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# **SAS<sup>®</sup> IT Management Adapter 2.7 for SAP: User's Guide**

The correct bibliographic citation for this manual is as follows: SAS Institute Inc. 2004. *SAS® IT Management Adapter 2.7 for SAP: User's Guide*. Cary, NC: SAS Institute Inc.

**SAS® IT Management Adapter 2.7 for SAP: User's Guide**

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SAS Institute Inc., SAS Campus Drive, Cary, North Carolina 27513.

1st printing, July 2004

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# Preface

The SAS IT Management Adapter for SAP is designed to automatically extract, transform, and load SAP R/3 and SAP Business Warehouse (BW) workload and performance measurements.

It can also be used to build and populate a performance database (PDB) within SAS IT Resource Management, which is SAS IT Resource Management Solutions' own data dictionary that contains all IT-related metadata.

With the SAP R/3 server, real-time workload performance data is written into an SAP statistic file (stat file). The SAP Computing Center Management System (CCMS) retrieves data from this file and pre-summarizes the data as it is read.

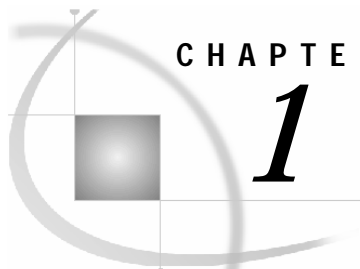
The SAS IT Management Adapter for SAP contains a component that reads the SAP stat file directly, collecting data for a longer period, providing a more detailed data view than CCMS.

With respect to SAP Business Warehouse (BW) performance, BW retains records of computer resources that are needed to populate and query BW cubes.

The SAS IT Management Adapter for SAP contains a component that reads this performance data. This information is then used to supplement BW server performance statistics.

This user's guide provides an overview of the SAS IT Management Adapter for SAP implementation process, including the adapter installation process and troubleshooting guidelines.



The graphic features a stylized 'C' shape on the left, a square in the center, and the word 'CHAPTER' above a large '1'.

# CHAPTER 1 Introduction

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## Technical Overview

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### Background

Performance data in R/3 is collected in statistics files on each R/3 server. The SAS IT Management Adapter for SAP provides ready-to-use code that reads this data and transforms it into a format that can immediately be fed into SAS IT Resource Management Solutions.

Figure 1.1 illustrates the solution architecture.

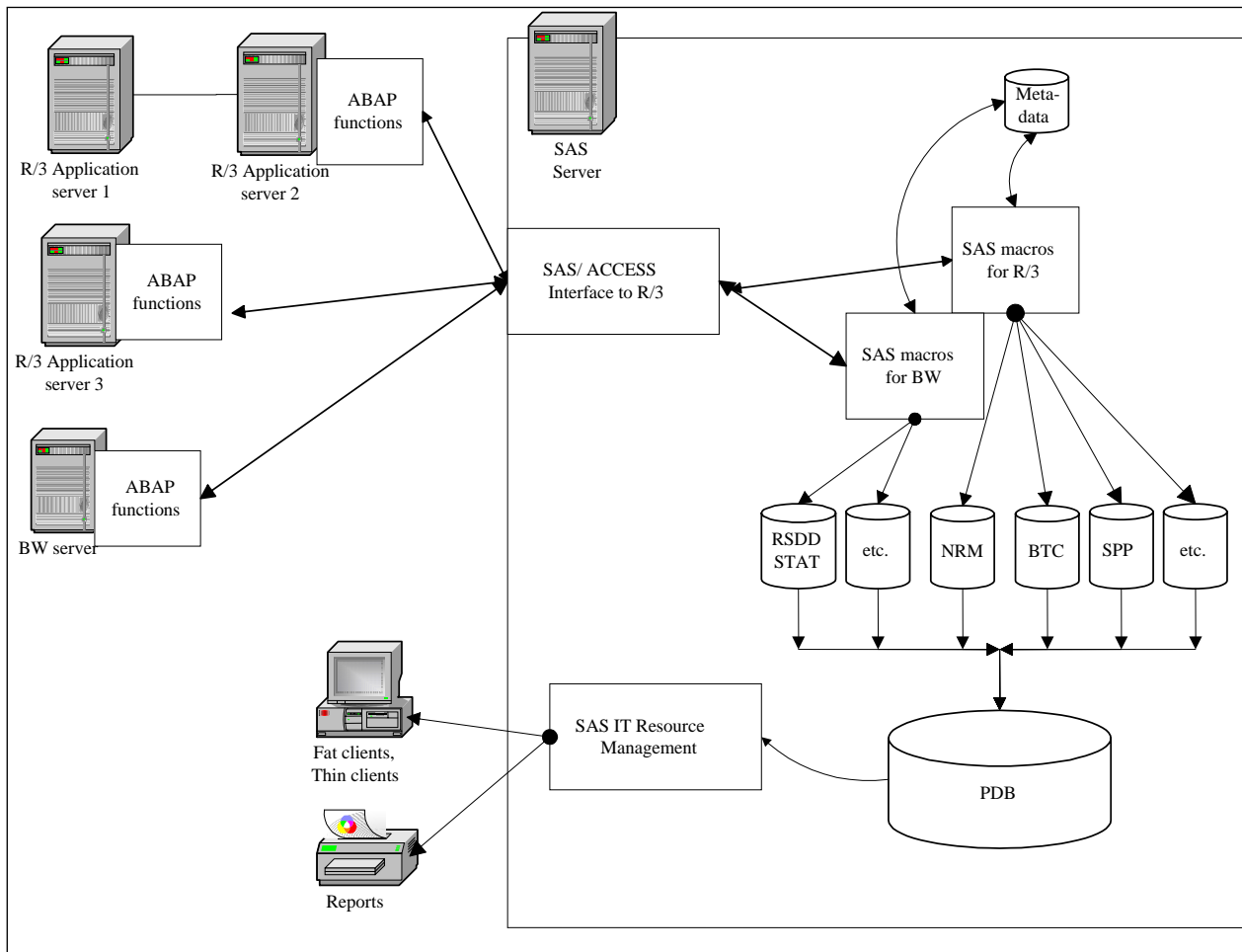
A typical SAP installation can have many separate application servers that monitor several selected SAP instances. Because some instances are not critical, such as development and test instances, the SAS IT Management Adapter for SAP provides the capability to choose and customize which SAP instances to monitor for performance.

BW server performance can be analyzed by using underlying R/3 server statistics information. This information can be supplemented by additional BW InfoCube performance statistics, which are also fed into the SAS IT Resource Management solution. The additional InfoCube data is extracted by using SAS code, which is also displayed in Figure 1.1.

The complete solution consists of three major software components:

- SAS/ACCESS Interface to R/3
- The adapter, consisting of SAS macros for R/3 and BW
- SAS IT Resource Management software.

This document covers the configuration and usage of the adapter.



**Figure 1.1** Solution Architecture

The technology for extracting SAP server and BW cube performance statistics is different, and therefore each is handled separately.

## Extraction of SAP Server Performance Statistics

The adapter consists of the following:

- Advanced Business Application Program (ABAP, an SAP programming language) code to be installed in the SAP environment
- SAS code that is needed to run within SAS.

The ABAP function `Z_SAS_SAPWL_STATREC_READ_FILE` reads SAP R/3 system statistics by calling one of the standard ABAP functions that are supplied by SAP. Depending on the SAP release, this ABAP function can be either `SAPWL_STATREC_READ_FILE` or `SAPWL_READ_STAT_A_ASTAT_FILES`.



The statistics are returned in a number of SAS tables (see Table 1.1). In addition to standard statistics, the ABAP function also returns general system information, such as hostname and system ID.

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## Extraction of BW Performance Statistics

An SAP Business Warehouse (BW) system runs on top of a kernel that is actually an R/3 system instance. As a result, BW performance can be monitored by using the same methodology for standard R/3 instances.

However, additional BW performance statistics can be gathered by the SAP system. This information is gathered at a BW InfoCube level. For example, InfoCube queries have a single record that identifies computer resources that are consumed by a query. This can translate into many records in the underlying R/3 system statistics tables. The cube performance information can be used to identify problem queries.

This adapter provides tools to extract the BW InfoCube performance statistics tables by using SAS/ACCESS Interface to R/3 technology. The extraction is done against the underlying R/3 kernel system; therefore no BW specific technology is required, and no queries are done via the BW system.

The provided tools are SAS macros that keep track of which data is extracted and use this information to extract only new records.

---

## Loading the Performance Database

As of Release 2.6 of SAS IT Management Solutions, the CPPROCES macro can be called as follows:

```
%CPPROCES(table list,COLLECTR=SAPR3,TOOLNM=SASADAPT);
```

This functionality is used to post-process “raw data” tables (data that is extracted and partially transformed SAP statistics tables) into SAS IT Management performance database (PDB) tables.

## Overview of Tables

Long R/3 Name	Short R/3 Name	SAS Raw Data Table	PDB Table(s)	Description, Notes
V2_NORMAL_RECORDS	NRM	NRM	SAPR3S SAPHST SAPSMT SAPSYS SAPTRN SAPTSK	Normal transaction history
V2_BTC_STEP_RECORDS	BTC	BTC	SAPBTCH	Batch transaction history
V2_TABLE_RECORDS	TAB	TAB	SAPTAB	Table access history. Not collected in SAP by default. Must be activated by using SAP transaction RZ10 / RZ11.
V2_RFC_CLIENT_RECORDS	RC	RC0	SAPRC0	RFC client access history
V2_RFC_SERVER_RECORDS	RS	RS0	SAPRS0	RFC server access history
V2_RFC_CLIENT_DEST_RECORDS	RCD	RCD	SAPRCD	RFC client destination access history
V2_RFC_SERVER_DEST_RECORDS	RSD	RSD	SAPRSD	RFC server destination access history
V2_SPOOL_PRINT_RECORDS	SPP	SPP	SAPSPP	Printing history
V2_SPOOL_ACTIVITY_RECORDS	SPA	SPA	SAPSPA	Spool activity history
V2_RFC_TIME_INT_RECORDS	TII	TII	SAPTII	Time <b>int</b> history (typically not collected by default)
DB_PROCEDURE_RECORDS	DBP	DBP	SAPDBP	Database procedure history
NORM_SUBRECORD_INDEX	CIX	CIX	Not applicable	Contains indexes to associate records in subtables with the normal transactions. For example, a normal transaction accessing tables would have one record in NRM and a record in TAB for each table access. This index table is used to establish this link.
RSDDSTAT	n/a	RSDDDS	SAPRSS	SAP BW cube query performance statistics
RSDDSTATWHM	n/a	WHM	SAPWHM	SAP BW Warehouse Maintenance statistics

**Table 1.1** Statistics Tables Extracted from R/3

# List of Abbreviations

**ABAP** – Advanced Business Application Program, an SAP programming language.

**CCMS** – Computing Center Management System, an SAP subsystem.

**PDB** – performance database.

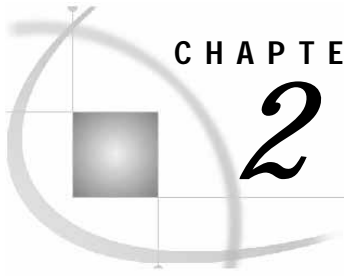
**RFC** – Remote Function Call. Typically a function call (other than SAP) from a system that runs on a remote SAP application server.

**RFCEXEC** – SAP program, which is part of the RFCSDK.

**RFCSDK** – The SAP RFC software development kit, used by the solution.

**SAP BW** – SAP Business Warehouse.





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## Standard Calling Programs

There is a collection of standard programs that call one of the main entry-point macros.

You will need to modify the calling programs in order to register servers. The calling programs call macros that are provided in the solution. These macros are described in the next section. You will need to modify the macro parameters in the calling programs.

The programs for SAP server and BW cube performance statistics are presented separately.

---

## Standard Calling Programs: SAP Servers

In general, on the first day of the installation, programs 1 through 3 should be run in order. After that, when you add new SAP servers, use the **addservr.sas** program.

**Note:** If you are running on z/OS, then the programs that are referred to as *<filename>.sas* consist of the SAS code that is stored as *<filename>* in the *<install-prefix>.SAMPLEPDS*.

The following calling programs must be run in the environment specified by **autoexec.sas** (Windows and UNIX operating environments) or by *<install-prefix>.CPMISC(AUTOXMVS)* (z/OS operating environment). The calling programs are as follows:

1. **firstrun.sas:** This program extracts data for all SAP statistics tables during the first extract run, and saves the data into SAS tables. It initializes the environment. You need to call the `%register_sap_server` macro for each SAP instance that you want to analyze, as in the following example:

```
* Register a relevant first server here;
*-----;
%register_sap_server(accr3_profile=APPLES,r3dest=NONE);

* Additional sap servers can be added here as well;

%register_sap_server(accr3_profile=46D, r3dest=NONE);
```

The program extracts selected R/3 data dictionary information. The program initializes extraction metadata for each SAP R/3 instance, extracting a few logical statistics records per SAP instance. Normally it is executed only once. If it is executed multiple times, then each time that it is executed, all of the data from the previous execution is removed. The provided program is a sample; modify it to refer to valid servers. You must establish the environment by submitting **autoexec.sas** (Windows and UNIX operating environments) or *<install-prefix>.CPMISC(AUTOXMVS)* (z/OS operating environment) first.

2. **nextruns.sas**: This program extracts new statistics data from tables in SAP and appends the data to the data that was previously extracted by **firstrun.sas** (or previous executions of **nextruns.sas**). It requires no modification for default behavior, because **autoexec.sas** provides the necessary parameters from macro variables. The program extracts data for each SAP R/3 instance. Statistics are extracted in 30,000 record segments. If the end-of-file (EOF) is not reached, then the program automatically begins a new extraction until the EOF is reached. Normally it is scheduled to run hourly.

**Note:** If you are running on z/OS, then this functionality is incorporated into the JCL job *<install-prefix>.CPMISC(NEXTRUNS)*.

3. **nightrun.sas**: This program reduces and processes previously extracted data into the PDB. It empties the tables after successful processing. Normally it is scheduled to run nightly, but it must not run if **nextruns.sas** is still executing.

**Note:** If you are running on z/OS, then this functionality is incorporated into the JCL job *<install-prefix>.CPMISC(NIGHTRUN)*.

4. **addservr.sas**: This program must be executed when new SAP servers are added into the environment. It is similar to **firstrun.sas**, but it does not delete the tables in the target raw data library. To run this program, follow these steps:
  - a. Establish the environment by submitting **autoexec.sas** (Windows and UNIX operating environments) or *<install-prefix>.CPMISC(AUTOXMVS)* (z/OS operating environment).
  - b. Include the program in an interactive SAS session.
  - c. Modify the call(s) to %REGISTER\_SAP\_SERVER to refer to the new server(s).
  - d. Submit the program.

**Note:** If the initialization programs are run out of sequence (for example, if **nextruns.sas** is executed before **firstrun.sas**), then error messages might be generated that do not clearly indicate a run sequence error.

## Standard Calling Programs: BW Cubes

There are four programs that call one of two main entry-point macros. In general, on the first day of the installation, the programs 1 through 3 should be run in order. These programs should be used in addition to the SAP server extraction programs described in the previous section. BW servers run on an SAP server kernel, and the underlying statistics are collected in the same manner that other SAP servers collect statistics. The statistics extracted by the following programs relate to BW performance that is aggregated at the cube level. The programs are as follows:

1. **firstbw.sas**: This program extracts data for all BW cube statistics tables during the first extract run and saves the data into SAS tables. Use this program as an example of how to register BW servers. The program extracts selected R/3 data dictionary information in the directory that is specified by the `&R3LIB_PATH` macro variable. Servers with the same SAP release can reuse the data dictionary information. Ensure that operating system level directories are created for each different SAP kernel release. The paths that are referenced by the example calls in the sample **firstbw.sas** program are not automatically created by the install routine; they must be created manually. To run this program, include it in an interactive SAS session, modify the call(s) to `%REGISTER_BW_SERVER` appropriately, and submit it interactively.

**firstbw.sas** is a sample program, and so for the sake of simplicity, it does therefore not reflect the syntax of all operating systems. On z/OS, the following macro call:

```
%register_bw_server(profile=SI8,
    r3lib_path=%str(&r3ITRM_solution_root/data/r3lib610));
```

Would take the form:

```
/* Following call contains .. - the first . is so the compiler can recognize the
end of the macro variable */

%register_bw_server(profile=SI8,
    r3lib_path=%str(&r3ITRM_solution_root..dat.r3lib610));
```

This also applies to sample `%register_bw_server` call in **addbwserv.sas**.

**Note:** You must establish the environment by submitting **autoexec.sas** (Windows and UNIX operating environments) or `<install-prefix>.CPMISC(AUTOXMVS)` (z/OS operating environment) first. Additionally, you must run **firstrun.sas**, which was described in the previous section, before you run **firstbw.sas**.

2. **nxtrunbw.sas**: This program extracts new statistics data from tables in SAP and appends the data to the data that was previously extracted by **firstbw.sas** (or previous runs of **nxtrunbw.sas**). It requires no modification for default behavior, because **autoexec.sas** provides the necessary parameters from macro variables. The program extracts data for each BW server. This program would normally be scheduled to run nightly, immediately preceding **nightrun.sas**.

**Note:** If you are running on z/OS, then this functionality is incorporated into the JCL job `<install-`

*prefix*>.CPMISC(NXTRUNBW).

3. **nightrun.sas**: This program is used for post-extraction processing for both R/3 server and BW cube performance data. The program reduces and processes previously extracted data into the PDB. It empties the tables after successful processing. Normally it is scheduled to run nightly, but it must not run if **nextruns.sas** or **nxtrunbw.sas** is still executing.

**Note:** If you are running on z/OS, then this functionality is incorporated into the JCL job <*install-prefix*>.CPMISC(NIGHTRUN).

4. **adbwsvr.sas**: This program must be executed when a new BW server is added into the environment. To run this program, include it in an interactive SAS session, modify the call(s) to %REGISTER\_BW\_SERVER appropriately, and submit it interactively.

---

## Standard Calling Programs: Scanning the SAS Log for Errors

To simplify the administrative task of overseeing a system where data is extracted from potentially hundreds of SAP servers, the adapter has a feature that automatically notifies an administrator of problems. After one of the scheduled programs has completed, a second SAS program is executed, which scans the SAS log for errors. The program in turn automatically generates and sends an e-mail message to a prespecified e-mail address (typically the SAS IT Resource Management Solutions PDB administrator).

**Note:** This feature is not available for z/OS. If you are running on z/OS, then you should check the JCL return codes in the job output queues.

All these programs call the macro %LOGERRCK, which is described later in this chapter.

- **If errors were found**, then e-mail is automatically generated that contains the log excerpt.
- **If no errors are found**, then a blank e-mail is generated and sent.
- **If no e-mail is sent**, then there is a problem and the SAS IT Resource Management Solutions PDB administrator should investigate the reason.

The following programs scan the SAS logs for errors:

- **chknxlog.sas** checks the log of **nextruns.sas**
- **chkbwlog.sas** checks the log of **nxtrunbw.sas**
- **chknight.sas** checks the log of **nightrun.sas**



---

## SAS Macros

The SAS macros %REGISTER\_R3\_SERVER and %READ\_R3\_STATS are the foundation of the solution to collect R/3 server performance statistics. In addition, the macros %REGISTER\_BW\_SERVER and %READ\_BW\_STATS are used to collect BW cube performance statistics. %INIT\_R3SYSTEMS populates global macro variables that are required in the adapter environment.

The %SAPCOLEC macro is used to do post-processing for both R/3 server and BW statistics tables.

Additional non-entry point macros are not described in this document.

The macros have a number of parameters available to modify the default behavior. While the macros themselves should not need to be modified, the way that the macros are called might need modification. Standard calling programs are provided to handle the most common requirements.

---

### %REGISTER\_SAP\_SERVER

This macro must be used to initially register or unregister each SAP instance. Rerunning the macro for a previously registered combination of ACCR3\_PROFILE= and R3DEST= has no effect. As a result, you can build a single program that registers all SAP servers, and you can safely rerun the program each time a new server is registered.

## Parameters

Name	Default Value	Description
ACCR3_PROFILE=		Required. Refers to a SAS/ACCESS Interface to R/3 logon profile. The ABAP code must be loaded on the referenced SAP server.
R3DEST=	NONE	A destination in SAP referring to an SAP server. If it is NONE, then the statistics will be extracted directly from the server specified by ACCE_PROFILE. If it is a valid SAP destination, then data will be extracted from the R/3 system that is referenced by the destination.
REMOVE=	NO	Set to YES in order to remove a registration.
PROFILE_DSN=	SASUSER.R3CONN	Usually SAS/ACCESS Interface to R/3 profiles are stored in the table SASUSER.R3CONN. If this is not the case, then you need to specify where they are stored.

## Usage examples:

- `%register_sap_server(accr3_profile=APPLES,r3dest=NONE);`  
registers the performance statistics on the server specified by SAS/ACCESS Interface to R/3 logon profile named APPLES to be extracted directly.
- `%register_sap_server(accr3_profile=APPLES,r3dest=ORANGES_SI4_123);`  
registers the combination of the SAS/ACCESS Interface to R/3 logon profile named APPLES and the R/3 destination called ORANGES\_SI4\_123. Subsequent data extraction runs will obtain the performance statistics from this SAP server.
- `%register_sap_server(accr3_profile=APPLES,r3dest=ORANGES_SI4_123,remove=YES);`  
removes the registration of the combination APPLES – ORANGES\_SI4\_123. Subsequent data extraction runs will no longer extract from that SAP instance.

---

## %INIT\_R3SYSTEMS

This macro must be called at the end of **autoexec.sas** (Windows and UNIX operating environments) or *<install-prefix>.CPMISC(AUTOXMVS)* (z/OS operating environment). It populates global macro variables that are required in the adapter environment.

The variables set are as follows:

Global Macro Variable	Description
<code>&amp;no_of_r3systems</code>	Number of systems that are registered by using the <code>%REGISTER_SAP_SERVER</code> macro.
<code>&amp;all_accr3_profile</code>	A list of the SAS/ACCESS Interface to R/3 profiles that are registered. There should be <code>&amp;no_of_r3systems</code> entries in the list. Note that this list does not include profiles that are registered by using the <code>%REGISTER_BW_SERVER</code> macro.
<code>&amp;all_destination</code>	A list of the destinations that corresponds to the list of registered profiles. The <i>n</i> th destination in the list corresponds to the <i>n</i> th profile in the <code>&amp;all_accr3_profile</code> list.

---

## %R3\_READ\_STATS

The primary macro, `%R3_READ_STATS`, validates input parameters and prepares the following additional parameters for the ABAP function `Z_SAS_SAPWL_STATREC_READ_FILE`:

- required R/3 statistic table names
- start date and time
- maximum number of records to be read in a single extraction.

The resulting tables are read in by the macro and processed into a SAS Resource Management PDB.

The `%R3_READ_STATS` macro calls the ABAP function `Z_SAS_SAPWL_STATREC_READ_FILE` through the SAS/ACCESS Interface to R/3 feature `%CALLRFC` (SAS/ACCESS Interface to R/3 is included in the adapter).

Statistics are extracted from SAP by using a "start transaction/event" time stamp that is greater than the time stamp of the previous extract. However, standard ABAP functions cannot take in time granularity parameters smaller than one second.

To avoid losing statistics, the `%R3_READ_STATS` extraction process retrieves all events with a start time greater than or equal to the previous maximum start time second.

While this process can result in extracted duplicates, any duplicates are later removed by using standard SAS IT Resource Management Solutions macros.

The data is then standardized by ensuring that all elapsed time units are in seconds. For example, 15 milliseconds is represented as 0.015 seconds. Calculated columns are added to provide additional information.

Using the index table that is returned by ABAP, the macro takes information such as the user ID and date-time from the normal transaction table and inserts this information into related subtables in corresponding records. These subtables contain more detailed, specialized information about the transactions.

Standard SAP function return tables have column labels that are mostly identical to each other and add no value in understanding column contents. To make the column labels more meaningful, they are taken from alternative R/3 tables.

## Parameters for %R3\_READ\_STATS Macro

Name	Default Value	Description
ACCR3_PROFILE=		Required. Refers to a SAS/ACCESS Interface to R/3 logon profile. The ABAP code must be loaded on the referenced SAP server.
R3DEST=	NONE	A destination in SAP referring to an SAP server. If it is NONE, then the extracted statistics will be for the local instance. If it is a valid SAP destination, then data is extracted from the R/3 system that is referenced by the destination.
FIRSTRUN=	NO	Default=NO Valid values: YES NO  If you specify YES, then initialization is done for logging and registration tables. A call that uses this option is automatically submitted by the %REGISTER_SAP_SERVER macro.
ADDTABLES=		DEFAULT=DEFAULT. It is recommended that you leave the default value.  The macro always extracts certain statistics tables (to enable certain pre-prepared reports to have data) whether you requested them or not. These tables are as follows: V2_NORMAL_RECORDS V2_BTC_STEP_RECORDS V2_RFC_CLIENT_RECORDS V2_RFC_SERVER_RECORDS V2_SPOOL_PRINT_RECORDS V2_SPOOL_ACTIVITY_RECORDS NORM_SUBRECORD_INDEX  If you leave the default selection, then you get these tables: V2_NORMAL_RECORDS V2_BTC_STEP_RECORDS V2_TABLE_RECORDS V2_RFC_CLIENT_RECORDS V2_RFC_SERVER_RECORDS V2_RFC_CLIENT_DEST_RECORDS V2_RFC_SERVER_DEST_RECORDS V2_SPOOL_PRINT_RECORDS V2_SPOOL_ACTIVITY_RECORDS NORM_SUBRECORD_INDEX You can also explicitly request tables by listing them in the parameter.

START_EXTRACT_DATE=		Specifies a start date to control which statistics information is to be pulled from SAP. It must be specified in the form YYYYMMDD. This parameter can be used to override the default behavior, where the start date is obtained from information that is stored after the last successful extract.
START_EXTRACT_TIME=		Specifies a start time. This parameter is used in conjunction with the START_EXTRACT_DATE= parameter. It must be specified in the form HHMMSS.
MAX_READ_RECORDS=	30000	Specifies the number of records that are extracted in a single chunk. The very first extraction that is made for a server (FIRSTRUN=YES) uses a small value and then stops. When FIRSTRUN=NO, if the end-of-file is not reached, then a new chunk is automatically requested. The recommended setting (30000) is the default. Note that the actual number of records might deviate slightly, because only complete transactions (in all tables) are sent.

### Usage example:

In the nextruns.sas program the call is

```
%read_r3_stats(accr3_profile=&r3prof, r3dest=&r3dest,
               firstrun=NO, max_read_records=30000);
```

---

## %SAPCOLEC Macro

The %SAPCOLEC macro can be called to append the raw data that was collected by the earlier steps into the PDB and then summarize the data. This process is done by calling the standard SAS IT Resource Management Solutions macros %CPPROCES and %CPREDUCE.

The %SAPCOLEC macro uses the %CPPROCES macro parameters that are introduced in Release 2.6 of SAS IT Resource Management Solutions. These parameters are as follows:

- COLLECTR=SAPR3
- TOOLNM=SASADAPT

If the post-processing is successful, then the processed raw data tables are emptied.

If errors are detected, then the macro aborts SAS with high return codes.

There are several SAS programs that call the %R3\_READ\_STATS and %SAPCOLEC macros. The section “Standard Calling Programs” earlier in this chapter contains the details.

The SAS programs are invoked from corresponding Windows or UNIX scripts, which first call the corresponding SAS program. Then a second SAS program is executed that scans the SAS log for errors. This program, in turn, sends an e-mail message to a prespecified e-mail address (typically that of the SAS IT Resource Management Solutions PDB administrator).

- **If errors are found**, then e-mail is sent that contains the log excerpt.
- **If no errors are found**, a blank e-mail message is sent.
- **If no e-mail is sent**, then there is a problem and the SAS IT Resource Management Solutions PDB administrator should investigate the reason.

---

## %REGISTER\_BW\_SERVER

This macro must be used to initially register or unregister each BW instance. Rerunning the macro for a previously registered ACCR3\_PROFILE= has no effect. As a result, you can build a single program that registers all SAP servers, and you can safely rerun the program each time a new server is registered. Note that the current version does not attempt to recognize if multiple profiles reference the same underlying server, which would cause the data to be extracted multiple times.

### Parameters for the %REGISTER\_BW\_SERVER Macro

Name	Default Value	Description
PROFILE=		Required. Refers to a SAS/ACCESS Interface to R/3 logon profile. The ABAP code must be loaded on the referenced SAP server.
R3LIB_PATH=		Should refer to a physical path which is to be used for the data dictionary extract for that server.  If it is left blank, then the currently assigned R3LIB library will be used. If you extract from different kernel releases of SAP, then you should use a separate R3LIB_PATH= for each release.
REMOVE=	NO	Set to YES to remove a registration
PROFILE_DSN=	SASUSER.R3CONN	Usually SAS/ACCESS Interface to R/3 profiles are stored in the table SASUSER.R3CONN. If this is not the case, then you need to specify where they are stored.

### Usage example:

```
%macro register_bw_server(profile=SI8,
    r3lib_path=%str(&r3ITRM_solution_root/data/r3lib610));
```

---

## %READ\_BW\_STATS

This macro loops over all registered BW servers and extracts the latest data from them.

### Parameters

Name	Default Value	Description
FIRSTRUN=	NO	Valid values: NO   YES Specify YES if data has not been previously extracted for all registered BW servers.
TABLES=	DEFAULT	If default is used, then the tables RSSDSTAT and RSSDSTATWHM are downloaded. If you do not want both of these tables, then you can specify only the required table.
R3_DICTIONARY_EXTRACT=	NO	A value of YES will force a re-extraction of the metadata (SAP data dictionary).

### Usage example:

```
%read_bw_stats(firstrun=YES);
```

---

## %LOGERRCK

The macro %LOGERRCK scans a SAS log file and is used to notify the user whose user ID is specified in **autoexec.sas** file regarding the success or failure of scheduled jobs.

### Parameters for %LOGERRCK Macro

Name	Default Value	Description
LOGFILE=		Required, SAS log to check.
EXFILE=		Optional, file that contains exception strings. Error messages in the exception file are not considered "alert" errors. It is recommended that you use the file called EXCLERRS.TXT. However, you might want to review this file.
MAIL=	Y	Y means send log to MAILUSER. N suppresses sending an e-mail.
MAILUSER		Optional. User ID to send log excerpt when an error is found.
MAILSUBJECT		Text that is inserted into subject line of the e-mail.
ERROR_WORD=	ERROR	The word that is used to trigger error detection. If

		you have a non-English version of SAS, then you will need to modify this accordingly.
MAIL_ON_NO_ERROR=	Y	Y means an e-mail is sent even if no error is detected. This can be useful because no e-mail arriving would indicate an error.

Global macro variable: &errfound

- 0 when no errors are encountered
- 1 when errors are encountered.

**Note:** When executing SAS system software that does not have English error messages, specify the local language word for "error" in the ERROR\_WORD= parameter.

---

## Troubleshooting

This section documents problems that might occur, and suggests possible remedies.

---

### Error: Connection Refused.

---

#### Symptoms

ERROR: 10061 - WSAECONNREFUSED.

---

#### Remedy

This condition occurs if the SAS session cannot establish a link to the SAS RFC server. This typically means the SAS RFC server, SAS RFC server V9, service is not running. Set up the SAS RFC service to start automatically when the machine is booted.

---

### Error: "Lock is not available" / "File is in use"

---

#### Symptoms

The following errors can occur in the nextruns log:

- ERROR: A lock is not available for ITRMDATA.RCD.DATA, lock held by another process.
- ERROR: A lock is not available for ITRMDATA.RCD.



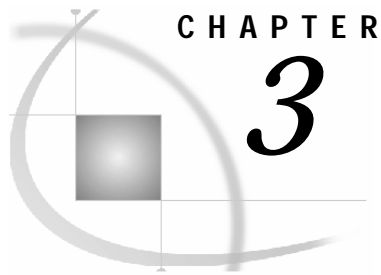
In addition, errors in the nightrun.sas log might be detected, such as "File is in use."

---

## Remedy

These problems occur if the nightrun.sas job begins before the nextruns.sas job completes. Avoid the problem by scheduling the jobs so that they do not run simultaneously.





## Integrating the QuickStart Wizard Reports (Windows and UNIX)

---

The QuickStart Wizard is a component of the SAS IT Management Solution interface. It can be used to create predefined reports on the SAP performance data. This appendix explains how the QuickStart Wizard should be used with the adapter.

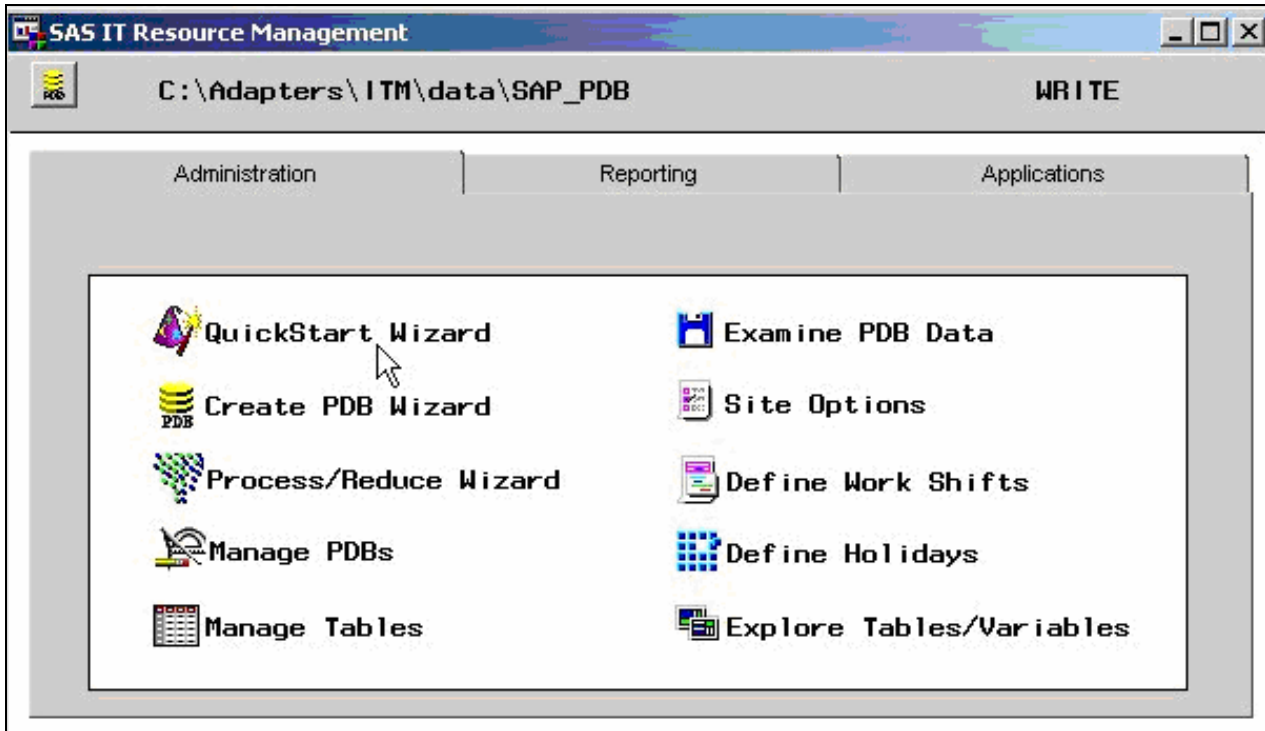
This process assumes that the **firstrun.sas** program that is supplied with the adapter has been run successfully.

---

### Generating the SAS Programs

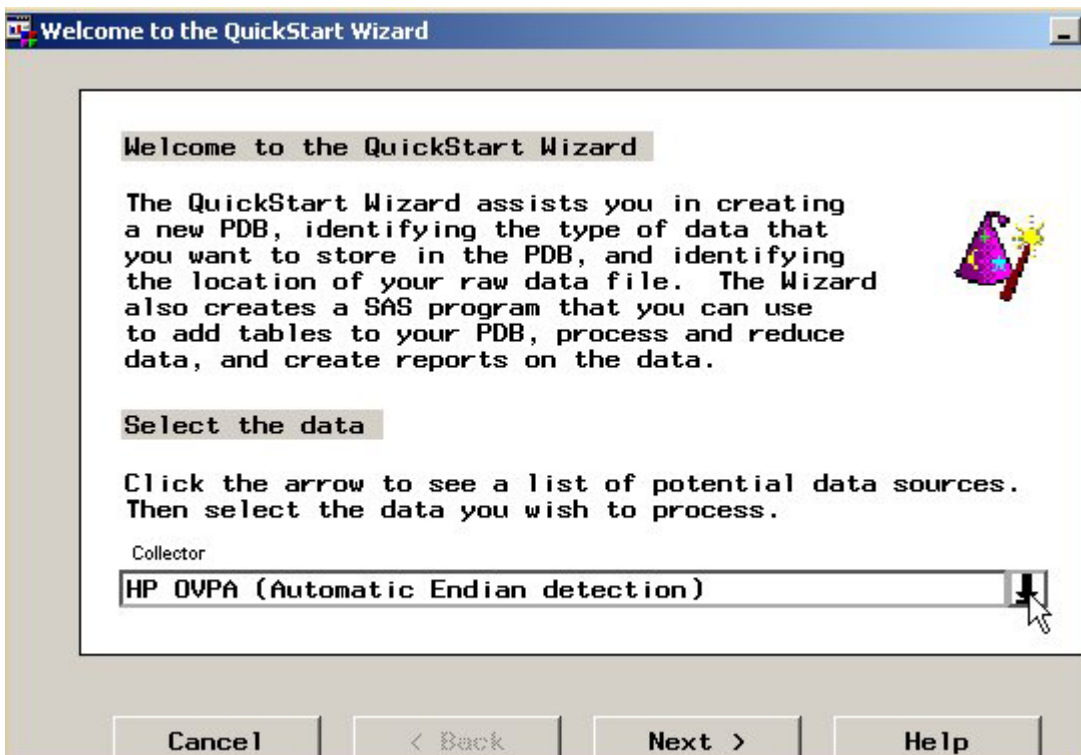
To generate the SAS programs:

1. Create a PDB by using the **nightrun.sas** program that is included with the adapter. You must successfully run **nightrun.sas** before initiating the QuickStart Wizard. If you have previously attempted to create a new PDB by using the QuickStart Wizard, and doing so resulted in error messages, you should delete this entire PDB (using an operating environment utility), and restart the process by running **nightrun.sas**.
2. Launch SAS IT Resource Management 2.7 and ensure that the PDB that was created by **nightrun.sas** is active.
3. Click **QuickStart Wizard** (Display 3.1).



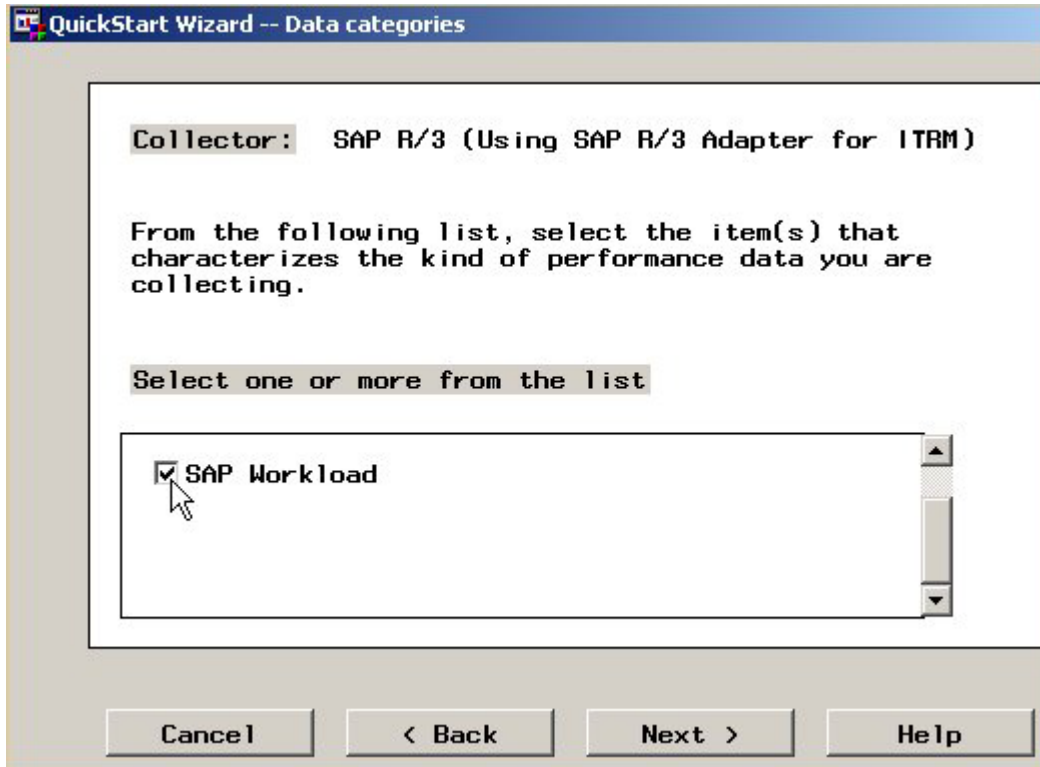
Display 3.1 SAS IT Resource Management Window

4. In the Welcome to the QuickStart Wizard panel (Display 3.2), click the down arrow next to the **Collector** field. Select **SAP R/3 (Using SAP R/3 Adapter for ITRM)**.



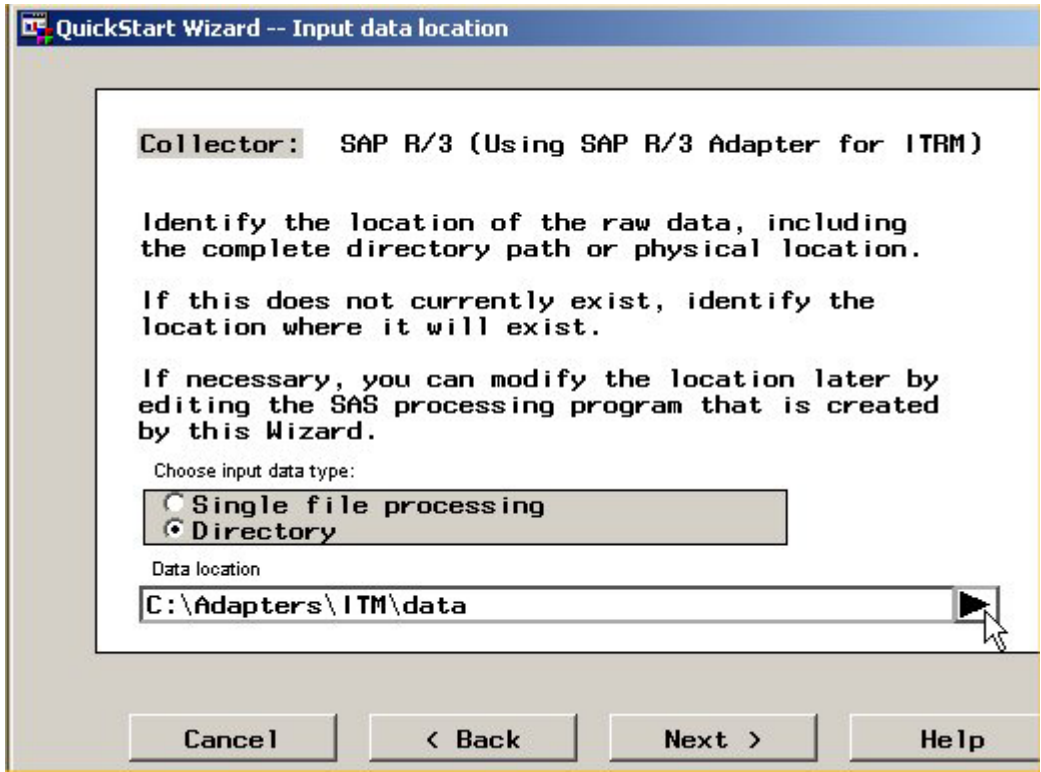
Display 3.2 Welcome to the QuickStart Wizard Panel

5. Click **Next**.
6. In the Data Categories panel (Display 3.3), select the **SAP Workload** check box, then click **Next**.



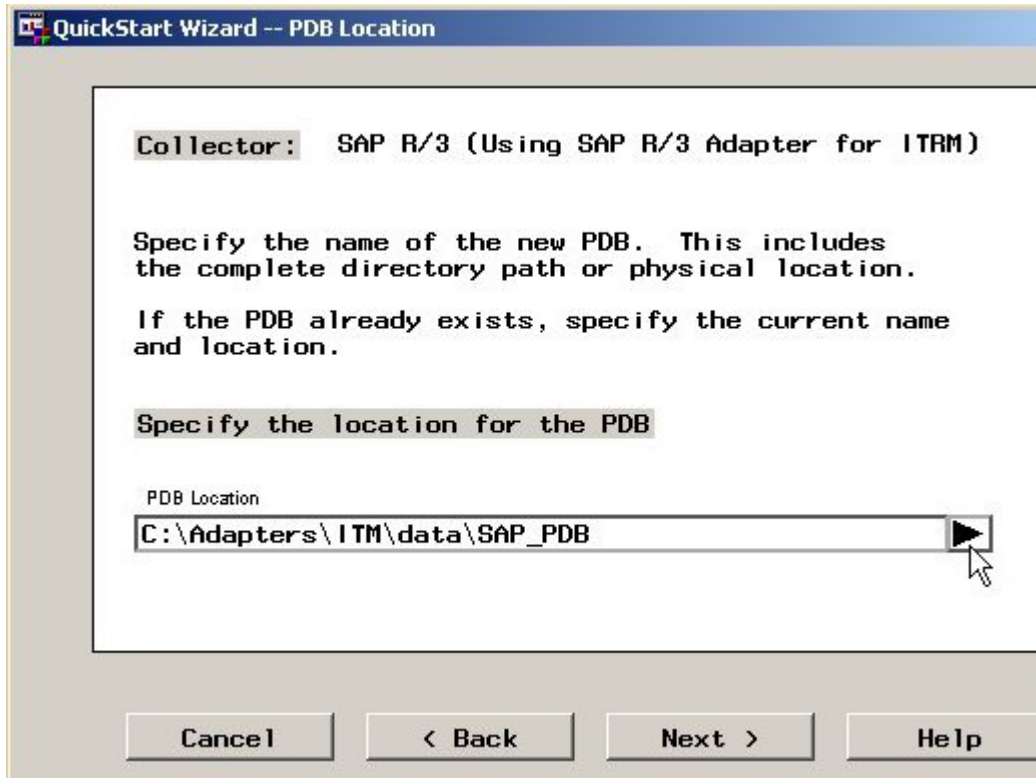
Display 3.3 Data Categories Panel

7. In the Input Data Location panel (Display 3.4), select **Directory**, then select or specify the location of the raw data. The raw data location must be the same as the location that is pointed to by the LIBNAME RAWDATA statement in the adapter's autoexec.sas program.



Display 3.4 Input Data Location Panel

8. Click **Next**.
9. In the PDB Location panel (Display 3.5), select or specify the PDB location. The PDB location should be the same as the location that is assigned to the macro variable &PDB\_NAME in the adapter's autoexec.sas program.



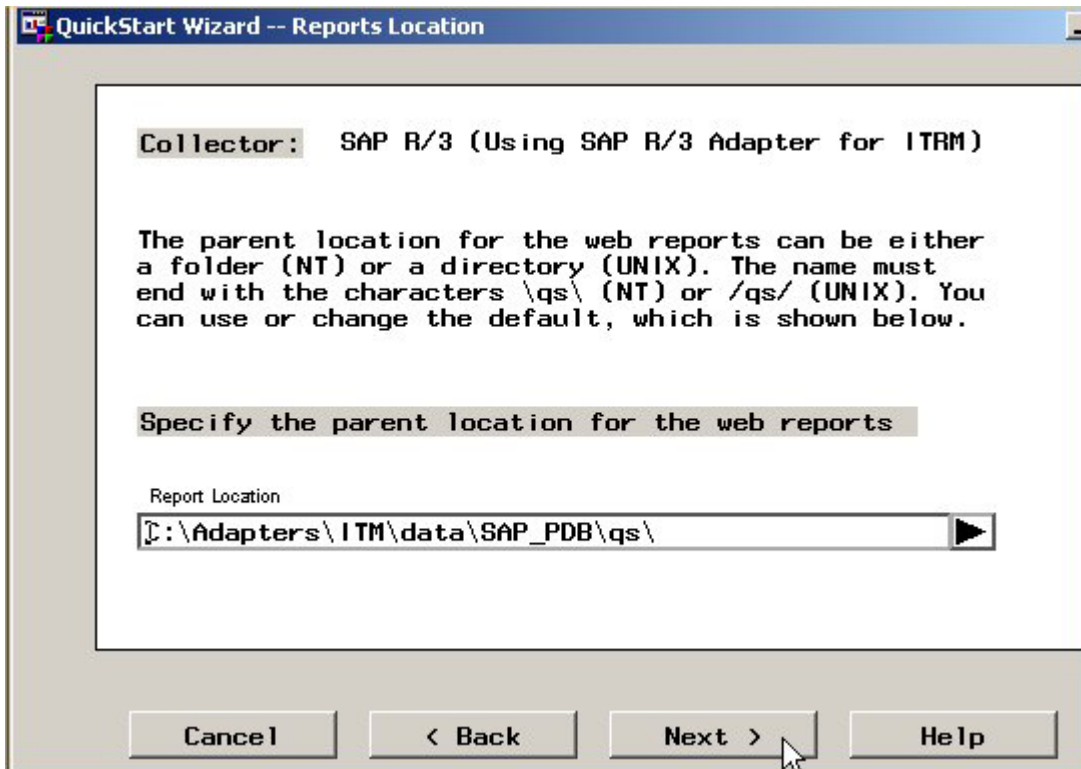
Display 3.5 PDB Location Panel

10. Click **Next**.
11. The PDB Location Exists panel (Display 3.6) confirms that the PDB location that you specified in the previous panel actually exists. Click **Next**.



Display 3.6 PDB Location Exists Panel

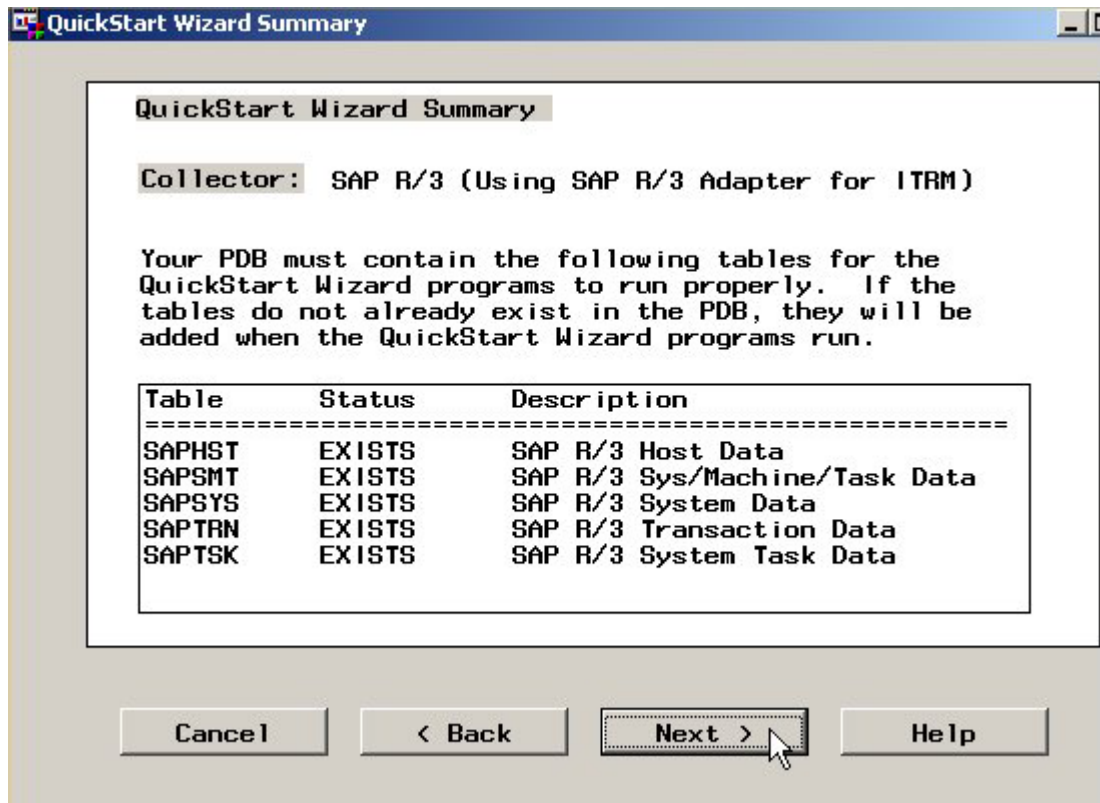
12. In the Reports Location panel (Display 3.7), specify a directory in which to store the generated Web reports. You should specify a location that is immediately accessible to a Web server. Note that additional programs will be generated and stored in a subdirectory called cntl in the specified report location.



Display 3.7 Reports Location Panel

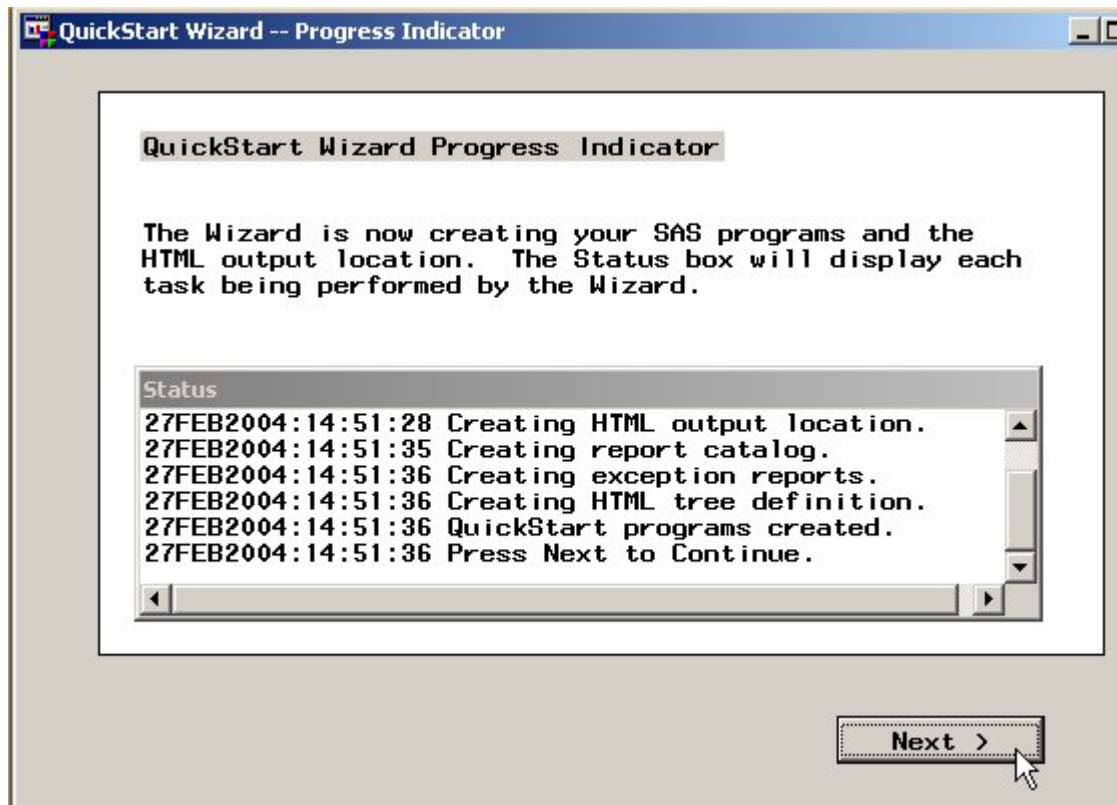
13. Click **Next**.
14. In the Summary panel (Display 3.8), click **Next**.





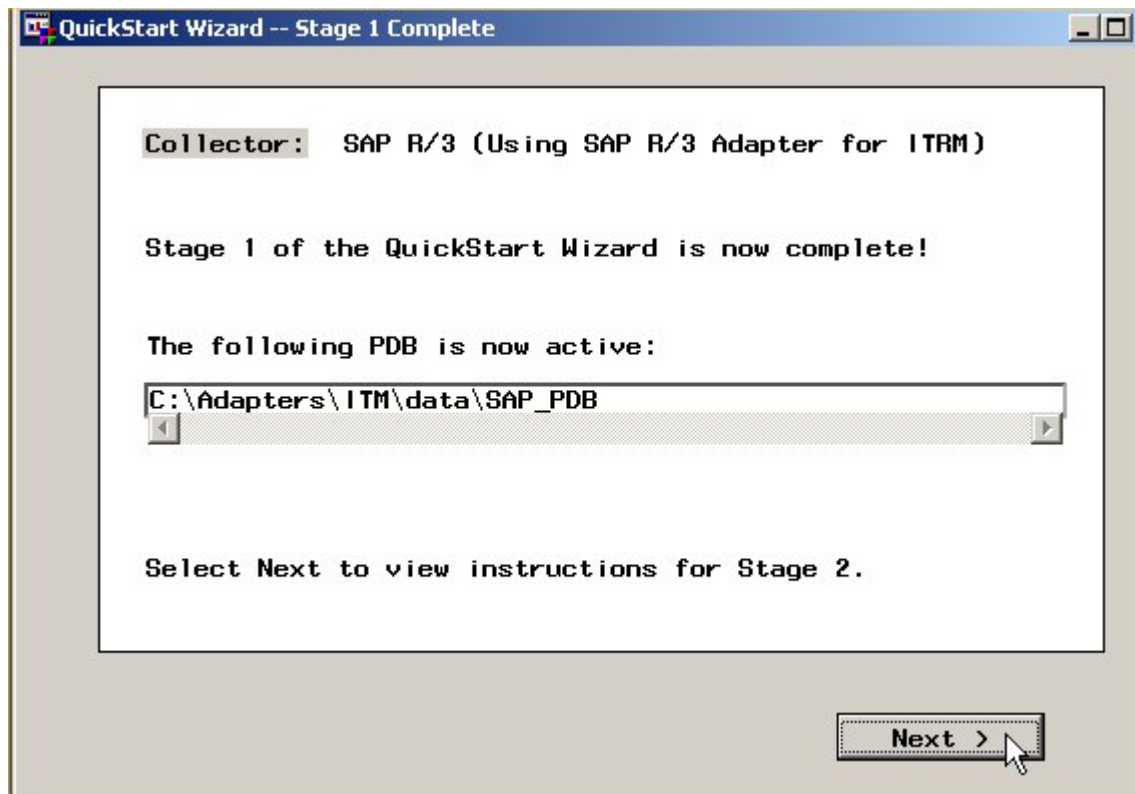
Display 3.8 Summary Panel

15. The Progress Indicator panel (Display 3.9) shows the status of the process as the programs and reports are being generated. Click **Next** when instructed to do so.



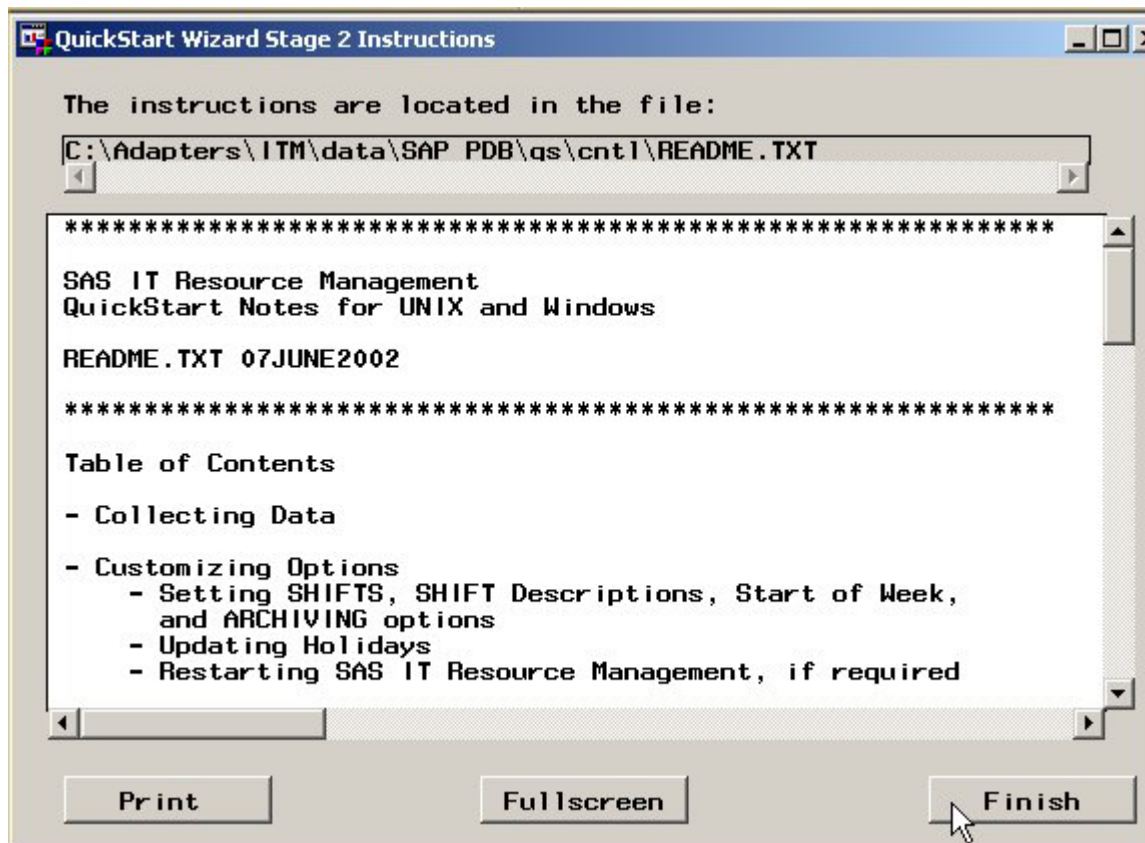
Display 3.9 Progress Indicator Panel

16. In the Stage 1 Complete panel (Display 3.10), click **Next**.



Display 3.10 Stage 1 Complete Panel

17. In the Stage 2 Instructions panel (Display 3.11), click **Finish**.



Display 3.11 Stage 2 Instructions Panel

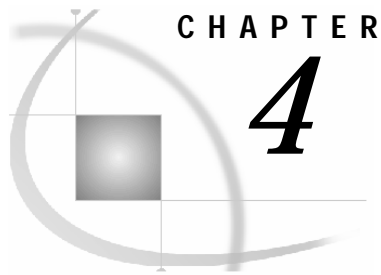
---

## Running the Generated Programs

After the SAS programs are generated, perform the following steps to schedule the programs to run regularly:

1. Copy the generated programs from their directory (the cntl subdirectory of the location that you specified in the Reports Location panel) to the adapter's working directory (where the nightrun.sas program is located).
2. Start an interactive SAS session with the adapter's autoexec.sas program. Include the sprocess.sas program and run it. Check the SAS log to ensure that there were no errors. Errors can occur if the environment is not set up correctly (as specified in the adapter's autoexec.sas program).
3. After sprocess.sas runs without errors, include and run the sreport.sas program. Check the SAS log to ensure that there were no errors. Warning messages about font sizes being reduced can generally be ignored.
4. Using a text editor, open the nightrun.bat file (for Windows) or nightrun script (for UNIX). Modify it so that the following programs are run, in this order:
  - nightrun.sas
  - sprocess.sas
  - sreport.sas
5. The nightrun.bat file or nightrun script is scheduled to run nightly to keep your reports up to date.
6. To enable Web browser access to the reports, set up a Web server to point to the welcome.htm file in the directory that you specified in the Reports Location panel in the QuickStart Wizard.





## Integrating the QuickStart Wizard Reports (z/OS)

---

The QuickStart Wizard is a component of the SAS IT Management Solution interface. It can be used to create predefined reports on the SAP performance data. This appendix explains how the QuickStart Wizard should be used with the adapter.

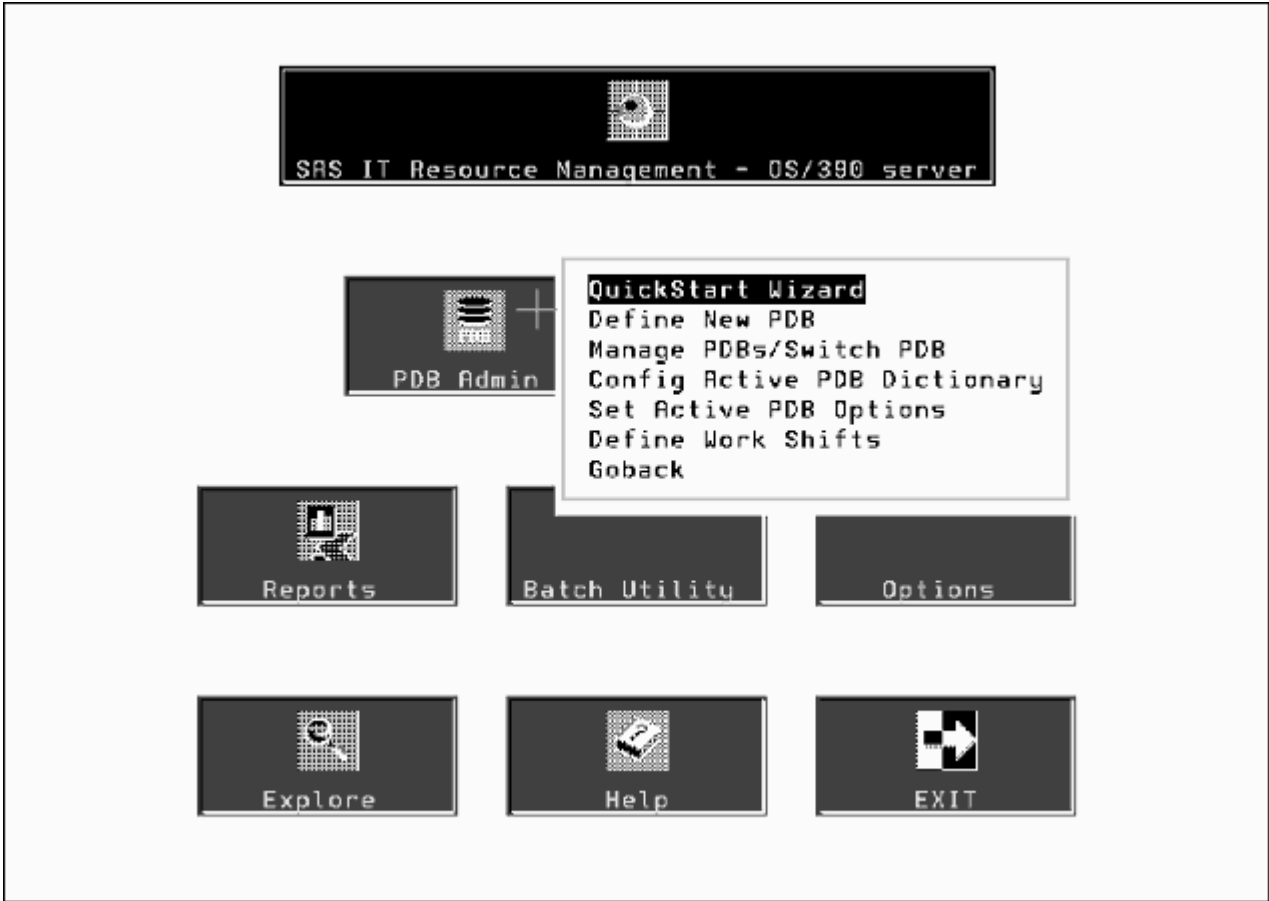
This process assumes that the **firstrun.sas** program that is supplied with the adapter has been run successfully.

---

### Generating the SAS Programs

To generate the SAS programs:

1. Create a PDB by using the **nightrun.sas** program that is included with the adapter. You must successfully run **nightrun.sas** before initiating the QuickStart Wizard. If you have previously attempted to create a new PDB by using the QuickStart Wizard, and doing so resulted in error messages, you should delete this entire PDB (using an operating environment utility), and restart the process by running **nightrun.sas**.
2. Launch SAS IT Resource Management 2.7 and ensure that the PDB that was created by **nightrun.sas** is active.
3. Click **PDB Admin** and then select **QuickStart Wizard** from the menu (Display 4.1).



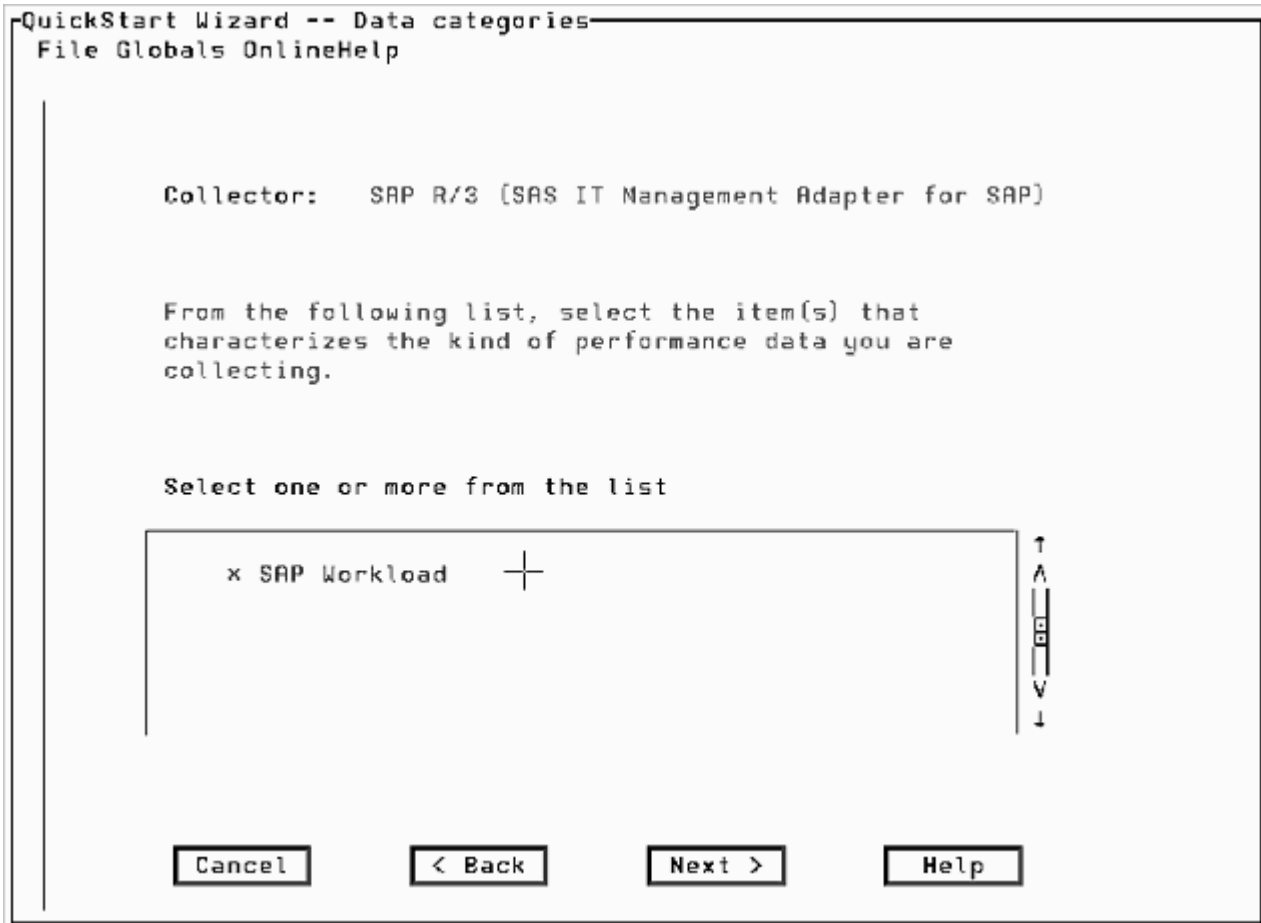
Display 4.1 SAS IT Resource Management Window

4. In the Welcome to the QuickStart Wizard panel (Display 4.2), click the down arrow next to the **Collector** field. Select **SAP R/3 (SAS IT Management Adapter for SAP)**.



**Display 4.2** Welcome to the QuickStart Wizard Panel

5. Click **Next**.
6. In the Data Categories panel (Display 4.3), select the **SAP Workload** check box, and then click **Next**.



Display 4.3 Data Categories Panel

7. In the Input Data Location panel (Display 4.4), specify the location of the raw data. The raw data location must be the same as the location that is pointed to by the LIBNAME RAWDATA statement in the adapter's **autoxmvs.sas** program.



QuickStart Wizard -- Input data location  
File Globals OnlineHelp

Collector: SAP R/3 (SAS IT Management Adapter for SAP)

Identify the location of the raw data, including the complete directory path or physical location.

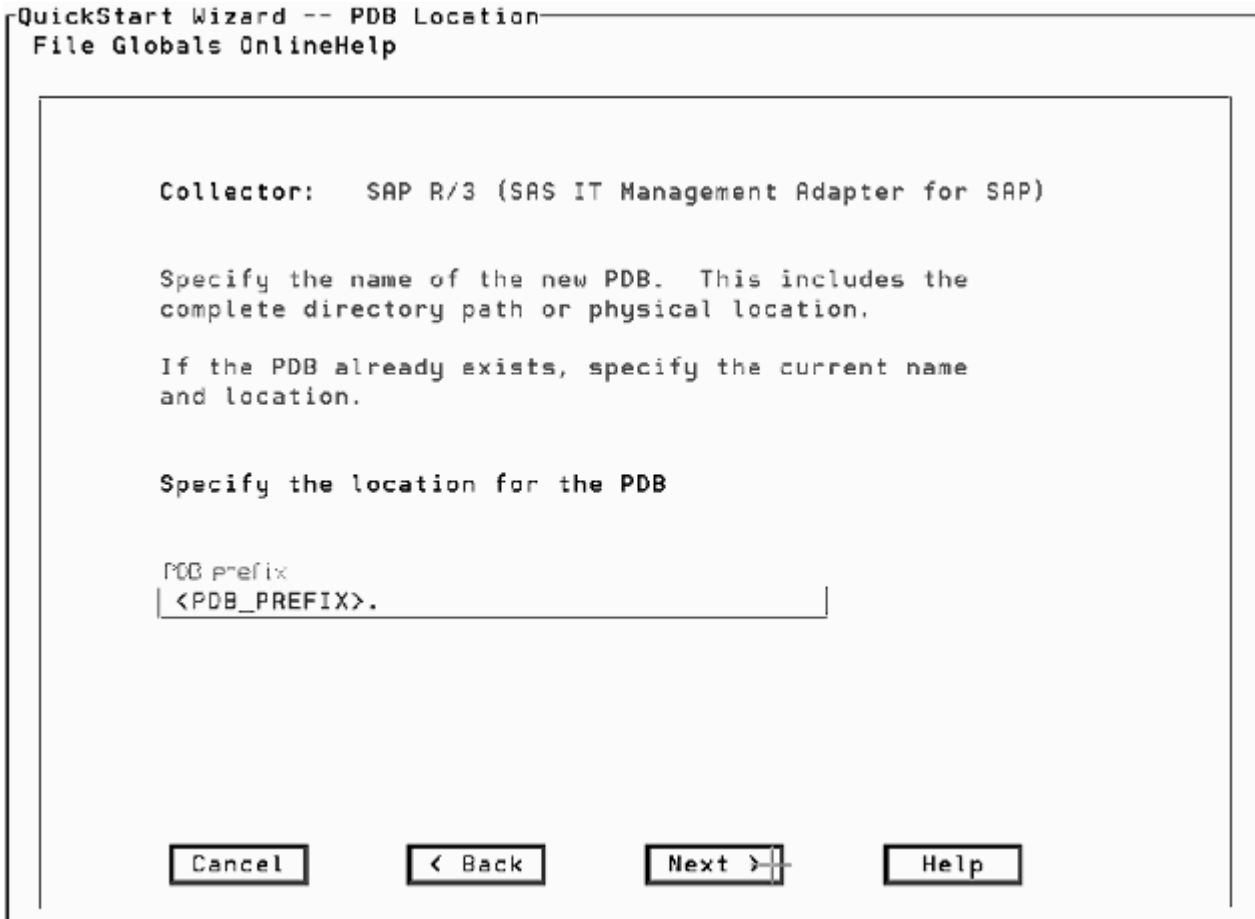
If this does not currently exist, identify the location where it will exist when you create the file.  
If necessary, you can modify the location later by editing the SAS processing program that is created by this Wizard.

Data location  
| <R3ITRM SOL ROOT>.DAT

Cancel    < Back    Next >    Help

**Display 4.4** Input Data Location Panel

8. Click **Next**.
9. In the PDB Location panel (Display 4.5), specify the PDB location. The PDB location should be the same as the location that is assigned to the macro variable &PDB\_NAME in the adapter's **autoxmv.sas** program.



Display 4.5 PDB Location Panel

10. Click **Next**.
11. The PDB Location Exists panel (Display 4.6) confirms that the PDB location that you specified in the previous panel does not yet exist. Click **OK**.



Display 4.6 PDB Location Exists Panel

12. In the PDB Allocation panel, update the values of each PDB as required and then click **Run**. This will allocate the PDB sets. When this process has completed, click **Goback**, as instructed on the screen
13. In the Reports Location panel, specify a directory in which to store the generated Web reports. A default data name is provided. It is recommended that you accept this default data name.
14. Click **Next**.
15. In the MVS Job Card panel (Display 4.7), update the provided JCL job card with the appropriate parameters for your site.

QuickStart Wizard -- MVS Job card  
File Globals OnlineHelp

Collector: SAP R/3 (SAS IT Management Adapter for SAP)

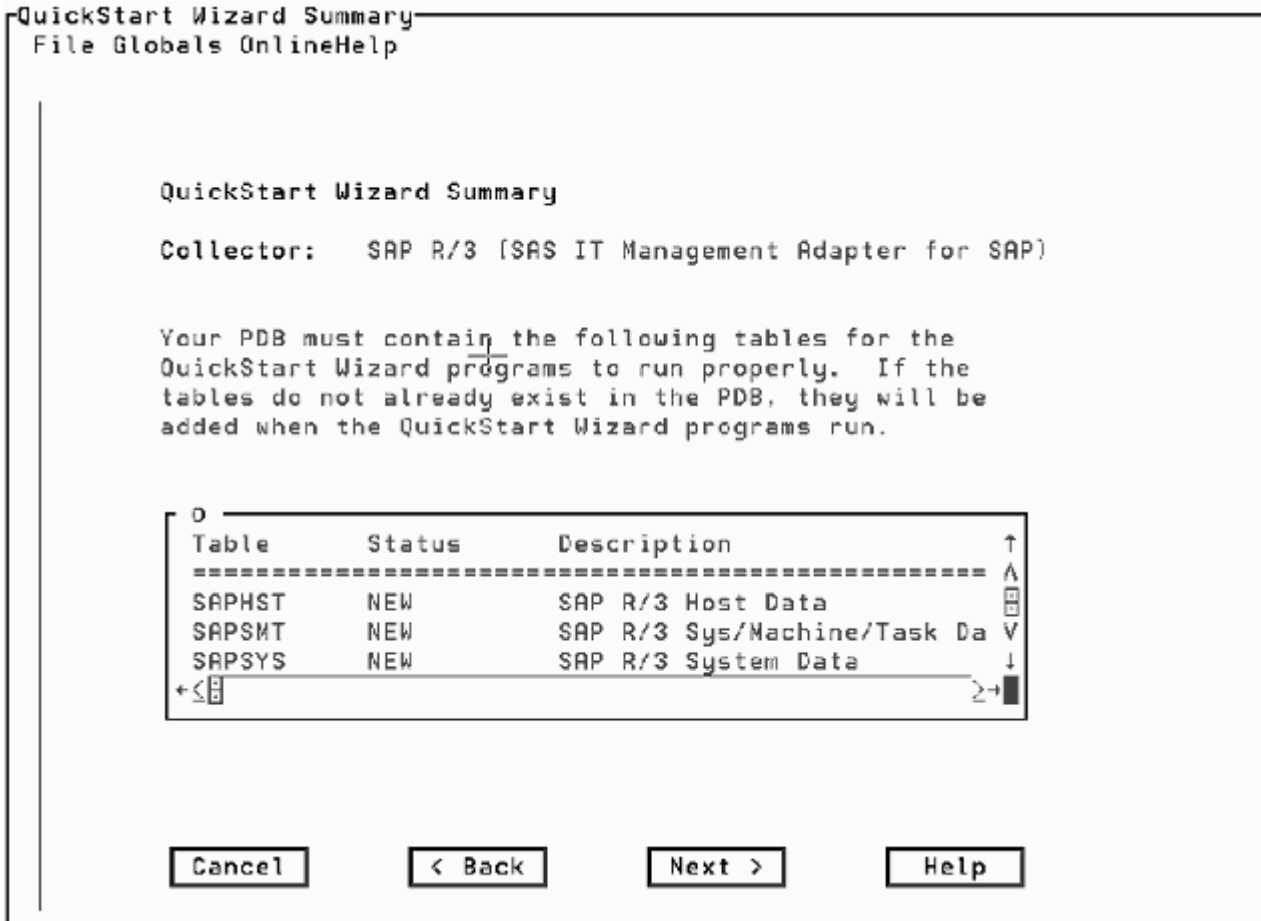
Customize the following MVS JCL statements  
to meet your site's needs.

```
//XXXXXXXXQ JOB (ACCT#), 'ITSV QUICKSTART', NOTIFY=XXXXXXXX,  
//          CLASS=A, TIME=(40,00), MSGCLASS=A, MSGLEVEL=(1,1)  
//*  
//*  
//*
```

This job card will be used in the SAS jobs that are created  
by this Wizard. Before you run each of these SAS jobs, you  
should change the default job name.

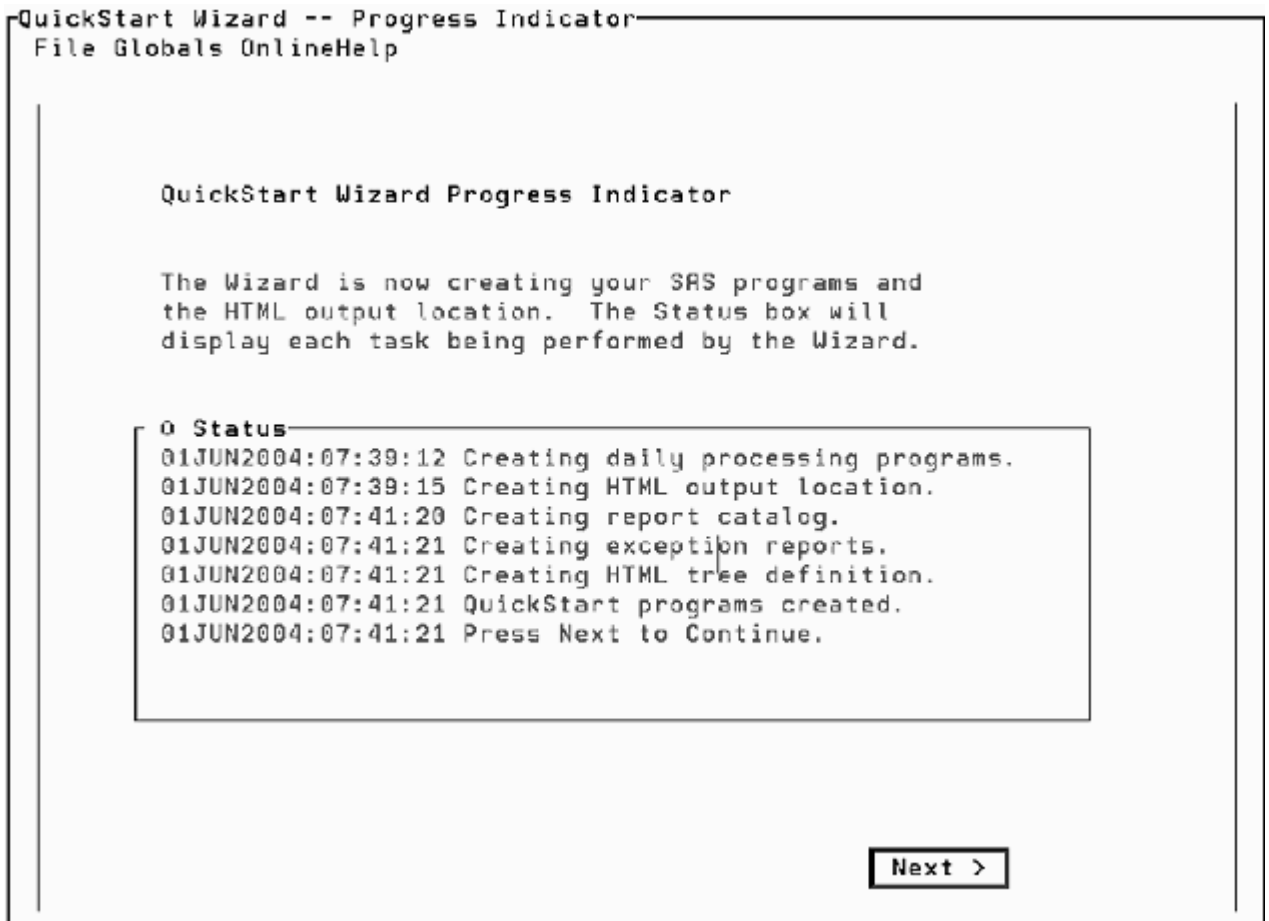
Display 4.7 MVS Job Card Panel

16. Click **Next**.
17. In the Summary panel (Display 4.8), click **Next**.



Display 4.8 Summary Panel

- The Progress Indicator panel (Display 4.9) shows the status of the process as the programs and reports are being generated. Click **Next** when instructed to do so.



**Display 4.9** Progress Indicator Panel

19. In the Stage 1 Complete panel (Display 4.10), click **Finish**.

```

JumpStart Wizard -- Stage 1 Complete
File Globals OnlineHelp

      _____

Collector:

Stage 1 of the QuickStart Wizard is now complete!

The following PDB is now active:
<PDB_PREFIX>.

Select Finish to view instructions for Stage 2 and exit
the QuickStart Wizard.

                                     Finish

```

Display 4.10 Stage 1 Complete Panel

20. After you have read the instructions in the Stage 2 Instructions panel, type END and then press ENTER to exit.

---

## Running the Generated Programs

After the SAS programs are generated, perform the following steps to schedule the programs to run regularly:

1. Review the following JCL jobs that were generated: SPROCESS and SREPORT. SPROCESS must run before SREPORT. To verify that SPROCESS and SREPORT ran correctly, check the SAS log for errors.

**Note:** Errors occur in the SAS log when the environment is not set up consistently. Typically, you can ignore errors that relate to font sizes being reduced.

2. Modify your batch job schedules so that the following JCL jobs are run, in this order:
  - nightrun.sas
  - sprocess.sas
  - sreport.sas

**Note:** These jobs should be scheduled to run nightly so that your reports are kept up-to-date.

The graphic features a stylized 'A' with a grid pattern, a square, and a circular arc. The word 'APPENDIX' is written in a sans-serif font above the 'A', and the word 'Scheduling' is written in a larger, bold, sans-serif font to the right of the 'A'.

# APPENDIX A Scheduling

---

---

## Setting Up Scheduling

**Note:** If another scheduling tool is used, then it must be in place and the tool's usage instructions must be available to you when you install the solution.

Although scheduling methods other than the SAP scheduler can be used to execute regular SAP extractions, this solution uses the SAP scheduler to submit SAS jobs. The use of other scheduling methods is not documented here, and it is recommended that you use standard site scheduling tools.

Where SAP is used for scheduling, the following must be installed:

- An SAP gateway.
- An additional ABAP program. In this example, ZSASPIPE is used.

In the example that follows, **nextruns.sas** is scheduled by using SAP R/3.

---

## Install a Local SAP Gateway

A local SAP gateway is required to schedule the SAS statistics file extraction from SAP. For further installation details, follow the instructions that are provided by SAP for installing the gateway.

First, here are two tips to finish the SAP gateway installation process.

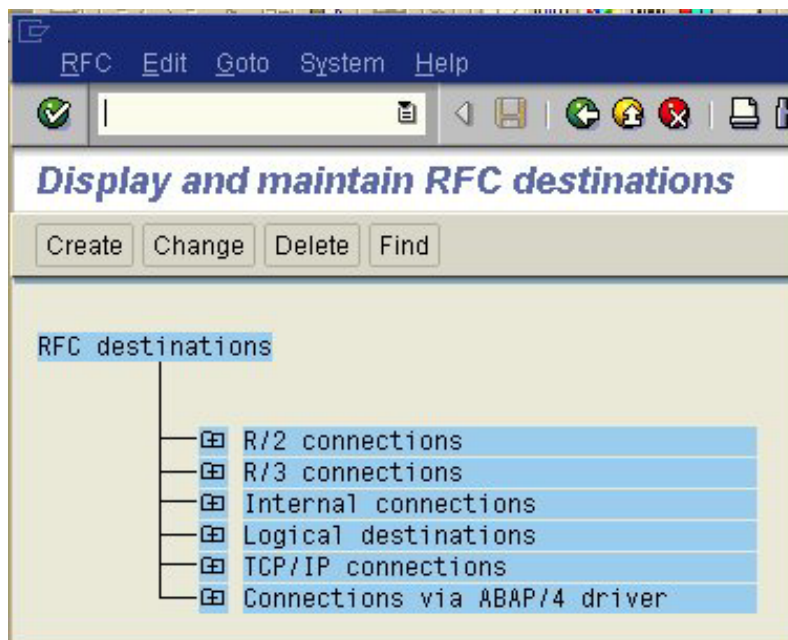
- For Windows NT, first ensure that Microsoft Management Console (MMC) is installed. MMC is preinstalled on Windows 2000 and Windows XP.
- Install the SAP MMC snap-in as explained in the SAP gateway installation instructions.

**Note:** An installation of a local SAP gateway is not required if a different scheduling method is used.

To install the local SAP gateway, do the following:

1. Set up a destination by using R/3 transaction SM59 and a TCP/IP connection.

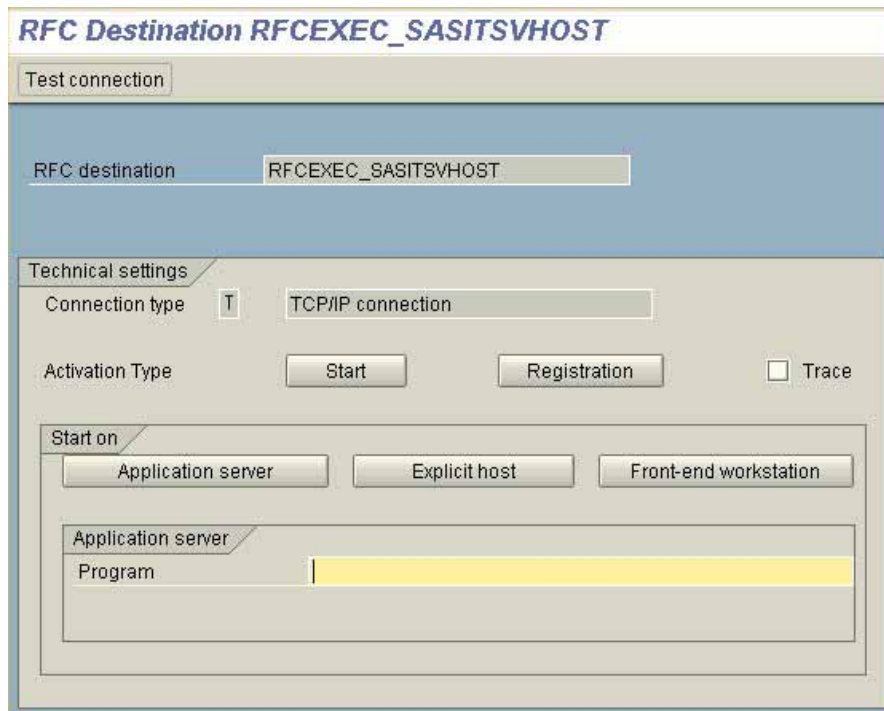
2. Reference the local gateway setup on the machine that is executing the SAS system software.
3. The activation type is Start, and the program to start is RFCEXEC (contained in the RFCSDK that is distributed by SAP AG).
4. On the SAP GUI command line in Display A.1, enter SM59. The Display and Maintain RFC Destinations window opens.



**Display A.1** Display and Maintain RFC Destinations Window

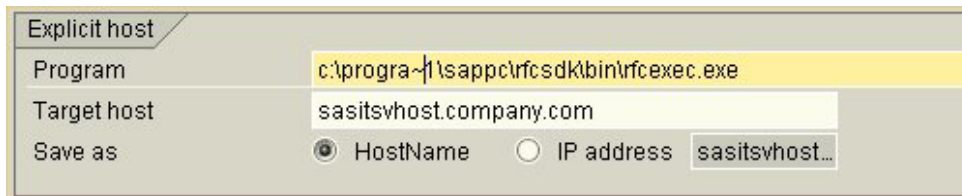
5. To create a new destination, click **Create**. The RFC Destination dialog box opens.
6. In the RFC Destination dialog box, type the **RFC destination** name, such as RFCEXEC\_ *hostname*, where *hostname* is the machine on which the SAS server is installed.
7. For a TCP/IP connection, type **T** in the **Connection type** field.
8. In the **Description** field, enter a short description, such as "Start RFCEXEC on hostname."
9. Press ENTER. The window changes to enable you to specify the technical settings (Display A.2).





**Display A.2** RFC Destination Window with Technical Settings Box

10. To select an explicit host, click **Explicit host**. The Explicit Host dialog box opens (Display A.3).



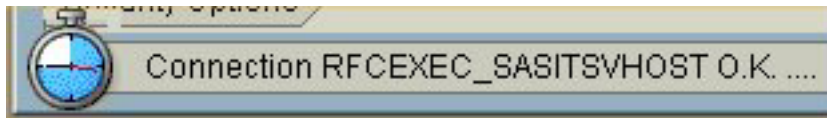
**Display A.3** RFC Explicit Host

11. In the Explicit host dialog box, specify **Program** as `rfcsdkpath\rfcexec.exe`, where `rfcsdkpath` is the path **SAP rfcsdk**. The pathname must not contain blanks. (You might need to use DOS 8.3 names.)
12. Specify **Target host** as either HostName or IP address.
13. To specify SAP gateway information (stand-alone) that is installed on the SAS server, from the drop-down menu that appears (Display A.4), click **Destination → Gateway options**.
14. To complete the gateway information, in the **gateway Host** field specify the SAS server name, and in the **Gateway Service** field specify the service that is associated with the gateway (Display A.4).



**Display A.4** RFC Gateway Host and Service Entries

15. To complete the RFC Destination configuration, click **OK**.
16. To test the RFC destination, in the RFC Destination window, click **Test connection** (Display A.2). If the RFC destination is correctly configured, then with the gateway server running, the status line appears as in Display A.5 and a window opens that displays response times.



**Display A.5** RFC Connection Test

---

## Install the ABAP Program ZSASPIPE

To install the ABAP program ZSASPIPE, do the following:

1. Using SAP transaction SE38, create a new program called ZSASPIPE.

**Note:** To complete this step, you must be logged in under a user ID that has been registered with an SAP developer key.

2. Upload the code from `your_install_path\ZSASPIPE.ab4`.
3. Enter a description, such as "Run command via remote pipe."

## Set Up and Schedule a Variant of ZSASPIPE

Create a variant of ZSASPIPE called nextruns.cmd (Display A.6). The variant specifies that ZSASPIPE must execute nextruns.cmd on the specified machine through the destination that was created in the previous step.

Variant attributes	
G_CMD	c:\terpdiv~1\standa~1\itsv\nextruns.cmd
G_DST	RFCEXEC_WIEDEVDMP

**Display A.6** Maintain Variant Window

**Note:** The command line must not contain blanks. If necessary, specify directory names by using their DOS 8.3 names. You can determine the DOS 8.3 names by using the DOS command **dir /x**.

To set up and schedule a variant of ZSASPIPE, do the following:

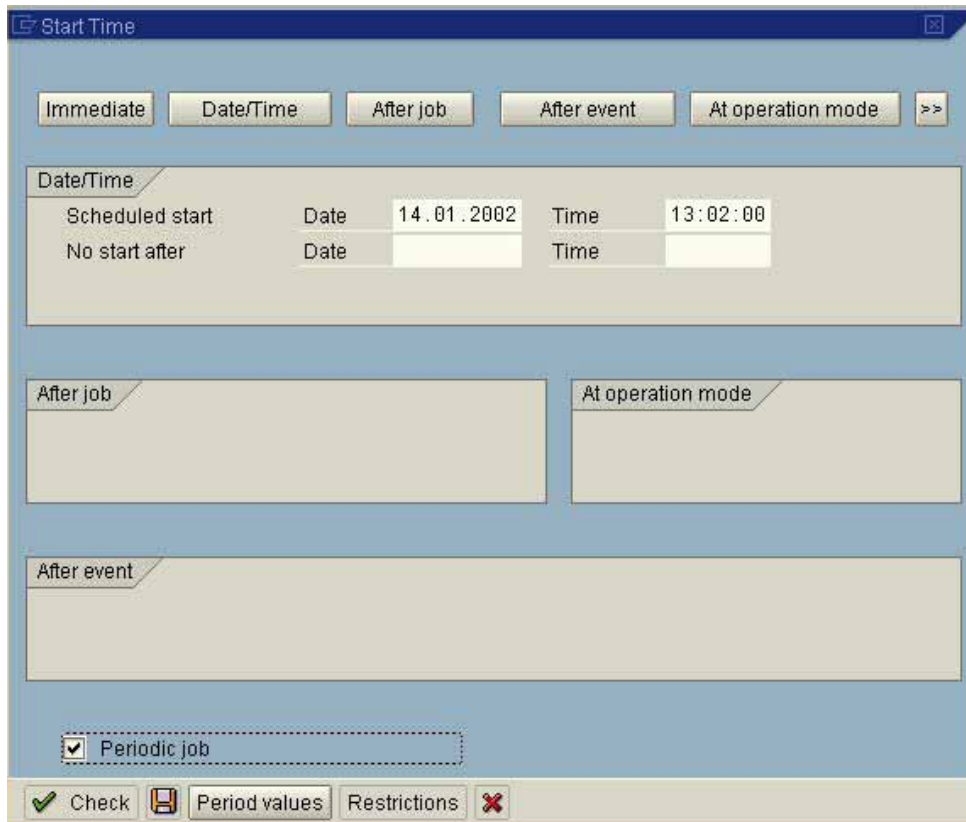
1. To define a scheduled job, use SAP transaction SM36.
2. Enter a job name and a job class.

General data	
Job name	sas_itsv_collector
Job class	B
Status	Scheduled
Target server	[Dropdown Menu]

Spool list recipient

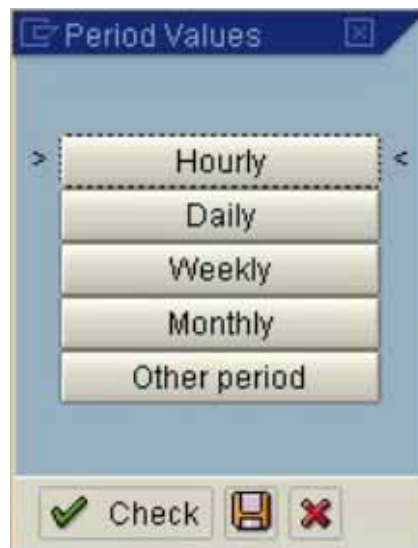
**Display A.7** Define Background Job Window

3. To enter the Start condition, from the menu bar, click **Start condition**.
4. From the Start Time dialog box that appears (Display A.8), select **Date/Time** and enter an appropriate date and time for the **Scheduled Start** item.



Display A.8 Schedule Start Time

5. To specify the job as periodic, select the **Periodic job** check box, and to set the period values, select **Period values** (Display A.8). The Period Values window opens (Display A.9).



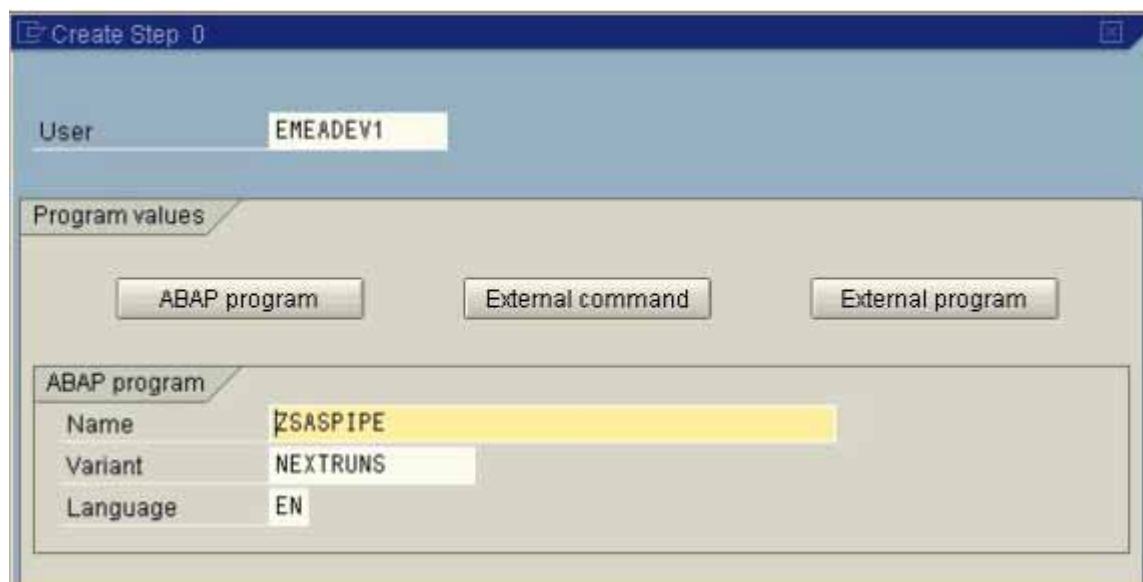
Display A.9 Set Period Values

6. In the Period Values window, select **Hourly**. To save your settings, click the diskette icon.
7. To save the schedule values, in the Start Time window (Display A.8), click the diskette icon. The Define Background Job window opens again.

---

## Defining the Job Step to Execute

1. To define the job step to execute, from the menu bar at the top of the Define Background Job window (Display A.7), click **Step**. The Create Step 0 window opens (Display A.10).



**Display A.10** Create Step 0 Setup

2. From the Create Step 0 window, click **ABAP program**. In the **Name** field, type the ABAP program name that was defined earlier, ZSASPIPE. In the **Variant** field, enter the variant that was created previously, NEXTRUNS.
3. To save your settings, click the diskette icon.
4. To maintain the job, use SAP transaction SM37.

---

## Testing the Environment Setup

To test the environment setup, additional test programs are provided in the subdirectory labeled **Test**.

## Test the SAS System in the SAP Environment

To test invoking SAS system software in the SAP environment, use `Testrun.cmd` and `Testrun.sas`, which confirms the correct installation of the ABAP program `ZSASPIPE` as well as the RFC destination.

`Testrun.sas` also tests the local SAP gateway setup. Ensure that `Testrun.cmd` works correctly when invoked locally. For example, in Windows, double-click Windows Explorer. If it runs successfully, then create a test run variant of `ZSASPIPE` on SAP, and execute it from SAP.

---

## Troubleshooting the Failure of a Scheduled SAP Job to Run

The following problem description is relevant only for sites that schedule jobs in SAS to run with an SAP gateway.

Display A.11 shows that the job `SAS_ITSV_COLLECTOR` was canceled. As a result, the command to invoke SAS from inside `Nextruns.cmd` was not executed, the e-mail program `SCAN_LOG_FOR_ERRORS` did not start, and no e-mail was sent.

**Job Overview**

Release [STOP] Spool Job log Step Application servers

Job overview from: 17.01.2002 at: 00:00:00  
to: 17.01.2002 at: 24:00:00

Selected job names: \*  
Selected user names: EMEDEV1

Scheduled  Released  Ready  Active  Finished  Canceled

Event controlled Event ID:  
 ABAP program Program name :

JobName	Ln	Job CreatedBy	Status	Start date	Start time	Duration(sec.)	Delay (sec.)
EU_PUT		EMEDEV1	Finished	17.01.2002	00:10:21	4	21
EU_REORG		EMEDEV1	Finished	17.01.2002	01:40:21	290	21
SAS_ITSV_COLLECTOR		EMEDEV1	Released			0	0
SAS_ITSV_COLLECTOR		EMEDEV1	Canceled	17.01.2002	04:02:21	5	21
SAS_ITSV_COLLECTOR		EMEDEV1	Finished	17.01.2002	00:02:21	294	21
SAS_ITSV_COLLECTOR		EMEDEV1	Finished	17.01.2002	01:02:21	296	21
SAS_ITSV_COLLECTOR		EMEDEV1	Finished	17.01.2002	02:02:21	290	21
SAS_ITSV_COLLECTOR		EMEDEV1	Finished	17.01.2002	03:02:21	295	21

Display A.11 SAP Job Overview

To determine the cause of the failure, drill down in the job log by double-clicking the job name in the JobName column (SAS\_ITSV\_COLLECTOR in this example). The Job Log Entries for *JobName* window opens (Display A.12).

**Job Log Entries for SAS\_ITSV\_COLLECTOR**

Long text Previous page Next page

Job log overview for job: SAS\_ITSV\_COLLECTOR

Date	Time	Message text
17.01.2002	04:02:21	Job started
17.01.2002	04:02:23	Step 001 started (program ZSASPIPE, variant NEXTRUNS, user name EMEDEV1)
17.01.2002	04:02:26	ABAP/4 processor: CALL_FUNCTION_OPEN_ERROR
17.01.2002	04:02:26	Job cancelled

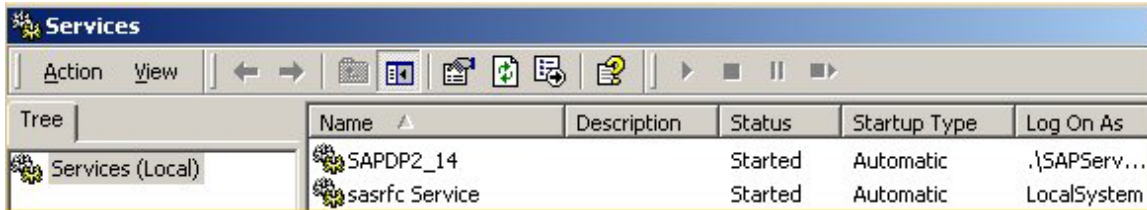
Display A.12 SAP Job Log Entries

The most likely reason for the run failure is that the local SAP gateway was not active when the job was invoked on the SAP server. That the gateway was down is unfortunately not clear from the Job Log Entries window (Display A.12).

To avoid the problem, ensure that the SAP gateway is **auto started**, as follows:

1. Confirm that the **Services (Local)** properties setting is **Autostart = 1** and is in the profile for the service when the stand-alone gateway is installed.

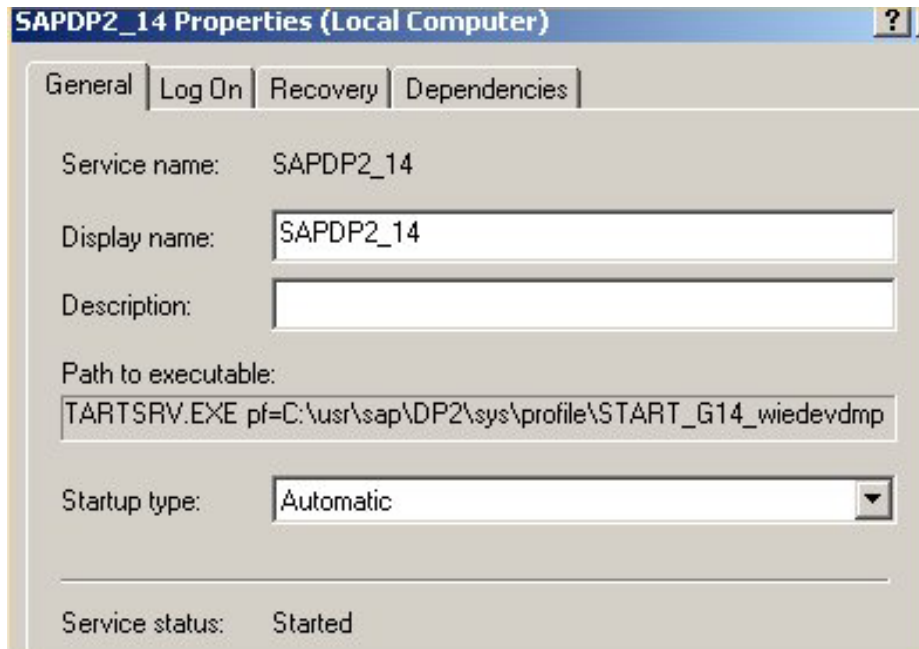
2. To determine the profile filename on Windows platforms, select **Start → Programs → Administrative Tools Services**. The Windows Services window opens (Display A.13).



**Display A.13** Windows Services

3. Locate the service call *SAPsysid\_sysno*, where *sysid* is the system ID and *sysno* is the gateway setup system number.
4. To open the properties window, on the **Tree** tab, double-click the service call name. The Properties dialog box for that service opens (Display A.14).





**Display A.14** Service Properties Dialog Box

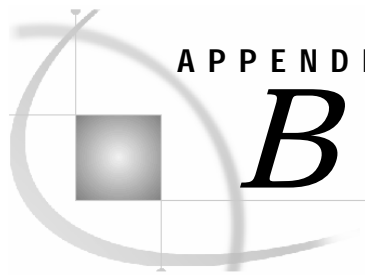
5. In this example, the service SAPD2\_14 is set up to start automatically. If this is not the case with your service, then set the **Startup type** to **Automatic**.
6. Next, note the information in the **Path to executable** field. From the job name, SAP automatically generates an editable STARTSRV.EXE profile text file, contained in the profile directory. In the example above, this is pf=C:\usr\sap\DP2\sys\START\_G14\_wiedevdmp.
7. Open this file with a text editor and confirm that the file includes the statement **Autostart = 1**. If not, add the statement, but not as the last line of the file. Note the uppercase **A** and lowercase **utostart**. Also note that blanks before and after the equal sign (=) are significant.

Here is an example:

```
# generated by R3SETUP
Autostart = 1
SAPSYSTEMNAME = DP2
INSTANCE_NAME = G14
SAPSYSTEM = 14
SAPGLOBALHOST = wiedevdmp
# start message server
_GW = gwr.exe
Start_Program_05 = local $(DIR_EXECUTABLE)\$_GW
pf=$(DIR_PROFILE)\DP2_G14_wiedevdmp
```

Typically, once the underlying problem is solved, the job runs successfully. SAP extractions begin from the last successful extraction, so recovery does not lose data.





APPENDIX

**B**

## SAP Notes Excerpts

---

The following includes text adapted from SAP notes that help provide a better understanding of the columns in the statistics tables.

---

### Definitions

#### Front-end

The measurement of time in R/3 starts when the request from the front-end system arrives at the application server. It ends when the final data package leaves the application server, headed in the direction of the front-end system. In the course of the transaction step, several communication steps might occur between the application servers and the front-end system. These are called *round-trips*.

In the course of a round-trip, the application server transfers data for the controls to the front-end system. The user context is generally rolled out, and this time is measured as *roll-wait time*. The entire time for every round-trip is measured on the application server in GUI time. With the help of this GUI time, the influence of network and front-end performance on the R/3 response time can be defined.

The SAP GUI also measures time. From the beginning of a request to the application server, until the end of processing on the front-end system, time is monitored and the next request is transferred to the application server. The difference between this time and the response time that is measured in R/3 is included as *front-end network time*—that is, as a total of network time for the first and the final communication step between the front-end system and the application server. The front-end network time is not included in the GUI time.

#### DBRequestTime

DBRequestTime is the time for processing logical database requests—that is, calls to the SAP database interface.

#### Response time

Response time is the total time that is consumed on the application server, including database request time.

The response time of a dialog step describes the duration from the request of the dialog to the dispatcher work process. It includes processing up to the completion of the dialog in the dispatcher.

The response time consists of many single values, such as

- CPU time
- Load+Gen time
- queue time
- DB request time.

All dialog steps that are started directly by the front-end user are evaluated; auto-ABAPs or dialog steps of the SAPSYS user are not relevant.

The response time value, which measures overall system performance, is reported to transaction RZ20 and is executed every five minutes. The length of the run time of this report depends on the number of users logged on and the number of dialog steps, so that an overview of system performance is measured by means of the relative change of the run time.

In Release 4.6, there are additional values for the following times:

FrontendResponseTime = Total of FrontendNetTime, ResponseTime, and GuiCallbackTime.

### FrontendNetTime

FrontendNetTime is the part of the FrontendResponseTime that is used for network communication between application servers and the front-end system. More precisely, it is the time that is used in the network for the first data transfer from the front-end system to the R/3 server, and for the last data transfer from the R/3 server to the front-end system during a dialog step.

**Note:** The FrontendNetTime does not yet always deliver dependable values. This limitation influences the FrontendResponse time (total of FrontendNetTime and ResponseTime).

### GuiCallbackTime

GuiCallbackTime is time in which a work process is waiting for the front-end system. During a dialog step, several communication steps between the R/3 server and the internal R/3 front-end system can take place. "GUI time" is the time that is used in the local R/3 front-end system, but not on the R/3 server.

### QueueTime

QueueTime is waiting time in the dispatcher request queue. If the application host or the entire system is used intensively, waits in the dispatcher queue can occur. In addition to the number of work processes on the application server, the CPU load (ST06 -> CPU: Load average) is a factor in waiting times.

---

## Release 4.6D and Later

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

- Access to the respective file is much faster.
- The availability of statistics records is defined now.

Prior to this release, the collector deleted the statistics file if it exceeded a defined size. However, all records were deleted. Now it can be specified how long the statistics files are to be kept (for example, 48 hours).

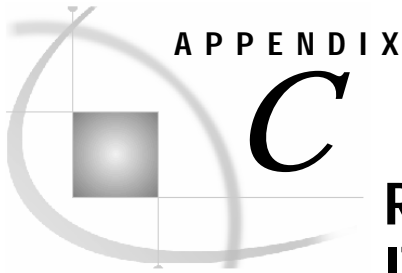
The collector deletes files that are older than specified if all records from this file have already been processed.

Ensure that this value is always lower than the profile parameter `stat/max_files`, which defines the maximum allowed number of statistics files. When this limit is reached, the kernel automatically overwrites the older file.

A reasonable value for `stat/max_files` is 72 hours. If set for `stat/max_files = 0`, the system works with one statistics file only, as it did in releases prior to 4.6D.

When the system is invoked, statistics files older than seven days are automatically deleted. In addition, for each collector that runs, files older than the set retention period are also deleted.





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

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## Overview

The follow example was performed on SAP/R3 Version 4.6C.

The administrator must create a new authorization, use it in a profile, and define a user account that will use the profile.

The general sequence of events is as follows:

1. Create the authorization SASCPIC.
2. Specify the program that the authorization SASCPIC is allowed to execute. Using SAP's authorization administration windows, enter a program name, in this example, SAPLZSASX (where the function group is ZSASX). The segments of code on pages 47 and 48 illustrate the example code that enables the program SAPLZSASX to execute.
3. Specify that only activities 37 and 51 are allowed.
4. Save your settings, and then activate the new authorization SASCPIC.
5. Create a new profile named ITRM, using the SASCPIC authorization that was created in steps 1-4. (The profile uses some 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/account that performs the data extractions. The following displays illustrate the creation of an authorization and a profile to use this authorization.

The intention is to prevent the usage of the account for any purpose other than the extraction of performance data. Only functions that are contained in the ZSASX function group can be used to return data. Any attempt to use the SAS/ACCESS Interface to R/3 to extract tables or metadata will result in errors that indicate a lack of permissions.

The above steps are detailed in the following set of displays.

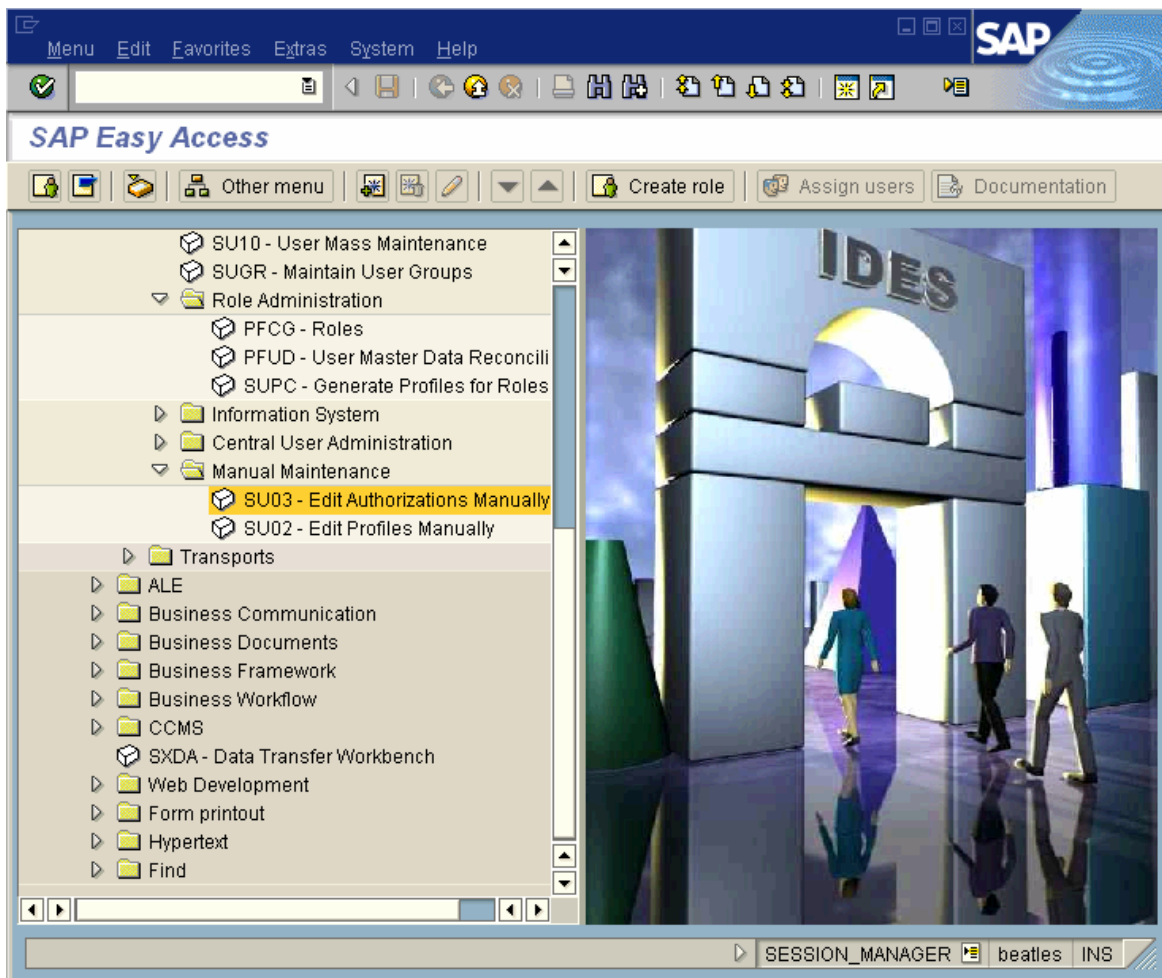
**Note:** In this example, in addition to the above restrictions, the user account is also designated to be a system account,

thus preventing interactive logons.

## Editing Authorizations Manually

To set authorizations manually, do the following:

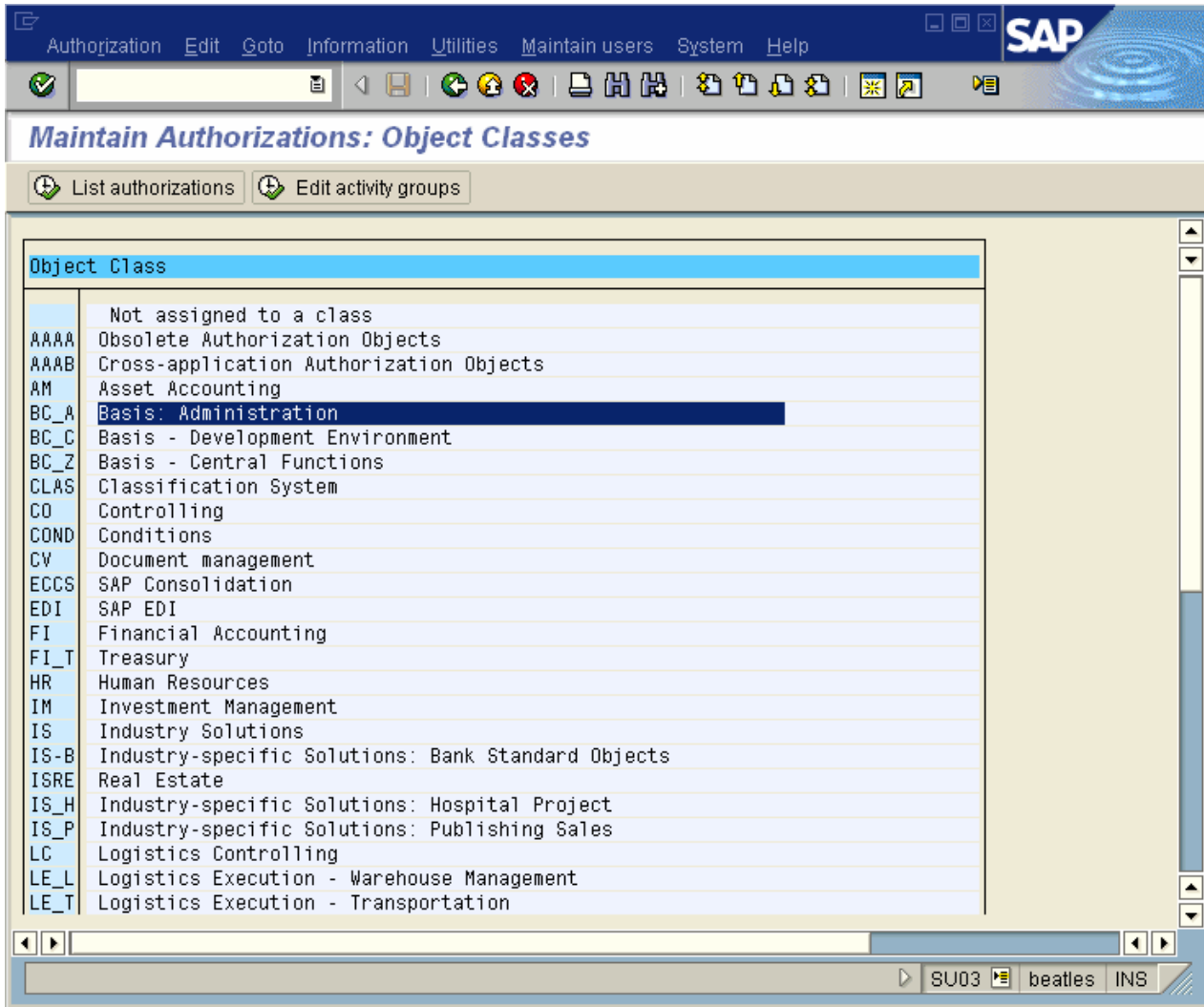
1. From the SAP Easy Access window, under the heading Manual Maintenance, click **SU03 – Edit Authorizations Manually** (Display C.1).



**Display C.1** SU03 - Edit Authorizations Manually

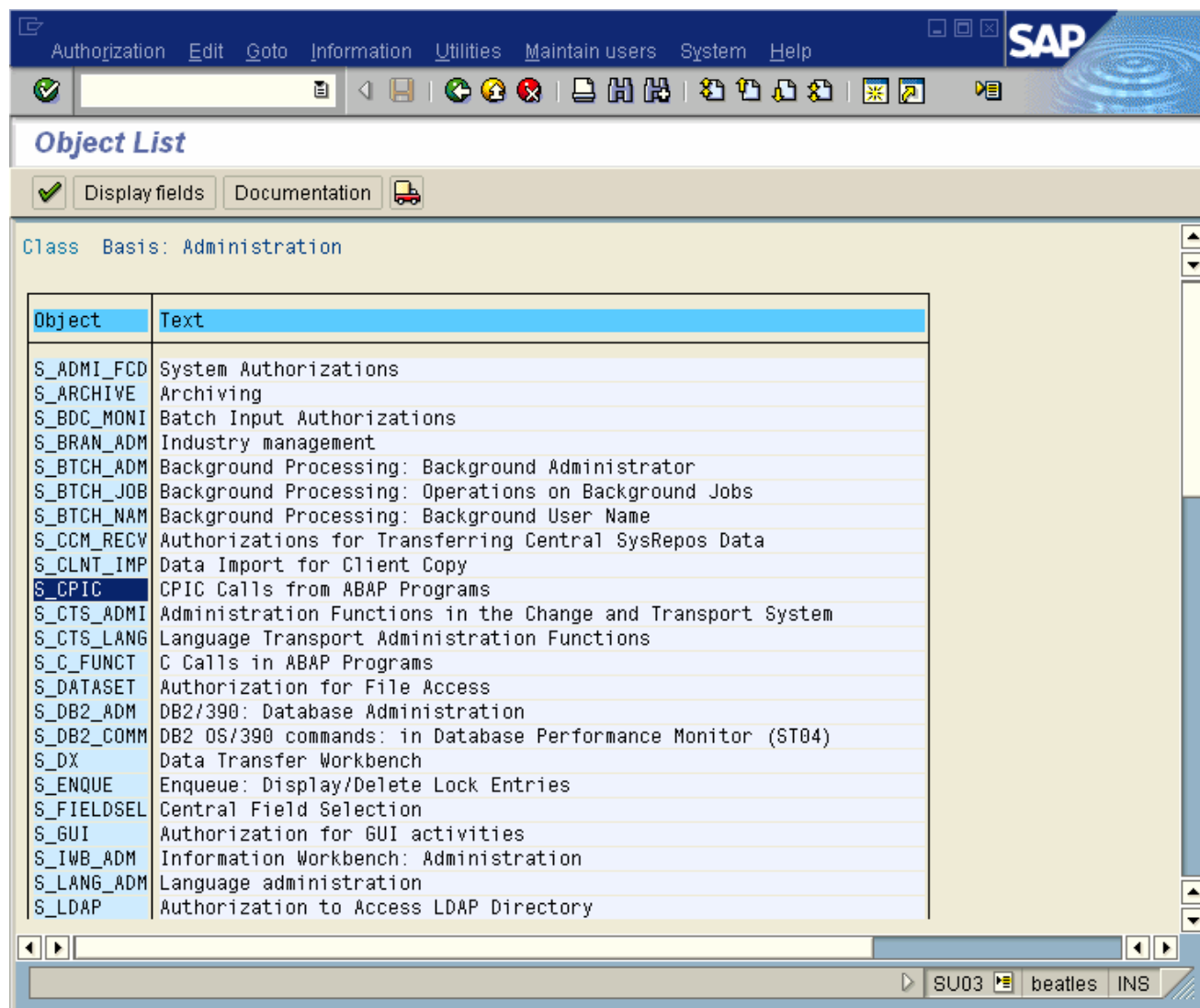
2. The Maintain Authorizations: Object Classes window opens (Display C.2).





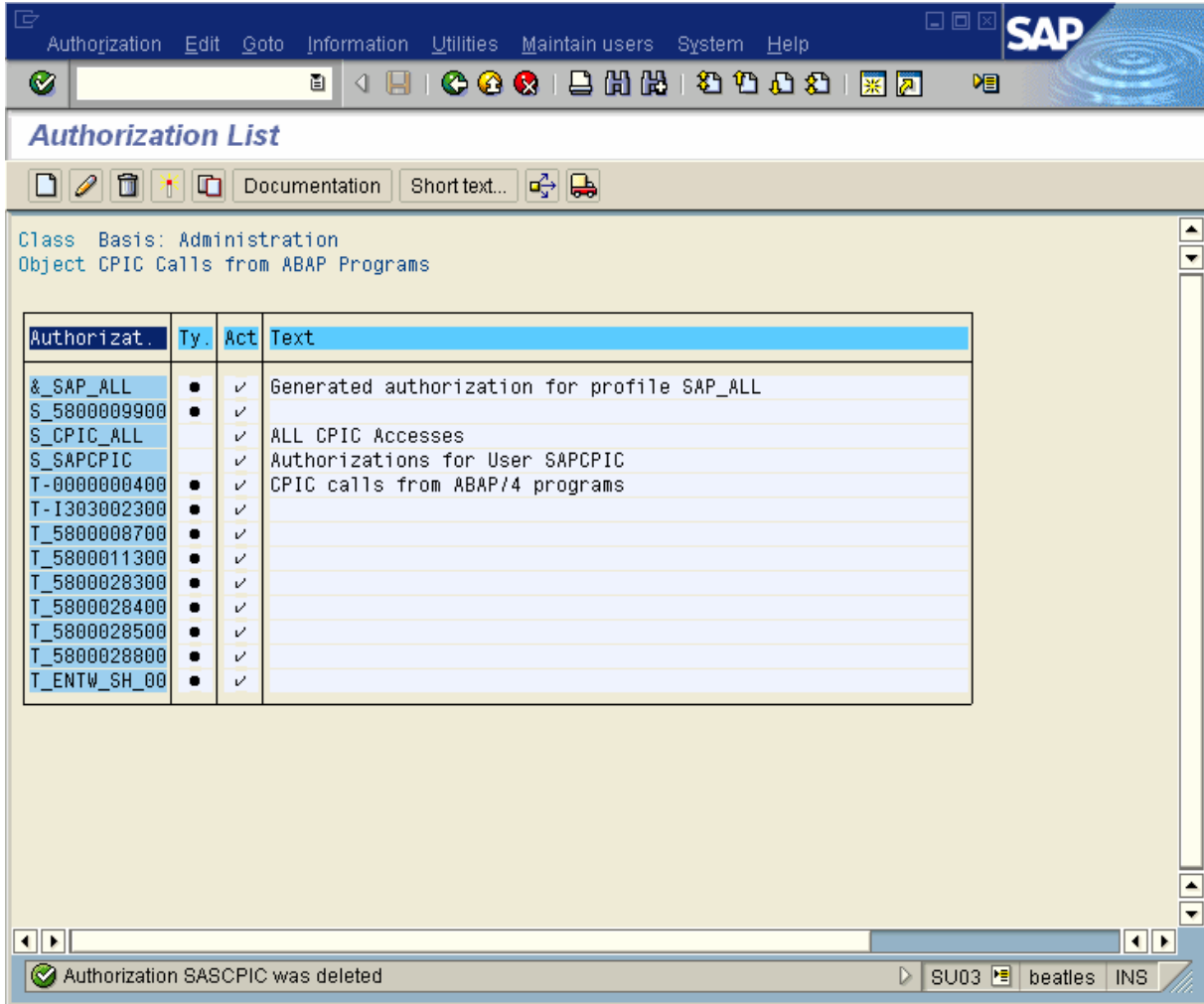
**Display C.2** Maintain Authorizations: Object Classes Window

- In the Maintain Authorizations: Object Classes window, double-click **BC\_A Basis: Administration**. The Object List window opens for the class **Basis: Administration** (Display C.3).



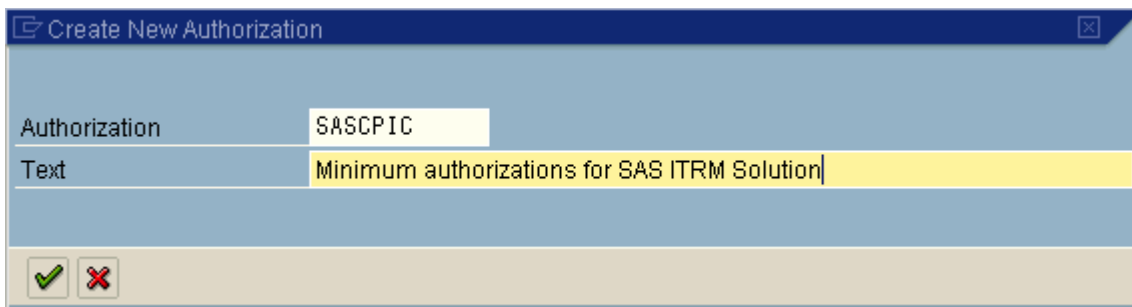
**Display C.3** Object List – Class Basis: Administration Window

- In the Object List window, in the Object column, double-click **S\_CPIC**. The Authorization List window opens for the class **Basis: Administration** and the object **CPIC Calls from ABAP Programs** (Display C.4).



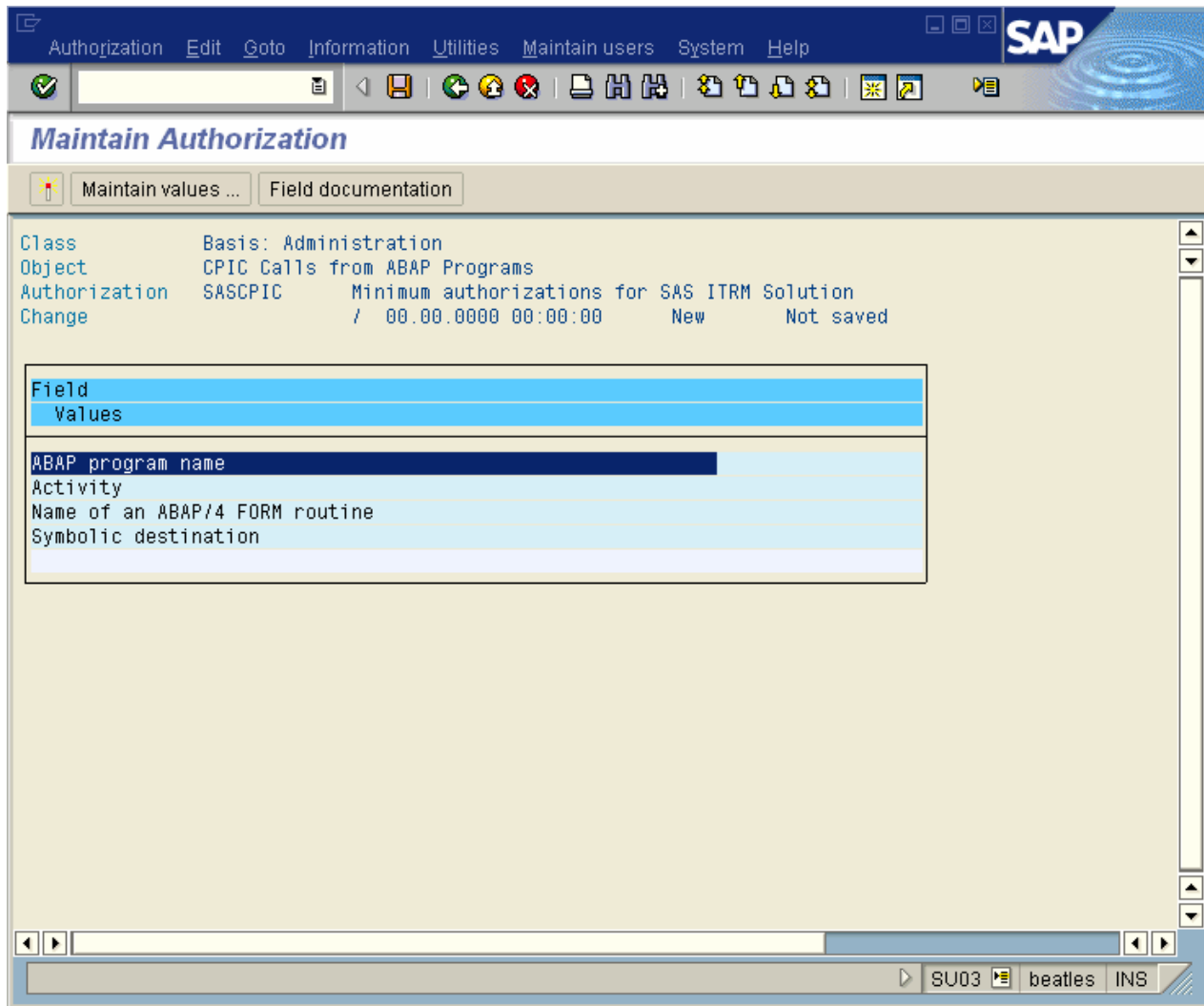
**Display C.4** Authorization List Window

- In the Authorization List window, from the menu bar at the top, select **Authorization** → **Create**. The Create New Authorization window opens for SASCPIC (Display C.5).



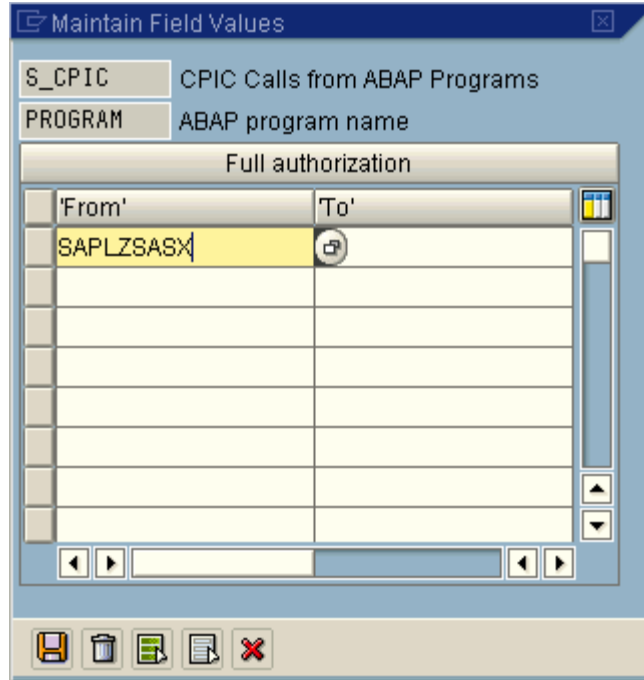
**Display C.5** Create New Authorization Window

- In the **Text** field, type a description for this authorization and click the check-mark button. The Maintain Authorization window opens (Display C.6).



**Display C.6** Maintain Authorization Window

- In the Maintain Authorization window, double-click **ABAP program name**. The Maintain Field Values window opens for S\_CPIC (Display C.7).



**Display C.7** Maintain Field Values Window

8. To restrict permissions for S\_CPIC so that it can execute only the ABAP program SAPLZSASX, from the Maintain Field Values window do the following:
  - Type SAPLZSASX in the 'From' column (where ZSASX is the function group).
  - Note that there is no 'From' – 'To' range.
  - To save your changes, click the diskette icon.

The following is an example of system-generated code to be associated with the ZSASX function group.

```

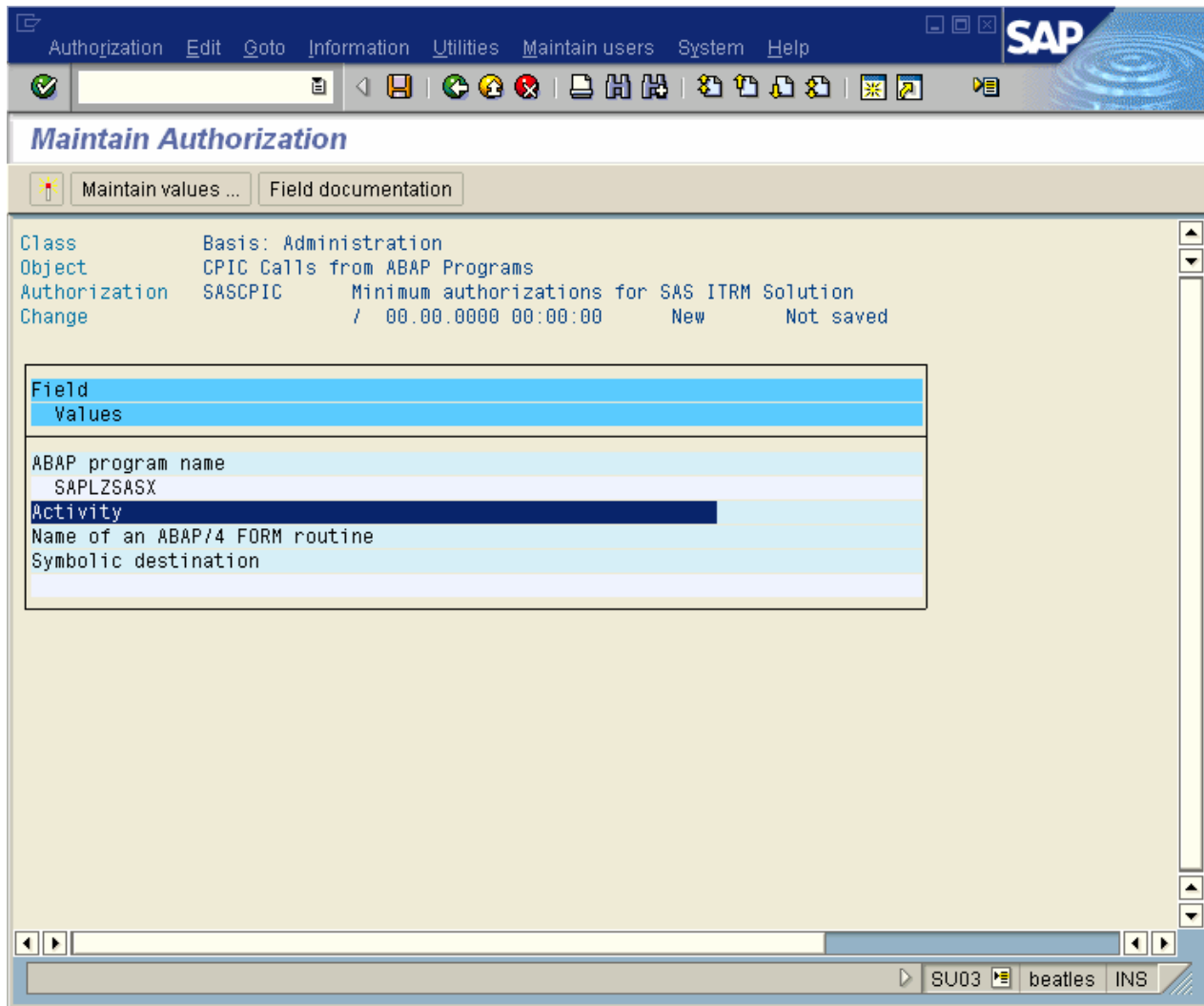
*****
*   System-defined Include-files.                               *
*****
INCLUDE LZSASXTOP.                " Global Data
INCLUDE LZSASXUXX.                " Function Modules

*****
*   User-defined Include-files (if necessary).                 *
*****
* INCLUDE LZSASXF...                " Subprograms
* INCLUDE LZSASXO...                " PBO-Modules
* INCLUDE LZSASXI...

```

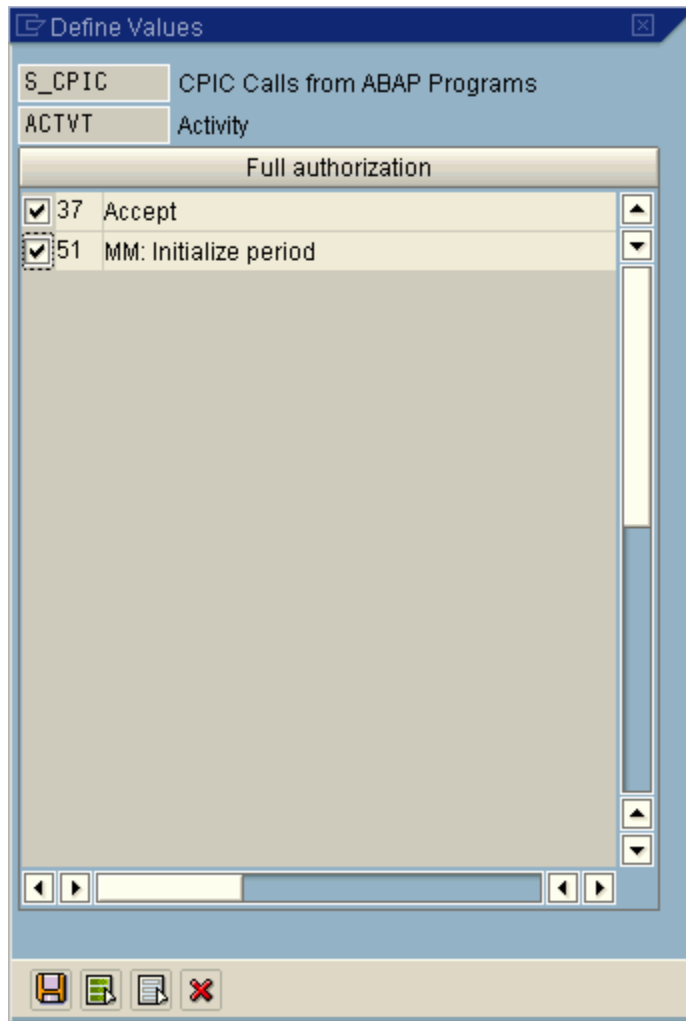
The account is restricted so that it can execute only the solution adapter function module Z\_SAS\_SAPWL\_STATREC\_READ\_FILE.

9. In the Maintain Authorization window, double-click **Activity** (Display C.8).



**Display C.8** Maintain Authorization Window

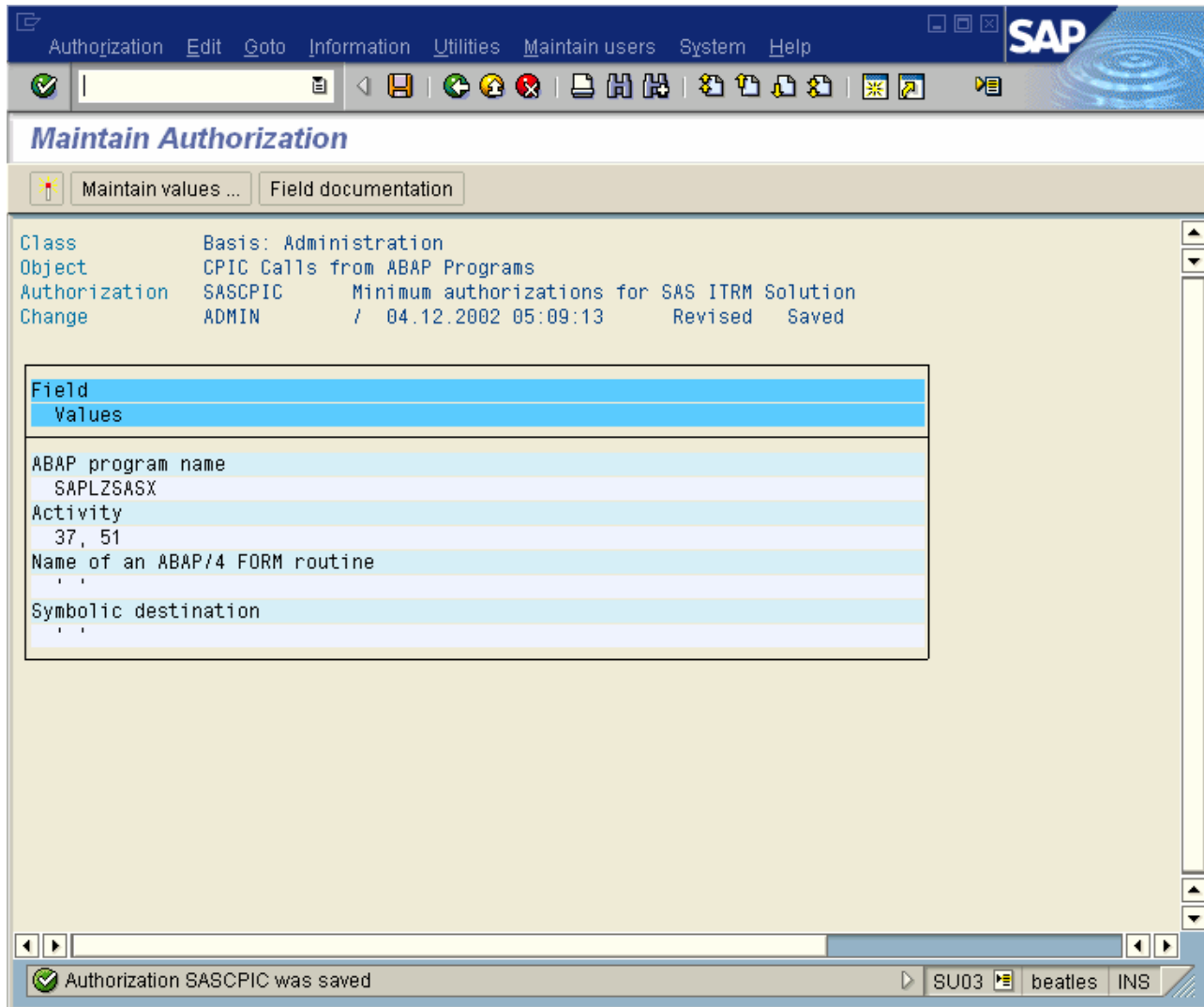
The Define Values window opens (Display C.9).



**Display C.9** Define Values Window

10. In the Define Values window, select the check boxes for activities 37 and 51. To save the changes, click the diskette icon.

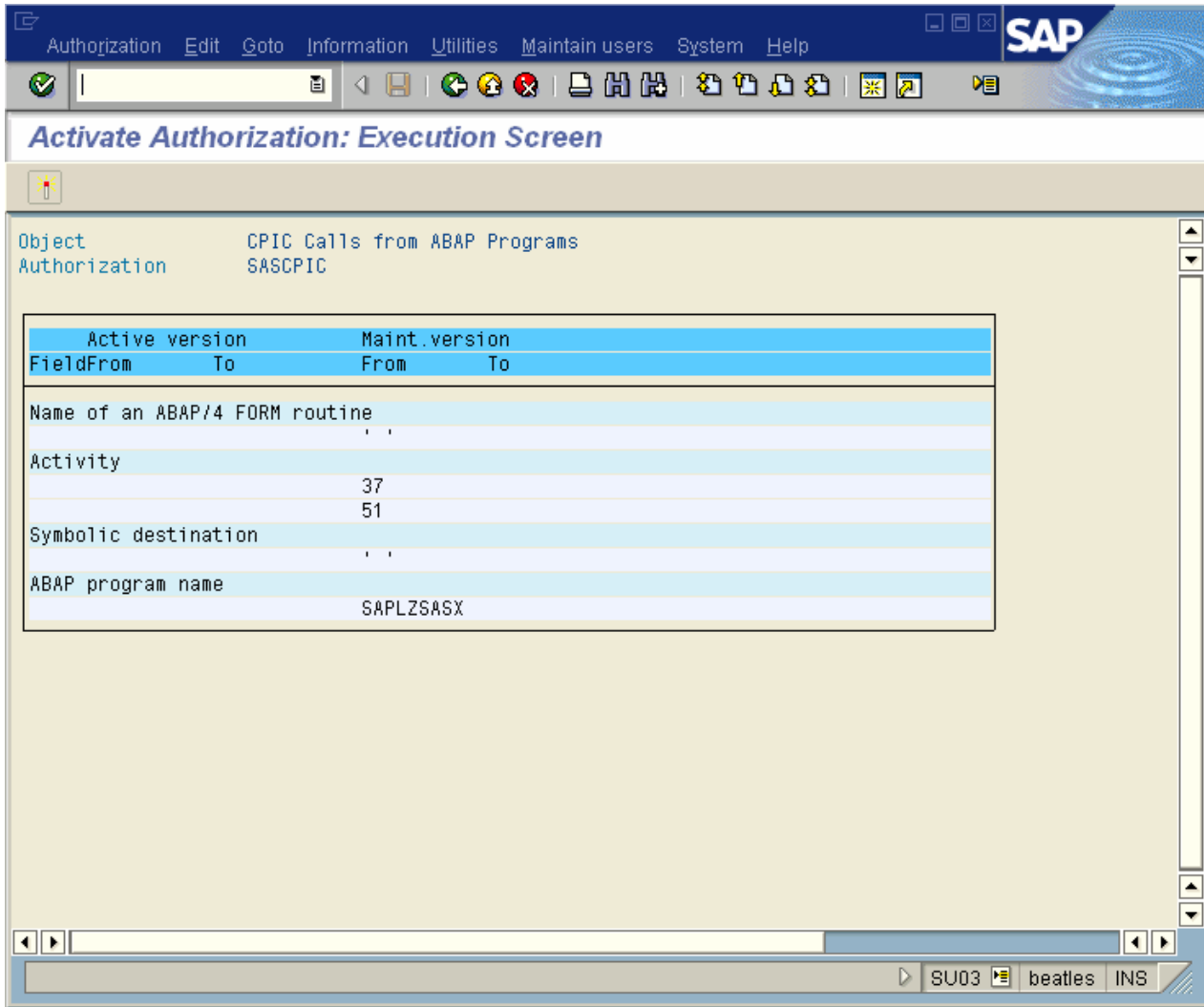
11. To save the authorization, in the Maintain Authorization window (Display C.10), from the menu bar at the top, select **Authorization → Activate**.



**Display C.10** Saving the Authorizations

The Activate Authorization: Execution Screen window opens (Display C.11).

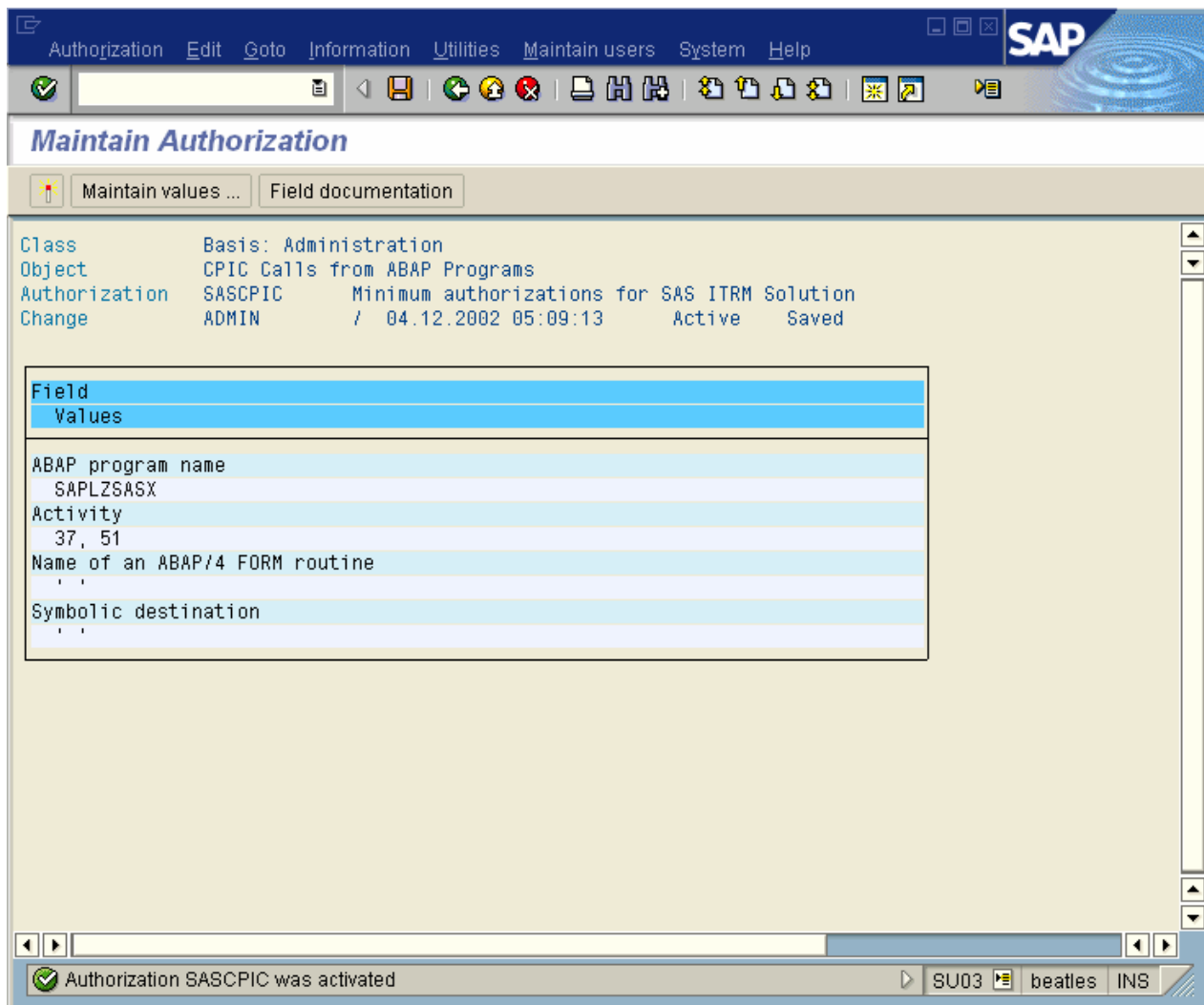




**Display C.11** Activate Authorization: Execution Screen Window

In the Activate Authorization: Execution Screen window, from the menu bar at the top, select **Authorization → Activate**.

A message appears in the status bar at the bottom of the window stating, "Authorization SASCPIC was activated" (Display C.12).

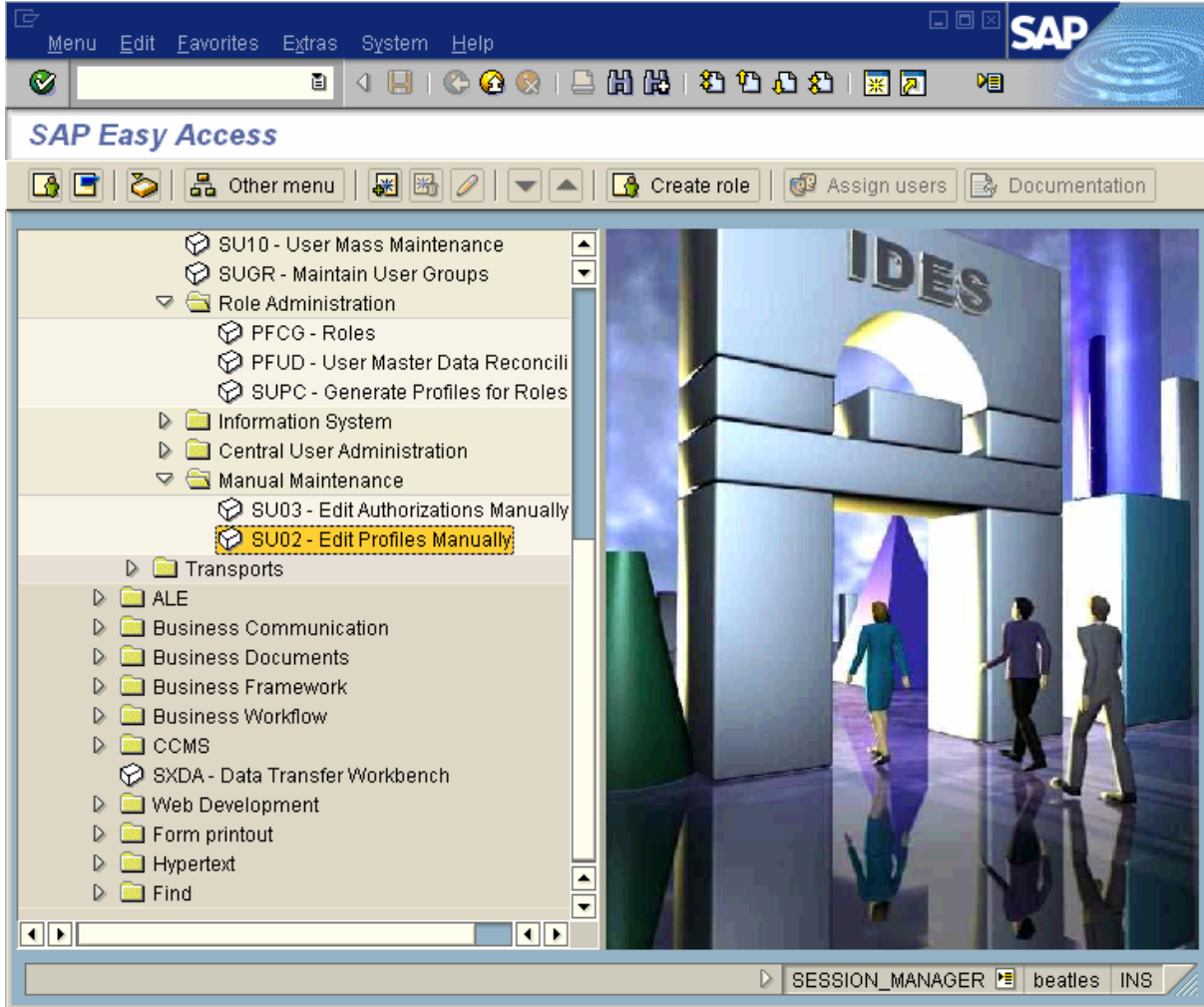


**Display C.12** Authorization Notification

## Editing Profiles Manually

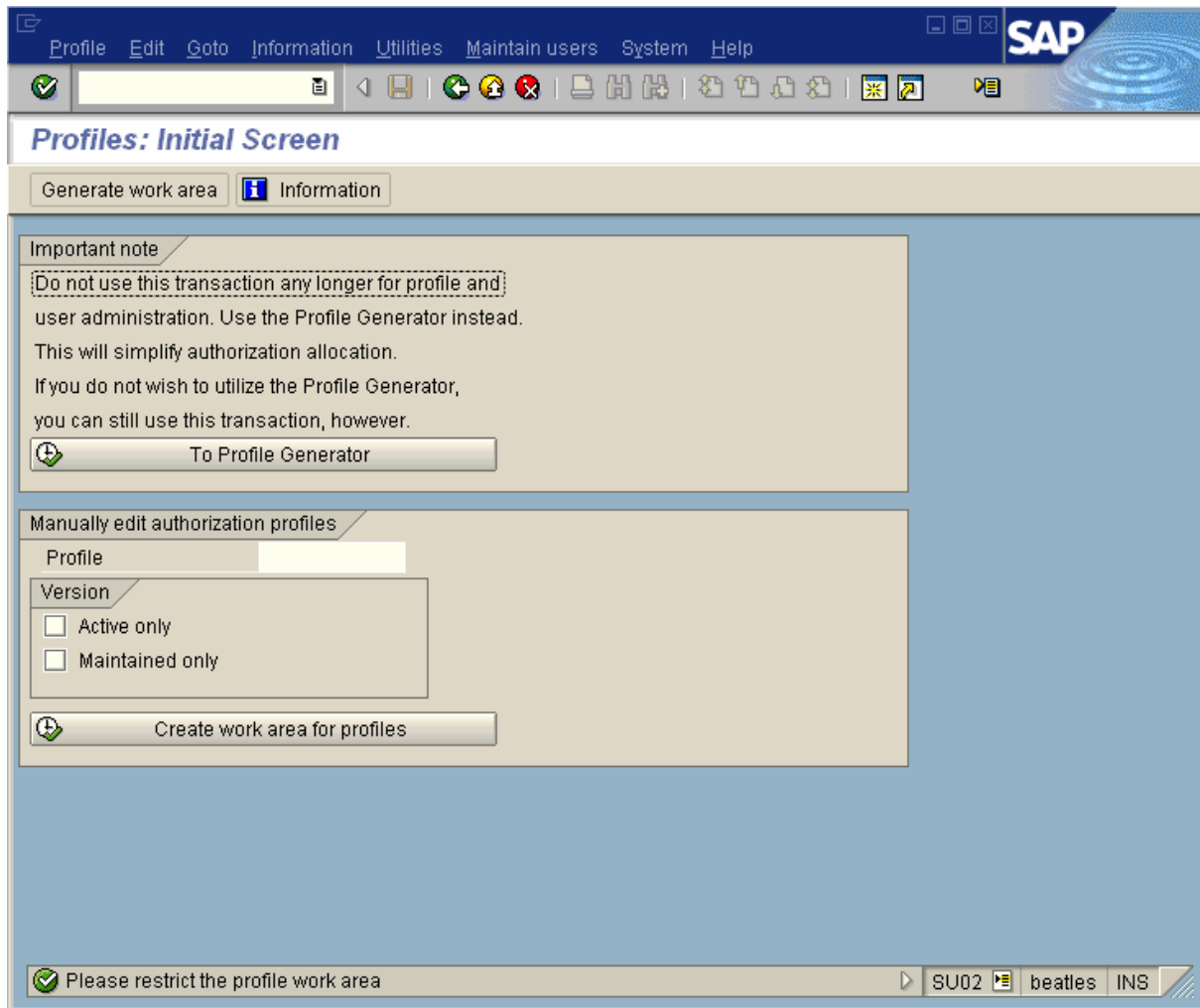
To manually edit the profiles, do the following:

1. In the SAP Easy Access window (Display C.13), click **SU02 – Edit Profiles Manually**.



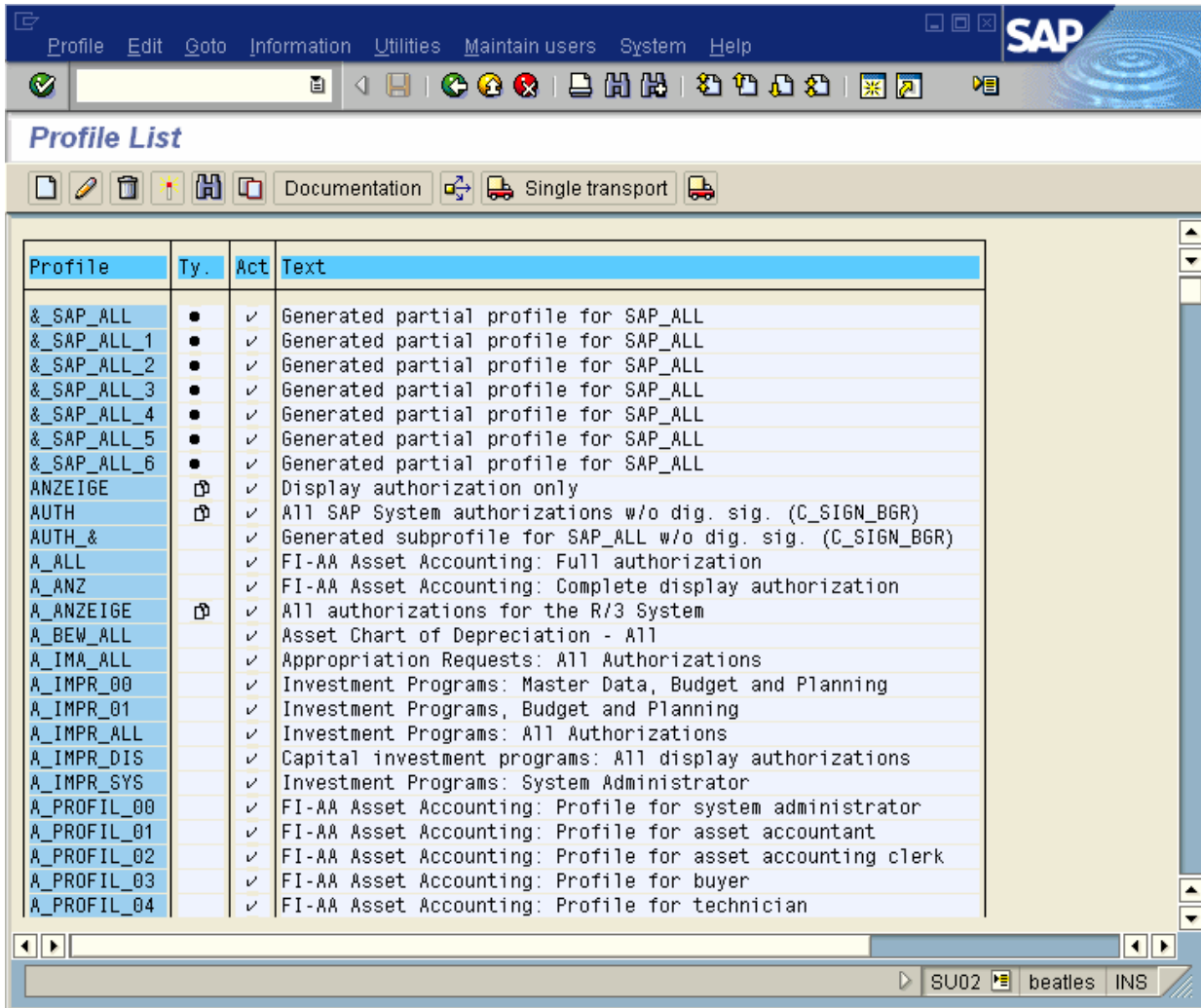
**Display C.13** Edit Profiles Manually

The Profiles: Initial Screen window opens (Display C.14).



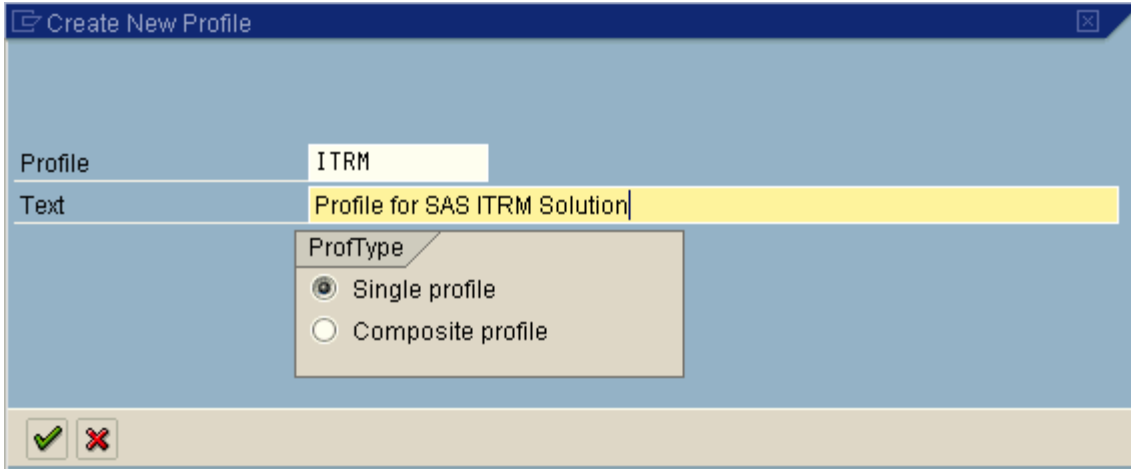
**Display C.14** Profiles: Initial Screen Window

2. In the Profiles: Initial Screen window, near the top left, click **Generate work area**. The Profile List window opens (Display C.15).



Display C.15 Profile List Window

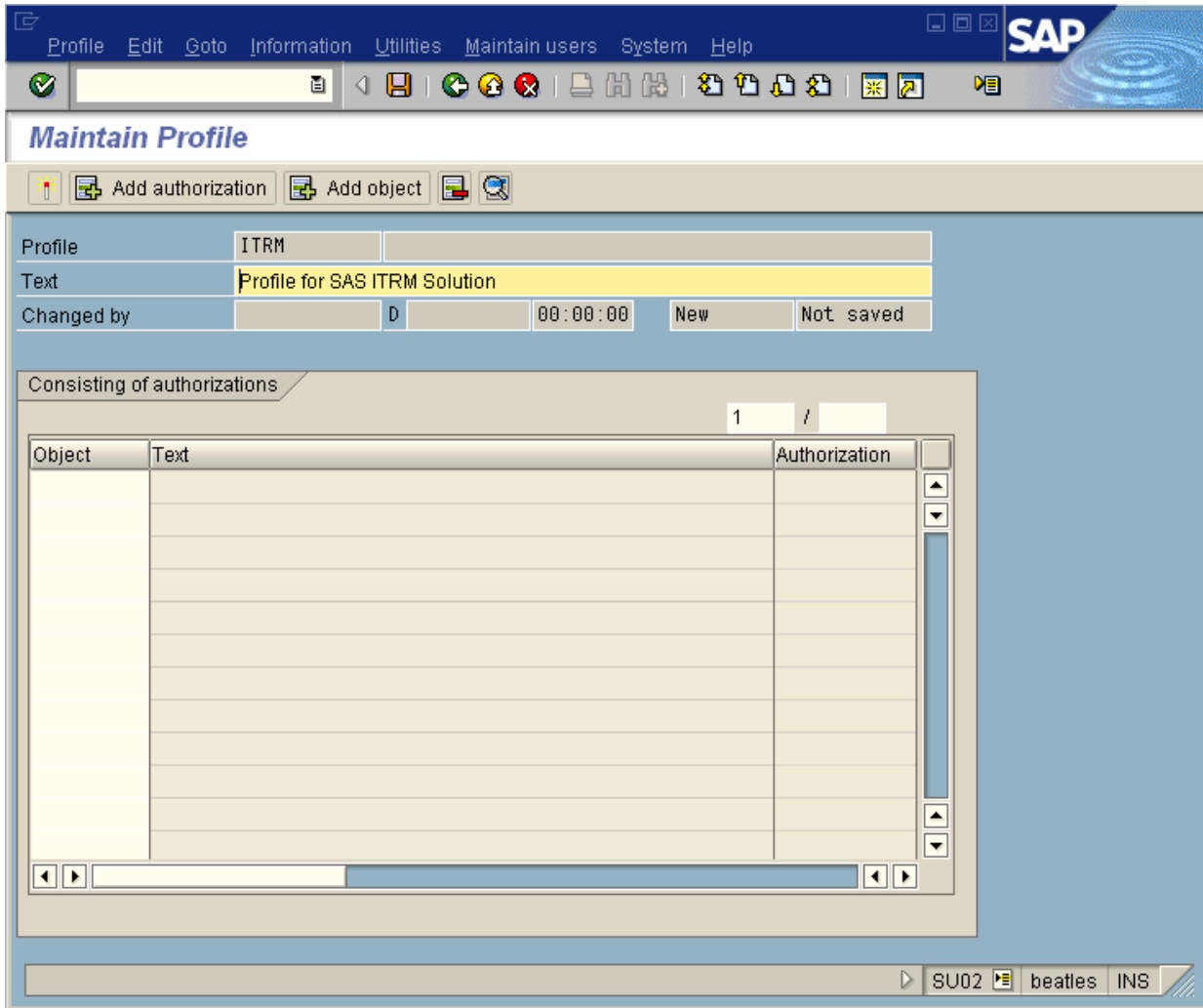
3. In the Profile List window, from the menu bar at the top, select **Profile → Create**. The Create New Profile dialog box appears (Display C.16).



**Display C.16** Create New Profile Dialog Box

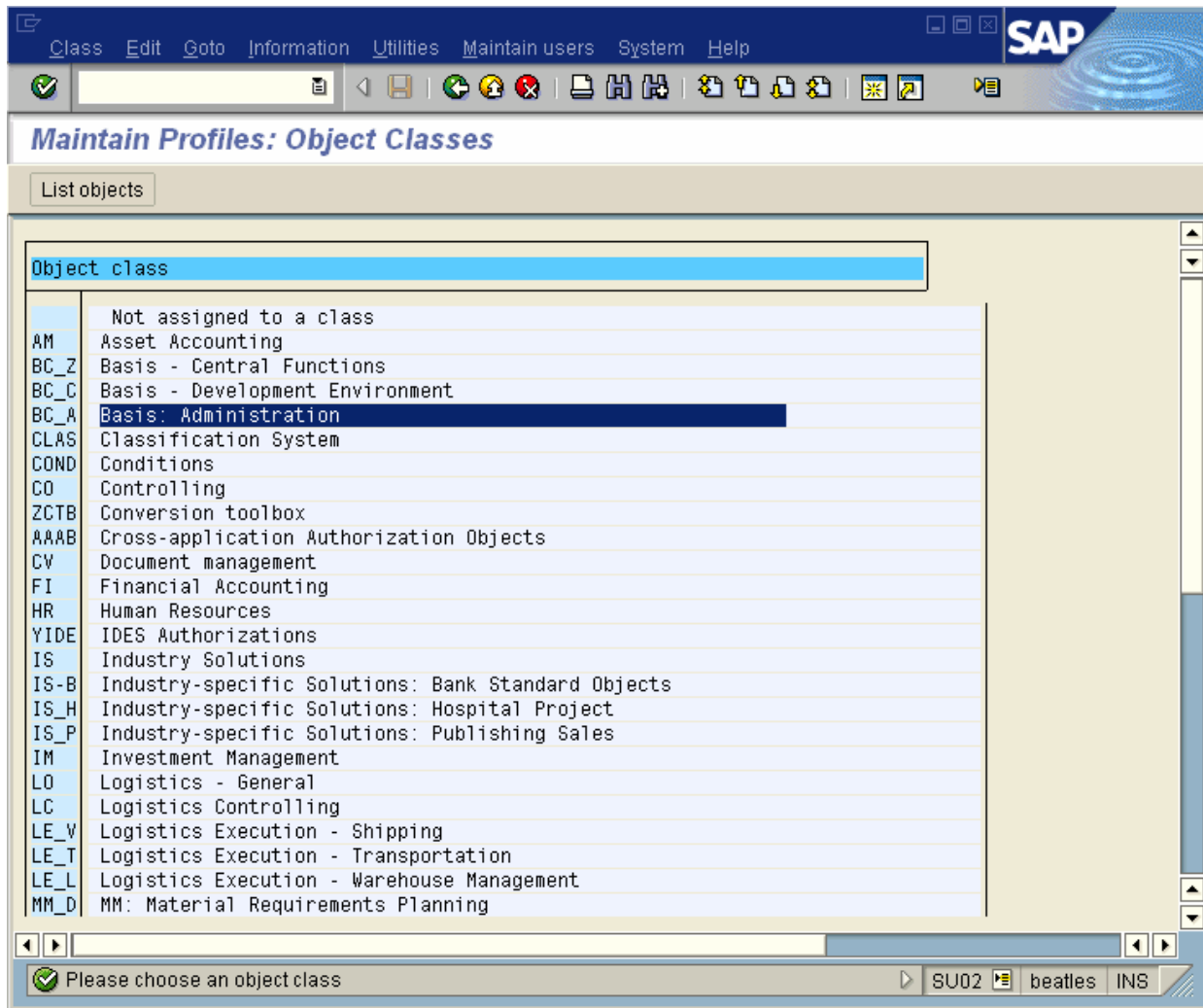
4. To set the new profile, from the Create New Profile dialog box, do the following:
  - In the **Profile** field, enter a profile name.
  - In the **Text** field, enter a description.
  - Under **ProfType**, select **Single profile**.
  - To save the profile, click the check mark.

The Maintain Profile window opens (Display C.17).



**Display C.17** Maintain Profile Window – Add object

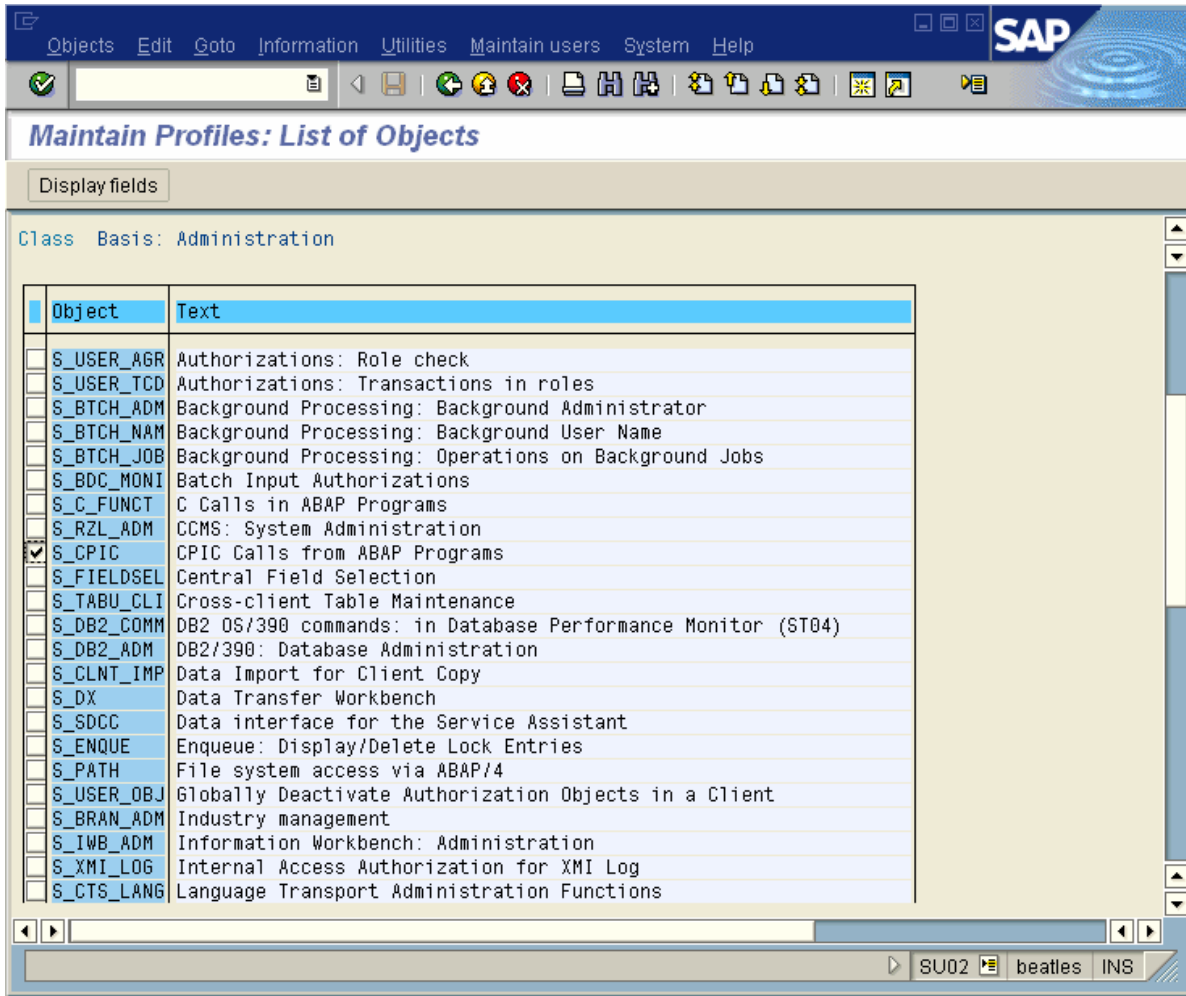
5. To edit the profile, in the Maintain Profile window, click **Add object**. The Maintain Profiles: Object Classes window opens (Display C.18).



**Display C.18** Maintain Profiles: Object Classes Window

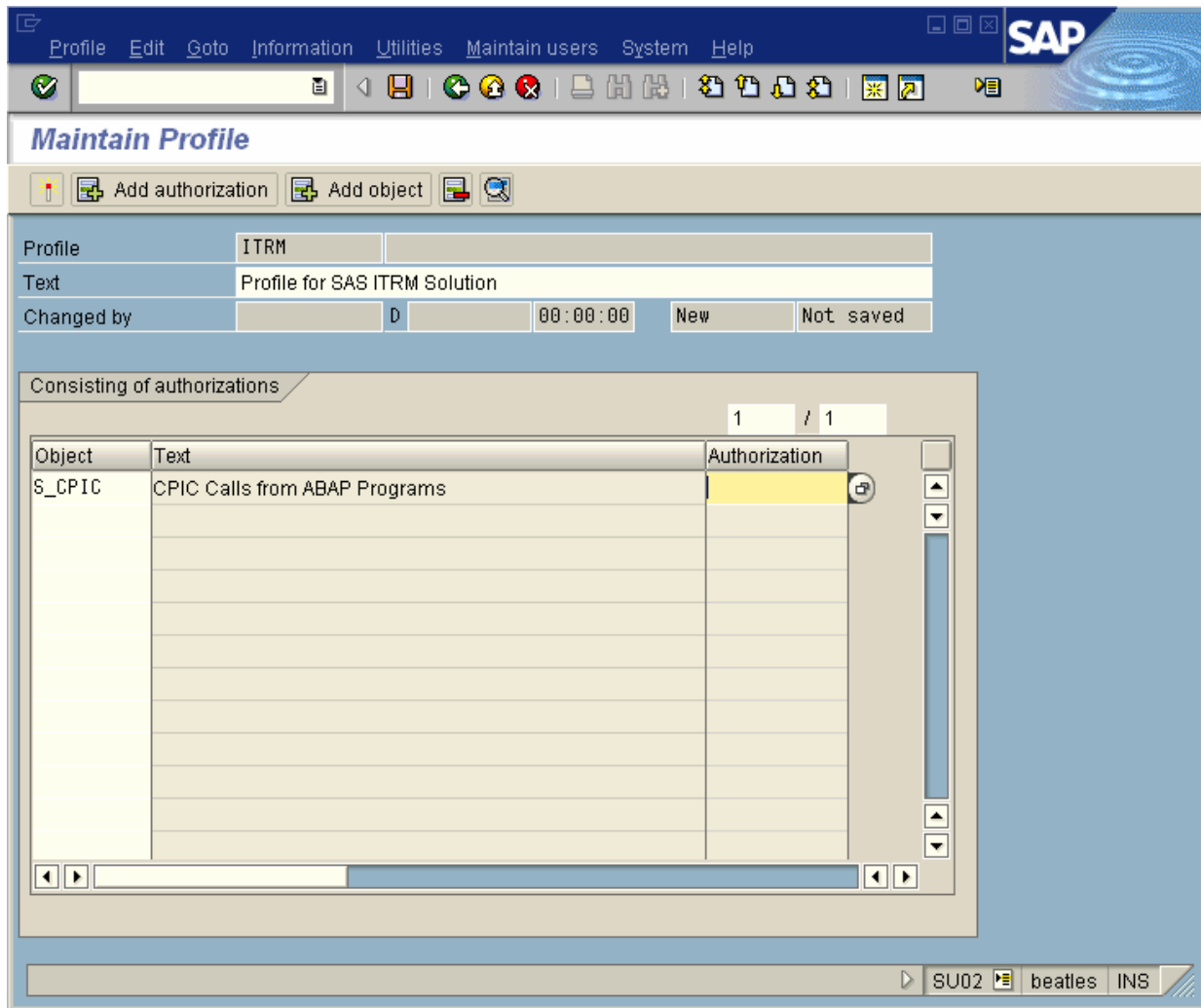
- To modify the profile, in the Maintain Profiles: Object Classes window, double-click **BC\_A Basis: Administration**. The Maintain Profiles: List of Objects window opens (Display C.19).






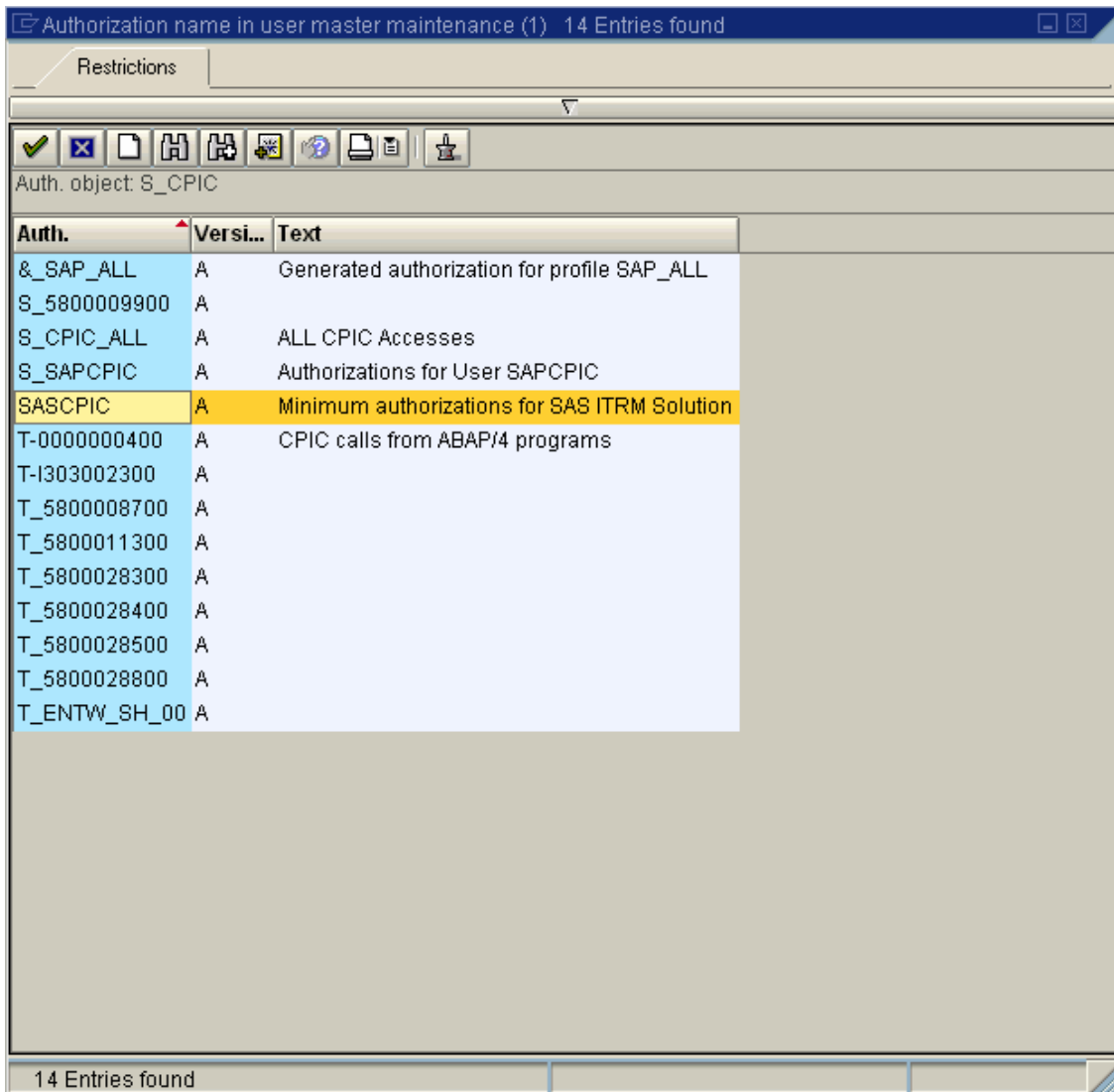
**Display C.19** Maintain Profiles: Object Classes Window

7. In the Maintain Profiles: List of Objects window, select the check box next to **S\_CPIC**. Then, from the menu bar at the top of the window, select **Objects -> Add object**. The Maintain Profile window opens (Display C.20).



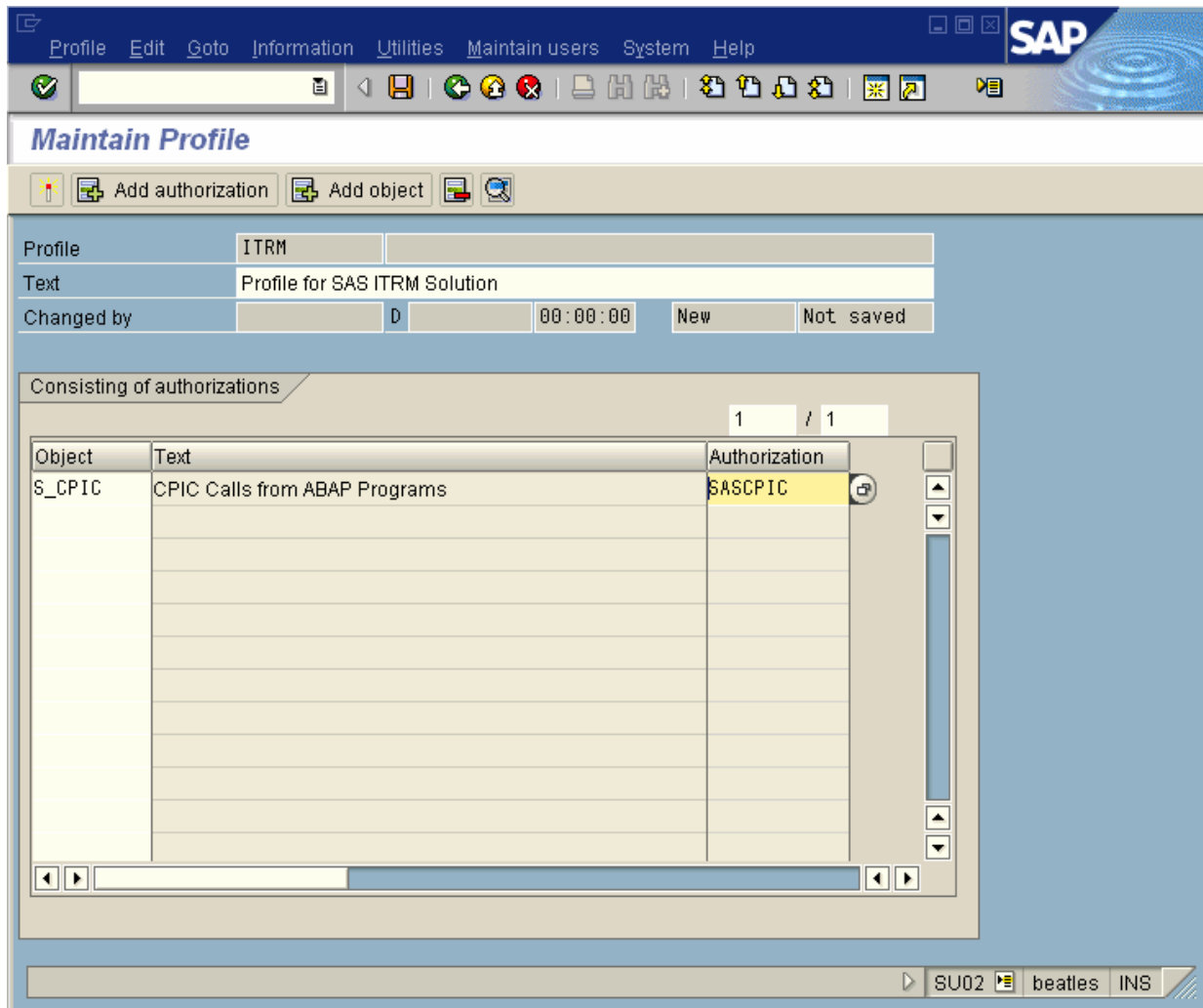
**Display C.20** Maintain Profile Window

- In the Maintain Profile window, in the **Authorization** column, click the list icon . A list of all associated authorizations for the object S\_CPIC appears in the Restrictions window (Display C.21).



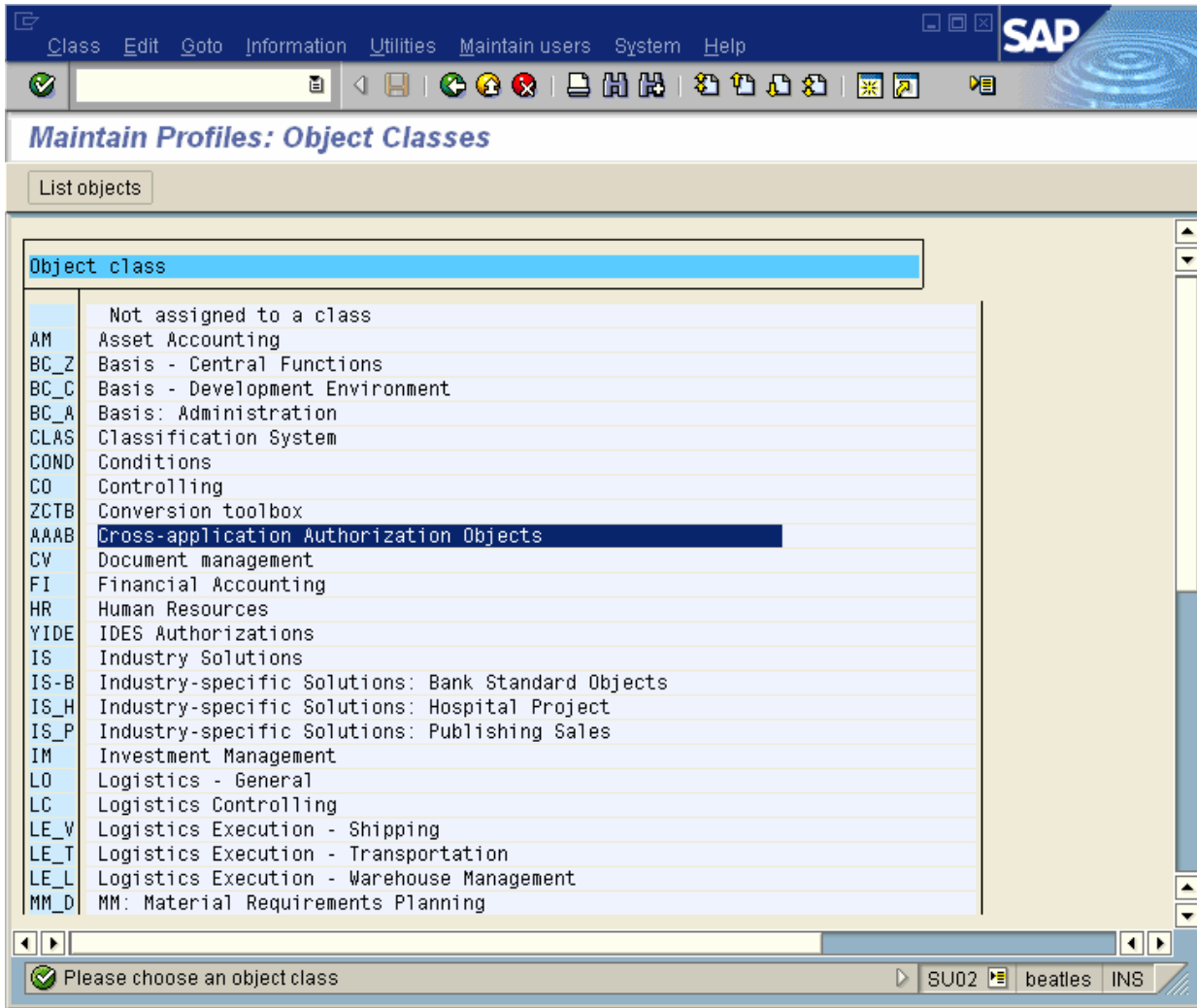
**Display C.21** Restrictions Window

- In the Restrictions window, double-click **SASCPIC** to select the authorization. The Maintain Profile window opens (Display C.22).



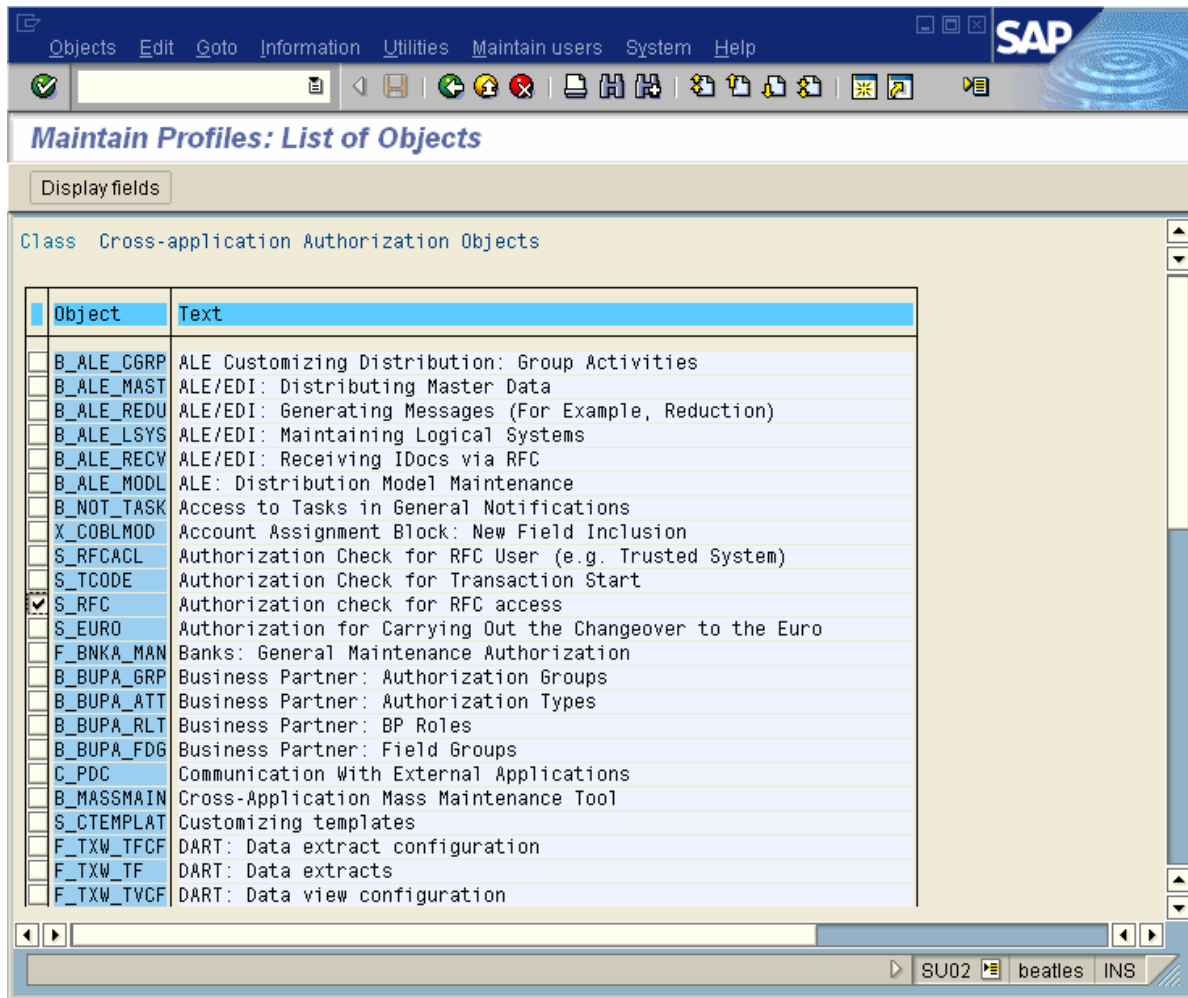
**Display C.22** Maintain Profile Window

- In the Maintain Profile window, click **Add object**. The authorization SASCPIC is associated with the object S\_CPIC. The Maintain Profiles: Object Classes window opens (Display C.23).



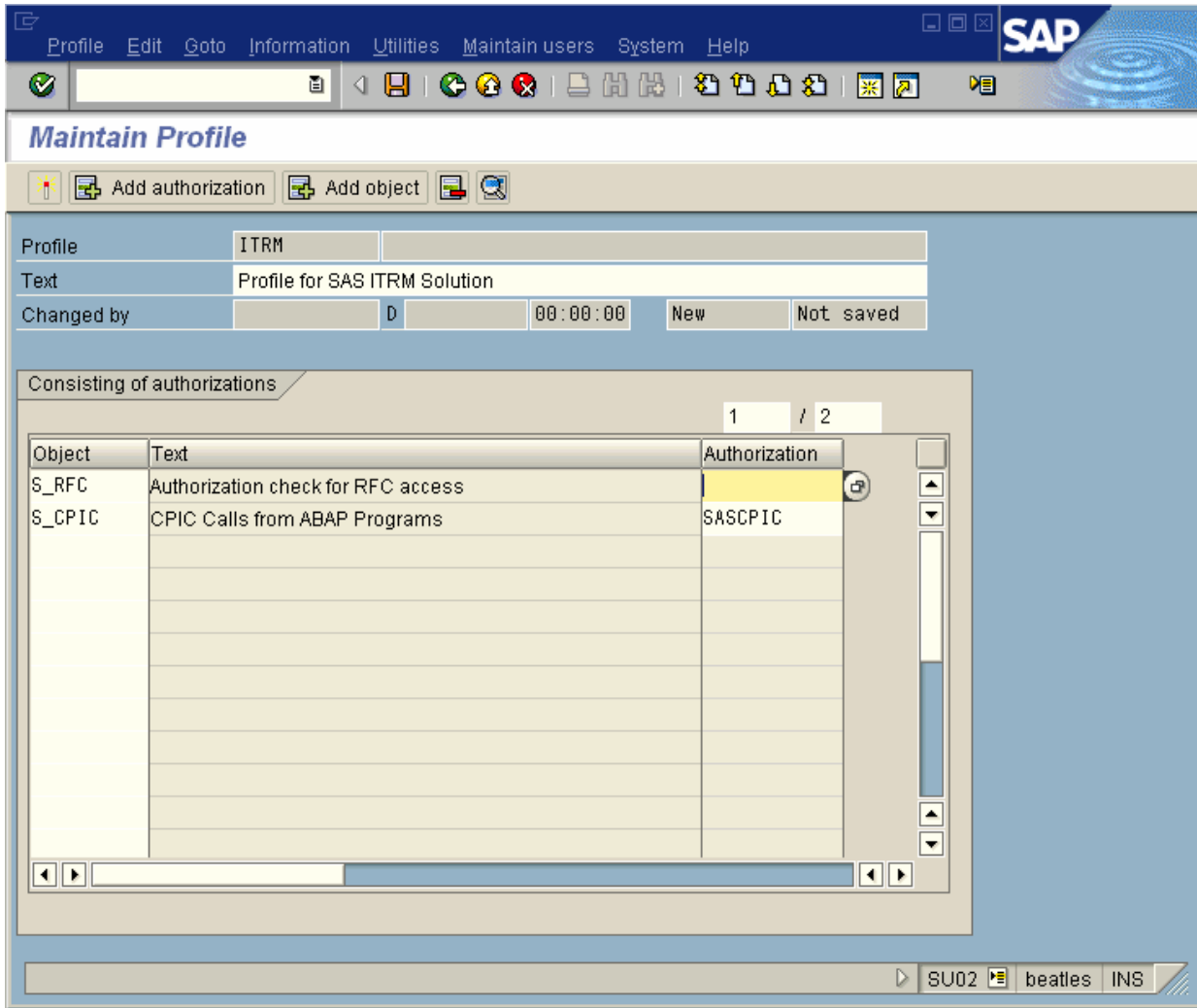
**Display C.23** Maintain Profiles: Objects Classes Window

11. In the Maintain Profiles: Object Classes window, double-click **AAAB Cross-application Authorization Objects**. The Maintain Profiles: List of Objects window opens (Display C.24).




**Display C.24** Maintain Profiles: List of Objects Window

- In the Maintain Profiles: List of Objects window, select the check box next to **S\_RFC**, and from the menu bar at the top select **Objects** → **Add object**. The Maintain Profile window opens (Display C.25).



Display C.25 Maintain Profile Window

13. In the Maintain Profile window, in the **Authorization** column, click the list icon . A list of all associated authorizations for the object S\_RFC appears in the Restrictions window (Display C.26).

Authorization name in user master maintenance (1) 74 Entries found

Restrictions

Auth. object: S\_RFC

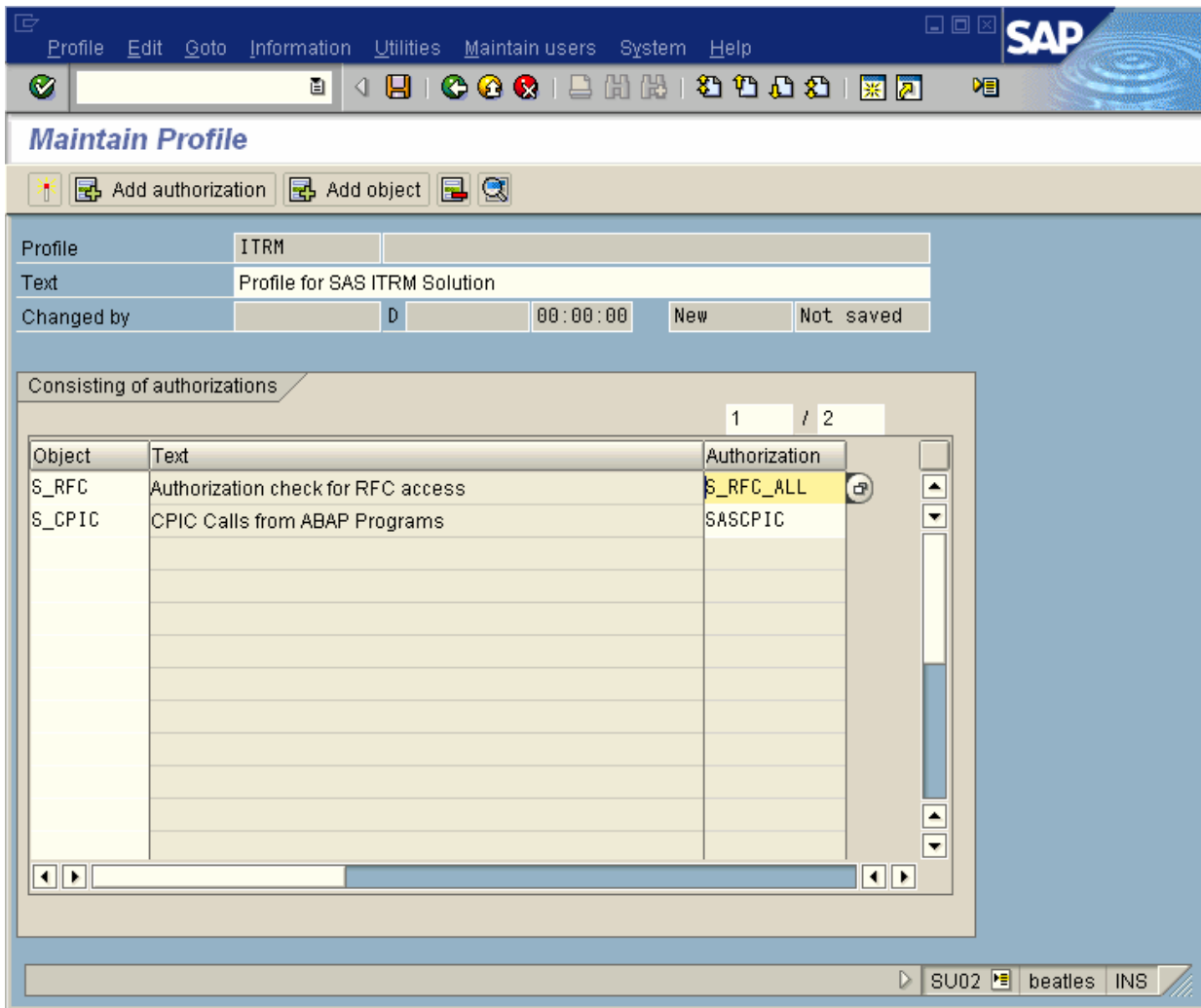
Auth.	Versi...	Text
S_CUSTO_QM00	A	
S_CUSTO_SD00	A	
S_CUSTO_TR00	A	
S_RFC_ALL	A	Execute all Function Modules via RFC
S_RFC_CUSCMP	A	RFC authorization for Customizing compare tool
S_RFC_DB2A	A	RFC authorization for DB2/OS390 Alert Router
S_RFC_DEADL	A	RFC Authorization for Workflow Deadline Handling
S_RFC_EVCREA	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_VERS	A	Remote Comparision Using Version Management
S_RFC_WFERR	A	RFC Authorization for Workflow Error Handling
S_RFC_WFLOCL	A	RFC Authorization for WORKFLOW_LOCAL (RFC destina...
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_TMS_RFC	A	RFC Authorization for Transport Management System
SASRFC	A	test
T-0000000400	A	
T-I303002300	A	
T-I355000112	A	
T-S355004800	A	Authorization check for RFC access
T-S355005200	A	Authorization check for RFC access

74 Entries found

**Display C.26** Authorization Restrictions

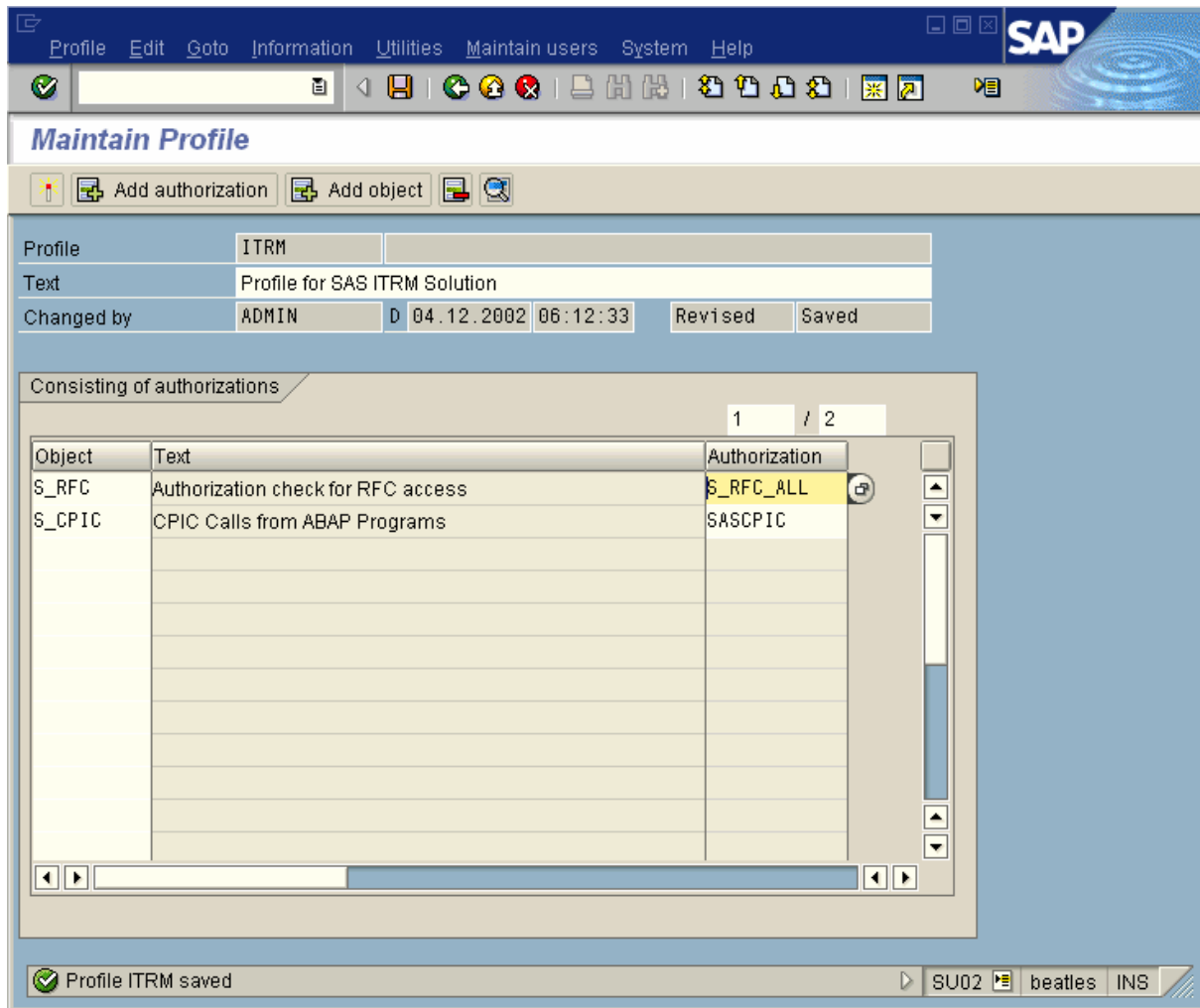
14. In the Restrictions window, double-click the **S\_RFC\_ALL** authorization to select it. The Maintain Profile window opens (Display C.27).





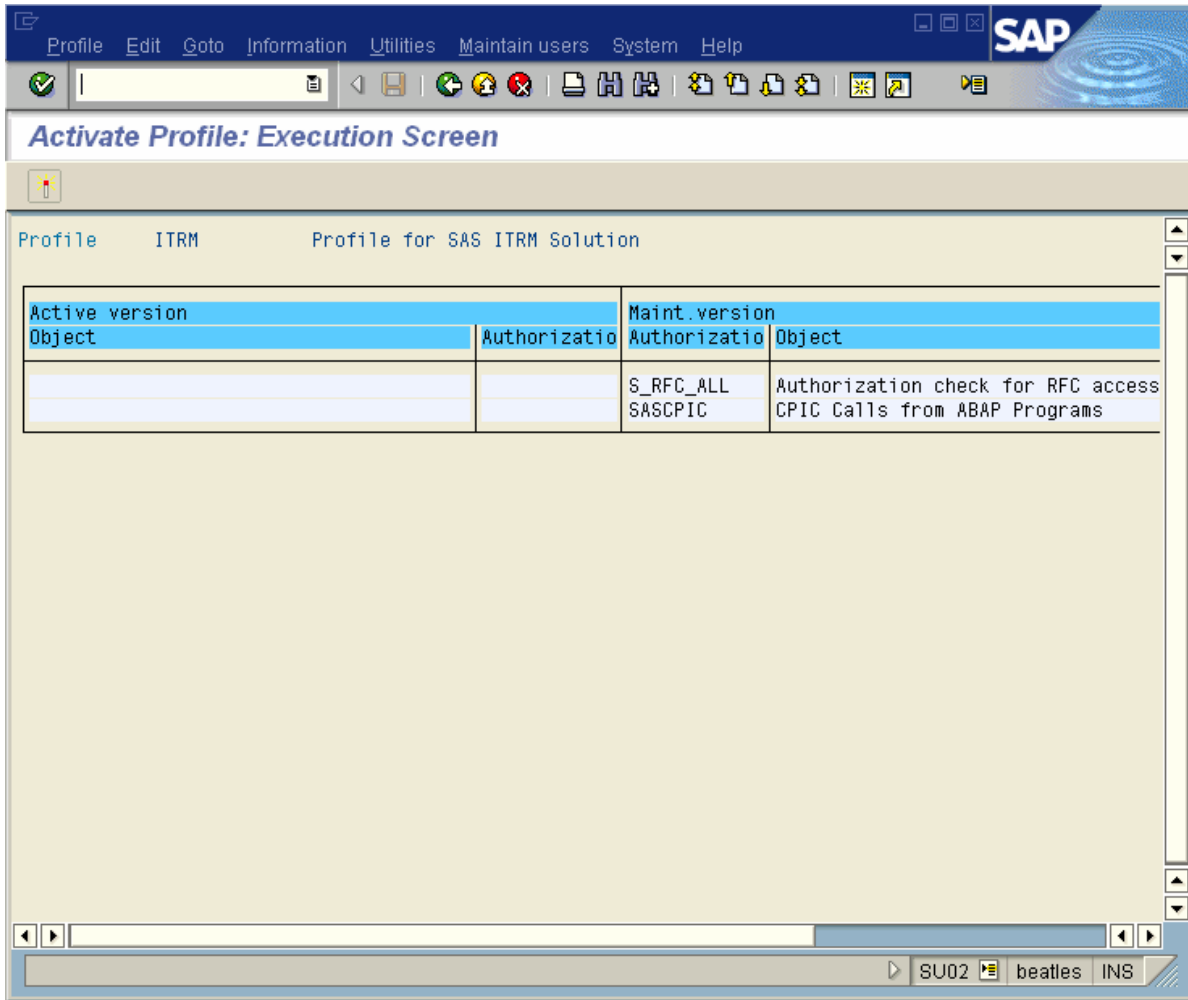
**Display C.27** Maintain Profile – Save Profile

15. To save the profile, in the Maintain Profile window, from the toolbar, click the diskette icon.



**Display C.28** Maintain Profile – Activate Profile

- To activate the profile, in the Maintain Profile window, from the menu bar at the top, select **Profile → Activate**. The Activate Profile: Execution Screen window opens (Display C.29).



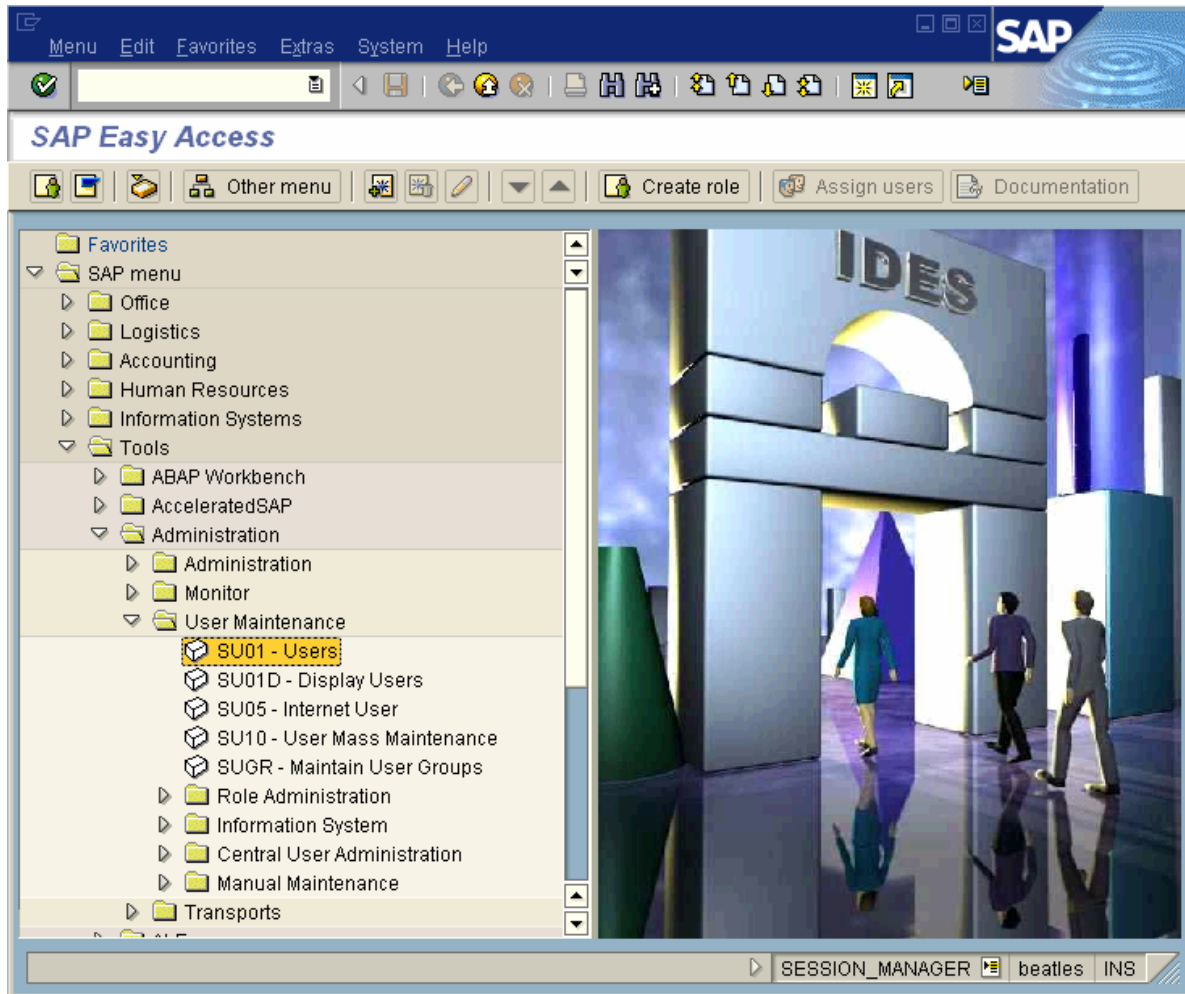
**Display C.29** Activate Profile: Execution Screen Window

17. To activate execution, in the Activate Profile: Execution Screen window, from the menu bar at the top, select **Profile** → **Activate**. The profile is now created and activated. The next step is to associate the profile with a user account.

## Associating the Profile with a User Account

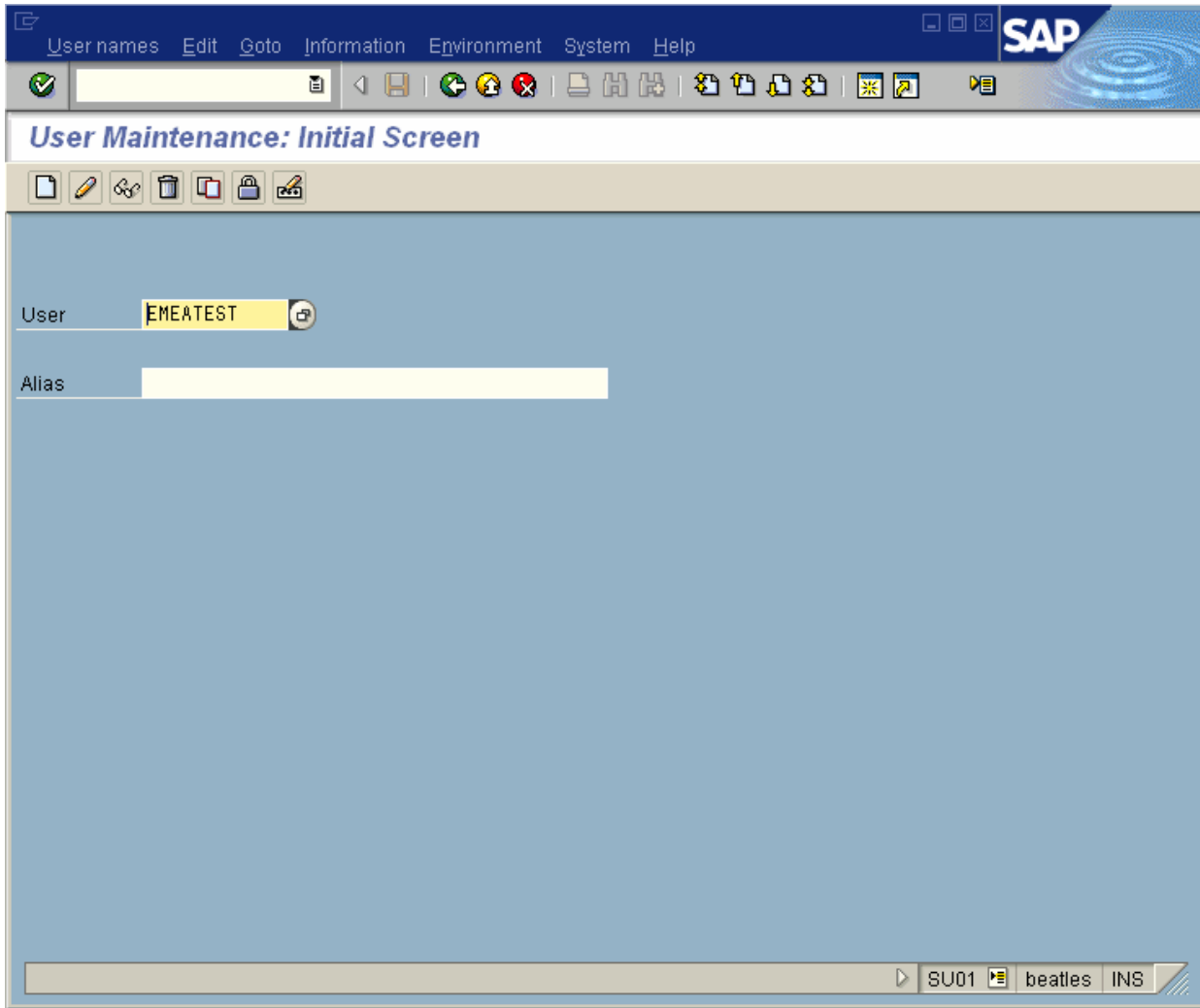
To associate the profile with a user account, do the following:

1. In the SAP Easy Access window, under the heading **User Maintenance**, click **SU01 - Users**.




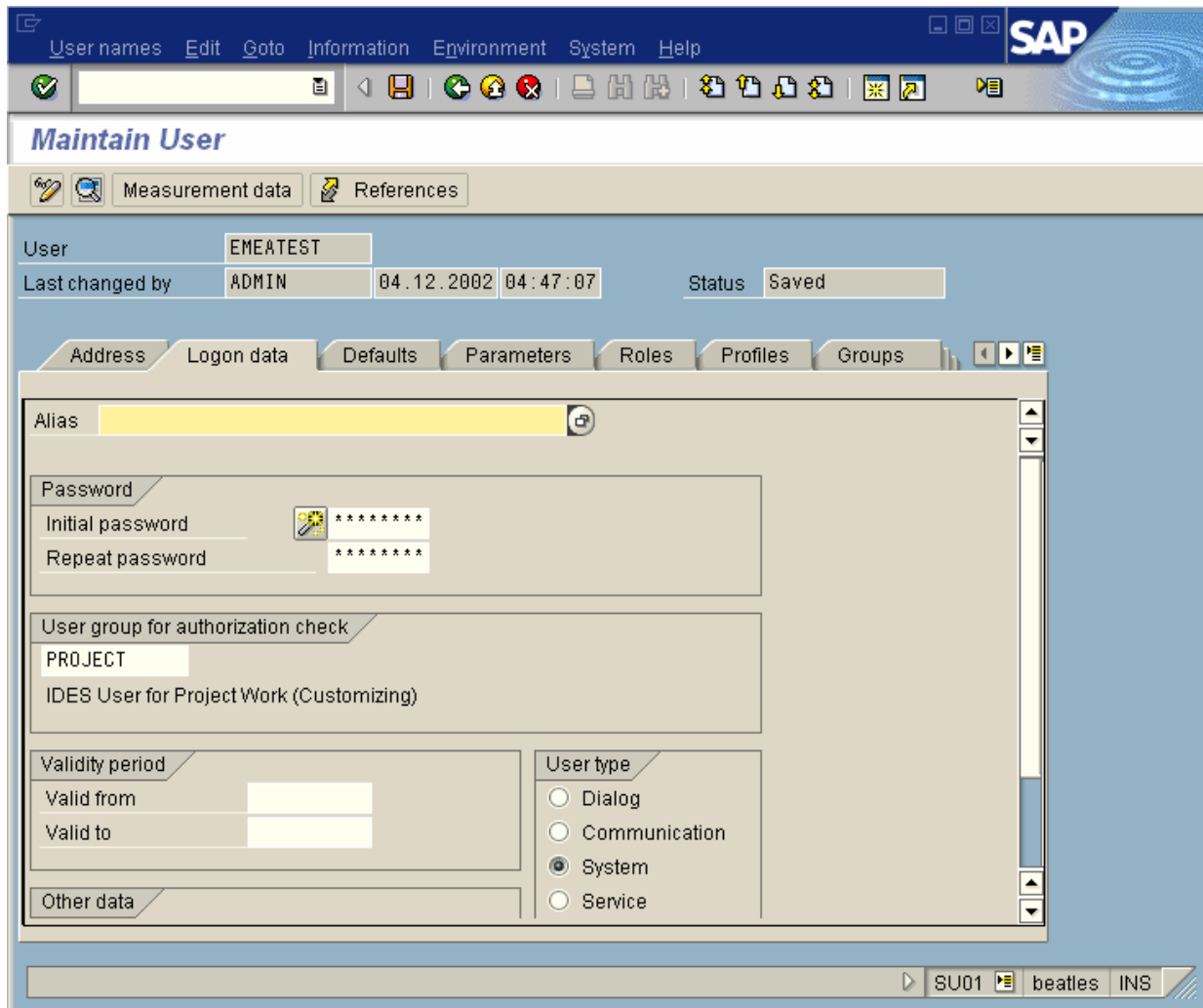
**Display C.30** SAP Easy Access Screen – Associate Profile

The User Maintenance: Initial Screen window opens (Display C.31).




**Display C.31** User Maintenance: Initial Screen Window

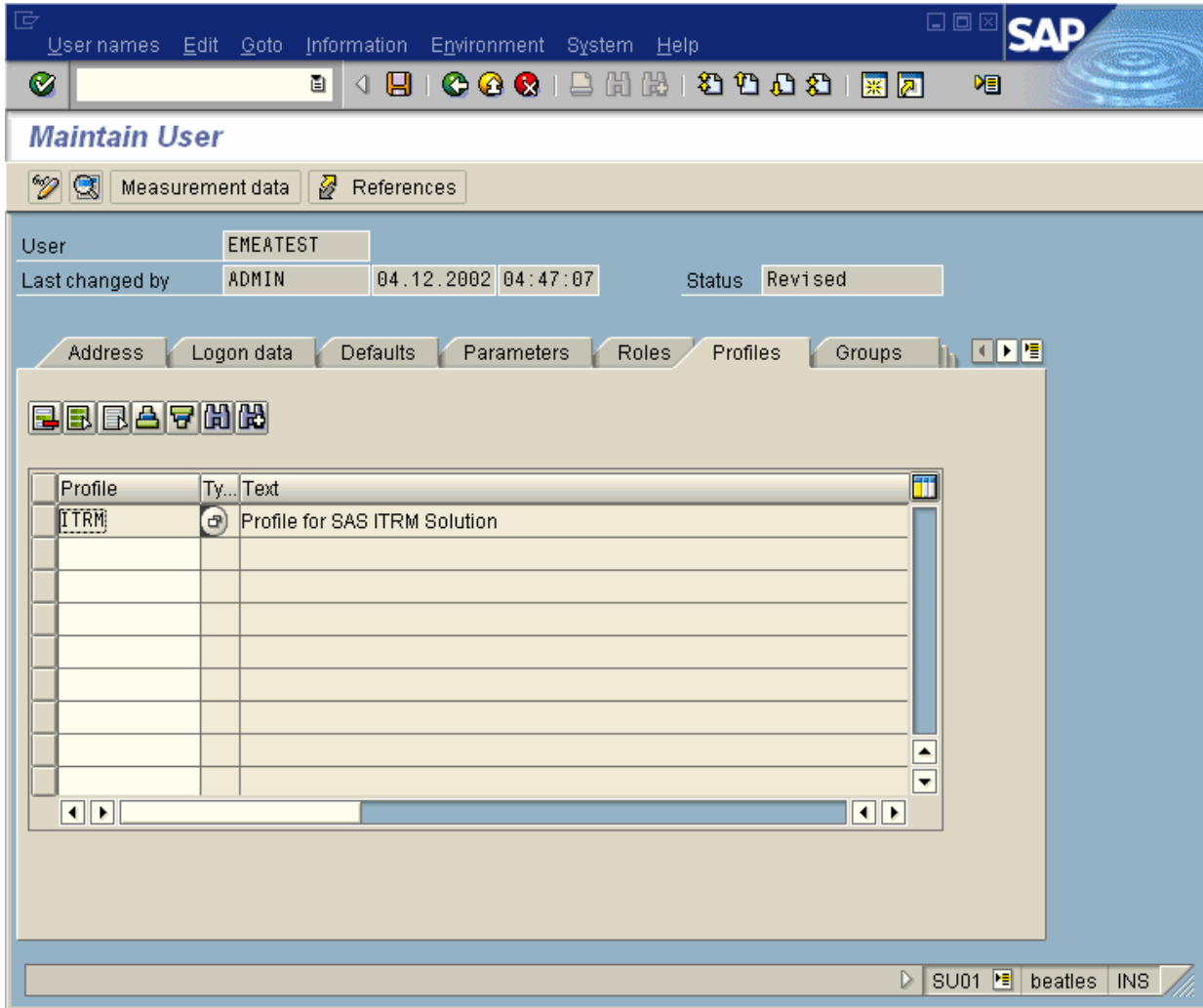
2. To modify the user account, in the User Maintenance: Initial Screen window, in the **User** field, type a user name and click the modify icon . The Maintain User window opens (Display C.32).



**Display C.32** Maintain User Window – Logon data Tab

3. The Maintain User window displays user account logon data information. The account can be a system account to ensure no interactive logins. To apply the previously defined authorization profile, click the **Profiles** tab.

- From the Maintain User window, to select the ITRM profile, click the list icon . From the list that appears, choose ITRM (Display C.33).



**Display C.33** Maintain User Window – ITRM Profile

- To save the modification, from the toolbar at the top, click the diskette icon.

Attempts to access tables other than performance data result in the following error message in the 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.
```

Attempts to read metadata will result in the following errors in the SAS log:

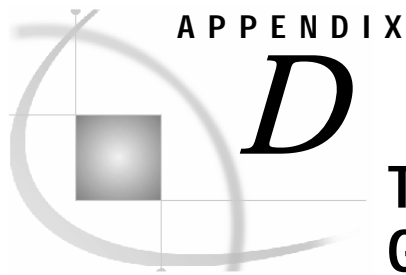
```
Log - (Untitled)

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.
```





## The RFC Destination for the Adapter Gateway Server (Hub) Machine

---

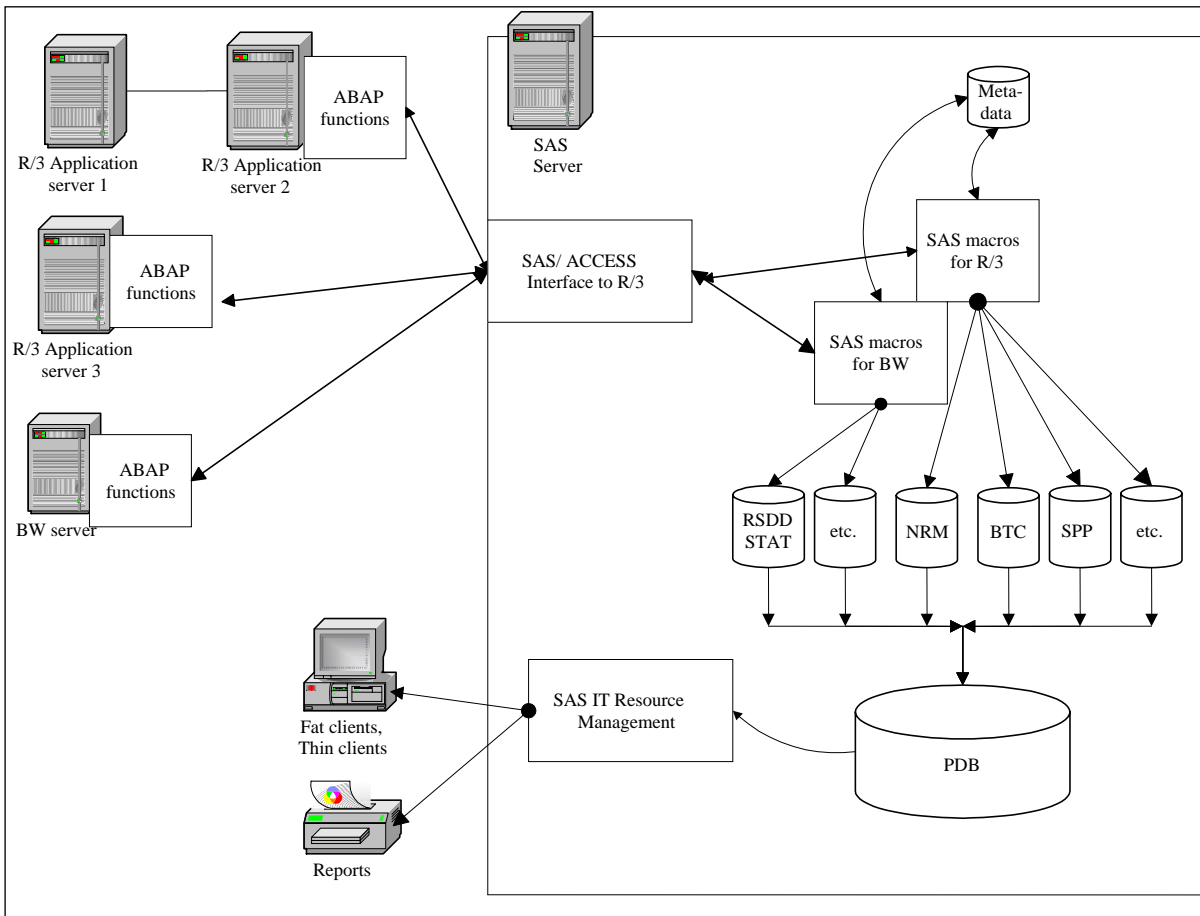
This appendix explains how destinations are used to get data either directly or indirectly.

Note in Figure D.1 (which is identical to Figure 1.1 in Chapter 1) that data from R/3 application servers 2 and 3 is extracted directly into SAS.

However, data from R/3 application server 1 is extracted indirectly, via R/3 application server 2.

**Note:** It is possible to use a hub server to retrieve data from other R/3 servers only if they have the same SAP kernel release.

The R/3 application server 2 is used as a hub or gateway to get information from R/3 server 1 by using an SAP "destination."



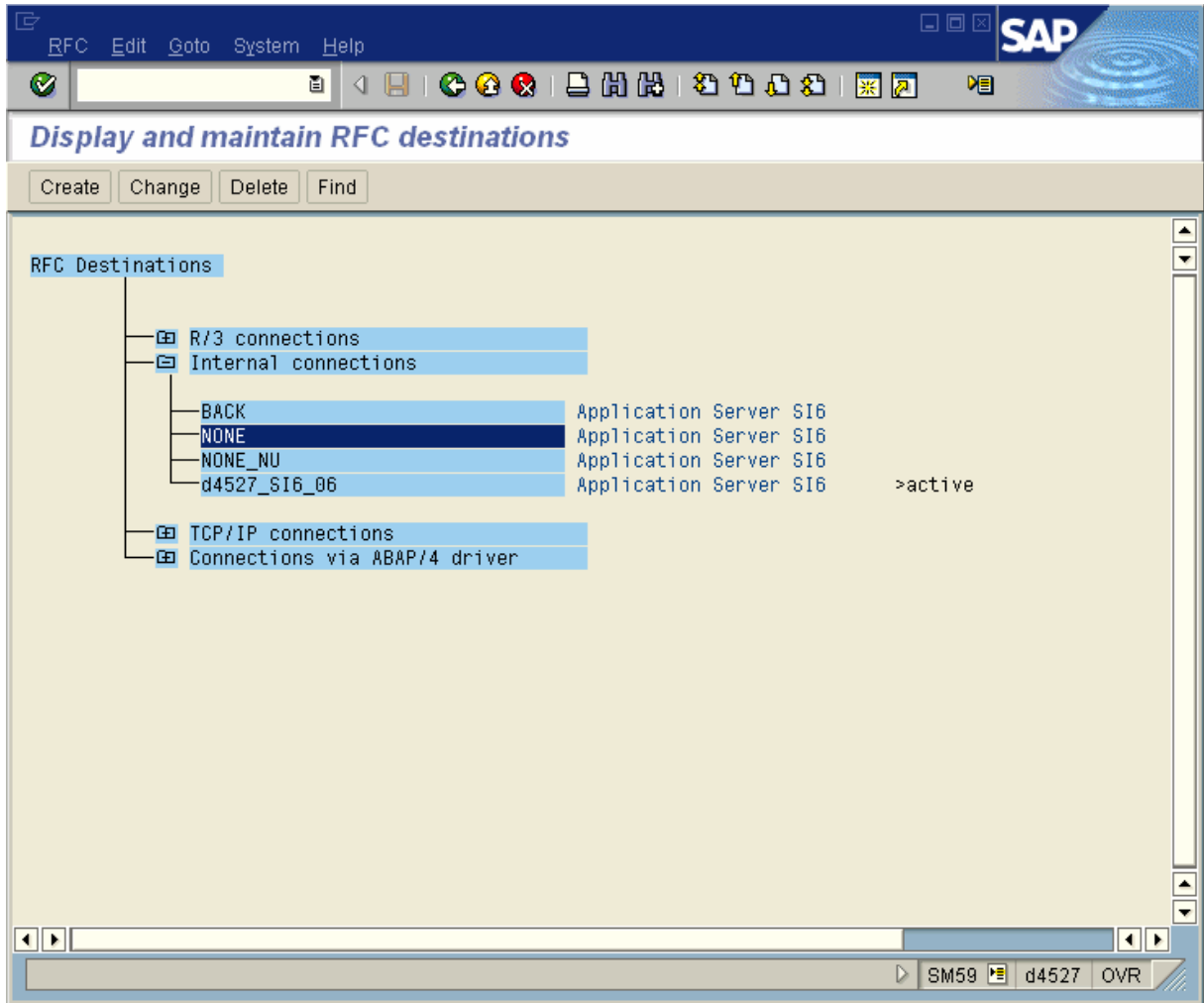
**Figure D.1** Solution Architecture

- The **advantage of direct access** is that there is no load on the hub machine.
- The **advantage of indirect access** is that there is no ABAP installation or maintenance of the remote machine.
- The **disadvantage of the hub approach** is that if the hub is down, then extractions from other machines are not made.

**Note:** If there are no restrictions on installing the ABAP on each machine, then you should use the direct extraction mechanism.

The following example shows an SAP BW instance (Version 6.10) being used as a gateway server. The SAS/ACCESS Interface to R/3 connection profile is BWv30A; this profile will also have the user account information. The RFC destination for this gateway machine is the predefined NONE internal connection.

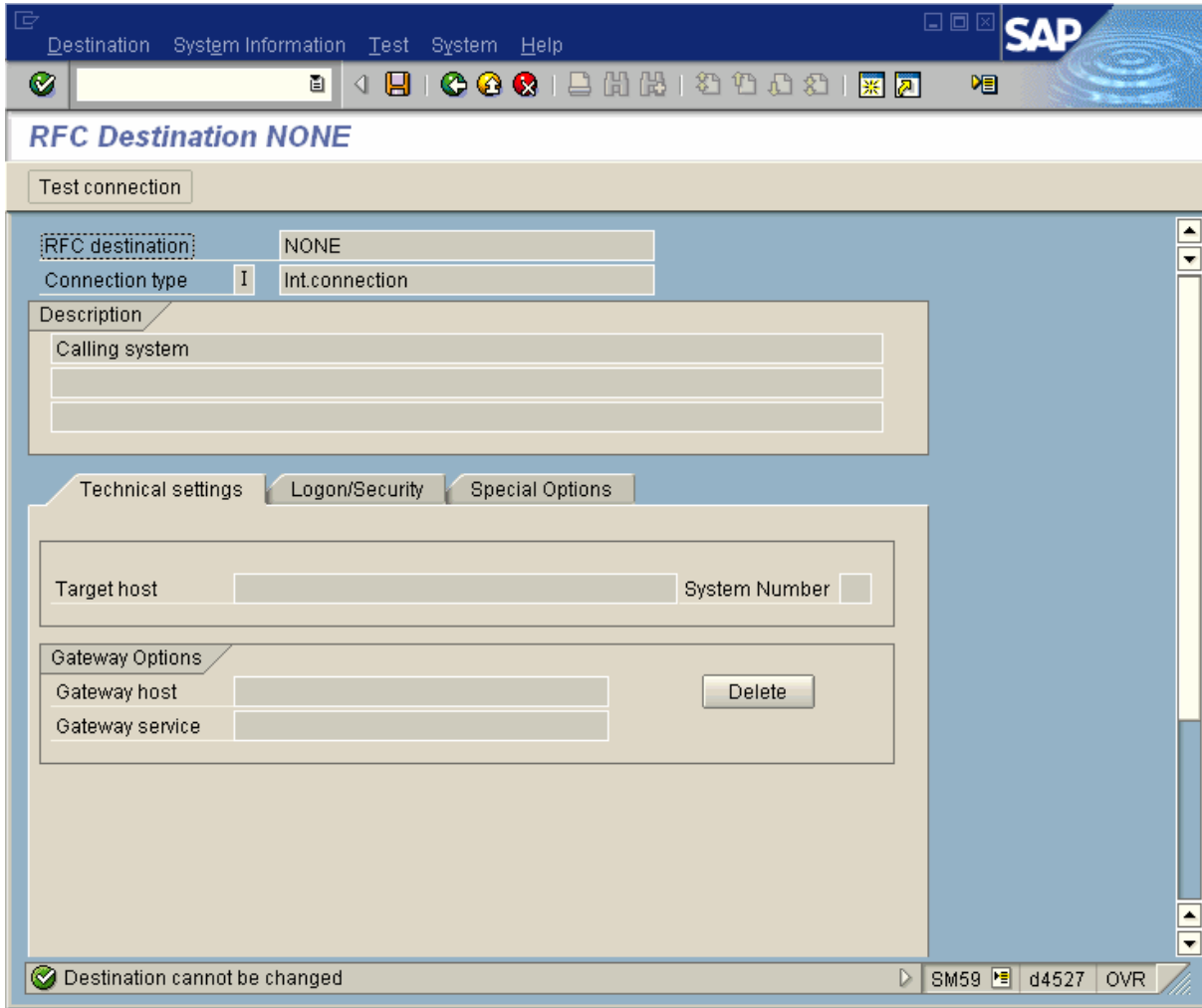
To display the RFC, on the command line, type **SM59**. The Display and maintain RFC destinations window opens (Display D.1). To display the defined internal connection properties for NONE, from within the RFC Destinations tree, double-click **NONE**.



**Display D.1** Display and Maintain RFC Destinations

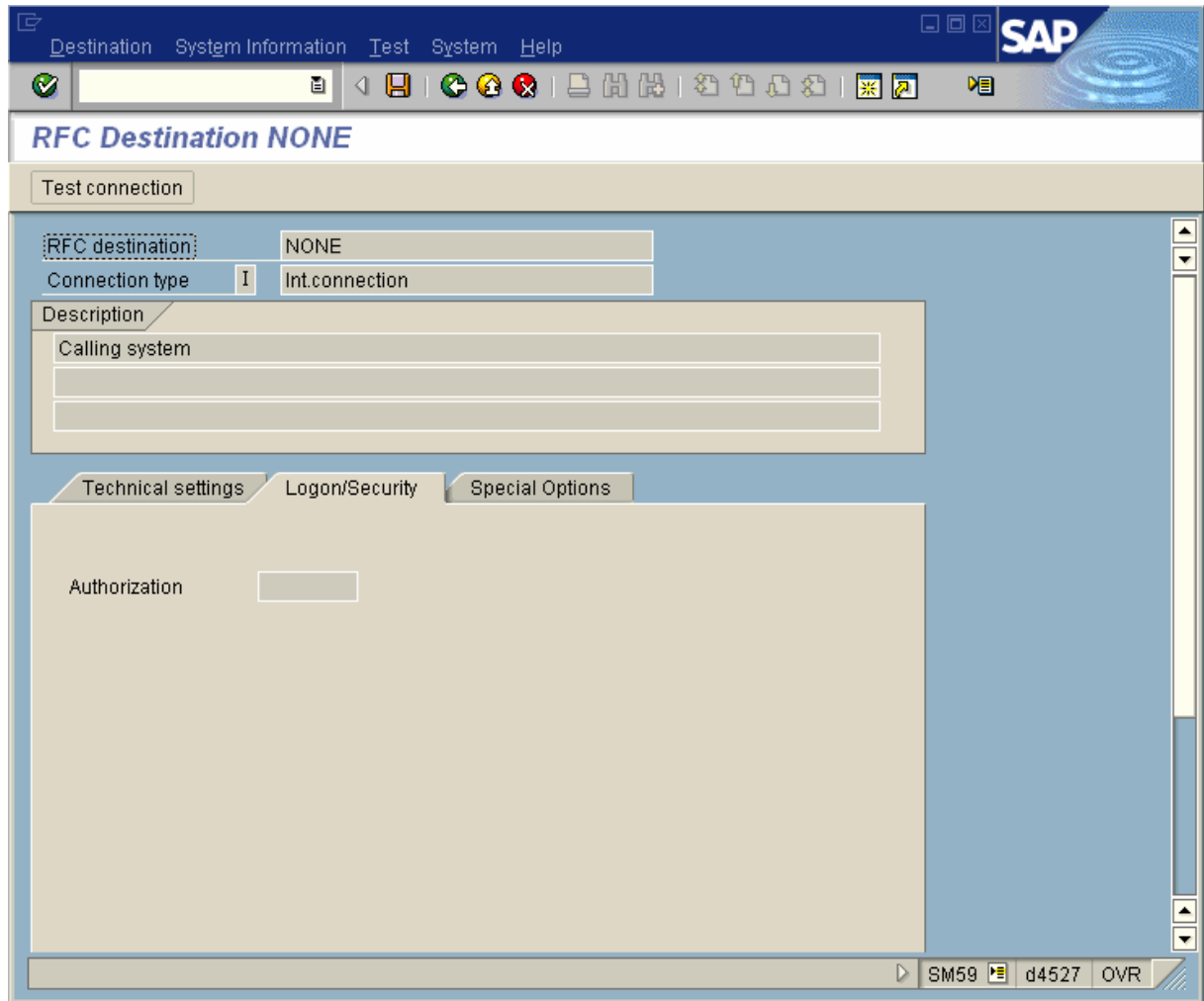
The RFC Destination NONE window opens (Display D.2).

The following displays illustrate the properties for the RFC Destination NONE. Display D.2 shows the **Technical Settings** tab.



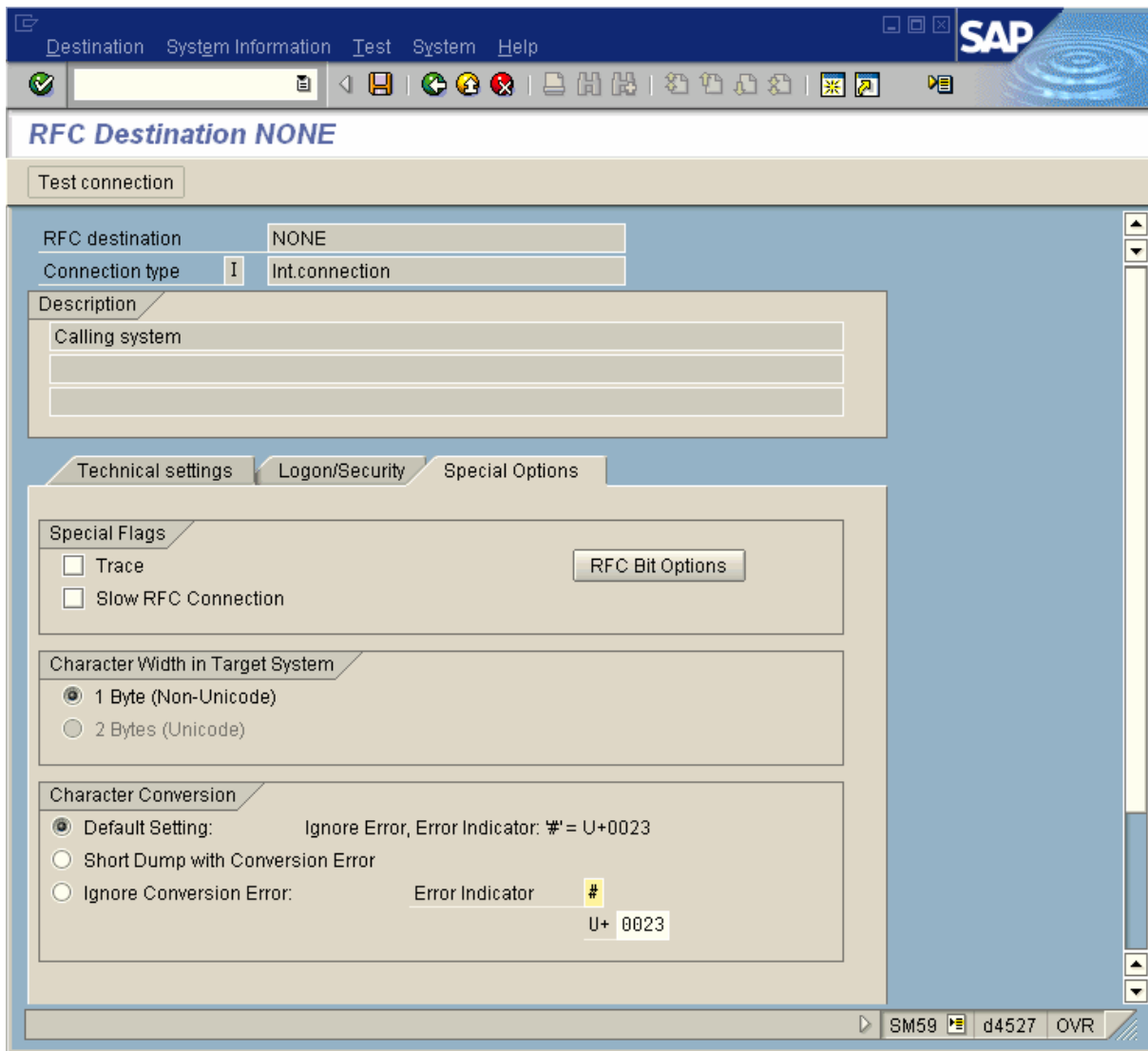
**Display D.2** RFC Destination – **Technical settings** Tab

Display D.3 shows the **Logon/Security** tab.



**Display D.3** RFC Destination – **Logon/Security** Tab

Display D.4 shows the **Special Options** tab.



**Display D.4** RFC Destination – Special Options Tab

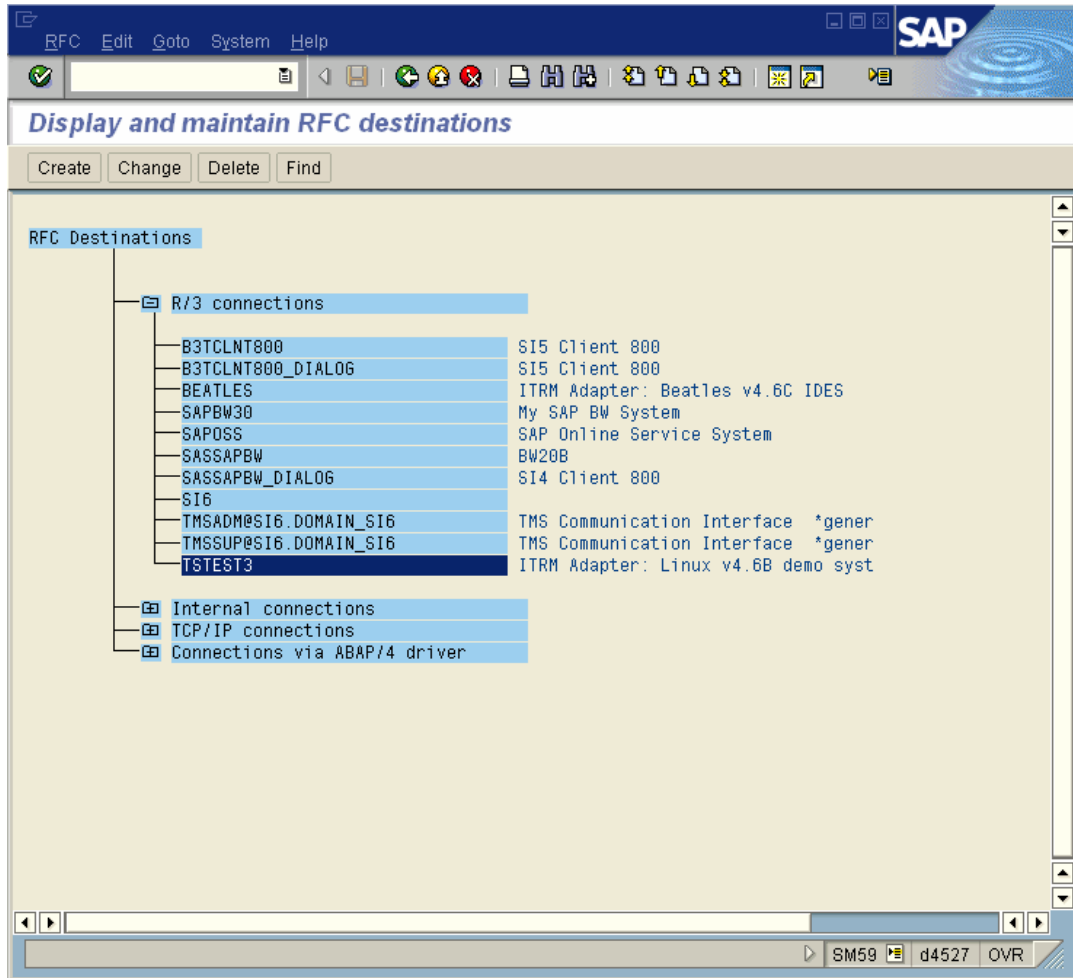
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## RFC Connection for Child Machine

An RFC connection can be made to another instance (from the gateway instance). Performance data can then be extracted from this instance without installing any ABAP functions.

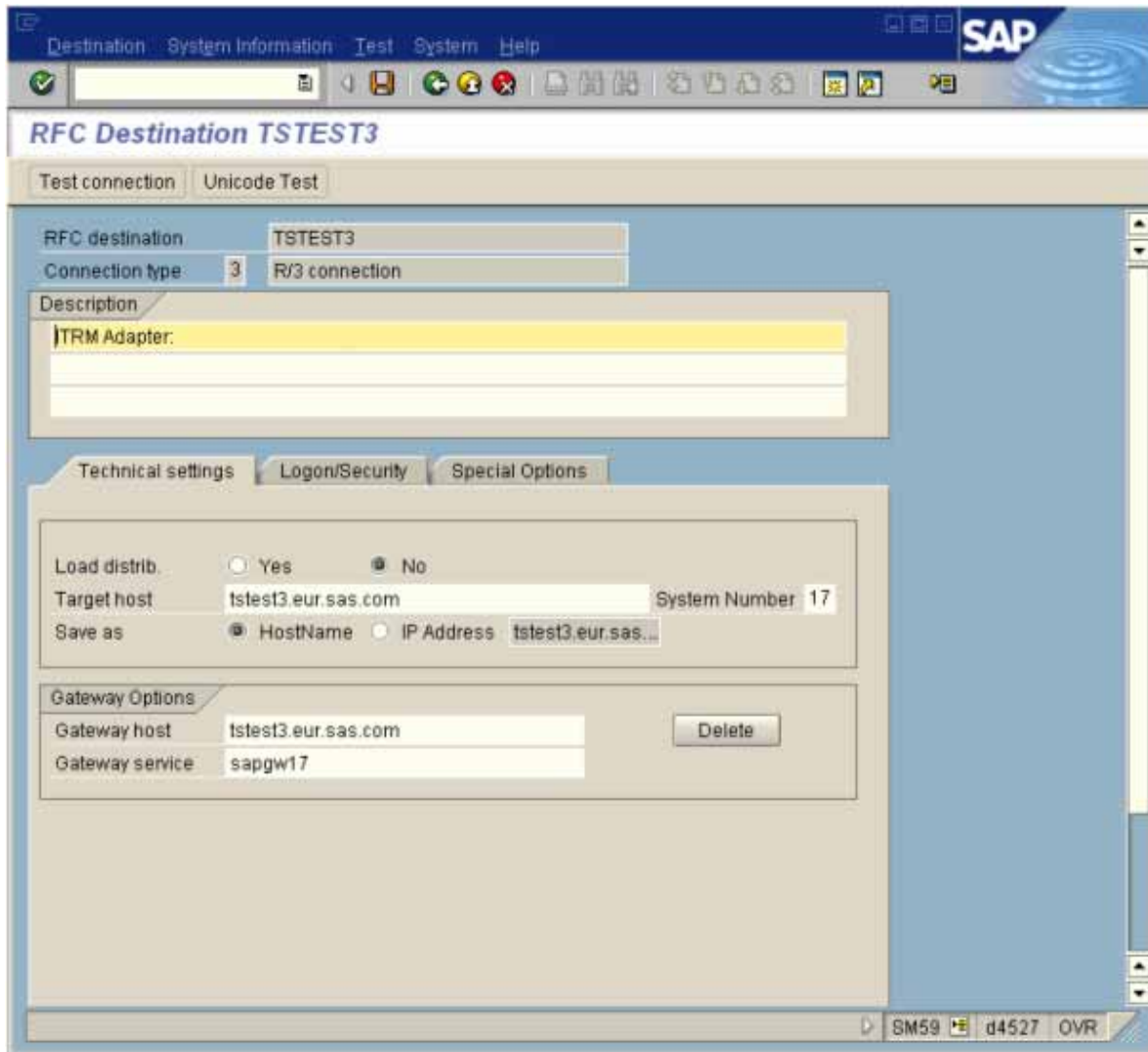
If an internal connection to the child machine already exists, then this connection should be referenced, in which case the following definition is not necessary.

To display the RFC, on the command line, type **SM59**. The Display and maintain RFC destinations window opens (Display D.5).



**Display D.5** Display and Maintain RFC Destinations Window

To display the defined internal connection properties for TSTEST3, from within the RFC Destinations tree, double-click **TSTEST3**. The RFC Destination TSTEST3 window opens (Display D.6).

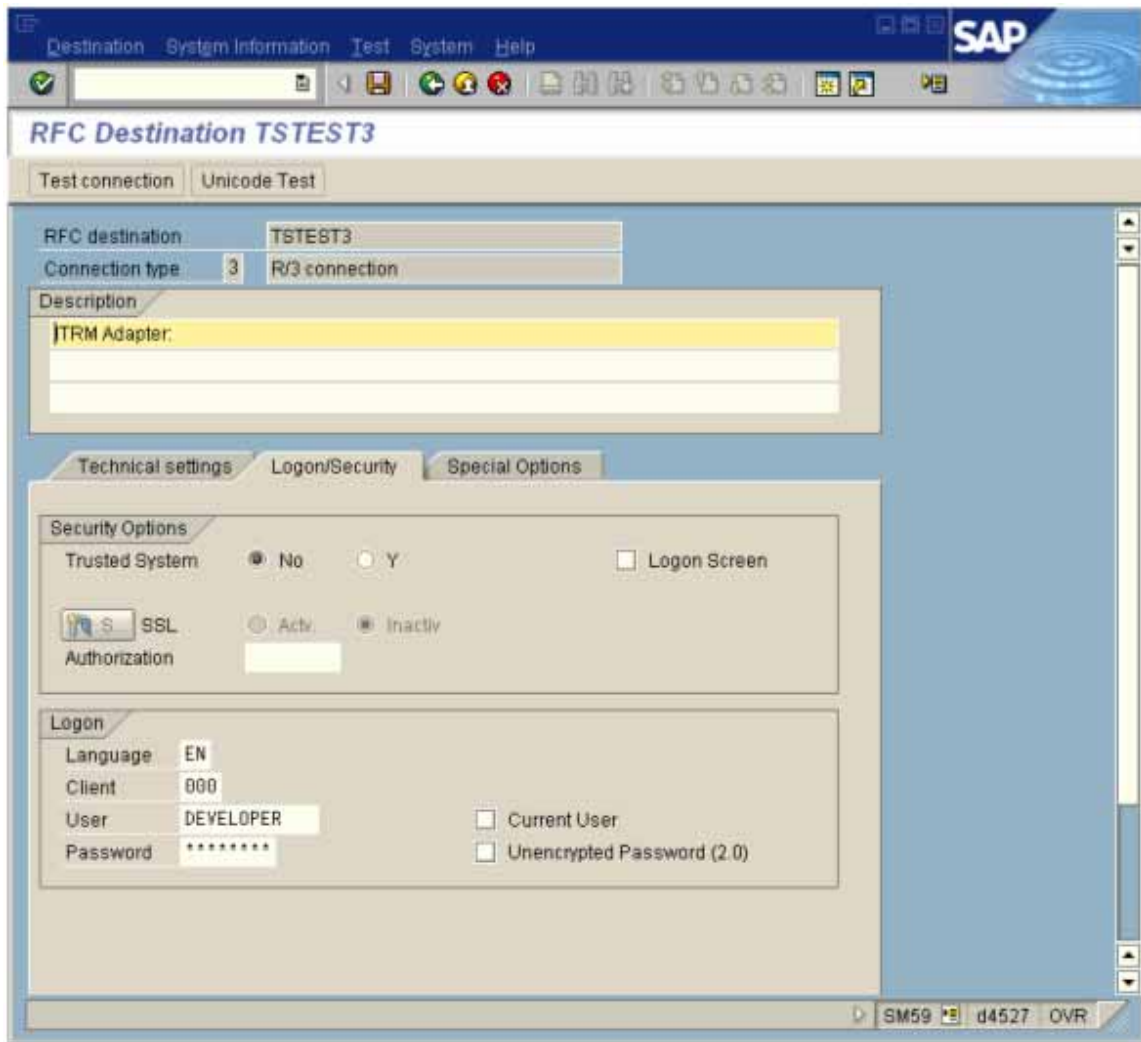


**Display D.6** RFC Destination TSTEST3 – **Technical settings** Tab

**Note:** The **Connection type** = 3. The **System Number** = 17; this is the instance number of the child machine. The **Target host** tstest3.eur.sas.com is the IP name of the child instance.

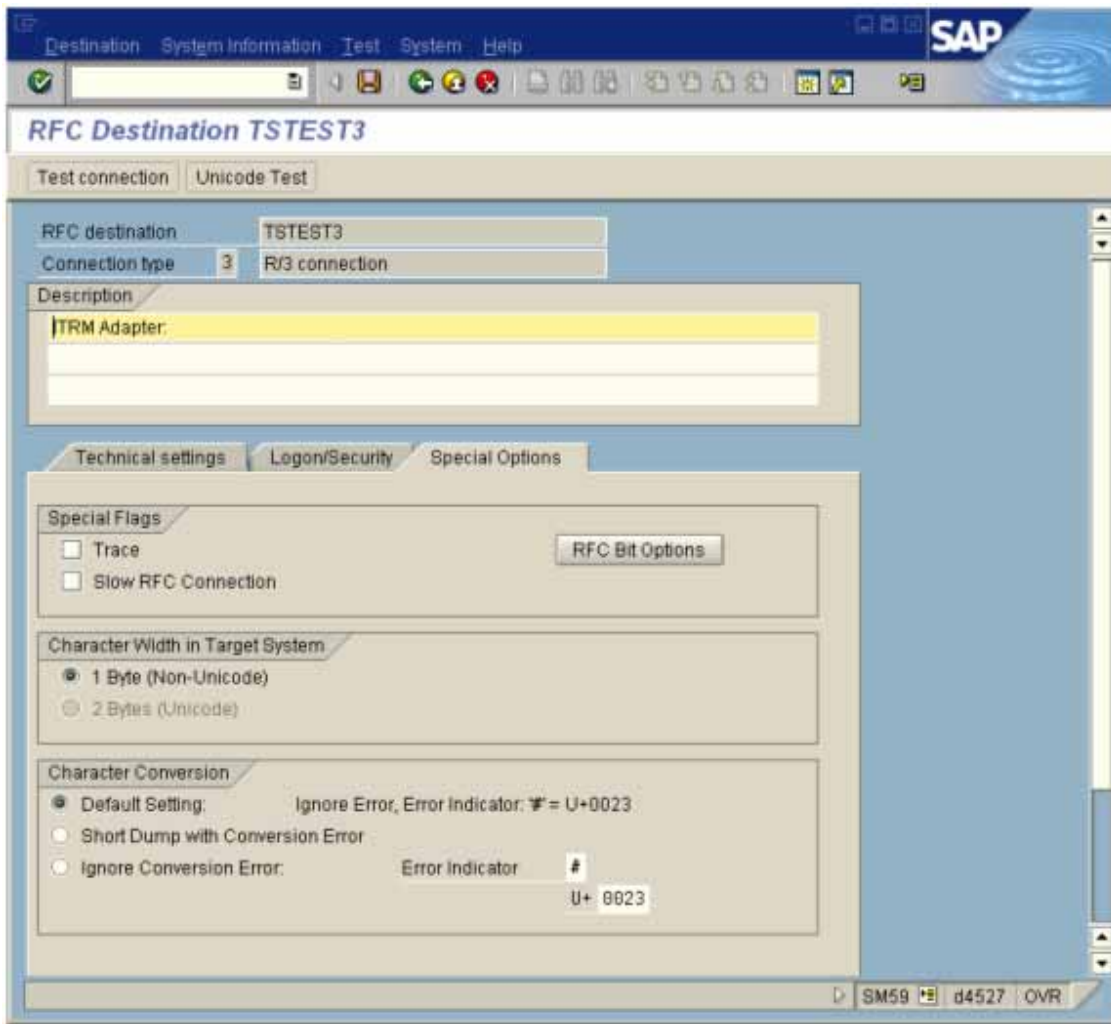


Display D.7 shows the **Logon/Security** tab.

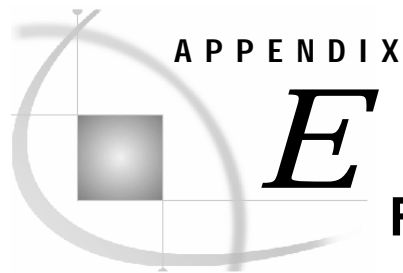


**Display D.7** RFC Destination TSTEST3 – **Logon/Security** Tab

Display D.8 shows the **Special Options** tab.



**Display D.8** RFC Destination TSTEST3 – Special Options Tab



## Recommended Reading

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### Recommended Reading

Here is the recommended reading list for this title:

- *SAS IT Resource Management User's Guide*
- *SAS/ACCESS Interface to R/3: User's Guide*

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