

SAS® IT Resource Management Adapter 3.3 for SAP: User's Guide



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SAS® IT Resource Management Adapter 3.3 for SAP: User's Guide

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Chapter 1

Introduction to the SAS IT Resource Management Adapter for SAP

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Overview

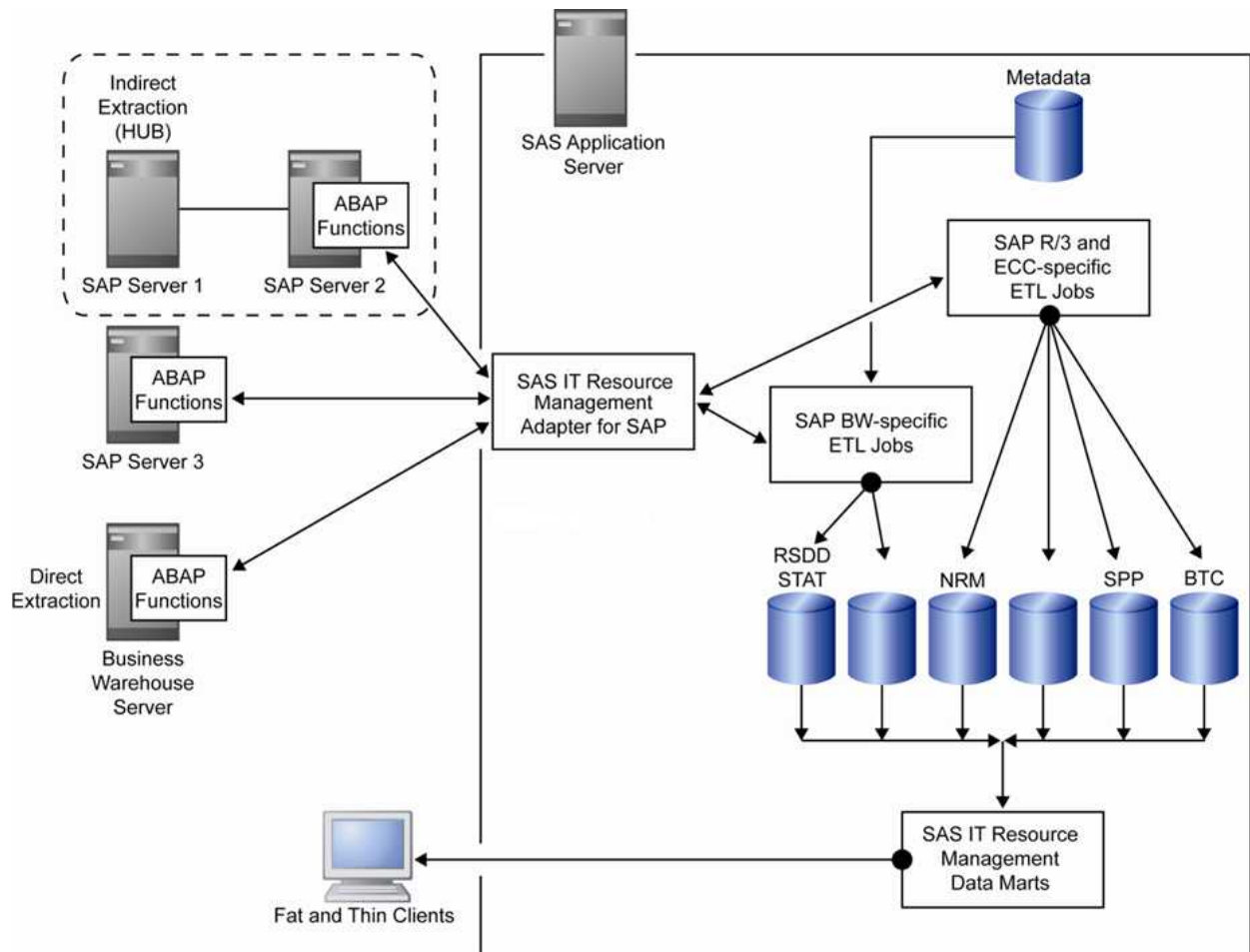
SAP stores performance data as statistics files on stand-alone SAP servers. The SAS IT Resource Management Adapter for SAP provides code to read these statistics files and transform them into a ready-to-use format. The files are then exported to SAS IT Resource Management. Figure 1.1 illustrates this process.

Note: References to the SAS IT Resource Management client in this document pertain to the use of SAS Data Integration Studio with ITRM plug-ins. These plug-ins are not specifically required for the SAS IT Resource Management Adapter for SAP tasks and jobs. In other words, you can use either the SAS Data Integration Studio client or the SAS IT Resource Management client to perform the tasks and work with the jobs that are referenced in this document.

A typical SAP installation uses more than one SAP server and several SAP instances. The SAS IT Resource Management Adapter for SAP provides the capability to choose and customize SAP instances and to monitor their performance.

In addition, a business warehouse server can be part of an SAP installation. Its performance can be analyzed using the underlying SAP server performance data.

Figure 1.1 Solution Architecture



The SAS IT Resource Management Adapter for SAP provides ready-to-use ETL jobs in SAS IT Resource Management. The ETL jobs read performance data from source SAP systems and transform the data into standard raw data tables that are given as input to the SAS IT Resource Management solution. These jobs are built on the SAS Data Surveyor and can communicate with any SAP R/3 system.

The SAS IT Resource Management Adapter for SAP uses the SAS Data Surveyor for SAP to extract SAP performance data. The process involves transparent table extracts, Business Application Programming Interface (BAPI) calls, and calls to remote-enabled Advanced Business Application Programming (ABAP) functions that SAS provides.

Based on whether your business needs to extract performance data from a single server or multiple servers, you can customize the ETL jobs. The architecture of SAS IT Resource Management components provides the environment for the ETL jobs. Therefore, you can use SAS IT Resource Management to view and edit your ETL jobs as needed.

Data Flow Architecture

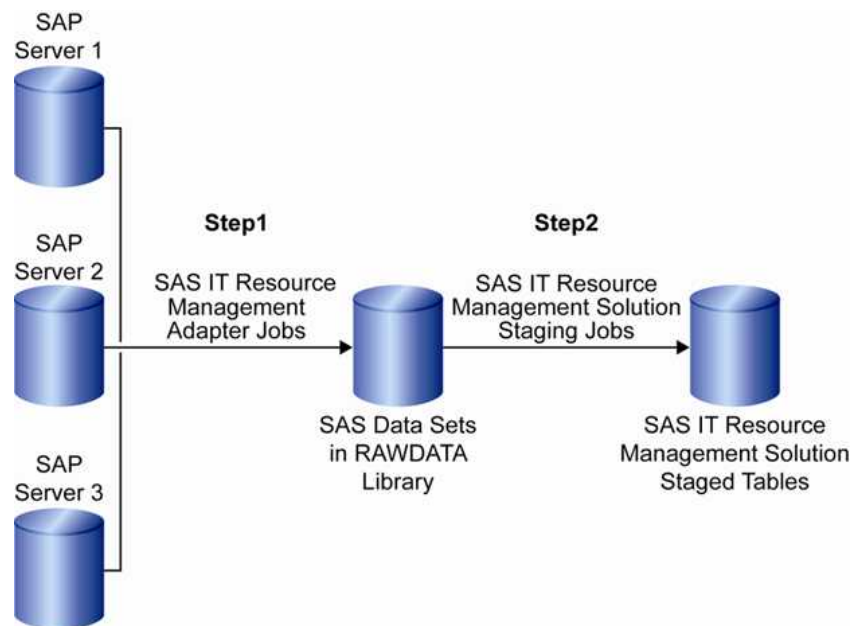
The SAS IT Resource Management Adapter for SAP begins a data flow that moves data from source SAP systems to the Rawdata library. The performance data is stored in the

Rawdata library as SAS data sets. The SAS IT Resource Management solution uses these raw data sets as input and provides solutions for your business needs.

Source data from various SAP systems flows through a series of extraction, transformation, and loading processes to be converted into a usable format for SAS IT Resource Management. Figure 1.2 details the basic concept behind this data flow. The SAS IT Resource Management Adapter for SAP plays its role in the first step of the model.

To extract data, define extraction jobs that create SAS data sets in the Rawdata library. The Rawdata library is the input library for the SAS IT Resource Management staging jobs, as displayed in the following figure.

Figure 1.2 Data Flow from SAP Servers to SAS IT Resource Management



Multiple steps are required before you can run the SAS IT Resource Management Adapter for SAP to extract performance data from SAP. Separate transformations are used to extract standard SAP statistics and business warehouse server performance tables.

Benefits

The SAS IT Resource Management Adapter for SAP enables the SAS IT Resource Management solution to turn SAP data into business intelligence. By automating and streamlining certain parts of the data conversion from SAP to SAS, the adapter decreases the time taken to convert source data into business intelligence. Primarily, it reduces the time taken to perform SAP ETL by 80% or more. Therefore, you have more time to concentrate on generating business solutions from SAP data.

The SAS IT Resource Management Adapter for SAP also includes SAP knowledge that streamlines the data conversion process. So, you do not need to depend on SAP resources to help you understand how SAP works. The SAS IT Resource Management Adapter for SAP also saves you time and valuable SAP resources so that they can be used for other projects.

Configuration and Administration

The SAS IT Resource Management Adapter for SAP is installed using the SAS Deployment Wizard and a set of manual configuration steps described in Chapter 4 of this document.

After you configure the SAS IT Resource Management Adapter for SAP, you can use SAS IT Resource Management to manage and customize the adapter.

SAP Server Performance Data Extraction

To understand the workflow, suppose there is an SAP server called Server1. A system administrator defines Server1 and its library metadata in SAS Management Console. You need to give the server details in the `preprocglobal.sas` program in the initialization job 0010 Step 1 Select Single SAP Server in SAS IT Resource Management that monitors the server. Thereafter, the system administrator deploys the jobs to extract performance data for Server1 on a regular hourly basis.

Next, SAS code calls an SAP ABAP function directly or calls an ABAP function provided by SAS to extract performance data from Server1. The SAS code assembles the performance data into logical SAS tables in the Rawdata library.

The table populates SAS IT Resource Management IT data marts. Reports containing the extracted performance data from Server1 are generated for SAS IT Resource Management.

Components

The SAS IT Resource Management Adapter for SAP consists of the following components:

SAP servers

collect performance data the standard way. Additional Advanced Business Application Programming (ABAP) functions are installed on the SAP servers to support the SAS Data Surveyor for SAP and to allow indirect calls of standard SAP ABAP functions.

SAS Management Console client

defines the SAP servers that are accessed by the SAS IT Resource Management Adapter for SAP.

SAS IT Resource Management client

provides technology that the SAS IT Resource Management Adapter for SAP uses to generate and submit code to the SAS Application Server.

SAS Metadata Server

SAS IT Resource Management and SAS Management Console do not store data locally. They communicate with the SAS Metadata Server, which stores and retrieves metadata from the jobs and tables in SAS IT Resource Management and SAS Data Integration Studio.

SAS ITRM application server

executes the code generated by SAS IT Resource Management. The following software must be installed on the SAS application server:

- Base SAS software
- SAS IT Resource Management server-side software
- SAS Solutions Adapter software (includes the server component of the SAS Data Surveyor for SAP: SAS/ACCESS Interface to R/3 software)
- Web server to deploy reports for common access

SAS IT Resource Management transformation (new)

In this release of SAS IT Resource Management Adapter, a new transformation named Libref Collector transformation is defined in the initialization job 0010 Step 1 Select Single SAP Server.

SAS code files

installed on the SAS Application Server. These open-source files are automatically copied to a location where they can be modified if necessary.

SAS macros

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

SAS libraries

provide storage for administration and data tables.

Business Warehouse Server Performance Data Extraction

The business warehouse server runs on a standard SAP threaded kernel. Therefore, business warehouse server performance can be monitored using the same methodology for standard R/3 instances.

However, each ABAP function must be installed on each business warehouse server in order to collect business warehouse server performance data. This means that performance data for business warehouse servers cannot be extracted through a hub. However, a business warehouse server can function as a hub for R/3 system statistics data.

Additional business warehouse server performance data can be collected by extracting data at the InfoCube level. This is explained in more detail in the “Extract Business Warehouse InfoCube Performance Data” section.

Tables

The following table lists the tables that contain performance data extracted from the SAP systems.

Long SAP Table Name	SAS Data Table	Performance Database (PDB) Tables	Description and Notes
V2_NORMAL_REC ORDS	NRM	SAPR3S SAPHST SAPSMY SAPSYS SAPTRN SAPTSK	Normal transaction history.
V2_BTC_STEP_REC ORDS	BTC	SAPBTCH	Batch transaction history.
V2_NORMAL_REC ORDS, V2_BTC_STEP_REC ORDS	NRM BTC	SAPWKLD	SAPWKLD is built on a combination of NRM and BTC.
V2_TABLE_RECOR DS	TAB	SAPTAB	Table access history. Not collected in SAP by default because collecting table access statistics places a heavy load on the SAP system.
V2_RFC_CLIENT_R ECORDS	RC0	SAPRC0	RFC client access history.
V2_RFC_SERVER_R ECORDS	RS0	SAPRS0	RFC server access history.
V2_RFC_CLIENT_D EST_RECORDS	RCD	SAPRCD	RFC client destination access history.
V2_RFC_SERVER_ DEST_RECORDS	RSD	SAPRSD	RFC server destination access history.
V2_SPOOL_PRINT_ RECORDS	SPP	SAPSPP	Printing history.
V2_SPOOL_ACTIVI TY_RECORDS	SPA	SAPSPA	Spool activity history.
V2_RFC_TIME_INT _RECORDS	TII	SAPTII	Time interval history (typically not collected by default).
DB_PROCEDURE_R ECORDS	DBP		Database procedure history.

Long SAP Table Name	SAS Data Table	Performance Database (PDB) Tables	Description and Notes
NORM_SUBRECORD_INDEX	CIX	Not applicable	Contains indexes to associate records in sub-tables with normal transactions. For example, a normal transaction accessing tables would have one record in NRM and one record in TAB for each table access. This index table is used to establish this link.
RSDDSTAT	RSDDS	SAPRSS	SAP business warehouse InfoCube query performance statistics.
RSDDSTATWHM	WHM	SAPWHM	SAP business warehouse server maintenance statistics.
ADM_MESSAGE_RECORDS	ADM		ADM message additional information.
CLIENT_INFO_RECORDS	CIF		Client (also known as passport) additional information.
HTTP_RECORDS	HTP		HTTP additional information.
HTTP_CLIENT_DEST_RECORDS	HTPCD		HTTP client destination additional information.

Accessibility

The SAS IT Resource Management Adapter for SAP does not have a stand-alone graphical user interface (GUI). It is configured and managed using features of SAS IT Resource Management and SAS Management Console.

SAS IT Resource Management and SAS Management Console include accessibility and compatibility features that improve their usability for users with disabilities. These features are related to accessibility standards for electronic information technology that

were adopted by the U.S. Government under Section 508 of the U.S. Rehabilitation Act of 1973, as amended.

For more information about specific accessibility features of SAS IT Resource Management and SAS Management Console, see their respective documentation available at <http://support.sas.com>.

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

What's New

The SAS IT Resource Management Adapter for SAP supports the SAS IT Resource Management Adapter 3.3 for SAP and the following platforms:

- WIN (Windows 32 bit on x86)
- WX6 (Windows 64 bit on x86)
- S64 (Solaris on SPARC)
- R64 (AIX on PowerPC)
- H61 (HP-UX on Itanium)
- z/OS

You can find the list of host platforms supported by the SAS IT Resource Management solution in the *System Requirements* document available at <http://support.sas.com/itrm>. The current version of SAS IT Resource Management Adapter for SAP supports the following SAP versions:

- SAP - ECC 4.7 (SAP Kernel 610, 620)
- SAP - ECC 5.0
- SAP - ECC 6.0 (ERP 6.0) (SAP Kernel 700, 701)
- SAP - BW 3.1
- SAP - BI 7.0

Chapter 2

SAP Customization Tasks

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Introduction

The SAS IT Resource Management Adapter for SAP requires customization to work in your unique installation environment. The system administrator must perform the following tasks:

1. Install SAP transports.
2. Set up hub servers to extract performance data for indirect extraction.
3. Connect to SAP destination servers for indirect extraction.
4. Extract business warehouse server performance data.
5. Set up SAP authorization.
6. Test ABAP functionality.

Furthermore, the SAS IT Resource Management Adapter for SAP uses the SAS Data Surveyor for SAP. The server component of the SAS Data Surveyor for SAP is the SAS/ACCESS Interface to R/3 software. SAS/ACCESS Interface to R/3 software requires additional setup. For more information, see the installation instructions for SAS/ACCESS Interface to R/3.

The following sections provide approximate instructions on how to complete these tasks. For specific information about how to complete these tasks in your environment, see your SAP documentation.

Install SAP Transports

There are two ways to gather performance data from an SAP server:

- **Direct extraction:** This requires installing standard SAP transports on each SAP server.
- **Indirect extraction:** This involves extracting data via a hub SAP server that has standard SAP transports installed. A destination that is configured on the hub enables the hub to connect to the server from which data is to be extracted.

Note: Indirect extraction can be used only with SAP servers that are of the same threaded kernel release. If there is more than one release represented in the SAP server environment, you must use direct extraction for individual SAP servers.

The main difference between the two ways is the effort to install the SAP transports on each server (direct extraction) versus the effort to configure the destination on the hub. Also, indirect extraction has additional overhead for the hub.

The transports in table 2.1 need to be installed in the SAP servers based on the release or kernel versions. The SAPKI31001INSAS transport is provided for SAP releases 4.6C or later (up to, but not including, SAP release 6.10). The SAPKI31002INSAS transport is provided for SAP release 6.10 or later. The SAPKI31003INSAS transport is provided for SAP Release 700 or later. Each transport installs the RFC function /SAS/SAPWL_STATREC_READ_FILE, which is provided by SAS.

Table 2.1 Specific Transports Required for the SAS IT Resource Management Adapter for SAP

Transport	Objects	To Be Applied to
SAPKI31001INSAS	Package /SAS/ADITM	SAP systems 46C and prior to 610
SAPKI31002INSAS	Package /SAS/ADITM	SAP systems 610 and higher
SAPKI31003INSAS	Package /SAS/ADITM	SAP systems 700 and higher

The transports are located in the `\itmadaptsap\sasmisc` directory. The directory location is relative to the location where SAS Foundation is installed (for example, `x:\Program Files\SASHome\SASFoundation\9.3\itmadaptsap\sasmisc`).

From the local directory, a system administrator with the necessary privileges can install the transport files using the SAP Transport Manager.

Set Up Hub Servers to Extract Performance Data for Indirect Extraction

Some SAP servers need to function as adapter gateway servers (or hubs). SAS calls this ABAP function to extract performance data for the hub and for other SAP servers.

Multiple extractions can be channeled through a single hub, which means that only one or two servers might need to function as hubs.

Note: Each unique SAP release requires a hub, because underlying data structures can change between releases. Remote function calls between SAP instances that have different underlying data structures can result in corrupt data.

Connect to SAP Destination Servers for Indirect Extraction

Servers connect to a hub using an SAP destination. On the hub, an ABAP function extracts data from other servers using an SAP destination defined on the hub itself.

An SAP destination must be defined for each server on each hub, so that the server's performance data can be extracted by the hub. To define an SAP destination, complete the following steps:

1. Issue transaction SM59 from SAP, and then provide the following:
 - For the RFC destination, specify *system-id_hostname* (for example, SI9_ENDAPP09).
 - For connection type, enter 3.
 - For description, enter **Connection to SI9 on appserver.pc.domain.com**.
2. In the Technical Settings section, verify the following settings and information:
 - Do not allow load distribution.
 - A host name or IP address of the SAP server is specified.
3. In the **Logon** and **Security** sections, provide a user ID and password for non-trusted systems to run code on the target SAP system.
4. In the **Special Options** section, complete the following steps:
 - Set the Unicode flag based on the setting of the target SAP server.
 - Review all other settings and make sure that they meet the local site's standards.

For more information about destinations, see Appendix 2.

Extract Business Warehouse InfoCube Performance Data

Additional business warehouse server performance data can be collected by extracting data at the InfoCube level. For example, an InfoCube query has a single record that identifies the resources that were used by the query. The information in this record can be collected in an underlying table that stores performance data for the entire SAP system. This InfoCube performance data can help identify problem queries.

The SAS IT Resource Management Adapter for SAP provides the tools to extract the business warehouse InfoCube performance table's data by using SAS Data Surveyor for SAP technology. That means business warehouse InfoCube performance data is

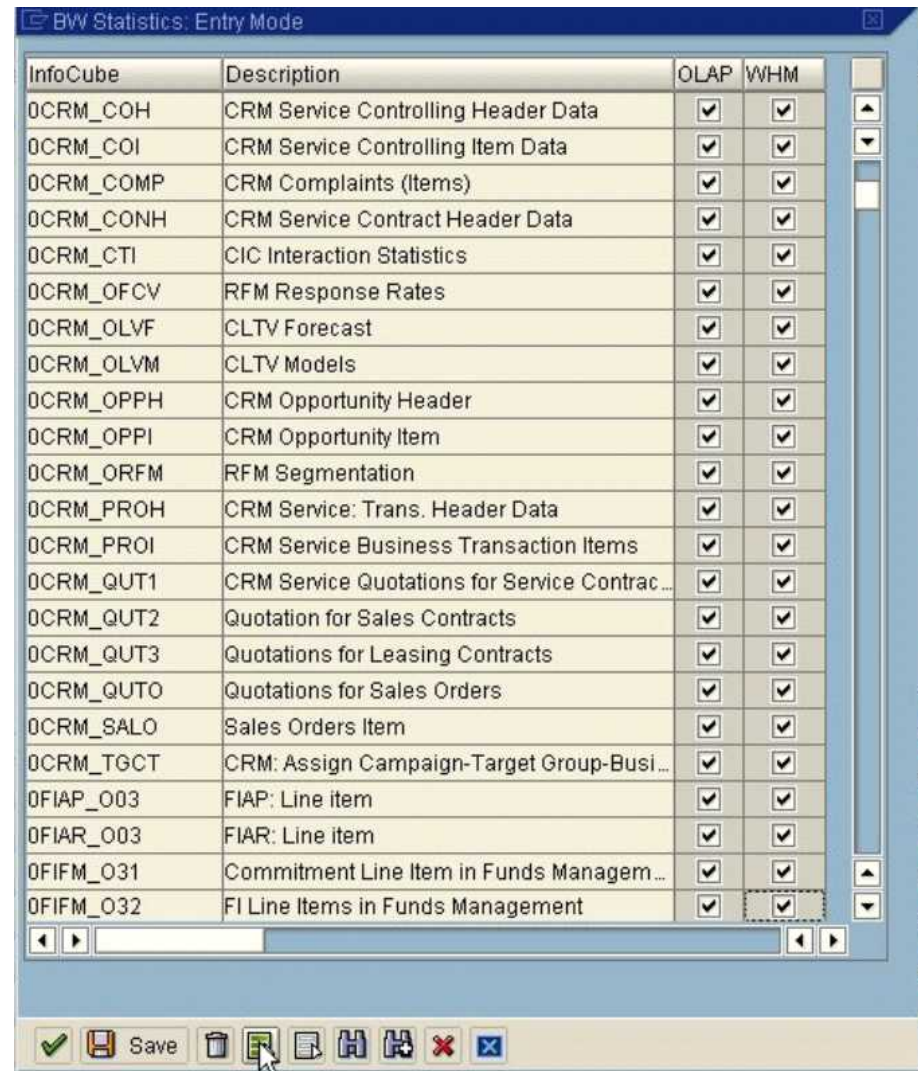
extracted by using standard ABAP functions. No additional ABAP functions are required. The extraction involves exploiting the SAP threaded kernel. There is no need for business warehouse server-specific technology.

Business warehouse servers must be activated in order to collect performance data. To activate a business warehouse server, complete the following steps:

1. Issue transaction RSA1 to access the business warehouse server workbench.
2. From the workbench, select **Tools** ⇒ **BW Statistics for Info Cubes**.

The BW Statistics: Entry Mode window appears with a listing of all active info cubes.

Display 2.1 BW Statistics: Entry Mode Window

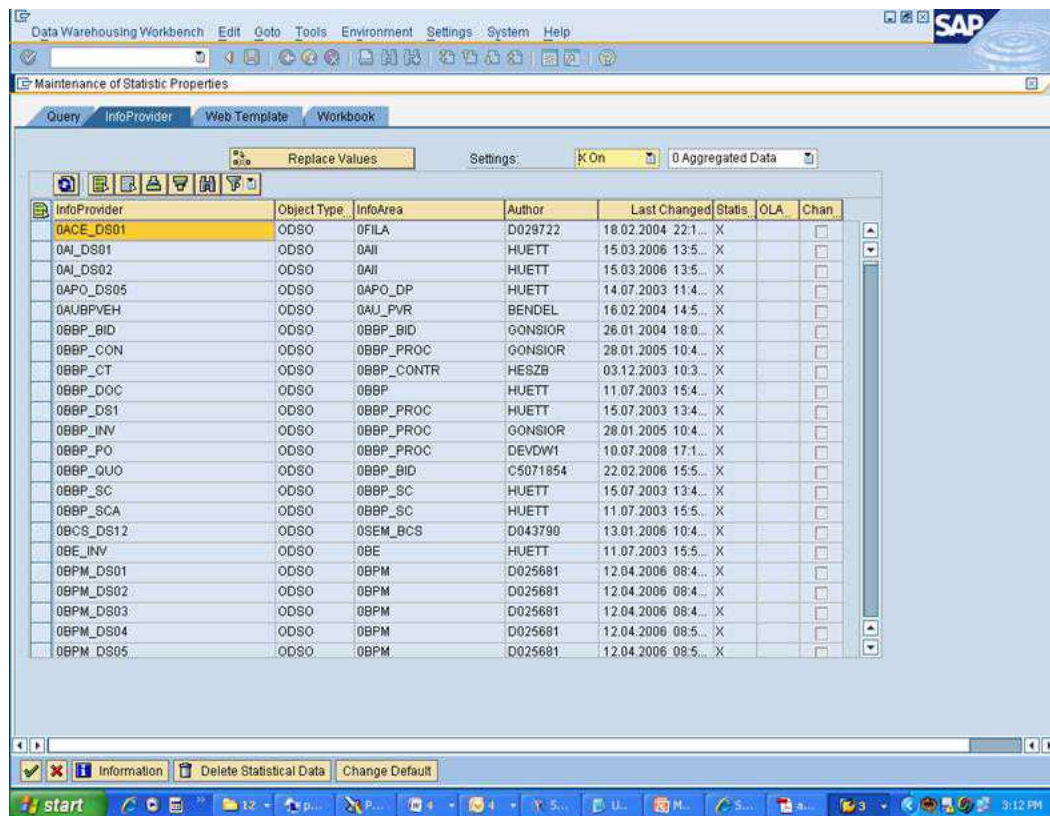


InfoCube	Description	OLAP	WHM
0CRM_COH	CRM Service Controlling Header Data	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_COI	CRM Service Controlling Item Data	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_COMP	CRM Complaints (Items)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_CONH	CRM Service Contract Header Data	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_CTI	CIC Interaction Statistics	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_OFCV	RFM Response Rates	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_OLVF	CLTV Forecast	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_OLVM	CLTV Models	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_OPPH	CRM Opportunity Header	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_OPPI	CRM Opportunity Item	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_ORFM	RFM Segmentation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_PROH	CRM Service: Trans. Header Data	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_PROI	CRM Service Business Transaction Items	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_QUT1	CRM Service Quotations for Service Contrac...	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_QUT2	Quotation for Sales Contracts	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_QUT3	Quotations for Leasing Contracts	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_QUTO	Quotations for Sales Orders	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_SALO	Sales Orders Item	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0CRM_TGCT	CRM: Assign Campaign-Target Group-Busi...	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0FIAP_003	FIAP: Line item	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0FIAR_003	FIAR: Line item	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0FIFM_031	Commitment Line Item in Funds Managem...	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0FIFM_032	FI Line Items in Funds Management	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

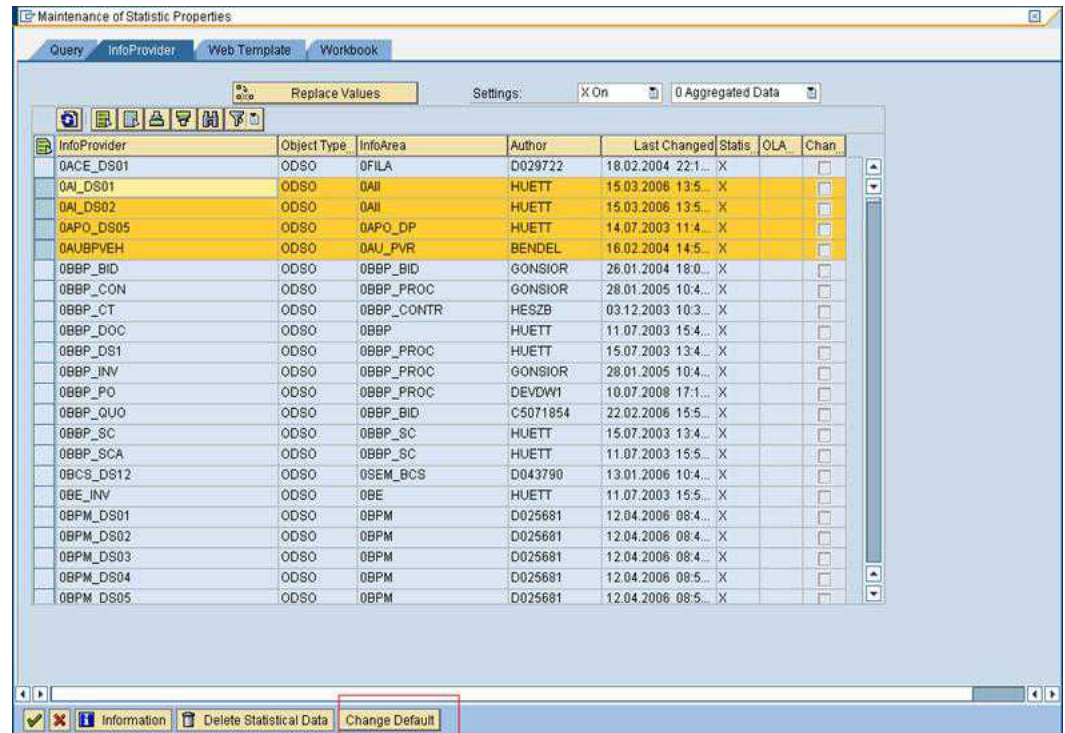
3. Click the **Select all** icon to select all information cubes (Info Cube). Or, select the **OLAP** and **WHM** check boxes to select individual information cubes.
4. Click **Save**.
5. In BI 7.0 from the workbench, select **Tools** ⇒ **BW Setting for BI Statistics**.

The following window appears.

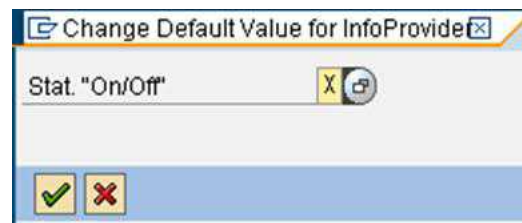
Display 2.2 Maintenance of Statistic Properties Window




- Click the **Select all** icon to select all information providers (InfoProvider). As an alternative, you can select individual information providers.



Display 2.3 Maintenance of Statistic Properties Window

7. Select the **Change Default** option at the bottom of the preceding screen.



8. Click the **Close** button .

The pop-up window closes.

9. Click the **Save** button , and then click  to continue.

Note: When this transaction takes place in new versions like B17.0, you determine the objects for which you want to write run-time statistics in the BI system. You can choose queries, information providers, Web templates, workbooks, and data transfer processes (DTPs) from the Warehouse Management area. For information providers, Web templates, workbooks, and DTPs, you can choose only On or Off. For queries, you can also choose the level of detail for the statistics.

A newly created object always has the default setting D. If the default value D is not altered, the system writes the statistics according to the setting that you made for the default value of the run-time object. You can change the default value in the menu under **Extras** ⇒ **Change Default Value**. The default always refers to the objects on the current tabbed page.

Set Up SAP Authorization

The system administrator must create user IDs before performance data can be extracted. To create all necessary user IDs, complete the following steps:

1. Create a user ID for extracting performance data.
2. Create a user ID for the SAS administrator, if one does not already exist. This user ID must have permission to issue transactions SE37, SE38, SM37, and SM59.

User IDs must be given the necessary permissions. For more information, see the installation instructions for SAS/ACCESS Interface to R/3 software.

The SAS administrator can configure the SAS IT Resource Management Adapter for SAP to allow only authorized SAP users to log on.

In addition, some sites might need to restrict permission so that only performance data can be extracted. To restrict permission, see Appendix 3.

Test ABAP Functionality

To ensure that ABAP functions are correctly installed, run a test job using the ABAP workbench function.

When all ABAP functions are installed and the SAS environment is customized, you can execute the test job. The job should not take more than a few minutes to execute, because the ABAP Workbench function extracts only a few test records.

Chapter 3

Preparing to Import the SAS IT Resource Management Adapter for SAP

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Introduction

As part of the installation and configuration of the SAS IT Resource Management Adapter for SAP, the system administrator must complete the following steps:

1. Verify that the environment meets the system requirements.
2. Follow the correct installation sequence.
3. Prepare the environment.
4. Import sample metadata.

All of these steps are necessary before you can use the SAS IT Resource Management Adapter for SAP.

Installation Prerequisites

As part of the installation of SAS IT Resource Management Adapter for SAP, it is mandatory to install the following dependent SAS software.

- SAS 9.3
- SAS Data Surveyor for SAP 4.4 (includes SAS/ACCESS to R/3)

Refer to the installation instructions for the specific SAS product for more information.

System Requirements

The SAS IT Resource Management Adapter for SAP requires that the following be installed:

- SAP, Release 4.7 or later
- SAS Foundation
- SAS IT Resource Management
- SAS/ACCESS Interface to R/3 software
- SAS Data Integration Studio
- SAS Data Surveyor for SAP

Complete these installations before you start using the SAS IT Resource Management Adapter for SAP.

Installation Sequence

Here is the recommended sequence for installing the components and software:

1. Install SAS Foundation, SAS IT Resource Management, and SAS/ACCESS Interface to R/3 software on the SAP server.
2. Install SAS Data Integration Studio on the client server.
3. Install SAS Data Surveyor for SAP on the client server.
4. Install SAS IT Resource Management Adapter for SAP.
5. Import the SAS IT Resource Management Adapter for SAP sample metadata.

Defining the Environment

Overview

Before the SAS IT Resource Management Adapter for SAP is installed, complete the following steps to prepare the environment:

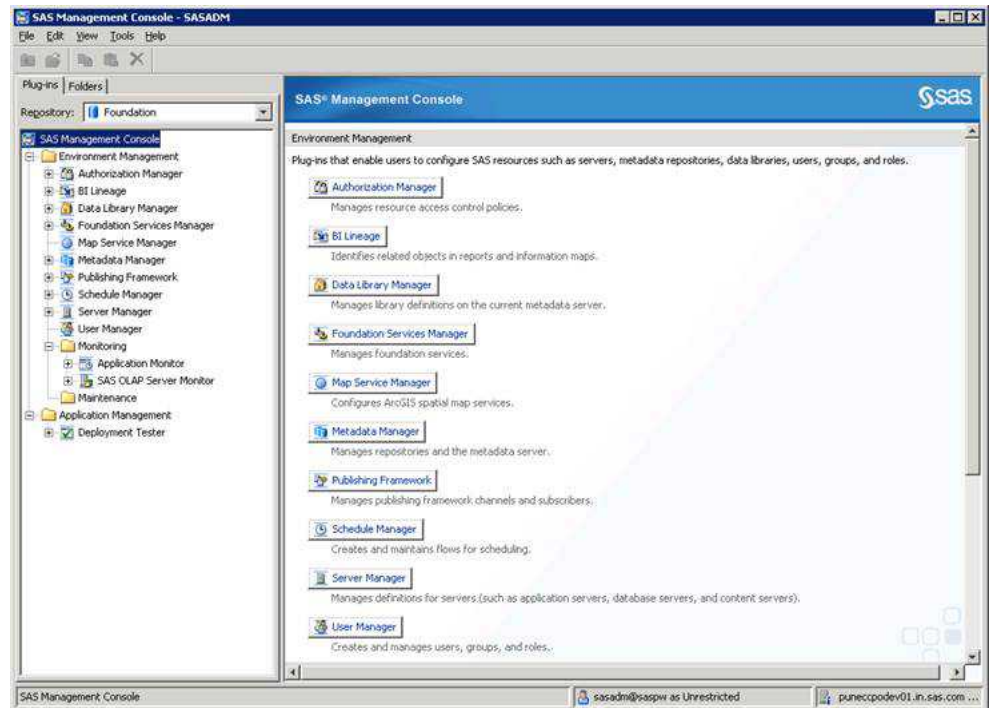
- Define users in SAS Management Console.
- Define an SAP library and an SAP server in SAS Management Console.
- Test the SAP connection to SAS Data Integration Studio.
- Create a directory for administrative data.

DefineUsers

To define a user for the SAS IT Resource Management Adapter for SAP, complete the following steps:

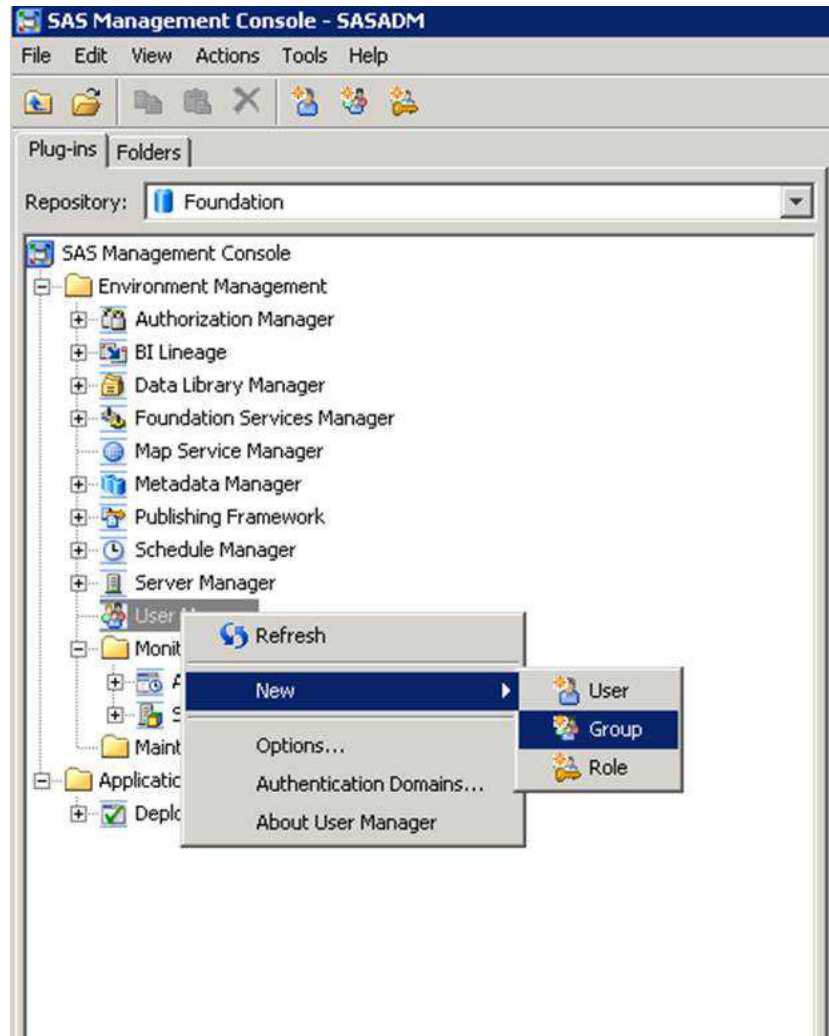
1. Open SAS Management Console.
2. Select **Foundation** in the **Repository** field to connect to the SAS Metadata Server at the Foundation level. You must have administrator access to complete this task.

Display 3.1 SAS Management Console

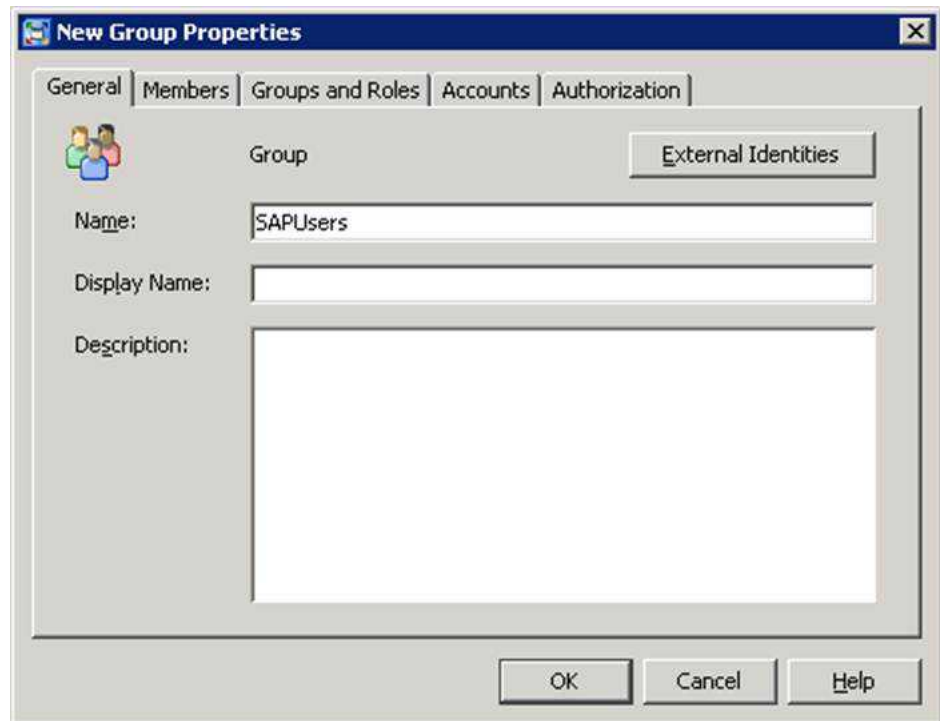


3. Right-click **User Manager** in the navigation tree, and then select **New** ⇒ **Group**.

Display 3.2 SAS Management Console: User Manager



4. In the New Group Properties dialog box, enter **SAPUsers** in the **Name** field.

Display 3.3 New Group Properties

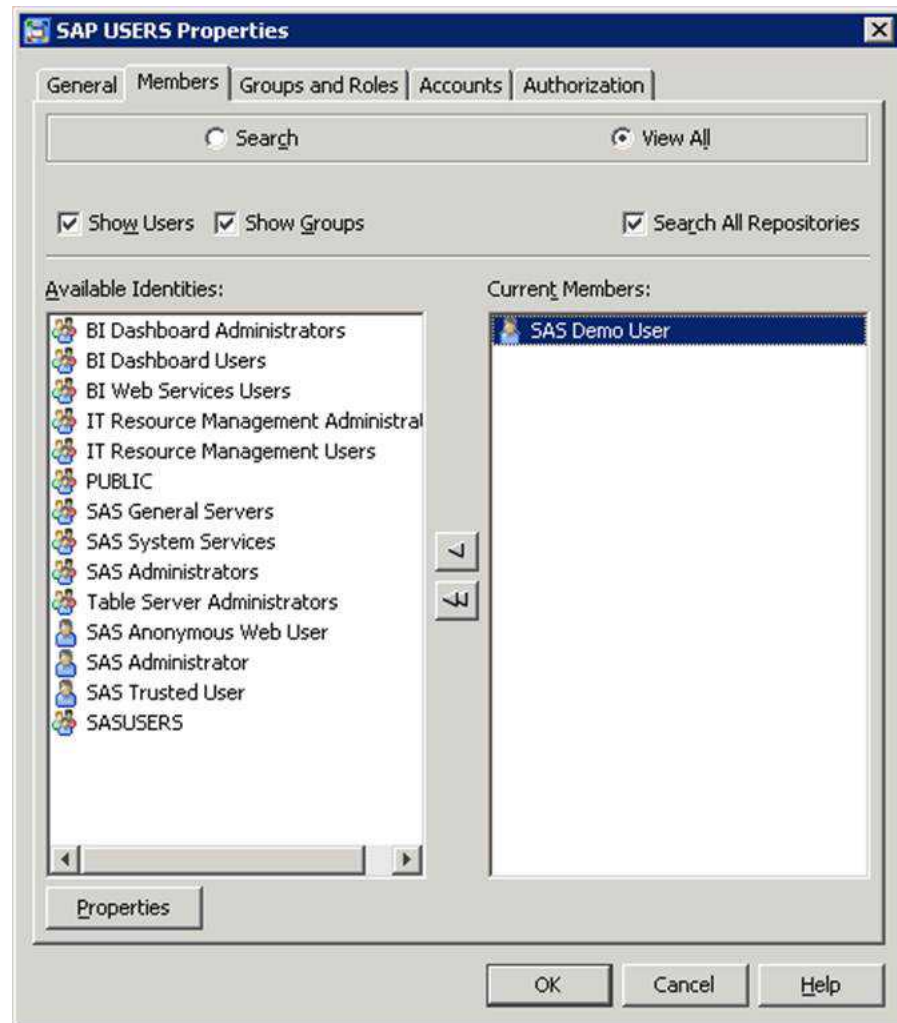
5. Select the **Members** tab. Select **SAS Demo User** in the **Available Members** box.


6. Click the single arrow button

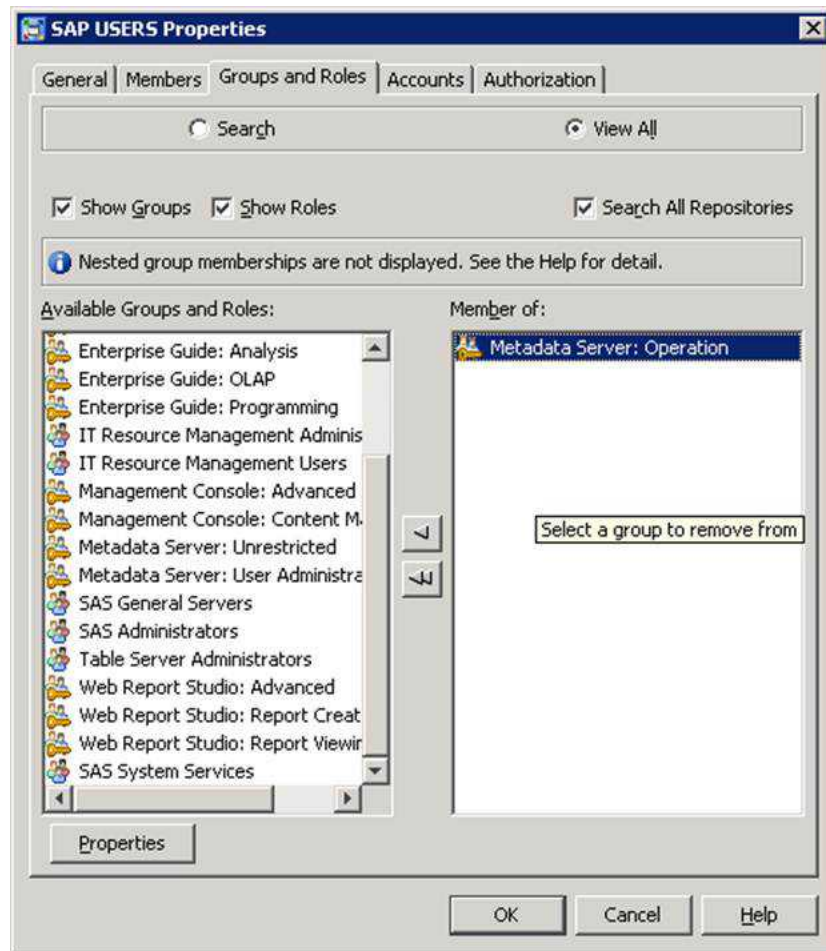


Current Members box.

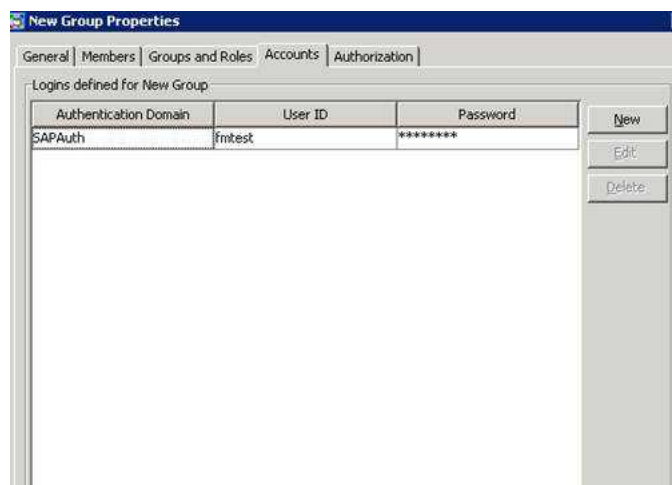
Display 3.4 SAP USERS Properties: Members Tab



7. Select the **Groups and Roles** tab. Select **Metadata Server: Operation** in the **Available Groups and Roles** box.
8. Click the single arrow button  to move the selected member to the **Member of** box.

Display 3.5 SAP USERS Properties: Groups and Roles Tab

9. Select the **Accounts** tab. Click **New**.

Display 3.6 SAP Users Properties: Accounts Tab

10. In the Edit Login Properties dialog box, complete the following steps:
 - Enter the user ID and password for the SAP server.
 - Select **SAPAuth** from the **Authentication Domain** menu.

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

- Click **OK** to save the new login properties.
- Click **OK** to save the new group properties.

Display 3.7 Edit Login Properties

11. In the SAS Demo User Properties dialog box, select the **Groups and Roles** tab. Select Metadata Server: Operation in the **Available Groups and Roles** box. Then, click the arrow to move the selected member to the **Member of** box.

Display 3.8 SAS Demo User Properties

Define an SAP Server and an SAP Library

When you have only one SAP Server defined, defining an SAP library for the server is not required. Library is automatically assigned to the server, once you import the package files into the SAS IT Resource Management. However, it is mandatory to define SAP libraries, when there are multiple servers and you need to extract data from specific servers. For example, when you need to extract data from a specific server, you are required to enter the SAP library of that server in the `preprocglobal.sas` program.

To define an SAP server for the SAS IT Resource Management Adapter for SAP, complete the following steps:

1. Open SAS Management Console.
2. In the **Repository** field, select **Foundation**, or select a repository that is solely dependent on the Foundation repository.

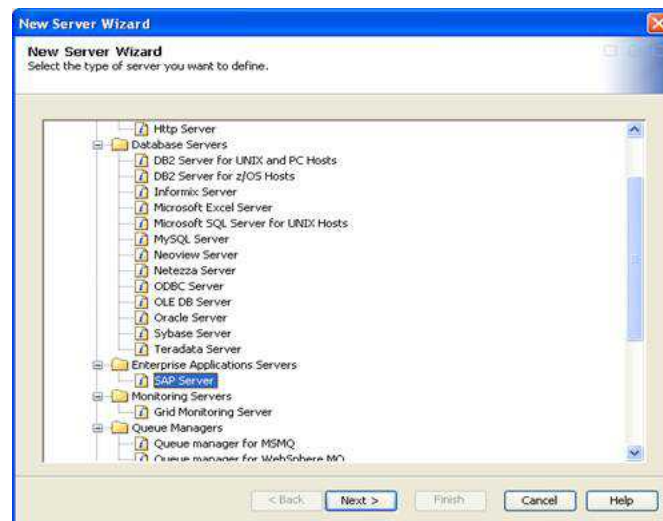
This connects to the metadata server at the foundation level.

3. Right-click **Server Manager** and select **New Server**.

The New Server Wizard appears.

4. Select **SAP Server** from the **Enterprise Applications Servers** folder.
5. Click **Next** to name the new SAP library.

Display 3.9 New Server Wizard

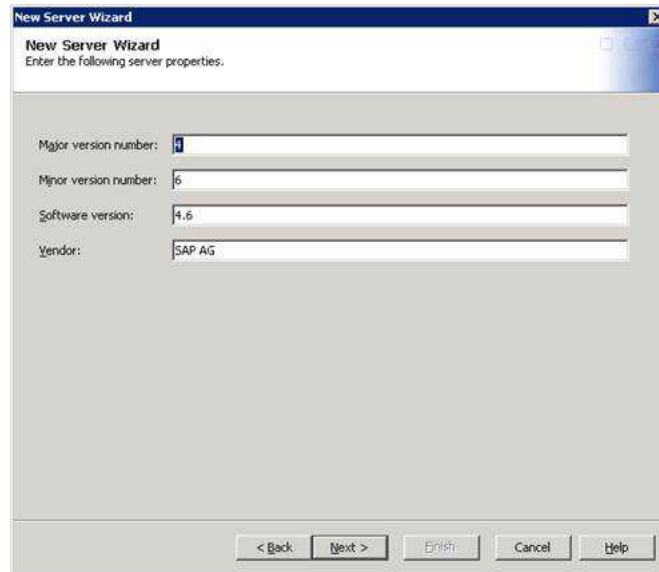


6. Enter a name and description for the server. Click **Next**.
7. Enter the version numbers for your SAP software.

These values are optional.

8. Click **Next**.

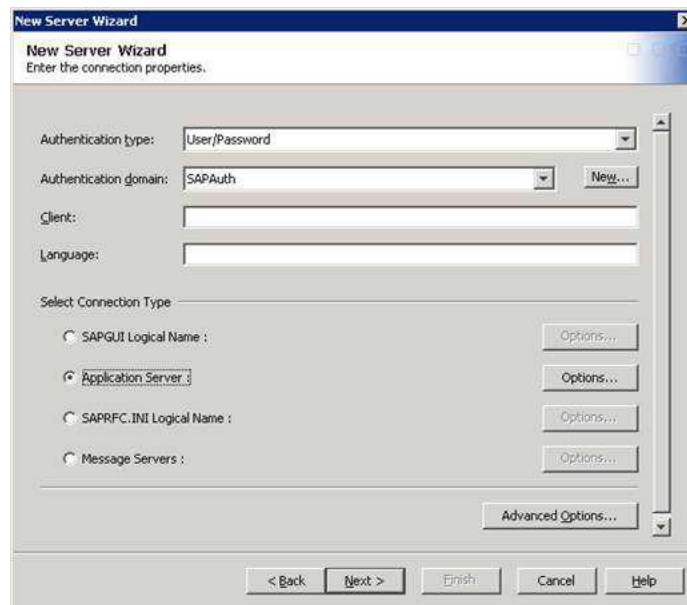
Display 3.10 Enterprise Applications Servers SAP Server



The 'New Server Wizard' dialog box is shown with the title 'New Server Wizard' and the instruction 'Enter the following server properties.' It contains four input fields: 'Major version number' with the value '4', 'Minor version number' with the value '6', 'Software version' with the value '4.6', and 'Vendor' with the value 'SAP AG'. At the bottom, there are five buttons: '< Back', 'Next >', 'Finish', 'Cancel', and 'Help'.

9. Select **SAPAuth** from the **Authentication Domain** menu. Select the connection type that corresponds to a normal SAP GUI connection for your system.

Display 3.11 New Server Wizard: Connection Properties



The 'New Server Wizard' dialog box is shown with the title 'New Server Wizard' and the instruction 'Enter the connection properties.' It contains several fields and a section for selecting a connection type. The 'Authentication type' is set to 'User/Password'. The 'Authentication domain' is set to 'SAPAuth' with a 'New...' button next to it. There are empty fields for 'Client' and 'Language'. Below these is a section titled 'Select Connection Type' with four radio button options: 'SAPGUI Logical Name', 'Application Server' (which is selected), 'SAPRFC.INI Logical Name', and 'Message Servers'. Each option has an 'Options...' button to its right. At the bottom right of this section is an 'Advanced Options...' button. At the very bottom, there are five buttons: '< Back', 'Next >', 'Finish', 'Cancel', and 'Help'.

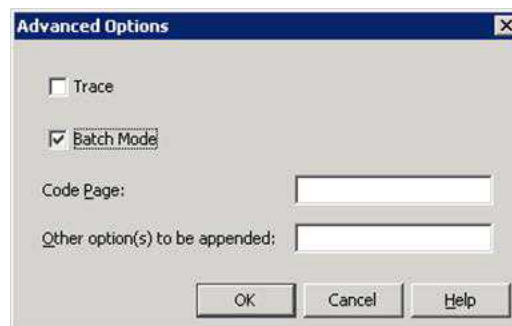
10. Click **Options** for your selection. The Application Server Options dialog box appears.
11. Specify the RFC server host and system number. Click **OK**.

Display 3.12 Application Server Options

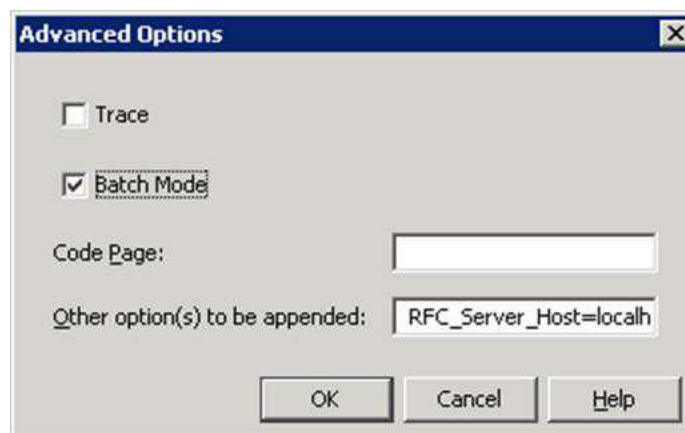
12. Click **Advanced Options** in the New Server Wizard dialog box.

If you have defined batch servers or processes, specify some of the advanced options that are available.

13. Select **Batch Mode** and click **OK**.

Display 3.13 Advanced Options

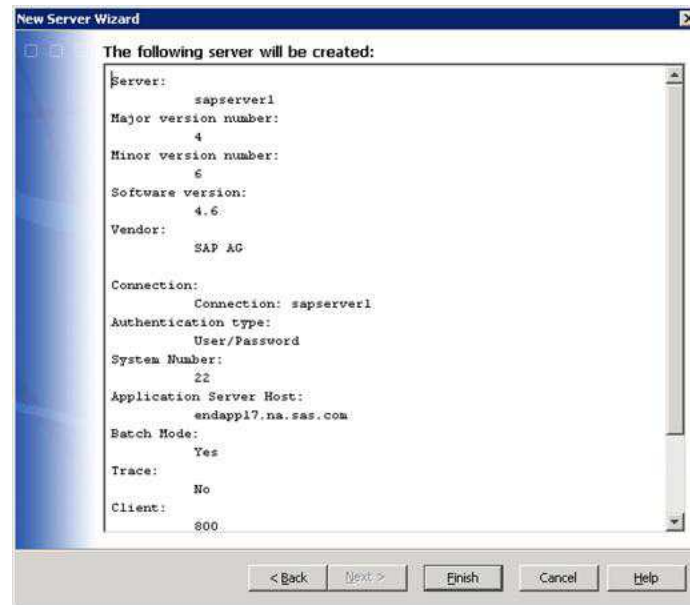
14. For a z/OS environment, specify the RFC Server host name (where your RFC server is available) and RFC server port in the field **Other option(s) to be appended**.

Display 3.14 Advanced Options

15. Click **Next**, in the New Server Wizard.
16. Review the information and click **Finish**.

This takes you to the main screen of the SAS Management Console, where you can view in the Servers list, the server that you have just defined.

Display 3.15 New Server Wizard: Summary of Specifications



To define an SAP library for the SAS IT Resource Management Adapter for SAP, complete the following steps:

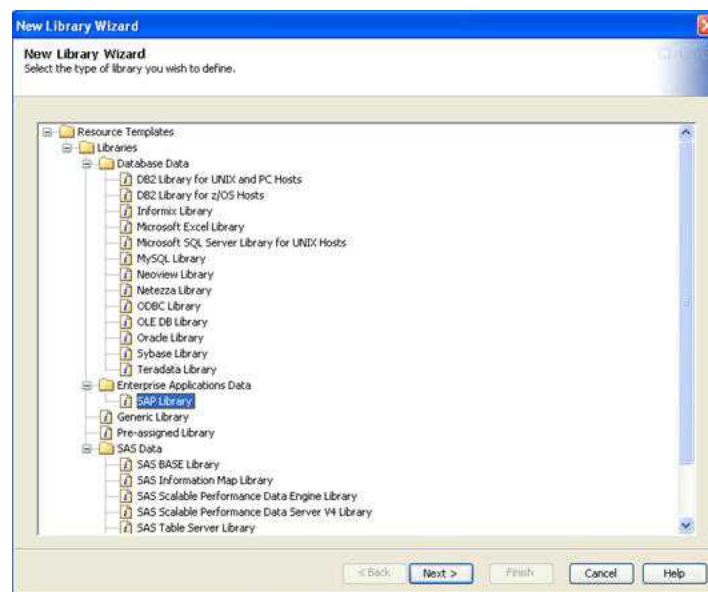
17. Expand **Data Library Manager** in the navigation tree.

18. Right-click **Libraries** and select **New Library**.

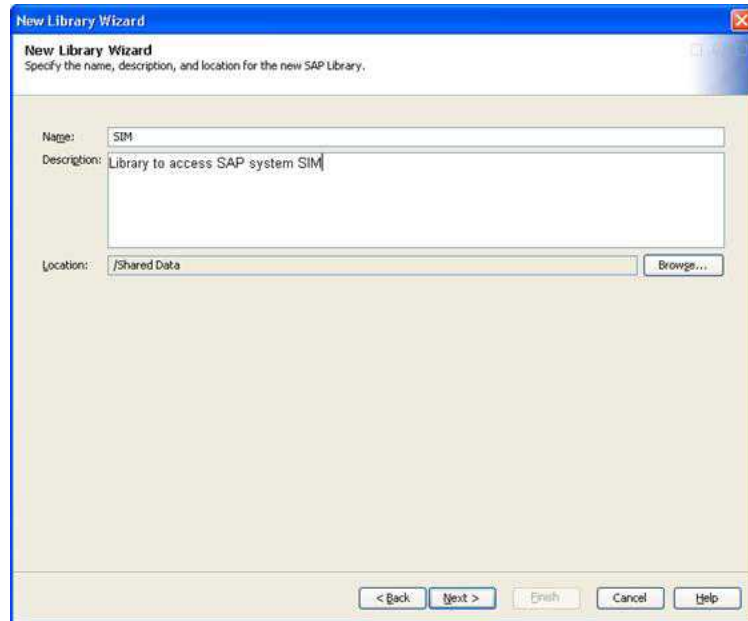
The New Library Wizard appears.

19. Select **SAP Library** from the **Enterprise Applications Libraries** folder. Click **Next**.

Display 3.16 New Library Wizard

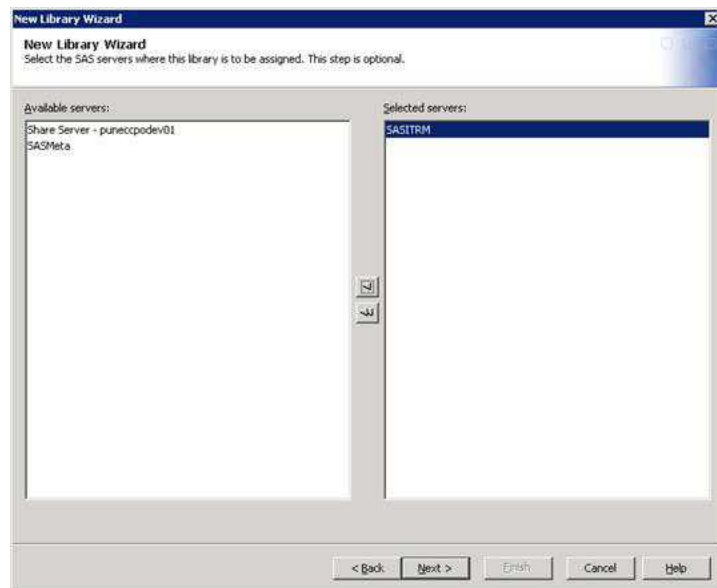


20. Enter a name and description for the library. Click **Next**.

Display 3.17 New Library Wizard


The 'New Library Wizard' dialog box is shown. It has a title bar with a close button. Below the title bar, the text 'New Library Wizard' is followed by the instruction 'Specify the name, description, and location for the new SAP Library.' The dialog contains three input fields: 'Name:' with the value 'SIM', 'Description:' with the value 'Library to access SAP system SIM', and 'Location:' with the value '/Shared Data'. To the right of the 'Location:' field is a 'Browse...' button. At the bottom of the dialog are five buttons: '< Back', 'Next >', 'Finish', 'Cancel', and 'Help'.

21. Select the required SAS **SASITRM** server.

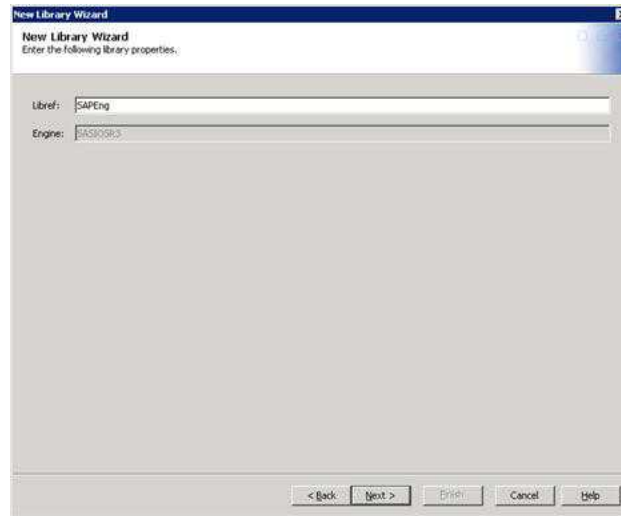
Display 3.18 New Library Wizard: Server Selection


The 'New Library Wizard' dialog box is shown in the 'Server Selection' step. The title bar and the text 'New Library Wizard' are at the top. Below this is the instruction 'Select the SAS servers where this library is to be assigned. This step is optional.' The dialog is divided into two main panes. The left pane, titled 'Available servers:', contains a list with two items: 'Share Server - puneccodev01' and 'SASMeta'. The right pane, titled 'Selected servers:', contains a list with one item: 'SASITRM'. Between the two panes are two small buttons with arrows pointing in opposite directions. At the bottom of the dialog are five buttons: '< Back', 'Next >', 'Finish', 'Cancel', and 'Help'.

The value **SAPEng** appears in the **Libref** field. This is the default value that the imported metadata uses. You can give any other name and description that uniquely identifies the SAP server that you have created.

22. Click **Next**.

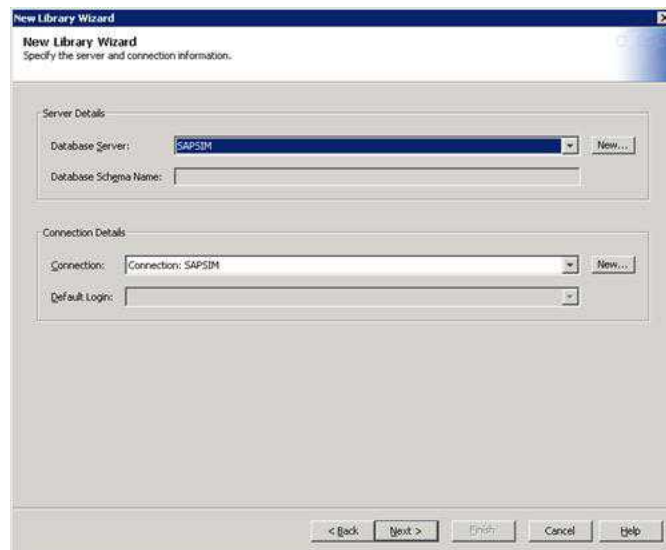
Display 3.19 New Libref Wizard: Libref Name



The dialog box is titled "New Library Wizard" with a subtitle "Enter the following library properties:". It contains two text input fields: "Libref:" with the value "SAPEng" and "Engine:" with the value "SAS00SR3". At the bottom, there are five buttons: "< Back", "Next >", "Finish", "Cancel", and "Help".

23. In the **Database Server** field, select a database server that contains parameters connecting to the SAP server.
24. If an appropriate database server is not already available in the menu, complete steps 1-16 to create one. Click **Next**.

Display 3.20 New Library Wizard: Database Server



The dialog box is titled "New Library Wizard" with a subtitle "Specify the server and connection information:". It is divided into two sections: "Server Details" and "Connection Details".
 In the "Server Details" section, there is a "Database Server:" dropdown menu showing "SAPSIM" and a "New..." button next to it. Below it is a "Database Schema Name:" text input field.
 In the "Connection Details" section, there is a "Connection:" dropdown menu showing "Connection: SAPSIM" and a "New..." button next to it. Below it is a "Default Login:" dropdown menu.
 At the bottom, there are five buttons: "< Back", "Next >", "Finish", "Cancel", and "Help".

25. Click **Finish**.

Display 3.21 Library Properties

SAS RFC Server (Only for SAS/ACCESS Interface to R/3 for z/OS)

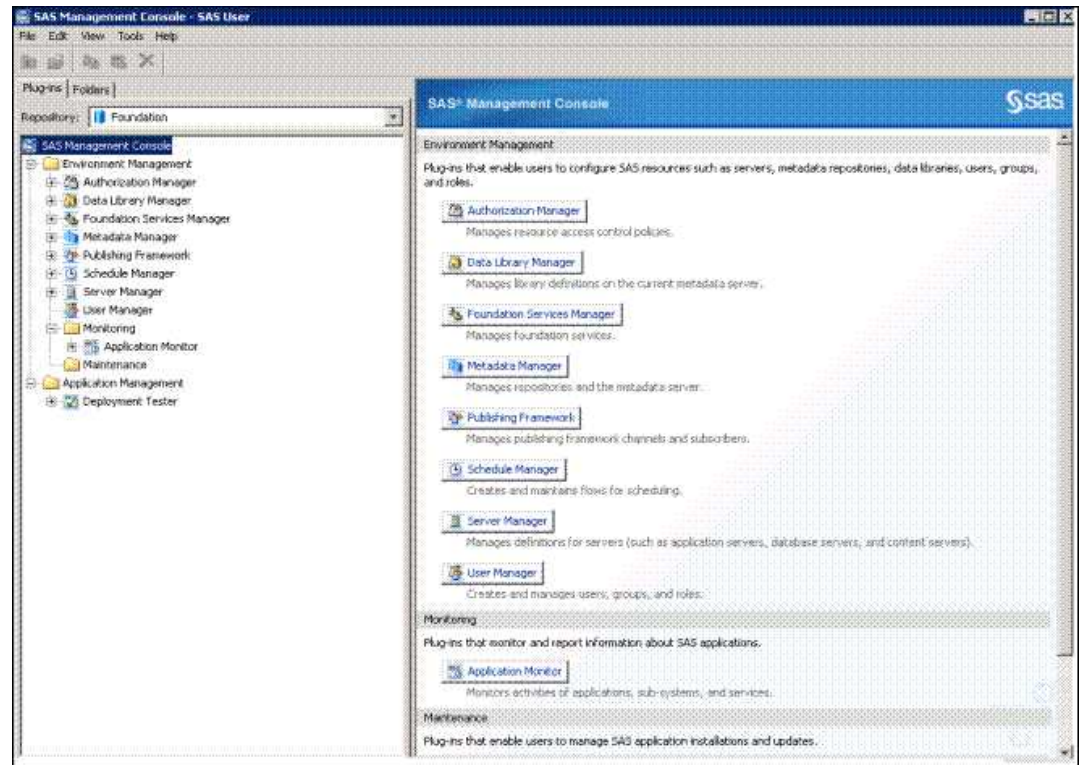
A SAS RFC server was needed in the previous releases of SAS IT Resource Management Adapter for SAP, to enable communication between the SAS/ACCESS Interface to R/3 and the SAP system. In this release of SAS IT Resource Management Adapter for SAP, SAS/ACCESS Interface to R/3 communicates directly with the SAP system, so that a SAS RFC server is not required. However, a SAS RFC server is needed for the LIBNAME engine on z/OS. SAS/ACCESS Interface to R/3 for z/OS includes RFC servers for z/OS, AIX, and Windows. The SAS RFC server is no longer supported for the SAS/ACCESS Interface to R/3 for Windows and UNIX. There is no Unicode RFC server on z/OS. You need to use the Unicode RFC server on one of the other supported platforms. Currently, the Unicode server for Windows and AIX is delivered with SAS/ACCESS to R/3 on z/OS.

You need to use the Unicode RFC server on AIX or Windows to connect the Unicode SAP system from z/OS environment. For this, you need to set up AIX RFC Unicode server on AIX box. Then provide the host name and port of the AIX RFC server when you create the SAP server on z/OS.

For more information about running the RFC server on z/OS, see the chapter entitled “Installing SAS/ACCESS Interface to R/3 Software on z/OS” in the *Post-Installation Instructions for SAS/ACCESS 4.4 Interface to R/3* available at <http://support.sas.com/>.

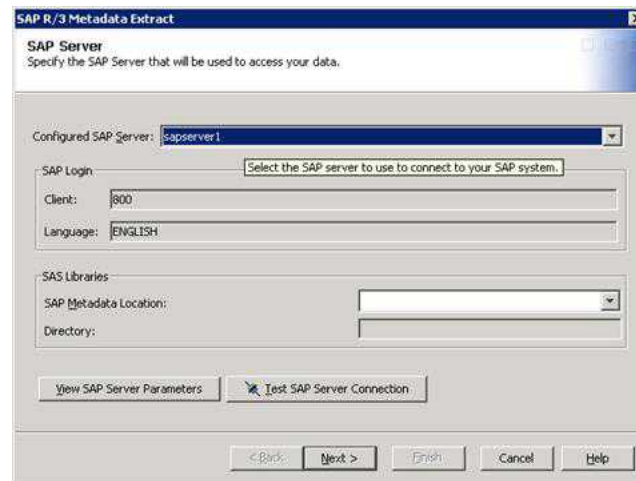
Test the SAPConnection

1. Open SAS Management Console.
2. Open the **Connection Profile** for the user.

Display 3.22 SAS Management Console Designer Box

3. Select **Tools** ⇒ **Extract From R3**.

The SAP R/3 Metadata Extract dialog box appears.

Display 3.23 SAP R/3 Metadata Extract

4. In the **Configured SAP Server** field, select the SAP server that you defined in SAS Management Console.
5. Click **Test SAP Server Connection**.

If the connection is successful, then the following message appears:

Display 3.24 Connection Successful Message



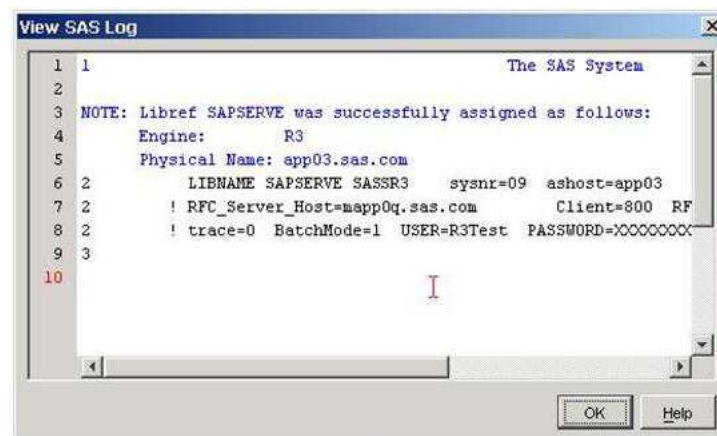
Note: If the connection is not successful, the SAS log indicates a problem. For example, RFC server errors might indicate that the RFC server is not running, or an invalid user ID might indicate that the password is incorrect. For more information about troubleshooting connection problems, see the *SAS/ACCESS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

6. Click **Yes**.

The View SAS Log dialog box displays the **LIBNAME** statement that is generated using the specified parameters.

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

Display 3.25 SAS Log Example



8. In the SAP R/3 Metadata Extract dialog box, click **Cancel**.

Note: Before you test the SAP connection, create the SAP library that is associated with the SAP server. You should test this connection after you have imported the package files for the first time. This ensures that the SAP library is automatically available for testing the connection. If you want to test the SAP connection for other SAP servers, then you need to create SAP libraries for the corresponding SAP servers.

Create Directories for Administrative and Raw Data

1. Create the **ITManagementAdapterSAP** folder on the SAS ITRM Application Server at the following location:

X:\SAS\<ConfigDir>\Lev1\SASITRM\Data

2. Create two directories, one for the administrative data and another for the raw data at the following location:

X:\SAS\<ConfigDir>\Lev1\SASITRM\Data\ITManagementAdapterSAP

After you create the two directories, the paths should be:

- **X:\SAS\<ConfigDir>\Lev1\SASITRM\Data\ITManagementAdapterSAP\Admin**
- **X:\SAS\<ConfigDir>\Lev1\SASITRM\Data\ITManagementAdapterSAP\Rawdata**

Note: The above path is for windows. While working in a z/OS environment, you need to create the ITManagementAdapterSAP, Admin, and Rawdata folders in the following location.

<ConfigDir>/Lev1/SASITRM/Data/

Chapter 4

Installation and Customization of SAS IT Resource Management Adapter for SAP

Installing the SAS IT Resource Management Adapter for SAPJobs and Metadata	35
Customizing the SAS Environment	35
Customization for Internationalization (I18N)	37
Deploying SAS IT Resource Management Adapter for SAP Jobs and Tables Metadata	39
Customizing SAS Data Integration Studio Jobs and Programs	47
Customize the get_sap_lib_info.sas Program	48
Customize the preprocglobal.sas Program	48

Installing the SAS IT Resource Management Adapter for SAPJobs and Metadata

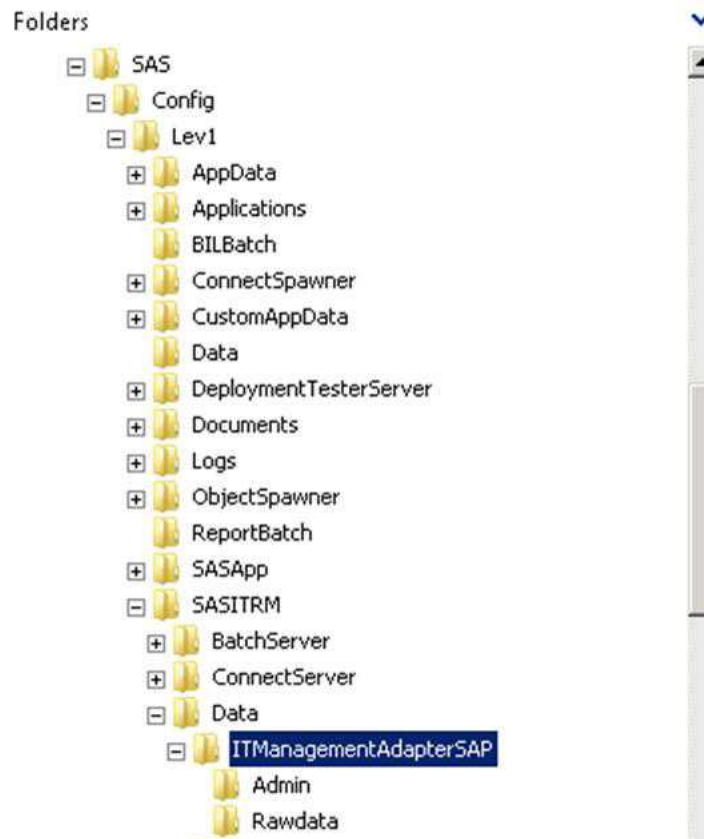
Installation of ETL job packages and related metadata for the SAS IT Resource Management Adapter for SAP is performed using the SAS Deployment Wizard that is part of your software order.

Customizing the SAS Environment

Since the configuration of SAS IT Resource Management Adapter for SAP is not handled by SAS Deployment Wizard, you need to perform certain steps manually. To customize the SAS IT Resource Management Adapter for SAP to suit your SAS environment:

1. Create the following folder structure on the machine where SAS IT Resource Management Adapter for SAP is installed.

The default path to create the **ITManagementAdapterSAP** folder structure under the Windows environment is **C:\SAS\<ConfigDir>\Lev1\SASITRM\Data**.

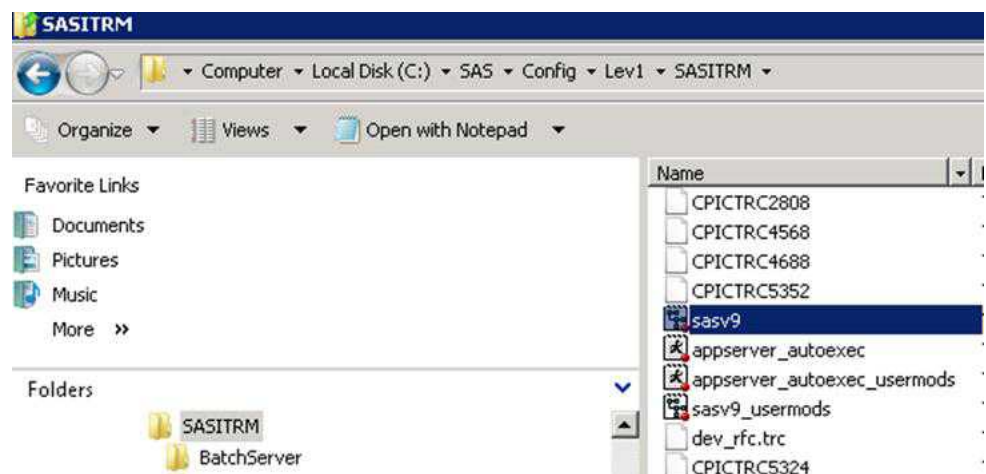
Display 4.1 SAS Environment Folder Structure

Note: If you do not give full permission to the folder and proceed with the deployment, then an error occurs while importing the adapter jobs. Therefore, granting full permissions to the Install folder is mandatory.

Note: The default path mentioned above is for Windows environments. While working in a z/OS environment, you need to create the ITManagementAdapterSAP, Admin, and Rawdata folders in the following location.

<ConfigDir>/Lev1/SASITRM/Data/

2. Modify the sasv9.cfg file to configure the adapter installation path and data path.

Display 4.2 Select the SASV9.CFG File

3. Add the following code to the config file:

```
-SET adptitminstall "C:\Program
Files\SASHome\SASITResourceManagementAdapterforSAPData\3.3\
CustomSASCode"
-SET adptitmdata
"C:\SAS\Config\Lev1\SASITRM\Data\ITManagementAdapterSAP"
```

Note: The above paths are default paths in a Windows environment. Apply the above changes appropriately as per your host and Install location at your site.

In a z/OS environment, create the following variables in the config file.

```
SET= 'ADPTITMINSTALL1 /SASHOME'
SET= 'ADPTITMINSTALL2 /SASITResourceManagementAdapterforSAPData'
SET= 'ADPTITMINSTALL3 /3.3/CustomSASCode'
```

These variables are required in order to find the program location while running the jobs in the SAS Data Integration Studio.

For more information about the location where you need to create these variables, see the manual entitled *Configuration Guide for SAS 9.3 Foundation for z/OS*. The guide has a section about customizing default options and system configuration files in the location **&prefix.CONFIG**.

4. Grant full permissions to the **Install** folder named **CustomSASCode**, as the deployment writes custom SAS code into this folder.

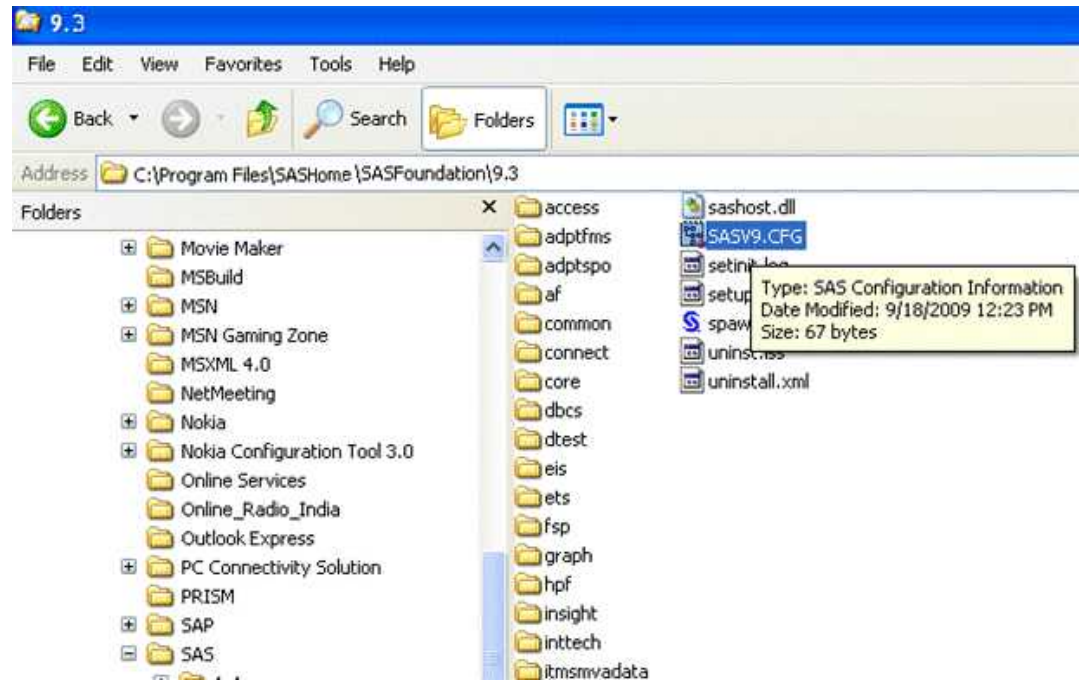
Customization for Internationalization (I18N)

This configuration step is optional. SAS IT Resource Management does not extract any text tables from SAP. Therefore, you can use the default language encoding even if your customer requires your SAP system to be a Unicode system. To configure the Adapter in an Internationalization Environment:

1. Configure SAS Unicode Server, if your SAP system is a Unicode system.

SAP data is on Unicode pages. You therefore need to use appropriate transcoding while extracting the SAP data using the SAS Data Surveyor for SAP. Configure SAS environment to point to the SAS Unicode Server.

2. Modify the SASV9.CFG file to access the SAS Unicode server. The default path for SASV9.CFG is **C:\Program Files\SASHome\SASFoundation\9.3**.

Display 4.3 SASV9.CFG

3. Change the following code snippet in the SASV9.CFG file to replace “en” by “u8”

```
-CONFIG
"C:\ProgramFiles\SASHome\SASFoundation\9.3\nls\u8\SASV9.CFG"
```

In a UNIX environment, replace “en” by “u8”, in the sas file, under the **/SASFoundation/9.3** folder. Here is the code that appears in the UNIX environment after you replace “en” with “u8”.

```
# Environmental variable to define config file lookthrough
if [ "$SASCFGPATH" ] ; then
    SASCFGPATH="!SASROOT/sasv9.cfg, !SASROOT/nls/u8/sasv9.cfg,
!SASROOT/sasv9_local.cfg, $SASCFGPATH"
else
    SASCFGPATH="!SASROOT/sasv9.cfg, !SASROOT/nls/u8/sasv9.cfg,
!SASROOT/sasv9_local.cfg"
```

4. Restart the SAS Services after the code changes are complete. Change the SASV9.CFG file to point to the appropriate encoding, based on your encoding requirement.

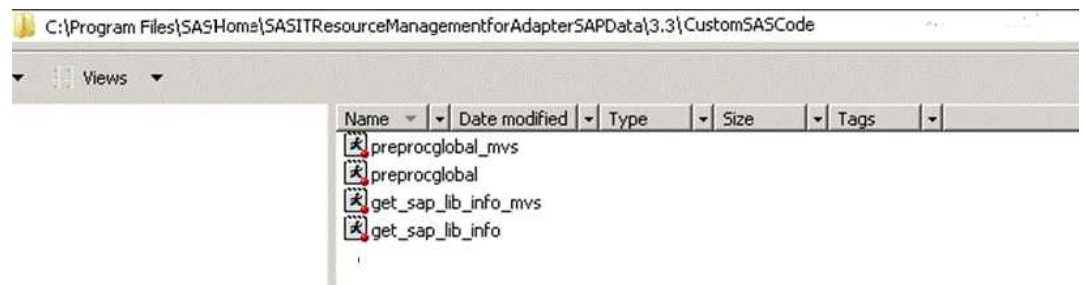
Note: The preceding example is for a Windows environment. Apply the above changes appropriately, as per the host at your site. For further details about SAS Unicode server, see the SAS support site.

Note: Steps 1-4 are not applicable for z/OS, as there is no Unicode server in a z/OS environment.

Deploying SAS IT Resource Management Adapter for SAP Jobs and Tables Metadata

After the installation of SAS IT Resource Management Adapter for SAP, deploying jobs and tables metadata for the adapter is a manual process.

In a Windows environment, when you install the adapter, the files in the following screen are available in the path `C:\Program Files\SASHome\SASITResourceManagementAdapterforSAPData\3.3\CustomSASCode`.



While working in a Windows or UNIX environment, delete the following files; they are specific to MVS:

- preprocglobal_mvs.sas
- get_sap_lib_info_mvs.sas

In a z/OS environment, delete the following files; they are specific to Windows or UNIX environment:

- preprocglobal.sas
- get_sap_lib_info.sas

After you delete the preceding files in a z/OS environment, you need to rename the remaining files by deleting `_mvs`.

To deploy metadata objects (in this case, jobs and tables) for the SAS IT Resource Management Adapter for SAP, use the standard metadata import and export features of the SAS Data Integration Studio.

The components for the SAS IT Resource Management Adapter for SAP are stored as package files. A package file is available in the Install location. The standard Install location in a Windows environment for storing the package file is `C:\Program Files\SASHome\SASITResourceManagementAdapterforSAPData\3.3\SASPackages`.

Note: The above install location is platform-dependent, and it can be changed as needed. For example, the path would be in `z/OS<SASHOME>/SASITResourceManagementAdapterforSAPData/3.3/SASPackages`.

As the SAS packages are installed in the z/OS, you need to transport them manually via File Transfer Protocol (FTP) to the PC where the client is running. Ensure that the SASPackages are transported in binary mode. This enables the import function of the SAS Data Integration Studio to read the SAS package files.

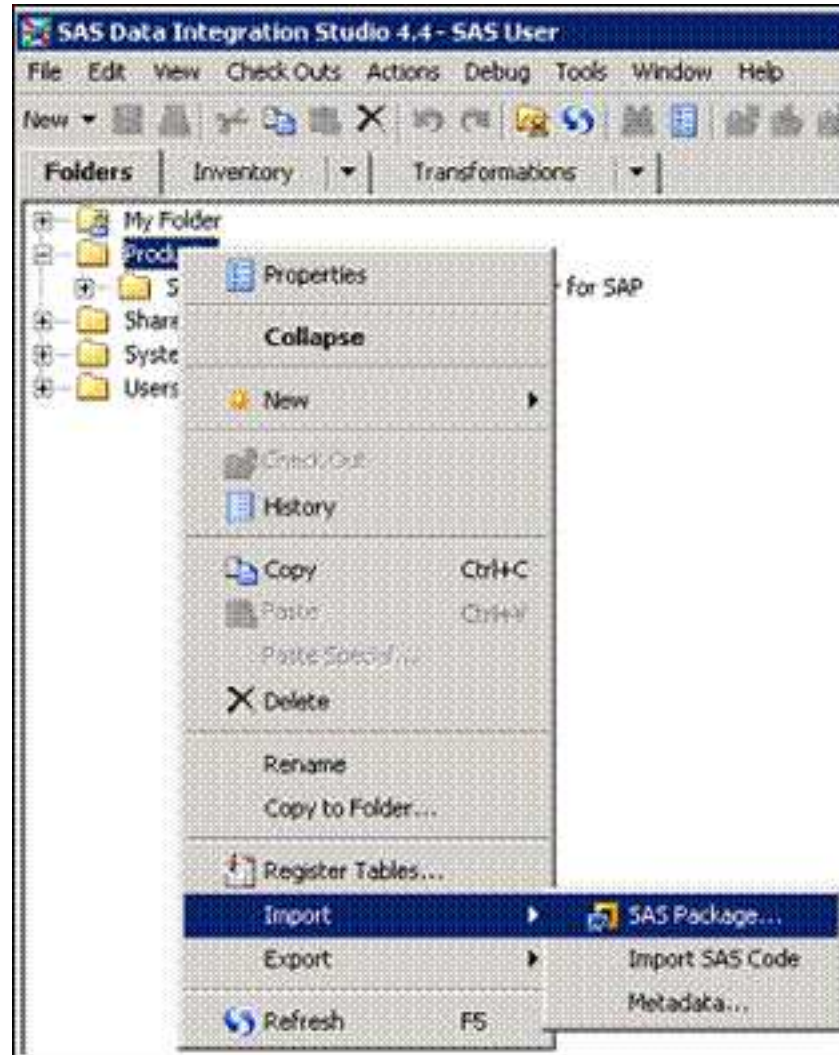
To deploy tables and jobs, complete the following steps:

1. Open SAS Data Integration Studio with **Connection Profile** for the user.
2. In the metadata profile, select the project that you defined when you added the SAP server and SAP library.

The SAS IT Resource Management Adapter for SAP is imported to the project that you select in this step.

3. Right-click **Products** in the **SAS Folders Tree**, and then click **Import**.

Display 4.4 SAS Data Integration Studio: Products



In the Import from SAS Package dialog box, click **Browse**, and then open the **SASPackages** folder.

You can find the SASPackages folder within the Install folder that you created at the time of installation.

4. Select the package **SASITMAdapterforSAP_DIS_ProductFolders.spk**.
5. Under **Import Options**, select **All Objects**, and then click **Next**.

Retain the default options and continue.

Display 4.5 Export SAS Package Wizard

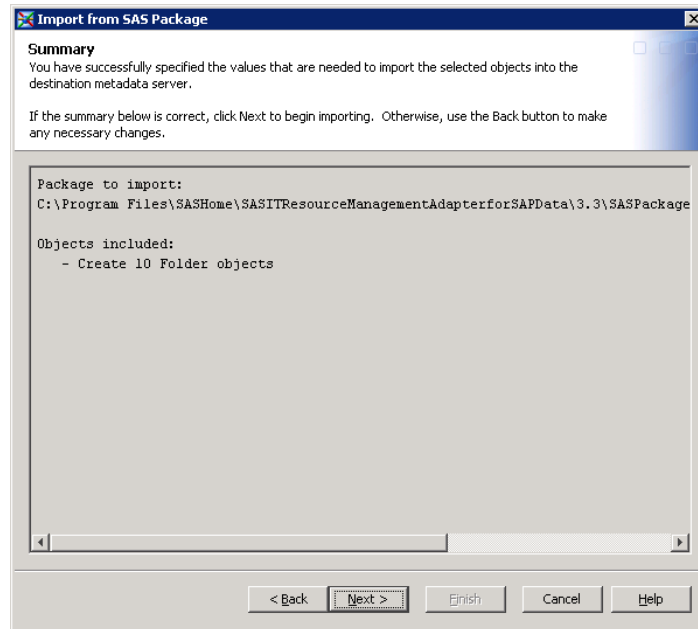
6. The objects to be imported appear.

Display 4.6 Select Objects to Import

7. Click **Next** to continue.

The following screen appears.

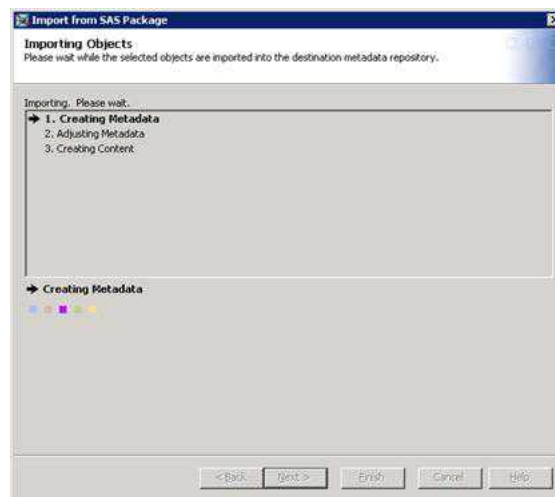
Display 4.7 Summary, Import from SAS Package Window



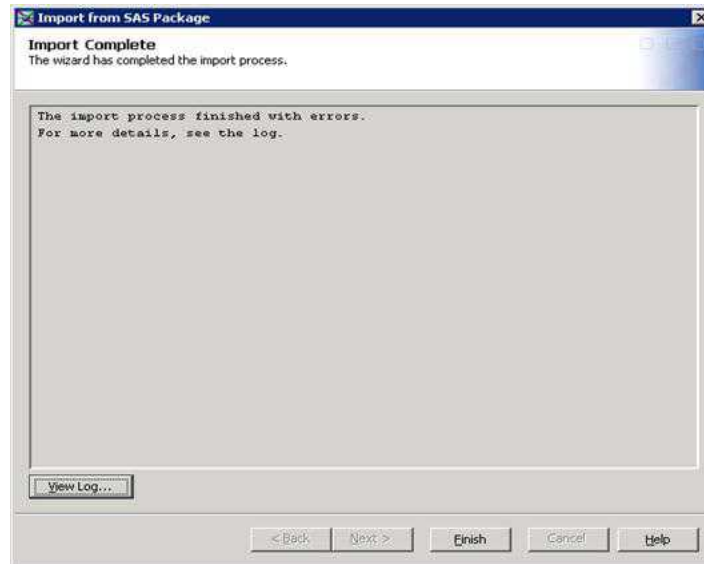
8. Review the summary, and then click **Next**.

A progress indicator appears.

Display 4.8 Important Objects Window



9. The Import from SAS Package dialog box displays a completion message. If the import process fails, click **View Log**, check for messages, and take appropriate action.

Display 4.9 Import Complete Message

Note: Use the following sequence while performing the preceding steps to deploy application folders, data sources, and jobs.

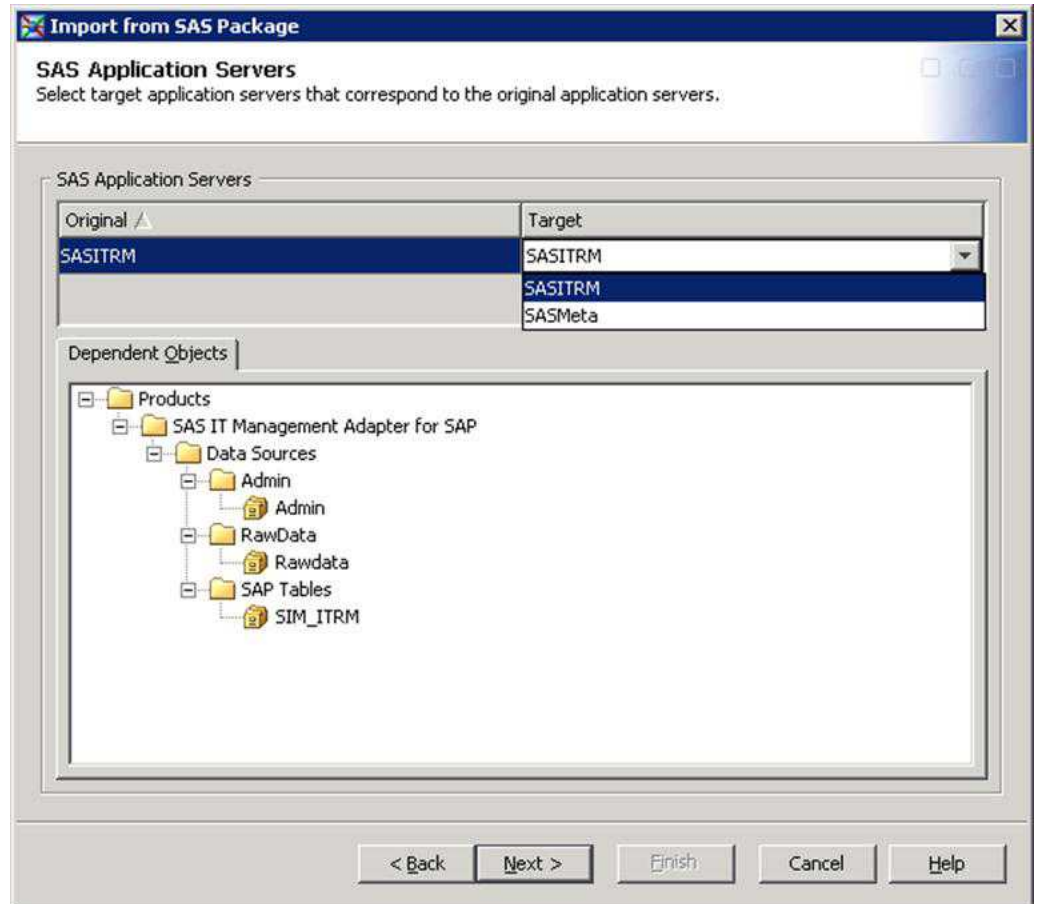
- SASITMAdapterforSAP_DIS_ProductFolders.spk
- SASITMAdapterforSAP_DIS_AppFolders.spk
- SASITMAdapterforSAP_DIS_Tables.spk
- SASITMAdapterforSAP_DIS_Jobs.spk

Note: To import the second package SASITMAdapterforSAP_DIS_AppFolders.spk, right-click **System** in the **SAS Folders** Tree, and then click **Import**. For other packages, right-click **Products** in the **SAS Folders** tree and then click **Import**.

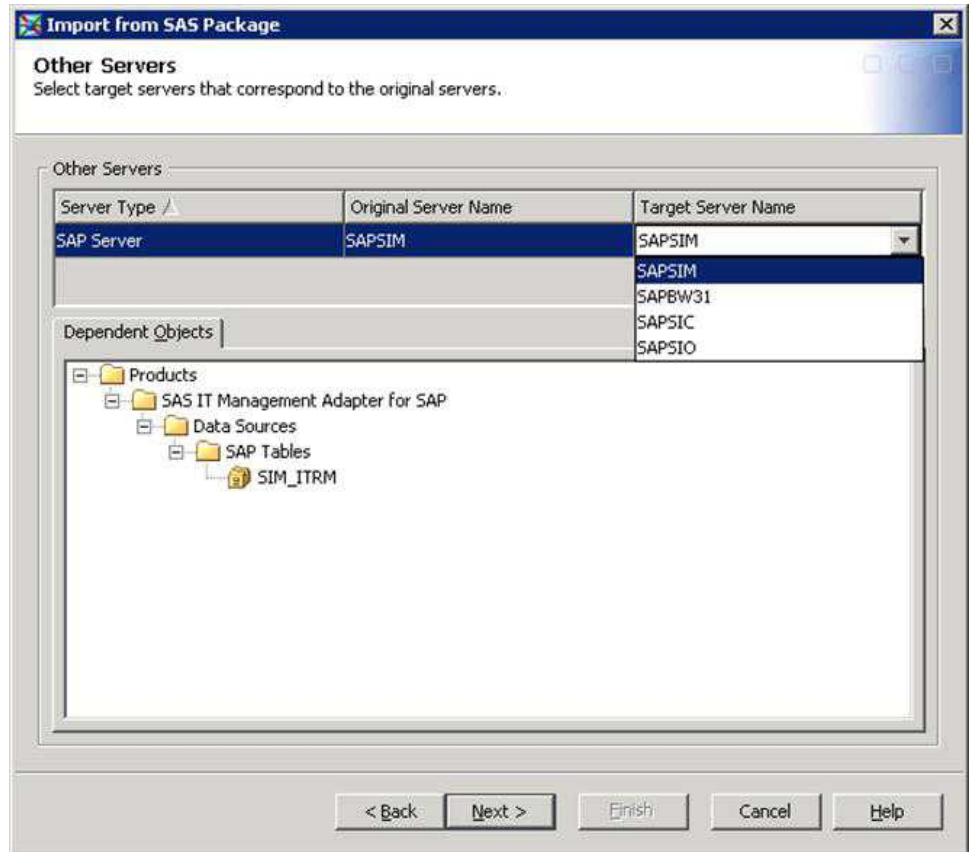
While importing to the package file SASITMAdapterforSAP_DIS_Tables.spk, perform the following steps:

10. In the Import from SAS Package dialog box, select the package SASITMAdapterforSAP_DIS_Tables.spk.
11. Under **Import Options**, select **All Objects**, and then click **Next**.
Retain the default options and continue.

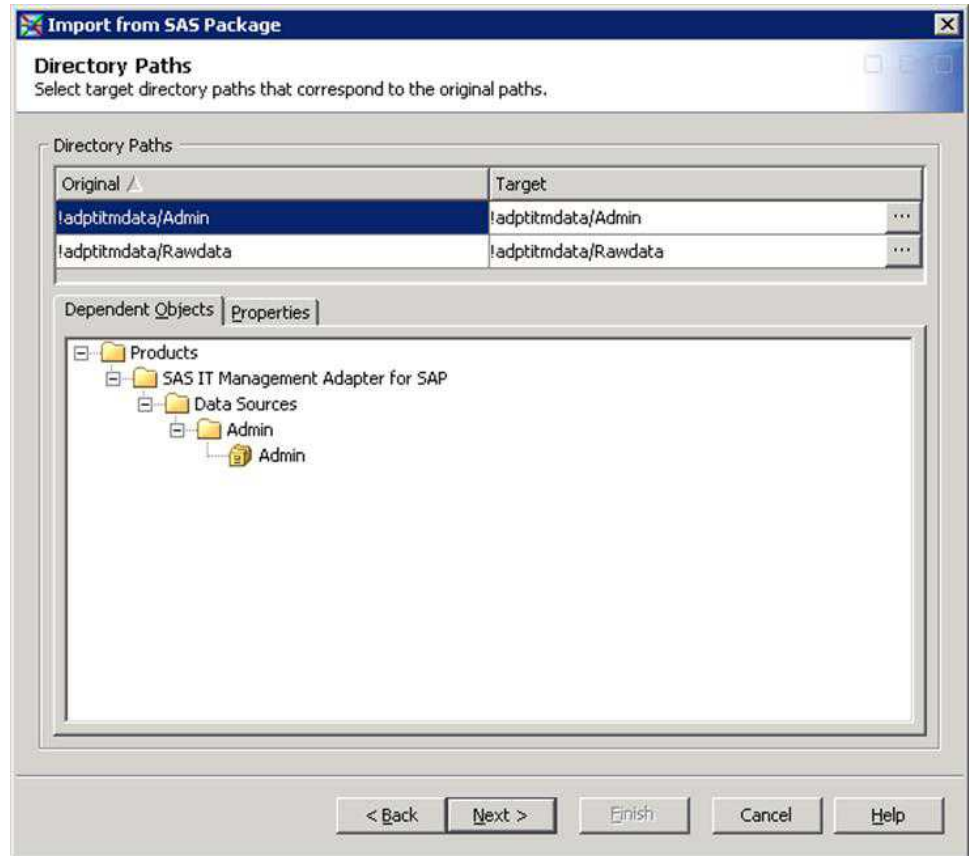
Display 4.10 SAS Application Servers Window



12. Verify that the **SAS Application Servers** is set correctly as **SASITRM**. Select **Next**.

Display 4.11 Other Servers Window

13. Select a SAP server.

Display 4.12 Directory Paths, Import from SAS Package Window

14. Verify that all directories and paths appear correctly.
15. Click **Import** to import the selected objects.
16. Click **View Log** to review the SAS log.

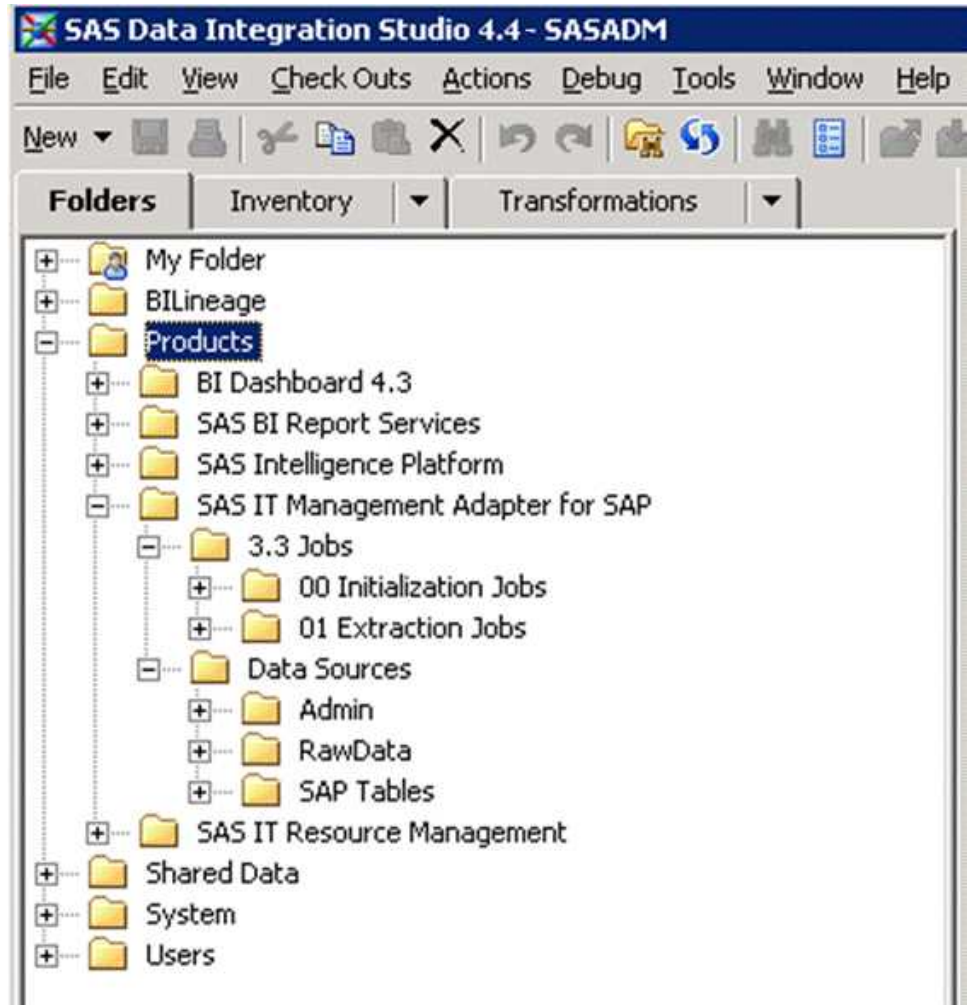
Note: The SAS log might contain the warning

the person ETL Developer 1 was not found

. Ignore the warning.

A new folder named **SAS IT Management Adapter for SAP** is added to the **Products** folder.

Display 4.13 Products Folder



Once the import process is complete, the environment for data extraction and transformation from SAP is set.

You can customize your environment further in the SAS Data Integration Studio environment, as needed.

Note: In a z/OS environment, while importing tables package file SASITMAdapterforSAP_DIS_Tables.spk, delete the default target directory paths. Then, manually select the paths of the Admin and Rawdata folders. While importing jobs package file SASITMAdapterforSAP_DIS_Jobs.spk, manually enter the **preprocglobal.sas** file from the adapter installation location.

Customizing SAS Data Integration Studio Jobs and Programs

To customize the SAS IT Resource Management Adapter for SAP to fit into your unique SAP environment, you need to review and change a few jobs in the SAS Data Integration Studio. You also need to review and change several SAS programs within these jobs.

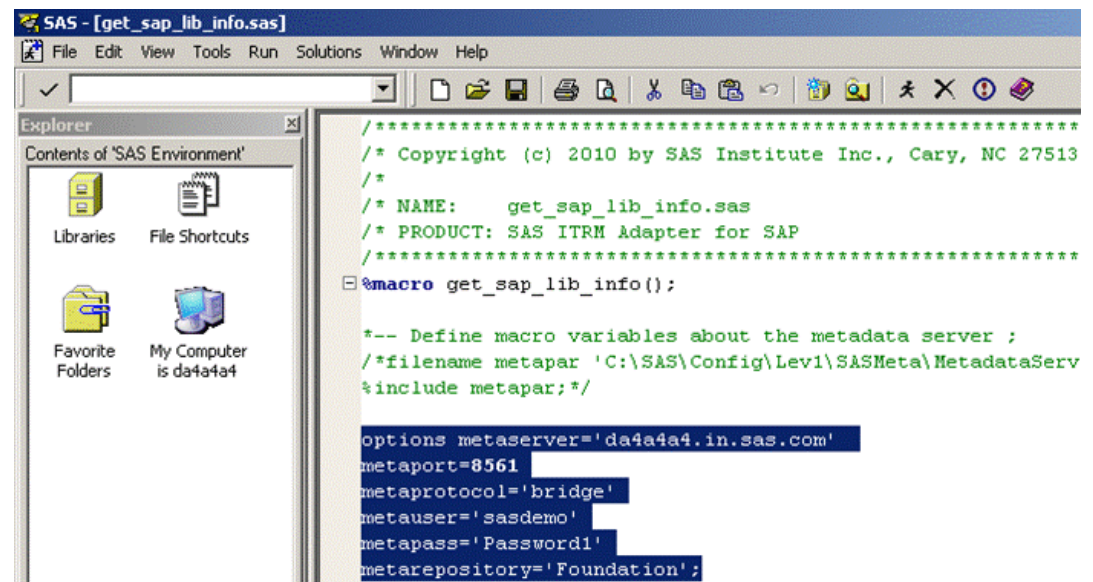
Although many of the jobs and programs do not require changes, you need to review each one to ensure the results that you get the results that you want. The following sections provide information about each job and program that requires your review and changes. It describes each job in the SAS Data Integration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

Customize the get_sap_lib_info.sas Program

The custom SAS code get_sap_lib_info.sas needs to be customized so as to point to the appropriate metadata server. The default location of the custom code is in Windows: C:\Program Files\SASHome\SASITResourceManagementAdapterforAPData\3.3\CustomSASCode.

The default location of the custom code in z/OS is <SASHOME>/SASITResourceManagementAdapterforSAPData/3.3/CustomSASCode.

Display 4.14 get_sap_lib_info.sas File



In the above program, modify the highlighted section to point to the appropriate SAS Metadata Server.

Note: The **metauser** in the above code should not have any **unrestricted** authorizations. Therefore, SAS demo user or any other external user created in Software Management Console is preferred. If the user does not provide the correct information in this program, the 0010 Step 1 Select SAP Servers job that uses this program does not create any records in the output table. Make sure that all the information is correct in the program before you run the job.

Customize the preprocglobal.sas Program

SAS IT Resource Management Adapter for SAP jobs use global macro variables that are initialized in the preprocglobal.sas program. This program serves as the preprocessing

step in the first initialization job. The custom SAS code preprocglobal.sas needs to be customized so as to point to the appropriate libref of the SAP server.

The preprocglobal.sas program is in the Install directory. The file is located at the place where you specified the Install directory on the SAS Deployment Wizard during Installation. The default location of the custom code is in Windows: **C:\Program Files\SASHome\SASITResourceManagementAdapterforSAPData\3.3\CustomSASCode**.

Make appropriate changes in the following section of the program to suit your environment.

```
*Select
wanted sap librefs that you want extract statistical data from.
  List must be entered as quoted company codes
  separated by commas;
% let wanted_sap_libref = 'SIO';
```

Use the preceding section of the program to assign values to the macro variable **%let wanted_sap_libref** in order to restrict the initialization job from specific SAP systems. Enter libref values of the SAP systems, from which you want to extract the data.

```
options mstored mrecall;

filename macro '!ADPTITMINSTALL';
* This macro filename setting is more portable, but
* can only work from the right context ;
options sasautos = (macro sasautos );

* Select wanted sap librefs that you want extract statistical data from.
  List must be entered as quoted company codes
  separated by commas ;

%let wanted_sap_libref = 'SIO';

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

While running the preprocglobal.sas program in an UNIX environment, a small change has to be done in the program. As UNIX is case sensitive, you need to replace **filename macro '!ADPTITMINSTALL';** with **filename macro '!adptitmininstall';**

In z/OS, the preprocglobal.sas program should resemble the program in the following figure.

```
options mstored mrecall;

filename macro %sysget
(ADPTITMINSTALL1)%sysget(ADPTITMINSTALL2)%sysget(ADPTITMINSTALL3) ;
* This macro filename setting is more portable, but
* can only work from the right context ;
options sasautos = (macro sasautos );

* Select wanted sap librefs that you want extract statistical data from.
  List must be entered as quoted company codes
```

```

        separated by commas ;

%let wanted_sap_libref = 'SIO';

/*
 * End of preprocglobal.sas
 */

```

Note: The variables that you find in the filename statement of the above program are those that you defined in the config file of the z/OS environment.

Chapter 5

SAS Data Integration Studio Jobs

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Overview

Using SAS Data Integration Studio or SAS IT Resource Management

This chapter describes the SAS IT Resource Management jobs that are provided with the SAS IT Resource Management Adapter for SAP. The SAS IT Resource Management jobs require customization so that they reference the SAP servers.

Note: References to the SAS IT Resource Management client in this document pertain to the use of SAS Data Integration Studio with ITRM plug-ins. These plug-ins are not specifically required for the SAS IT Resource Management Adapter for SAP tasks and jobs. In other words, you can use either the SAS Data Integration Studio client or the SAS IT Resource Management client to perform the tasks and work with the jobs that are referenced in this document.

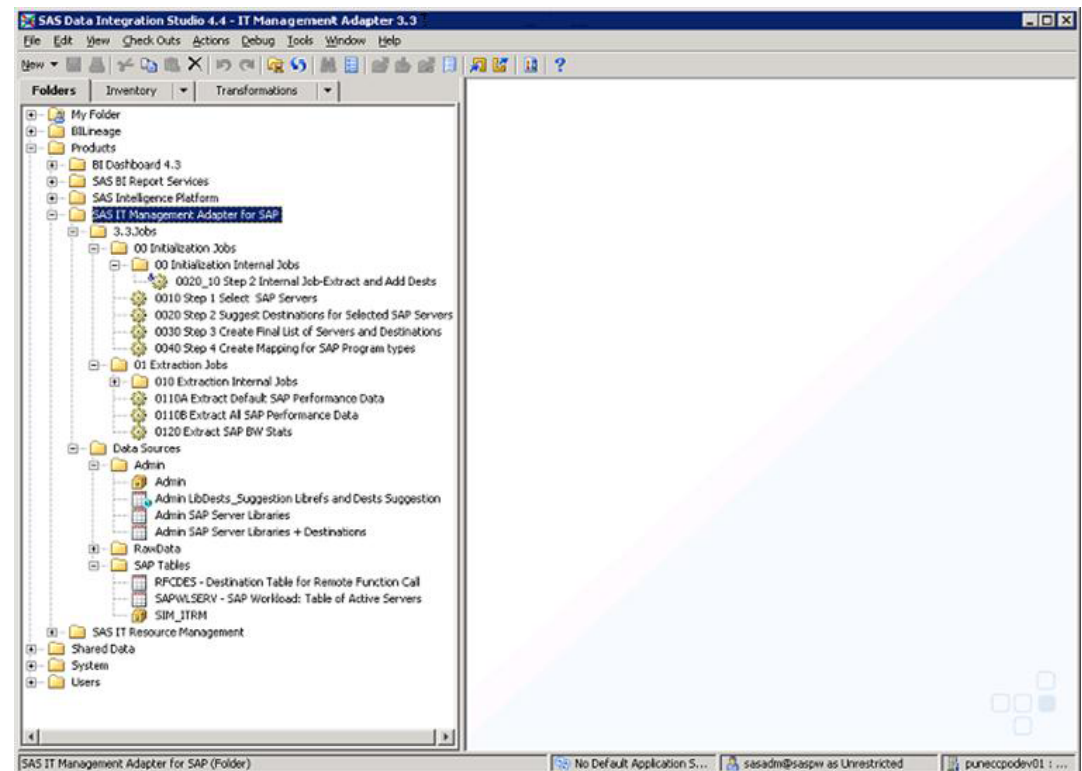
Job Naming Conventions

The jobs use the following naming conventions:

- **Ordering Jobs:** A job has a numeric prefix that indicates its order of execution. A job with a lower number is executed before a job with a higher number. The display order of the job is the same as its execution order. Numbering between jobs is not contiguous so that additional jobs can be added between two existing jobs.
- **Internal Jobs:** An internal job is submitted from within another job (using a LOOP construct). It has a two-part prefix, separated by an underscore. The first part of the prefix refers to the calling job, and the second part refers to the individual internal job. For example, the prefix 0020_10 refers to an internal job that is called by the job with the prefix 0020. Internal jobs are grouped in subfolders. Internal jobs cannot be executed independently because the parameters set up by the calling job are not available.
- **Alternative Jobs:** When there is more than one job that achieves the same results, an additional alphabetic character is added to the prefix. For example, 0010A and 0010B are alternative jobs. That is, only one of these two jobs is required.

The following figure displays all of the SAS Data Integration Studio jobs provided with the SAS IT Resource Management Adapter for SAP:

Display 5.1 SAS IT Resource Management Adapter for SAP Jobs



Initialization Jobs

Overview

The initialization jobs are listed in the following sections. The job descriptions and figures provide a high-level overview of the SAS IT Resource Management interface and how to work with the jobs. 0010 Step 1 Select SAP Servers is the only initialization job to select the required SAP libraries to extract the performance data from the SAP systems. The rest of the other initialization jobs are required to run in both the indirect as well as the direct extraction method.

0010 Step 1 Select SAP Servers

This job lists the servers that are monitored. The job appends the attributes of the source SAP servers to the Admin SAP Server Libraries table. The job uses the **Libref Collector** transformation, which extracts the details of all the SAP libraries registered in the SAS Metadata Server. You need to apply a filter if you want to restrict some libraries, otherwise, you can leave the job as it is shipped. (In the previous release, this was a customization job where you needed to drag and drop the relevant libraries for data extraction.)

Display 5.2 0010 Step 1 Select SAP Servers

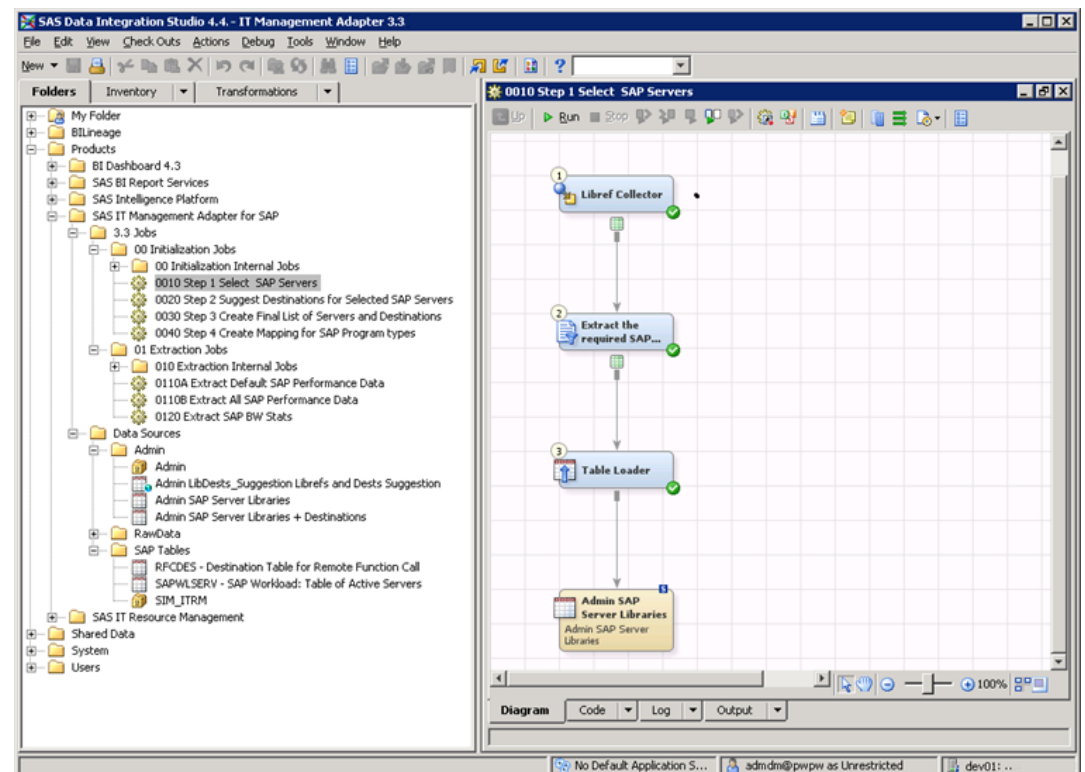


Table 5.1 Parameters Used in the 0010 Step 1 Select SAP Servers

Parameter Name	Macro Variable Name	Description
Libref	libref	SAS libref to SAP server
Options	options	All options for the SAS LIBNAME statement to connect to an SAP server
n	_n_	Observation number in loop input table

The output of the Libref Collector transformation is the following data set, which contains the LIBNAME and the options used in separate columns.

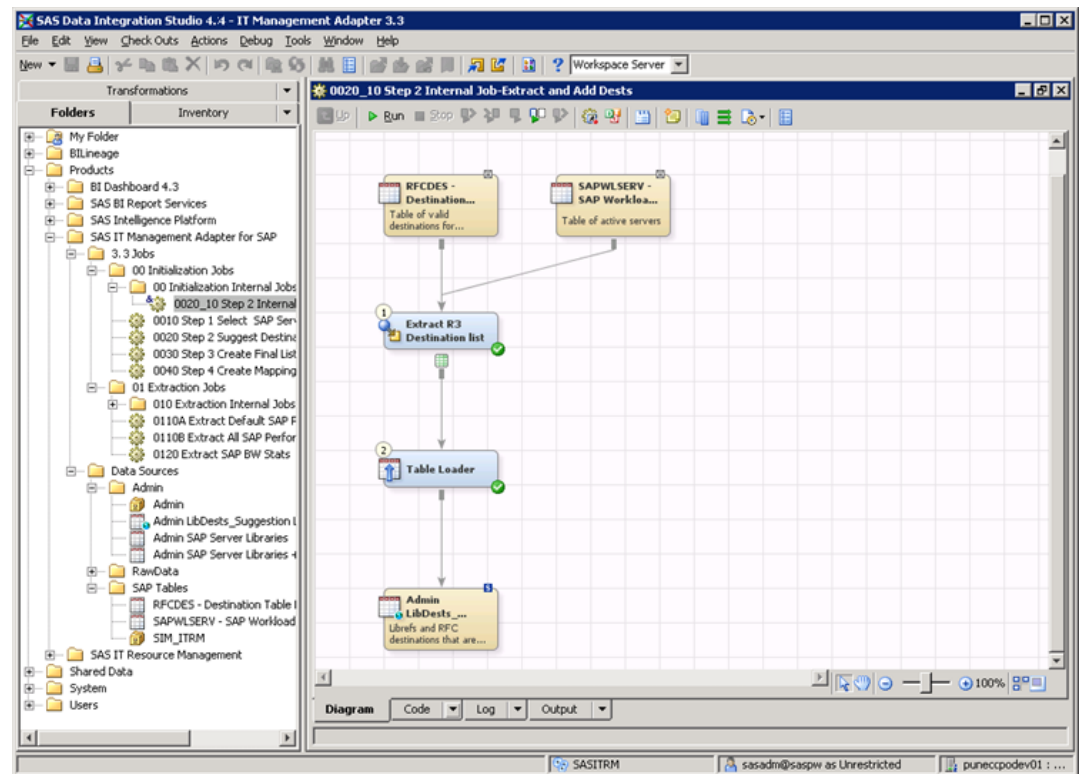
#	libref	Options
1	SIO	SASIO5R3 ashost=endapp21.na.sas.com sysnr=24 Client=800 language=EN trace=0 BatchMode=1 USER=sinsuo PASSWORD

To customize this job, provide the libref values of the relevant SAP servers to the macro variable in **Preprocglobal.sas** program, which is used in this job.

0020 Step 2 Suggest Destinations for Selected SAP Servers: Extracts Destinations

This job takes the output table Admin.SAP Server Libraries of the previous job as input. The job then reads destinations from the selected SAP servers and creates an output table named Admin LibDests_Suggestion Librefs and Dests Suggestion, with destinations for indirect extraction. By default, performance data is extracted directly from a single SAP system. If you need indirect extraction via RFC-connected SAP systems, then additional data has to be supplied for the extraction. Indirect extraction is not supported for the statistic tables specific to the SAP Business Warehouse.

This job has an internal job named 0020_10 Step 2 Internal Job-Extract and Add Dests. This job collects the attributes of all the libraries and saves the attributes in a table. This internal job takes the tables RFCDES and SAPWLSERV as input. These SAP tables are assigned by the import process to an SAP server through the SAP sample library mapping. The job reads these tables from the SAP server that is used in job 0010A Step 1 Select single SAP Server. The tables RFCDES and SAPWLSERV serve rather as templates than real tables.

Display 5.3 0020 Step 2 Suggested Destinations for Selected SAP Servers

The internal job is called in a loop over input table Admin.SAP Server Libraries. The loop provides the values for the parameters of the job. It has three input tables and one output table.

0030 Step 3 Create Final List of Servers and Destinations

This job lists the SAP systems connected via RFC to the selected SAP hub server. There are two tasks that you need to perform:

- Modify the code in the User Exit to Clean Suggested List transformation that adds or removes unwanted remote systems.
- Remove unwanted destinations from the output table. This can be done by customizing the job 0030 Step 3 Create Final List of Servers and Destinations.

This job uses the table min. LibDests_Suggestion as input. SAS table Admin.SAP Server libraries + Destinations is the output table. This table is basically the Admin.SAP Server Libraries table extended by destinations.

Run the saved job and verify that the output table contains the right records. The value 'NONE' in column RFC Destination (RFCDEST) implies direct extraction from the SAP server with SAP System ID specified in column SAPSYS. Other values denote the SAP servers connected to the hub server via RFC.

0040 Step 4 Create Mapping for SAP Program Types

The SAS IT Resource Management solution does not require an output table from this job. Therefore, this job is optional for both direct and indirect extraction methods.

This job extracts objects from SAP servers and maps them to SAP programs, provided you extract performance data via the hub server. The job uses the table Admin.SAP_Server_dests as input and generates the table RAWDATA.PROGRAM_MAP as output.

Note: If you want to run this job and the SAP system is Unicode, then you need to set a Unicode encoding option. For information about this topic, see [“Customization for Internationalization \(I18N\)” on page 37](#).

Extraction Jobs

Extraction of Default R/3 Statistics

About the Extraction Process

This process involves either one of the two jobs that are described in detail in the following sections. Whenever you run the job, it extracts data corresponding to the current date. For example, if you run the job today, it retrieves today's R/3 statistics.

0110_1A Extract Default Performance Data from SAP Server

This job is an alternative job for job 0110_1B Extract All Performance Data from SAP Server. This job uses the input table Admin.SAP_Server_dests, which is created in previous job (0030 Step 3) and extracts default SAP performance data from the monitored SAP servers. This extraction job generates the following output tables:

- RAWDATA.RC0
- RAWDATA.BTC
- RAWDATA.RS0
- RAWDATA.RCD
- RAWDATA.NRM
- RAWDATA.SPP
- RAWDATA.RSD
- RAWDATA.SPA
- RAWDATA.TII

Before you start running this job, run the initialization jobs based on the type of extraction that you use. To execute this job under direct extraction:

1. Define each of the source SAP systems as an SAP library with associated SAP server. To do this, you need to customize the initialization job 0010 Step Select SAP Servers. Enter required SAP libraries in preprocglobal.sas program.
2. Run the initialization jobs 0020 and 0030. This creates the final input table for the extraction job. In direct extraction, the final admin table looks like the following table.

Display 5.4 Sample Data Administration SAP_Server_destinations

libref	rfcdest	sap_release	ipaddr	sapsys	options
SIM	NONE	700	10.12.11.105	SIM	SASIOSR3 sysnr=22 ahost=Endapp17.na.sas.com BatchMode=1 trace=0 language=EN Client=800 RFC_Server_Host=localhost RFC_Server_Port=6999 USER=sinsuo PASSWORD="(SAS001)U3VyaTEyMw=="
SIO	NONE	700	10.12.14.215	SIO	SASIOSR3 sysnr=24 ahost=endapp21.na.sas.com trace=0 BatchMode=1 RFC_Server_Port=6999 Client=800 RFC_Server_Host=localhost language=EN USER=sinsuo PASSWORD="(SAS001)U3VyaTEyMw=="

- After you run the jobs 0020 and 0030, verify that the output table Admin SAP Server Libraries + Destinations contains the right records. The value 'NONE' in column RFC Destination (RFCDEST) implies direct extraction from the SAP server with SAP System ID specified in column SAPSYS.

Note: If you want to extract data from multiple servers, then you need to enter all the required SAP systems in the preprocglobal.sas program.

To execute this job under indirect extraction:

- Specify an SAP system to be the hub. From this hub, you can establish destinations to other SAP systems.
- Enter the libref of the hub SAP server in the preprocglobal.sas program.

Note: The job 0020 Step 2 Suggest Destinations for Selected SAP Servers takes the output table Admin.SAP Server Libraries of the previous step as input. It reads destinations from the selected SAP servers and generates an output table with possible destinations for indirect extraction. By default, the output table is named as Admin LibDests_Suggestion Librefs and Dests Suggestion.

Display 5.5 Sample Data Admin LibDests_Suggestion Librefs and Dests Suggestion

libref	rfcdest	RFCOptions	dest_host	Dest_host_part	Libref_host	libref_instance	options
SIM	TESTCRM	H=dfxsap01.us.dataflux.com,S=01,	DFXSAP01	DFXSAP01	ENDAPP17	endapp17_SIM_22	SASIOSR3 sysnr=22 ahost=Endapp17.na.sas.com trace=0 BatchMode=1 language=EN Client=800 USER=sinsuo PASSWORD="(SAS002)6476AC4B20D"
SIM	TESTBW	H=endapp21.na.sas.com,S=24,M	ENDAPP21	ENDAPP21	ENDAPP17	endapp17_SIM_22	SASIOSR3 sysnr=22 ahost=Endapp17.na.sas.com trace=0 BatchMode=1 language=EN Client=800 USER=sinsuo PASSWORD="(SAS002)6476AC4B20D"
SIM	NONE	No Destination - direct call			ENDAPP17	endapp17_SIM_22	SASIOSR3 sysnr=22 ahost=Endapp17.na.sas.com trace=0 BatchMode=1 language=EN Client=800 USER=sinsuo PASSWORD="(SAS002)6476AC4B20D"

- Edit the job 0030 Step 3, and then run it. This creates the final list of servers and destinations.

Display 5.6 Sample Data Administration SAP_Server_destinations

	libref	rfcdest	sap_release	ipaddr	sapsys	options
1	SIM	NONE	700	10.12.11.105	SIM	SASIOSR3 sysnr=22 ahost=Endapp17.na.sas.com trace=0 BatchMode=1 language=EN Client=800 USER=sinsuo PASSWORD="(SAS002)6476AC4B20DF87D3042E4"
2	SIM	TESTBW	700	10.12.14.215	SIO	SASIOSR3 sysnr=22 ahost=Endapp17.na.sas.com trace=0 BatchMode=1 language=EN Client=800 USER=sinsuo PASSWORD="(SAS002)6476AC4B20DF87D3042E4"
3	SIM	TESTCRM	700	172.25.226.118	DF1	SASIOSR3 sysnr=22 ahost=Endapp17.na.sas.com trace=0 BatchMode=1 language=EN Client=800 USER=sinsuo PASSWORD="(SAS002)6476AC4B20DF87D3042E4"

- Run the saved job and verify that the output table Admin SAP Server Libraries + Destinations contains the right records. The value 'NONE' in column RFC Destination (RFCDEST) stands for direct extraction from the SAP server with SAP System ID specified in column SAPSYS. Other values stand for other SAP servers RFC-connected to the hub server.

0110_1B Extract All Performance Data from SAP Server

This job is an alternative job for job 0110_1A Extract Default Performance Data from SAP Server. The job extracts all SAP performance data from all SAP servers to populate the raw data tables. The job uses the input table Admin.SAP_Server_dests. This input table is created in a previous job (0030 Step 3) and generates the following output tables:

- RAWDATA.RC0
- RAWDATA.BTC
- RAWDATA.RS0
- RAWDATA.RCD
- RAWDATA.NRM
- RAWDATA.SPP
- RAWDATA.RSD
- RAWDATA.SPA
- RAWDATA.TII
- RAWDATA.DBP
- RAWDATA.ADM
- RAWDATA.TAB
- RAWDATA.CIF
- RAWDATA.HTPCL
- RAWDATA.HTPCD
- RAWDATA.HTP

Note: Some of the raw data tables are created based on the version of SAP that you are using.

Extraction of Business Warehouse (BW) Statistic Tables

The job 0120 Extract SAP BW Stats in the SAS Data Integration Studio is specifically meant for the extraction of SAP BW performance statistics from selected BW systems. This job uses the transformation **Extract SAP BW Performance Statistics** to get statistics from SAP. The statistics are specified as output tables of the transformation Extract SAP BW Performance Statistics. The transformation takes as input the Admin.SAP Server Libraries table created in the previous step and the BW Delta Control table. The selected statistic tables are extracted from each selected SAP system.

The job extracts records from BW statistic tables by taking the starting time as the first day of the first month of the current year. The end time is the time when you run the job. That is, it extracts data from the starting time to the end date. For example, the extraction condition for the year 2010 would be:

```
STARTTIME > 20100101 (yymmdd)
```

Note: You cannot set STARTTIME dynamically.

To extract SAP BW performance statistics from selected BW systems:

1. Define each SAP system that is accessed for extraction of performance data as an SAP library with its associated SAP server.

2. The initialization job 0010 Step Select SAP Servers needs to be customized for this purpose. Enter required bwsap libraries in the preprocglobal.sas program.
3. Run the extraction job 0120 Extract SAP BW Stats in the Data Integration Studio to extract SAP BW Performance Statistics from selected BW systems.

This extraction job uses the following input tables:

- Admin. SAP_Server_libraries
- Rawadmin BW_DELTACTL

The job creates the following output tables:

- RAWDATA.WHM
- RAWDATA.RSS

The following tables are optional. If you want to extract data from these tables, you have to customize the job accordingly.

- RAWDATA.RSS
- RAWDATA.WHM
- RAWDATA.AGR
- RAWDATA.BCA
- RAWDATA.CND
- RAWDATA.DELXTR
- RAWDATA.LOG
- RAWDATA.DEL

Note: BW Delta Control table is defined as input table, but it is also updated by the transformation.

Note: You might have set up a Unicode (u8) encoding option, which is mentioned in Customization for Internalization (I18N) in Chapter 4. If so, then before you run the 0120 Extract SAP BW Stats job, you need to add an option to the **System Options** tab in the properties section of the BW job: **0120 Extract SAP BW Stats**. To add this option, right-click **Properties** on the **Job** tab and then go to the **Option** tab. In the **System Options** field, enter the following statement:

```
Varlenchk=NOWARN;
```

If this option is not specified, a warning about truncating field lengths might appear in the job log files. Since the system error options (syserr) are set to 4 because of these warnings, the job is unable to process the creation of the output tables in the raw data folder.

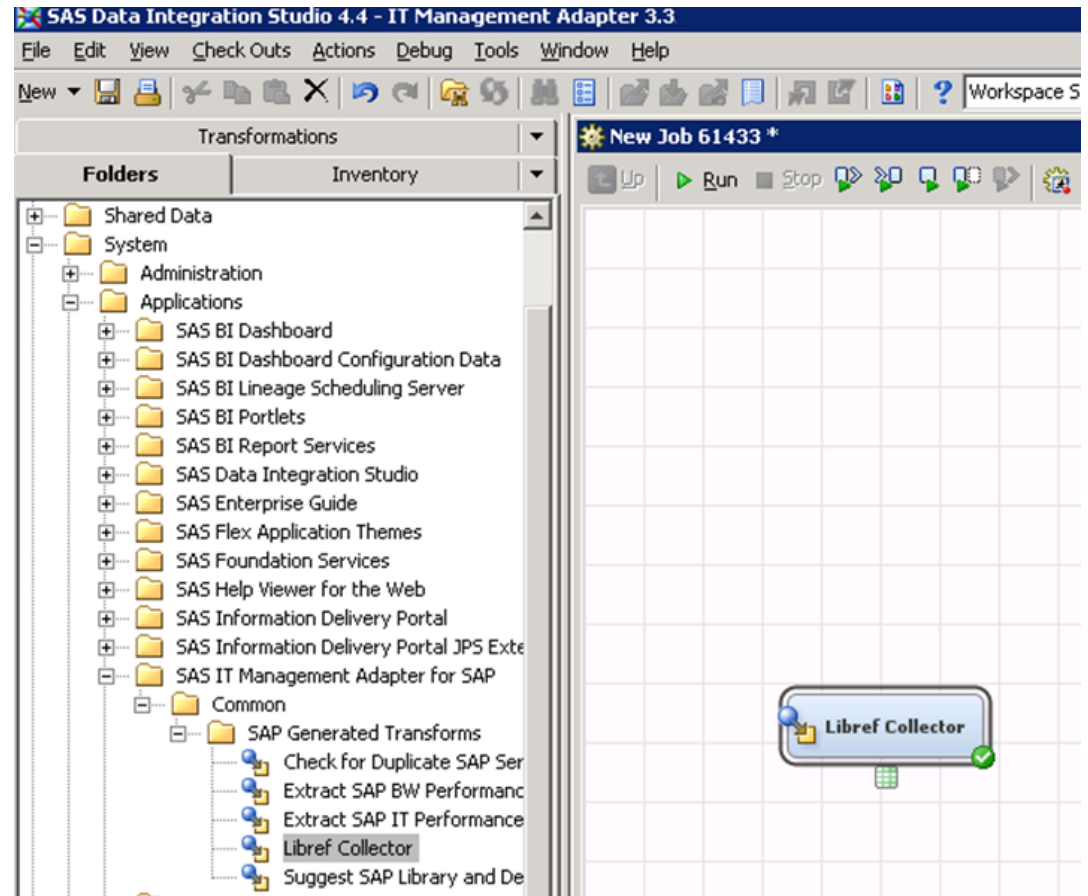
Transformations

Libref Collector

The Libref Collector transformation is the new transformation that is developed in this release of SAS IT Resource Management Adapter. The transformation collects SAP library values in a data set.

In the previous release, there was a Java component named Libref Collector in 9.1.3, plugged into the SAS Data Integration Studio. This plug-in was used to collect the SAP library values. In this release, the Libref Collector transformation with SAS code replaces the Libref Collector plug-in.

Display 5.7 Libref Collector Transformation



The Libref Collector transformation extracts the details of all the SAP libraries registered in the SAS Metadata Server. Also, you can customize the job that contains this transformation, as per your requirements.

Extract SAP Business Warehouse (BW) Performance Statistics

The transformation extracts performance statistics tables from the SAP BW, using a delta control mechanism. Extraction time stamps are logged in a delta control table by SAP host instance and extracted SAP BW table. Successive extractions retrieve only records with a time stamp larger than the previous extract minus one hour, and append the extracted records to the output tables. The rationale for one-hour overlap is to ensure that even the long running jobs are caught. This might result in duplicate records. However, any duplicate records are removed by the loading steps into the SAS IT Resource Management IT data marts.

The transformation has two input tables:

- the BW Delta Control table
- the list of SAP systems to extract data from

The BW Delta Control table is defined as input table, but it is also updated by the transformation. The table fills details about BW tables and extraction conditions so that the next extraction of data from a particular table starts from that time onwards from SAP.

The transformation has 11 output tables. All output tables are located in the same library. The transformation has the following options to extract data from SAP BW systems.

Table 5.2 Parameters Used in the Transformation

Parameter Name	Macro Variable	Valid Values and Description
MODE	_MODE	<p>INIT: Initialize the BW Delta Control Table and overwrite output tables.</p> <p>APPEND: Append new records to output tables according to time stamps from Delta Control Table.</p> <p>OVERWRITE: Replace output tables with new records according to time stamps from Delta Control Table.</p> <p>Default is APPEND.</p>

The transformation calls the SAS SCL program `sashelp.r3itadp.read_bw_stats.scl`. This program loops through the input table. The transformation also performs the following functions:

- Lists the SAP systems for data extraction.
- Assigns an SAP LIBNAME to each SAP system.
- Calls the macro `%readBwStats` to extract the statistic tables.

Suggest SAP Library and Destination Parameters

The **Suggest SAP Library and Destination Parameters** transformation has to be used in a DATA step. The transformation also has to be used in input and output statements. The transformation has three input tables and one output table. The following table describes the three input tables used by this transformation.

Table 5.3 Input Tables Used by the Suggest SAP Library and Destination Parameters Transformation

Prompt	Description
Place table RFCDES here	Table of Destinations in the SAP system for Remote Function Call. A sample schema of this table is distributed with the installation. It can also be registered using Source Designer for SAP from the table RFCDES on the SAP system.

Prompt	Description
Place table SAPWLSERV here	Table of active SAP servers. A sample schema of this table is distributed with the installation. It can also be registered using Source Designer for SAP from the table SAPWLSERV on the SAP system. This table needs to be updated with all active SAP servers from which we are extracting data via the hub server for indirect extraction.
Place table ADMIN.SAP Server Libraries here	List of SAP servers to extract performance data from. This table should have been created with the first initialization job.

Extract SAP IT Performance Statistics

The transformation calls the SAS SCL program `sashelp.r3itadp.read_r3_stats.scl` involving RFC function modules to extract the data from SAP. The log files are read from SAP for particular RFC destination assigned by the SAP Library, beginning date and end date. Table 5.4 gives more information about the RFC destination, beginning date and end date.

Once extraction is complete, administration tables `Last_extract_information` and `EXTRACTION_RECORD` are filled by date and time stamps. The `EXTRACTION_RECORD` table contains the information about when the last extraction takes place. The table also contains date stamps against the current extraction start times and end times. Therefore, the next extraction will take the starting date from this table itself.

Table 5.4 Extraction Condition for Function Module

Condition	Description
DEST	<p>Optional. Specifies the name of an SAP destination (that was setup using SM59) for indirect extraction.</p> <p>If DEST is set and its value is NONE, then it stands for direct extraction from the SAP server.</p> <p>If the value of DEST is different from NONE, then it stands for other SAP servers RFC-connected to the hub server. This means it stands for the indirect extraction method.</p>
BDAT AND EDAT	<p>The job looks for a previous run date in the table <code>LAST_EXTRACT_INFO</code>. If a previous run date is found, then the job takes it as the begin date. If no previous run date is found in the table, then it takes the previous night midnight as the begin time. The end date is current date plus one.</p>

Jobs in z/OS

If you are executing on a SAS workspace server in z/OS, then add the following options to the SAS configuration file or to the individual SAS IT Resource Management Adapter for SAP batch jobs:

```
options nocardimage;  
options linesize=300;
```

Note: These options are required. Without these options, the default values in z/OS might truncate the inherently long string of parameters that are associated with LIBNAME statements that access SAP.

Appendix 1

Restricting the RFC User Account for IT Resource Management Adapter for SAP

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Overview

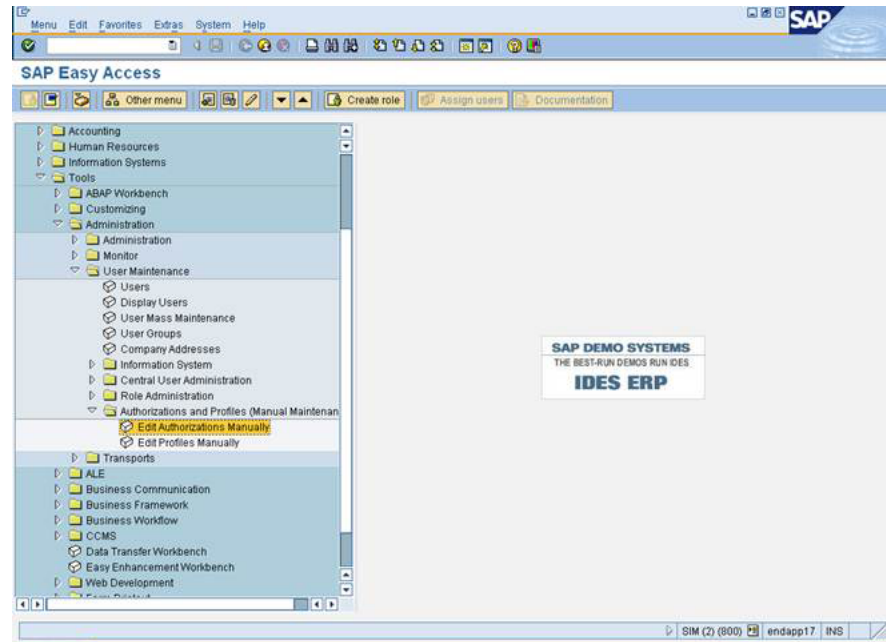
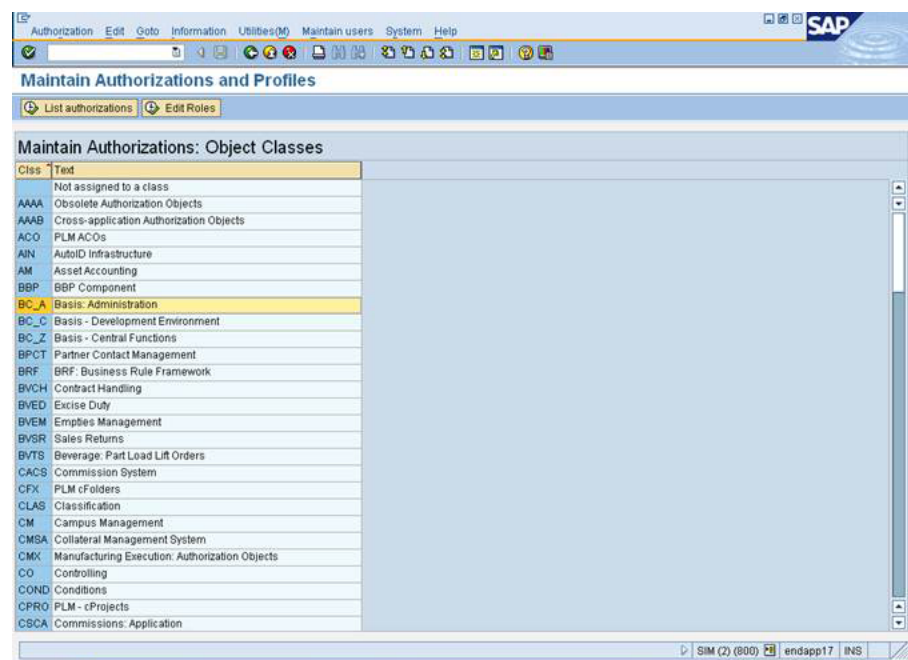
The example detailed in this appendix was performed on SAS 6.0. In this example, the system administrator creates a new authorization, uses it in a profile, and defines a user account that uses the profile. (In addition, the user account is designated as a system account, which prevents interactive logons.) Here is the sequence of events:

1. Create the authorization SASCPIC.
2. Specify the program that SASCPIC is allowed to execute. Using the SAP authorization administration, enter the program name /SAS/SAPLADITM with the function group /SAS/ADITM.
3. Specify that only activities 37 and 51 are allowed.
4. Save your settings. Activate SASCPIC.
5. Create a new profile named ITRM using the SASCPIC authorization. (The profile uses other more standard authorizations as well, such as those that allow CPIC and RFCs to run.)
6. Associate the new ITRM profile with the SAP user ID and account that performs data extractions.

By completing these steps, the account can be used only for extracting performance data. Functions in the /SAS/ADITM function group are the only functions that can be used to return data. Any attempt to extract tables or metadata results in an error that indicates a lack of permission. Create an Authorization

To create an authorization, complete the following steps:

1. In the SAP Easy Access window, under **Authorizations and Profiles (Manual Maintenance)**, double-click **Edit Authorizations Manually**.

Display A1.1 SAP Easy Access Window**Display A1.2** Maintain Authorizations: Object Classes Window

2. Double-click **BC_A Basis: Administration**.

Display A1.3 Object List Window

Object	Text
K_PRPS_SET	CO-CCA: PSP Element Groups
MAN_PM_KPI	Manufacturing: Add Plant Manager KPI
P_EFI	Authorisation object effiling
PPF_ADMIN	Authorization for Parallel Processing
S_ADMI_FCD	System Authorizations
S_ARCHIVE	Archiving
S_ASAP_RF	Implementation Assistant Roadmap (Type and Flavor)
S_ASAP_TF	Separate Roadmap Type and Flavor
S_ASAPIAT	Maintain Topic Attributes
S_BDC_MONI	Batch Input Authorizations
S_BRAN_ADM	Industry management
S_BTCH_ADM	Background Processing: Background Administrator
S_BTCH_JOB	Background Processing: Operations on Background Jobs
S_BTCH_NAM	Background Processing: Background User Name
S_C_FUNCT	C calls in ABAP programs
S_CCM_RECV	Authorizations for Transferring Central System Repos. Data
S_CCMS_CMC	CCMS Monitoring Console
S_CLNT_IMP	Data Import for Client Copy
S_CPIC	CPIC Calls from ABAP Programs
S_CTS_ADMI	Administration Functions in Change and Transport System
S_CTS_LANG	Language Transport Administration Functions
S_DATASET	Authorization for file access
S_DB2_ADM	DB2/390: Database Administration
S_DB2_COMM	DB2 OS/390 commands: in Database Performance Monitor (ST04)
S_DDSTCAUT	Structure Changes in Support Package Systems
S_ENQUE	Enqueue: Display and Delete Lock Entries

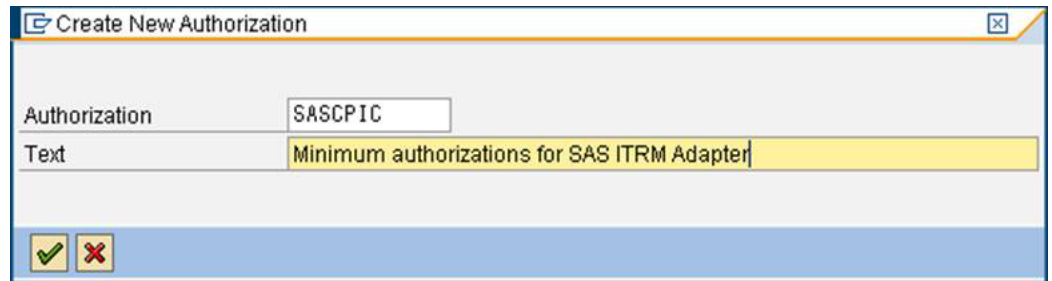
3. In the **Object** column, double-click **S_CPIC** CPIC Calls from ABAP Programs.

Display A1.4 Authorization List Window


Authorization	Version	Type	Text
&_SAP_ALL	A Active versn	G Generated	Generated authorization for profile SAP_ALL
CPICBAS	A Active versn		Minimum authorizations for SASI/ACCESS Interface to SAP R/3
S_CPIC_ALL	A Active versn		ALL CPIC Accesses
S_SAPCPIC	A Active versn		Authorizations for User SAPCPIC
T_5400000900	A Active versn	G Generated	CPIC Calls from ABAP Programs
T_54000003100	A Active versn	G Generated	CPIC Calls from ABAP Programs
T_K780002900	A Active versn	G Generated	
T-0000000400	A Active versn	G Generated	CPIC calls from ABAP/4 programs
T-1303002300	A Active versn	G Generated	CPIC Calls from ABAP Programs
T-1303003700	A Active versn	G Generated	
T-1355012800	A Active versn	G Generated	
T-1355036300	A Active versn	G Generated	
ZADM950__00	A Active versn	G Generated	CPIC Calls from ABAP Programs

4. Click **Authorization** ⇒ **Create**.

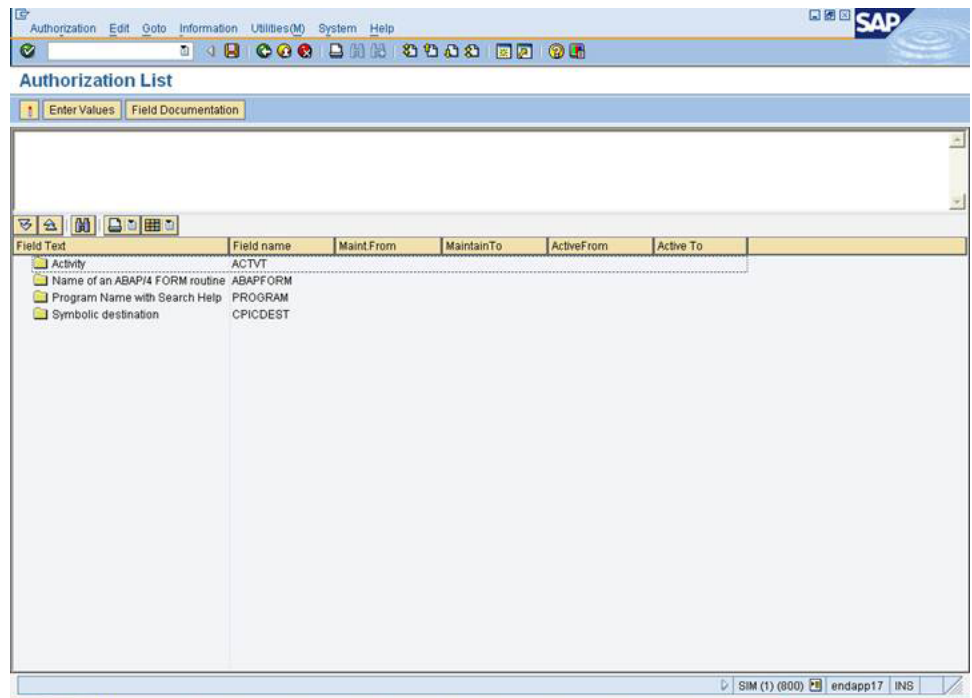
Display A1.5 Create New Authorization Dialog Box



The dialog box titled "Create New Authorization" has two input fields. The "Authorization" field contains the text "SASCPIC". The "Text" field contains the text "Minimum authorizations for SAS ITRM Adapter". At the bottom left, there are two buttons: a green checkmark and a red X.

5. In the **Text** field, enter a description for this authorization. Click .

Display A1.6 Authorization List Window



The "Authorization List" window shows a table with the following columns: Field Text, Field name, Maint.From, MaintainTo, ActiveFrom, and Active To. The table contains three rows of data:

Field Text	Field name	Maint.From	MaintainTo	ActiveFrom	Active To
Activity	ACTVT				
Name of an ABAP/4 FORM routine	ABAPFORM				
Program Name with Search Help	PROGRAM				

Below the table, there is a section for "Symbolic destination" with the value "CPICDEST".

6. Double-click **ABAP** program name with search help.

Display A1.7 Field Values Dialog Box

Field values

Object: S_CPIC CPIC Calls from ABAP Programs

Field Name: PROGRAM Program Name with Search Help

Full authorization

Value Intrvl	From	To
	/SAS/SAPLADITM	

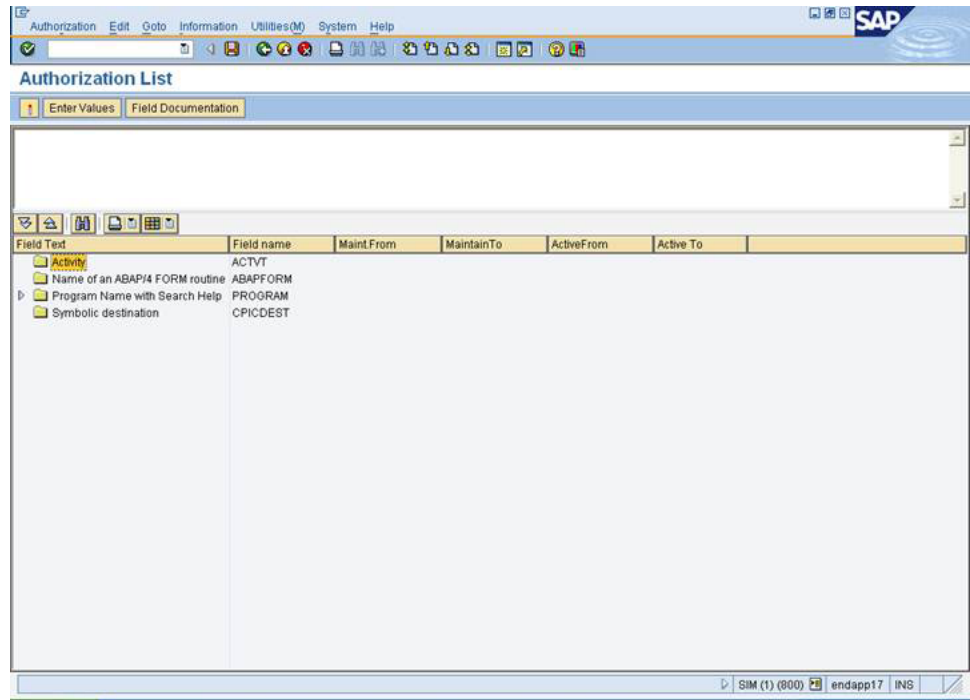
Save, Delete, Insert, Print, Close icons at the bottom.

7. To restrict permission for S_CPIC so that it can execute only the /SAS/SAPLADITM program, complete the following steps:
 - a. In the **From** column, type /SAS/SAPLADITM (where /SAS/ADITM is the function group).
 - Note: There is no value for this entry in the To column.
 - b. Click the diskette icon to save your changes.

Here is an example of the system-generated code associated with the /SAS/ADITM function group:

```
*****
* System-defined Include-files. *
*****
INCLUDE LZSASXTOP.  Global Data
INCLUDE LZSASXUX.  Function Modules
*****
* User-defined Include-files (if necessary). *
*****
* INCLUDE LZSASXF... Subprograms
* INCLUDE LZSASXO... PBO-Modules
* INCLUDE LZSASXI...
Permission is restricted so that only the function module
/SAS/SAPWL_STATREC_READ_FILE can be executed.
```

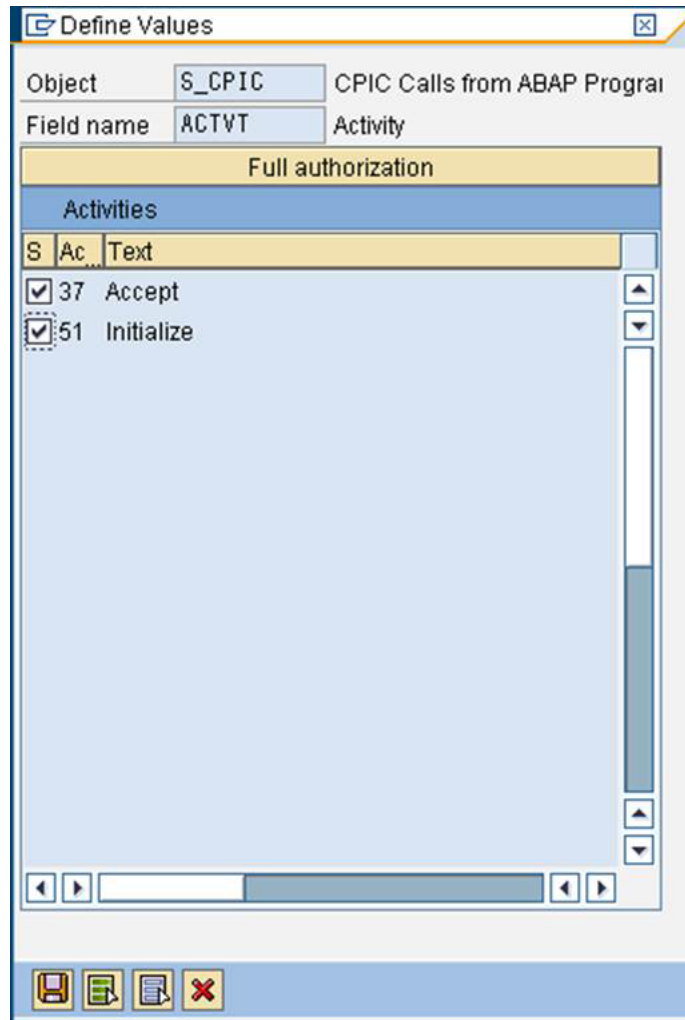
8. In the Authorization List window, select **Activity** and then click **Enter Values**.

Display A1.8 Authorization List Window

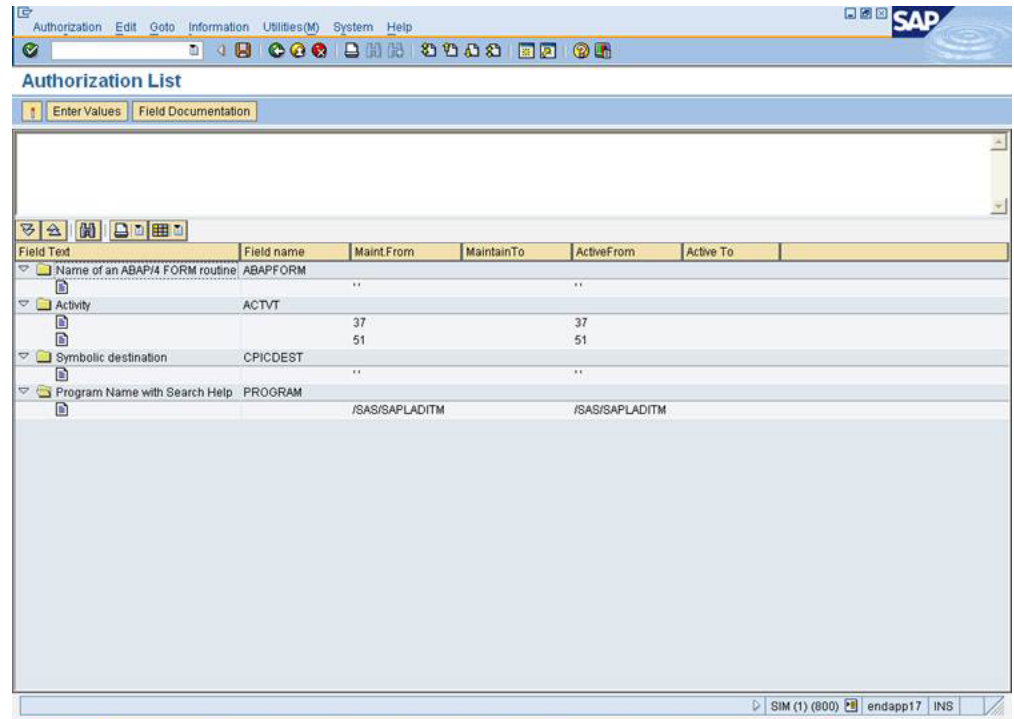
The screenshot shows the SAP Authorization List window. The title bar includes the SAP logo and menu options: Authorization, Edit, Goto, Information, Utilities(M), System, Help. Below the title bar is a toolbar with icons for search, print, and other functions. The main window has a header bar with the title "Authorization List" and two buttons: "Enter Values" and "Field Documentation". Below the header bar is a large table with the following columns: Field Text, Field name, Maint.From, MaintainTo, ActiveFrom, and Active To. The table contains the following data:

Field Text	Field name	Maint.From	MaintainTo	ActiveFrom	Active To
Activity	ACTVT				
Name of an ABAP/4 FORM routine	ABAPFORM				
Program Name with Search Help	PROGRAM				
Symbolic destination	CPICDEST				

The status bar at the bottom of the window displays the text: SIM (1) (800) endapp17 INS.

Display A1.9 Define Values Dialog Box

9. Select the check boxes for activities 37 and 51. Click the diskette icon to save the changes.
10. In the Maintain Authorization window, click **Authorization** ⇌ **Activate**. This activates the newly created authorization.

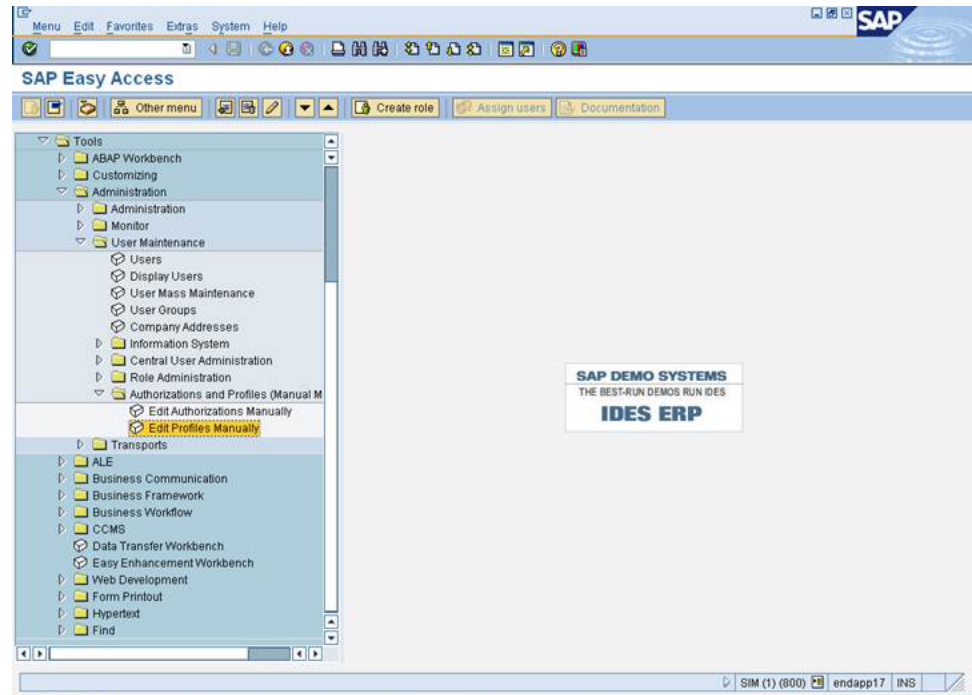
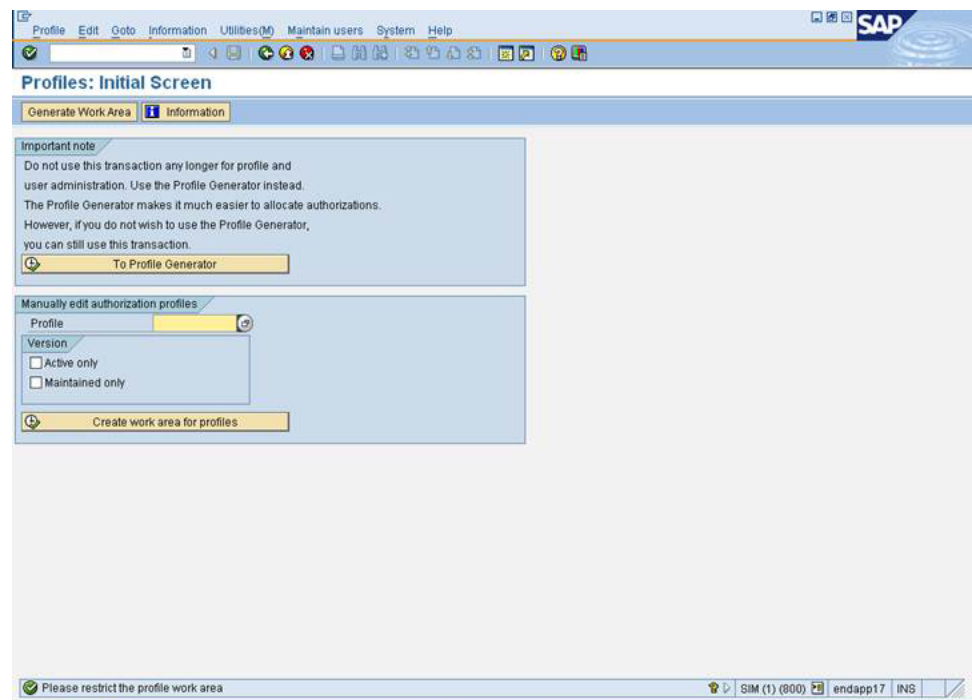
Display A1.10 Authorization List Window


Field Text	Field name	MaintFrom	MaintainTo	ActiveFrom	Active To
Name of an ABAP/4 FORM routine	ABAPFORM				
Activity	ACTVT				
		37		37	
		51		51	
Symbolic destination	CPICDEST				
Program Name with Search Help	PROGRAM				
		/SAS/SAPLADITM		/SAS/SAPLADITM	

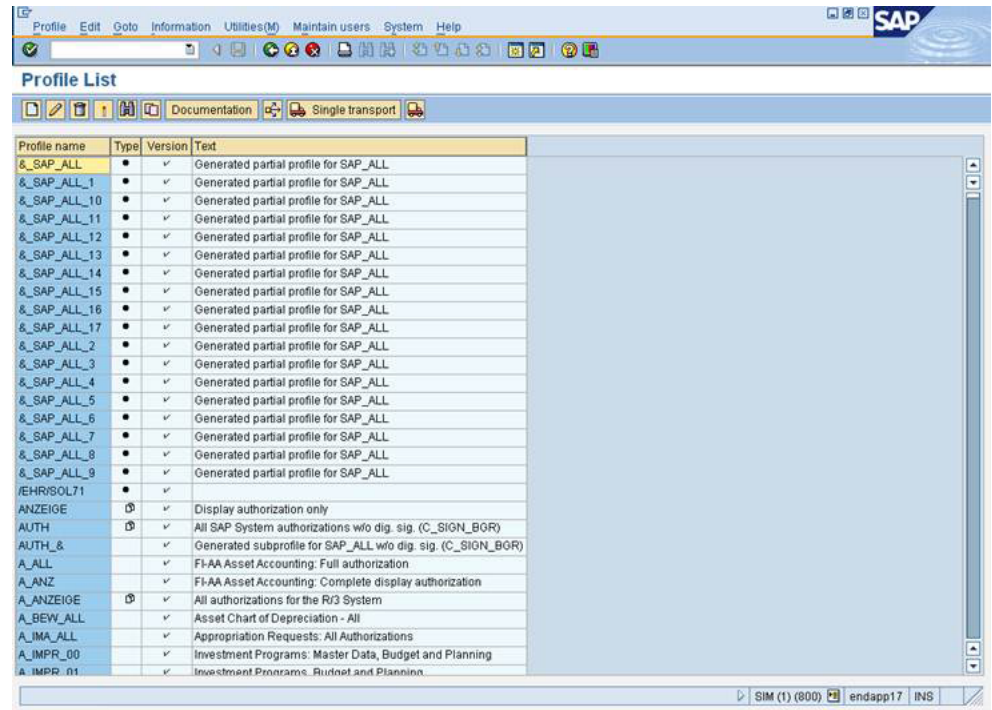
Create and Edit a Profile

To create a profile, complete the following steps:

1. In the SAP Easy Access window, under **Authorizations and Profiles (Manual Maintenance)**, double-click **Edit Profiles Manually** or enter the transaction code **SU02**.

Display A1.11 SAP Easy Access Window**Display A1.12** Profiles: Initial Screen Window

2. Click **Generate Work Area**.

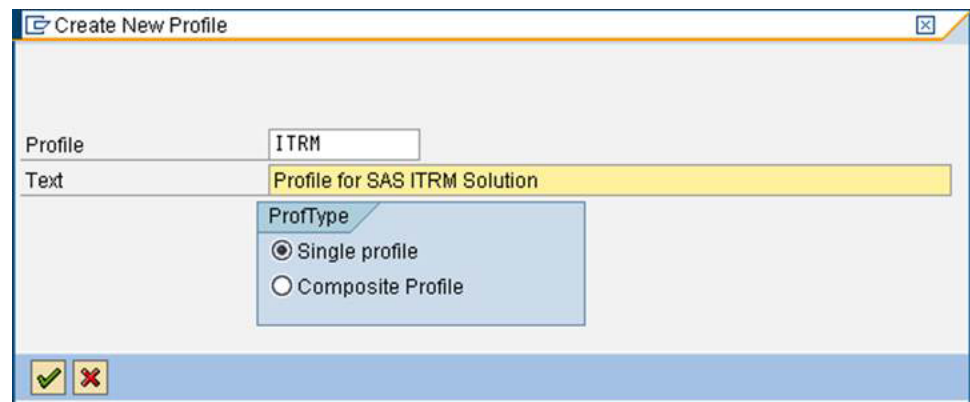
Display A1.13 Profile List Window


The screenshot shows the SAP Profile List window. The menu bar includes Profile, Edit, Goto, Information, Utilities(M), Maintain users, System, and Help. The toolbar contains icons for Profile, Edit, Goto, Information, Utilities(M), Maintain users, System, Help, and a 'Single transport' button. The table below lists the profiles.

Profile name	Type	Version	Text
&_SAP_ALL	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_1	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_10	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_11	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_12	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_13	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_14	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_15	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_16	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_17	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_2	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_3	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_4	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_5	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_6	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_7	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_8	•	✓	Generated partial profile for SAP_ALL
&_SAP_ALL_9	•	✓	Generated partial profile for SAP_ALL
/EHR/SOL71	•	✓	
ANZEIGE	⊞	✓	Display authorization only
AUTH	⊞	✓	All SAP System authorizations w/o dig. sig. (C_SIGN_BGR)
AUTH_8	✓		Generated subprofile for SAP_ALL w/o dig. sig. (C_SIGN_BGR)
A_ALL	✓		FI-AA Asset Accounting: Full authorization
A_ANZ	✓		FI-AA Asset Accounting: Complete display authorization
A_ANZEIGE	⊞	✓	All authorizations for the R/3 System
A_BEW_ALL	✓		Asset Chart of Depreciation - All
A_IMA_ALL	✓		Appropriation Requests: All Authorizations
A_IMPR_00	✓		Investment Programs: Master Data, Budget and Planning
A_IMPR_01	✓		Investment Programs: Budget and Planning

At the bottom right, the status bar shows: SIM (1) (800) | endapp17 | INS |


3. Click **Profile** ⇒ **Create**.

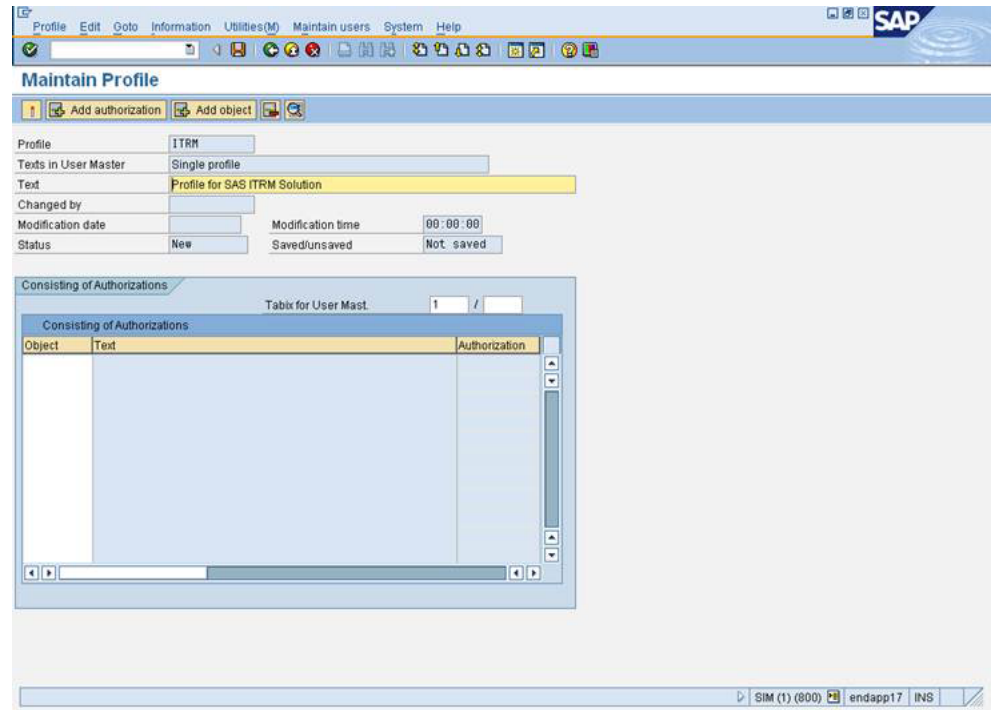
Display A1.14 Create New Profile Dialog Box


The screenshot shows the 'Create New Profile' dialog box. It contains the following fields and options:

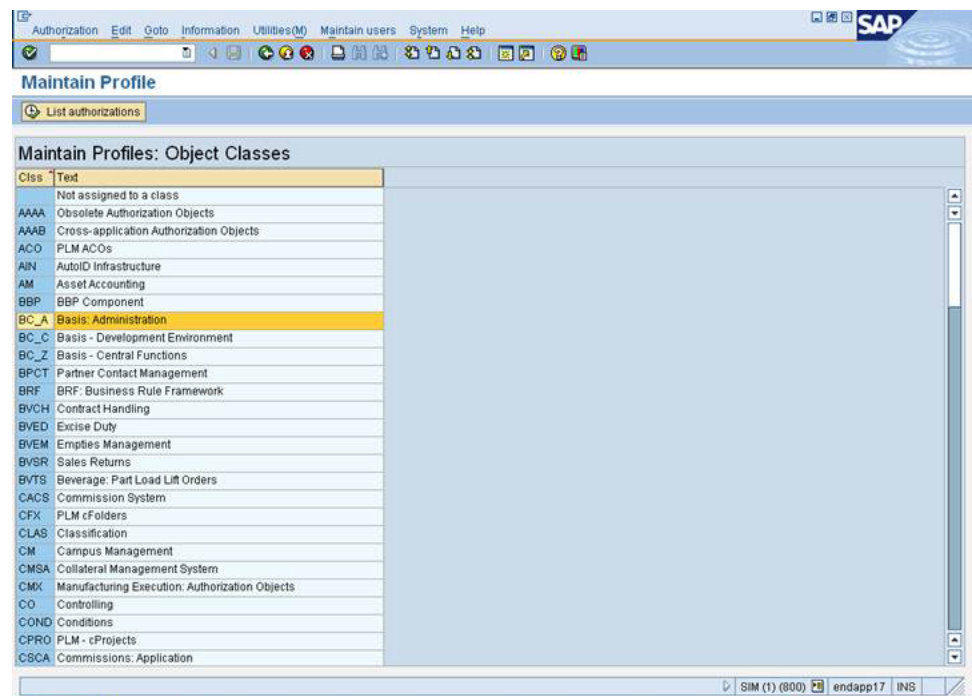
- Profile**: ITRM
- Text**: Profile for SAS ITRM Solution
- ProfType**:
 - ☒ Single profile
 - ☐ Composite Profile

At the bottom, there are two buttons: a green checkmark (Save) and a red X (Cancel).

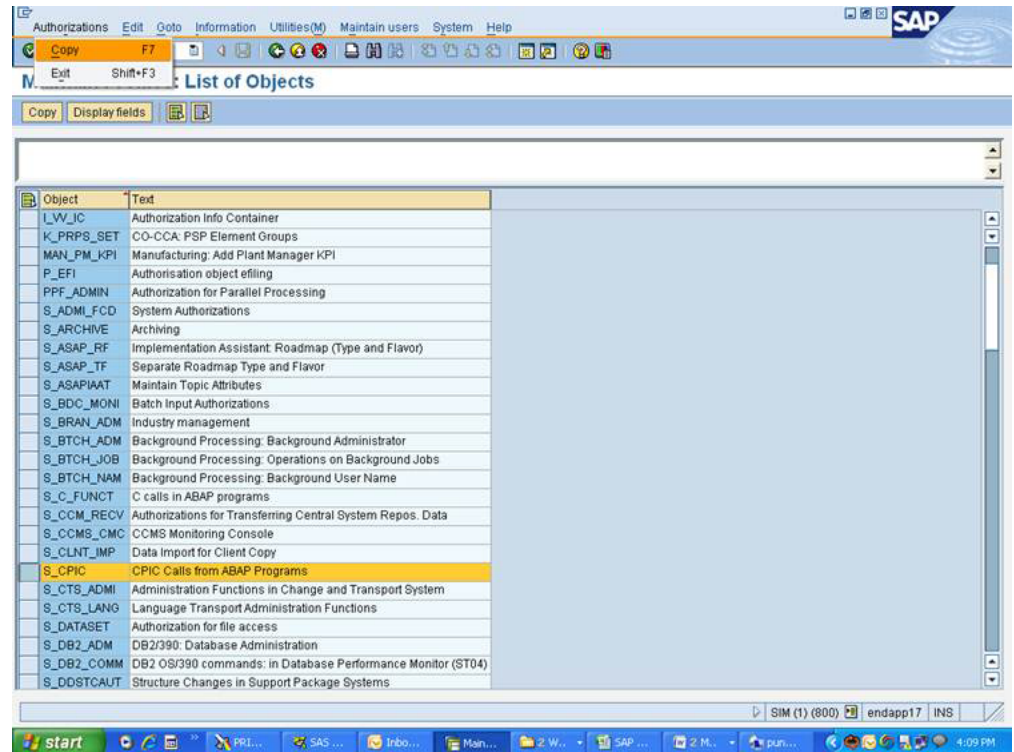
4. To create a new profile, complete the following steps:
- In the **Profile** field, enter a profile name.
 - In the **Text** field, enter description.
 - Under **ProfType**, select **Single profile**.
 - Click  to save the profile.

Display A1.15 Maintain Profile Window

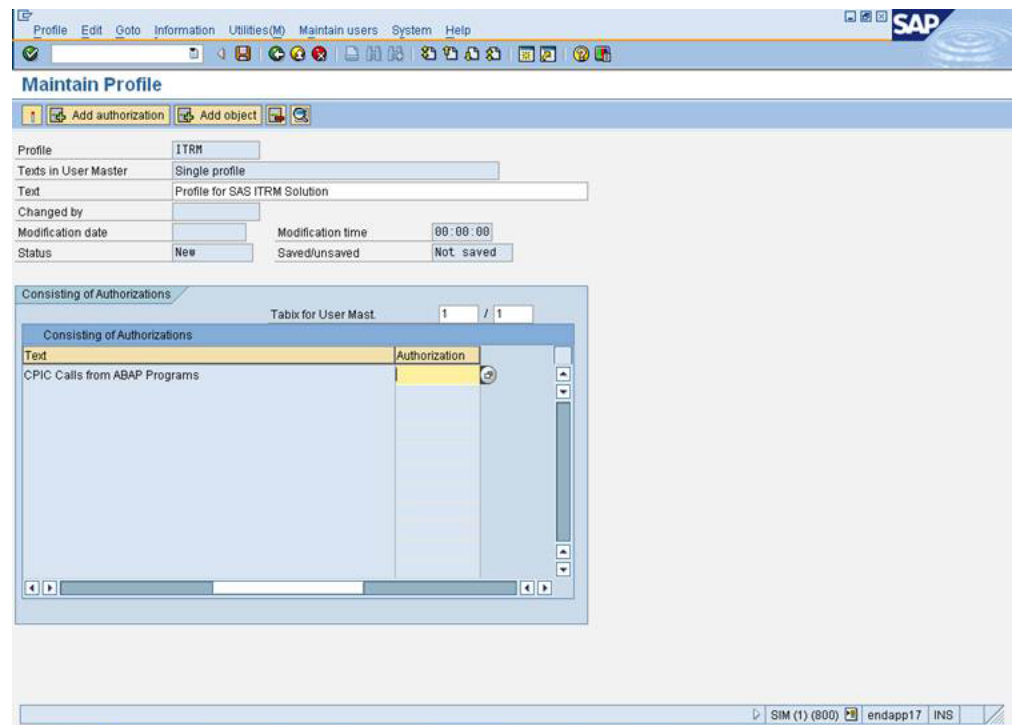
- To edit the profile, click **Add object**.


Display A1.16 Maintain Profiles: Object Classes Window

- Double-click **BC_A Basis: Administration**.

Display A1.17 Maintain Profiles: List of Objects Window

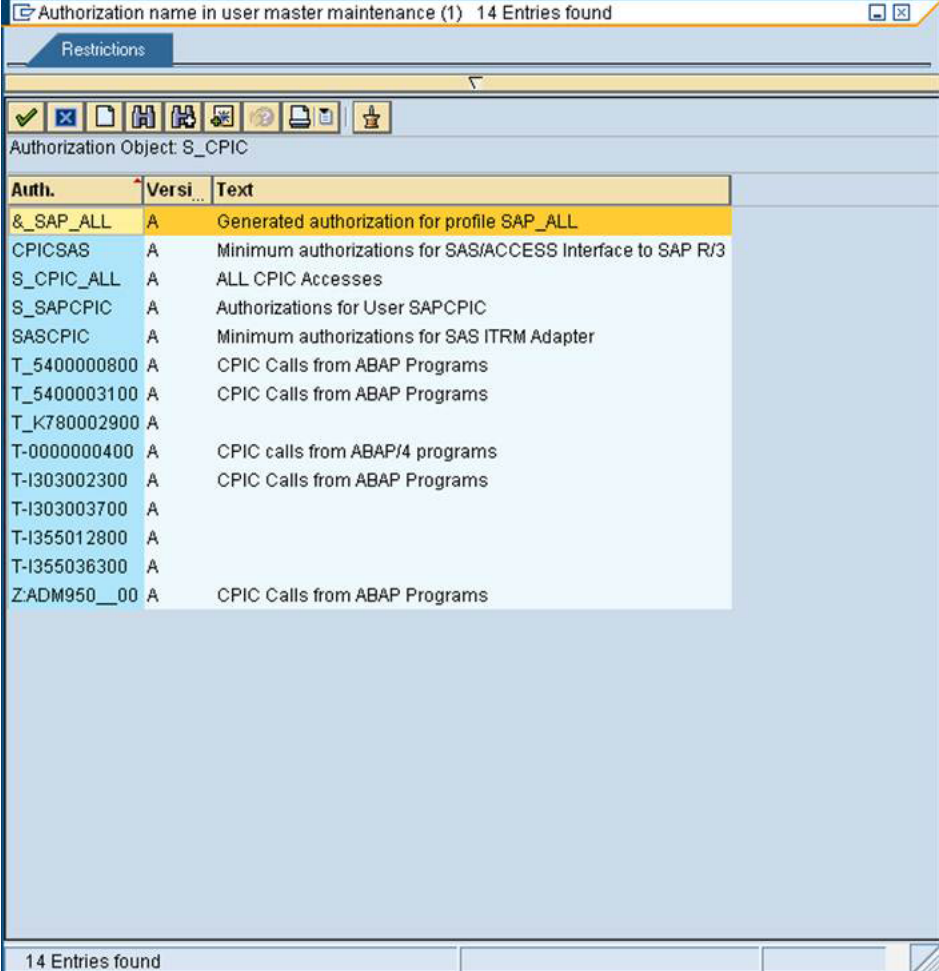
7. Click the check box next to **S_CPIC** and then select **Authorizations** ⇌ **Copy**.

Display A1.18 Maintain Profile Window

8. In the Authorization column, click .

A list of associated authorizations for the object S_CPIC appears in the Restrictions window.

Display A1.19 Restrictions Window

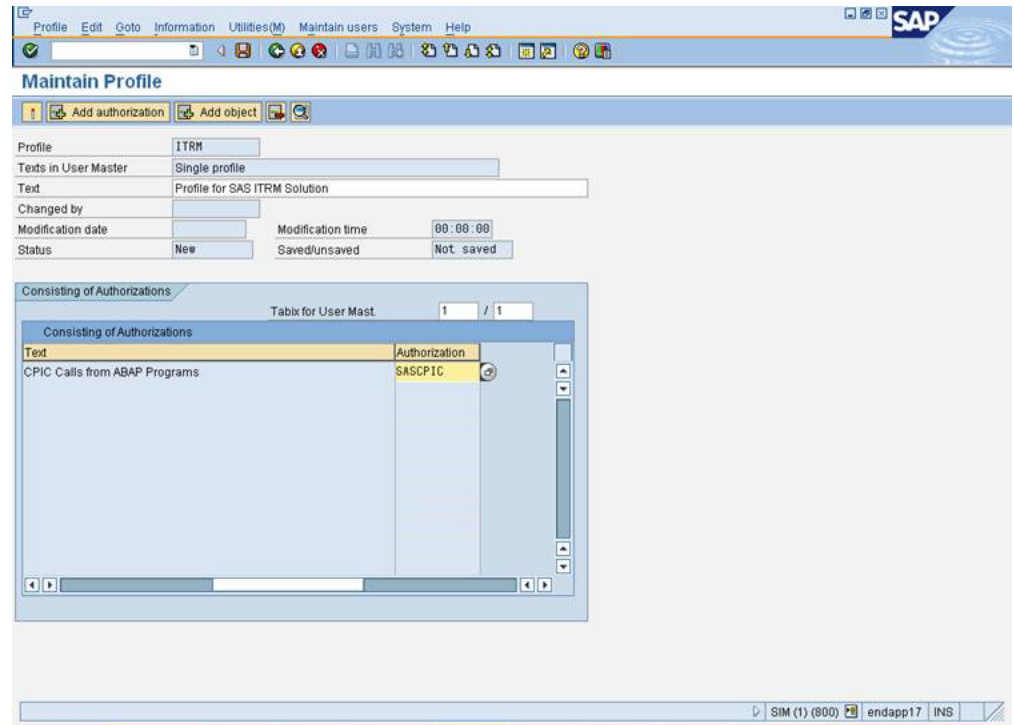


Auth.	Versi...	Text
&_SAP_ALL	A	Generated authorization for profile SAP_ALL
CPICSAS	A	Minimum authorizations for SAS/ACCESS Interface to SAP R/3
S_CPIC_ALL	A	ALL CPIC Accesses
S_SAPCPIC	A	Authorizations for User SAPCPIC
SASCPIC	A	Minimum authorizations for SAS ITRM Adapter
T_5400000800	A	CPIC Calls from ABAP Programs
T_5400003100	A	CPIC Calls from ABAP Programs
T_K780002900	A	
T-0000000400	A	CPIC calls from ABAP/4 programs
T-I303002300	A	CPIC Calls from ABAP Programs
T-I303003700	A	
T-I355012800	A	
T-I355036300	A	
ZADM950__00	A	CPIC Calls from ABAP Programs

- Double-click **SASCPIC**. The authorization SASCPIC is associated with the object S_CPIC.

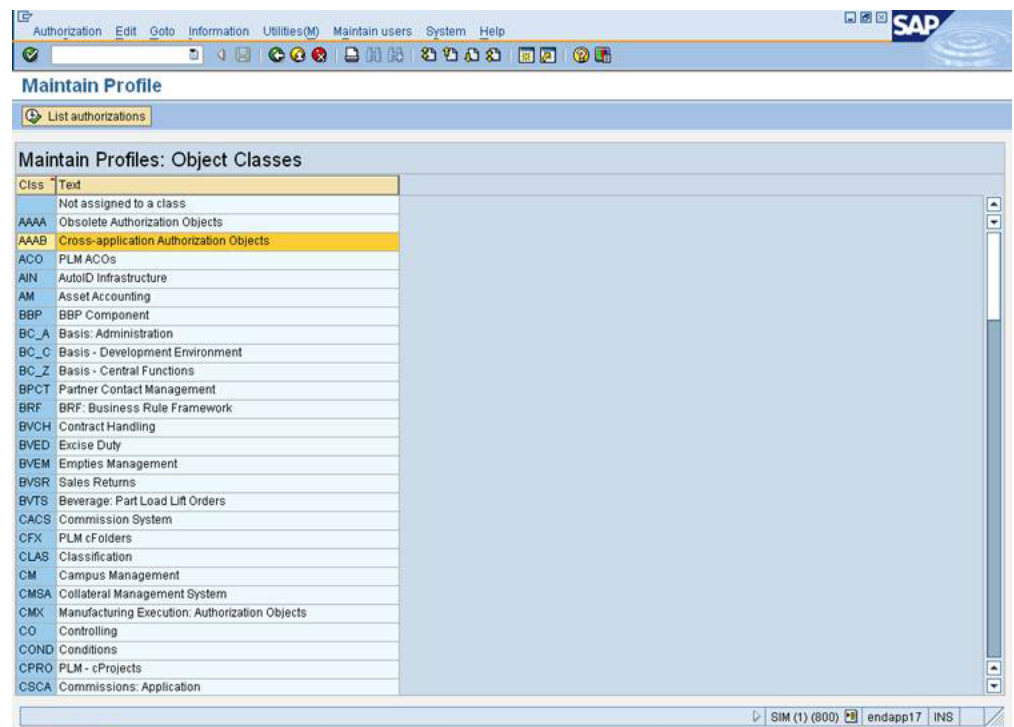
Display A1.20 Restrictions Window Selecting SASCPIC

Authorization name in user master maintenance (1) 14 Entries found		
Restrictions		
Authorization Object: S_CPIC		
Auth.	Versi...	Text
&_SAP_ALL	A	Generated authorization for profile SAP_ALL
CPICSAS	A	Minimum authorizations for SAS/ACCESS Interface to SAP R/3
S_CPIC_ALL	A	ALL CPIC Accesses
S_SAPCPIC	A	Authorizations for User SAPCPIC
SASCPIC	A	Minimum authorizations for SAS ITRM Adapter
T_5400000800	A	CPIC Calls from ABAP Programs
T_5400003100	A	CPIC Calls from ABAP Programs
T_K780002900	A	
T-0000000400	A	CPIC calls from ABAP/4 programs
T-I303002300	A	CPIC Calls from ABAP Programs
T-I303003700	A	
T-I355012800	A	
T-I355036300	A	
Z:ADM950__00	A	CPIC Calls from ABAP Programs
14 Entries found		

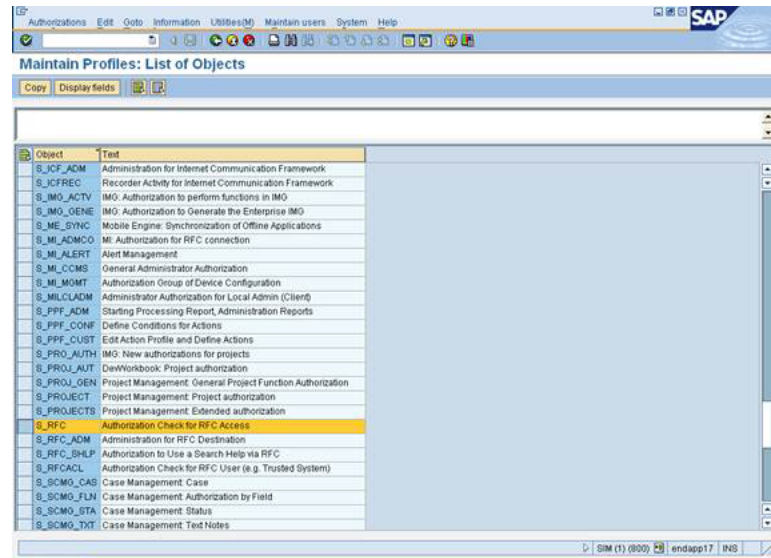
Display A1.21 Maintain Profile Window

10. Click **Add object**.

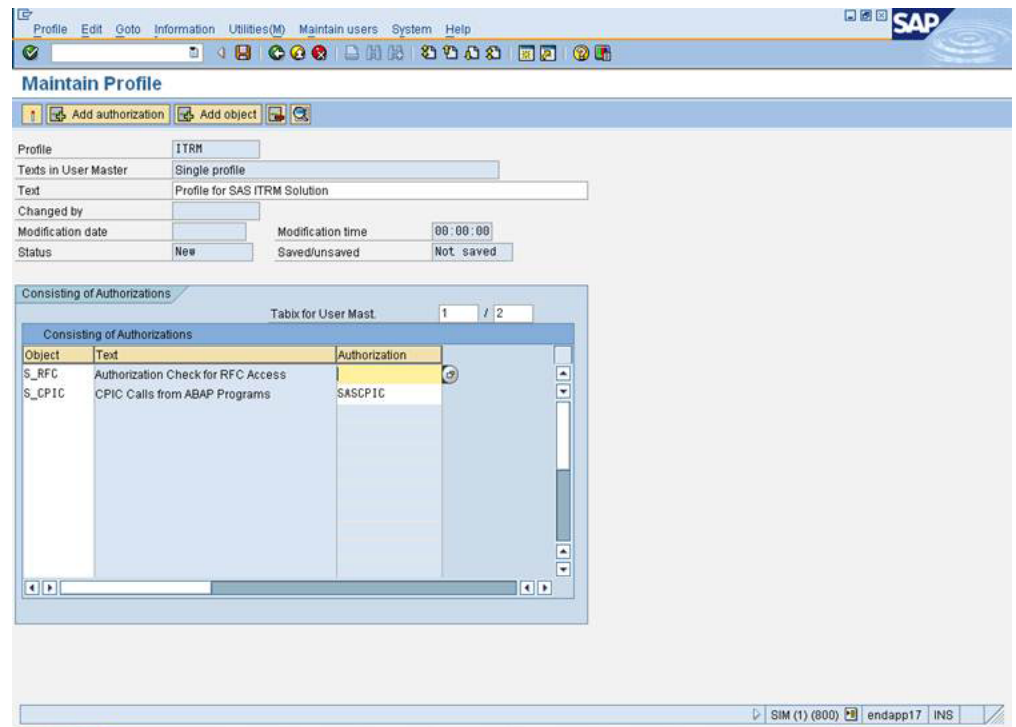
You see the following display.


Display A1.22 Maintain Profiles: Object Classes Window

11. Double-click **AAAB Cross-application Authorization Objects**.

Display A1.23 Maintain Profiles: List of Objects Window

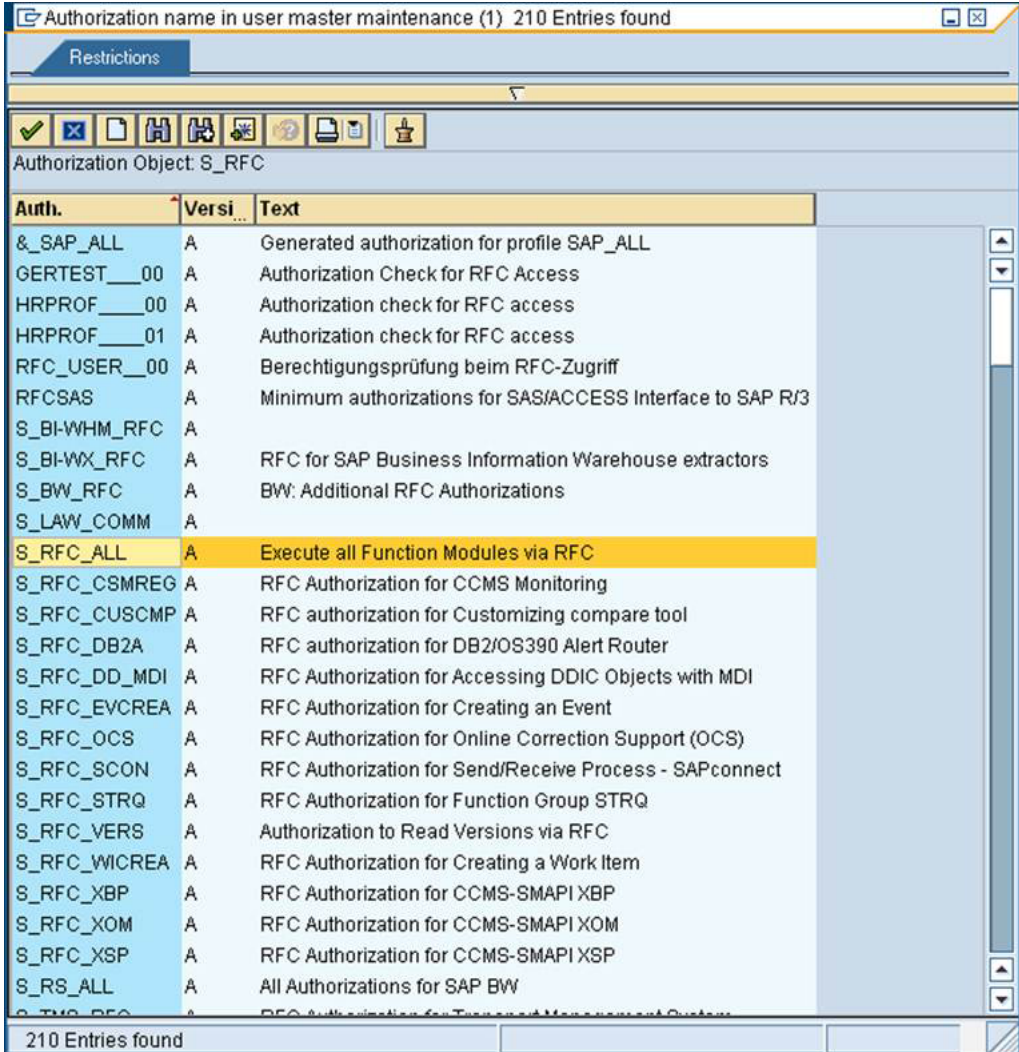
12. Click the check box next to **S_RFC**, and then select **Authorizations** ⇒ **Copy**.

Display A1.24 Maintain Profile Window

13. In the **Authorization** column, click  corresponding to **S_RFC**.

A list of associated authorizations for the object S_RFC appears in the Restrictions window.

Display A1.25 Restrictions Window



Auth.	Versi...	Text
&_SAP_ALL	A	Generated authorization for profile SAP_ALL
GERTEST__00	A	Authorization Check for RFC Access
HRPROF__00	A	Authorization check for RFC access
HRPROF__01	A	Authorization check for RFC access
RFC_USER__00	A	Berechtigungsprüfung beim RFC-Zugriff
RFC_SAS	A	Minimum authorizations for SAS/ACCESS Interface to SAP R/3
S_BI-WHM_RFC	A	
S_BI-WX_RFC	A	RFC for SAP Business Information Warehouse extractors
S_BW_RFC	A	BW: Additional RFC Authorizations
S_LAW_COMM	A	
S_RFC_ALL	A	Execute all Function Modules via RFC
S_RFC_CSMREG	A	RFC Authorization for CCMS Monitoring
S_RFC_CUSCMP	A	RFC authorization for Customizing compare tool
S_RFC_DB2A	A	RFC authorization for DB2/OS390 Alert Router
S_RFC_DD_MDI	A	RFC Authorization for Accessing DDIC Objects with MDI
S_RFC_EVCREA	A	RFC Authorization for Creating an Event
S_RFC_OCS	A	RFC Authorization for Online Correction Support (OCS)
S_RFC_SCON	A	RFC Authorization for Send/Receive Process - SAPconnect
S_RFC_STRQ	A	RFC Authorization for Function Group STRQ
S_RFC_VERS	A	Authorization to Read Versions via RFC
S_RFC_WICREA	A	RFC Authorization for Creating a Work Item
S_RFC_XBP	A	RFC Authorization for CCMS-SMAPI XBP
S_RFC_XOM	A	RFC Authorization for CCMS-SMAPI XOM
S_RFC_XSP	A	RFC Authorization for CCMS-SMAPI XSP
S_RS_ALL	A	All Authorizations for SAP BW
S_TMS_RFC	A	RFC Authorization for Transport Management Custom...

210 Entries found

14. Double-click **S_RFC_ALL**.

You see the following display.

Display A1.26 Maintain Profile Window

Maintain Profile

Profile: ITRM
 Texts in User Master: Single profile
 Text: Profile for SAS ITRM Solution
 Changed by:
 Modification date:
 Modification time: 00:00:00
 Status: New
 Saved/unsaved: Not saved

Consisting of Authorizations

Object	Text	Authorization
S RFC	Authorization Check for RFC Access	S RFC_ALL
S CPIC	CPIC Calls from ABAP Programs	SASCPIC

Tablix for User Mast: 1 / 2

Profile ITRM saved

- Click the **diskette** icon to save the profile.

Display A1.27 Maintain Profile Window

Maintain Profile

Profile: ITRM
 Texts in User Master: Single profile
 Text: Profile for SAS ITRM Solution
 Changed by: SINSUO
 Modification date: 07.09.2010
 Modification time: 06:57:29
 Status: Revised
 Saved/unsaved: Saved

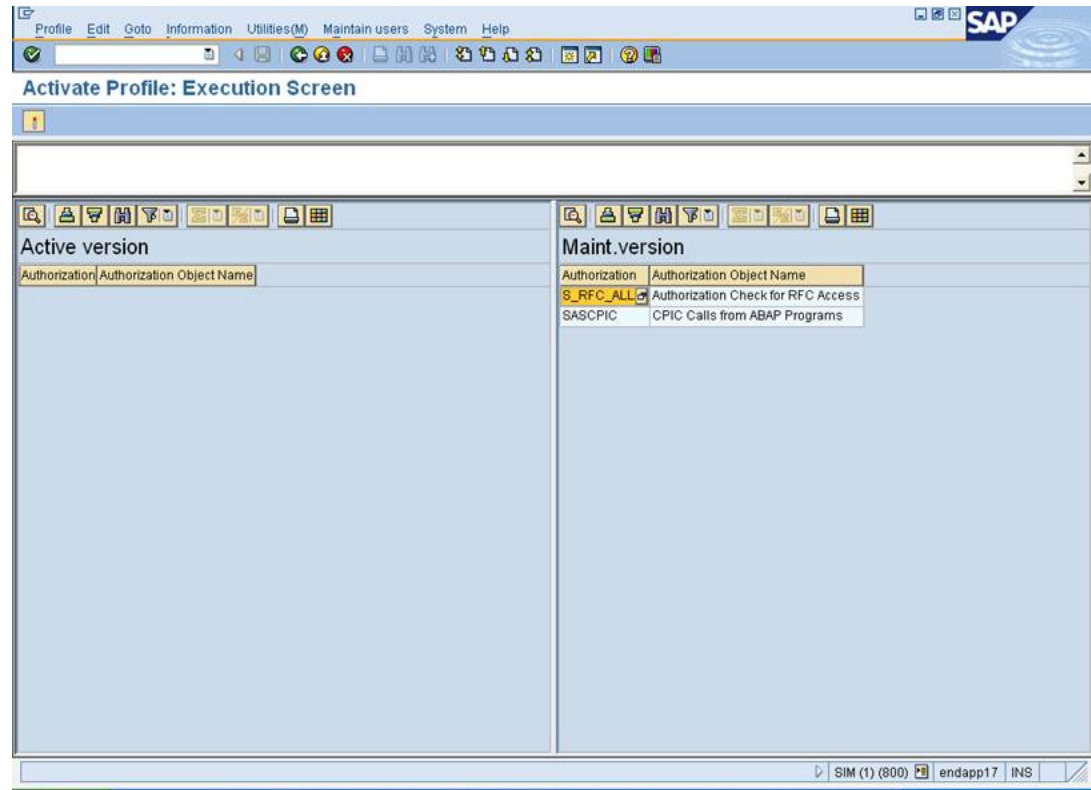
Consisting of Authorizations

Object	Text	Authorization
S RFC	Authorization Check for RFC Access	S RFC_ALL
S CPIC	CPIC Calls from ABAP Programs	SASCPIC

Tablix for User Mast: 1 / 2

Profile ITRM saved

- To activate the profile, select **Profile** ⇒ **Activate**.

Display A1.28 Activate Profile: Execution Screen Window

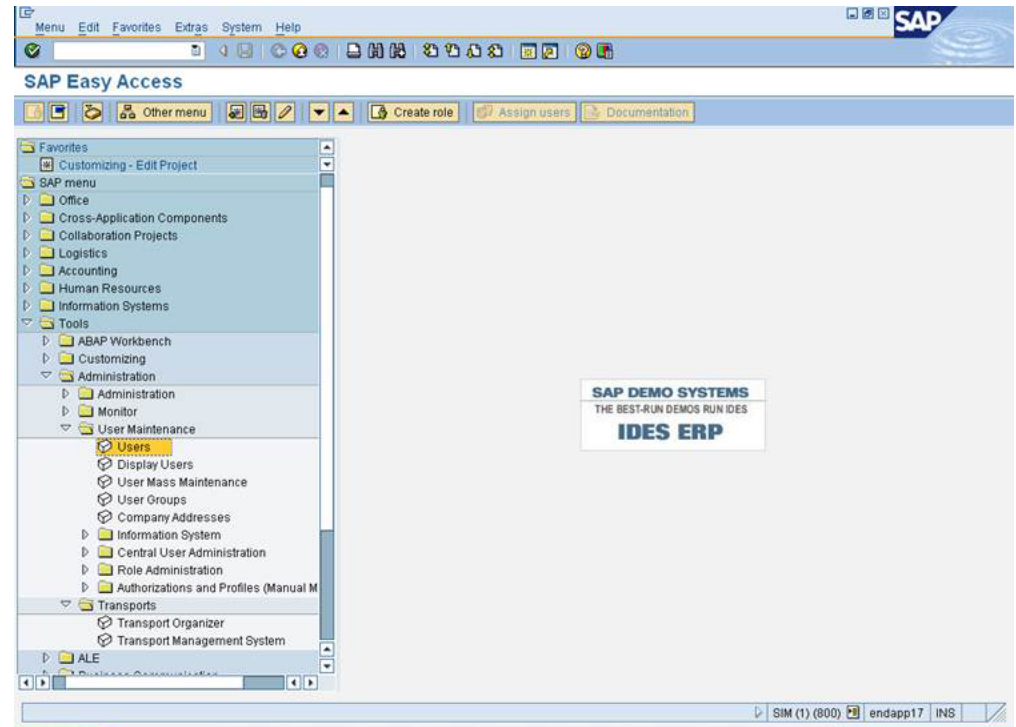
17. To activate execution, select **Profile** ⇒ **Activate**.

Associating the Profile with User Account

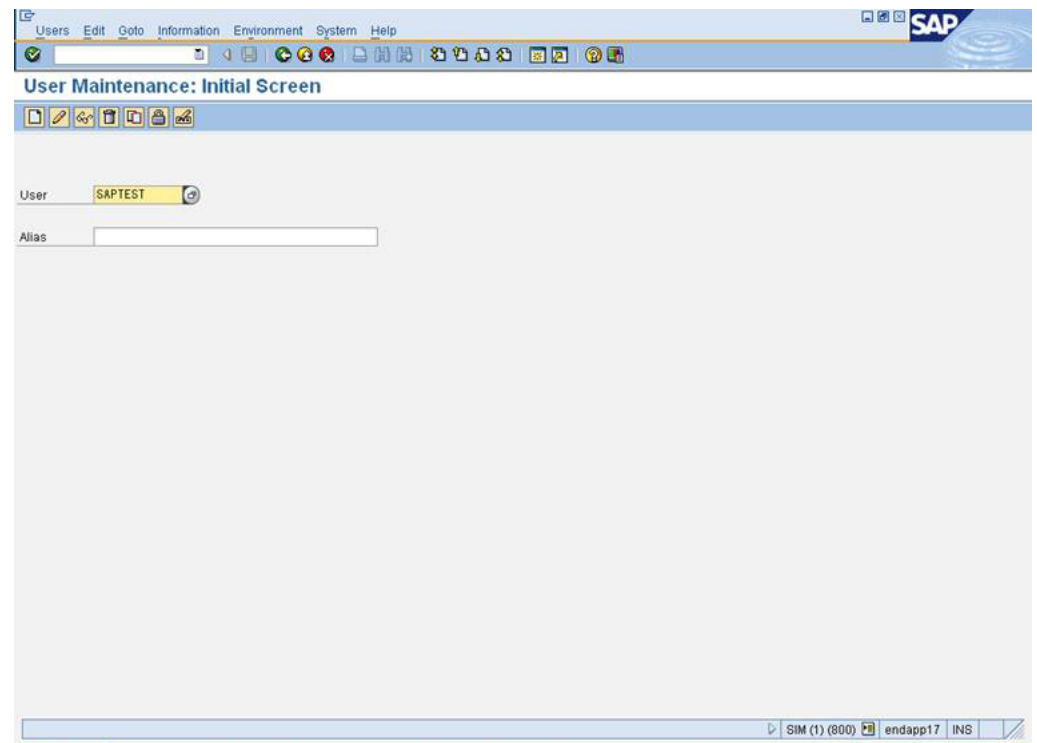
To associate the profile with a user account, complete the following steps:


1. In the SAP Easy Access window under **User Maintenance**, double-click **Users**.
As an alternative, you can enter transaction Code SU01 in the command bar at the top of the SAP Easy Access Window.

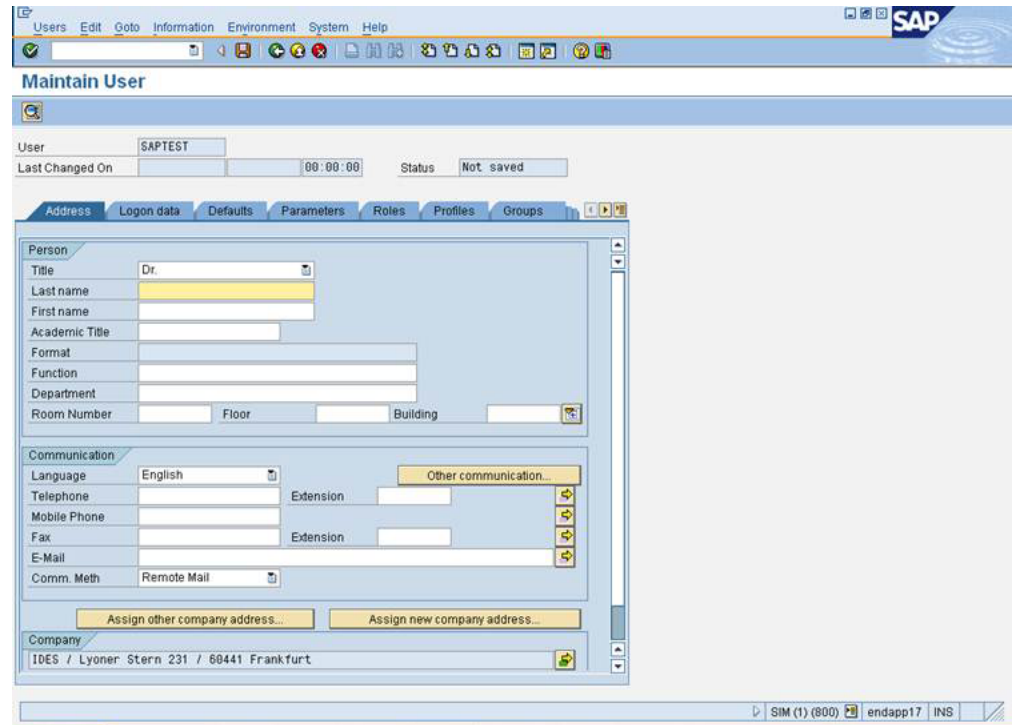
Display A1.29 SAP Easy Access Window



Display A1.30 User Maintenance: Initial Screen Window

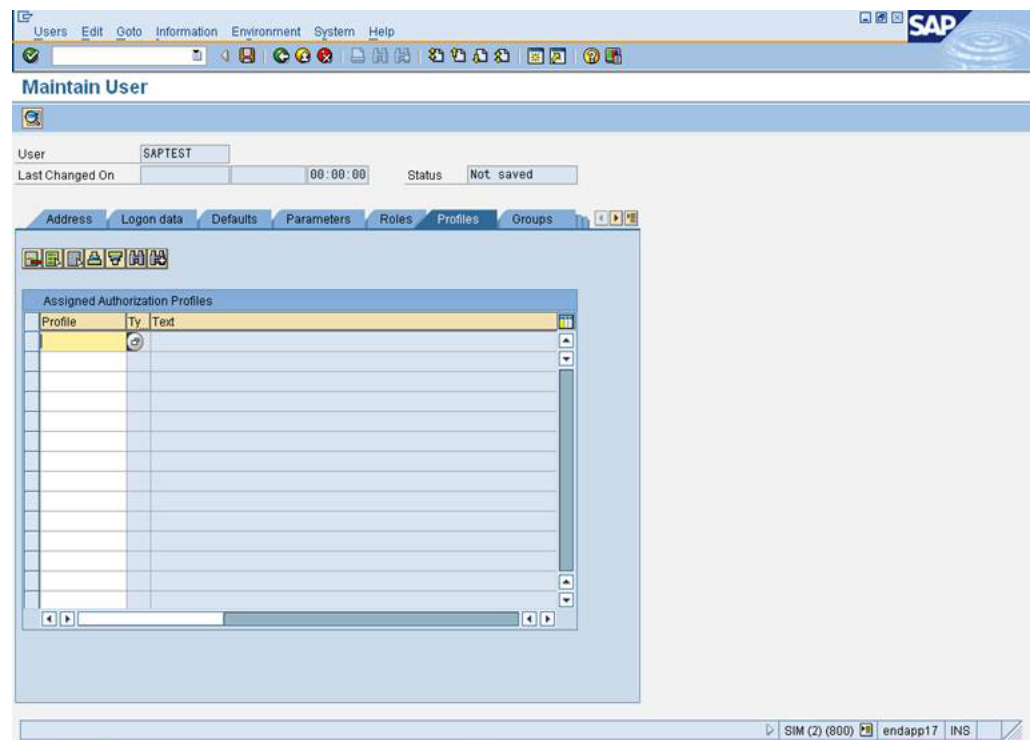


2. In the **User** field, enter a unique user name. Click .

Display A1.31 Maintain User: Address


The screenshot shows the SAP 'Maintain User' dialog box with the 'Address' tab selected. The 'User' field contains 'SAPTEST'. The 'Last Changed On' field shows '00:00:00' and the 'Status' is 'Not saved'. The 'Person' section includes fields for Title (Dr.), Last name, First name, Academic Title, Format, Function, Department, Room Number, Floor, and Building. The 'Communication' section includes Language (English), Telephone, Mobile Phone, Fax, E-Mail, and Comm. Meth (Remote Mail). There are buttons for 'Assign other company address...' and 'Assign new company address...'. The 'Company' field shows 'IDES / Lyoner Stern 231 / 60441 Frankfurt'. The bottom status bar indicates 'SIM (1) (800) endapp17 INS'.

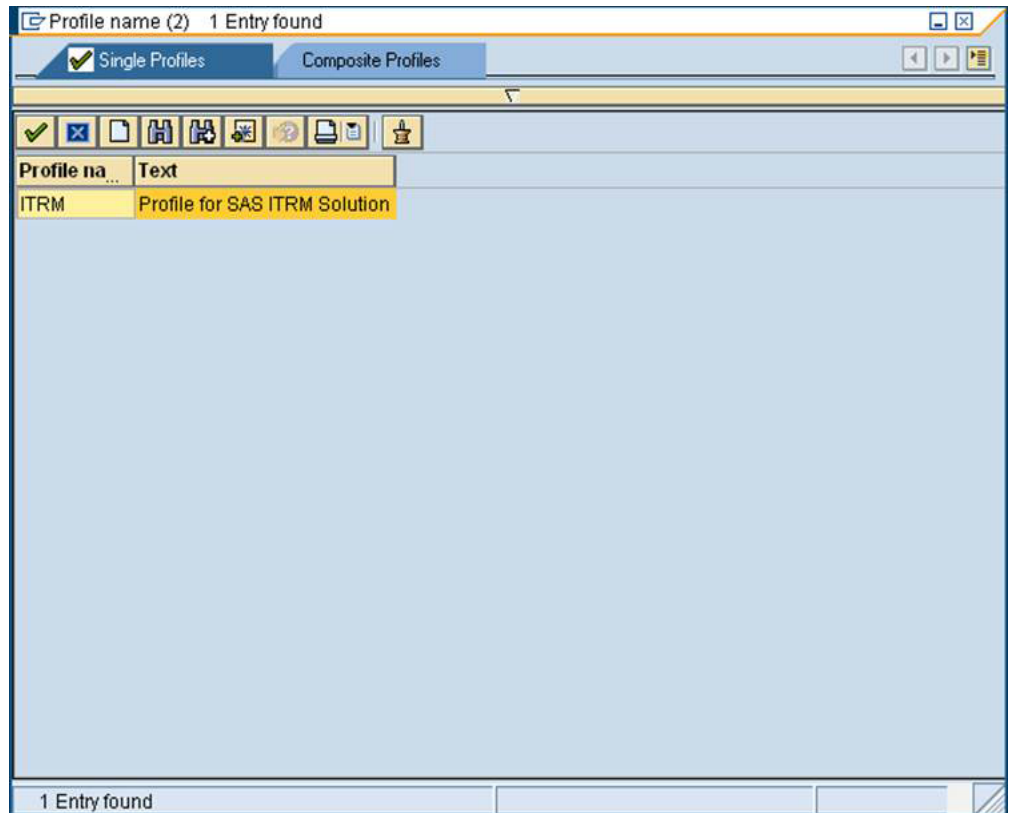
3. Fill in the **Last name** field, and then click **Logon data**.
4. Fill in **Alias**, **Initial password**, and **Repeat password**.
5. Click **Profiles**.

Display A1.32 Maintain User: Profiles


The screenshot shows the SAP 'Maintain User' dialog box with the 'Profiles' tab selected. The 'Assigned Authorization Profiles' table is visible, with columns for Profile, Ty, and Text. The table is currently empty. The bottom status bar indicates 'SIM (2) (800) endapp17 INS'.

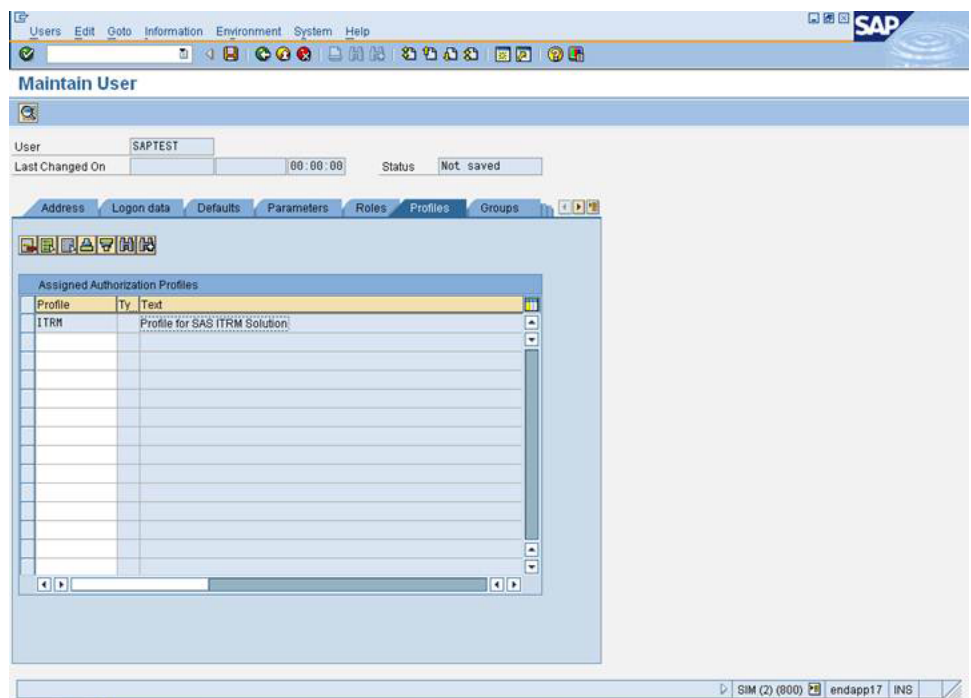
6. In **Profile** column, click . Enter **ITRM** in the **Profile name** field.

Display A1.33 Entering Profile Name of ITRM



7. Click the diskette icon to save your changes.

Display A1.34 Maintain User: Profiles



Any attempt to access data other than performance data results in the following error message in the SAS log:

Display A1.35 SAS Log

```
Log - (Untitled)

NOTE: The file/infile CONN1R is:
      Local Host Name=Vulture,
      Local Host IP addr=127.0.0.1.112,
      Peer Hostname Name=Vulture.emea.sas.com,
      Peer IP addr=127.0.0.1,Peer Name=N/A,
      Peer Portno=6991,Lrecl=256,Recfm=Variable

ERROR: Not authorized to read table T000

NOTE: 2 records were read from the infile CONN1D.
      The minimum record length was 16.
      The maximum record length was 108.
NOTE: 7 records were read from the infile CONN1R.
      The minimum record length was 2.
      The maximum record length was 15.
NOTE: 6 records were written to the file CONN1R.
      The minimum record length was 7.
      The maximum record length was 16.
```

Any attempt to read metadata results in the following error message in the SAS log:

Display A1.36 SAS Log

```
Log - (Untitled)

NOTE: Invalid argument to function SYMGET at line 19666 column 117.
ERROR: RFC operation/code CallReceive

ERROR: info :

ERROR: key   :

ERROR: status :

+No authorization for CPIC destination SELF   .
+

ERROR: internal:

ERROR: Execution terminated by an ABORT statement at line 19966 column 82.
```


Appendix 2

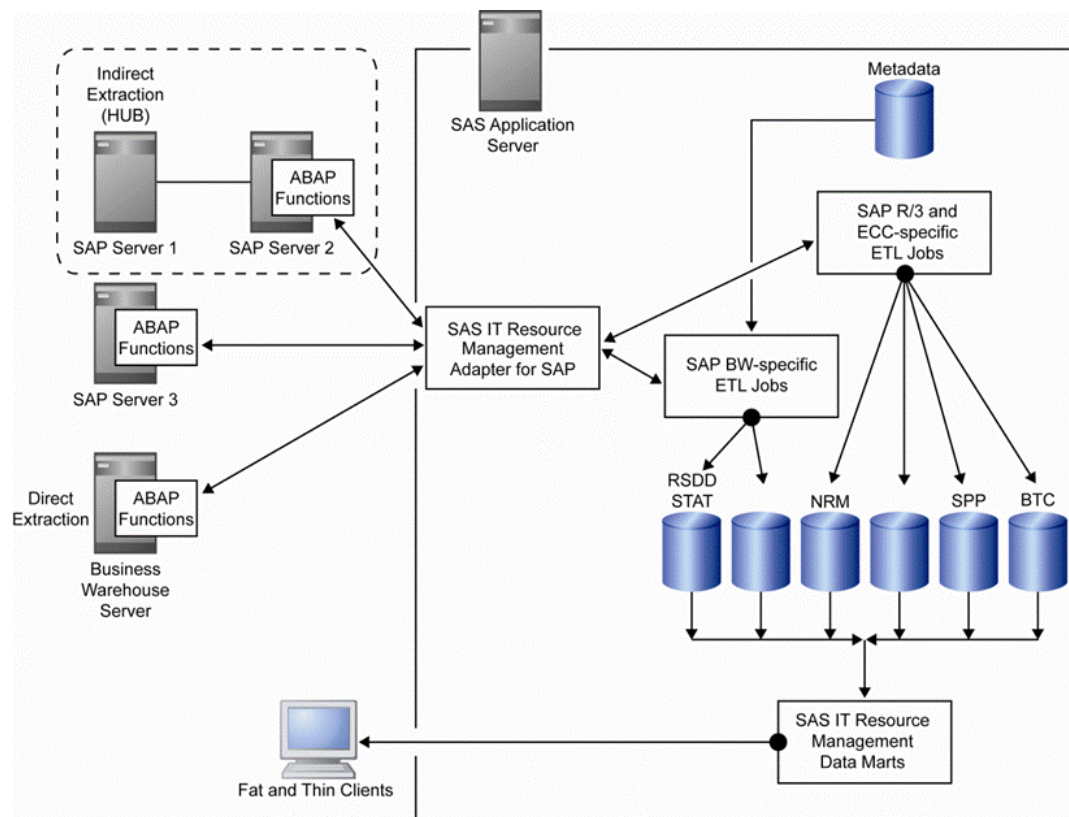
The RFC Destination for the Hub

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Overview

This appendix explains how an RFC destination is used to get data either directly or indirectly. The following figure (also in Chapter 1) shows how data from SAP servers 2 and 3 is extracted directly into SAS.

Figure A2.1 Solution Architecture



Data from SAP Server 1 is extracted indirectly using SAP Server 2.

Note: A hub can retrieve data from other SAP servers only if they are of the same SAP threaded kernel release.

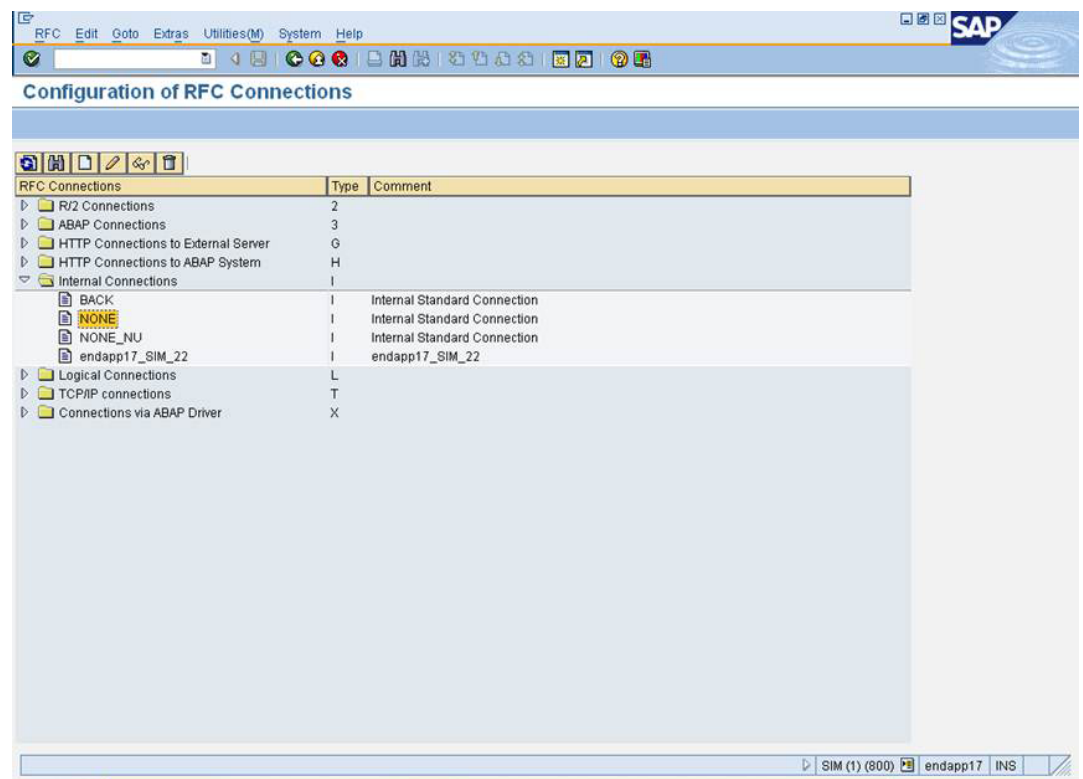
SAP Server 2 is used as a hub to get data from SAP Server 1 using an SAP destination.

- The advantage of direct access is that there is no load on the hub.
- The advantage of indirect access is that you do not have to install any ABAP functions or maintain a remote machine.
- The disadvantage of using a hub is that if the hub is down, then extractions from other machines are not made.

Note: If there are no restrictions on installing ABAP functions on each machine, then you should use direct access.

The following example shows an SAP ECC 6.0 (release 6.10) being used as an adapter gateway server. The RFC destination for this adapter gateway server is the predefined **NONE** internal connection.

Type **SM59** on the command line to display the RFC destination. The Display and maintain RFC destinations window appears. To display the internal connection properties for **NONE**, double-click **NONE**.



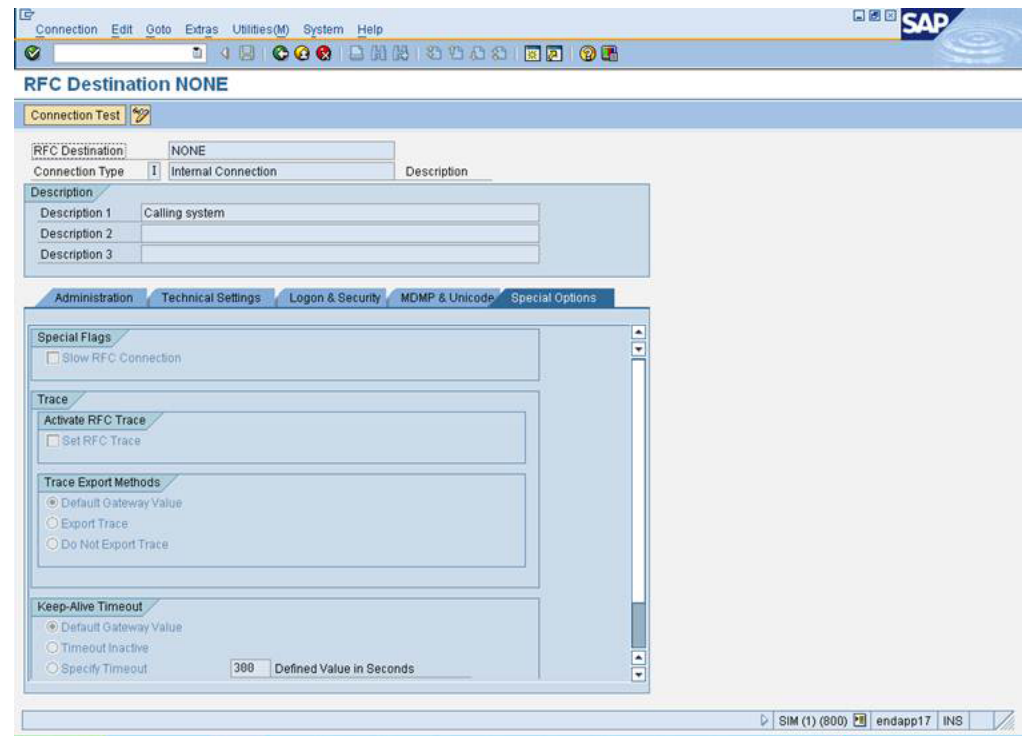
The RFC Destination NONE window appears. The properties for the RFC Destination NONE are displayed. The following figure shows the **Technical Settings** tab.

The screenshot shows the 'RFC Destination NONE' window in SAP. The 'Connection Test' button is visible. The 'RFC Destination' is set to 'NONE' and the 'Connection Type' is 'Internal Connection'. The 'Description' section contains three fields: 'Description 1' (Calling system), 'Description 2', and 'Description 3'. The 'Administration' tab is selected, showing 'Target System Settings' with 'Target Host' and 'System Number' fields. Below this, the 'Gateway Options' section has 'Gateway Host' and 'Gateway service' fields, and a 'Delete' button. The status bar at the bottom indicates 'Only "Special Options" can be modified' and shows the user 'endapp17'.

The following figure shows the **Logon & Security** tab.

The screenshot shows the 'RFC Destination NONE' window in SAP, with the 'Logon & Security' tab selected. The 'Security Options' section is visible, containing the 'Authorization for Destination' field. The status bar at the bottom shows the user 'endapp17'.

The following figure shows the **Special Options** tab.

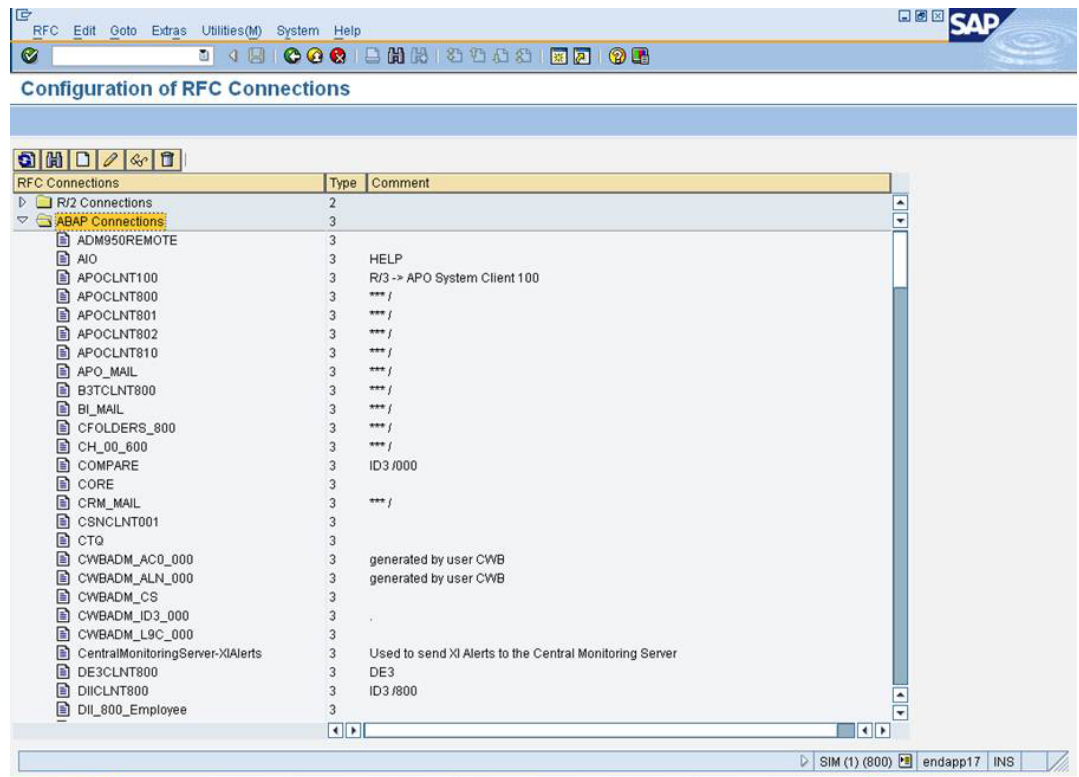


RFC Connection to Another Machine

An RFC connection can be made from the hub to another machine. As a result, performance data can be extracted from that machine without having to install any ABAP functions.

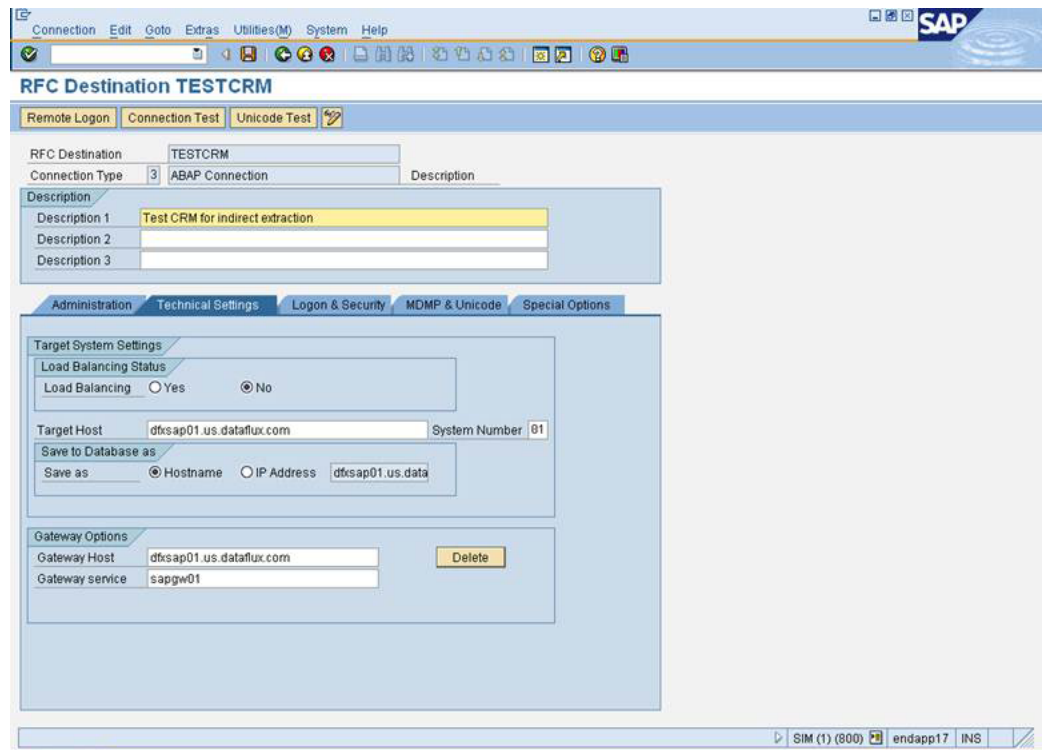
Note: If an internal connection to this machine already exists, reference the existing connection. A new connection is not necessary.

1. Type **SM59** on the command line to display the Configuration of RFC Connections. The RFC connections window appears.



- To display the internal connection properties for **TESTCRM**, double-click **TESTCRM**.

The RFC Destination TESTCRM window appears.



Note: The **Connection Type = 3**. Enter the *System Number*; the system number is the instance number of the child machine. Enter the *Target Host*; the target host is the IP address of the other machine.

The following figure shows the Logon & Security tab.

The screenshot shows the SAP GUI window titled "RFC Destination TESTCRM". The "Logon & Security" tab is selected. The "Remote Logon" sub-tab is active. The "RFC Destination" is "TESTCRM" and the "Connection Type" is "3 ABAP Connection". The "Description" section contains three fields: "Description 1" (Test CRM for indirect extraction), "Description 2", and "Description 3". The "Security Options" section includes "Trusted System/Logon Screen Status" with "Trusted System" set to "No" and "Logon Screen" unchecked. The "Status of Secure Protocol" section shows "SNC" as "Inactive". The "Authorization for Destination" field is empty. The "Logon" section includes "Language" (EN), "Client" (800), "User" (empty), "PW Status" (saved), and "Password" (masked). The "Current User" checkbox is checked. The status bar at the bottom shows "SIM (1) (800) endapp17 INS".

The following figure shows the **Special Options** tab.

The screenshot shows the same SAP GUI window, but with the "Special Options" sub-tab selected. The "Special Flags" section has "Slow RFC Connection" unchecked and "RFC Bit Options" button. The "Trace" section has "Activate RFC Trace" unchecked and "Set RFC Trace" unchecked. The "Trace Export Methods" section has "Default Gateway Value" selected, with "Export Trace" and "Do Not Export Trace" options. The "Keep-Alive Timeout" section has "Default Gateway Value" selected, with "Timeout Inactive" and "Specify Timeout" (300 Defined Value in Seconds) options. The status bar at the bottom shows "SIM (1) (800) endapp17 INS".

The following figure shows the **MDMP & Unicode** tab.

The screenshot displays the SAP configuration interface for an RFC Destination named **TESTCRM**. The window has a menu bar (Connection, Edit, Goto, Extras, Utilities(M), System, Help) and a toolbar. Below the title bar, there are tabs for **Remote Logon**, **Connection Test**, and **Unicode Test**. The main area is divided into sections:

- RF Destination:** TESTCRM
- Connection Type:** 3 ABAP Connection
- Description:** A table with three rows: Description 1 (Test CRM for indirect extraction), Description 2, and Description 3.
- Administration:** A sub-tabbed section containing:
 - Communication Type with Target System:** Radio buttons for **Non-Unicode** and **Unicode** (selected). Under **Non-Unicode**, there is an **MDMP Settings** sub-section with **Inactive** (selected) and **Active** radio buttons.
 - Character Conversion:** Radio buttons for **Default Setting** (selected), **Short Dump After Conversion Error**, and **Ignore Conversion Errors**. The **Default Setting** option includes the text "Ignore Error, Error Indicator: # = U+0023".
 - Display of Conversion Errors:** A sub-section with an **Error Indicator** field set to **#** and a value **U+ 0023**.
- Special Options:** A tab that is currently not selected.

The status bar at the bottom shows "SIM (1) (800)", "endapp17", and "INS".

Appendix 3

Terms and Statistics Files Duration

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Terms and Definitions

Introduction

The following terms and their definitions are extracted from SAP notes.

Front-End Network Time

SAP measures time as starting when the request from the front-end system reaches the server. Time ends when the final data package is sent from the server. During the transaction, several communication steps might occur between the server and the front-end system. These are called round trips.

During a round trip, the server transfers data for the controls to the front-end system. The user context is rolled out. The time to do these two tasks is roll-wait time. The time line for every round trip is measured on the server in GUI time. The influence of network performance and front-end system performance on the SAP response time can be defined with the help of GUI time.

The difference between the first time measurement (how SAP measures time) and the second time measurement (SAP response time) is included as front-end network time. In other words, it is the total network time for the first and the final communication steps between the front-end system and the server. The front-end network time is not included in the GUI time.

DBRequestTime

DBRequestTime (database request time) is the time that it takes to process logical database requests (calls to the SAP database interface).

Response Time

Response time is the total time used on the server, including database request time.

The response time of a dialog step is the time that it takes from the request of the dialog to the application dispatcher to when the work is actually processed. The response time consists of single values such as:

- CPU time
- load+gen time
- queue time
- database request time

All dialog steps that are initiated directly by the front-end user are evaluated. Automatic ABAP functions or dialog steps of the SAPSYS user are not relevant.

The response time value, which measures overall system performance, is reported to transaction RZ20. This transaction is executed every five minutes. The length of the run time to report the response time depends on the number of users logged on and the number of dialog steps.

Statistics Files Duration

As of SAP Release 4.6D (for application statistics: Base SAS 6.10), the threaded kernel starts a statistics file on the hour. This procedure offers two advantages:

- Access to the statistics file is much faster.
- Updated statistics files are available.

Before SAP Release 4.6D, the collector deleted the statistics file if it was larger than a defined size.

In the current release, the duration for storing the statistics files can be specified (for example, 48 hours). The collector deletes statistics files that are older than the specified time if all records from the statistics file have been processed.

The duration should always be shorter than the value for the stat/max file. A stat/max file defines the maximum number of statistics files that are allowed. When you reach the limit, the threaded kernel overwrites the older statistics files.

A reasonable value for a stat/max file is 72 hours. If this value is set to 0, SAP works with one statistics file only, as it did in releases before 4.6D.

When SAP is invoked, statistics files older than seven days are automatically deleted. In addition, for each collector that runs, files older than the specified duration are deleted.

Host Platforms

You can find the list of host platforms supported by the SAS IT Resource Management solution in the document that is available at <http://support.sas.com/itrm>.