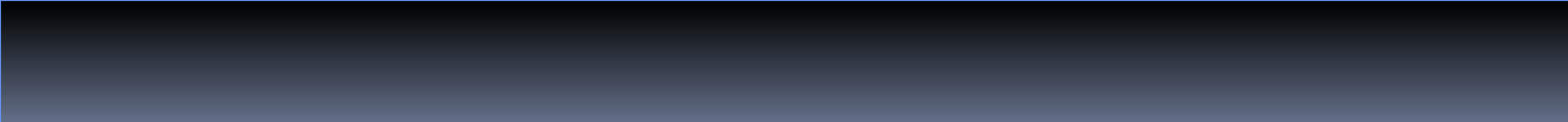
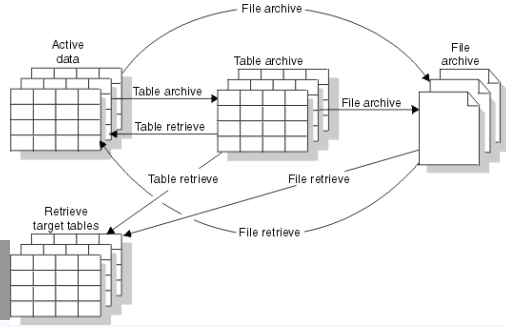
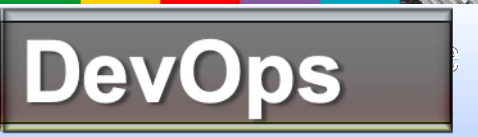


IBM Software Group

IBM Developer for z Systems – for ISPF Developers

Module 8 – Using the Data Source Explorer





Jon Sayles, IBM - jsayles@us.ibm.com

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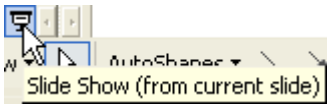
Learning DB2 and SQL

- Many (in the thousands of) books exist that do an excellent job teaching SQL.
- Additionally, sites exist on the Internet (GOOGLE: "SQL tutorials" – or "Learn SQL") for online (and typically free) education.

- IBM Also supplies *excellent* SQL and DB2 documentation:
  - DB2 Documentation
  - SQL Getting Started
  - SQL Reference Manual
  - Message (error code) Reference. Cached pdf version of full guide.
  - DB2 Application Development Guide with example embedded SQL programs.
  - Triggers in DB2
  - Constraints in DB2
- And there are plenty of non-IBM sites to learn about SQL:
  - Http://en.wikipedia.org/wiki/SQL

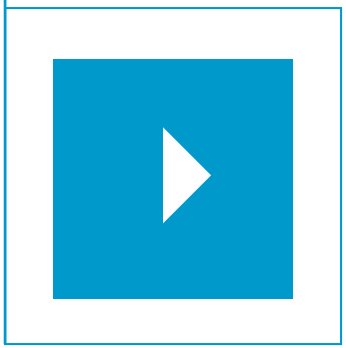
- Note: In order for you to get the above links to work, view the PowerPoint in Slide Show mode.



- Here is an example of COBOL database access:
  - http://publib.boulder.ibm.com/infocenter/dzichelp/v2r2/index.jsp?topic=/com.ibm.db29.doc.apsg/db2z_samplecoboldrdathreepartnames.htm

UNIT

The IDz Workbench



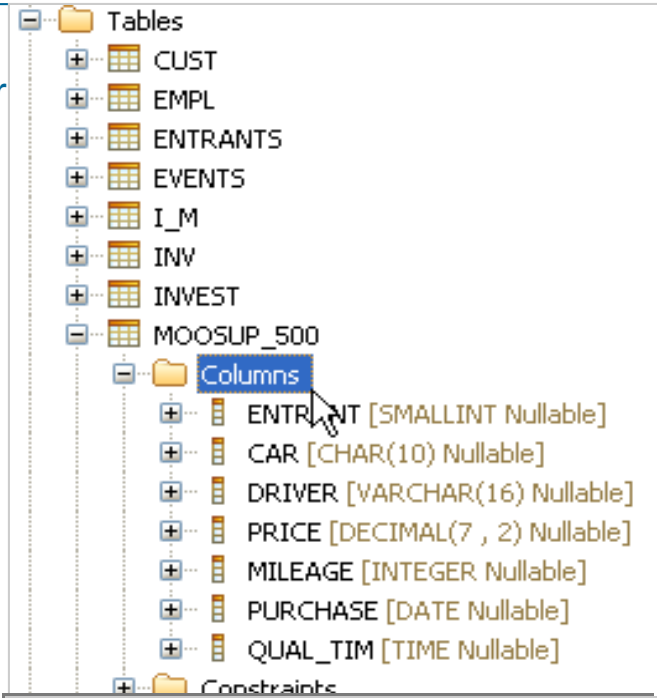
Topics:

- The Data Perspective and connecting to DB2
- Understanding your DB2 objects and dependencies
- **Editing and managing DB2 Table Data**
- Coding and testing SQL
- Extract/Load and Managing Test Data & Decision Support

The Data Source Explorer – Data Context Menu

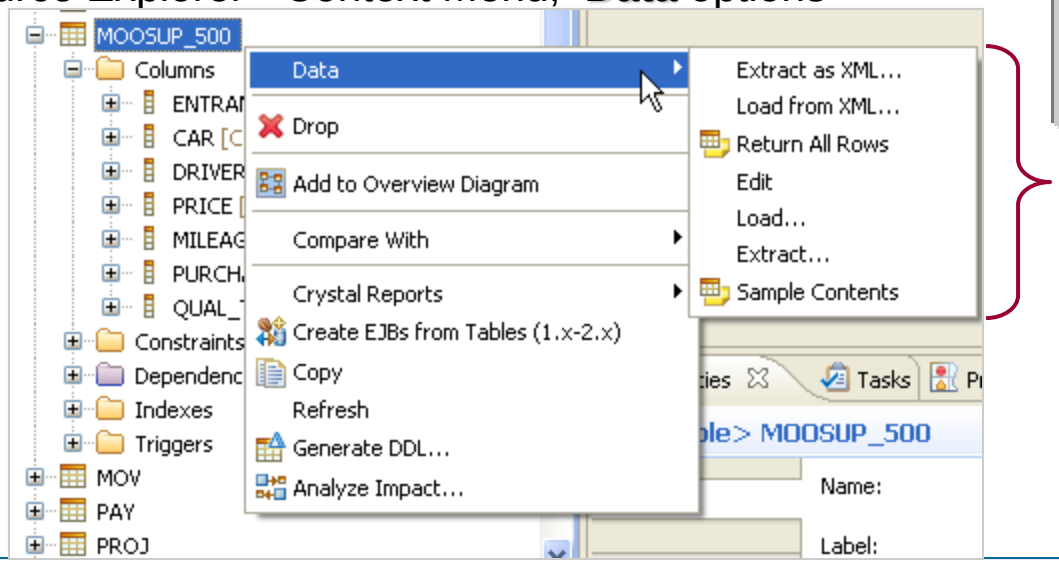
You can work with relational objects:

- View Schemas, Tables, Table Columns, Referential Integr Constraints, Indexes, Synonyms, Aliases
- Re-Create the SQL data definition language statements for the relational objects – from the System Catalog
- For individual tables:
  - View the table contents
  - View column contents (row cardinality)
  - Edit table values
  - Extract/Load the table using a comma-delimited file
  - Perform a DCLGEN operation



Viewing a table's column definitions

Data Source Explorer - Context Menu, **Data** options



The Data Source Explorer – **Data** Context Menu

- **View Schemas, Tables, Table Columns, Referential Integrity Constraints, Indexes, Synonyms, Aliases**
- **Re-Create the SQL data definition language statements – from the System Catalog**
- **For individual tables:**
  - **View the table contents**
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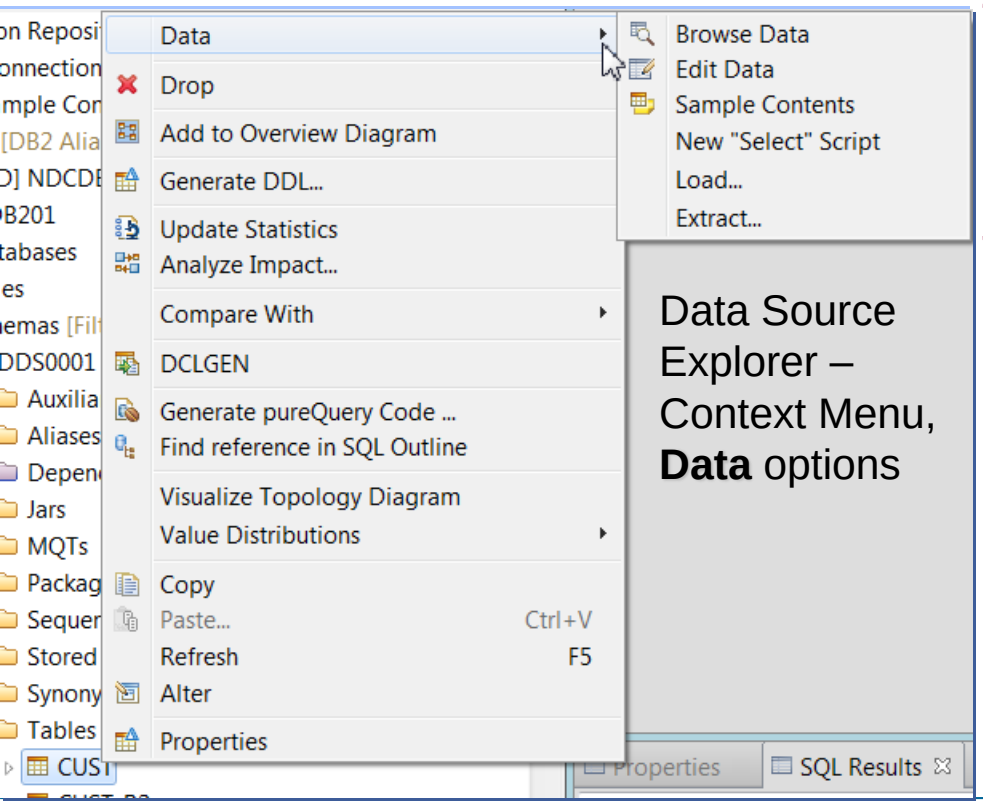
  - **Extract/Load the table using a comma-delimited file**
  - **Perform a DCLGEN operation**



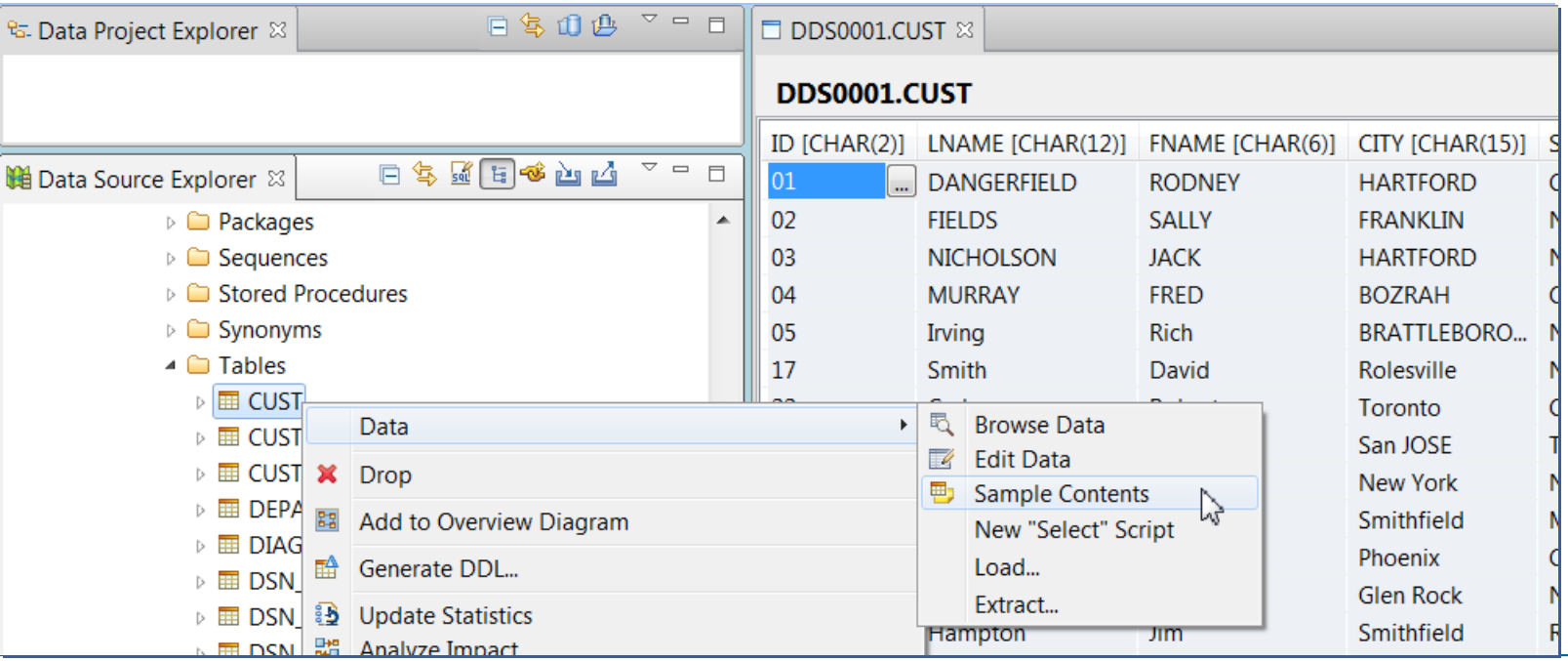
Data Source Explorer – Context Menu, **Data** options

- IDz Data tools provide many additional features. Some of them are traditional DBA functions which you may not be authorized to use (Updating Statistics)

Sample Table Contents – **Read/Only View of a Table's Row Values**

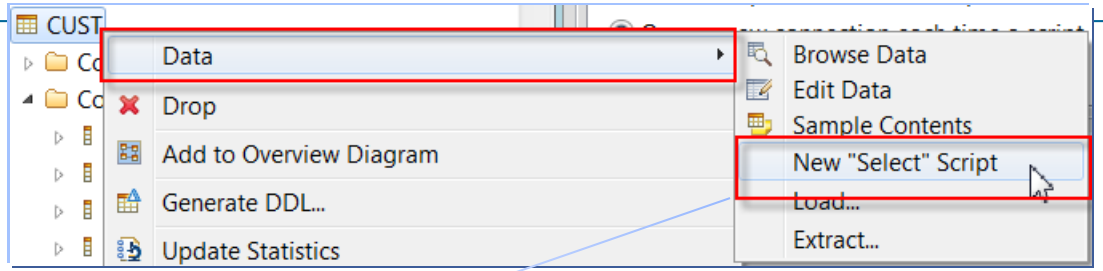
When you are testing your SQL statements, it can be helpful to view the row/column values in your tables. **Sample Contents** provides this, in a **SQL Results** view.

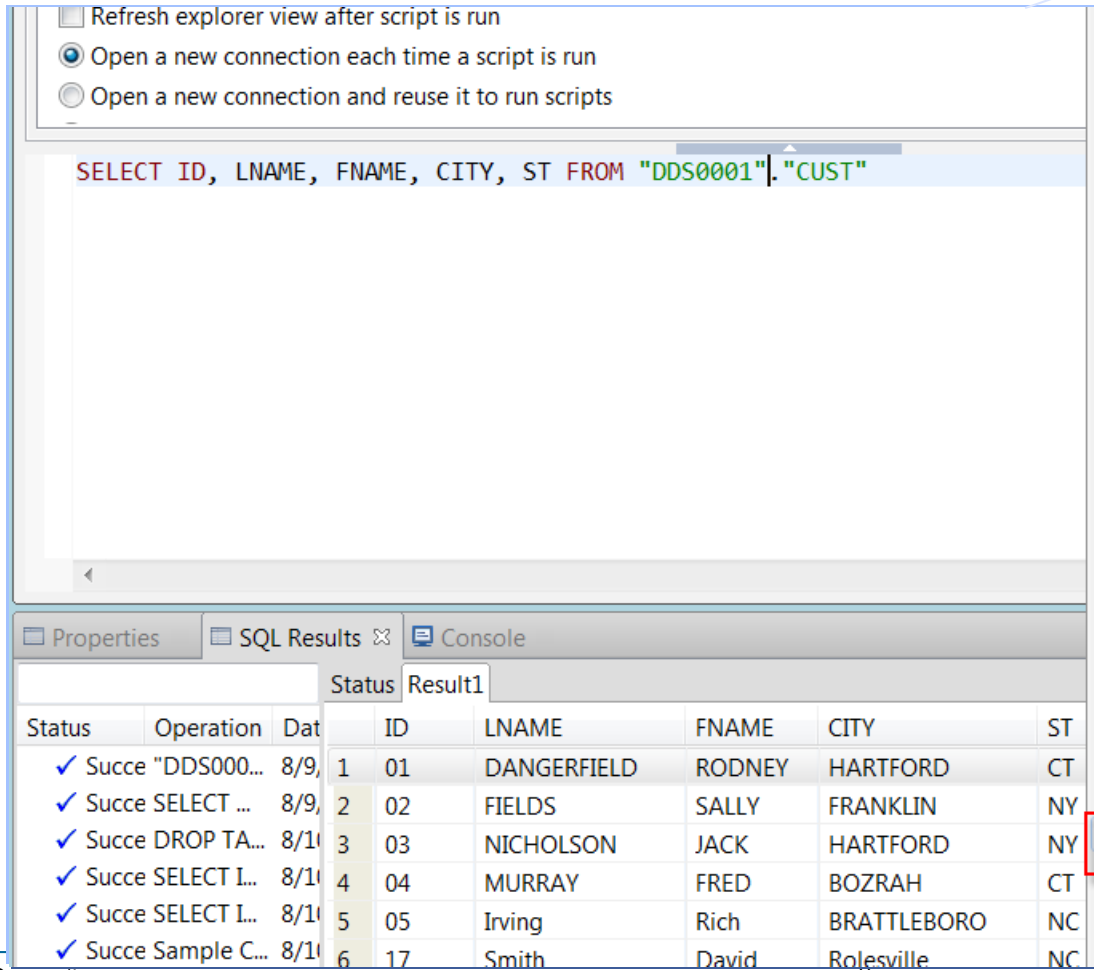
- Note that this is essentially a **Select *** from **<schema.table>**
  - The # of rows returned is configurable in **Preferences**
    - **Consider using SQL Scripts to write statements that filter the result tables**

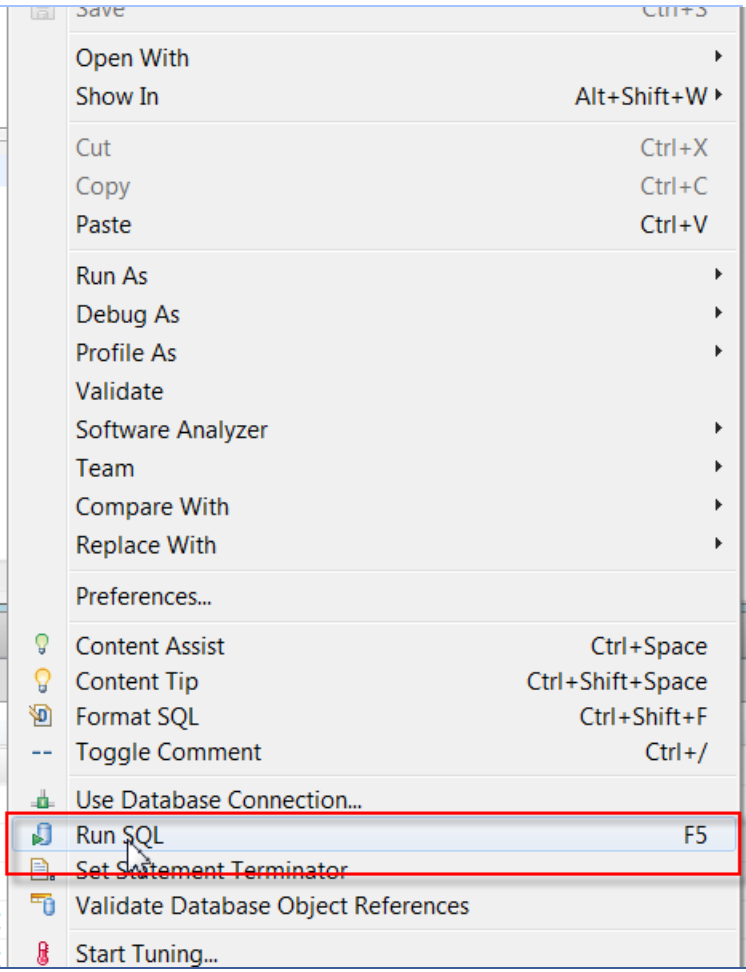


Sample Table Contents – “New Select Script”

- Instead of Browse Data or Sample Contents, you can use **New “Select” Script**
- Press F5 to run the SQL produced by the tooling







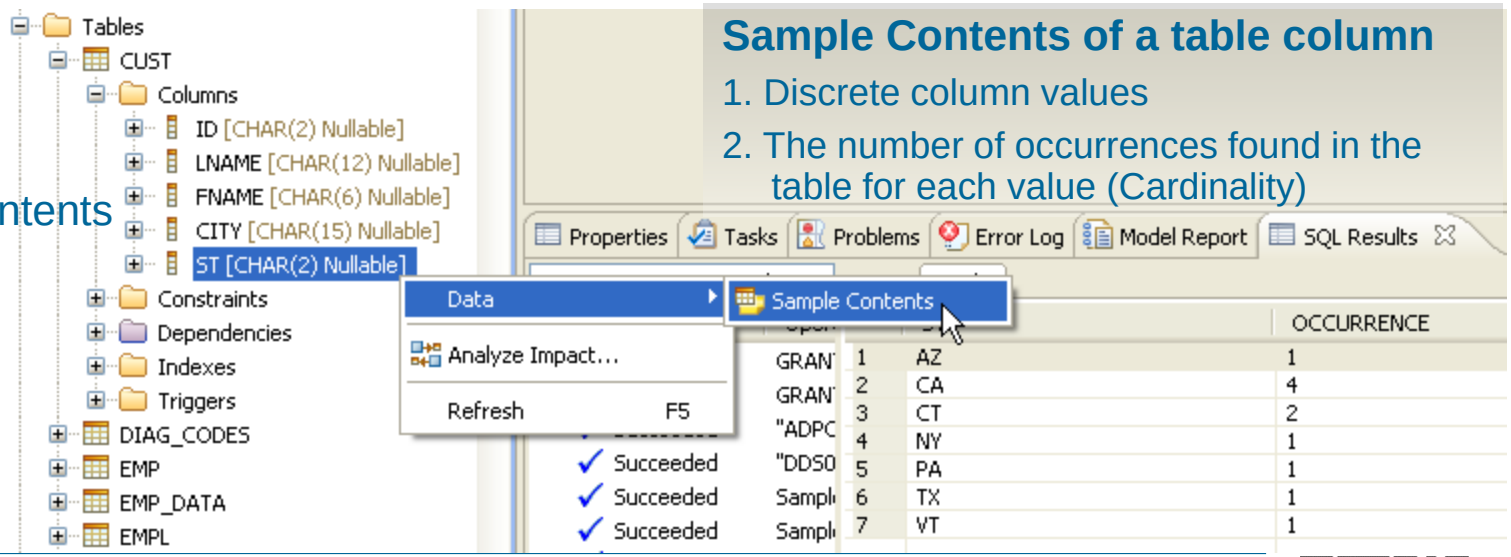
Data > Sample Contents – Display Table Values in a Single Column

It can be also useful to view the sample contents of individual columns – for various reasons:

- Applications:
  - Test data coverage
  - Testing and debugging values
- DBA:
  - Candidate indexing
  - SQL performance issues related to data volume

Steps:

- Select a table
- Expand Columns, and select a column
- Right-click
- Select:
  - Data
  - Sample Contents



Export SQL Results

Used to save row values in:

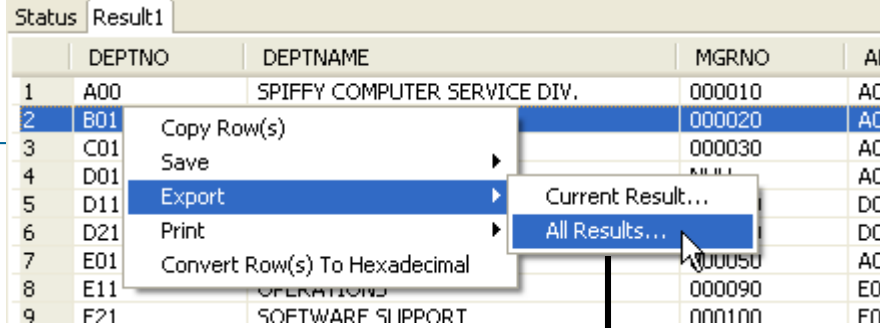
- HTML
- XML
- Plain text
- XLS (spreadsheet) format

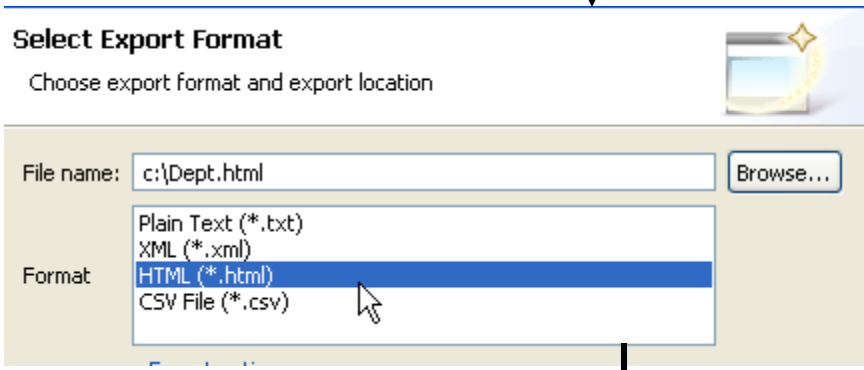
Steps:

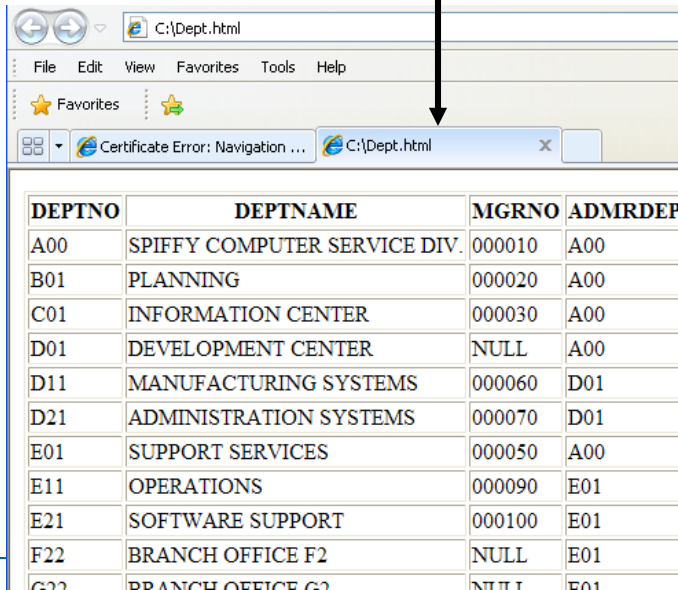
- From the Result window:
  - Right-click
  - Select which rows to export
  - Select the Export Format
    - Browse to the file name
    - Be sure to enter the .**file extension**
  - Click Finish

Note that you can export the results of any SQL statement

- Reduces the effort to build xml and reports off of DB2 data







DEPTNO	DEPTNAME	MGRNO	ADMRDEP
A00	SPIFFY COMPUTER SERVICE DIV.	000010	A00
B01	PLANNING	000020	A00
C01	INFORMATION CENTER	000030	A00
D01	DEVELOPMENT CENTER	NULL	A00
D11	MANUFACTURING SYSTEMS	000060	D01
D21	ADMINISTRATION SYSTEMS	000070	D01
E01	SUPPORT SERVICES	000050	A00
E11	OPERATIONS	000090	E01
E21	SOFTWARE SUPPORT	000100	E01
F22	BRANCH OFFICE F2	NULL	E01

Table Editing – 1 of 2

Another very common requirement for SQL programming is to customize your test data. Rather than fussing with interactive SQL INSERT/UPDATE/DELETE statements using QMF or SPUFI, try this:

- **From the Data Source Explorer**
- **Right-click over a table**
- **Select: Data > Edit**

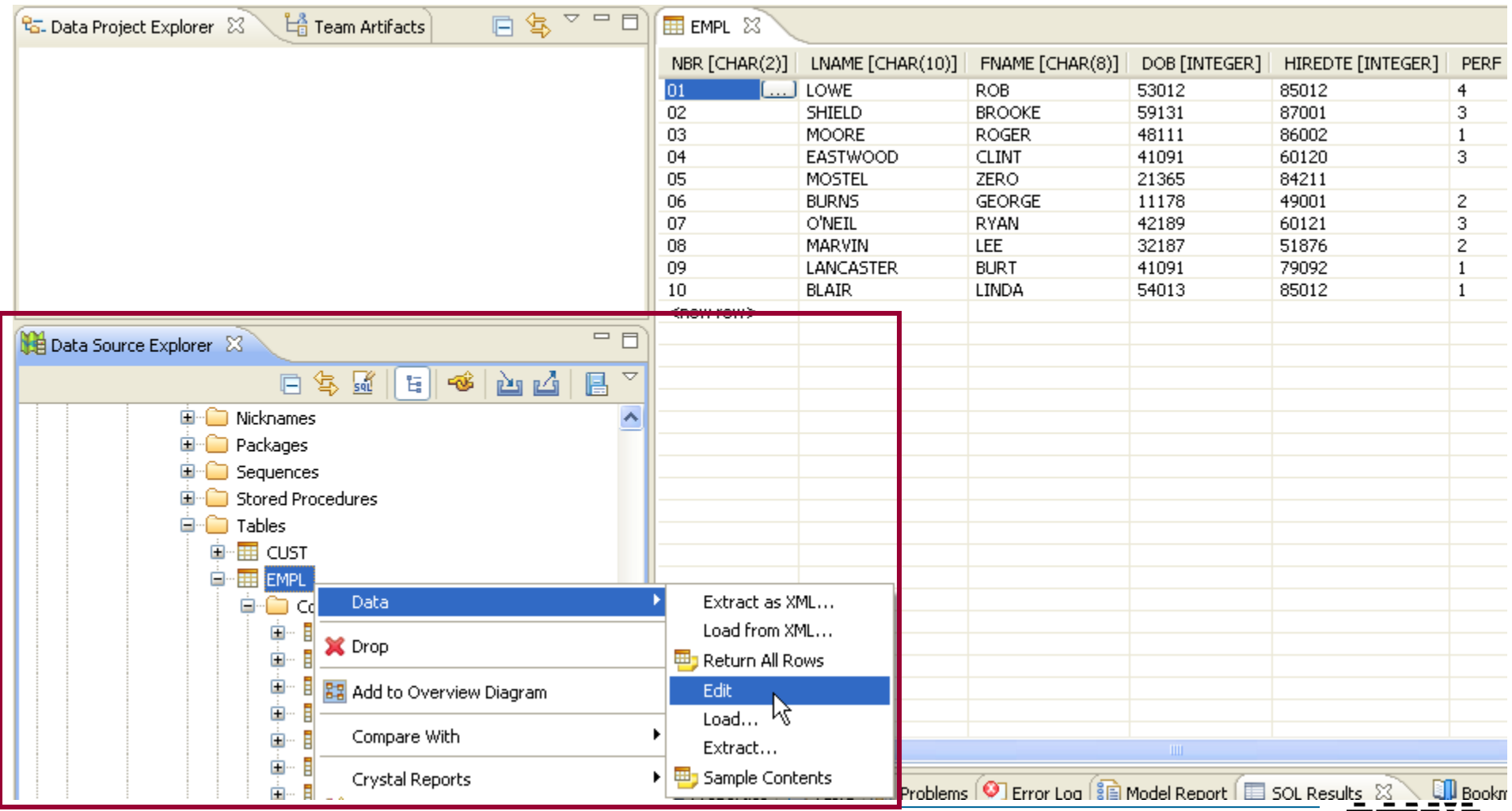
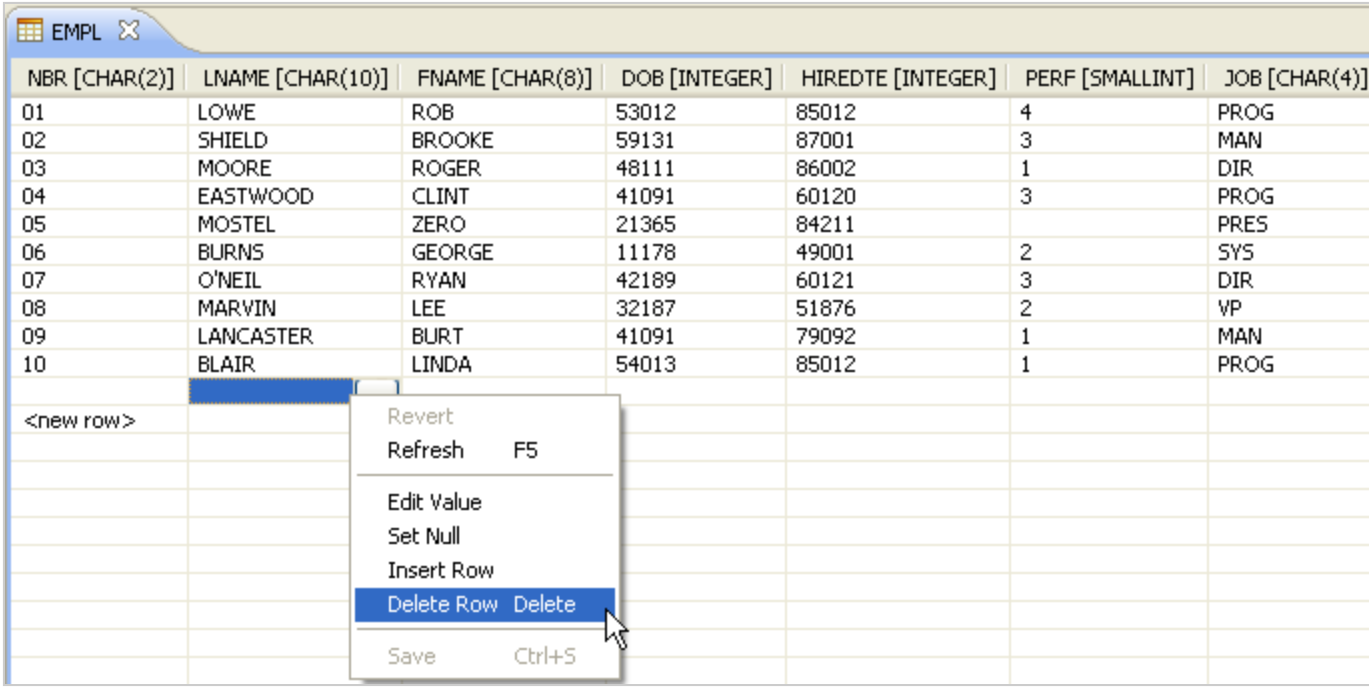


Table Row Value Edit Options – 2 of 2

The table editor allows you to:

- **Modify (update) values - Add (insert) new rows - Delete Rows**
- **Set individual field values to null**
- **Select image files (for columns of type: Blob/Clob)**

- All values are saved (committed) or not (rolled-back) at once when you press **Ctrl/S**

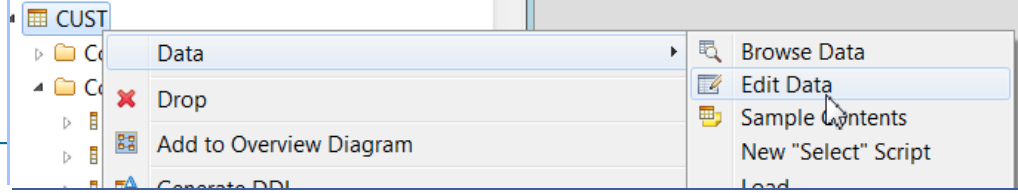


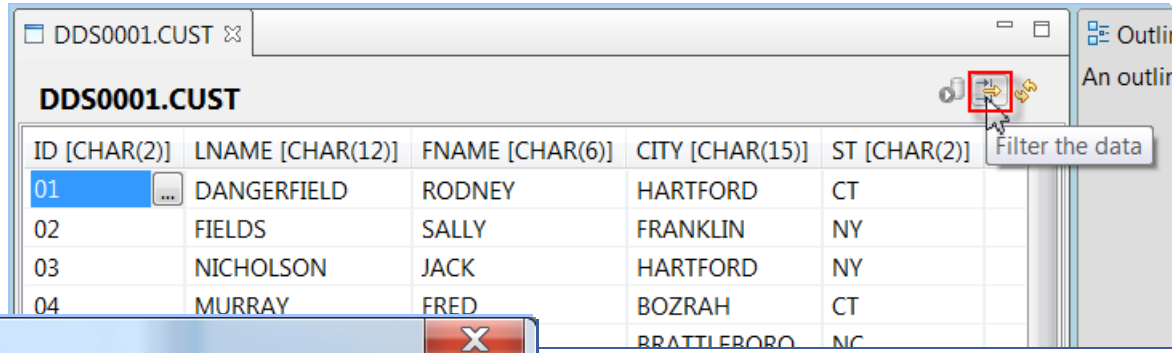
Using the Data tools you can: 1. Run a SQL Statement, 2. View the SQL results, 3. Modify table data values in order to test different WHERE clause conditions, 4. Re-run the SQL Statement, etc.

Table Filtering (IDz + Data Studio) – 1 of 3

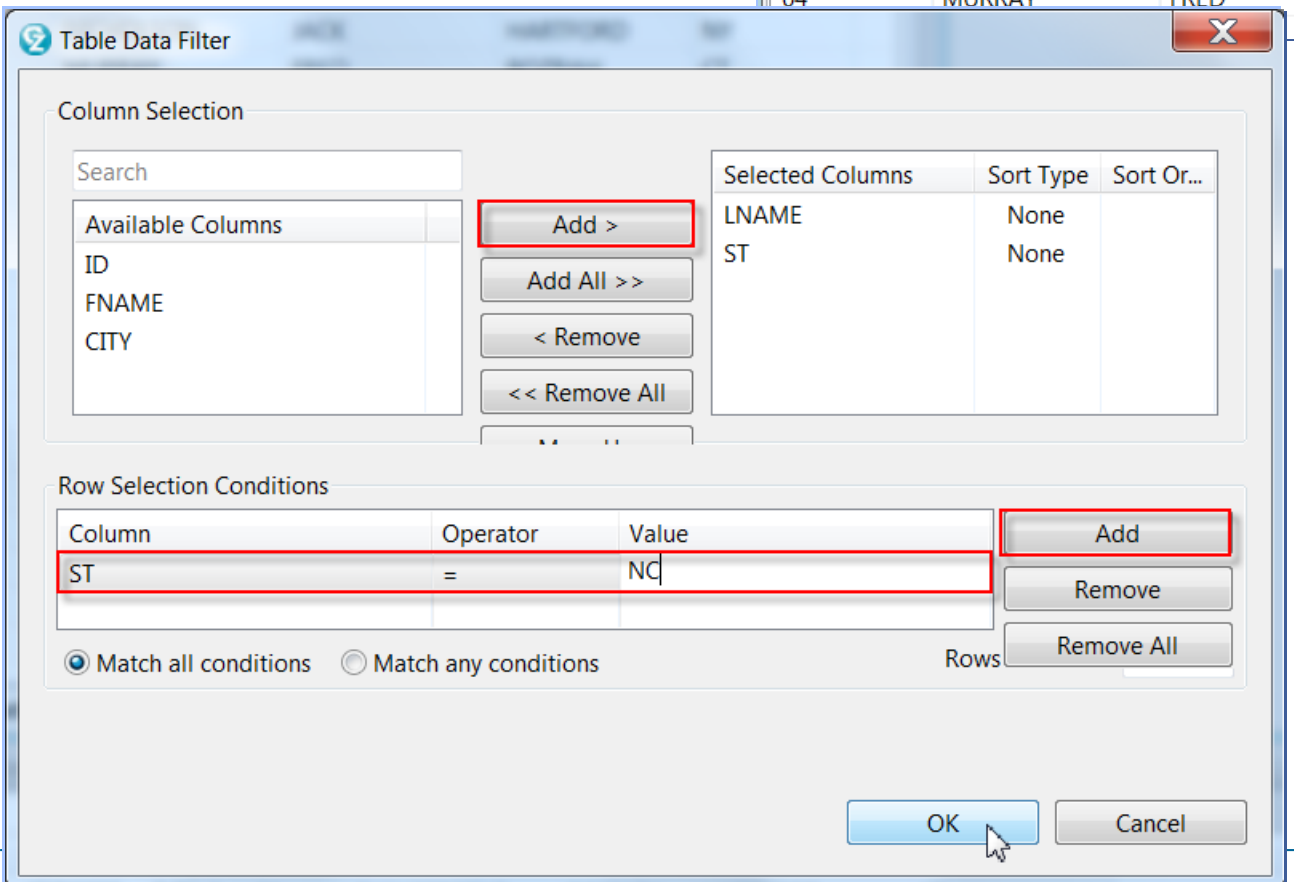
From the Data Source Explorer

- Right-click over a table
- Select: Data > Edit Data
- Click: Filter the data





This opens the Table Data Filter dialog



Use the dialog to:

- Add > Columns

- Add Row Selection
  - Click Add
  - Open the Column drop-down
  - Open the Operator drop-down
  - Specify a search value

Table Filtering (IDz + Data Studio) – 2 of 3

IBM Data Studio table editor – in data filtering mode allows you to:

- Modify (update) values - Add (insert) new rows - Delete Rows
- Set individual field values to DB2 Null values
- Select image files (for columns of type: Blob/Clob)

- All values are saved (committed) or not (rolled-back) at once when you press **Ctrl/S**

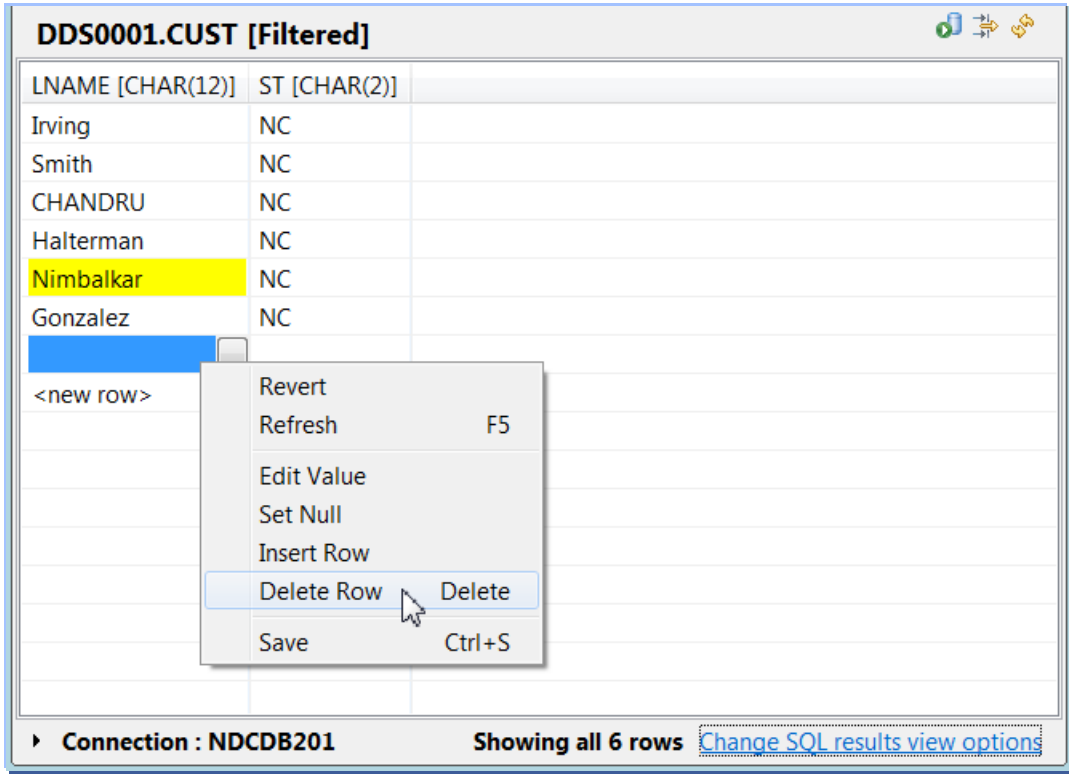
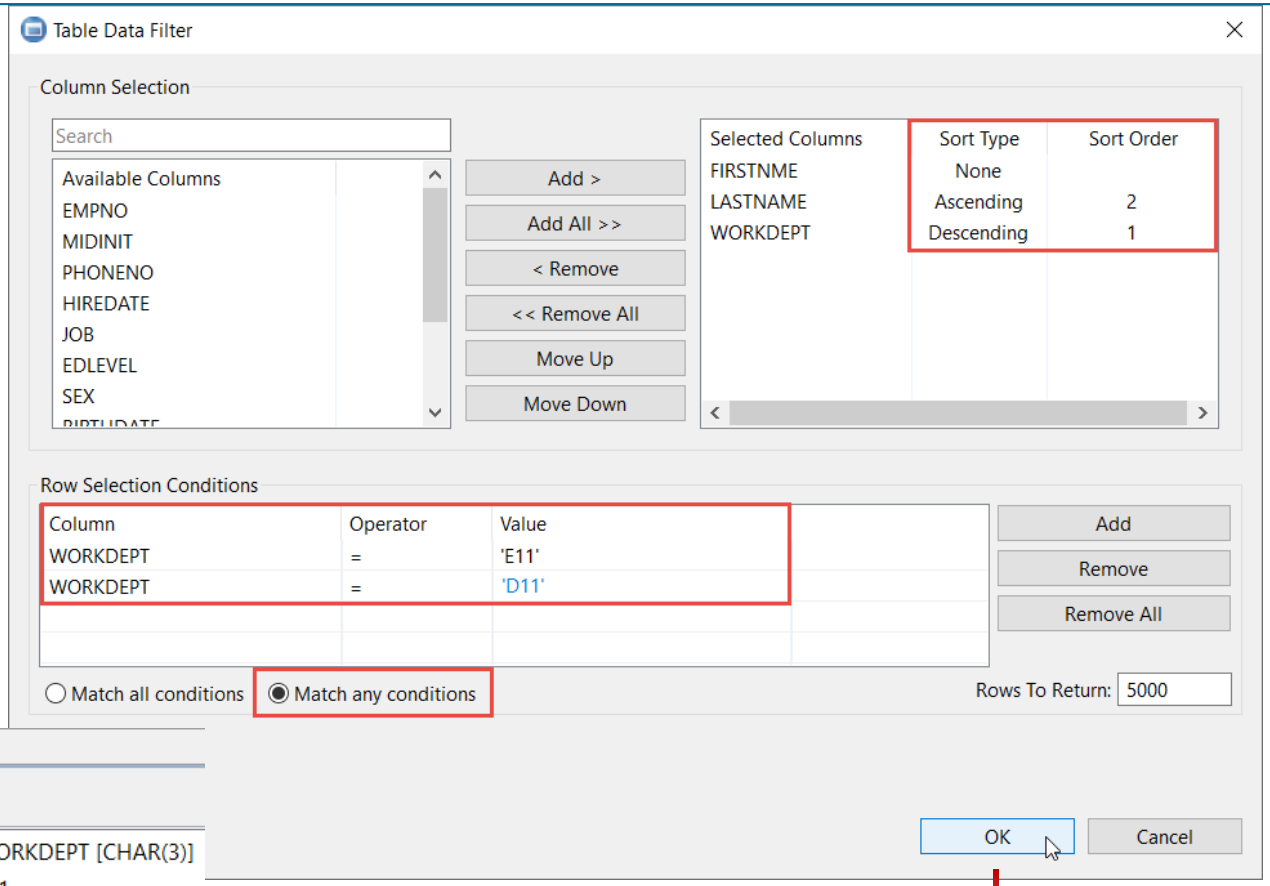
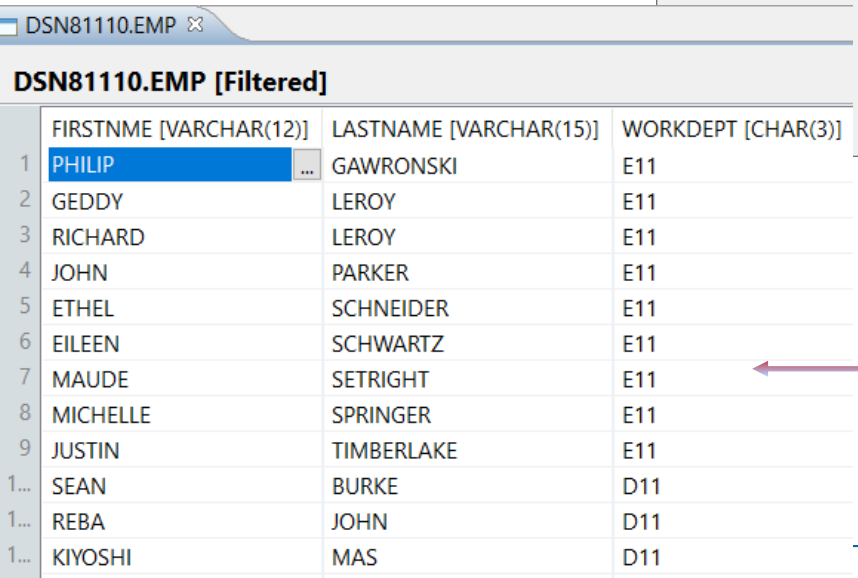


Table Filtering (IDz + Data Studio) – 3 of 3

Filtering options include:

- Sorting
- Sort Order
- Move Column Right/Left
  - Move up/Move down
- Multiple Row Selection Conditions
- Any/All predicate



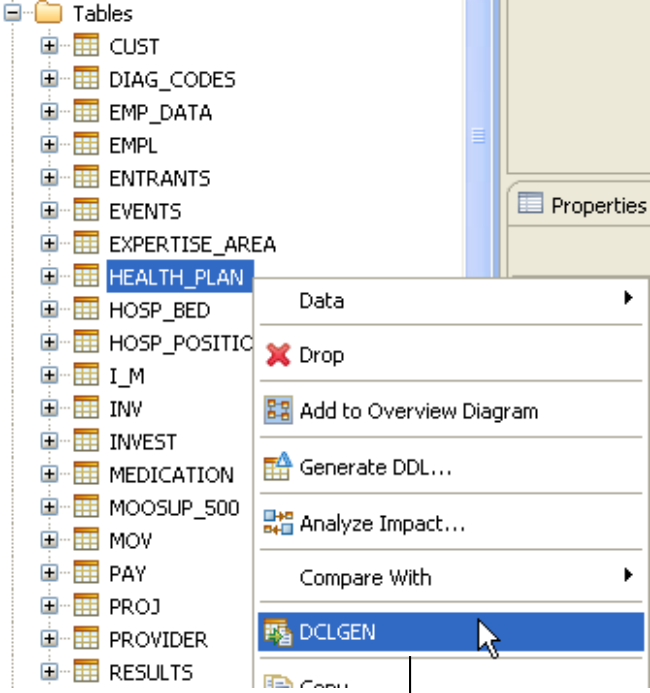


DCLGEN – 1 of 4

DCLGEN – Allows you to create copybooks from table schemas for: COBOL, PL/I, C, and Java

Steps – from the Data Perspective:

- Highlight the table you want
- Right-click and select: **DCLGEN**



Using the DCLGEN wizard

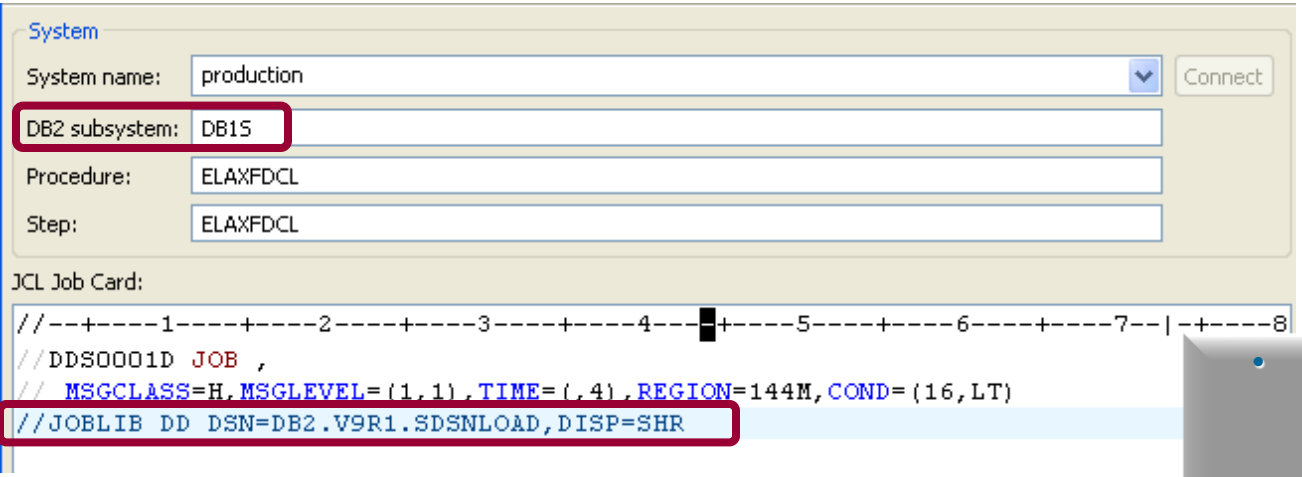
Connect to the host System

1. Specify the name of your shop's DB2 subsystem

2. Customize the JCL JOB Card, Add `//JOBLIB`

DD card – referencing **your** shop's DB2 load library)

3. Click: Next >

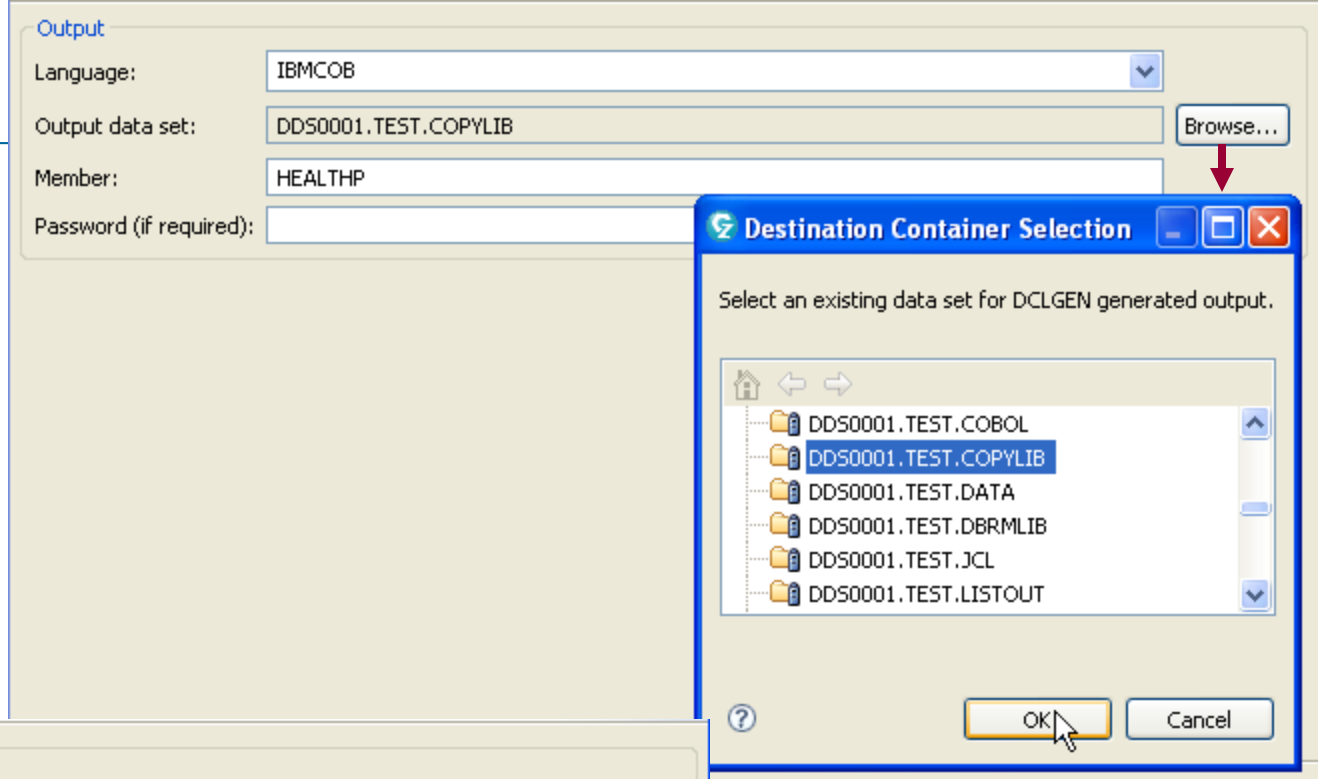


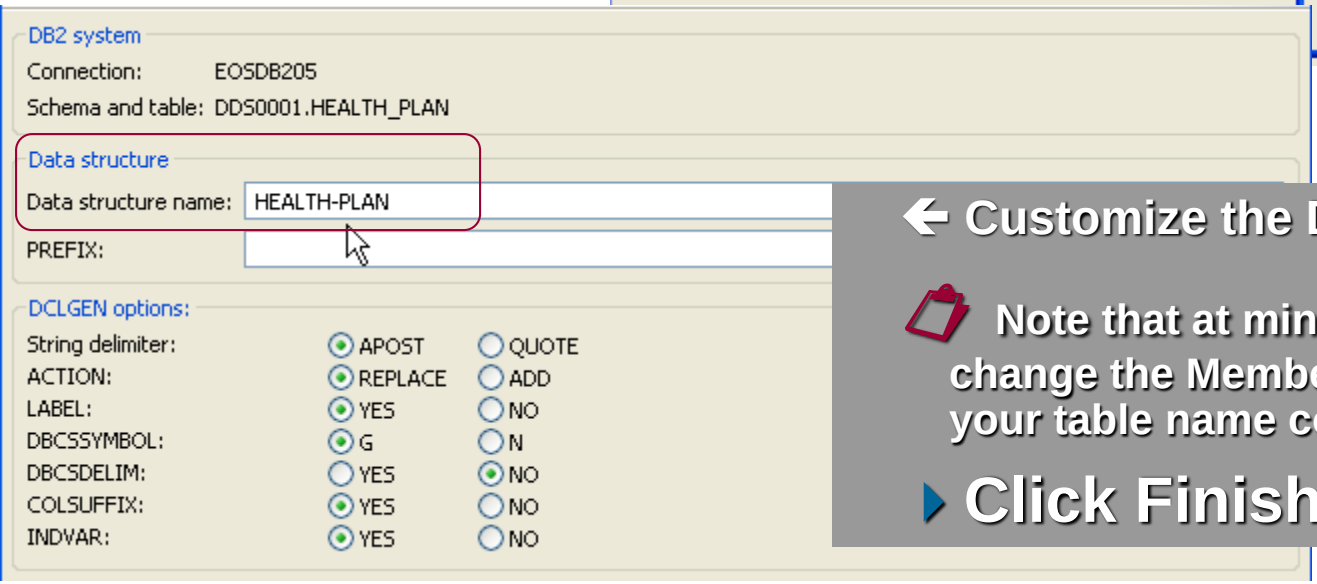
- **you will need to specify the correct DSN for the DB2 SDSNLOAD runtime library where the DCLGEN CLIST exists**

DCLGEN – 2 of 4

Select:

- Language
- Browse to select your DCLGEN output PDS
- Rename the PDS member
- Click **Next >**





Customize the DCLGEN-specific options

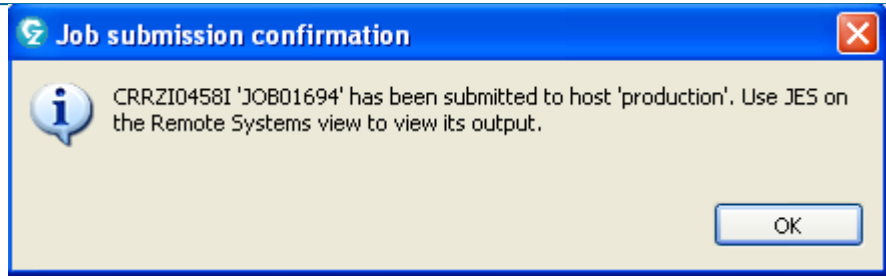
Note that at minimum, you will have to change the Member and Data structure name if your table name contains an underscore

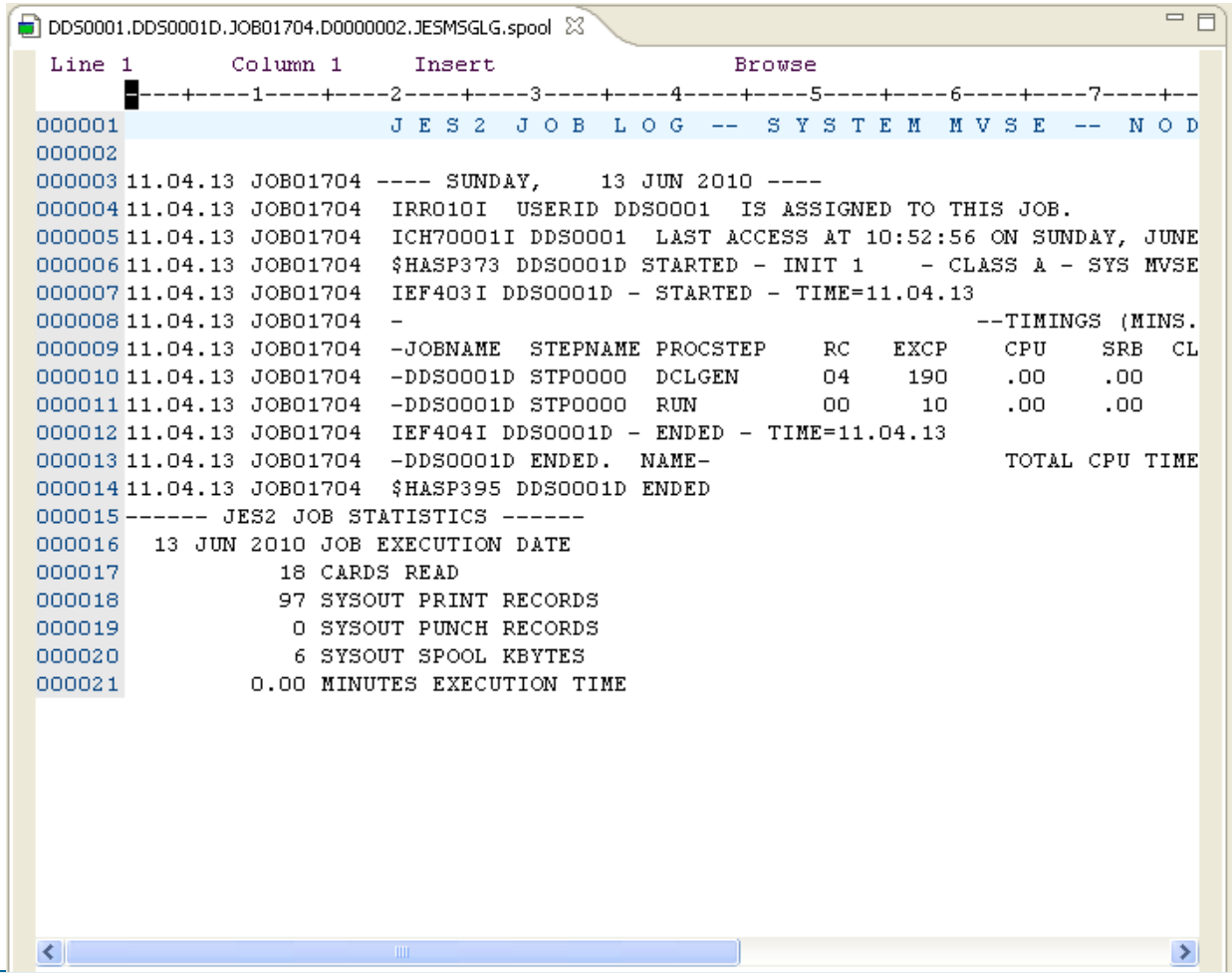
Click Finish

See Slide Notes

DCLGEN – 3 of 4

- The wizard will submit a job, which you can track in the:
  - z/OS Projects Perspective
  - JES facility





DCLGEN – 4 of 4

From Remote Systems explorer you can also open the PDS and look at your DCLGEN'd source ➔

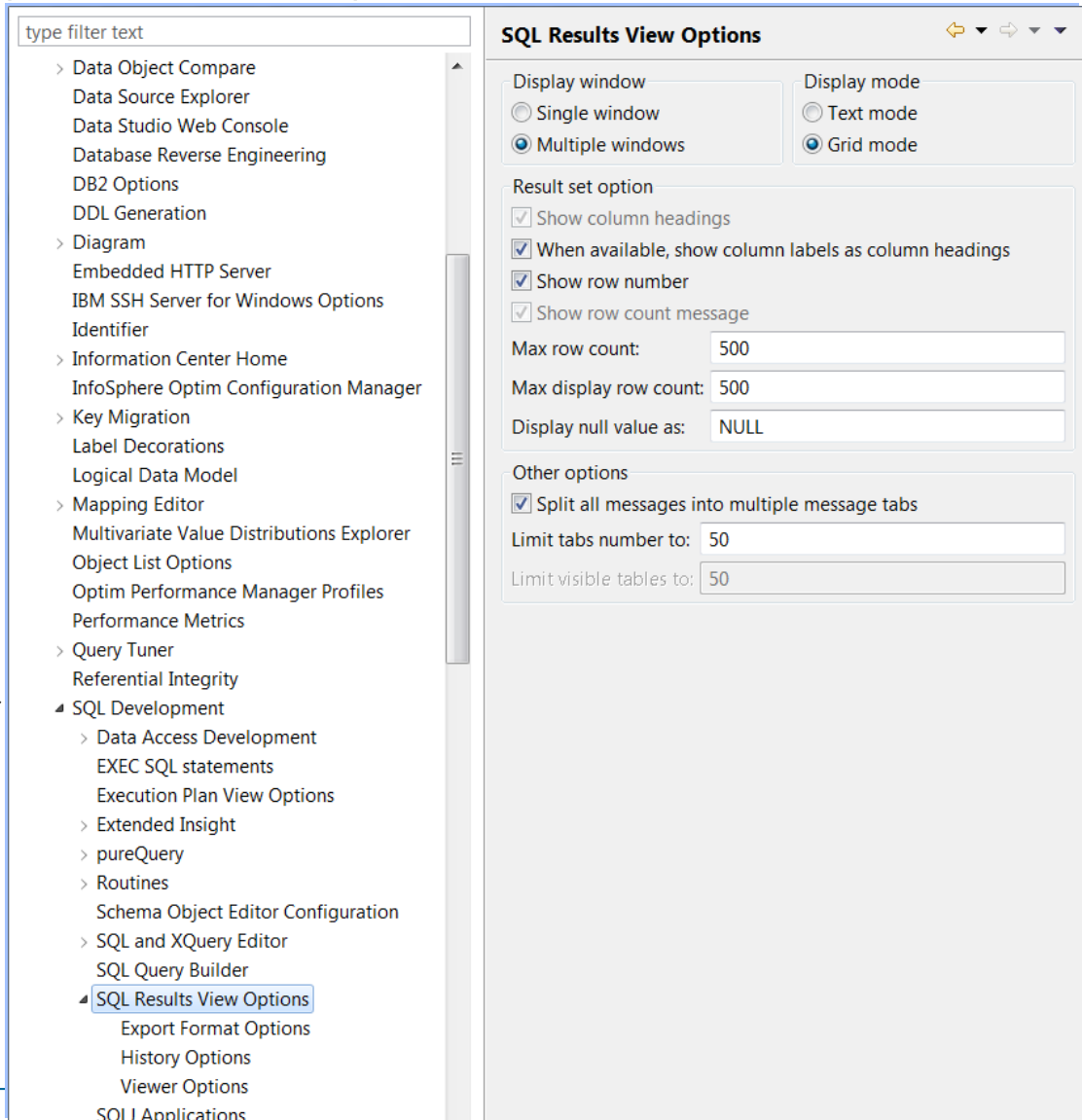
Customizing the Data Perspective – Preferences

- Data Studio provides a much large set of tools – which brings many more options for setup, configuration , customization, etc.

Preferences for Data Studio Customization

(again) from:

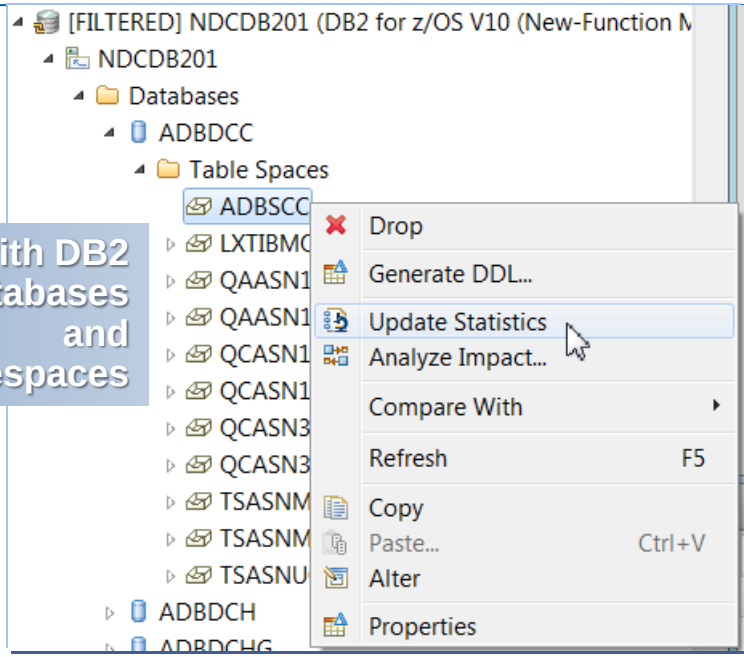
- Window
  - Preferences
    - Data Management
      - SQL Development ➔



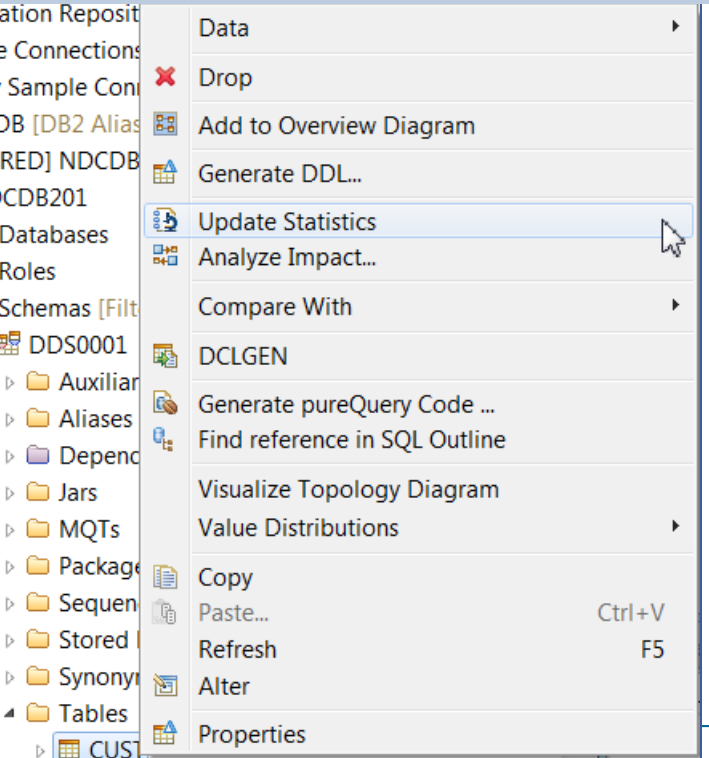
Additional IBM Data Studio Tooling for Working With DB2 Objects – 1 of 3

- Provided you have the necessary level of authority in your DB2 subsystem, you can do the following:

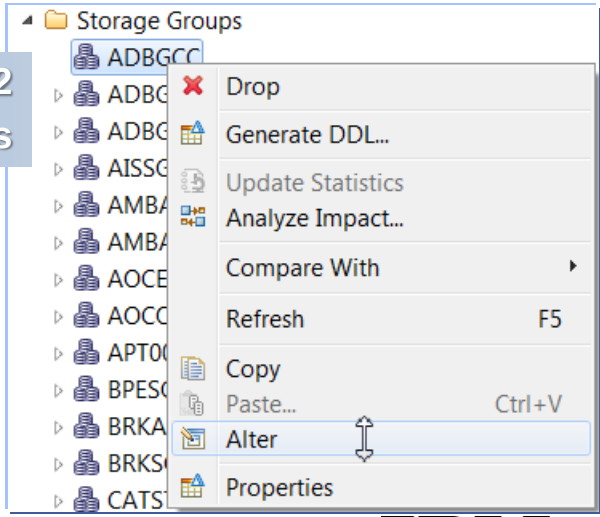
Work with DB2 Databases and Tablespaces



Perform certain traditional DBA functions against Tables, Views and Indexes

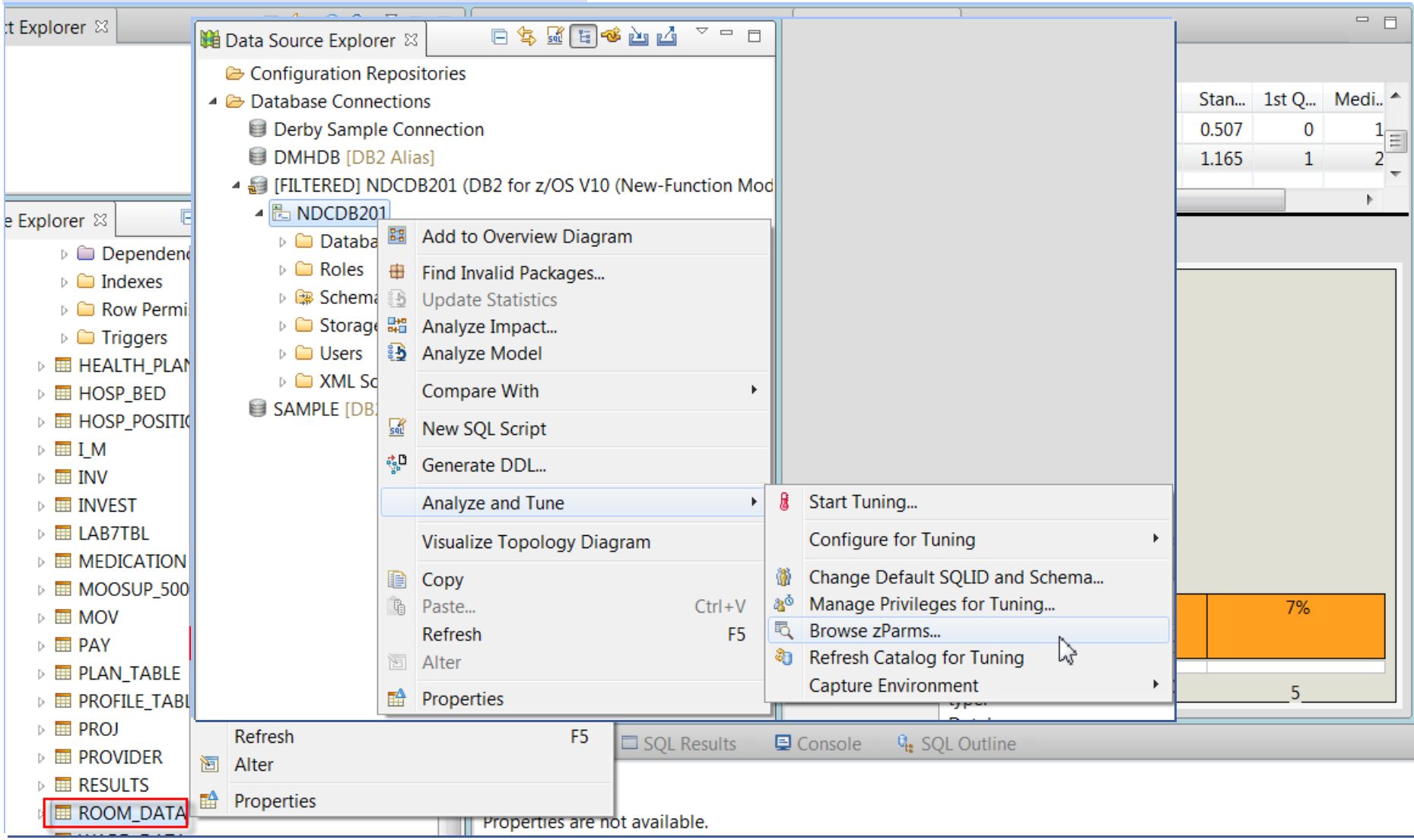


Work with DB2 Storage Groups



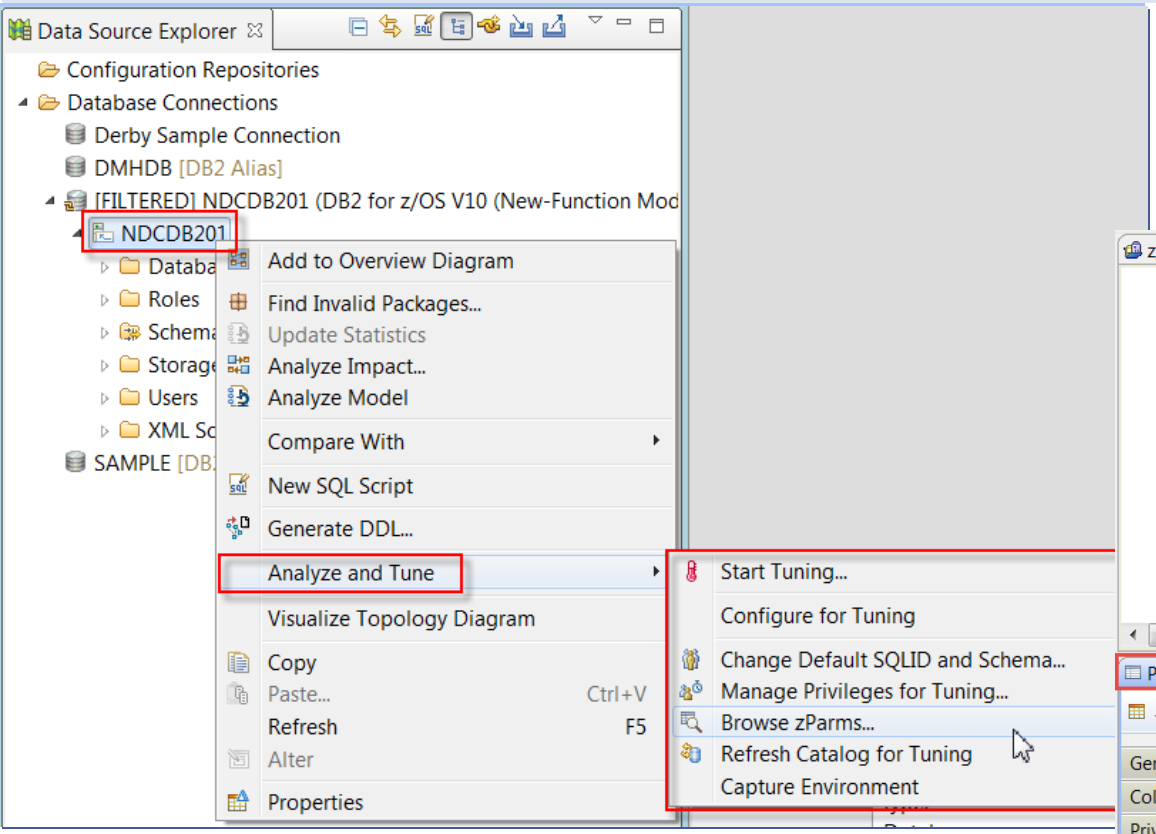
Additional IBM Data Studio Tooling for Working With DB2 Objects – 2 of 3

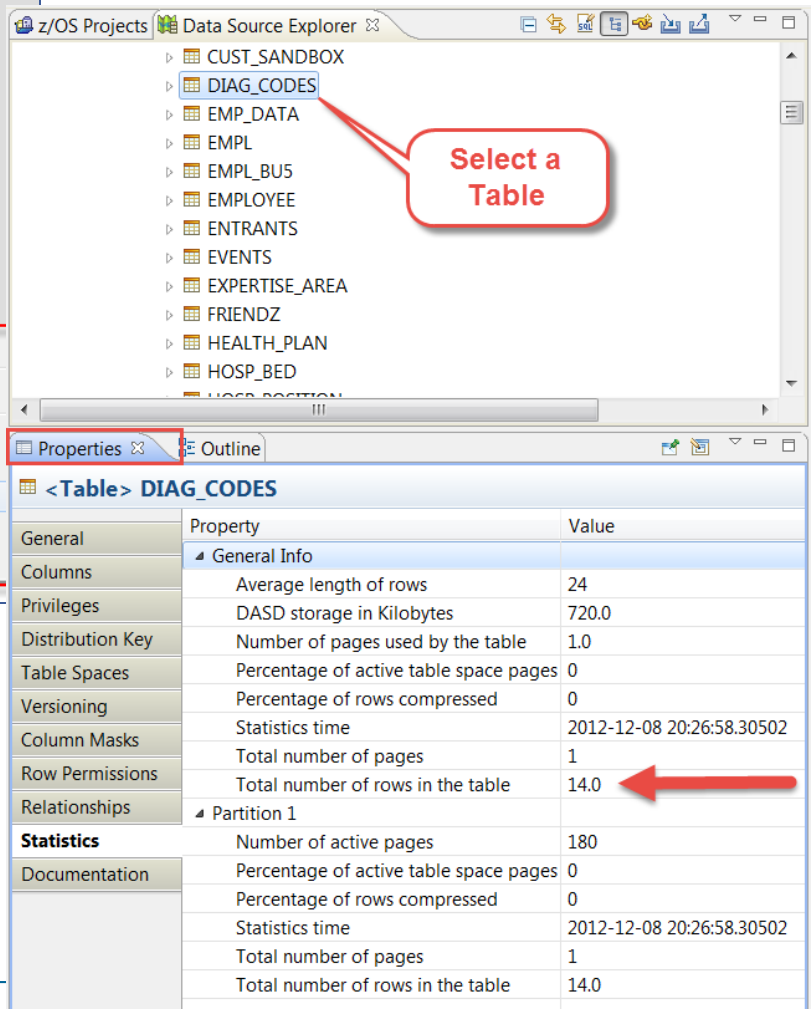
Table value statistics reporting



Additional IBM Data Studio Tooling for Working With DB2 Objects – 3 of 3

DBA, SYSPROG and SQL coding options against the DB2 Subsystem





With a DB2 Table selected you can find out things like: **Total number of rows, etc.**

Note that Statistics must have been run prior