IBM System i™

Session: 409159
Agenda Key: 54CB

System i Access for Windows: Data Transfer Tips and Techniques

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System i Access Development

i want stress-free IT.
i want control.
i want an i.

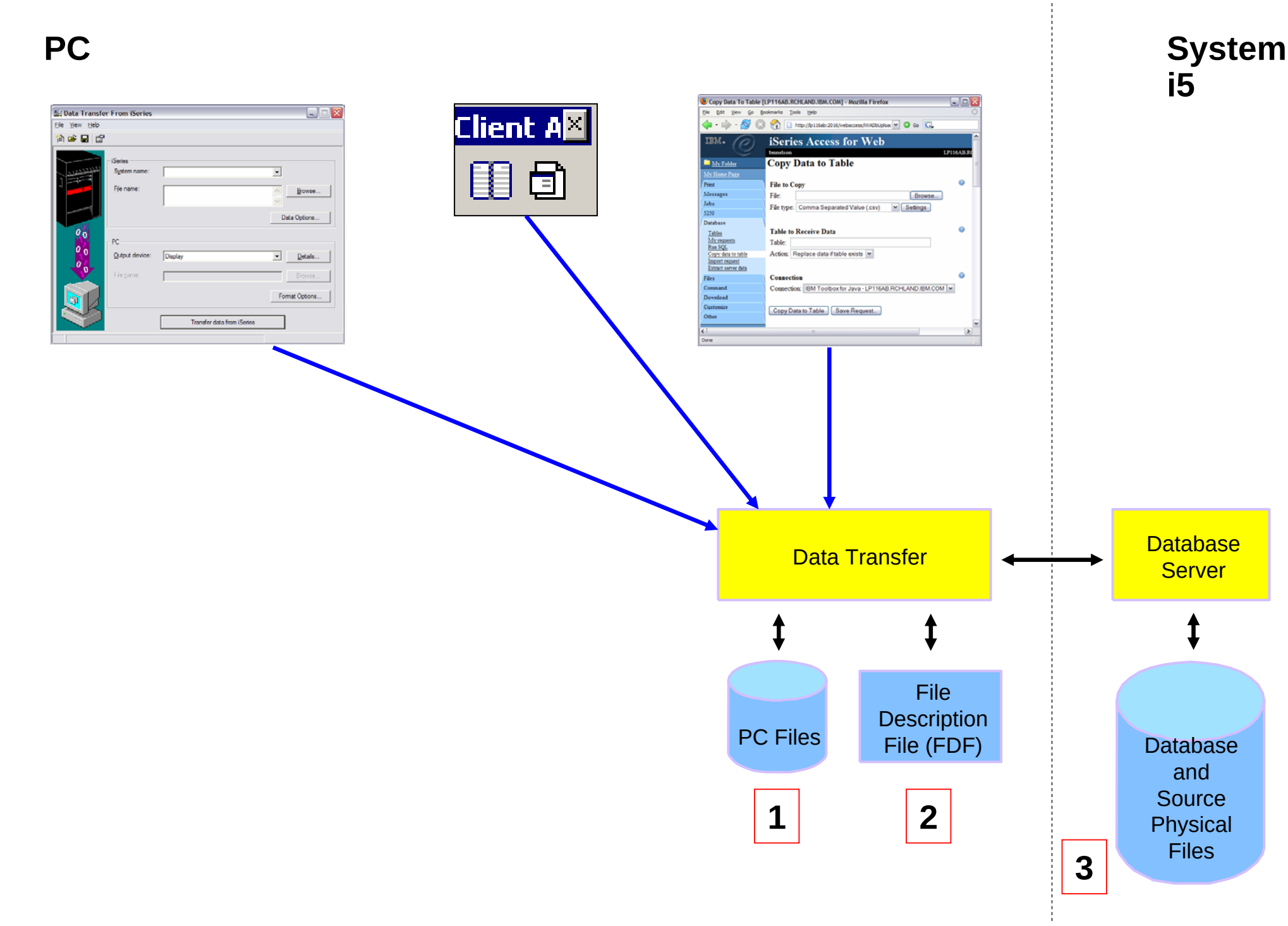
Agenda

- 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

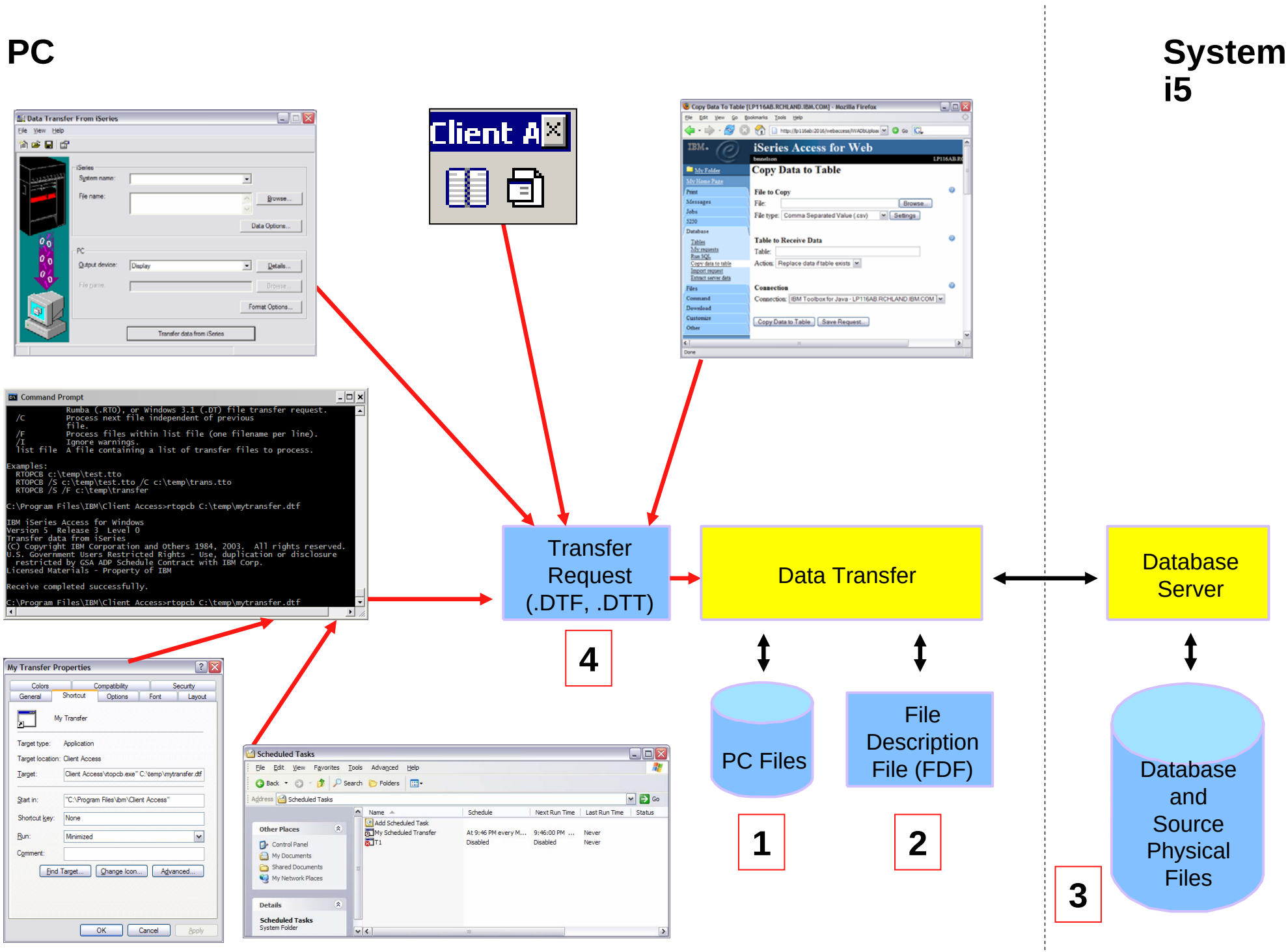
Data Transfer Overview

- Uses the System i5 database server to transfer data to and from DB2 database files and System i5 source physical files
- Provides 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
- Provides access to System i5 file members
- Transfers may be run
  - Interactively
  - In batch mode
  - Programmatically
  - Directly from Microsoft Excel

Data Transfer Overview



Data Transfer Overview



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 System i5. Transferring other types of files to and from a PC and the System i5 requires using other methods. Some other types of files that reside on the System i5 are stream files or flat files such as those stored in the Root or NetWare portions of the System i5 Integrated File System. These files may be accessed using the methods listed below.

- System i5 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

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

Data Transfer Usage

- **Basic Data Transfer**
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Basic Data Transfer

Upload file to System i5

Lotus SMARTSuite 1-2-3 - [C:\temp\dtransfer\customer.123]

File Edit View Create Range Sheet Query Window Help

A:A8

	A	B	C	D	E	F	G	H	I	J	K
1	CUSNUM	LSTNAM	INIT	STREET	CITY	STATE	ZIPCOD	CDTLMT	CHGCOD	BALDUE	CDTDUE
2	938472	Henning	G K	4859 Elm Av	Dallas	TX	75217	5000	3	37	0
3	839283	Jones	B D	21B NW 135	Clay	NY	13041	400	1	100	0
4	392859	Vine	S S	PO Box 79	Broton	VT	5046	700	1	439	0
5	938485	Johnson	J A	3 Alpine Wa	Helen	GA	30545	9999	2	3987.5	33.5
6	397267	Tyron	W E	13 Myrtle Dr	Hector	NY	14841	1000	1	0	0
7	389572	Stevens	K L	208 Snow P	Denver	CO	80226	400	1	58.75	1.5
8		Alison	J S	787 Lake Dr	Isle		56342	5000	3	10	0
9	475938	Doe	J W	59 Archer R	Sutter	CA	95685	700	2	250	100
10	693829	Thomas	A N	3 Dove Circ	Casper	WY	82609	9999	2	0	0
11	593029	Williams	E D	485 SE 2 Av	Dallas	TX	75218	200	1	25	0
12	192837	bbb	F L	5963 Oak St	Hector	NY	14841	700	2	489.5	0.5
13	583990	ccc	M T	392 Mill St	Isle	MN	56342	9999	3	500	0
14											

Arial 12 B I U No style General Ready

Library: INFO

Table: CUSTOMER

Basic Data Transfer

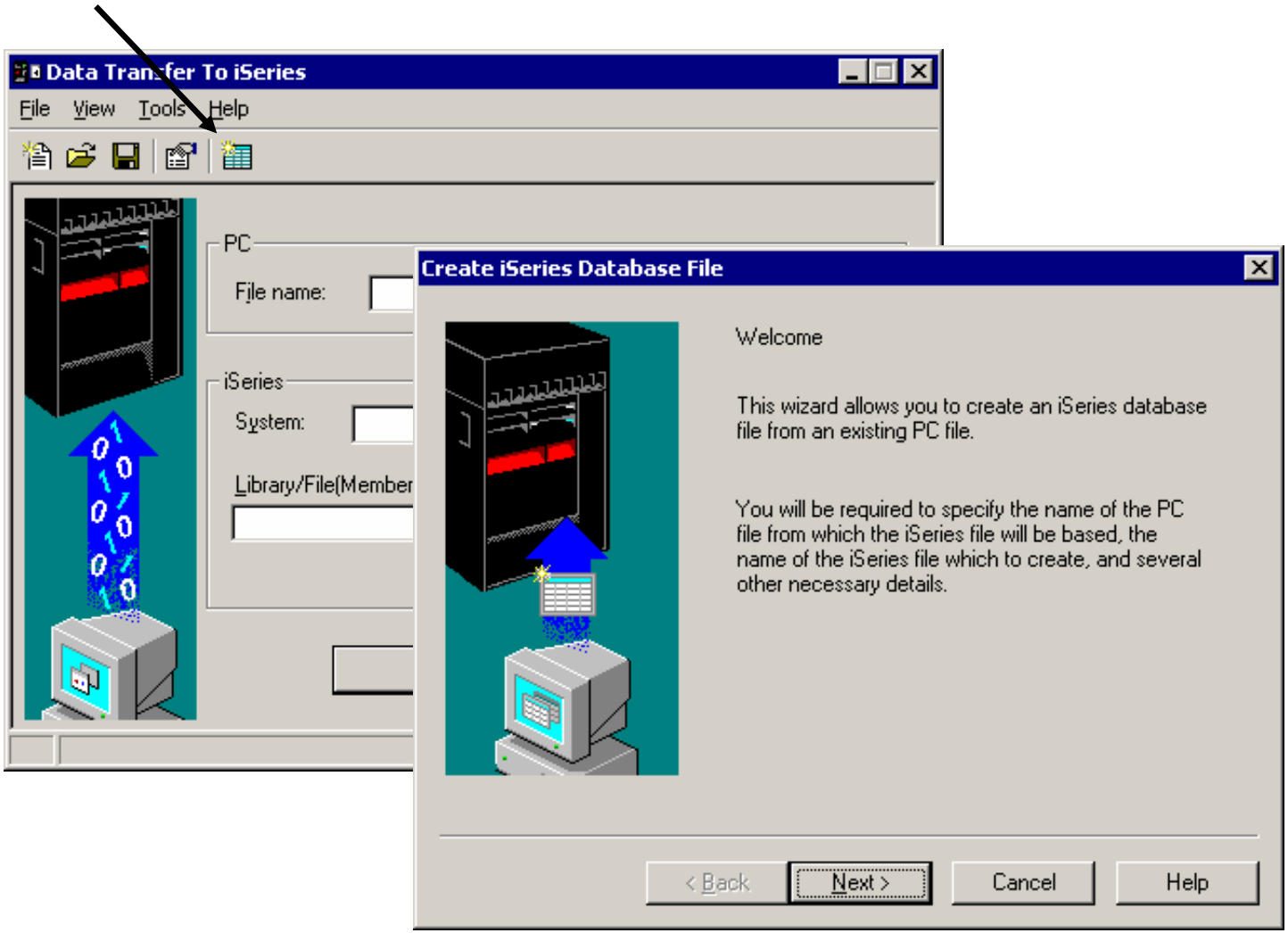
What is the iSeries Database File Wizard?

- The wizard creates a:
  - File Description File (FDF)
  - Database file on the server
- The wizard does not do the actual data transfer to the System i5

Basic Data Transfer

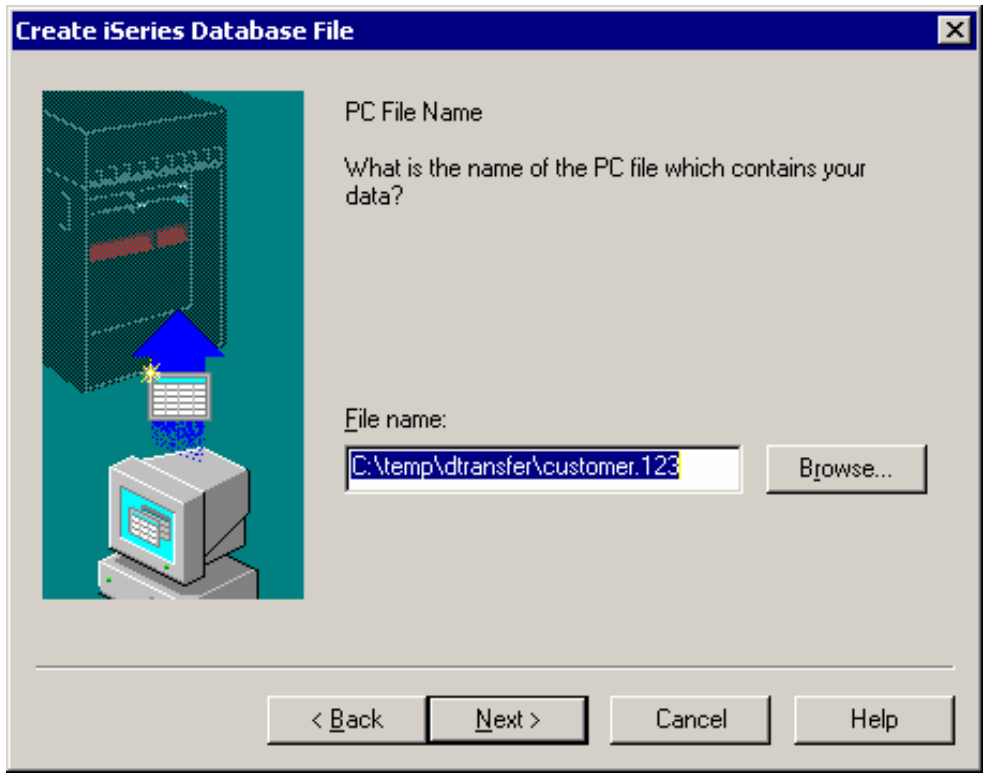
Starting the iSeries Database File Wizard

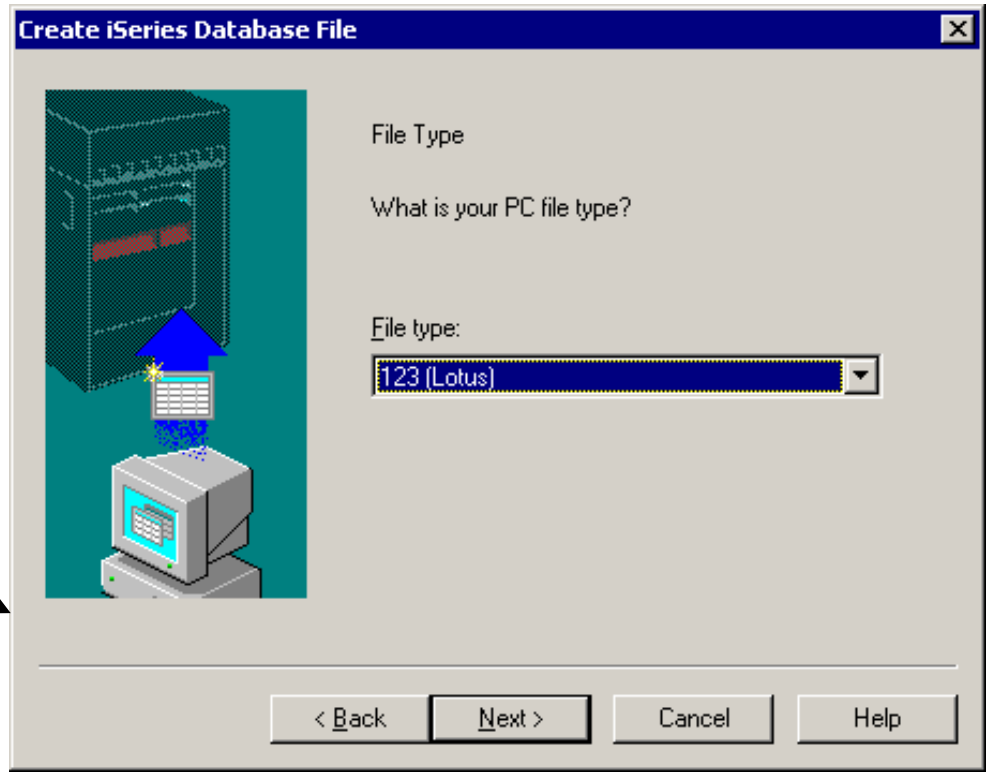
Start the Create iSeries Database File tool by selecting it from the Tools menu or by clicking on its icon in the toolbar



Basic Data Transfer

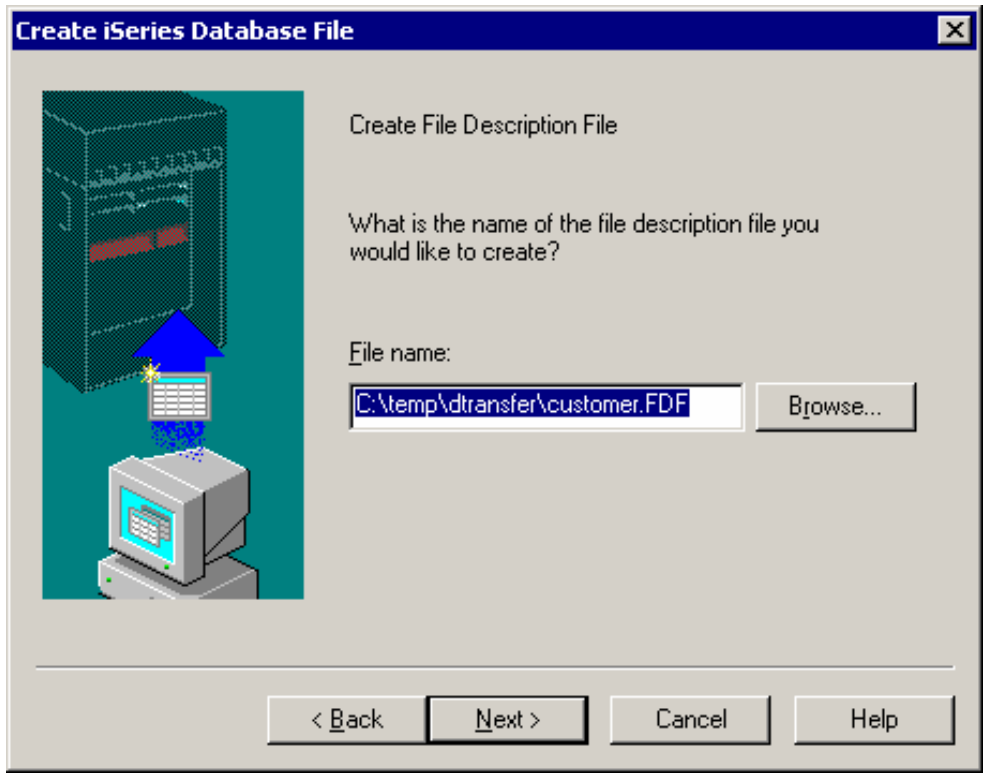
Selecting the PC File and the File Type

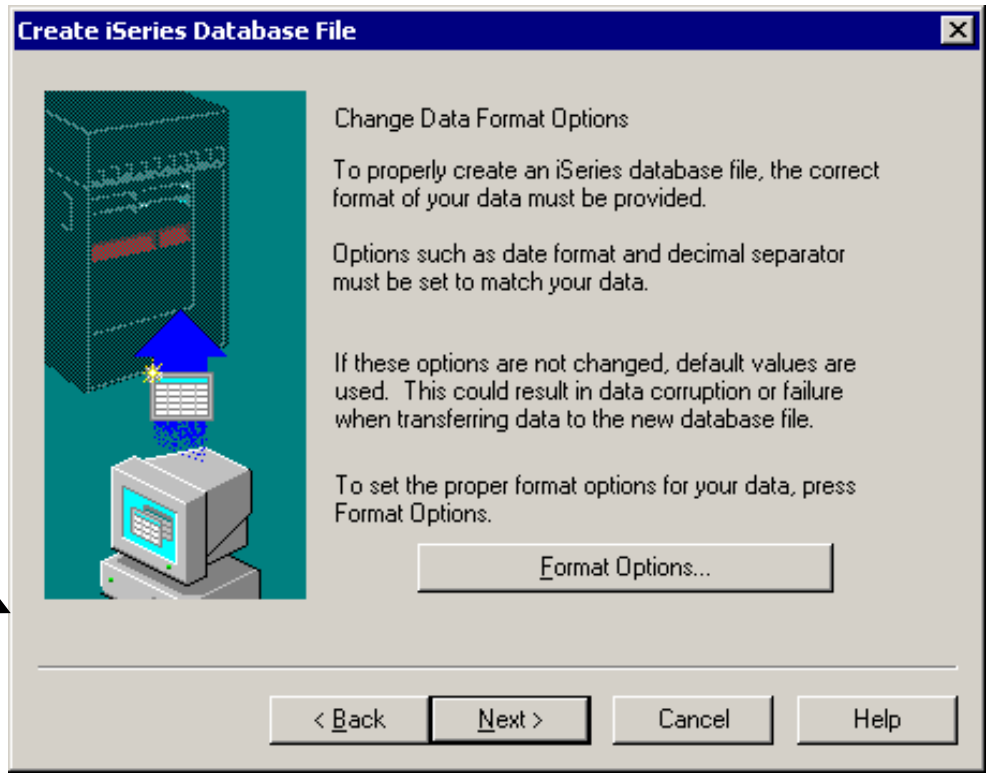




Basic Data Transfer

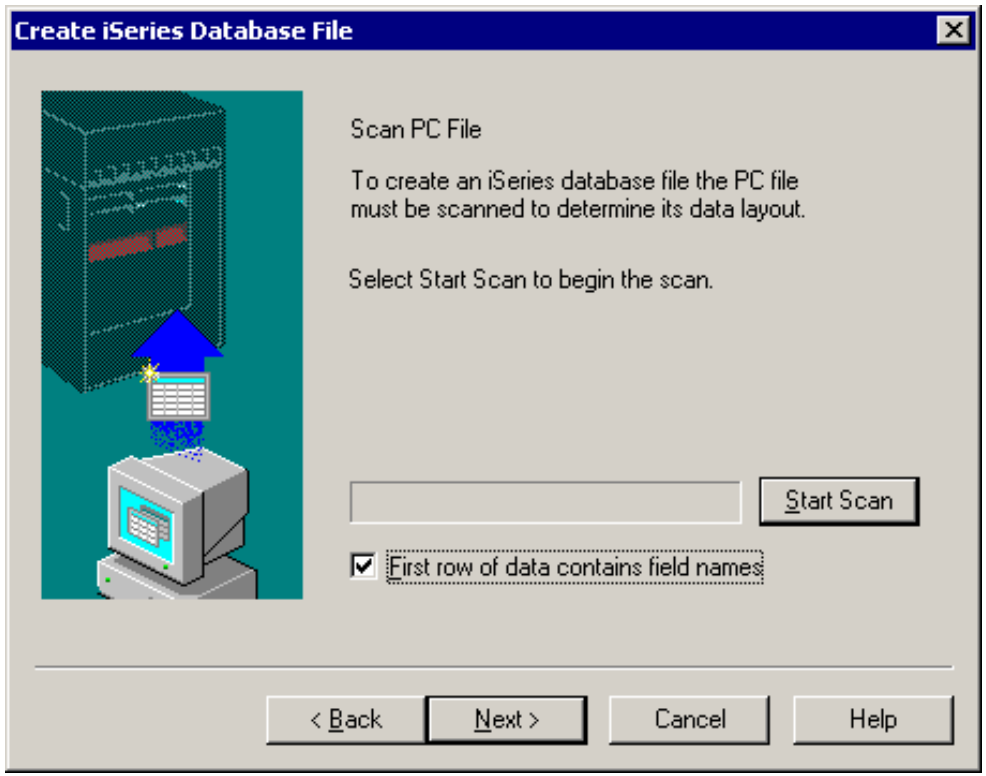
The File Description File and Create iSeries Database File panels

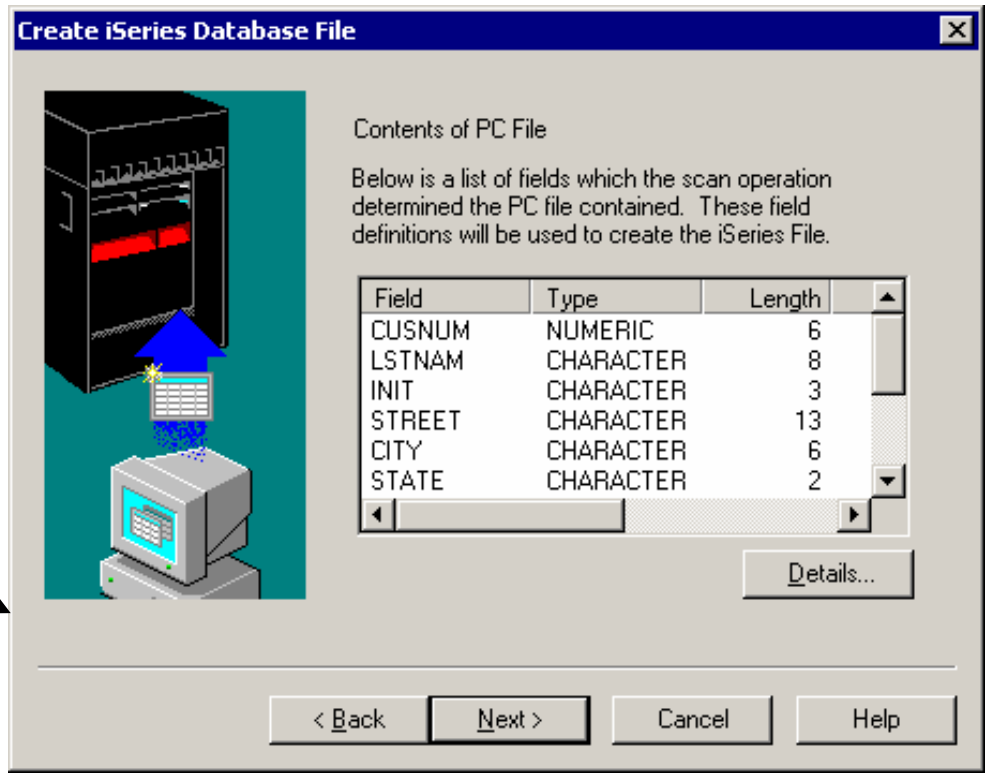




Basic Data Transfer

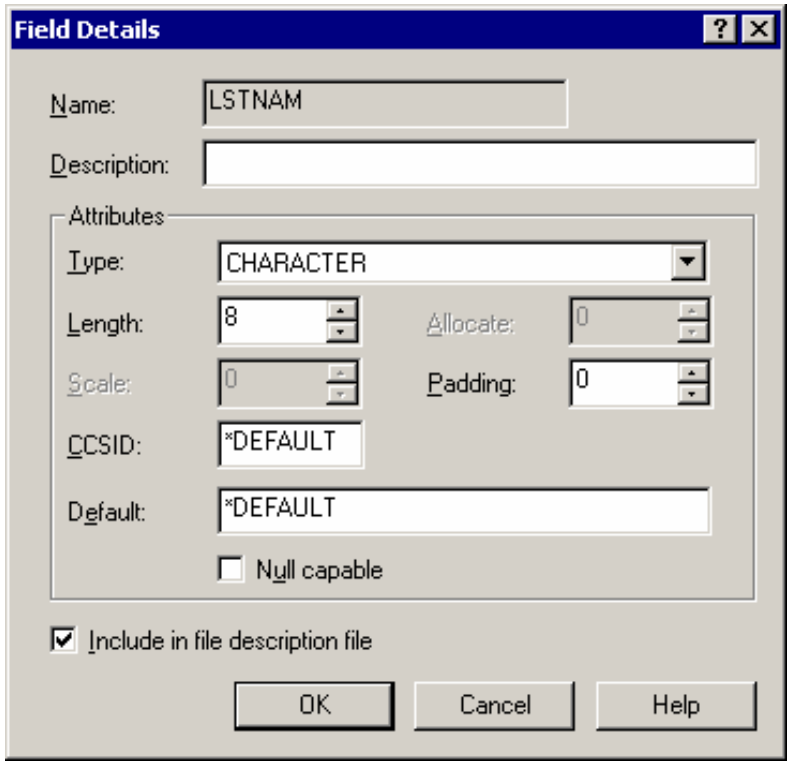
The Scan PC File panel





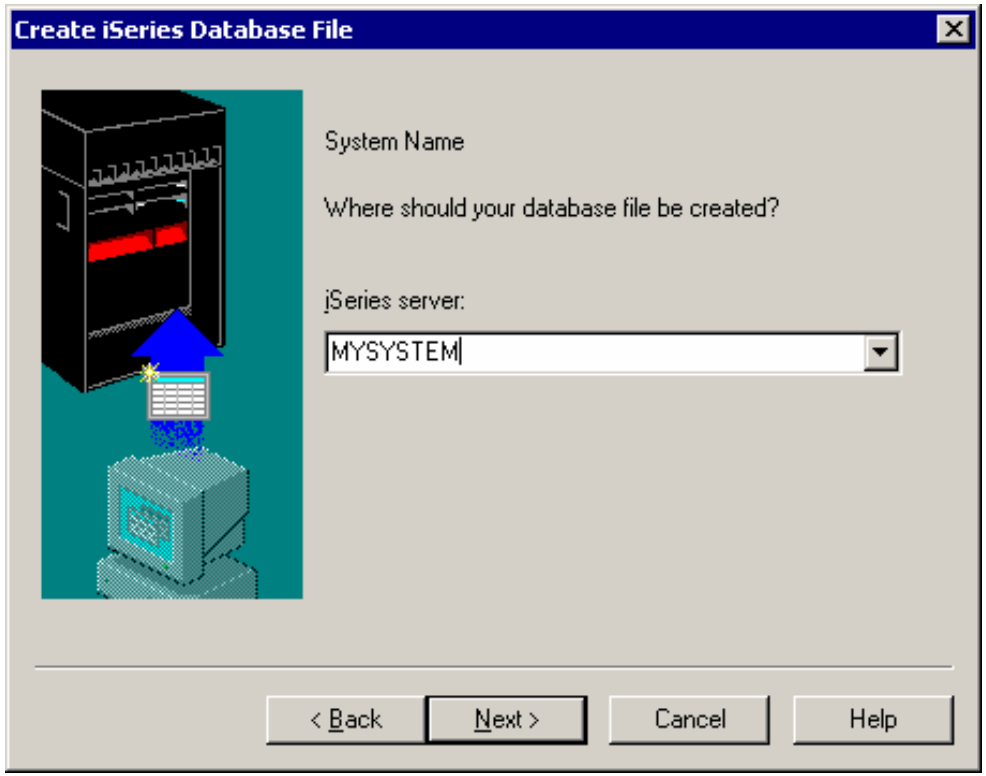
Basic Data Transfer

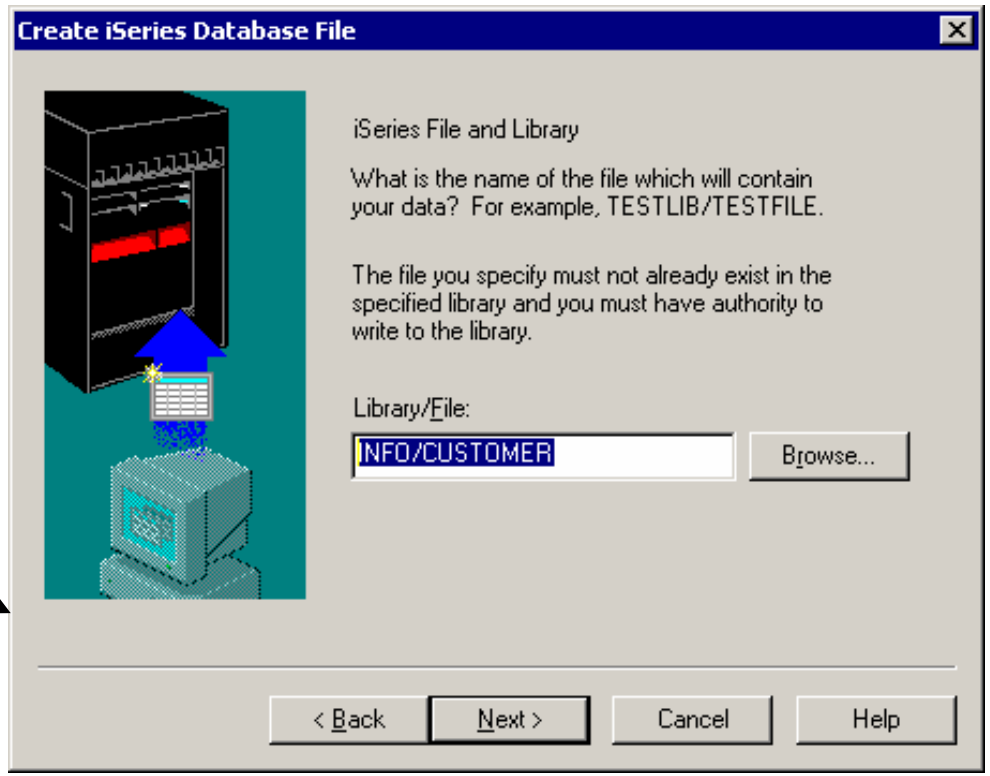
The Field Details panel



Basic Data Transfer

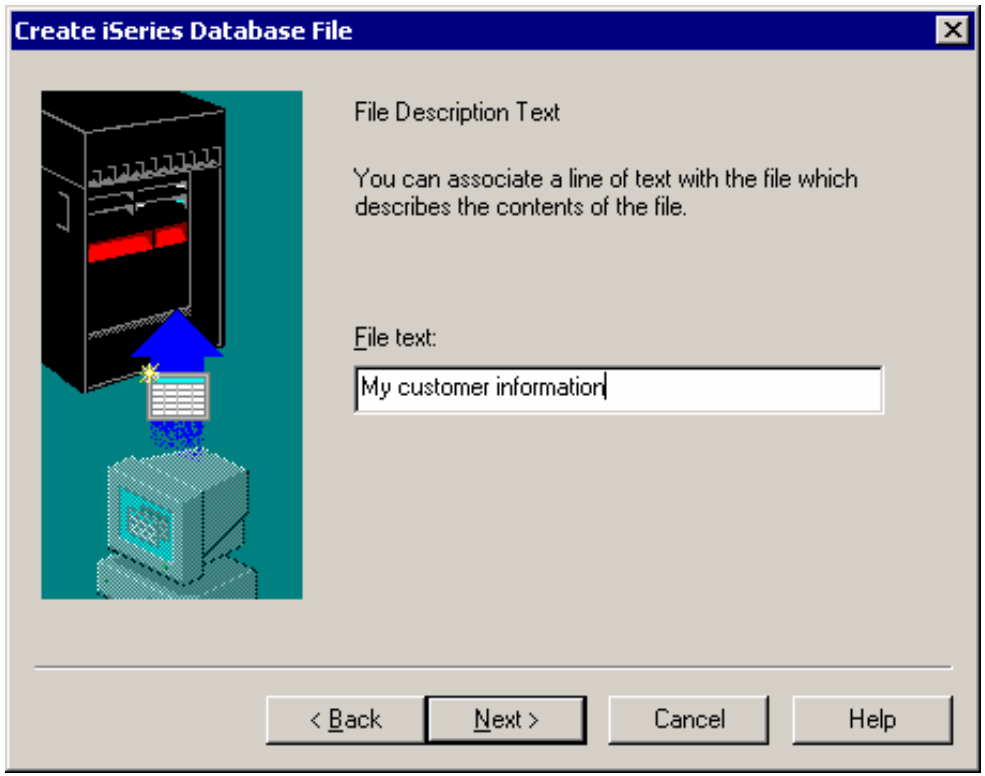
The System Name panel

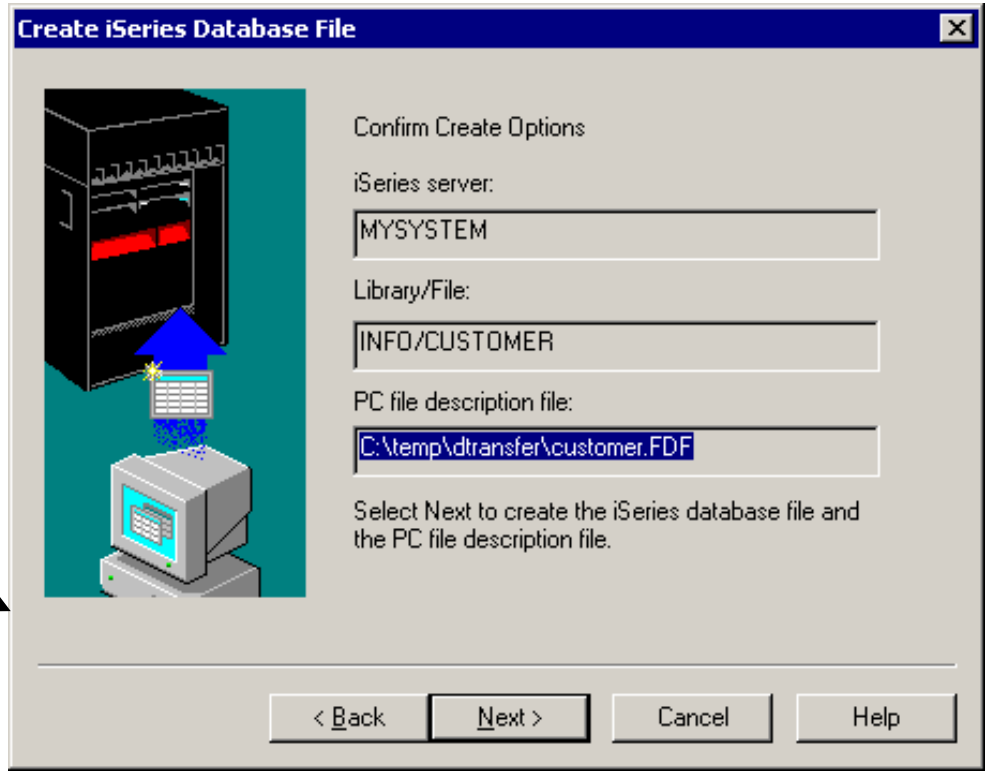




Basic Data Transfer

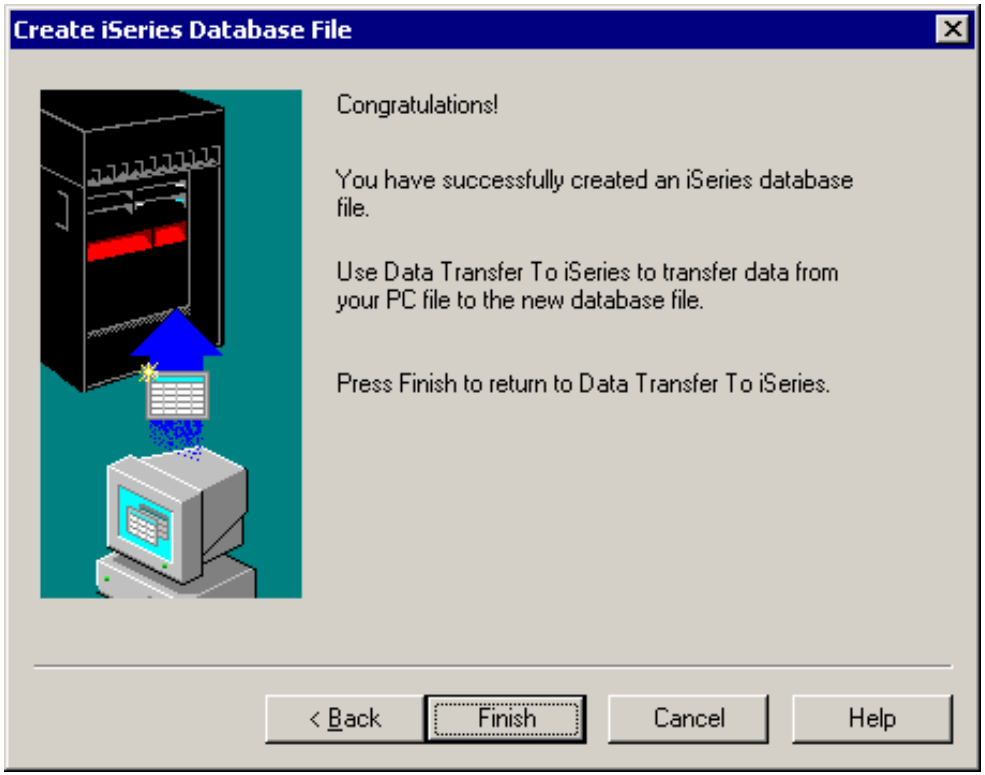
The File Description Text panel





Basic Data Transfer

The final panel - your file has been created!



Basic Data Transfer

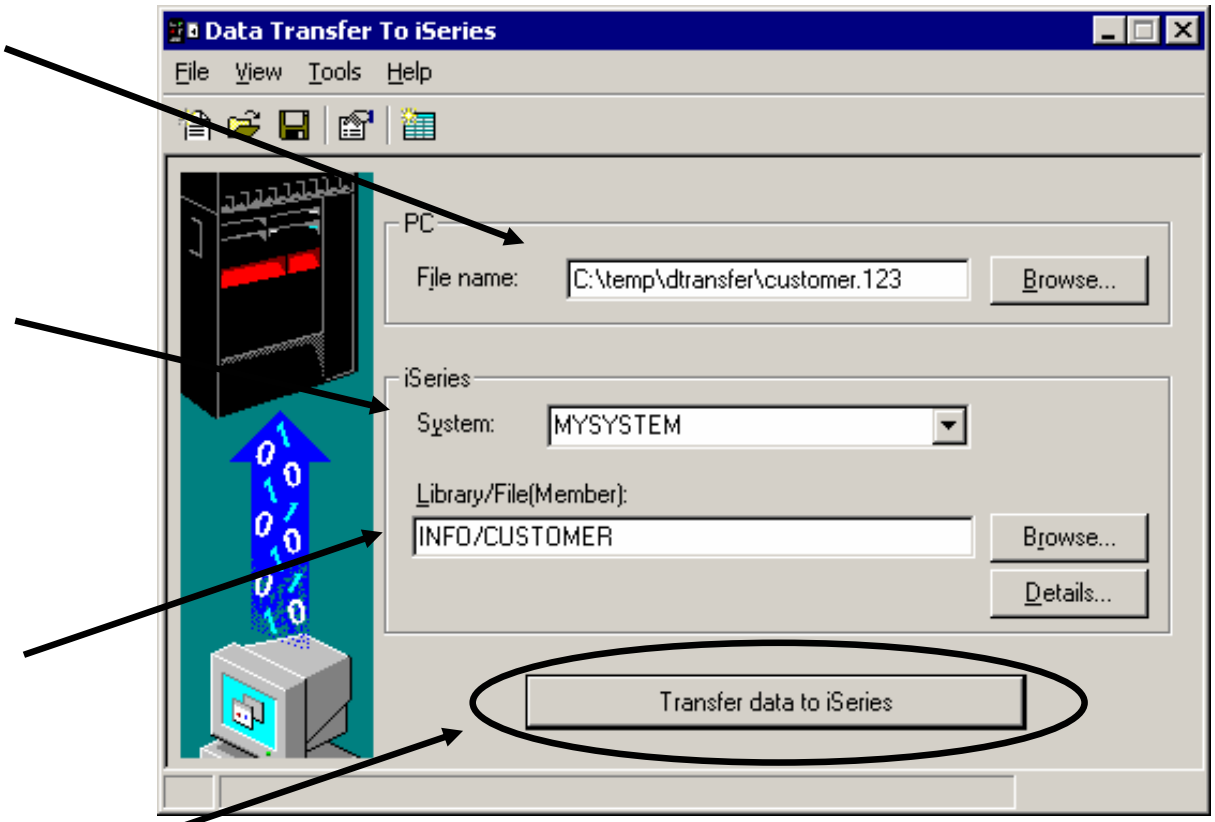
Returning to Data Transfer To iSeries

The PC file we used as a model

The system we created the file upon

The Library/File name of our new file

Click to transfer data to your new file



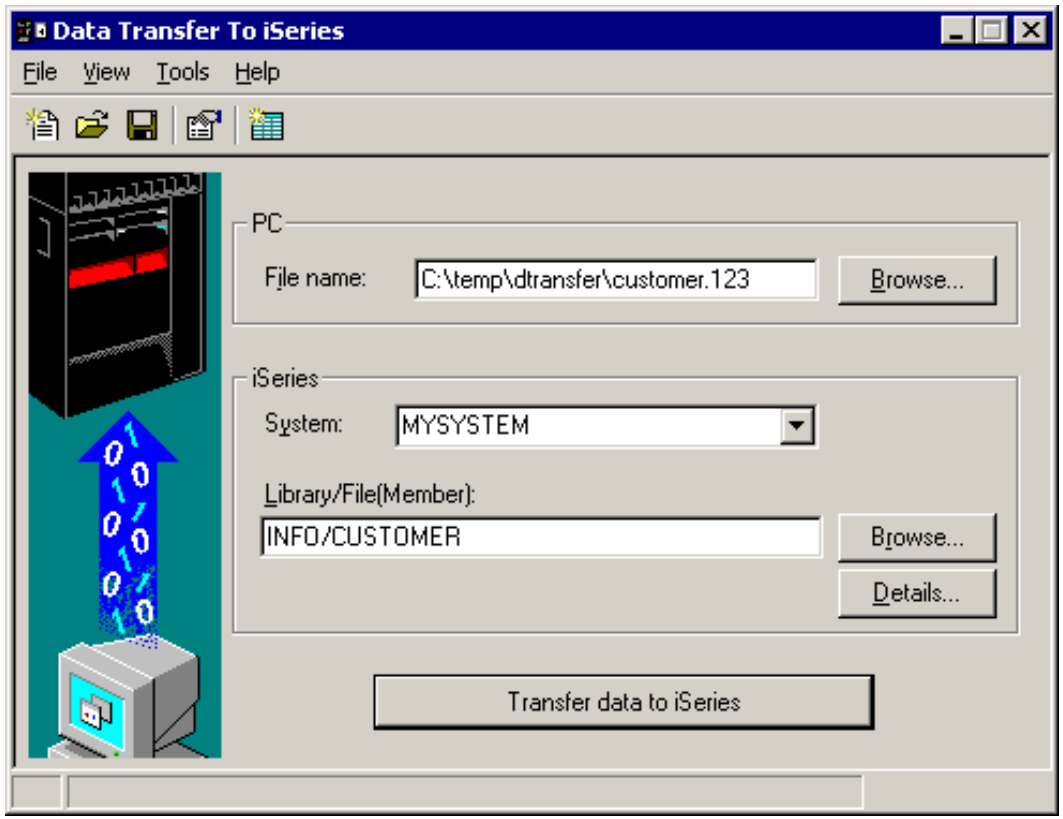
Basic Data Transfer

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

Basic Data Transfer

Data Transfer to iSeries: Specifying iSeries File Details

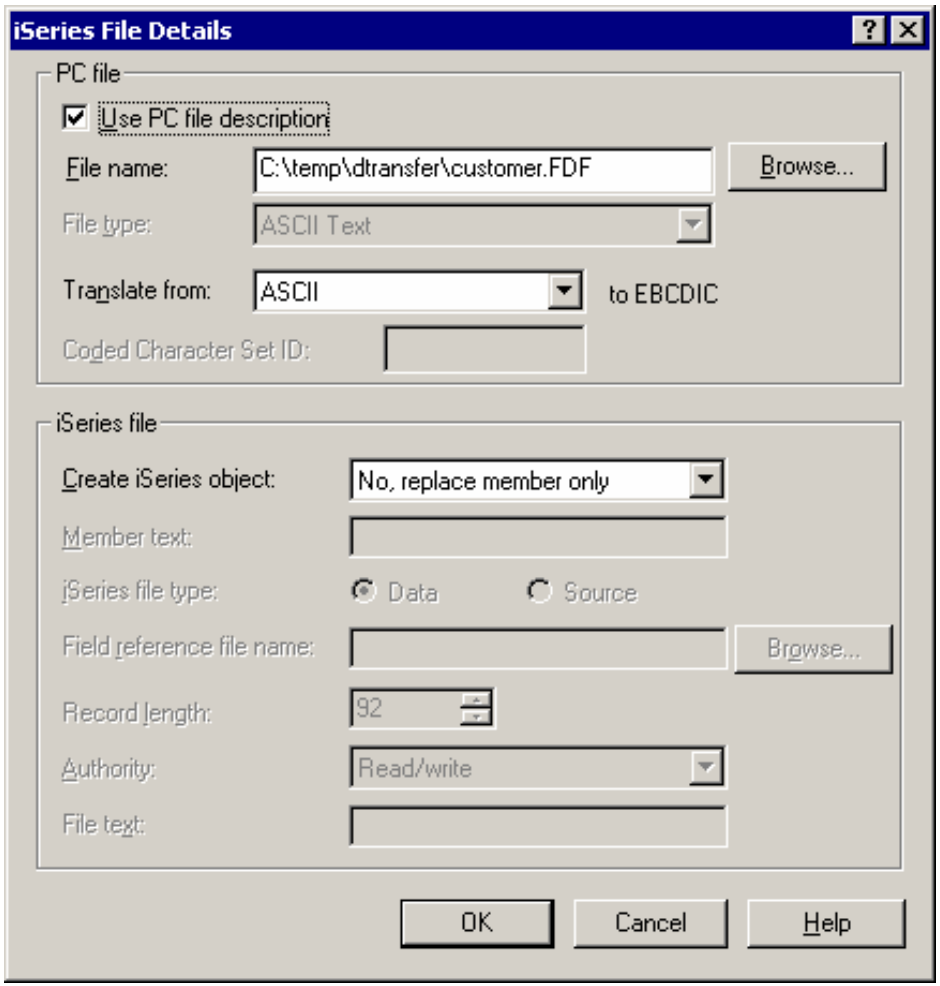


Basic Data Transfer

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



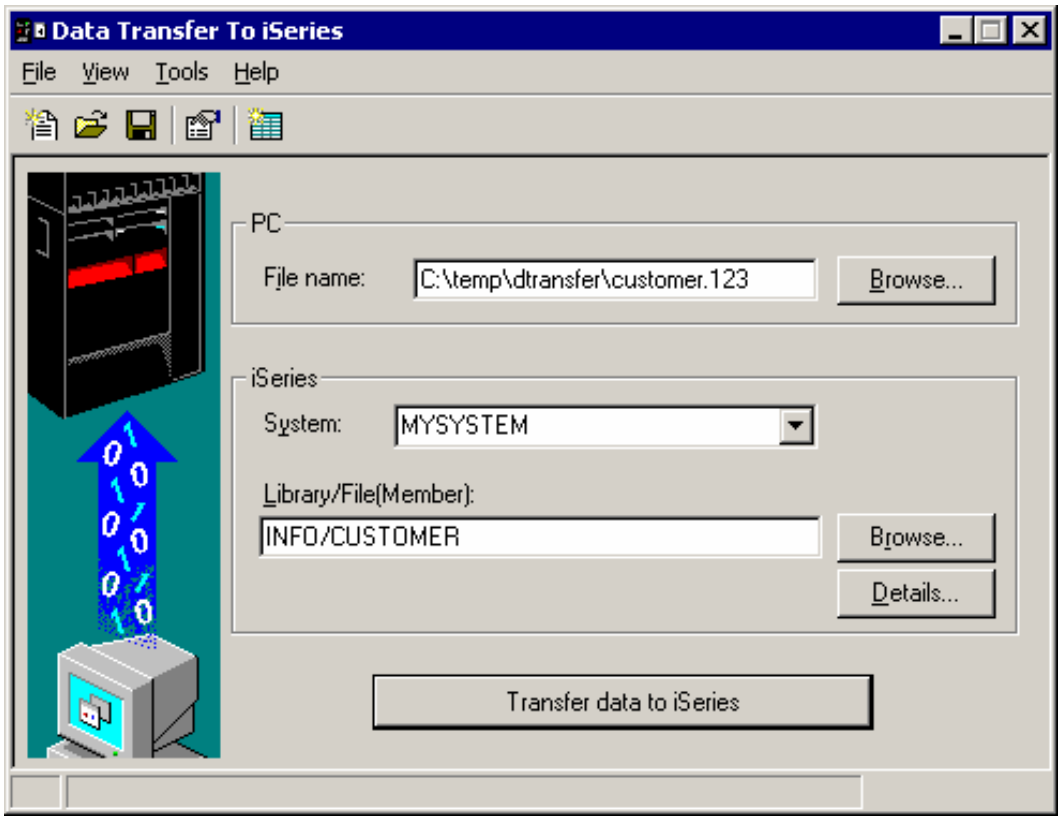
Data Transfer Usage

- 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

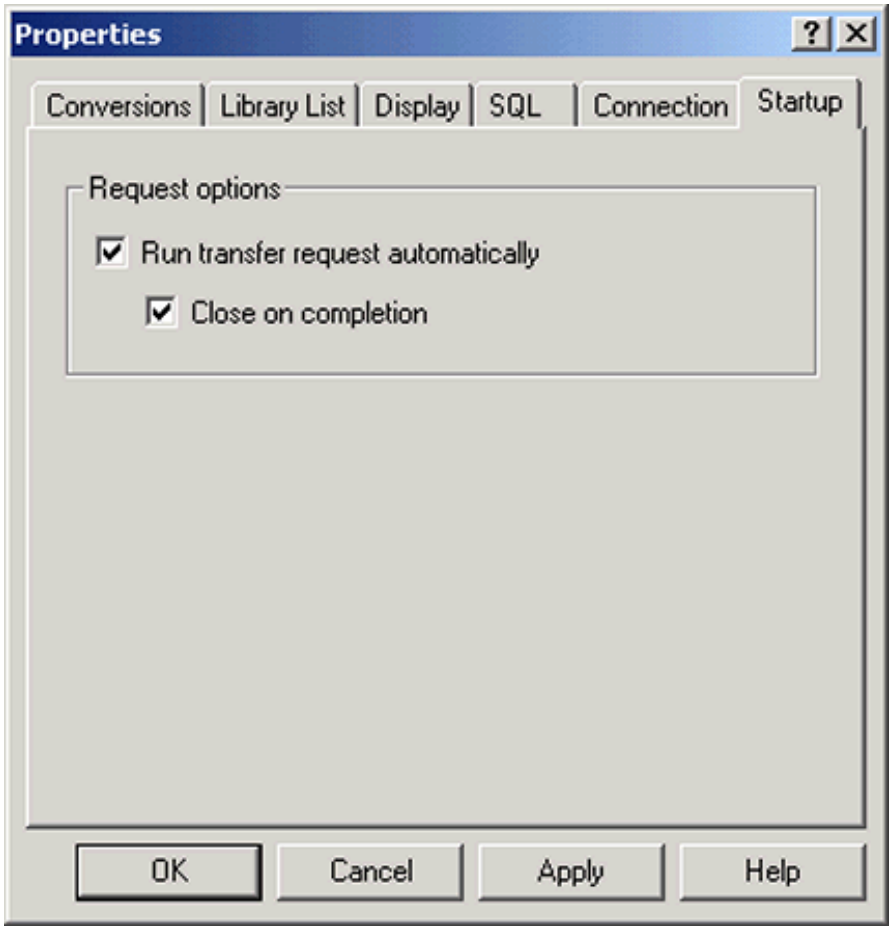
Clicking File->Save As allows you to save the request.



Running Data Transfer by Clicking an Icon

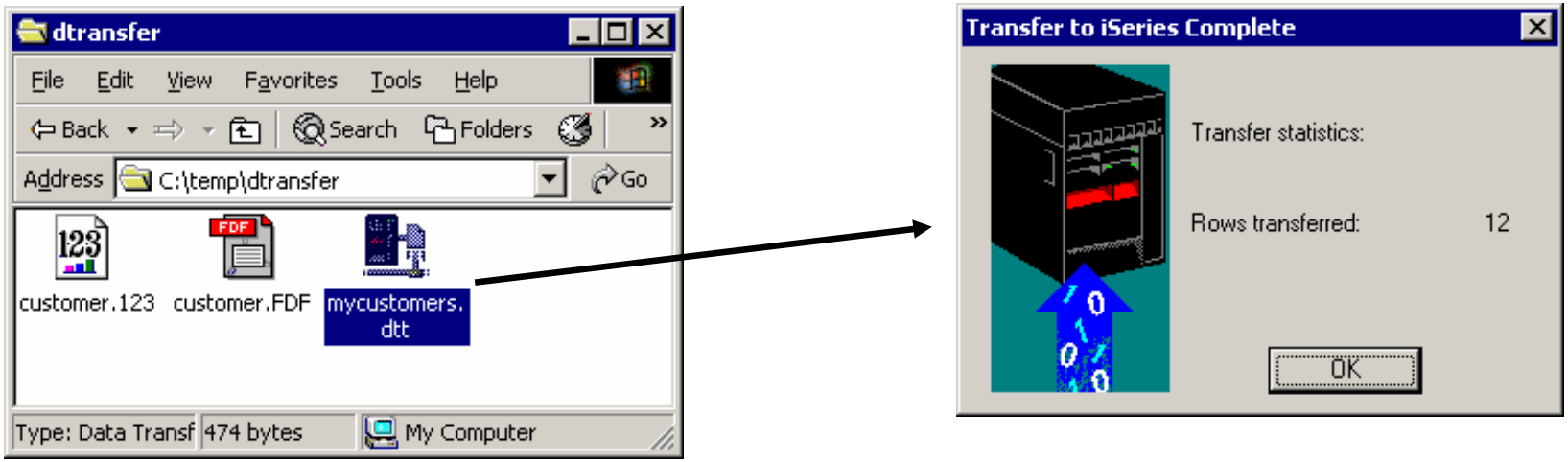
Auto-run/Auto-close support

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



Running Data Transfer by Clicking an Icon

Running by double-clicking the icon



Running Data Transfer by Clicking an Icon

Batch transfer command interface

- RTOPCB
  - Does batch data transfers from System i5 to PC
- RFROMPCB
  - Does batch data transfers from PC to System i5
- RXFERPCB
  - Does batch data transfers from System i5 to PC
  - Does batch data transfers from PC to System i5

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

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:

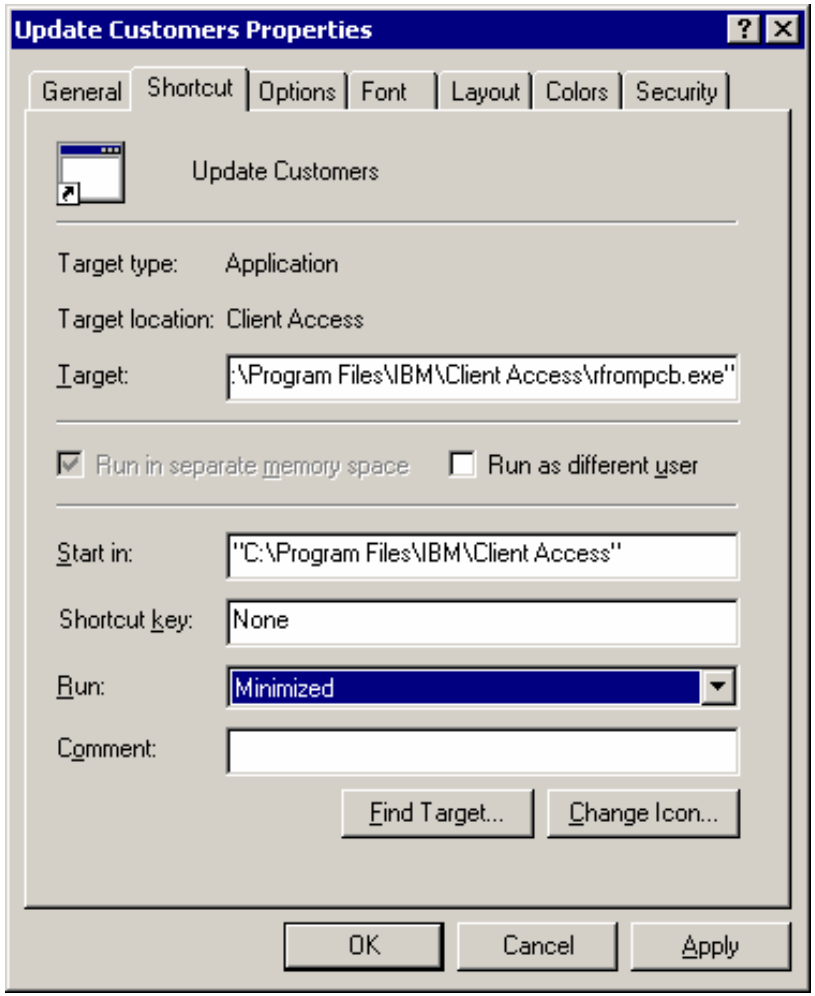
RXFERPCB c:\temp\upload.dtf myuserid mypassword
RXFERPCB c:\temp\download.dtt myuserid mypassword

Running Data Transfer by Clicking an Icon

Shortcut to the Data Transfer command line interface

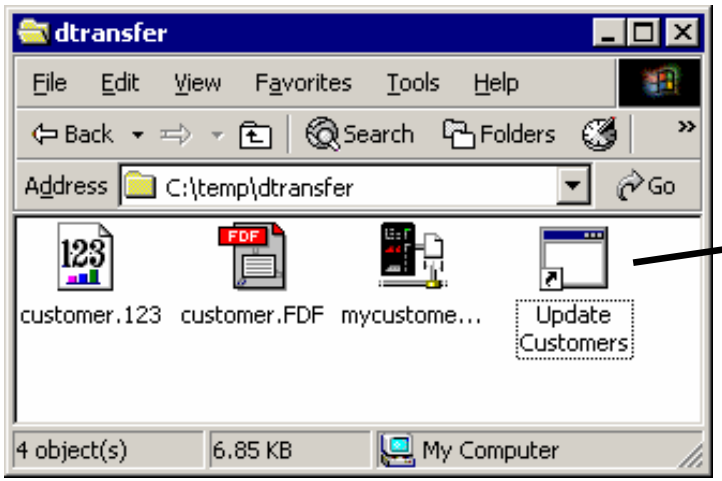
To create a new shortcut:

- 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



Running Data Transfer by Clicking an Icon

Running by double-clicking the icon



Data is updated.
No prompts!

Data Transfer Usage

- Basic Data Transfer
- Running Data Transfer by Clicking an Icon
- **Scheduling Data Transfers**
- Using the Excel Add-in
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- Using the Data Transfer Query Builder
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Scheduling Data Transfers

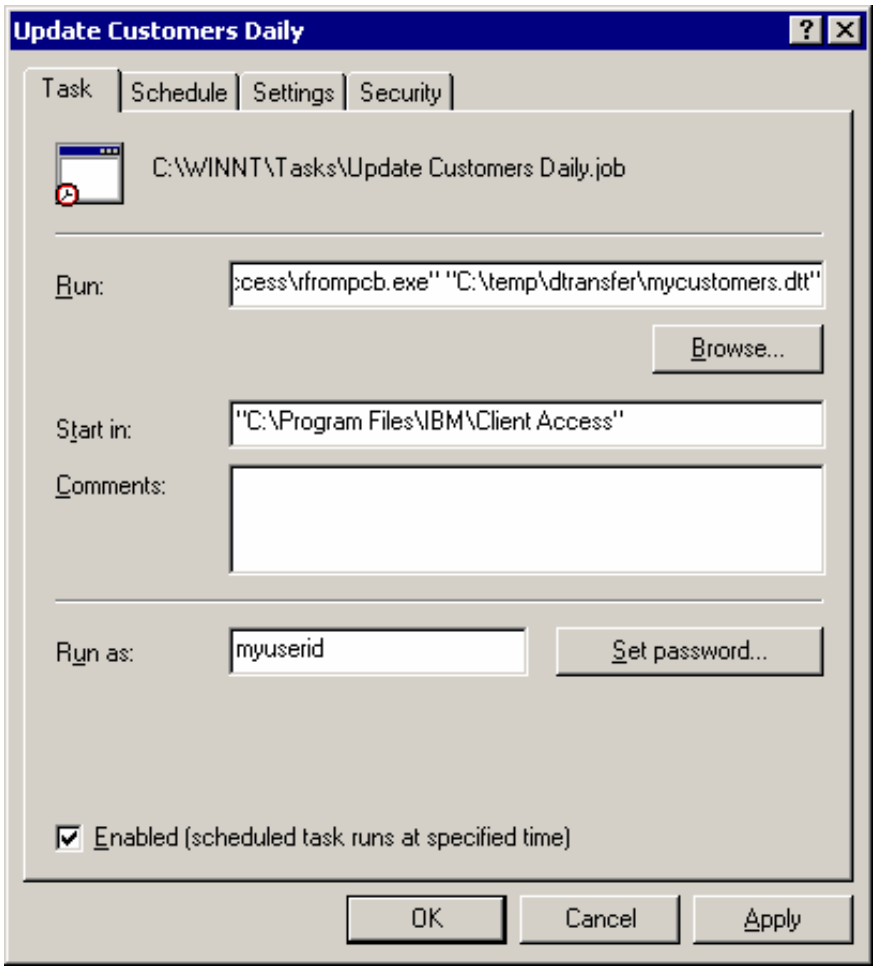
Add a scheduled task

- 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.

Scheduling Data Transfers

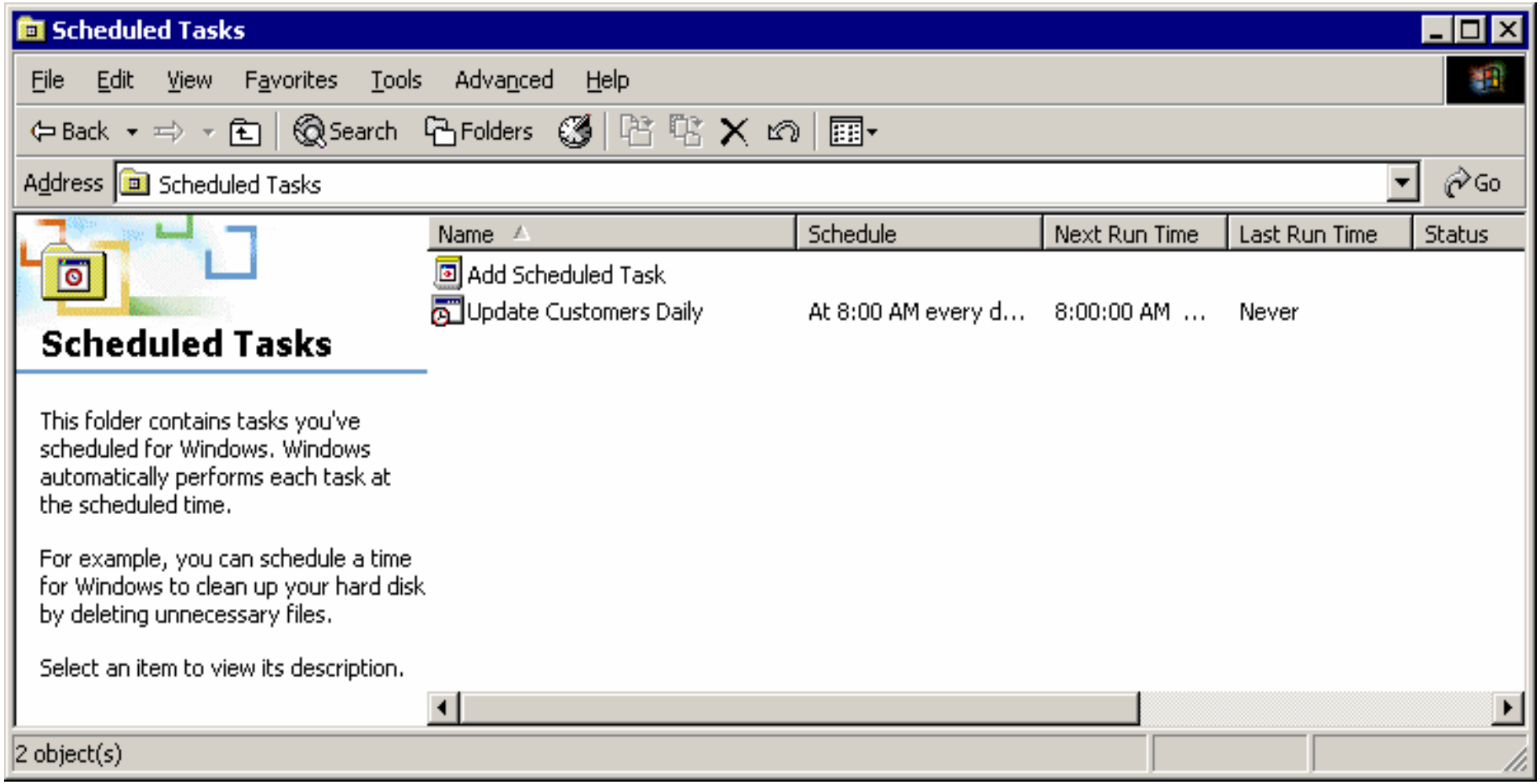
Add the transfer request to run

- Modify the Run line to include the transfer you want to run



Scheduling Data Transfers

Viewing scheduled tasks



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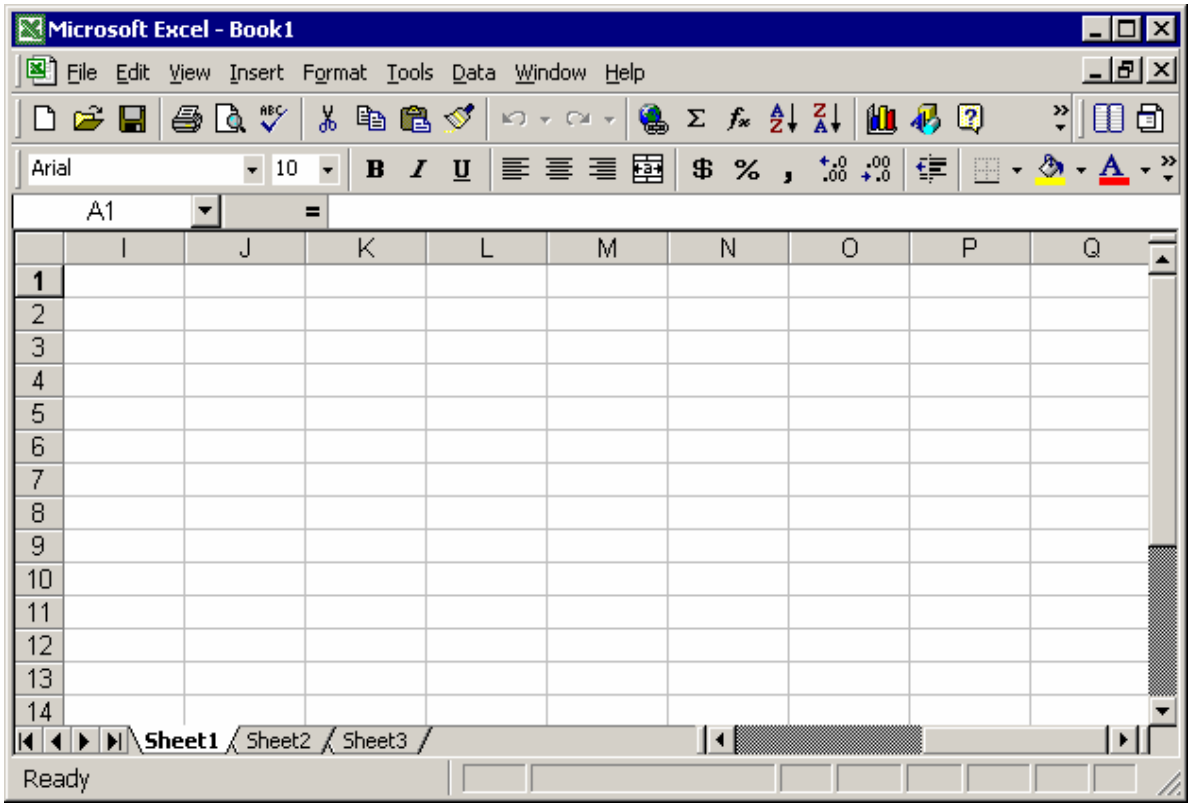
Using the Excel Add-in

Data Transfer from iSeries

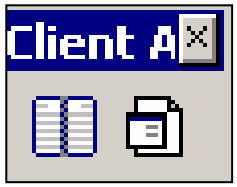
Library: QIWS

Table: QCUSTCDT



Using the Excel Add-in

What is the Excel Add-in?

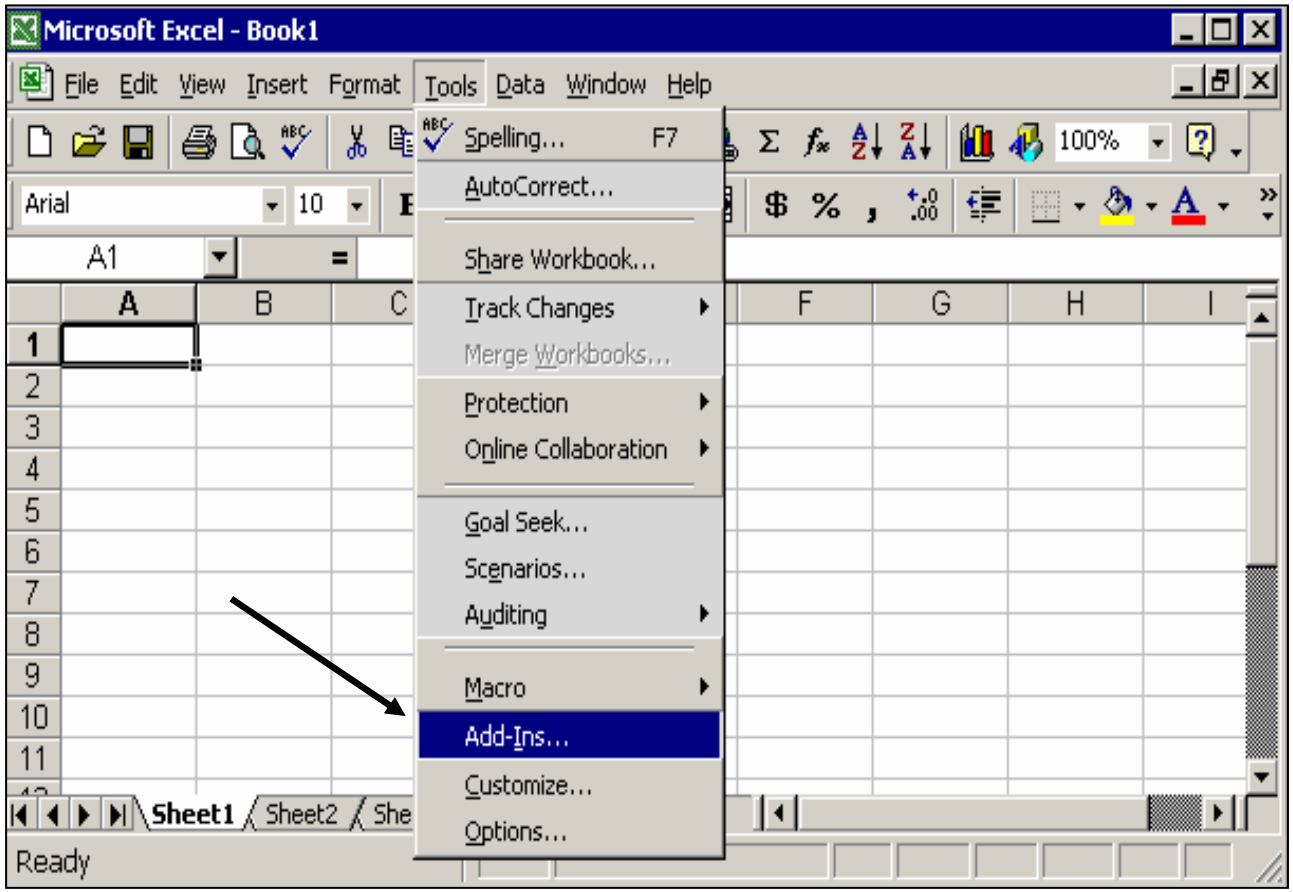


- Available with Microsoft Excel 97, Excel 2000, and Excel XP.
- Use this support by:
  - Clicking on the Data Transfer upload or download button on the Excel toolbar
  - Using the options on the Data menu bar

Using the Excel Add-In

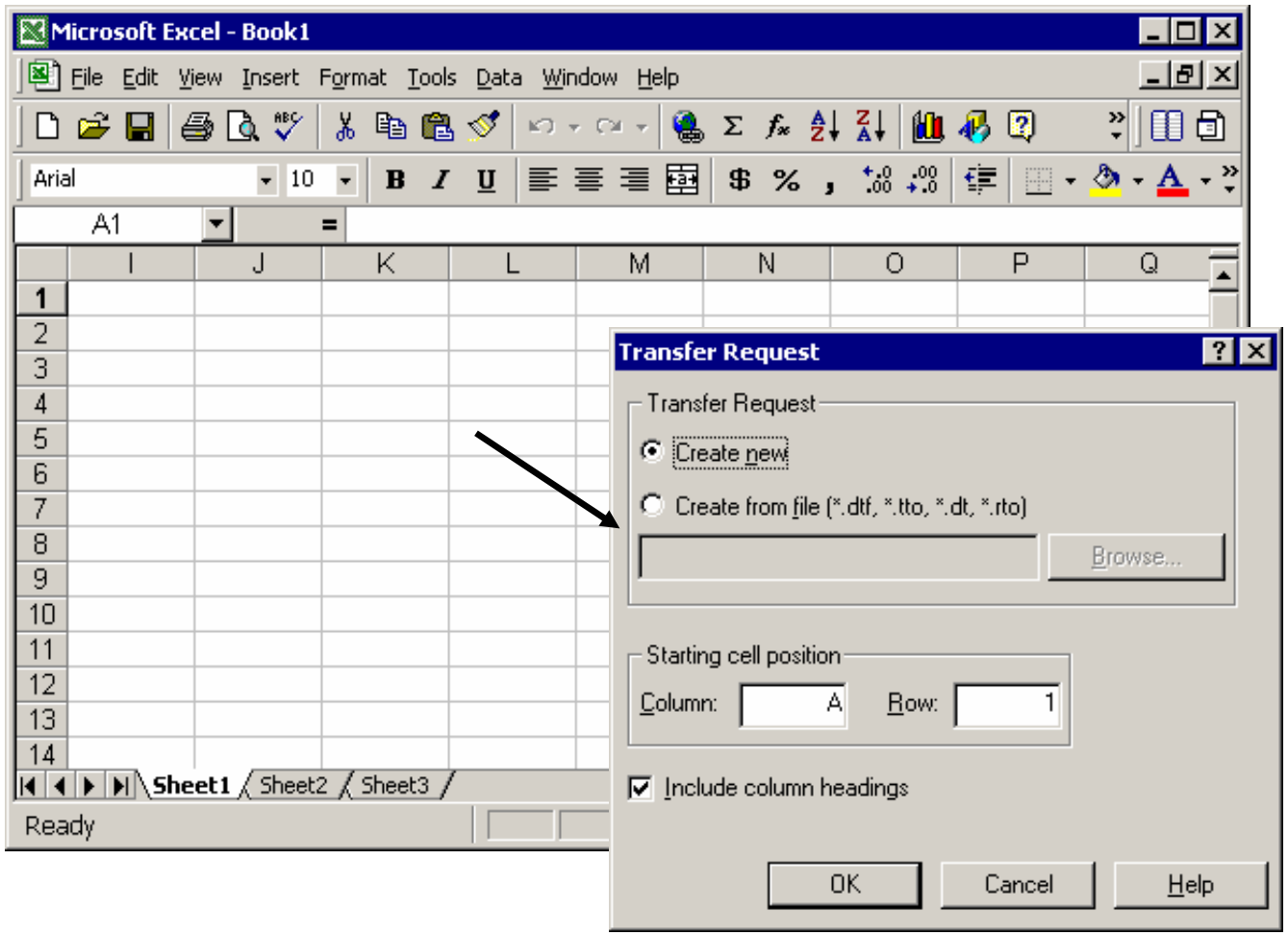
Installing the Excel Add-In

- 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



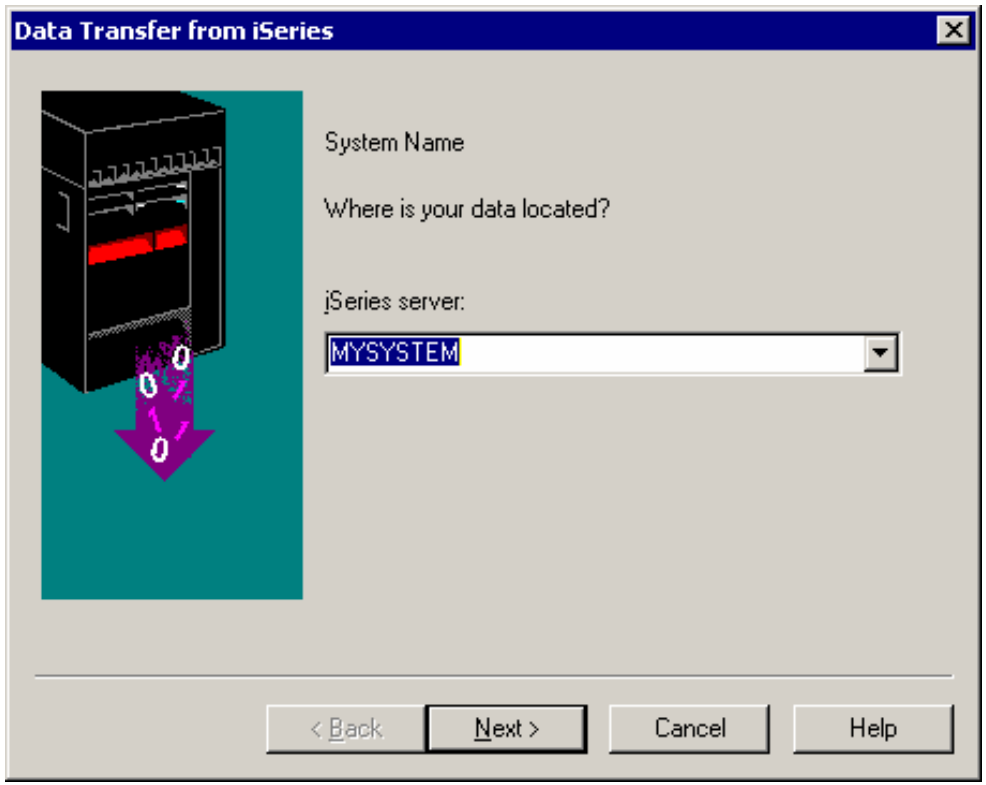
Using the Excel Add-in

Data Transfer from iSeries: The Transfer Request panel



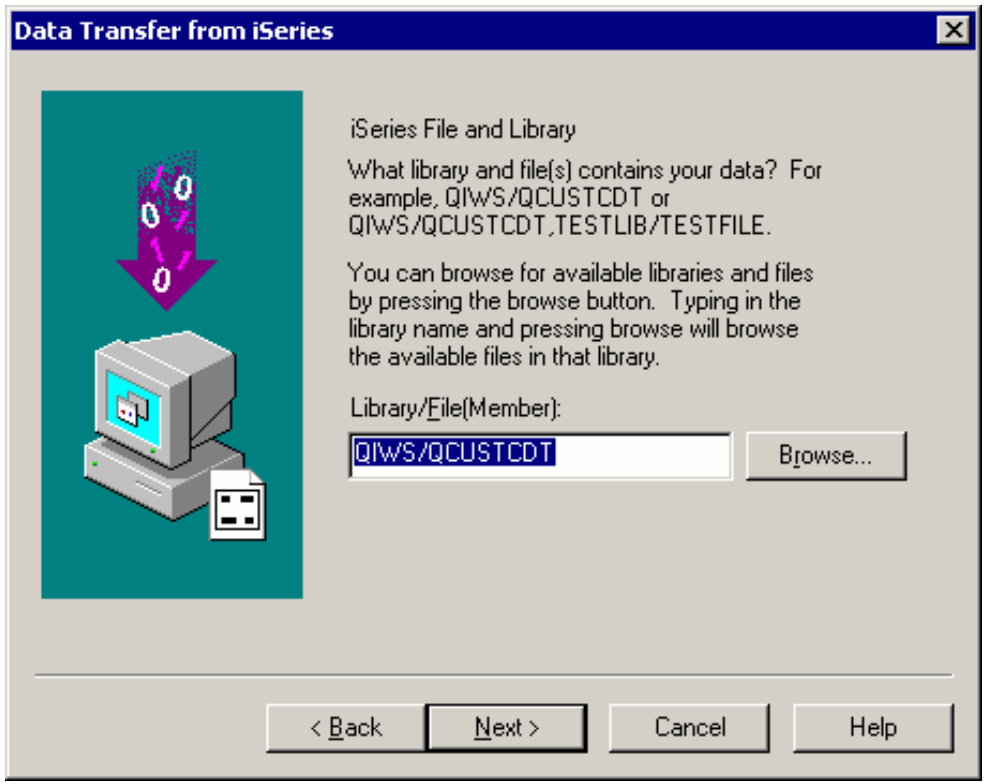
Using the Excel Add-In

Data Transfer from iSeries: Creating a new data transfer request



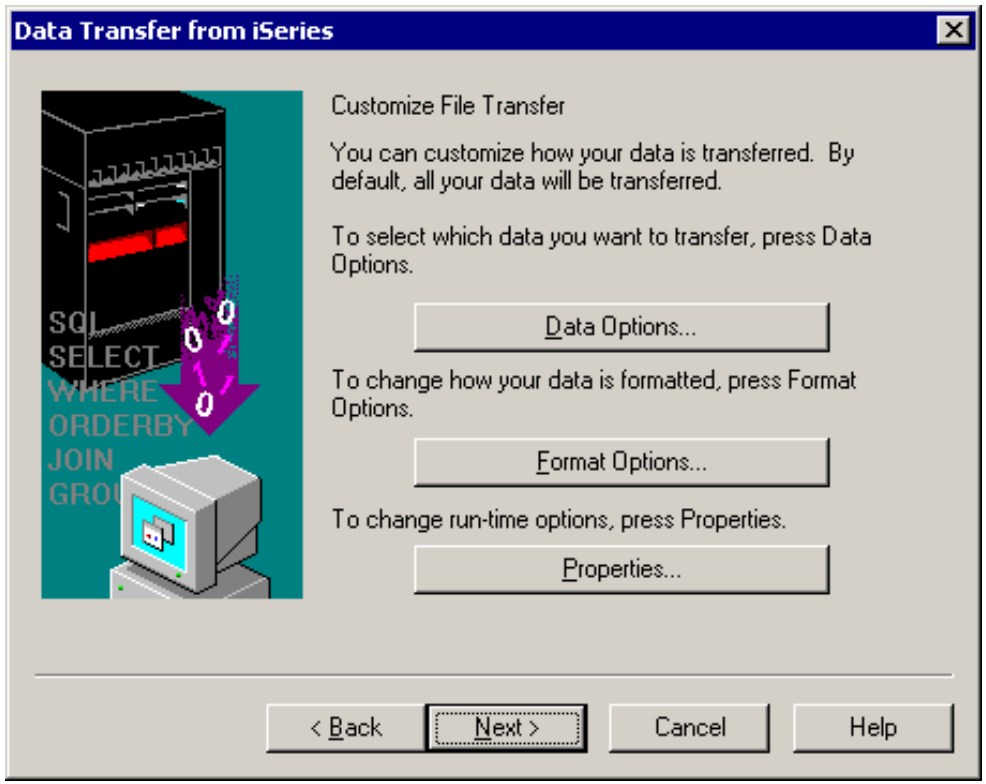
Using the Excel Add-In

Data Transfer from iSeries: Choose the file to download



Using the Excel Add-In

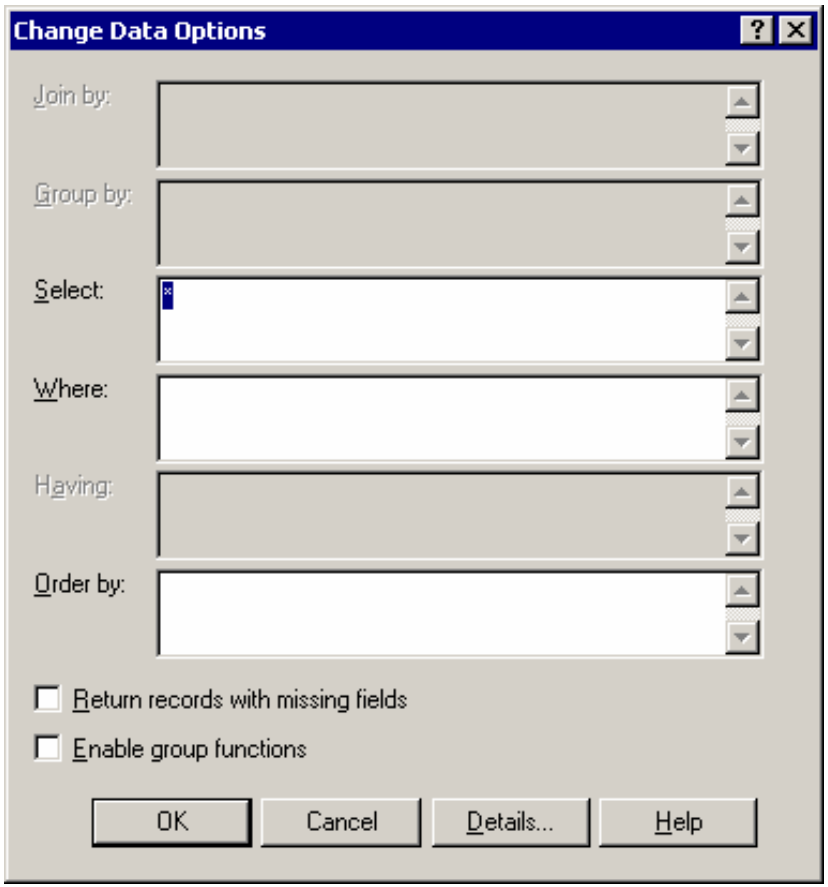
Data Transfer from iSeries: Customize the Data Transfer request



Using the Excel Add-In

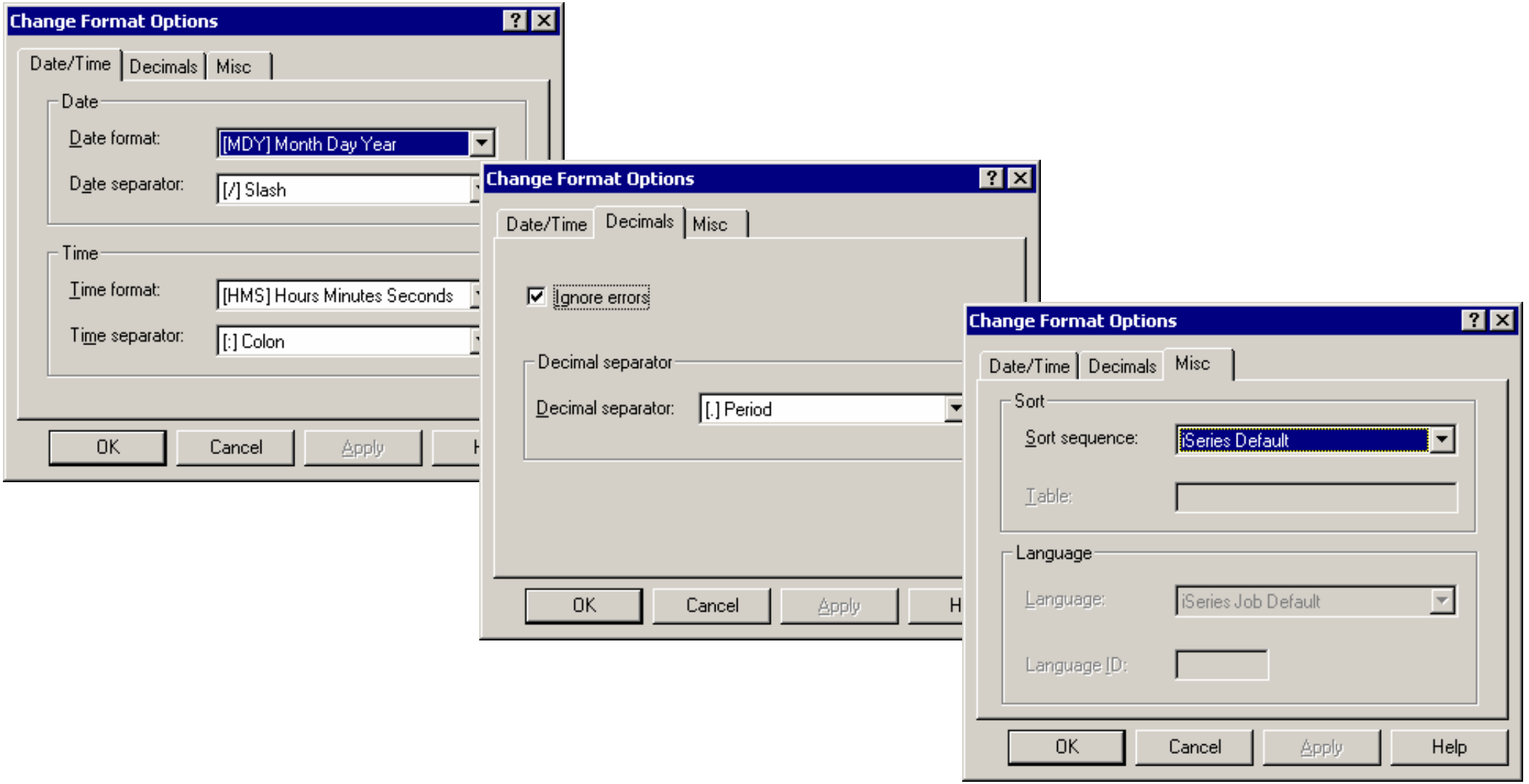
Data Transfer from iSeries: Customizing Data Options

- 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



Using the Excel Add-In

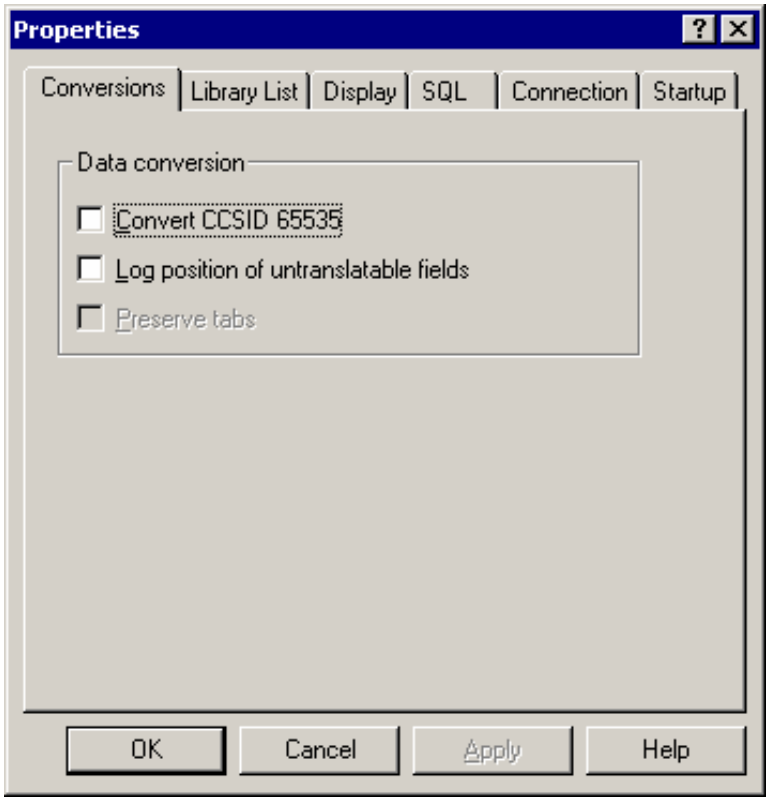
Data Transfer from iSeries: Customizing Format Options



Using the Excel Add-In

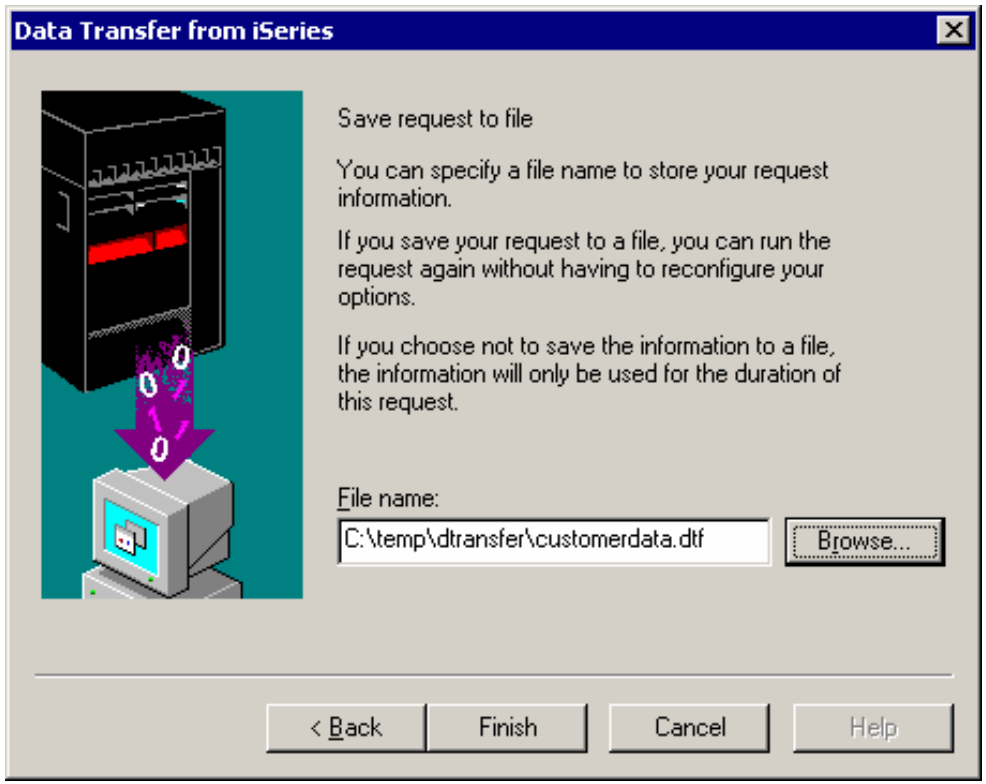
Data Transfer from iSeries: Customizing run-time options

- 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



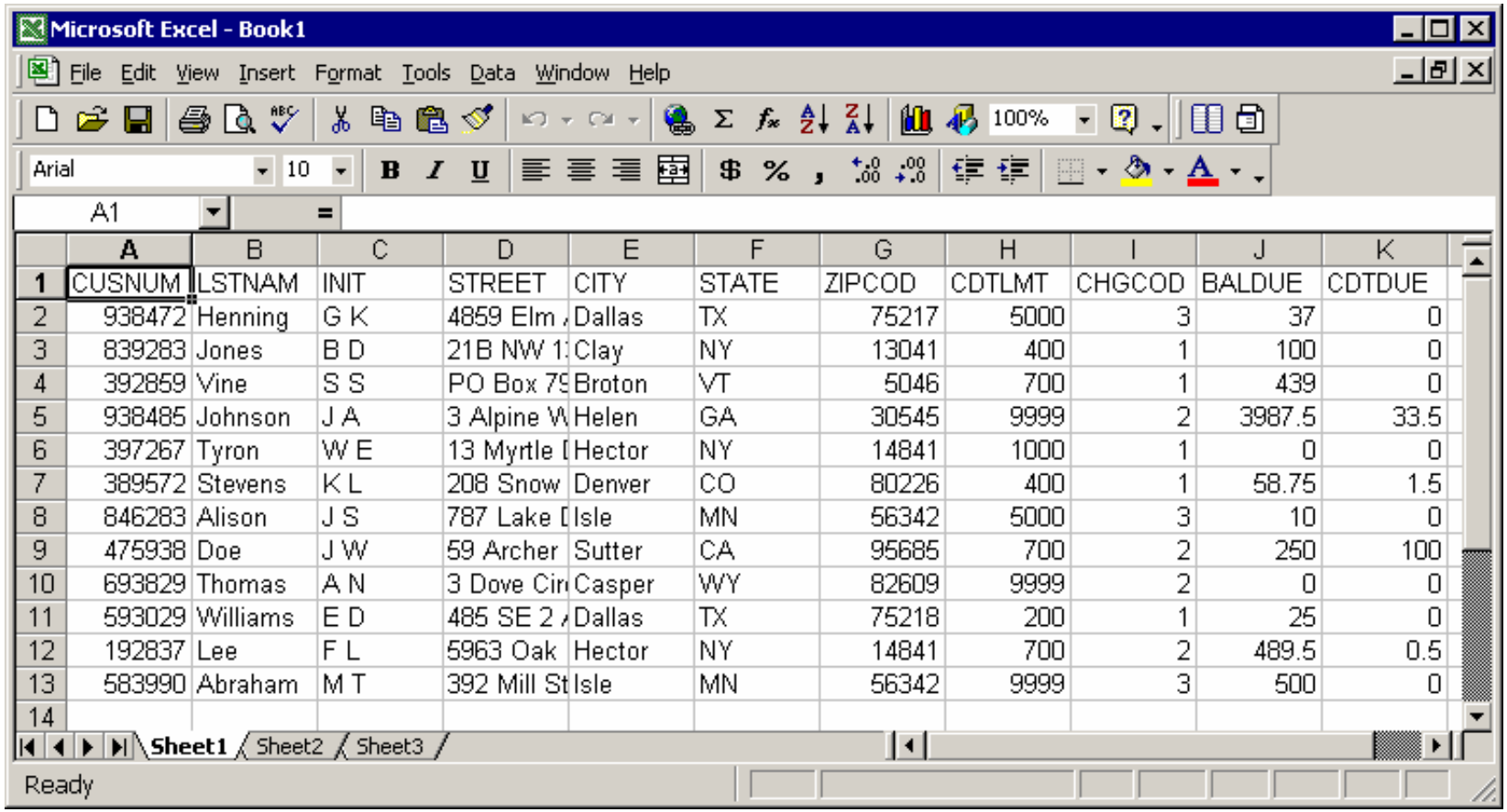
Using the Excel Add-In

Data Transfer from iSeries: Specify a file name



Using the Excel Add-In

Data Transfer from iSeries: Viewing the results



	A	B	C	D	E	F	G	H	I	J	K
1	CUSNUM	LSTNAM	INIT	STREET	CITY	STATE	ZIPCOD	CDTLMT	CHGCOD	BALDUE	CDTDUE
2	938472	Henning	G K	4859 Elm	Dallas	TX	75217	5000	3	37	0
3	839283	Jones	B D	21B NW 1	Clay	NY	13041	400	1	100	0
4	392859	Vine	S S	PO Box 79	Broton	VT	5046	700	1	439	0
5	938485	Johnson	J A	3 Alpine W	Helen	GA	30545	9999	2	3987.5	33.5
6	397267	Tyron	W E	13 Myrtle [	Hector	NY	14841	1000	1	0	0
7	389572	Stevens	K L	208 Snow	Denver	CO	80226	400	1	58.75	1.5
8	846283	Alison	J S	787 Lake [	Isle	MN	56342	5000	3	10	0
9	475938	Doe	J W	59 Archer	Sutter	CA	95685	700	2	250	100
10	693829	Thomas	A N	3 Dove Cir	Casper	WY	82609	9999	2	0	0
11	593029	Williams	E D	485 SE 2	Dallas	TX	75218	200	1	25	0
12	192837	Lee	F L	5963 Oak	Hector	NY	14841	700	2	489.5	0.5
13	583990	Abraham	M T	392 Mill St	Isle	MN	56342	9999	3	500	0
14											

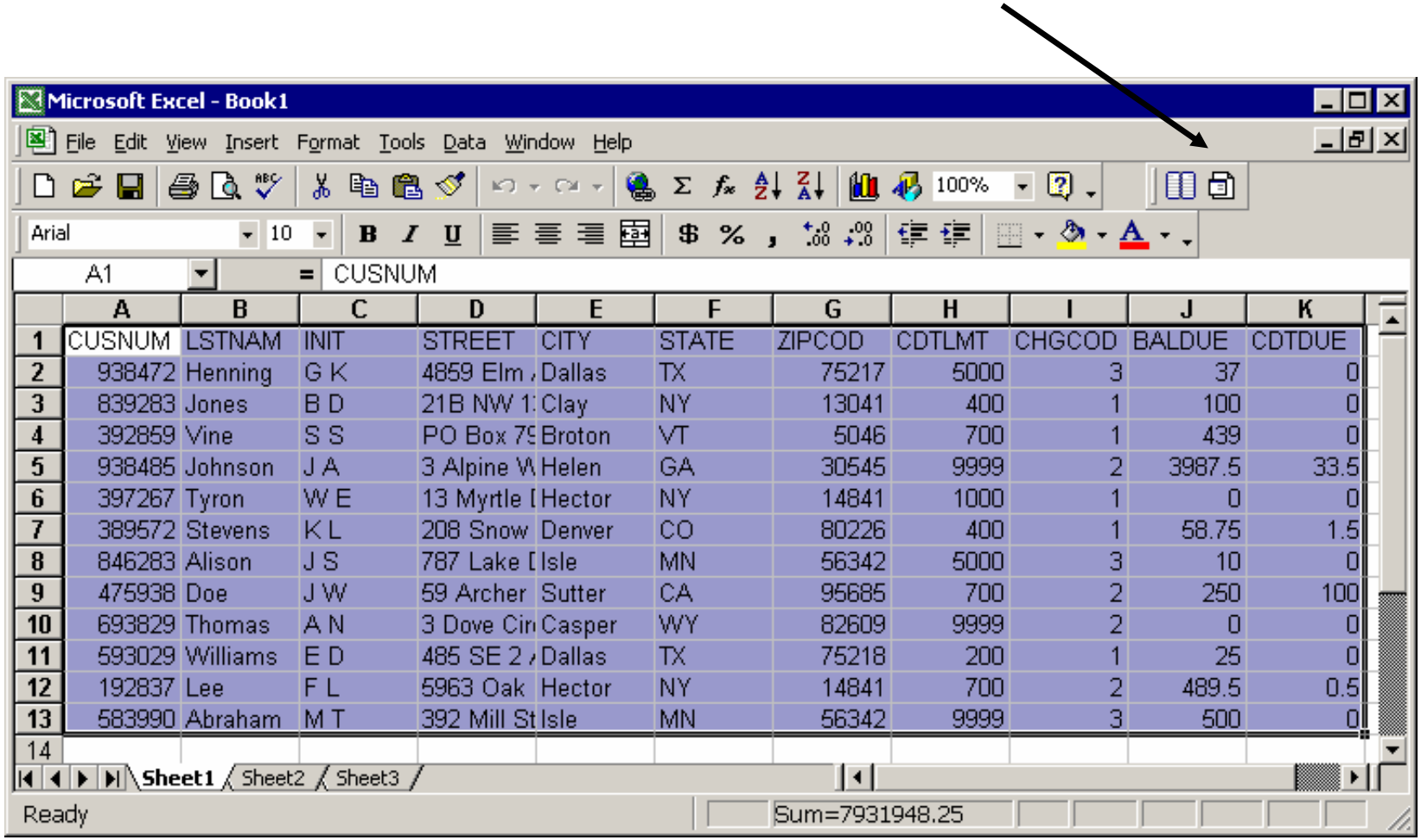
Using the Excel Add-In

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



	A	B	C	D	E	F	G	H	I	J	K
1	CUSNUM	LSTNAM	INIT	STREET	CITY	STATE	ZIPCOD	CDTLMT	CHGCOD	BALDUE	CDTDUE
2	938472	Henning	G K	4859 Elm	Dallas	TX	75217	5000	3	37	0
3	839283	Jones	B D	21B NW 1	Clay	NY	13041	400	1	100	0
4	392859	Vine	S S	PO Box 79	Broton	VT	5046	700	1	439	0
5	938485	Johnson	J A	3 Alpine W	Helen	GA	30545	9999	2	3987.5	33.5
6	397267	Tyron	W E	13 Myrtle [	Hector	NY	14841	1000	1	0	0
7	389572	Stevens	K L	208 Snow	Denver	CO	80226	400	1	58.75	1.5
8	846283	Alison	J S	787 Lake [	Isle	MN	56342	5000	3	10	0
9	475938	Doe	J W	59 Archer	Sutter	CA	95685	700	2	250	100
10	693829	Thomas	A N	3 Dove Cir	Casper	WY	82609	9999	2	0	0
11	593029	Williams	E D	485 SE 2	Dallas	TX	75218	200	1	25	0
12	192837	Lee	F L	5963 Oak	Hector	NY	14841	700	2	489.5	0.5
13	583990	Abraham	M T	392 Mill St	Isle	MN	56342	9999	3	500	0
14											

Data Transfer Usage

- Basic Data Transfer
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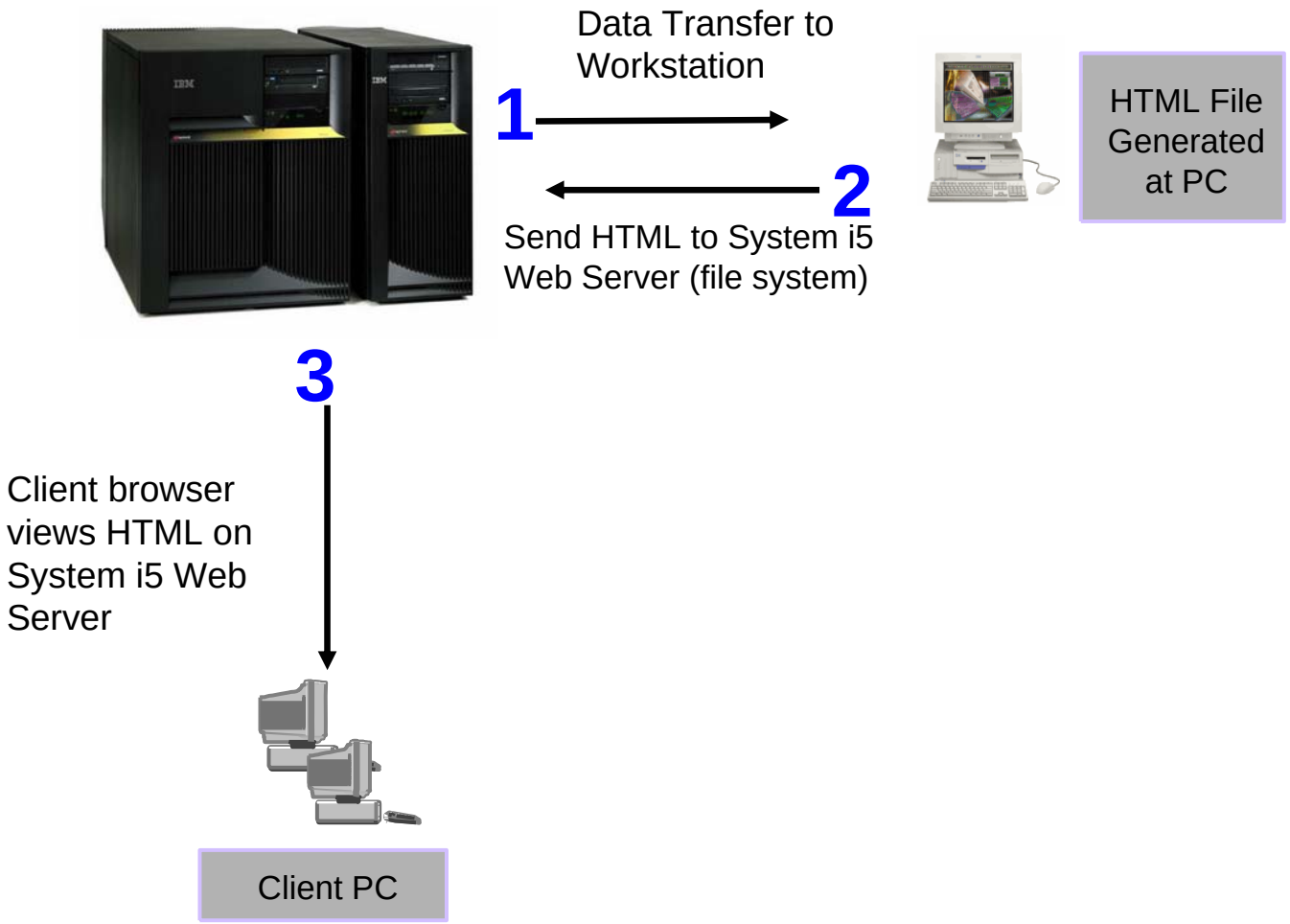
- **Using Data Transfer with a Web server**
- Using the Data Transfer Query Builder
- Tips and Tricks with Data Transfer

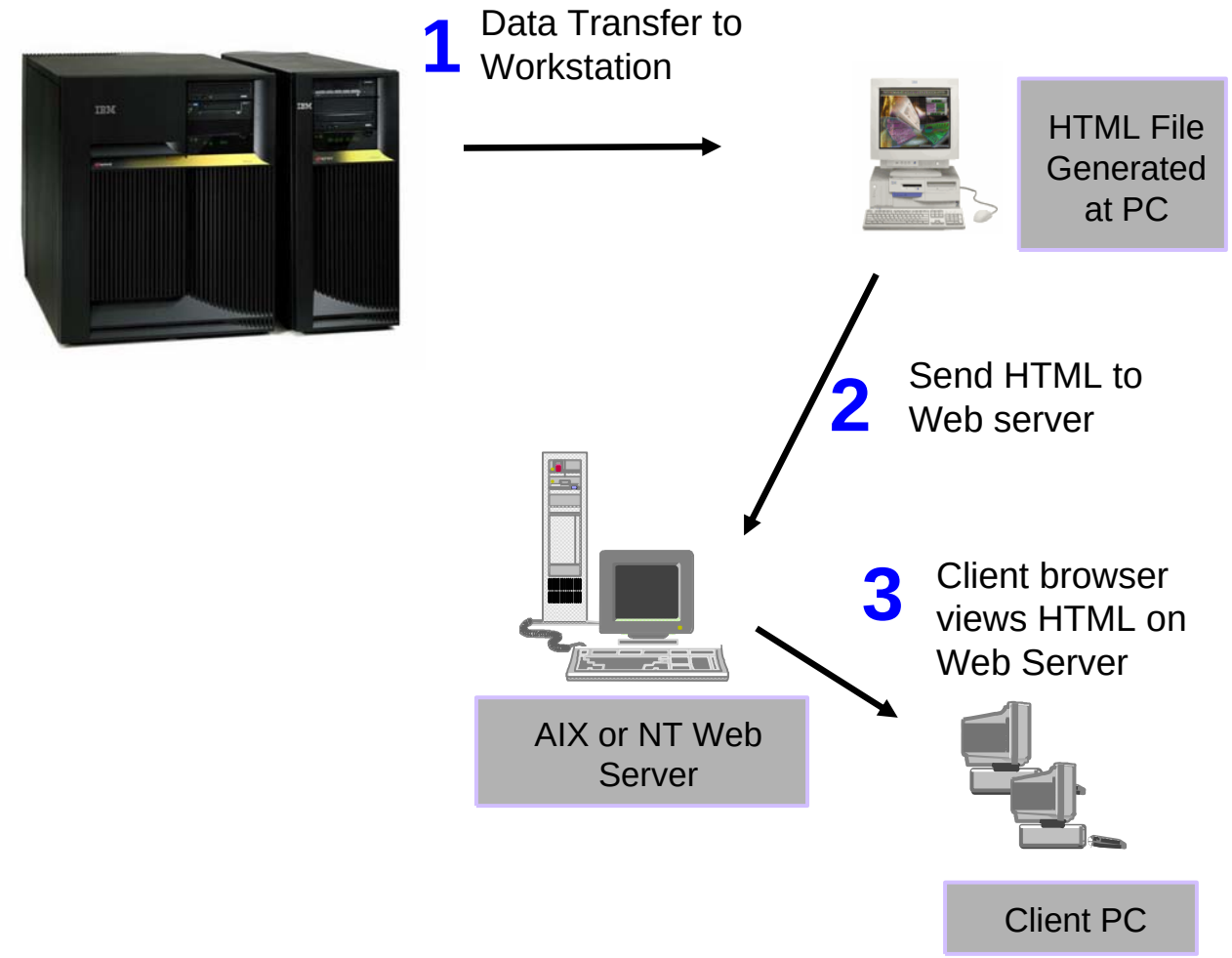
Using Data Transfer with a Web server

HTML File support - Updating a web server on System i5



Using Data Transfer with a Web server

HTML File support - Updating a web server on another machine



Running Data Transfer by Clicking an Icon

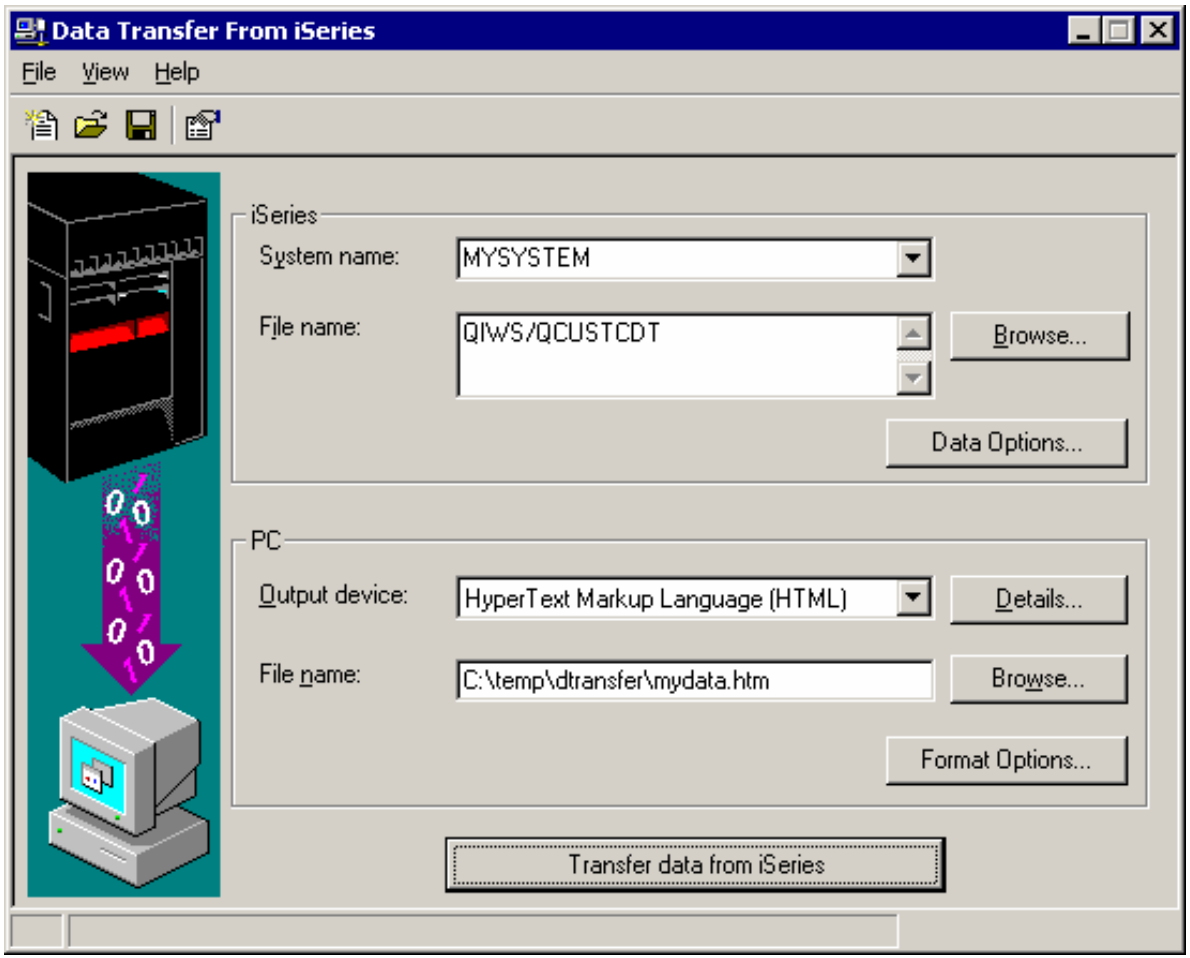
Incoming Remote Command (IRC)

- Installable option of iSeries Access
- Gives System i5 users ability to start remote commands on a PC
- Message logged in the iSeries Access for Windows History log identifying what was run

- CWBRXD
  - Name of program that controls Incoming Remote Commands
  - Runs as a Windows service called iSeries Access for Windows Remote Command.
- RUNRMTCMD
  - System i5 server CL command
  - Used to send PC command requests to the PC running the IRC service.

Using Data Transfer with a Web server

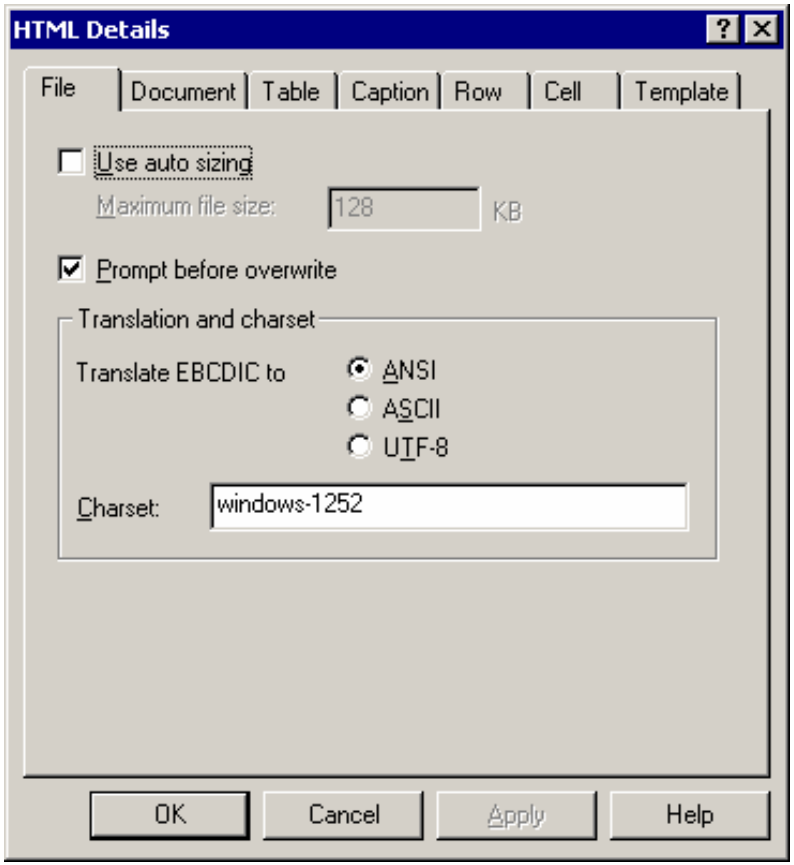
Downloading a file to HTML



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

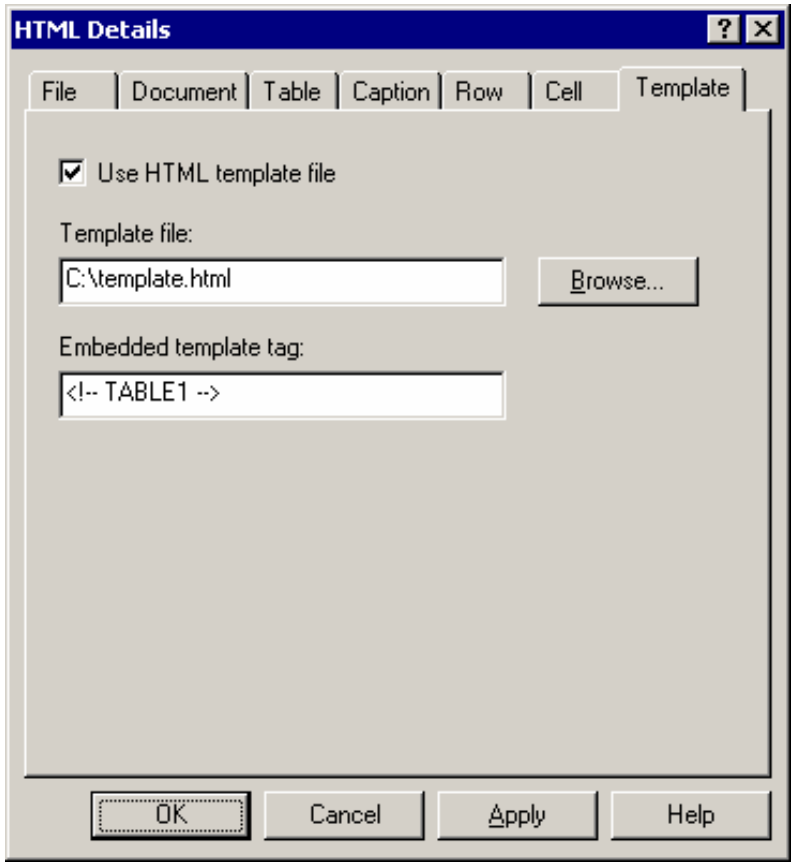


Using Data Transfer with a Web server

HTML Template support - enhancing web pages

HTML Template allows System i5 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.



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 System i5, the data will be formatted and will inserted in place of the <!-- TABLE1 --> tag.

Using Data Transfer with a Web server

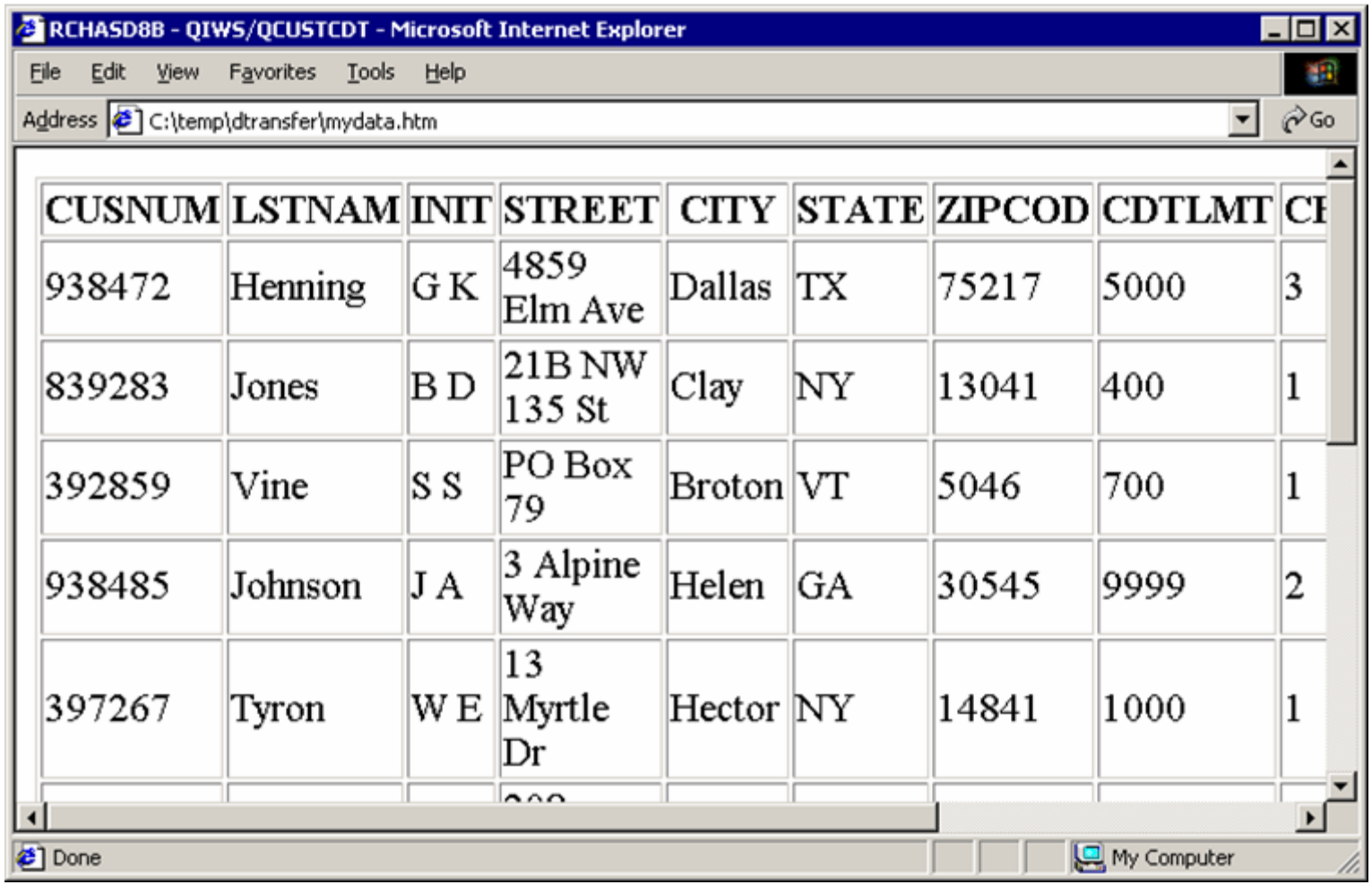
DATALINK data type support

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

CUSTNAM	ADDRESS	PHONE	WEBSITE
Bob	Rochester, MN	800-426-3333	http://www.ibm.com/eserver/iseries/index.html
John	Anaheim, CA	800-270-8223	http://www.common.org/index.html
…	…	…	…

Using Data Transfer with a Web server

Viewing the results



CUSNUM	LSTNAM	INIT	STREET	CITY	STATE	ZIPCOD	CDTLMT	CI
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

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 System i5 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

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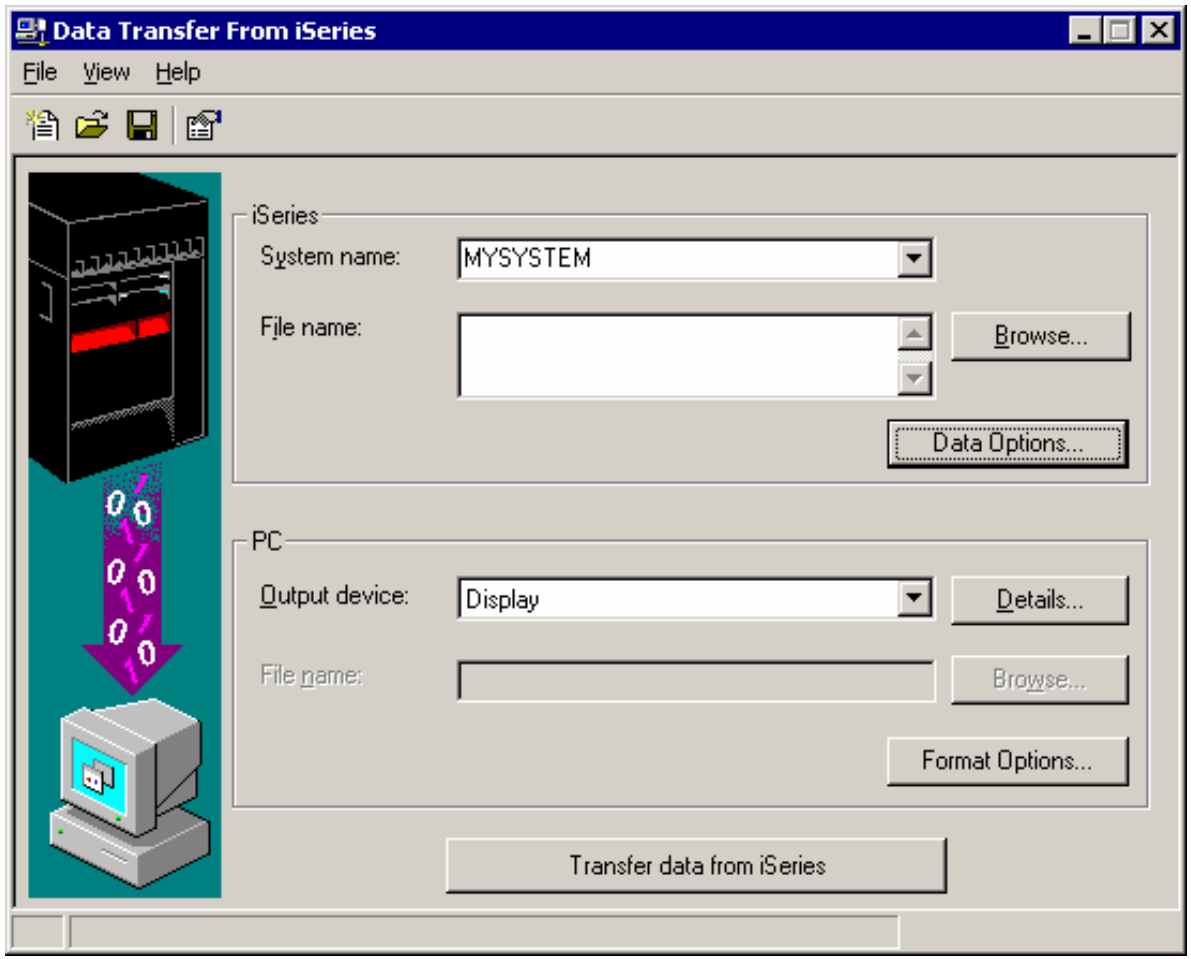
- Tips and Tricks with Data Transfer

Using the Data Transfer Query Builder

Starting the Data Transfer query builder



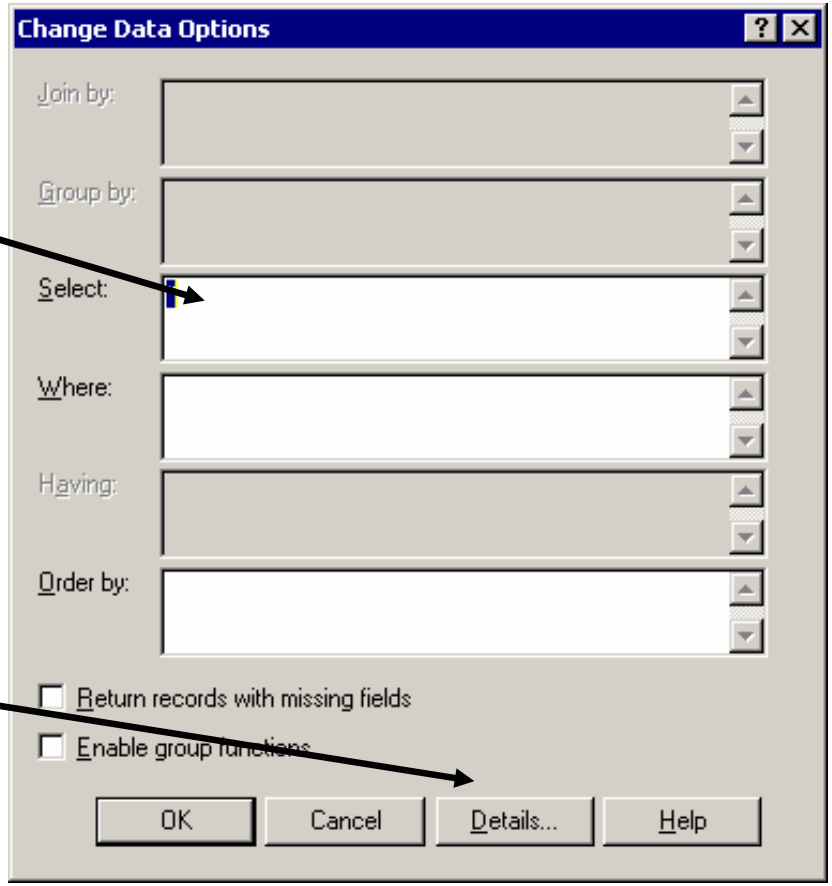
Using the Data Transfer Query Builder

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

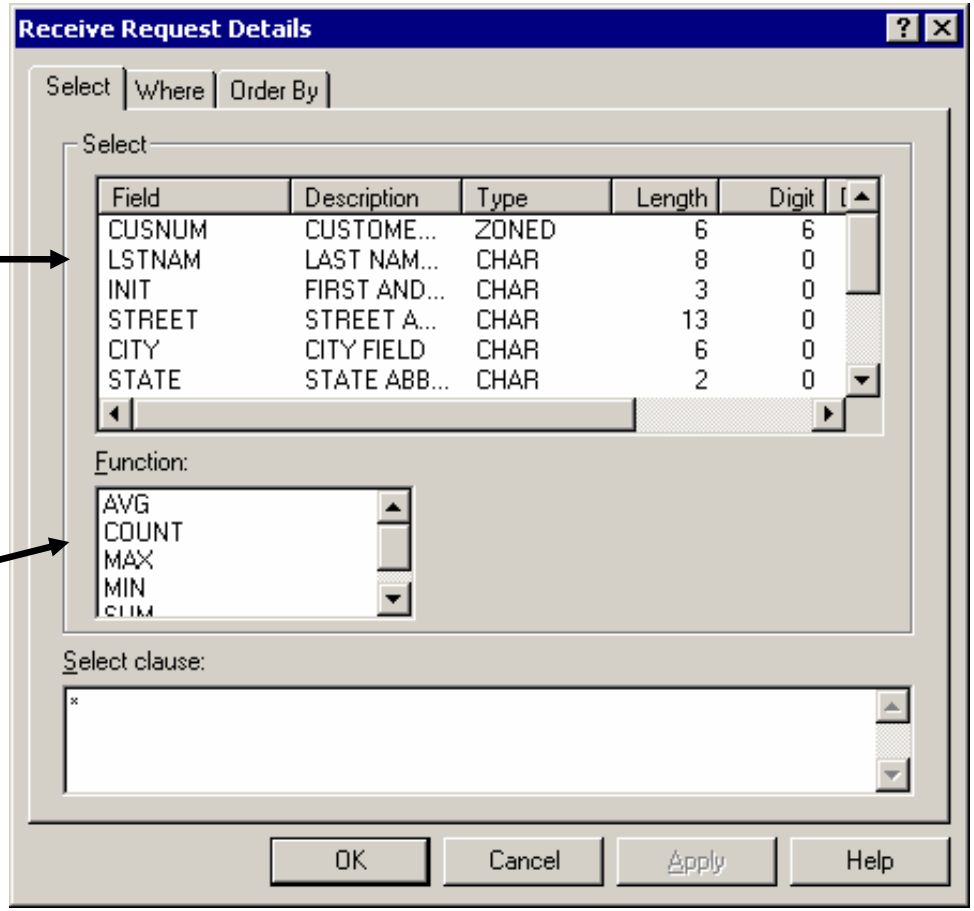


Using the Data Transfer Query Builder

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

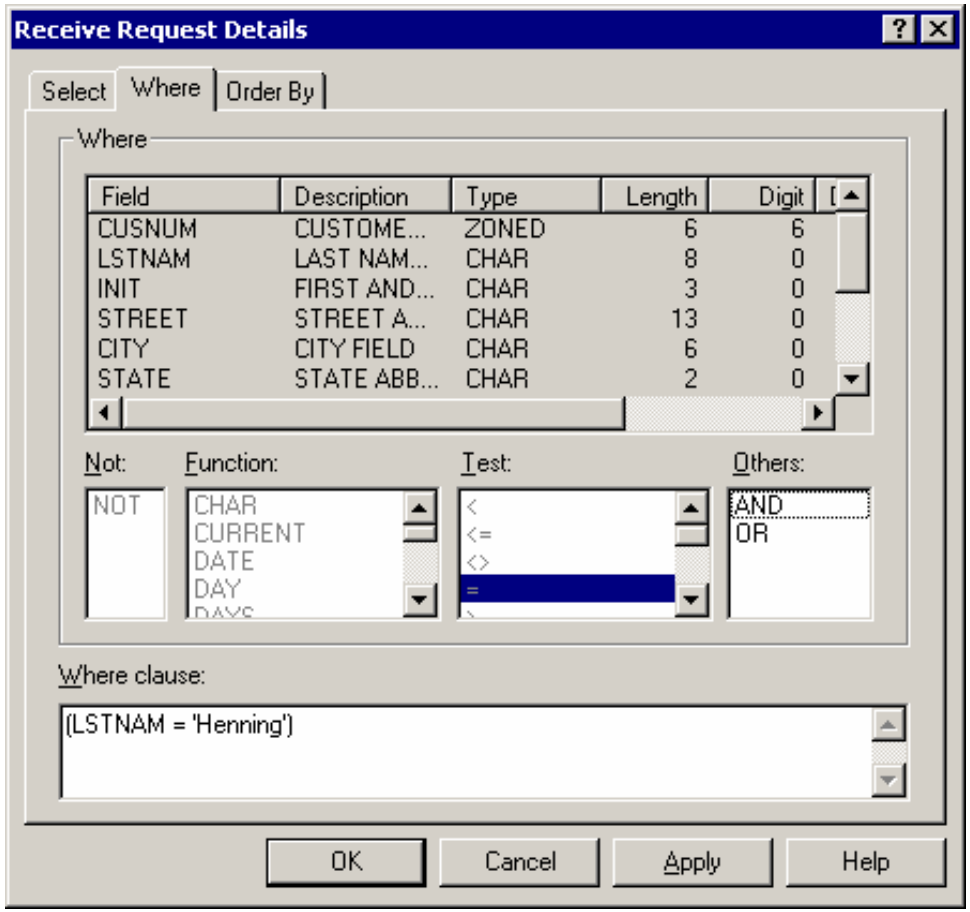


Using the Data Transfer Query Builder

Creating a where clause

Specify conditions on data transferred from the System i5 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.

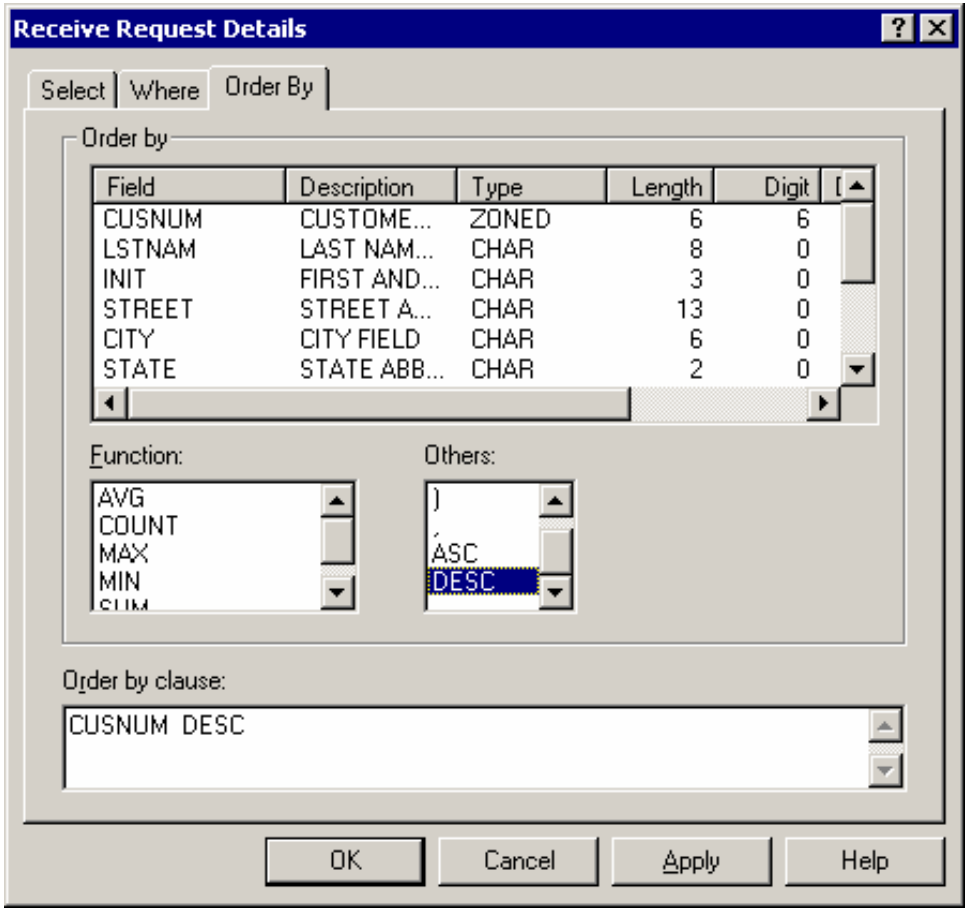


Using the Data Transfer Query Builder

Ordering data

An Order By clause may be specified to order data transferred from the System i5.

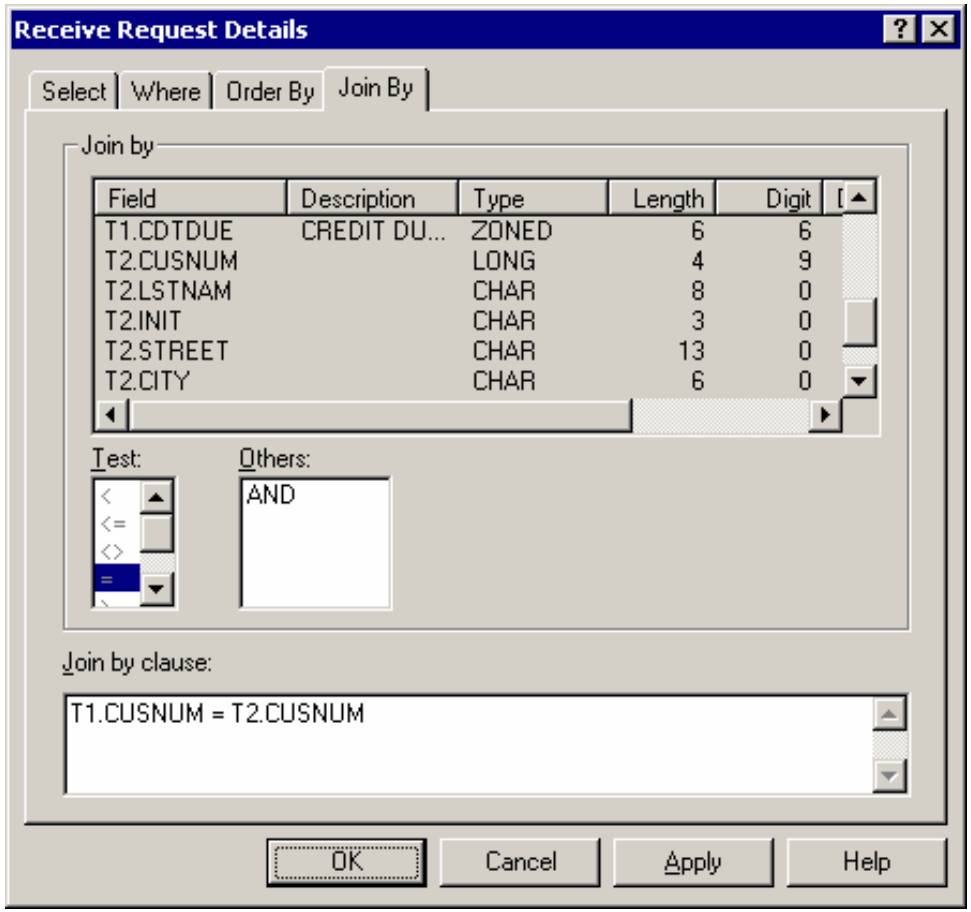
Fields may be ordered in ascending or descending order by specifying either ASC or DESC after each field name. Currently, on the System i5, fields used in the order by must also exist in the Select clause.



Using the Data Transfer Query Builder

Multi-file joins

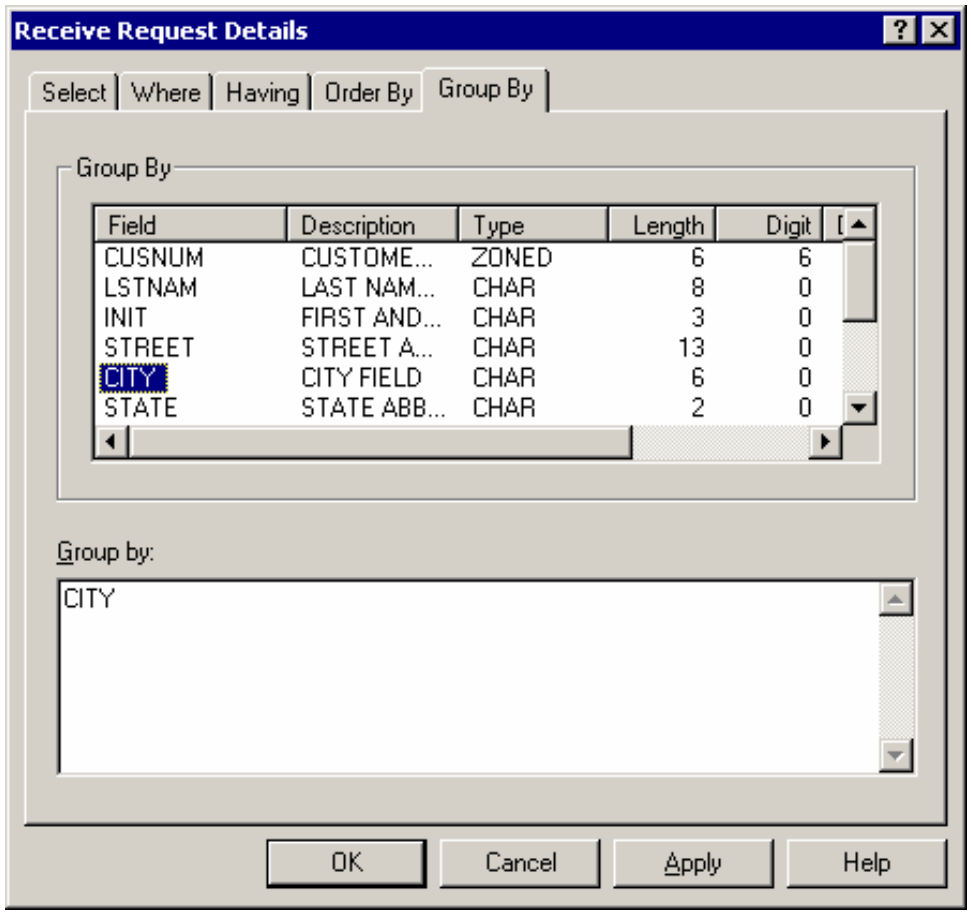
When multiple files are specified for download on the main Data Transfer panel, a join clause may be built to conditionally join records across multiple files.



Using the Data Transfer Query Builder

Record grouping

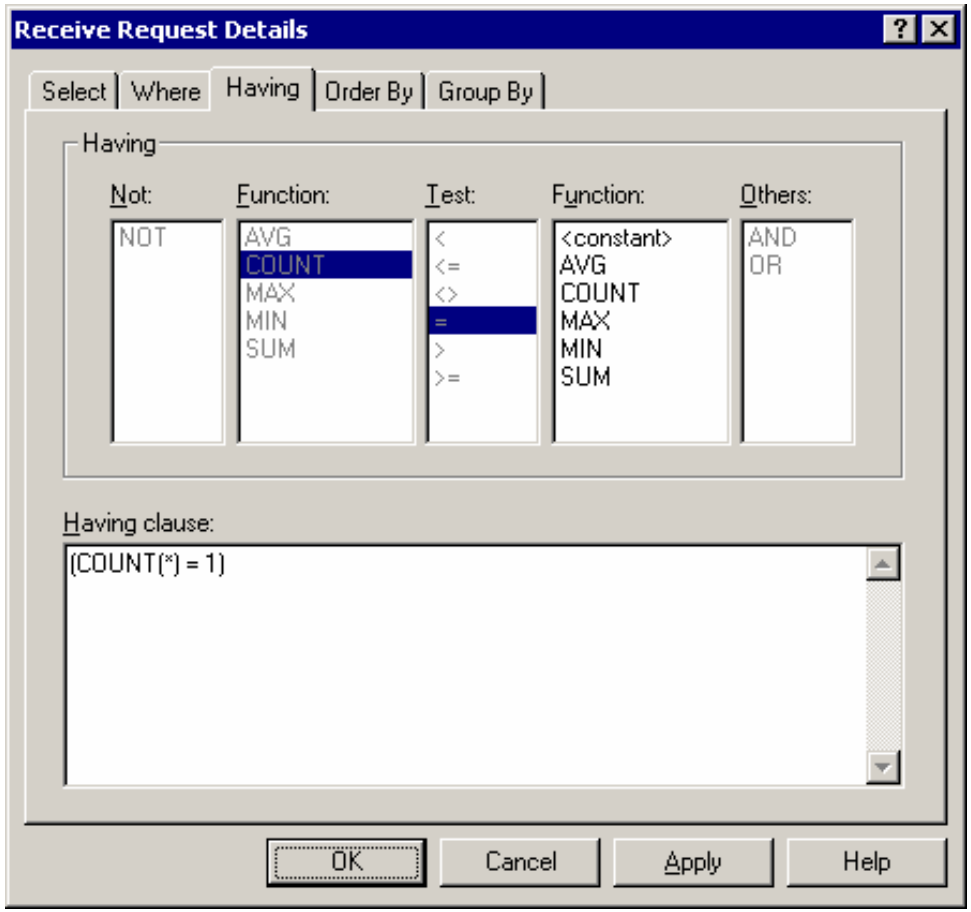
If Group By functions are enabled on the Data Options panel, a Group By statement may be specified to group records that are returned.



Using the Data Transfer Query Builder

Conditional grouping using Having

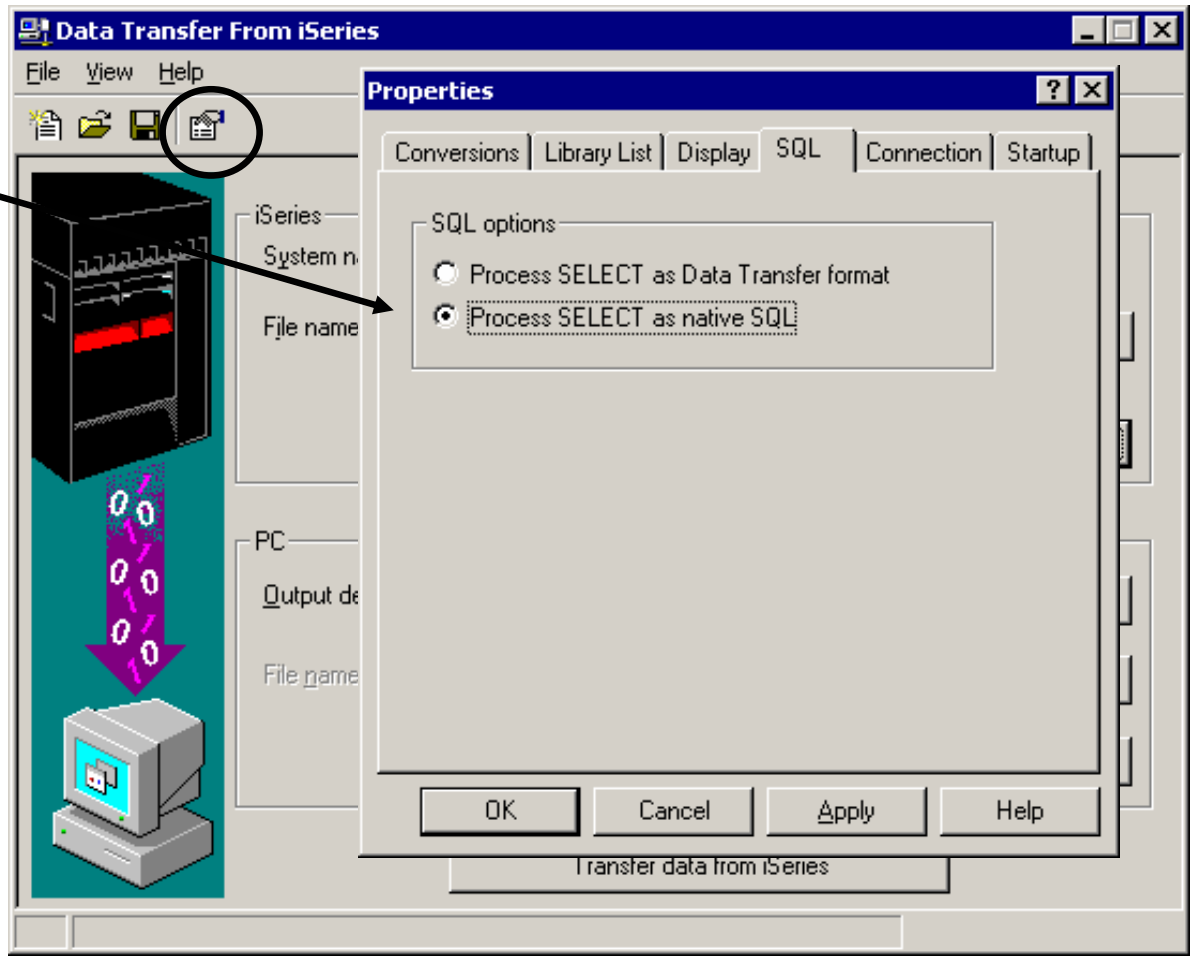
Conditional record grouping from a Group By operation may be done by specifying a Having clause.



Using the Data Transfer Query Builder

Activating the Native SQL Interface

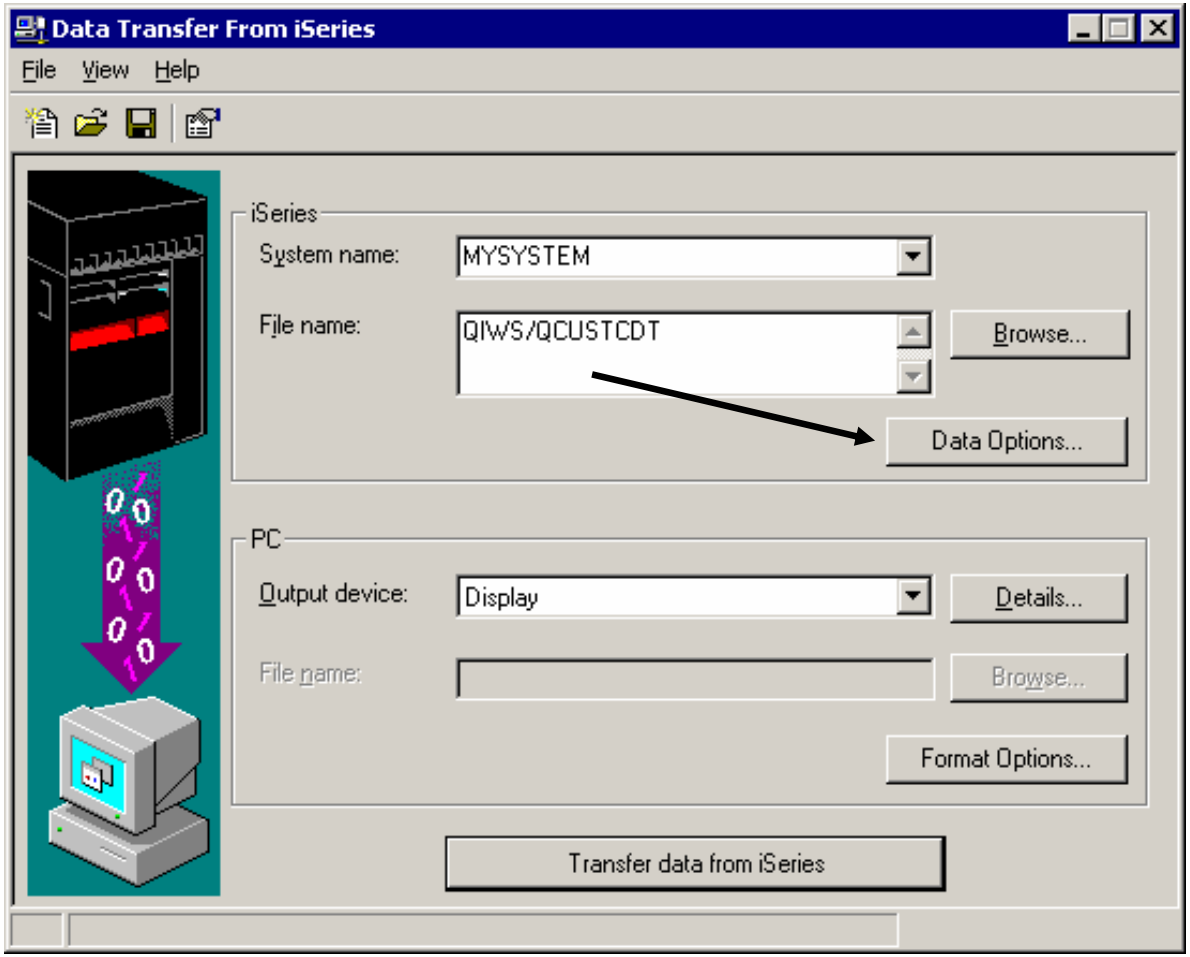
A Native SQL interface is provided for power users or for situations where the Data Transfer format does not provide enough functionality



Using the Data Transfer Query Builder

Finding the Native SQL Interface

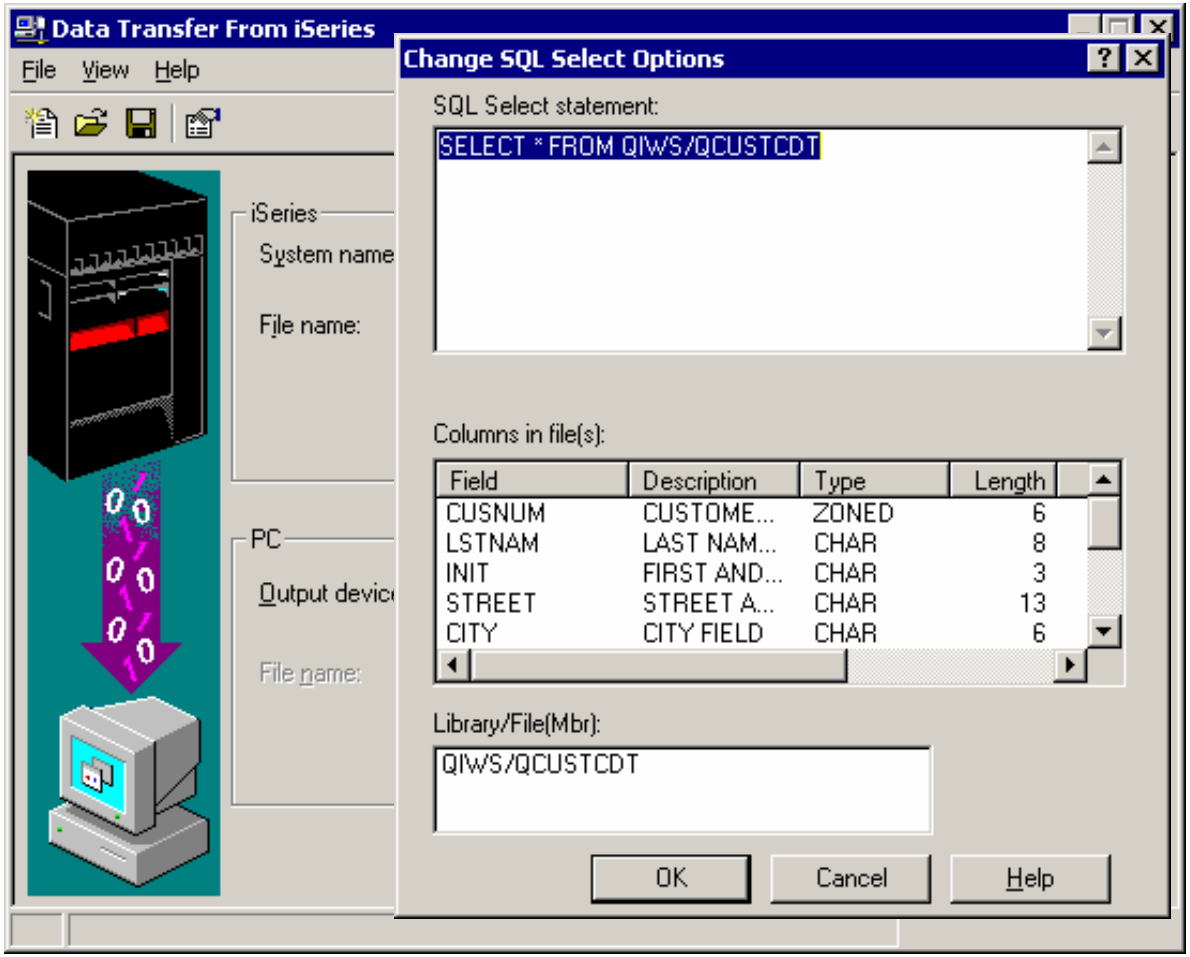
After choosing to process your statement as Native SQL, the Data Options button activates a Native SQL panel



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 Usage

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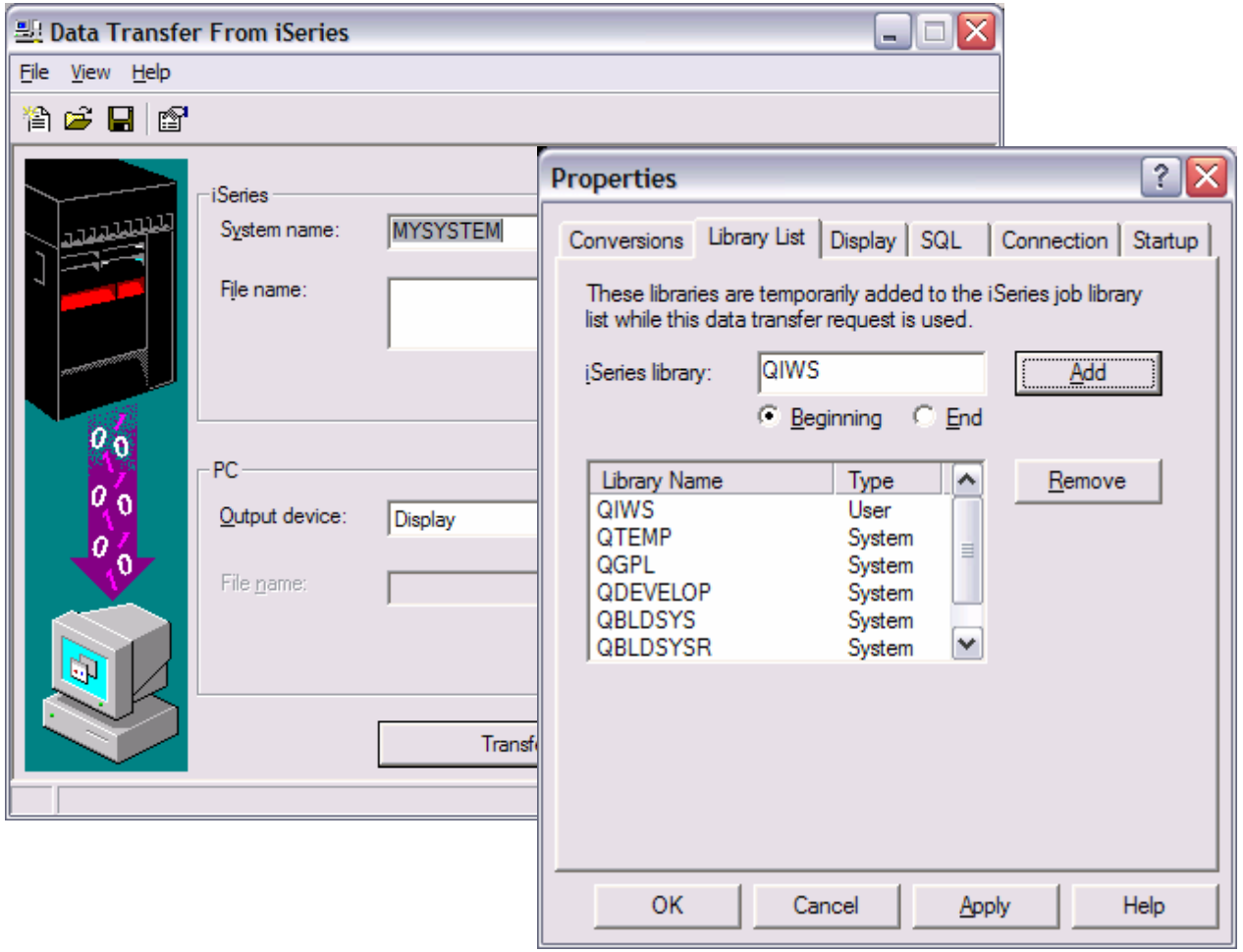
- Using the Data Transfer Query Builder
- **Tips and Tricks with Data Transfer**

Tips and Tricks with 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.

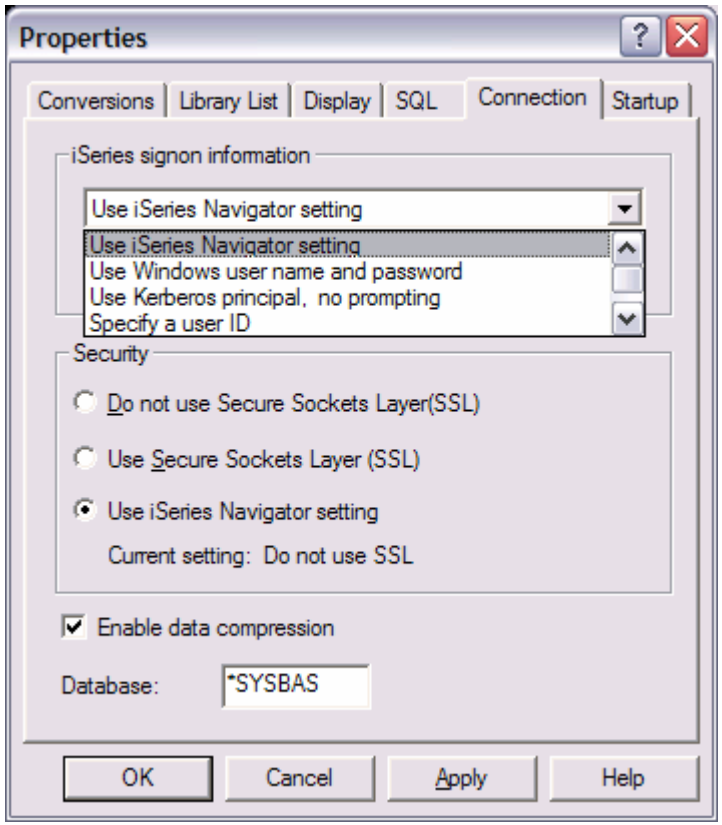
To set properties go to the File menu and select Properties.



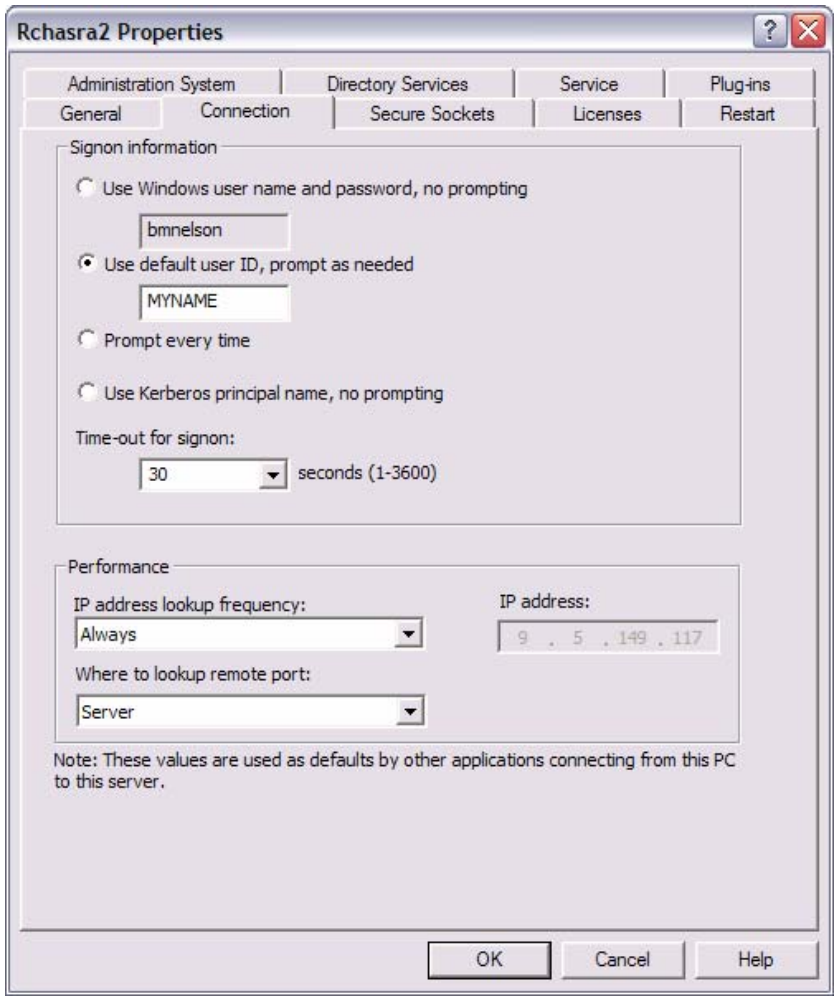
Tips and Tricks with Data Transfer

Select desired signon mode

Data Transfer
File menu -> Properties



System i Navigator
Right-click system, Properties



Tips and Tricks with Data Transfer

cwbtfdft.exe and cwbtfr.ini

- cwbtfdft.exe
  - Located in your …\IBM\Client Access directory
  - Example usage:

    cwbtfdft /dftchar:0

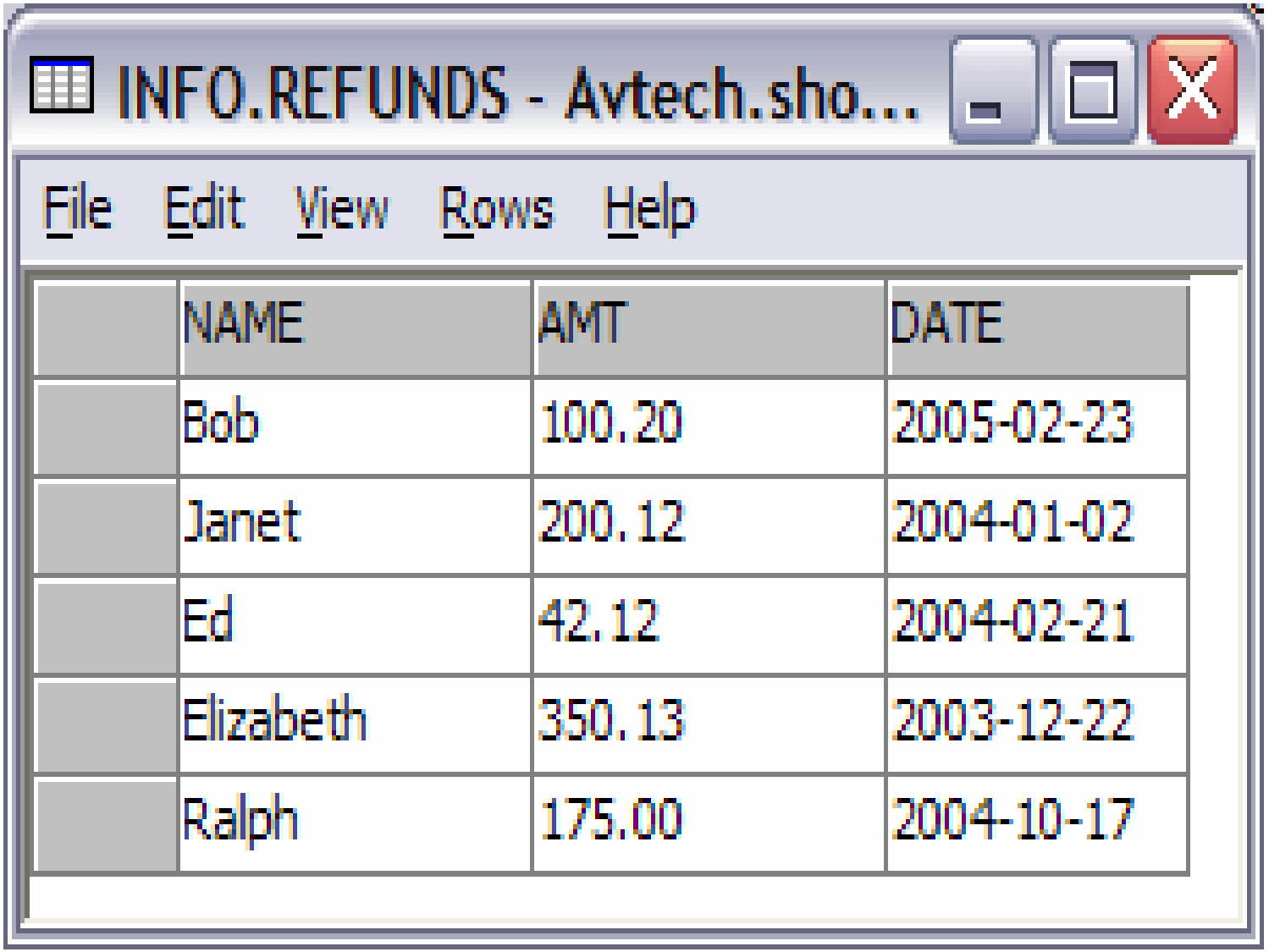
- cwbtfr.ini options:
  - Described at:

    http://www-1.ibm.com/support/docview.wss?uid=nas1352f81ff9d0d4c86862565c2007cae44

  - Example File:

    [Client Access Data Transfer]
    TabsAreTabs=1 ;
    ForceTranslation=1 ;

Tips and Tricks with Data Transfer



	NAME	AMT	DATE
	Bob	100.20	2005-02-23
	Janet	200.12	2004-01-02
	Ed	42.12	2004-02-21
	Elizabeth	350.13	2003-12-22
	Ralph	175.00	2004-10-17

Tips and Tricks with Data Transfer

SQL Tips

- Renaming a column – Ex: COL1 AS CUSTOMERS
- Reordering columns
- CAST'ing a column – Ex: CAST (COL1 AS INT)
- Scalar functions

Tips and Tricks with Data Transfer

Common Problems

- Transfers to PC
  - Working with CCSID 65535 fields
  - Working with date/time/timestamp fields
  - Modifying output into PC Files

- Transfers to Server
  - V5R3 Data Transfer change to Unicode fields when uploading data

Tips and Tricks with Data Transfer

Performance Considerations

- Data Compression
- Indexes
- SQL performance clauses
  - OPTIMIZE FOR N ROWS
  - FOR FETCH ONLY / FOR UPDATE
  - FETCH FIRST N ROWS ONLY

Tips and Tricks with Data Transfer

Hooking into ActiveX support

Add reference to cwbx.dll

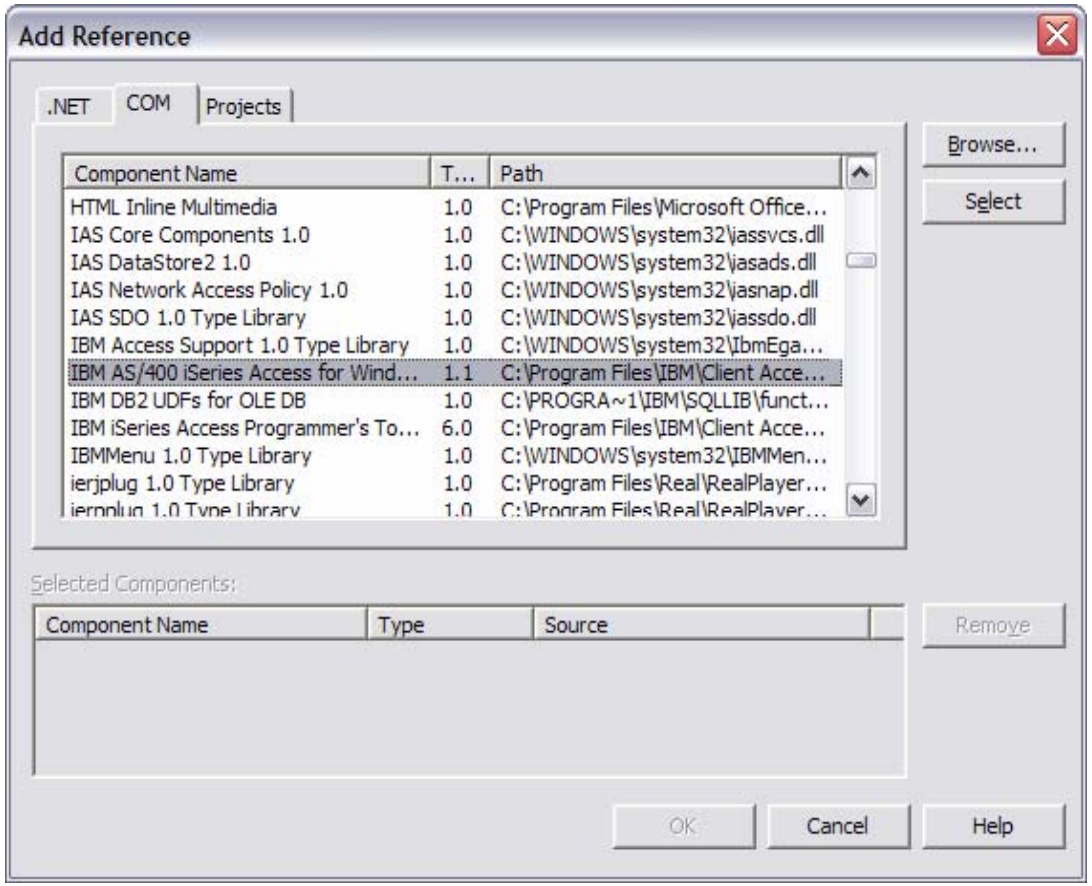
In Visual Studio 2003, go to:

Project menu ->

Add Reference ... ->

COM tab ->

IBM AS/400 iSeries Access for Windows ActiveX Object Library



Tips and Tricks with Data Transfer

Microsoft Visual Basic - Code

```
Dim dlr As New cwbx.DatabaseDownloadRequest
Dim mySystem As New cwbx.AS400System

mySystem.Define “MySystemName"
mySystem.UserID = “MyUserID"
mySystem.Password = “MyPassword"

Set dlr.System = mySystem
dlr.AS400File = “QIWS/QCUSTCDT"
dlr.pcFile = "c:\mycustomers.xls"
dlr.pcFile.FileType = cwbdtBIFF8

dlr.Download
```

Tips and Tricks with Data Transfer

Microsoft Visual Studio 2003 - C# Code

```
cwbx.DatabaseDownloadRequest myrequest = new cwbx.DatabaseDownloadRequestClass();
cwbx.AS400System mySystem = new cwbx.AS400SystemClass();

mySystem.Define( “MySystemName" );
mySystem.UserID = “MyUserID";
mySystem.Password = “MyPassword";

myrequest.system = mySystem;
myrequest.AS400File.Name = "QIWS/QCUSTCDT";
myrequest.pcFile.Name = "C:\\mycustomers.xls";
myrequest.pcFile.FileType = cwbx.cwbdtFileTypeEnum.cwbdtBIFF8;

myrequest.Download();
```

Tips and Tricks with Data Transfer

Recent Enhancements

- V5R4
  - MS Excel XML Spreadsheet format
  - 128 byte column names
  - Can access data in an independent auxiliary storage pool (IASP)
  - Supports creating and overwriting empty query result sets

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

Session title: iSeries Access Data Transfer – Tips and Techniques

Session ID: 409159

Agenda Key: 54CB

Speakers: Carole Miner
Ruben Ibarra Gonzalez

System i Access for Windows sessions:

21CA	420017	System i Access for Windows: What's New in V5R4
22CA	409159	System i Access for Windows Data Transfer: Tips & Techniques
26CC	403971	System i Access for Windows: Security & Communications Tips
31CA	406172	PC5250 Emulation: Everything You Need To Know
32CA	401918	Performance Tune System i Access ODBC
33CA	420219	System i Access in the .NET World
35LA/ 36LA	410160	OPEN LAB: System i Access for Windows with the Experts
52CB	402066	Administration of System i Access for Windows

System i Access for Linux session:

25CA	480144	Creating the System i Linux Desktop

Appendices

- Components of a Data Transfer Notes
- Scheduling Data Transfers
- 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:

PC File Types

Data Transfer supports many popular PC file formats when transferring data to or from the System i5. However, some rules apply when performing a data transfer, especially uploading data to the System i5.

Download

- The PC file type to download to must be able to hold the data from the System i5 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 System i5 file, the format of the data in the PC file must match the format of the data in the System i5 file.
- If the PC file has column names those names must match the names in the File Description File and the System i5 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.

Components of a Data Transfer

Component II: An iSeries Database or Source Physical File

Transferring data to or from the System i5 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 System i5 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 System i5 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.

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 System i5.

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.

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 System i5.
- Some of the items stored in a transfer request include:
  - System i5 system name
  - System i5 file name(s)
  - PC file name
  - PC File Description File name
  - PC file type

Scheduling Data Transfers

Add a scheduled task

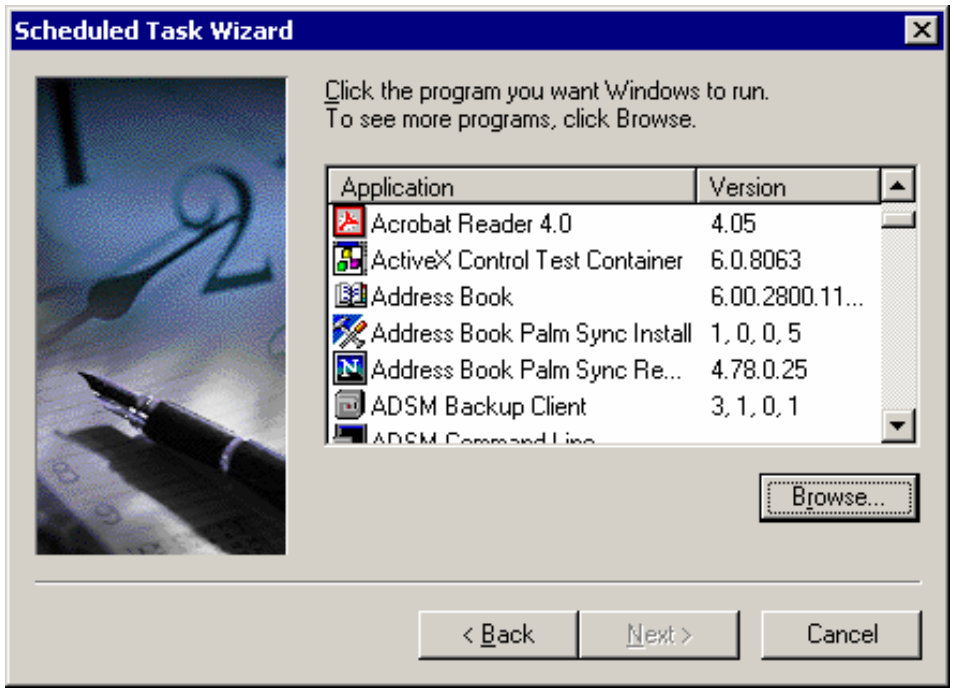
- iSeries Access for Windows does not provide a scheduler program. For this example, we use Microsoft's Task Scheduler application.
- To access Microsoft's Task Scheduler, go to your Control Panel, select Scheduled Tasks, and select Add Scheduled Task.

Scheduling Data Transfers

Choose the application to schedule

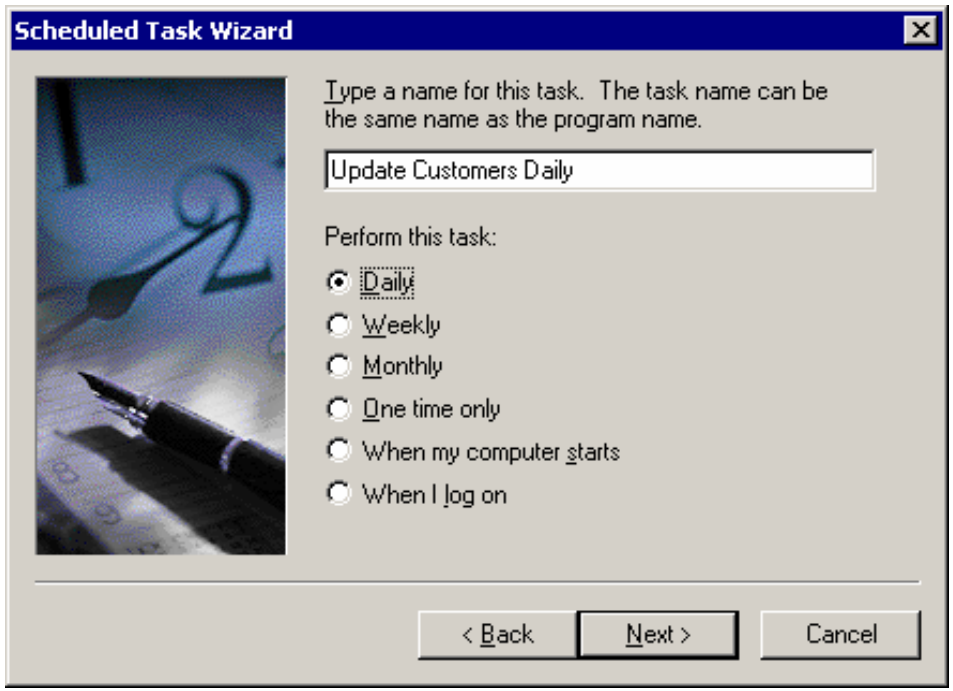
- Click Browse
- Choose the RXFERPCB.EXE, RTOPCB.EXE or RFROMPCB.EXE program located by default in:

C:\Program Files\IBM\Client Access



Scheduling Data Transfers

Choose how often to run the task

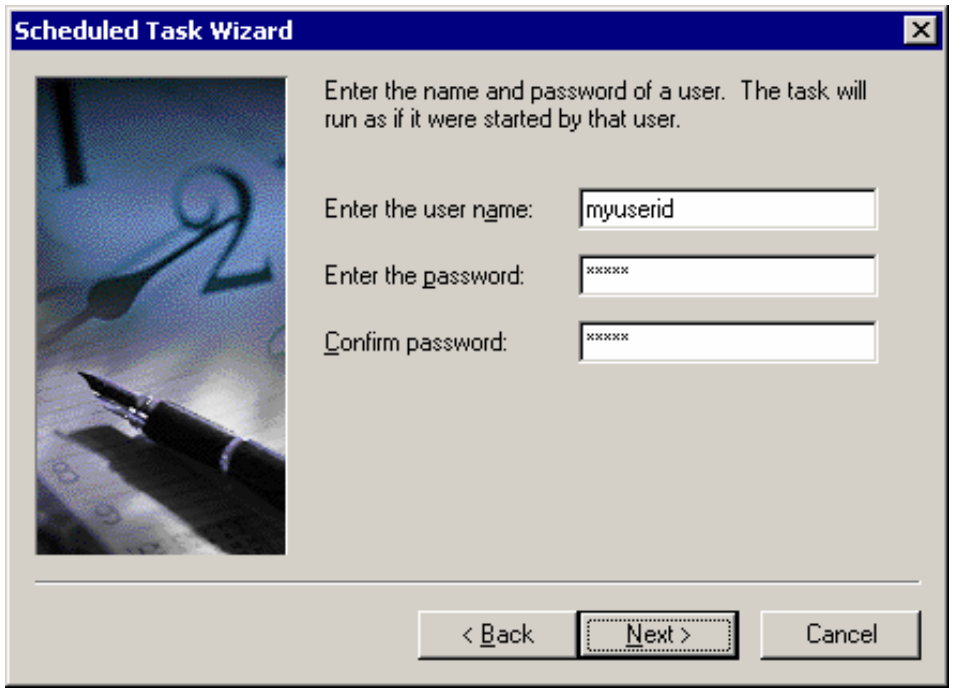


Scheduling Data Transfers

Choose the time to run the task

Scheduling Data Transfers

Choose the user ID to run the task



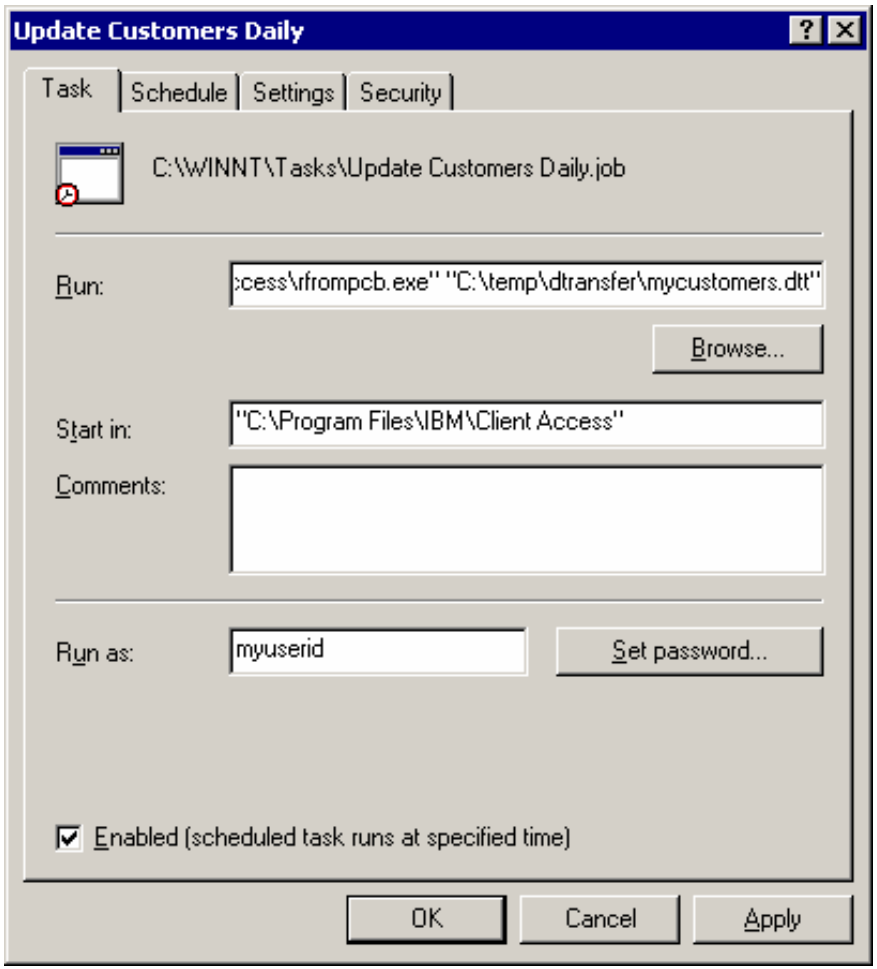
Scheduling Data Transfers

Verify summary information

Scheduling Data Transfers

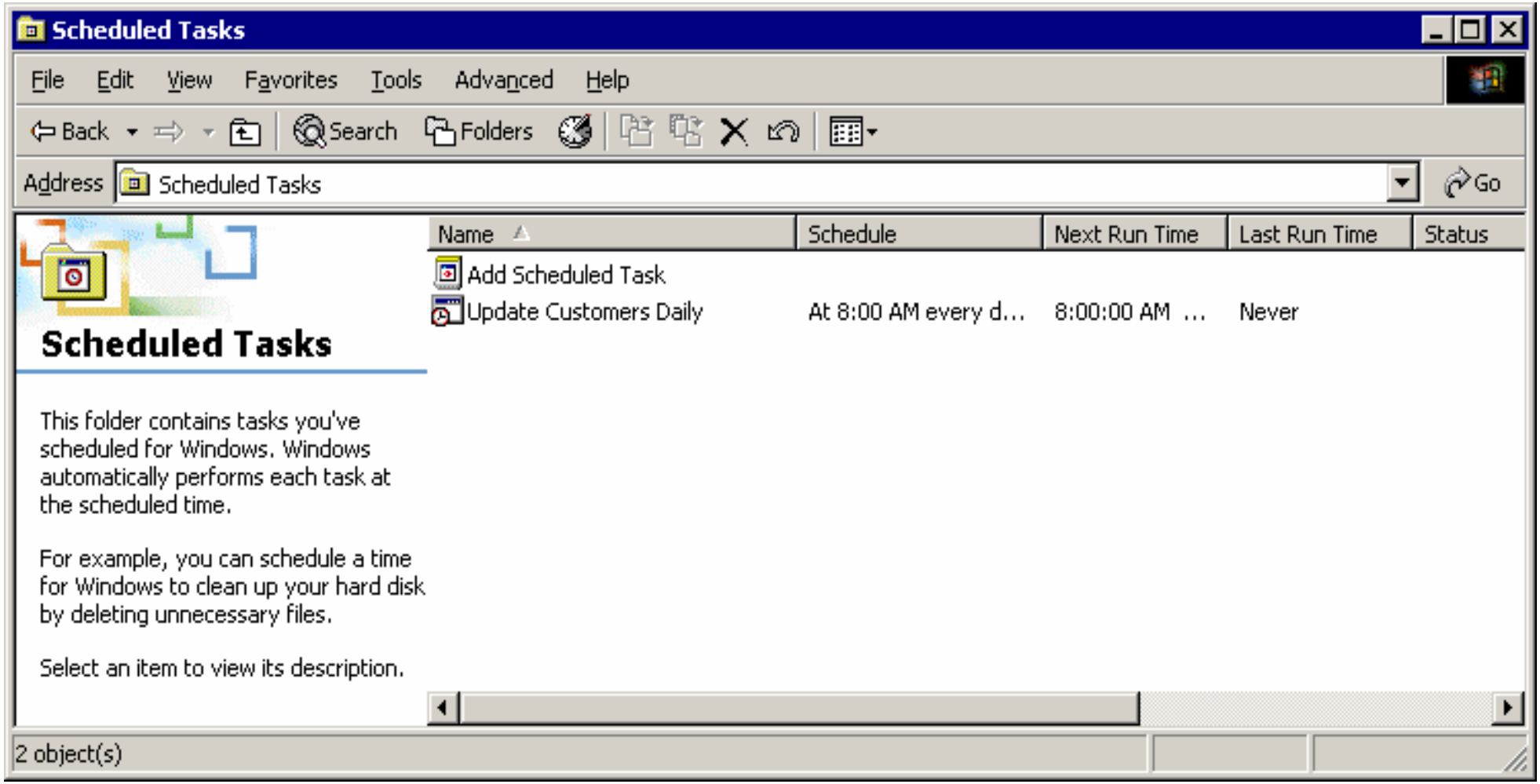
Add the transfer request to run

- Modify the Run line to include the transfer you want to run



Scheduling Data Transfers

Viewing scheduled tasks



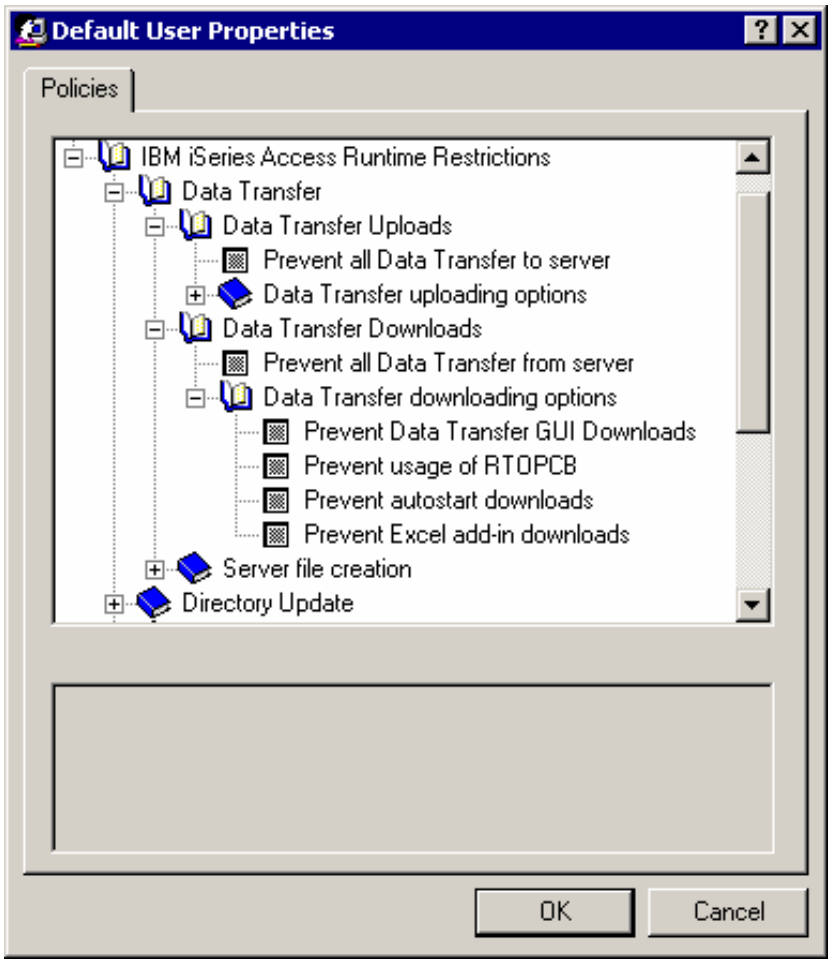
Administering Access to Data Transfer

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

Administering Access to Data Transfer

Microsoft System Policies

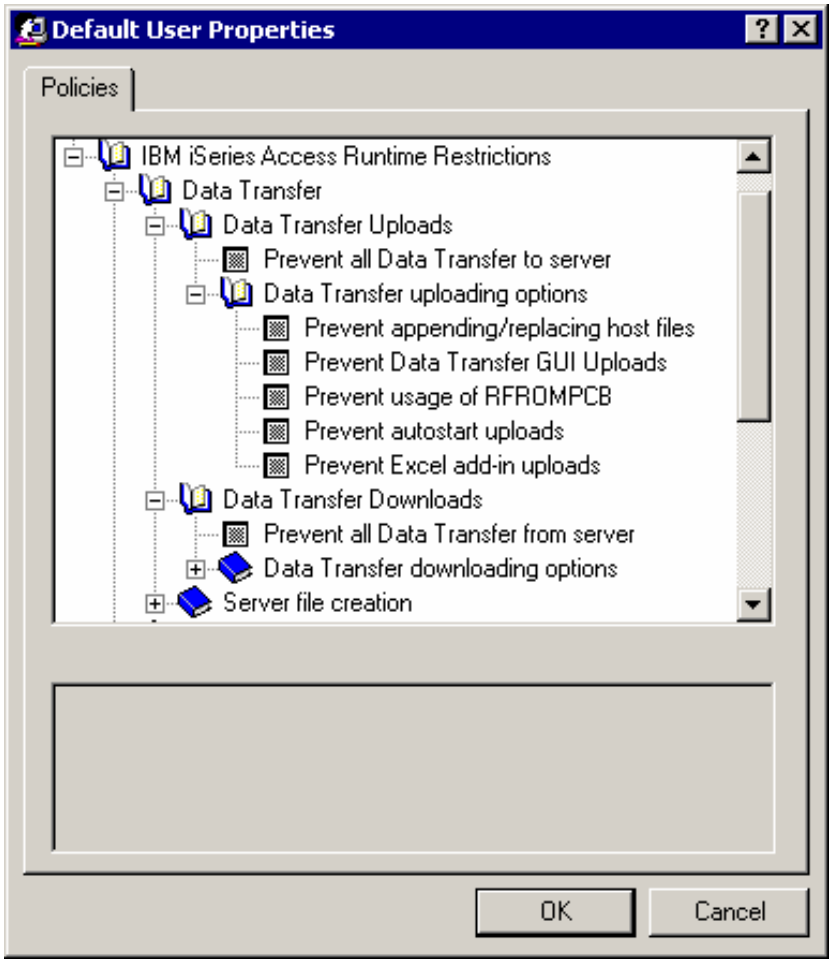
- Data Transfer From iSeries - Limiting downloads
  - Prevent usage of Data Transfer From iSeries
  - Prevent usage of Data Transfer GUI
  - Prevent usage of RTOPCB command
  - Prevent autostart uploads
  - Prevent usage of Excel-Add In
- Limiting users to only autostart downloads will help to prevent them from modifying transfer requests and keep them from downloading any file they have read access to on the System i5.



Administering Access to Data Transfer

Microsoft System Policies

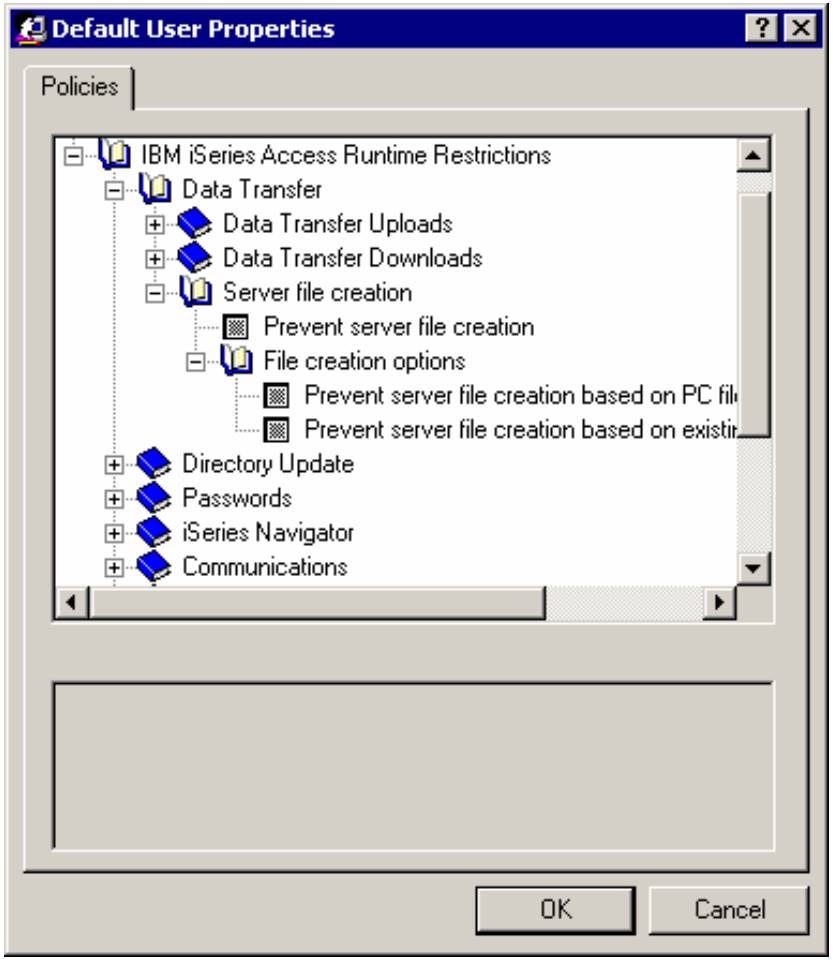
- Data Transfer To iSeries - Limiting uploads
  - Prevent usage of Data Transfer To iSeries
  - Prevent appending to/replacing host files
  - Prevent usage of Data Transfer GUI
  - Prevent usage of RFROMPCB command
  - Prevent autostart uploads
- Limiting users to only autostart uploads will help to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



Administering Access to Data Transfer

Microsoft System Policies

- Data Transfer To iSeries - iSeries server file creation
  - Prevent creation of new files on the System i5
  - 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.



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.

For more information on policy support see:
http://publib.boulder.ibm.com/infocenter/iseries/v5r4/index.jsp?topic=/rzaii/rzaiiconfiguration.htm

Administering Access to Data Transfer

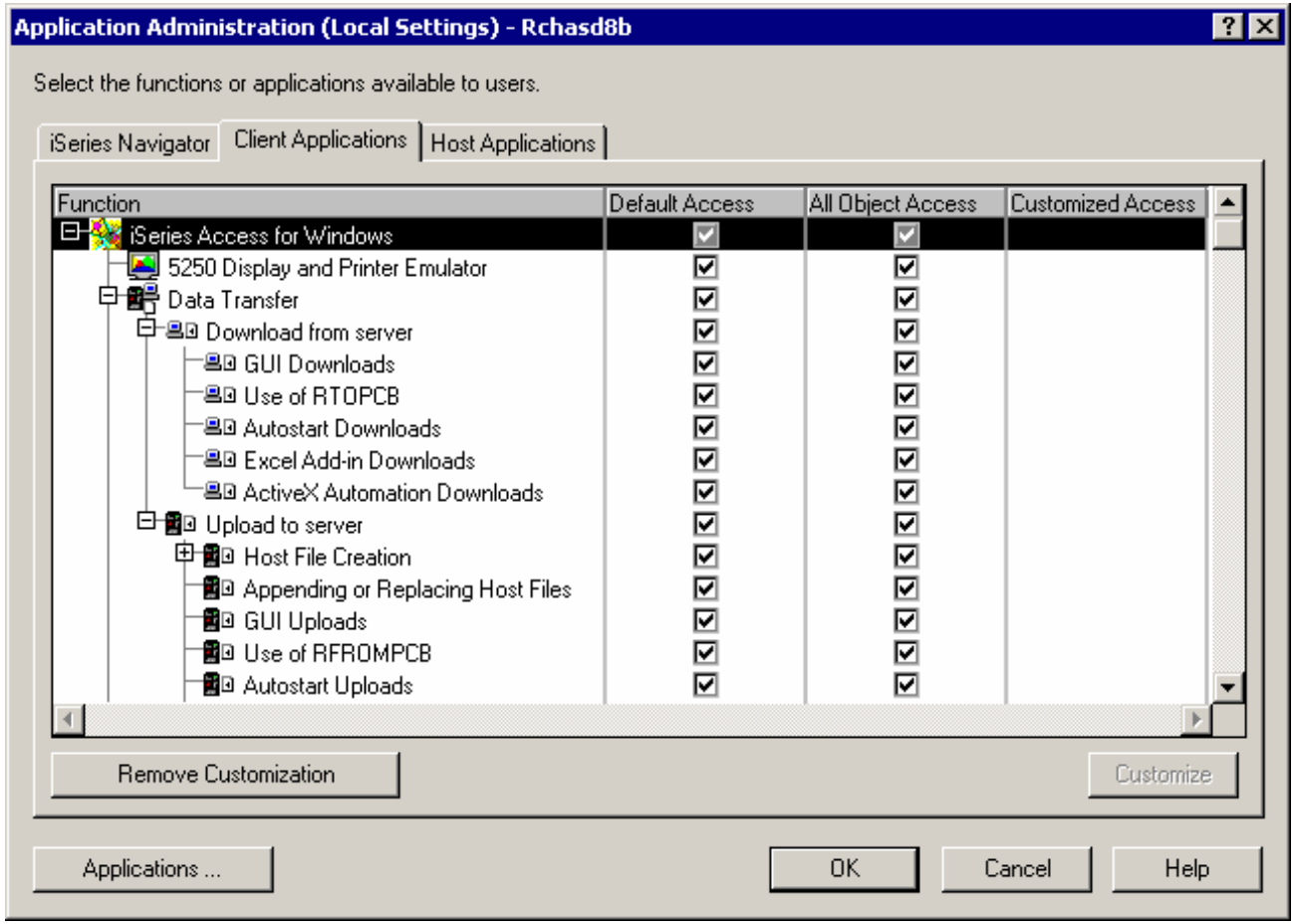
Getting a system setup for policies

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 System i5 NetServer.
    - POLICIES is the name of the shared file folder on your System i5 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.)

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 System i5
  - Data Transfer options are stored on a per user/per System i5 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 System i5
  - 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.

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/infocenter/iseries/v5r4/index.jsp?topic=/rzahf/rzahfsecurity.htm

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.

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.

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

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 System i5 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 System i5 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.

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

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 mySystem As New cwbx.AS400System

mySystem.Define “MySystemName"
mySystem.UserID = “MyUserID"
mySystem.Password = “MyPassword"

Set dlr.System = mySystem
dlr.AS400File = “QIWS/QCUSTCDT"
dlr.pcFile = "c:\mycustomers.xls"
dlr.pcFile.FileType = cwbdtBIFF8

dlr.Download
```

Data Transfer ActiveX Automation Objects

Using the DatabaseUploadRequest Object

The DatabaseUploadRequest object can be used to programmatically perform an upload to the System i5 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.

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