
Chapter 1. End to end example

This chapter examines a case study of a customer who wants to use some of the new functions available for print and presentation to e-mail personalized invoices to their customers.

Assume you are an employee for the Super Sun Seeds Company and it is your responsibility to implement their e-business strategy, including delivering output electronically.

The Super Sun Seeds Company currently produces invoices on an IBM laser printer. Infoprint Designer is used to generate two copies, one for the customer and one for packing.

The company has decided to take this one step further. As part of their e-business strategy, the Super Sun Seeds Company wants to deliver the invoices to their customers electronically, as a Portable Document Format (PDF) attachment in an e-mail. You need to devise a method to take the output from their current application, split it into individual invoices, and match each one with the corresponding e-mail address.

This chapter describes the steps you must take to produce the desired results, including:

- Modifications to the Infoprint Designer project
- A single, one-time modification to the application
- Using CRTAFPDTA to index the data
- Using PRTAFPDTA to re-spool the indexed file
- Displaying the file using the AFP Viewer
- Creating a PSF configuration object and an output queue for PDF conversion
- Creating an exit program to lookup e-mail addresses
- Monitoring for undeliverable mail
- Other maintenance tasks

The target audience for this chapter are system analysts, developers, and programmers. Certain iSeries system skills are assumed. Programming skills in RPGLE are required to implement the user exit program.

The products used in the example are:

- PSF/400 for iSeries (V5R1) (This is only needed if the documents are printed to an IPDS printer along with being sent electronically.)
- Infoprint Server for iSeries
- Infoprint Designer for iSeries
- A product capable of reading e-mails, such as Lotus Notes or Microsoft Outlook
- Adobe Acrobat Reader
- AFP Viewer, within Client Access Express/400

1.1 Overall flow of end-to-end application

The overall flow of the data from the application generating the original spooled file to an e-mail being sent to a customer is shown in Figure 1 on page 4.

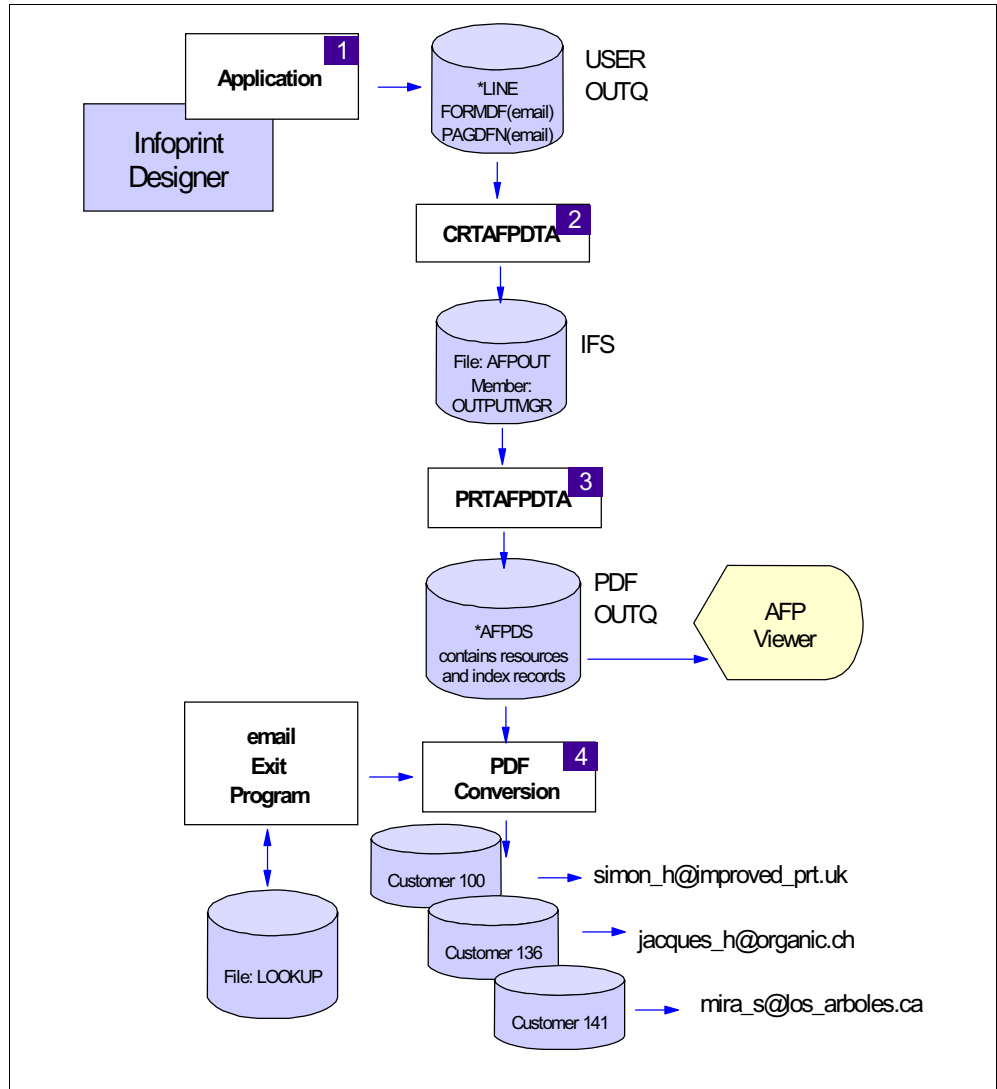


Figure 1. From application to e-mail

The process shown in Figure 1 is explained in the following steps:

1. The application produces the data which is spooled to a printer file that is defined as DEVTYPE(*LINE). The printer file also references the form definition and page definition that were created using Infoprint Designer for iSeries.
2. The CRTAFPDTA command is run against this spooled file. This creates a physical file member that contains the resolved AFPDS spooled file, the external resources, and the index records.
3. The PRTAFPDTA command is used to create a *new* spooled file that is in AFPDS format. The new spooled file now contains the all the external resources and index records.
4. This new spooled file is moved to the PDF conversion output queue and Infoprint Server converts it to PDF format.
5. The user exit program for e-mail does a lookup operation to the LOOKUP file using the information in the index records to select the appropriate e-mail

address for each customer. Each separate invoice is sent to a different destination.

This chapter describes each of these steps, as well as any one-time setup tasks.

1.2 Infoprint Designer changes

The needs of an e-mail application are slightly different than the original printed application. Some changes to the Infoprint Designer project are made to accommodate this new means of output.

1.2.1 Creating a new Infoprint Designer project for e-mail

To create the e-mail project, start with the COND.prj, which uses conditional processing to reformat the marketing message. (For detail on the COND.prj see the Infoprint Designer chapter.) The invoices that are sent via e-mail do not need the second copy that was used for a packing slip, and they don't need the Terms and Conditions that would have printed on the back. Remove the extra *Packing Slip* subgroup from the form definition, redefine the copy group to print simplex, and eliminate the terms and conditions subgroup.

Store this project, the new form definition, page definition, and overlay under the name EMAIL. (These resources are *not* included in the sample Infoprint Designer projects included with the product.)

This task must be performed only once.

1.2.2 Using the new Infoprint Designer objects

As normal, to use the new resources that you just created using Infoprint Designer, the printer file must be changed with the Change Printer File command (CHGPRTF), or overridden at run time with the Override with Printer File command (OVRPRTF), to create LINE data and also to reference the new form definition and page definition.

An example of the command to change the printer file (here called INVSCS) is:

```
CHGPRTF PRTF ( INVSCS )
        DEVTYPE ( *LINE )
        FORMDF ( EMAIL )
        PAGDFN ( EMAIL )
        DUPLEX ( *FORMDF )
        DRAWER ( *FORMDF )
```

If you change the printer file, it only must be done once. If you choose to override the printer file instead, you must insert that command into the CL program that runs the application. Ensure that the AFP resources are in a library within your library list.

There are some additional changes that must be made to the Super Sun Seeds invoice program to accommodate the indexing function. They are described in 1.3.4, "Changing the invoicing program to accommodate the index requirements" on page 7.

One final change to the application is to change the output queue to which the spooled file is directed. In the past, you directed the output to a queue that was

directly associated to a physical printer. We recommend that the new e-mail spooled file be directed to an output queue that is not associated with an active printer writer.

1.3 Planning for the index function

For more information on the index function of the CRTAFPDTA command, see the Infoprint Server - CRTAFPDTA Chapter.

Super Sun Seeds invoices are produced using the INVSCS program. A copy of this program is shipped with the Infoprint Designer for iSeries product. You can find it in the IPDATA library. See *Infoprint Designer for iSeries, Getting Started*, G544-5773, for information on the IPDATA library and using the programs in it.

1.3.1 Why CRTAFPDTA is used

To send individual invoices within a single spooled file to different addresses, you must add index records to the spooled data. The *Infoprint Server for iSeries User's Guide*, G544-5775, as well as the PDF creation chapter in this document, describe how to use the DDS keywords STRPAGGRP and ENDPAGGRP to add index records. However, these keywords require that the file be generated with DEVTYPE(*AFPDS), and cannot be used with a printer file that uses page definitions and is generated with DEVTYPE(*LINE). Super Sun Seeds is using Infoprint Designer for iSeries to develop this application. The layout component of Infoprint Designer produces page definitions which must be used with line data. Consequently they need to find an alternative to those DDS keywords. The CRTAFPDTA command, which is also part of Infoprint Server for iSeries, has the ability to generate index records for a spooled file that contains line data.

1.3.2 Setting up a target file for CRTAFPDTA

The CRTAFPDTA command generates AFPDS files in an integrated file system (IFS) directory. The index entries generated within the spooled file are used by the PDF generator to separate the one large spooled file to individual files for each customer and to lookup the e-mail address based on the customer number.

The CRTAFPDTA command directs its output to any directory in the IFS that you specify. However, in the next step of this process, CRTAFPDTA expects the data to be in a physical file. Before running the CRTAFPDTA command, you must create the physical file that is to receive the output. You can create the file once, and then clear it out each time, or create a new file each time with a different name that identifies the run date or some other meaningful information. This example shows how to create the file called AFPOUT in library MYLIB. The record length is not critical, but it must be specified. You must specify LVLCHK(*NO), to prevent getting a Level Check error when you run the CRTAFPDTA command. You must allow for at least four new members to be added to the file:

```
CRTPF  FILE(MYLIB/AFPOUT)
        RCDLEN(80)
        LVLCHK(*NO)
        MAXMERS(*NOMAX)
```

You can enter the IFS path to this physical file in each of the TOIDXSTMS, TOMRGSTMF, TORSCSTMF and TOSTMF parameters in the CRTAFPDTA

command. However, you may find it easier to make the AFPOUT file accessible as your current directory and then indicate in each of those four parameters that you want the output to go to *DFT. This is done using CHGCURDIR and you can reference the file by its path in the IFS:

```
CHGCURDIR DIR( '/QSYS.LIB/MYLIB.LIB/AFPOUT.FILE' )
```

This step is included in the job that is run each time you wish to perform the e-mail function.

1.3.3 Understanding the requirements of the index function of CRTAFPDTA

The indexing function essentially looks for two types of information: the trigger fields and the index fields.

The combination of fields defined as the trigger tell the indexing function where each new customer invoice should begin. This allows for a different number of pages per invoice. The first of the trigger fields defined has a second role of being an *anchor point*. This means that all other trigger fields and index fields are defined by their relative location with respect to the first trigger field, or anchor point.

The index fields are used to identify a distinct piece of data in each separate invoice. The combinations of fields used for the index is used by the e-mail exit program to look up the actual e-mail address of the recipient of the invoice. In this example, you are using only one index field (the customer number).

1.3.4 Changing the invoicing program to accommodate the index requirements

In the case of Super Sun Seeds, the one identifying feature to start each new invoice is the fact that "Page 1" prints on the bottom of the first page of each invoice, always on line 63. You may think that this would be the ideal trigger point or anchor. However, depending on how many of the invoice detail lines actually have data on them, there may be a different number of "records" in the spooled file before the record that has the page number on it. Consequently, CRTAFPDTA cannot use this field as the index trigger. This is a common occurrence when the application uses DDS keywords SKIPA or SKIPB, or other similar language instructions, to skip over an unknown or variable number of lines.

To work around this problem, the application program and associated DDS are modified slightly to output the word "NEW" on the same line as the company name on the first page of a new invoice. This record line is always in the same relative position on the page, and the customer number is always four records after it.

Note:

These programming changes may not be necessary for all applications. If the trigger fields and index fields are always in the same relative positions to each other in your application, you do not have to modify the program.

You did not map the word "NEW" when you redesigned the Infoprint Designer project as described in 1.2.1, "Creating a new Infoprint Designer project for e-mail" on page 5, therefore it does not show on the final document that is delivered to the customer.

When planning for the index function, you may find it helpful to copy the spooled file to a physical file using the Copy Spooled File (CPYSPLF) command and specifying CTLCHAR(*FCFC). Create the physical file with a record length one record longer than that of the spooled file, for example 81 or 133 record length for original spooled files that have used the common length of 80 or 132.

The commands you will use to do this are:

```
CRTPF FILE(mylib/CPYSPLF) RCDLEN(133) MAXMBSR(*NOMAX)
```

```
CPYSPLF FILE(INVSCS) TOFILE(mylib/CPYSPLF) JOB(number/user/name) SPLNBR(1)
TOMBR(INVSCS) CTLCHAR(*FCFC)
```

If you do not know the job information for your spooled file use the F11 key from either a WRKSPLF or WRKOUTQ display.

If you view the file with the Display Physical File Member (DSPPFM) command, you will see a good representation of how the spooled data is presented to the CRTAFPDTA process.

```

                                Display Physical File Member
File . . . . . : CPYSPLF           Library . . . . . : MSHNIER
Member . . . . . : INVSCS          Record . . . . . : 1
Control . . . . .                   Column . . . . . : 1
Find . . . . .
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+...8.
1
-
-
-
0 NEW      IMPROVED PRINTING CORP      SAME
           PERFORMANCE BOULEVARD
           PRINTERSVILLE
           CO 45789-2637
-           100           31300           3/28/01           4/28/01
0           BEST WAY           3/28/01           NET 30           YOUR PRINTER REP
-
           1 CT  00000300  HIGH ALTITUDE WATERMELON           1.01           1.01
           1 PK  01100517  SPARTAN SEEDS           2.39           2.39
           9 PK  04569870  NORTHERN LITE BLUE SPRUCE           858.32           7,724.88
           12 BX 11005004  BUSH GREEN SEEDS           2.50           30.00
           12 CT 11005011  LASSO RED SEEDS           892.23           10,706.76
           26 PK 11005018  EARLY BANTAM SEEDS           .38           9.88
           5 BX  11057893  AFRICAN DAISY, SEEDS           2.35           11.75

```

Figure 2. Sample spooled file after CPYSPLF with CTLCHAR(*FCFC)

Figure 2 shows the first page of the Super Sun Seeds invoice after the modification to add the word “NEW” at the beginning of each invoice. This becomes the first trigger field and is represented in the CRTAFPDTA command as IDXTRG((* 3 'NEW')). This tells the indexing program to look in any record, starting in position 3 for the string “NEW”. Note that the carriage control byte in column 1 is included in the position count. Note also that you must specify an asterisk (*) for record number value of the first trigger field.

The customer number appears four records below the trigger field. It is represented in the CRTAFPDTA command as IDXTAGFLD((4 15 6)). This tells the indexing program to look four records *after* the anchor point set by the first trigger field. Then, starting in position 15, the program uses the next six characters as

the first index. The customer number, as shown in the example, appears to be only three characters long. However, by inspecting the DDS for the application, you can see that it can have up to six characters. If you set the index based only on the three characters visible in the one example, you may have problems at some future time. This shows where it is important to have the original application documentation available.

Be aware of the fact that CRTAFPDTA looks at the relative positions of the **records** in the spooled file, not the relative lines that they may end up printing. The word "NEW" and the customer number are 4 records apart in the file, but print 6 lines apart, on lines 12 and 18 respectively. This is because there is a carriage control character "-" in position 1 of the record containing the customer number, which inserts a triple space at print time.

This step, if necessary, is done as part of the one-time setup.

1.3.5 Running the CRTAFPDTA command

Now that you have set up a destination for the output of the CRTAFPDTA command, and have identified the trigger fields and index fields, you are ready to run the CRTAFPDTA command. The four files that are generated by this command are placed in the default directory, which is set up to be AFPOUT, as described in 1.3.2, "Setting up a target file for CRTAFPDTA" on page 6:

```
CRTAFPDTA FROMSPLF( INVOICE)
          TOSTMF( *DFT)
          JOB(number/user/name)
          SPLNBR( *LAST)
          FORMDF(QGPL/EMAIL)
          PAGDFN(QGPL/EMAIL)
          TOIDXSTMF( *DFT)
          TORSCSTMF( *DFT)
          IDXTRG(( * 3 'NEW' ))
          IDXTAGFLD((4 15 6))
          IDXTAG(('Customer Number' (*IDXTAGFLD1)))
          RSCDTA(*FORMDF)
          TOMRGSTMF( *DFT)
```

After the command is run, there are four members in the physical file AFPOUT. They are:

- **OUTPUTAFP**: The resolved AFPDS document
- **OUTPUTIDX**: The index records
- **OUTPUTRSC**: The external resources
- **OUTPUTMRG**: Merged output. This contains the information from the other three members

These names are automatically assigned by CRTAFPDTA because a value of *DFT was specified for each of the TOxxxSTMF variables. It is possible to specify different names for these files. See the Infoprint Server - CRTAFPDTA chapter.

You use the member OUTPUTMRG. It contains the AFPDS data, along with the form definition resource and the index records. The form definition is needed inline in order to view the spooled file using the AFP Viewer, as shown in 1.4.2, "Checking your file with the AFP Viewer" on page 11

This step must be included in the job that runs for each e-mail.

1.4 Re-spooling the file using PRTAFPDTA

You cannot use the output of the CRTAFPDTA command directly by the PDF conversion process until you regenerate it back as a spooled file. There is a system command, Print AFP Data (PRTAFPDTA), included with OS/400 that you use to do this:

```
PRTAFPDTA FILE(AFPOUT)
          MBR(OUTPUTMRG)
          DEV(MYOUTQ)
          FORMDF(*INLINE)
          FIDELITY(*CONTENT)
```

The prompt for the parameter DEV implies that a physical device must be named as the destination for this command. An unqualified name of an output queue works just as well and may be preferred.

The form definition that was captured in the OUTPUTRSC member is included inline with this command. This facilitates using it with the AFP Viewer. See 1.4.2, "Checking your file with the AFP Viewer" on page 11.

The spooled file that is generated from the PRTAFPDTA command has the same name as the member used to create it (in this case, OUTPUTMRG). This same name is ultimately used in the subject line of the e-mail. You may choose to rename the member prior to running the PRTAFPDTA command:

```
RNMM FILE(AFPOUT)
      MBR(OUTPUTMRG)
      NEWMBR(EINVOICE)
```

This step must be included in the job that runs for each e-mail.

1.4.1 Directing the output of PRTAFPDTA

You may choose to direct the output of the PRTAFPDTA step directly to the output queue being used by the PDF process. However, it may be prudent to direct it to a temporary output queue and change the attribute to SAVE(*YES) as you move it to the PDF output queue.

1.4.1.1 Changing the USRDTA parameter

You may also add some information to the User Data (USRDTA) attribute this time. The USRDTA parameter is picked up in the e-mail exit program and you may find a use for it there. For example, you may use this field to look up a greeting message to include in the body of the email. In doing so, the program will not have to be changed if the message changes.

To move the spooled file to the PDF output queue and to set other parameters as described in this section use the Change Spooled File Attributes (CHGSPLFA) command.

```
CHGSPLFA FILE(EINVOICE)
          JOB(jobno/user/jobname)
          SPLNBR(n)
          OUTQ(*LIBL/PDF)
          SAVE(*YES)
          USRDTA('HelloWorld')
```


This step must be included in the job that runs for each e-mail.

1.4.2 Checking your file with the AFP Viewer

This may be a good time, especially while the application is under development, to verify that your index selection is correct. This can be done using the AFP Viewer. Start Operations Navigator from Client Access or Client Access Express. If you do not already have a session with your iSeries server, start the connection and log on. Select **Basic Operations** and then click **Printer Output**. Select your new spooled file from the list.

The index function is illustrated when by selecting **Search->Find group**. The complete index generated by the CRTAFPDTA is a combination of the customer number and a document sequence number.

Figure 3 shows an example of what should appear.

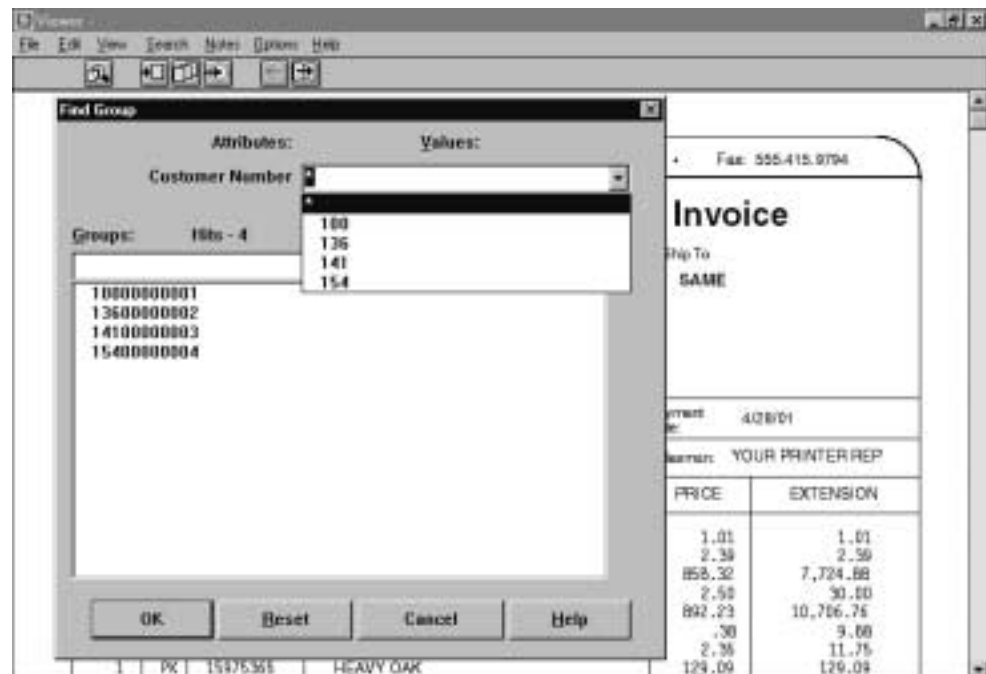


Figure 3. Using the AFP Viewer with an indexed spooled file

This step is helpful during the initial setup and testing of the e-mail process. It may also be used at any time with the production files.

1.4.2.1 Font mapping with AFP Viewer

When using the AFP Viewer, you may find you get messages indicating that it cannot find the requested fonts. This is because Infoprint Designer references fonts by what is known as the Alternate Coded Font Identifier, whereas the AFP Viewer only maps the standard Coded Font names. To rectify the situation, the font mappings for the missing fonts must be appended to the bottom of the ICODED.FNT file that is used by the AFP viewer.

For the Super Sun Seeds case study, add the following entries to the table:

```
XZ4010=CZ4200,T1V10037
XZH0F0=CZH400,T1V10500
```

```
XZH0E0=CZH300,T1V10500
XZH010=CZH200,T1V10037
XZ5010=CZ5200,T1V10037
XZN0E0=CZN300,T1V10500
```

If you find you are missing entries for other coded fonts, you can determine the corresponding character set and code page by using the Work with Font Resources command (WRKFNTRSC) and looking at the description of the iSeries coded font object as shown in Figure 4.

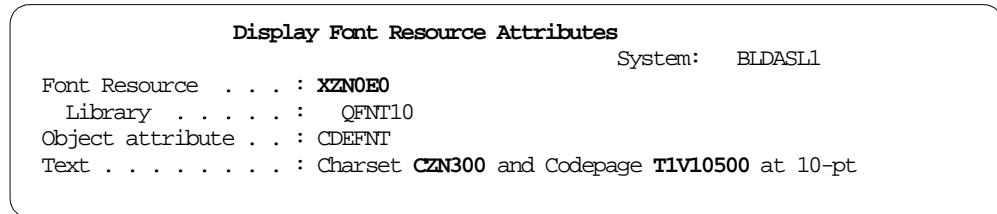


Figure 4. Displaying the description of a coded font object

This step is done as part of the one-time setup.

1.5 Converting the spooled file to PDF and sending as an e-mail

There are a number of steps to be done when preparing to convert a spooled file to a PDF file and send it to the appropriate destination via e-mail.

1.5.1 Enabling OS/400 to send e-mail

There are some system tasks that must be done to enable the iSeries server to send e-mail. These are described in Appendix A of the *Infoprint Server for iSeries User's Guide*, G544-5775.

If your iSeries server is not already set up for e-mail, you must do this step as part of the one-time setup.

1.5.2 Configuring a PDF device and PSF configuration object

As described in the Infoprint Server - PDF chapter, the PDF creation function depends on a Printer Device Description with the appropriate PSF Configuration object being configured. Refer to that section for additional details on the parameters.

For the Super Sun Seeds e-mail function, the Device Description and PSF Configuration object are created as follows:

```
CRTDEVPRT DEVD(PDF)
          DEVCLS(*LAN)
          TYPE(*IPDS)
          MODEL(0)
          LANATTACH(*IP)
          AFP(*YES)
          PORT(5013)
          FONT(416 12)
          RMTLOCNAME('127.0.0.1')
          USRDFNOBJ(QGPL/PDF *PSFCFG)
```

```
TEXT('Device Description for PDF email')
```

The **DEVD**, **DEVCLS**, **TYPE**, **MODEL**, **LANATTACH**, **AFP**, and **FONT** parameters are assigned values as if you were setting up an IPDS printer on your local area network.

- PORT** Use a unique 4 digit number to use as a TCP/IP Port number for each PDF Virtual printer
- RMTLOCNAM** Remote Location Name: Specify a loopback address or a name for a loopback address. A valid loopback address must have 127 as the first octet.
- USRDFNOBJ** User Defined Object: Specify the name and library of a PSF Configuration object. The object type is *PSFCFG. If PSF Configuration object does not exist when you create the device description you will get a warning message. This is not a problem provided you create the object before you attempt to start the writer.

```
CRTPSFCFG PSFCFG(QGPL/PDF)
          PDFGEN(*MAIL)
          PDFDEVTYPE(*IP40300)
          PDFMULT(*YES)
          PDFSENDER(MSHNIER)
          PDFDTAQ(QGPL/PDFDTAQ)
          PDFMAPPGM(QGPL/EMAIL)
          TEXT('PSF configuration for PDF email')
```

- PSFCFG** PSF Configuration Object name. This name will be referenced by the PDF Device.
- PDFGEN** PDF Generation: This parameter tells the PDF Generation subsystem that you wish to e-mail the PDF files.
- PDFDEVTYPE** PDF Device Type: This tells the PDF subsystem to use functions available on an IBM Infoprint 40, at 300 dots per inch. This is the recommended setting for this parameter.
- PDFMULT** Generate multiple PDF files: This tells the PDF subsystem to look for the imbedded tag records and to generate multiple PDF e-mails accordingly.
- PDFSENDER** PDF Sender: This parameter identifies the user that is sending the e-mails. This user must be enrolled in the iSeries Directory.
- PDFDTAQ** PDF Data Queue. Specifies the name of the data queue where PSF/400 will log the IPDS to PDF transformation completion notifications. This parameter is optional. See 1.6.1, "Using the PDF data queue" on page 21 for additional information.
- PDFMAPPGM** PDF Mapping Program: This tells the PDF subsystem to run the user to obtain the valid e-mail addresses.

This step is done as part of the one-time setup.

1.5.3 Creating an e-mail exit program

As described in 1.3.5, "Running the CRTAFPDTA command" on page 9, the CRTAFPDTA command causes index records that contain the customer number for each invoice to be inserted into the spooled file at the appropriate places. The e-mail exit program that is named in the PSF Configuration Object for the PDF transform uses this information to do a lookup on an iSeries database file that contains customer information, including their e-mail address.

A description of the requirements for the input and output parameters and data structures for this program can be found in Appendix .

As an experienced RPG programmer at the hypothetical Super Sun Seeds Company, you choose to write the e-mail exit program in RPGLE. A sample program listing can be found in Appendix . (A sample C language program is also included in the *Infoprint Server for iSeries User's Guide*, G544-5775.)

Note that the e-mail Address field in the e-mail output information buffer may be defined as any length up to 16M. A length of 255 characters is adequate for the sample program. If you are sending each e-mail to multiple destinations you may need to make that field longer.

The customer number that is found in the index records is passed into the program as the first six characters of the MAILTAG field. The program extracts those characters and performs a CHAIN operation to the LOOKUP file to retrieve the corresponding e-mail address.

Figure 5 shows an example of the DDS used to create the LOOKUP physical file.

```

A                                     UNIQUE
A          R EMAILR
A          CUSTNO          6A          COLHDG('CUSTOMER' 'NUMBER')
A          COMP           25A          COLHDG('COMPANY' 'NAME')
A          PERSON         25A          COLHDG('CONTACT')
A          EADDR          80A          COLHDG('E-MAIL' 'ADDRESS')
A          K CUSTNO

```

Figure 5. DDS for e-mail LOOKUP file

Figure 6 shows a sample of a few records from the e-mail LOOKUP file. Note that the e-mail addresses are surrounded by single quotes.

```

Display Physical File Member
File . . . . . : LOOKUP          Library . . . . . : QGPL
Member . . . . . : LOOKUP        Record . . . . . : 1
Control . . . . . :              Column . . . . . : 1
Find . . . . .
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+...8..
 100Improved Printing Corp Simon Hodkin      'simon_h@improved_prt.uk'
 136Organic Garden Supplies Jacques Hofstetter 'jacques_h@organic.ch'
 141Los Arboles Del Mundo Mira Shnier     'mira_s@los_arboles.ca'
 154The Last Leaf Bill Shaffer             'bill_s@last_leaf.com.'
          ***** END OF DATA *****

```

Figure 6. Sample records in e-mail LOOKUP file

If the CHAIN operation to the LOOKUP file is successful, the Disposition (DISPOSTN) field is assigned a value of '1', indicating the e-mail should be sent. The e-mail address from the LOOKUP file (EADDR) is moved into the ADDRESS field. A short message is built, including the company name and the contact person, and is moved into the MSGTEXT field. The program ends and these values are returned to the PDF writer and are used to generate the electronic mail and attachment.

If the lookup fails, control is transferred to the RPGLE subroutine called "Not_Found. The disposition field is set to '0', indicating that the e-mail is not to be sent. A CL program, NOTFOUND, is called. This program does two things:

1. It sends a message to a user which contains the customer number that failed, and the name of the PDF file that contains that customer's invoice
2. It also copies the PDF file from the temporary location in QDLS to a user-specified folder in the IFS

This last step must be done because the e-mail PDF process cleans up all of the temporary files at the end of the job, whether they are successfully sent or not.

A listing for the NOTFOUND program can be found in Appendix . Figure 7, illustrates a sample message as issued by the NOTFOUND program. Note the structure of the PDFFILE name. The syntax for this name is described in the *Infoprint Server for iSeries User's Guide, G544-5775*.

```

Display Messages
                                     System:  BLDASL1
Queue . . . . . :  MSHNIER           Program . . . . . :  WSMMSGQ
  Library . . . . :    QUSRSYS       Library . . . . . :    AFP
Severity . . . . :    00             Delivery . . . . . :  *HOLD

Type reply (if required), press Enter.

From . . . . . :  QSPLJOB           06/17/01  17:48:37
Cannot find e-mail address for customer number  136 . File
/QDLS/PSF/092962/QPRTJOB/066591/MSHNIER/000004/OUTPUTMR/
06172001/000002.PDF not sent.

```

Figure 7. Sample message issued by program NOTFOUND

This step is done as part of the one-time setup.

1.5.3.1 Using USRDTA in the e-mail exit program

In this example, the exit program looks up the email addresses based on the customer number passed to it in the index records. You may also find a similar exit program can be used to e-mail individual spooled files.

The USRDFNDA parameter in the printer file can be used to specify an e-mail address by entering a value for MAILTAG. This is described in the *Infoprint Server - PDF chapter* . However, this parameter may only be set when the printer file is created with CRTPRTF, or by using an override printer file (OVRPRTF). If the spooled file already exists, you cannot use Change Spooled File Attributes (CHGSPLFA) to change the value of USERDFNDA.

One solution is to change the USRDTA field for the spooled file. This field is passed as input to the e-mail exit program and can easily be set up as the search key for a lookup function to find the associated e-mail address.

1.5.4 Sending the spooled file as a PDF

You are now ready to send the spooled file as an e-mail. Move the spooled file to the output queue associated with the PDF device description and start the writer.

Once the file arrives in the output queue for the PDF writer, all the conversion and e-mail tasks are done as defined in the PSF Configuration object for that output queue. See 1.5.2, “Configuring a PDF device and PSF configuration object” on page 12.

Figure 8 on page 16 shows an example of the file as it appears in the mailbox of a Lotus Notes user.



Figure 8. Sample Lotus Notes e-mail with PDF attachment

When you open the attached PDF file with Adobe Acrobat, you see the Invoice from Super Sun Seeds as shown in Figure 9.

400 CPU Parkway • Vegetation, NJ 08090 • Office: 605-499-2267 • Fax: 605-415-9704

SUPER SUN SEEDS

Invoice

Sold To: **LOS ARBOLES DEL MUNDO**
32483 ARBOL LANE
MESA VERDE
IL 64078-9080

Ship To: **SAME**

Customer Number: 141 Invoice Number: 31341 Invoice Date: 3/28/01 Payment Date: 4/28/01

Ship Via: Shipped Date: 3/28/01 Terms: N10 Salesman: MICHELE GOODACRE

QTY	UDM	ITEM #	DESCRIPTION	PRICE	EXTENSION
300	EA	00001200	ARBOLES DEL SUR	45.00	40,500.00
951	CT	11005011	LASSO RED SEEDS	892.23	48,510.73
46	DZ	11005014	SCARLET NANTES SEEDS	5.90	271.40
45	BZ	11005015	CHANTENAY SEEDS	2.19	98.55
951	PK	11005018	EARLY BANTAM SEEDS	.38	361.38
4	BX	11057853	AFRICAN DAISY, SEEDS	2.35	9.40
100	EA	31321655	SEMILLAS DEL SUS SOMBEROS	24.95	2,495.00
1000	BX	66413213	POT POT	7.55	7,550.00
98	PK	84512023	OREGON SPRING TOMATO SEED	.97	95.06

Figure 9. Opening the PDF attachment with Adobe Acrobat

Moving the spooled files to the output queue is a step that is included in the job that processes each spooled file.

1.5.5 Checking for non-delivery messages

The e-mail function of Infoprint Server for iSeries uses the SNDDST (Send Distribution) command to do the mailing. SNDDST in itself was originally designed for distribution using SNA Distribution Services (SNADS), but its functions are mapped to TCP/IP Simple Mail Transfer Protocol (SMTP) and e-mail addressing.

When an e-mail document is sent, and either the destination user name or the domain name is incorrect, a message is returned to the sender. The SNDDST command does not have a specific vehicle to check for these incoming messages, but they are accessible and should be monitored.

The non-delivery messages are directed to the user who is designated as the sender of the e-mails. The sender name can be specified with the PDFSENDER parameter in the PSF configuration object used for the PDF function, or it may be set in the USRDFNDDTA in the spooled file itself by specifying a value for MAILSENDER. The spooled file setting overrides the PSF configuration object.

One way of setting up the sender to receive the non-delivery messages is to set up a Post Office Protocol Version 3 (POP3) client associated with their user ID. This is done by mapping the sender's entry in the iSeries system directory to an SMTP address. An SMTP address is the address you see on the Internet (myname@domain). There are three steps:

1. Enroll the sender in the System Directory
2. Associate the sender's user ID with an SMTP user ID

3. Configure a client to receive email for that user

Be aware that you are dealing with three different types of user identification here. There is the iSeries system user profile that is created with CRTUSRPRF. There is the SNADS user ID in the iSeries system directory which is created using ADDIRE. Finally there is the SMTP address used for internet mail, which is created using WRKNAMSMTP. To avoid confusion, we recommend you make all three of these names the same.

1.5.5.1 Enrolling the sender in the System Directory

The sender's user ID must be added to the iSeries System Directory for the e-mail function to work. To direct the non-delivery messages to a POP3 client for the sender, use the Add Directory Entry (ADDIRE) or Change Directory Entry (CHGDIRE) command and set up the Mail service level to System Message Store and set the Preferred address to the SMTP name. Figure 10 shows an example screen for setting these parameters.

```

Change Directory Entry

User ID/Address . . . . : MSHNIER  BLDASL1

Type changes, press Enter.

Mail service level . . 2                1=User index
                                         2=System message store
                                         4=Lotus Domino
                                         9=Other mail service

For choice 9=Other mail service:
Field name . . . . .                   F4 for list

Preferred address . . . 3                1=User ID/Address
                                         2=O/R name
                                         3=SMTP name
                                         9=Other preferred address
                                         F4 for list

Address type . . . . .                   F4 for list
For choice 9=Other preferred address:
Field name . . . . .                   F4 for list

F3=Exit F4=Prompt F5=Refresh F12=Cancel F18=Display location details
F19=Change name for SMTP                F22=Remove name for SMTP
More...

```

Figure 10. CHGDIRE for sender to receive non-delivery notices

1.5.5.2 Associating the sender's user ID with an SMTP address

The SMTP address for e-mail must be associated with the user's SNADS address name that is in the system directory. While you are enrolling the user in the system directory, press F19 from the CHGDIRE panel as shown in Figure 10 to take you to the Change Name for SMTP panel. An alternative is to enter WRKNAMSMTP on the command line. The panel shown in Figure 11 should appear the same either way.


```

                                Add Name for SMTP
                                System:   BLDASL1
User ID/Address . . . . . :   MSHNIER   BLDASL1

SMTP user ID . . . . . :   MSHNIER
SMTP domain . . . . . :   BLDASL1.PENN.BOULDER.IBM.COM

SMTP route . . . . . :

Press Enter to continue.

F3=Exit   F12=Cancel

```

Figure 11. Associating an SMTP address to a user ID using WRKNAMSMTP

1.5.5.3 Configuring a POP3 client to receive the messages

There are many software products that can be used to act as a client to the iSeries Post Office Protocol Version 3 (POP3) server. These include clients such as Eudora or Netscape. Configuration steps naturally depend on each product's individual interface. However, the information you must provide is basically the same.

This example uses Netscape Mail. Identify the incoming mail server by selecting **Edit->Preferences->Mail & Newsgroups->Mail Servers**. You are presented with a panel that looks like Figure 12.

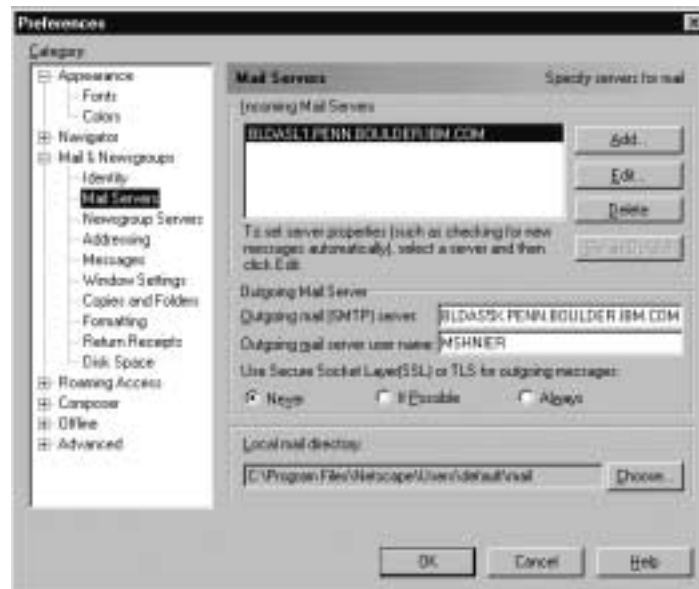


Figure 12. Netscape Mail Server Preferences

Select **Add** to define the Incoming Mail Server to the address you previously defined for the e-mail sender. Figure 13 shows an example of the panel that appears.

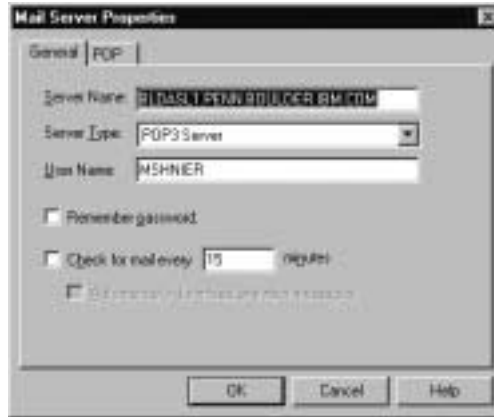


Figure 13. Netscape Mail Server Properties

The user name you enter here should match the iSeries user ID. When the sender retrieves mail, they are prompted for the iSeries password for that user ID.

If you use this client to send electronic mail to other destinations via the iSeries server, you must set up the outgoing mail server information and other identification information.

Figure 14 shows a portion of a returned e-mail that was sent to an incorrect domain. The format is slightly different if the domain name is correct, but the user name is wrong. Not shown here is the fact that the original e-mail is contained in this message further down the page, including the PDF attachment.

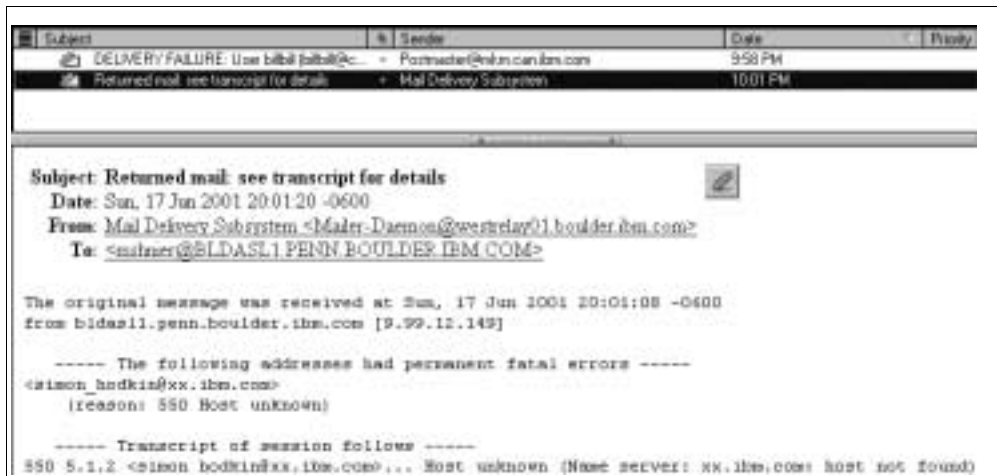


Figure 14. Returned e-mail message in Netscape

Some thought should be given as to how you set up and manage the sender user ID for the PDF distribution function. If you set up your PSF Configuration object with the default value of PDFSENDER(*SPLFOWN) you may have to enroll many different users so they can monitor for the non-delivery messages. For business critical applications, consider setting up a special user ID for the sender function and have one individual responsible for checking for messages and taking appropriate action, such as contacting the intended recipient and re-sending the document.

For more information on using the iSeries server as an e-mail server, go to the iSeries Information Center on the Internet at:

<http://publib.boulder.ibm.com/pubs/html/as400/infocenter.html>

Select **V5R1->Networking->TCP/IP->E-mail**.

The configuration of the sender to send and receive e-mail is done only once during setup.

1.6 Other maintenance tasks

The example provided in this chapter involves only the basic minimum coding required to produce the desired electronic mail. To implement this as a robust business solution, there are additional tasks that must be included in the application. These include, but are not limited to:

- Building CL programs to automate the process
- Checking the data queue for the status of each of the PDF files
- Maintenance routines to add, change, and delete records in the LOOKUP file
- Clean up of any temporary files created in the IFS or standard library structure

1.6.1 Using the PDF data queue

The IPDS to PDF process creates entries in a data queue object if you specify one in the PDFDTAQ parameter in the PSF Configuration object. To use this function, the data queue must exist and have a minimum length of 752 characters. Use the iSeries API called QRCVDTAQ to read the entries. For more information on QRCVDTAQ, see the iSeries Information Center on the Internet.

Using the data queue helps you identify other types of problems that may occur. For example, if you forget the single quotes on the e-mail address in the LOOKUP table, it is treated as an invalid address and the file is not sent. A return value of '05' is logged in the data queue.

The layout of the fields in the data queue are listed Appendix .

1.7 An alternative to e-mail

There are situations for which it is more appropriate to post the PDF files on a Web site for users to retrieve rather than having the files e-mailed directly. This approach is sometimes referred to as having the end user "Pull" the information rather than you "Push" it to them.

In this case, you may choose to follow most of the steps described in this document. However, rather than e-mailing the final documents, you store them in the system IFS as stream files by specifying PDFGEN(*STMF). A Web server application posts the files as required. In this situation, the information in the data queue is useful. It can be used to match up the index information in the Mail Tag field to the Path and name of the PDF file that is created in the IFS.

You may also choose to store the files as stream files if you plan on using a different method to e-mail the PDF files. For example, you may want to integrate the PDF stream files in a Domino based application.

1.8 One time setup versus ongoing tasks

In this chapter we described a number of steps needed to complete the task of converting an iSeries applications from a spooled file to an e-mail containing a PDF attachment. These tasks can be divided into two categories:

- one-time setup tasks
- tasks to be repeated for each spooled file.

To help in planning, the two types are summarized here.

1.8.1 One time setup

The following tasks are done once as part of the one-time setup of the e-mail function.

- Create or modify the Infoprint Designer project.
- Modify the printer file or change the CL to use the new form definition, page definition and overlay.
- Modify the application program (if necessary) to generate data that can be used by the CRTAFPDTA index function.
- Modify the ICODED.FNT file in AFP Viewer if necessary.
- Check the output using the AFP Viewer.
- Enable OS/400 to send e-mail
- Create the PDF printer device description and PSF Configuration object.
- Create the e-mail exit program.
- Enroll the sender in the iSeries system directory and create an SMTP address.
- Configure a POP3 client to receive the non-delivery messages.
- Create a data queue to capture status messages.

1.8.2 Repeated tasks

It is likely you will want to build a CL program to manage the steps that will be repeated for each spooled file you are mailing using this process. The steps to incorporate in the program will include:

- Create (or clear) a physical file to receive the output from the CRTAFPDTA command.
- Set the default target directory for the CRTAFPDTA command using the CHGCURDIR command.
- Run the CRTAFPDTA command.
- Change the OUTPUTMRG member name to a name that is more meaningful.
- Re-spool the output using the PRTAFPDTA command.
- Move the output to the PDF output queue.
- Monitor for files not sent.
- Cleanup any temporary files created during this process.