Run IBM i Access Client Solutions Data Transfers on the IBM i

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About this document

This document describes how to run the IBM i Access Client Solutions Java–based data transfer program on the IBM i.

Your IBM i server must be at OS/400 V5R4 or above to use the steps shown in this document.

The IBM i Access Client Solutions (ACS) product is a new offering from IBM. It provides some of the features of the traditional IBM i Access for Windows (5250 emulation, data transfer) in a Java environment. Any client computer that has the Java 6 or Java 7 runtime environment can use the ACS programs. For example, the program can be installed on a Macintosh computer or on a PC running Linux.

Because the product is entirely Java–based, it is also possible to run the Data Transfer features (file download / file upload) on the IBM i. It is important to understand that installing and running the IBM i Access Client Solutions product on the IBM i is **not supported** by IBM.

Installing and using the ACS data transfer components on the IBM i may be useful for some scenarios where you need to extract data from the IBM i database into PC file formats, or where you need to upload data from PC file formats to the IBM i database. By moving the data transfer components to the IBM i, you can take advantage of the IBM i batch processes to run the data transfer programs. This may lessen the need for creating and maintaining cumbersome PC–based data transfer mechanisms, which traditionally use remote command features.

The PC format files that are produced (file download) or consumed (file upload) are located in the IBM i IFS

After installing and configuring the ACS components on the IBM i, you can use a workstation–based version of ACS to develop the data transfer applications. The outputs of the workstation development are PC files that describe the data transfers. After creating and saving the description files on the workstation, you copy the description files to the IBM i IFS. When you run the data transfer programs on the IBM i, you reference the description files.

IMPORTANT

USE THE STEPS DESCRIBED IN THIS DOCUMENT **AT YOUR OWN RISK**.

IBM WILL NOT PROVIDE SUPPORT FOR THE STEPS DESCRIBED IN THIS DOCUMENT.

IF YOU ARE UNSURE ABOUT WHAT YOU ARE DOING, DO NOT CONTINUE. SEEK QUALIFIED HELP IF NECESSARY.

BEFORE RUNNING THE PROGRAMS DESCRIBED IN THIS DOCUMENT, BE SURE YOU HAVE ADEQUATE BACKUPS OF ALL IMPORTANT DATA THAT YOU ARE WORKING WITH.

IMPORTANT

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Why

At each major section of this document, you will see a heading labeled **Why**. Within that heading, there is a brief description of why you need to perform the steps in the section.

Although it looks like performing all of the steps in this document will be a laborious task, you should be able to complete all of the steps and have Data Transfer running on your IBM i within a few hours. By explaining why you need to perform the steps shown in a section, you should have a better understanding of what you are trying to accomplish within that section and how the steps fit in with the rest of the procedures described in this document.

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PC Prerequisites

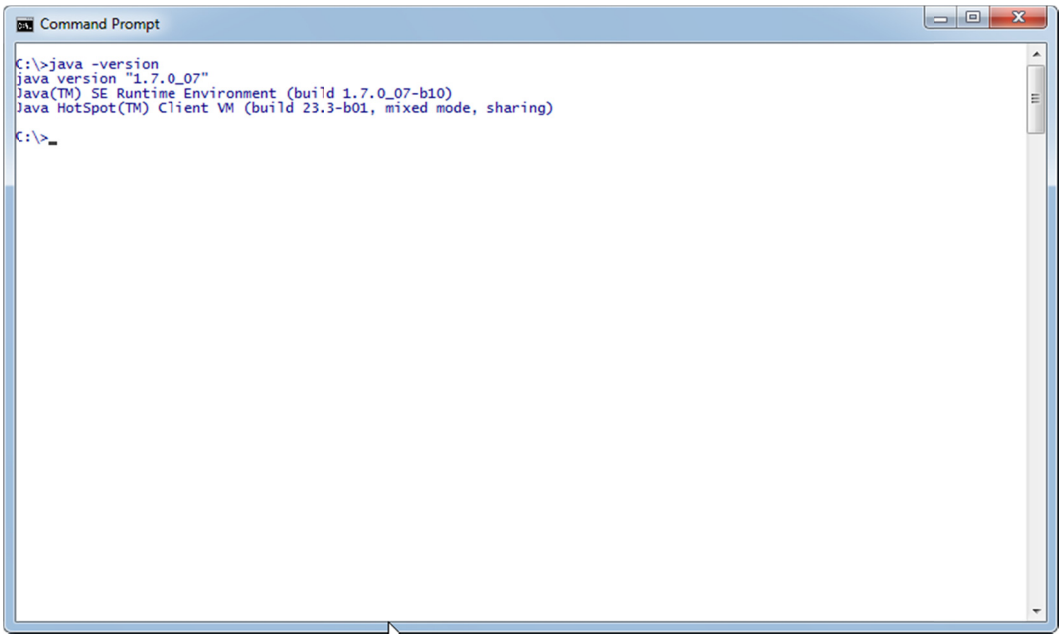
Why: To run the ACS code on your PC, you need the Java 6 or higher runtime on your workstation. You will run the ACS code on your PC to test the programs, and also to develop the Data Transfer description files.

_____ Open the Command Prompt program.

_____ Enter the following command:

```
java  -version
```

_____ If Java is installed on your workstation, you will see output similar to what is shown in Figure 1.



iac090

Figure 1: Use the java -version command to verify that Java is installed on your workstation.

_____ If you do not get the expected output from the `java –version` command, or if the version is lower than 1.6, you need to download and install the current version of Java.

Go to http://www.java.com and download the version for your workstation's operating system.

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IBM i Prerequisites

Why: To run the ACS code on the IBM i, you need the Java 6 or higher runtime on the IBM i. You need to verify that you have the correct feature of the IBM Developer Kit for Java (Licensed Program Product [LPP] 57xx-JV1) installed on the IBM i.

- For OS/400 V5R4, the LPP is 5722-JV1
- For IBM i V6R1 and IBM i V7R1, the LPP is 5761-JV1

_____ On a 5250 command entry display, enter the command:

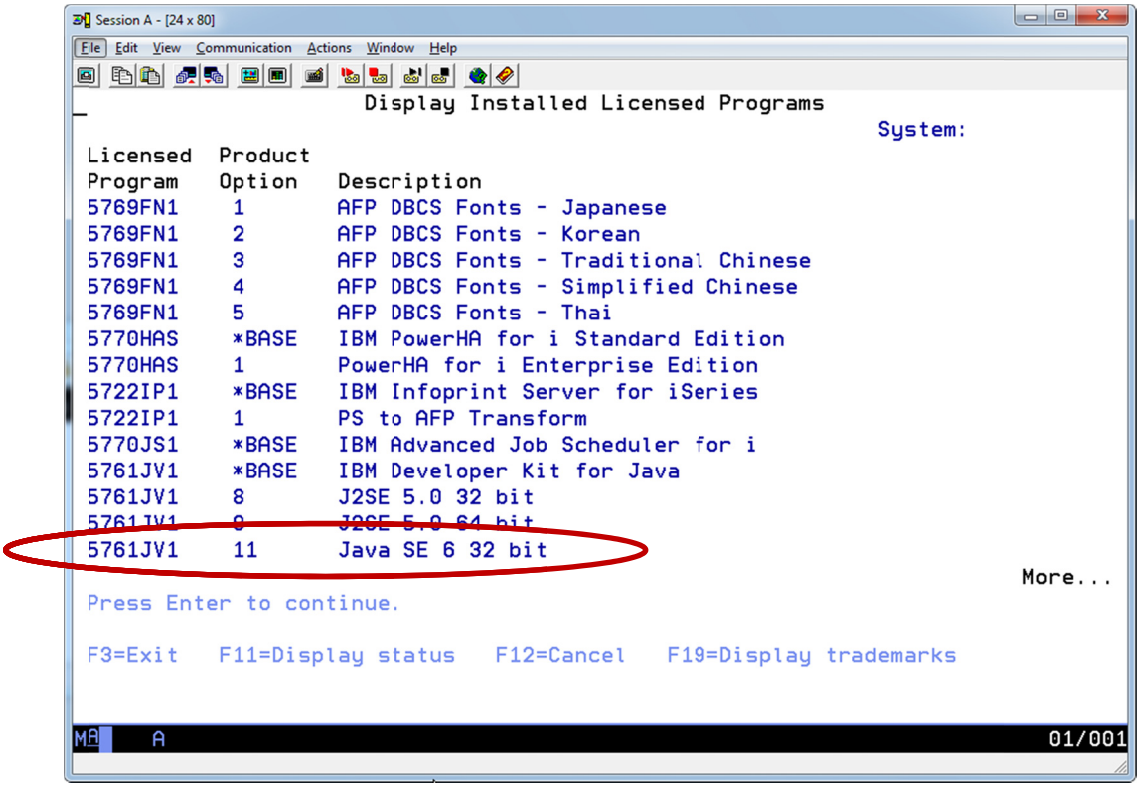
```
GO LICPGM
```

_____ On the **Work with Licensed Programs** menu, enter option 10, **Display installed licensed programs**.

_____ Scroll through the list of installed licensed programs until you locate the **57xxJV1 IBM Developer Kit for Java.**

_____ Verify that LPP **57xx-JV1 option 11** (**Java SE 6 32 bit**) is installed (Figure 2) and/or LPP **57xx-JV1 option 12** (**Java SE 6 64 bit**) (Figure 3) is installed.

_____ If neither of the Java SE 6 options are installed, you need to install the LPP product options and install the current PTFs before continuing.



iac091

Figure 2: Use the Display Installed Licensed Programs program to verify that the Java SE 6 product is installed on the IBM i.

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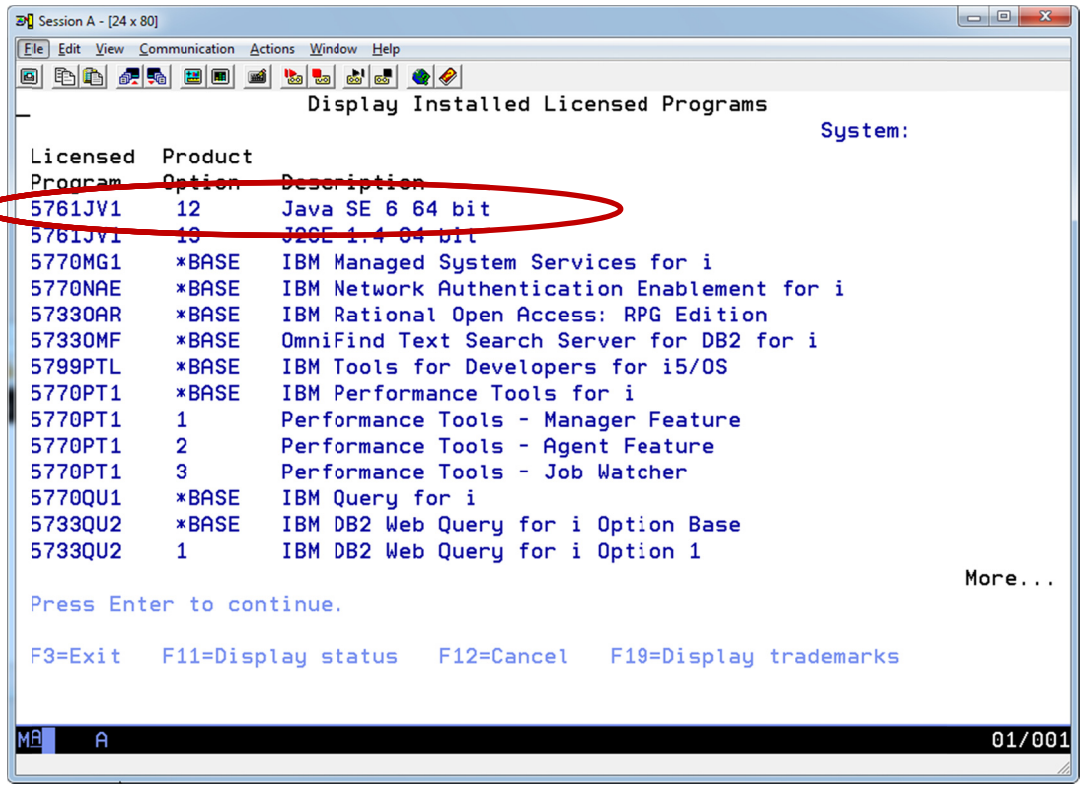

iac092

Figure 3: This is a continuation of the Display Installed Licensed Programs output, showing that the 64 bit Java SE 6 runtime is installed on the IBM i.

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Download and install IBM i Access Client Solutions

Why: You need to get the IBM i Access Client Solutions code to complete the steps shown in this document.

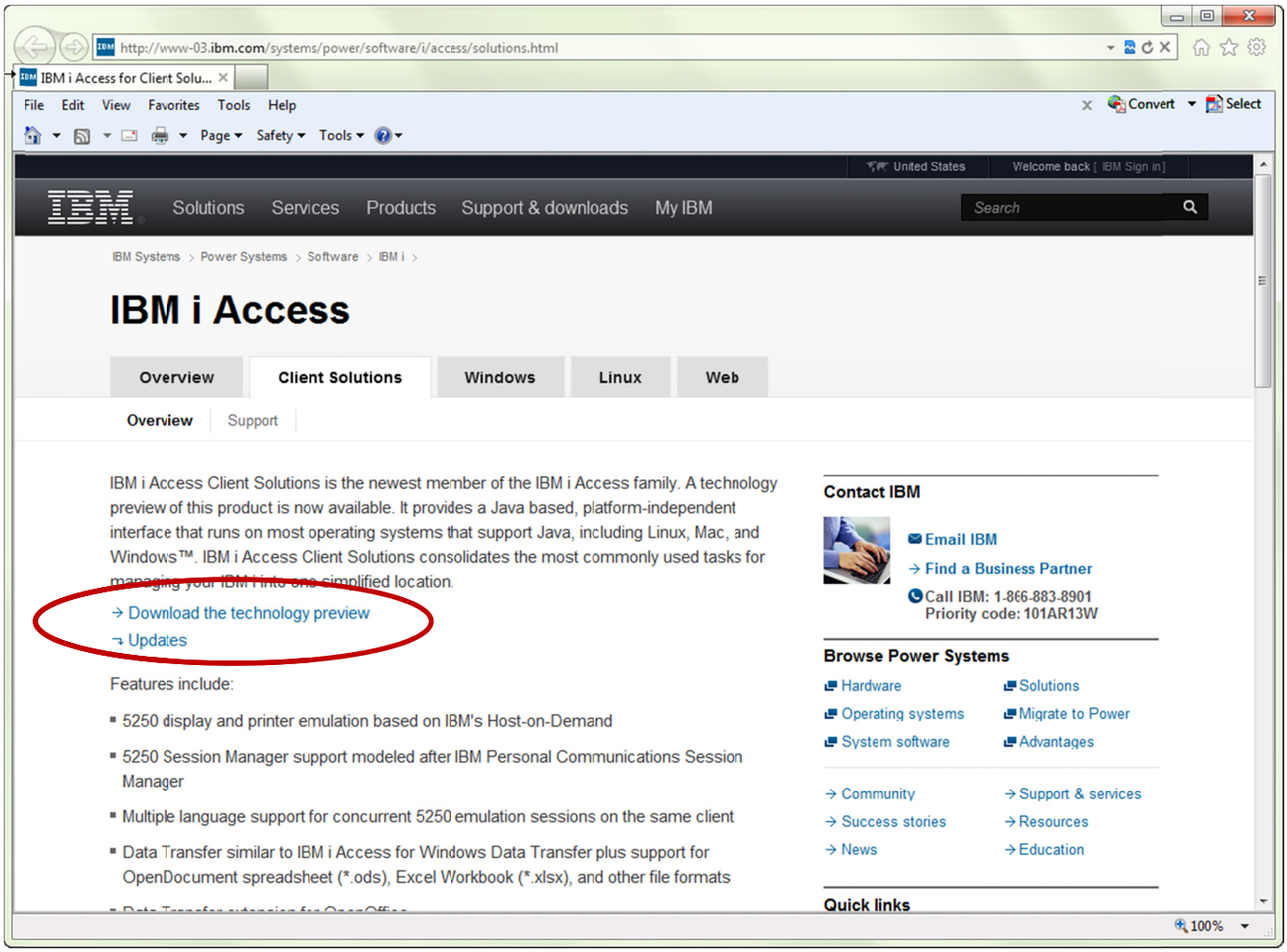
At the time this document was prepared, the IBM i Access Client Solutions licensed program product (5733-XJ1) was available for download from IBM's web site. The download that was available was a "beta" version of the product.

Download the software

_____ Go to the following URL:

http://www-03.ibm.com/systems/power/software/i/access/solutions.html

_____ On the web page, click the **Download the technology preview** link as shown in Figure 4.



iac001v2

Figure 4: Download the IBM i Access Client Solutions product from the IBM site (screen grab: 2012-11-14).

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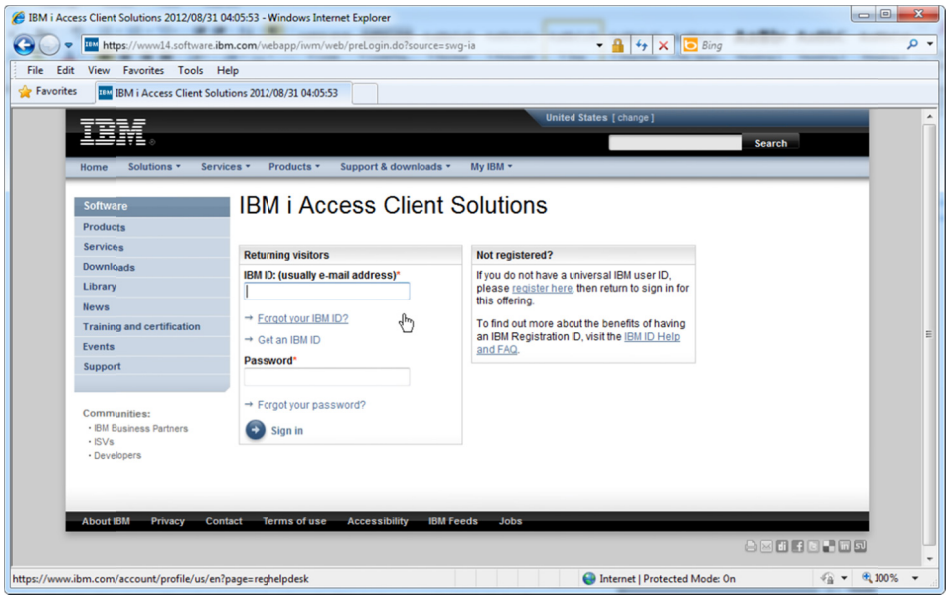
_____ You are prompted to enter your IBM ID and password (Figure 5). If you do not have an IBM ID, you can register and create an ID on this page.

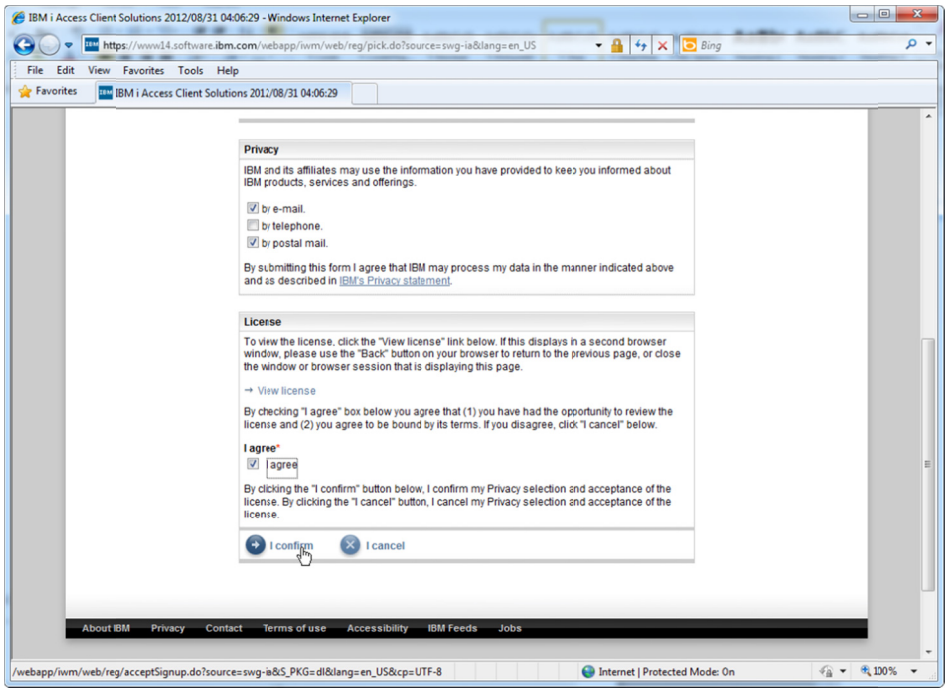
Note: do not enter your IBM i user ID and password**.** The IBM ID and password is an ID that is used to access IBM web pages.



iac002

Figure 5: You need to enter your IBM ID and password to access the software download page.

_____ After entering your ID and password, you are asked to confirm personal information and accept the license agreement (Figure 6).



iac003

Figure 6: You are asked to confirm your selections and agree to the license before downloading the software.

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_____ The IBM i Access Client Solutions download page shown in Figure 7 is displayed.

There are two techniques you can use to download the software:

- **Download Director** — this launches a Java application on your PC. You can select both files for download. The IBM Download Director is typically used when you are downloading very large files (several hundred MB and up), as it may be faster than the HTTP download. When downloading the ACS file, there is probably no performance advantage using the Download Directory.

  The Download Director requires that you have Java installed on your workstation.

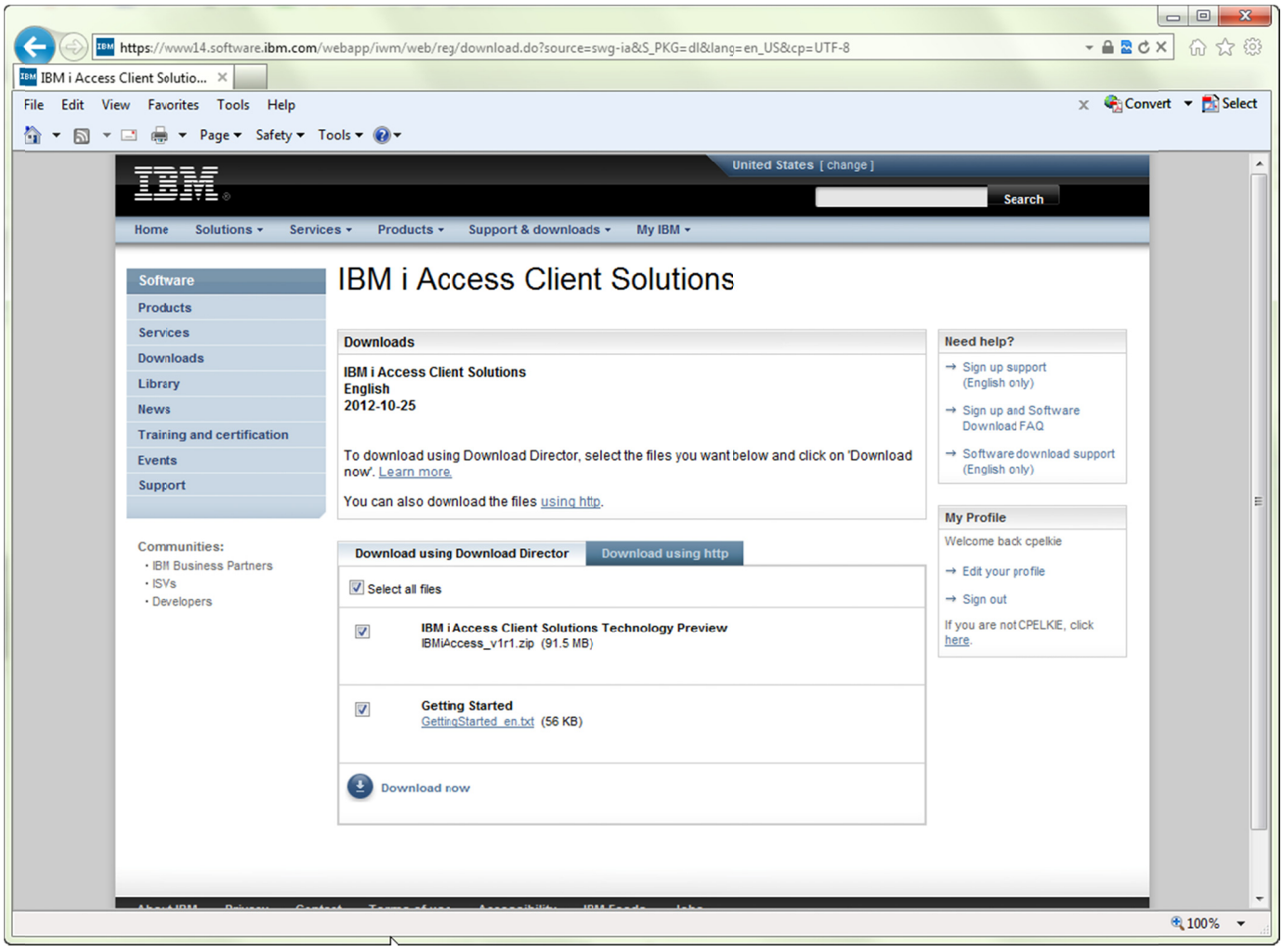
- **HTTP** — this uses the traditional browser–based download process.

_____ If you want to use the Download Director, use the steps shown in the next section.

_____ If you want to use HTTP, use the steps shown starting on page 12.

Download using the Download Director

_____ Select both files for download and click the **Download now** link, as shown in Figure 7.



iac004v2

Figure 7: You can use the Download Director to download the files.

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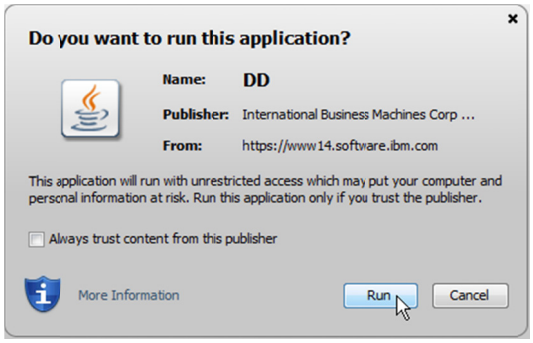
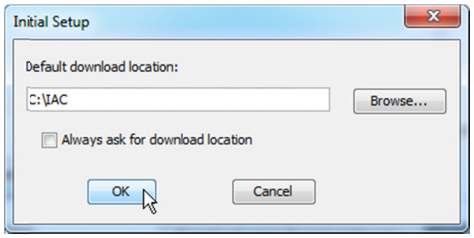
_____ The confirmation dialog shown in Figure 8 is displayed. Click the **Run** button to continue.



iac005

Figure 8: You are asked if you want the Download Director (a Java application) to run.

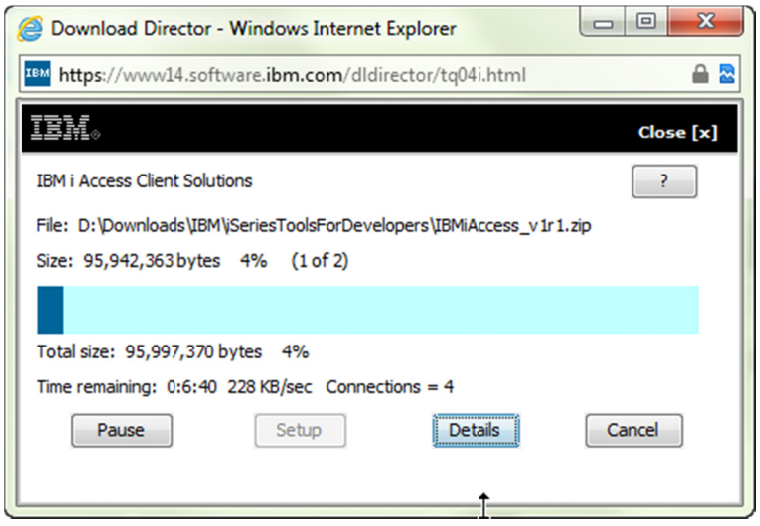
_____ If the Intial Setup dialog is displayed (Figure 9), enter the directory on your PC where you want the files downloaded to, then click the **OK** button.



iac006

Figure 9: The Download Director prompts for the directory on your PC where you want the software downloaded to.

_____ The Download Director progress dialog is displayed while the download is in progress (Figure 10).



iac007v2

Figure 10: The Download Director displays a progress dialog during the download.

_____ Go to **Extract the downloaded files** on page 13 to continue installing ACS on the workstation.

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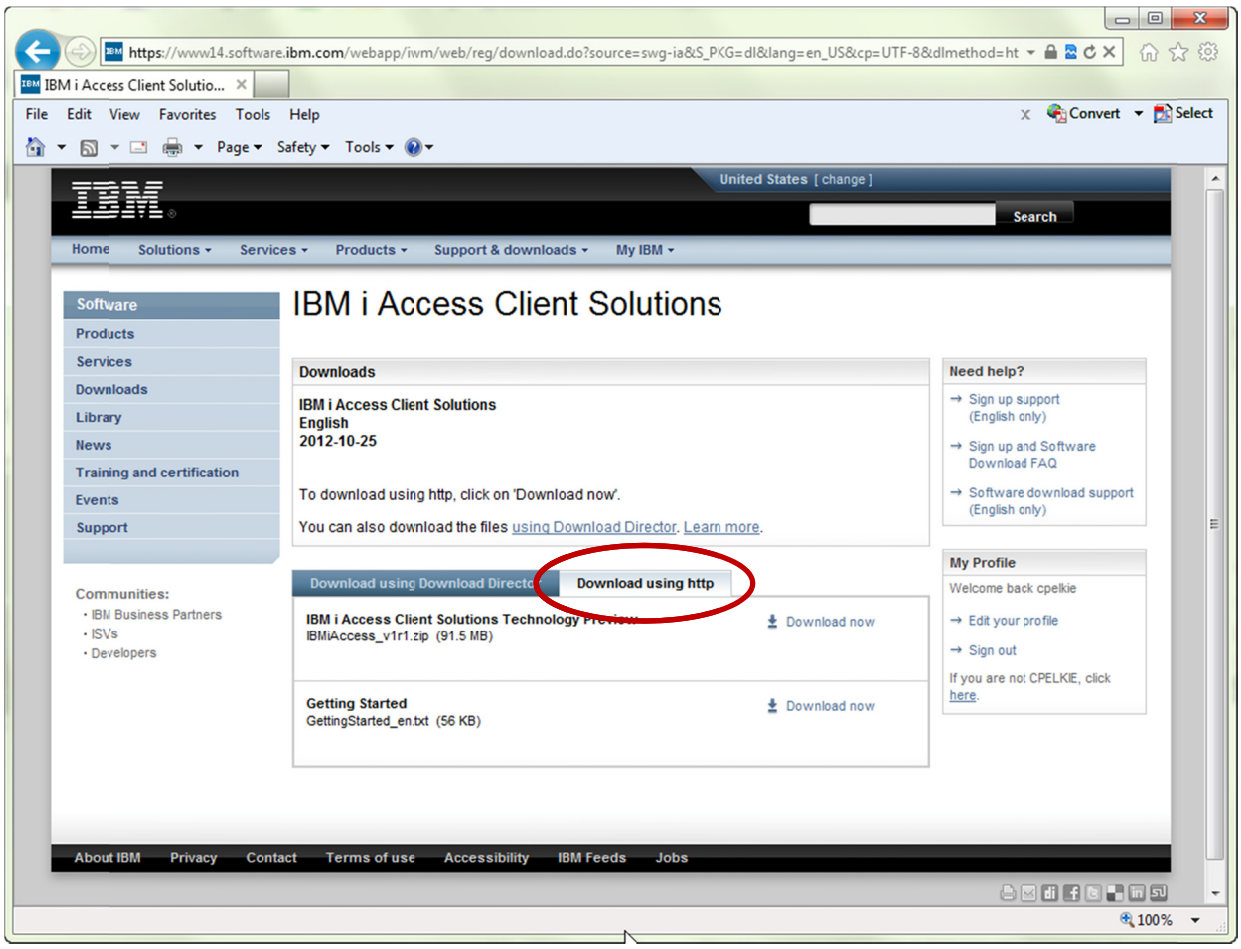
Download using HTTP

_____ If you do not want to use the Download Director, click the **Download using http** tab as shown in Figure 11.

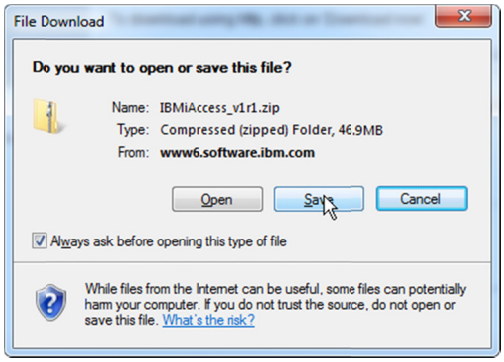
_____ Click the **Download now** link for both of the files.



iac011v2

Figure 11: You can download using HTTP if you do not want to use the Download Director.

_____ In the File Download dialog (Figure 12), click the **Save** button. Save the ACS files to a directory on your PC.



iac012

Figure 12: You are prompted to open or save the file that is downloaded.

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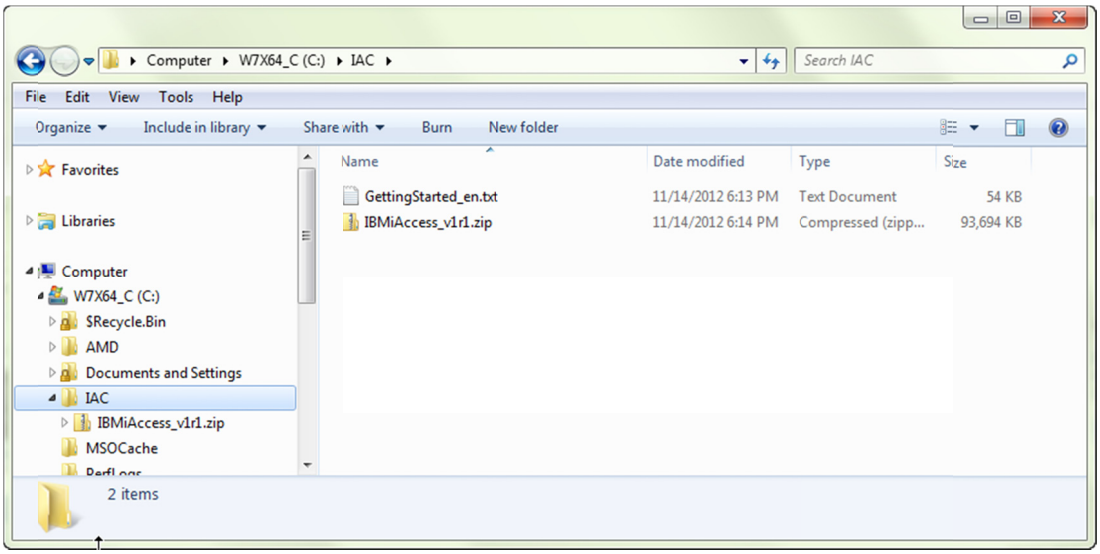
Extract the downloaded files

Why: The code that you download is in a ZIP file. You need to extract the files from the ZIP.

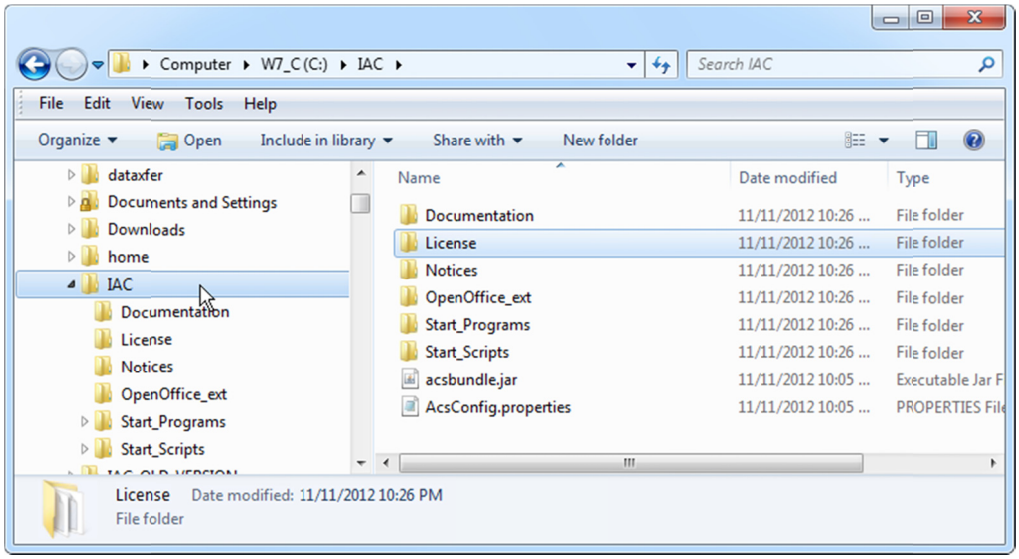
_____ Go to the directory where you download the ACS code. Figure 13 shows the `.txt` and the `.zip` file that were downloaded. (The `dlmgr.pro` file is only present if you used the Download Director. If you used the HTTP download, the file will not be present. It is not needed and may be deleted.)



iac021v2

Figure 13: Go to the directory where you downloaded the ACS code.

_____ Extract all of the files from the `IBMiAccess_v1r1.zip` file. You can extract the files to the same directory that you downloaded the files to, or to another directory on your workstation. Figure 14 shows all of the files in the zip, extracted to the same directory where the files were downloaded.



iac022

Figure 14: The directory will look like this after extracting all of the files from the .zip file.Run an ACS Data Transfer Download on your workstation

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Why: You need to run a Data Transfer download on your workstation to verify that the code works.

Before installing the ACS code on the IBM i, you should test it on your workstation. For this test, you will start ACS and perform a Data Transfer download (data will be transferred from an IBM i database file to a file on your workstation).

By running the test, you will verify hat the ACS code works, and you will see how it works. When done with the transfer, you will save the transfer description to a file on your workstation. The transfer description will be used when you run the ACS code on your IBM i.

Start the ACS program

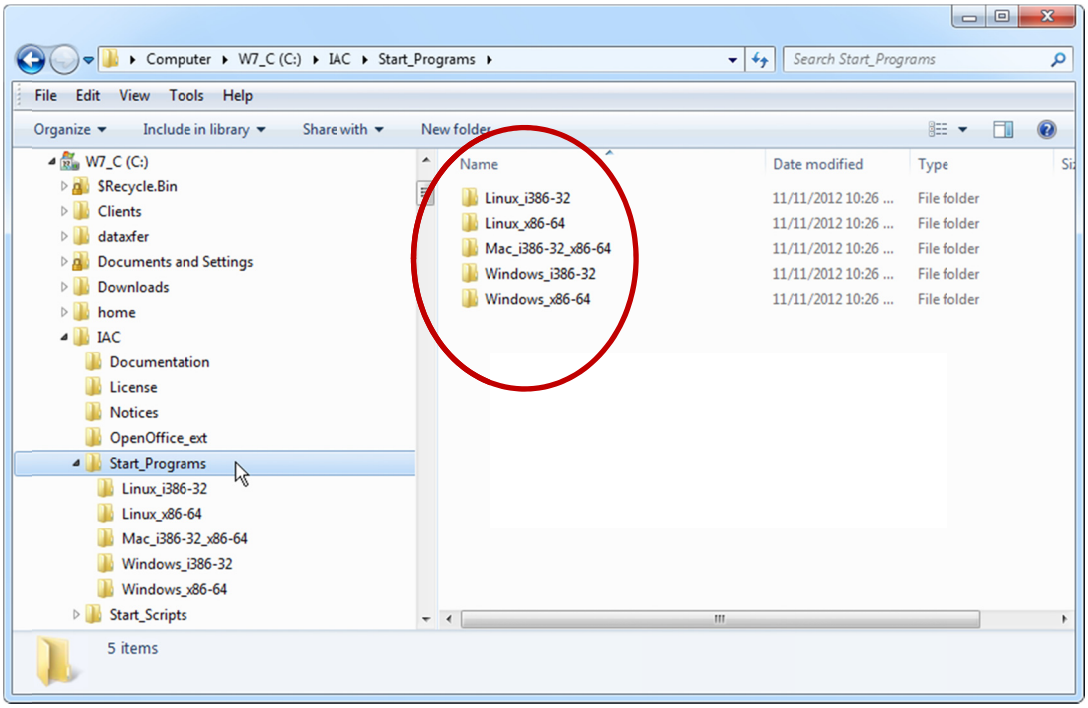
You can start the ACS program using either a startup program provided by IBM, or by running a startup script provided by IBM.

Start using a startup program

_____ Go to the directory where you extracted the downloaded file.

_____ In the `Start_Programs` directory, open the subdirectory for the workstation operating system that you are using, as shown in Figure 15.

_____ In the subdirectory, run the executable program to start the ACS program.



iac031

Figure 15: You can start the ACS client from the Start_Programs directory.

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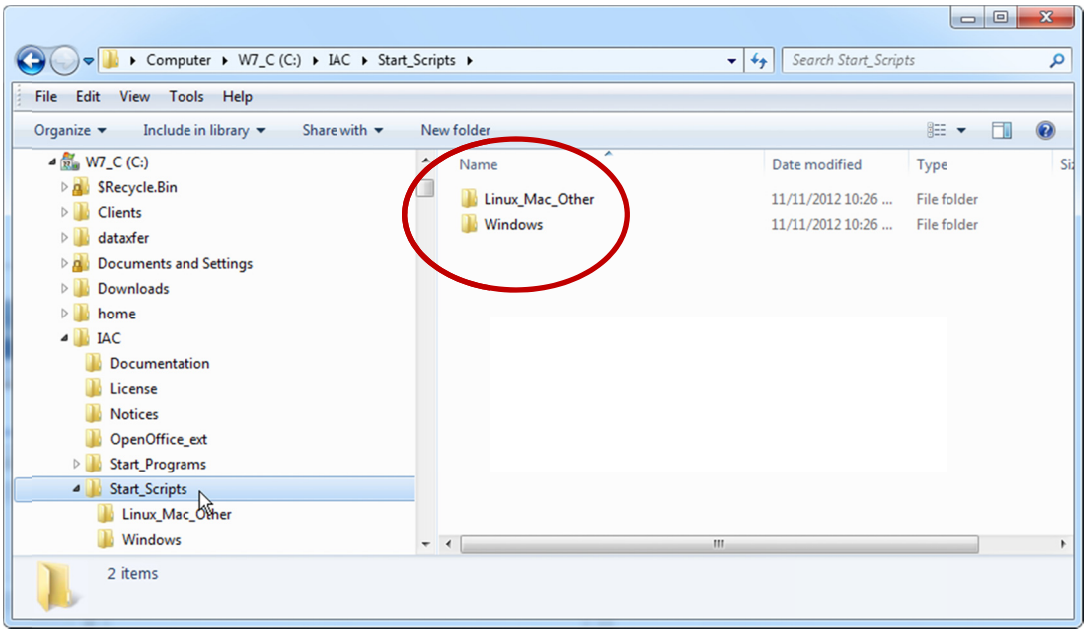
Start using a startup script

_____ Go to the directory where you extracted the downloaded file.

_____ In the `Start_Scripts` directory, open the subdirectory for the workstation operating system that you are using, as shown in Figure 16.

_____ In the subdirectory, run the script to start the ACS program.

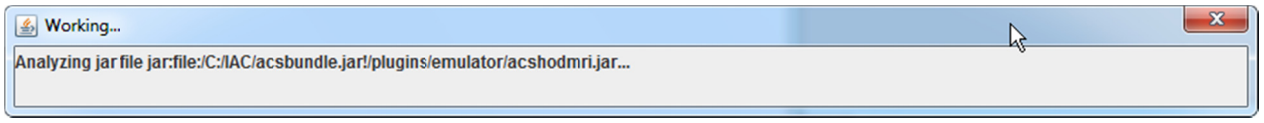


iac032

Figure 16: You can start the ACS client from the Start_Scripts directory.

Startup (startup program or startup script)

_____ The ACS program starts. While starting, you will see the **Working** panel shown in Figure 17. The message displayed in the panel changes as the program is loaded.



iac035

Figure 17: The Working panel shown here is displayed when you start the ACS program.

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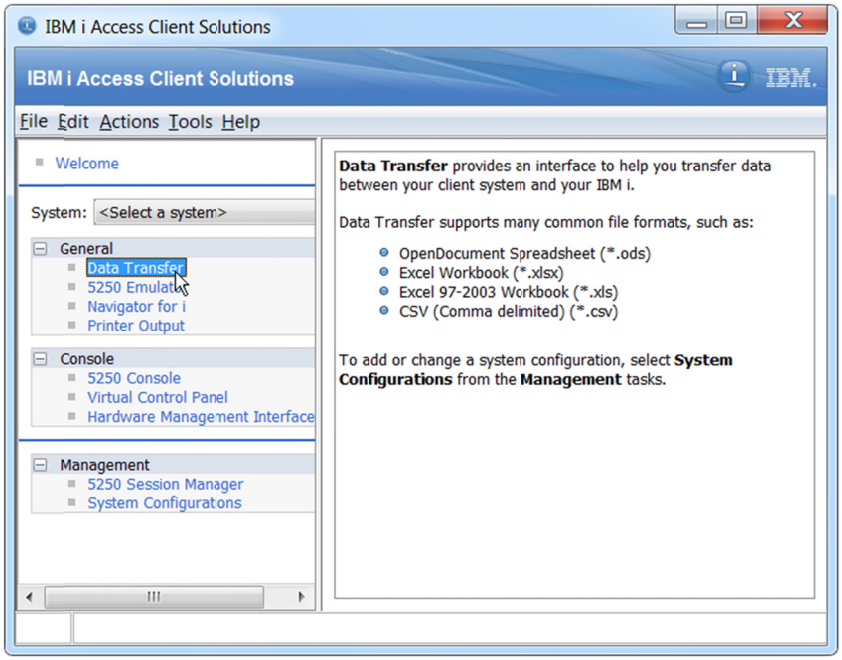
Run the Data Transfer with Display output

Why: For your first test, you will run a Data Transfer download to a display. This is the simplest and quickest way to verify that the download works.

_____ The **IBM i Access Client Solutions** dialog is displayed, as shown in Figure 18.

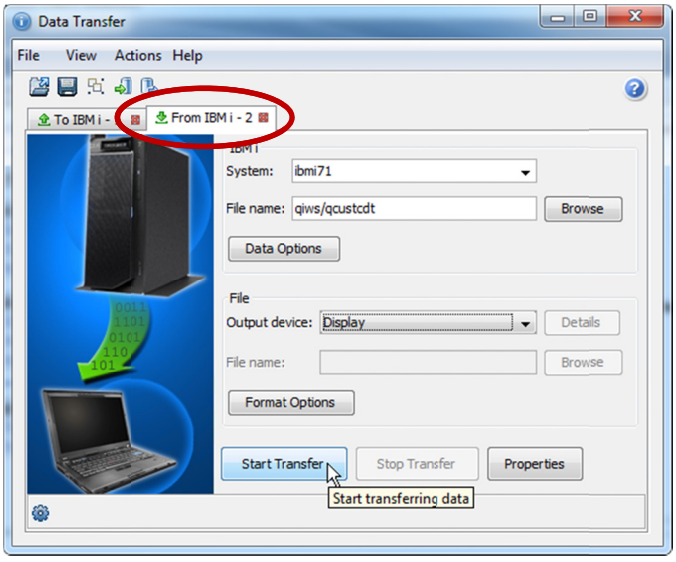
_____ In the **General** section, click the **Data Transfer** item.



iac041v2

Figure 18: Click the Data Transfer item in the IBM i Access Client Solutions dialog.

_____ The **Data Transfer** dialog shown in Figure 19 is displayed. Verify that the **From IBM i – 2** tab is the selected tab.



iac042

Figure 19: Enter the System name, File name and output device on the Data Transfer dialog.

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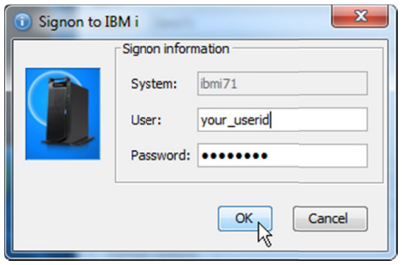
_____ Enter the following items in the Data Transfer dialog:

System	(enter your IBM i TCP/IP host name or IP address)
File name	`qiws/qcustcdt`
Output device	Display

_____ Click the **Start Transfer** button.

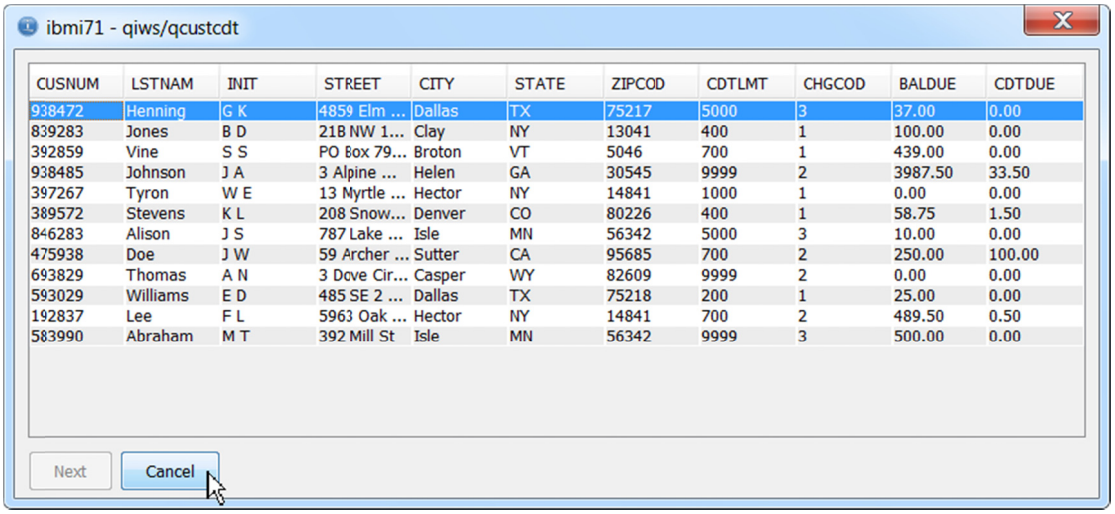
_____ The **Signon to IBM i** dialog shown in Figure 20 is displayed. Enter your IBM i user ID and password, then click the **OK** button.



iac043

Figure 20: Enter your user ID and password when prompted.

_____ The data transfer runs. It displays the output shown in Figure 21. When done viewing the output, close the output display panel.



iac044v2

Figure 21: The results of the data transfer are displayed.

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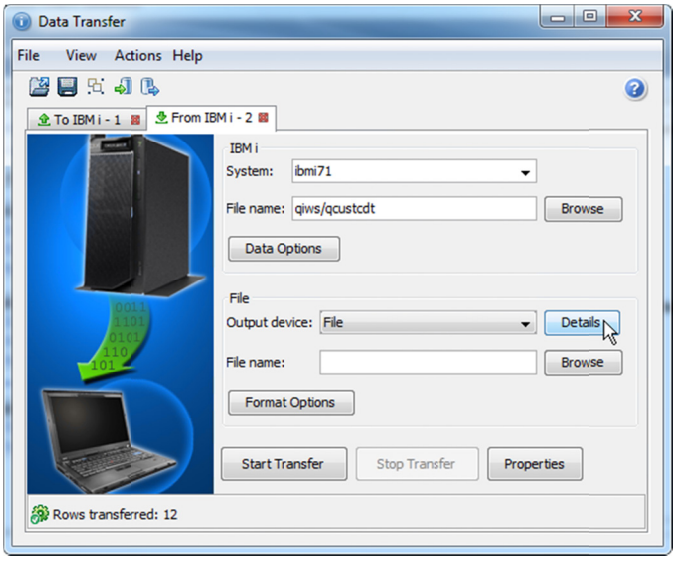
Run the Data Transfer with File output

Why: You need to test the Data Transfer download with output to a CSV file. This step shows you how to use the Data Transfer program to configure a download request.

_____ When you close the output display panel you are returned to the **Data Transfer** dialog.

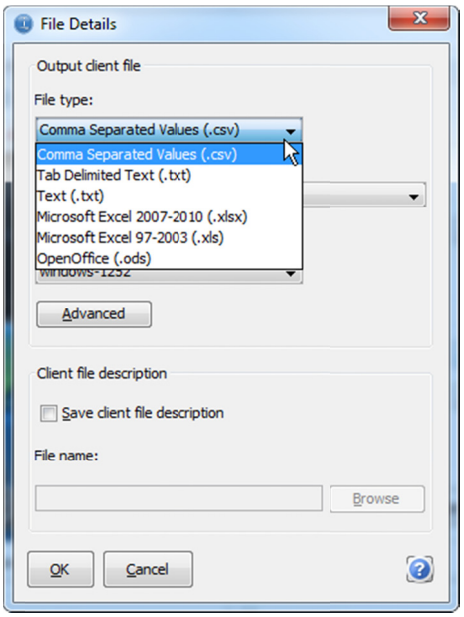
_____ Change the **Output device** selection to **File** and click the **Details** button, as shown in Figure 22.



iac051

Figure 22: Select the File output device and click the Details button.

_____ The **File Details** dialog shown in Figure 23 is displayed. Select **Comma Separated Values (.csv)** as the file type.



iac052v2

Figure 23: Select the Comma Separated Values file type.

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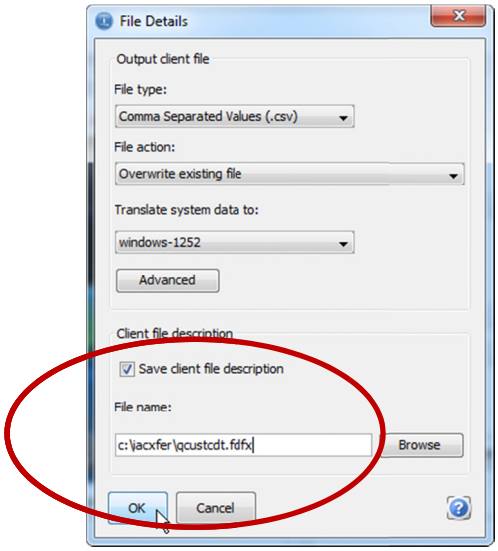
_____ In the **File Details** dialog, check the **Save client file description** checkbox and enter the path and file name for the **Client file description file**, as shown in Figure 24.

Note: a directory named IACXFER is used to contain the file description file and transfer description file (which will be created later). You can create and use that directory name or you can use another directory name on your workstation.

_____ Click the **OK** button to close the **File Details** dialog.



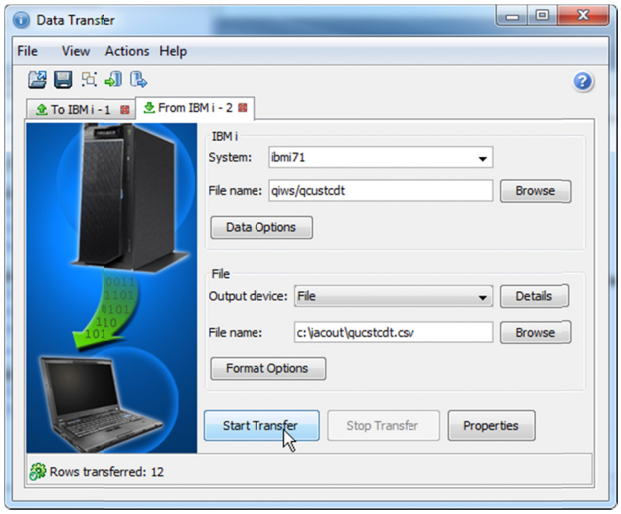
iac053v2

Figure 24: Specify the file description file name.

_____ On the **Data Transfer** dialog, enter the path and file name for the **File name**, as shown in Figure 25.

Note: a directory named IACOUT is used to contain the file description file and transfer description file (which will be created later). You can create and use that directory name or another directory on your workstation.

_____ Click the **Start Transfer** button to run the data transfer.



iac054

Figure 25: Specify the file name for the CSV file, click the Start Transfer button.

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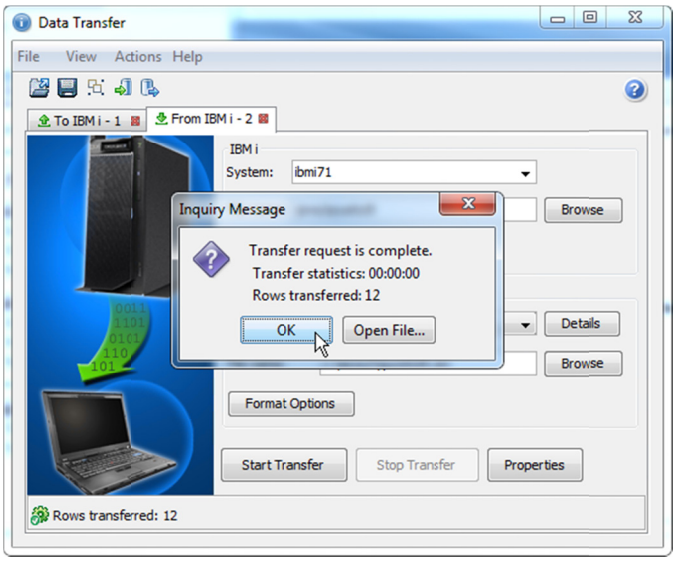
_____ The transfer runs. When it is done, the **Inquiry Message** shown in Figure 26 is displayed.

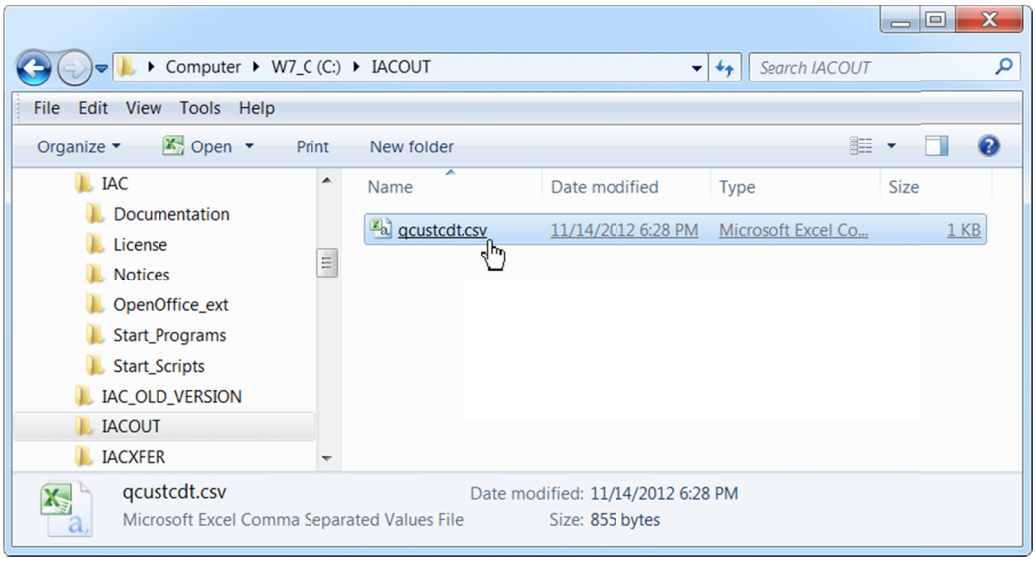
_____ Click the **OK** button to close the **Inquiry Message**.



iac055

Figure 26: The completion message is displayed when the transfer is done.

_____ On your workstation, go to the directory where the output file (the `.csv` file) was created. Figure 27 shows the `qcustcdt.csv` file in the `c:\IACOUT` directory.



iac056v2

Figure 27: Verify that the CSV file is in the output directory.

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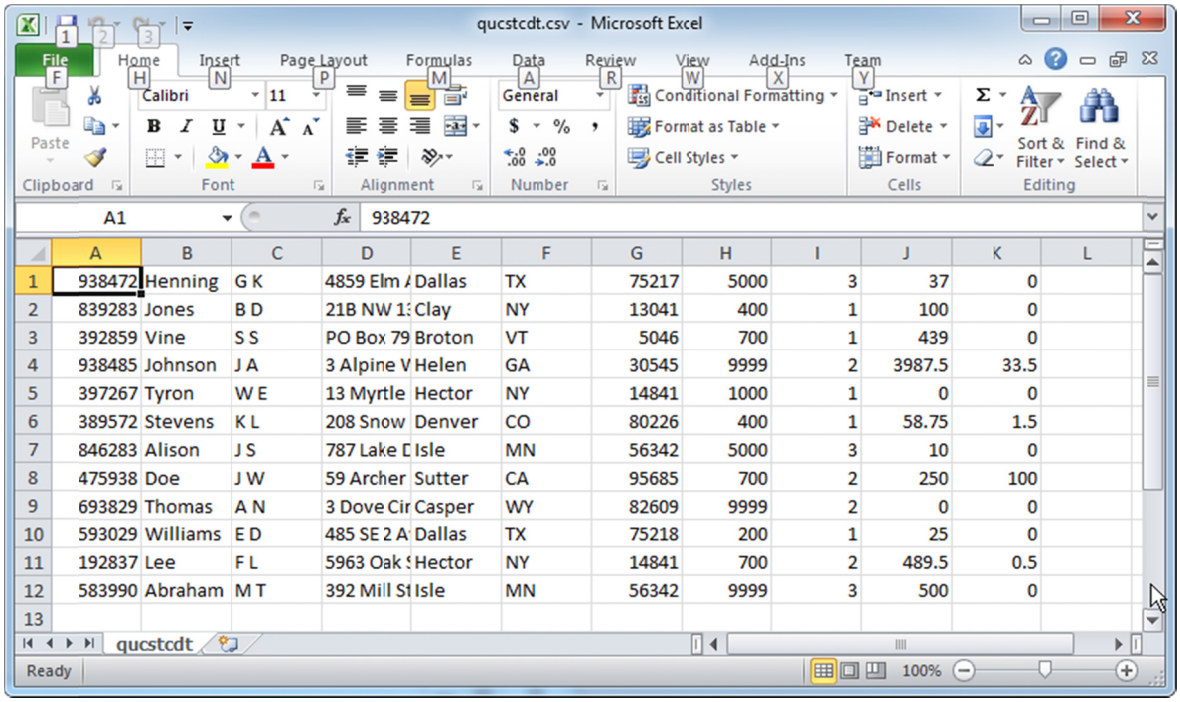
_____ Open the `qcustcdt.csv` file. Figure 28 shows the file opened in Microsoft Excel. If you do not have Excel installed on your workstation, open the `.csv` file in a text editor.

_____ When done reviewing the `.csv` file, close the program that you used to view it.



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

iac057

Figure 28: The CSV file is open in Microsoft Excel.

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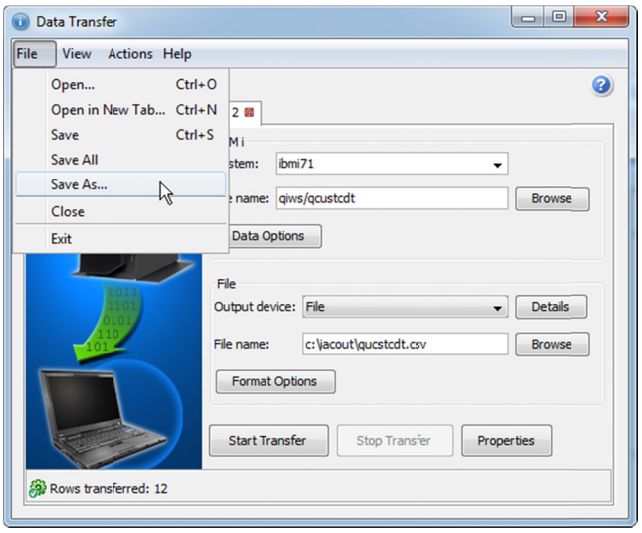
Save the Data Transfer download request

Why: You need to save the Data Transfer request so that you can copy the saved request file to your IBM i.

_____ Go back to the **Data Transfer** dialog (it should still be open, with the values set to download to the `.csv` file).

_____ Select the **File, Save As** menu item, as shown in Figure 29.

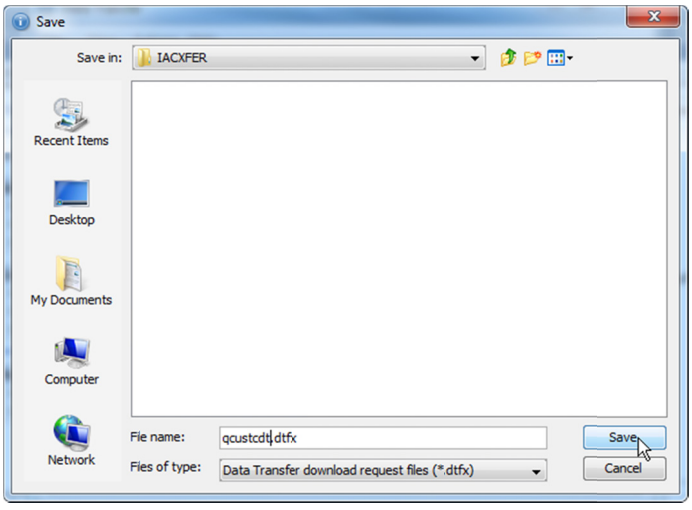


iac061

Figure 29: Select the File, Save As menu item.

_____ In the **Save** dialog (Figure 30), navigate to the `c:\IACXFER` directory.

_____ Save the transfer description file as `qcustcdt.dtfx`.



iac062

Figure 30: Save the transfer description as qcustcdt.dtfx.

_____ You are returned to the **Data Transfer** dialog.

_____ Close the **Data Transfer** dialog.

_____ Close the **IBM i Access Client Solutions** dialog.

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Run the Data Transfer from a command line

Why: These steps use the saved data transfer request with a Java command line. This is the technique that you will use when you run the Data Transfer on the IBM i.

At this point, you have installed the IBM i Access Client Solutions program on your workstation. You have tested the Data Transfer download feature to download a `.csv` file to the workstation. You have also saved the data transfer description file (`.dtfx`).

In this section, you will run the Data Transfer from a Java command line, you will not use the Data Transfer GUI. The Data Transfer uses the `.dtfx` file that you saved in the previous section.

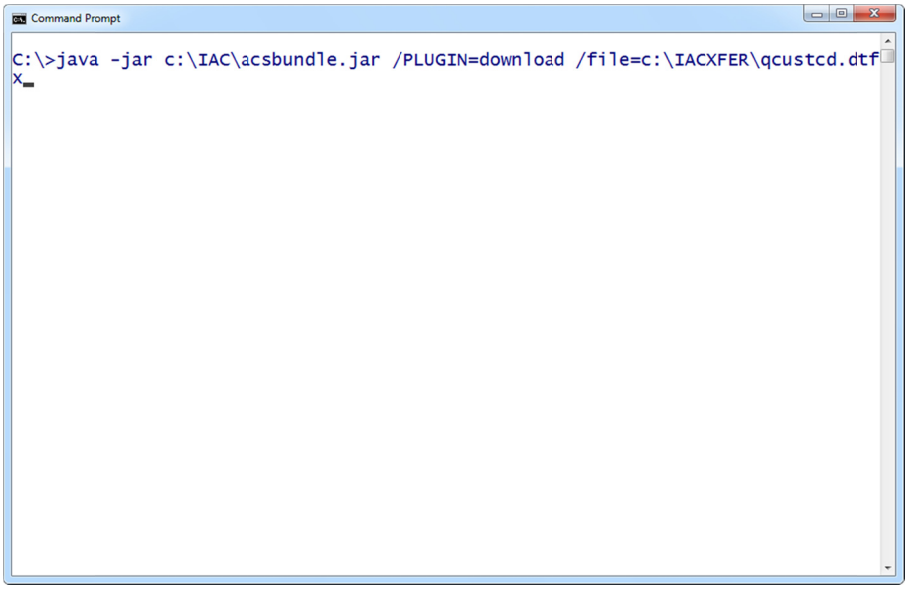
The steps shown in this section are what you will do on the IBM i. When you run the Data Transfer program on the IBM i, you will not use the Data Transfer GUI. You will use the Java features of the IBM i to run the saved data transfer description.

_____ Open a Command Prompt program on your workstation.

_____ Enter the following command in the Command Prompt window, as shown in Figure 31.

- **Note:** the values that you enter (other than drive letter and directory names) are case–sensitive. Be sure that you enter the values as shown here.
- **Note:** if you created different directory names (`IAC`, `IACXFER`) substitute the directory names that you created.
- **Note:** enter the `java` command line on the same line, as shown in the figure. The command is wrapped in this document.

```
java  -jar  c:\IAC\acsbundle.jar  /PLUGIN=download
    /file=c:\IACXFER\qcustcdt.dtfx
```



iac071v2

Figure 31: Enter the java command line to run the data transfer.

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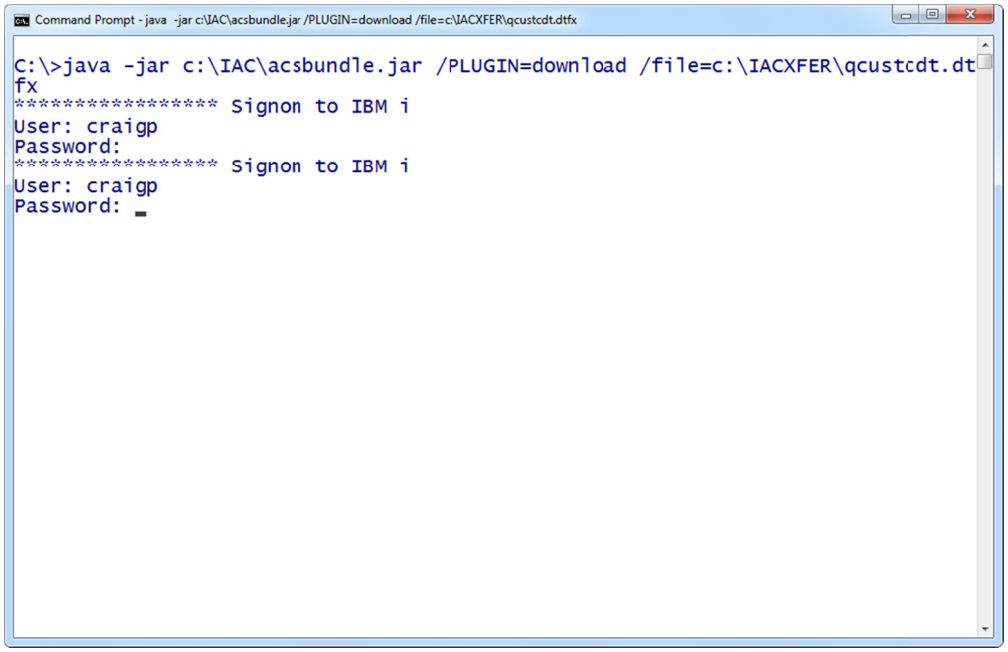
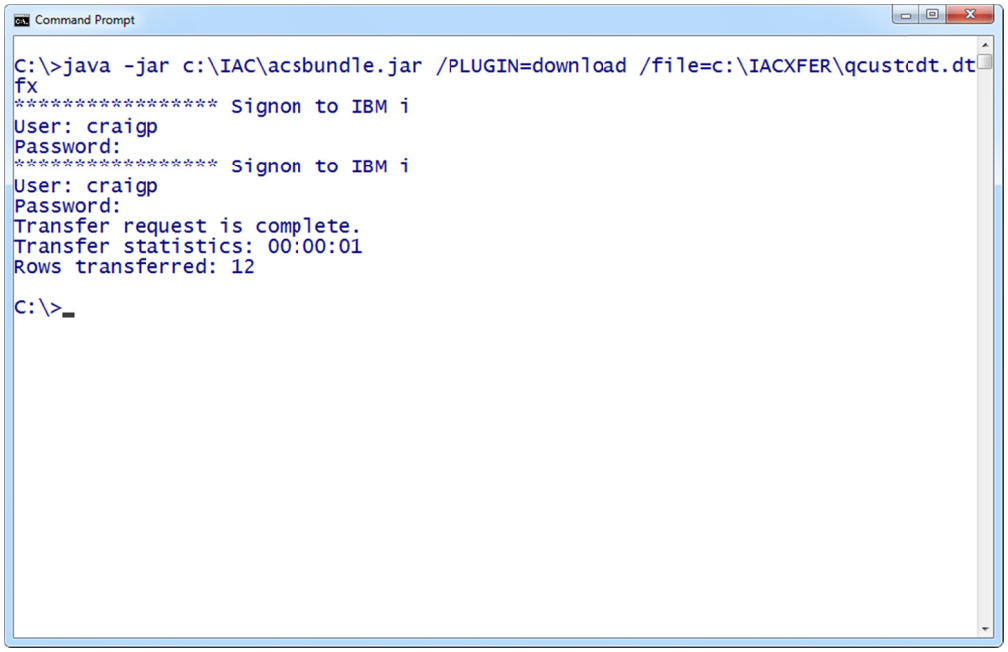
_____ The first time you run the java command line Data Transfer, you will be prompted to enter your IBM i user ID and password, as shown in Figure 32. **Note:** you may be prompted twice for your user ID and password.



iac072v2

Figure 32: You will be prompted to enter your IBM i user ID and password the first time you run the java command line data transfer.

_____ The Data Transfer program runs. The output of the program is shown in Figure 33.



iac073v2

Figure 33: The output of the Data Transfer program shows that it is done.

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Install the IBM i Access Client Solutions program on the IBM i

Why: You need to install the code that you download onto your IBM i to run the Data Transfer.

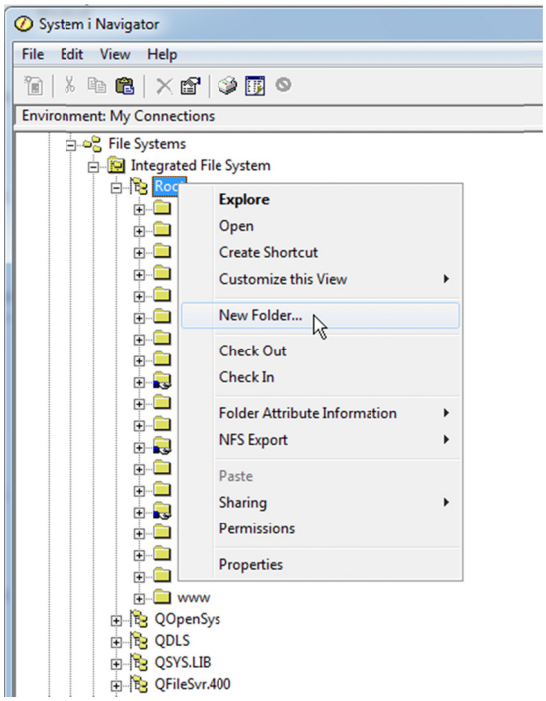
In this section, you will install the IBM i Access Client Solutions program on the IBM i. You will copy files from your workstation to directories in the IFS.

The steps shown in this section use the System i Navigator to work with the IFS. If you prefer another technique to access and work with the IFS, you do not have to use the System i Navigator.

Create directories in the Root file system

_____ In the System i Navigator program, expand the **File Systems** item, then **Integrated File System**, then **Root**.

_____ Right-click the **Root** item and select the **New Folder** item in the pop-up menu, as shown in Figure 34.



iac101

Figure 34: Right-click the Root item, select the New Folder item in the pop-up menu.

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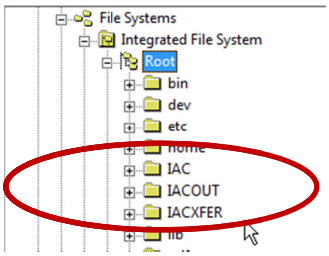
_____ Create the following three directories in the Root file system:

Directory	Used For
IAC	Contains the ACS program, copied from your workstation (instructions shown below).
IACOUT	Directory where the output from a Data Transfer (download) is written to.
IACXFER	Directory where the data transfer description files that you create on your workstation will be located.

_____ When done, verify that the Root file system directory contains the three subdirectories, as shown in Figure 35.



iac102

Figure 35: When done, verify that the three directories are in the Root file system.

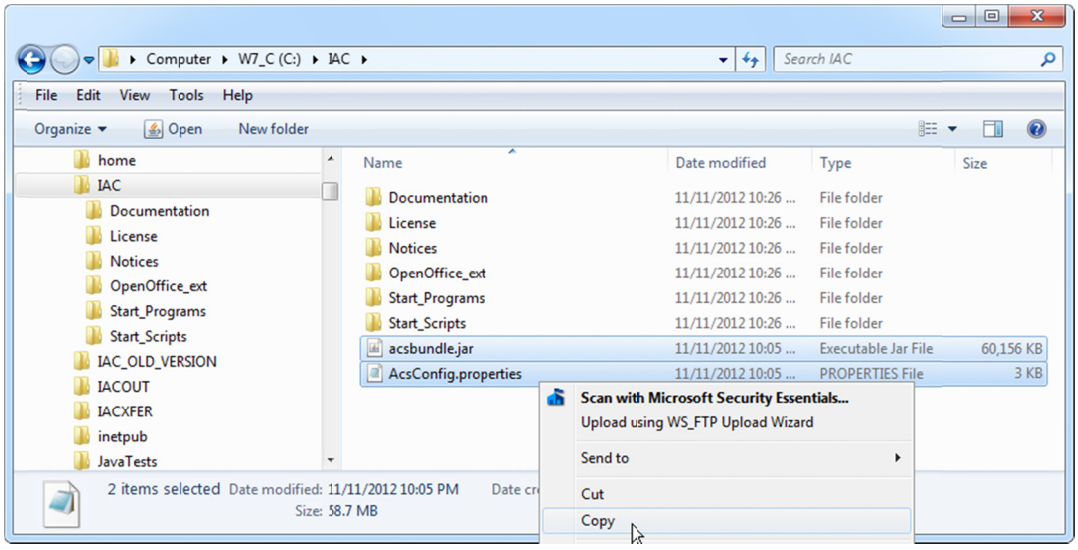
Copy the ACS code from your workstation to the /IAC directory

_____ On your workstation, navigate to the \IAC directory (the directory where the ACS code is installed).

_____ Select the acsbundle.jar file and the AcsConfig.properties file.

Note: you can select and copy the files one at a time if you prefer.

_____ Right-click and select the **Copy** item from the pop-up menu, as shown in Figure 36.



iac111

Figure 36: Select the two files shown here and select the Copy option.

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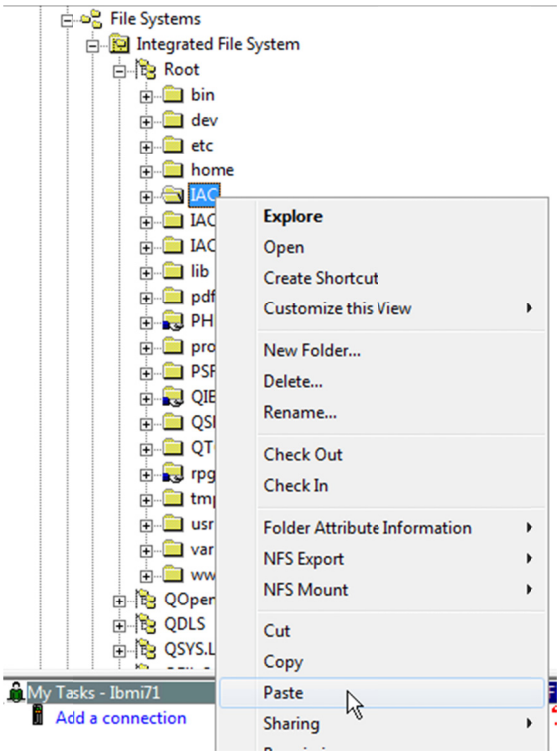
_____ Go back to the System i Navigator. Right-click the IAC directory in the Root file system, then select the **Paste** item from the pop-up menu as shown in Figure 37.

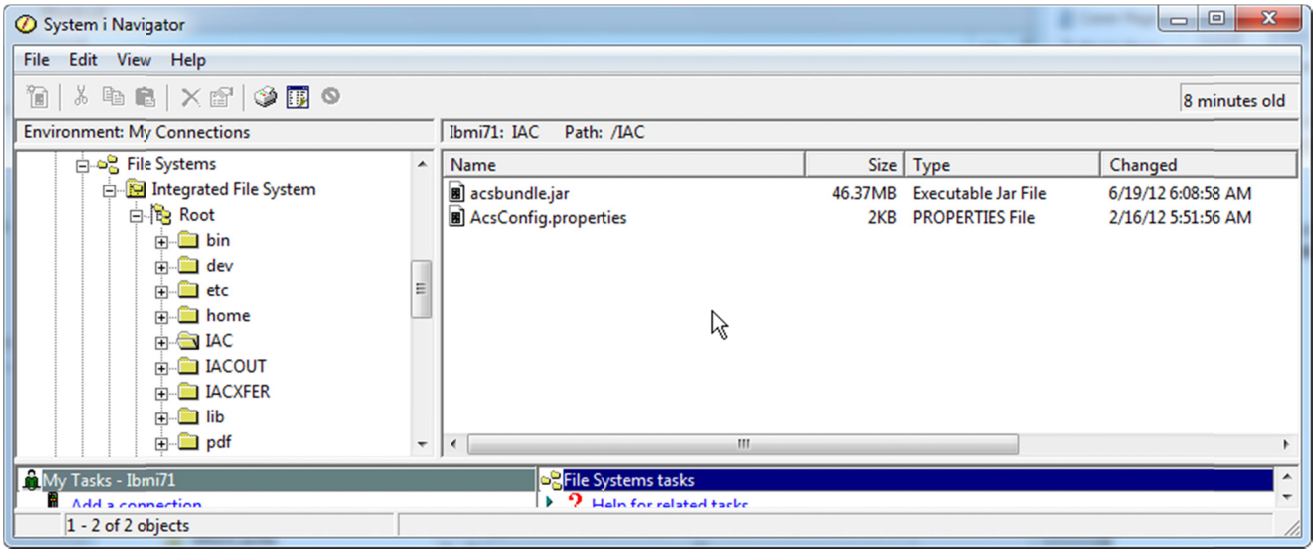


iac112

Figure 37: Right-click the IAC directory, select the Paste item from the pop-up menu.

_____ Wait for the file copy to complete.

_____ Verify that the two files are in the IAC directory, as shown in Figure 38. If you do not see the files, repeat the steps shown above.



iac113

Figure 38: Verify that the two files are in the IAC directory.

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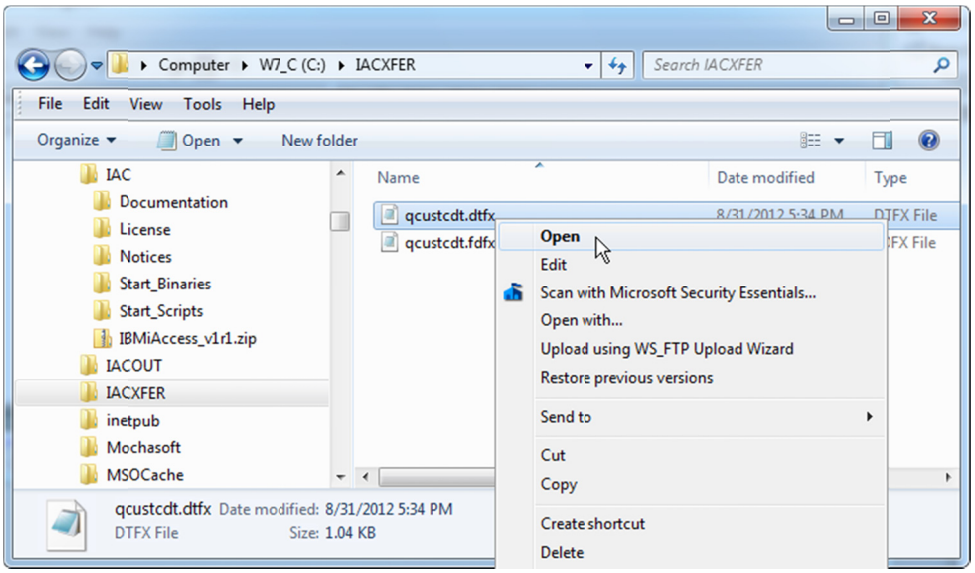
Change the directories in the saved transfer description file

Why: The saved transfer description file on your workstation points to directories on the workstation. To use the transfer description on the IBM i, you need to change the directories to directories that are in the IBM i IFS.

_____ On your workstation, go to the IACXFER directory.

_____ In the directory, right click the qucstcdt.dtfx file (you saved the file in the section **Save the Data Transfer download request** on page 22).

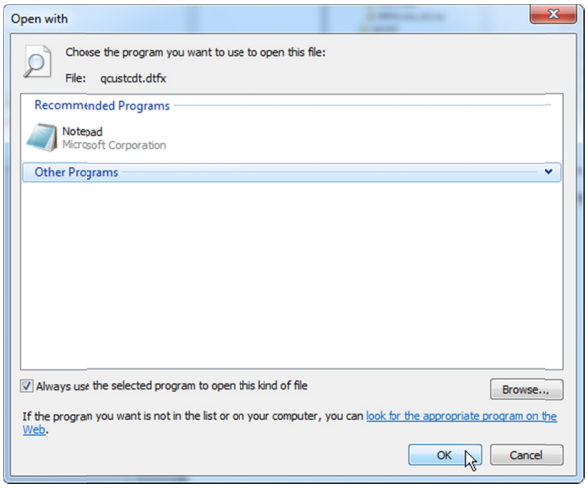
_____ Select the **Open** item from the pop-up menu, as shown in Figure 39.



iac121

Figure 39: Right-click the qcustcdt.dtfx file and select the Open option.

_____ The file should open in Notepad. If the **Open with** dialog is displayed as shown in Figure 40, select **Notepad** as the program to be used to open the file.



iac122

Figure 40: If the Open with dialog is displayed, select Notepad as the program to open the .dtfx file type.

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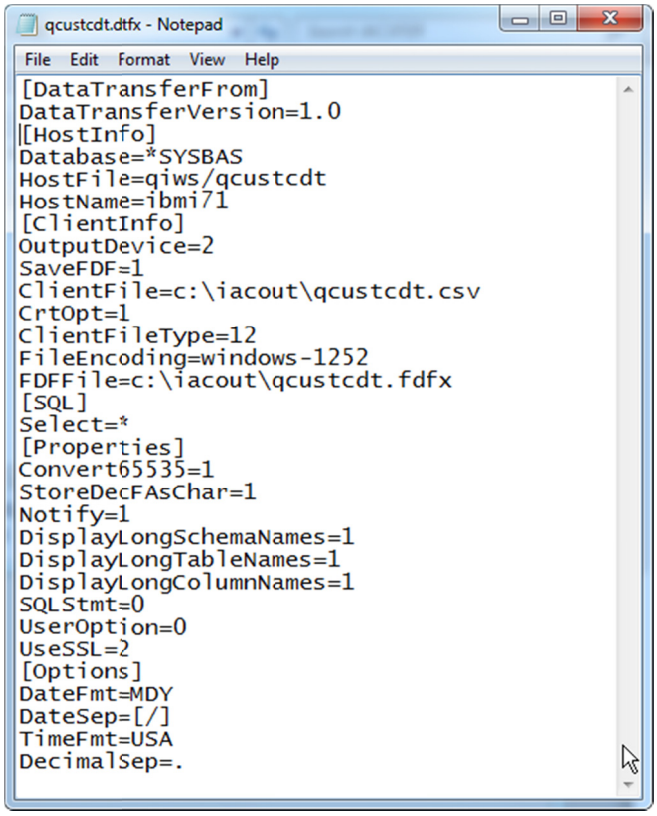
_____ The `qucstcdt.dtfx` file is opened in Notepad (Figure 41).



iac123

Figure 41: The qcustcdt.dtfx file, opened in Notepad.

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_____ Before making any changes, use the **File, Save As** menu item to save the file as `xqcustcdt.dtfx`. By saving the file with a new name, you retain the original file on your workstation.

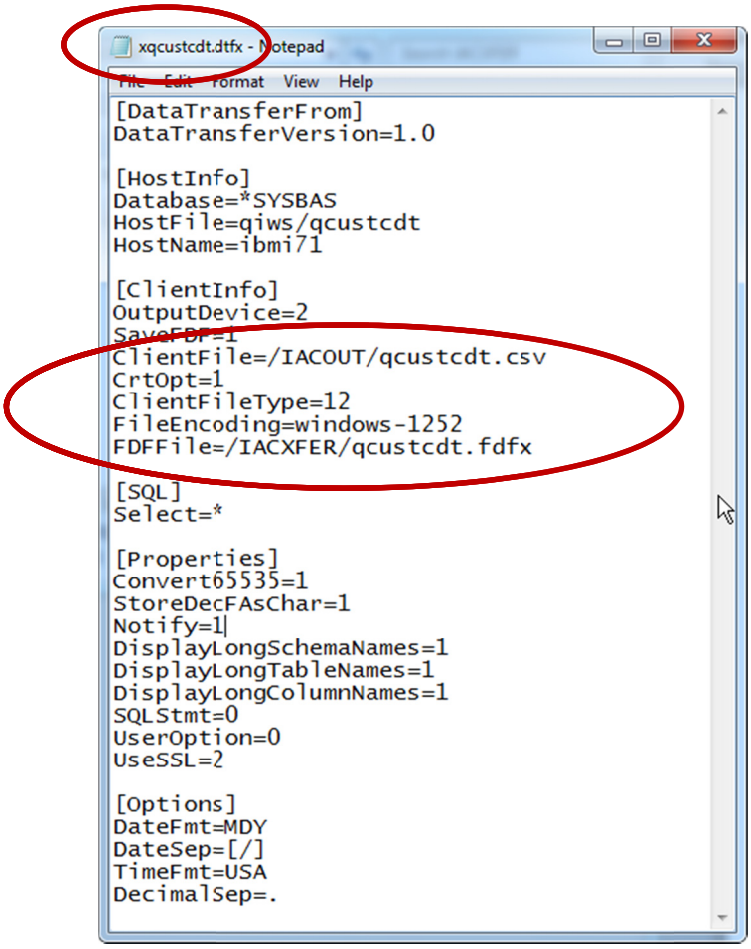
Note: when you use the File, Save As item in Notepad, change the **Save as type** to **All Files (*.*)**. If you do set the **Save as type** to that option, the file is saved with a `.txt` extension.

_____ Make the following changes to the values shown in the file:

Identifier	New Value
ClientFile	/IACOUT/qcustcdt.csv
FDFFile	/IACXFER/qcustcdt.fdfx

_____ When done, verify that the values that are in the file are as shown in Figure 42.

Note: blank separator lines were added between each section. You do not have to add the blank separator lines.



iac124

Figure 42: Change the ClientFile and FDFFile values, save the file as xqcustcdt.dtfx.

_____ Save the file after making the changes.

_____ Close Notepad.

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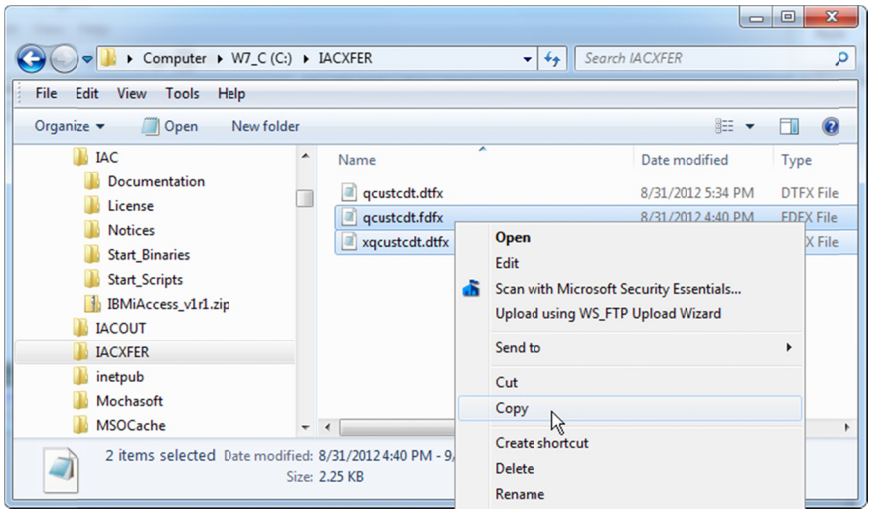
Copy the Data Transfer description files to the IBM i IFS

Why: When you run the Data Transfer program on the IBM i, it will use the Data Transfer description file that you modified.

_____ On your workstation, navigate to the \IACXFER directory.

_____ Select the qcustcdt.fdfx and xqcustcdt.dtfx files, right-click, and select the **Copy** item from the pop-up menu, as shown in Figure 43.



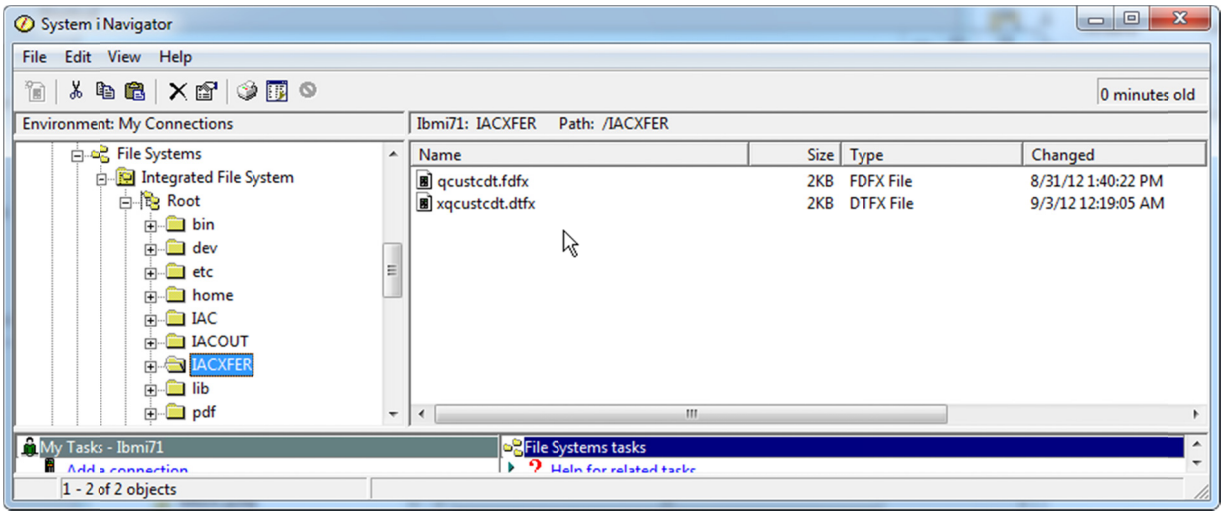
iac131

Figure 43: Select the two files in the IACXFER directory on your workstation.

_____ Go go the System i Navigator.

_____ Right-click the IACXFER directory and select the **Paste** item from the pop-up menu.

_____ When the copy is done, verify that the two files are in the directory, as shown in Figure 44.



iac132

Figure 44: Verify that the files are in the IACXFER directory in the IFS.

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Start the Data Transfer program

Why: You can now run the Data Transfer program. For the first test, you will run the `java` command in the QSHELL environment.

_____ On a 5250 command line, enter the `QSH` (Start QSHELL) command.

_____ The QSH Command Entry panel is displayed.

_____ Enter the following command on the QSH Command Entry line.

Note: the data transfer runs with the authority of the user profile of the interactive session.

Note: the command is **case–sensitive**, enter it as shown.

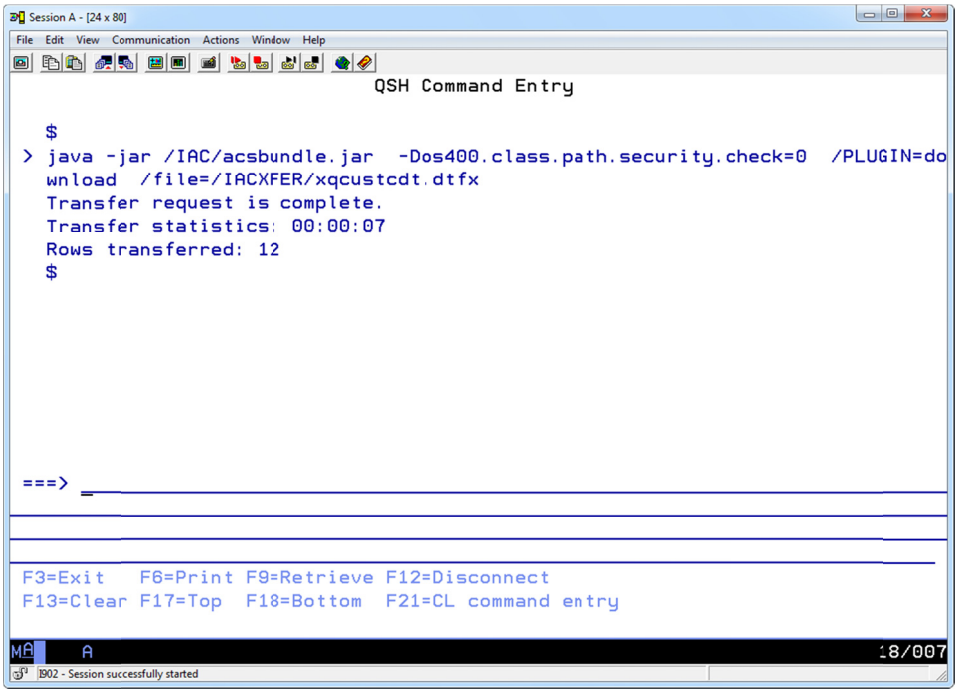
Note: the value for the `os400.class.path.security.check` parameter is zero, not the letter "O".

Note: enter the entire command on one line in the QSH Command Entry panel. The line will "wrap" on the Command Entry panel as you type it in. The command text shown in this example is wrapped on this page.

```
java  –jar  /IAC/acsbundle.jar  -Dos400.class.path.security.check=0
   /PLUGIN=download  /file=/IACXFER/xqcustcdt.dtfx
```

_____ The Data Transfer program runs. The messages shown in Figure 45 are displayed when the program ends. **It may more than a minute** or longer before you see any output. **Let the program run** before doing anything else on the QSH Command Entry panel.

_____ Press the **F3** (Exit) function key to close the QSH Command Entry panel.



iac235v2

Figure 45: The Data Transfer program runs and displays the messages shown here.

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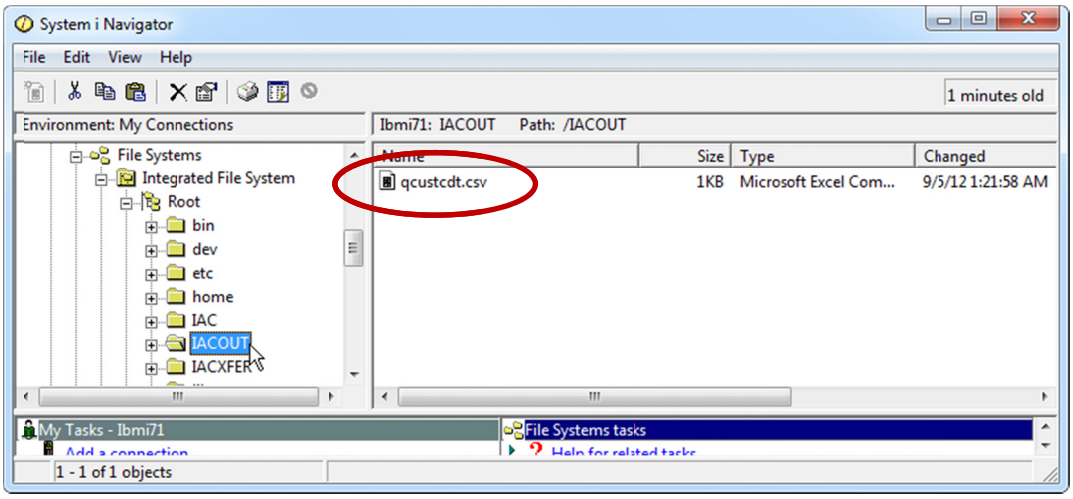
_____ In the System i Navigator, go to the output directory that you specified (see the `ClientFile` item in Figure 42 on page 30). In this example, the output directory is IFS directory `/IACOUT`.

_____ The `qcustcdt.csv` file is the output from the Data Transfer program.

_____ Copy the `qcustcdt.csv` file to your workstation and open it. You should see the same output as you saw when you ran the Data Transfer on your workstation, as shown in Figure 28 on page 21.



iac236

Figure 46: The qcustcdt.csv file is in the output directory used by the Data Transfer program.

Discussion

Part of the reason why the program takes so long to respond is because it incurs the overhead of starting the Java runtime environment. For small data transfers, such as shown in this example, the time to transfer the records is excessive.

After you have worked through the steps in this document, run the data transfer for a file with a greater number of records. You should see that the transfer program performs much better, when considered as the number of records transferred per second.

On a test system, a file containing 6483 rows, with 53 fields and a record length of 290, was downloaded to a .csv file in 70 seconds, for a rate of 92.6 records per second.

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Run the Data Transfer program from a 5250 command line

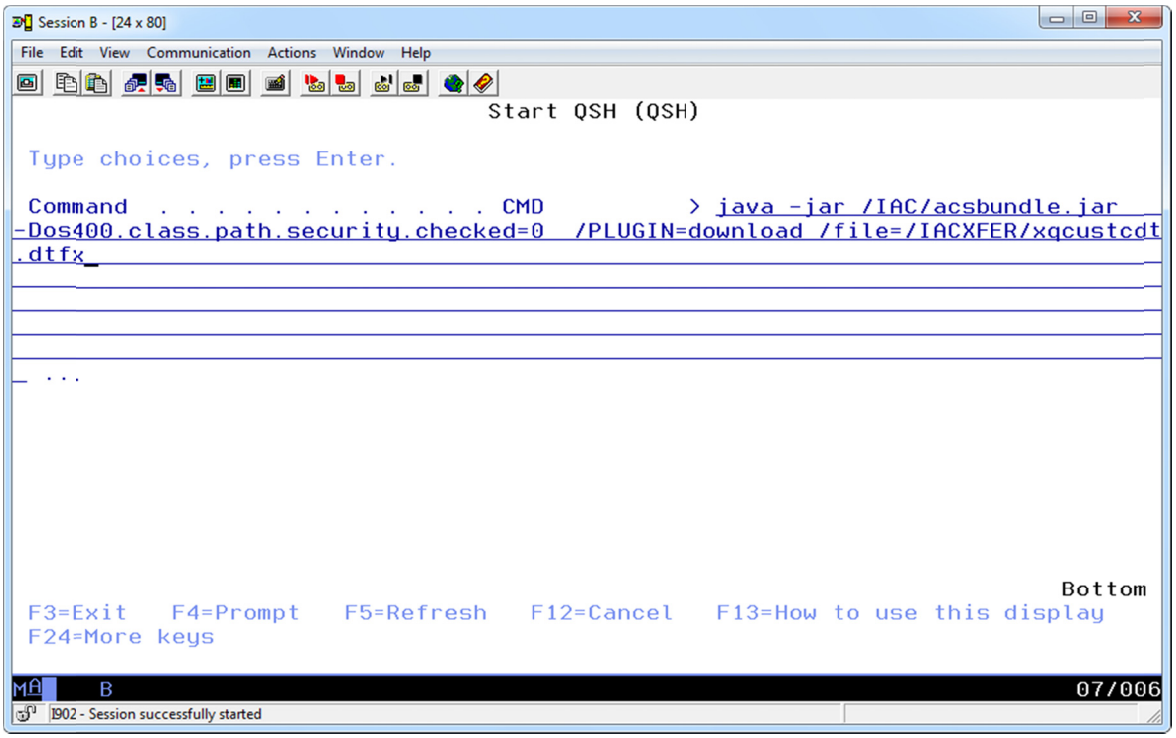
Why: Although you can go into the QSH Command Entry panel and run the java command to invoke the Data Transfer, it is more likely that you will want to run Data Transfers using IBM i commands. When you use commands, you can embed Data Transfer within CL programs or you can submit the Data Transfer request to batch. You can use either the QSH command or the RUNJVA command to invoke the Data Transfer program.

Use the QSH command to invoke the Data Transfer

Why: In the previous section, you went into the QSH Command Entry panel to run the java command. You can pass the java command as a parameter to the QSH command.

_____ On a 5250 command line, enter the QSH command and press **F4** to prompt for its parameters.

_____ For the CMD parameter value, enter the complete java command string that you previously entered on the QSH Command Entry panel, as shown in Figure 47.



iac261v2

Figure 47: Enter the java command with all of the parameters as the CMD value on the QSH command.

_____ Press **Enter** after you enter the complete java command string.

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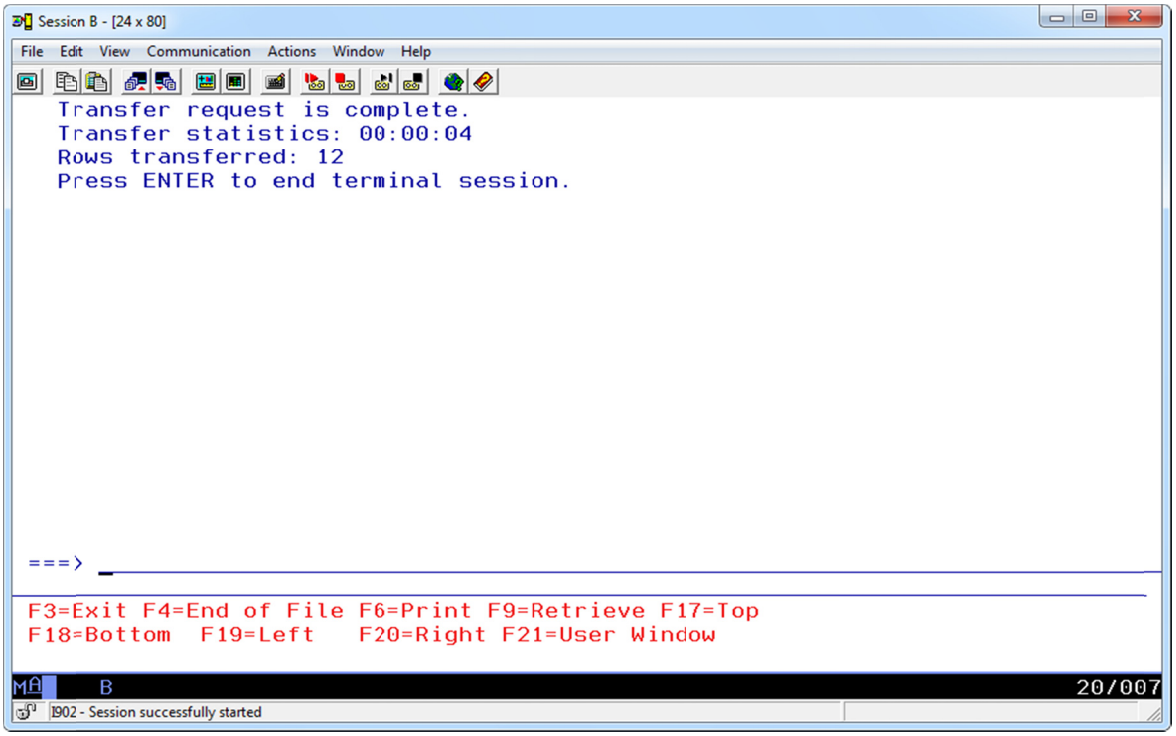
_____ A shell environment panel opens to display the messages sent from the Data Transfer program, as shown in Figure 48.

_____ Press **Enter** to close the shell environment panel.



iac262v2

Figure 48: This panel is displayed when you run the java command from the QSH command. Some of the messages from the previous use of the shell are shown, in addition to the messages for the Data Transfer.

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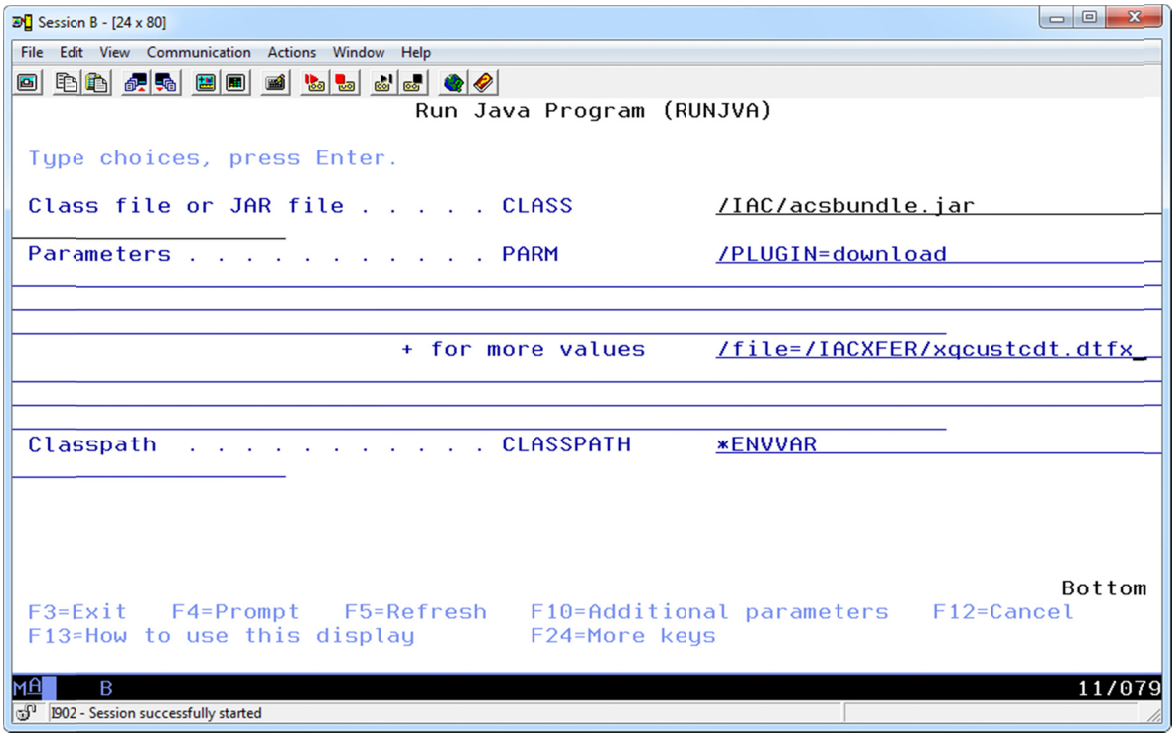
Use the RUNJVA command to invoke the Data Transfer

Why: You can use the RUNJVA command as an alternative to the QSH command. The RUNJVA command uses the traditional IBM i command parameter style. You may find it easier to work with the RUNJVA command instead of the QSH command.

_____ On a 5250 command line, enter the RUNJVA command and press **F4** to prompt for its parameters.

_____ On the **Run Java Program** command prompt panel, enter the following values for the parameters, as shown in Figure 49:

Parameter Name	Value
CLASS	'/IAC/acsbundle.jar'
PARM (parameter 1)	'/PLUGIN=download'
PARM (parameter 2)	'/file=/IACXFER/xqcustcdt.dtfx'



iac271v2

Figure 49: Enter the CLASS and PARM values, press F10 to display additional parameters.

_____ Press the **F10** key to display additional parameters for the RUNJVA command.

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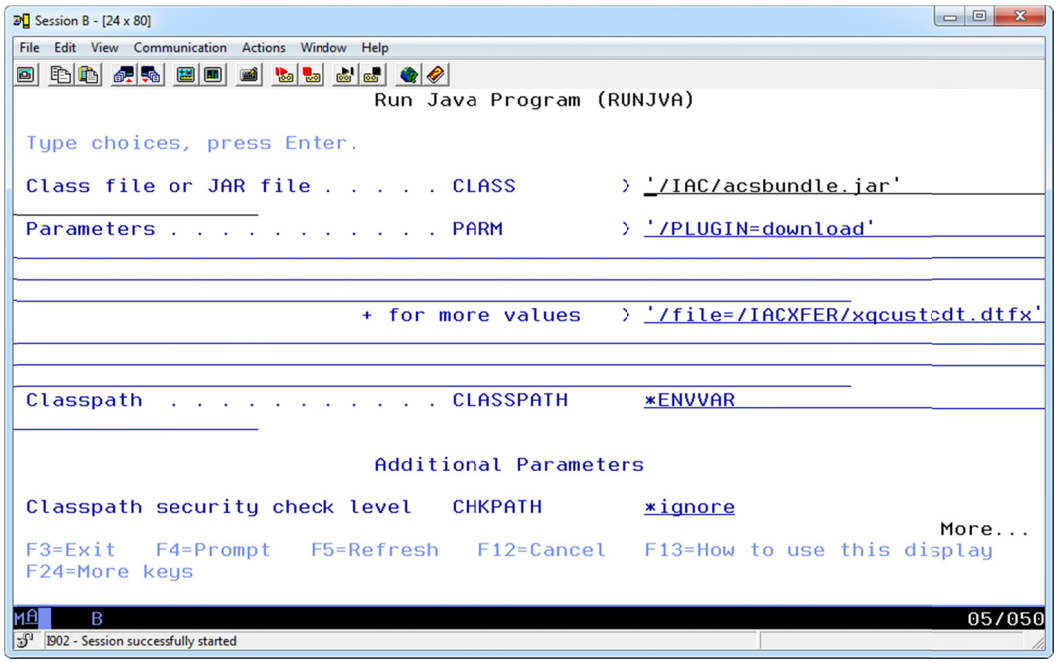
_____ On the second parameter panel, enter the value *IGNORE for the CHKPATH parameter, as shown in Figure 50.



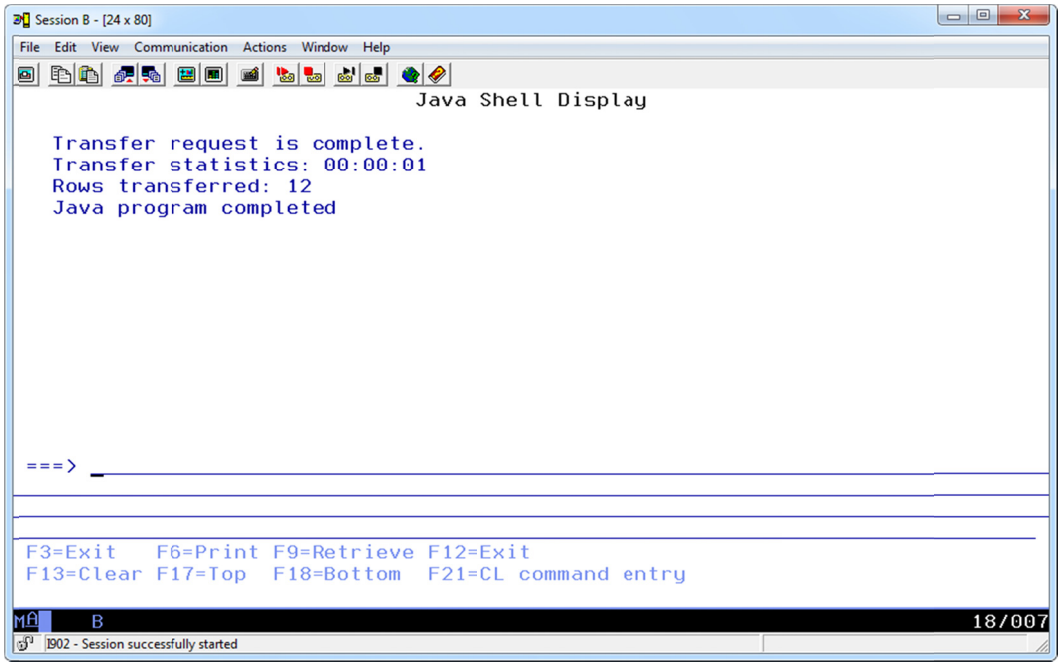
iac272v2

Figure 50: Enter the CHKPATH value.

_____ Press **Enter** to run the RUNJVA command with the parameter values that you entered.

_____ The Java Shell Display panel shown in Figure 51 is displayed. It displays the messages when the Data Transfer program runs.

_____ Press the **Enter** key to close the Java Shell Display and return to the 5250 command display.



iac273v2

Figure 51: The Java Shell Display shows these messages when you run the Data Transfer.

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Review additional options for the RUNJVA command

Why: The OUTPUT parameter for the RUNJVA command may be of interest to you.

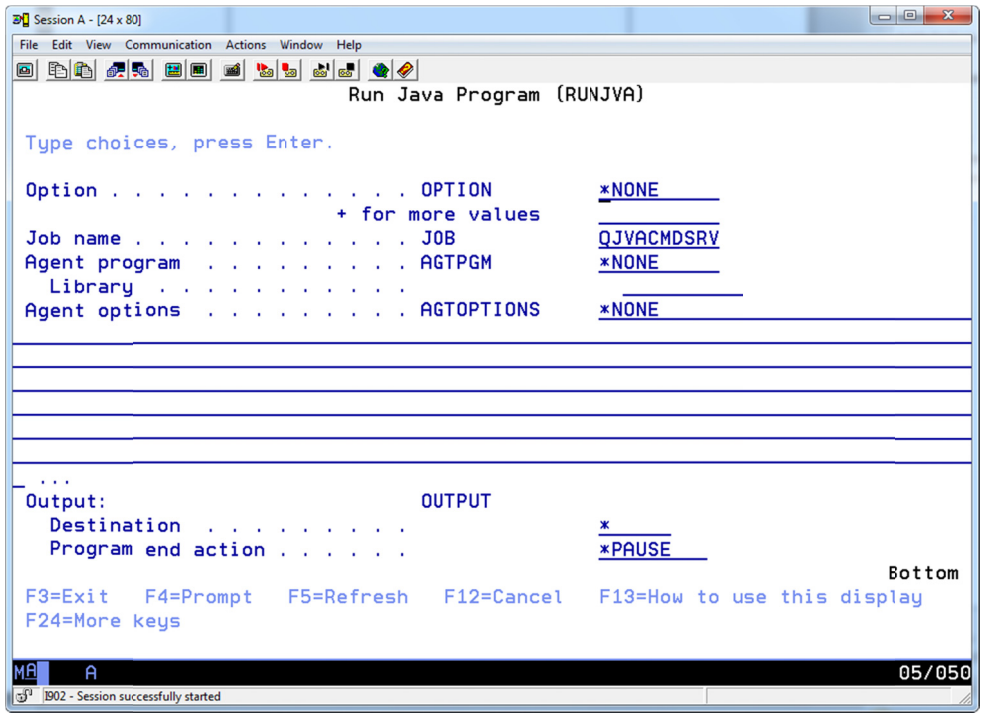
_____ Enter the RUNJVA command from a 5250 command prompt and enter the parameter values that you previously entered.

_____ Press the **F10** key to display all parameters for the command.

_____ Roll forward in the command prompter to the 4th prompt panel, shown in Figure 52.

_____ The values that you can enter for the OUTPUT parameter are:

Destination	* — output is displayed in the Java Shell Display
	*PRINT — output is sent to a spool file
	*NONE — output is not displayed or spooled
Program end action	*PAUSE — the Java Shell Display remains open until you close it
	*CONTINUE — the Java Shell Display closes automatically



iac274

Figure 52: The OUTPUT parameter is the last parameter on the RUNJVA command prompt.

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Submit a Data Transfer request to batch

Why: You can run a Data Transfer request as a batch job. By moving the request to batch, you make it easier to create automated Data Transfer requests.

Use the QSH command to invoke the Data Transfer

Why: You can run the QSH command that invokes the java command to run the Data Transfer in batch.

_____ On a 5250 command line, enter the following SBMJOB command:

```
SBMJOB CMD(QSH CMD('java -jar /IAC/acsbundle.jar
                   -Dos400.class.path.security.check=0
                   /PLUGIN=download
                   /file=/IACXFER/xqcustcdt.dtfx')) +
       JOB(QSHXFER) +
       LOG(4 00 *SECLVL) +
       LOGCLPGM(*YES)
```

Note: the JOB, LOG and LOGCLPGM parameter values are optional, you do not need to enter values for those parameters.

Use the RUNJVA command to invoke the Data Transfer

Why: You can run the RUNJVA command to run the Data Transfer in batch.

_____ On a 5250 command line, enter the following SBMJOB command:

```
SBMJOB CMD(RUNJVA CLASS('/IAC/acsbundle.jar')
                  PARM('/PLUGIN=download'
                       '/file=/IACXFER/xqcustcdt.dtfx')
                  CHKPATH(*IGNORE)) +
       JOB(RUNJVADTXF) +
       LOG(4 00 *SECLVL) +
       LOGCLPGM(*YES)
```

Note: the JOB, LOG and LOGCLPGM parameter values are optional, you do not need to enter values for those parameters.

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The Command Line Download option

Why: If you want to download all of the records and all fields in a database file to a stream file, you can use the Command Line Download plugin. You do not have to specify a `.dtfx` file (data transfer description file) with this plugin.

In addition to the **download** and **upload** plugin types, IBM provides the **cldownload** plugin. The cldownload plugin provides a simplified way to download data from an IBM i database file to a stream file. Because the cldownload plugin downloads all of the rows and fields that are in the database file, there is no need to specify a data transfer description file (`.dtfx`).

The syntax of the command is:

```
java  –jar  acsbundle.jar
      -Dos400.class.path.security.check=0
       /PLUGIN=cldownload
       /system=<system>
       /hostfile=<library>/<file>(<member>)
       /clientfile=<path><filename>.<extension>
```

The `/system` parameter value is set to the name of the IBM i system where the database file is located. When you run the `cldownload` plugin on the IBM i, you can specify the system name `LOCALHOST` to download a database file from the system where the plugin is running.

The `/hostfile` parameter is used to specify the qualified name (system format) of the database file to download from. If you need to specify a member name, enclose the name in parentheses.

The `/clientfile` parameter specifies the complete path, file name and extension of the stream file that is created as a result of the download. The file extension is used to determine the type of transfer to perform. For example, if the file extension `.xlsx` is specified, an Excel 2007/2010 file is created.

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Create and work with the XFRDTA command

Why: The Transfer Data (XFRDTA) command provides a simplified way to invoke the Data Transfer program.

Review and compile the XFRDTAC CL program

Why: The XFRDTAC CL program is the Command Processing Program for the XFRDTA command.

The source code for this program can be downloaded at:

http://www.web400.com/downloads/ACS/xfrdta.clp.txt

Use the following CL command to compile this program:

```
    CRTCLPGM  PGM(your_lib/XFRDTAC)  SRCFILE(your_lib/QCLSRC)
```

```
/*********************************************************************/
/* Program XFRDTAC                                                   */
/* Run the IBM i Access Client Solutions Data Transfer program       */
/*********************************************************************/
/*                                                                   */
/* Copyright 2012, Craig Pelkie, ALL RIGHTS RESERVED                 */
/* craig@web400.com                                                  */
/*                                                                   */
/* V1.01 - 2012-08-28 ORIGINAL VERSION                               */
/* V1.03 - 2012-11-14 UPDATE FOR OCT. 2012 ACSBUNDLE.JAR             */
/*                                                                   */
/*********************************************************************/
/* You may freely make use of this program in any application that   */
/* you develop, as long as you retain the copyright notice shown     */
/* above.                                                            */
/*                                                                   */
/* This program is provided for instructional purposes only.         */
/* No warranty is expressed or implied.                              */
/*                                                                   */
/* Craig Pelkie explicitly disclaims all responsibilty for your      */
/* use of the program, and will not be held liable for any           */
/* results or unforeseen consequences that result from your          */
/* use of this program or any of the techniques that are             */
/* demonstrated by this program.                                     */
/*                                                                   */
/* By using this program, you acknowledge that:                      */
/*                                                                   */
/*   1. The techniques shown in this program have not been           */
/*      tested, documented, approved, or recommended by              */
/*      IBM. You should not expect any IBM support for               */
/*      the techniques shown in this program.                        */
/*                                                                   */
/*   2. Running this program may result in changes to files          */
/*      on your system. The expected outputs include the             */
/*      data transfer output file in your IBM i IFS, and             */
/*      possibly one or more job log files. It is your               */
/*      responsibility to verify the outputs of running the          */
/*      program, and to ascertain that no other unwanted or          */
/*      unexpected changes occur on your IBM i as a result           */
/*      of running this program.                                     */
/*                                                                   */
/*   3. No support from Craig Pelkie is expressed or implied         */
/*      in the provision of this program and its accompanying        */
/*      documentation, if any.                                       */
/*                                                                   */
/*   4. If you do not understand how to use this program and         */
/*      the potential consequences of running it, DO NOT RUN IT.     */
/*********************************************************************/

 XFRDTAC:    PGM        PARM(&jardir +
                             &plugin +
                             &xfrdsc +
                             &file   +
                             &mbr    +
                             &clientfile)
```

(continues)

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```
/*********************************************************/
/* The path, file name and extension of the stream       */
/* file to transfer data to.                             */
/*                                                       */
/* This is only used with &direction CLDOWNLOAD          */
/* (Command Line Download)                               */
/*                                                       */
/* Supported extensions:                                 */
/*                                                       */
/*     .csv  - Comma Separated Variable                  */
/*     .ods  - Open Document Spreadsheet                 */
/*     .xls  - Microsoft Excel 97 - 2003                 */
/*     .xlsx - Microsoft Excel 2007, 2010                */
/*                                                       */
/* If an unsupported extension is specified, the         */
/* default extension .csv is used.                       */
/*********************************************************/
dcl        &clientFile  *char 256

/*********************************************************/
/* The qualified name of the IBM i database file to      */
/* transfer data from. This is only used with            */
/* &plugin value *CLDOWNLOAD (Command Line Download)     */
/*********************************************************/
dcl        &file  *char 20

/*********************************************************/
/* The IFS directory where the acsbundle.jar file        */
/* is located                                            */
/*********************************************************/
dcl        &jardir *char 256

/*********************************************************/
/* The member in the IBM i database file to              */
/* transfer data from. This is only used with            */
/* &plugin value *CLDOWNLOAD (Command Line Download)     */
/*********************************************************/
dcl        &mbr  *char 10

/*********************************************************/
/* The plugin to use for the transfer.                   */
/*                                                       */
/*   *DOWNLOAD - transfer data from an IBM i database    */
/*               file to a stream file                   */
/*                                                       */
/*   *CLDOWNLOAD - transfer the entire IBM i database    */
/*               file to a stream file                   */
/*                                                       */
/*   *UPLOAD   - transfer data from a stream file to     */
/*               an IBM i database file                  */
/*********************************************************/
dcl        &plugin *char 11

/*********************************************************/
/* Variable used to set the value of the CLASS parm      */
/* &jardir/acsbundle.jar                                 */
/*********************************************************/
dcl        &valCLASS *char 270

/*********************************************************/
/* Variable used to set the value of the /file parm      */
/* /file=<filename>                                      */
/*********************************************************/
dcl        &valfile *char 262

/*********************************************************/
/* Variable used to set the value of the client file.    */
/* clientfile=<filename>                                 */
/*********************************************************/
dcl        &valCfile *char 268

/*********************************************************/
/* Variable used to set the value of the host file/lib   */
/* hostfile=<library>/<file>                             */
/* hostifle=<library>/<file>(<member>)                   */
/*********************************************************/
dcl        &valHfile *char 43
```

(continues)

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```
/*********************************************************/
/* Variable used to set the value of the /PLUGIN parm  */
/*********************************************************/
dcl        &valPLUGIN *char 18

/*********************************************************/
/* Variable used to set the value of the /system parm  */
/* Used only with cldownload plugin                      */
/*********************************************************/
dcl        &valSystem *char 17 +
           value('/system=LOCALHOST')

/*********************************************************/
/* The path (directory) and file name of the transfer  */
/* description file                                      */
/*                                                       */
/* Example: file for upload                              */
/*          .dttx = "transfer to IBM i"                  */
/*                                                       */
/*    /path/upload_description.dttx                      */
/*                                                       */
/* Example: file for download                            */
/*          .dtfx = "transfer from IBM i"                */
/*                                                       */
/*    /path/download_description.dtfx                    */
/*                                                       */
/*********************************************************/
dcl        &xfrdsc  *char 256

/*********************************************************/
/* Set the parameter values to pass to the data        */
/* transfer program                                      */
/*********************************************************/
chgvar     var(&valCLASS) +
           value(&jardir *tcat '/acsbundle.jar')

/*********************************************************/
/* Set values for cldownload (Command Line Download)   */
/*********************************************************/
if         (&plugin *eq '*CLDOWNLOAD') then(do)

   chgvar     var(&valPLUGIN) +
              value('/PLUGIN=cldownload')

   chgvar     var(&valHfile) +
              value('/hostfile='      *tcat +
                    %sst(&file 11 10) *tcat +
                    '/'               *tcat +
                    %sst(&file  1 10))

   if  (&mbr *ne '*FIRST') then(do)
       chgvar  var(&valHfile) +
                value(&valHfile *tcat +
                      '('       *tcat +
                      &mbr      *tcat +
                      ')')
   enddo

   chgvar     var(&valCfile) +
              value('/clientfile=' *tcat +
                    &clientfile)

enddo

/*********************************************************/
/* Set values for download / upload                    */
/*********************************************************/
if         (&plugin *eq '*DOWNLOAD') then(do)
   chgvar     var(&valPLUGIN) +
              value('/PLUGIN=download')
enddo

if         (&plugin *eq '*UPLOAD') then(do)
   chgvar     var(&valPLUGIN) +
              value('/PLUGIN=upload')
enddo

if         ((&plugin *eq '*DOWNLOAD') *or +
            (&plugin *eq '*UPLOAD  ')) then(do)

   chgvar     var(&valfile) +
              value('/file=' *tcat &xfrdsc)
enddo
```

(continues)

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```
/*************************************************/
/* Run the data transfer                         */
/*************************************************/
if (&plugin *eq '*CLDOWNLOAD') then(do)

   runjva  class(&valCLASS) +
           parm(&valPLUGIN &valSystem &valHfile &valCfile) +
           chkpath(*IGNORE)
   monmsg     msgid(CPF0000)
enddo

else cmd(do)

   runjva  class(&valCLASS) +
           parm(&valPLUGIN &valfile) +
           chkpath(*IGNORE)
   monmsg     msgid(CPF0000)
enddo

endpgm
```


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Review and create the XFRDTA command

Why: The XFRDTA command can be used to run the Data Transfer program (XFRDTAC).

The source code for this command can be downloaded at:

http://www.web400.com/downloads/ACS/xfrdta.cmd.txt

Use the following CL command to compile this program:

```
    CRTCMD  CMD(your_lib/XFRDTA)  PGM(your_lib/XFRDTAC)  SRCFILE(your_lib/QCMDSRC)

/*********************************************************************/
/* Command XFRDTA - transfer data using download/upload              */
/*                                                                   */
/* Copyright 2012, Craig Pelkie, ALL RIGHTS RESERVED                 */
/*********************************************************************/
 XFRDTA:     CMD         PROMPT('Transfer Data')

             PARM        KWD(JARDIR) TYPE(*PNAME) LEN(256) MIN(1) +
                           VARY(*NO) CASE(*MIXED) PROMPT('Directory +
                           for acsbundle.jar')

             PARM        KWD(PLUGIN) TYPE(*CHAR) LEN(11) +
                           RSTD(*YES) VALUES(*DOWNLOAD *UPLOAD +
                           *CLDOWNLOAD) MIN(1) PROMPT('Plugin  +
                           to use')

             PARM        KWD(XFRDSC) TYPE(*PNAME) LEN(256) +
                           MIN(0) CASE(*MIXED) +
                           PMTCTL(NOTCLD) PROMPT('Path to .dtfx / +
                           .dttx file')

             PARM        KWD(FILE) TYPE(QUAL1) MIN(0) PMTCTL(ISCLD) +
                           PROMPT('Database file library to xfer')

             PARM        KWD(MBR) TYPE(*NAME) LEN(10) DFT(*FIRST) +
                           SPCVAL((*FIRST)) PMTCTL(ISCLD) PROMPT('Member')

             PARM        KWD(CLIENTFILE) TYPE(*PNAME) LEN(256) +
                           SPCVAL((*NONE)) MIN(0) +
                           CASE(*MIXED) PMTCTL(ISCLD) +
                           PROMPT('Client file path/name to write')

 QUAL1:      QUAL        TYPE(*NAME) LEN(10)
             QUAL        TYPE(*NAME) LEN(10) PROMPT('Database file name')

 ISCLD:      PMTCTL      CTL(PLUGIN) COND((*EQ *CLDOWNLOAD))

 NOTCLD:     PMTCTL      CTL(PLUGIN) COND((*NE *CLDOWNLOAD))
```


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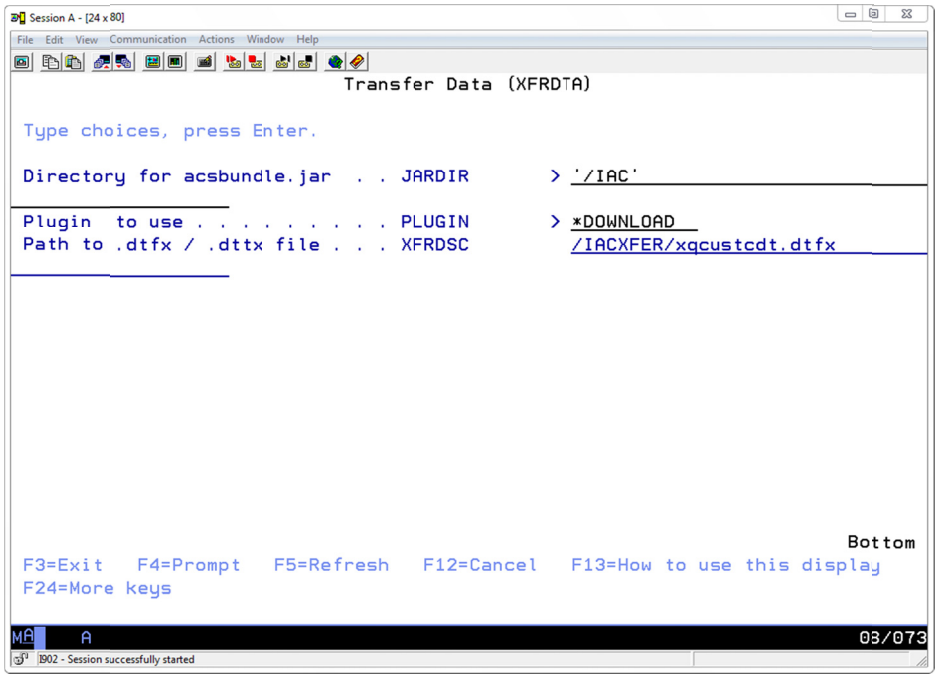
The XFRDTA command in operation

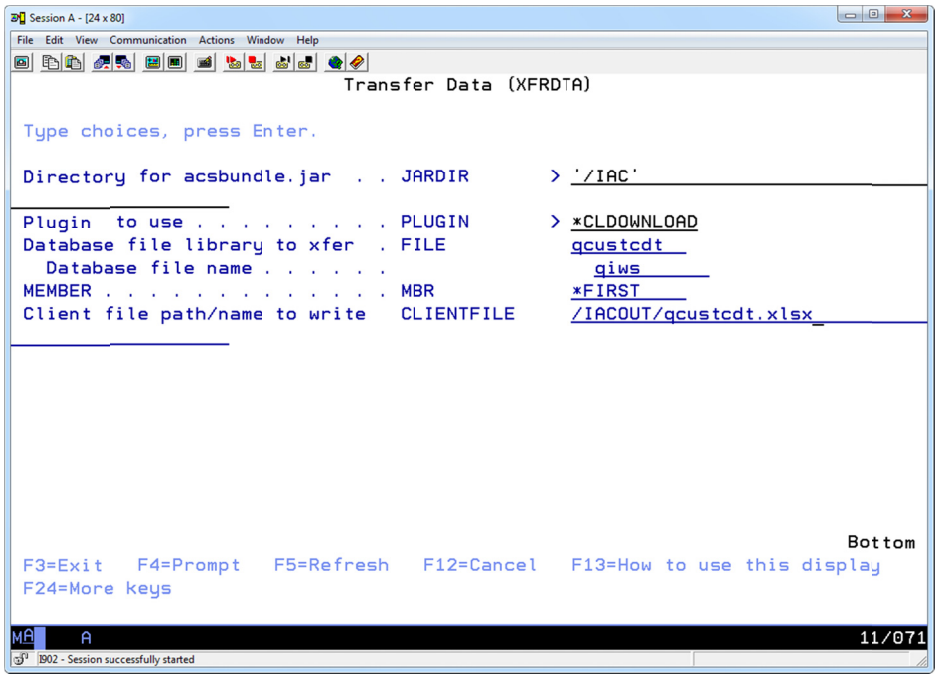
Figure 53 shows the Transfer Data (XFRDTA) command in the command prompter. This is the command prompter display for when the PLUGIN parameter value is *DOWNLOAD or *UPLOAD.



iac281v2

Figure 53: The Transfer Data (XFRDTA) command, when displayed in the command prompter.

Figure 54 shows the Transfer Data command in the command prompter when the PLUGIN parameter value is *CLDOWNLOAD.



iac282v2

Figure 54: The Transfer Data command string.

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Parameters used with the XFRDTA command

The parameters used with the Transfer Data command are described below.

Parameter	Value	Usage
JARDIR	/path_name	The path in the IFS where the acsbundle.jar file is located. Do not enter the name of the .jar file.
PLUGIN	*DOWNLOAD *UPLOAD *CLDOWNLOAD	The type of transfer to perform.
The following parameter is used when the value of the PLUGIN parameter is *DOWNLOAD or *UPLOAD.		
XFRDSC	/path_name/file_name.dtfx /path_name/file_name.dttx	The path in the IFS where the .dtfx (download) or .dttx (upload) description file is located.
The following parameters are used when the value of the PLUGIN parameter is *CLDOWNLOAD.		
FILE	Qualified name of an IBM i database file	This is the name of the database file that is to be downloaded. The entire content of the file is download (all rows, all fields).
MBR	*FIRST member_name	The name of the member in the file specified in the FILE parameter to download.
CLIENTFILE	/path_name/file_name.extension	The complete path and file name of the file that is to be created as a result of the download. The extension must be a valid extension for the data transfer download (.xls, .xlsx, .csv, .ods, .txt). If an invalid extension is specified, the default extension value .csv is used.

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Check for, install the IBM Tools for Developers for i5/OS LPP (OBSOLETE)

Note: the steps shown starting in this section through the end of this document are not needed if you are using the updated version of the IBM i Access Client Solutions from October 2012 (or later). You only need to use these steps if you are using the original version of the IBM i Access Client Solutions product.

Why: To run the Data Transfer programs using Java on the IBM i, you need to use tools provided by IBM in the **IBM Tools for Developers for i5/OS** Licensed Program Product.

Use the Display Installed Licensed Programs program to check for the LPP

Why: You can check to see if the LPP is already installed on your system.

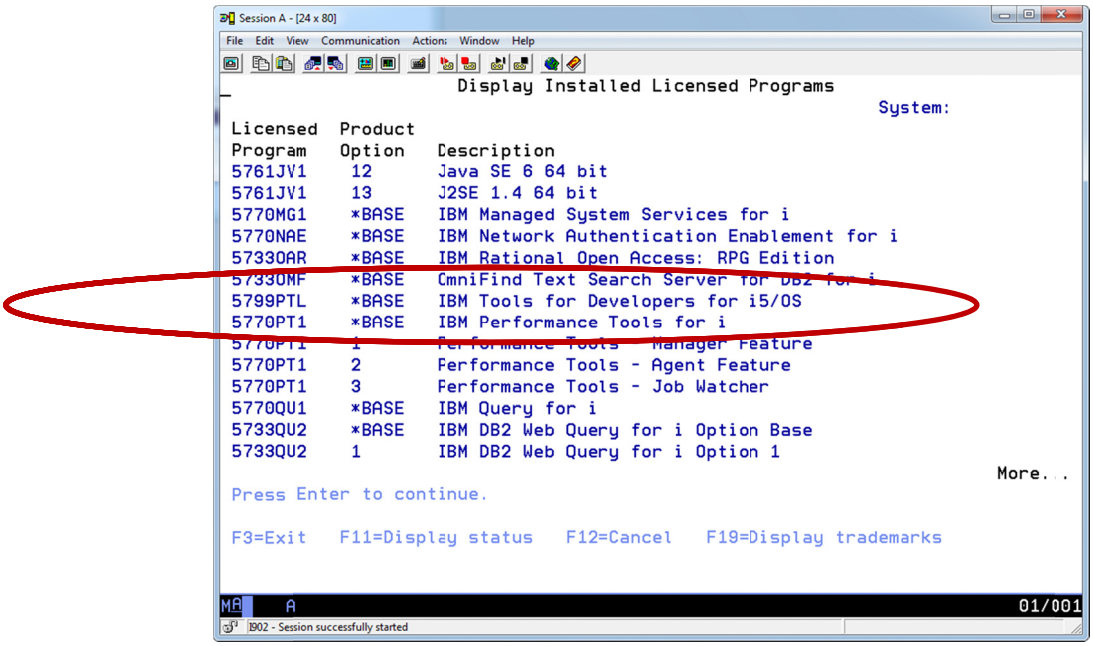
_____ On a 5250 command line, enter the following command:

```
GO LICPGM
```

_____ On the **Work with Licensed Programs** menu, enter option 10, **Display installed licensed programs**.

_____ When the **Display Installed Licensed Programs** panel is displayed, scroll through the list of installed programs. Look for Licensed Program **5799PTL IBM Tools for Developers for i5/OS** as shown in Figure 55.

Note: the 5799PTL LPP is not distributed with the operating system, so if you did not have a previous reason to work with the tools, it is unlikely that the LPP will be on your system.



iac141

Figure 55: Look for the Licensed Program Product 5799PTL.

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_____ If the LPP is not installed on your IBM i, continue with the steps in the section **Download the IBM Tools for Developers for i5/OS LPP** on page 51.

_____ If the LPP is installed on your IBM i, continue with the steps in the next section to verify that you have the current version of the tools.

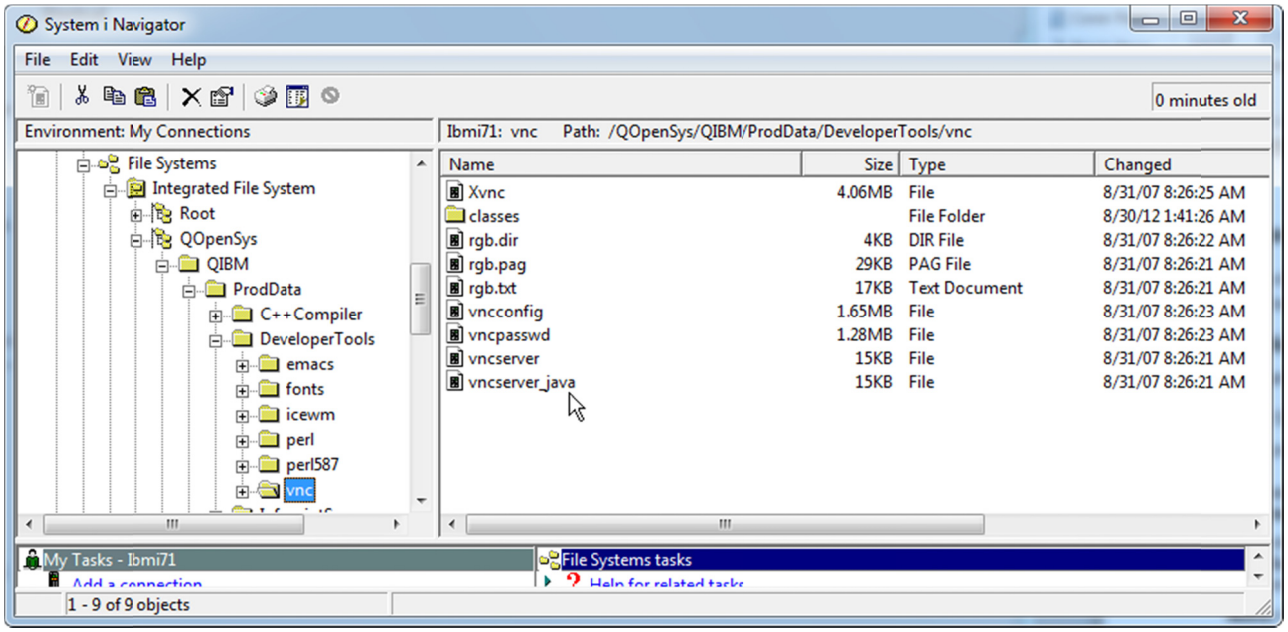
Check for the vncserver_java file (5799PTL already installed)

Why: If you already have the 5799PTL LPP installed on your system, you need to verify that the version that is installed includes the Virtual Network Computing (VNC) server, which is used when you run the Java–based Data Transfer on your IBM i.

_____ Navigate to the following directory in your IBM i IFS:

```
/QOpenSys/QIBM/ProdData/DeveloperTools/vnc
```

_____ In that directory, look for the `vncserver_java` file, as shown in Figure 56.



iac142

Figure 56: Look for the vncserver_java file.

_____ If the file is not in the directory, you need to download the current version of the **IBM Tools for Developers for i5/OS** LPP. Use the steps in the next section to download and install the current version.

_____ If the file is in the directory, go to the section **Work with the VNC Server** on page 57 and continue with the steps in that section.

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Download the IBM Tools for Developers for i5/OS LPP

Why: The **IBM Tools for Developers for i5/OS** LPP is distributed via an IBM website. The code that you will download is a save file image that you will subsequently upload to your IBM i to complete the installation of the tools.

_____ The **IBM Tools for Developers for i5/OS** LPP is distributed as a ZIP file that contains a save file image and a `readme.txt` file of instructions. To obtain the ZIP file, navigate to the following URL:

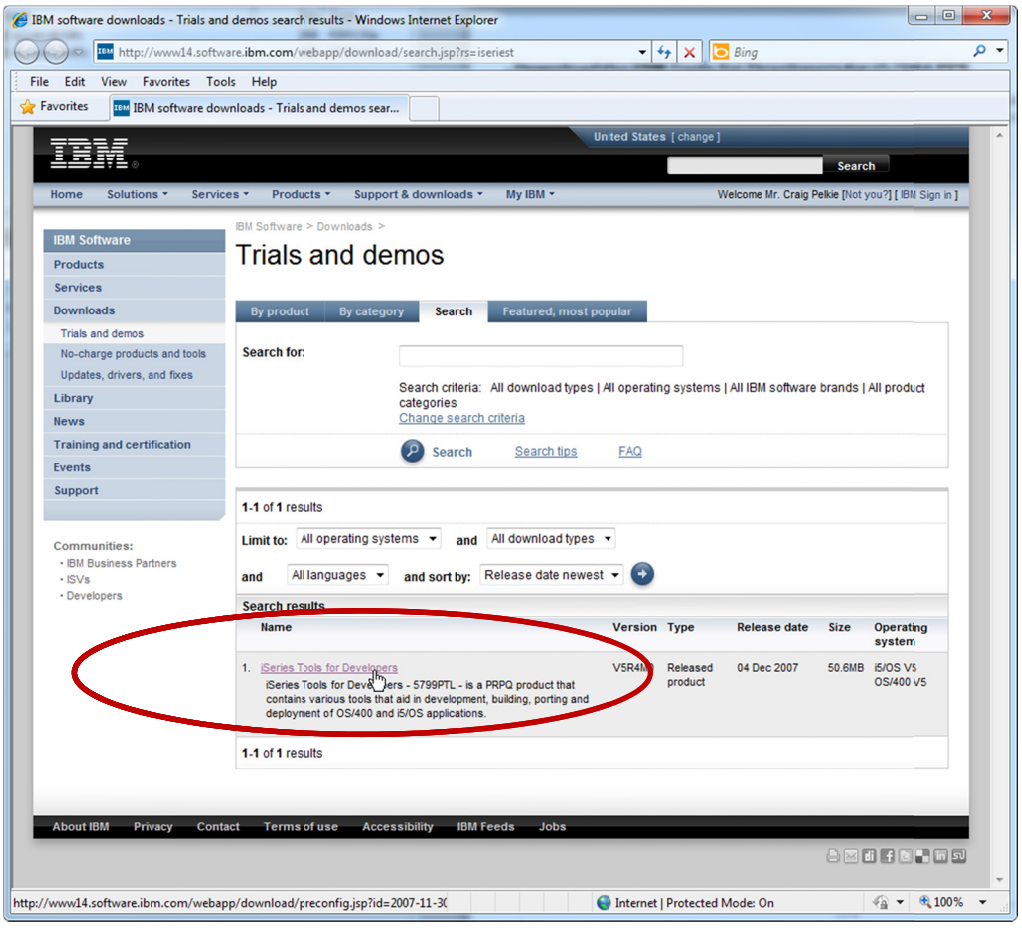
http://www14.software.ibm.com/webapp/download/search.jsp?rs=iseriest

_____ You should a web page similar to what is shown in Figure 57 (screen capture taken on 2012-09-03).

_____ If you do not see a web page that includes a link to download the **Tools for Developers**, go to the main IBM web site (http://www.ibm.com) and enter the search term `5799PTL`. From the results page, navigate to the download page.

_____ Click the link (on the page, it is labeled **iSeries Tools for Developers**).

Note: the Version shown on the page is V5R4M0. This download is also used for later releases (V6R1M0 and V7R1M0 when this document was prepared).



iac151

Figure 57: This is the landing page to download the Tools for Developers.

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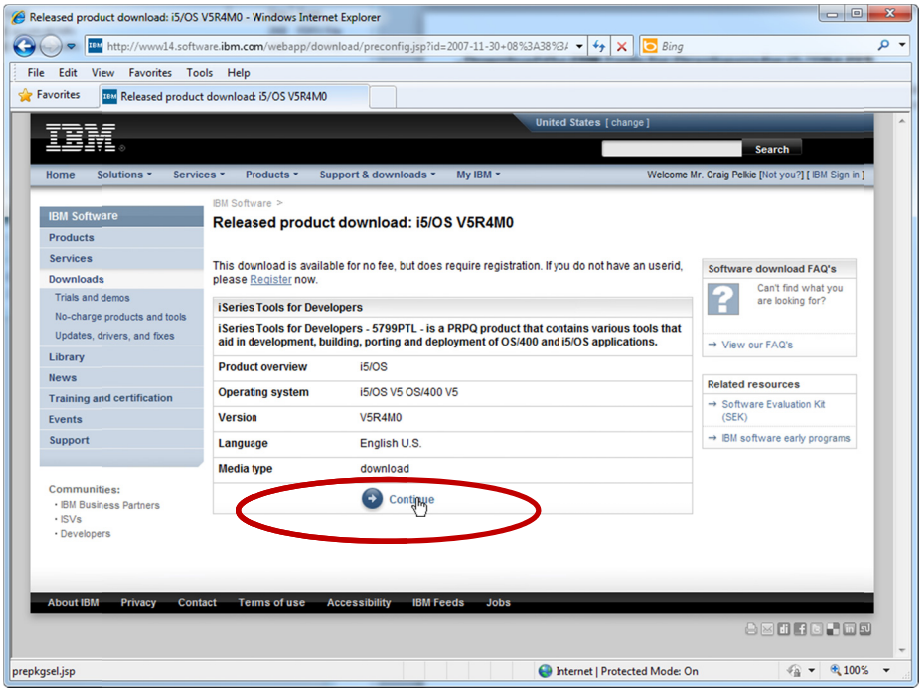
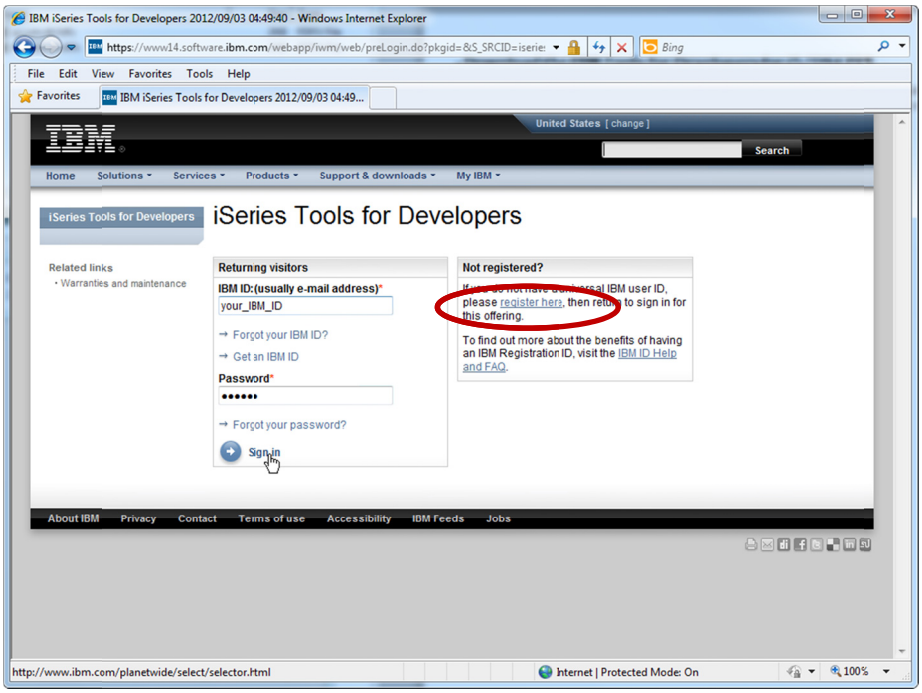
_____ The next page that is displayed is shown in Figure 58. Click the **Continue** link.



iac152

Figure 58: Click the Continue button to start the download process.

_____ You are prompted to enter your IBM User ID and Password, as shown in Figure 59. If you do not have an IBM User ID, you can click the **register here** link on this page to create an ID. There is no charge to create and use your ID for the purposes of this download.



iac153

Figure 59: You are asked to sign in with your IBM ID. If you do not have an IBM ID, you can create an ID (register) on this page.

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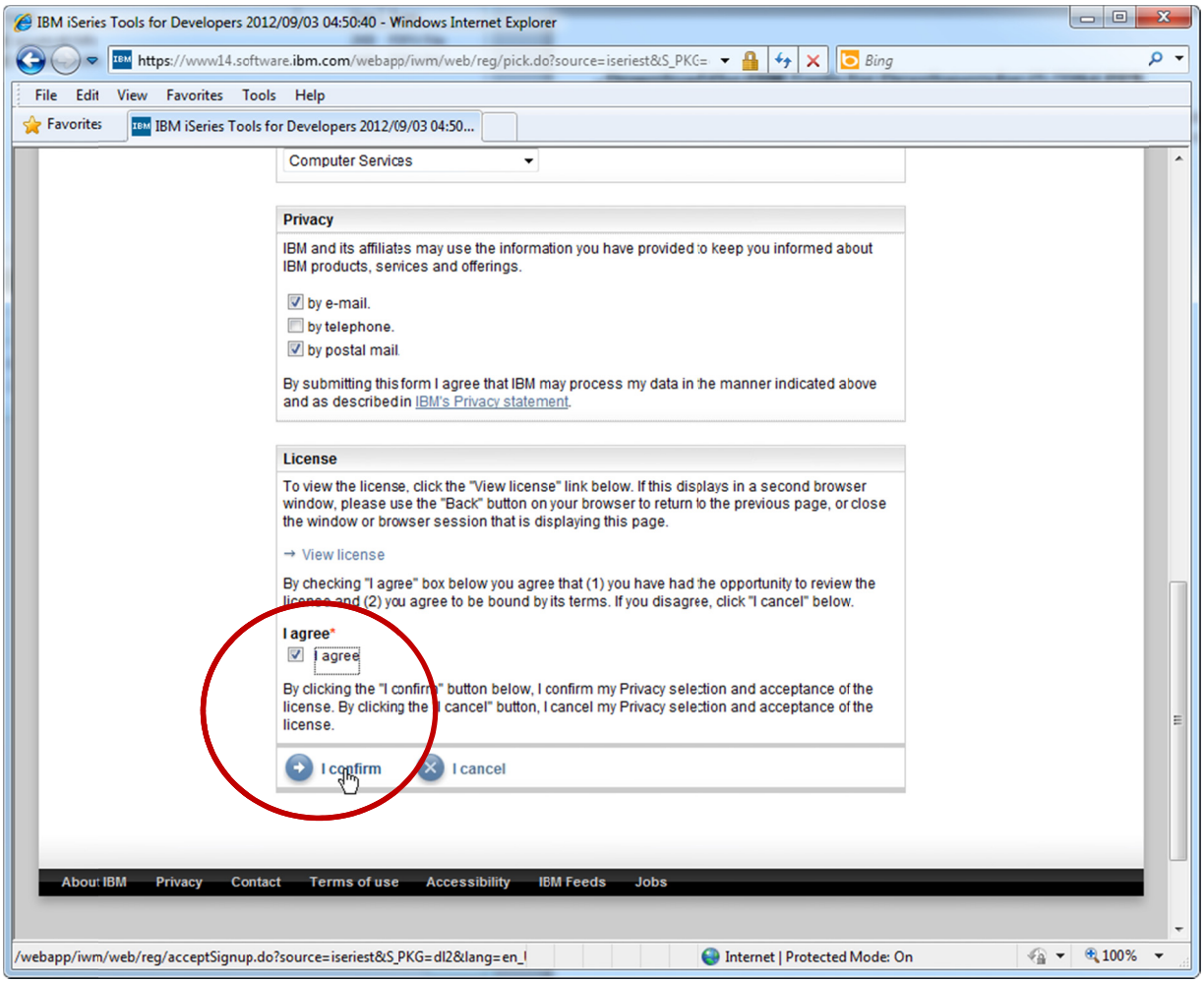
_____ After entering your IBM user ID and password, you are taken to a page that asks you for some information, shown in Figure 60.

You are required to click the **I agree** checkbox on this page to continue, then click the **I confirm** link.



iac154

Figure 60: You need to click the "I agree" checkbox to download the software.

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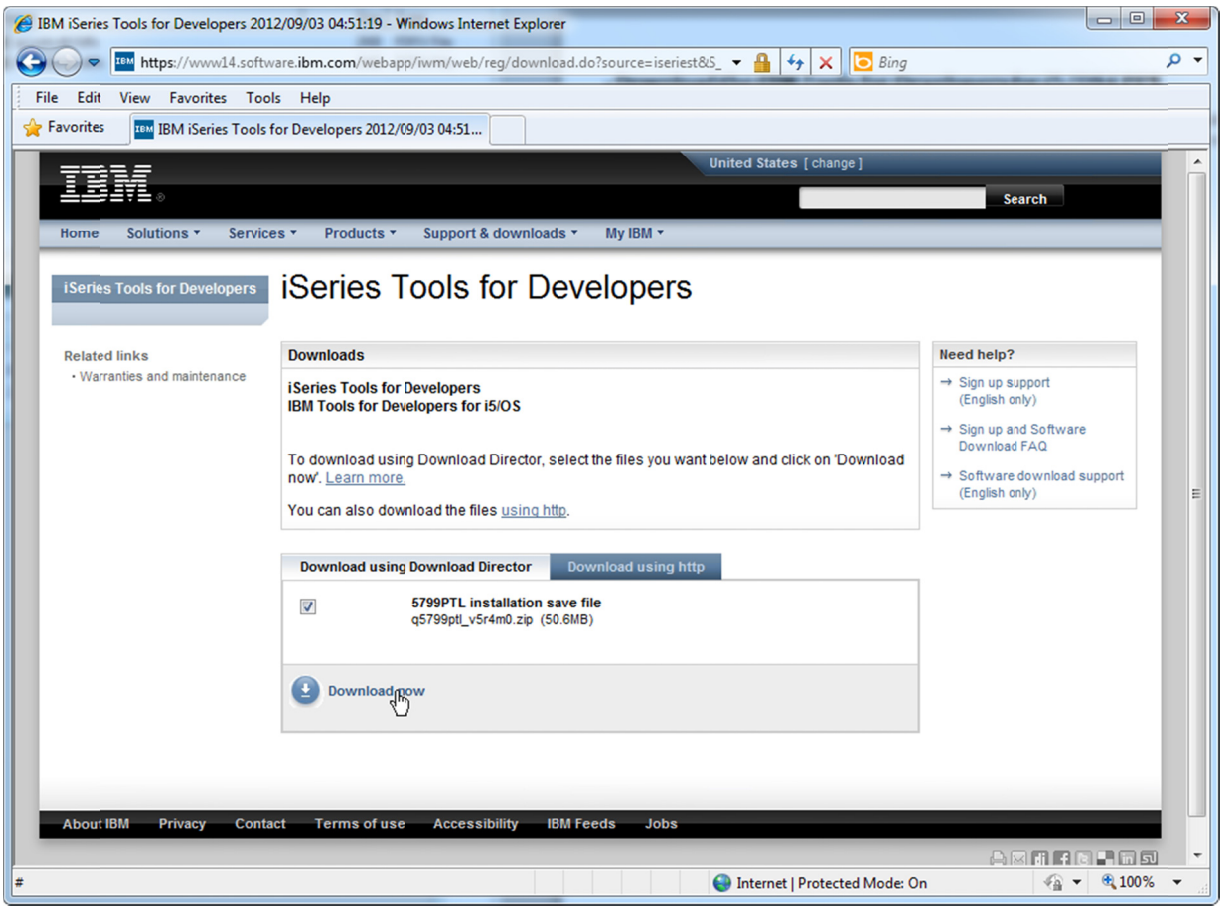
_____ You are taken to the download page, shown in Figure 61. You can use either the Download Director or Download using HTTP to download the ZIP files.

See the previous description for the download options:

Download using the Download Director on page 10

Download using HTTP on page 12

_____ Download the ZIP file to a directory on your workstation.



iac155

Figure 61: You can use the Download Directory or Download using HTTP options.

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Install the IBM Tools for Developers for i5/OS LPP

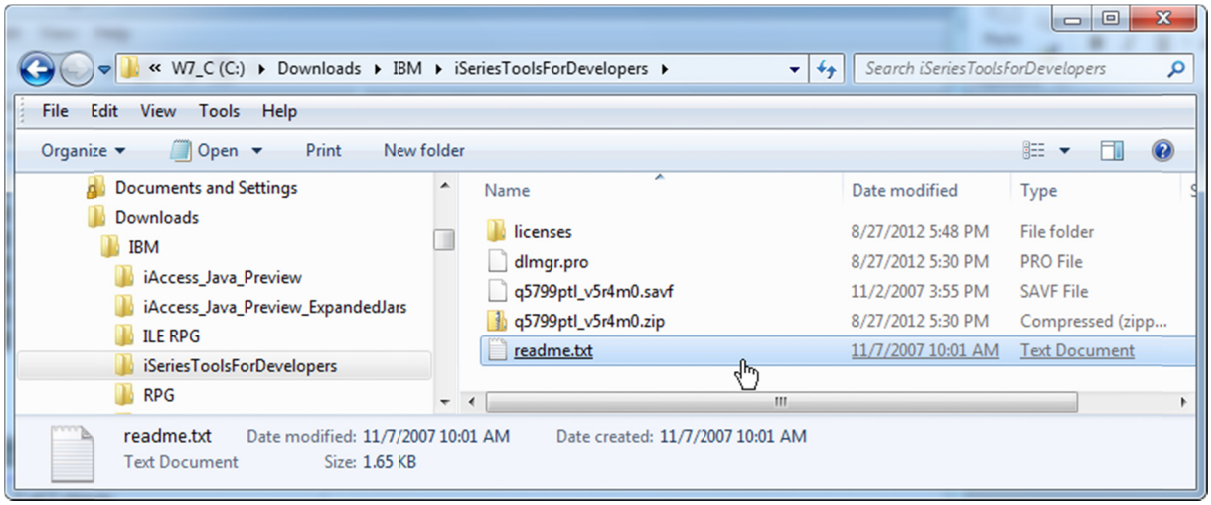
Why: The ZIP file that you downloaded from the IBM web site contains a save file image and a `readme.txt` file. You need to extract those files from the ZIP and work the files to install the tools on your IBM.

_____ On your workstation, navigate to the directory where you downloaded the ZIP file for the **IBM Tools for Developers for i5/OS** (file name `q5799ptl_v5r4m0.zip`).

_____ Extract all of the files from the ZIP into a directory. You can extract the files into the same directory where the ZIP file is located.

_____ Verify that the list of extracted files looks like the list shown in Figure 62.

Note: the `dlmgr.pro` file is present only if you used the Download Director. The file is not needed and may be delete.



iac161

Figure 62: This shows what the contents of the q5799ptl_v5r4m0.zip file contains after you extract all of the files.

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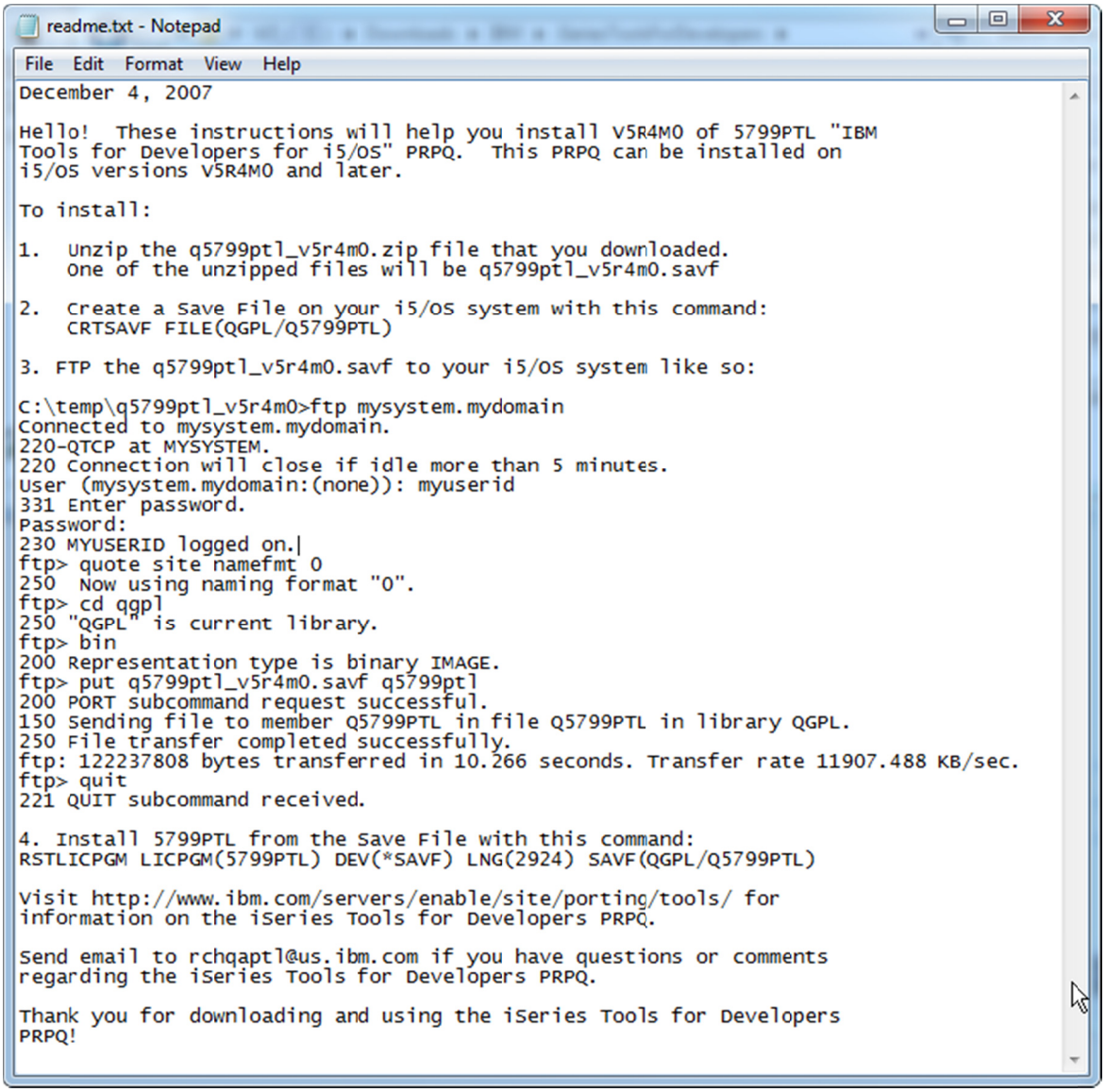
_____ Open the readme.txt file. The contents of the file are shown in Figure 63.

_____ Follow the steps that are described in the readme.txt file to perform the following:

- Create save file QGPL/Q5799PTL on your IBM i
- FTP the save file image (q5799ptl_v5r4m0.savf) to the save file
- Install the 5799PTL LPP from the save file



iac162

Figure 63: The readme.txt file contains instructions on uploading the save file image to a save file on your IBM i, and restoring the LPP from the save file.

_____ After you complete the RSTLICPGM step, use the steps shown in the section **Use the Display Installed Licensed Programs program to check for the LPP** on page 49. Verify that the 5799PTL LPP is installed, as shown in Figure 55 on page 49.

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Work with the VNC Server

Why:

The IBM i Access Client Solutions product is designed to be used in a workstation environment, which provides a graphical user interface (GUI). When you run the ACS programs, the Java code in the product displays status messages and dialogs using Java GUI features.

When you run the ACS Data Transfer program on the IBM i, there is no support for the Java GUI. If you simply try to run the Data Transfer program on the IBM i, it ends in error.

In some cases, you can run Java code on the IBM i and indicate that you do not want to use the GUI. That is referred to as running in *headless mode*. You can find a description of that mode in the **IBM Developer Kit for Java** documentation at this link:

http://publib.boulder.ibm.com/infocenter/iseries/v7r1m0/index.jsp?topic=%2Frzaha%2Fnawtsupport.htm

It would be ideal if the ACS programs could use headless mode, as using it is as easy as adding a command line parameter to the `java` command (`java.awt.headless=true`). Unfortunately, even if you add that parameter value to the `java` command, the program ends in error.

The alternative is to use what IBM calls the ***Native Abstract Windowing Toolkit*** (NAWT) that is also described in the **IBM Developer Kit for Java** documentation at this link:

http://publib.boulder.ibm.com/infocenter/iseries/v7r1m0/index.jsp?topic=%2Frzaha%2Fguiintro.htm

The ACS programs will run on your IBM i when you configure NAWT. The NAWT support is provided by using the Virtual Network Computing (VNC) server that is part of the IBM Tools for Developers LPP. The VNC server runs in the IBM i Portable Application Solutions Environment (PASE), which provides support for running AIX applications in the IBM i environment.

After installing and configuring the VNC server on your IBM i, you will work with a VNC viewer on your workstation. When you use the ACS programs, the output of the programs is directed through the VNC server to the VNC viewer.

Although it may sound very complicated to work with the tools, there are only a few steps that you need to do to get everything installed and configured. The steps are shown in the following sections. Once you have the VNC server and VNC viewer configured, you can use the ACS Data Transfer programs directly on your IBM i.

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Check to see if the VNC server is already running

Why: If the **IBM Tools for Developers** LPP was already installed on your IBM i, the VNC server might already be configured and running. If the server is already running, you need to work with the existing server environment.

_____ If you just installed the **IBM Tools for Developers**, you will not have any VNC servers running, so you can skip ahead to the section **Create the VNC password file** on page 62. You can also work through the steps in this section if you want to.

_____ On a 5250 command line, enter the following CALL command to start the PASE shell (the *PASE shell* is where you will enter the commands to work with the VNC server):

```
CALL QP2TERM
```

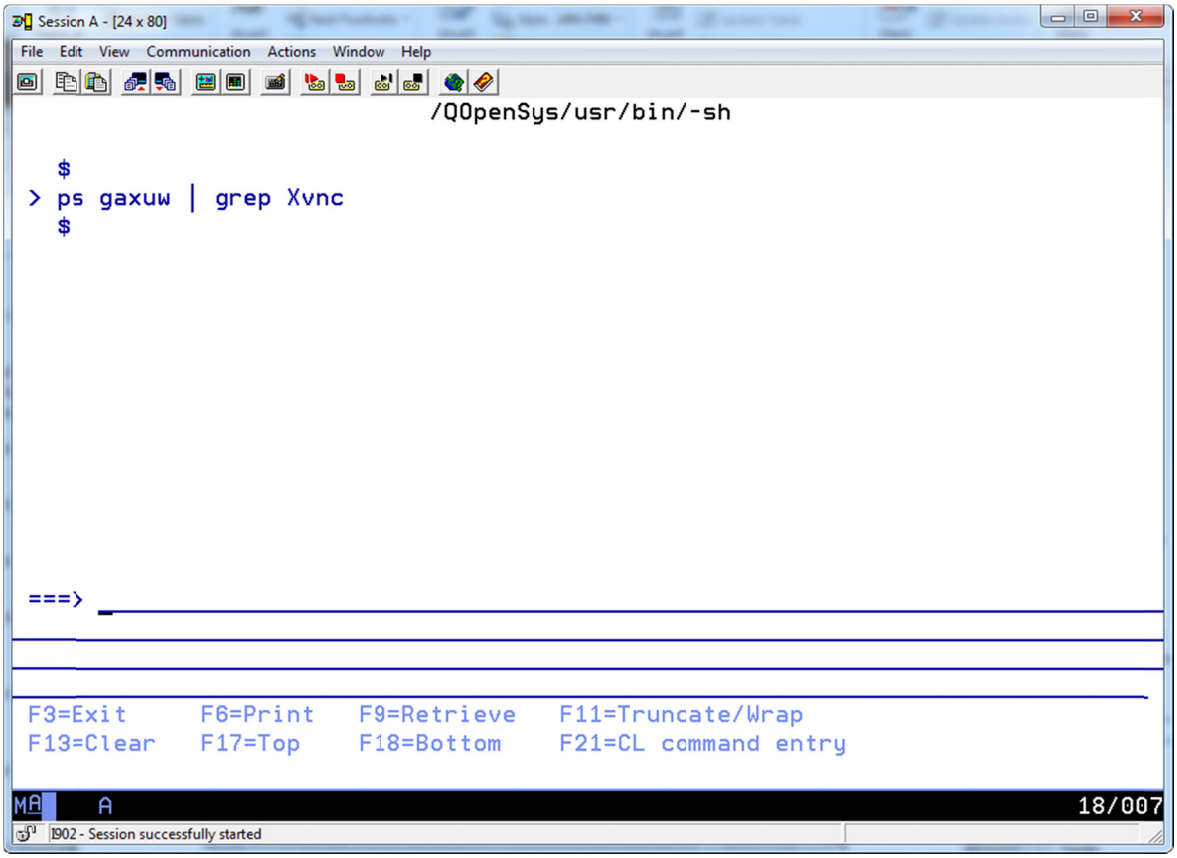
_____ The PASE shell is displayed. It provides a command entry display that is similar to the command line display used to enter IBM i commands.

_____ Enter the following PASE command to display any currently active VNC servers.

Note: all commands that are used in the PASE environment are case–sensitive.

```
ps gaxuw | grep Xvnc
```

_____ If there are no active VNC servers, you will see the output shown in Figure 64.



iac171

Figure 64: This is what the output of the ps command looks like when there are no active VNC servers.

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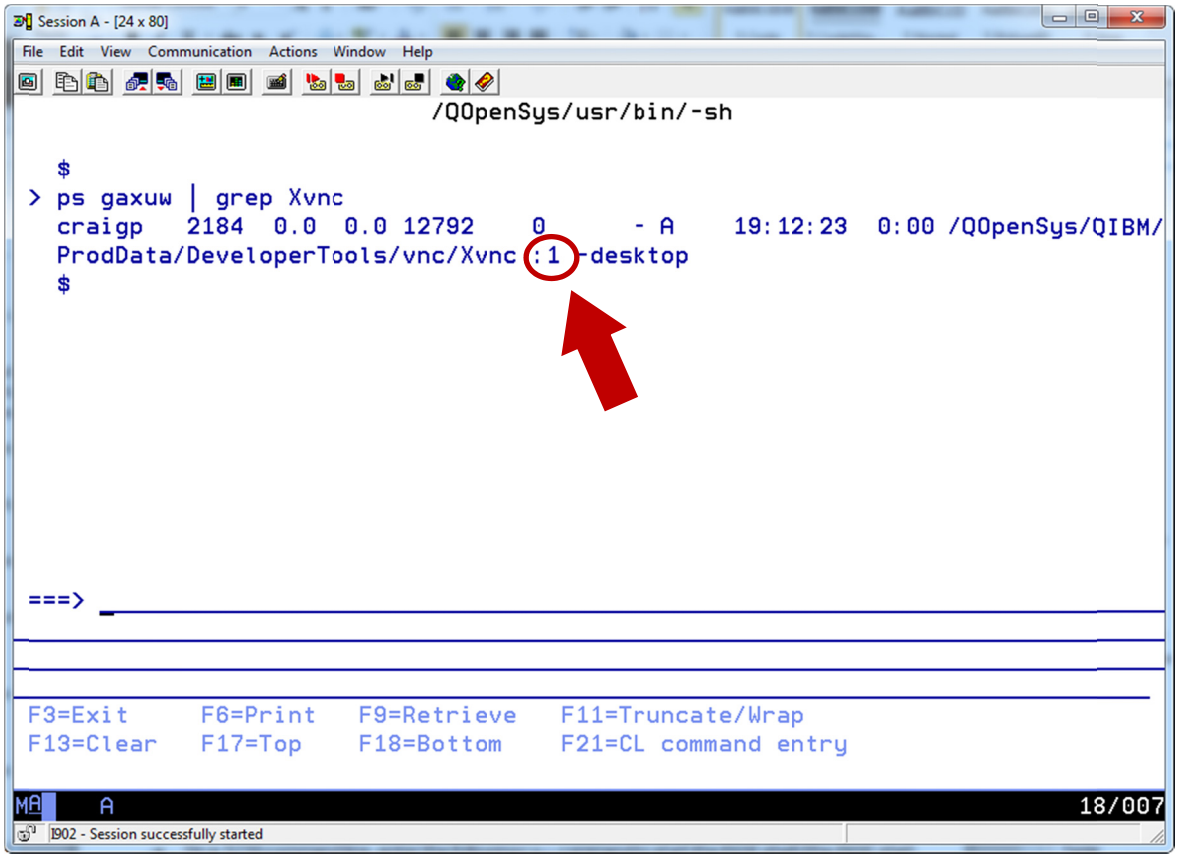
_____ If there is at least one active VNC server, you will see output similar to what is shown in Figure 65.

If any VNC servers are active, make a note of the highest server instance number. The server instance number is preceded by a colon (:) character. You need to know the highest server instance number so that you can start another VNC server using the next higher number.

Note: some of the data that is shown in the figure has been obscured. You will see more data following the `-desktop` text, the data that is obscured is not relevant here.



iac172

Figure 65: This is what the output of the ps command looks like when at least one VNC server is running. The VNC server instance number is 1.

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What is the ps command and what do the gaxuw options mean?

The ps command, used in the PASE environment, displays the status of processes. It is similar to the IBM i WRKACTJOB command.

The gaxuw options that are used on the command are a set of five individual options. The options are described in the following IBM document, in the section titled **Options**:

http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.aix.cmds/doc/aixcmds4/ps.htm

The options are used as follows. The descriptions of the options are from the IBM document linked to above:

g — displays all processes

a — displays information about all processes with terminals (ordinarily only the own processes of the user are displayed)

x — displays processes without a controlling terminal in addition to processes with a controlling terminal

u — displays user–oriented output. This includes the **USER**, **PID**, **%CPY**, **%MEM**, **SZ**, **RSS**, **TTY**, **STAT**, **STIME**, **TIME** and **COMMAND** fields.

w — specifies a wide–column format for output (132 columns rather than 80).

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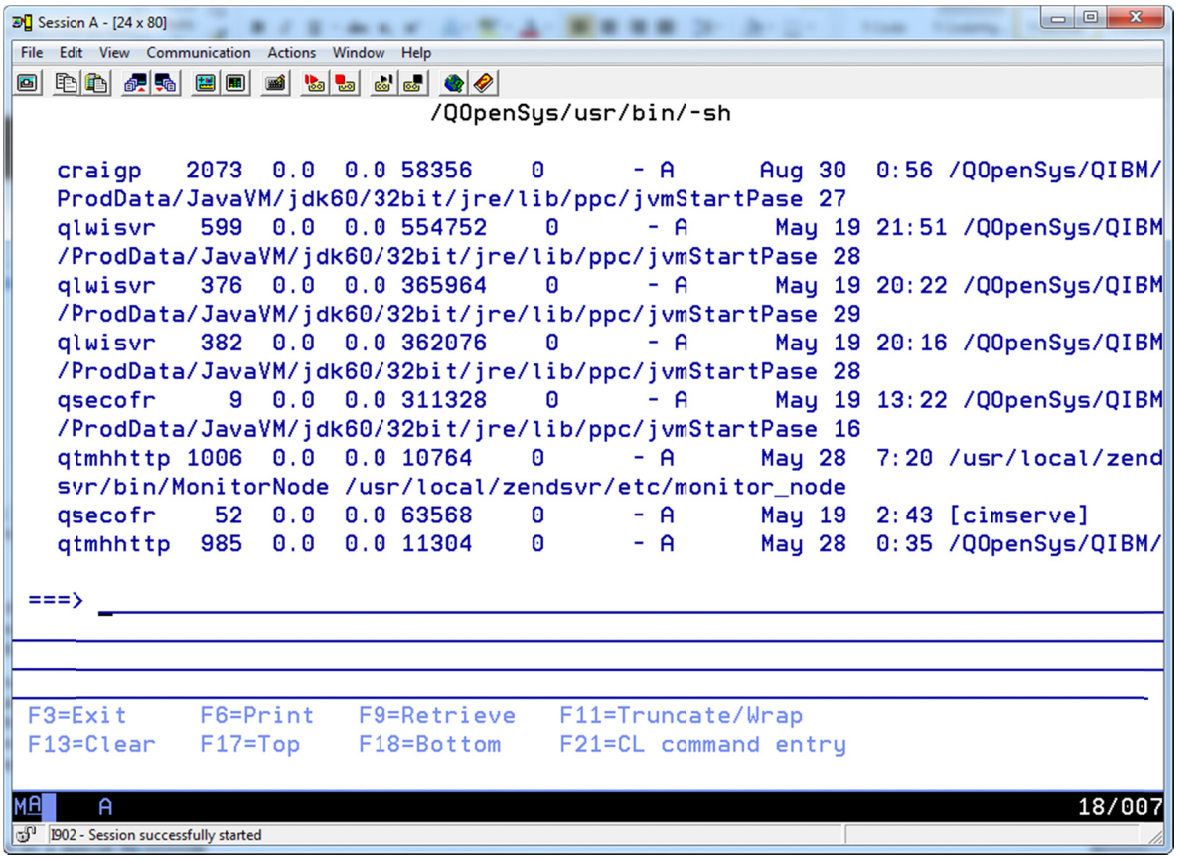
What does the grep command do?

The `grep` command searches for a pattern in a file.

The output of the `ps` command is *piped* to the `grep` command, using the vertical bar (`|`) character. In other words, the output of the `ps` command is the input to the `grep` command.

In the command that you entered, the pattern to search for was `Xvnc`. That pattern is used to identify the VNC servers.

If you run the `ps gaxuw` command and do not pipe the output to `grep`, the resulting output might look like what is shown in Figure 66.



iac173

Figure 66: This shows the output of the ps gaxuw command when the grep command is not used.

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Create the VNC password file

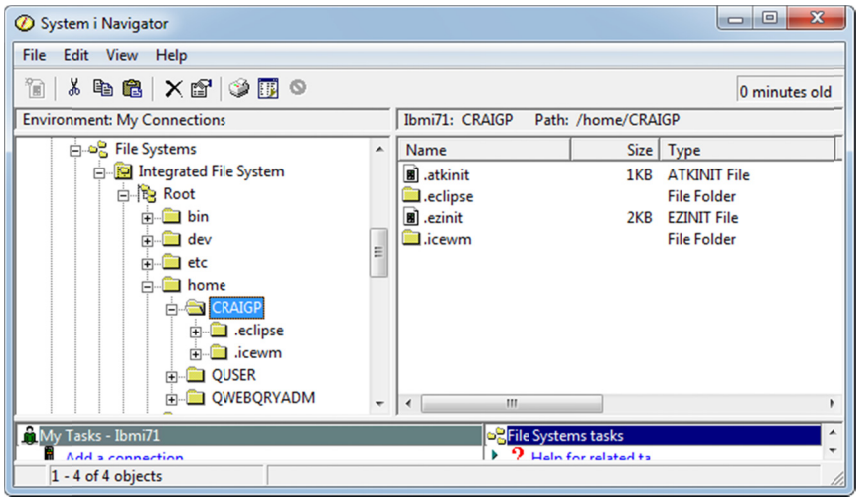
Why: To use the Native Abstract Windowing Toolkit (NAWT) support, you must start a VNC server. The VNC server that you start requires a VNC password so that the VNC viewer can connect to the server. In this section, you will create the directory that will contain the VNC password.

_____ In the System i Navigator, go to the `/home` directory in the `Root` file system.

_____ In the `/home` directory, identify the user profile name that you will use to start the VNC server.

In Figure 67, the user profile name is `CRAIGP`.

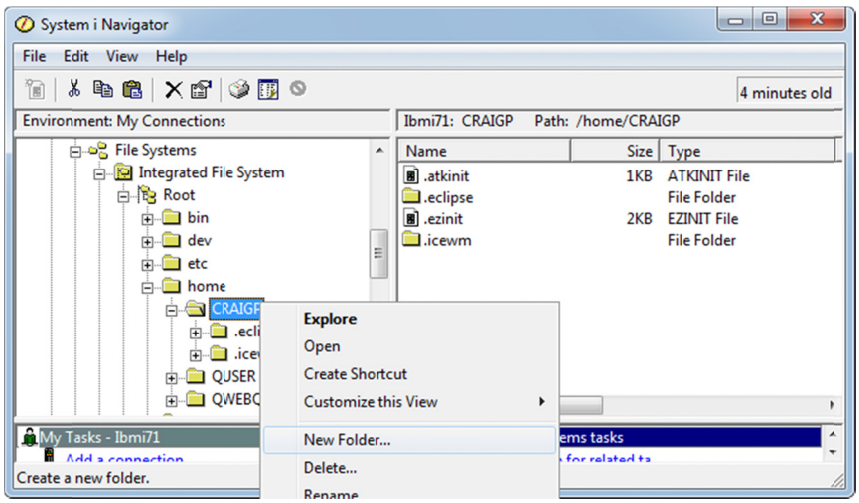
On your IBM i, the list of subdirectories in the `/home` directory will obviously be different from what is shown in the figure.



iac181

Figure 67: Identify the user profile name in the /home directory.

_____ In the System i Navigator, right–click the user profile that will be used to start the VNC server. Select the **New Folder** item from the pop–up menu, as shown in Figure 68.



iac182

Figure 68: Right-click the user profile to use for the VNC, select New Folder from the pop-up menu.

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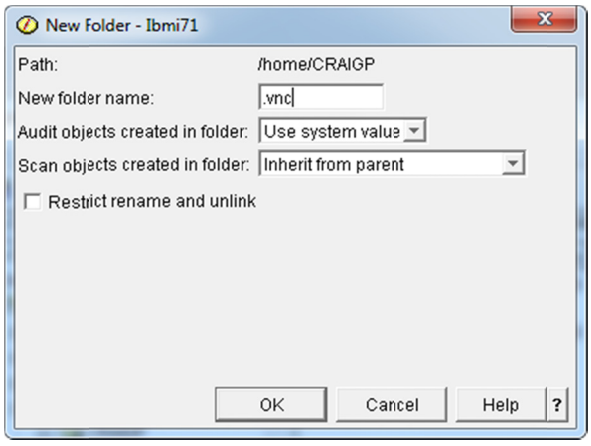
_____ The **New Folder** dialog (shown in Figure 69) is displayed. Enter the new folder name as:

.vnc

(note the leading period character)

_____ Click the **OK** button to create the folder.



iac183

Figure 69: Enter the new folder name value as .vnc.

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Create the VNC password

Why: You need to enter the VNC password before you can connect to the VNC server.

_____ Enter the following command on a 5250 command line:

```
QAPTL/VNCPASSWD PASSWORD(your_vnc_password)
                VERIFY(your_vnc_password)
                USEHOME(*NO)
                PWDFILE('/home/your_user_profile_name/.vnc/passwd')
```

Where:

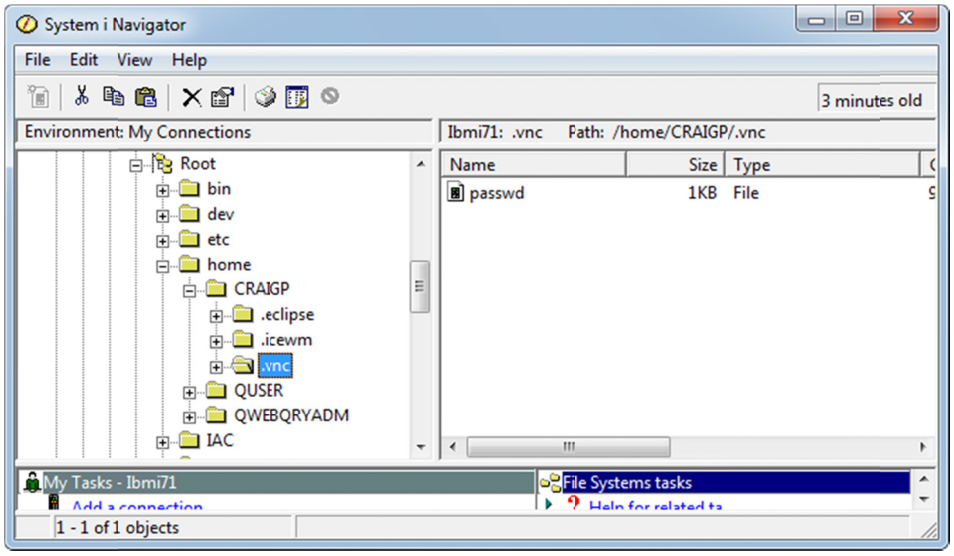
`your_vnc_password` is the case-sensitive 6 to 8 character password to assign.

`your_user_profile_name` is the name of your subdirectory in the `/home` directory

Note: the QAPTL library is the library where the **IBM Tools for Developers** LPP is installed.

Note: do not use your IBM i user profile password as the VNC server password.

_____ When done, verify that the `passwd` file is in the `.vnc` subdirectory, as shown in Figure 70.



vnc184

Figure 70: Verify that the passwd file is contained in the .vnc subdirectory.

Notes

- The password that you enter on the VNCPASSWD command is encrypted within the `passwd` file.
- If you forget the password value, delete the `passwd` file, then run the VNCPASSWD command again.

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Start the VNC sever — Initial Start

Why: If you are working with a new VNC server (that is, you did not previously have a VNC server configuration on your IBM i), you need to start the VNC server so that it can build some files that it needs. Starting the VNC server also lets you verify that the server can be started.

_____ Enter the following command on a 5250 command line:

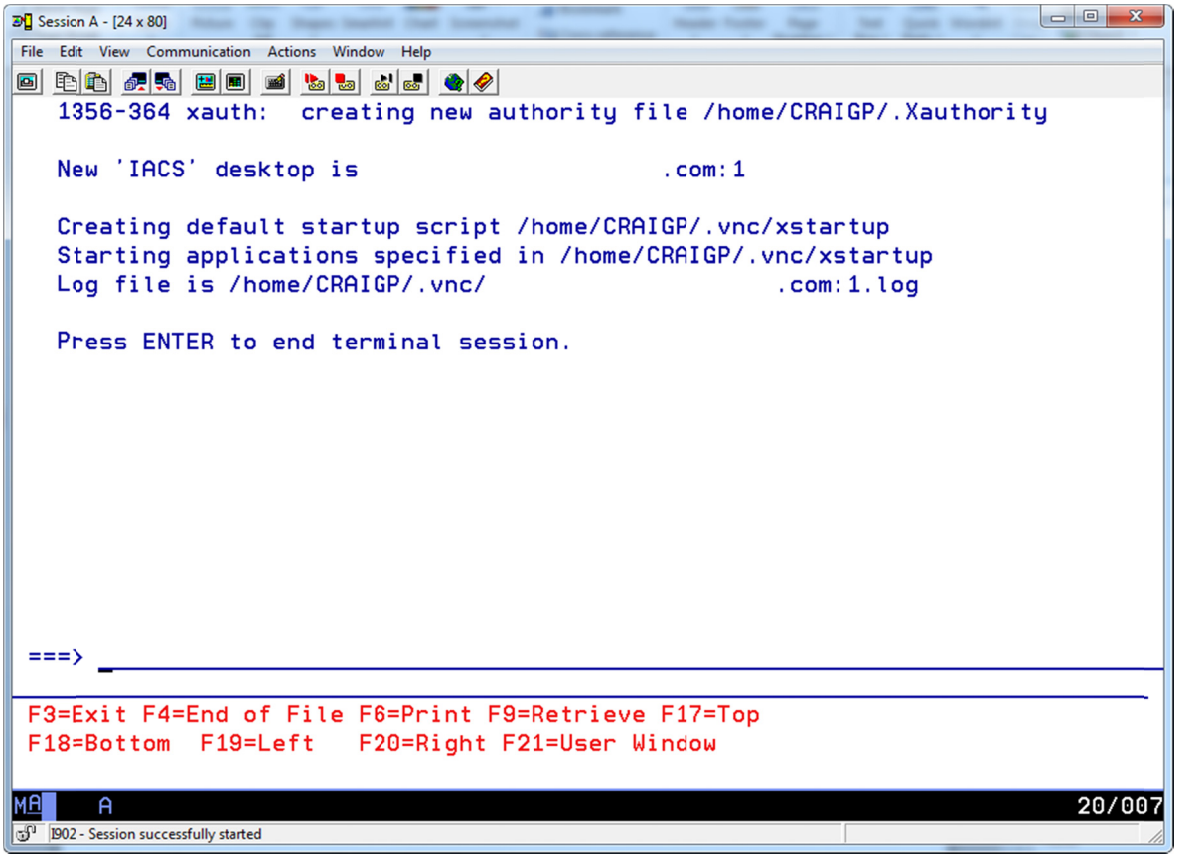
```
QAPTL/STRVNCSVR NAME(ACS)
```

_____ A terminal session display opens. You will see messages similar to those shown in Figure 71.

Note: some of the text that is displayed in the terminal session is omitted from the figure. Text that identifies the IBM i that the command was run on is omitted in the line that begins **New 'ACS' desktop is** and the line that begins **Log file is**.

_____ Press the **Enter** key to end the terminal session and return to the 5250 command line.

Note: ending the terminal session **does not** end the VNC server.



iac191

Figure 71: Theses status messages are displayed when you use the STRVNCSVR command.

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Verify that the VNC server is running

Why: This step will prove that the VNC server that you started in the previous step is active.

_____ On a 5250 command line, enter the following CALL command to start the PASE shell:

```
CALL QP2TERM
```

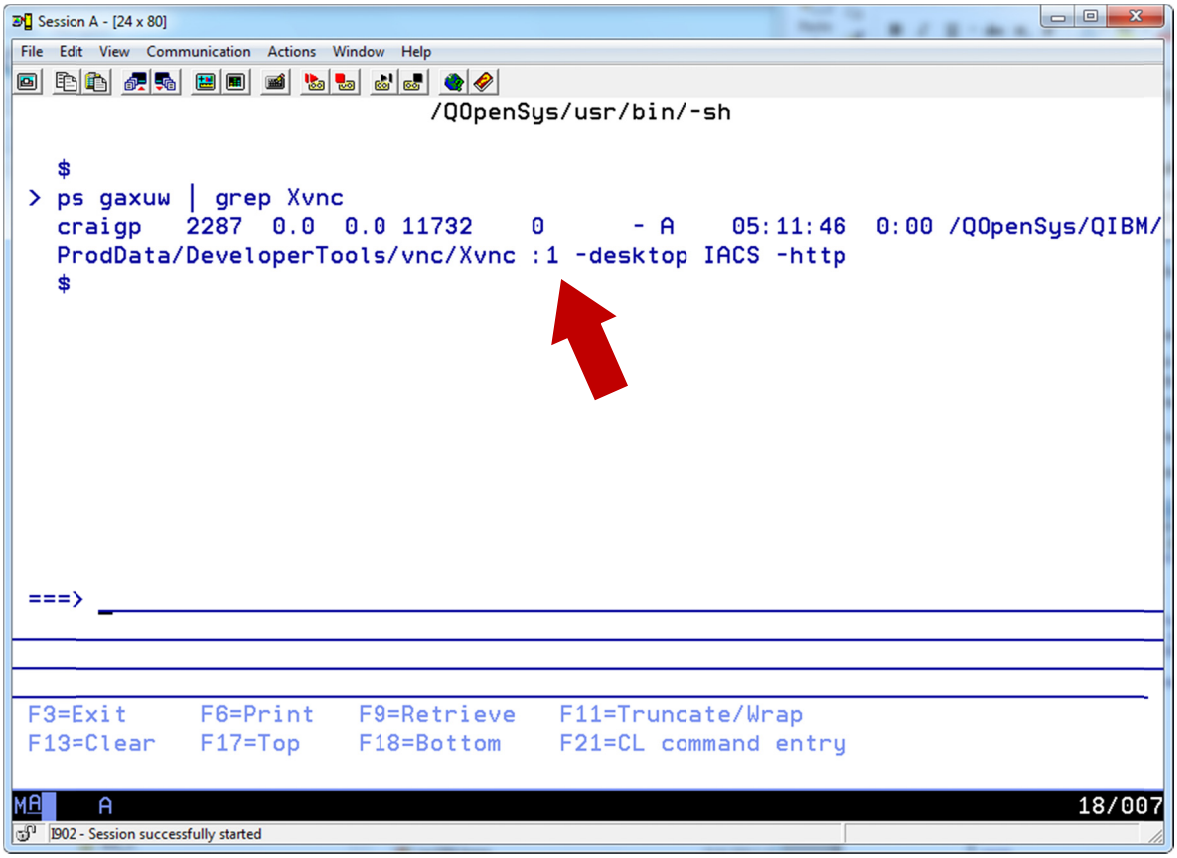
_____ Enter the following PASE command to display any currently active VNC servers.

```
ps gaxuw | grep Xvnc
```

_____ You should see that the VNC server is active, as shown in Figure 72.

_____ The instance number is the number on the third line of text that is preceded by the colon (:) character. You will use the instance number with the ENDVNCSVR command, described in the next section.

_____ When done, press the **F3** key to return to the 5250 command line.



iac192

Figure 72: Use the ps command to verify that the VNC server is running.

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Stop the VNC server

Why: You will learn how to stop the VNC server.

_____ Enter the following command on a 5250 command line:

```
QAPTL/ENDVNCSVR INSTANCE(1)
```

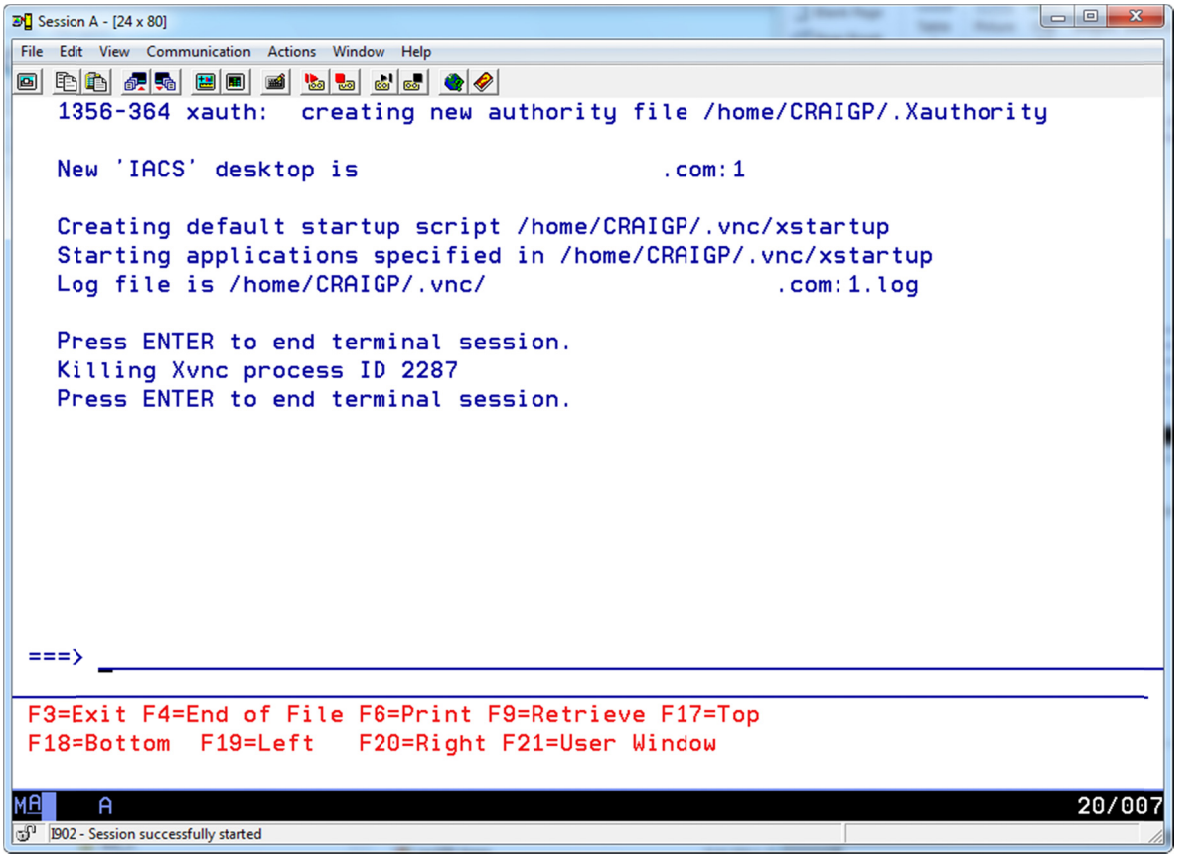
Where the value that you enter for the INSTANCE parameter is the instance number of the active VNC server (see Figure 72).

_____ A terminal session display opens. You will see messages similar to those shown in Figure 73.

Note: the messages that are shown in Figure 73 include the messages from the STRVNCSVR command that you entered earlier. The message for the ENDVNCSVR command starts with the line that begins **Killing Xvnc**.

Note: some of the text that is displayed in the terminal session is omitted from the figure. Text that identifies the IBM i that the command was run on is omitted in the line that begins **New 'ACS' desktop is** and the line that begins **Log file is**.

_____ Press the **Enter** key to end the terminal session and return to the 5250 command line.



iac193

Figure 73: You will see the "Killing Xvnc" message when you use the ENDVNCSVR command.

_____ Use the steps shown in the section **Verify that the VNC server is running** on page 66 to verify that the VNC server is ended (you should not see it in the process list).

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Review files that were created by starting the VNC server

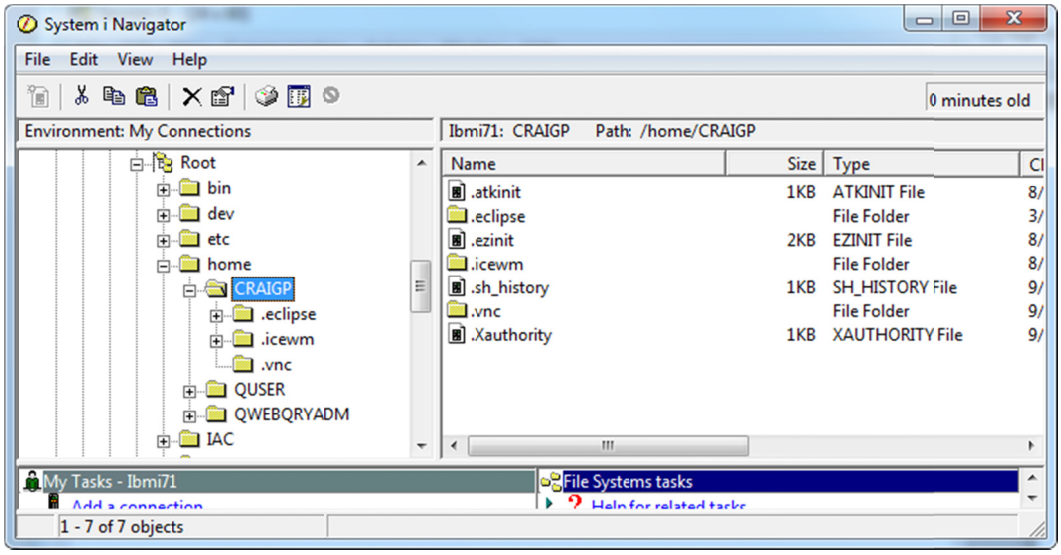
Why: When you start the VNC server the first time, it creates files in your `/home` directory and in the `.vnc` subdirectory. If you decide to not use the VNC server for a user profile, you may want to remove the files from the user `/home` directory and the `.vnc` subdirectory.

_____ In the System i Navigator, go to your user directory in the `/home` subdirectory.

_____ When you start the VNC server the first time, two files are added to your user directory, as shown in Figure 74:

`.sh_history`

`.Xauthority`



iac194

Figure 74: The .sh_history and .Xauthority files are added to the user directory when you start the VNC server.

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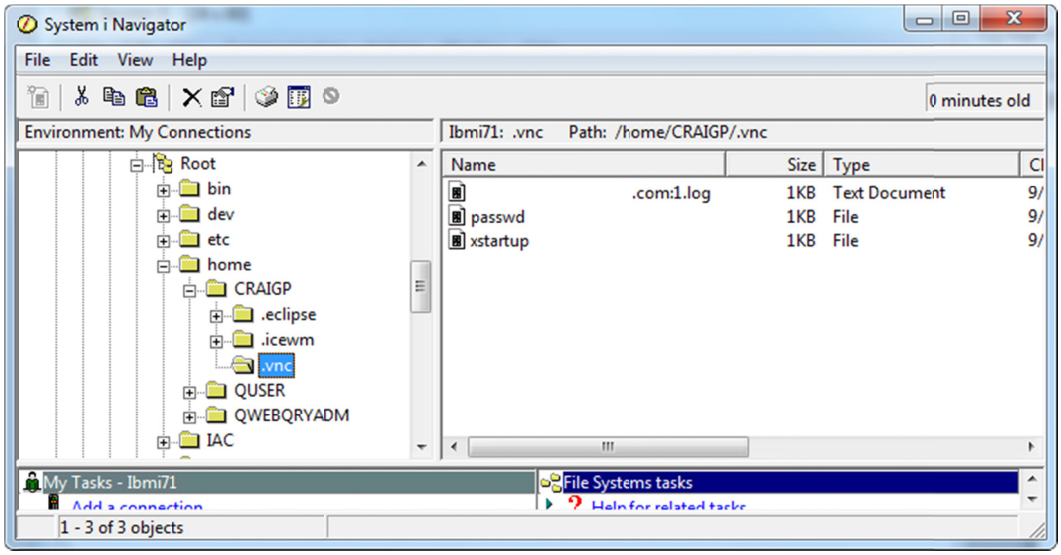
_____ Click the .vnc subdirectory to display its contents.

_____ When you start the VNC server the first time, two files are added to the .vnc subdirectory, as shown in Figure 75:

`.log` (a file that ends with the `.log` extension, name is based on your IBM i TCP/IP host name)

`xstartup`

Note: some of the text that is displayed in Figure 75 is omitted. Text that identifies the IBM i that was used to get the screen capture is omitted in the name of the `.log` file.



iac195

Figure 75: The .log file and the xstartup file are added to the .vnc subdirectory.

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Start the VNC Server — Production Start

Why: Now that you've installed, started, ended and verified the VNC server, you can start it for production use.

_____ Enter the following command on a 5250 command line:

```
QAPTL/STRVNCSVR NAME(ACS)
```

_____ The VNC server starts, as described in the section **Start the VNC sever — Initial Start** on page 65.

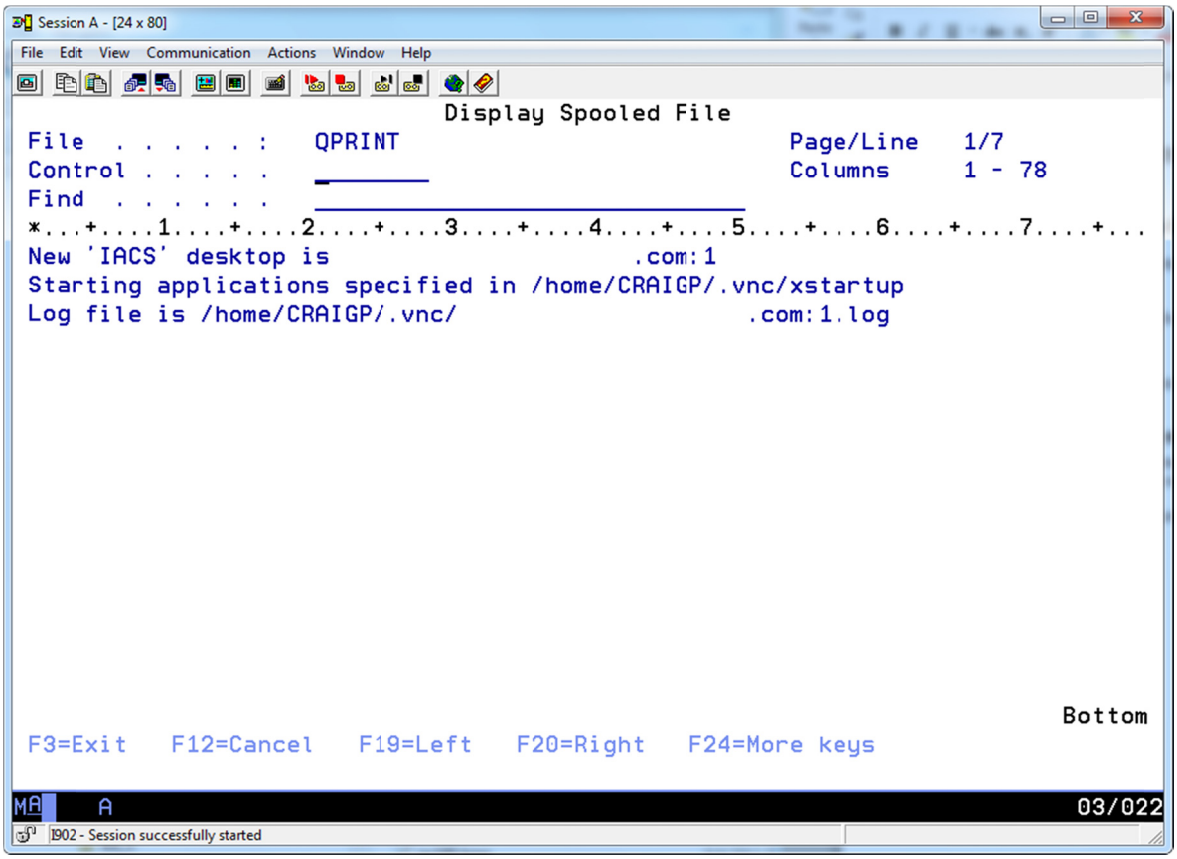
Working with the VNC sever in a production environment

If you plan to use the ACS Data Transfer programs on the IBM i on a regular basis, you will probably find it to be most convenient to start the VNC server and leave it running.

The STRVNCSVR and ENDVNCSVR commands can be run in a batch environment.

Figure 76 shows the spool file output that is created when you run the STRVNCSVR command in batch.

Note: some of the text that is displayed in the spool file is omitted from Figure 76. Text that identifies the IBM i that the command was run on is omitted in the line that begins **New 'ACS' desktop is** and the line that begins **Log file is**.



iac198

Figure 76: This is the spool file output when the STRVNCSVR command is run in batch.

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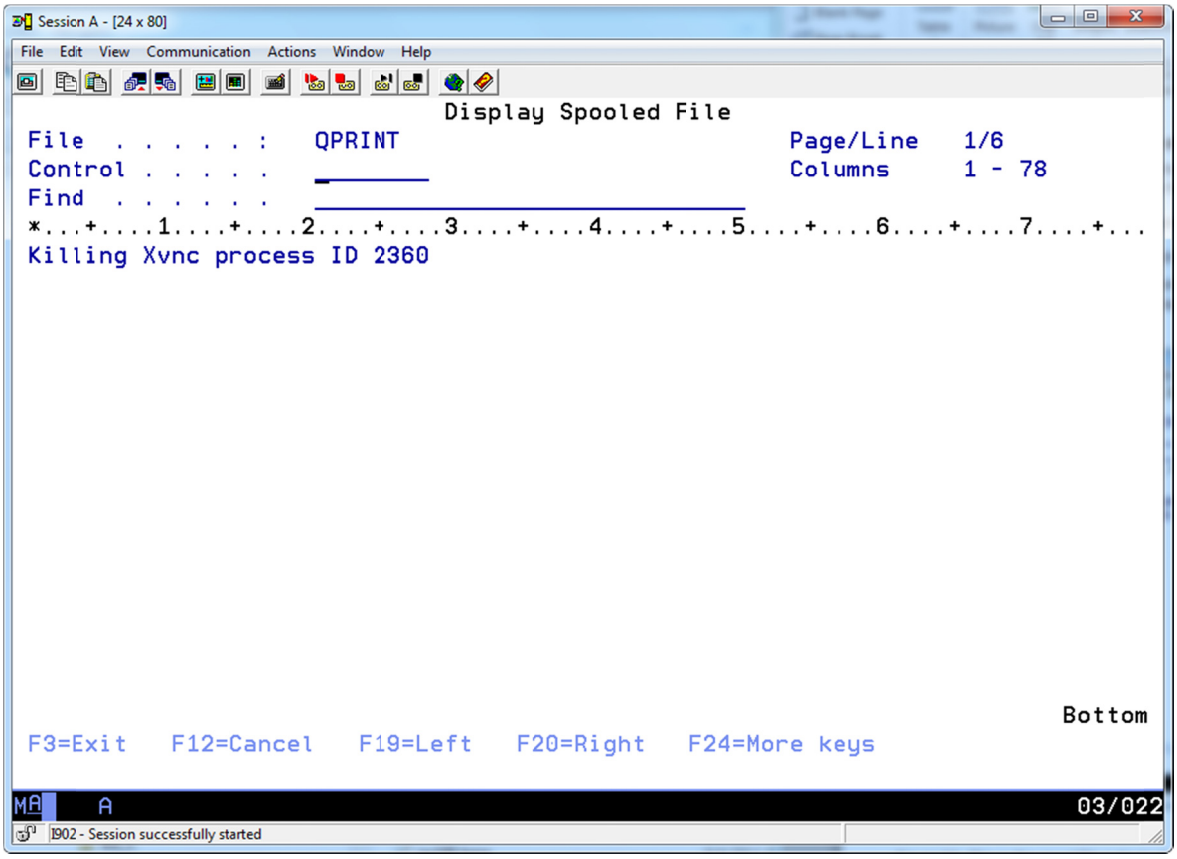
Figure 77 shows the spool file output that is created when you run the ENDVNCSVR command in batch.

Note: the process ID shown in the figure (2360) may be different when you run the command on your IBM i.



iac199

Figure 77: This is the spool file output when the ENDVNCSVR command is run in batch.

Open firewall ports used by the VNC server

Why: If your IBM i is behind a firewall, you may need to open one or more ports in the firewall so that you can access the VNC server from the VNC viewer program (described in the next section).

_____ If your workstation is not in the same network as your IBM i (for example, if you are accessing your IBM i remotely via an Internet connection), or if your IBM i is protected by an internal firewall, you will need to open one or more ports.

_____ The port(s) that you need to open are in the 580x range, where "x" is a digit from 1 to 9.

_____ The value of "x" that you specify is based on the VNC server instance number. See Figure 72 on page 66 for an example of how to find the VNC server instance number.

_____ Using Figure 72 as an example, you would need to open port 5801 in your firewall to access the VNC server.

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Work with the VNC Viewer

Why: To work with the VNC server, you need a VNC viewer program on your workstation. You can use any VNC viewer program that you want. The steps shown in this section describe how to use the browser–based VNC viewer that is provided with the VNC server.

_____ Before starting, identify the VNC server instance number that you will be working with. See Figure 72 on page 66 for an example of how to find the VNC server instance number.

_____ Open your browser and enter a URL in the following format:

`http://ibm_i_host_name:580x`

or

`http://ibm_i_tcp_ip_address:580x`

Where:

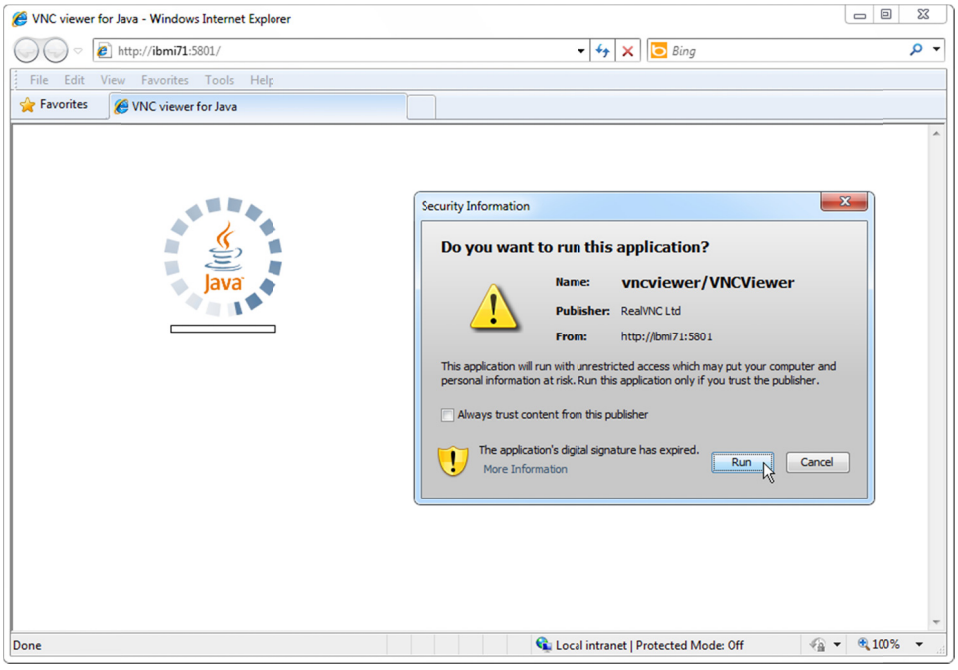
`ibm_i_host_name` is the TCP/IP host name of your IBM i

`ibm_i_tcp_ip_address` it the TCP/IP address of your IBM i

`580x` is the port number of the VNC server. The "x" value is a digit from 1 to 9 that corresponds to the VNC server instance number.

In Figure 78, the port number specified is `5801`.

_____ The browser displays the **Security Information** message shown in Figure 78. Click the **Run** button to continue.



vnc241

Figure 78: Open your browser to the VNC port on your IBM i, allow the application to run.

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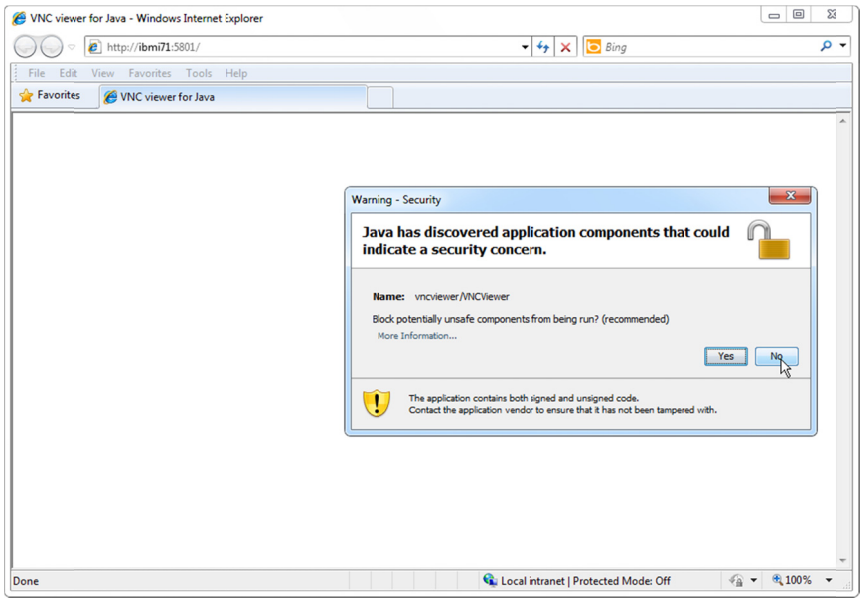
_____ You may see the **Warning – Security** message shown in Figure 79. If you get this message, click the **No** button to allow the application to run (the **Yes** button blocks the application).



iac242

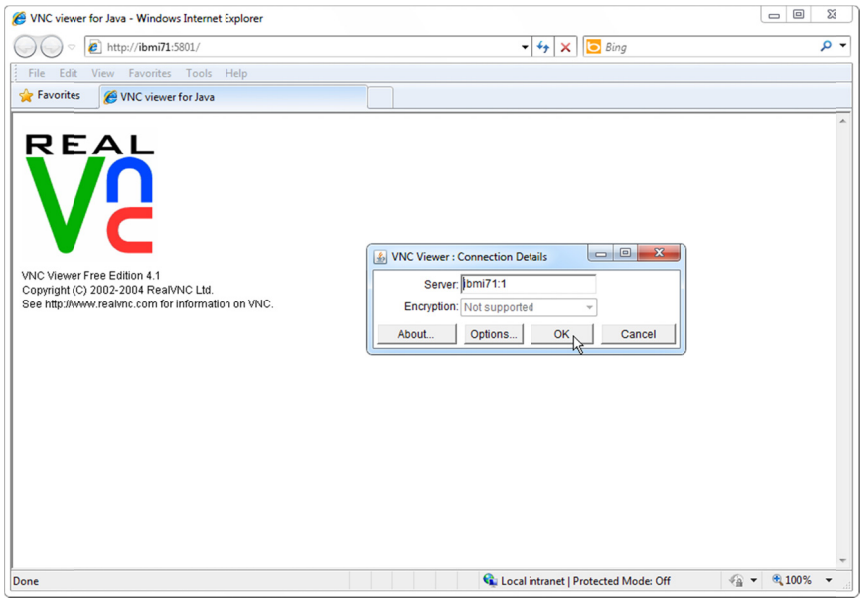
Figure 79: If you get this Security message, click the No button to continue.

_____ The **VNC Viewer – Connection Details** panel shown in Figure 80 is displayed. The **Server** value may already be filled in; if it is, click **OK** to accept the value.

_____ If the **Server** value is not filled in, enter it in the format

```
vnc_server_name:instance
```

Where `vnc_server_name` is the name of your IBM i and `instance` is the VNC server instance number.



iac243

Figure 80: If necessary, specify the VNC server and instance number to connect to.

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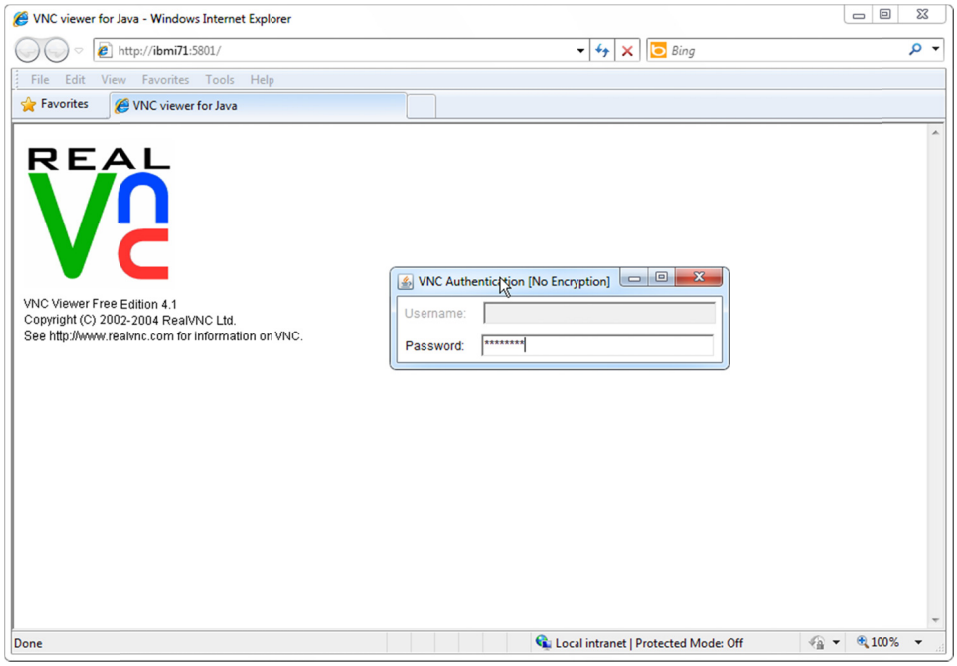
_____ The VNC Authentication panel shown in Figure 81 is displayed.

_____ Enter the VNC server password that you created earlier (see the section **Create the VNC password** on page 64).

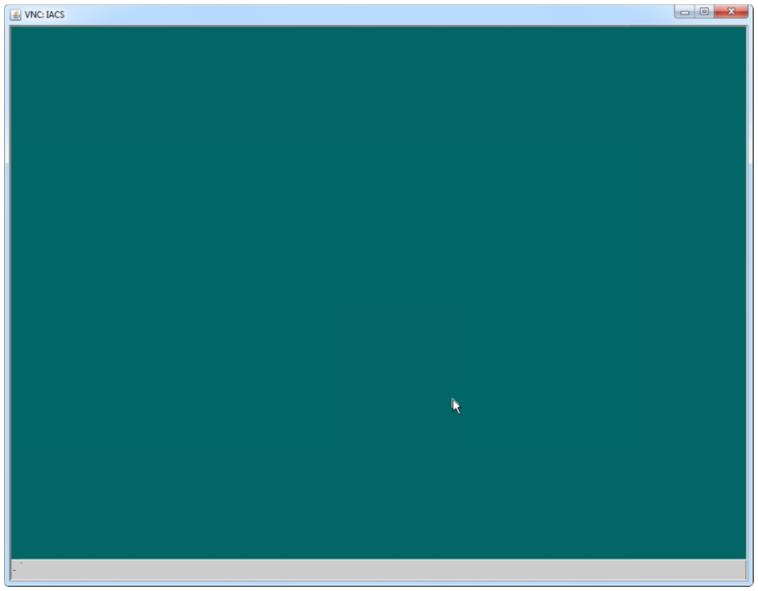
_____ Press **Enter** after you enter the password.



iac244

Figure 81: Enter the password that you assigned to the VNC server.

_____ The VNC viewer panel shown in Figure 82 is displayed. Leave the panel open on your workstation desktop.



iac245

Figure 82: The VNC viewer window is displayed.

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Start the Data Transfer program on the IBM i

Why: You now have everything configured to work with the Data Transfer program on the IBM i. In this section, you will start the Data Transfer program on your IBM i for the first time, and handle some of the tasks that need to be done the first time you run the program.

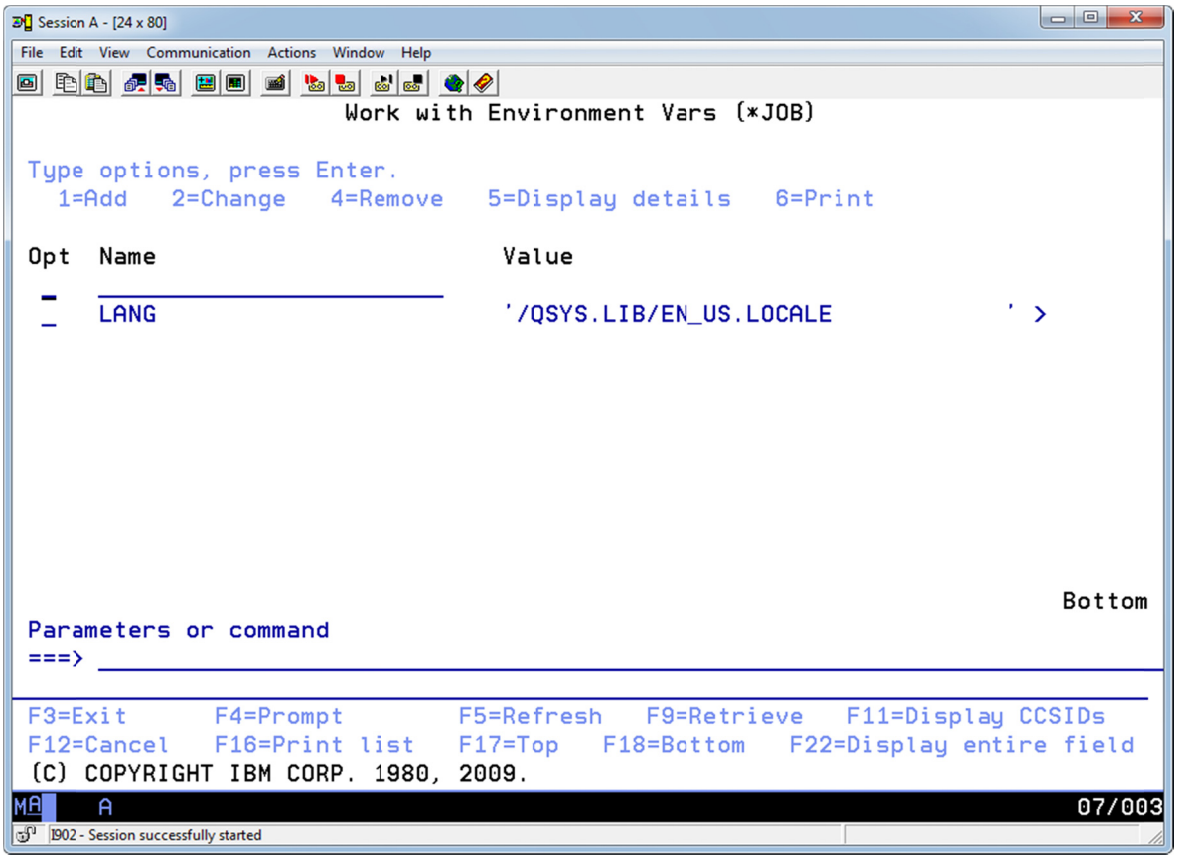
Check for environment variables

Why: There are two environment variables that are needed to run the ACS Data Transfer program. When you start the Java application for the Data Transfer, the values assigned to the environment variables are used in the Java environment. If the environment variables are already defined, you need to remove the environment variable or change its value to the value required by the Data Transfer program.

_____ On a 5250 command line, enter the following command:

```
WRKENVVAR
```

_____ The **Work with Environment Vars** display (Figure 83) show the environment variables associated with the interactive job.



iac221

Figure 83: The Work with Environment Vars display shows the environment variables for your interactive job.

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Remove environment variable(s)

Why: If the environment variable(s) that are needed by the Data Transfer program are already in use, you can remove the variable(s) or change its value. This section shows how to remove the environment variable(s).

_____ On the **Work with Environment Vars** display (Figure 83), look for an environment variable named DISPLAY and an environment variable named XAUTHORITY.

_____ If the DISPLAY and XAUTHORITY environment variables are not defined, go to the section **Add environment variables** on page 78.

_____ Make a note of the current value of the DISPLAY or XAUTHORITY environment variables.

_____ You can either remove and add the environment variables, or you can change the value of the existing DISPLAY and XAUTHORITY environment variables.

If you want to change the existing value of the existing environment variables, go to the section **Change environment variable(s)** on page 77.

_____ Use either of the following steps to remove the existing environment variables.

Note: use the steps shown here to remove the DISPLAY and XAUTHORITY environment variables only. Do not remove any other environment variables that are shown in the WRKENVVAR display.

_____ Use **option 4 (Remove)** on the WRKENVVAR panel to remove the environment variable.

_____ Enter the command RMVENVVAR ENVVAR(DISPLAY) or RMVENVVAR ENVVAR(XAUTHORITY) on a 5250 command line.

_____ Continue with the steps in the section **Add environment variables** on page 78.

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Change environment variable(s)

Why: If the environment variables DISPLAY or XAUTHORITY are already defined, you can use the Change Environment Variable (CHGENVVAR) command to set the value that is required by the ACS Data Transfer program.

_____ Use either of the following steps to change the existing environment variables DISPLAY and XAUTHORITY.

_____ Use **option 2 (Change)** on the WRKENVVAR panel to change the value.

_____ Use the **Change Environment Variable** (CHGENVVAR) command on a 5250 command line.

_____ Set the values of the environment variables as follows.

Environment Variable	Value
DISPLAY	ibm_i_host_name:vnc_instance_number **or** ibm_i_tcp_ip_address:vnc_instance_number Where vnc_instance_number is the instance number assigned when you started the VNC server (see Figure 72 on page 66 for an example of determining the instance number).
XAUTHORITY	/home/your_user_profile_name/.Xauthority For your_user_profile_name, enter the name of the user profile where the .Xauthority file is located (see Figure 74 on page 68).

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Add environment variables

Why: The ACS Data Transfer program uses two environment variables named DISPLAY and XAUTHORITY. The values of the environment variable point to the VNC server and its configuration.

_____ Enter the following commands on a 5250 command line:

```
ADDENVVAR ENVVAR(DISPLAY) VALUE('ibm_i_host_name:vnc_instance_number')
```

or

```
ADDENVVAR ENVVAR(DISPLAY) VALUE('ibm_i_tcp_ip_address:vnc_instance_number')


ADDENVVAR ENVVAR(XAUTHORITY) VALUE('/home/user_profile_name/.Xauthority')
```

Notes

- Enter the environment variable names in upper–case, as shown in the commands above.
- The vnc_instance_number is the instance number assigned when you started the VNC server (see Figure 72 on page 66 for an example of determining the instance number).
- For your_user_profile_name, enter the name of the user profile where the .Xauthority file is located (see Figure 74 on page 68).

IMPORTANT!

The values that you enter for the environment variables in your 5250 session are **not persistent**. When you sign-off from your 5250 session, the values for the environment variables **are not kept**.

The next time you sign on to a 5250 session, you need to add the environment variables.

If you will be running Data Transfers frequently from your 5250 session, you may want to consider adding the ADDENVVAR commands to your start up program.

IMPORTANT!

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Start the Data Transfer program

Why: You can now run the Data Transfer program. For the first test, you will run the `java` command in the QSHELL environment.

_____ Verify that the VNC viewer application is still running on your workstation. If it is not running, start it and connect to the VNC server running on your IBM i. (See the section **Work with the VNC Viewer** on page 72.)

_____ On a 5250 command line, enter the `QSH` (Start QSHELL) command.

_____ The QSH Command Entry panel is displayed.

_____ Enter the following command on the QSH Command Entry line.

Note: the command is **case–sensitive**, enter it as shown.

Note: the value for the `os400.class.path.security.check` parameter is zero, not the letter "O".

Note: for the `/userid` parameter, enter the name of your user profile. This must be the same user profile name that you used to start the VNC server.

Note: enter the entire command on one line in the QSH Command Entry panel. The line will "wrap" on the Command Entry panel as you type it in. The command text shown in this example is wrapped on this page.

```
java –jar /IAC/acsbundle.jar -Dos400.class.path.security.check=0
   /PLUGIN=download /file=/IACXFER/xqcustcdt.dtfx
   /userid=your_user_profile_name
```


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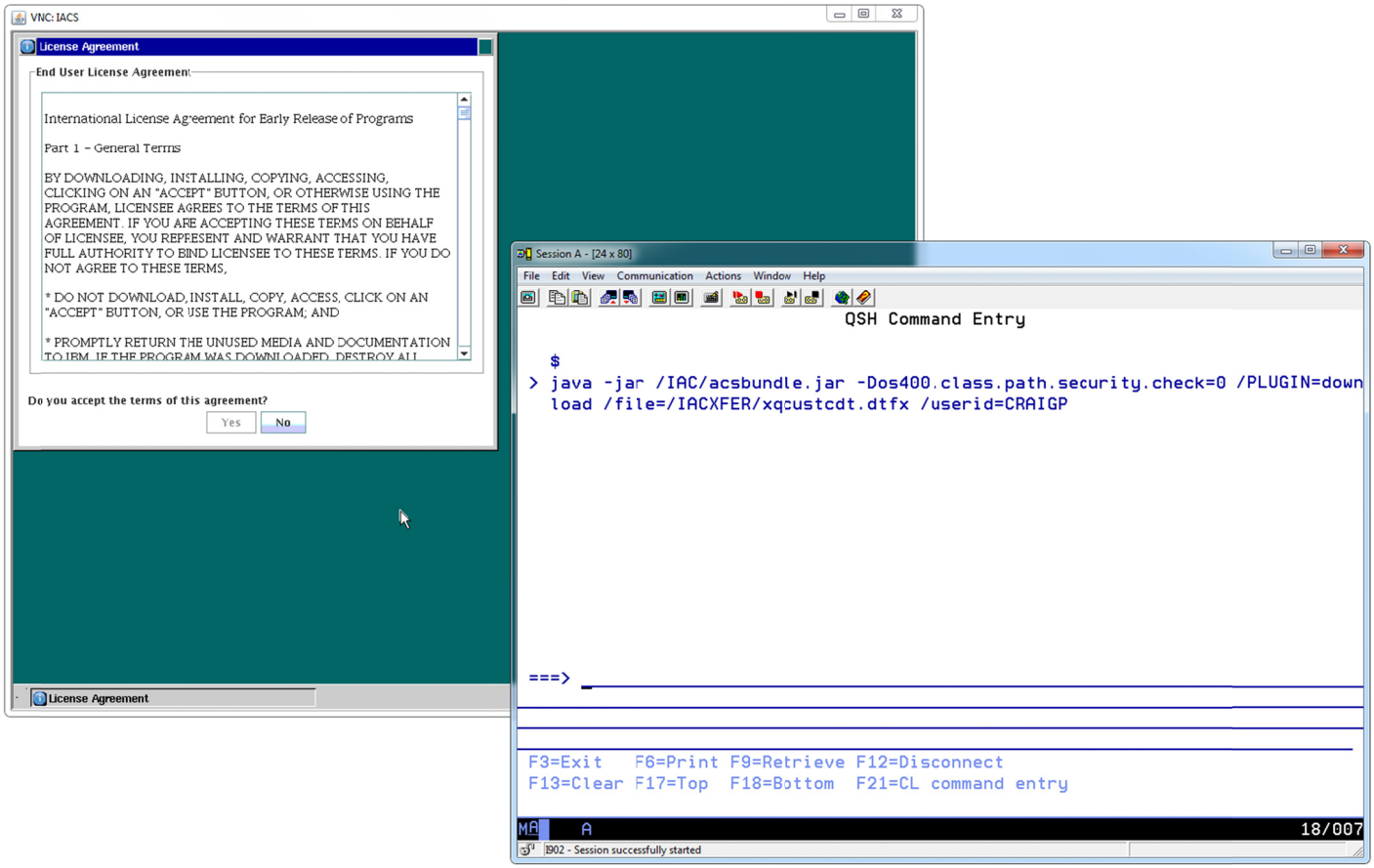
_____ The java command might take a few seconds to start. You should see the **End User License Agreement** displayed in the VNC viewer, as shown in **Error! Reference source not found.**.



iac231

Figure 84: When you run the java command to start the Data Transfer, the End User License Agreement is displayed in the VNC viewer.

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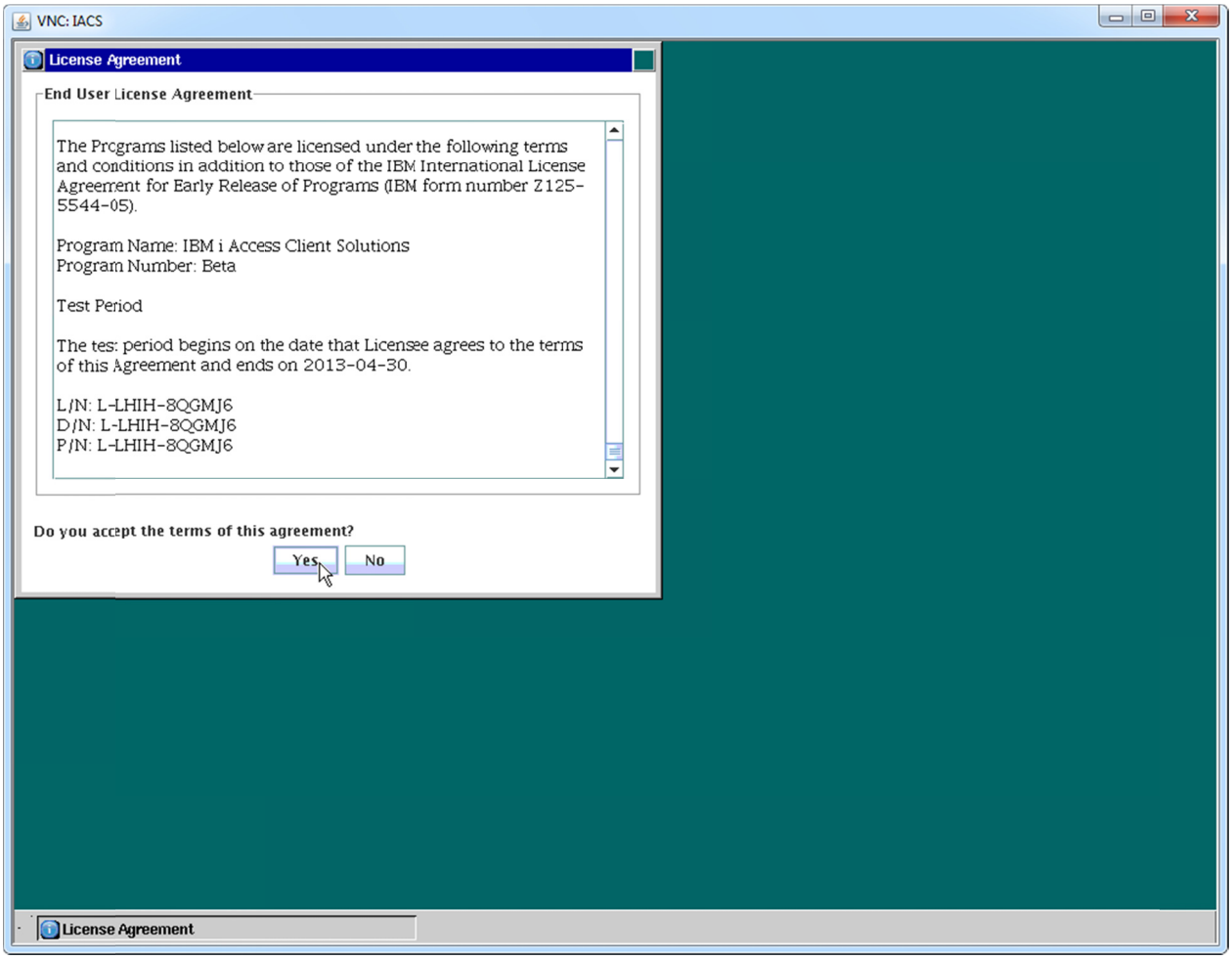
_____ Use the scroll bar on the right side of the **License Agreement** window to scroll to the end of the License Agreement. When you get to the end of the agreement, the **Yes** button is enabled.

_____ Click the **Yes** button to accept the agreement. If you do not accept the agreement, the Data Transfer program will not run.

_____ After you accept the agreement, you can close the VNC viewer window and the browser window that you used to open the viewer.



iac232

Figure 85: Scroll to the end of the License Agreement, click the Yes button to accept the agreement.

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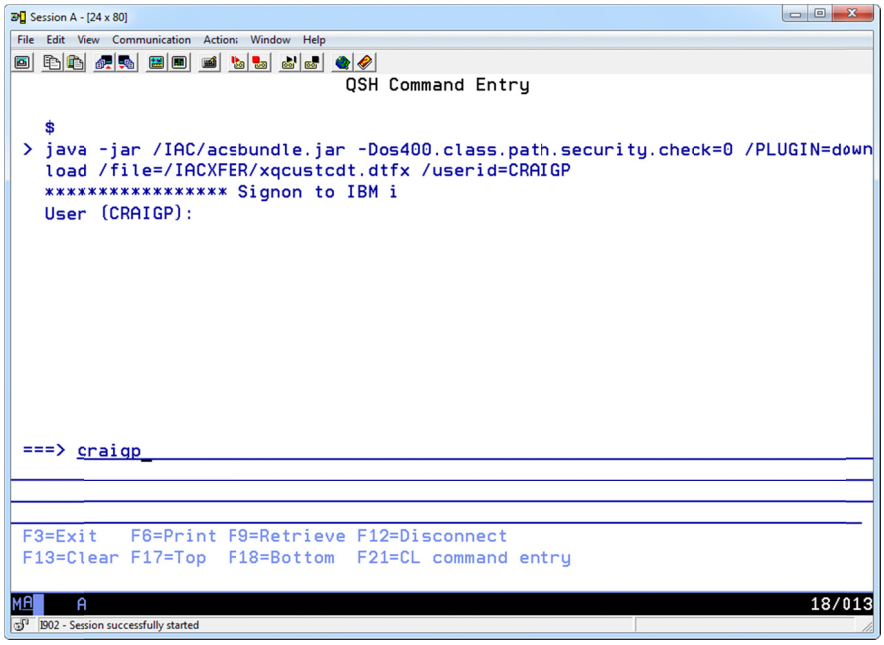
_____ After you accept the agreement, the Data Transfer program that is running in the QSH Command Entry panel prompts for your IBM i user ID, as shown in **Error! Reference source not found.**.

_____ Enter your IBM i user ID and press **Enter**.

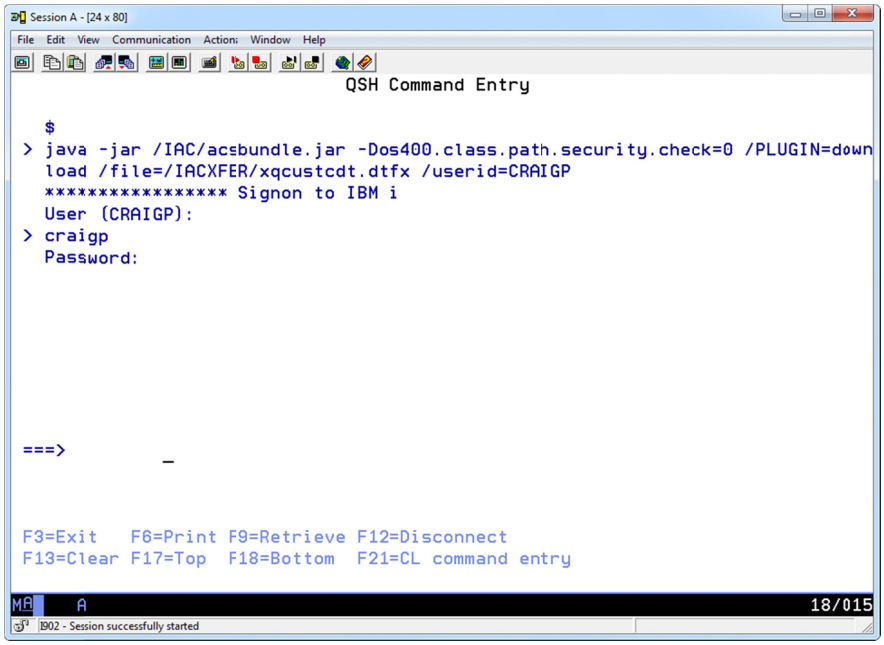


iac233

Figure 86: Enter your IBM i user ID when prompted.

_____ You are prompted to enter your IBM i password, as shown in **Error! Reference source not found.**.

_____ Enter your IBM i password and press **Enter**.



iac234

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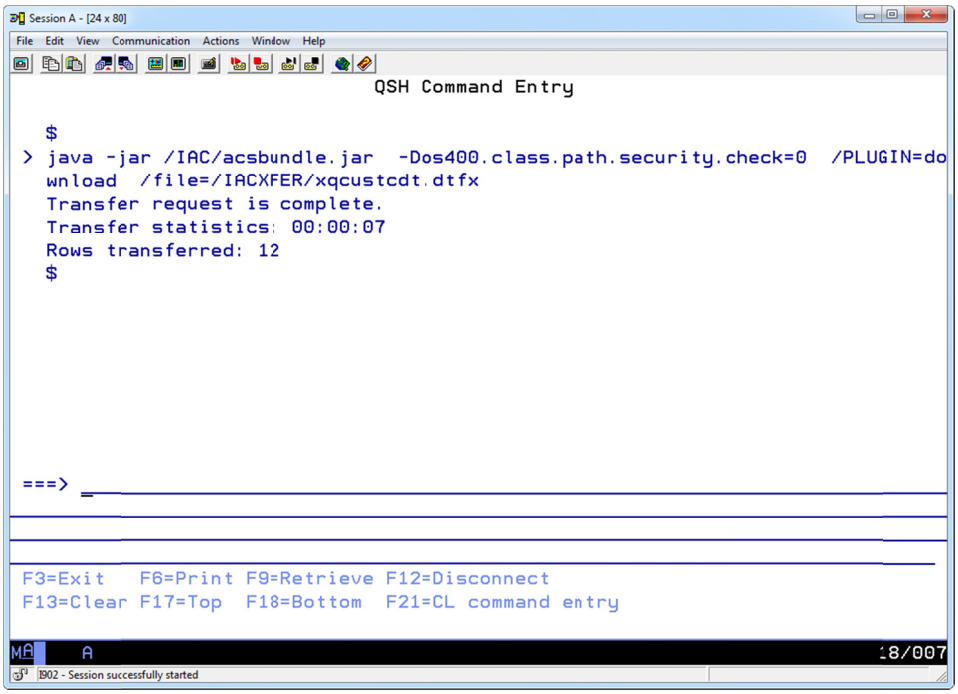
Figure 87: Enter your IBM i password when prompted.

_____ The Data Transfer program runs. The messages shown in Figure 45 are displayed when the program ends.

_____ Press the **F3** (Exit) function key to close the QSH Command Entry panel.



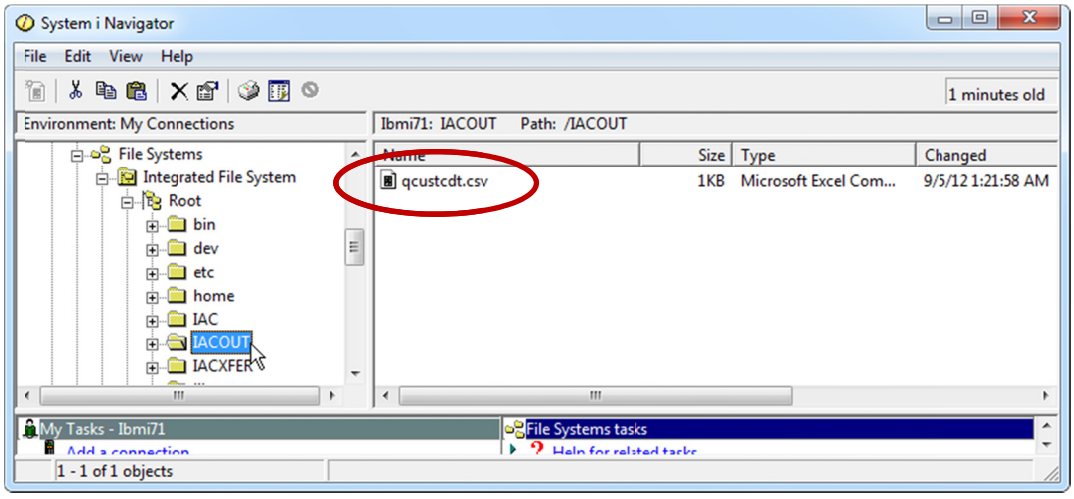
iac235v2

Figure 88: The Data Transfer program runs and displays the messages shown here.

_____ In the System i Navigator, go to the output directory that you specified (see the `ClientFile` item in Figure 42 on page 30). In this example, the output directory is IFS directory `/IACOUT`.

_____ The `qcustcdt.csv` file is the output from the Data Transfer program.

_____ Copy the `qcustcdt.csv` file to your workstation and open it. You should see the same output as you saw when you ran the Data Transfer on your workstation, as shown in Figure 28 on page 21.



iac236

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Figure 89: The qcustcdt.csv file is in the output directory used by the Data Transfer program.Run the Data Transfer program — Pass 2

Why: The first time you ran the Data Transfer program, you were prompted to accept the License Agreement. You also had to enter your IBM i user ID and password. When you run the Data Transfer again, you will not need to do either of those tasks.

_____ Delete the `/IACOUT/qcustcdt.csv` file from the IFS. You can use the System i Navigator to delete the file.

_____ Verify that the VNC viewer application is still running on your workstation. If it is not running, start it and connect to the VNC server running on your IBM i. (See the section **Work with the VNC Viewer** on page 72.)

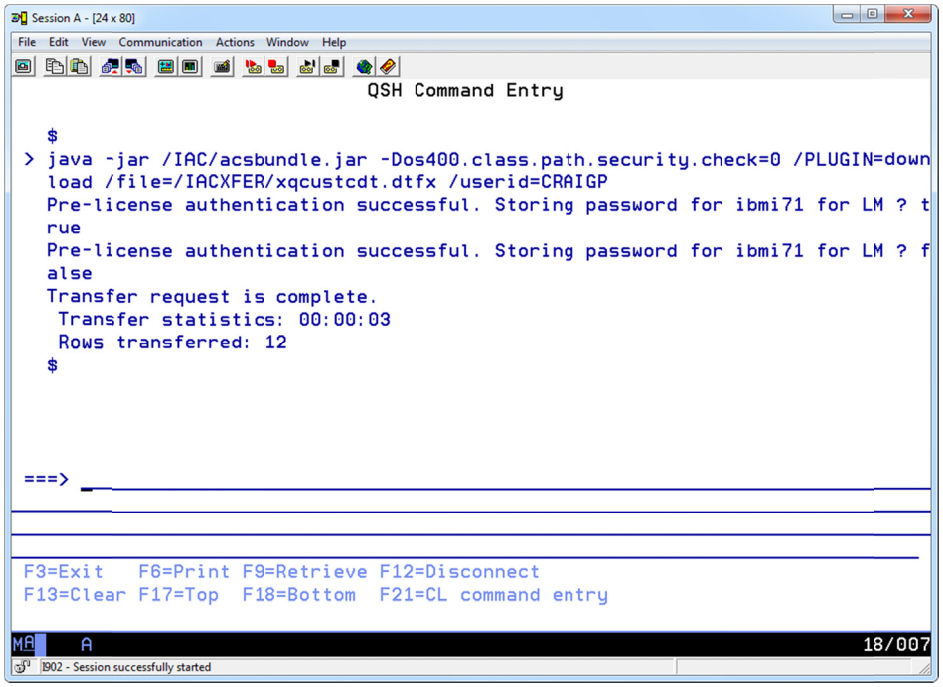
_____ On a 5250 command line, enter the `QSH` (Start QSHELL) command.

_____ The QSH Command Entry panel is displayed.

_____ Enter the following command on the QSH Command Entry line.

Note: the command is **case–sensitive**, enter it as shown.

```
java -jar /IAC/acsbundle.jar -Dos400.class.path.security.check=0
  /PLUGIN=download /file=/IACXFER/xqcustcdt.dtfx
  /userid=your_user_profile_name
```



iac237

Figure 90: The Data Transfer program displays the messages shown here when you run it the second time.

_____ The **License Agreement** panel is not displayed in the VNC viewer.

_____ Use the System i Navigator to verify that file `/IACOUT/qcustcdt.csv` has been created.

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END OF DOCUMENT

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