

Chapter 12

Exit Programs

Interface between i-effect and Business Specific Workflow

i-effect allows to call up user-defined exit programs at different, defined processing units. Furthermore, afore defined data and data extracted from source files can be passed to these exit programs.

By this, all i-effect processes can perfectly be integrated into a business company's individual workflows.

The basis for the following examples of exit programs is in each case a concrete scenario. While i-effect as standard application in combination with the particular exit program realizes the desired workflow in the iSeries system, the exit programs cover the company specific side.

Example of a Type 1 Exit Program (RPGLE)

The example program shows how an exit program can be used in CVTSPL in order to create meaningful names for data stream files generated with this command. In CVTSPL it is given with the following syntax:

```
EXITPGM(*LIBL/EXITREN *TYPE1)
```

It is assumed that option EXITPGMPRM(*POS) or EXITPGMPRM(*KEY) is used to extract details from a report, which is then given to the exit program in the ninth place of the EXITPGMPRM parameter. Details might be client names, reference number, invoice number, etc.

```
EXITPGMPRM(*POS)  
EXITPGMPOS((*ALL 10 60 10 *ROWCOL))
```

The data stream file is renamed. The name given by CVTSPL turns into the name nnnnnn.pdf, whereas nnnnnn is the number extracted from the report that was transmitted as parameter. The source file of the following program can be found in the i-effect working library in the QRPGLSRC file.

```
H COPYRIGHT('© menten GmbH, 2003')
**-----**
**                tt                **
**      mmmmm   eeeee  nnnnn  tt   eeeee  nnnnn  **
**      m m m e   e n   n tttt e   e n   n      **
**      m m m eeeee  n   n tt  eeeee  n   n      **
**      m m m e     n   n tt  e     n   n      **
**      m m m eeeee  n   n ttt eeeee  n   n      **
**
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**
**      Systemberatung                **
**      IBM System AS/400              **
**      Individualprogrammierung       **
**
**      menten GmbH                   **
**      Hauptstrasse 136 - 140         **
**      51465 Bergisch Gladbach       **
**      Telefon +49 2202 2399 0        **
**      Telefax +49 2202-2399 23       **
**      Email   info@menten-gmbh.de   **
**      Homepage http://www.menten-gmbh.de **
**-----**
**
** PROGRAM      : EXITREN              **
**
** BESCHREIBUNG : Sample 'TYPE 1' CVTSPL exit program for rename **
**      streamfile -> CustomerNr.pdf   **
**
** DATUM        : Aug. 2002            **
**
** AUTOR        : Ilja Kolsow          **
**-----**
** Änderungsdatum :                    **
** Änderungsgrund :                    **
```

```
** Autor      :                          **
**-----**
** PROTOTYPE FOR STANDARD EXIT PROGRAM PARAMETERS **
**-----**
D Parameters  PR              ExtPgm('EXITREN')
* Spooled file name
D   iaSplFile          10A
* Name of the job which created the spooled file
D   iaSplJob           10A
* User id of the job which created the spooled file
D   iaSplUser          10A
* Job number of the job which created the spooled file
D   iaSplJobNo         6A
* Spooled file number of the spooled file
D   iiSplNbr           10I 0
* Spooled file user data
D   iaUsrDta           10A
* Name of the stream file created
D   iaStmFile          128A
* IFS directory in which stream file was created
D   iaDir              256A
* Exit program parameter string extracted from spooled file
D   iaExitParm         1024A
**
**-----**
** PROTOTYPE FOR QCMDEXC **
**-----**
**
D Command     PR              ExtPgm('QCMDEXC')
D   iaCommand          32767A  CONST OPTIONS(*VARSIZE)
D   inCmdLen           15P 5  CONST
**-----**
** STANDARD EXIT PROGRAM PARAMETERS **
**-----**
D Parameters  PI
* Spooled file name
D   iaSplFile          10A
* Name of the job which created the spooled file
D   iaSplJob           10A
* User id of the job which created the spooled file
D   iaSplUser          10A
* Job number of the job which created the spooled file
```

```

D   iaSplJobNo          6A
* Spooled file number of the spooled file
D   iiSplNbr           10I 0
* Spooled file user data
D   iaUsrDta           10A
* Name of the stream file created
D   iaStmFile          128A
* IFS directory in which stream file was created
D   iaDir              256A
* User-definable exit program parameter.
D   iaExitParm         1024A
**
D   laOldName          S      1024A
D   laNewName          S      1024A
**
D QUOTE                C      ' '
**
D   i                  S      10I 0
**-----**
** main procedure          **
**-----**
**
* If customer number found and passed as parameter, rename stream file
C           IF          iaExitParm <> *BLANKS
**
* Set up full path name to stream file
C           IF          iaDir = *BLANKS
C           EVAL        laOldName = QUOTE
C                               + %trim(iaStmFile)
C                               + QUOTE
C           ELSE
C           EVAL        laOldName = QUOTE
C                               + %trim(iaDir)
C                               + '/'
C                               + %trim(iaStmFile)
C                               + QUOTE
C           ENDIF
**
* Set up new path name for file using customer number in parameter
C           EVAL        laNewName = QUOTE
C                               + %trim(%subst(iaExitParm:1:10))
C                               + '.pdf'
C                               + QUOTE

```

```

**
* Rename the stream file
C           CALLP(E) Command( 'REN '
C                               + laOldName
C                               + ' '
C                               + laNewName:2053)
**
C           dow         %error
**
C           EVAL        i = i + 1
* Set up new path name for file using customer number in parameter
C           EVAL        laNewName = QUOTE
C                               + %trim(%subst(iaExitParm:1:10))
C                               + '_' + %trim(%editc(i:'Z'))
C                               + '.pdf'
C                               + QUOTE
* Rename the stream file
C           CALLP(E) Command( 'REN '
C                               + laOldName
C                               + ' '
C                               + laNewName:2053)
C           EndDo
C           ENDIF
**
C           RETURN

```

Example of a Type 1 Exit Program (CLLE)

The example program shows how an exit program can be used in CVTSPL in order to create meaningful names for data stream files generated with this command. The source file of the following program can be found in the i-effect working library in the QCLLESRC file.

```

/*-----*/
/*                               tt                               */
/*          mmmmmmm   eeeee   nnnnnn   tt   eeeee   nnnnnn   */
/*          m m m e   e n   n tttt e   e n   n   */
/*          m m m eeeeeee n   n tt   eeeeeee n   n   */
/*          m m m e   n   n tt   e   n   n   */
/*          m m m eeeeeee n   n ttt   eeeeeee n   n   */

```

```

/*                                     */
/* E D V - B e r a t u n g G m b H      */
/*                                     */
/*           Systemberatung            */
/*           IBM System AS/400         */
/*           Individualprogrammierung  */
/*           menten GmbH               */
/*           Hauptstrasse 136 - 140    */
/*           51465 Bergisch Gladbach  */
/*           Telefon +49 2202 2399 0   */
/*           Telefax +49 2202-2399 23  */
/*           Email info@menten-gmbh.de */
/*           Homepage http://www.menten-gmbh.de */
/*-----*/
/*                                     */
/* PROGRAMM      : GZPEXIT              */
/*                                     */
/* BESCHREIBUNG : Sample 'TYPE 1' CVTSPL exit program for rename */
/*               streamfile -> CustomerNr.pdf */
/*                                     */
/* DATUM         : September 2002      */
/*                                     */
/* AUTOR         : Ilja Kolosow        */
/*                                     */
/*-----*/
/* Änderungsdatum :                    */
/* Änderungsgrund :                    */
/* Autor           :                    */
/*-----*/
PGM          PARM(&FILENAME &JOBNAME &USERID &JOBNBR +
                &FILENBR &USERDTA &PDFNAME &PDFPATH +
                &USRPARM)
COPYRIGHT TEXT('© menten GmbH, 2003')
/* Spooled file name */
DCL          VAR(&FILENAME) TYPE(*CHAR) LEN(10)
/* Name of the job which created the spooled file */
DCL          VAR(&JOBNAME) TYPE(*CHAR) LEN(10)
/* User id of the job which created the spooled file */
DCL          VAR(&USERID) TYPE(*CHAR) LEN(10)
/* Job number of the job which created the spooled file */
DCL          VAR(&JOBNBR) TYPE(*CHAR) LEN(10)
/* Spooled file number of the spooled file */
DCL          VAR(&FILENBR) TYPE(*DEC) LEN(4 0)

```

```

/* Spooled file user data */
DCL          VAR(&USERDTA) TYPE(*CHAR) LEN(10)
/* Name of the stream file created */
DCL          VAR(&PDFNAME) TYPE(*CHAR) LEN(128)
/* IFS directory in which stream file was created */
DCL          VAR(&PDFPATH) TYPE(*CHAR) LEN(128)
/* Exit program parameter string extracted from spooled file */
DCL          VAR(&USRPARM) TYPE(*CHAR) LEN(1024)
DCL          VAR(&FILE) TYPE(*CHAR) LEN(512)
DCL          VAR(&FILE1) TYPE(*CHAR) LEN(512)
DCL          VAR(&PDFNAME1) TYPE(*CHAR) LEN(128)

/**/
/* Globale Fehlerbehandlung */
/**/
MONMSG      MSGID(RPG0000 CPF0000 GZI0000 CEE0000) +
            EXEC(GOTO CMDLBL(ERROR))
/**/
/* Name der soeben erzeugten PDF-Datei */
/**/
CHGVAR      VAR(&FILE) VALUE(&PDFPATH *TCAT '/' *TCAT +
                            &PDFNAME)
/**/
/* An dieser Stelle müssen die Werte der nachfolgenden Variablen */
/* gefüllt werden. */
CHGVAR      VAR(&PDFNAME1) VALUE(&USRPARM)
CHGVAR      VAR(&PDFNAME1) VALUE(&PDFNAME1 *TCAT '.pdf')

REN         OBJ(&FILE) NEWOBJ(&PDFNAME1)

RETURN

/**/
/* Fehlerbehandlung */
/**/
ERROR:
SNDPGMMSG  MSGID(CPF9898) MSGF(*LIBL/QCPFMSG) +
            MSGDTA('Das i-effect Exit-Programm wurde +
            abnormal beendet') MSGTYPE(*ESCAPE)

END:       ENDPGM

```

Example of a Type 2 Exit Program (RPGLE)

In the type 2 example program, the exit program EXITSNDEML uses a type 2 parameter list (*TYPE2).

It shall be called up for every newly created data stream file in order to immediately and automatically send it to the designated client via email.

```
EXITPGM(*LIBL/EXITSNDEML *TYPE2)
```

It is assumed that option EXITPGMPRM(*POS) or EXITPGMPRM(*KEY) is used to extract the customer number from the report. This customer number serves to determine the customer address in the customer database. The i-effect command SNDEMAIL is then used to send the data stream file to the respective customer. The source file of the following example program as well as the CUSTFILE source file can be found in the i-effect working library in the QRPGLSRC and QDDSSRC files.

```
H COPYRIGHT(`© menten GmbH, 2003`)
**-----**
**                tt                **
**      mmmmmmm  eeeee  nnnnnn  tt  eeeee  nnnnnn  **
**      m m m e   e n   n tttt e   e n   n   **
**      m m m eeeeeee n   n tt  eeeeeee n   n   **
**      m m m e       n   n tt  e       n   n   **
**      m m m eeeeeee n   n ttt  eeeeeee n   n   **
**
** E D V - B e r a t u n g   G m b H
**
**           Systemberatung
**           IBM System AS/400
**           Individualprogrammierung
**
**           menten GmbH
**           Hauptstrasse 136 - 140
**           51465 Bergisch Gladbach
**           Telefon +49 2202 2399 0
**           Telefax +49 2202-2399 23
**           Email   info@menten-gmbh.de
**           Homepage http://www.menten-gmbh.de
**-----**
** PROGRAM NAME: EXITSNDEML                **
```

```
**
** APPLICATION : CVTSPL command
**
** LANGUAGE   : ILE RPG
**
** AUTHOR    : Ilja Kolosow
**
** DATE WRITTEN: Sep. 2002
**
** DESCRIPTION : Sample 'TYPE 2' CVTSPL exit program for sending a
**               stream file via e-mail using the SNDEMAIL command
**               of i-effect
**-----**
* Customer file

FCustFile IF E          K DISK  RENAME(CUSTFILE:CUSTFILER)

**-----**
** PROTOTYPE FOR STANDARD EXIT PROGRAM PARAMETERS
**-----**

D Parameters          PR          EXITPGM('EXITSNDEML')

* Spooled file name

D iaSplFile           10A

* Name of the job which created the spooled file

D iaSplJob            10A

* User id of the job which created the spooled file

D iaSplUser           10A

* Job number of the job which created the spooled file

D iaSplJobNo          6A

* Spooled file number of the spooled file

D iiSplNbr            10I 0
```

```

* Spooled file user data

D  iaUsrDta          10A

* Name of the stream file created

D  iaStmFile        128A

* IFS directory in which stream file was created

D  iaDir            256A

* Page number of the first page in the range processed

D  iiFirstPage      10I 0

* Page number of the last page in the range processed

D  iiLastPage       10I 0

* Exit program parameter count

D  iiParmCount      10I 0

* User-definable exit program parameter strings. Up to 150 of these
* may follow. Define as many as you need.

D  iaUserParam1     999A      OPTIONS(*NOPASS)
D                               VARYING

D  iaUserParam2     999A      OPTIONS(*NOPASS)
D                               VARYING

D  iaUserParam3     999A      OPTIONS(*NOPASS)
D                               VARYING

**-----**
** PROTOTYPE FOR QCMDXEC **
**-----**

D Command          PR          ExtPgm('QCMDXEC')
D  iaCommand        32767A     CONST OPTIONS(*VARSIZE)
D  inCmdLen         15P 5     CONST

```

```

**-----**
** STANDARD EXIT PROGRAM PARAMETERS **
**-----**

D Parameters      PI

D  iaSplFile       10A
D  iaSplJob        10A
D  iaSplUser       10A
D  iaSplJobNo      6A
D  iiSplNbr        10I 0
D  iaUsrDta        10A
D  iaStmFile       128A
D  iaDir           256A
D  iiFirstPage     10I 0
D  iiLastPage      10I 0
D  iiParmCount     10I 0
D  iaUserParam1    999A      OPTIONS(*NOPASS)
D                               VARYING
D  iaUserParam2    999A      OPTIONS(*NOPASS)
D                               VARYING
D  iaUserParam3    999A      OPTIONS(*NOPASS)
D                               VARYING

D waCustomerNo    S          10A
D waCommand       S          1024A
D wnCmdLen        S          15P 5

D QUOTE          C          ''''

* This example assumes that the EXITPGMPRM, EXITPGMPOS and EXITPGMKEY
* parameters have been used to extract the customer number from the
* spooled file, and that the first user-definable parameter contains the
* customer number (assumed to be 10 characters for the purposes of
* this example).

* Make sure at least one parameter was passed and that the parameter
* passed is not too short

C          IF          iiParmCount < 1
C                               or %len(iaUserParam1) < %size(waCustomerNo)
* Insert appropriate error handling here
C          RETURN

```

```

C             ENDF

* Extract the customer number from the parameter string

C             EVAL      waCustomerNo = %subst(iaUserParam1      :
C                                 1                          :
C                                 %len(waCustomerNo))

* Retrieve the customer's e-mail address from the customer file

C      waCustomerNo CHAIN      CustFile
C             IF          not %found(CustFile)
* Insert appropriate error handling here
C             RETURN
C             ENDF

* Build the SNDEMAIL command
C             EVAL      waCommand = `SNDEMAIL `
C                                 + `RECIPIENT(` + QUOTE
* „CustEMail“ is assumed to be the customer's email address field
* from the customer file
C                                 + %trim(CustEMail) + QUOTE
C                                 + `)` `

* DSTD parameter below is the „subject“ line that will appear for
* the e-mail. Substitute your choice of subject line
C                                 + `SUBJECT(`
C                                 + QUOTE
C                                 + `Your invoice from i-effect`
C                                 + QUOTE
C                                 + `)` `

* MSG parameter below is a brief message to accompany the attachment.
* Substitute your choice of message.
C                                 + `MSGTEXT(`
C                                 + QUOTE
C                                 + `Your invoice is`
C                                 + ` attached. Thank you for your `
C                                 + `custom.`
C                                 + QUOTE
C                                 + `)` `

* The document name and folder names are passed into this program from
* CVTSPL. The document name if generated from the OUTPFILE parameter
* with the addition of a numeric suffix for each spooled file created.

```

```

C                                 + `ATTACH(` + QUOTE
C                                 + %trim(%trim(iaDir) + `/`
C                                 + %trim(iaStmFile)) + QUOTE
C                                 + `)` `
C             eval      wnCmdLen = %len(waCommand)

* e-mail the stream file to the customer
C             CALLP(E)  Command(waCommand:wnCmdLen)

C             IF          %error
* Insert appropriate error handling here
C             ELSE
* Send OK message
C             ENDF
C             RETURN

```

EXITSNDEML Individual Programming

In the following example, the spool file INVNEW1 from the QSAMPLER library (IBM AFP Examples) is used.

It is assumed that option EXITPGMPRM(*POS) or EXITPGMPRM(*KEY) was used to extract the costumer number from the report. This costumer number serves to determine the costumer's email address in the costumer database. The i-effect command SNDEMAIL is then used to send the data stream file to the respective costumer. The source file of the following example program as well as the CUSTFILE source file can be found in the i-effect working library in the QRPGLSRC and QDDSSRC files.

2	BX	56413213	POT POT	7.65	15.30
80	PK	65412384	SEED SCRUBBER	888.79	71,103.20
1	PK	84512023	OREGON SPRING TOMATO SEED	.97	.97
2	DZ	96325874	PINEAPPLE-ORANGE SEEDS	1.29	2.58

Weitere ...

Work with all spooled files

Enter option and press enter.

- 1=Send 2=Change 3=Stop 4=Delete 5=Display 6=Release
7=Messages 8=Attribute 9=Work with printing status

Opt	File	Queue	Library	Last used Date	Spooled-File Size (K)
5	INVNEW1	CUSTOMER	KOLOSOW	1 24.08.04	44

Display spooled file

File : INVNEW1 Page/Line 1/18
Control +1_____ Colum 1 - 78
Search _____
*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+...
100 31300 13.02.03 3/13/03
BEST WAY 13.02.03 NET 30 YOUR PRINTER RE

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
1	PK	15975365	HEAVY OAK	129.09	129.09
33	BX	32746510	HOPS BREWING LIGHT	1.20	39.60
6	EA	46578913	SEED SURVEYING SITE	50.00	300.00

Convert Spool File(s) (CVTSPL)

Enter option and press enter.

Split per Position: SPLITPOS

Line No. or y-coordinate	> 18_____
Character Pos. or. x-coordinate	> 17_____
Length	3_____
Testing method	*ROWCOL
Comparison	*NE
Character String to be compared	*PRV_____

Exit Programs: EXITPGM

File Generation	> EXITSNDEML
Library	> IIEFFECT__
Parameter Format	> *TYPE2
Pagination	*NONE_____
Library	_____
Parameter Format	*TYPE1
File End	*NONE_____
Library	_____
Parameter Format	*TYPE1
Exit Program before File Generation	*NONE_____
Library	_____
Parameter Format	*TYPE1

Exit Program Parameter: EXITPGMPRM

Parameter Type	*POS_
CCSID of Parameter Data . .	*SPLF__

Exit Progr.Param. String Pos.: EXITPGMPOS _

Page Number	> 1_____
Line No. or y-coordinate	> 18_____
Character Pos. or. x-coordinate	> 17_____
Length	3_____
Testing method	*ROWCOL

+ for further values _

Example Allocation Customer Number -> Email Address:

Display Physical File Member

```
File . . . . . : CUSTFILE      Library . . . . . : GZIPR7
File Member . . : CUSTFILE1    Set . . . . . : 1
Control . . . . . : _____ Column . . . . . : 1
Search . . . . . : _____

*...+...1...+...2...+...3...+...4...+...5...+...6...+...7...+...
100    100.MUSTERMANN@MENTEN-GMBH.DE      TEST CUSTOMER SNDE
136    136.MUSTERMANN@MENTEN-GMBH.DE      TEST CUSTOMER SNDE
141    141.MUSTERMANN@MENTEN-GMBH.DE      TEST CUSTOMER SNDE
154    154.MUSTERMANN@MENTEN-GMBH.DE      TEST CUSTOMER SNDE

***** DATENENDE *****
```

```
CVTSPL FILE(INVNEW1)
      JOBNAM(011085/KOLOSOW/QPRTJOB)
      SPLNBR(105)
      OUTPFILE(`%TMP%%SPLFILENAME%`)
      PAGESIZE(*A4 *PORTRAIT)
      SPLIT(*POS)
      SPLITPOS(18 17 3)
      EXITPGM(IEFFECT/EXITSNDEML *TYPE2)
      EXITPGMPRM(*POS)
      EXITPGMPOS((1 18 17 3))

...

SPLIT(*POS) Process of Parameter Element 1 chose Text „100“.
EXITPGMPRM(*POS) Process of Parameter Element 1 chose Text „100“.

SPLIT(*POS) Process of Parameter Element 1 chose Text „136“.
EXITPGMPRM(*POS) Process of Parameter Element 1 chose Text „136“.

SPLIT(*POS) Process of Parameter Element 1 chose Text „ 56“.
EXITPGMPRM(*POS) Process of Parameter Element 1 chose Text „ 56“.

SPLIT(*POS) Process of Parameter Element 1 chose Text „141“.
EXITPGMPRM(*POS) Process of Parameter Element 1 chose Text „141“.

SPLIT(*POS) Process of Parameter Element 1 chose Text „154“.
EXITPGMPRM(*POS) Process of Parameter Element 1 chose Text „154“.

...

Spooled File INVNEW1 converted into data stream file /TMP/INVNEW1_30.pdf.
```

```
Email saved in archive file /gzip400/archive/mail/out/M2133.EML.
Connection to email server davad established
At: 100.MUSTERMANN@MENTEN-GMBH.DE
Attachment /TMP/INVNEW1_30.pdf sent.
Connection to email server davad ended
SNDEMAIL normally ended.
Exit program EXITSNDEML ended normally.

Spooled File INVNEW1 converted into data stream file /TMP/INVNEW1_31.pdf.
Email saved in archive file /gzip400/archive/mail/out/M2134.EML.
Connection to email server davad established
At: 136.MUSTERMANN@MENTEN-GMBH.DE
Attachment /TMP/INVNEW1_31.pdf sent.
Connection to email server davad ended
SNDEMAIL normally ended.
Exit program EXITSNDEML ended normally.

Spooled File INVNEW1 converted into data stream file /TMP/INVNEW1_32.pdf.
Exit program error: customer number 56 not found in CUSTFILE!.
Spool File INVNEW1 converted into data stream file /TMP/INVNEW1_33.pdf.
Email saved in archive file /gzip400/archive/mail/out/M2135.EML.
Connection to email server davad established
At: 141.MUSTERMANN@MENTEN-GMBH.DE
Attachment /TMP/INVNEW1_33.pdf sent.
Connection to email server davad ended
SNDEMAIL normally ended.
Exit program EXITSNDEML ended normally.

Spooled File INVNEW1 converted into data stream file /TMP/INVNEW1_34.pdf.
Email saved in archive file /gzip400/archive/mail/out/M2136.EML.
Connection to email server davad established
At: 154.MUSTERMANN@MENTEN-GMBH.DE
Attachment /TMP/INVNEW1_34.pdf sent.
Connection to email server davad ended
SNDEMAIL normally ended.
Exit program EXITSNDEML ended normally.

Spooled file INVNEW1 converted into *PDF.
Spool file INVNEW1 from Job QPRTJOB/KOLOSOW/011085 Number 000105
      successfully processed.
0000000001 Spool entries successfully converted.
i-effect Processing ended.
```

