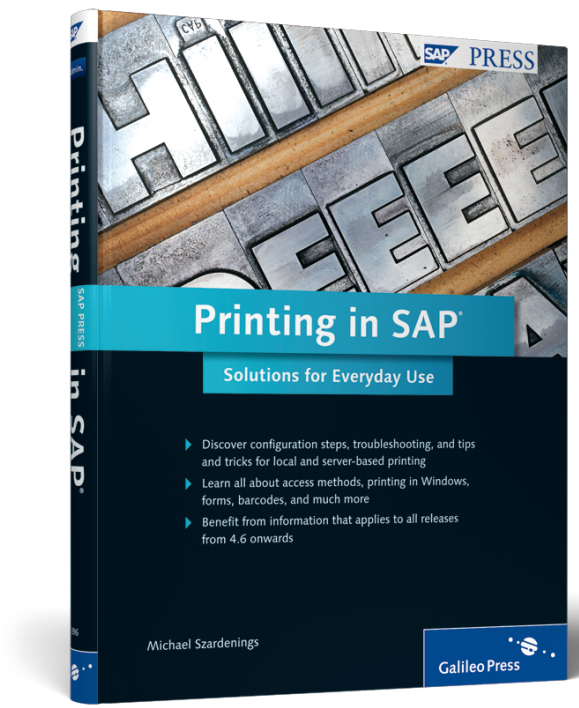
Michael Szardenings

Printing in SAP®

Solutions for Everyday Use



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Contents at a Glance

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Preface

From my point of view, the decision to write this book was rather a coincidence because Stefan Proksch from the editorial office of SAP PRESS contacted me: He had found out that although SAP R/3 has been implemented for a long time, there is no comprehensive book that deals with the topic of printing from the SAP system. On the other hand, I was able to confirm that there is indeed demand for such information, considering the recurring questions coming from customer support. You are now holding in your hand the result of an initial idea, numerous customer talks, gathered expert knowledge, and structured editing.

How This Book Is Organized

The book is subdivided into a main part and an appendix:

- **Chapter 1**, Introduction, shows how printing is generally integrated with the architecture of the SAP system, and it details basic terminology you need to understand.
- **Chapter 2**, Access Methods, presents various methods for setting up a complex printer landscape for SAP systems. These methods are referred to as access methods in SAP terminology.
- In **Chapter 3**, Printing in Microsoft Windows, you learn why only Windows can be offered as a print solution for specific scenarios.
- **Chapter 4**, Printing SAP Interactive Forms by Adobe, explains why printing SAP Interactive Forms by Adobe is different from printing other SAP documents.
- **Chapter 5**, Printing and Internationalization, describes problems you might encounter when printing international documents and how to meet these challenges.
- **Chapter 6**, Printing Bar Codes, briefly outlines different methods for printing bar codes from an SAP system.
- The Printing Assistant for Landscapes (PAL) as a distribution tool for printer definitions was implemented in the SAP system rather late. **Chapter 7**, Printing Assistant for Landscapes, presents a sample scenario of how to use PAL.

- **Chapter 8**, Authorizations in the Spool Environment, describes the SAP authorizations that must be assigned to users for printing.
- The **Appendix** provides an overview of the various tables as well as transactions and parameters used in the book.

At the end of Chapters 2 through 8, you'll find a brief summary of the most essential information covered in each chapter. You can use this overview as a quick reference when dealing with your daily printing tasks.

Who This Book Is For

This book is aimed primarily at system administrators who are responsible for the setup and maintenance of an enterprise-wide printer landscape, as well as form developers, particularly for international forms. Beyond those, this book is useful for application developers, as printing documents is frequently part of an application scenario, but is often given inadequate consideration.

Prerequisites

The biggest challenge in writing this book was to reasonably define the scope of this topic. Due to the method of the technical integration of printing with the SAP system, in your daily work you quickly go into the details of system configuration and, for form creation, of the respective application. Both topics require comprehensive special knowledge that cannot be discussed in this book. Common topics are mentioned in the relevant passages; however, the backgrounds are not discussed in detail or in their entirety. This book also does not cover how you can enhance or modify the default SAP delivery.

This book is independent of SAP releases to the greatest extent. The screenshots were created in the current releases (7.0 or later), but you can also find most figures in older releases as of 4.6x in (optically) changed form. The latest version is required for periphery components, such as SAPSprint or SAP GUI. If a specific function is only available for a specific release of a component, this is indicated explicitly.

Additional Information

Important points to note and additional information are provided throughout this book in gray boxes. These boxes can be divided into various categories depending on their focus, and these categories are indicated using various icons:

Caution [!]

Please take particular care when performing the task or executing the step that is marked with an exclamation mark. An explanation of why particular care is needed in these cases is also provided.

Example [Ex]

Some contents can be described easier using a practical example. You can identify these sample excursions with this icon.

Note [+]

A plus sign indicates that the current topic is explained and discussed in more detail.

Tip [*]

This icon identifies useful hints and shortcuts, which are intended to make your job easier.

Additional Information [«]

The sections marked with a double-headed arrow refer to other chapters in the book or external information that help you to understand the topic at a deeper level.

Acknowledgments

I'd like to thank the following persons who made major contributions to this book by proofreading it and providing detailed information on specific topics: Dieter Babutzka, Michael Barth, Uwe Bauer, Alexander Bolloni, Markus Eichelsdörfer, Klaus Layer, Yasuo Nagao, Martin Vierling, Christina Vogt, and Olaf Wolter.

Special thanks are due to some people who were immediately affected by and tolerated my bad mood on Mondays after a weekend spent with writing this book.

Michael Szardenings
Senior Developer SAP AG

Besides the device type, the access method is the second decisive criterion for setting up an enterprise-wide print landscape. This chapter supports you in selecting the right access method by describing the respectively supported functionality with a practical orientation.

2 Access Methods

In SAP terminology, an *access method* refers to how a print data stream formatted by the SAP system is transported to the physical printer. Usually, this method is not direct but leads through different components that may modify the data stream again.

Not every access method can be used for all possible scenarios. Many criteria are critical in the decision making: The operating system, the number and type of printers used, the type of application, and the distribution of enterprise locations, to name a few. The criteria discussed in this chapter therefore cannot make any claims for completeness due to the diversity of possible factors; if in doubt, contact a competent consultant or the SAP support team.

In general, you can find all access methods listed here in Transaction SPAD for the definition of a printer in the SAP system. Table 2.1 provides a short overview of the various access methods.

Access Method	Description
C	Print via direct operating system call. The print data is directly sent from the spool work process via a programming interface to a printer on the same server. Only on Windows and IBM i.
E	External output management system (OMS). The print data is sent via an interface defined by SAP to an OMS of a third-party manufacturer.
F	Obsolete frontend printing not being further supported.

Table 2.1 Overview of Access Methods

Access Method	Description
G	Frontend printing. The print data is sent from the spool work process via the frontend component to the printer.
L	Printing via command sets. The spool work process calls external commands for transferring print data and for querying the status.
M	Printing via email. The print data is sent from the SAP system via email.
P	Printing via device pool. The print data can be sent to multiple printers.
S	Network printing with the SAP protocol. The print data is sent from the spool work process via a network to a remote print server.
U	Network printing with the Berkeley protocol. The print data is sent from the spool work process via a network to a remote print server.

Table 2.1 Overview of Access Methods (Cont.)

[+]

Note

The following sections are allocated in alphabetical order according to the name of the access methods. You can read the sections in any order, and they are not based on one another. However, some sections include details that can also apply to other access methods; these are only described once. Of course, you are provided with a reference to the relevant section.

2.1 Access Method C—Direct Operating System Call

In access method C, the spool work process sends the formatted print data stream via a platform-dependent programming interface directly to a printer that has been defined on the same server. Figure 2.1 (DeviceAttributes) and Figure 2.2 (Access Method) show a sample configuration for an access method C printer.

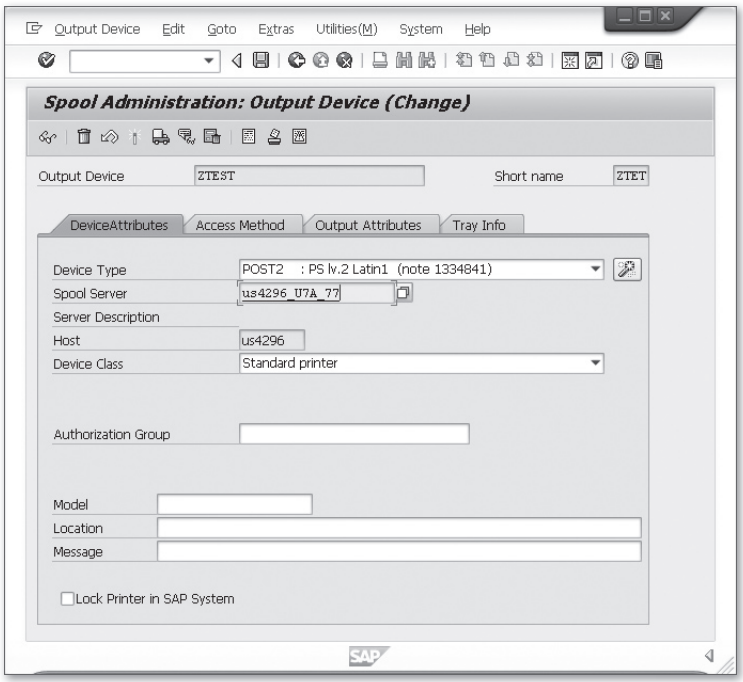

Figure 2.1 Access Method C—DeviceAttributes

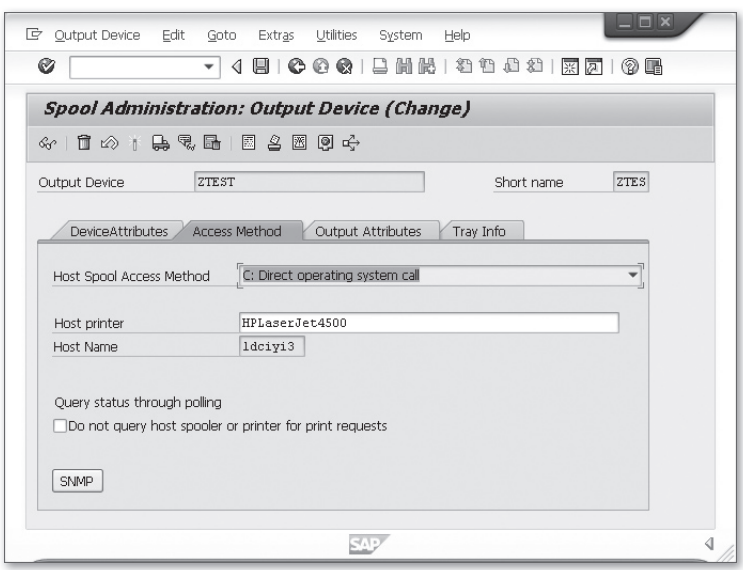

Figure 2.2 Access Method C—Access Method

In both figures, you can see a printer that is completely configured already. If you configure a new printer, first select an active Spool Server. The system automatically enters the host name of the selected server in the Host field. It also appears in the Host Name field in the Access Method tab (see Figure 2.2). This is the decisive point in access method C. The spool work process of the selected server, which processes a spool request for this printer, uses a programming interface provided by the operating system to send the print data stream directly to the printer. The printer must be defined on this server at operating system level, and the name of the printer must be transferred exactly to the Host printer field.

You can use any native device type as the device type for access method C whose PDL is understood by the configured printer.

[+] **Note**

You cannot use the generic device type `SAPWIN` for access method C, even if your spool server runs on Windows. Theoretically, this would be possible if the `SAPWIN` interpreter was integrated with the SAP core. However, this will not happen due to the problem described in Chapter 3, Section 3.2.4. The risk is too high that the entire system could become unstable.

Access method C is only supported in the Microsoft Windows and IBM i operating system platforms because only these provide the relevant programming interface. Access methods L or U (see Sections 2.5, 2.9, and 2.10) are available as alternatives in platforms that are not supported.

If your SAP system consists of different operating systems, and if you select the spool server as in access method C, you must make sure that the spool server always runs in one of these platforms. Otherwise, this may result in errors, particularly when you use logical servers if the logical server is mapped on a real server of another platform for a new configuration. Spool requests for printers that are configured incorrectly here will then output the error shown in Figure 2.3, which is not very meaningful. When you use logical servers, make sure that the printer is defined on all real servers at operating system level.

The main disadvantage of access method C can be found in the non-universal platform support. But if you can use this access method, the particular advantage is in the closed environment:

- You can install the entire SAP system, including the print environment, in a single machine.

- You don't require any additional software (e.g., print server, LPD daemon, external OMS, etc.), that you would have to install and maintain.
- You don't require a network connection at print time.
- Everything is already available in the operating system except for the printer installation. This can be a major advantage, especially in locations where the options for system maintenance and the existing network infrastructure are less distinct.

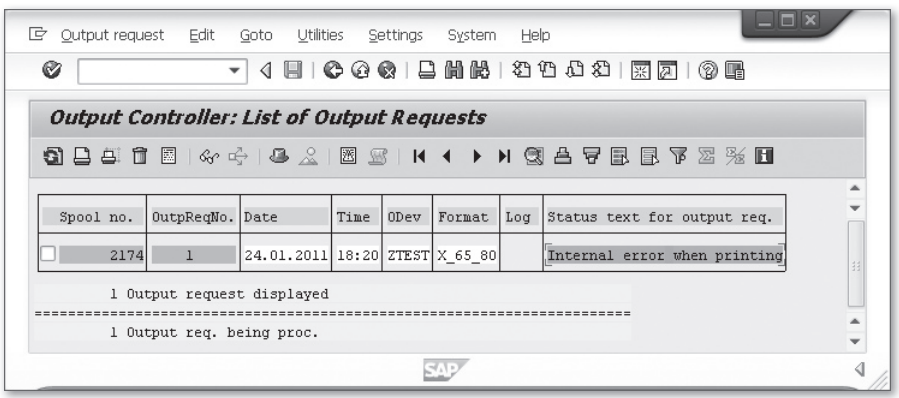

Figure 2.3 Error for an Incorrectly Configured Spool Server

2.2 Access Method E—External Output Management System

Access method E is the most complex method to send print data to a printer. The configuration of the individual printers is very similar to those of other access methods; however, you must set up the output management system (OMS) itself first. This section describes the OMS configuration.

There are four main reasons to use an output management system:

- An increased reliability is required for the transfer of print requests and for the status query.
- The output requests from many SAP systems must be monitored from a central location.

- Besides the print requests from SAP systems, all requests from other applications should be monitored as well.
- Other output channels such as fax or email are required in addition to printouts.

There may be more reasons, but the four reasons mentioned here basically form the background for setting up an OMS. From these reasons and the fact that an OMS entails additional costs, you can see why this access method is used in larger enterprises.

Before we discuss the actual configuration, note the following with regard to the reliability: As you will determine for every access method discussed, there are repeatedly difficulties in both the transfer of print data and in the status query. The reason for this can be summarized in one simple statement: Every chain is only as strong as its weakest link.

It's a long distance from the user in the United States to the printout on paper (possibly) somewhere else in the world, and this process travels via many different software and hardware components. If, at the end of the chain, a printer is out of paper, and you don't add new paper for some time, this leads to a problem when print requests are still sent to this printer. The question in such cases is where the problem causes the least damage.

The SAP system is a generalist. The sending and monitoring of print requests are secondary tasks only. But if these additional tasks have the result that the main task (that is, the application processing) is not executed correctly, you had better leave this task to a specialist. An OMS is one of those specialists. The SAP system transfers the print request to the OMS and no longer needs to bother about it. In the extreme case, problems such as missing paper can impact the operation of the SAP system. This sounds very unlikely, but can occur in real life because these problems can also impact other components.

[Ex] **Example**

One or more printers are out of paper or are switched off, but no one notices the problem or corrects it for a long time. If print requests are still sent to these printers, problems may arise for the spool system at operating system level. As a result, various processes required for printing may fail or get stuck.

If these printers can no longer accept any other requests, this backflow continues in the SAP system. Printers are locked because print requests can no longer be sent. Entire workflows may get mixed up. Timeouts in the network communication can lead to synchronization problems in work processes. In the worst case, the work processes block one another so that the entire system gets stuck or is at least slowed down considerably. This is a simple example, but it isn't just a theoretical one. The problem messages from customers serve as the basis here. This is exactly the point at which the OMS should be applied:

- The OMS serves as a buffer between the operating system and the SAP system to catch the problems described.
- The OMS provides a central location where difficulties in printing can be detected, rather than dealing with different views in many different SAP systems.

2.2.1 Configuration of the Output Management System

The OMS is configured in Transaction SPAD via a separate tab (see Figure 2.4).

Note [+]

If the Output management systems tab is not available in the initial screen of Transaction SPAD, activate it via the Extended Admin. or Full Administration buttons.

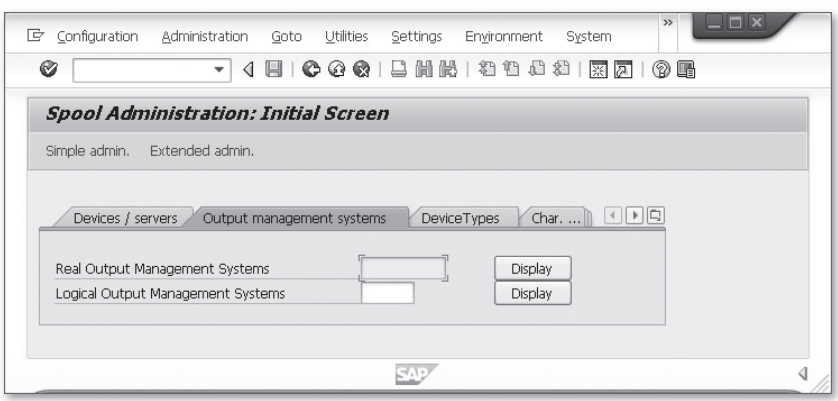

Figure 2.4 Initial Screen of OMS Configuration

The configuration of the OMS involves two steps:

1. Set up the real output management system (ROMS).
2. Set up one or more logical output management systems (LOMS).

The idea behind this configuration is the following: An OMS manufacturer provides different functions for its product. You may want to use them in different ways depending on the area of use:

- In the ROMS, you specify the entire functional scope of the OMS.
- You can configure a different partial scope in every LOMS.

To save you the trouble of having to make a new configuration on every printer whenever a change is made, you only need to specify the LOMS used in the printer configuration. Every change becomes immediately effective in all printers. We will describe this in more detail later in the book. The simplest case has exactly one ROMS and one LOMS.

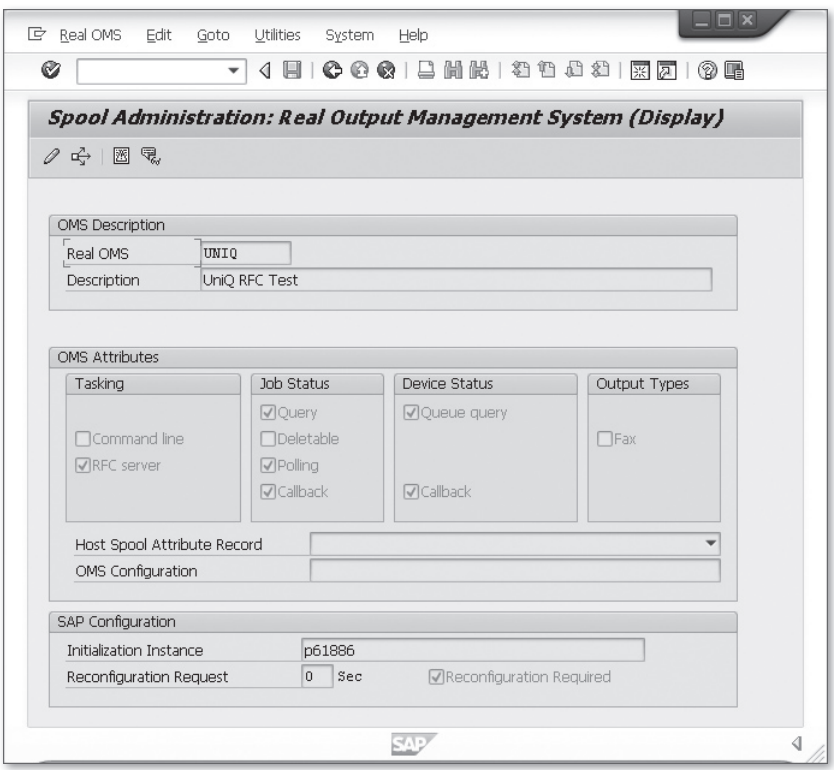

Figure 2.5 ROMS Configuration

Figure 2.5 shows the configuration screen of the ROMS. The system displays this screen if you click the Display button for Real Output Management Systems,

shown previously in Figure 2.4. When you set up this system, enter any name and a description. You then select the functional scope specified by the manufacturer in the OMS Attributes. This functional scope is divided into three main categories:

- Tasking
  This comprises the method of how a print request is sent to the OMS.
- Job Status
  Here, you specify how the status query of an output request is executed.
- Device Status
  In addition to the status of a print request, you can also query the status of the printer. Here, you specify how this is done.

The fourth category, Output Types, is not discussed here. This category only specifies whether the OMS can additionally send fax requests.

The rest of this section only outlines the basic differences in the three main categories. A concrete example is not possible here because it strongly depends on the implementation of the OMS manufacturer. Refer to the manual of your OMS for specific configuration information.

OMS Configuration: Tasking

In the transfer of print requests to the OMS, there are two methods available (not all OMSs support both):

- **Transfer of the print request via a command line command**
  This corresponds to the command sets in access method L (see Section 2.5), with the difference that the command sets are referred to as command groups and are defined by the OMS manufacturer.
- **RFC notification to the OMS that a print request is available for collection**
  With RFC, connections between different SAP systems, or connections between an SAP system and an external system, are possible. Specially programmed functions, whose interface simulates a function module, are called in external systems instead of function modules. In this case, an OMS corresponds to an external system.

  This is also referred to as RFC callback, where the OMS is implemented as an RFC server. The SAP system uses a remote function call—that is, it calls a function module that runs on a different system than the caller—to call a function in the OMS. With this call, the OMS is notified that a formatted print data stream is available for collection. The OMS then collects the print data.

Whether an OMS supports the first case, the second case, or both is specified in the TASKING column in the ROMS definition (see Figure 2.5).

Depending on the definition in the ROMS, the system displays different screens in the configuration of the LOMS. Figure 2.6 shows an example with command groups for a mixed configuration. The print requests are transferred via commands (TASKING column), but the status information is returned via RFC by the OMS. You specify this by selecting CALLBACK in the DEVICES and JOBS columns. If supported, you should always select CALLBACK because the OMS status information is confirmed if required, and no unnecessary system load is generated by periodic queries.

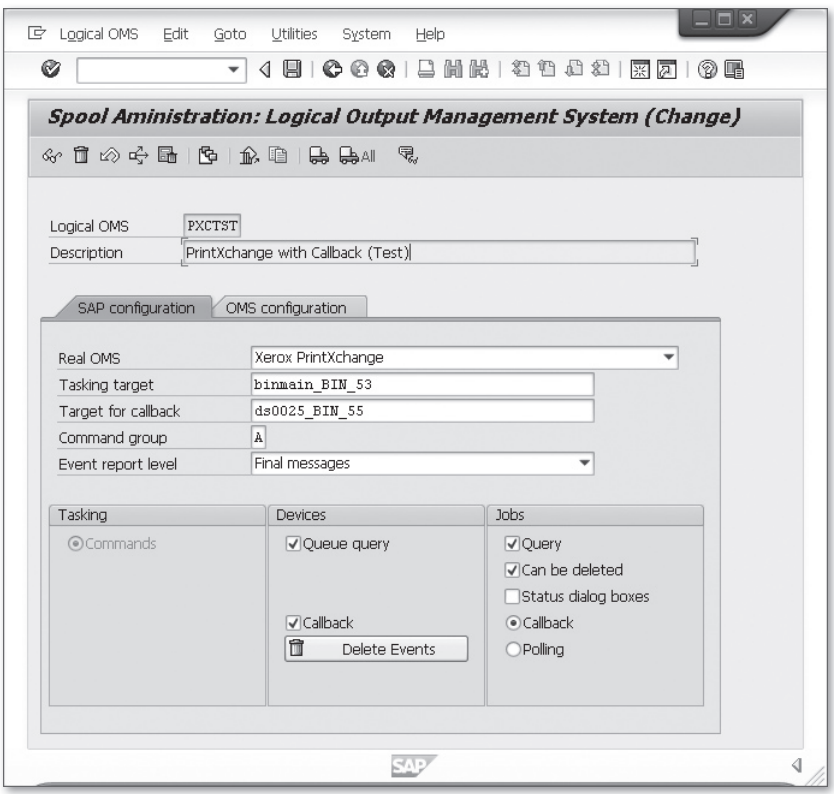

Figure 2.6 LOMS Configuration with Command Groups

Figure 2.7 shows an RFC server example. The selected DATA BY FILE radio button corresponds to the description for the transfer of print data.

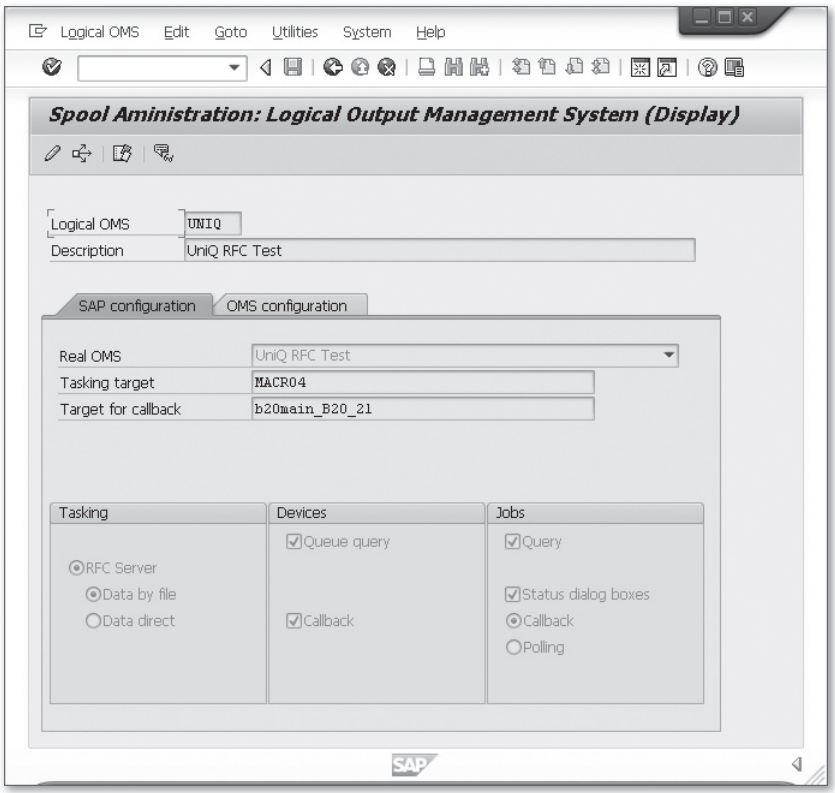

Figure 2.7 LOMS Configuration as RFC Server

Note [+]

SAP no longer supports the DATA DIRECT selection field in TASKING (see Figure 2.7). In this method, the print data stream was also transferred to the OMS via RFC. This is no longer supported technically because the RFCs are made from the SAP core. If you transfer larger data volumes, these calls result in uncontrollable problems in most cases. OMS manufacturers know about this problem, and more recent systems no longer provide this functionality. The selection field was kept in order to not put existing installations into an inconsistent state.

OMS Configuration: Device and Job Status

Similar to tasking, the LOMS configuration of device and job statuses displays different screens, depending on the functionality you selected in the ROMS definition. Table 2.2 provides an overview of the parameters shown in Figures 2.6 and 2.7.

Parameter Name	Description
Callback	Status callback of the OMS via RFC in the SAP system.
Polling	Status callback via periodic call of the `Polling` command.
Status dialog boxes	A status callback dialog box is additionally displayed for the status report.
Can be deleted	Print requests can be deleted in the OMS. This does not mean that the spool request is deleted in the SAP system, but that the print request transferred to the OMS is canceled via the `Cancel` command.
Command group	ID of a command group.
Target for callback	Name of the SAP server that is supposed to output the command for starting the OMS callback client. The SAP system usually expects that OMS commands can be output by every SAP server. However, an OMS may request that an initialization command is output to a specific server. In this case, you can meet this requirement with this field.
Tasking target	This server is used for the output of anonymous commands; in other words, commands that are not bound to a specific server due to the device definition. Anonymous commands include all OMS commands except for `Submit` and `Polling`.

Table 2.2 LOMS Configuration Parameters

OMS Configuration: Command Groups

If you configured the tasking and/or status callback in LOMS as a command, you must now define the corresponding command group. For this purpose, enter a letter not used yet in the Command group field if you want to create a new group, or select an already existing one. Click the Commands button or press F6, as illustrated in the tooltip in Figure 2.8.

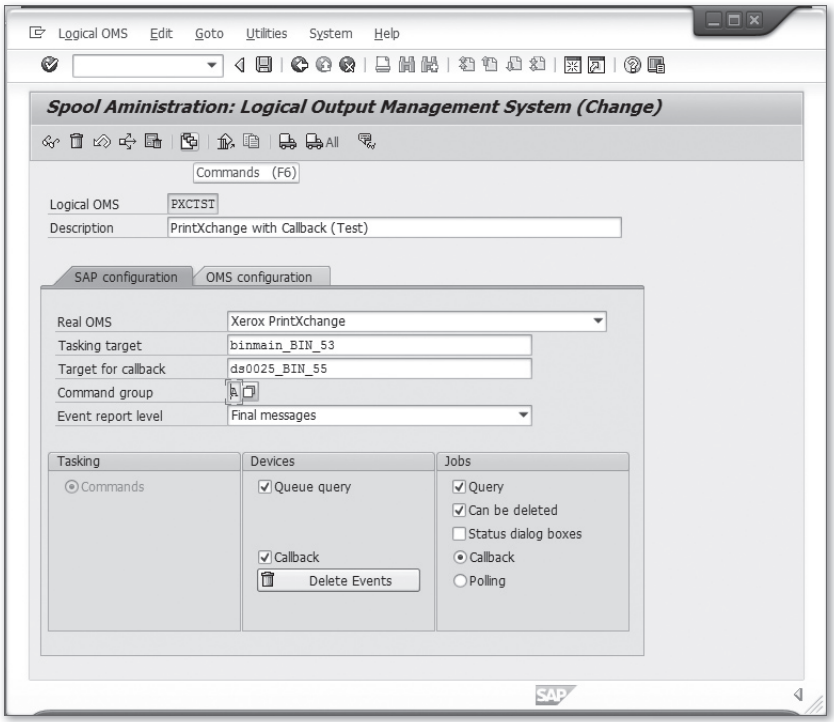

Figure 2.8 Definition of a Command Group

The system then displays an operating system-specific selection list (see Figure 2.9). Double-click the desired row. In the subsequent screen, you can enter the commands predefined by the OMS manufacturer together with the parameters (see Figure 2.10).

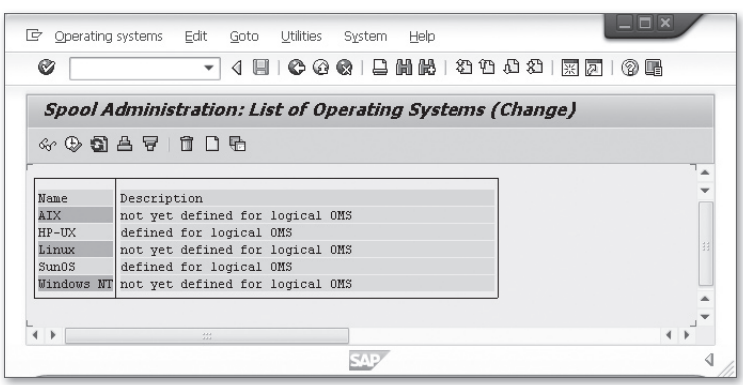

Figure 2.9 Operating System-Specific Command Groups

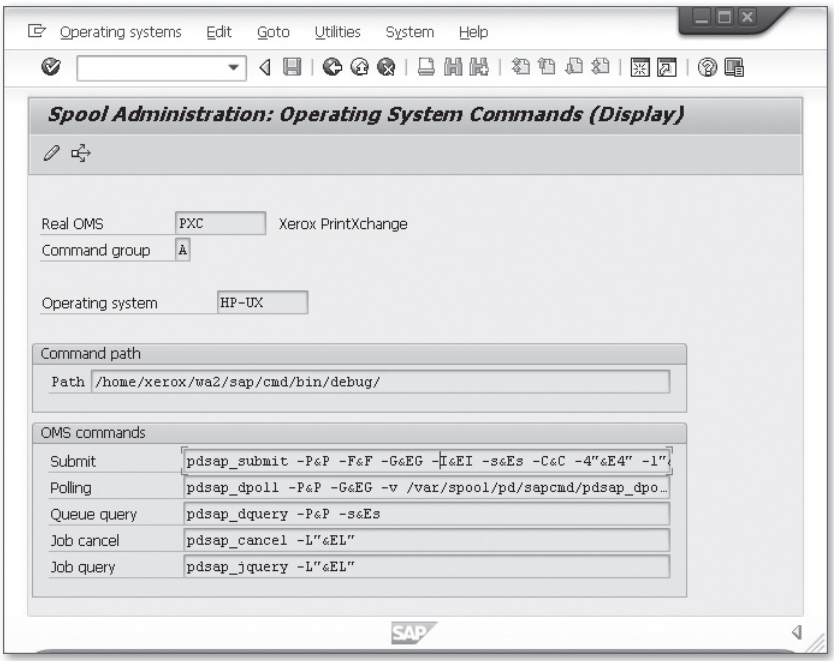

Figure 2.10 OMS Command Group

[*] **Tip**

If you selected CALLBACK for the status callback as shown earlier in Figure 2.6, you don't need to specify the `Polling` command for this command group. The same applies to other commands that you don't use due to the specified configuration. For example, you don't require a job query command if you selected CALLBACK in JOBS.

The command itself is preset by the OMS manufacturer. You can enter the parameters of the command line in any sequence. If you make an entry in the PATH input field, you must consider that it is put in front of the command pattern. If not, the pattern can also contain multiple commands. You should note possible limitations of the command interpreter used at operating system level or of the command shell.

In addition to any elements of the shell command syntax, you can use further SAP-specific replacement characters to specify command parameters. These begin with an `&` character (ampersand). If the command is supposed to include an `&` character, it must be written as `&&`. The spool work process automatically determines the command arguments from the system configuration and uses them.

An operating system-dependent masking character of special characters is required to correctly handle command arguments. This also applies to the currently used values of the parameters. The following mechanism is used for this purpose:

- **Unix**
  The \, ‘, “, and $ characters are masked with a backslash (\). A separate \ character is represented by \\. Parameters should therefore be compounded with “ characters to achieve a correct forwarding of special characters, including blanks.
- **Windows**
  The “ character is masked with a backslash (\). All \ characters in front of a “ character are masked. % characters are replaced by # characters.

Table 2.3 shows the possible command parameters. Indispensable parameters are indicated as such. Also compare the commands and the parameters with those of access method L (see Section 2.5). The two access methods have a similar technical background here.

Replacement Character/ Parameter	Description
&C	Number of copies
&D	Department of recipient
&F (required parameter for Submit command)	Name of the file with the print data, including the path
&f	Name of the file without path
&H/<x>/<y>/	<x> if host spool cover page is requested, otherwise <y>
&I	Job name with database ID
&J	Job name without database ID
&L	Format type
&M	Client of the spool request's owner
&m	Client of the output request's owner
&N	Number of the spool request
&n	Number of the output request

Table 2.3 Default Parameters for OMS Commands

Replacement Character/ Parameter	Description
&O	SAP name of the spool request's owner
&o	SAP name of the output request's owner
&P (required parameter for Submit command; required parameter for the Polling command)	Name of the host printer
&p	Path name of the print file
&R	Name of recipient
&S	Name of the SAP printer
&T	Title of the spool request
&t	Fax number
&U/<X>/<N>/	Host spool cover page requested (X = yes, N = no)
&Y	SAP priority of the spool request (1-99), with 1 as highest

Table 2.3 Default Parameters for OMS Commands (Cont.)

Besides the default parameters, you are also provided with additional parameters for OMS commands, as listed in Table 2.4. At runtime, the spool work process inserts the values of the parameters specified instead of the replacement characters. Again, refer to the documentation of your OMS for further details.

Replacement Character/ Parameter	Description
&EI (required parameter for Submit command)	SAP spool ID
&EG (required parameter for Submit command; alternative parameter for the Polling command; see the following note box)	Reply message group (RMG)

Table 2.4 Advanced Parameters for OMS Commands

Replacement Character/ Parameter	Description
&EL (alternative parameter for Polling command, see the following note box)	List of OMS Job IDs, separated by blanks
&ES	SAP instance name for callback
&ET	Maximum buffer time for callback events
&EA	Maximum number of buffered events
&EP	Fax recipient
&E1	SAP flags of the LOMS
&E2	OMS flags of the LOMS
&E3	SAP flags of the ROMS
&E4	OMS flags of the ROMS

Table 2.4 Advanced Parameters for OMS Commands (Cont.)

Note [+]

An essential element for the communication between the SAP system and the OMS is the reply message group (RMG). The RMG simply involves a unique character string combined by the spool work process, which is comprised of the system name and the application server ID. This character string enables the OMS to determine uniquely which system or application server created a specific print request. The &EG parameter is therefore mandatory in the Submit command.

The Polling command queries the status of a possibly large number of spool requests in the OMS. In general, you can use either parameter &EL (list of spool requests) or &EG again for this purpose. For &EL, the list of spool requests is separated by blanks and transferred to the command shell. For a large number of queried spool requests, it may be possible that the maximum number of characters permitted by the command shell is exceeded. We therefore highly recommend to always use the &EG parameter.

In the screen shown in Figure 2.11, you specify the time intervals in which the OMS returns status information, as well as the maximum number of events returned per callback. The screen is displayed by selecting the OMS CONFIGURATION tab shown in Figure 2.8. In the OMS CONFIGURATION input field, you can define additional options or parameters, which are returned to the OMS in the following cases:

- The content of the field is transferred to the OMS for the `Submit` command. For this purpose, you must add the corresponding option to the `Submit` command definition in the LOMS command groups.
- The content of the fields is forwarded to the OMS for the RFC callback when the OMS RFC client starts and reconfiguration is made.

Refer to the documentation of your OMS to obtain information on the possible content of the field.

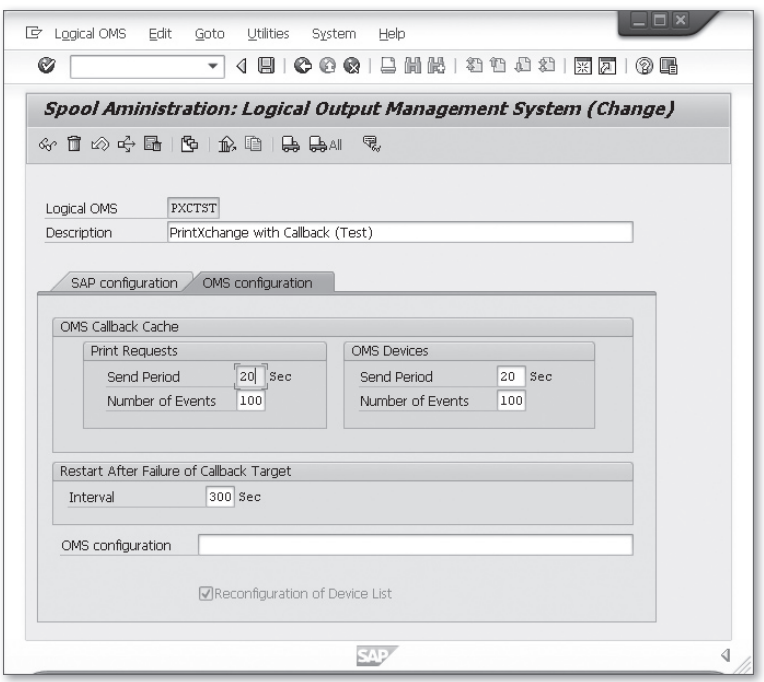

Figure 2.11 OMS-Specific Configuration

2.2.2 OMS Certification

If you use an OMS, you should make sure that the manufacturer certified its product at SAP. Because there are many incorrect perceptions of what a certification actually is, we briefly discuss this topic next. A certification ensures the following:

- The product of the manufacturer is known at SAP.
- The manufacturer uses the interface provided by SAP for the implementation of a product.

- The manufacturer provides parts or the entire functional scope of the functionality intended by SAP.
- SAP checked the correct usage of the interface provided by SAP.

Beyond that, the certification doesn't make any quality statements with regard to installation, reliability, scalability, or speed. The main objective of the certification is to ensure support by SAP. This is not possible for any uncontrolled implementation from the manufacturer's side. This is only enabled by the restriction to a defined interface, whose stability is guaranteed by SAP.

2.2.3 Configuration of a Printer

If you've mastered the configuration up to this point, setting up a printer is comparably easy. In the DeviceAttributes tab, select a suitable device type for your printer and a spool server (see Figure 2.12).

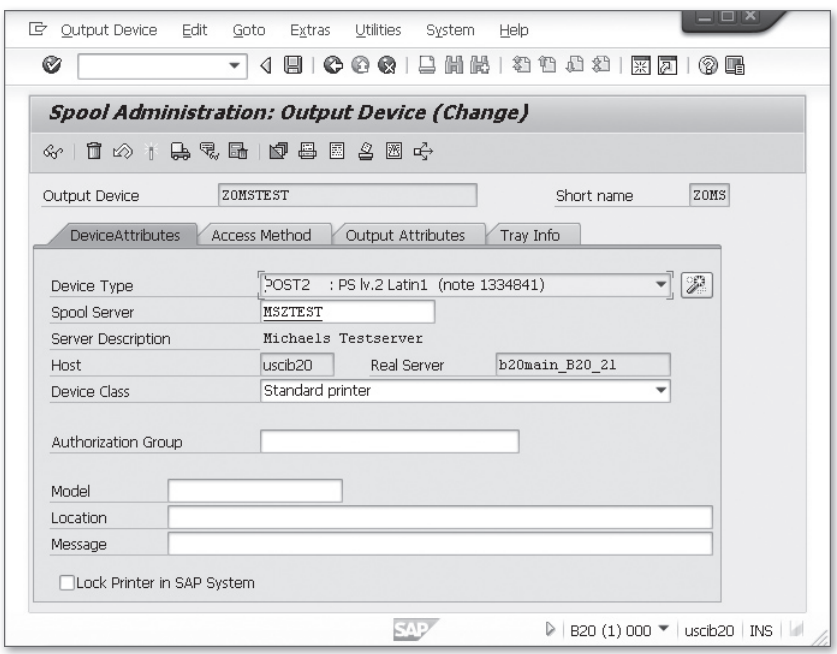

Figure 2.12 Access Method E—DeviceAttributes

DeviceAttributes and Access Method are the tabs that must be defined for each access method. The content of the pages changes accordingly after you've specified the access methods in the Access method page. The Host and Real Server fields automatically result from the selection of the spool server. All other specifications are optional.

[+] **Note**

Only native device types are possible for access method E. `SAPWIN` device types cannot be used, even if the OMS runs on Windows.

In the Access Method tab, set access method E and enter the name of the printer in the Host printer field, as it is known in the OMS. Finally, select a LOMS that you configured previously and save your entries. The printer setup is now complete.

[!] **Caution**

The message "CAUTION: Alternate Host Possible" shown in Figure 2.13 (next to the Host Name field) appears because you selected a logical spool server with the name MSZTEST in Figure 2.12. Different real servers can be used at runtime. Ensure that the command scripts used by the OMS are also installed on every possible server.

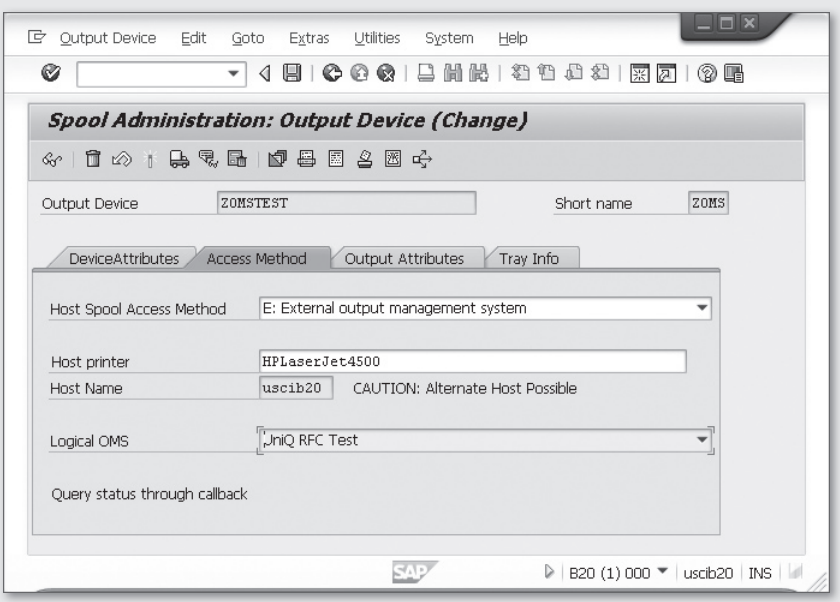

Figure 2.13 Access Method E—Access Method

2.3 Access Method F—Frontend Printing

Access method F is an obsolete frontend printing method with SAPLPD, the predecessor of SAPSprint (see Section 2.8). SAPLPD is no longer supported by SAP, so we do not discuss it in this book. You should only use access method G (see Section 2.4) for frontend printing.

In summary, access method F had too many technical limitations and was no longer up to date. We mention it here for the sake of completeness because access method F is still included in the list of available access methods in Transaction SPAD for compatibility reasons.

2.4 Access Method G—Frontend Printing

Frontend printing is the printout on a personal printer (e.g., the default Windows printer) via an SAP frontend component (e.g., SAP GUI). Access method G is the successor of access method F, which is no longer supported and used SAPLPD—the predecessor of SAPSprint (see Section 2.8)—as the transfer program to the printer.

Access method G is attractive due to its high flexibility with minimal configuration effort. In the ideal case, you only need to configure a single printer in the SAP system. However, there are also some limitations that increase depending on the frontend component used. This is presented in more detail in the subsequent sections.

Additional Information [«]

Access method G is supported as of SAP Basis release 4.6C. A specific support package is required in some older releases. If access method G is not available in the list of available access methods in Transaction SPAD, you can use auxiliary Report RSPO0075 for activation (see Figure 2.14). If access method G doesn't appear in Report RSPO0075 either, your system is not suitable for this access method. Refer to SAP Note 821519 to determine the exact release and support package numbers.

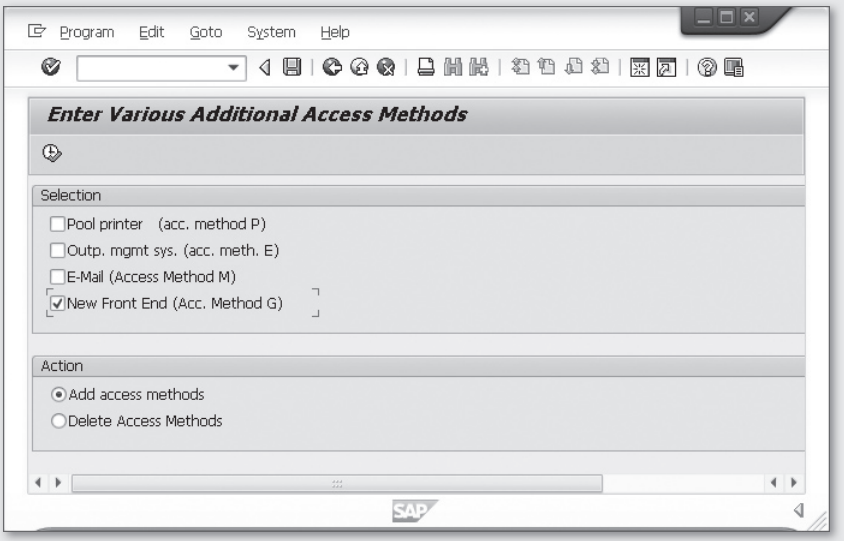

Figure 2.14 Report RSPO0075—Entering Access Methods

2.4.1 Frontend Printing with SAP GUI for Windows

SAP GUI for Windows is the frontend component used most frequently in the SAP environment and offers the largest functionality. Figures 2.15 (DeviceAttributes) and 2.16 (Access Method) show a typical definition of a frontend printer in the SAP system.

The freely selectable printer name (Output Device) is often specified as LOCL. `SAPWIN` or a corresponding language-dependent variant is typically entered as the Device Type for non-Unicode systems or `SWINCF` for Unicode systems. The name LOCL is a common abbreviation for "local printer," but you can also use any other name. Chapter 5 describes how the individual `SAPWIN` device types are linked with the language to be printed in more detail. `__DEFAULT` is entered in the Host Printer field. As a result, printouts are automatically made on the default Windows printer.

[+] **Note**

The character string `__DEFAULT` (with two prefixed underscores) can also be used with the spellings `__default` and `__Default`.

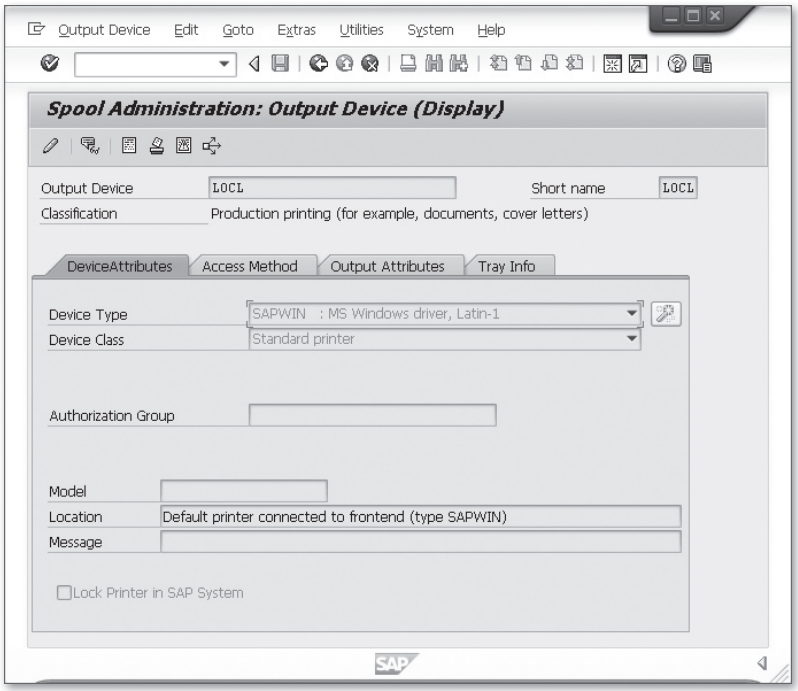

Figure 2.15 Frontend Printing—DeviceAttributes

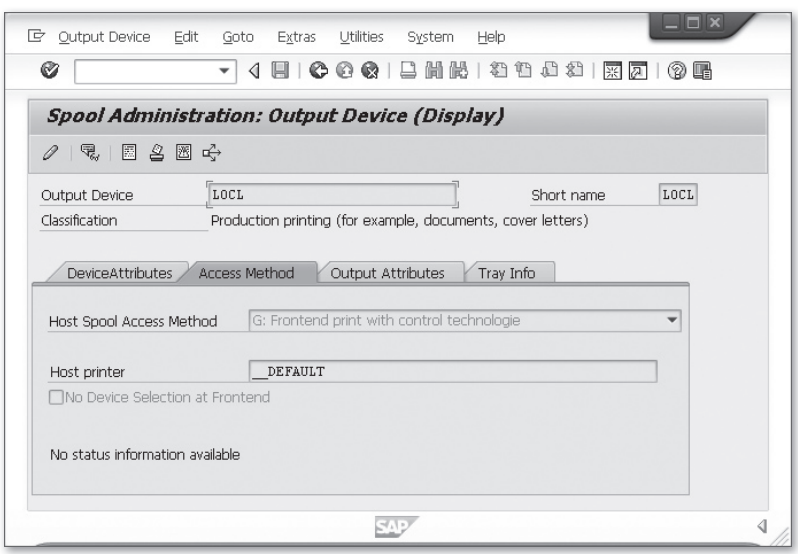

Figure 2.16 Frontend Printing—Access Method

In contrast to all other access methods, you don't specify any fixed spool server in access method G. The spool requests are processed by any free spool work process. To avoid unnecessary network traffic, you should define at least one spool work process on every application server. Frontend print requests are then processed by a spool work process that runs on the same server as the generating dialog work process.

[!]

Caution

Using the profile parameter `rdisp/wp_no_spo_Fro_max`, you can increase the number of spool work processes that process the frontend output requests. However, this should only happen in exceptional cases; for instance, if only frontend printing is used. An increase can result in undesirable interactions with printers of other access methods as the frontend output requests are not assigned to a predefined server. For example, it may be possible that frontend print requests are slotted in between print requests that are to be output on a specific printer in a fixed sequence.

The default profile parameter setting of 1 should generally suffice.

At this point, let's discuss the general flow for creating a print request, as this often causes problems in frontend printing:

1. The user is connected with the SAP system via the SAP GUI. The user context runs in a dialog work process.
2. If a print request is to be started from the dialog work process, the spool request is created in the dialog work process as well. The device type-dependent formatting of the output request, however, is done asynchronously in the spool work process.
3. It sends the formatted data stream to the printer depending on the access method. In access method G, this is done via the SAP GUI. In other words, the spool work process needs to know to which workplace computer it is supposed to send the data stream.
4. This so-called terminal information is forwarded from the dialog work process to the spool work process. If the terminal information is not available, the print request cannot be executed. This is the case if the print request is not started by a dialog work process but by a background work process. In this case, there is no terminal information at all (in other words, the frontend printers cannot be used from background work processes).

[+]

Note

No error occurs if you don't use the PRINT IMMEDIATELY option during the creation of the print request when you use frontend printers in background operation. Only a spool request is created at this point. The printout itself can be started manually via Transaction SP01 afterwards.

However, this procedure should only be used with due care, as the parameter can easily be used incorrectly by accident in the definition of the background job. Spool requests then receive the status "Frontend unavailable" (see Section 2.4.5). Therefore, you shouldn't use any frontend printers in background operation.

The printout process for access method G with SAP GUI for Windows is almost identical to the process known from other Windows applications. As long as you don't select the NO DEVICE SELECTION AT FRONTEND option (refer to Figure 2.16), the printer selection screen is displayed after the spool work process created the output request and its successful forwarding to the SAP GUI (see Figure 2.17). Chapter 3, Section 3.3 details the exact technical relations. If the option mentioned is set, the printer selection screen is not displayed, and the data stream is sent immediately to the printer defined in the HOST PRINTER field.

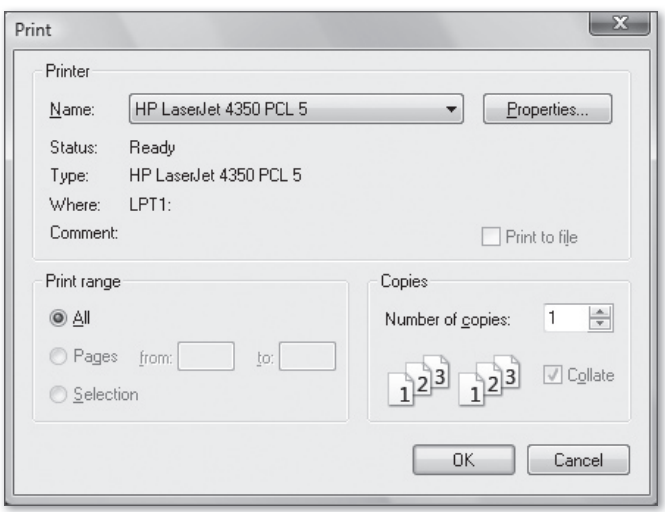

Figure 2.17 Printer Selection Screen in Windows

You can configure the properties of the selected printer via the PROPERTIES button as you are used to from other Windows applications. This particularly applies to printer-specific properties, such as the entry of a PIN (see Figure 2.18). Note that this option is not available for any other access method in the entire SAP environment. However, you should be aware that problems occur with some Windows printer drivers.

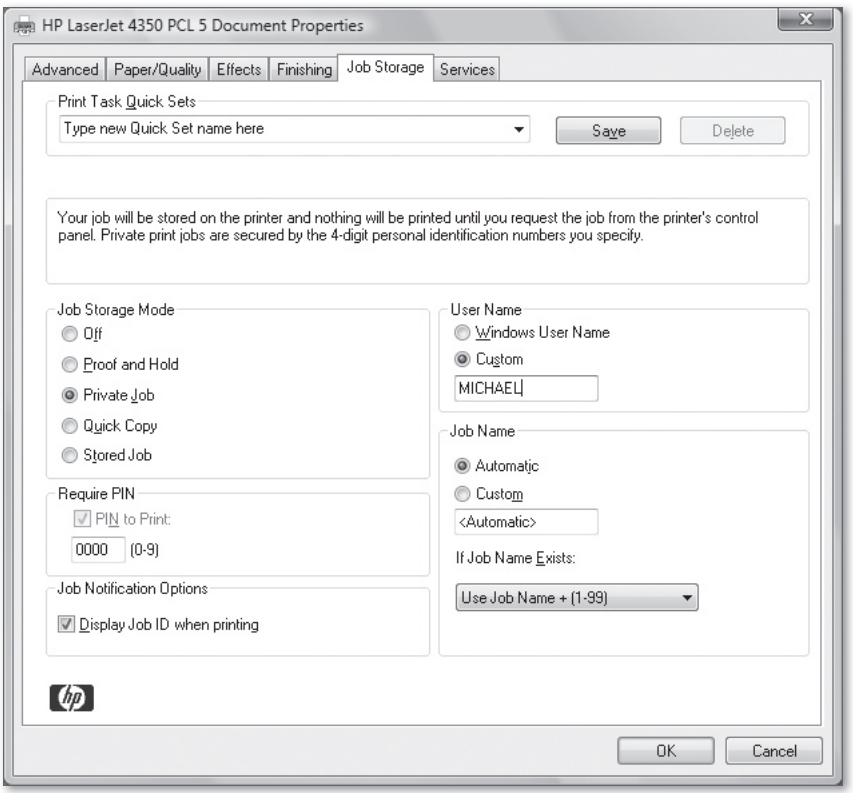

Figure 2.18 Using Printer-Specific Properties

The program-based creation of a print request in the SAP system does not correspond to the printout process from any Windows application, as the document to be printed is created on a computer that is different from the one where the printout is made. You can therefore deactivate the PROPERTIES and CANCEL buttons via options if required. Chapter 3, Section 3.3.2 provides details on this topic.

Tip [*]

Instead of __DEFAULT, you can also enter any other printer name defined on the workplace computer in the Host Printer field in the SAP system. This printer—provided that it still exists for the printout—is then selected instead of the default printer in the Windows printer selection screen that is displayed for the printout. If the printer is not known, the default printer is always selected. This is often done, for example, for mobile workstations if the employees work at different locations. Because the printer used can still be modified in the printer selection screen, the specification of a specific printer in the definition in the SAP system is an unnecessary restriction in general.

2.4.2 Frontend Printing with SAP GUI for Java

SAP GUI for Java is the frontend component provided by SAP for workplace computers with different operating systems. SAP GUI for Java is available for Windows, Linux, and Mac OS.

SAP GUI for Java on Windows

If you use SAP GUI for Java on Windows, there are no restrictions compared with SAP GUI for Windows. No restrictions particularly means that printers configured with the SAPWIN device type can be used in the SAP system unrestrictedly.

Instead of the Windows control described in Chapter 3, Section 3.3, a JavaBean is called, which is installed together with SAP GUI for Java and that creates the printer selection screen shown in Figure 2.17 using a JNI call (Java Native Interface) in the *sapwin.dll* file. The further processing is identical to the description provided in Chapter 3, Section 3.3.

SAP GUI for Java on Linux

Comparing Windows and Linux is difficult, due to their different printing concepts. The Graphics Device Interface (GDI) programming interface available on Windows for indirect communication with the printer drivers does not exist under Linux. Instead, you are provided with the Common Unix Printing System (CUPS), which uses configured rules to convert specific input data streams into output data streams that are understood by the printer. Of course, "convert" can also simply mean "pass through" if the format of the input data stream already corresponds to the printer language.

Which input format can be converted into which output format depends on the installed filters and Linux printer drivers. In this context, *input format* refers to the format of the print data stream generated by the SAP system's spool work process. *Output format* is the Page Description Language (PDL) of the printer. In other words, for frontend printing in Linux, you can use precisely those native device types for which an input filter exists in the CUPS of your workplace computer. PostScript is the standard in Linux, which is usually the right one in most cases.

Because there is a wide range of different Linux or Unix installations, this book can only give examples for questions with regard to configuration.

[+]

Note

In Linux, there is generally no filter that can convert the `SAPWIN` data stream as the input format into some other output format. As a result, printers with the `SAPWIN` device type can't be used in Linux. If you use Windows and Linux workplace computers in parallel, you must definitely define at least two different frontend printers in the SAP system if `SAPWIN` will be used. This may be a restriction.

The standardized printer selection screen shown earlier in Figure 2.17 is not available in Linux either. Instead, different programs (e.g., `kprinter`, `gtklp`, and `lp`) can assume this function depending on your personal taste and the Linux desktop installed. Figure 2.19 shows a printer selection screen in Linux with `gtklp`. When you install SAP GUI for Java, the availability of these programs is checked in the mentioned order, and the first one found is automatically configured as the default setting.

[+]

Note

The program `lp` should be available in every Linux installation. If it is not available, no spool system might be installed, and you can't print. `lp` doesn't offer any printer selection screen. Print requests are directly sent to the printer without interaction.

You can subsequently change the automatic default setting according to your personal preferences in the settings of SAP GUI for Java. You can find the settings in the SAP logon menu via Options • Settings. Figure 2.20 shows the preconfigured setting if `gtklp` is used for the selection screen from Figure 2.19. Refer to the respective documentation to obtain the call parameters for your selected program.

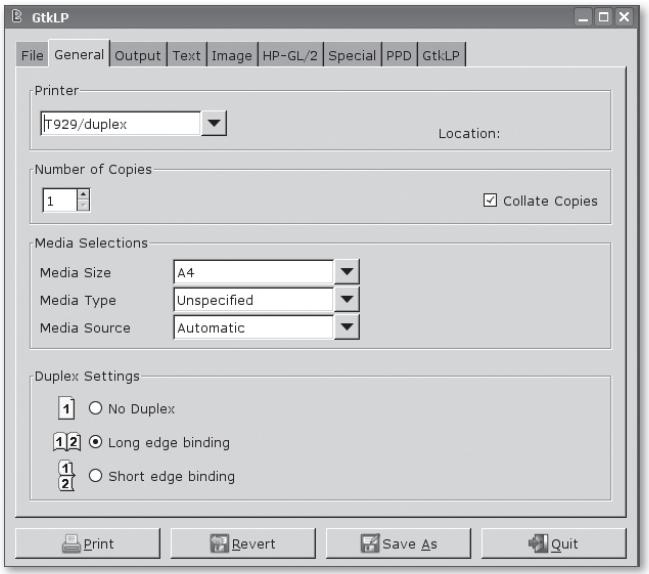

Figure 2.19 Printer Selection Screen in Linux with gtklp

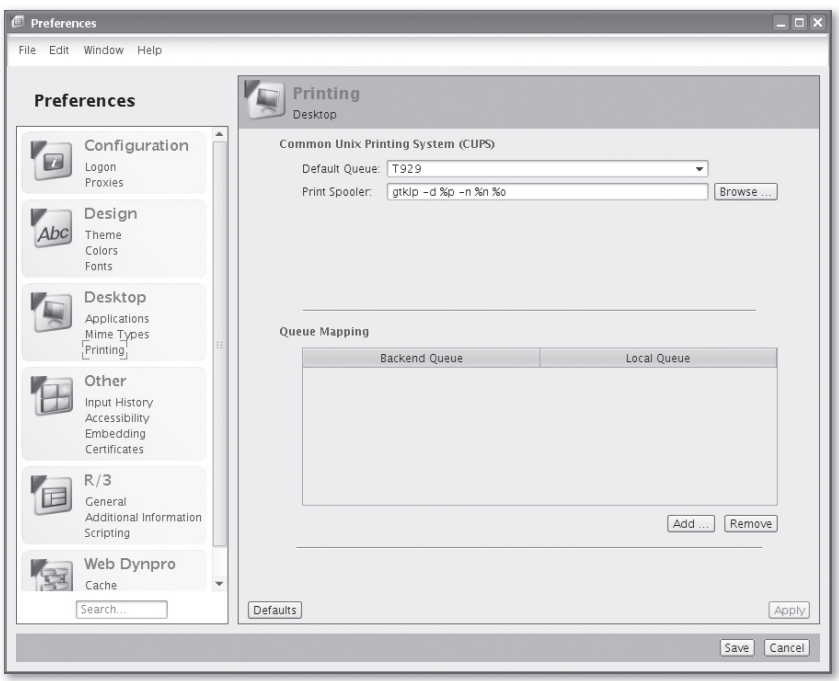

Figure 2.20 Setting the Printer Selection Screen

The SAP system transfers the printer name and the number of copies. The file name of the print file is generated locally. If you use parameters that don't have a valid value, these are ignored.

SAP GUI for Java on Mac OS

For the use of SAP GUI for Java on Mac OS, basically the same rules apply as for the use under Linux. However, the programs are not provided for displaying the printer selection screen in Mac OS. In other words, only the default program `lp` is available for forwarding the print requests to the printer, which, as mentioned, doesn't display any printer selection screen.

2.4.3 Frontend Printing with SAP GUI for HTML

SAP GUI for HTML is a browser-based implementation of SAP GUI, which largely corresponds to the two other implementations. This was achieved by sending the HTTP requests of the browser via the Internet Communication Manager (ICM) contained in the SAP system to the Internet Transaction Server (ITS). It adopts the graphical setup of the pages and communicates with the SAP system via the same protocol (DIAG) as the other SAP GUI implementations. Only through the ITS is it possible to provide the frontend printing in modified form for a browser-based frontend.

No print data stream is directly sent to the printer for SAP GUI for HTML. Instead, the spool request to be printed is converted into a PDF file. This conversion is done by the spool work process using the PDF creation provided in the SAP system, which is also used for the `PDF1` device type, for example. The created PDF file is displayed in the browser. You can print it there via the default print button of the browser. From the SAP system's perspective, the spool request is "printed" as soon as the PDF file is displayed. This is definitely equivalent to the procedure of many applications that you know from the Internet. As a result, the selection of the device type for frontend printers with SAP GUI for HTML is limited to PDF device types (see Figure 2.21).

In the SAP environment, printing with PDF device types is rather unusual, especially because you must face the difficulty that the conversion of the spool request is asynchronous. The dialog work process of the user who has created the request is not involved here.

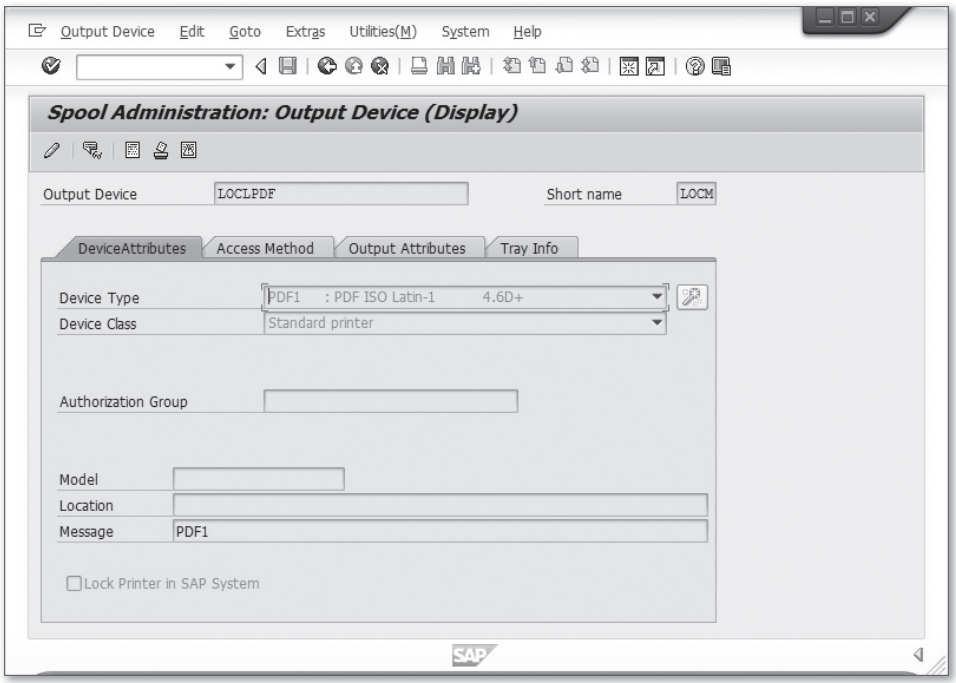

Figure 2.21 Device Type for SAP GUI for HTML

As we already mentioned, the spool work process requires terminal information for the frontend printing so that the work process knows to which workplace it is supposed to send the formatted data stream. Unfortunately, if you use web browsers, it must not send the data stream, which is the PDF file in this case. Instead, the browser must retrieve the file itself. But because it doesn't know when the spool work process has completed the file conversion, it must query this at regular intervals. This procedure is known as *polling*. A new window is opened for this purpose, which is implemented as a Business Server Page (BSP; see Figure 2.22).

After completion of the file, the spool work process records from which workplace the relevant spool request was created. If this workplace (more precisely, the polling window of the workplace) sends a query, a positive reply is sent. The polling window then creates a request for displaying the PDF file, and it deletes the entry for this request in the spool work process.

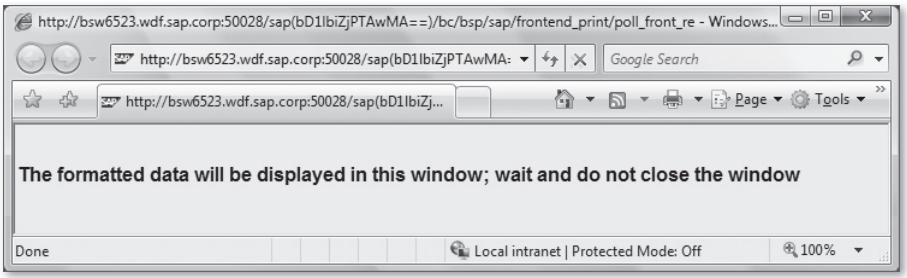

Figure 2.22 Polling Window

The created PDF file is displayed in the same window in a PDF plug-in as shown in Figure 2.23. In the example, a screen list was printed. The printout of the screen list was converted into a PDF file, which is displayed. From there, the file can be printed using the default print button of the Adobe Acrobat Reader plug-in.

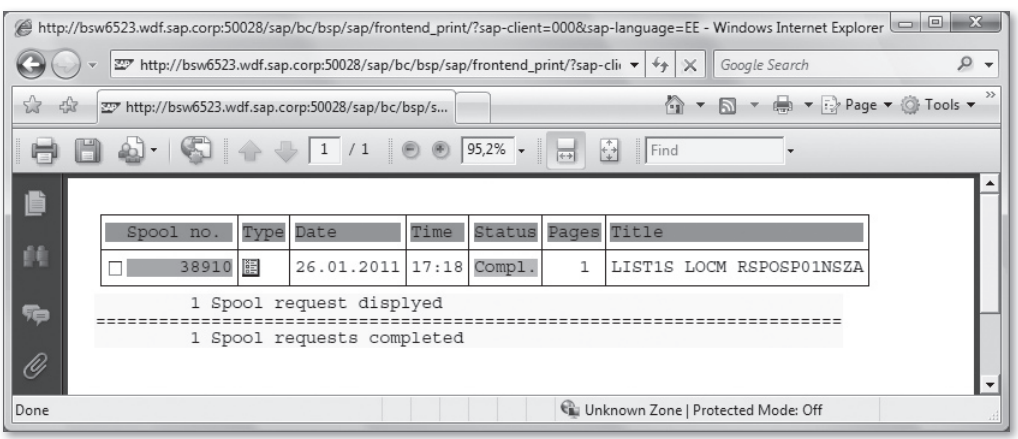

Figure 2.23 Display of a Created PDF File

[+] **Note**

If you use different frontend components in parallel, you usually have to create multiple frontend printers with different device types. The access method can always be G, even if, strictly speaking, the name Frontend Printing with Control Technology is not correct when you use SAP GUI for HTML.

For example, you can define two frontend printers LOCL and LOCLPDF when you use SAP GUI for Windows and SAP GUI for HTML; these frontend printers each have access method G and different device types (SAPWIN and PDF1). Earlier in this chapter, Figures 2.15 and 2.16 showed the definitions for SAP GUI for Windows, and Figures 2.21 and 2.24 showed those for SAP GUI for HTML.

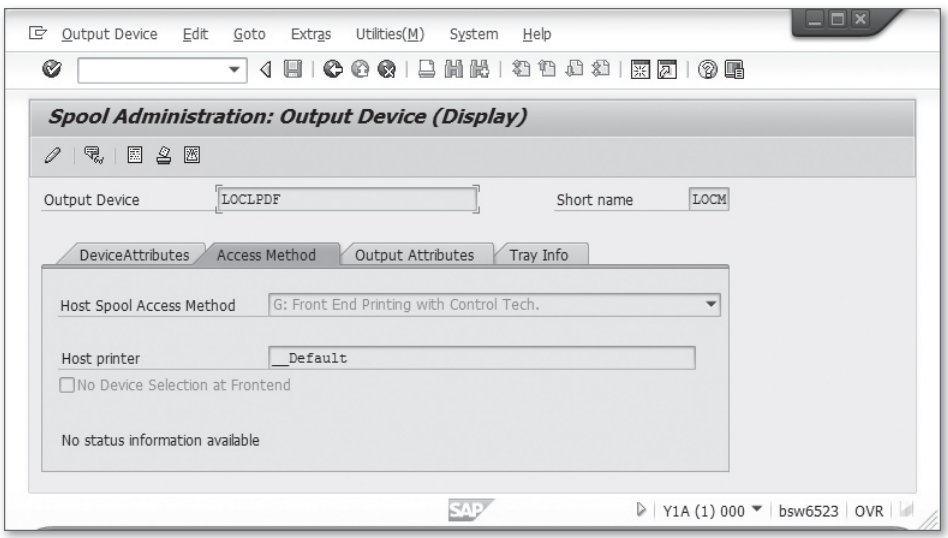

Figure 2.24 Access Method for SAP GUI for HTML

Additional Authorizations for Frontend Printing with SAP GUI for HTML

In addition to the general spool authorizations, which are discussed in Chapter 8, users also require the authorizations for frontend printing with SAP GUI for HTML, which are listed in Tables 2.5 and 2.6. These authorizations are required because the PDF files must be stored temporarily and processed by the programs mentioned.

Authorization Object	Program	Activity	File Name
S_DATASET	SAPLLPRF	06, 33-34	*
S_DATASET	SAPLSPOF	06, 33-34	*

Table 2.5 Additional Authorization S_DATASET

Authorization Object	RFC_TYPE	RFC_NAME	Activity
S_RFC	FUGR	SPOF	16

Table 2.6 Additional Authorization S_RFC

Restrictions for Frontend Printing with SAP GUI for HTML

The previously discussed flow for frontend printing with SAP GUI for HTML requires some additional user interaction compared to the flow when using another SAP GUI, which is absolutely common. This is somewhat different if the frontend printing is used in a manner that typically occurs in the SAP environment only. This includes the simultaneous printing of multiple spool requests, as well as the use of frontend printers when printing SAP Interactive Forms by Adobe. We discuss both in the following sections.

Simultaneous Printing of Multiple Spool Requests

Simultaneously printing multiple spool requests is possible via Transaction SP01, for example. This usually poses no problem; the spool requests selected in Transaction SP01 are processed successively by the spool work process and sent to the correct workplace computer using the terminal information.

But as you've seen, the flow in SAP GUI for HTML is different: Depending on the number of selected spool requests, you would be overrun by a flood of polling windows appearing one after the other and most likely quickly lose track here. Therefore, the procedure is changed as soon as more than one spool request is generated at the same time from one workplace. Only one polling window appears, as well as a list of available spool requests instead of the immediate display of the document in the PDF plug-in. This is shown in Figure 2.25.

You must select, display, and print each spool request separately. This does not reduce the number of windows that are opened and closed, but it is clearer than a large number of windows opening at the same time.

You can have the system redisplay this user-dependent list of frontend print requests at any time via the menu in Transaction SP01 as long as the spool requests exist in the system. The Utilities • List SAP GUI for HTML Print Requests menu item (see Figure 2.26) is only activated if SAP GUI for HTML is used.

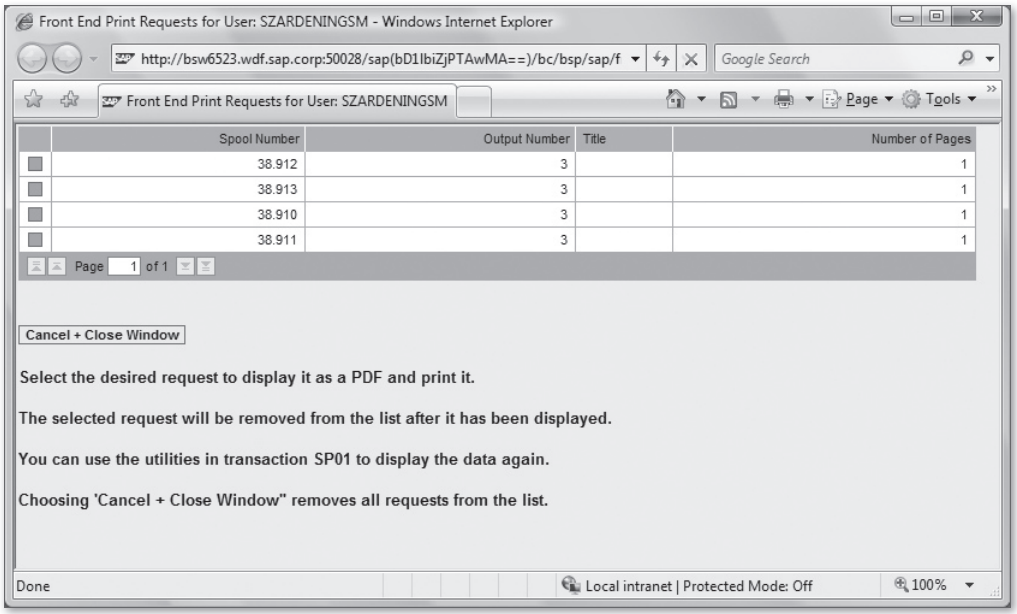

Figure 2.25 List of Multiple Spool Requests

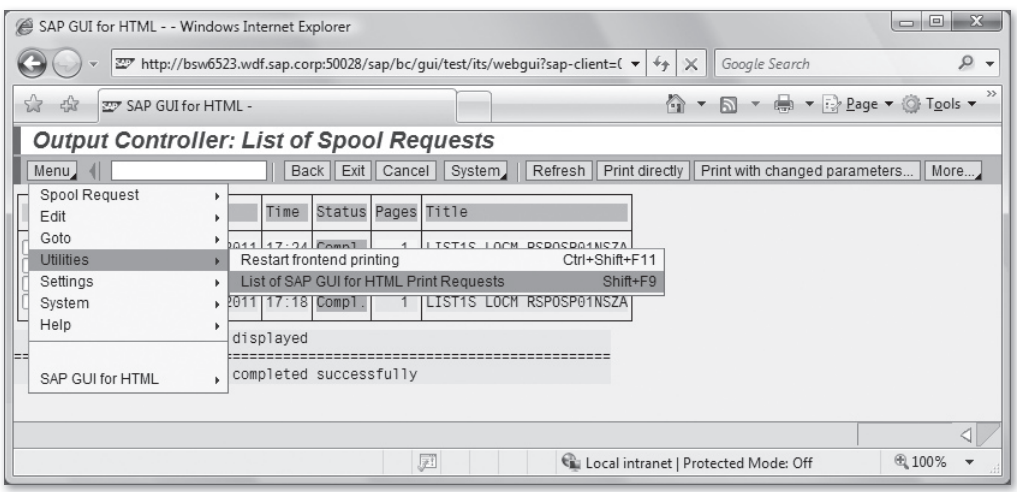

Figure 2.26 List of a User's Frontend Print Requests

[*] **Tip**

The raw data required by the spool work process for creating the PDF file must be stored in the global system directory (*GLOBAL_DIR*) if you use SAP GUI for HTML because no fixed spool server is specified for frontend printing. This may have the result that the spool request is processed by a spool work process of another application server, rather than the creating dialog work process. Because the raw data is kept as long as the spool request exists in the system, it must be ensured that there is no global system directory overflow.

For this purpose, you can set the DELETE AFTER PRINTING option as shown in Figure 2.27. Because the spool request is considered as printed as soon as the PDF file is displayed, the raw data is deleted together with the spool request after display.

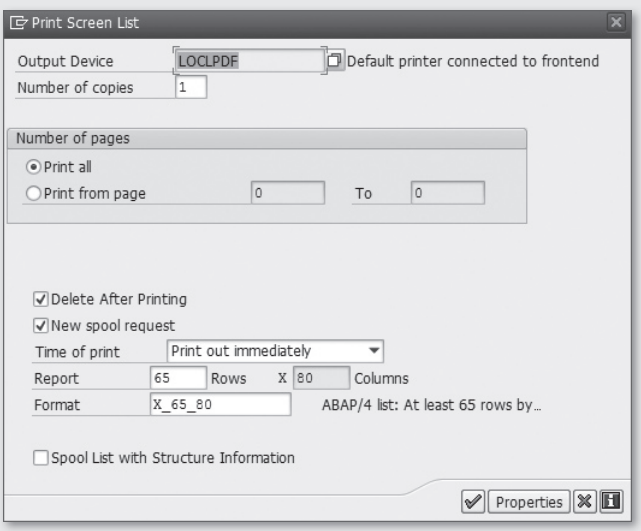

Figure 2.27 Print Options

Printing SAP Interactive Forms by Adobe

Chapter 4 discusses printing SAP Interactive Forms by Adobe in detail. There you will learn that an Interactive Forms spool request can comprise several individual PDF files (parts). This became necessary so that the functionality of adding to existing spool requests can also be supported for Interactive Forms.

We can note consequences at several points, but they are very severe in frontend printing with SAP GUI for HTML. An Interactive Forms spool request with more than one part cannot be displayed or printed completely with SAP GUI for

HTML via frontend printing. The reason for this is that only one PDF file can be displayed per spool request—this is the PDF file of the first part. All other files are not recognized.

So if you want to print Interactive Forms spool requests via frontend printing with SAP GUI for HTML, you must ensure that no other print data is added to the already existing spool requests. You must create a new spool request each time. You can achieve this in dialog mode by selecting the NEW SPOOL REQUEST option as shown previously in Figure 2.27.

2.4.4 Frontend Printing with Other Browser-Based Components

Frontend printing is basically only possible with the three frontend components already described. Portal applications, for example, cannot use frontend printers for two reasons:

- Terminal information must exist that is supported by the spool work process. This is only possible if the communication between the frontend and the SAP system uses a protocol that is supported by the spool work process.
- It must be possible to send information from the spool work process to the frontend component asynchronously. The spool request in the dialog work process is created at a different time than the output request in the spool work process.

The first of the two reasons could be solved technically in theory; the second one, however, is not possible if you use a web browser without active elements because in web browsers, a query originates from the browser; that is, the frontend. However, the spool work process should actively send the finished spool request to the frontend in frontend printing.

Another option is the active polling used in SAP GUI for HTML. Active elements in the frontend usually result in platform or browser dependencies because proprietary language elements are normally used. Neither SAP nor many customers want this. The implementation for SAP GUI for HTML is only possible using polling. Because of this, the support of frontend printing will likely be restricted to the three SAP GUI versions described.

2.4.5 Status Information in Frontend Printing

In frontend printing, status information can only be processed up to the time of releasing the print request to the frontend component. Possible errors that might

occur during printout are not detected. The reason for this is that an elaborate subsequent status query cannot be programmed reasonably due to the complex connection from the spool work process via the terminal information to the frontend.

For example, a user could disconnect from the SAP system directly after printout. The terminal information, which is specific to a user and session so that it cannot be rebuilt identically, compared to other access methods, is thus lost. If the user reconnects to the SAP system, the terminal information is different. Relative to the benefit, the effort of an implementation that considers this fact in frontend printing would be too high. It is assumed that the users use a printer in frontend printing where they can recognize these problems immediately themselves and remedy them. They can reprint the failed spool request without any problems.

This means that a spool request with access method G has the status "Completed" as soon as it is successfully transferred to the frontend component. Except for errors that can occur in the creation of a spool request, error messages are limited to the "Frontend unavailable" text shown in Figure 2.28.

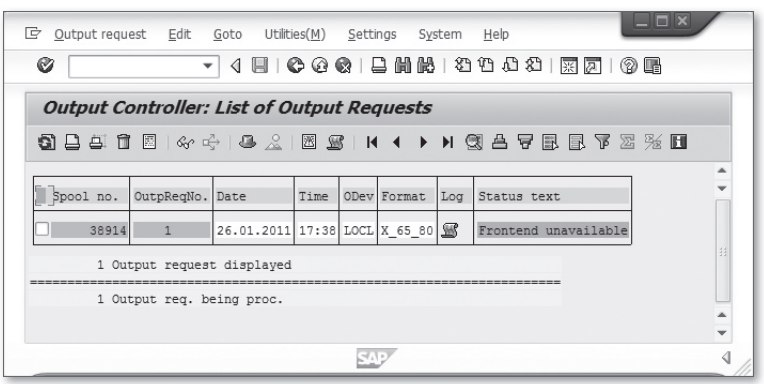

Figure 2.28 Error Message if the Frontend Is Unavailable

There are three possible causes for this:

- You use a frontend printer from a background application. This is not permitted. Always use a different access method from the background jobs. You can reprint spool requests indicated this way from Transaction SP01.
- A connection that was installed and configured correctly was disconnected before the print data was transferred. This can happen, for example, via the already mentioned disconnection from the SAP system immediately after the spool request was created. These requests can also be reprinted from Transaction SP01.

- The connection cannot be established by the spool work process because a fundamental problem exists in the installation, configuration, or at runtime.

As you can imagine, the latter case is the most unpleasant one. The best approach is to send an SAP problem message because there is no general solution for this case. To avoid an unnecessary delay, first check whether a reprint of the spool request is possible from Transaction SP01. If so, the latter case does not exist.

In some applications, it cannot be identified immediately whether the error message involves case one or case two. For example, from an application transaction, you can start a background job that creates a printout on a frontend printer.

Tip [*]

You get the simplest test printout via the System • List • Print menu in Transaction SP01. If this printout is successful, you probably do not have a fundamental problem in frontend printing. The most common cause for the error of the unavailable frontend is an accidentally used frontend printer in the background operation.

If you can exclude case one and two, and if you use SAP GUI for Windows, you can also check the correct installation of the control used for printing:

1. Use the command line to go to the installation directory of the SAP GUI (usually, *C:\Programs\SAP\FrontEnd\SAPgui*). Call the following command:

   ```
   regsvr32 sapfprint.dll /u
   ```

2. Subsequently, you should see the message shown in Figure 2.29 in the language of your operating system.

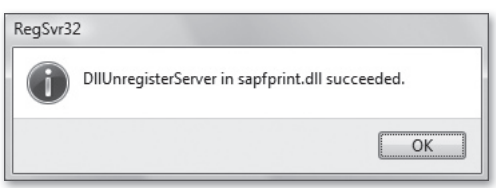

Figure 2.29 Message for Successful Control Unregistration

3. With this command, you unregistered the control for printer control in Windows. Re-register the control with the following command:

   ```
   regsvr32 sapfprint.dll
   ```

4. The system should now display the message shown in Figure 2.30.

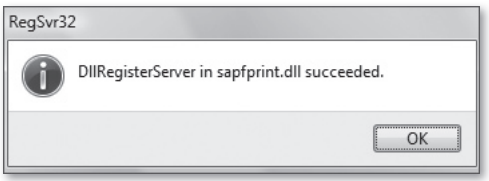

Figure 2.30 Message for Successful Control Registration

5. Trigger another test print. If this still doesn't work, you should create an SAP problem message.

The registration should usually be done automatically when the SAP GUI is installed. If the system displays messages different from those shown in the figures when you call the two commands, the control was not installed correctly, or something is wrong on your workplace computer for some reason. In this case, you should still create an SAP problem message, but at least you have an indication for the problem's cause.

2.4.6 Summary

As you've seen, you are not provided with one single solution for frontend printing, but there are graduations depending on the type of the SAP GUI used. In SAP GUI for Windows, the advantages clearly outweigh the disadvantages:

- You have minimal configuration in the SAP system.
- You have a maximum use of printer-specific options through the printer selection screen, which are not available to any other access method otherwise.
- You have the option to directly print without any further interaction by switching off the printer selection screen as in Windows. This even enables a rather convenient, simultaneous printout of several documents.
- Provided that you have a sufficient network bandwidth, you can also process large spool requests in access method G with SAP GUI for Windows without any problem.

By definition, frontend printing is a print type for dialog mode. So the lack of support in background operation is not a restriction but an incorrect use in the event of an error. Admittedly, it is not always easy to determine in the SAP system

where the name of the printer that is used in a specific situation is taken from. Frequently, frontend printing is also accidentally used in the background operation. The only real restriction in the use of SAP GUI for Windows is the unreliable status information.

The same reasoning essentially applies to the use of SAP GUI for Java. In Windows, the behavior is identical anyway. In Linux, it largely corresponds to the behavior that you, as the user of a Linux workplace computer, are accustomed to. Only the missing printer selection screen in Mac OS can be considered a restriction.

The most severe restrictions occur in the use of SAP GUI for HTML. Actually, the concepts cannot be compared at all, but we believe that the disadvantages outweigh in the end:

- The entire procedure with its different windows that each requires time to build is much more complex.
- Large print requests are manageable to a limited extent only because the PDF conversion becomes slower and slower with the growing size.
- A concept for printing multiple spool requests exists, but its operation quickly becomes a nuisance.
- Interactive Forms print requests with more than one part cannot be processed.

2.5 Access Method L—Printing via Command Sets

Printing via command sets, access method L, is mainly used in the Unix or Linux environment. By tradition, every Unix system is comprised of a comprehensive set of command line commands that you can use to control the entire system via a variety of parameters. You can combine simple commands into more complex commands using the script functionality, which is typically also available in the operating system. This entire functionality is provided in access method L. Due to the diversity, you can only be provided with examples for a possible printer configuration in the SAP system.

In general, access method L is not limited to Unix. You can use it in any operating system platform that theoretically permits command line commands. However, the commands for printing in Windows are rather restricted functionally. Numerous Unix commands are also implemented in Windows, but these are tool packages

that you either have to purchase or that must not be used commercially because they are provided as freeware. This also applies to the script functionality in Windows. In other words, you can functionally upgrade a Windows system, but this is rather uncommon in real life. Access method L is mainly used in pure Unix or Linux systems.

Figure 2.31 shows the initial screen for the configuration of access method L. As usual, you must enter the printer name as it was defined at operating system level in the HOST PRINTER field. The HOST NAME field is populated automatically after you've selected the spool server in the DEVICEATTRIBUTES tab. The configuration of this page is identical to that of access method C (refer to Figure 2.1). If you use logical servers, you must also ensure here that the printer name entered in the HOST PRINTER field is defined in all real servers.

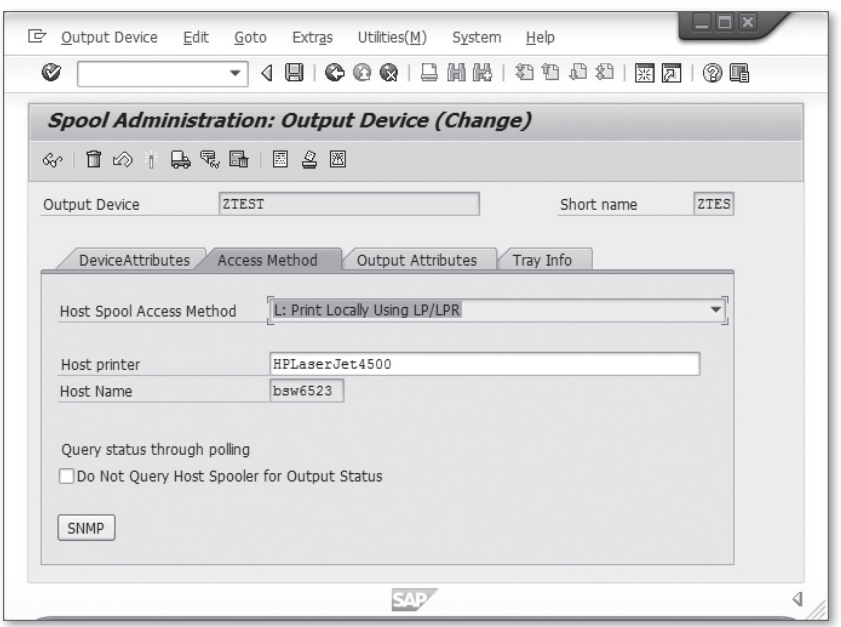

Figure 2.31 Printing via Command Sets—Access Method

[+] **Note**

Because no SAPWIN interpreter is used in access method L, you can use native device types only. Generic SAPWIN device types are not possible even if you operate access method L on Windows.

But where are the command sets? The operation indeed needs getting used to. Select the ACCESS METHOD tab, and call the EDIT • COMMAND SET menu as shown in Figure 2.32.

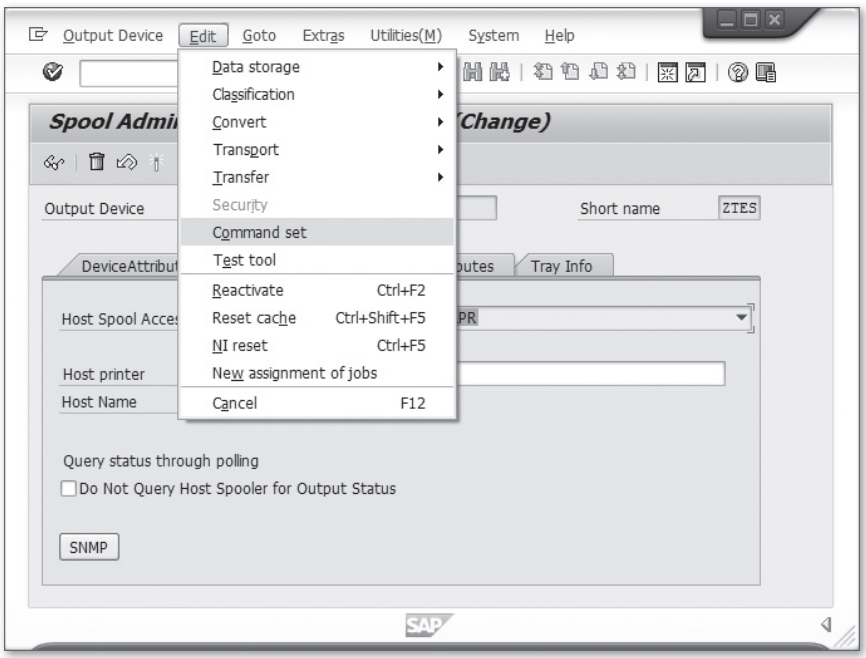

Figure 2.32 Displaying the Command Set Definition

The screen changes now. The COMMAND SET ID field is displayed as you can see in Figure 2.33.

You can now define different command sets. A command set consists of two commands respectively and is identified via a letter. You use the first command to send a new print request and the second one for periodic status queries similar to access method S or access method U (see Section 2.9). After you've defined the commands, you can use them for different printers.

Tip [*]

If you select the DO NOT QUERY HOST SPOOLER FOR OUTPUT STATUS checkbox, you don't need to specify a command for the status query.

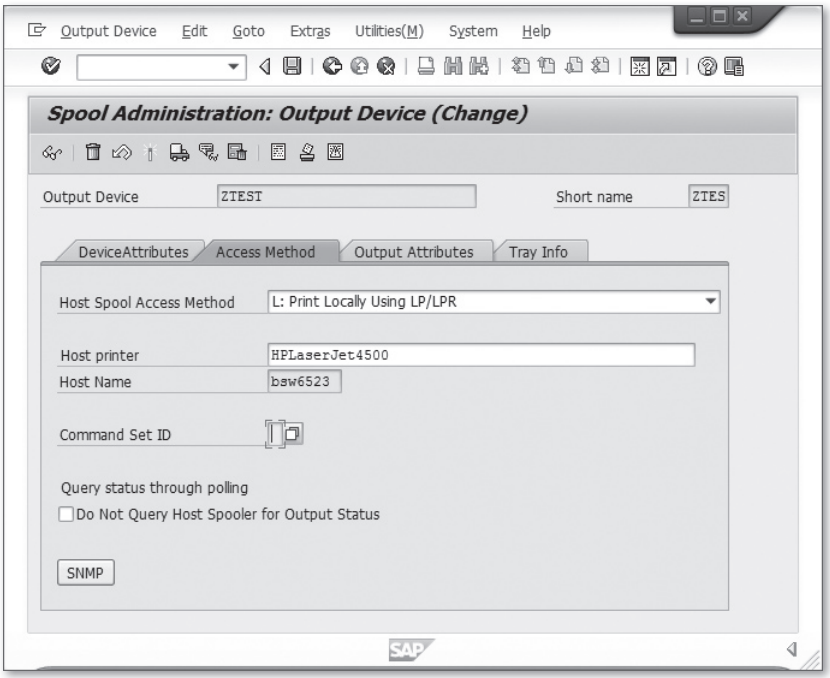

Figure 2.33 Displayed Command Set ID

If you've already defined a suitable command set, enter the ID letter in the COMMAND SET ID field. If you want to define a new command set, enter a letter not used yet in the same field to give the set a name. Double-click the field. In the next dialog window (see Figure 2.34), you can enter the commands to be used in the device with the relevant parameters. Request-specific parameters that will not be determined until runtime are specified with placeholders.

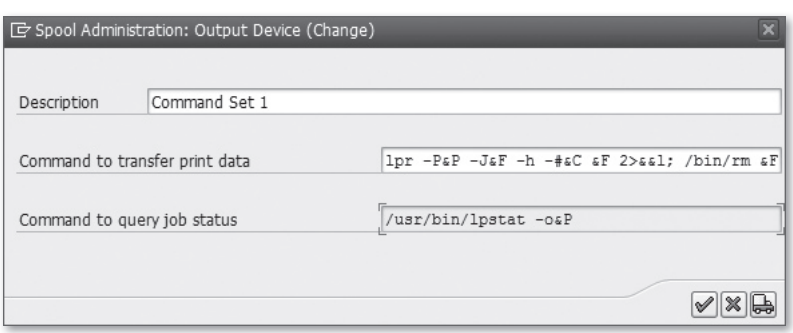

Figure 2.34 Command Set Definition

[+]

Note

If you haven't created a command set, the system uses the values of the profile parameters `rspo/host_spool/print` and `rspo/host_spool/query` as preset commands for print data transfer or status query. Default commands are used here that work in most cases. The `rspo/to_host/datafile` profile parameter defines the name for the file that is transferred by the spool work process to the host spooler for each output request. The name selected must contain a sequence of eight plus signs (+). The spool work process replaces these signs at runtime with a unique file name. You usually only need to change the parameter if you want to move the path for the files to another directory.

The spool work process replaces the defined placeholders with the values of the current spool request before the command is called. Table 2.7 shows the placeholders available for the two commands.

Parameter	Description
`&P`	Name of the host printer.
`&p`	Path of the file to be output.
`&F`	Name of the file to be output (with path specification). The name is specified in the `rspo/to_host/datafile` profile parameter.
`&f`	Name of the file to be output (without path specification).
`&C`	Copy counter.
`&&`	Single `&` character.
`&I`	Request name of the SAP spool system.
`&J`	Request name of the SAP spool system with database name.
`&L`	Format (layout).
`&O`	Owner of the spool request.
`&M`	Client of the owner.
`&o`	User of the spool request.
`&m`	Client of the user.

Table 2.7 Command Line Parameters for Access Method L

Parameter	Description
&T	Title of the spool request.
&R	Recipient (cover page).
&D	Department (cover page).
&S	SAP printer name.
&Y	Priority.
&U	Unix cover page (N = no, X = yes, D = default).
&N	Number of the spool request.
&n	Number of the output request.
&c	Page count of the request.

Table 2.7 Command Line Parameters for Access Method L (Cont.)

The following two default commands should be available in every Unix platform:

- **Sample command for transferring the print file**

  ```
  /usr/bin/lpr -P&P -J&F -h -#&C &F 2>&&1; /bin/rm &F
  ```

  `-P`, `-J`, `-h`, and `-#` are parameters of the `lpr` command, which is the default command for print job transfers in Unix systems. Refer to the manual of your system for other possible parameters.

  - **`-P<name of host printer>`**
    Printer name of the operating system
  - **`-J<Name of the file to be output>`**
    Name of the print request in the printer analogous to the file name
  - **`-h`**
    Without SAP variable = no cover page
  - **`-#<copy counter>`**
    Number of copies to be output
  - **`&F`**
    Name of the file to be output

- `2>&&1`
  Diversion of the command's reply
- `/bin/rm &F`
  Deletion of the output file after transfer

- **Sample command for status query**

  `/usr/bin/lpstat -o&P`

  `-o` is a parameter of the `lpstat` command, which is the default command for the status query in Unix systems.

  - `-o<name of host printer>`
    Printer name of the operating system

The spool work process replaces the parameters masked with `&` with the corresponding current values. You can log the commands with the replaced call parameters in the work process trace file for error analysis. For this purpose, first activate the Test tool tab via the Edit • Test tool menu as shown in Figure 2.35, and then select the Log print command checkbox as shown in Figure 2.36.

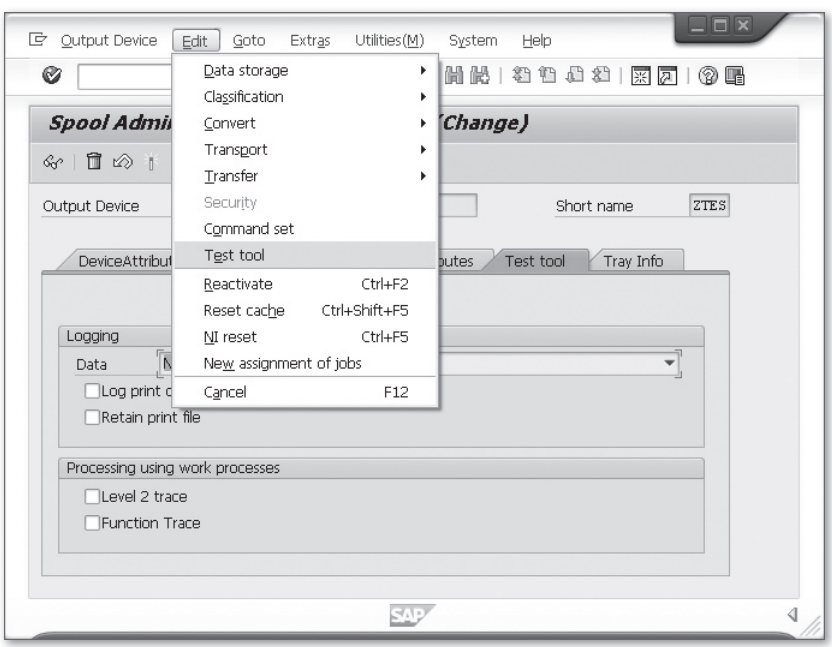

Figure 2.35 Activating the Test Tool

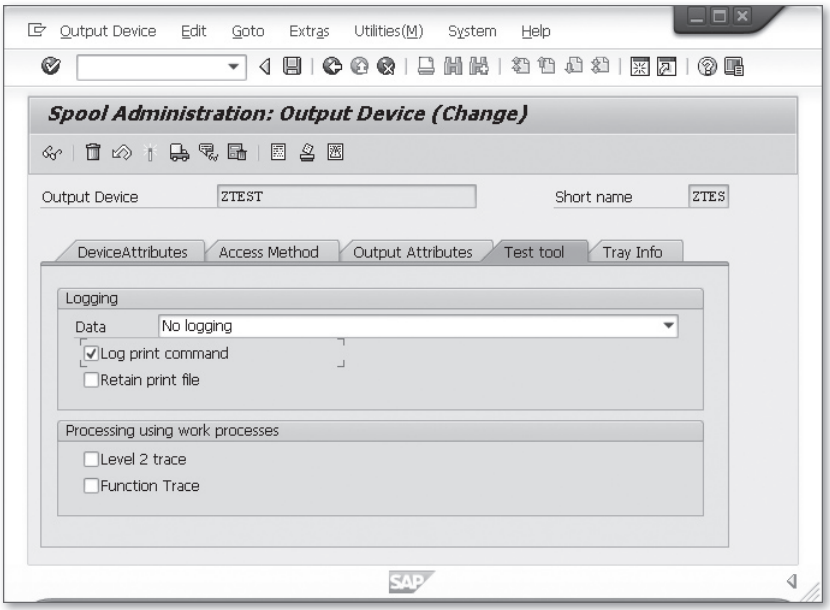

Figure 2.36 Activating Logging

2.6 Access Method M—Printing via Email

Originally, printing via email was implemented as a replacement for frontend printing from browser-based frontends. At that time, SAP GUI for HTML had not been available in its current form, and the procedure we saw in Section 2.4.3 had not been developed yet. In access method M, the spool request is converted into a PDF file and sent as an email attachment. This attachment can be viewed with a PDF viewer and printed if required. This printout, which was somewhat difficult to create, was the mentioned replacement for the unavailable frontend printing.

Figure 2.37 shows the configuration screen for access method M. The recipient address of a spool request is determined in the following order:

1. If an email address is specified in the printer selection screen of the SAP system (see the Mail Address field in Figure 2.38) for the creation of a spool request, this address is used.
2. If a fixed email address is defined in the printer configuration (see the Email Address field in Figure 2.37), this address is used. If the Only Use This Mail Address checkbox is activated, no field for entering the mail address is shown in

the printer selection screen. Otherwise, the address defined in the printer configuration can be overridden by the address from the printer selection screen.

3. If no address is found either in the printer selection screen or in the printer, the address of the print recipient from the user master data is used as the recipient. The user who created the mail is automatically entered by default.

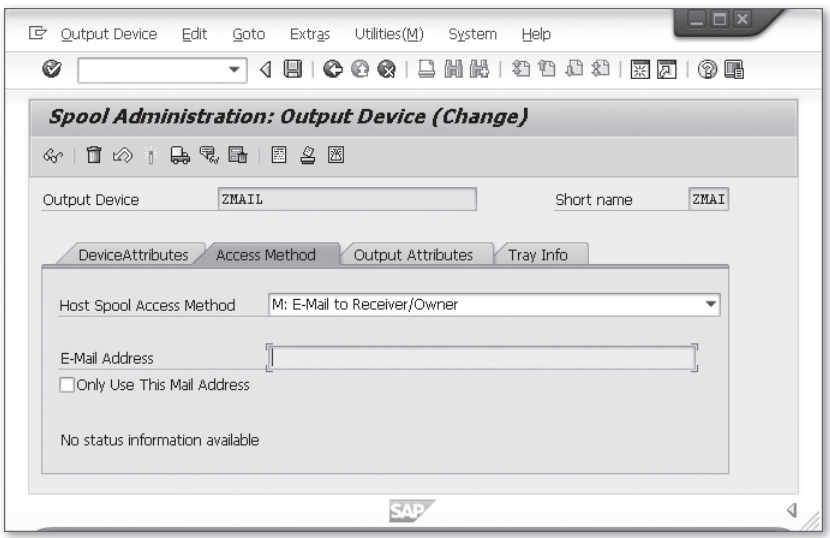

Figure 2.37 Printing via Email—Access Method

Note [+]

We assume that SAP users who send email via access method M printers entered a valid email address in their user master. This address is used as the sender address for dispatch. This ensures that a reply can be sent to the sender address also using the reply function of email programs.

If no address is maintained in the user master, the system automatically generates a dummy address so that the email can be sent. A reply, however, cannot be sent. This dummy address is comprised of the user name and the domain maintained in Transaction SCOT in the SETTINGS • DEFAULT DOMAIN menu.

As already mentioned, the spool request will be converted into a PDF file. For this purpose, you should use the `PDF1` device type (or a corresponding language-dependent PDF device type) for the printer in non-Unicode systems. In Unicode

systems, you should use the PDFUC device type. The converted PDF file is used as an attachment to an email.

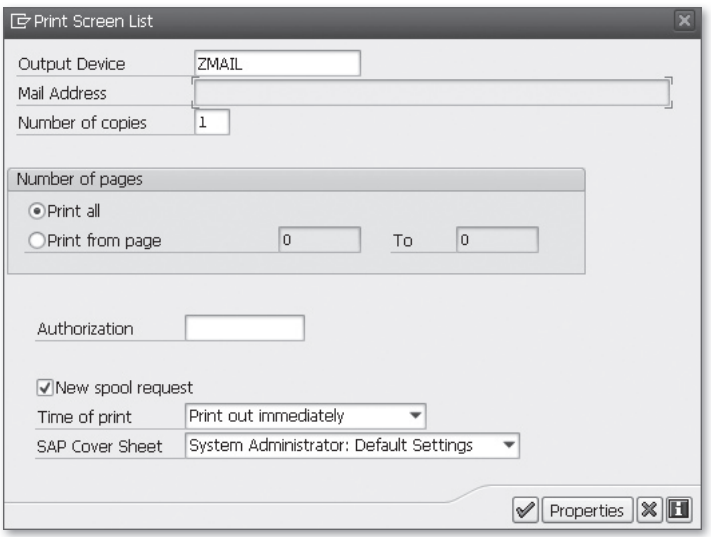

Figure 2.38 Printer Selection Screen of Access Method M

[+] **Note**

Theoretically, you can also use any other device type. The question is how the recipient will further process the file. At this point, PDF is possibly the most flexible option. Viewer programs for printer languages are not particularly widespread.

The email itself only consists of plain text that you can maintain via Transaction SPTP. Select the required language, and then choose Local texts (see Figure 2.39). Select the edit or display mode from the two icons.

The language-dependent text is selected at runtime according to the cover page language defined for the printer. You specify this in the Output Attributes tab as shown in Figure 2.40.

In access method M, the sending of the email corresponds to the printout in other access methods. To be able to send the mail from the SAP system, you must maintain a corresponding SMTP node in Transaction SCOT.

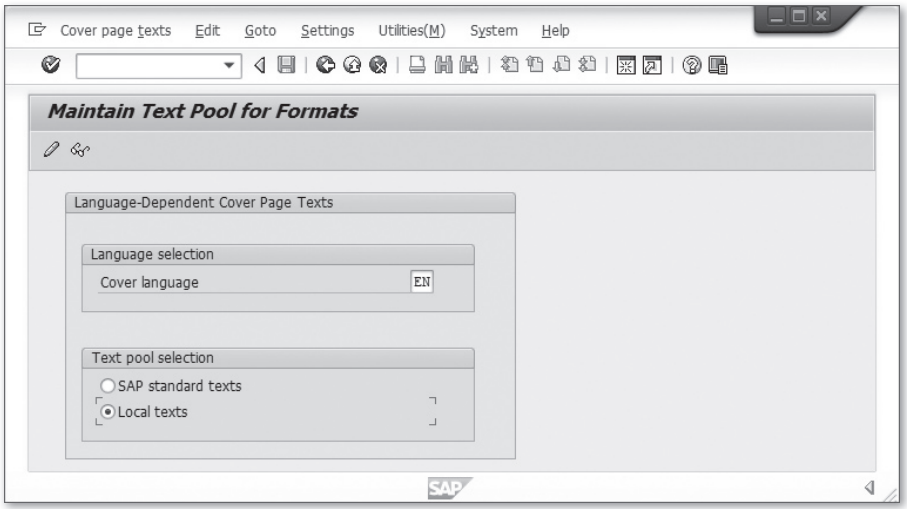

Figure 2.39 Transaction SPTP

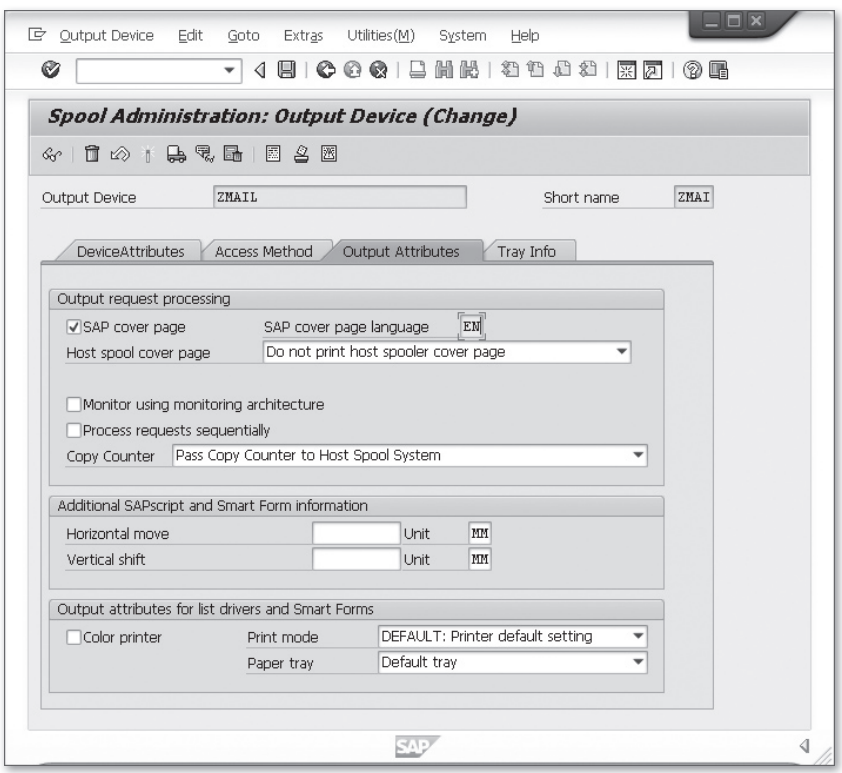

Figure 2.40 Attribute—SAP Cover Page Language

[+] **Note**

The email is not sent immediately but periodically according to the SAPCONNECT settings in Transaction SCOT. That is, a spool request via access method M is "printed" with a certain time displacement.

Figure 2.41 shows an example. The email address used in the spool request must be within the address range of the node so that sending is possible. The configuration of the Output Formats for SAP Documents in Figure 2.41 is irrelevant for email printers because it refers to the email text and not to the email attachment.

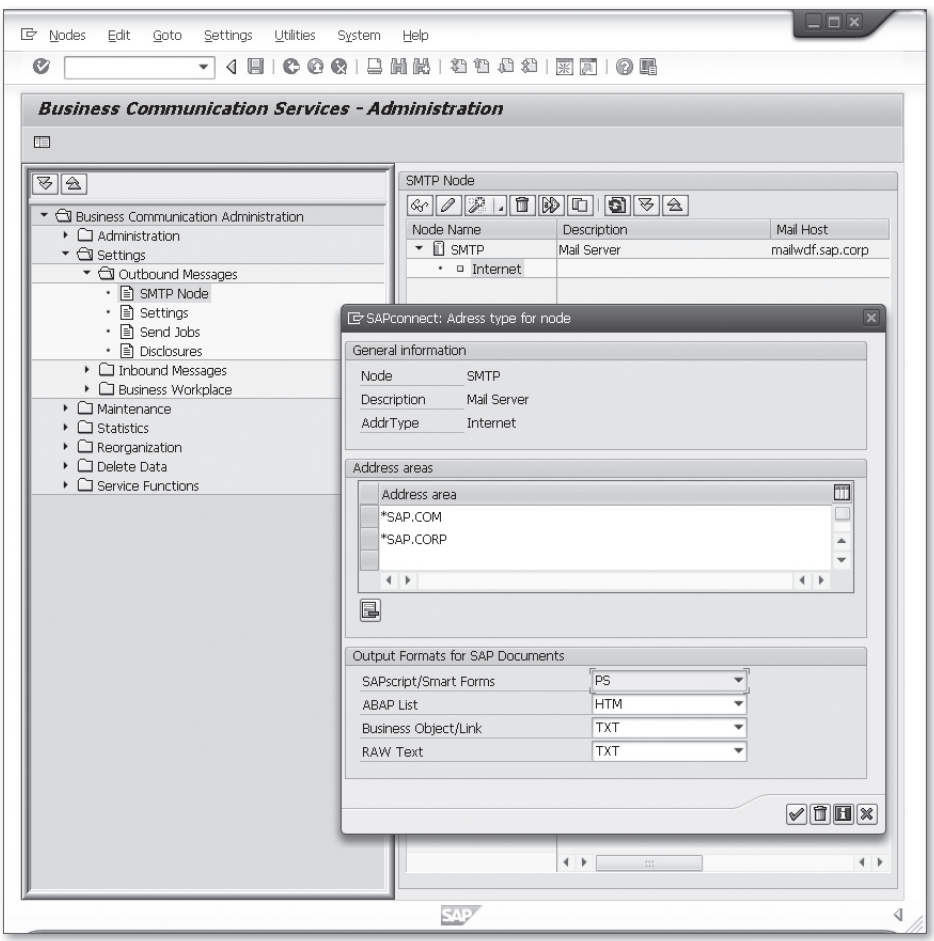

Figure 2.41 Transaction SCOT

The email printer doesn't include any more complex functionality than what you already know from email programs. For instance, you cannot use distribution lists instead of an individual address. SAP ceased developing this access method.

2.7 Access Method P—Printing via Device Pool

A printer with access method P is not a printer definition like all other access methods but a collection (pool) of two or more other printers pooled under one name. This can be used, for example, to output a printout in two different locations at the same time on two different physical printers.

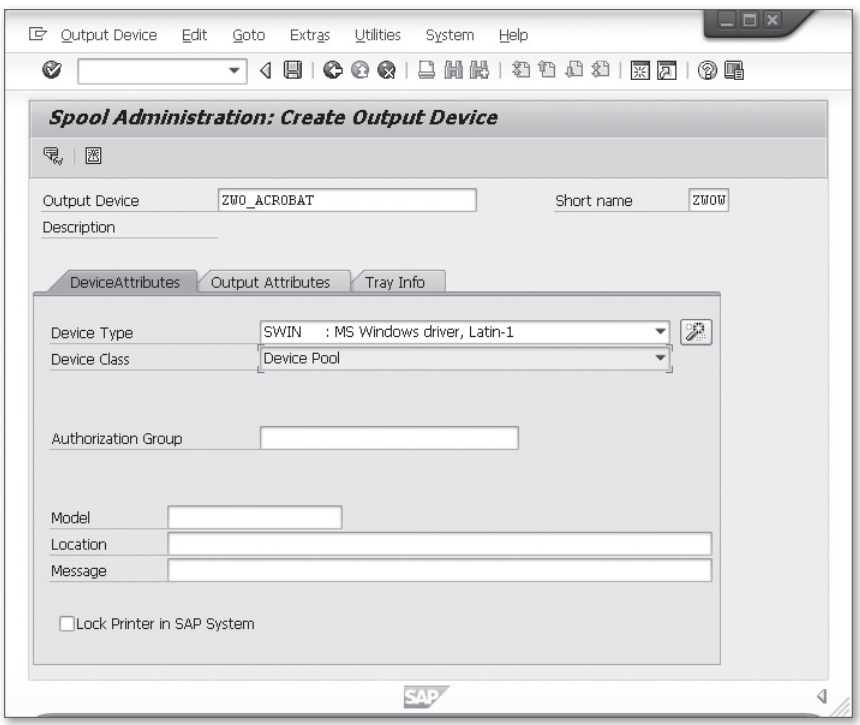

Figure 2.42 Access Method P—DeviceAttributes

To define a pool printer, select "Device Pool" as the DEVICE CLASS in the DEVICEATTRIBUTES tab (see Figure 2.42). In the DEVICEPOOL tab, you can define which printers are pooled as a device pool under the name entered. This page is

displayed as soon as you've selected device pool as the DEVICE CLASS. You can use the two buttons in the middle of the screen to add printers that are already defined in the system or remove them from the device list. Figure 2.43 shows an example for this.

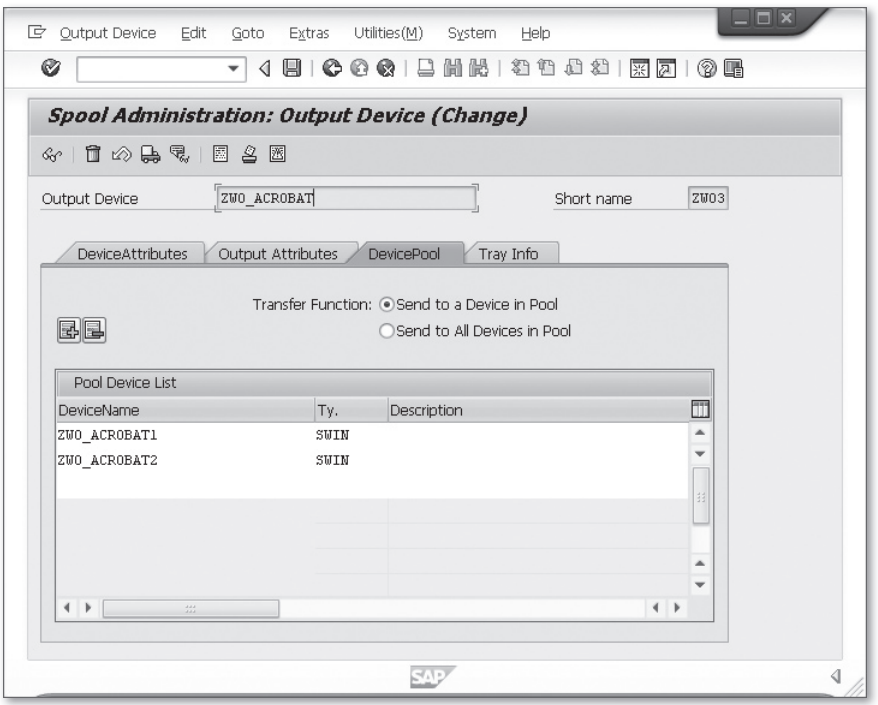

Figure 2.43 Device Pool Definition

On the same page, you can also define the print behavior. A print request is sent either to any device or to all devices of the list. If the print request is sent to all devices, an output request is created for each device. These requests can also assume different statuses.

The device type of the printers added to the pool doesn't have to be identical, as shown in Figure 2.43. You can use printers with different devices types and access methods. In general, however, the printout will not be identical if you use different device types. As shown in Figure 2.44, a printout may be successful on one printer and erroneous on another one.

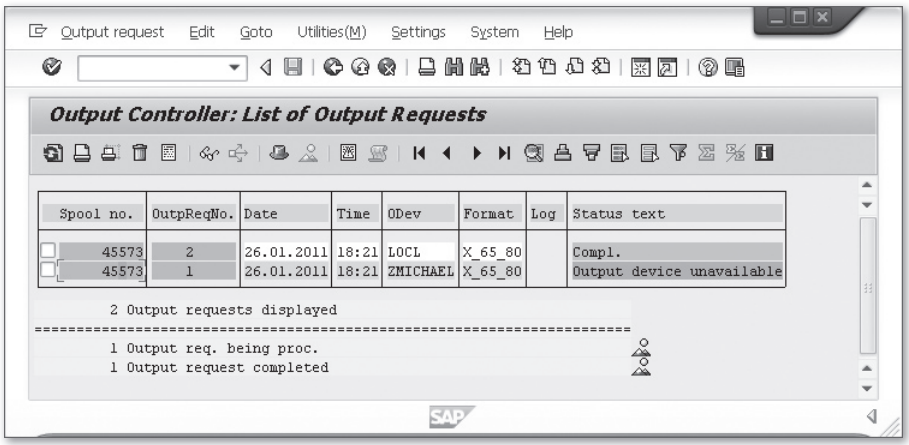

Figure 2.44 Print Job Status for Pool Printers

2.8 Access Method S—Network Printing with SAP Protocol

Compared to the open Berkeley protocol of access method U, access method S is a proprietary SAP network protocol that can only be used for transferring data between the spool work process and SAPSprint. If you use SAPSprint, you should also use access method S. Chapter 3, Section 3.2 provides a detailed description. For this reason, access method S is only mentioned for the sake of completeness here.

In general, the same statements apply as for access method U (see the following Section 2.9) as there is no difference between access method S and access method U from the technical point of view with regard to data transfer. Both access methods are based on network communication via TCP/IP with the same advantages and disadvantages.

2.9 Access Method U—Network Printing with Berkeley Protocol

Besides access method L, access method U is the second classic method for mass printing from the SAP system. In contrast to access method L, in access method U, the spool request doesn't trigger a command on the respective application server, but establishes a TCP/IP connection to an external print server to transfer the spool requests or query the status information. In the DeviceAttributes tab, the

configuration initially corresponds to the access methods C (see Section 2.1) and L (see Section 2.5). Select any device type and a spool server.

[+] **Note**

You can always select the generic `SAPWIN` device type independent of the platform of the application server as long as the external print server is a Windows server with SAPSprint (see Chapter 3, Section 3.2).

The Access Method tab (see Figure 2.45) can be configured rather easily compared to access method L. There are no command sets, but instead you must enter the name or the IP address of the external print server in the Destination host field. The Host printer field indicates the printer name just like in access method L. However, the host printer doesn't need to be defined in the application server but in the external print server.

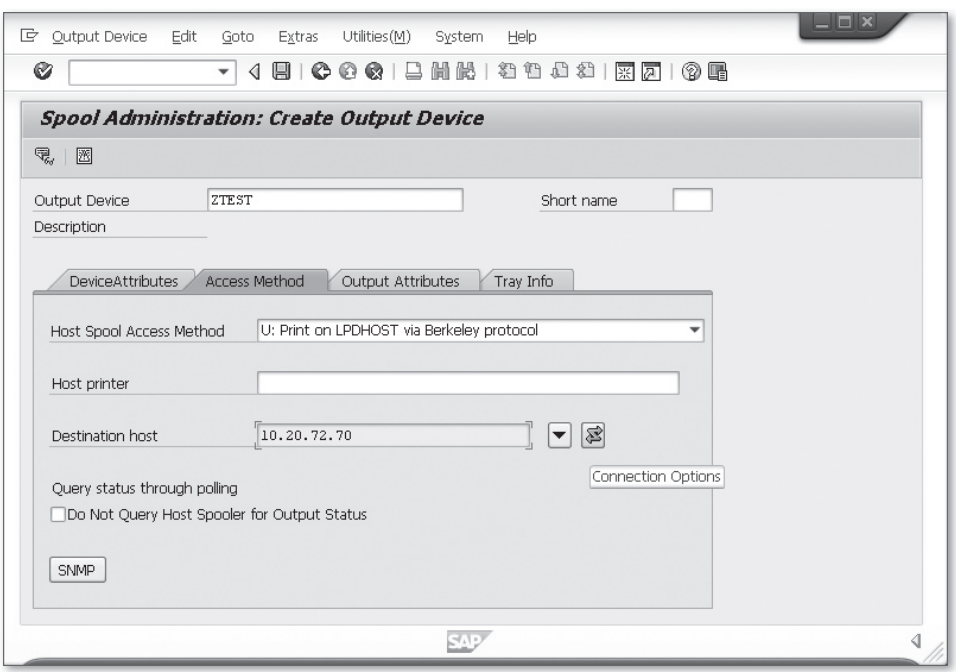

Figure 2.45 Network Print—Access Method

This has two advantages compared with access method L or access method C:

- You only need to define the printer once at operating system level.
- There is no risk of incorrect configuration when you use logical servers because every real server automatically always refers to the same external print server.

Tip [*]

Besides the host name or an IP address, you can also enter an SAProuter string in the DESTINATION HOST field. Consequently, the print server can also be in networks that normally cannot be accessed directly. The entry must follow this pattern:

/H/saprouter_server/H/print_server/S/515

Access method U uses the standard Berkeley protocol for the communication between the spool work process and the external print server. This is described in RFC 1179 (Line Printer Daemon Protocol) of Network Printing Working Group. Data is exchanged via TCP/IP port 515 between the spool work process and an LPD (Line Printer Daemon) on the print server. The LPD can be any software that understands the Berkeley protocol.

In Windows, you are provided with the default TCP/IP print service or SAP's SAPSprint (see Chapter 3, Section 3.2). Every Unix or Linux system also contains an LPD. You can find the relevant information in the documentation of your operating system. An LPD should also be installed in every network-compatible printer. In this case, the destination host is omitted. This is the printer itself; in other words, you must then enter the IP address of the printer in the DESTINATION HOST field.

Note [+]

The preset TCP/IP port 515 for the communication can be changed in the SAP system if you click the CONNECTION OPTIONS button in Figure 2.45. The screen changes as shown in Figure 2.46. Enter the required number in the PORT NUMBER field. Of course, you must then also change the receive port of the LPD in the print server accordingly. Refer to your operating system or printer documentation for more information.

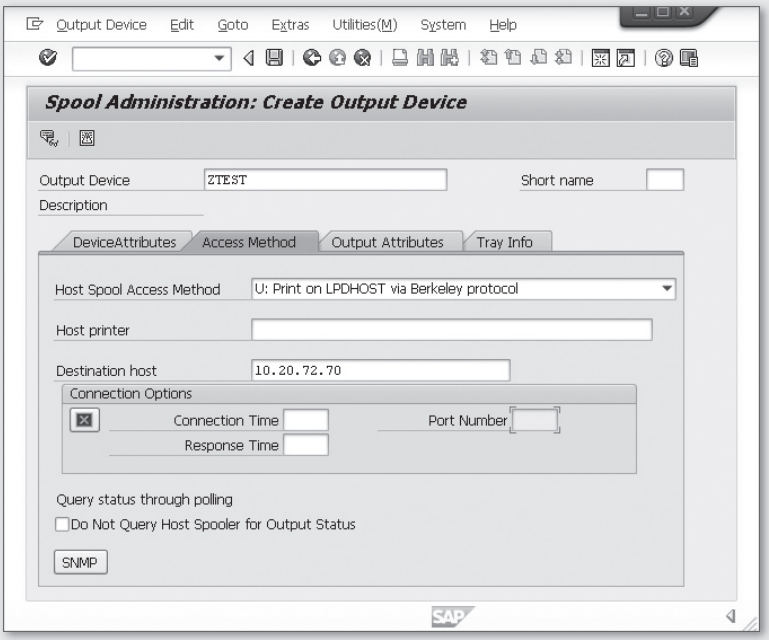

Figure 2.46 Port Change for Network Print

The Berkeley protocol basically consists of two commands for triggering print requests and for querying the status. The status query is rather simple here: Only the printer queue specified in the command is browsed for the specified print request. If the request is not found, it is assumed that the request has already been printed.

This way, you cannot determine whether the print request has reached the queue at all or whether it disappeared from there otherwise. This may sound paranoid, but it's not that absurd in today's common software complexity. A printer queue doesn't necessarily involve a physical printer, but only another software component can process the requests. At any rate, the status information in access method U is not necessarily reliable.

2.10 Comparing Access Method L and Access Method U

If you need to decide which access method to use, you will probably need to discuss L or U at some point. Both access methods present a classic method for mass printing from the SAP system. Neither of the two has fundamental restrictions with regard

to the supported platform (like access method C) or area of application (like access method G). No additional expensive software (like for access method E) is necessary. Exotic methods like access method M are not up for discussion here anyway.

Many customers want to have an official recommendation from SAP. But SAP cannot give any recommendation because the decision—as usual—depends on the requirements. There is no ultimate solution. Every access method has its strengths and weaknesses. The following provides some general remarks that you can use for decision support.

Usually, an SAP system is not planned without preconditions in a green field approach. You typically already have an enterprise structure into which you must integrate the SAP system landscape. The operating system platform is usually already determined. Consequently, the administrators' level of knowledge is already determined.

- In a pure Unix landscape, you can freely select between access method L and access method U.
  - Access method L requires the configuration of printer queues on every SAP application server. If the system is distributed across different locations, administrators should be available in every location. The definition of command sets in the SAP system is not exactly easy.
  - For access method U, however, the printer configuration can be done centrally at operating system level. A network that is stable at all times is a prerequisite here. The configuration in the SAP system is comparably easy. Sufficient knowledge in the configuration of the operating system is required in both cases. This particularly concerns the printer setup. This is required for both access methods, whereas access method U is easier here because you need to set up every printer only once on the print server and not on every application server of the SAP system. The risk of an incorrect configuration in the use of logical servers or mixed platforms does not exist for access method U.
- The status query is not particularly reliable in both access methods if the default command `lpstat` is used in access method L. Only the specified printer queue is browsed for the print request. If you don't use custom scripts as commands but always use the default, the two access methods only differ in the transfer of data.
- If an enterprise uses Windows, the trend is toward access method U or access method S when SAPSprint is deployed. This is not only because command line

commands are a Unix domain, but also because you should exploit the options of the SAPWIN device types in the Windows environment.

- Enterprises often have mixed landscapes, or there are specific areas with special requirements, so that the specific options of the individual access methods must be used. This automatically results in a combination of several access methods.

2.11 Summary and Overview

This section provides a quick overview of data transfer with the advantages and disadvantages for each access method.

2.11.1 Direct Operating System Call (Access Method C)

In access method C, the spool work process sends the formatted print data stream via a platform-dependent programming interface directly to a printer defined on the same server.

- **Advantages**
  - Closed environment
  - No third-party software required for printing
  - No network communication required for printing
  - Minimum maintenance effort
- **Disadvantages**
  - Only available in Windows and IBM i
  - Only native device types (no SAPWIN) can be used in Windows
  - Risk of incorrect configuration for mixed platforms
  - Risk of incorrect configuration for logical spool servers

2.11.2 External Output Management System (Access Method E)

The print data stream is transferred to a third-party external OMS, which is then responsible for printing and status information.

- **Advantages**
  - Reliable method of print job transfer

- No system load through status queries in RFC callback
- Status monitoring possible for many systems at a central location
- Integration of print requests from SAP systems and other systems possible at a central location
- Additional output channels such as fax or email often included in an OMS
- Additional functionality, such as a service desk connection for automatic creation of problem messages, often included

- **Disadvantages**
  - Expensive in acquisition
  - Complex installation and configuration
  - Not every printer supported

2.11.3 Frontend Printing (Access Method G)

Frontend printing is the printing on a personal printer (e.g., the default Windows printer) via an SAP frontend component (e.g., SAP GUI).

- **Advantages**
  - Simple configuration in the SAP system
  - Support of virtually all (also manufacturer-specific) printer options when using SAP GUI for Windows

- **Disadvantages**
  - Cannot be used in background operation
  - Restricted status information
  - Restrictions for mass printing
  - Restrictions for very large print requests
  - Possible restrictions for non-Windows work centers due to different concepts
  - Support of browser-based frontends only for SAP GUI for HTML
  - Comprehensive restrictions for the usage of SAP GUI for HTML
  - If different frontend components are used in parallel, usually requires creation of multiple frontend printers in the SAP system

2.11.4 Printing via Command Sets (Access Method L)

The print data stream is transferred via operating system commands of the respective application server.

- **Advantages**
  - Typical access method for Unix system landscapes
  - Control via powerful but complex command line commands
  - In contrast to access method U, no network required; very stable as a result
  - No fundamental restriction with regard to mass printing and size of print requests
- **Disadvantages**
  - The used printer queues required to be defined on every application server with a spool work process
  - Risk of incorrect configuration for mixed platforms
  - Risk of incorrect configuration for logical spool servers

2.11.5 Printing via Email (Access Method M)

The print data stream is generally converted into a PDF file, which is sent as an email to the user. The file can then be printed via a corresponding viewer program.

- **Advantages**
  - Simple configuration in the SAP system if `SAPCONNECT` is already configured
  - Simple option to send emails from different applications of the SAP system without complex configuration or programming of the `SAPCONNECT` interface
  - Can also be used from background processing in contrast to frontend printing
- **Disadvantages**
  - Only suitable for mass printing to a limited extent because manual printing required
  - Restrictions for very large print requests due to the typically used size limit for email attachments

- Time-displaced sending of email and thus the printout
- Can generally only be used with PDF device types

2.11.6 Printing via Device Pool (Access Method P)

The print data stream can be sent to multiple printers at the same time.

- **Advantages**
  - Pooling of various printers under one name
  - Print at different locations possible at the same time
- **Disadvantages**
  - Rarely used in real life
  - Possible that appearance of respective prints differ due to different device types used

2.11.7 Network Printing (Access Method S and U)

The print data stream is sent via a proprietary (S) or open (U) network protocol to a remote print server. The protocol then forwards the data to the printer.

- **Advantages**
  - Standard method for mass printing from SAP systems
  - Easy configuration
  - No fundamental restriction with regard to mass printing and size of print requests
  - No incorrect configuration possible for mixed platforms or logical servers
- **Disadvantages**
  - Requires a stable network between the SAP system and the external print server
  - Poor performance for slow network connections

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