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Installing and Using the SAP R/3 Device Type

for Lexmark Optra Printers

including support for the Lexmark Bar Code SIMM

By

Liang Zeng, Graduate Research Assistant
Georgia Tech College of Management

and

Gary S. Tjaden, Director, Center for Enterprise Systems
Georgia Institute of Technology

and

A. Tyler Barnett, SAP technical lead and Barcode Project Manager
Lexmark International

and

Helmut Burger-Scheidlin
Siemens Business Services, GmbH & Co OHG

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Executive Summary

SAP provides its own spooling and printing system within the R/3 application to enable a uniform interface for all printing functions, independently of the system platforms supporting both the printing devices and the application devices. This internal spool system is capable of generating a print-ready output stream for a variety of supported printers. In the SAP R/3 spool system, a device type contains the information needed to format data for output on a particular type of printer or fax.

A typical R/3 device type contains all the information needed to make an output-ready data stream for the device. Most R/3 device types correspond to particular printer models. Since formatting information is the same for all instances of a printer model, a single device type is shared among all such devices in the R/3 spool system. Making a change to a device type puts the change into effect for all devices that reference the device type.

In those cases when SAP R/3 does not include a device type for a particular type of printer or output device, a new device type must be supplied by the manufacturer or a new device type can be created by the user. Lexmark supplies a device type to use with all Optra printers. This paper describes how to put the new device type into effect in the R/3 system.

The same device type can be used for all printers which are of the same model.

Once a new device type is defined, it should be distributed and installed on the R/3 systems in which it will be used. Running the SAP R/3 report RSTXSCRP is the easiest way to accomplish this. The report exports an R/3 device type in ASCII file format to a file on the host system on which the new device type has been defined, or to a local PC (starting in R/3 3.1H). To complete the transport, this exported file is copied onto the host of the destination R/3 system (or local PC). It is then imported into this target R/3 system by running report RSTXSCRP on it.

Once the new device type is installed on the R/3 system, the printers which will use it are assigned to it with a simple SAP R/3 administrative dialog.

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I SAP R/3 SPOOL SYSTEM CONCEPTS AND FEATURES

SAP provides its own spooling and printing system within the R/3 application to enable a uniform interface for all printing functions, independently of the system platforms supporting both the printing devices and the application devices. This is one of the features of the open client/server architecture of the R/3 system.

This internal spool system is capable of generating a print-ready output stream for a variety of supported printers. This document output capability means that the R/3 system can format and output documents without concerning itself with the formatting services offered by the operating system platforms on which R/3 is running. All formatting is carried out within the R/3 System. All that is required is that the host or network operating system offers a compatible spooler and that the printer is supported by the R/3 spool system. The R/3 system relies on host spooling and printing services to pass a print-ready output stream to the target output device.

Among the basic features of the SAP spool system are the following
- Manages the output requests for printing, for the SAP communication server, and for the archiving devices
- Provides a uniform interface for different host spool systems
- Supports local, remote, and PC printing
- Supports multiple print and output devices, formats, paper types, and character sets

1.1 R/3 Spool Processing in Overview

Figure 1.1 shows the main components of the R/3 spool system and the typical processing of print output from the user to the destination printer or fax. The components in the diagram play the following roles in printing:

- The **print data source** may be an ABAP/4 program (list output), or a SAP R/3 application (a program editor, the SAPscript text processing system, or the R/3 presentation graphics system). Any of these agents can print a document and thereby generate a spool request, a request for output services.
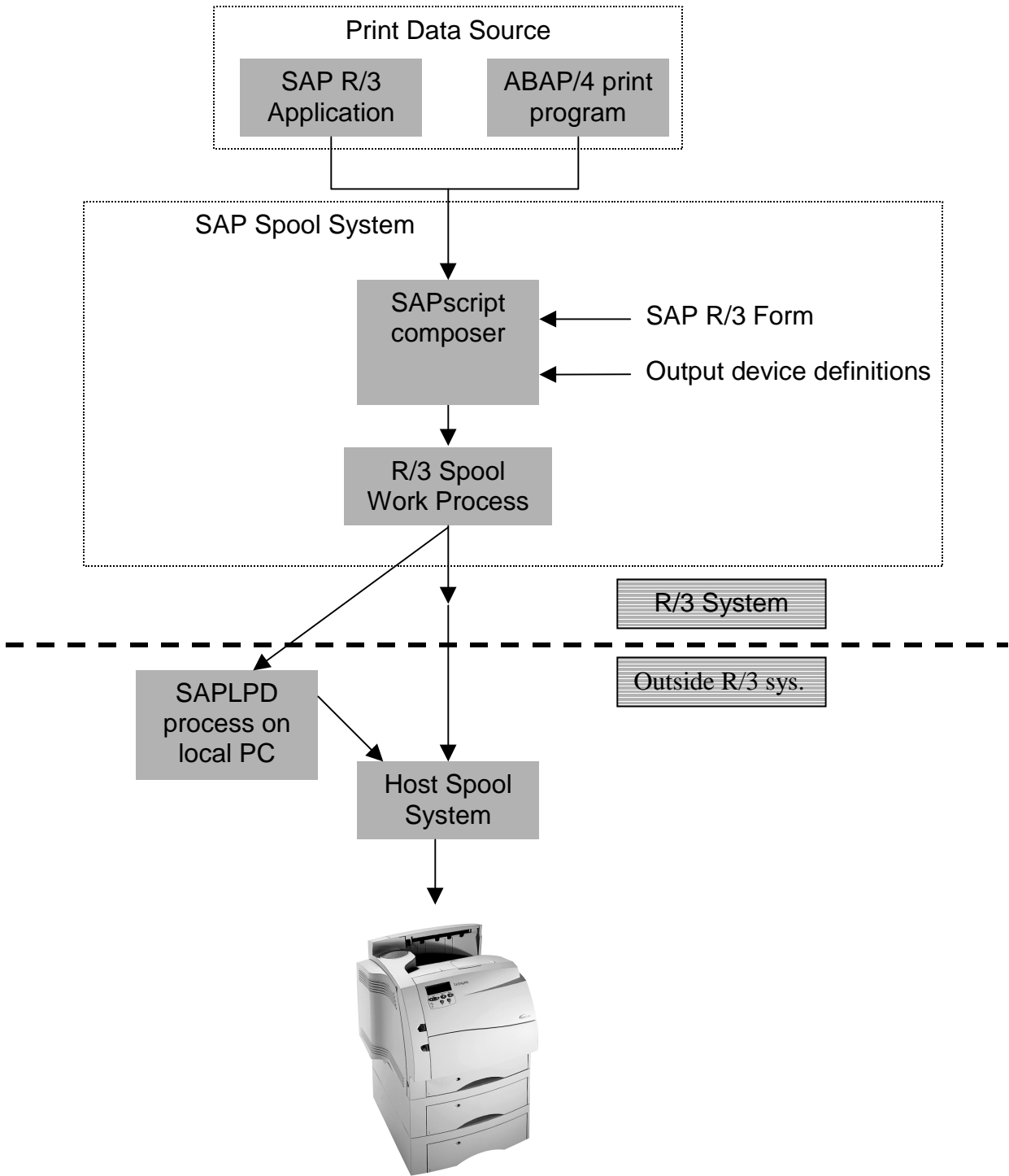
Figure 1.1 SAP R/3 Printing Process

The **R/3 spool system** manages all "printed" R/3 documents as spool and output requests. Output generated by one of the document sources is held in the spool system as a **spool request**. If the output is actually sent to a printer, then the spool system generates an **output request** and formats the data for output.

- **SAPscript composer** passes the application data extracted from the R/3 database to SAPscript by calling elements in a form. **Forms** are maps of output pages, which specify where the text is placed (filled) on a page and what its attributes are. The SAPscript composer sends the data stream to the remaining SAP spool subsystem.

- The spool subsystem comprises the R/3 components having the functions of managing output devices, device types, device drivers and initialization, device formats, character sets, and so forth. In other words, it is not only the repository for R/3 device definitions which identify a device, but also actually a complete interface which converts all types of SAP output into the required output device formats.

- The **spool work process** is one of the several work process types that can run at an R/3 application server. The spool work process is responsible for generating a device-specific output stream for an output request from the print data in a spool request. Generating such an output stream requires that the spool work process does the following:
  - resolve R/3 print controls into printer commands
  - add device-specific printer initialization and output event sequences (end of line, end of page, and so on)
  - convert from the character set used by the R/3 System to the character set of the output device
  - for SAPscript output, use the services of the designated SAPscript printer driver to format the data for output.

  The spool work process is also responsible for transferring the data either:
  - directly to a host spool system or network printer; or
  - to the SAPLPD transfer program running on a Windows-based computer, which then passes the output data to a host spool system or print manager.

  Data transfer may take place locally (within a single host system) or by way of a TCP/IP link between the spool work process and the destination host system. The method by which data is transferred is called the "access method."

- The **host spool system** or print manager is responsible for the last link in the communication chain between the R/3 System and the printer. Like most application programs, the R/3 System does not directly drive printers and other output devices itself. Rather, the R/3 System passes print data to the host system spool or print manager. The host system print manager is responsible for actually passing the data to the output device.

1.2   Device Management and Formatting in Detail

As soon as the R/3 spool system has been notified that a document should actually be output, formatting can begin. The usual result of formatting is a device-specific, output-ready data stream that can be passed directly to the target output device. Since this output data stream is already completely ready for use by the output device, host spoolers or print managers in this case serve only to relay the output stream from the R/3 System to the target printer.

- **Device Descriptions** As Figure 1.2 shows, the information that is needed to produce an output-ready data stream is held in a device description. This device description is stored in two R/3 spool objects, the **device definition** and the **device type**. Usually, R/3 device descriptions hold all of the information that is held in printer drivers in a host system. This device information is used to convert the document to be printed from the raw R/3 internal format of a spool request to a device-specific output-ready format. The device description to use for formatting is specified in the device name entry in the spool request. This device name points to a device definition and to a device type in the device management system.
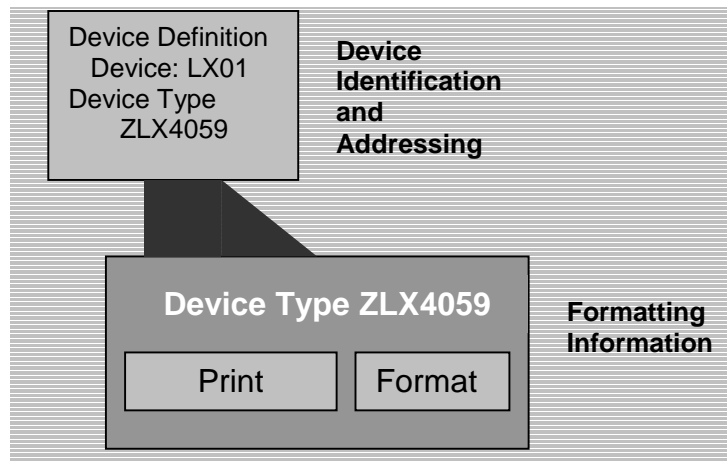

Figure 1.2   Device Description Overview

- **Device definitions:** A device definition identifies an output device and tells the spool output system how to route data to it. The addressing information includes the R/3 name of the device, the name of the output device in the host system, and the communications method (access method) to use for transferring the data. Depending upon the access method, the host name of an intermediate "transfer computer" may also be required. The device definition also specifies which spool server in the R/3 System must process output requests destined for the output device. Finally, every device definition also must specify a device type. With the exception of pre-defined standard devices for certain R/3 applications and devices for front-end printing, you will have to define your own *Output devices* in your R/3 System.

- **Device types:** A device type contains the information needed to format data for output on a particular type of printer. For example, a device type:
  - Specifies the R/3 character set to use for coding characters for output on the device
  - Specifies the OTF printer driver to use for formatting SAPscript output.
  - Defines the device-specific commands to substitute during formatting for generic R/3 print controls and device format actions.

  A typical R/3 device type contains the same information that a printer driver does in a Microsoft Windows system (except for pixel graphics) -- all the information needed to make an output-ready data stream for the device. In fact, most R/3 device types correspond to particular printer models. Since formatting information is the same for all instances of a printer model, a single device type is shared among all such devices in the R/3 spool system. Making a change to a device type puts the change into effect in all devices that reference the device type.

- **Formatting**   The main steps in formatting include:

  - Text filling
  - Character set conversion
  - Insertion of device-specific output commands (replacing print controls and adding actions)

In the final step in formatting, the formatting instructions in the document (print controls) and the formatting actions associated with the document (device format actions) are converted to commands that the output device can understand.

Formats Associated with each document is an R/3 format, DINA4 or X_65_80, for example. A format defines a paper size or a layout, such as the DINA4 paper size or a layout with 65-character lines and 80-line pages (X_65_80).

Formats are named by the spool format object. This object has a purely documentary purpose from the user's point of view. A format is a logical entity, a statement that the R/3 spool system supports a particular paper size or text layout. Formats are actually implemented in two additional R/3 spool components which share the format's name. These additional objects are both part of a device type and are called the *Device format* and the *Page format*. (For the DINA4 paper size, for example, there is a DINA4 format, a DINA4 page format, and a <device type> DINA4 device format.) A device type may support any format defined in the R/3 spool system. To do so, however, the device type must include a *Device format* and a *Page format* that implement the format. .

Device format contains a set of device-specific event-driven "actions". Actions represent sets of device commands that must be issued at such output events as "job begin" (initialization of the output device, *Printer initialization* action), "line end,"

and "page end." The spool formatting system inserts these actions in the output stream where they are required.

A **page format**, the third "format" object, specifies the physical paper size that is to be used. A page format is specified for each SAPscript form, though page formats are maintained in the spool administration function. (Paper size information is used primarily by SAPscript, when the SAPscript composer fills the text as it creates a spool request. However, list and editor formats (those whose names begin with "X") also use the default page format ANY. Since ANY is not used to fill text, it serves as a placeholder in list and editor formats.

At the end of formatting, the output stream is complete and can be sent to the target output device. The commands embedded in the output from the *Printer initialization action* set up the printer for the job, selecting the correct line length or character set, for example. The commands embedded with print controls and device format actions carry out specific operations in the running text.

II   DISTRIBUTING AND INSTALLING THE DEVICE TYPE DEFINITION FOR THE LEXMARK OPTRA PRINTER

There are two options available for distributing device definitions:
- With the normal SAP R/3 workbench organizer tools
- Exporting and importing the definition with report RSTXSCRP

To use the workbench organizer tools you must create a transportable change request such as "tp r3tr prin zlx4059", which is normally done from a test to a production system. (Please refer to SAP help documentation on workbench organizer and transport system.)
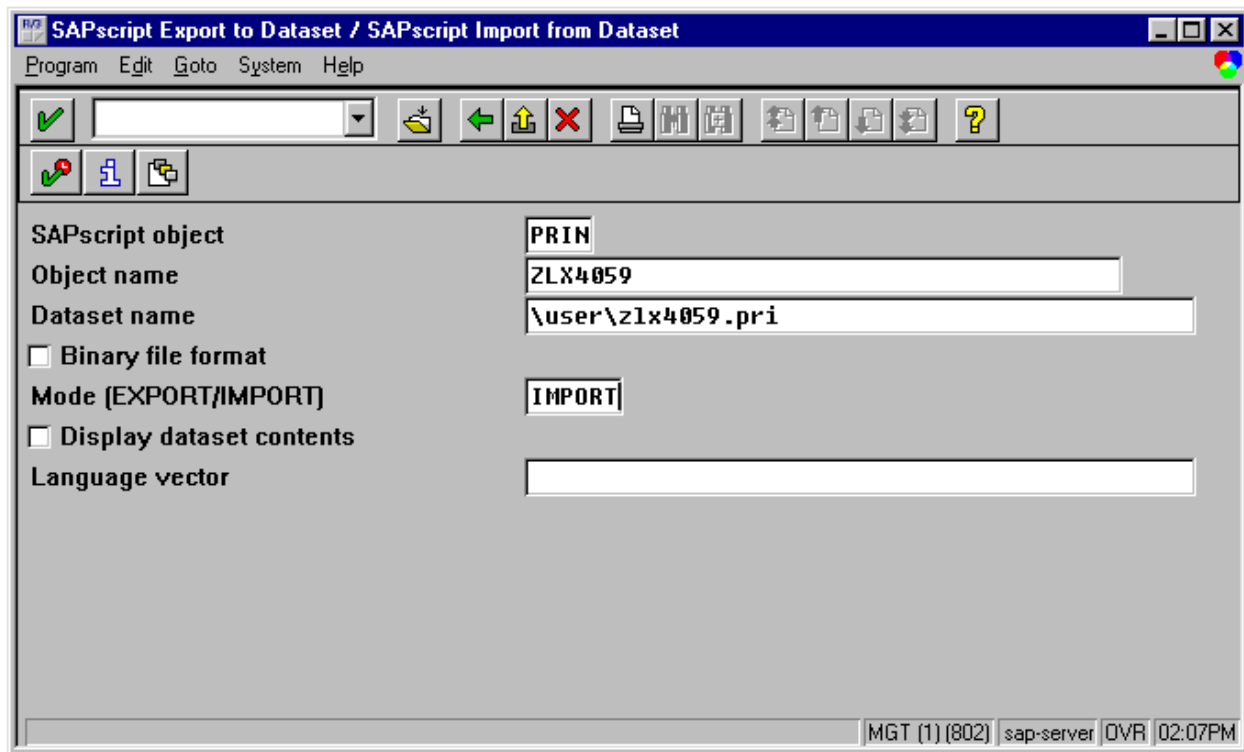
Using the RSTXSCRP report is much easier. RSTXSCRP works by exporting an R/3 device type in ASCII format to a file on the host system on which the report is run, or to a file on the local PC. To complete the transport, you copy that file onto the host of the destination R/3 system (or local PC) and import it into the R/3 system, which must be open for modifications.

Distributing a device type from one R/3 System to another using RSTXSCRP copies all of the following components:
- The device type
- All components belonging to the device type, such as print control definitions, device formats, and SAPscript fonts.

RSTXSCRP exports/imports only device type definitions. It does not distribute the printer name definitions of individual printers or other devices. To distribute device type definitions with RSTXSCRP, do the following:

- *Import the device type definition in a target R/3 System* First, copy the device definition file to a directory on the target host or local PC. Then, start transaction SA38 (*System → Services → Reporting*), enter RSTXSCRP as the program name, and click the *Execute* button to enter the following screen. On this screen, the following fields have to be filled:
  - *SAPscript Object* Enter PRIN.
  - *Object name* Enter the device-type name such as ZLX4059
  - *Dataset name* It's the name of the file on the host system that contains the device definition.
  - *Mode* To perform the import, type IMPORT.
- Please note when performing imports that the RSTXSCRP report will overwrite any device definition with the same name.

```
SAPscript Export to Dataset / SAPscript Import from Dataset        _□×
Program  Edit  Goto  System  Help

SAPscript object        PRIN
Object name             ZLX4059
Dataset name            \user\zlx4059.pri
□ Binary file format
Mode [EXPORT/IMPORT]    IMPORT
□ Display dataset contents
Language vector


                                      MGT (1) (802)  sap-server  OVR  02:07PM
```

III   DEFINING NEW PRINTER DEVICES FOR NEW DEVICE TYPES

## 3.1   Connecting Printers to the Operating Systems Spool

Before you can define a new printing device in the R/3 system, the printers must be physically installed and configured in the host operating system (UNIX, Windows or Windows NT, AS/400, and so on) that is running the host spool system, and thus managing the spool requests sent to that device. Printers can be connected to operating systems either locally (physically attached to those servers) or remotely (through the network). From the point of view of the access methods, local printing means that the spool work process is running on the same server as the host operating system spool, and remote printing is when the servers are different and connected through the network. A third way, known by SAP as PC printing, is when printers are configured on Windows PC systems through the print manager.

To proceed with the definition of printers within R/3 the following information is needed:
- Printer or spool queue name at the host system
- Model and type of printing device
- Printing protocol supported: PCL, POSTSCRIPT, and so forth

3.2   Defining the Printer Device

For the R/3 system, a printer is defined as an output device. To change or create a new printer, from the initial *Spool Administration* screen, select the radio button next to *Output devices*, and then click on the *Change* radio button. The system will display the list of current output devices. On this screen, click on the *Create* push button for defining a new output device. The following screen shows the new display. Main fields on this screen are as follows:
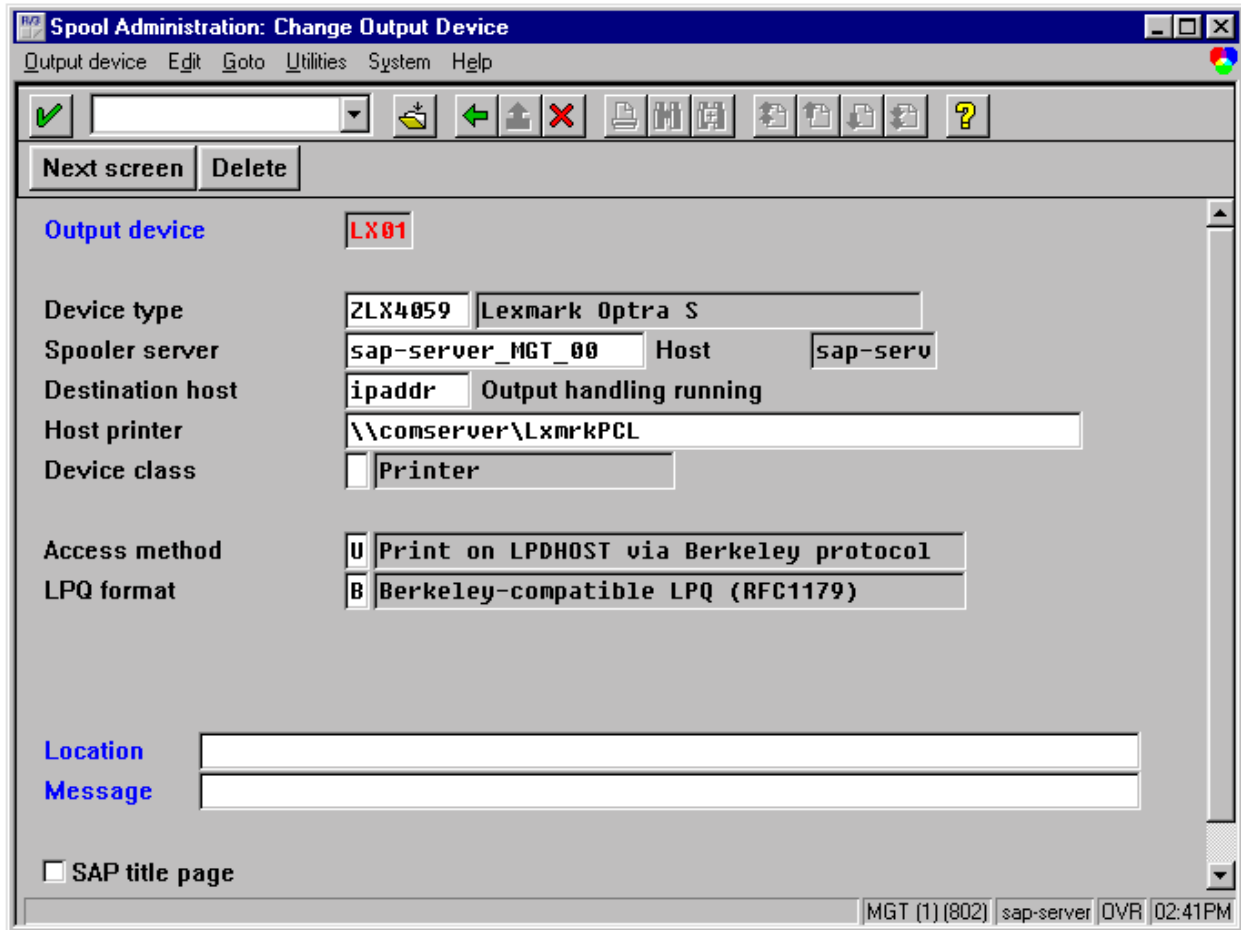
- *Output device*. It's the name of the device as it will be known to R/3 users. You can enter a 4-character name, such as PRT1, NY07 or LX01.
- *Device type*. Enter the name of the new device type you just defined here, ZLX4059.
- *Spooler server*. Enter the name of the SAP instance running a spool work process.
- *Host*. This is a display field which shows on which host server the spool work process is running.
- *Host printer*. It's the name of the printer exactly as it's defined at the operating system level. In a Windows system, it might be something like LPT1:, or even a UNC name such as \\myserver\myprinter.
- *Device class*. Shows the device type (printer, fax, archive flag…). The default is printer.
- *Access method*. Specifies the communication path between the SAP R/3 spool system and the host spool system. Main access methods include:
  - Access method *L* (local printing): On UNIX platforms, the R/3 spool work process stores the output request as a normal operating-system file. It passes the output request to the UNIX spooler using the UNIX lpr or lp command defined in the instance profile. Copy to file is not normally used on NT systems.
  - Access method *C* (local printing): On Windows NT systems, the spool work process uses operating system calls to pass output to the print manager. The

print data is not first written to an operating system file. Instead, it is passed directly to the print manager.

- Access method **U** (remote printing):   An R/3 spool work process passes formatted output requests to the spool system in another host, or network card in a printer. The transfer requires moving the output data across a network link.
- Access method **S** (PC printing):   In this access method, an R/3 spool work process passes formatted output requests to the SAPLPD transfer program running on a local client PC. SAPLPD, in turn, passes the output to the local Windows print manager. Access method **S** uses a special R/3 communication protocol, which is slower than the alternative. Its corresponding device type should be SAPWIN up to R/3 3.1, or any device type after R/3 3.1. (Access method **U** can be used in remote PC printing also. It uses a standard communication protocol based upon the Berkeley Standard Distribution UNIX lpr protocol to pass output data to the SAPLPD program).
- Access method **F** (Front-end printing):   In this access method, the R/3 dialog work process in which a user is working passes formatted output requests to the SAPLPD transfer program running on the user's PC.

- *LPQ format.* In this field you can specify what the format of the status manager for the output request is. Available LPQ formats are
  - 2: BS2000 format.
  - B: Format compatible with Berkeley (LPQ). This is normally the default value.
  - S: System v-compatible format (LPSTAT).
- *Destination host.* This field only appears for the remote printing and PC printing. You should enter the IP address (or alias) of the host server (remote printing) or Windows PC (PC printing) or network printer. Because there is not enough space for entering an IP address, you should use transaction code SM55 to go to *Maintain Table THOST* screen, assign a short alias to the IP address (or DNS name), and then enter this short alias in *Destination host* field.