SHARE in Orlando 2015

Attendee Choice: IMS Hands-on Lab

Thursday, August 13, 2015: 12:30 PM - 01:30 PM, Dolphin, Asia 5

#17765

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SHARE is an independent volunteer-run information technology association that provides education, professional networking and industry influence.

Using the IMS Universal Drivers and QMF to Access Your IMS Data Hands-on Lab

Overview

QMF for Workstation is an Eclipse-based, rich client desktop Java application, that uses JDBC to connect to data sources to provide querying, reporting and Business Intelligence (BI) solution development and execution capabilities.

This hands-on lab covers how to use QMF for Workstation to access IMS DB using the IMS Universal Driver.
how to use QMF for Workstation to access IMS Databases

QMF can be used

- Allow users to graphically construct ad-hoc IMS queries
- Create reports and dashboards that draw directly from IMS data
- Roll out web-based graphical content that blends IMS data with relational and multi-dimensional data sources

The lab exercises cover the following topics:

1. Installing the IMS driver (FOR YOUR INFORMATION only)

2. Creating a personal repository.

3. Working with queries.

4. Developing reports using QMF forms.

5. Defining virtual data sources.

Exercise 1: Configuring the IMS JDBC Driver

QMF for Workstation uses JDBC drivers to connect to data sources. The product does not include the actual JDBC driver files. Administrators must define the location of the JDBC driver files. ***This exercise is for your information – for this lab, the IMS Universal Driver has already been installed into the QMF tool.***

How to get the IMS Universal Drivers
The IMS Universal Drivers are shipped with IMS.

The IMS distribution libraries (DLIBs) contain the master copy of elements in IMS and can be used to restore SYSMODs in the target library or to rebuild a target environment. These data sets are maintained by SMP/E.

The IMS.ADFSJHFS: ADFSJHFS contains the type-2 and type-4 Universal driver Java class libraries used for IMS DB access through the JDBC and DLI for Java interfaces.

The TLIB data sets are the IMS SMP/E target libraries (SYSLIBs), and are the libraries that are used to run and use IMS.

The following data sets that reside in a UNIX System Services (USS) file system are also maintained by the SMP/E APPLY processing:
SDFSJCPS
SDFSJTOL
SDFSIC4J
SDFSJCIC
SDFSJCPI
SDFSJHFS
SDFSJRAR
SDFSJSAM

The IMS HFS data sets contain
SDFSJCIC: Maps to PathPrefix/usr/lpp/ims/imsnn/imsjava/classic/cics/IBM/
SDFSJHFS: Maps to PathPrefix/usr/lpp/ims/imsnn/imsjava/IBM/
SDFSJSAM: Maps to PathPrefix/usr/lpp/ims/imsnn/imsjava/ivp/IBM/
SDFSJRAR: Maps to PathPrefix/usr/lpp/ims/imsnn/imsjava/IBM/
SDFSJCPI: Maps to PathPrefix/usr/lpp/ims/imsnn/imsjava/classic/IBM/
SDFSJTOL: Maps to PathPrefix/usr/lpp/ims/imsnn/imsjava/classic/dlimodel/IBM/
SDFSJCPS: Maps to PathPrefix/usr/lpp/ims/imsnn/imsjava/classic/classic/ivp/IBM/
SDFSIC4J: Maps to PathPrefix/usr/lpp/ims/imsnn/ico/IBM/

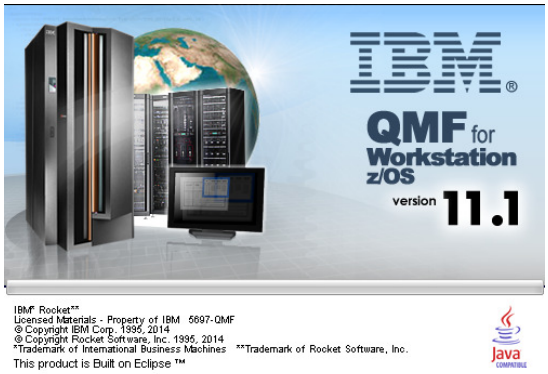
The IMS Universal JDBC driver (**imsudb.jar**) is used to make SQL calls with the JDBC API and can be download as a binary file from HFS path: PathPrefix/usr/lpp/ims/ims**nn**/imsjava/IBM/ where **nn** is the IMS version you have installed..

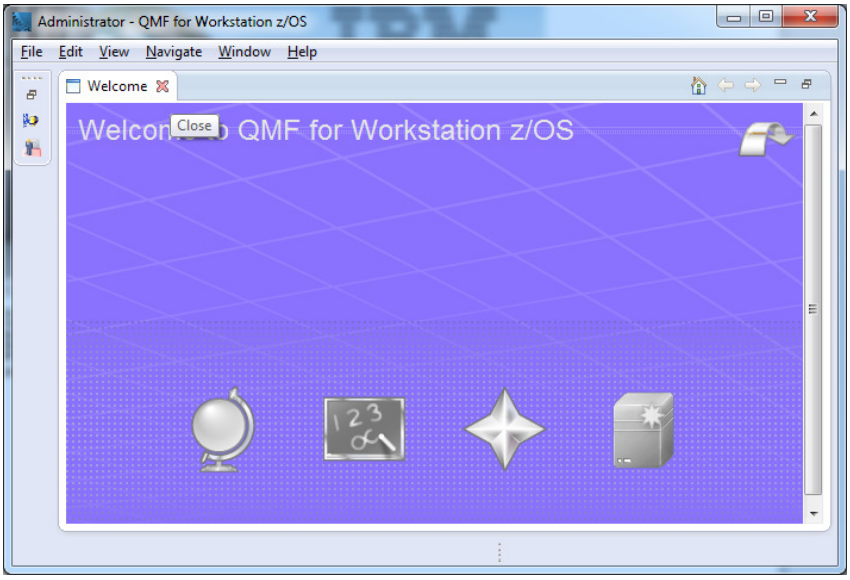
For this lab the imsudb.jar has already been downloaded and can be found at ***C:\share\Drivers***

> View the IMS Universal Driver JDBC driver configuration file

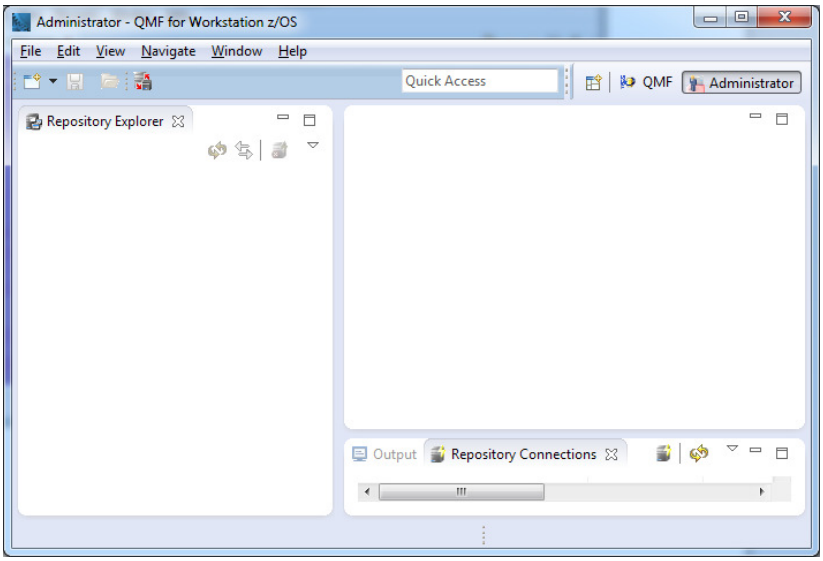
1. Launch QMF by double-clicking the DB2 Query Management Facility application on the desktop or via the Windows Start Menu.

2. When the application launches, you will see the Welcome page. You can 'x' out of this view.

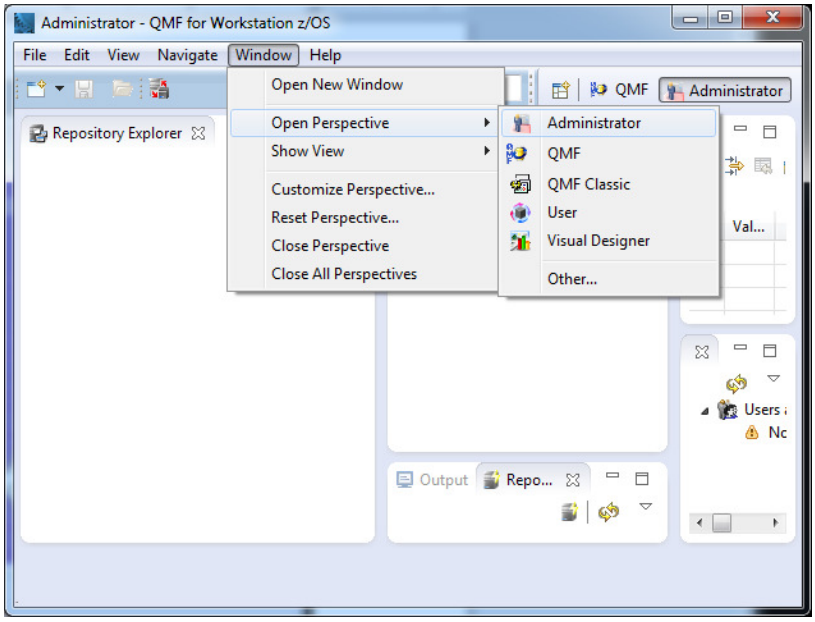




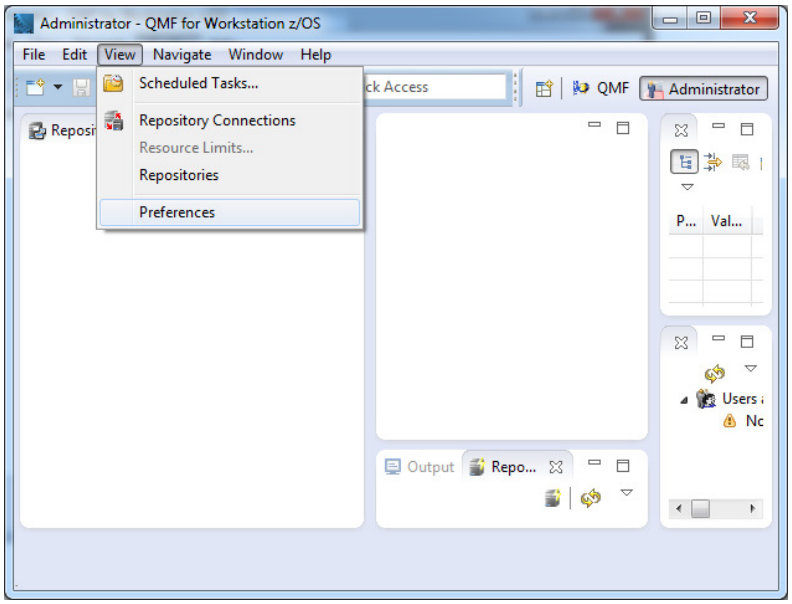
Click on the **x** by the **Welcome** tab to close the view.



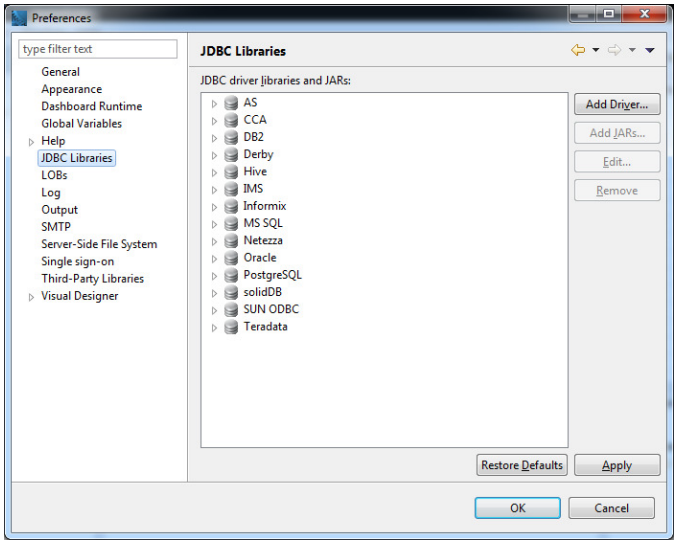
3. Open the Administrator perspective if you have not already done so. To open the Administrative perspective go to the menu pane and select:
   Window > Open perspective > Administrator.
   (If **Administrator** is not in the list then **Window > Open perspective > Other > Administrator**).



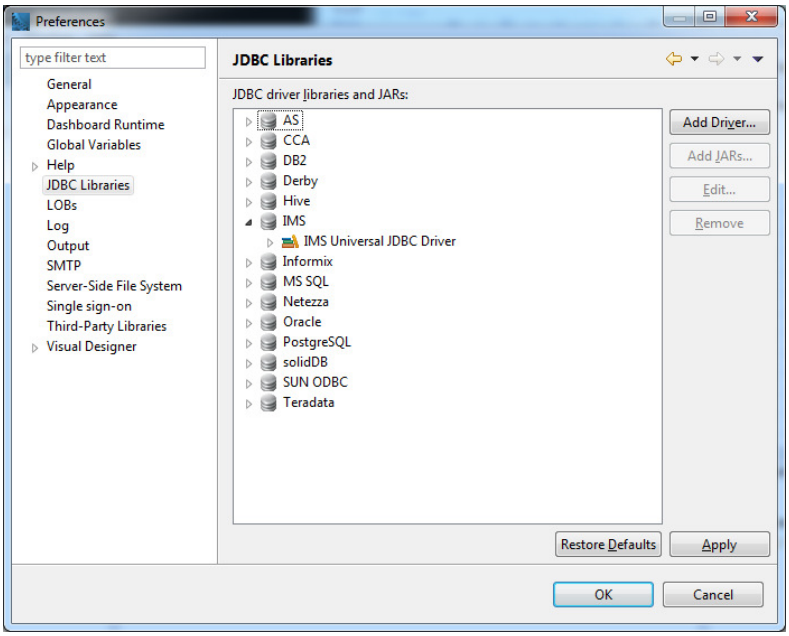
4. Select **Preferences** from the **View** menu to open the **Preferences** window.



5. Select **JDBC Libraries**.



6. The JDBC Libraries page opens. QMF supplies pre-populated libraries named for specific databases including IMS. You can expand the **IMS** tab to see that the **IMS Universal JDBC Driver** has been installed.

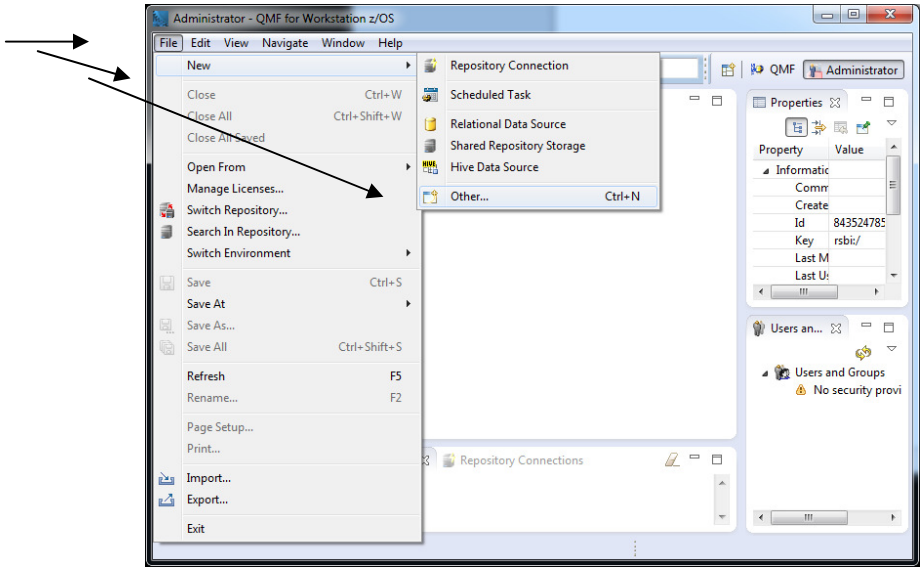


Exercise 2: Create a personal repository

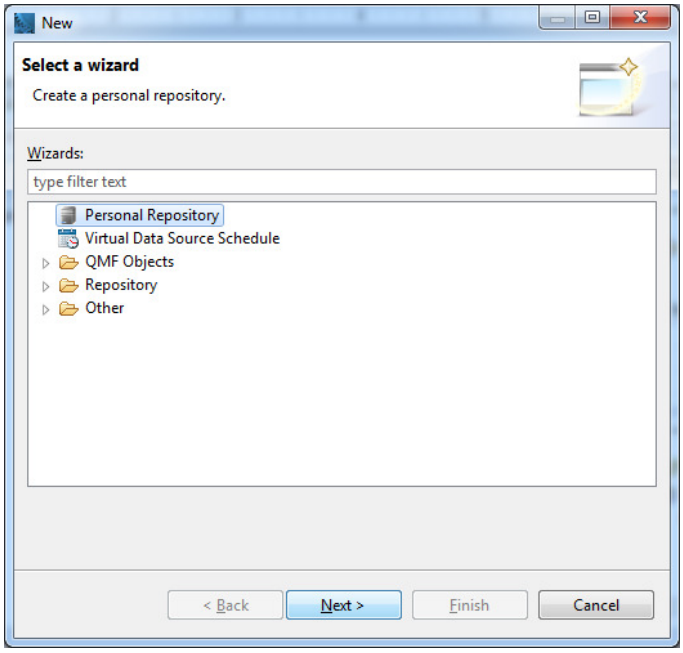
A personal repository is a set of database tables that stores QMF for Workstation objects, such as queries and dashboards, as well as database connection information, QMF configuration information, and application data.

To set up a personal repository, follow these steps:

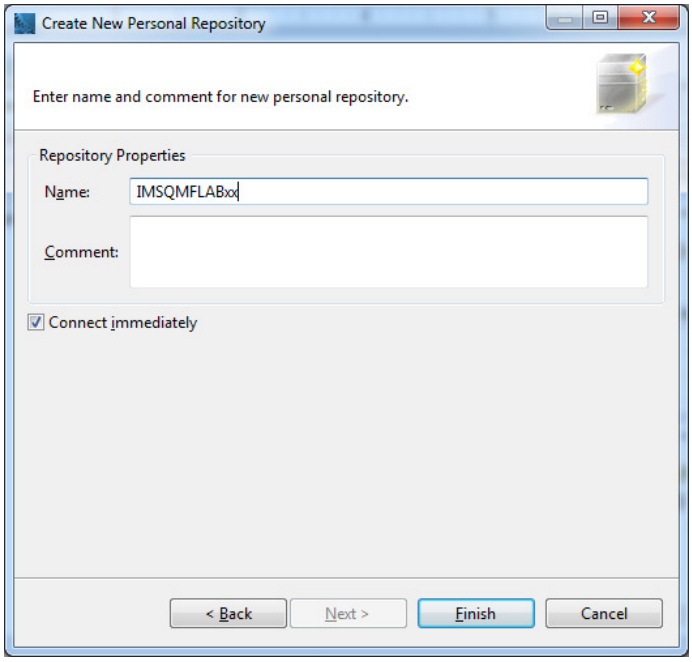
1. Select **File -> New -> Other.**



2. When the **Select a wizard** opens, **c**hoose **Personal Repository.**



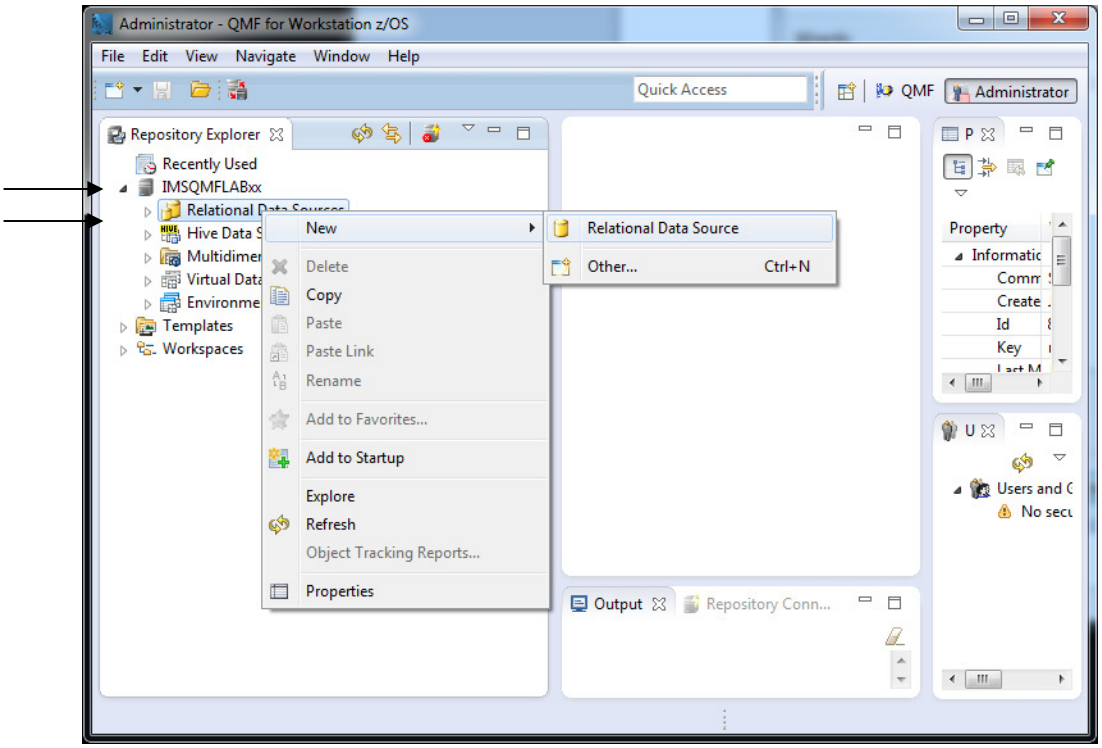
3. Select **NEXT** and enter a name. For example **IMSQMFLAB**xx where xx is your team number.



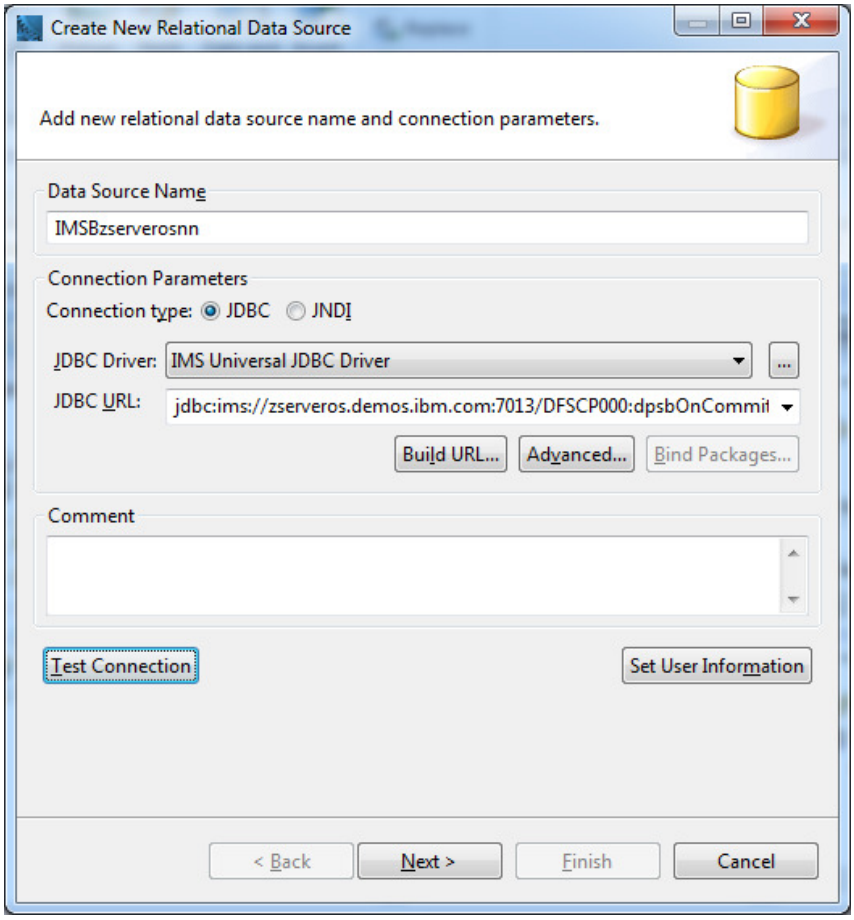
Click **FINISH.**

4. The I**MSQMFLAB**xx Personal Repository connection information needs to be updated to connect to a repository:

Expand **IMSQMFLAB**xx. Right-click **Relational Data Source -> New -> Relational Data Source**



5. The **Create New Relational Data Source** window opens. This is where you can define your connection to a data source (IMS) and a specific PSB through IMS Connect. For this exercise, your connection will be to the IMS Catalog PSB.



In the **Data Source Name** field enter **IMSBzserveros***nn* where ***nn*** is your team number.

Set the connection type button to **JDBC.**

In the JDBC Driver drop down list select **IMS Universal JDBC Driver.**

Enter the following for the JDBC URL to access the IMS Catalog metadata:

```
jdbc:ims://zserveros.demos.ibm.com:7013/DFSCP000:dpsbOnCommit=true;datastoreName=IMSB;
```

(invoke the IMS JDBC driver)

(**zserveros.demos.ibm.com** is the host)

(**7013** is the IMS Connect Port)

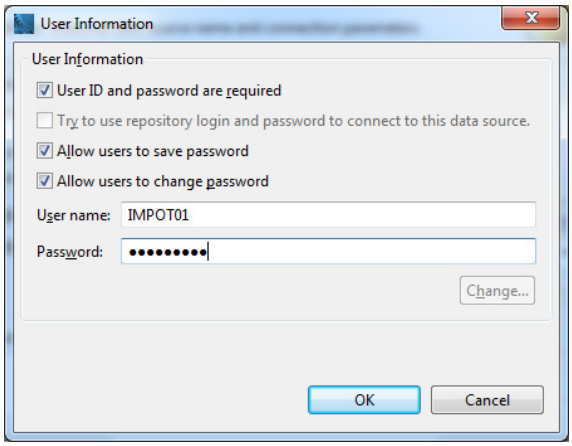
(**DFSCP000** is the PSB for the IMS catalog).

(Deallocate the PSB during commit processing)

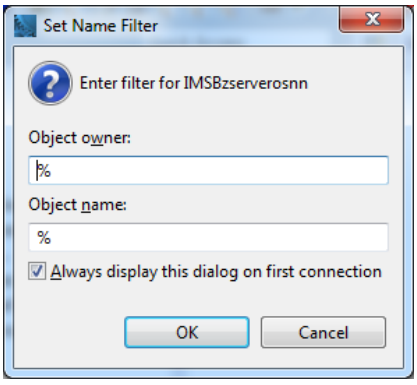
(access the **IMSB** system defined in IMS Connect as a datastore)

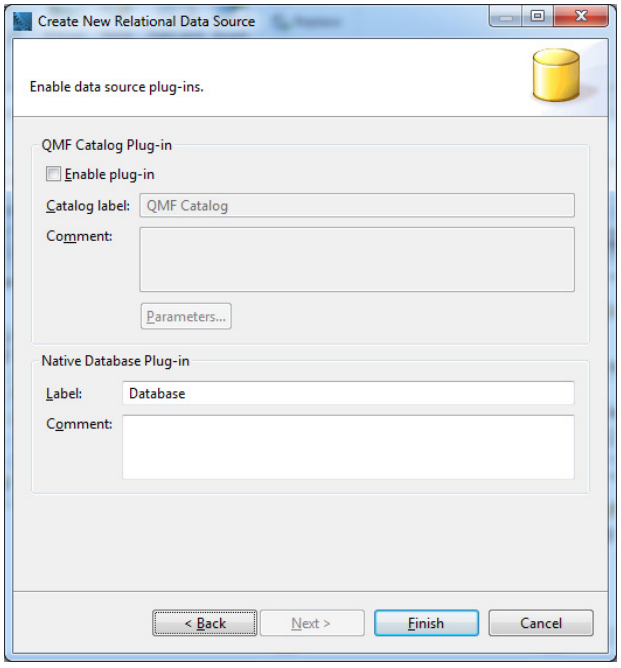
Select **NEXT.**

6. When the window opens for your credentials, in the **userid** field enter **IMPOT**xx where xx is your team number. In the **password** field enter the password provided by the instructor. Click **OK.**



During the course of the exercises, the following screens may appear:

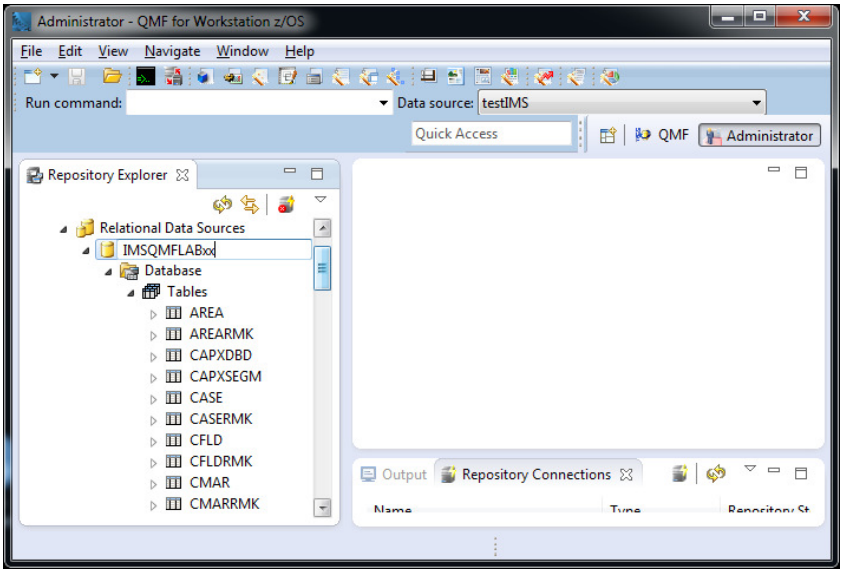




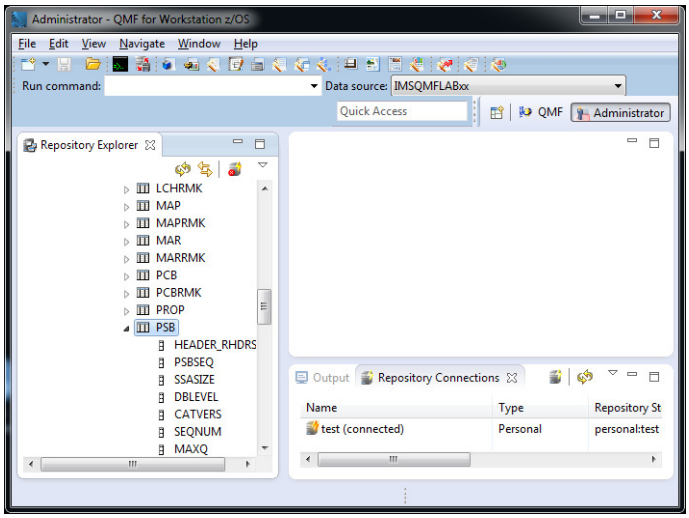
If so: Click OK. Click Finish.

7. You should now be able to access the IMS Catalog.

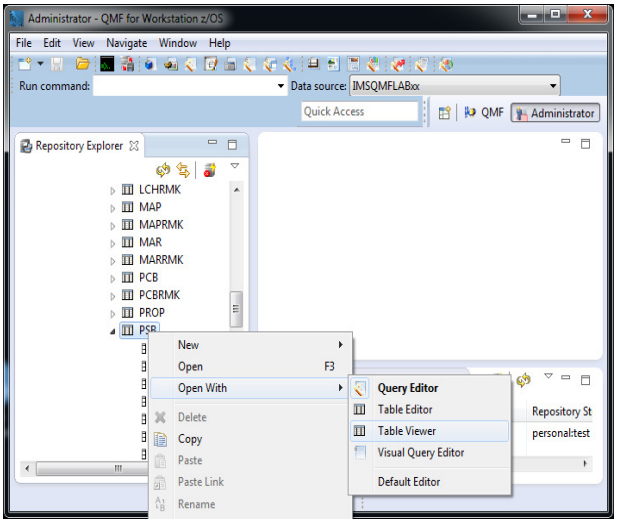
This shows the information in the IMS Catalog

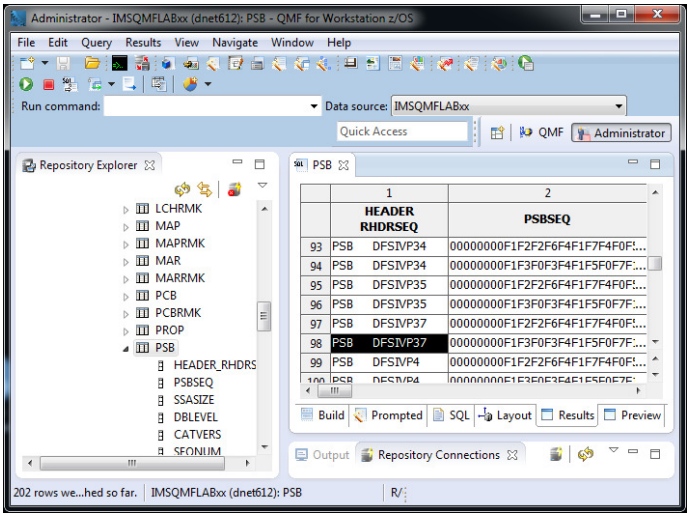


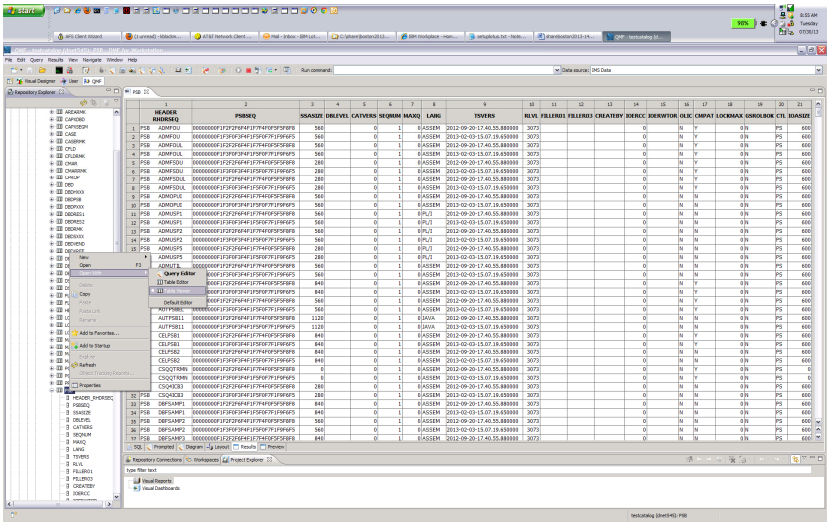
Use the scroll bar until you see the PSB table.



and right-click then use **Open -> Table Viewer**







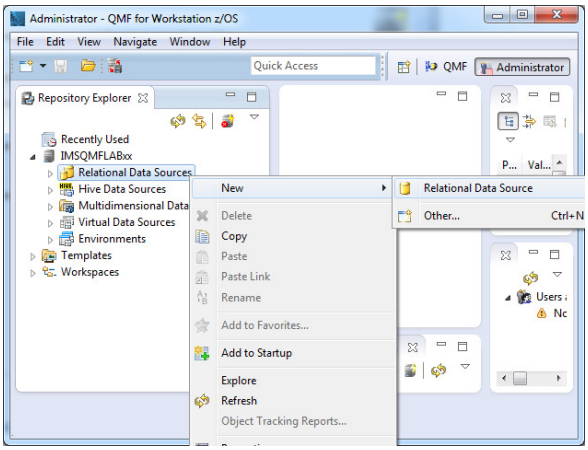
This allows you to see all the PSBs as well as any other information you choose to view in the Catalog.

Exercise 3: Accessing IMS if the catalog is unavailable

For environments that do not have access to the metadata in the IMS Catalog, the IMS Enterprise Suite Explorer for Development (downloadable from the IMS home page www.ibm.com/ims which creates metadata) can save the information in a local file on the workstation. For this lab, the metadata created by the IMS Explorer for Development has been stored in the folder - C:/share/IMS Universal Drivers Metadata.

You will access two PSBs: DFSIVP37 (on IMSD) and DFSSAM09 (on IMSB), using local metadata that has been saved on your workstation,

1. Create another Data Source connection, this time for access to PSB **DFSIVP37.** Right click **Relational Data Source NEW -> Relational Data Source**

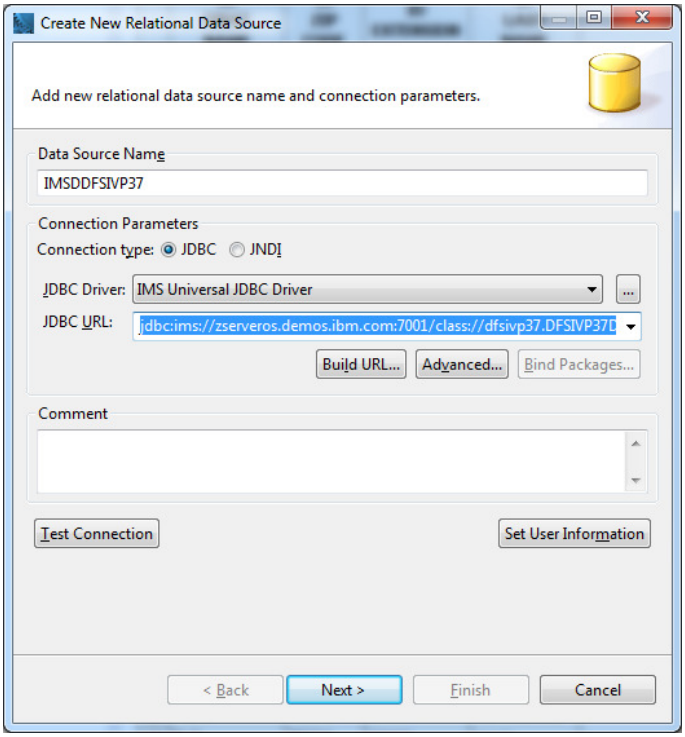


In the Data Source Name field enter **IMSDDFSIVP37.**

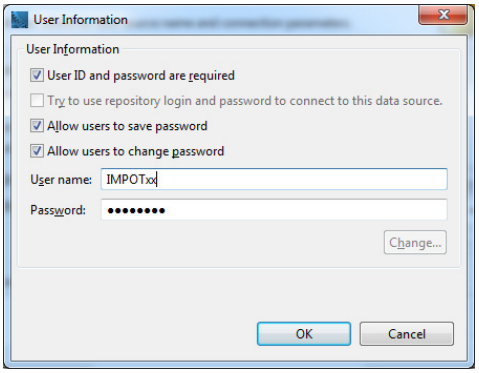
Set the connection type button to **JDBC.** In the JDBC Driver drop done list select **IMS Universal JDBC Driver.** Enter the following for the JDBC URL to access the DFSIVP37 local file metadata:

```
jdbc:ims://zserveros.demos.ibm.com:7001/class://dfsivp37.DFSIVP37DatabaseView:db
   ViewLocation=C:/share/IMS Universal Drivers Metadata;fetchSize=0;
```

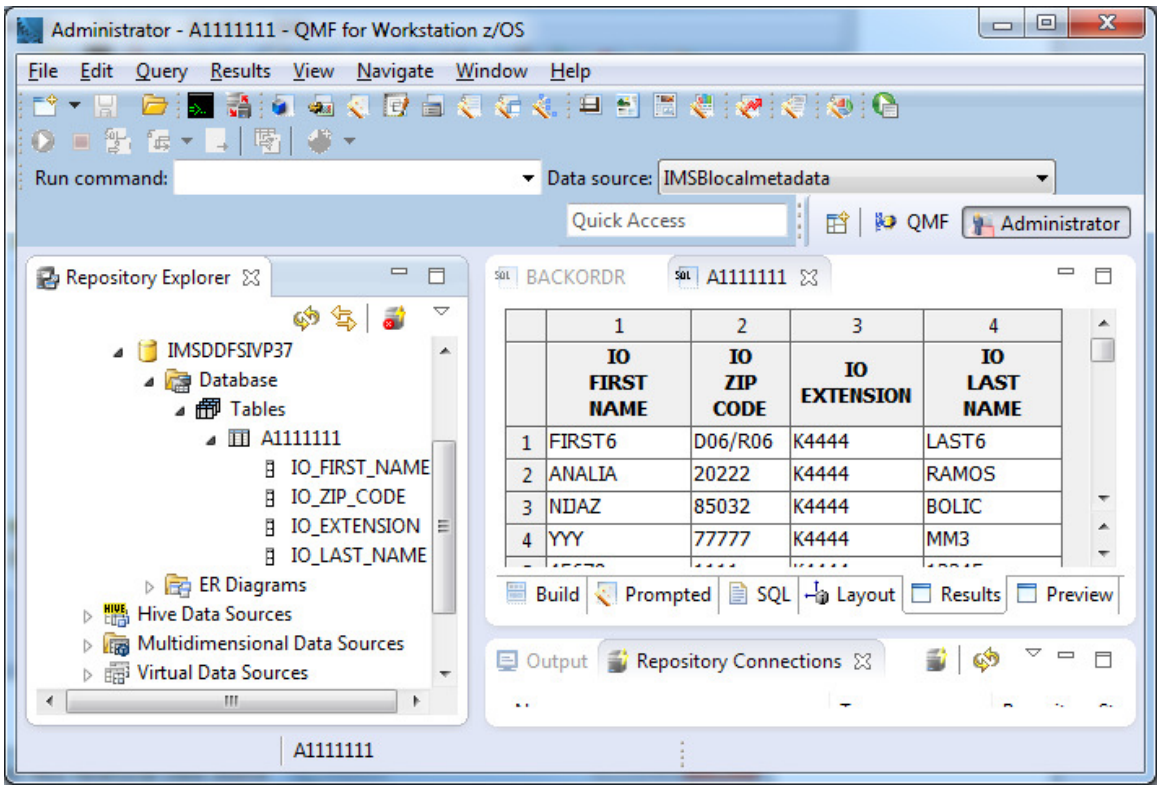
- (//**zserveros.demos.ibm.com**) is the hostname where IMS Connect is running
- (**7001**) is the IMS Connect port number that will send the request to the **IMS system (IMSD)**
- The (**class://)** points to the metadata URL, (**dfsivp37.**) is a folder in the local file system, and (**DFSIVP37DatabaseView**) is the metadata that was previously created with the IMS Explorer for Development
- The **dbViewLocation** points to the local file system **C:/share/IMS Universal Drivers Metadata** (you can use windows explorer to see this file structure)
- **fetchsize** gives the JDBC driver a hint as to the number of rows that should be fetched from the database when more rows are needed. The number of rows specified affects only result sets created using this interaction. If the value specified is zero, then the hint is ignored and the driver returns as many rows as are available. The default value is zero.



Select **NEXT.**



In the userid field enter I**MPOT***xx* where *xx* is your team number and enter the password provided by the instructor. Click **OK.**



Expand the structure to view the data that is returned.

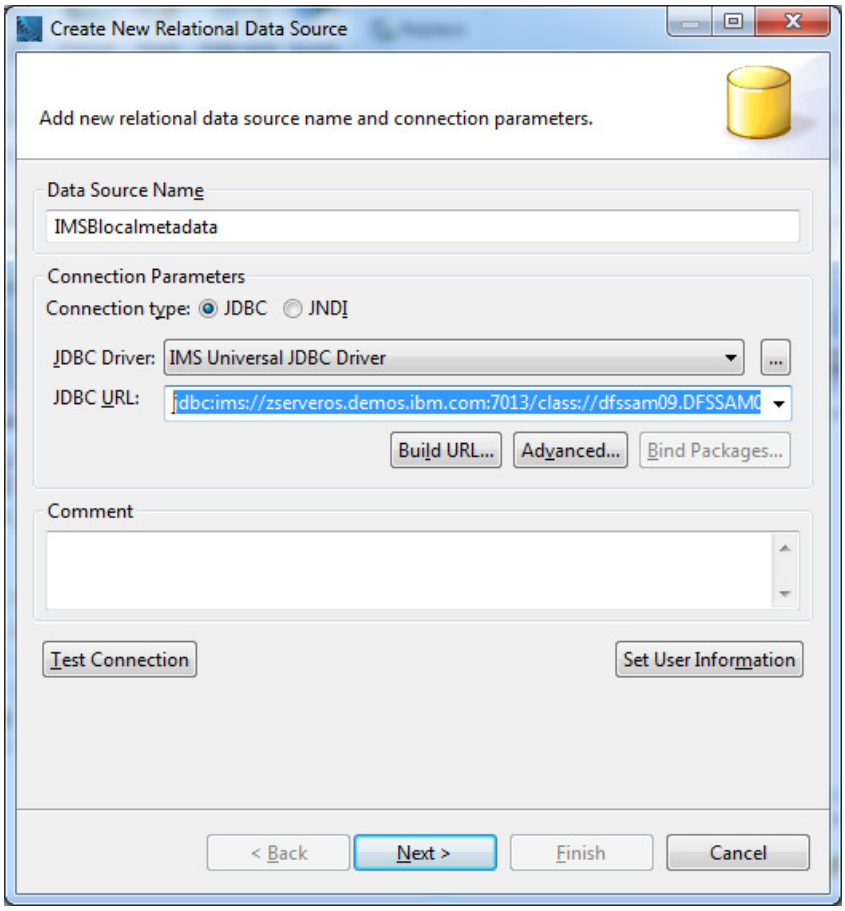
2. Create another **IMSQMFLAB***xx* Personal Repository connection. This time for PSB DFSSAM09 on IMS system IMSB. The URL for this connection also uses a local metadata file:

Right click **Relational Data Source NEW -> Relational Data Source** .
In the **Data Source Name** field enter **IMSBlocalmetadata.**

Set the connection type button to **JDBC.** In the **JDBC Driver** drop down list select **IMS Universal JDBC Driver.** In the **JDBC URL** drop down list enter the following:

```
jdbc:ims://zserveros.demos.ibm.com:7013/class://dfssam09.DFSSAM09DatabaseView:dbViewLocation
=C:/share/IMS Universal Drivers Metadata;fetchSize=0;
```

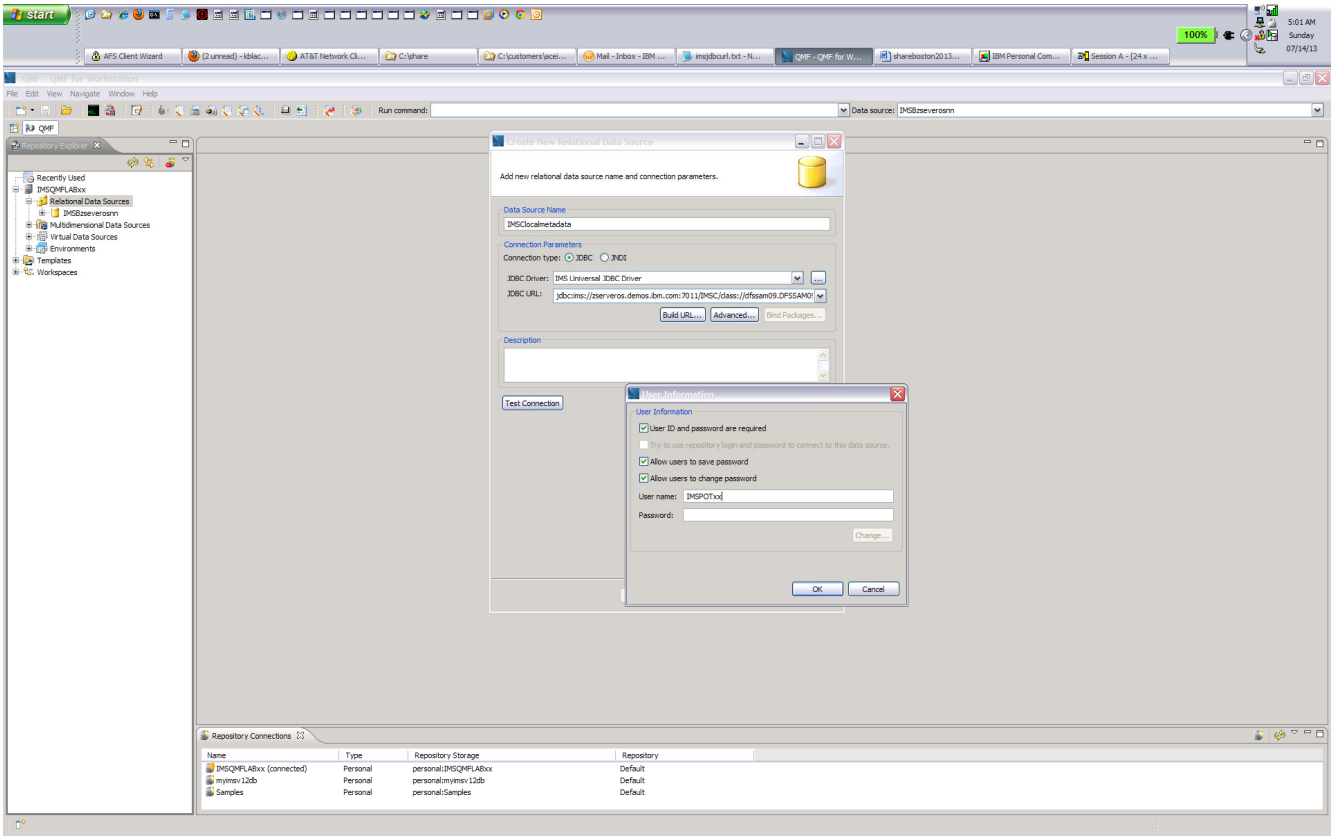
Note that access continues to be to the hostname of zserveros.demos.ibm.com but that the port number is 7013 which will allow the request to be sent to IMSB.



Select **OK** to close the template.

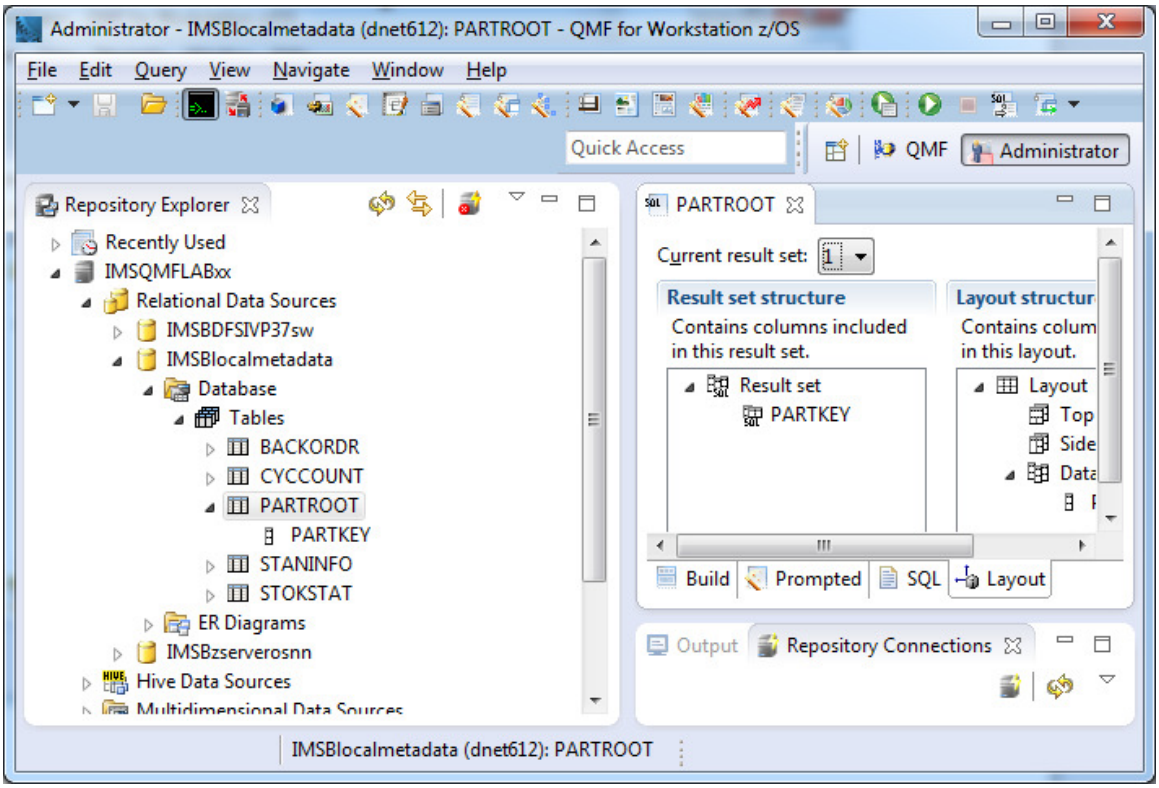
Select **NEXT.**

When the window for your security credentials pops up, enter **IMPOT***xx* where *xx* is your team number in the userid field and the password provided by the instructor.



Select **OK** to close the login template.

In the **Repository Explorer** you will see the tables in the IMS PARTS DB.



Exercise 4 – Working with queries

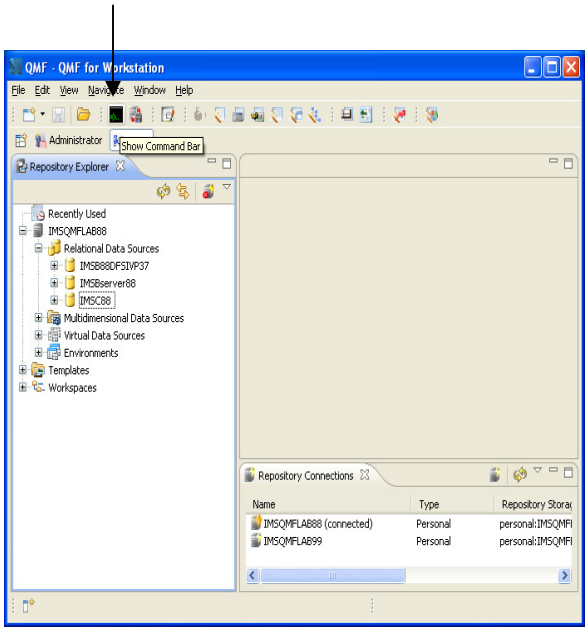
This section introduces you to the query development facilities in QMF for Workstation.

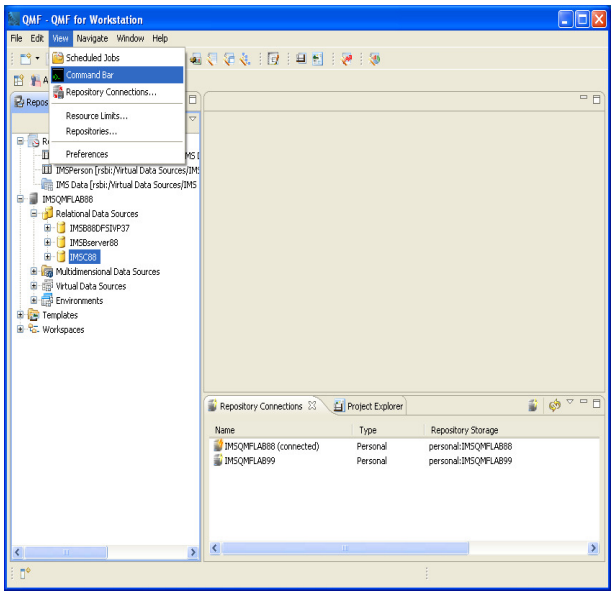
There are a number of ways to create a new query, including:

- Browsing through your database structure and double-clicking on a given table.
- Using the File->New->Query menu item or 'New Query' toolbar button.
- Using the QMF command bar to directly display a given table with a default query.
- Using the 'Draw Query' toolbar button.
- Clicking on tables that have been arranged in an arbitrary folder structure in your QMF workspace.

In our case, we will start by using the QMF command bar.

1. Click on the 'Show Command Bar' toolbar button (fourth from the left). The QMF command bar visibility is toggled. Click on the button such that the command bar is visible.



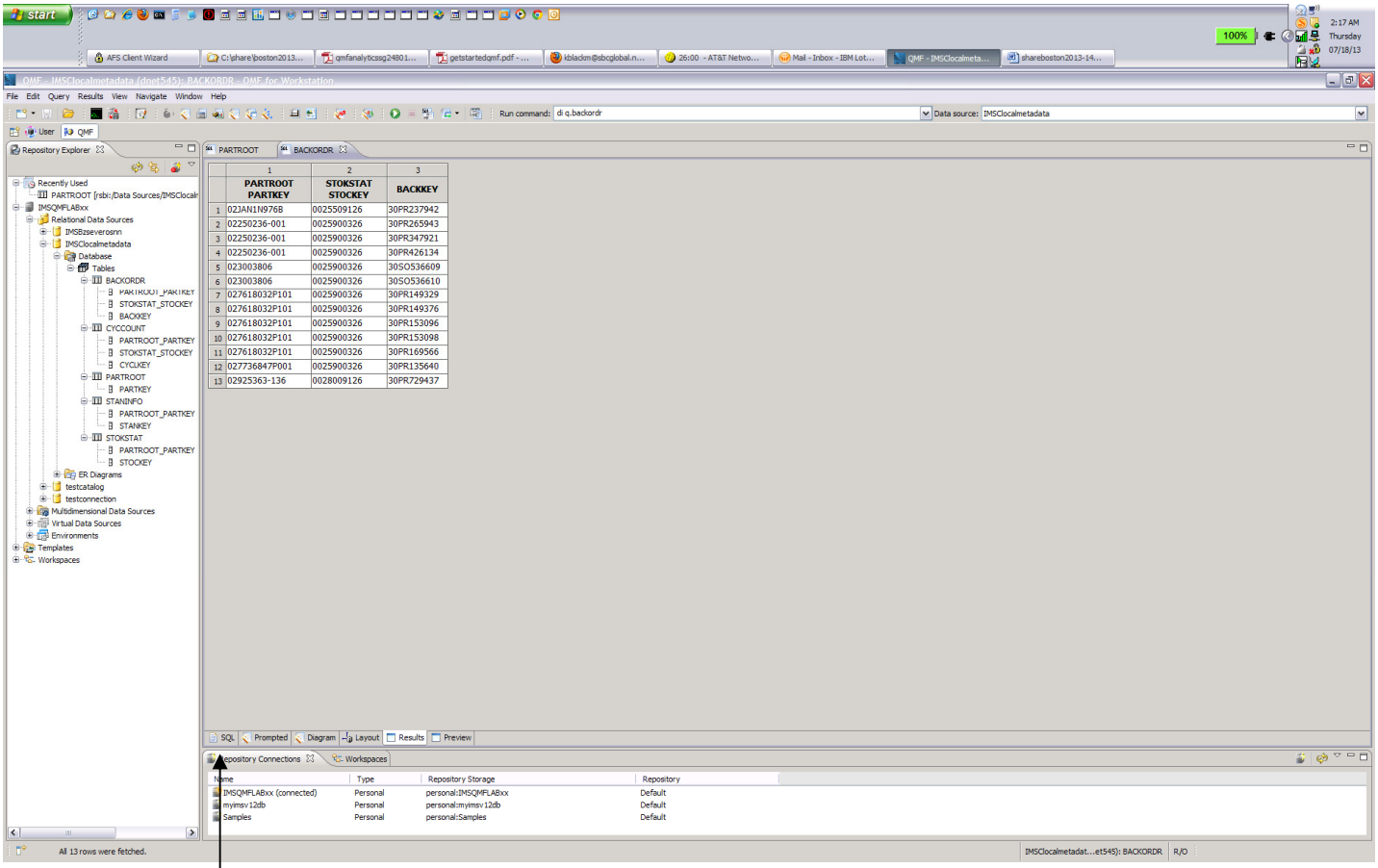


Alternatively, you can click on **View** -> **Command Bar**

The command bar accepts QMF procedure commands. You only need enough letters from the command's name to allow QMF for Workstation to distinguish it from other procedure commands.

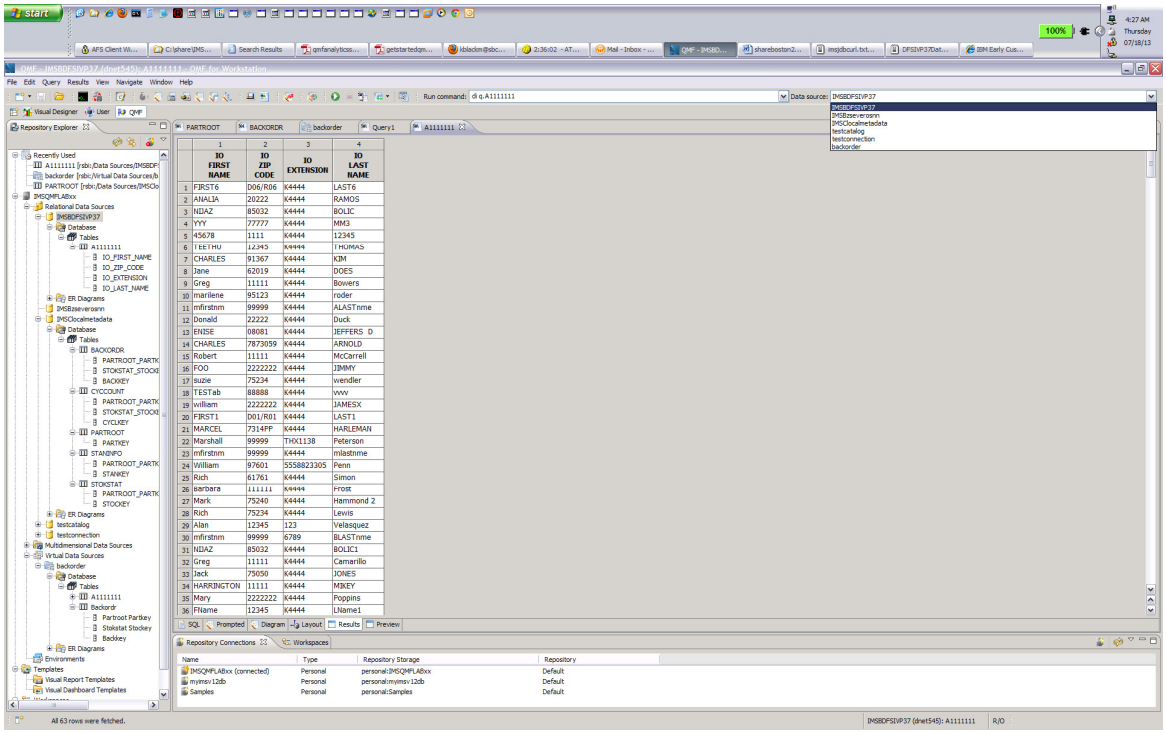
We will use the DISPLAY command but you only need to enter **'di'** since DISPLAY is the only command that starts with 'di'.

2. Enter **di q.backordr** into the **Run** command field and on the right in the **Data Source** field, choose the one that you last created which has the table, e.g., **IMSBlocalmetadata.** Press enter. QMF for Workstation creates a default query and runs it.



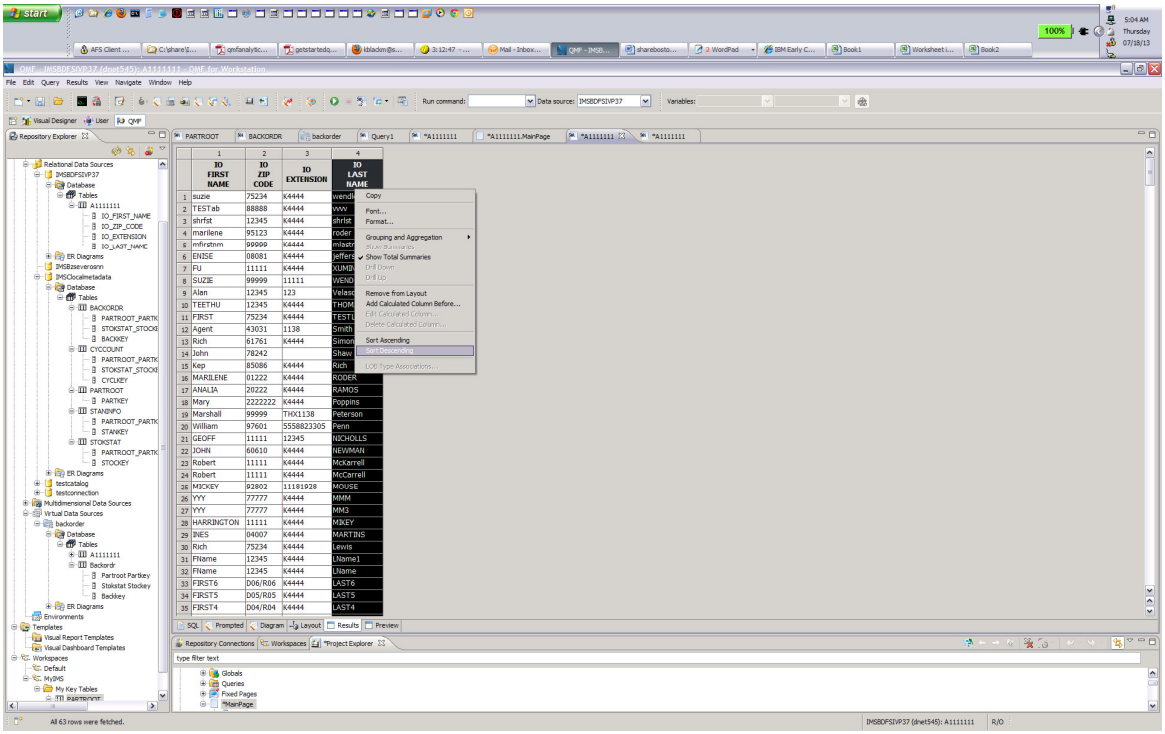
Review the SQL that was generated by clicking on the SQL tab toward the bottom.

3. Try another query. Enter **di q.A1111111** into the **Run command** field and in the Data source: drop down box select **IMSDDFSIVP37** then press enter. QMF for Workstation creates a default query and runs it.



4. Sort the Results.

Right click on the **IO LAST NAME** column and select either **Sort Ascending** or Sort **Descending** to view the results in a different order.

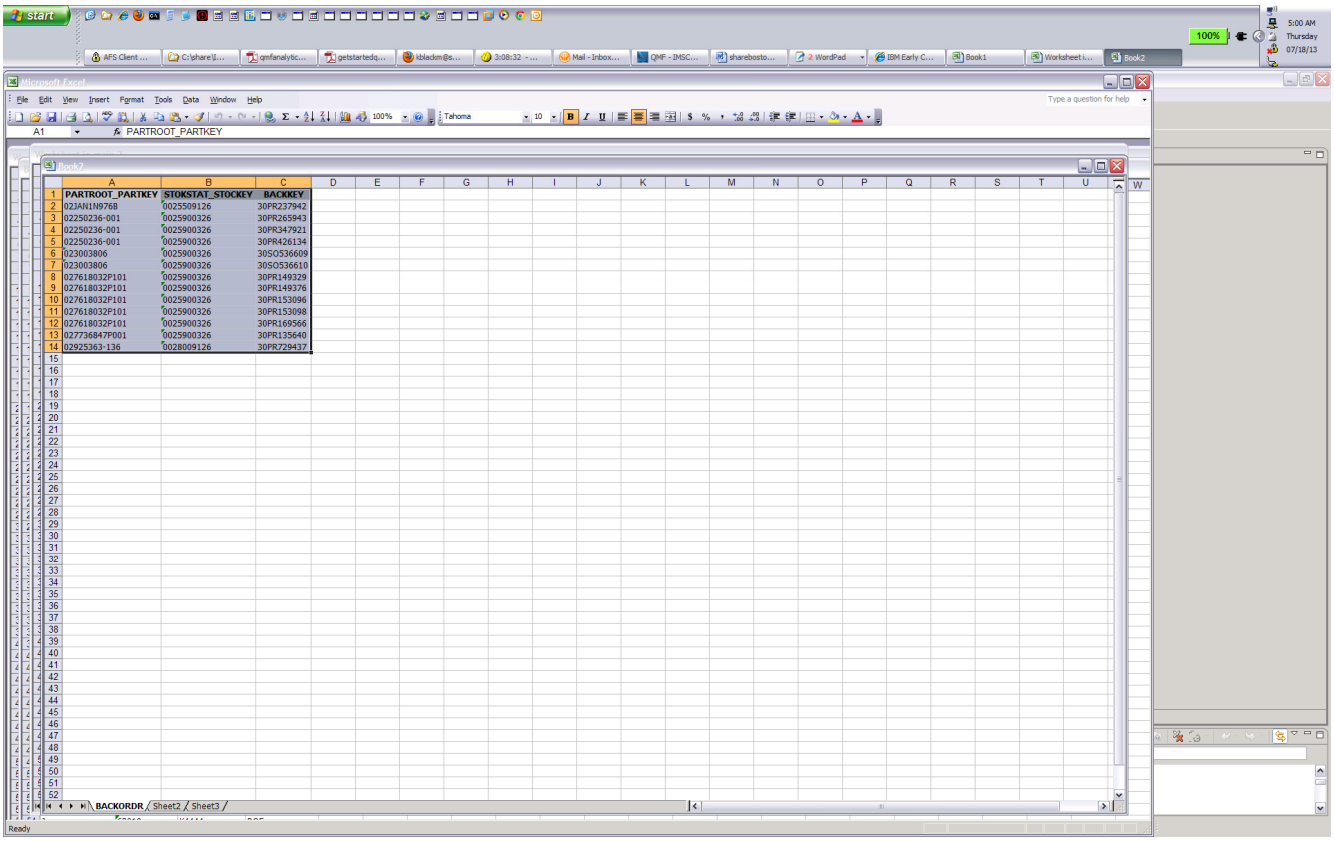


5. Close the query by clicking on the **X** in the query tab.

Transferring Data to Microsoft Excel

(this can be done back at your shop but cannot be done in this lab because Microsoft Excel is not installed)

QMF for Workstation is capable of directly transferring query results to Microsoft Excel. When running QMF for Workstation on a desktop with Excel installed, data can be immediately exported to Excel by pressing Ctrl+B or selecting the Results->Display Excel Sheet menu item.

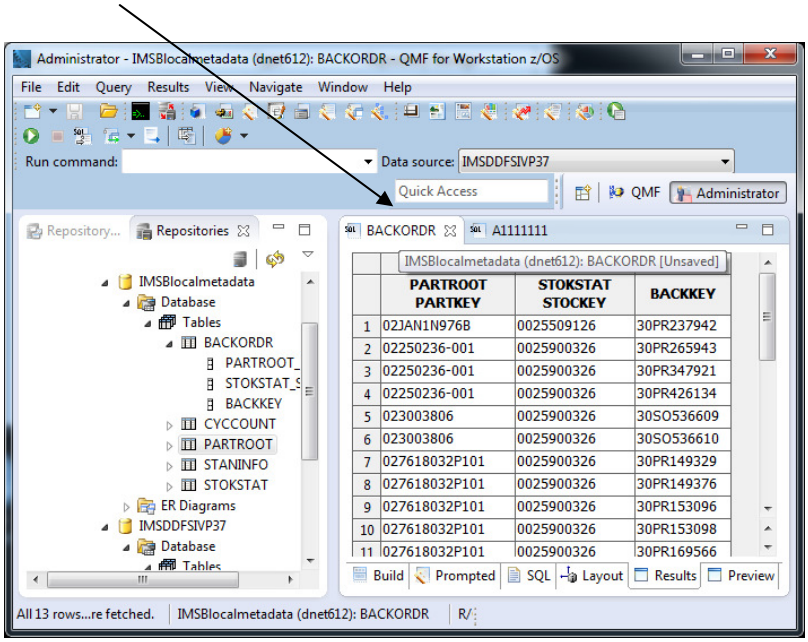


A screen capture of the outcome of exporting a query result set to Microsoft Excel using QMF for Workstation's 'Display Excel Sheet' function. The export is performed 'live' without the need to create and open an external file.

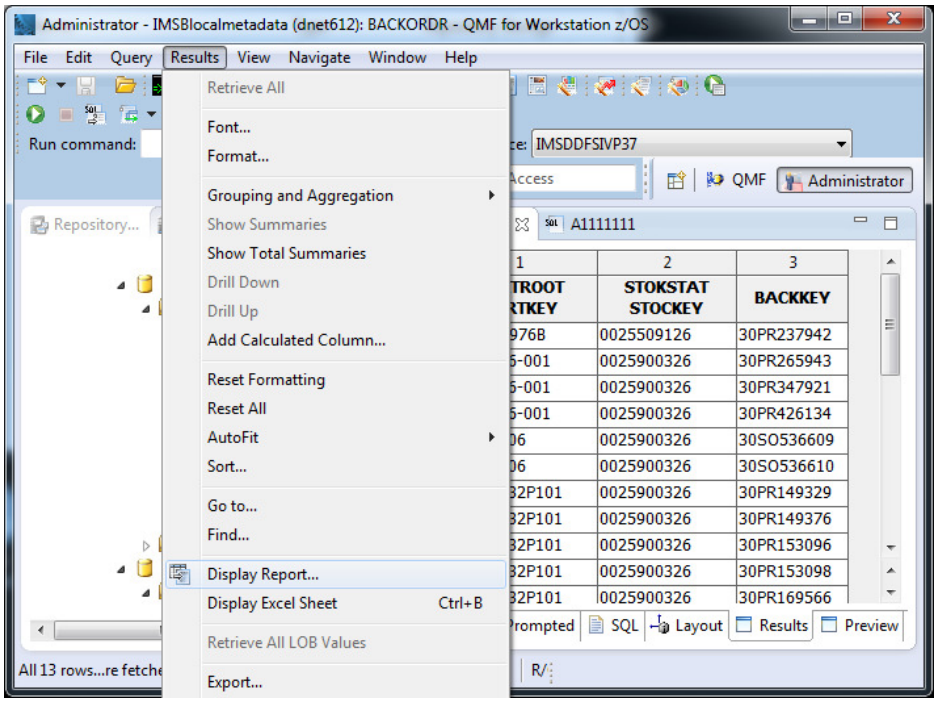
Exercise 5 – Developing Reports using QMF Forms

In this exercise, we will apply a QMF form to the result set produced from the query that was created in the prior exercise.

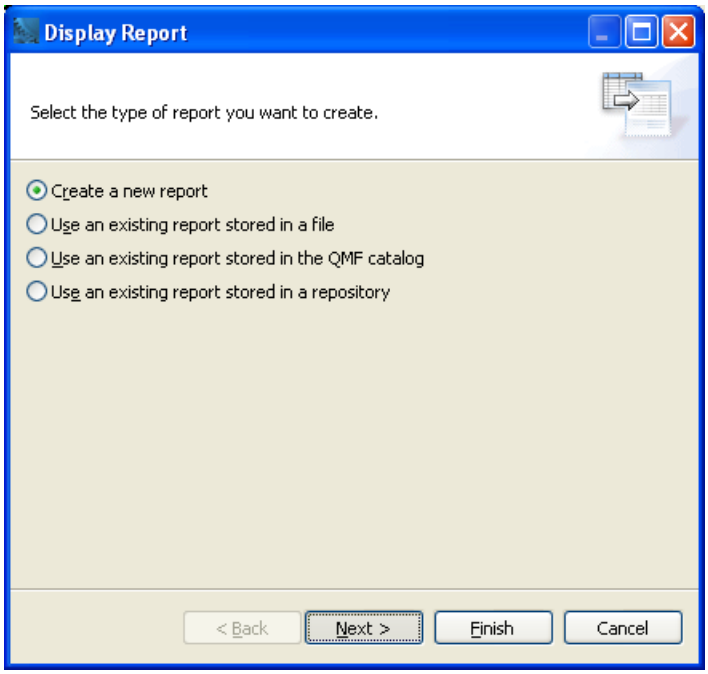
1. Click on the **backorder** tab to display the result set that you created earlier.



2. Click on the '**Display a report**' toolbar button, or alternatively, click on **Results -> Display Report** tabs.

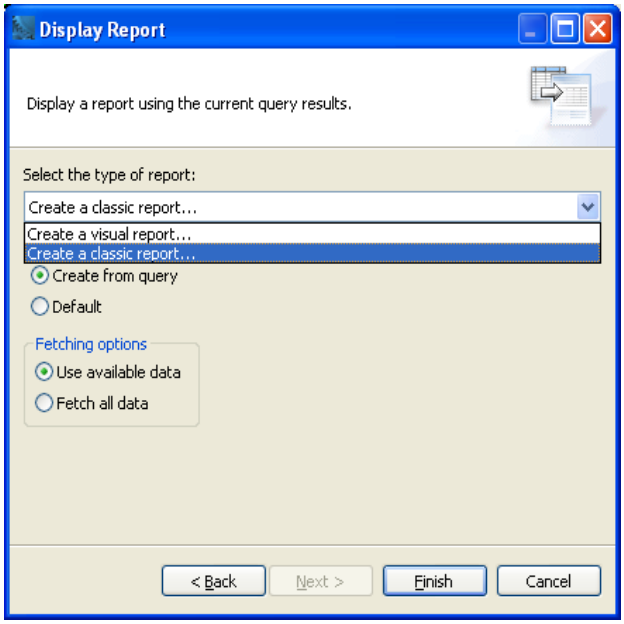


3. The **Display Report** wizard allows users to either create a new report or apply an existing report to a given query result set. Leave **Create a new report** selected and click on the **Next** button.



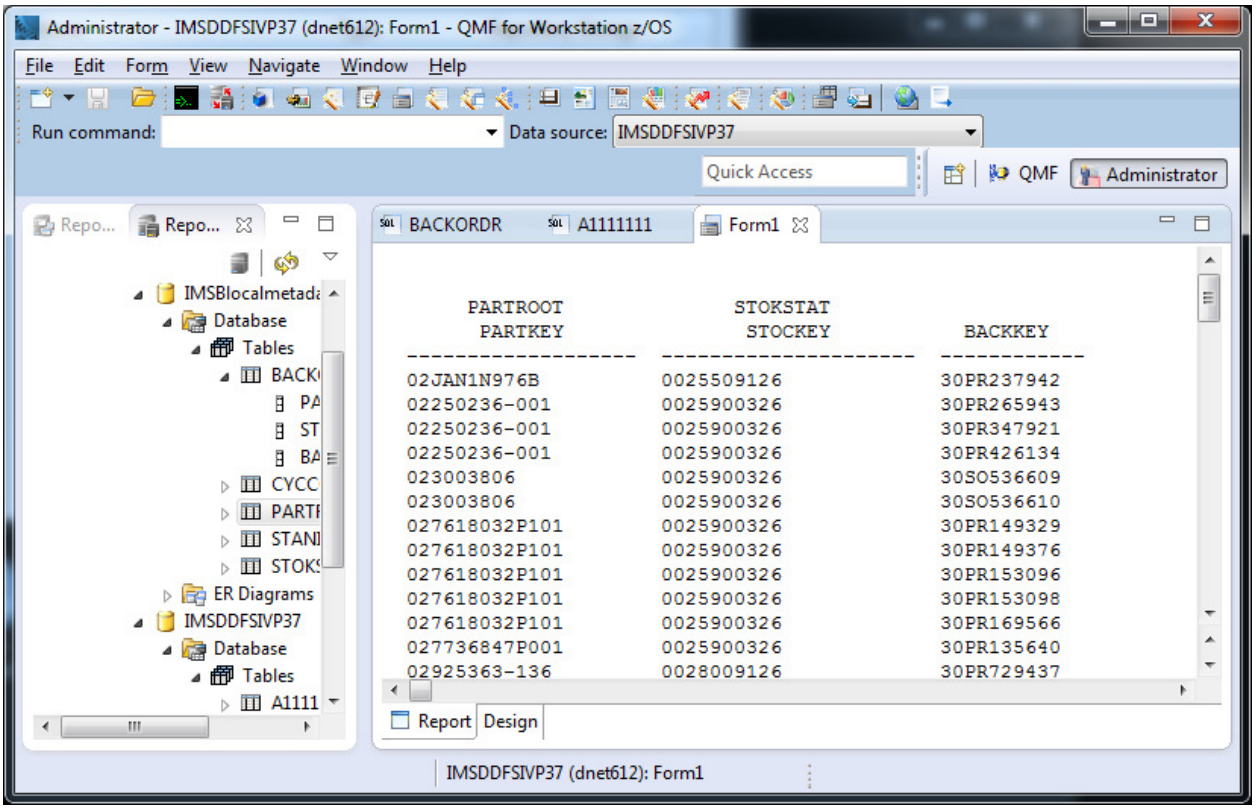
3. Select **Create a classic report** from the report type combo box. Note the remaining options in the dialog – one can create a default report format or derive the report from the format already contained in the query result set.

   - Ensure that the **Create from query** and the **use available data** buttones are both selected then click on the **Finish** button.



5. The report is created and executed. Note that the report format matches the layout of the

query.


Administrator - IMSDDFSIVP37 (dnet612): Form1 - QMF for Workstation z/OS
File Edit Form View Navigate Window Help
Run command:
Data source: IMSDDFSIVP37
Quick Access
QMF
Administrator
Repo...
Repo...
IMSBlocalmetada
Database
Tables
BACK
PA
ST
BA
CYCC
PARTI
STANI
STOK
ER Diagrams
IMSDDFSIVP37
Database
Tables
A1111
BACKORDR
A1111111
Form1
PARTROOT
PARTKEY
STOKSTAT
STOCKEY
BACKKEY
02JAN1N976B 0025509126 30PR237942
02250236-001 0025900326 30PR265943
02250236-001 0025900326 30PR347921
02250236-001 0025900326 30PR426134
023003806 0025900326 30SO536609
023003806 0025900326 30SO536610
027618032P101 0025900326 30PR149329
027618032P101 0025900326 30PR149376
027618032P101 0025900326 30PR153096
027618032P101 0025900326 30PR153098
027618032P101 0025900326 30PR169566
027736847P001 0025900326 30PR135640
02925363-136 0028009126 30PR729437
Report
Design
IMSDDFSIVP37 (dnet612): Form1

Exercise 6 – Defining virtual data sources to simplify database schemas for non-technical users

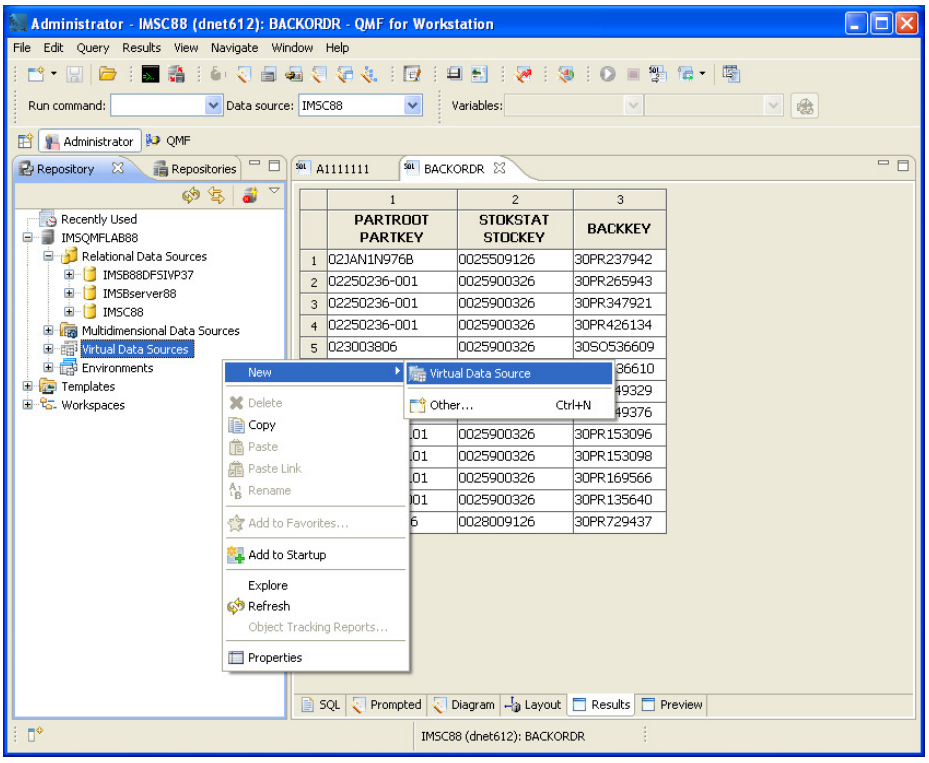
Virtual data sources allow QMF administrators to define simplified data schemas that make it easier for end users to work with your enterprise data. Traditionally, QMF users have been required to understand the explicit data schemas in your data sources since they work directly with the tables and views when building queries and forms. With virtual data sources, you can now define a level of simplification between the underlying data sources and the end users. This has two distinct advantages:

- Users are shielded from the complexities of the underlying data sources and only see relevant columns that pertain to their job function.

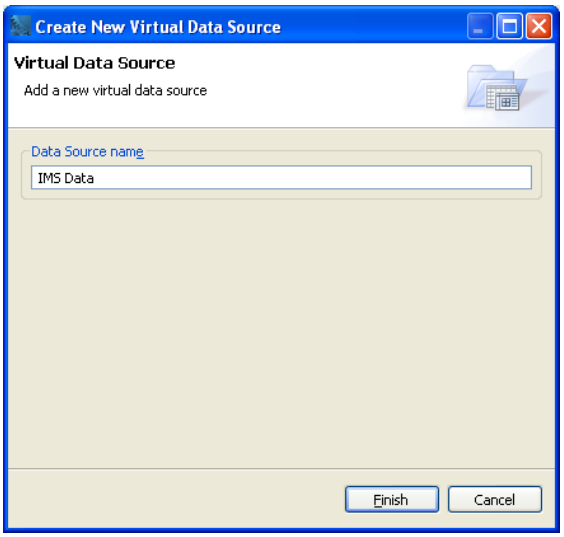
- A metadata layer allows changes to the underlying data schema without necessarily altering the virtual schema used by queries, reports and dashboards. This can be used to isolate BI content from database changes.

1. Select the Administrator Perspective. This displays the Repository Explorer. From the previous exercises you are probably already in the Repository Explorer. Otherwise, click on **Window > Open perspective > Administrator**

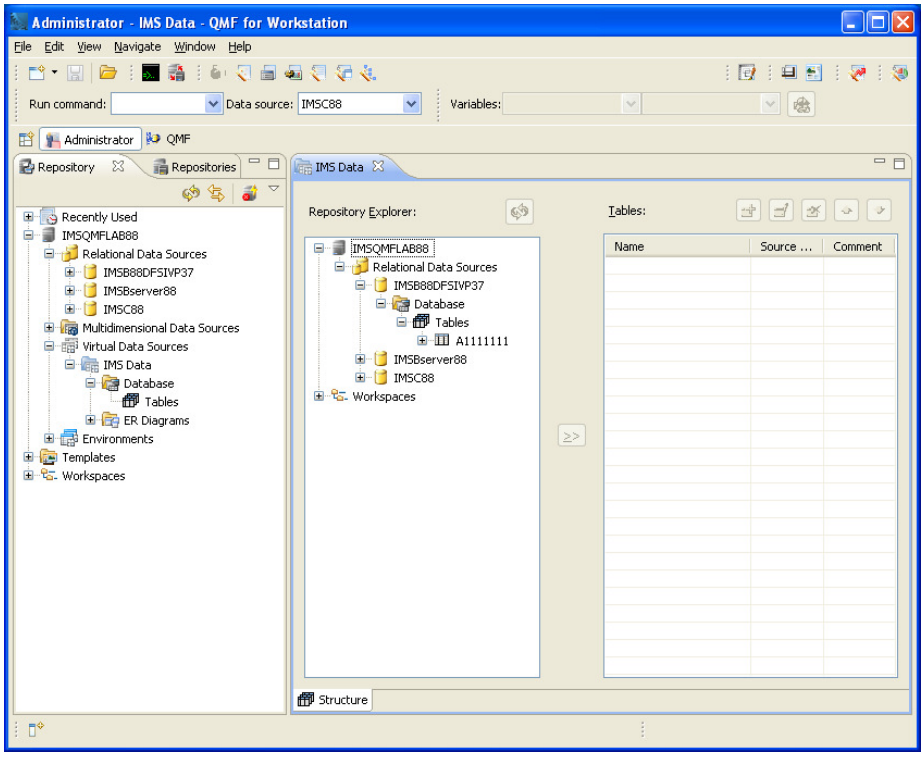
2. Expand **IMSQMFLAB***xx* and right-click on **Virtual Data Sources**. Select **New->Virtual Data Source**



3. Enter **IMS Data** for the data source name and click on the **Finish** button.



4. Expand the new **IMS Data** virtual data source and note that it appears much like any other data source in the repository explorer, complete with a tables tree item.



Virtual data source tables can be added using two key approaches:

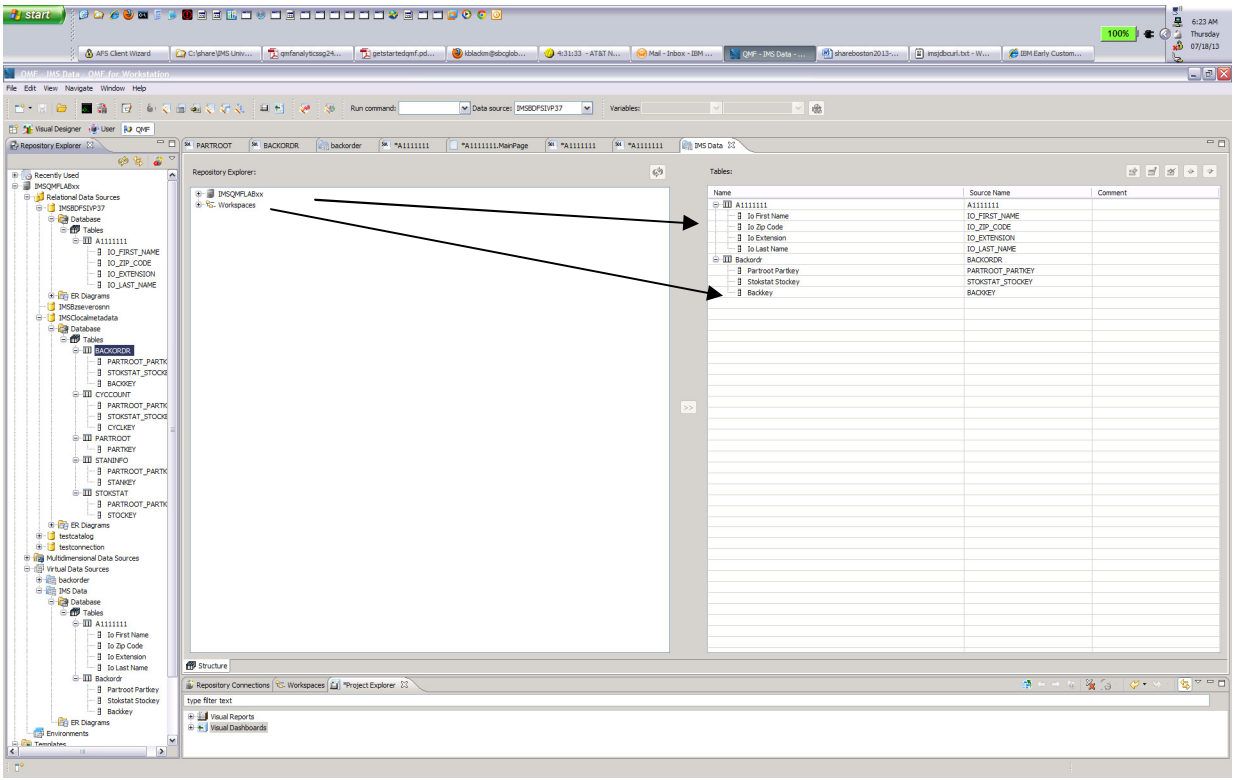
- Adding tables from real data sources into the virtual data sources. Once added, the table name and columns can be renamed and specific columns can be removed from the virtual data source copy.

- Adding saved QMF queries into the virtual data source's table collection. The query

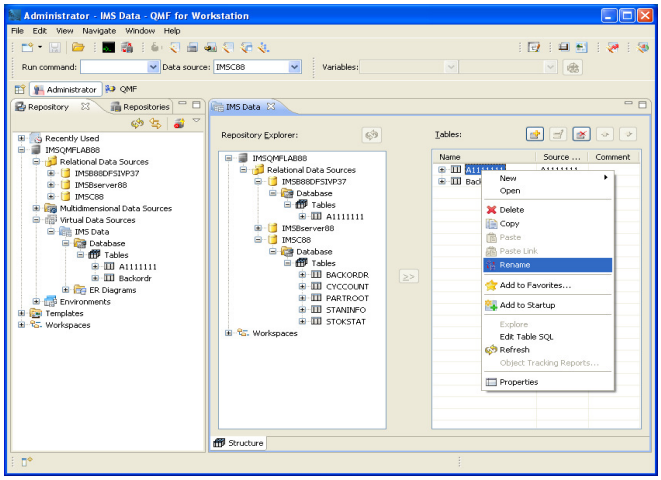
will appear as a regular table. As above, the table name and columns can be renamed and specific query columns can be removed.

4. We will copy a table from an existing data source.
   - Locate the **DFSIVP37** `A1111111` table in the **IMSDDFSIVP37** Data Source, listed under **IMSQMFLABxx->Relational Data Sources** tree item.

   - When located, select the table and **hold left mouse key to drag** to the table folder in **Virtual Data Sources**. Repeat to copy table from IMSBLocalmetadata data source.



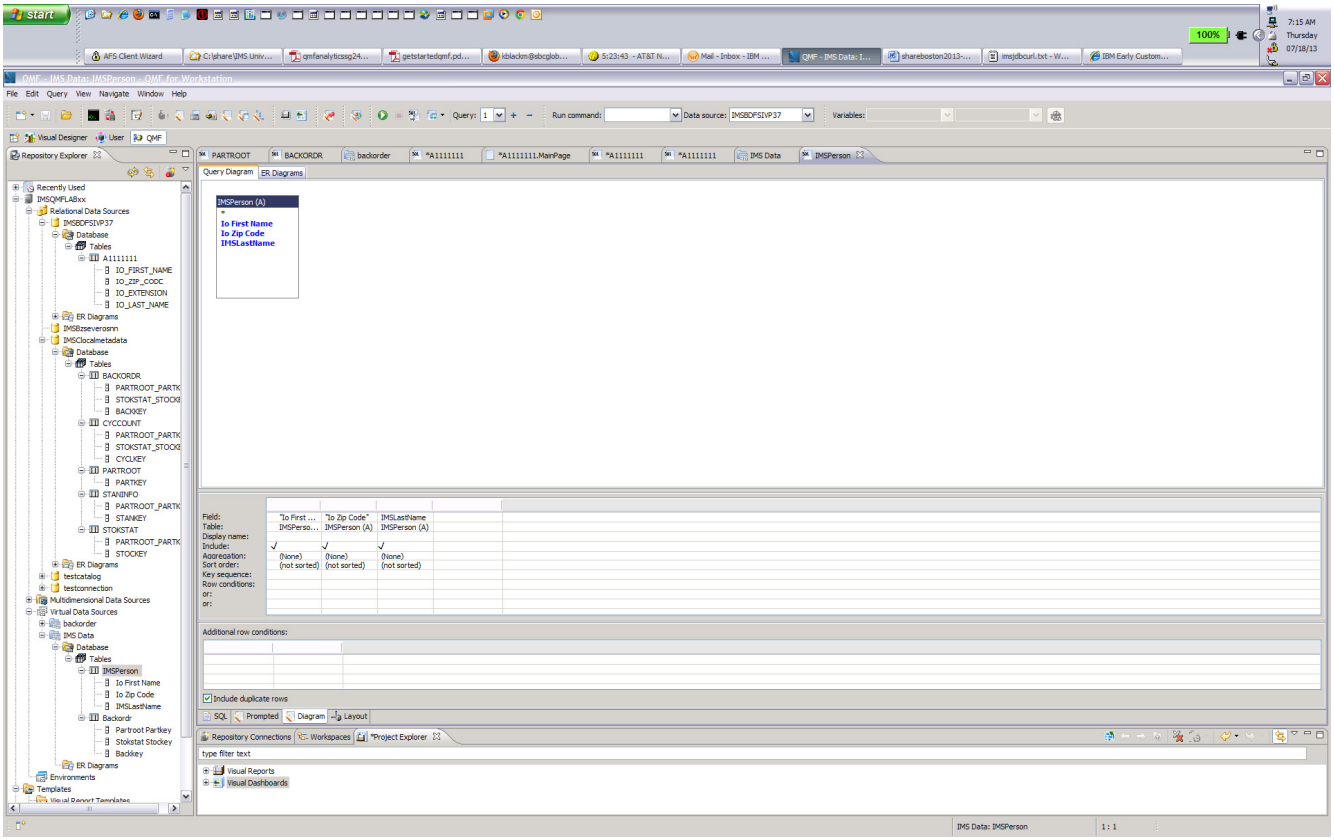
6. Right-click on the `A1111111` table and select **rename**. Type **IMSPerson** for the table name.

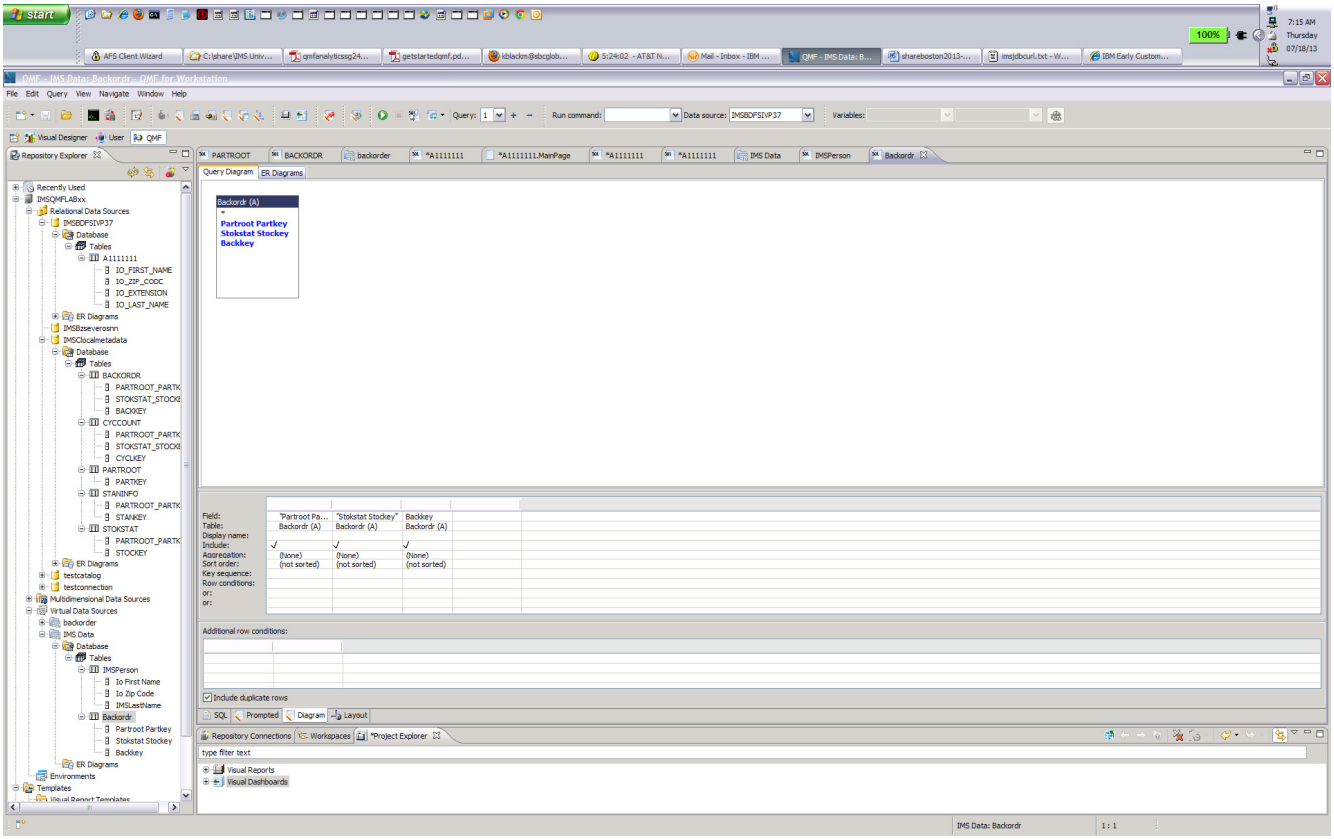


7. Expand the table to view the columns and right-click on the **io-lastname** column. Rename it to **IMSLastName**.

8. Right-click on the **io-extension** column and select **delete** to remove it from the virtual table. Any number of columns can be removed from a virtual data source table.

9. Double-click on the tabs for each of the tables to view the schemas.





This concludes the hands on lab. Thank you for taking the time to complete this set of exercises.