SAP Manufacturing Execution

How-To Guide

How To Set Up and Use the SAP ME Printing Feature

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Document History

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1.2	Updated info for Adobe LiveCycle Designer (Section 4.3)	Chet Moutrie
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1.4	Adding Windows based print services for non-PCL/ZPL/PS printers (Section 4.5)	Lukas Bretschneider
1.5	Added 4.6 Best Practice to speed up printing of ADS forms	Chet Moutrie

Contents

1 Introduction

1.1 Purpose

This ME Help How-To-Guide for the Printing feature is intended to provide sufficient information to enable the user to easily configure and readily utilize the Printing feature making use of available best practices.

1.2 Scope

This How-To-Guide covers printing with the Adobe Document Services (ADS) SAP NetWeaver component. It does not fully cover printing with third party software.

2 Printing Overview

This overview provides a high level description of the printing feature.

2.1 Description and Applicability

The printing feature allows you to automatically print production-related documents when and where they are needed on the factory floor. It also enables manual printing of documents that are created on the shop order release to the shop floor. Printing with Adobe Document Services (ADS) minimizes total cost of ownership (TCO) for required printing capabilities by using the SAP NetWeaver component.

When you set up printing for your site, you decide the following:

- How, when, and where in the manufacturing process printing is to occur
  - You can set up automatic printing at defined points on your production lines. For example, you may want to print a barcode label document right before or after the first step on a particular routing. Or you may want to print a packing list document right before or after operators perform the PACK operation.
  - You can print or reprint documents manually from a POD or through the *Document Reprint* activity any time after order is released to the shop floor.
- What printers to use
- Which of the following document types to use:
  - Barcode labels
  - Shop orders or SFC travelers
  - Packing lists for containers
- What information, and in what order, (template) each document is to contain
- Which materials require printing of specific documents
  - For example, material **A** requires printing of traveler **AA** and label **AB**, whereas material B requires printing of label **BB**.

Depending on your settings, you can trigger printing at different points.

Manual printing can be performed at any time after the shop order is released to the shop floor. Automatic printing can be triggered depending on at which hook points you have set up the *ADS*

Document Print (SY521) activity. For example, you can set up automatic printing on shop order release, operation start, SFC serialize or relabel.

2.2 Business Purposes / Functions

Printing feature provides the following functions:

- Automatic printing at defined points
- Manual (re)printing of documents

2.3 High-Level Process Flow

This figure illustrates the primary flow of user actions when performing automatic printing:

3 Printing Functions

3.1 Automatic Printing

3.1.1 Description and Applicability

You can use this function to automatically print production-related documents, such as travelers, labels, and packing lists, at defined points in the manufacturing process.

3.1.2 Prerequisites

1. You have set up printing feature (see Printing Setup).
2. You have set up the *ADS Document Print* (SY521) activity as an activity hook, at the point where you want to print the document, as follows:
    1. Insert – *ADS Document Print* (SY521) at the appropriate hook point.
    2. Enable the activity hook.
    3. Specify the types of documents to be printed as the user argument.

3.1.3 Features

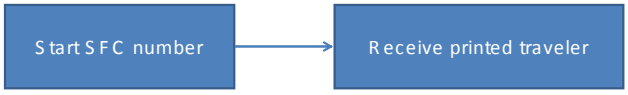
Automatic printing can be triggered at different points depending on at which hook points you have set up *ADS Document Print* (SY521). You can set up automatic printing at the site, operation, resource, or routing step level.

For example, you can set up automatic printing on shop order release, operation start, SFC serialize or relabel. In this case, the document defined as User Argument at the activity hook point is automatically printed when the hook point activity is executed.

For example, if you set up the *ADS Document Print* (SY521) activity in Operation Maintenance at POST_START hook point with the document **Label_A** defined as the *User Argument* value, **Label_A** is automatically printed right after the operator performs the *Start* (PR500) activity at that operation.

Note that you must have assigned your document to the material for the activity hook to work.

The figure below illustrates the primary flow of user actions when performing printing of the traveler:



3.2 Manual Printing

3.2.1 Description and Applicability

You can use this function to manually print production-related documents, such as travelers, labels, and packing lists, at any time after the order is released to the shop floor.

3.2.2 Prerequisites

1. You have set up printing (see Printing Setup).
2. If the ability to manually print documents from a POD is required, you have associated the *Document Print* activity (SY511) with a button and layout in *POD Maintenance*.

3.2.3 Features

You can execute manual printing in two ways:

- Using the *Document Reprint* (SY510) activity from activity manager
- Using the *Document Reprint* plug-in (SY511) activity from a POD

To manually print or reprint documents, proceed as follows:

1. Enter the name of your POD and the object for which you want to print, such as the SFC number, shop order number, process lot number, or container number, and retrieve the data. The system displays two tables. The first table contains information about the target for which to print. The second table contains information about the documents to print.

   Note that in the *Document Reprint* plug-in (SY511), the data is filled in automatically based on your POD selection.

2. In the second table, select the documents you want to print.
3. Enter the quantity of the document copies you want to print in the *Qty* field.
4. If required, enter comments to pass to the printing program in the *Document Notes* field and choose the *Print* button. The *Document Reprint Confirmation* screen appears.
5. Choose *Close* to return to the *Document Reprint* screen.

4 Printing Setup

4.1 Description and Applicability

You can use this process to set up printing of production-related documents using SAP NetWeaver Adobe Document Services component, including setting up manual printing from the Document Reprint activity and from a POD, as well as automatic printing at defined points in the manufacturing process.

4.2 External Configuration

4.2.1 Adobe Document Services Deployment

1. Check if the Adobe Document Services (ADS) exists by navigating to the SAP Netweaver Administrator (NWA) at http://server:port/nwa .
2. Login to the SAP NWA with a user that has administrator privileges.
3. In the SAP NWA, navigate *to Configuration Management* → *Infrastructure* → *Adobe Document Services*.
4. If there is a message that says "*There are no Adobe document services running on the selected system*", then Adobe Document Services component has not been installed.
5. If Adobe Document Services component is not available, obtain it from Service Marketplace.

4.2.2 Installing Reader Rights Credentials

4.2.2.1 Verify Adobe Document Reader Rights Credentials have been installed

1. Navigate to the SAP Netweaver Administrator (NWA) at http://<server>:<port>/nwa .
2. Login to the SAP NWA with a user that has administrator privileges.
3. In the SAP NWA, navigate to *Configuration Management* → *Infrastructure* → *Adobe Document Services*.
4. Select the *Credentials* entry from the *Show* drop down list.
5. Verify that there is a *ReaderRights* row. If there is not, then the Reader Rights Credentials must be obtained and installed.
6. If there is a *ReaderRights* row, select it and then verify that the expiry data has not been reached. If the expiry date has passed, then a new Reader Rights Credential must be obtained and installed.

4.2.2.2 Obtain Adobe Document Services Reader Rights Credentials

1. See SAP Note 736902 for additional information.
2. Open an SAP customer message under the component BC-SRV-FP-ICF. In the message text, write that you require a credential for the Adobe Interactive Forms scenarios. In the message, include an e-mail address to which the credentials can be sent. The persons responsible will then contact you directly. Note that only one credential can be assigned for each customer number. The credential is valid for all Adobe Document Services installations for this customer number.

3. SAP sends a zip file containing the credential file as well as a password to use with the file. Open the zip file and you will find a .pfx file in it

4.2.2.3 Configure Reader Rights Credentials

1. Navigate to the SAP Netweaver Administrator (NWA) at http://<server>:<port>/nwa
2. Login to the SAP NWA with a user that has administrator privileges.
3. In the SAP NWA, navigate to *Configuration Management* → *Infrastructure* → *Adobe Document Services*
4. Select *Credentials* from the *Show* drop down list and click the *Manage P12 Files…* button. *The Manage P12 Files* dialog appears.
5. On the *Manage P12 Files* dialog, click the *Add New File* ... button and upload the credential file <filename>.pfx you obtained.
6. Select *Credentials* from the *Show* drop down list and click the *Add New Object* button. The dialog box *Create New Credential* appears.
7. On the *Create New Credential* dialog, enter the following:

    - *Alias*: Select *the ReaderRights* radio button.
    - Type: P12
    - *P12 File*: Enter the <filename>.pfx you uploaded.
    - *Password*: Enter the password that you received with the credential.
    - *Confirm Password*: Enter the password that you received with the credential.

8. Choose *Save*. The credential is added.
9. Select the added Reader Rights Alias in the table and verify the Expiry.

4.2.3 Creating a User for Basic Authentication

This user is required for the secure communication between the Java application and the Java system where the Adobe document services are installed.

1. Navigate to http://<server>:<port>/useradmin to start the User Management.
2. On the *Identity Management* tab page, select *the Search Criteria as Group*.
3. Click on *Create Group* to create a group called *ADSCallers* and save it.
4. Change the *Search Criteria* drop down to *User*.
5. Click *Create User* and enter ADSuser for the user name, specify a password.
6. Under *Security Policy*, choose *Technical User*. (If you choose Technical User, the password won't expire.)
7. Go to the *Assigned Roles* tab page. In *Available Roles*, search for the role SAP_ADSCALLER and press *Add* to assign it to the user ADSuser.

    Note: The SAP_ADSCALLER role was created when your system was installed. You should not assign this role to users other than the user that you will use for accessing Adobe document services.

8. Save your changes.

4.2.4 Configuring WSIL Destination

You have to create and configure a Web service physical destination for every Web service logical destination available in the application.

1. Navigate to the SAP Netweaver Administrator (NWA) at http://<server>:<port>/nwa.
2. Login to the SAP NWA with a user that has administrator privileges.
3. In the SAP NWA, navigate to *SOA Management* → *Technical Configuration* → *Destination Template Management*.
4. To create a logical port, choose *New*.
5. Choose WSIL as *Destination Type*.
6. Enter *ConfigPort_Document* in the *Destination Name* field.
7. In the field URL, enter http://<host>:<port>/inspection.wsil.
8. Click *Next*.
9. Choose *HTTP Authentication* in the *Authentication* group box and select the *User ID/Password (Basic)* indicator.
10. Choose the *Details* button. Enter ADSUser in the *User ID* field and the password in the *Password* and *Confirm Password* fields. You must specify the same password as you did in the Creating a User for Basic Authentication task .
11. Choose *Finish* to save your entries.

4.2.5 Printer Setup using Domain User

If you are going to use network printers from ME you should install printer drivers on the server. There are several ways to define access to the network printers on the server where the NetWeaver instance is running, depending upon how the print server is set up and the network printers are connected. However, the configuration steps shown below should work in all cases.

You should also assign a domain user with appropriate rights to access the network printer, and enough permissions to start the NetWeaver instance (for example, is assigned to Administrators user group at the server), as the user for starting NetWeaver services. The following steps should be performed on the server:

1. In the SAPMMC, stop the SAP NetWeaver instance
2. In Windows Services, locate the service that starts the NetWeaver instance for your SID. The service name is of the form SAP<SID>_<INSTANCE> (e.g. SAPME1_01).
3. In Windows Services, stop all of the SAP NetWeaver services of the instance.
4. Replace the “Log on As” user ID with any domain user that has access to the network printer and has enough permissions to start the NetWeaver instance on the server.
    a. Right click on the service
    b. Select Properties
    c. Select Log On tab
    d. Enter User Id and password
    e. Select OK
5. Log in to Windows as the user identified above and add the Network Printer with that user’s account.
6. In Windows Services, start all of the SAP NetWeaver services of the instance.
7. In the SAPMMC, start the SAP NetWeaver instance.

4.3 Creating Printing Template

1. Create an XDP template file in the Adobe LifeCycle Designer, or you can use the template delivered with SAP ME. The Adobe LifeCycle Designer software is included in the NetWeaver license and is available on Service Marketplace. If you are using only static print forms, no user interaction with the forms (templates), then no additional license is needed.
2. If you are going to do any of the following:
   - Create templates for interactive forms
   - Modify templates by adding interactive fields or modifying interactive fields
   - Use interactive forms in a productive system

   then you must purchase a license (only one) from SAP for the use of Adobe Interactive Forms. Additional information regarding this is available in SAP Note 750784.
3. To print SAP ME field values, for example, shop order, SFC number, NC code, you should reference ME fields and values as described in section Referencing SAP ME Variables in Printing Template.
4. Save the template in a shared folder on the server.

4.4 SAP ME Internal Configuration

1. In *System Rule Maintenance*, under the *System Setup* category, you do the following:
   - Enter the path to the shared folder on the server, where you keep your templates, in the *ADS - Document Printing Template Directory* system rule, for example D:\Template.
   - Enter the path to the folder on the server, for the temporary printing files, in the *Document Printing Temporary Directory* system rule, for example D:\Temporary.
   - If you need to save your temporary files in the folder you specified in the *Document Printing Temporary Directory* system rule, set the *ADS - Storage of PDF Document* system rule to *True*.
2. In *Document Maintenance*, you create a record for each document you want to print.
   - Define the Print By Method on the Main Tab
   - Select the data group(s) to be printed on the Document Options tab.
   - On the Print Integration Tab,
     1. Enter `com.sap.me.document.impl.BaseDataAcquisition` value in the *Data Acquisition* field.
     2. Enter `com.sap.me.document.impl.ADSFormat` value in the *Formatting* field; define `PRINT_FORMAT` with one of the supported values (`ZPL, PDF, PS, PCL`) as *User Argument* value for *Formatting*. An example of user argument setting for *Formatting* is `PRINT_FORMAT=PCL`.
     3. Enter `com.sap.me.document.impl.ADSTransport` value in the *Transport* field; define `SFC,SHOP_ORDER` or both as a user argument to include SFC and/or Shop Order name into the output document name.

        if User Argument = `SHOP_ORDER`, the document name will be `<Site>-<DocumentName>-<timestamp>-<ShopOrder>.pdf`

        if User Argument = `SHOP_ORDER;SFC`, the document name will be `<Site>-<DocumentName>-<timestamp>-<ShopOrder>-<SFCNumber>.pdf`

if User Argument = SFC, the document name will be <Site>-<DocumentName>-<timestamp>-<SFCNumber>.pdf

if User Argument field is empty, the document name will not include the reference to SFC/Shop order and will look like <Site>-<DocumentName>-<timestamp>.pdf

An example of user argument setting for Transport is SHOP_ORDER;SFC

3. In *Material Maintenance*, you retrieve the material you want to associate with one or more documents. On the *Documents* tab page, you associate all the documents that you want to print with this material, for example, LABEL_01 and TVLR01.

   For example, you may want to print a barcode label document with PCBOARD, revision *C*, and a packing list document with PRINTER, revision *A*.

4. In *Printer Maintenance*, you define printers you want to use and mark them as enabled. You also indicate what document types can be printed on each printer.

Caution: Printer name defined in *Printer Maintenance* must be equal to the printer name used by Windows on a client machine.

5. In *POD Maintenance* on the *Printers* tab page, you specify the printer for the specific document types. If you want to use the same printer for all document types from all PODs, define this printer, in *Activity Maintenance*, for the *ADS Document Print* (SY521) activity as follows:
   - Retrieve activity SY521 – *ADS Document Print*.
   - Insert PRINTER_NAME rule.
   - Assign printer to be used as a rule setting.

   The printer defined for *ADS Document Print* (SY521) in Activity maintenance supersedes printers defined in POD Maitnenance.

The steps above are sufficient for manual printing production-related documents using the Document Reprint (SY510) activity at any time after the shop order is released to the shop floor. The further steps depend on whether you also need to enable manual document print from a POD or automatic printing at defined points.

1. If you want to enable operators to manually print documents from a POD, you associate the *Document Reprint* plug-in activity (SY511) with a button and layout in *POD Maintenance*.
2. If you want to set up automatic printing of documents at a defined point, set up *ADS Document Print* (SY521) as an activity hook where you want the documents to print. You can set an activity hook at the site, operation, resource, or routing step level.
   - Insert SY521 – *ADS Document Print* at the appropriate hook point and enable the activity hook.
   - Specify the types of documents to be printed as the user argument.

4.5 Printing on Non-PCL/PS/ZPL Printers with SAP/Windows Services

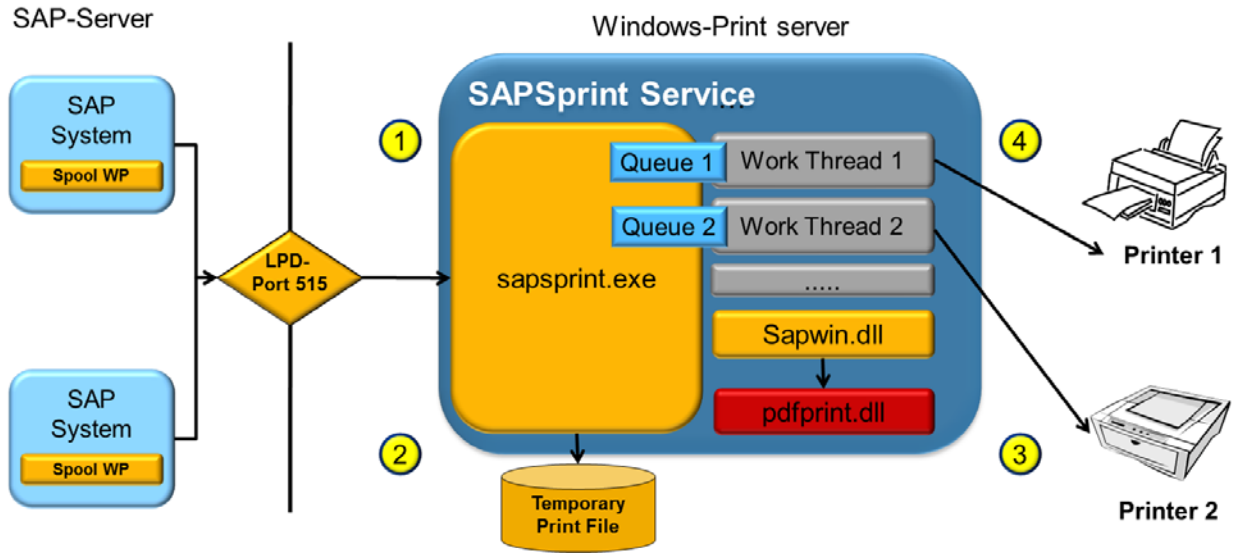
4.5.1 Use Case

Using Adobe Document Services (ADS) to create documents, you are limited to the following standard formats: PCL, PostScript, ZPL and PDF.

Although there are some additional print formats like IPL available in newer ADS versions (see SAP note 1672781 for details), in some cases you cannot create the needed format directly with ADS.

In this scenario, you can achieve device-type independent printing with ADS by using SAPSPRINT. The main idea behind SAPSprint is to deliver a device independent data stream (like PDF) to a Windows Server and to leverage the Windows printer drivers to send data to the printer. This technology is commonly used in SAP ERP (or generally speaking: in SAP NetWeaver ABAP) scenarios.

In this technology, the SAPSprint Service has to run on the Windows Server. It takes care of the conversion of the incoming PDF Files (with use of a pdfprint.dll) to a printable format with use of the Windows printer drivers. The result is that you can print ADS documents on any printer that comes with a Windows printer driver.



Typical use cases are specialized (“exotic”) printers like impact printers to create several copies of a document at once or label printers that cannot handle ZPL or IPL, like some CAB printers.

4.5.2 Technical Integration

In SAP ME scenarios (no NetWeaver ABAP available), it is important to adapt the typical SAPSPRINT scenario as shown in the picture above.

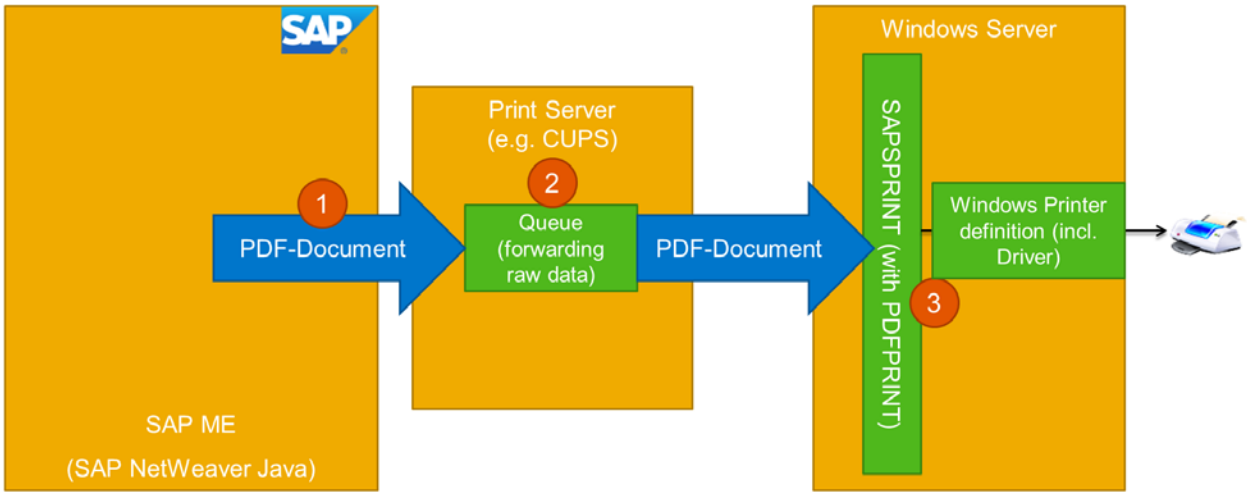
SAPSPRINT is a service for Windows servers that can handle SAPWIN (an ABAP specific device independent print format) as well as PDF. SAPSPRINT handles print requests that

come in via LPD port 515 (in standard configuration) and uses windows printer drivers to convert the data into the printer specific language.

Therefore, your SAP ME system has to be configured to produce PDF files in this scenario. Instead of defining a printer on any print server like CUPS, you simply define a queue that is forwarding the print (PDF) data to a Windows Server. On this server, SAPSPRINT (including SAPPDFPRINT) has to be installed

The picture below shows how the architecture is set up to print to these exotic printers. Firstly you print to a print queue on e.g. CUPS (1) that is simply forwarding the file in the raw format to a Windows printer server (and a printer queue on that Windows server) (2).

On this Windows Server, the SAPSPRINT service is running and converting the data (3)



4.5.2.1 Installation of SAPSPRINT[1]

You can download SAPSprint as a self-extracting executable file from SAP Service Marketplace:

Browse to http://service.sap.com/patches and navigate as follows:

1. Entry by Application Group (on the left)
2. SAP Frontend Components (on the right)
3. SAPSPRINT (on the right)
4. SAPSPRINT <Release> (on the right)
5. SAPSPRINT <Release> (on the right)
6. Win32 (on the right)

Start the program. After you enter the installation path, the system prompts you to enter the TCP/IP port.

[1] Check SAP Note 894444 for current version of installation notes

Normally, the default setting of 515 is suitable for the port. You should only change this setting if the Windows TCP/IP print service is also running on the computer. The SAPSprint Windows service starts as soon as the installation is over.

We recommend that you set up the following options for the service in the Windows Service Control Manager:

- The service should run under a domain user that has the relevant authorizations for the required printers. After the installation, the service runs under "Local system account". This can access locally-defined printers only. You can set the user in the Windows Service Control Manager, in the options of the SAPSprint service.
- After installing SAPSprint, you have to install SAPPDFPRINT as well.
- Install SAPPDFPRINT 7.20 together with SAPSprint 7.20 on a Windows print server. SAPSprint automatically recognizes if SAPPDFPRINT is installed and prints interactive forms on the selected printer. Make sure that the SAPSprint service runs under a domain user instead of under a local user.

However, you cannot print any PDFs that contain additional information (see SAP Note 944221). Therefore, the PDFs that are rendered by ADS must always be created as print forms.

4.5.2.2 Configuration of Landscape

Define the printer you want to print on as Windows printer with the related printer driver.

You can test the expected result by opening a relevant PDF file with Adobe Reader and printing it manually. The technology used by SAPSPRINT is the same as Adobe Reader is using for printing any file.

After the successful test, you have to define a printer queue on the CUPS server that points to the Windows Printer Server and directly forwards any incoming request in the raw format.

4.6 Best Practice

To speed up printing of an ADS form, it is recommended that the setting (Allow Form Rendering to be Cached on Server) be enabled for the form in Adobe LiveCycle Designer. This setting can be found by selecting *File* > *Form Properties* > *Performance*.

5 Usage Scenario Examples

5.1 Printing a Traveler

During production, you want to have travelers printed when SFC numbers of the ENGINE_MOUNT material are started on the first operation of the routing (WELDING).

5.1.1 Prerequisites

1. *Adobe Document Services* (ADS) component is installed and configured during the SAP NetWeaver installation (see the External Configuration section of Printing Setup chapter).
2. Network printer ATL4 is set up on the system network. Printer drivers are installed on the server. SAP NetWeaver Windows Services SAPLKG_00 and SAPLKG_01 (where LKG is the SAP NetWeaver instance name) are logged on as Windows users having permission to the printer.
3. Folder D:\Template is created on the server and shared. Traveler template file TVLR01.XDP, with ME data fields to be printed, is saved in this folder.
4. In *Routing Maintenance*, you have created a routing with the WELDING operation as the first step.
5. In *System Rule Maintenance*, under the *System Setup* category, you have set up system rules as follows:

System Rule	Site Value
ADS - Document Printing Template Directory	D:\Template
Document Printing Temporary Directory	D:\Temporary
ADS - Storage of PDF Document	*TRUE*

6. In *Document Maintenance*, you have defined the following values for the traveler document to be printed:

Field Name	Value
Document	SHOP_ORDER_TRAVELER
Version	A
Main Tab Page	
Print Qty	1
Template	TVLR01.XDP
Document Type	*Traveler*
Print By	*SFC*
Print Method	*All*
Status	*Enabled*
Document Options Tab Page	
All checkboxes selected	
Print Integration Tab Page	
Data Acquisition:	com.sap.me.document.impl.BaseDataAcquisition
User Argument:	Blank
Formatting:	com.sap.me.document.impl.ADSFormat
User Argument:	PRINT_FORMAT=ZPL
Transport:	com.sap.me.document.impl.ADSTransport

User Argument:	*SFC*
Write Error Log:	Selected

7. In *Material Maintenance*, on the *Documents* tab page, you have added TVLR01 to *Printing Documents* for the material SHOP_ORDER_TRAVELER.
8. In *Printer Maintenance*, you have created ATL4 printer with the *Enabled* checkbox selected and *Traveler* added to the *Assigned Document Types* list.

   Caution: Printer name defined in *Printer Maintenance* must be equal to the printer name used by Windows on a client machine.

9. In *POD Maintenance*, on the *Printers* tab page, you have specified ATL4 as a *Traveler Printer*.
10. In *Operation Maintenance*, on the *Activity Hooks* tab page, you have set up *ADS Document Print* (SY521) activity as an activity hook on POST_START hook point at the first operation (WELDING) . The hook is enabled and *User Argument* for it is document name (SHOP_ORDER_TRAVELER).

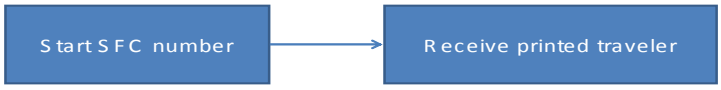
5.1.2 Procedure

To print the traveller when SFC numbers of the ENGINE_MOUNT material are started on the first operation in the routing (WELDING), proceed as follows:

1. In default *Operation* POD, specify WELDING as the operation and choose the appropriate resource.
2. Enter an SFC number of the ENGINE_MOUNT material.
3. Start the SFC number. A traveler for the SFC will be automatically printed at the assigned printer.

5.1.3 Scenario Flow

The following figure provides a high level flow of user actions when performing printing of the traveler:



6 Referencing SAP ME Variables in Printing Template

6.1 Description and Applicability

While designing the .XDP template, you may need to include SAP ME fields and values. SAP ME provides this ability for a great number of fields. To reference the supported field in a template, you need to add a field to the template as described in Adobe LiveCycle Designer help and define the Data Binding for the object.

ME Data Binding values consist of 3 parts and depend on Print By method and data to be printed.

For example, Data Binding value for BOM Actual Component field is:
`DATA_BY_SFC.SFC_DATA.BOM_DATA.BOM_COMPONENT_DATA.ACTUAL_COMPONENT`

In this example, `DATA_BY_SFC` indicates that document needs to be printed by SFC whereas `SFC_DATA. BOM_DATA.BOM_COMPONENT_DATA` indicates that the field to be printed belongs to the BOM Component Data and `ACTUAL_COMPONENT` indicates the field ID to be printed.

The first part of the binding depends on the desired Print By method as follows:

- Print by SFC - `DATA_BY_SFC`
- Print by Shop Order - `DATA_BY_SHOP_ORDER`
- Print by Process Lot - `DATA_BY_PROCESS_LOT`
- Print by Container - `DATA_BY_CONTAINER`
- Print by Inventory - `DATA_BY_INVENTORY`

Please make sure the first part of data binding value corresponds to the Print By method you define for a document in Document Maintenance.

The second part of the binding depends on the data category and corresponds to the options you select on the Document Options tab in Document Maintenance. In some cases it also depends on the Print By value. Please make sure the second part of data binding corresponds to options you have selected on Document Options tab in Document Maintenance. The third part represents the field to be printed.

6.2 SFC Header Data

To reference a field of SFC Header Data category in the template, define the binding for the field object as follows: `<print method binding>.SFC_DATA.SFC_HEADER_DATA.<field ID>`

For example, to reference the Item in document to be printed by SFC, use the following binding:

`DATA_BY_SFC.SFC_DATA.SFC_HEADER_DATA.ITEM`

SFC Header Data binding is used to reference the following field IDs:

`ITEM`

ITEM_REVISION

SHOP_ORDER

SFC_NUMBER

ROUTER_NAME

ROUTER_REVISION

SFC_PRIORITY

SFC_QUANTITY

PROCESS_LOT

BOM_NAME

BOM_REVISION

LABOR_CHARGE_CODE

CUSTOMER

6.3 SFC Data

To reference the SFC data fields and values collected using the SFC Data Entry plugin, define the binding for the field object as follows: **<print method binding>.SFC_DATA.SFC_CUSTOM_DATA.ATTRIBUTE** for printing data field ID and **<print method binding>.SFC_DATA.SFC_CUSTOM_DATA.VALUE** for the value.

If there are multiple SFC data fields and values, you must use indexing after ATTRIBUTE and VALUE starting with 0. For example, to reference two data fields and values while printing by SFC, define four fields with the following bindings:

DATA_BY_SFC.SFC_DATA.SFC_CUSTOM_DATA.ATTRIBUTE0

DATA_BY_SFC.SFC_DATA.SFC_CUSTOM_DATA.VALUE0

DATA_BY_SFC.SFC_DATA.SFC_CUSTOM_DATA.ATTRIBUTE1

DATA_BY_SFC.SFC_DATA.SFC_CUSTOM_DATA.VALUE1

6.4 Shop Order Header Data

To reference a field of the Shop Order Header Data category in the template while printing by Shop Order, define the binding for the field object as follows:
`DATA_BY_SHOP_ORDER.SHOP_ORDER_DATA.SHOP_ORDER_HEADER_DATA.<field ID>`

To reference the field of this category in the template while printing by SFC, Process Lot or Container, define the binding for the field object as follows: `<print method binding>`
`SFC_DATA.SHOP_ORDER_DATA.SHOP_ORDER_HEADER_DATA.<field ID>`

For example, to reference planned start date of the Shop Order in document to be printed by SFC, use the following binding:

```
DATA_BY_SFC.SFC_DATA.SHOP_ORDER_DATA.SHOP_ORDER_HEADER_DATA.PLANNED_ST
ART_DATE
```

Printing of the Shop Order Header Data by Inventory is not supported.

Shop Order Header Data binding is used to reference the following field IDs:

```
SHOP_ORDER_QUANTITY_RELEASED

SHOP_ORDER_QUANTITY_DONE

SHOP_ORDER_QUANTITY_BUILD

SHOP_ORDER_QUANTITY_ORDERED

SHOP_ORDER

CUSTOMER_ORDER

CUSTOMER_NAME

ITEM_ID

ITEM_REVISION

ITEM_DESCRIPTION

ROUTER_NAME

ROUTER_REVISION

ROUTER_DESCRIPTION

PLANNED_START_DATE

PLANNED_COMPLETION_DATE
```

SCHEDULED_START_DATE

SCHEDULED_COMPLETION_DATE

LABOUR_CHARGE_CODE

BATCH_NUMBER

6.5 Shop Order Custom Data

To reference the shop order custom data fields and values in the template while printing by Shop Order, define the binding for the field object as follows:
DATA_BY_SHOP_ORDER.SHOP_ORDER_DATA.SHOP_ORDER_CUSTOM_DATA.ATTRIBUTE for printing the Data Field label and
DATA_BY_SHOP_ORDER.SHOP_ORDER_DATA.SHOP_ORDER_CUSTOM_DATA.VALUE for the Data Attribute.

To reference the field of this category in the template while printing by SFC, Process Lot or Container , define the binding for the field object as follows: <print method binding>.SFC_DATA.SHOP_ORDER_DATA.SHOP_ORDER_CUSTOM_DATA.ATTRIBUTE and <print method binding>.SFC_DATA.SHOP_ORDER_DATA.SHOP_ORDER_CUSTOM_DATA.VALUE

If there are multiple custom data fields and values, you must use indexing after ATTRIBUTE and VALUE starting with 0.

Printing of the Shop Order Custom Data by Inventory is not supported.

6.6 Material Custom Data

To reference the material custom data fields and values define the binding for the field object as follows: <print method binding> .SFC_DATA.ITEM_DATA.ITEM_CUSTOM_DATA. ATTRIBUTE for printing the Data Field label and <print method binding>.SFC_DATA.ITEM_DATA.ITEM_CUSTOM_DATA.VALUE for Data Attribute.

If there are multiple custom data fields and values, you must use indexing after ATTRIBUTE and VALUE starting with 0.

6.7 BOM Header Data

To reference a field of BOM Header Data category in the template, define the binding for the field object as follows: <print method binding>.
SFC_DATA.BOM_DATA.BOM_HEADER_DATA.<field ID>

For example, to reference the BOM Type in the document to be printed by SFC, use the following binding:

```
DATA_BY_SFC.SFC_DATA.BOM_DATA.BOM_HEADER_DATA.BOM_TYPE
```

BOM Header Data binding is used to reference the following field IDs:

```
BOM

BOM_REVISION

BOM_DESCRIPTION

BOM_TYPE
```

6.8 BOM Component Data

To reference a field of BOM Component Data category in the template, define the binding for the field object as follows: `<print method binding>.SFC_DATA.BOM_DATA.BOM_COMPONENT_DATA.<field ID>`

For example, to reference the actual BOM component in the document to be printed by SFC, use the following binding:

```
DATA_BY_SFC.SFC_DATA.BOM_DATA.BOM_COMPONENT_DATA.ACTUAL_COMPONENT
```

BOM Component Data binding is used to reference the following field IDs:

```
BOM_COMPONENT

BOM_COMPONENT_REVISION

ACTUAL_COMPONENT

ACTUAL_COMPONENT_REVISION

REMOVED_FLAG

ASSEMBLED_DATE

RESOURCE

OPERATION

OPERATION_REVISION

INVENTORY_ID

ASSEMBLED_BY

ASSEMBLY_ID
```

ASSEMBLED_QTY

REQUIRED_QTY

6.9 BOM Assembly Metrics

To reference a field of BOM Assembly Metrics Data category in the template, define the binding for the field object as follows: `<print method binding>.SFC_DATA.BOM_DATA.BOM_ASSEMBLY_METRICS.<field ID>`

For example, to reference the excess quantity in the document to be printed by SFC, use the following binding:

```
DATA_BY_SFC.SFC_DATA.BOM_DATA.BOM_ASSEMBLY_METRICS.EXCESS_QUANTITY
```

BOM Assembly Metrics Data binding is used to reference the following field IDs:

NON_BOM_QUANTITY

CUMULATIVE_REQUIRED_QUANTITY

EXCESS_QUANTITY

MISSING_QUANTITY

TOTAL_QUANTITY

6.10 BOM Component Assembly Data

To reference the assembly data fields and values collected for the BOM component, define the binding for the field object as follows: `<print method binding>.SFC_DATA.BOM_DATA.BOM_COMPONENT_DATA.ASSEMBLY_DATA.DATA_FIELD` for printing the data field ID and `<print method binding>.SFC_DATA.BOM_DATA.BOM_COMPONENT_DATA.ASSEMBLY_DATA.DATA_VALUE` for the value.

If there are multiple assembly data fields and values for the component, you must use indexing after `DATA_FIELD` and `DATA_VALUE` starting with 0.

6.11 Router Data

To reference a field of Router Data category in the template, define the binding for the field object as follows: `<print method binding>. SFC_DATA.ROUTER_DATA.<field ID>`

For example, to reference the router step ID in the document to be printed by SFC, use the following binding:

```
DATA_BY_SFC.SFC_DATA.ROUTER_DATA.ROUTER_STEP_ID
```

If there are multiple fields with the same ID, you must use indexing after the field ID starting with 0. For example to reference 3 router steps in the document to be printed by SFC, use the following bindings for the fields in the template:

```
DATA_BY_SFC.SFC_DATA.ROUTER_DATA.ROUTER_STEP_ID0

DATA_BY_SFC.SFC_DATA.ROUTER_DATA.ROUTER_STEP_ID1

DATA_BY_SFC.SFC_DATA.ROUTER_DATA.ROUTER_STEP_ID2
```

Router Data binding is used to reference the following field IDs:

```
ROUTER_STEP_ID

ROUTER_STEP_SEQUENCE

ROUTER_STEP_DESCRIPTION

OPERATION

OPERATION_REVISION

REWORK_FLAG

STEP_TYPE
```

6.12 Operation Custom Data

To reference the operation custom data fields and values define the binding for the field objects as follows: `<print method binding>.SFC_DATA.ROUTER_DATA.OPERATION_CUSTOM_DATA0.ATTRIBUTE` for printing the Data Field label and `<print method binding>.SFC_DATA.ROUTER_DATA.OPERATION_CUSTOM_DATA0.VALUE` for printing the Data Attribute.

If there are multiple custom data fields and values, you must use indexing after `ATTRIBUTE` and `VALUE` starting with 0.

6.13 Work Instruction Data

To reference a field of Work Instruction Data category in the template, define the binding for the field object as follows: `<print method binding>.SFC_DATA.ROUTER_DATA.WORK_INSTRUCTION_DATA1.<field ID>`

For example, to reference the work instruction name in the document to be printed by SFC, use the following binding:

```
DATA_BY_SFC.SFC_DATA.ROUTER_DATA.WORK_INSTRUCTION_DATA1.WORK_INSTRUCTI
ON
```

Router Data binding is used to reference the following field IDs:

```
WORK_INSTRUCTION

WORK_INSTRUCTION_DESCRIPTION

WORK_INSTRUCTION_TEXT_LINES
```

6.14 NC Code Data

To reference a field of NC Code Data category in the template, define the binding for the field object as follows: `<print method binding>.SFC_DATA.NC_DATA.<field ID>`

For example, to reference the NC Code in the document to be printed by SFC, use the following binding:

```
DATA_BY_SFC.SFC_DATA.NC_DATA.NC_CODE_DATA.NC_CODE
```

If there are multiple NC Codes, you must use indexing after the field ID starting with 0. For example to reference 2 NC Codes in the document to be printed by SFC, use the following bindings for the fields in the template:

```
DATA_BY_SFC.SFC_DATA.NC_DATA.NC_CODE_DATA.NC_CODE0

DATA_BY_SFC.SFC_DATA.NC_DATA.NC_CODE_DATA.NC_CODE1
```

NC Code Data binding is used to reference the following field IDs:

```
PARENT_SFC_NUMBER

NC_SFC

INCIDENT_NUMBER

NC_CODE

NC_DESCRIPTION
```

```
NC_QTY

OPERATION
RESOURCE

NC_DATE

NC_COMMENTS

NC_USER

NC_COMPONENT

USER_DESCRIPTION

WORKSTATION

NC_COMPONENT_REVISION

NC_CATEGORY

NC_STATUS

DATA_COMPONENT_SFC
```

6.15 NC Code Reference Designator Data

To reference NC code reference designator, define the binding for the field object as follows: `<print method binding>.SFC_DATA.NC_DATA.NC_CODE_DATA.REFERENCE_DESIGNATOR.REF_DES`

For example, to reference the NC code reference designator in the document to be printed by SFC, use the following binding:

```
DATA_BY_SFC.SFC_DATA.NC_DATA.NC_CODE_DATA.REFERENCE_DESIGNATOR.REF_DES
```

6.16 NC Code Assembly Data

If component was indicated when logging NC code for assembly, you can reference the assembly data fields and values collected for component. For this, define the binding for the field object as follows: `<print method binding>.SFC_DATA.NC_DATA.NC_CODE_DATA.NC_ASSEMBLY.ASSEMBLY_DATA_FIELD` for printing the data field ID and `<print method binding>.SFC_DATA.NC_DATA.NC_CODE_DATA.NC_ASSEMBLY.ASSEMBLY_DATA_VALUE` for the value.

If there are multiple assembly data fields and values for the component defined wile entering the NC code, you must use indexing after `ASSEMBLY_DATA_FIELD` and `ASSEMBLY_DATA_VALUE` starting with 0.

6.17 NC Code Custom Data

To reference the NC Code custom data fields and values define the binding for the field objects as follows: `<print method binding>.SFC_DATA.NC_DATA.NC_CODE_DATA.NC_CUSTOM_DATA.ATTRIBUTE` for printing the Data Field label and `<print method binding>.SFC_DATA.NC_DATA.NC_CODE_DATA.NC_CUSTOM_DATA.VALUE` for printing the Data Attribute.

If there are multiple custom data fields and values, you must use indexing after `ATTRIBUTE` and `VALUE` starting with 0.

6.18 Parametric Data

To reference the collected parametric data, define the binding for the field object as follows: `<print method binding>.SFC_DATA.PARAMETRIC_DATA.field ID>`

For example, to reference the parameter name in the document to be printed by SFC, use the following binding:

```
DATA_BY_SFC.SFC_DATA.PARAMETRIC_DATA.MEASURE_NAME
```

If there are multiple parameters, you must use indexing after the field ID starting with 0.

Parametric Data binding is used to reference the following field IDs:

```
MEASURE_NAME

DESCRIPTION

MEASURE_GROUP
```

DC_GROUP_REVISION

DATA_TYPE

ACTUAL

TEST_STATUS

TEST_DATE_TIME

HIGH_LIMIT

LOW_LIMIT

USER

TIMES_PROCESSED

RESOURCE

OPERATION

OPERATION_REVISION

ORIGINAL_ACTUAL

ORIGINAL_TEST_DATE_TIME

START_TIME

EDITED

6.19 SFC Pack Data

To reference a field of SFC Pack Data category in the template, define the binding for the field object as follows: `<print method binding>.SFC_DATA.SFC_PACK_DATA.<field ID>`

For example, to reference the Packing Date in the document to be printed by SFC, use the following binding:

```
DATA_BY_SFC.SFC_DATA.SFC_PACK_DATA.PACK_DATE
```

SFC Pack Data binding is used to reference the following field IDs:

PARENT_CONTAINER

PACKING_USER

PACK_DATE

6.20 Container Header Data

To reference a field of the Container Header Data category in the template while printing by Container, define the binding for the field object as follows:
`DATA_BY_CONTAINER.CONTAINER_DATA.CONTAINER_HEADER_DATA.<field ID>`

To reference the field of this category in the template while printing by SFC, Shop Order or Process Lot, define the binding for the field object as follows: `<print method binding>`
`SFC_DATA.SFC_DATA.CONTAINER_DATA.CONTAINER_HEADER_DATA.<field ID>`

For example, to reference container number in document to be printed by SFC, use the following binding:

```
DATA_BY_SFC.SFC_DATA.CONTAINER_DATA.CONTAINER_HEADER_DATA.PACKING_CONT
AINER_NUMBER
```

Printing of the Container Header Data by Inventory is not supported.

Container Header Data binding is used to reference the following field IDs:

- `PACKING_CONTAINER_DESCRIPTION`
- `PACKING_CONTAINER_NUMBER`
- `PACKING_CONTAINER`
- `HEIGHT`
- `WIDTH`
- `LENGTH`
- `MAX_FILL_WEIGHT`
- `CONTAINER_WEIGHT`

6.21 Container Assembly Metrics

To reference a field of the Container Assembly Metrics Data category in the template while printing by Container, define the binding for the field object as follows:
`DATA_BY_CONTAINER.CONTAINER_DATA.CONTAINER_ASSEMBLY_METRICS.<field ID>`

To reference the field of this category in the template while printing by SFC, Shop Order or Process Lot, define the binding for the field object as follows: `<print method binding>`
`SFC_DATA.SFC_DATA.CONTAINER_DATA.CONTAINER_ASSEMBLY_METRICS.<field ID>`

For example, to reference packed quantity in document to be printed by SFC, use the following binding:

DATA_BY_SFC.SFC_DATA.CONTAINER_DATA.CONTAINER_ASSEMBLY_METRICS.PACKED_QTY

Printing of the Container Assembly Metrics Data by Inventory is not supported.

Container Assembly Metrics Data binding is used to reference the following field IDs:

PACKING_VALUE

PACKING_VALUE_REVISION

PACKED_QTY

PACKING_LEVEL

MAX_QTY_REQ

MIN_QTY_REQ

6.22 Container Custom Data

To reference the Container custom data fields and values while printing by Container, define the binding for the field objects as follows:
DATA_BY_CONTAINER.CONTAINER_DATA.CONTAINER_CUSTOM_DATA.ATTRIBUTE for printing the Data Field label and
DATA_BY_CONTAINER.CONTAINER_DATA.CONTAINER_CUSTOM_DATA.VALUE for printing the Data Attribute.

To reference the Container custom data fields and values while printing by SFC, Shop Order or Process Lot, define the binding for the field objects as follows:

<print method binding>.SFC_DATA.CONTAINER_DATA.CONTAINER_CUSTOM_DATA.ATTRIBUTE for printing the Data Field label and <print method binding>.SFC_DATA.CONTAINER_DATA.CONTAINER_CUSTOM_DATA.VALUE for printing the Data Attribute.

If there are multiple custom data fields and values, you must use indexing after ATTRIBUTE and VALUE starting with 0.

6.23 Document Data

To reference a field of the Document Data category in the template, define the binding for the field object as follows: <print method binding>.DOCUMENT_DATA.DOCUMENT_REQ_DATA.<field ID>

For example, to reference print date in document to be printed by SFC, use the following binding:

`DATA_BY_SFC.DOCUMENT_DATA.DOCUMENT_REQ_DATA.PRINT_DATE`

Document Data binding is used to reference the following field IDs:

`PRINT_DATE`

`SITE`

`WORK_STATION_BO`

`PRINT_USER_BO`

NOTE: To reference Document ID in the template, define the binding for the field object as follows: `<print method binding>.DOCUMENT`

6.24 Document Custom Data

To reference the Document custom data fields and values define the binding for the field objects as follows: `<print method binding>.DOCUMENT_DATA.DOCUMENT_REQ_DATA.DOCUMENT_CUSTOM_DATA.ATTRIBUTE` for printing the Data Field label and `<print method binding>.DOCUMENT_DATA.DOCUMENT_REQ_DATA.DOCUMENT_CUSTOM_DATA.VALUE` for printing the Data Attribute.

If there are multiple custom data fields and values, you must use indexing after `ATTRIBUTE` and `VALUE` starting with 0.

7 Overview of Changes

The following sections describe the changes made to the Printing feature in SAP ME 6.0.

7.1 Support of Printing with the Adobe Document Services

Support of Printing using the Adobe Document Services component of SAP NetWeaver has been added in SAP ME 6.0.