sasrfc_server -d 4 -p 6991
```

To stop a SAS RFC server that is running on port number **6991**, use the following command:

```
sasrfc_server -k -p 6991
```

Using the RFC Server on Windows NT

In a Windows NT environment, the SAS RFC server and the Unicode RFC server for SAP are installed in the **!SASROOT\access\sasexe** directory.

To start or stop the SAS RFC server using a command line in the Windows NT environment, use the following command:

```
sasrfc_server [-i n] [-r] [-s] [-k] [-t n] [-d n] [-n name[,desc]] [-p port]
      [-N namespace] [-V variant] [-help] [-c dialog_compat_port]
      [-b "-p port-number -V variant_name -R report_name"]
      [-B number_of_bytes]  [-S "-a program_id -g gateway_host -x gateway_service"]
```

To start or stop the Unicode RFC server using a command line in the Windows NT environment, use the following command. Note that the Unicode RFC server is used to access Unicode SAP systems, and it cannot be used to access non-Unicode SAP systems.

```
sasrfc_serveru [-i n] [-r] [-s] [-k] [-t n] [-d n] [-n name[,desc]] [-p port]
      [-N namespace] [-V variant] [-help] [-c dialog_compat_port]
      [-b "-p port_number -V variant_name -R report_name"]
      [-B number_of_bytes] [-S "-a program_id -g gateway_host -x gateway_service"]
```

The options for the SAS RFC server command and the options for the Unicode RFC server on Windows NT are as follows:

−i *n*
    installs the program as a Windows service and specifies the startup option for a new service. Startup options are

    n=2   starts the service automatically

    n=3   starts the service on demand

    n=4   disables the service.

−r
    removes the program from the Service Manager.

−s
    starts the service.

−k
    stops the service.

−t *n*
    sets the startup option for an existing service. Startup options are

    n=2   starts the service automatically

    n=3   starts the service on demand

    n=4   disables the service.

-d *n*
    specifies the diagnostic level. When you specify the -d *n* option where *n*= any number between **1** and **6**, the program runs as an application and messages are

routed to standard error. Higher diagnostic levels route more detailed messages to standard error.

–n *name,desc*
specifies the name and description of the service.

–p *port*
specifies the port number on which the server listens. The default port number is **6999**.

-N *namespace*
specifies the namespace for ABAP functions and programs that are used by SAS. The default value is **/SAS/**. If the ABAP programs are installed in the customer namespace rather than in the **/SAS/** namespace, then this parameter identifies where the ABAP programs are installed.

-V *variant*
specifies the R/3 report variant that is assigned to this server. You must assign a report variant for each RFC server that accesses an R/3 application server in batch mode. The variant parameter G_DEST specifies a unique destination to call back to the RFC server.

–help
specifies that you want to display command line Help.

-c *dialog_compat_port*
identifies the option that, when specified, runs the RFC server in V8 compatibility mode on the port indicated by the *dialog_compat_port* parameter. The port number for a 9.1 request must be different than the one used for the version 9 requests. If the -c option is omitted, no dialog compatibility will be available.

-b "-p *port_number* –V *variant_name* –R *report_name*"
enables batch compatibility so that you can process V8 ACCR3 requests while you are using a V9 RFC server. You must use the double quotation marks in the batch compatibility option in order to separate the batch compatibility parameters from the V9 parameters that use the same syntax.
   The port parameter is optional. If omitted, the port number defaults to **6995**.
   The report variant parameter is required and must be a valid variant of the report.
   The report parameter is optional and normally is omitted. If the report parameter is omitted, then *report_name* defaults to /SAS/ZSASV8COMPAT.
   The values in *port_number*, *variant_name*, and *report_name* must be different from the values used by V9 and different from the values used by dialog compatibility.

-B *number_of_bytes*
sets the minimum buffer size for data transfers in batch and dialog modes. The *number of bytes* should be greater than 10000 and no more than eight digits, or it will be ignored. If the –B option is omitted, the default is 10000 bytes.
   If you specify a value for the G_BUFMAX parameter that is less than the value of –B in batch mode, then the –B value is used.

-S "-a *program_id* -g *gateway_host* -x *gateway_service*"
permanently registers the SAS RFC server at an SAP gateway. You must specify the -S option in order to use the SAS RFC Monitor in the SAP Netweaver Portal. The option enables the server to receive requests for information from the RFC Server Monitor through a remote function call that uses an SM59 destination.
   To register the server at more than one gateway, specify the –S option multiple times.

-a *program_id*
>   the *program_id* that you specify must match the program ID that you assign
>   in the SM59 destination of type **registration**. The destination that you use
>   must not be the same as other destinations that are used for batch
>   extractions.

-g *gateway_host*
>   A valid SAP gateway host.

-x *gateway_service*
>   A valid SAP service.

For information about other setup requirements for using the SAS RFC Server
Monitor, see the SAS RFC Server Monitor help in the SAP Netweaver Portal.

For example, if you want to start the RFC server with a debug level of **1** on port
number **6991**, use the command below. Note that the following examples also work
using Unicode server command **sasrfc_serveru**.

```
sasrfc_server –d 1 -p 6991
```

To install the RFC server as a service with automatic startup on port **6991** and use
the name **test** and a description of **'Test RFC server'**, use the following command:

```
sasrfc_server –i 2 –n ''test,Test RFC server'' -p 6991
```

To uninstall the server that was started in the previous example, use the following
command:

```
sasrfc_server -r –n ''test''
```

Using the RFC Server in Batch Mode

The RFC server can perform batch mode processing of RFC calls to the SAP system.
Users who submit interactive RFC calls to the SAP system might encounter time-out
limitations. This occurs when interactive SAP jobs exceed the default processing
time-out limit of 10 minutes.

By allowing batch mode processing of RFC calls to the SAP system, time-out
limitations for interactive SAP dialog processes are resolved. Batch mode processing is
often employed to reduce the use of dialog processes and to reduce the impact of
extractions (a SAS program reading the tables and views of the SAP system by means
of the LIBNAME engine) on the SAP system. Batch processes usually run at a lower
priority. Batch mode processes of RFC calls can also help control the number of
simultaneous extractions.

The ABAP program that is normally generated (by another ABAP program), executes
a requested read and join operation on the database table(s). When operating in batch
mode, the RFC server creates and releases an SAP job to execute this ABAP program.
The RFC server then waits for the job that is running the ABAP program to start and
to recall the RFC server. Finally, the resulting data stream (that the RFC server
receives from the SAP system) is passed on to the LIBNAME engine.

LIBNAME or data set option: BATCH | BATCH_MODE | BATCHMODE= 0|1|Y|N

Indicates whether the RFC server should use SAP batch jobs for the data extracts.

Y   RFC uses batch jobs to extract R/3 data

N   RFC uses dialog processes to extract R/3 data

The default value for this option is N.

To submit batch requests to the RFC server, an RFC destination and a variant for ABAP program /SAS/Z_SAS_READ must be set up for each RFC server instance. Before the RFC server can execute requests as a batch job the following steps must be performed:

1 *Create an RFC server destination.* For each RFC server that accesses an SAP system, a destination must be set up on that SAP system. The program ID and the gateway information defined in the destination are used to register the RFC server on an SAP gateway. If two RFC servers are used to read data from one SAP application server, two RFC destinations must be set up on that SAP application server.

   If gateway information is omitted from the SM59 destination, the batch job is constrained to run on the R/3 server mentioned in the SAS LIBNAME statement for the request.

   If explicit gateway information is entered in the SM59 destination information, the batch job is run on any eligible R/3 server as determined by the SAP site batch configuration.

   Omitting the gateway information is typically done in small SAP configurations such as test, QA, and single-server systems. In production environments, it is preferable to have the jobs run on a server allocated by the SAP batch system.

2 *Create a variant of ABAP program /SAS/Z_SAS_READ.* After defining the destination for the RFC server, you will need to make the RFC destination known to the ABAP program. This is done by creating a variant for the ABAP program / SAS/Z_SAS_READ. The concept of variants provides a way of parameterizing ABAP programs. For each defined destination, a variant needs to be created that references the destination. Variants are client dependent.

3 *Start the RFC server with the variant.* For more information about using the RFC server and particularly the sasrfc server option, see "Using the RFC Server on UNIX" on page 58 and "Using the RFC Server on Windows NT" on page 62.

For further information about the setup of RFC server destinations and variants, see the *Installation Instructions to SAS/ACCESS Interface to R3.*

Using the RFC Macros and Macro Variables

SAS/ACCESS Interface 4.2 to R/3 includes several SAS macros and SAS macro variables that enable you to communicate with the RFC server. The following SAS macros and SAS macro variables are available:

%CALLRFC
   enables you to call a specified R/3 function. For more information about using the %CALLRFC macro, see "%CALLRFC" on page 66.

%R3CONNB
   enables you to use a profile to log on to the R/3 system for batch processing. For more information about using the %R3CONNB macro, see "%R3CONNB" on page 70.

%R3CONNC
   enables you to log on to the R/3 system when performing batch processing. For more information about using the %R3CONNC macro, see "%R3CONNC" on page 71.

%R3CONNE
> enables you to log off of the R/3 system when performing batch processing. For more information about using the %R3CONNE macro, see "%R3CONNE" on page 74.

RFC_LOGON_INFO
> enables you to you to specify the logon information and connection parameters that are used in the %CALLRFC macro. For more information about using the RFC_LOGON_INFO macro variable, see "RFC_LOGON_INFO" on page 74.

%CALLRFC

Calls a specified RFC-enabled R/3 function module

Type: autocall macro

See also:
> "Using the R/3 BAPI Connector: Logon Window" on page 76
> "RFC_LOGON_INFO" on page 74

Syntax

%CALLRFC(*<RFC-enabled function module name>* EXPORTING *<parameter string>* IMPORTING *<parameter string>* INTABLES *<parameter string>* OUTTABLES *<parameter string>* USING *<parameter string>)*

Details

%CALLRFC is a SAS macro that allows you to call any RFC-enabled R/3 function module that you specify. Function modules that are called using this macro must

- □ be RFC-enabled
- □ be synchronous
- □ have no user interaction.

The parameters for %CALLRFC are as follows:

EXPORTING   passes field values or structures to the specified R/3 function module. The EXPORTING parameters are declared as import parameters in the function interface and are defined as follows:

> □ *p1=value1 ... pn=valuen*
>
>> These parameters are passed as field values to the specified R/3 function module.
>
> □ *p1.n1=value p1.n2=value2 ... pn.vn=valuen*
>
>> These parameters are passed as elements of a structured parameter (a complex parameter that contains fields).

HOST   specifies the network location of the RFC server. The default is localhost.

IMPORTING passes field values or structures from the specified R/3 function module back to SAS. The IMPORTING parameters are defined as follows:

□ *p1=var1 ... pn=varn*

The *p1 ... pn* parameters are export parameters declared in the function interface.

The *var1 ... varn* parameters are SAS macro variables that are used to pass the values from the RFC server back to SAS. The macro variables must be defined before the function call is submitted.

□ *p1=dataset1 pn=datasetn*

Parameters that are written into a data set require a two-level data set name. Writing parameters into data sets can be useful for structured parameters.

INTABLES passes references to input SAS data sets. The INTABLES parameters are defined as follows:

□ *p1=dataset1 ... pn=datasetn*

The SAS data sets are converted into internal tables and are passed to the specified function module.

Note: The variable names in the SAS data set must match the field names of the internal table as they are defined in the function interface. △

OUTTABLES specifies references to output SAS data sets. The OUTTABLES parameters are defined as follows:

□ *p1=dataset1 ... pn=datasetn*

Internal tables passed back to SAS from the specified function module are converted into SAS data sets.

PORT specifies the TCP/IP port to use for communicating with the RFC server. The default port number is 6999.

USING specifies alternate connection parameters when you log on to the R/3 system. By default, the %CALLRFC macro uses the connection parameters that are defined in the RFC_LOGON_INFO variable. However, if you want to use an alternate set of connection parameters, create a variable that contains those parameters and reference that variable in the USING parameter.

Note: The alternate logon variable must be defined before the function call is submitted. △

Note: If an error occurs while the %CALLRFC macro is executing, the macro variables &SYSRC and/or &SYSERR contain nonzero values. (See "Example 4" on page 69.) The ABAP function module might also contain parameters to return error conditions to the calling program. These return codes can be written into a SAS macro variable and checked in the SAS program. (See "Example 5" on page 69.) △

Using

The following macro variables are used with the %CALLRFC macro:

☐ RFC_LOGON_INFO

defines the R/3 BAPI connection parameters that are required to access the SAP R/3 system. You can specify these connection parameters by using the RFC_LOGON_INFO macro string or by using the R/3 BAPI Connector window, which is automatically displayed if you do not use the RFC_LOGON_INFO macro string when you submit your %CALLRFC macro statement. The following connection parameters are required:

☐ CLIENT

☐ USER

☐ PASSWD (or PASSWDX)

☐ LANG

☐ HOST

☐ PORT

Note: If any of the required values are missing, the user is prompted to provide the missing information. △

The RFC_LOGON_INFO macro variable also requires some connection information. The connection parameters should be defined as follows:

☐ If you use the saprfc.ini, specify the DEST value.

☐ If you use a specific application server, specify the ASHOST and SYSNR values.

☐ If you use Load Balancing, specify the MSHOST, R3NAME, and GROUP values.

Note: Load Balancing is available only if the CALLRFC executable has been linked using Release 4.0 or higher of the RFCSDK. △

For more information about defining the RFC_LOGON_INFO variable, see "RFC_LOGON_INFO" on page 74. For more information about using the R/3 BAPI Connector window, see "Using the R/3 BAPI Connector: Logon Window" on page 76.

Example 1

The following example shows how to use the %CALLRFC macro to read data from an SAP R/3 system into a SAS data set:

```
%callrfc(RFC_SYSTEM_INFO
         IMPORTING RFCSI_EXPORT=WORK.RFCSI_EXPORT);
```

In this example, the %CALLRFC macro calls the RFC-enabled function module named RFC_SYSTEM_INFO and writes the system information output to the SAS data set WORK.RFCSI_EXPORT.

Example 2

The following example shows how to specify the logon parameters for the %CALLRFC macro using the RFC_LOGON_INFO:

```
%let RFC_LOGON_INFO=CLIENT=010 USER=TestUser
                    PASSWD=USERPWD LANG=E HOST=localhost PORT=6999
                    ASHOST=HostName SYSNR=02;
```

```
%callrfc(RFC_SYSTEM_INFO
        IMPORTING RFCSI_EXPORT=WORK.RFCSI_EXPORT);
```

In this example, TestUser is connecting to a specific application server to read data from the R/3 system into a temporary SAS data set named WORK.RFCSI_EXPORT.

Example 3

The following example demonstrates how to use SAS dates in the function call:

```
%let MRETURN=;
%callrfc(BAPI_COSTCENTER_GETLIST
        EXPORTING CONTROLLINGAREA=1000
                  DATE=%sysfunc(date (), yymmddn8.)
        IMPORTING RETURN=MRETURN
        OUTTABLES COSTCENTER_LIST=WORK.COSTCENTER_LIST);
```

In this example, the %CALLRFC macro is used to call the function module named BAPI_COSTCENTER_GETLIST. The function call reads the list of cost centers for controlling area 1000 for the current date and writes the output list into a temporary SAS data set named WORK.COSTCENTER_LIST. The return code of the function call is written to the SAS macro variable MRETURN. Note that the macro variable is defined before the %CALLRFC macro is used.

Example 4

The following example illustrates how to use the &SYSRC and &SYSERR macro variables to check for errors that occur while the %CALLRFC macro is executing:

```
%macro example4;
%callrfc(INVALID_FUNCTION_CALL);
        %if %eval(&sysrc) ne 0 or %eval(&syserr) ne 0 %then %do;
            %put An error occurred while calling the function.
            %put sysrc=&sysrc syserr=&syserr;
        %end;
%mend;
%example4;
```

In this example, a new macro named %EXAMPLE4 is created. %EXAMPLE4 uses the SAS macro variables &SYSRC and &SYSERR to check return codes from the %CALLRFC macro. The new macro also generates an error message if errors occurred.

Example 5

The following example shows how to use the parameters in the function module to check for errors that occurred during the execution of the %CALLRFC macro:

```
%macro example5;

%global bapi_return;

    /* create the input data set */
data WORK.IDRANGE;
sign='I';
option='BT';
low='0000000000';
high='9999999999';
```

```
        output;
        run;

        %callrfc(BAPI_CUSTOMER_GETLIST
                 IMPORTING RETURN=BAPI_RETURN
                 INTABLES IDRANGE=WORK.IDRANGE
                 OUTTABLES ADDRESSDATA=WORK.ADDRESSES);
        %if %substr(&bapi_return,1,1)=E or
            %substr(&bapi_return,1,1)=W %then %do;
          %put An error occurred while calling the BAPI_CUSTOMER_GETLIST function.;
          %put bapi_return=&bapi_return;
        %end;

        %else %do;
          proc print data=WORK.ADDRESSEs;
          run;
        %end;
        %mend;

        %example5;
```

In this example, a new macro named %EXAMPLE5 is created to retrieve a list of
customers from the R/3 system. The range of customer numbers to be retrieved is
specified in the SAS data set WORK.IDRANGE. This data set is then used as the input
table in the function call. The information for customers between customer number
0000000000 and 9999999999 will be read into the SAS data set WORK.ADDRESSES.
The function parameters contain return codes and messages from the
BAPI_CUSTOMER_GETLIST function. The structure of the return parameter is
defined in the function interface. In this example, the first character in the return
string contains the message type. E indicates an error message and W indicates a
warning message.

%R3CONNB

Connects to or disconnects from an R/3 system using a profile

Type: batch macro

Syntax

%**R3CONNB**(PROFILE=*value*, LIBREF=*value*, FUNCTION=open | close, ID=*value*,
    SOURCE=*value*)

Details

The %R3CONNB macro allows you to log on to and log off of the R/3 system using
parameters stored in the data set LIBREF.R3CONN under the profile name. Profiles
that connect to and disconnect from the R/3 system can be used for batch operation,
such as overnight processing, and to simplify the logon process for end users.
   The parameters for %R3CONNB are as follows:

PROFILE identifies the name of the profile that contains the information used in the Logon to R/3 window.

LIBREF identifies the SAS library containing the LIBREF.R3CONN data set. This data set contains the logon parameters defined for the profile.

FUNCTION specifies whether you want to open or close the connection to the R/3 system. Valid values are

    □ OPEN

    □ CLOSE

ID specifies the connection ID that is associated with the profile.

    Note: This parameter was defined for previous versions of this macro and is supported in this release for backward compatibility. However, it is recommended that this parameter not be used. △

SOURCE specifies the logon parameters that are defined in SOURCE type catalog entries. Although the SOURCE parameter is supported in this version, logon parameters should now be defined in profiles that are stored in a SAS data set.

    Note: This parameter was defined for previous versions of this macro and is supported in this release for backward compatibility. However, it is recommended that this parameter not be used. △

Example 1

The following example shows how to use the %R3CONNB macro to connect to the R/3 system using a profile:

```
%r3connb(PROFILE=BatchUser, LIBREF=batch, FUNCTION=open);
```

In this example, the profile BatchUser is used to connect to the R/3 system. The BatchUser profile uses the connection parameters stored in the BATCH.R3CONN data set.

Example 2

The following example shows how to use the %R3CONNB macro to disconnect from the R/3 system by using a profile:

```
%r3connb(PROFILE=BatchUser, LIBREF=batch, FUNCTION=close);
```

The BatchUser profile was used to connect to the R/3 system. This example demonstrates how to use the %R3CONNB macro to close the BatchUser profile's connection to the R/3 system.

%R3CONNC

Connects to an R/3 system

Type: batch macro

See also: "%R3CONNE" on page 74

Syntax

%R3CONNC(CCONN=*value*, HOST=*value*, PORT=*value*, USR=*value*, PWD=*value*,
     CLI=*value*, LNG=*value*, HST=*value*, DST=*value*, SNA=*value*, R3=*value*,
     SYS=*value*, GWS=*value*, GWH=*value*, FUNC=*value*, CPICUSR=*value*,
     CPICPWD=*value*, CPICCLI=*value*, CPICLNG=*value*, CPICDST=*value*,
     CPICFRM=*value*, DEBUG=*value*, REMSESS=*value*)

Details

The %R3CONNC macro allows you to connect to an R/3 system. This macro can be
used to log on to the R/3 system during batch operation.
    The parameters for %R3CONNC are as follows:

CCONN	specifies the connection identifier to be used when connecting to the R/3 system.
HOST	specifies the name of the TCP/IP host to be used when connecting to the RFC server.
PORT	specifies the TCP/IP port to be used when connecting to the RFC server.
USR	specifies the R/3 user ID to be used when connecting to the R/3 system.
PWD	specifies the encoded R/3 password to be used when connecting to the R/3 system.
CLI	specifies the R/3 client to be used with the R/3 system.
LNG	specifies the R/3 logon language to be used with the R/3 system.
HST	specifies the R/3 host name to be used when connecting to the R/3 system.
DST	specifies the R/3 destination name to be used when using the SIDEINFO file to specify connection parameters.
SNA	specifies whether the RFC server connects to an R/2 system. Valid values are

        □ Y — RFC server connects to an R/2 system.

        □ blank — RFC server is *not* connecting to an R/2 system.

R3	specifies whether the RFC server is connecting to an R/3 system. Valid values are

        □ Y — RFC server is connecting to an R/3 system.

        □ blank — RFC server is *not* connecting to an R/3 system.

SYS	specifies the R/3 system number. This parameter can be specified here or in the SIDEINFO file.
GWS	specifies the TCP service of the SAP gateway. This parameter can be specified here or in the SIDEINFO file.
GWH	specifies the name of the host on which the SAP gateway is running. This parameter can be specified here or in the SIDEINFO file.
FUNC	specifies the R/3 function module to be used.
CPICUSR	specifies the R/3 user identifier for CPIC.
CPICPWD	specifies the encoded R/3 password for CPIC.

CPICCLI   specifies the R/3 client for CPIC.

CPICLNG   specifies the R/3 logon language for CPIC.

CPICDST   specifies the destination for CPIC communication (as defined in the TXCOM table in the R/3 system).

CPICFRM   specifies the form for CPIC.

DEBUG   specifies whether you want to use the trace option. Valid values are

            □ Y — Use the trace option.

            □ blank — Do *not* use the trace option.

REMSESS   specifies the SAS/CONNECT remote session ID to be used when connecting to the R/3 system.

Note: The SIDEINFO file provides the connection parameters required for the RFC server to communicate with the R/3 system. The SIDEINFO file is not needed if you specify all connection parameters in the %RCONNC macro. △

Example 1

The following example shows how to use the %R3CONNC macro to connect to an R/3 system when you specify a specific application server:

```
%r3connc(CCONN=IDES, USR=USER1, PWD=D27A927AD9E768,
        CLI=800, LNG=EN, HST=HostName1, SYS=02,
        CPICUSR=CPICUSER, CPICPWD=6FD3E4BAC4);
```

In this example, USER1 is connecting to an R/3 system on an application server named HostName1 with a system number of 02.

Example 2

The following example shows how to use the %R3CONNC macro to connect to an R/3 system and an RFC server that runs on a specified application server:

```
%r3connc(CCONN=IDES, USR=USER1, PWD=D27A927AD9E768, CLI=800, LNG=EN,
        HOST=HostName2, PORT=6998,
        HST=HostName1, SYS=02,
        CPICUSR=CPICUSER, CPICPWD=6FD3E4BAC4);
```

In this example, SAS connects to an R/3 application server (HostName1) with the system number of 02 using an RFC server running on a separate host (HOSTNAME2) on port 6998.

Example 3

The following example shows how to use the %R3CONNC macro and a SIDEINFO file to connect to an R/3 system identified by a logical destination:

```
%r3connc(CCONN=IDES, USR=USER1, PWD=D27A927AD9E768,
        CLI=800, LNG=EN, DST=SYSTEM1,
        CPICUSR=CPICUSER, CPICPWD=6FD3E4BAC4);
```

In this example, USER1 is connecting to an R/3 system. The R/3 system is identified by a logical destination (SYSTEM1), and the connection information is defined in the SIDEINFO file.

%R3CONNE

Disconnects from an R/3 system

Type: batch macro

See also: "%R3CONNC" on page 71

Syntax

%R3CONNE(CCONN=*value*, REMSESS=*value*)

Details

The %R3CONNE macro allows you to disconnect from the R/3 system. This macro can be used to log out of the R/3 system during batch operation.

The parameters for %R3CONNE are as follows:

CCONN   specifies the connection identifier that is associated with the current session.

REMSESS   specifies the SAS/CONNECT remote session identifier that is associated with the current remote session.

Example

The following example shows how to use the %R3CONNE macro to disconnect from an R/3 system:

```
%r3conne(CCONN=IDES);
```

In this example, the %R3CONNE macro is used to terminate the R/3 connection with an ID of IDES.

RFC_LOGON_INFO

Defines the connection parameters that are required to access the SAP R/3 system

Type: optional macro variable

Applies to: %CALLRFC macro

See also:
   "%CALLRFC" on page 66
   "Using the R/3 BAPI Connector: Logon Window" on page 76

Syntax

%let RFC_LOGON_INFO=_ID=value ID=value ... ID=value_

Note: Values are case-sensitive. IDs are not. △

Details

RFC_LOGON_INFO is a macro variable that is used with the %CALLRFC macro. The
RFC_LOGON_INFO variable uses the following parameters:

Parameter ID	Description
TYPE	identifies the type of RFC server. Valid values are
	2 - identifies an R/2 server
	3 - (default) identifies an R/3 server
	E - identifies an external server.
CLIENT	is a required value that identifies the SAP logon client.
USER	is a required value that specifies the SAP user logon ID.
PASSWD	is a required value that identifies the SAP logon password.
	This value is not required if a PASSWDX value is specified.
LANG	is a required value that identifies the SAP logon language. Specify the
	1-byte SAP language (E for English, D for German, etc.)
	2-byte ISO language (EN for English, DE for German, etc.)
LCHECK	specifies the logon check option at OPEN time. Valid values are
	0 - logon without check
	1 - (default) logon with check.
TRACE	specifies the RFC trace option. Valid values are
	0 - (default) without trace
	1 - with trace.
DEST	identifies the logical destination in the saprfc.ini file, if applicable. When you use an R/2 RFC server, you must also define this destination in the SIDEINFO file for the SAP gateway.
	This value is required when you use the saprfc.ini.
GWHOST	specifies the host name of the SAP gateway if you use an R/2 or external RFC server.
GWSERV	identifies the service of the SAP gateway if you use an R/2 or external RFC server.
MSHOST	specifies the host name of the message server if you use Load Balancing.
	This value is required if you use Load Balancing.
R3NAME	specifies the name of the R/3 system if you use Load Balancing.
	This value is required if you use Load Balancing.
GROUP	specifies the name of the group of application servers if you use Load Balancing.
	This value is required if you use Load Balancing.
ASHOST	identifies the host name of the specific application server to be used.
	This value is required if you use a specific application server.
SYSNR	identifies the R/3 system number if you use a specific application server and do not use Load Balancing.
	This value is required if you use a specific application server.

Parameter ID	Description
ABAP_DEBUG	specifies the ABAP debugger option. Valid values are
	0 - (default) run without the ABAP debugger
	1 - run with the ABAP debugger.
	Note: If you use the ABAP_DEBUG option, the SAP GUI must be installed.
PASSWDX	identifies the SAS-encrypted SAP logon password.

Example 1

The following example shows how to specify logon information for the %CALLRFC macro using the RFC_LOGON_INFO macro variable:

```
%let RFC_LOGON_INFO CLIENT=010 USER=USER1
                    PASSWD=USERPWD LANG=E
                     MSHOST=HostName R3NAME=BIN GROUP=Public;
%callrfc(RFC_SYSTEM_INFO
        IMPORTING RFCSI_EXPORT=WORK.RFCSI_EXPORT);
```

In this example, USER1 is connecting to a server that uses Load Balancing to read R/3 data into a temporary data set called WORK.RFCSI_EXPORT.

Example 2

The following example shows how to specify logon information for the %CALLRFC macro using the RFC_LOGON_INFO macro variable:

```
%let RFC_LOGON_INFO=CLIENT=010 USER=USER1
                    PASSWD=USERPWD LANG=E
                     ASHOST=HostName SYSNR=02;
%callrfc(RFC_SYSTEM_INFO
        IMPORTING RFCSI_EXPORT=WORK.RFCSI_EXPORT);
```

In this example, USER1 is connecting to a specific application server to read R/3 data into a temporary data set called WORK.RFCSI_EXPORT.

Using the R/3 BAPI Connector: Logon Window

The R/3 BAPI Connector: Logon window is automatically displayed if you do not use the RFC_LOGON_INFO macro string when you submit your %CALLRFC macro statement. The R/3 BAPI Connector: Logon window enables you to define the R/3 BAPI connection parameters that are required to access the SAP R/3 system.

Display 5.1   R/3 BAPI Connector: Logon Window

For more information about the %CALLRFC macro, see "%CALLRFC" on page 66. For more information about using the RFC_LOGON_INFO macro string, see "RFC_LOGON_INFO" on page 74.

The following fields are available on the R/3 BAPI Connector: Logon window:

Client   enables you to identify the SAP logon client. This field is required.

User   enables you to identify the SAP user logon ID. This field is required.

Password   enables you to enter the SAP user password. This field is required.

Language   enables you to specify the SAP logon language. Specify the 1–byte SAP language (E for English, D for German, and so on) or the 2–byte ISO language (EN for English, DE for German, and so on). This field is required.

Destination   enables you to identify the logical destination of the saprfc.ini file, if applicable. When you use an R/2 RFC server, you must also define this information in the sideinfo file for the SAP gateway. This field is required if you use the saprfc.ini. For more information about the sideinfo file, see "Sideinfo File" on page 22.

Host   enables you to identify the application server host. This field is required if a specific application server will be used.

System number   enables you to identify the R/3 system number if you are using a specific application server and are not using Load Balancing. This field is required if you use a specific application server.

Gateway host   enables you to identify the host name of the SAP gateway if you use an R/2 or external RFC server.

Gateway service enables you to identify the service of the SAP gateway if you use an R/2 or external RFC server.

The following buttons are available on the R/3 BAPI Connector: Logon window:

OK   submits the R/3 BAPI connection parameters that you entered and attempts to log on to the R/3 system.

Cancel
closes the R/3 BAPI Connector: Logon window without submitting the connection paramaters and attempting to logon to the R/3 system.

Help
displays the SAS Help for the window.
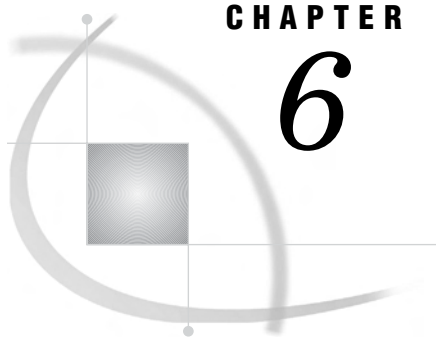
CHAPTER
6

Using the LIBNAME Statement for SAP

Overview of the LIBNAME Engine for SAP

The SAP LIBNAME engine is a read-only engine that allows you to access tables and views from SAP R/3 and SAP BW systems. The SAP LIBNAME engine accesses an SAP system through a connection to the SAS RFC server and is part of the SAS solution to access data in a SAP system. When a connection to the SAP system is successfully established and you are logged on to the system, the RFC server sends system information back to the LIBNAME engine.

The 9.1 SAP LIBNAME engine supports new features such as load balancing, user validation at log on, more efficient handling of projections, and server-side joins. Directory processing is also supported.

Note: Unlike other library engines, these interfaces are read-only and do not support any forms of data set creation, deletion, or modification. △

LIBNAME Statement Syntax for SAP

LIBNAME *libref* R3 <Options>;

libref   specifies a valid SAS name that serves as an alias to associate SAS with the SAP tables and view. It is any SAS name when you are assigning a new libref.

R3   explicitly specifies the R/3 library engine.

<Options>   names one or more options honored by the R/3 engine, delimited with blanks.

The SAP LIBNAME statement assigns a library and allows the SAP engine to establish the connection to the SAP system. It checks (by default) the logon information including: user, password, language, and client. This is done by establishing the connection to the RFC server and sending the logon information to the RFC server.

A user specifies a LIBNAME statement for the engine, and then can use that libref throughout SAS, wherever a libref is valid.

SAP LIBNAME Engine Options

The following LIBNAME options apply to the SAP LIBNAME Engine.

ABAPFM= abap_function_name

Indicates the name of the ABAP function module that the RFC server uses internally

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: /SAS/Z_SAS_DIALOG

Syntax

ABAPFM | ABAPFUNCTION | ABAPFUNC = abap_function_name

Indicates the name of the ABAP function module that the RFC server uses internally. The default value for this option is /SAS/Z_SAS_DIALOG and is set by the RFC server.

ABAPPROG= abap_program

Indicates the name of the ABAP program that the RFC server uses internally

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: /SAS/Z_SAS_READ

Syntax

ABAPPROG | ABAPREPORT |ABAPPROGRAM = abap_program
   Indicates the name of the ABAP program that the RFC server uses internally. The default value for this option is /SAS/Z_SAS_READ and is set by the ABAP function module.

ASHOST= application_server_host

Indicates the host name or IP address of a specific SAP application server

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: none

Syntax

ASHOST| HST |RFCHOST |R3HOST = application_server_host
   Indicates the host name or IP address of a specific SAP application server.

BATCH= 0|1|Y|N

Indicates whether the RFC server should use SAP batch jobs for the data extracts

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: N

Syntax

BATCH | BATCH_MODE | BATCHMODE = 0|1|Y|N

Y

specifies that the RFC uses batch jobs to extract R/3 data.

N

specifies that the RFC uses dialog processes to extract R/3 data.

Indicates whether the RFC server should use SAP batch jobs for the data extracts. The default value for this option is N.

CLIENT= client

Specifies the SAP logon parameter client

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: SAP system default

Syntax

CLIENT| CLI | RFCCLIENT | RFCCLI = client

Indicates the SAP logon parameter client. Examples for a client are 000 or 800. The default value for this option is the SAP system default. When accessing the SAP R/3 system or the SAP BW system via the LIBNAME engine, you must specify valid logon information including client, user name, password, and language. The RFC server performs a logon check at OPEN time.

DESTINATION= destination

Indicates the destination in saprfc.ini if working with saprfc.ini

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: none

Syntax

DESTINATION | DEST| DST | DSTN = destination

Indicates the destination in saprfc.ini if working with saprfc.ini. If the RFC server is an R/3 system, then this destination must also be defined in the SIDEINFO file for the SAP gateway.

GROUP= application_server_group

Indicates the name of the group of SAP application servers

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: none

Syntax

GROUP= application_server_group
   Indicates the name of the group of SAP application servers if using load balancing.

GWHOST= gateway_host_name

Indicates the host name of the SAP gateway

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: none

Syntax

GWHOST |GATEWAY_HOST = gateway_host_name
   Indicates the host name of the SAP gateway.

GWSERV= gateway_service

Indicates the service of the SAP gateway

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: none

Syntax

GWSERV| GATEWAY_SERVICE = gateway_service
   Indicates the service of the SAP gateway.

HOST= rfc_server_host

Indicates the host of the RFC server to be used to connect to the SAP system

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: localhost

Syntax

HOST | RFC_SERVER_HOST | RFC_SERVER | SASRFC_SERVER |
      SASRFC_SERVER_HOST = rfc_server_host

   Indicates the host of the RFC server to be used to connect to the SAP system. The default value for this option is localhost.

IEEE_REVERSE= YIN

Indicates whether floating point numbers are byte reversed

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: Y or N depending on platform

Syntax

IEEE_REVERSE = Y | N

Y

   Indicates that floating point numbers are byte reversed.

N

   Indicates that floating point numbers are not byte reversed.

   Indicates whether floating point numbers are byte reversed. The default value for this option is Y for an R/3 application server on Windows NT, and N for the other platforms.

INENCODING = code_page

Indicates the code page

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: none

Syntax

INENCODING = code_page

Indicates the code page. The code page identifies characters and symbols that can be printed, displayed on terminals, and used in SAP programs.

LANGUAGE = language

Indicates the SAP logon parameter language

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: SAP system default

Syntax

LANGUAGE | LANG | LNG |RFCLANG |RFCLNG = language
   Indicates the SAP logon parameter language. The value for language is either the 2-byte ISO-language key or the 1-byte SAP language. Examples for the language include EN, DE or E, D. The default value for this option is the SAP system default. When accessing the SAP R/3 system or the SAP BW system via the LIBNAME engine, you must specify valid logon information including client, user name, password and language. The RFC server performs a logon check at OPEN time.

MAX_TABLE_JOINS = number

Indicates the number of tables that can be used in a left-outer join or an inner join in ABAP Open SQL

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: 25

Syntax

MAX_TABLE_JOINS | MAX_TABLES_JOIN | MAX_TABLES_JOINS
      |MAX_TABLE_JOIN = number
   Indicates the number of tables that can be used in a left-outer join or an inner join in ABAP Open SQL. The default value for this option is 25.

MSHOST= message_server_host

Indicates the host name of the message server

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: none

Syntax

MSHOST= message_server_host
> Indicates the host name of the message server (if using load balancing).

NUMC_SAS_TYPE = NICI$

Indicates the SAS type for ABAP type NUMC

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: C

Syntax

NUMC_SAS_TYPE | NUMC_SASTYPE | NUMC_TYPE |NUMC = N|C|$

N
> Number

C
> Character

$
> Character

> Indicates the SAS type for ABAP type NUMC. The default is C.

PASSWORD= password

Indicates the SAP logon parameter password

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: none

Syntax

PASSWORD | PASSWD |PWD |PW|PASS = password
> Indicates the SAP logon parameter password. When accessing the SAP R/3 system or the SAP BW system via the LIBNAME engine, you must specify valid logon information including client, user name, password and language. The RFC server performs a logon check at OPEN time.

PASSWORDX= encrypted-password

Indicates the SAP logon parameter password in an encrypted form

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: none

Syntax

PASSWORDX | PASSWDX |PWDX |PWX | PASSX= encrypted password
  Indicates the SAP logon parameter password in an encrypted form. It uses the encryption type that is used in the SAS/ACCESS Interface to R/3, Version 8. It is supported for compatibility with the Version 8 connection profile.

PORT= rfc_server_port

Indicates the port number of the RFC server to be used to connect to the SAP system

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: 6999

Syntax

PORT | RFC_SERVER_PORT | RFCSERVERPORT | SASRFC_SERVER_PORT |
    SASRFCSERVERPORT = rfc_server_port
  Indicates the port number of the RFC server to be used to connect to the SAP system. The default value for this option is 6999.

R3NAME= system_name

Indicates the name of the R/3 system

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: none

Syntax

R3NAME= system_name
  Indicates the name of the R/3 system (if using load balancing).

RFC_STRING= additional_rfc_options

Indicates additional logon or connection parameters for the RfcOpenEx() call

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: none

Syntax

RFC_STRING | RFCSTRING | RFC_OPTIONS_EXT | RFCOPENEX |
     ADDITIONAL_RFC_OPTIONS = additional_rfc_options

Indicates additional log on or connection parameters for the RfcOpenEx() call. The RFC server uses the RfcOpenEx() call to log on to the SAP system. With this option, parameters that are not LIBNAME options can be passed to the RfcOpenEx() call.

RFC_STRING Example

RFC_STRING = "ABAP_DEBUG=1"

Note: When using RFC_STRING="ABAP_DEBUG=1", the ABAP debugger is invoked to debug the ABAP programs used by the engine. The SAP GUI on the RFC server host is required to use the ABAP_DEBUG=1 option. △

SAPLOGON_ID= saplogon_id

Indicates the string defined for SAPLOGON on 32-bit Windows

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: none

Syntax

SAPLOGON_ID= saplogon_id

Indicates the string defined for SAPLOGON on 32-bit Windows.

SYSNR= system_number

Indicates the R/3 system number

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: none

Syntax

SYSNR |SYS |SYSTEM |SYSNO = system_number

Indicates the R/3 system number. It is the 2-byte code that identifies the system on the host. For example: 00 or 01.

TRACE= 0 |1|Y|N

Indicates whether the RFC server should trace the requests

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: 0

Syntax

TRACE= 0 |1|Y|N

0
  Specifies that RFC trace is switched off.

1
  Specifies that RFC trace is switched on.

Y
  Specifies that RFC trace is switched on.

N
  Specifies that RFC trace is switched off.

Indicates whether the RFC server should trace the requests. If the trace option is switched on, the RFC server writes log information into a file. The RFC library logs messages in the file dev_rfc. The default value for this option is 0.

USER= user

Indicates the SAP logon parameter user.

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: none

Syntax

USER | USR |RFCUSER |USERNAME |USERID= user
  When accessing the SAP R/3 system or the SAP BW system via the LIBNAME engine, you must specify valid logon information including the client, user name, password, and language. The RFC server performs a logon check at OPEN time.

SAS LIBNAME Statement Options for the SAP Engine

The following list describes the SAP interface support for SAS /ACCESS LIBNAME options and presents default values where applicable. For further information, refer to the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

CONNECTION= LIBNAME Option

Specifies whether operations against a single libref share a connection to the DBMS, and whether operations against multiple librefs share a connection to the DBMS

Valid in: SAS/ACCESS LIBNAME statement

DBMS support: DB2 OS/390, DB2 UNIX/PC, Informix, ODBC, OLE DB, Oracle, Microsoft SQL Server, SYBASE, Teradata, SAP

Default value: DBMS-specific. The default value for SAP is SHAREDREAD

Syntax

CONNECTION= SHAREDREAD | UNIQUE | GLOBALREAD |

For more information about the CONNECTION= option, see the LIBNAME statement for relational databases in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

CONNECTION_GROUP= LIBNAME Option

Causes operations against multiple librefs to share a connection to the DBMS. Also causes operations against multiple pass-through facility CONNECT statements to share a connection to the DBMS

Valid in: SAS/ACCESS LIBNAME statement

DBMS support: DB2 OS/390, DB2 UNIX/PC, Informix, ODBC, OLE DB, Oracle, Microsoft SQL Server, SYBASE, Teradata

Default value: none

Syntax

CONNECTION_GROUP= *connection-group-name*

For more information about the CONNECTION_GROUP= option, see the LIBNAME statement for relational databases in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

DBGEN_NAME= LIBNAME Option

Specifies whether to automatically rename DBMS columns containing characters that SAS does not allow, such as $, to valid SAS variable names

Valid in: SAS/ACCESS LIBNAME statement

DBMS support: DB2 OS/390, DB2 UNIX/PC, Informix, ODBC, OLE DB, Oracle, Microsoft SQL Server, SYBASE, Teradata

Default value: DBMS

Syntax

DBGEN_NAME= DBMS | SAS

For more information about the DBGEN_NAME= option, see the LIBNAME statement for relational databases in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

DBPROMPT= LIBNAME Option

Specifies whether SAS displays a window that prompts the user to enter DBMS connection information prior to connecting to the DBMS in interactive mode

Valid in: SAS/ACCESS LIBNAME statement

DBMS support: DB2 UNIX/PC, Informix, ODBC, Oracle, Microsoft SQL Server, SYBASE, Teradata

Default value: NO

Syntax

DBPROMPT=YES | NO

For more information about the DBPROMPT= option, see the LIBNAME statement for relational databases in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

DBSASLABEL= COMPAT | NONE | DBMS

Indicates to the engine what column labels the application expects to be returned

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: COMPAT

Syntax

DBSASLABEL= COMPAT | NONE

COMPAT   specifies that the column labels are compatible with the engine's behavior in previous SAS releases. The SAP engine returns the short descriptive text for the columns of the SAP table. It reads the column label from the SAP data dictionary. This is the default value.

NONE   specifies that no column label information is returned.

For more information about the DBPROMPT= option, see the LIBNAME statement for relational databases in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

DEFER= LIBNAME Option

Specifies when the connection to the DBMS occurs

Valid in: SAS/ACCESS LIBNAME statement

DBMS support: DB2 OS/390, DB2 UNIX/PC, Informix, ODBC, OLE DB, Oracle, Microsoft SQL Server, SYBASE, Teradata

Default value: NO

Syntax

DEFER= NO | YES

For more information about the DEFER= option, see the LIBNAME statement for relational databases in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

DIRECT_SQL= LIBNAME Option

Enables you to specify whether generated SQL is passed to the DBMS for processing

Valid in: SAS/ACCESS LIBNAME statement

DBMS support: DB2 OS/390, DB2 UNIX/PC, Informix, ODBC, OLE DB, Oracle, Microsoft SQL Server, SYBASE, Teradata

Default value: YES

Syntax

DIRECT_SQL= YES | NO | NONE | NOGENSQL | NOWHERE |NOFUNCTIONS |NOMULTOUTJOINS

For more information about the DIRECT_SQL= option, see the LIBNAME statement for relational databases in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

MULTI_DATASRC_OPT= LIBNAME Option

Used in place of DBKEY to improve performance when processing a join between two data sources

Valid in: SAS/ACCESS LIBNAME statement

DBMS support: DB2 OS/390, DB2 UNIX/PC, Informix, ODBC, OLE DB, Oracle, Microsoft SQL Server, SYBASE, Teradata

Default value: NONE

Syntax

MULTI_DATASRC_OPT=NONE |IN_CLAUSE

For more information about the MULTI_DATASRC_OPT= option, see the LIBNAME statement for relational databases in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

REREAD_EXPOSURE= LIBNAME Option

Specifies whether the SAS/ACCESS engine behaves like a random access engine for the scope of the LIBNAME statement

Valid in: SAS/ACCESS LIBNAME statement

DBMS support: DB2 OS/390, DB2 UNIX/PC, Informix, ODBC, OLE DB, Oracle, Microsoft SQL Server, SYBASE, Teradata

Default value: NO

Syntax

REREAD_EXPOSURE= NO | YES

For more information about the REREAD_EXPOSURE= option, see the LIBNAME statement for relational databases in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

SPOOL= LIBNAME Option

Specifies whether SAS creates a utility spool file during read transactions that read data more than once

Valid in: SAS/ACCESS LIBNAME statement

DBMS support: DB2 OS/390, DB2 UNIX/PC, Informix, ODBC, OLE DB, Oracle, Microsoft SQL Server, SYBASE, Teradata

Default value: YES

Syntax

SPOOL= YES | NO

For more information about the SPOOL= option, see the LIBNAME statement for relational databases in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

SAS Data Set Options for the SAP Engine

The following list describes the SAP interface support for SAS /ACCESS data set options and presents default values where applicable. For further information, refer to the *SAS/ACCESS 9.1 for Relational Databases: Reference*

BATCH= 0l1lYlN

Indicates whether the RFC server should use SAP batch jobs for the data extracts

Valid in: SAS/ACCESS LIBNAME statement for SAP

Default value: N

Syntax

BATCH | BATCH_MODE | BATCHMODE = 0|1|Y|N

Y

RFC uses batch jobs to extract R/3 data.

N

RFC uses dialog processes to extract R/3 data.

Indicates whether the RFC server should use SAP batch jobs for the data extracts. The default value for this option is N.

Note: The BATCH= option is SAP specific. △

DBCONDITION= Data Set Option

Specifies criteria for subsetting and ordering DBMS data

Valid in: DATA and PROC steps (when accessing DBMS data using SAS/ACCESS software)

DBMS support: DB2 OS/390, DB2 UNIX/PC, Informix, ODBC, OLE DB, Oracle, Microsoft SQL Server, SYBASE, Teradata

Default value: none

Syntax

DBCONDITION=*"DBMS-SQL-query-clause"*

For more information about the DBCONDITION= option, see the data set options for relational databases section in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

DBGEN_NAME= Data Set Option

Specifies whether to rename columns automatically when they contain characters that SAS does not allow

Valid in: DATA and PROC steps (when accessing DBMS data using SAS/ACCESS software)

DBMS support: DB2 OS/390, DB2 UNIX/PC, Informix, ODBC, OLE DB, Oracle, Microsoft SQL Server, SYBASE, Teradata

Default value: DBMS

Syntax

DBGEN_NAME=DBMS | SAS

For more information about the DBGEN_NAME= option, see the data set options for relational databases section in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

DBKEY= Data Set Option

Can improve performance when processing a join that involves a large DBMS table and a small SAS data set or DBMS table (by specifying a key column to optimize DBMS retrieval)

Valid in: DATA and PROC steps (when accessing DBMS data using SAS/ACCESS software)

DBMS support: DB2 OS/390, DB2 UNIX/PC, Informix, ODBC, OLE DB, Oracle, Microsoft SQL Server, SYBASE, Teradata

Default value: none

Syntax

DBKEY=(*<'>column-1<'> <... <'>column-n<'>>*)

For more information about the DBKEY= option, see the data set options for relational databases section in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

DBMASTER= Data Set Option

Used to designate which table is the larger table when you are processing a join that involves tables from two different types of databases

Valid in: DATA and PROC steps (when accessing DBMS data using SAS/ACCESS software)

DBMS support: DB2 OS/390, DB2 UNIX/PC, Informix, ODBC, OLE DB, Oracle, Microsoft SQL Server, SYBASE, Teradata

Default value: none

Syntax

DBMASTER=*YES*

For more information about the DBMASTER= option, see the data set options for relational databases section in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

NULLCHAR= Data Set Option

Indicates how SAS character missing values are handled during insert, update, DBINDEX=, and DBKEY= processing

Valid in: DATA and PROC steps (when accessing DBMS data using SAS/ACCESS software)

DBMS support: DB2 OS/390, DB2 UNIX/PC, Informix, ODBC, OLE DB, Oracle, Microsoft SQL Server, SYBASE, Teradata

Default value: SAS

Syntax

NULLCHAR= SAS | YES | NO

For more information about the NULLCHAR= option, see the data set options for relational databases section in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

NULLCHARVAL= Data Set Option

Defines the character string that replaces SAS character missing values during insert, update, DBINDEX=, and DBKEY= processing

Valid in: DATA and PROC steps (when accessing DBMS data using SAS/ACCESS software)

DBMS support: DB2 OS/390, DB2 UNIX/PC, Informix, ODBC, OLE DB, Oracle, Microsoft SQL Server, SYBASE, Teradata

Default value: a blank character

Syntax

NULLCHARVAL=*'character-string'*

For more information about the NULLCHARVAL= option, see the data set options for relational databases section in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

REREAD_EXPOSURE= Data Set Option

Specifies whether the SAS/ACCESS engine behaves like a random access engine for the scope of the LIBNAME statement

Valid in: SAS/ACCESS LIBNAME statement

DBMS support: DB2 OS/390, DB2 UNIX/PC, Informix, ODBC, OLE DB, Oracle, Microsoft SQL Server, SYBASE, Teradata

Default value: NO

Syntax

REREAD_EXPOSURE= NO | YES

For more information about the REREAD_EXPOSURE= option, see the LIBNAME statement for relational databases section in the *SAS/ACCESS 9.1 for Relational Databases: Reference*.

Examples

Example 1: Accessing the SAP Server From a Local Host   In this example, the RFC server has been started on the local host on port 6998. You want to access the SAP system on sapr3srv.sup.com. The system number for the system is 03. You specify the entire set of user information, for example, client, user, password, and language.

```
libname mylib r3 user=TEST password=MYPASS client=800 language=EN
      ashost=sapr3srv.sup.com sysnr=03
      host=localhost port=6998;
```

Note: If the RFC server has been started on the SAS system host on port 6999, you do not need to define the host or port because 6999 is the default. △

Example 2: Changing the User Logon Language   In this example, the RFC server has been started on betaguys on port 6994. You want to access the BW system on whjapp01 and the system number is 06. This time you want to log on using the German language. If you log on using that language, the column labels will all be in German.

```
libname bwides r3 user=Test password=pwd client=800 language=DE
    ashost=whjapp01 sysnr=06
    host=betaguys port=6994;
```

Example 3: Defining an SAP Destination from the SAP Logon Utility   In this example, the RFC server is running on the local host on port 6999. This is the default. The SAP system you want to access is defined as SI9 in the SAP logon utility.

```
libname mylib r3 user=test password=secret client=800 language=E
    saplogon_id=SI9;
```

Example 4: Defining an SAP Destination from the saprfc.ini File   In this example, the RFC server is running on the local host on port 6999. This is the default. The SAP system you want to access is defined by the logical destination bwides in the file saprfc.ini.

```
libname mylib r3 user=test password=secret client=800 language=EN
    destination=bwides;
```
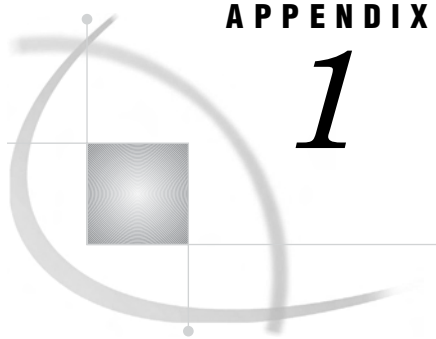
APPENDIX

1

Recommended Reading

Recommended Reading

Here is the recommended reading list for this title:

- □ *Doing More with SAS/ASSIST*
- □ *Getting Started with the SAS System*
- □ *SAS/AF Procedure Guide*
- □ *SAS/FSP Procedures Guide*
- □ *SAS Language Reference: Concepts*
- □ *SAS Language Reference: Dictionary*
- □ *SAS Macro Language: Reference*
- □ *SAS/Warehouse Administrator Metadata API Reference*
- □ *SAS/Warehouse Administrator User's Guide*
- □ *Step-by-Step Programming with Base SAS Software*
- □ *Getting Started with SAS/ASSIST*
- □ SAS Companion that is specific to your operating environment.

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Glossary

ABAP
   Advanced Business Applications Programming. ABAP is a fourth-generation programming language that is used for developing SAP R/3 client/server applications.

Communications Interface
   an interface through which various types of R/3 communication can occur. R/3 communicates with all systems that comply with Open Systems architecture. The Communications Interface enables users to work transparently with data from any one of several database management systems in any one of several operating environments. The Communications Interface also enables users to run R/3 in multiple operating environments.

CPI-C
   Common Programming Interface-Communications. An application-level interface for direct program-to-program communication. CPI-C is not used in 9.1 and later versions of the SAS/ACCESS Interface to R/3.

data dictionary
   in R/3 applications, a central repository that stores metadata about the data sources, such as a database that contains information about company expenses and company profits or a database that contains human resources information. The data dictionary also stores information about the applications that use the data sources.

data model
   a collection of data that is relevant to a particular facet of a specific business, such as finance or materials management. A data model can contain other data models. A data model is used to organize potentially complex relationships between entity types and other data models.

DATA step
   a group of statements in a SAS program that begins with a DATA statement and ends with either a RUN statement, another DATA statement, a PROC statement, the end of the job, or the semicolon that immediately follows lines of data. The DATA step enables you to read raw data or other SAS data sets and to use programming logic to create a SAS data set, to write a report, or to write to an external file.

Database Interface
   in SAP R/3, a logical application layer that is used to transport data between one or more physical databases and the R/3 applications. The R/3 Database Interface

translates R/3 SQL statements into pure SQL statements and enables R/3 to access data that is in other database formats.

entity
in SAP R/3 applications, an abstract or physical object, such as "Mr. Brown" or "Division Management Subsystem" that represents the smallest collection of data that has meaning within a business. An entity is categorized according to its entity type properties. See also entity type.

entity type
in R/3 applications, a category of entities that have the dame definable characteristics. The definable characteristics are called attributes. Multiple entity types can be grouped into a single table. See also entity.

ERP (Enterprise Resource Planning) system
an integrated application that controls day-to-day business operations such as inventory, sales, finance, human resources, and distribution. From the warehousing perspective, ERP systems differ from standard databases in that they have predefined data models that must be understood in order to successfully extract the data.

format
a pattern that SAS uses to determine how the values of a variable should be written or displayed. SAS provides a set of standard formats and also enables you to define your own formats.

library reference
See libref.

libref
a name that is temporarily associated with a SAS data library. For example, in the name SASUSER.ACCOUNTS, the name SASUSER is the libref. You assign a libref with a LIBNAME statement or with an operating system's command.

observation
a row in a SAS data set. All of the data values in an observation are associated with a single entity such as a customer or a state. Each observation contains one data value for each variable.

ODD
an operational data definition. A metadata record that provides access to a data source. ODDs are used for loading data into data stores in your warehouse.

PROC step
a group of SAS statements that call and execute a procedure. A PROC step usually takes a SAS data set as input.

R/3
an enterprise resource planning (ERP) system that has been developed by SAP AG for use in client/server environments.

RFC
Remote Function Call. The RFC is the SAP AG implementation of a remote procedure call. RFCs enable external applications such as SAS and R/3 systems to access SAP BW and R/3 systems.

SAS data library
a collection of one or more SAS files that are recognized by SAS and that are referenced and stored as a unit. Each file is a member of the library.

SAS data set

a file whose contents are in one of the native SAS file formats. There are two types of SAS data sets: SAS data files and SAS data views. SAS data files contain data values in addition to descriptor information that is associated with the data. SAS data views contain only the descriptor information plus other information that is required for retrieving data values from other SAS data sets or from files whose contents are in other software vendors' file formats.

sideinfo file

a text file that can be used to set logon parameters, such as RFC host, system number, gateway service, and gateway host, for R/3 users.

variable

a column in a SAS data set. Each column contains data values that describe a single characteristic for all observations.

view

a definition of a virtual data set. The definition is named and stored for later use. A view contains no data; it merely describes or defines data that is stored elsewhere.

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