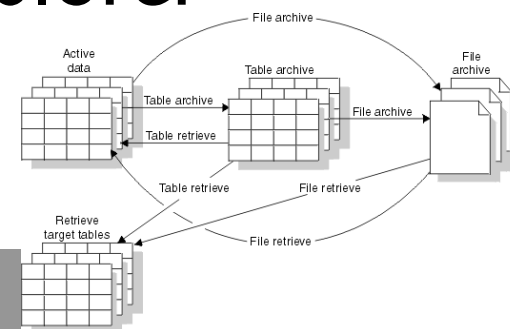




IBM Software Group

IBM Developer for z Systems – for ISPF Developers

Module 8 – Using the Data Source Explorer



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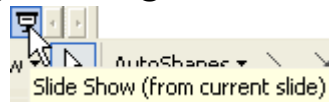
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Learning DB2 and SQL

- 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](http://en.wikipedia.org/wiki/SQL)

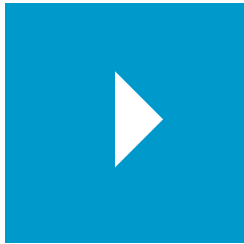
- Note: In order for you to get the above links to work, view the PowerPoint in Slide Show mode.



- 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_samplecobolrdrdathreepartnames.htm

UNIT

The IDz Workbench



Topics:

- The Data Perspective and Connecting to DB2
- **Understanding 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 – Tree Control

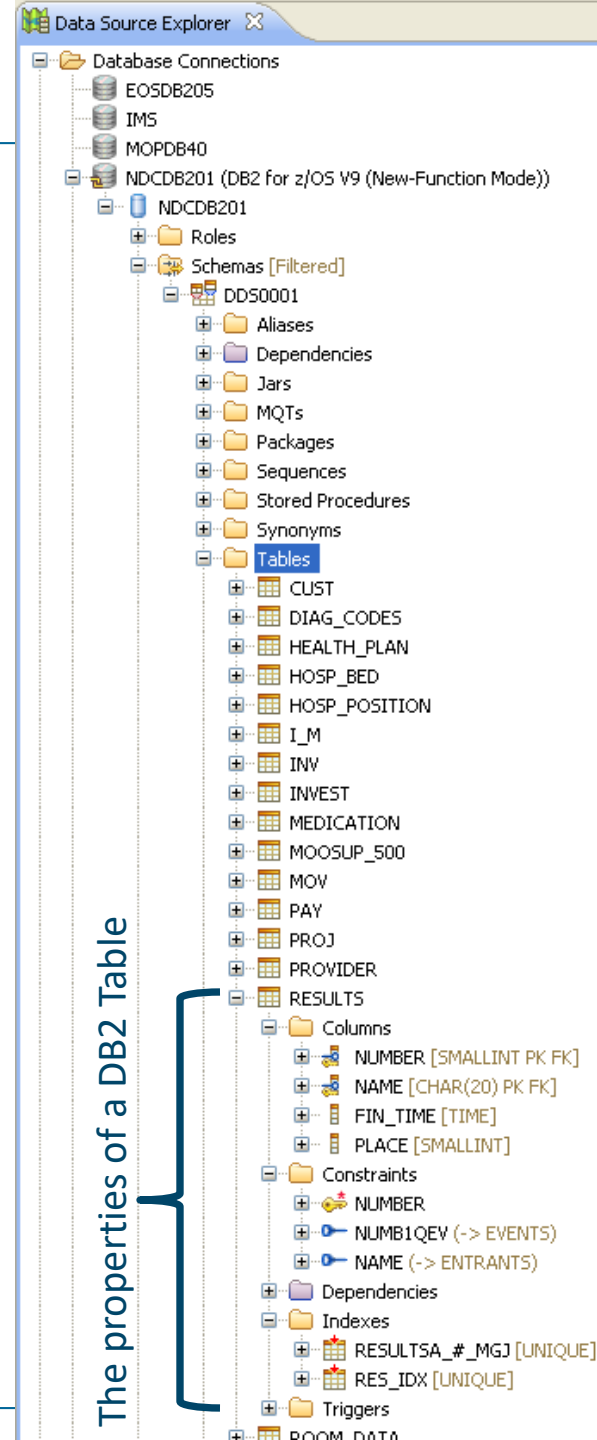
Once you're connected, the Data Source Explorer presents "meta-data" about the database objects accessible through your connection:

- Databases within the connection – and within the database:

- ▶ **Schemas** (the high-level qualifier of the resource owner)
- ▶ Within each Schema relational object resources (DBMS-dependent):

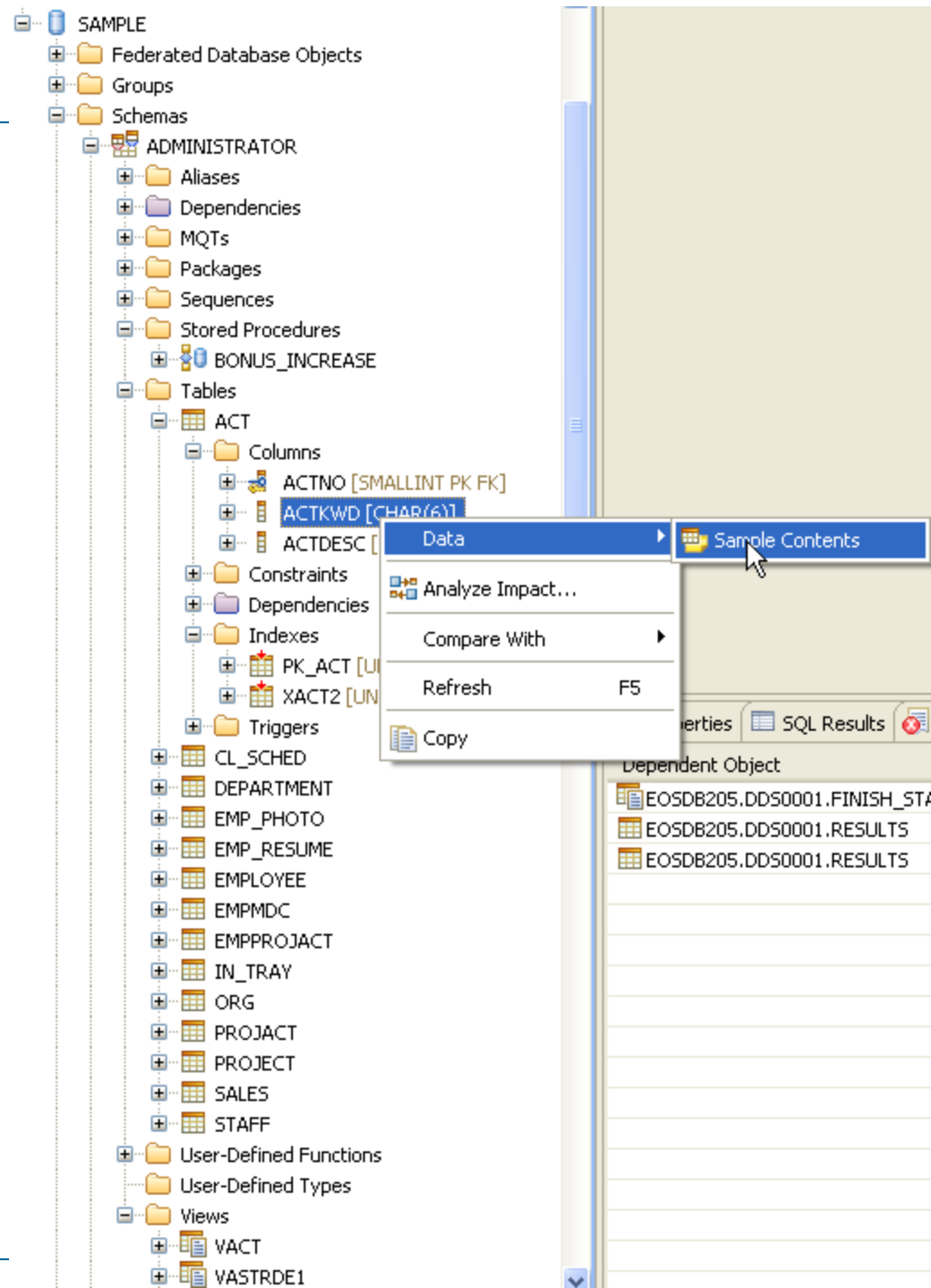
- **Synonyms**
- **Stored Procedures**
- (if DB2 for z) – Federated Stored Procedures
- **Tables** and the elements of a table and related objects:
 - **Column definitions**
 - **Relational constraints** (primary and foreign key rules)
 - **Indexes**
 - **Triggers**
 - **User-defined functions**
- **Views**

- The Properties view can be helpful in expanding the information presented.
- Many additional context menu options exist off these entries



Exploring DB2 Meta Data

- Use your mouse to expand/collapse DB2 object meta-data categories
- Information is presented through a hierarchical tree-control – modeling the structure in the DDL that was used to create the object
- All of the meta-data shown in the Explorer is pulled dynamically from the DB2 Catalog, making it 100%
 - ▶ Accurate
 - ▶ Current
- The Context Menu provides (much) additional functionality:
 - ▶ Select a DB2 object
 - ▶ Right-click
 - ▶ Context options pop-up in the menu and sub-menus



Exploring Table Values – Sample (Data) Contents in a DB2 Table/Column

- IDz provides a canned SELECT DISTINCT/GROUP BY query
- The query results show column *cardinality*
 - ▶ The number of discrete values in each column, throughout the Table

The screenshot shows the IBM Data Source Explorer interface. On the left, a tree view displays the database structure for 'EOSDB2051 (DB2 for z/OS V11 (New-Fu...))'. The 'Tables [Filtered]' folder is expanded, showing a list of tables including 'EMP'. A red arrow points to the 'EMP' table, and another red arrow points to the 'JOB' column within it. A right-click context menu is open over the 'JOB' column, with a red callout box stating 'Right-click on a column and select: Data => Sample Contents'. The 'Data' option is highlighted, and the 'Sample Contents' sub-option is also highlighted. On the right, the 'SQL Results' pane displays the results of a query, showing a table with two columns: 'JOB' and 'OCCURRENCE'. The results list 10 distinct job titles and their corresponding occurrence counts. A red box highlights the results table.

Right-click on a column and select:
Data => Sample Contents

Status	Result1	JOB	OCCURRENCE
	1	AD	1
	2	ANALYST	2
	3	CLERK	8
	4	CREATIVE	1
	5	DESIGNER	9
	6	FIELDREP	5
	7	MANAGER	9
	8	OPERATOR	6
	9	PRES	1
	10	SALESREP	2

Total 10 records shown

Exporting Column “Sample Contents”

	JOB	OCCURRENCE
1	AD	1
2	ANALYST	2
3	CLERK	8
4	CREATIVE	1
5	DESIGNER	9
6	FIELDREP	5
7	MANAGER	9
8	OPERATOR	6
9	PRES	1
10	SALESREP	2

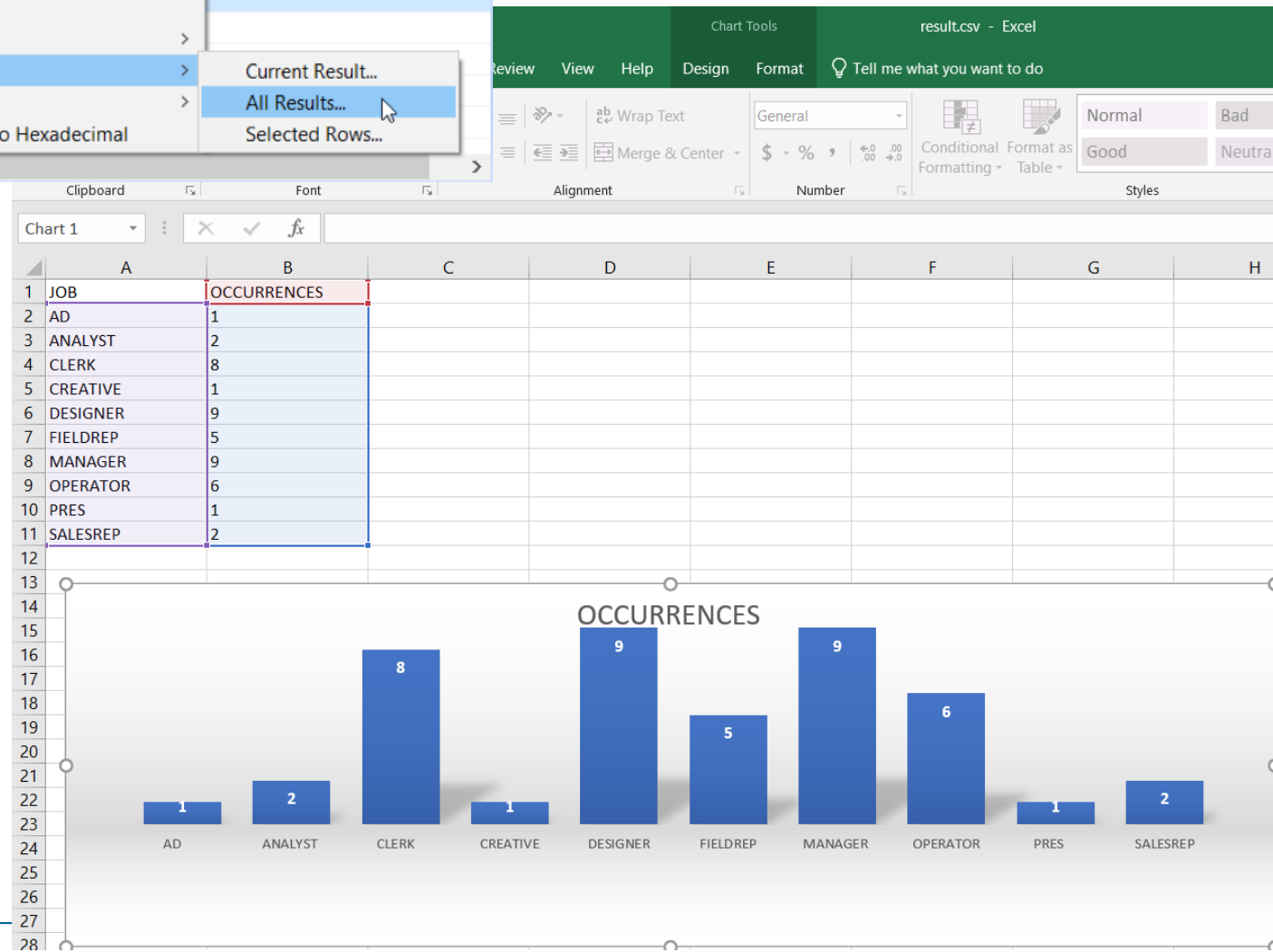
Context menu for the selected row (row 6):

- Copy Row(s)
- Save
- Export
- Print
- Convert Row(s) To Hexadecimal

Sub-menu for Export:

- Current Result...
- All Results...
- Selected Rows...

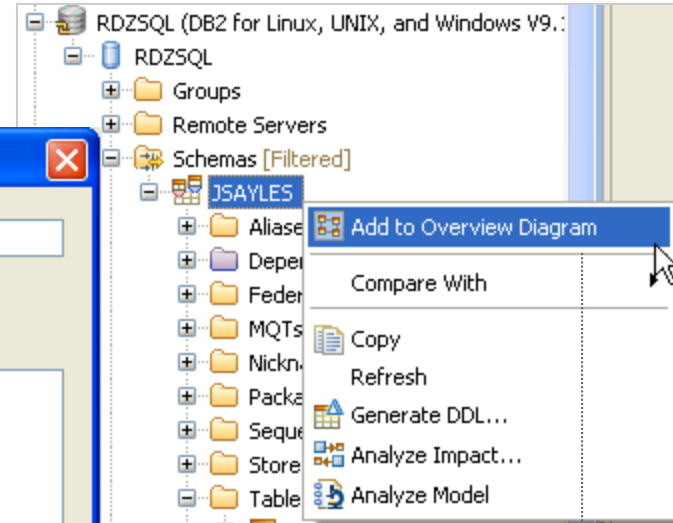
- You can Export All Results into a spreadsheet – and turn data into information



Overview Diagram – 1 of 4

So what can we do with the Data Source Explorer? Let's start by having a look at our tables and table relationships (Parent/Child tables associated by defined Primary/Foreign key constraints)

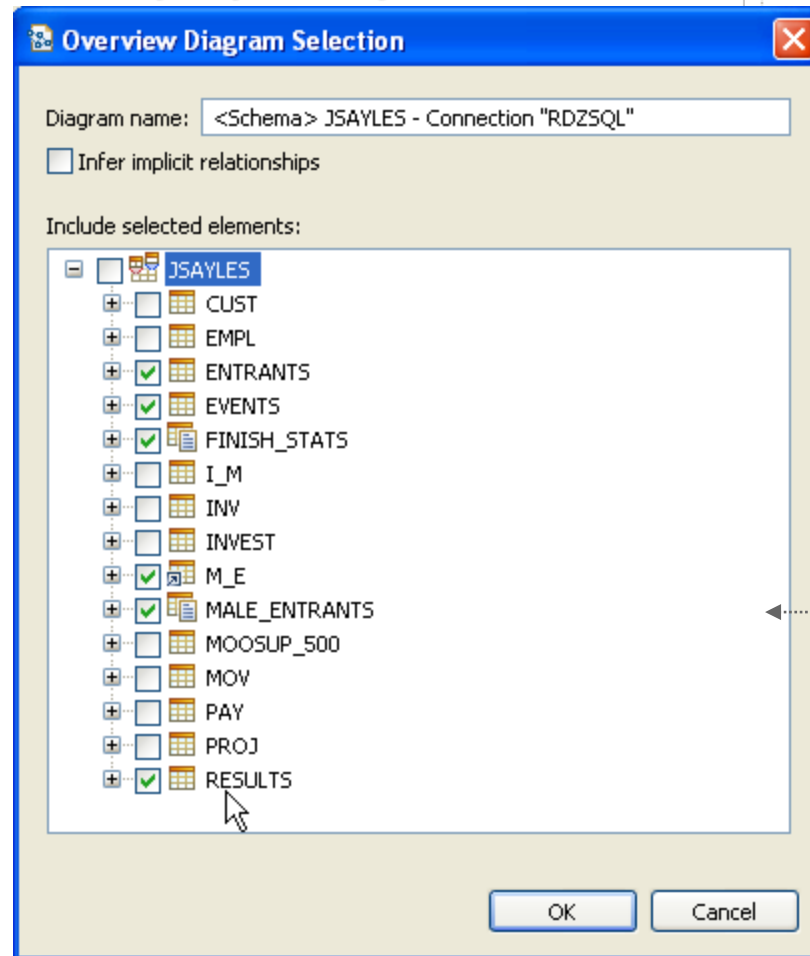
- From the Data Source Explorer:
 - Expand a folder for a database and navigate the schemas:
 - Right-click a schema select: **Add to Overview Diagram**
 - Select the tables, views, synonyms, etc. you wish to see



Notes:

The Overview Diagram feature is available in IDz version 7.6.1 and later

This kind of diagram (see results on next slide) is often called an **"Entity-Relationship Diagram"** – because it draws out the relationships between your DB2 "entities" – tables/views/synonyms



(Data Model) Overview Diagram – 2 of 4

The Diagram Tool shows all of the tables, views and synonyms selected through our connection as entities, and their relationships as defined by Primary/Foreign key SQL specifications. This allows us to understand things like how to join tables, and where data exists in relation to other table values.

- We can also use the Diagram Tool to navigate in the Data Source Explorer

- ▶ Right-click over **Results**

- ▶ Select:

- Navigate >
- Show in >
- Database Explorer

- Note the different icons for:

- ▶ **Tables:**

- Events, Entrants, Results
- Employee

- ▶ **Views:**

- Race_Report
- Local_Referrals

- ▶ **Synonym:**

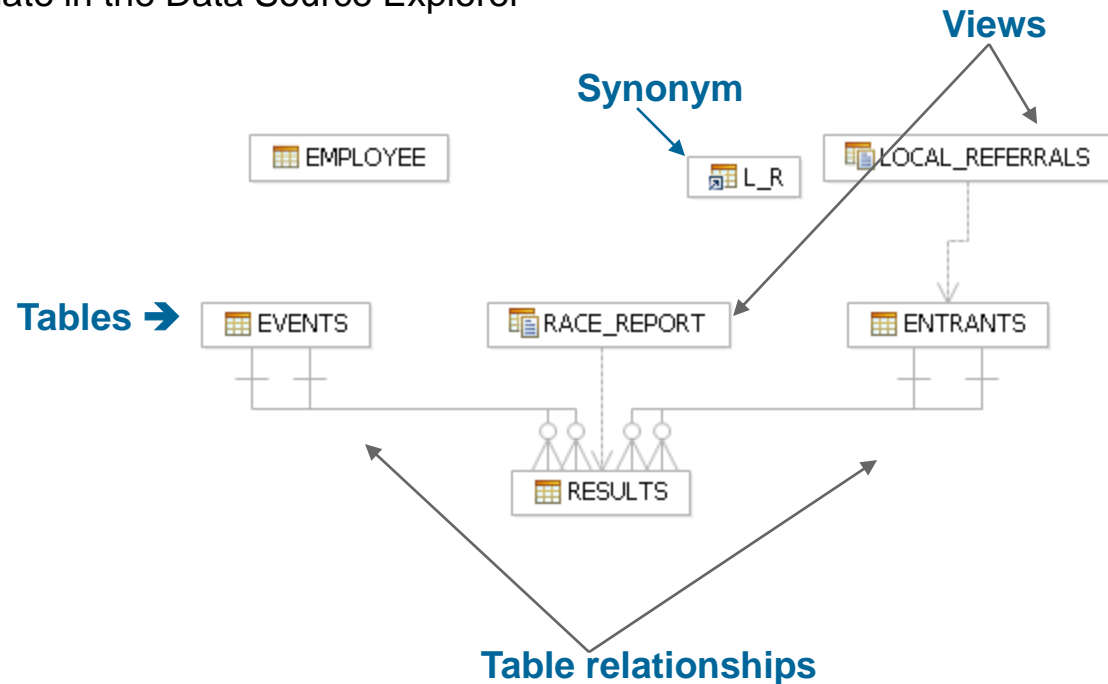
- L_R

- Notes:

- ▶ If you select a large number of tables this diagram can take some time to materialize

- ▶ To read the diagram shown here:

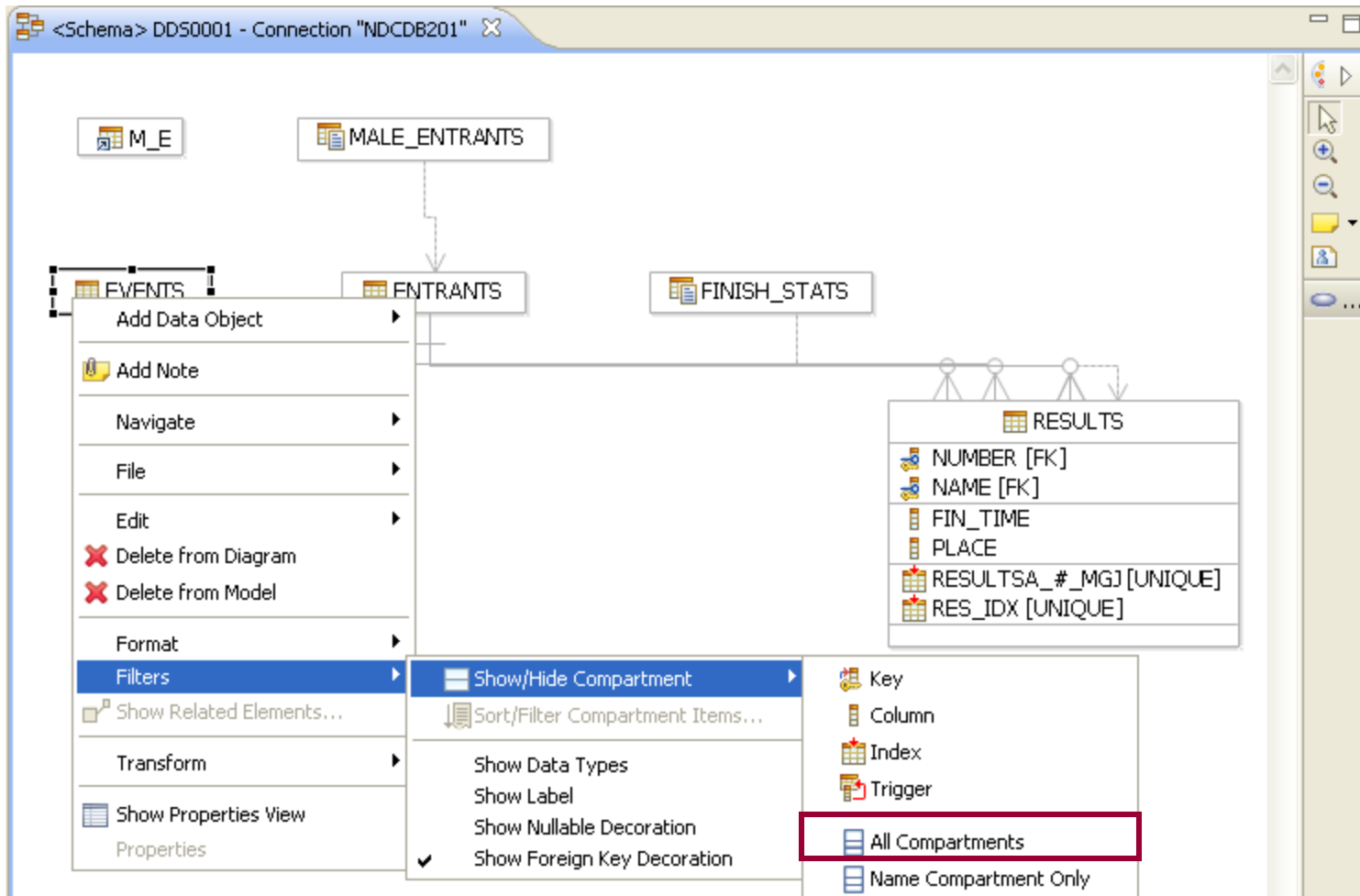
- Each Entrant and Event can have many Result rows
- Race_Report is a relational View based on the Results table
- Local_Referrals is a relational View based on the Entrants table



(Data Model) Overview Diagram – 3 of 4

By default, the Overview Diagram shows only DB2 object names and their relationships. You might wish to show additional attributes. To do this:

- Select the object
 - ▶ Right-click and select:
 - Filters > Show/Hide Compartment > <your option>



(Data Model) Overview Diagram – Show View/Table Relationships – 4 of 4

Sometimes you need to find out what base tables underlie a particular DB2 View...

- Select the View
 - ▶ Right-click and select: **Add to Overview Diagram**
 - ▶ Click **OK**

The screenshot displays the IBM Data Studio interface. On the left, the 'Data Source Explorer' pane shows a tree view of 'Views' under the 'z/OS Projects' connection. The 'VACT' view is selected, and a right-click context menu is open. The menu options include 'Data', 'Drop', 'Add to Overview Diagram' (highlighted with a red box), 'Generate DDL...', 'Analyze Impact...', 'Compare With', 'Copy', and 'Refresh'. The main workspace shows a complex data model diagram with various tables and views represented by icons. Relationships are indicated by lines connecting the icons. A callout box with a magnifying glass icon and the text 'F3 opens a Find window – to locate tables/views in the diagram' is overlaid on the diagram. At the bottom, the 'SQL Results' pane shows a successful query execution: 'Succes SELECT C... 8/24/16 ... EOSDB205'.

Generate Table DDL

You may wish to access/modify/etc. one or more of your DB2 table's DDL. To do this you'll need the original DDL – which is obtained from: Generate Table DDL

From the Data Source Explorer:

- ▶ **Right-click over the table name**
- ▶ **Select: Generate DDL...**
- ▶ Follow the wizard
 - Check/Un-check selections

A screenshot of a text editor window titled 'script1.sql'. It displays the generated DDL for the JSAYLES.EMPL table. The code is as follows:

```
CREATE TABLE JSAYLES.EMPL (  
    NBR CHAR(2),  
    LNAME CHAR(10),  
    FNAME CHAR(8),  
    DOB INTEGER,  
    HIREDTE INTEGER,  
    PERF SMALLINT,  
    JOB CHAR(4),  
    DEPT CHAR(3),  
    PROJ CHAR(2)  
)  
DATA CAPTURE NONE ;
```

A screenshot of the 'Generate DDL' wizard dialog box. The title bar says 'Generate DDL'. The main section is 'Save and Run DDL'. It contains a text area for 'Folder:' with the value '.sqlxeditor_project' and a 'Browse...' button. Below it is a 'File name:' field with the value 'script1.sql'. A 'Preview DDL' section shows the same DDL code as the previous screenshot. At the bottom, there is a 'Statement terminator:' field with a semicolon ';' and an 'Apply' button. Two checkboxes are at the bottom: 'Run DDL on server' (unchecked) and 'Open DDL file for editing' (checked).