IBM

Session: 409159
Agenda Key: 41CB

@server **iSeries**

iSeries Access Data Transfer – Tips and Techniques

Brent Nelson - bmnelson@us.ibm.com

iSeries Access Development

ON DEMAND BUSINESS

IBM

@server

Agenda

• Data Transfer Overview
• Data Transfer Usage
    – Basic Data Transfer
    – Running Data Transfer by Clicking an Icon
    – Scheduling Data Transfers
    – Using the Excel Add-in
    – Using Data Transfer with a Web server
    – Using the Data Transfer Query Builder
    – Tips and Tricks with Data Transfer

• Appendix
    – Components of a Data Transfer
    – Administering Access to Data Transfer
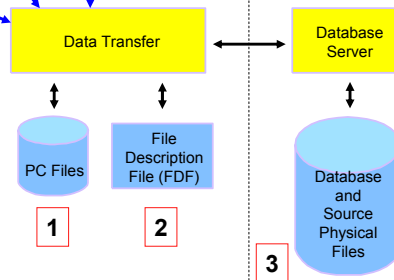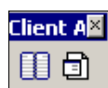   – Data Transfer ActiveX Automation Objects

*e*server

Data Transfer Overview

- Uses the iSeries database server to transfer data to and from DB2 database files and iSeries source physical files
- Provides an SQL-like interface to allow full file SELECT or customized queries including joins, sorting, and record grouping
- Capable of transferring data to and from many popular PC file types including ASCII Text, CSV, Excel types, Tab-Delimited Text, Lotus 123, and others
- Provides access to iSeries file members
- Transfers may be run interactively, in batch mode, programmatically, or directly from Microsoft Excel

ON DEMAND BUSINESS
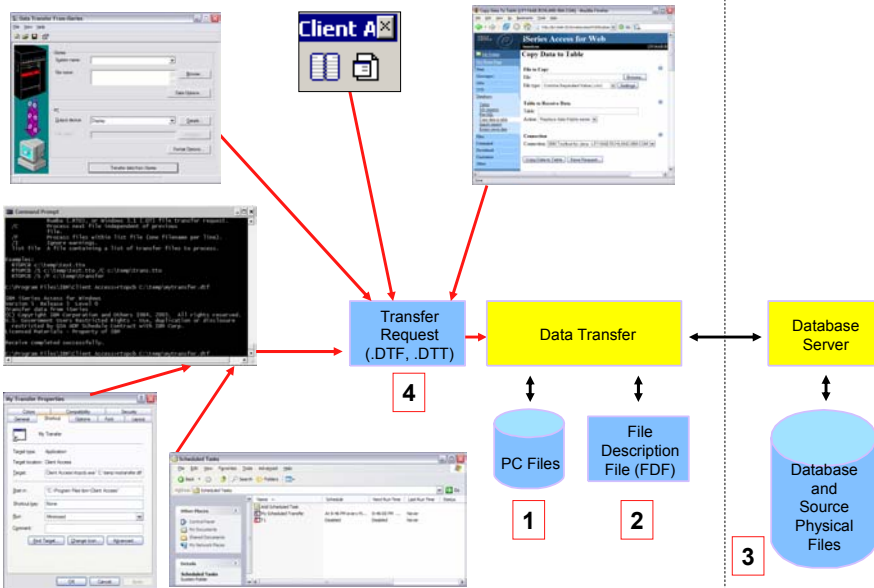

Data Transfer Overview

PC　　　　　　　　　　　　　　　　　　　　　　　　　　　　**iSeries**

Data Transfer	Database Server

| PC Files **1** | File Description File (FDF) **2** | Database and Source Physical Files **3** |

Data Transfer Overview

PC   **iSeries**

The diagram shows the following labeled flow elements:

- **Transfer Request (.DTF, .DTT)** — marked **4**
- **Data Transfer**
- **Database Server**
- **PC Files** — marked **1**
- **File Description File (FDF)** — marked **2**
- **Database and Source Physical Files** — marked **3**

Data Transfer Overview

Data Transfer is limited to transferring source physical files and data physical files to PC file types and PC file types to the source and data physical files on the iSeries. Transferring other types of files to and from a PC and the iSeries requires using other methods. Some other types of files that reside on the iSeries are stream files or flat files such as those stored in the Root or NetWare portions of the iSeries Integrated File System. These files may be accessed using the methods listed below.

- iSeries NetServer through 'shares'
- iSeries Navigator Integrated File System (IFS) support
- File Transfer Protocol (FTP)
- The IBM Toolbox for Java IFS classes
- iSeries Access for Web

IBM

Components of a Data Transfer

Supported transfer request file types

- **Data Transfer From iSeries**
  - .DTF - New request type used in iSeries Access
  - .TTO - Request type used in XD1 and DOS Extended clients
  - .DT - Request type used in Windows 3.1 client
  - .RTO - Rumba transfer request file
- **Data Transfer To iSeries**
  - .DTT - New request type used in iSeries Access
  - .TFR - Request type used in XD1 and DOS Extended clients
  - .DT - Request type used in Windows 3.1 client
  - .RTO - Rumba transfer request file

ON DEMAND BUSINESS

IBM

Data Transfer Usage

- **Basic Data Transfer**
- Running Data Transfer by Clicking an Icon
- Scheduling Data Transfers
- Using the Excel Add-in
- Using Data Transfer with a Web server
- Using the Data Transfer Query Builder
- Tips and Tricks with Data Transfer

ON DEMAND BUSINESS

Basic Data Transfer

Upload file to iSeries

Library: INFO

Table: CUSTOMER

iSeries
ON DEMAND BUSINESS

Basic Data Transfer

Setting up the library list

Optional: To aid us when we are looking for files, we need to add the libraries to the library list.

To set properties go to the File menu and select Properties.

iSeries
ON DEMAND BUSINESS

e. server®

Basic Data Transfer

What is the iSeries Database File Wizard?

- The wizard creates a:
  - File Description File (FDF)
  - Database file on the server
- The wizard does **not** do the actual data transfer to the iSeries

iSeries

ON DEMAND BUSINESS™

---

e. server®

Basic Data Transfer

Starting the iSeries Database File Wizard

Start the Create iSeries Database File tool by selecting it from the Tools menu or by clicking on its icon in the toolbar

iSeries

ON DEMAND BUSINESS™

@server

Basic Data Transfer

Selecting the PC file that contains your data

Create iSeries Database File

PC File Name

What is the name of the PC file which contains your data?

File name:

C:\temp\dtransfer\customer.123   [Browse...]

[< Back] [Next >] [Cancel] [Help]

ON DEMAND BUSINESS

@server

Basic Data Transfer

Selecting the PC File Type

Create iSeries Database File

File Type

What is your PC file type?

File type:

123 (Lotus)   [▼]

[< Back] [Next >] [Cancel] [Help]

ON DEMAND BUSINESS

Basic Data Transfer

The File Description File panel

Create iSeries Database File

Create File Description File

What is the name of the file description file you would like to create?

File name:

C:\temp\dtransfer\customer.FDF   Browse...

< Back   Next >   Cancel   Help

Basic Data Transfer

The Change Data Format Options panel

Create iSeries Database File

Change Data Format Options

To properly create an iSeries database file, the correct format of your data must be provided.

Options such as date format and decimal separator must be set to match your data.

If these options are not changed, default values are used. This could result in data corruption or failure when transferring data to the new database file.

To set the proper format options for your data, press Format Options.

Format Options...

< Back   Next >   Cancel   Help
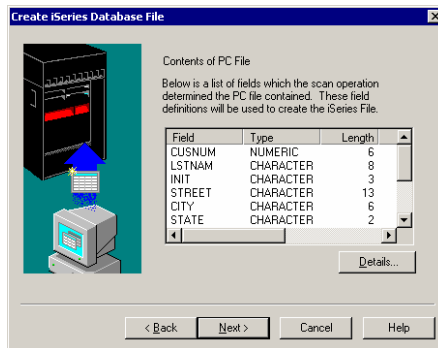
Basic Data Transfer

The Scan PC File panel

Basic Data Transfer

The Contents of PC File panel

IBM

Basic Data Transfer

The Field Details panel

ON DEMAND BUSINESS

IBM

Basic Data Transfer

The System Name panel

ON DEMAND BUSINESS

IBM

@server

Basic Data Transfer

The iSeries File and Library panel

Create iSeries Database File

iSeries File and Library

What is the name of the file which will contain your data? For example, TESTLIB/TESTFILE.

The file you specify must not already exist in the specified library and you must have authority to write to the library.

Library/File:
INFO/CUSTOMER   [Browse...]

[< Back] [Next >] [Cancel] [Help]

© 2005 IBM Corporation

iSeries

PAGE 21

ON DEMAND BUSINESS

IBM

@server

Basic Data Transfer

The File Description Text panel

Create iSeries Database File

File Description Text

You can associate a line of text with the file which describes the contents of the file.

File text:
My customer information

[< Back] [Next >] [Cancel] [Help]

© 2005 IBM Corporation

iSeries

PAGE 22

ON DEMAND BUSINESS

Basic Data Transfer

The Confirm Create Options panel

Basic Data Transfer

The final panel - your file has been created!

@server

Basic Data Transfer

Returning to Data Transfer To iSeries

The PC file we used as a model

The iSeries System we created the file upon

The Library/File name of our new file

Click to transfer data to your new file

Data Transfer To iSeries

File View Tools Help

PC
File name: `C:\temp\dtransfer\customer.123` Browse...

iSeries
System: `MYSYSTEM`

Library/File(Member):
`INFO/CUSTOMER` Browse...
Details...

Transfer data to iSeries

iSeries

ON DEMAND BUSINESS

@server

Basic Data Transfer

Key points about the iSeries Database File Wizard

• Creating the table and FDF does not do the data transfer.
• Plan ahead by increasing lengths if necessary.
• Do not include character and numeric data in the same column.

iSeries

ON DEMAND BUSINESS

Slide 1

@server

Basic Data Transfer

Data Transfer to iSeries: Specifying iSeries File Details

Data Transfer To iSeries

File View Tools Help

PC

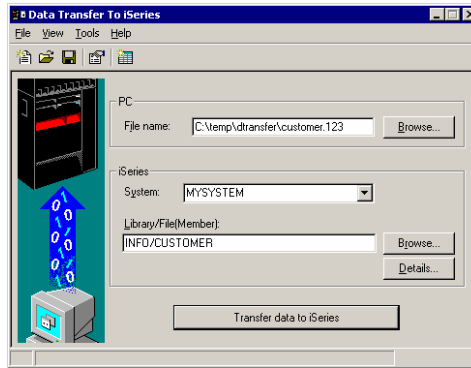File name: C:\temp\dtransfer\customer.123   Browse...

iSeries

System: MYSYSTEM

Library/File(Member):

INFO/CUSTOMER   Browse...

Details...

Transfer data to iSeries

© 2005 IBM Corporation

iSeries   PAGE 27

ON DEMAND BUSINESS

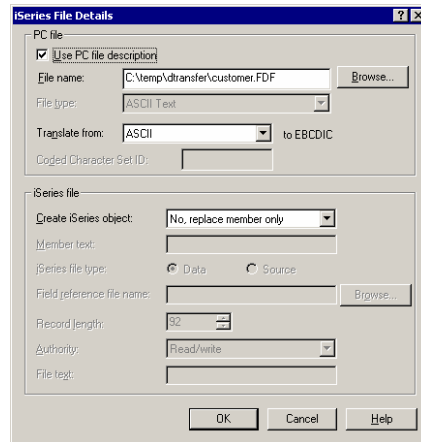
Slide 2

@server

Basic Data Transfer

Data Transfer to iSeries: iSeries File Details - upload options

Source Physical files
- Select not to use an FDF file
- Select the proper file type
- Select the record length, file and member text and authority on create

Data Physical files
- Use a PC FDF file
- Select Field Reference File, file and member text, and authority when creating new files

iSeries File Details

PC file

☑ Use PC file description

File name: C:\temp\dtransfer\customer.FDF   Browse...

File type: ASCII Text

Translate from: ASCII   to EBCDIC

Coded Character Set ID:

iSeries file

Create iSeries object: No, replace member only

Member text:

iSeries file type: ○ Data   ○ Source

Field reference file name: Browse...

Record length: 92

Authority: Read/write

File text:

OK   Cancel   Help

© 2005 IBM Corporation

iSeries   PAGE 28

ON DEMAND BUSINESS
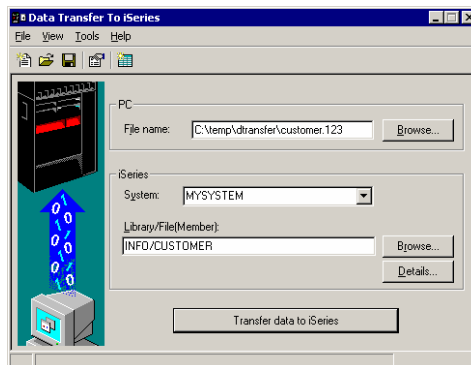
Data Transfer Usage

- Basic Data Transfer
- **Running Data Transfer by Clicking an Icon**
- Scheduling Data Transfers
- Using the Excel Add-in
- Using Data Transfer with a Web server
- Using the Data Transfer Query Builder
- Tips and Tricks with Data Transfer

Running Data Transfer by Clicking an Icon
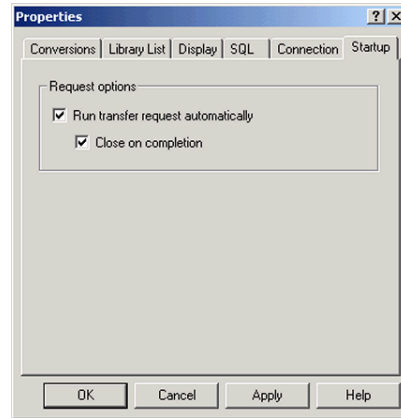
Saving the request

Clicking File->Save As allows you to save the request.
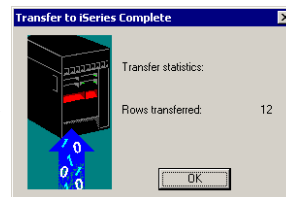
@server

Running Data Transfer by Clicking an Icon

Auto-run/Auto-close support

Clicking File->Properties allows
you to customize properties
related to this data transfer.

Properties

Conversions | Library List | Display | SQL | Connection | Startup

Request options
- ☑ Run transfer request automatically
  - ☑ Close on completion

OK | Cancel | Apply | Help

ON DEMAND BUSINESS

@server

Running Data Transfer by Clicking an Icon

Running by double-clicking the icon

dtransfer

File Edit View Favorites Tools Help

⇐ Back ⇒ 🔁 🔍Search 📁Folders ☁ »

Address C:\temp\dtransfer ▼ ⇕ Go

customer.123   customer.FDF   mycustomers.
dtt

Type: Data Transf 474 bytes 💻 My Computer

Transfer to iSeries Complete

Transfer statistics:

Rows transferred: 12

OK

ON DEMAND BUSINESS

IBM

@server

Running Data Transfer by Clicking an Icon

Batch transfer command interface

- RTOPCB
  - Does batch data transfers from iSeries to PC
- RFROMPCB
  - Does batch data transfers from PC to iSeries
- RXFERPCB
  - Does batch data transfers from iSeries to PC
  - Does batch data transfers from PC to iSeries

© 2005 IBM Corporation

iSeries   PAGE 33

ON DEMAND BUSINESS

IBM

@server

Running Data Transfer by Clicking an Icon

Data Transfer from iSeries: Batch transfer command interface

RTOPCB [/S] [[/I] [filename [/C] [...]] | [[I] /F list file]]

/S	Show transfer statistics.
filename	An iSeries to PC transfer request (.TTO or .DTF), Rumba (.RTO), or Windows 3.1 (.DT) file transfer request.
/C	Process next file independent of previous file.
/I	Ignore warnings.
/F	Process files within list file (one filename per line).
list file	A file containing a list of transfer files to process.

Examples:
  RTOPCB c:\temp\test.tto
  RTOPCB /S c:\temp\test.tto /C c:\temp\trans.dtf
  RTOPCB /S /F c:\temp\transfer.dtf

© 2005 IBM Corporation

iSeries   PAGE 34

ON DEMAND BUSINESS

Running Data Transfer by Clicking an Icon

Data Transfer to iSeries: Batch transfer command interface

RFROMPCB [/S] [[/I] [filename [/C] [...]] | [/I] [/F list file]]

/S	Show transfer statistics.
filename	A PC to iSeries file transfer request (.TFR or .DTT), Rumba (.RTO), or Windows 3.1 (.DT) file transfer request.
/C	Process next file independent of previous file.
/F	Process files within list file (one filename per line).
list file	A file containing a list of transfer files to process.

Examples:
RFROMPCB c:\temp\test.tfr
RFROMPCB /S c:\temp\test.tfr /C c:\temp\trans.dtt
RFROMPCB /S /F c:\temp\transfer.dtt

Running Data Transfer by Clicking an Icon

Data Transfer between iSeries: Batch transfer command interface

RXFERPCB request userID password

request -	Fully qualified file name of any Client Access upload or download request of type .DTF, .DTT, .TTO, or .TFR.
userID -	A valid iSeries user profile for the system specified in the request.
password -	A valid password for the specified user profile.

Examples:
RXFERPCB c:\temp\upload.dtf myuserid mypassword
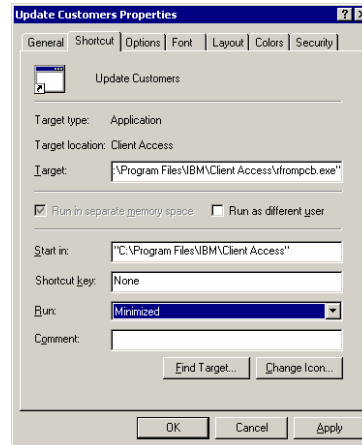RXFERPCB c:\temp\download.dtt myuserid mypassword

Running Data Transfer by Clicking an Icon
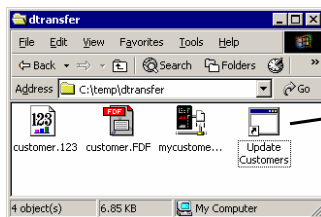
Shortcut to the Data Transfer command line interface

To create a new shortcut:

➡ Right click on an open area of Windows Explorer (or My Computer)
➡ Select New -> Shortcut
➡ Find and select the RXFERPCB, RTOPCB, or RFROMPCB program in the Client Access Folder
➡ Name the shortcut
➡ Right click on the new shortcut and select properties from the menu
➡ Add the full path of the transfer request to run after the command
➡ Select to run minimized

Update Customers Properties ? ✕

General | Shortcut | Options | Font | Layout | Colors | Security |

Update Customers

Target type: Application
Target location: Client Access
Target: :\Program Files\IBM\Client Access\rfrompcb.exe"

☑ Run in separate memory space   ☐ Run as different user

Start in: "C:\Program Files\IBM\Client Access"
Shortcut key: None
Run: Minimized
Comment:

Find Target...   Change Icon...

OK   Cancel   Apply

Running Data Transfer by Clicking an Icon

Running by double-clicking the icon

dtransfer _ □ ✕

File Edit View Favorites Tools Help

⇦ Back ▾ ⇨ ▾ 🔁 | 🔍 Search 🗁 Folders 🕒 | »

Address 🗀 C:\temp\dtransfer   ▾ �🡒 Go

customer.123   customer.FDF   mycustome...   Update Customers

4 object(s)   6.85 KB   🖳 My Computer
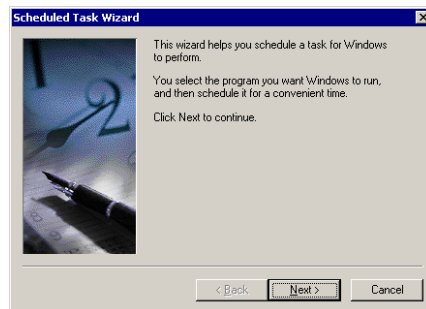
Data is updated.
No prompts!

@.server

Data Transfer Usage

- Basic Data Transfer
- Running Data Transfer by Clicking an Icon
- **Scheduling Data Transfers**
- Using the Excel Add-in
- Using Data Transfer with a Web server
- Using the Data Transfer Query Builder
- Tips and Tricks with Data Transfer

ON DEMAND BUSINESS™

@.server

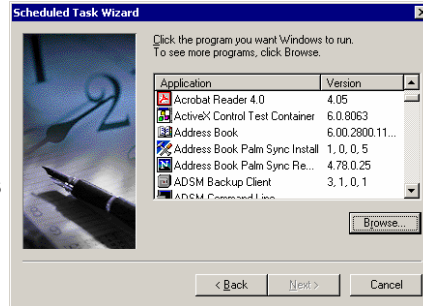# Scheduling Data Transfers

Add a scheduled task

- iSeries Access for Windows does not provide a scheduler program. For this example, we use Microsoft's Task Scheduler application.

- To access Microsoft's Task Scheduler, go to your Control Panel, select Scheduled Tasks, and select Add Scheduled Task.

ON DEMAND BUSINESS™
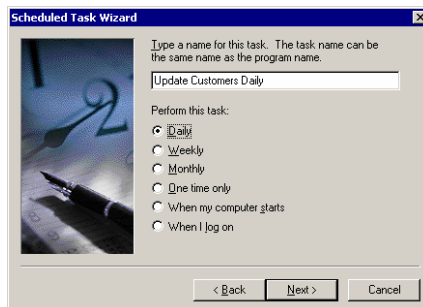
Scheduling Data Transfers

Choose the application to schedule

- Click Browse
- Choose the RXFERPCB.EXE, RTOPCB.EXE or RFROMPCB.EXE program located by default in:

C:\Program Files\IBM\Client Access

ON DEMAND BUSINESS

Scheduling Data Transfers

Choose how often to run the task

ON DEMAND BUSINESS

Scheduling Data Transfers

Viewing scheduled tasks

Data Transfer Usage

- Basic Data Transfer
- Running Data Transfer by Clicking an Icon
- Scheduling Data Transfers
- **Using the Excel Add-in**
- Using Data Transfer with a Web server
- Using the Data Transfer Query Builder
- Tips and Tricks with Data Transfer

Using the Excel Add-in

Data Transfer from iSeries

Library: QIWS

Table: QCUSTCDT

Using the Excel Add-in

What is the Excel Add-in?

• Available with Microsoft Excel 97, Excel 2000, and Excel XP.
• Use this support by:
  – Clicking on the Data Transfer upload or download button on the Excel toolbar
  – Using the options on the Data menu bar

Using the Excel Add-In

Installing the Excel Add-In

- Open Microsoft Excel
- Click Add-Ins from the Tools menu
- Click the Browse... button
- Locate the path in which you installed Client Access
- Double click on the folder named 'Shared'
- Double click on the cwbtfxla file
- Click the OK button

iSeries

ON DEMAND BUSINESS™

Using the Excel Add-In

Data Transfer from iSeries: Transferring data into Excel

- Select Data -> Transfer Data From/To iSeries

      -or-

- Click one of the Data Transfer icons on the toolbar

iSeries

ON DEMAND BUSINESS™

Using the Excel Add-in

Data Transfer from iSeries: The Transfer Request panel

Using the Excel Add-In

Data Transfer from iSeries: Creating a new data transfer request

Using the Excel Add-In

Data Transfer from iSeries: Choose the file to download

Using the Excel Add-In

Data Transfer from iSeries: Customize the Data Transfer request

Using the Excel Add-In

Data Transfer from iSeries: Customizing Data Options

- Customizing Data Options allows you to set options like:
  - what fields are retrieved
  - the ordering of the data
  - only retrieve data based on certain conditions

Change Data Options

Join by:

Group by:

Select: *

Where:

Having:

Order by:

☐ Return records with missing fields
☐ Enable group functions

OK   Cancel   Details...   Help

Using the Excel Add-In

Data Transfer from iSeries: Customizing Format Options

Change Format Options

Date/Time | Decimals | Misc

Date
Date format: [MDY] Month Day Year
Date separator: [/] Slash

Time
Time format: [HMS] Hours Minutes Seconds
Time separator: [:] Colon

OK   Cancel   Apply   He

Change Format Options

Date/Time | Decimals | Misc

☑ Ignore errors

Decimal separator
Decimal separator: [.] Period

OK   Cancel   Apply   Hel

Change Format Options

Date/Time | Decimals | Misc

Sort
Sort sequence: iSeries Default

Table:

Language
Language: iSeries Job Default

Language ID:

OK   Cancel   Apply   Help

Using the Excel Add-In

Data Transfer from iSeries: Customizing run-time options

- Conversions
  - Allows for the enablement of special data conversions and for error logging
- Library List
- Display
- SQL
- Connection
  - Can configure signon and security options
- Startup
  - Can enable option to run transfer request automatically later

ON DEMAND BUSINESS

Using the Excel Add-In

Data Transfer from iSeries: Specify a file name

ON DEMAND BUSINESS

Using the Excel Add-In

Data Transfer from iSeries: Viewing the results

Using the Excel Add-In

Data Transfer to iSeries: Notes

- Support for uploading data added in V5R1
- Support allows the following functions for transferring data to the iSeries:
  - Create new file and member based on iSeries file
  - Create new file and member based on spreadsheet
  - Create new member
  - Replace member
  - Append to existing member

Using the Excel Add-in

Data Transfer to iSeries: Highlighting the data

Data Transfer Usage

- Basic Data Transfer
- Running Data Transfer by Clicking an Icon
- Scheduling Data Transfers
- Using the Excel Add-in
- **Using Data Transfer with a Web server**
- Using the Data Transfer Query Builder
- Tips and Tricks with Data Transfer

Using Data Transfer with a Web server

HTML File support - Updating a web server on iSeries

1 Data Transfer to Workstation →

2 ← Send HTML to iSeries Web Server (file system)

HTML File Generated at PC

3

Client browser views HTML on iSeries Web Server

Client PC

iSeries

ON DEMAND BUSINESS

Using Data Transfer with a Web server

HTML File support - Updating a web server on another machine

1 Data Transfer to Workstation →

HTML File Generated at PC

2 Send HTML to Web server

3 Client browser views HTML on Web Server

AIX or NT Web Server

Client PC

iSeries

ON DEMAND BUSINESS

Using Data Transfer with a Web server

Downloading a file to HTML

iSeries

ON DEMAND BUSINESS™

Using Data Transfer with a Web server

Setting HTML properties

- File
- Document
  - Specify a title and timestamp
- Table
  - Specify spacing, alignment, and other table properties
- Caption
  - Specify whether to add a caption for your table
- Row
- Cell
- Template

iSeries

ON DEMAND BUSINESS™

Using Data Transfer with a Web server

HTML Template support - enhancing web pages

HTML Template allows iSeries tabular
data to be inserted into a pre-
formatted HTML document at a
specified location. The location is
defined by an embedded template
tag.

The template document may contain
graphics, links, frames, and any other
HTML elements you provide.

HTML Details

| File | Document | Table | Caption | Row | Cell | Template |

☑ Use HTML template file

Template file:

`C:\template.html`   Browse...

Embedded template tag:

`<!-- TABLE1 -->`

OK   Cancel   Apply   Help

iSeries

ON DEMAND BUSINESS

Using Data Transfer with a Web server

Using HTML Template Files

<HTML>
<HEAD>
<TITLE>Sample HTML Code</TITLE>
</HEAD>
<BODY>
<H1>Customer Data</H1>
<!-- TABLE1 -->
</BODY>
</HTML>

When the transfer is run, the template file will be used as a base for the new HTML file.
When data is received from the iSeries, the data will be formatted and will inserted in place
of the <!-- TABLE1 --> tag.

iSeries

ON DEMAND BUSINESS

IBM

Using Data Transfer with a Web server

DATALINK data type support

Transferring the DB2 UDB for iSeries DATALINK type to a HTML file will produce active links within your HTML File.

CUSTNAM	ADDRESS	PHONE	WEBSITE
IBM iSeries	Rochester, MN	800-426-3333	http://www.ibm.com/eserver/iseries/index.html
COMMON	Chicago, IL	800-270-8223	http://www.common.org/index.html
…	…	…	…

ON DEMAND BUSINESS

IBM

Using Data Transfer with a Web server

Viewing the results

RCHASD8B - QIWS/QCUSTCDT - Microsoft Internet Explorer

File   Edit   View   Favorites   Tools   Help

Address C:\temp\dtransfer\mydata.htm   Go

CUSNUM	LSTNAM	INIT	STREET	CITY	STATE	ZIPCOD	CDTLMT	CF
938472	Henning	G K	4859 Elm Ave	Dallas	TX	75217	5000	3
839283	Jones	B D	21B NW 135 St	Clay	NY	13041	400	1
392859	Vine	S S	PO Box 79	Broton	VT	5046	700	1
938485	Johnson	J A	3 Alpine Way	Helen	GA	30545	9999	2
397267	Tyron	W E	13 Myrtle Dr	Hector	NY	14841	1000	1

Done   My Computer

ON DEMAND BUSINESS

Using Data Transfer with a Web server

Movement of data

- Data Transfer may be used as an data utility in e-business processes.
    - May be used to upload gathered transactions to the iSeries from a PC server acting as the e-business interface.
    - May be used by CGI programs on the PC Server to build standard PC files which may then be sent to customers through the web.
    - May be used to generate HTML files to be published on a web server.
    - ActiveX objects (or RXFERPCB) may be used in 3-tier to run data transfer from a Windows Web Server.

Data Transfer Usage

- Basic Data Transfer
- Running Data Transfer by Clicking an Icon
- Scheduling Data Transfers
- Using the Excel Add-in
- Using Data Transfer with a Web server
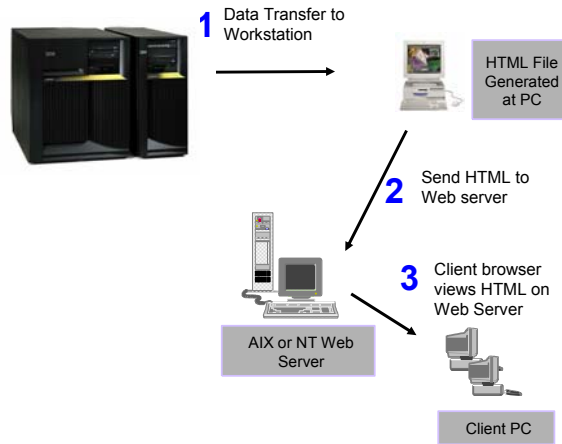- **Using the Data Transfer Query Builder**
- Tips and Tricks with Data Transfer

Using the Data Transfer Query Builder

Starting the Data Transfer query builder

ON DEMAND BUSINESS™

Using the Data Transfer Query Builder

Setting up a query

Enter "SQL-like" statements directly into the edit panels

OR

Click on Details... to bring up the Data Transfer query builder

ON DEMAND BUSINESS™

Slide 1

Using the Data Transfer Query Builder

Select fields to transfer from the iSeries

Double click on field names in the field list to add them to the Select clause.

Functions such as SUM may also be used to return functional results

Receive Request Details

Select | Where | Order By

Select

Field	Description	Type	Length	Digit
CUSNUM	CUSTOME...	ZONED	6	6
LSTNAM	LAST NAM...	CHAR	8	0
INIT	FIRST AND...	CHAR	3	0
STREET	STREET A...	CHAR	13	0
CITY	CITY FIELD	CHAR	6	0
STATE	STATE ABB...	CHAR	2	0

Function:
AVG
COUNT
MAX
MIN
SUM

Select clause:

OK   Cancel   Apply   Help

Slide 2

Using the Data Transfer Query Builder

Creating a where clause

Specify conditions on data transferred from the iSeries by building a where clause.

Double click on a field name or specify a function, then specify a test condition by double clicking on a test operator. Enter the right side of the comparison in the comparison dialog.

Receive Request Details

Select | Where | Order By

Where

Field	Description	Type	Length	Digit
CUSNUM	CUSTOME...	ZONED	6	6
LSTNAM	LAST NAM...	CHAR	8	0
INIT	FIRST AND...	CHAR	3	0
STREET	STREET A...	CHAR	13	0
CITY	CITY FIELD	CHAR	6	0
STATE	STATE ABB...	CHAR	2	0

Not: NOT

Function: CHAR, CURRENT, DATE, DAY, DAYS

Test: <, <=, <>

Others: AND, OR

Where clause:
(LSTNAM = 'Henning')

OK   Cancel   Apply   Help

Using the Data Transfer Query Builder

Ordering data

An Order By clause may be specified to order data transferred from the iSeries.

Fields may be ordered in ascending or descending order by specifying either ASC or DESC after each field name. Currently, on the iSeries, fields used in the order by must also exist in the Select clause.

Receive Request Details

Select | Where | Order By

Order by

Field	Description	Type	Length	Digit
CUSNUM	CUSTOME...	ZONED	6	6
LSTNAM	LAST NAM...	CHAR	8	0
INIT	FIRST AND...	CHAR	3	0
STREET	STREET A...	CHAR	13	0
CITY	CITY FIELD	CHAR	6	0
STATE	STATE ABB...	CHAR	2	0

Function:
AVG
COUNT
MAX
MIN
SUM

Others:
)
ASC
DESC

Order by clause:
CUSNUM DESC

OK | Cancel | Apply | Help

Using the Data Transfer Query Builder

Multi-file joins

When multiple files are specified for download on the main Data Transfer panel, a join clause may be built to conditionally join records across multiple files.

Receive Request Details

Select | Where | Order By | Join By

Join by

Field	Description	Type	Length	Digit
T1.CDTDUE	CREDIT DU...	ZONED	6	6
T2.CUSNUM		LONG	4	9
T2.LSTNAM		CHAR	8	0
T2.INIT		CHAR	3	0
T2.STREET		CHAR	13	0
T2.CITY		CHAR	6	0

Test:
<
<=
<>
=

Others:
AND

Join by clause:
T1.CUSNUM = T2.CUSNUM

OK | Cancel | Apply | Help

Using the Data Transfer Query Builder

Record grouping

If Group By functions are enabled on the Data Options panel, a Group By statement may be specified to group records that are returned.

Using the Data Transfer Query Builder

Conditional grouping using Having

Conditional record grouping from a Group By operation may be done by specifying a Having clause.

e.server®

Using the Data Transfer Query Builder

Activating the Native SQL Interface

A Native SQL interface is provided for power users or for situations where the Data Transfer format does not provide enough functionality

Data Transfer From iSeries

File View Help

iSeries
System n
File name

Properties

Conversions | Library List | Display | SQL | Connection | Startup |

SQL options
- ○ Process SELECT as Data Transfer format
- ● Process SELECT as native SQL

PC
Output d
File name

| OK | Cancel | Apply | Help |

Transfer data from iSeries

ON DEMAND BUSINESS™

---

e.server®

Using the Data Transfer Query Builder

Finding the Native SQL Interface

After choosing to process your statement as Native SQL, the Data Options button activates a Native SQL panel

Data Transfer From iSeries

File View Help

iSeries
System name: MYSYSTEM
File name: QIWS/QCUSTCDT   Browse...
Data Options...

PC
Output device: Display   Details...
File name: Browse...
Format Options...

Transfer data from iSeries

ON DEMAND BUSINESS™

Using the Data Transfer Query Builder

Using the Native SQL Interface

The Native SQL interface allows you to type in a free form SELECT statement. A list of files and columns in those files are provided to help you build your statement

Data Transfer From iSeries

File   View   Help

iSeries
System name
File name:

PC
Output devic
File name:

Change SQL Select Options

SQL Select statement:

SELECT * FROM QIWS/QCUSTCDT

Columns in file(s):

Field	Description	Type	Length
CUSNUM	CUSTOME...	ZONED	6
LSTNAM	LAST NAM...	CHAR	8
INIT	FIRST AND...	CHAR	3
STREET	STREET A...	CHAR	13
CITY	CITY FIELD	CHAR	6

Library/File(Mbr):

QIWS/QCUSTCDT

OK   Cancel   Help

Data Transfer Usage

- Basic Data Transfer
- Running Data Transfer by Clicking an Icon
- Scheduling Data Transfers
- Using the Excel Add-in
- Using Data Transfer with a Web server
- Using the Data Transfer Query Builder
- **Tips and Tricks with Data Transfer**

Tips and Tricks with Data Transfer

- Renaming a column
- Reordering columns
- CAST'ing a column
- Scalar functions
- Working with date/time/timestamp fields

Summary

- Take advantage of all the ways you can use Data Transfer
  - Running requests by clicking an icon
  - Scheduling data transfers
  - Using the Excel Add-in
  - Using with a web server
  - Running advanced queries
  - Using ActiveX Automation Objects

@server

iSeries Access for Windows – Sessions in Chicago

1. **26GH – MS Office with Client Access**
2. **31GJ - Administration of iSeries Access for Windows: Advanced Tips**
3. **31GH - MS Office and Client Access Integration Session 1: Setup and Overview**
4. **32GH – MS Office and Client Access Integration Session 2: Word and Excel**
5. **33GH – MS Office and Client Access Integration Session 3: Access-Web-Sending Data**
6. **36CA - iSeries Access for Windows: What's New in V5R3**
7. **41CB - iSeries Access Data Transfer: Tips and Techniques**
8. **41LC - LAB: MS Office with CA/400**
9. **42CB - iSeries Access for Windows: Security and Communications Tips**
10. **44CA - iSeries Access for Windows in a .NET World**
11. **45LA - OPEN LAB: iSeries Access for Windows with the Experts**
12. **52CB - Everything you wanted to know about PC5250 emulation**
13. **56CB - Performance Tune iSeries Access ODBC Driver**

ON DEMAND BUSINESS

@server

Session title: Using iSeries Access Data Transfer

Session ID: 409159

Agenda Key: 23CI

Speakers: Brent Nelson

ON DEMAND BUSINESS

Appendices

- Components of a Data Transfer Notes
- Administering Access to Data Transfer
- Data Transfer ActiveX Automation Objects

Components of a Data Transfer

- Data Transfers involve 4 basic components
  - PC File
  - An iSeries Database or Source Physical File
  - File Description File (FDF)
  - New or existing transfer request

Components of a Data Transfer

Component I: The PC File

- A PC file is a standard "flat file" located on (or to be created on) your network or workstation.
- Data Transfer supports many popular PC file formats
  - Lotus 1-2-3 (.123) and Lotus 1-2-3 version 4 (.wk4)
  - ASCII Text (.txt)
  - Basic Random and Basic Sequential
  - Microsoft Excel (BIFF) versions 3, 4, 5, 7, and 8 (.xls)
  - Comma Separated Variable (.csv)
  - Data Interchange Format (.dif)
  - DOS Random, including type 2
  - Tab Delimited Text (.txt)
  - No Conversion (EBCDIC)
  - Hypertext Markup Language (.htm, .html)

Components of a Data Transfer: Supported PC File types

Data Transfer supports many popular PC file formats when transferring data to or from the iSeries. However, some rules apply when performing a data transfer, especially uploading data to the iSeries.

Download
  ■ The PC file type to download to must be able to hold the data from the iSeries file. For example, downloading to a BIFF3 (Excel version 3) file limits character fields to 256 characters and only allows 16,385 rows in a spreadsheet.

Upload
  ■ If uploading to an existing iSeries file, the format of the data in the PC file must match the format of the data in the iSeries file.
  ■ If the PC file has column names those names must match the names in the File Description File and the iSeries file.
  ■ The HTML file type is not supported for upload.
  ■ Uploading to a database file (table) requires that you have a File Description File (FDF) to match your PC file.
Uploading to a source physical file with a file type other than ASCII text will only send the first column of data from the PC file. If more than one column exists in the PC file, you will get a message stating that extra data was found at the end of the file and will be truncated.

@server

Components of a Data Transfer

Component II: An iSeries Database or Source Physical File

Transferring data to or from the iSeries requires you to specify either a database table(s) or source physical file. Each of these file types may contain multiple members.

Database File
An iSeries file in the form of a relational table. It has a specific layout composed of various types of columns with various lengths.

Source Physical File
An iSeries file normally contains 3 columns. A SRCSEQ, SRCDAT, and SRCDTA column. The first column is a sequence number. The second column is a date, and the last column contains your data. The first two columns are six bytes each, and the last column may be variable length.

@server

Components of a Data Transfer

Component III: The File Description File (FDF)

A file description file (FDF) is a PC file used to describe a PC data file. A file description file is required when transferring data to a database file on the iSeries.

An example file description file:
PCFDF
PCFT 19
PCFO 1,1,1,1,1
PCFL Name 1 8
PCFL Address 1 13
PCFL Zip 2 6
PCFL Phone 1 8
PCFL Balance 2 8/2

Components of a Data Transfer: File Description File (FDF)

The PC File Description File (FDF) contains various record types.

The first line of an FDF file must contain **PCFDF**. This line indicates that the file is an FDF.

The next line of the file, **PCFT**, indicates the PC file type. File type 19 signifies an FDF for use with the Lotus 123 Version 9 file type. Values for other file types are as follows:

ASCII Text = 1	Dos Random = 2	BasicSequential = 3	Basic Random = 4
DIF = 5	No Conversion = 6	Dos Random = 7	Dos Random Type 2 = 8
BIFF 4 = 9	BIFF3 = 10	BIFF5 = 11	CSV = 12
Lotus WK4 = 13	Tab Delimited Text = 14	BIFF7 = 15	BIFF8 = 16
Lotus 123 = 17	Excel Add-in = 18	Lotus 123 Version 9 = 19	

The **PCFO** line indicates PC file options. These options include date and time formatting and the decimal separator to use.

The **PCFL** lines contain the fields of the PC file. These are in order, top to bottom, listing fields in the PC file. The first column is the field name, for example, Address, the next column is the data type, and the final column is the length. The most common data types are '1' for character and '2' for numeric. The third column may contain two numbers separated by a '/'. This indicates that the field has numeric scale.

ON DEMAND BUSINESS™

Components of a Data Transfer

Component IV: The Transfer request

• What is a transfer request?
  – A transfer request is a PC file created by and used with Data Transfer for storing options and settings for the transferring of data to or from the iSeries.
• Some of the items stored in a transfer request include:
  – iSeries system name
  – iSeries file name(s)
  – PC file name
  – PC File Description File name
  – PC file type

ON DEMAND BUSINESS™

Administering Access to Data Transfer

- Some options include:
  - Microsoft System Policy support
  - Application Administration
  - Exit Programs
  - Object-level database security

ON DEMAND BUSINESS™

Administering Access to Data Transfer

Microsoft System Policies

POLEDIT.EXE

- Data Transfer From iSeries - Limiting downloads
  - Prevent usage of Data Transfer From iSeries
  - Prevent usage of Data Transfer GUI
  - Prevent usage of RTOPCB command
  - Prevent autostart uploads
  - Prevent usage of Excel-Add In
- Limiting users to only autostart downloads will help to prevent them from modifying transfer requests and keep them from downloading any file they have read access to on the iSeries.

Default User Properties

Policies

- IBM iSeries Access Runtime Restrictions
  - Data Transfer
    - Data Transfer Uploads
      - Prevent all Data Transfer to server
      - Data Transfer uploading options
    - Data Transfer Downloads
      - Prevent all Data Transfer from server
      - Data Transfer downloading options
        - Prevent Data Transfer GUI Downloads
        - Prevent usage of RTOPCB
        - Prevent autostart downloads
        - Prevent Excel add-in downloads
      - Server file creation
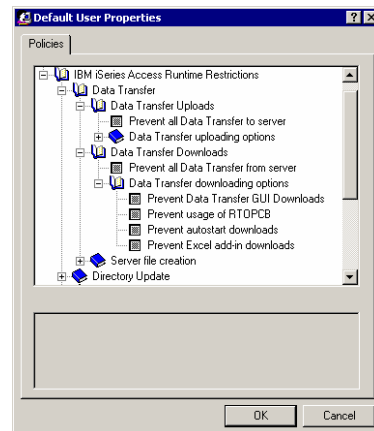 - Directory Update

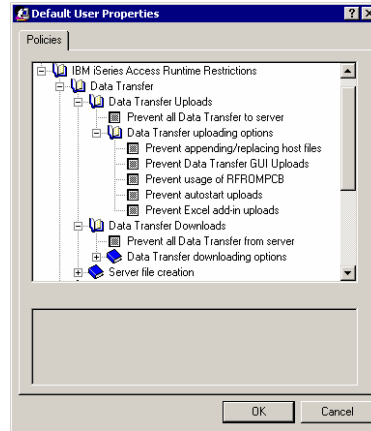OK   Cancel

ON DEMAND BUSINESS™

Administering Access to Data Transfer

Microsoft System Policies

POLEDIT.EXE

- Data Transfer To iSeries - Limiting uploads
  - Prevent usage of Data Transfer To iSeries
  - Prevent appending to/replacing host files
  - Prevent usage of Data Transfer GUI
  - Prevent usage of RFROMPCB command
  - Prevent autostart uploads
- Limiting users to only autostart uploads will help to prevent them from modifying transfer requests and keep them from using Data Transfer in potentially harmful ways.
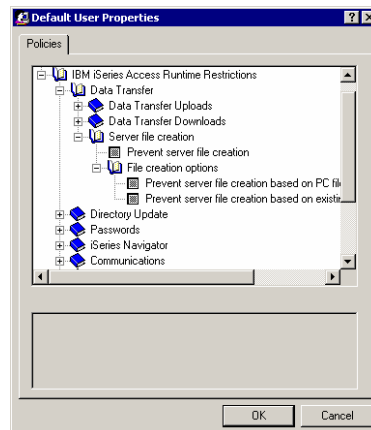
Default User Properties

Policies

- IBM iSeries Access Runtime Restrictions
  - Data Transfer
    - Data Transfer Uploads
      - Prevent all Data Transfer to server
      - Data Transfer uploading options
        - Prevent appending/replacing host files
        - Prevent Data Transfer GUI Uploads
        - Prevent usage of RFROMPCB
        - Prevent autostart uploads
        - Prevent Excel add-in uploads
    - Data Transfer Downloads
      - Prevent all Data Transfer from server
      - Data Transfer downloading options
  - Server file creation

OK   Cancel

Administering Access to Data Transfer

Microsoft System Policies

POLEDIT.EXE

- Data Transfer To iSeries - iSeries server file creation
  - Prevent creation of new files on the iSeries
  - Prevent creation of files via the Data Transfer
    - Create iSeries Database File wizard
  - Prevent creation of files via the standard
- "created based on" or Field Reference File method.

Default User Properties

Policies

- IBM iSeries Access Runtime Restrictions
  - Data Transfer
    - Data Transfer Uploads
    - Data Transfer Downloads
    - Server file creation
      - Prevent server file creation
      - File creation options
        - Prevent server file creation based on PC fil
        - Prevent server file creation based on existir
  - Directory Update
  - Passwords
  - iSeries Navigator
  - Communications

OK   Cancel

Administering Access to Data Transfer

Getting a system setup for policies

1. Get the System Policy Editor from http://www.microsoft.com.
2. Open an MS-DOS window.
3. Go to the iSeries Access for Windows directory, normally located at: [C:]\Program Files\IBM\Client Access\
4. Run the cwbadgen /std command in the MS-DOS window. This generates the caerestr.adm policy template needed to create the policy file.

Note: for more information on policy support see:
http://publib.boulder.ibm.com/iseries/v5r2/ic2924/info/rzaii/rzaiiconfiguration.htm

ON DEMAND BUSINESS™

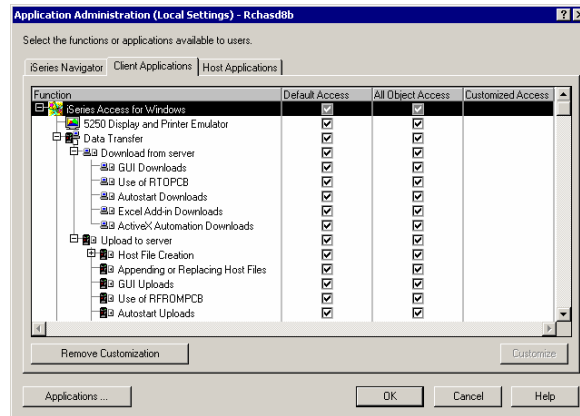# Administering Access to Data Transfer

Getting a system setup for policies

1. Start the policy editor by double-clicking on poledit.exe.
2. Go to Options > Policy Template > Add.
3. Go to the location where you stored the .adm files that you created in creating policy templates.
4. Select the .adm files that you want to add and press Add. Keep doing this until you have added all the .adm files you want to use. Click OK.
5. Select File > New Policy.
6. Set your policies and save the policy file:
   1. \\QYOURSYS\POLICIES\config.pol (for Windows 95/98) -or-
   2. \\QYOURSYS\POLICIES\ntconfig.pol (for Windows NT)
7. Where:
   - QYOURSYS is the name of your iSeries NetServer.
   - POLICIES is the name of the shared file folder on your iSeries NetServer.
   - (nt) config.pol is the name of your policies file.
   - To update the policy file, open your policy file with the policy editor, make your changes and save the file back to the above location.
   - Note: You must create and maintain policies for the Windows 95/98/Me and Windows NT/2000 separately. (Policies created for Windows 95 will not work on an NT system, and vice-versa.)

ON DEMAND BUSINESS™

Administering Access to Data Transfer

iSeries Navigator Application Administration

- To get to Application Administration:
- Open iSeries Navigator
- Click on the system you want to administer
- Go to the File menu and select Application Administration -> Local Settings

---

Administering Access to Data Transfer

iSeries Navigator Application Administration

- Application Administration
  - Provides similar capabilities as Microsoft PC based policies
  - Administration information is stored on the iSeries
  - Data Transfer options are stored on a per user/per iSeries basis
  - Customize user access to Data Transfer functions

Administering Access to Data Transfer

iSeries host server exit programs

- Exit Programs
  - Exit programs written for the QIBM_QZDA NDB, ROI, and SQL exit points may help to restrict certain users from accessing specific files.
  - Configured with WRKREGINF on the iSeries
  - Given the SQL statement sent from the client application (Data Transfer). Statements may be rejected by the user exit program
  - May be written in a variety of host languages

Note: Data Transfer and ODBC use the same server for database access. Currently, exit programs created for Data Transfer are also active for ODBC users.

ON DEMAND BUSINESS™

Administering Access to Data Transfer

Object-level database security

- All objects on the server, including SQL objects, are managed by the system security function

- See:
http://publib.boulder.ibm.com/iseries/v5r2/ic2924/index.htm?info/sqlp/rbafymst324.htm

ON DEMAND BUSINESS™

Data Transfer ActiveX Automation Objects

ActiveX? Automation Objects? So what's this? What can they do for me?

ActiveX Automations are re-usable objects that reside on your
Windows PC. Many times they can be used to run an application by
"remote" with a program or script.

They work similarly to Object Linking and Embedding (OLE), used
for things like inserting an Excel spreadsheet into a WordPad
document. Not just cutting and paste, actually "linking" the
spreadsheet into the document.

ActiveX objects work much like this, except in the programming world.

Data Transfer ActiveX Automation Objects

So what can they do for me?

ActiveX automations can be used to quickly and easily perform many tasks
with little or no user intervention. For example, a program may use the
Automations for Microsoft Excel to perform various data calculations
without ever bringing up the Excel interface.

ActiveX automations can be used to create new custom interfaces
over applications that have ActiveX automations. A few examples are
Microsoft Office products, Internet Explorer, the PC5250 emulator, and
various iSeries Access for Windows functions.

@ server

Data Transfer ActiveX Automation Objects

OK, how do I use them?

• ActiveX automations are supported by many programming languages including:
  – Visual Basic
  – Visual Basic for Applications (used by Microsoft Office)
  – Visual Basic Script (used in web pages and the PC5250 emulator)
  – C++
  – Java
  – Lotus Script
  – Many other applications and development environments
• You must write program code to use these objects. Or allow some development tool to write the code for you.

ON DEMAND BUSINESS

@ server

Data Transfer ActiveX Automation Objects

What Automations are available for Data Transfer?

• Two types of ActiveX Automations for Data Transfer
  – High Level Automations
  – Low Level Automations
• Labeled based on functionality and ease of use

ON DEMAND BUSINESS

Data Transfer ActiveX Automation Objects

High Level Automations

Easier to use, but limited functionality!

With the high level automations you can run a Data Transfer with as little as 2 lines of code!

Data Transfer ActiveX Automation Objects

The High Level Automation Object

The name of this object is **DatabaseTransfer**

The DatabaseTransfer object can be used to run a simple upload, download, or an existing transfer request file!

Data Transfer ActiveX Automation Objects

Using the DatabaseTransfer Object

These two lines of Visual Basic (VB) code can be used to run a download:

Dim dt As New cwbx.DatabaseTransfer
dt.Download "mysys", "qiws/qcustcdt", "c:\myfile.xls", cwbdtBIFF5

To do an upload:

dt.Upload "mysys", "cwbxtest/qcustcdt", "c:\qcustcdt.txt", "c:\qcustcdt.fdf"

To run a saved request:

dt.Transfer "c:\qcustlst.dtf"

Data Transfer ActiveX Automation Objects

Using the DatabaseTransfer Object

The DatabaseTransfer automation object also contains properties
you can query or set for the transfer request.

- **Errors** - for query only. A standard collection of error messages.
  Messages get put into this collection while the request is running
- **Password** - Allows you to set the password for the iSeries connection
  necessary for the transfer
- **TransferResults** - Allow you to get the number of rows transferred,
  return codes, and error and warning locations.
- **UserID** - Allows you to set the user ID to use for this transfer request.

Data Transfer ActiveX Automation Objects

The Low Level Automation Objects

- There are two main Low Level Objects:
  - DatabaseDownloadRequest
  - DatabaseUploadRequest
- Various properties must be set on these objects to perform an upload or download
- Used with other Client Access Express Automation objects.

Data Transfer ActiveX Automation Objects

Using the DatabaseDownloadRequest Object

The DatabaseDownloadRequest object can be used to programmatically perform a download from the iSeries to a PC workstation. It contains 5 additional objects that may be set to perform a download. Each of these objects has various settings.

- **DatabaseAS400File** - Stores the name of the file or files to download.
- **DatabaseDownloadPCFile** - Stores the name of the PC file to download, plus file options.
- **DatabaseQuerySettings** - Query settings for the download.
- **DatabaseFormatOptions** - Data/time format options.
- **DatabaseUserLibraryList** - A list of libraries to use with the request.

*e*server

Data Transfer ActiveX Automation Objects

DatabaseDownloadRequest Object Methods

The DatabaseDownloadRequest object has several methods to perform various tasks:

- **Download** - Run the configured download
- **DownloadAsync** - Runs the configured download asynchronously
- **LoadRequest** - Used to load a stored download request
- **SaveRequest** - Used to save the current request
- **Cancel** - Cancels a running Async request

ON DEMAND BUSINESS™

---

*e*server

Data Transfer ActiveX Automation Objects

A simple Visual Basic program to run a download using the low level DatabaseDownloadRequest object:

```
Dim dlr As New cwbx.DatabaseDownloadRequest
Dim myiSeries As New cwbx.AS400System
myiSeries.Define "mysystem"
myiSeries.UserID = "myUserID"
myiSeries.Password = "myPassword"
Set dlr.System = myiSeries
dlr.AS400File = "qiws/qcustcdt"
dlr.pcFile = "c:\myfile"
dlr.pcFile.FileType = cwbdtBIFF8
dlr.Download
```

ON DEMAND BUSINESS™

Data Transfer ActiveX Automation Objects

Using the DatabaseUploadRequest Object

The DatabaseUploadRequest object can be used to programmatically perform an upload to the iSeries from a PC workstation. It contains 3 additional objects that may be set to perform an upload:

- **DatabaseAS400File** - Stores the name of the file or files to download.
- **DatabaseUploadPCFile** - Stores the name of the PC file to upload, plus file options.
- **DatabaseUserLibraryList** - A list of libraries to use with the request.

Data Transfer ActiveX Automation Objects

DatabaseUploadRequest Object Methods

The DatabaseDownloadRequest object has several methods to perform various tasks:
- **Upload** - Run the configured upload
- **UploadAsync** - Runs the configured upload asynchronously
- **LoadRequest** - Used to load a stored upload request
- **SaveRequest** - Used to save the current upload request
- **Cancel** - Cancels a running Async request

Data Transfer ActiveX Automation Objects

Asynchronous Methods

The DatabaseDownloadRequest and DatabaseUploadRequest objects have asynchronous capabilities. This means the upload or download request can run "In the background" while program execution continues. A running Async request may also be cancelled by the main program.

The **UploadAsync** and **DownloadAsync** methods also pass events back to the running program. These events are:
- **StatusChanged** - Indicates that something has changed, like the request has completed, or there was an error, or a specific number of rows has been transferred.
- **UploadComplete** - Indicates that an upload completed
- **DownloadComplete** - Indicates that a download completed

More information

Additional Information on the iSeries Access for Windows ActiveX automation objects can be found in the iSeries Access for Windows Toolkit.

This information can be found under the ActiveX section of the Database portion of the Toolkit documentation.

IBM

Sample Code Disclaimer

This material contains IBM copyrighted sample programming source code for your consideration. This sample code has not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function. IBM provides no program services for this material. This material is provided "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO THE ABOVE EXCLUSIONS MAY NOT APPLY TO YOU. IN NO EVENT WILL IBM BE LIABLE TO ANY PARTY FOR ANY DIRECT, INDIRECT, SPECIAL OR OTHER CONSEQUENTIAL DAMAGES FOR ANY USE OF THIS MATERIAL INCLUDING, WITHOUT LIMITATION, ANY LOST PROFITS, BUSINESS INTERRUPTION, LOSS OF PROGRAMS OR OTHER DATA ON YOUR INFORMATION HANDLING SYSTEM OR OTHERWISE, EVEN IF EXPRESSLY ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

iSeries

ON DEMAND BUSINESS™

IBM

Trademarks and Disclaimers

References in this document to IBM products or services do not imply that IBM intends to make them available in every country.

The following terms are trademarks of International Business Machines Corporation in the United States, other countries, or both:

AS/400	e-business on demand	OS/400
AS/400e	IBM	i5/OS
eServer	IBM (logo)	
@server	iSeries	

Rational is a trademark of International Business Machines Corporation and Rational Software Corporation in the United States, other countries, or both.
Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.
Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.
Intel, Intel Inside (logos), MMX and Pentium are trademarks of Intel Corporation in the United States, other countries, or both.
UNIX is a registered trademark of The Open Group in the United States and other countries.
SET and the SET Logo are trademarks owned by SET Secure Electronic Transaction LLC.
Other company, product or service names may be trademarks or service marks of others.

Information is provided "AS IS" without warranty of any kind.

All customer examples described are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics may vary by customer.

Information concerning non-IBM products was obtained from a supplier of these products, published announcement material, or other publicly available sources and does not constitute an endorsement of such products by IBM. Sources for non-IBM list prices and performance numbers are taken from publicly available information, including vendor announcements and vendor worldwide homepages. IBM has not tested these products and cannot confirm the accuracy of performance, capability, or any other claims related to non-IBM products. Questions on the capability of non-IBM products should be addressed to the supplier of those products.

All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only. Contact your local IBM office or IBM authorized reseller for the full text of the specific Statement of Direction.

Some information addresses anticipated future capabilities. Such information is not intended as a definitive statement of a commitment to specific levels of performance, function or delivery schedules with respect to any future products. Such commitments are only made in IBM product announcements. The information is presented here to communicate IBM's current investment and development activities as a good faith effort to help with our customers' future planning.

Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput or performance improvements equivalent to the ratios stated here.

Photographs shown are of engineering prototypes. Changes may be incorporated in production models.

iSeries

ON DEMAND BUSINESS™