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Automated Data Mover

This document describes the major components of the Automated Data Mover (ADM) an application system designed to move orders, inbound, from various sources to the iSeries order data base. The ADM consists of many different elements, database files, programs, commands, even REXX Queue processes. But through the application interfaces provided, the ADM process is fairly simple to manage.



Fig. 1

At a system level, the three major components of the ADM exist in the subsystem named ADMSBS. This subsystem is an environment for the data mover job, the data editor, and the data translator.



NEP Process

The basis for the data mover consists of programs set to execute in a Never Ending Process (NEP). Each NEP for the ADM performs a selective function. The job, ADM_MOVER wakes periodically to check if there are any orders to process. When orders are present in a specific IFS folder, the data mover converts the data from PCASCII to a DB2 database file. The inbound file is then moved from the inbound folder into an archive folder. When there are no more files to process the data mover goes to sleep (job delay). At intervals the program wakes, tests to see if it should exit, or process more files.

The editor is not as complicated as the data mover. The NEP ADM_EDITOR does not move data. When orders are added to the ADM database, they have not been checked for errors. The editor reads the order data and tags the orders with an error flag, if discrepancies are found. If no errors are found, the editor sets the status of the order to 'Pending'—in effect passing the order on to the order translator. Like the data mover, the editor wakes at established intervals and tests to see if it should exit, or continue to edit data.

The data translator (ADM_XLATE) works with a limited set of transactions. Only orders that have passed an edit will be examined. The translator maps the ADM data to the production order database. Once all pending orders have been mapped the translator goes into the delay mode and on waking, tests to see if it should exit or continue mapping data.

Starting the NEP process is simple. Start the subsystem with the command STRSBS SBSD(ADMSBS). This will initiate the subsystem. Then issue the command STRDTAMVR.



Start Data Mover

The start data mover command (STRDTAMVR) defaults to launching all of the NEP programs for the ADM system. However, the command can be prompted and each individual component may be selected to start, or not to start via the command parameters.

Start Automated Data Mover (STRDTAMVR)

Type choices, press Enter.

Start the data mover	<u>Y</u>	Y, N
Start the data editor	<u>Y</u>	Y, N
Start the data translator	<u>Y</u>	Y, N

Bottom

F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
F24=More keys

The command processing program (CPP) will submit each NEP job selected to start to the ADMSBS. Prior to start, the CPP will issue a command, SETADMPGM, to insure the NEP will not exit immediately on start up. The command sets the exit function on the named program to the value of 'NOEXIT'.



End Data Mover

The End Data Mover (ENDDTAMVR) command is the functional opposite of the STRDTAMVR command. This is a command interface to allow an operator a method to end the data mover process in a controlled manner.

End Automated Data Mover (ENDDTAMVR)

Type choices, press Enter.

End the data mover	<u>Y</u>	Y, N
End the data editor	<u>Y</u>	Y, N
End the data translator	<u>Y</u>	Y, N

Bottom

F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
F24=More keys

The control instructions will be set to cause the data mover jobs to end as soon as the NEP checks to see if it should exit or continue processing.

The command default is to end all ADM NEP processes. However, the user may choose to end any one of the jobs individually. This will not cause the any interruption in the actual data mover process. If the NEP is active all records will be processed before the job terminates.



SETADMPGM Command

The command SETADMPGM may be used to cause the NEP programs to quit or it may be used to make sure the NEP does not quit.

Set ADM Program (SETADMPGM)

Type choices, press Enter.

```
ADM Program . . . . . █          *MOVER, *EDITOR, *XLATE...
Exit, or no exit . . . . . *NOEXIT *NOEXIT, *EXIT, *NOEXIT...
```

Bottom

F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
F24=More keys

The ADM program is one of the special values selected (you must chose one), *MOVER, *EDITOR, or *XLATE.

The exit value can be *EXIT, which is a signal for the NEP to quit, or the value can be *NOEXIT, which means the NEP will not end.

Before ending the ADMSBS, it is recommended that the NEP jobs in the subsystem be ended in a controlled manner. The command (SETADMPGM) created expressly for the purpose may be used to end the NEP but, you can also cause the NEP to end by setting the *EXIT function with the ADM control maintenance facility.



ADM Control File

One of the key elements in the Automated Data Mover (ADM) system is the control file and control maintenance program.

The file is ADMCTLPF which is a general purpose control file used within the ADM system to direct processes to specific files, control the execution of programs, and provide default code values to programs within the scope of the ADM.

Field map for ADMCTLPF:

Field	Len	T	From	To	Nbr	D	Text
AMPRGM	10	A	1	10			OBJECT - OPERATION
AMFUNC	10	A	11	20			CONTROL FUNCTION
AMDESC	30	A	21	50			CODE DESCRIPTION
AMDATA	128	A	51	178			CONTROL DATA
AMDATE	8	S	179	186	8		Change Date
AMTIME	6	S	187	192	6		Change Time
AMUSER	10	A	193	202			Change User

The keys to the file are the first two fields, AMPRGM and AMFUNC, the object and the function name. This provides more flexibility than hard-coding values within programs and allows the definitions of variable delay times, changeable default values for programs, and even variable process directives—such as where to archive IFS information.



ADM Control Maintenance

Maintenance of the control file is performed through the Work with Control application, ADM030RP. This simple maintenance facility will allow the user to add, change, or delete control entries.

This is designed as a tool for IT personnel as it provides function keys to work with the ADMSBS and manage ADM jobs.

```
QPADEV000M ADM030RP          S100860D  6/18/07
CROYS          980100          Work With Controls  ADM030C2 15:23:36
```

```
Type in option, press enter.      Position to: _____
          2=Edit                    4=Delete                    5=View
```

OP	Object	Function	Description	Value
___	ADMDTAPF	XLATE	FILE TRANSLATE PGM	ADM300RP
___	ADM010CL	ARCHIVE	WEB ORDER ARCHIVE FOLDER	/WEBARCHIVE
___	ADM010CL	DB2FILE	ADM DATA FILE	CROYS ADMDTAPF
___	ADM010CL	DELAY	ADM010CL JOB DELAY SECONDS	060
___	ADM010CL	EXIT	ADM EXIT REQUEST	NOEXIT
___	ADM010CL	IMPORT	WEB ORDER IMPORT FOLDER	/WEBORDERS
___	ADM010CL	ORD	IMPORT FILE TO DATABASE	ADMDTAPF
___	ADM015CL	ARCHIVE	ARCHIVE WEB FOLDER	/WEBARCHIVE
___	ADM015CL	DB2FILE	ADM DATA FILE	CROYS ADMDTAPF
___	ADM015CL	IMPORT	IMPORT WEB ORDERS FOLDER	/WEBORDERS
___	ADM300RP	DFTCAT	DEFAULT SHIPPING CATEGORY	A
___	ADM300RP	DFTTERMS	DEFAULT TERMS CODE	07

More...

```
F3=Exit          F4=ADM Data          F5=Refresh
F6=Add control   F8=Work with ADMSBS F24=More Keys
```

Since the application is operated by IT staff, a function key (F21) is provided to allow the user a command line entry. The command line entry (a call to QUSCMDLN) provides the user with the ability to issue system commands without leaving the program itself.



Along with controls that allow a user to define where web orders are to be archived, and what IFS folder they come from, the maintenance program will also allow a user to set the delay time for the Never Ending Programs (NEP) that manage the data flow through the ADM.

```

QPADEV001D  ADM030RP                S100860D  6/19/07
CROYS      981398                    Work With Controls  ADM030C2  09:07:53

Type .....
: ADM035RP      Change Control Entry ADM010CL  DELAY      ADM03501  :
:                                                    View      :
: Control name.....: ADM010CL                :
OP  Ob : Function.....: DELAY                :
__ ADMD : Description.....: ADM010CL JOB DELAY SECONDS :
__ ADM0 : Data value.....: 060                  :
__ ADM0 :                  :                          :
5  ADM0 :                  :                          :
__ ADM0 :                  :                          :
__ ADM0 :                  :                          :
__ ADM0 : Last updated: CROYS      2007-06-15  8:42:48 :
__ ADM0 :                  :                          :
__ ADM0 : F3=Exit                :                          :
__ ADM0 :                  :                          :
__ ADM3 :                  :                          :
__ ADM3 : .....                  :
                                                    More...

F3=Exit      F4=ADM Data      F5=Refresh
F6=Add control  F8=Work with ADMSBS  F24=More Keys
    
```

Setting the value of the DELAY function to 300 will cause the NEP program to go to sleep for five minutes, the next time it wakes and processes order information. In the example above the delay time is set to 060 (seconds) which means the NEP controlled By ADM010CL (ADM_MOVER) will poll for order information every 60 seconds.

The control maintenance facility can also be used to set the NEP exit functions to EXIT, causing the NEP to quit.



ADM Data Flow



Fig. 2

The ADM data flow is straightforward. Any data source may feed information into the ADM system through the IFS. IFS data is typically ASCII data in a comma, space delimited or fixed record format.

The data is passed into the ADM via the data mover NEP. It is converted to EBCDIC format and stored in DB2/400 files, where it is examined for errors. This is an important step in the process. By translating the data to an intermediate format any errors can be corrected before the data is placed into production files. This insures that production data is “clean” and any subsequent data manipulation is kept to a minimum.



Work with ADM Data

A program, (ADM040RP) has been created to support inquiry and maintenance of the order data within the ADM system. The initial screen is presented in a Common User Access (CUA) orientation with options at the top a list in the middle and functions at the bottom of the display.

```

QPADEV001D ADM040RP                               S100860D  6/19/07
CROYS      981398   Work With Order Transactions    ADM040C2  09:16:13

Options--> 12=Xlate order      2=Edit          4=Delete
           5=View              7=Show error   8=Line items   ...

                YYYYMMDD - YYYYMMDD
S Co   ID      Web ID      Date Entered   Customer   PO Number      Invoice
Op X   ___    _____  _____  _____  _____  _____  _____
___ X 02 14401252 0000000560 2007/05/24 11:20:27 00014767 40081, 40101 00043857
___ X 02 14401310 0000000552 2007/05/24 11:19:55 00018638 516stk      00043858
___ X 02 14402161 0000000558 2007/05/24 11:20:29 00017763 2178       00043859
___ X 01 14402219 0000000550 2007/05/24 11:19:57 00017763 2169       00043860
___ X 02 14403128 0000000548 2007/05/24 11:19:59 00011056 3287A      00043861
___ X 02 14405370 0000000547 2007/05/24 11:20:00 00014767 40013      00043862
___ X 02 14406279 0000000545 2007/05/24 11:20:02 00017989 624-3131Lind 00043863
___ X 02 14407187 0000000543 2007/05/24 11:20:04 00006869 51207rm    00043864
___ X 01 14408096 0000000541 2007/05/24 11:20:06 00017763 2156       00043865
___ X 01 14409005 0000000539 2007/05/24 11:20:08 00008128 051107     00043866
___ X 01 14409913 0000000536 2007/05/24 11:20:10 00011234 jac5/10/07 00043867
___ X 02 14412639 0000000530 2007/05/24 11:20:16 00006576 27307     00043868
                                           More...

F3=Exit          F5=Refresh      F8=Messages
F10=Move web orders F14=Web Orders F24=More Keys
    
```

The input-capable fields at the top of each column function as a filter or sort for the data in the ADM system. For example the Web ID column may be used to position the data list to a web order ID. The list will be positioned closest to the value entered and the list will be sorted by web order ID. If a date entered field is entered, all transactions for that date and greater will be listed and the list will be organized by entry date.

This application also provides function keys to allow the inquiry into the Integrated File System (IFS) for a look at the original, transmitted data via the links for web orders and the web archive folders.



The function to show the web order archive displays the IFS folder where the order data is archived. From this IBM supplied panel, the original order data may be displayed.

Work with Object Links

Directory : /WEBARCHIVE

Type options, press Enter.

2=Edit 3=Copy 4=Remove 5=Display 7=Rename 8=Display attributes
11=Change current directory ...

Opt	Object link	Type	Attribute	Text
█	ORD608.xml	STMF		
—	ORD609.xml	STMF		
—	ORD610.xml	STMF		
—	ORD611.xml	STMF		
—	ORD612.xml	STMF		
—	ORD613.xml	STMF		
—	ORD614.xml	STMF		
—	ORD615.xml	STMF		
—	ORD616.xml	STMF		

More...

Parameters or command

===>

F3=Exit F4=Prompt F5=Refresh F9=Retrieve F12=Cancel F17=Position to
F22=Display entire field F23=More options



This information provides a view of the order information, from inception, that may be compared to customer invoice. Having the original order information can be important when attempting to correct an error in the ADM data.

Browse : /WEBARCHIVE/ORD608.xml

Record : 1 of 89 by 18

Column : 1 59 by 131

Control : _____

....+...1....+...2....+...3....+...4....+...5....+...6....+...7....+...8....+...9....+...0....+...1....+...2....+...3.

*****Beginning of data*****

<?xml version="1.0"?)

<WebOrder>

<OrderHeader>

<customerNum>17482</customerNum>

<salesman>937</salesman>

<shipVia>01</shipVia>

<terms>07</terms>

<ops></ops>

<bulletin></bulletin>

<weborderID>608</weborderID>

<zone>5</zone>

<shipName>FURNITURE DIREC</shipName>

<shipAdd>3501 SPRING FOREST </shipAdd>

<shipCity>RALEIGH </shipCity>

<shipState>NC</shipState>

<shipZip>276162946</shipZip>

<orderCompany>01</orderCompany>

<PO>61207-j</PO>

F3=Exit F10=Display Hex F12=Cancel F15=Services F16=Repeat find F19=Left F20=Right



ADM data maintenance

This application allows the user to view the order line items, the order header information and the ability to correct the order information.

Error tags will be set for any record that the ADM editor discovers in error. It can be simply missing information, or as in the example below, information that is not on file. Order header records in error will be flagged with the status code of 'E'.

```
QPADEV001D ADM040RP                      S100860D  6/19/07
CROYS      981398      Work With Order Transactions  ADM040C2 10:23:37

Options--> 12=Xlate order      2=Edit      4=Delete
           5=View              7=Show error 8=Line items ...
           YYYYYMDD - YYYYYMDD

  S Co   ID      Web ID      Date Entered      Customer  PO Number      Invoice
Op E  _____  _____  _____  _____  _____  _____
7 E 02 16608495 0000000524 2007/06/15 10:29:36 99999900 Test1      00000000
```

```
.....
:   Salesman not on file for company.   :
:                                       :
:                               Press ENTER to continue                               :
:                                       :
:.....................................................................: ottom
F3=Exit      F5=Refresh      F8=Messages
F10=Move web orders F14=Web Orders      F24=More Keys
```



Header maintenance

Fields that may be changed will be underlined and the color will be turquoise. The fields are not edited on entry, but will be edited by the ADM editor when wakes for processing, or the order may be immediately sent to the editor using the option (Check Order) provided on the Work with Order Transaction display.

```
QPADEV001D ADM045RP          S100860D  6/19/07
CROYS          981398          ADM045C2 10:26:30
                                Change

Company.....: 02
Customer.....: 99999900 SMITH
Ship to.....: _____

Customer PO..: Test1
Salesman.....: 215 Salesman not on file
Ship category: A
Ship volume..: -
Ship via.....: 1 COMPANY TRUCK
Terms.....: 7 NET 30
Ship zone....: 5
Ship complete: Y
Commission rt: _____
Freight amt..: 186.00
Item amount..: 1079.85
Order total..: 1265.85

                                Invoice:
                                Origin.: W
                                Error...: ADM0002
                                Created: 2007/06/15
                                10:29:36
                                CROYS

                                Revised: 2007/06/19
                                10:26:10
                                CROYS

                                OPS code.....: _____
                                Bulletin.....: _____

                                F3=Exit          ENTER=Update record F12=Cancel
```



Line Item Maintenance

Line item maintenance is very similar to the header maintenance process. Items in error will be flagged as errors and show a status code of 'E'.

```

QPADEV001D ADM060RP                               S100860D  6/19/07
CROYS      981398                               ADM060C2 10:27:12
Customer...: 99999900      Seats....:
Customer PO: Test1        Cat/zone.: A   05
Order ID...:      524     Vol/via...:   01
Options--> 2=Edit item      4=Delete item      5=Display item
              7=Show error
    
```

| Op | S | Ln | Frame | Dsc | Cover | cl | Cover | cl | Co | Wh | Qty | Price | Freight | Total |
|----|---|----|----------|-----|-------|----|-------|----|----|----|-----|--------|---------|--------|
| __ | P | 01 | 00030002 | | 01976 | 19 | 00000 | 00 | 04 | 00 | 001 | 259.95 | | 259.95 |
| __ | P | 02 | 00003001 | | 01976 | 19 | 00000 | 00 | 04 | 00 | 001 | 409.95 | | 409.95 |
| __ | P | 03 | 00030022 | | 01976 | 19 | 00000 | 00 | 04 | 00 | 001 | 409.95 | | 409.95 |

```

Total.....: 1079.85  186.00  1265.85
Bottom
    
```

F3=Exit

F5=Refresh

F12=Previous



Individual line item entries may be changed with this maintenance program. All input-capable fields will be underlined and appear in the color turquoise.

```
QPADEV001D ADM065RP          S100860D  6/19/07
CROYS          981398          ADM065C2 10:27:29
                                   Change

Company.....: 02
Customer.....: 99999900 SMITH
Customer PO...: Test1
Order Co.....: 02
Billing Co...: 02
Mfg Co.....: 04
Quantity.....: 1
Frame.....: 3001
Cover 1.....: 1976
Color 1.....: 19
Cover 2.....:
Color 2.....:
Express code.: 3281
Unit price...: 409.95
Unit freight.:
Commission rt: .05

Invoice:
Origin.: W
Error...:
Created: 20070615
        102936
        CROYS

Revised: 20070619
        102720
        CROYS
```

F3=Exit

ENTER=Update record F12=Cancel

As with the header information, the data is not edited at entry time but will be automatically edited when the editor NEP runs, or if the option (Check Order) is executed for the individual order.



Appendix A. ADM system objects.

ADM file objects

The following are file objects associated with the ADM system. The files listed below are defined in DDS, with the exception of the raw data file which is a simple flat file with a record length of 500 bytes.

| Member | Type | Text |
|----------|------|---------------------------------------|
| ADMCMTPF | PF | ADM: comments |
| ADMCTLPF | PF | ADM: Automated Data Management |
| ADMDETPF | PF | ADM: Order detail |
| ADMHDRL0 | LF | ADM: Header, select only '*' |
| ADMHDRL1 | LF | ADM: Header, select only 'E' |
| ADMHDRL2 | LF | ADM: Header, select only pending |
| ADMHDRL3 | LF | ADM: Header, select errors only |
| ADMHDRPF | PF | ADM: Order header |
| ADM030DF | DSPF | ADM: Control file maintenance display |
| ADM035DF | DSPF | ADM: maintain control file entry |
| ADM040DA | DSPF | ADM: conversion data list display |
| ADM040DF | DSPF | ADM: conversion data list display |
| ADM040WF | PF | ADM: Filter work file |
| ADM045DF | DSPF | ADM: maintain header file entry |
| ADM060DF | DSPF | ADM: conversion line list display |
| ADM065DF | DSPF | ADM: maintain line item file entry |

*no DDS

| | | | |
|----------|-------|----|--------------------|
| ADMDTAPF | *FILE | PF | ADM: Raw data file |
|----------|-------|----|--------------------|

ADM command objects

| Member | Type | Text |
|-----------|------|----------------------------|
| SETADMPGM | CMD | Set ADM program |
| STRDTAMVR | CMD | Start Automated Data Mover |
| ENDDTAMVR | CMD | End Automated Data Mover |



ADM program objects

The following list of RPG members are associated with the ADM system. Most of the program objects are RPG programs, however there are several modules and objects with embedded SQL.

| Member | Type | Text |
|-----------|----------|-------------------------------------|
| ADM000_PR | RPGLE | ADM: Procedure prototypes |
| ADM005RM | SQLRPGLE | ADM: Service modules |
| ADM005RP | RPGLE | ADM: SP wrapper-find value by key |
| ADM006RP | RPGLE | ADM: SP wrapper-find key by value |
| ADM010RP | RPGLE | ADM: List directory to REXXQ |
| ADM020RP | RPGLE | ADM: Read file list from REXXQ |
| ADM030RM | SQLRPGLE | ADM: Service module for ADMHDRPF |
| ADM030RP | RPGLE | ADM: Work with control file entries |
| ADM035RP | RPGLE | ADM: control entry maintenance |
| ADM040_PR | RPGLE | ADM: Procedure prototypes |
| ADM040RM | SQLRPGLE | ADM: Header sort module |
| ADM040RP | RPGLE | ADM: Work with translated entries |
| ADM041RP | RPGLE | ADM: Format query |
| ADM042RP | RPGLE | ADM: Filter manager |
| ADM045RP | RPGLE | ADM: header file maintenance |
| ADM047RP | RPGLE | ADM: header soft delete |
| ADM050RP | RPGLE | ADM: Random number generator |
| ADM060RP | RPGLE | ADM: list transmitted line items |
| ADM065RP | RPGLE | ADM: item file maintenance |
| ADM100_PR | RPGLE | ADM: Procedure prototypes |
| ADM100RM | RPGLE | ADM: validity checker |
| ADM300RP | RPGLE | ADM: XML parser |
| ADM325RP | RPGLE | ADM: Splitter |
| ADM350RP | RPGLE | ADM: Editor |
| ADM400RP | RPGLE | ADM: Order translator |
| ADM405RP | RPGLE | ADM: Get next invoice number |

The following objects are CL programs are associated with the ADM system. ADM010CL, ADM350CL, and ADM400CL are designed to be used as NEP processes within the system.

| Member | Type | Text |
|----------|------|--|
| ADM010CL | CLP | ADM: data mover |
| ADM015CL | CLP | ADM: data mover II |
| ADM020CL | CLP | ADM: Move data from directory to directory |
| ADM030CL | CLP | ADM: Start data mover CPP |
| ADM040CL | CLP | ADM: start |
| ADM350CL | CLP | ADM: Call data editor |
| ADM400CL | CLP | ADM: Call data translation program |