

Data Studio Administration Overview

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What is IBM Data Studio?

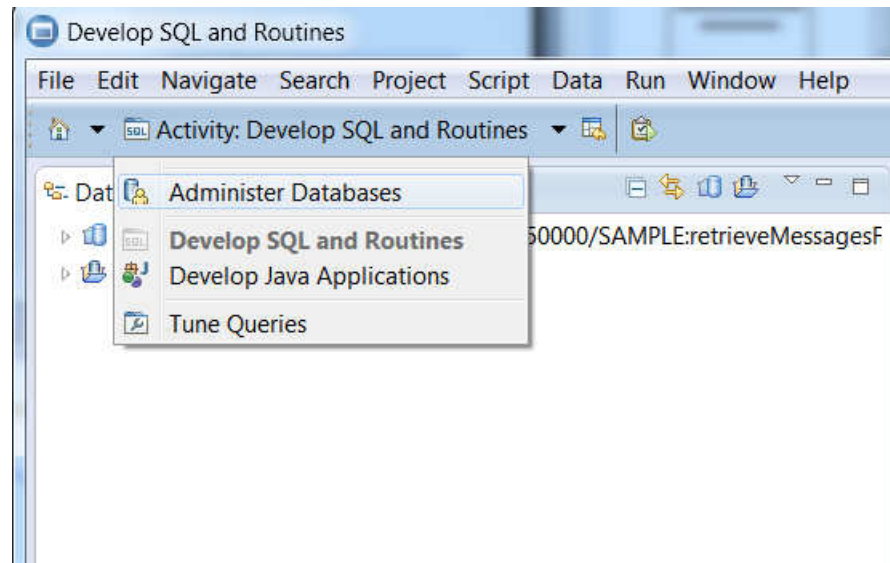
- Comprehensive **data management** tool
 - An integrated environment for managing databases and developing database applications
 - Manage database objects based on change plan: Create, Alter, Drop
 - Database Commands/Utilities Task Assistant
 - Data Management
 - Develop and execute SQL scripts
 - Impact analysis
 - Compare database objects
 - Develop, debug, and deploy database applications and database routines



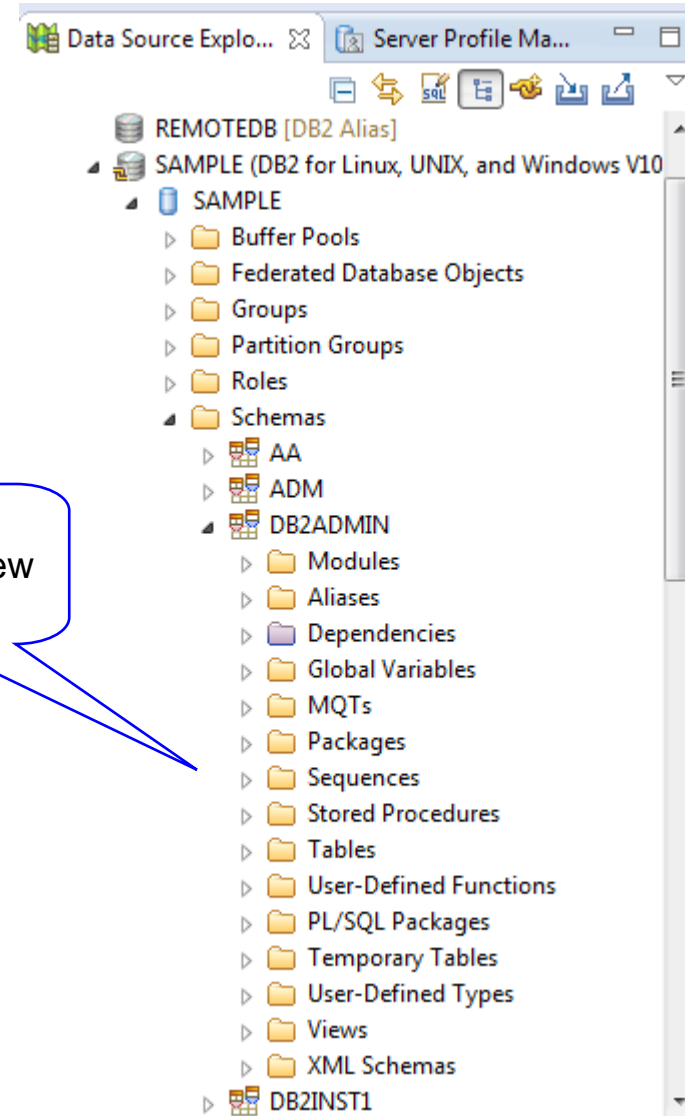
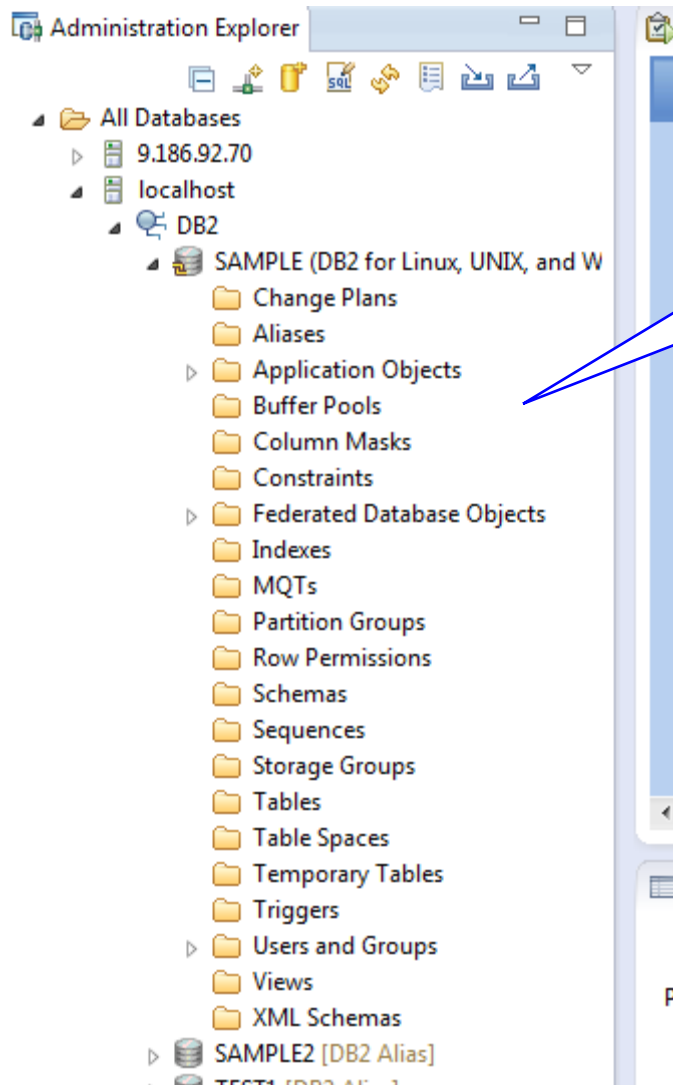
What is IBM Data Studio? (cont)

- Replaces **Control Center** from DB2 10
- Built on the popular **Eclipse** framework
- Support for Red Hat Linux, SUSE Linux, Windows
- Optional extra component
 - **Data Studio Web console**: health and availability monitoring
- **No Charge** to download and use!
- Support through PMRs and DeveloperWorks forum

Switching between Admin and Development



Flutter view and Hierarchy view



Multiple navigation

- Flatter view: Click on a type of objects in Administration Explorer to list the objects in **Object List** on the right side.
 - Object List contains several features to facilitate navigation such as: in-place searching, sorting, etc.
- Hierarchy View: Navigation in Data Source Explorer will see an object hierarchy, **Schema->Table->Index**
- User can also use the breadcrumb navigated like web browser
- Show related objects: User can also right click an object , **Show-> Show Indexes etc** to navigated to relative objects
- Object Filter: Two way filter
 - Database Catalog filter is filter the object load from data server
 - Name search in object list is only for search on UI

Object Filter

- Filter load objects

Conditions

Specify each condition with a predicate and value to return objects from the database catalog that meet those conditions.

Meet all conditions Meet any condition

Property	Operator	Value
Name	Starts With	T

Include dependent objects

Select the types of dependent objects to return from the database catalog. The database catalog returns these types that are dependent on the objects that meet the conditions in this filter. These objects and are needed for some tasks, such as analyzing impact and dependency for data objects. However, objects in the filter might impact loading performance into the Object list.

- Table
- View
- MQT
- Alias
- Stored procedure

Select All

Clear All

- Filter in current loaded objects

localhost DB2 Tables Name Search

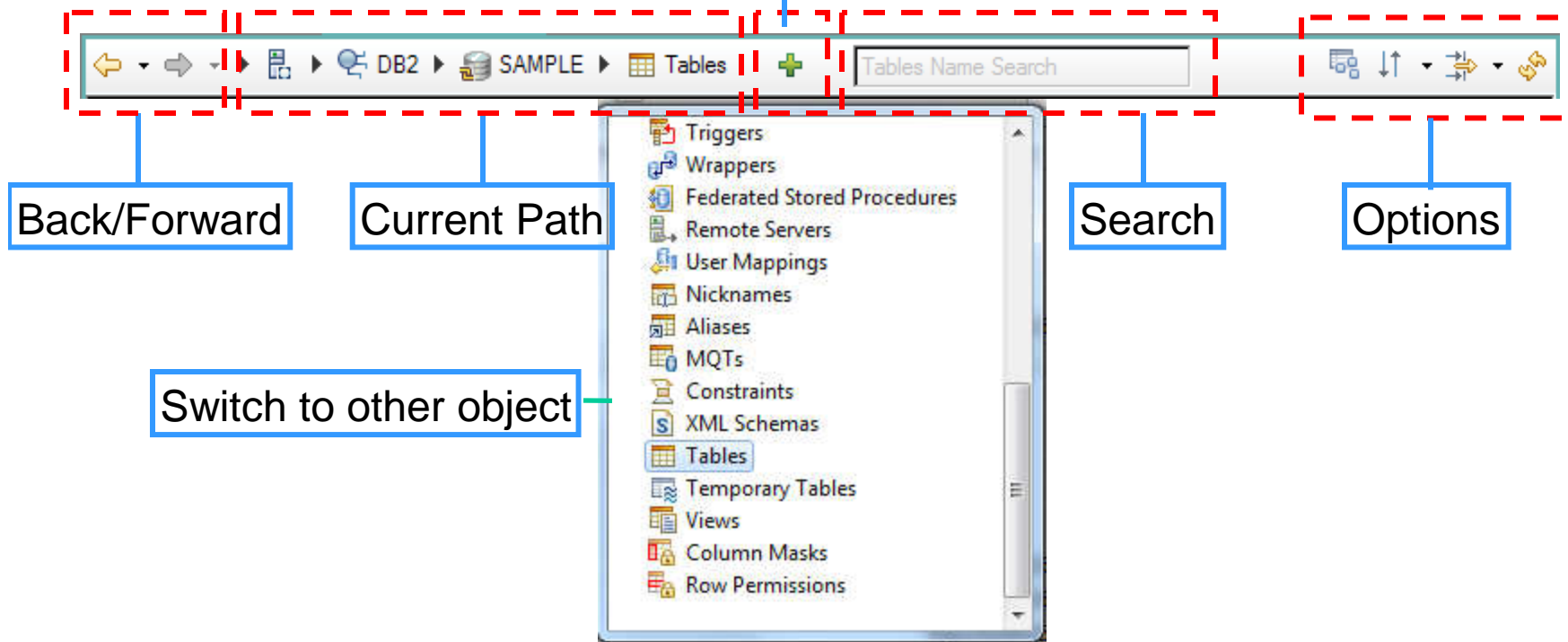
Enter a pattern to match names in the Object List

Schema	Name	Perce...	Row Count	Log Mode	Primary Key	Partition ...
--------	------	----------	-----------	----------	-------------	---------------

Navigation in breadcrumb

- Multi-purpose navigation bar
 - Web-browser-like back / forward navigation
 - Breadcrumb navigation facilitates moving through **hierarchy of objects**
 - Create **new object** button
 - **In-place search** function. Type object name or part of it and list is dynamically updated.
 - Support use of wildcards
 - Options to sort, filter, refresh objects list

New Object



Back/Forward

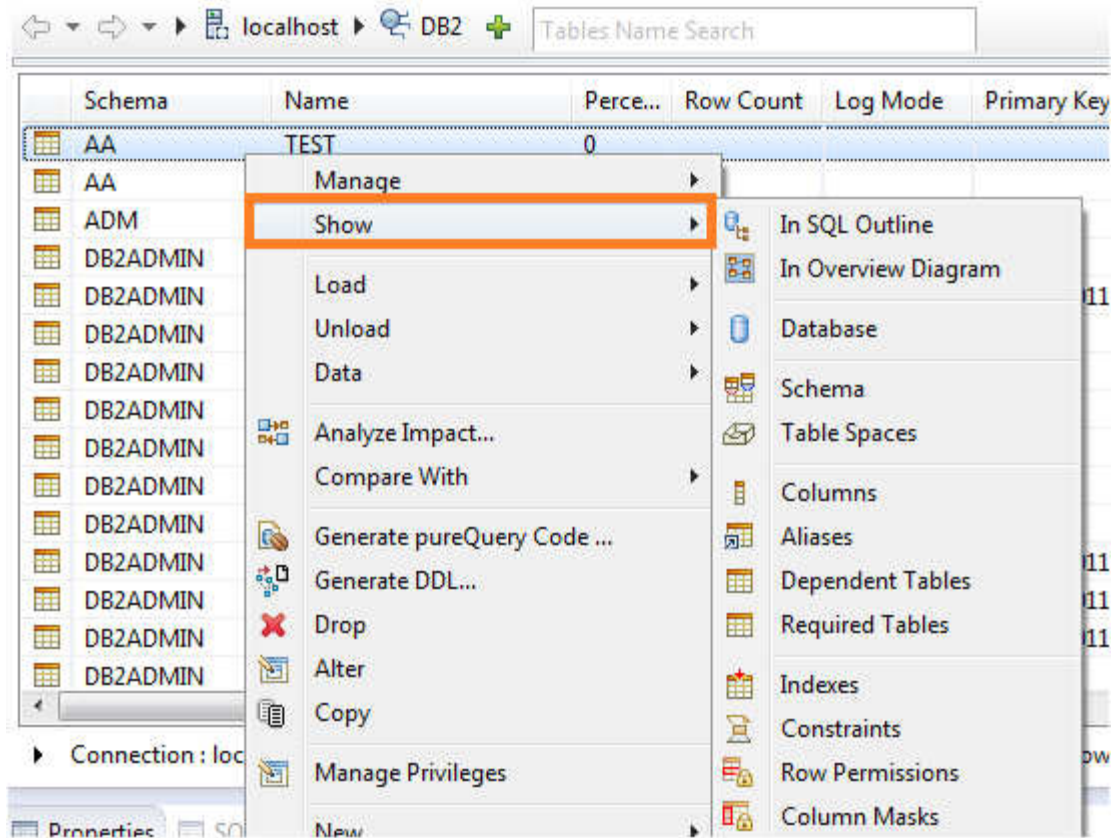
Current Path

Switch to other object

Search

Options

Navigate by related objects



I Just want to run a SQL

Launching the SQL Editor

The screenshot shows the IBM Data Studio interface with the following components and annotations:

- Administration Explorer:** A tree view on the left showing database structures. A red arrow points to the 'SAMPLE (DB2 for Linux)' folder, labeled '1. Launch SQL Editor'.
- Script Editor:** The main window contains a SQL query:

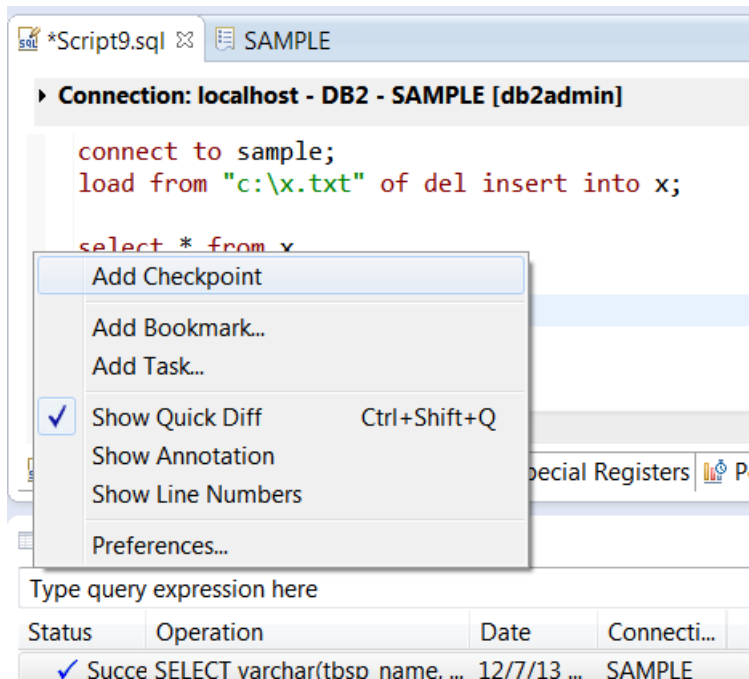

```
SELECT varchar(tbsp_name, 30) as tbsp_name,
       reclaimable_space_enabled,
       tbsp_free_pages,
       tbsp_page_top,
       tbsp_usable_pages
FROM TABLE(MON_GET_TABLESPACE(' ', -2)) AS t
ORDER BY tbsp_free_pages ASC
```

 A red arrow points to the query text, labeled '2. Type SQL'.
- Run SQL:** A red arrow points to the 'Run SQL' button (a green play icon) in the toolbar above the editor, labeled '3. Run SQL'.
- SQL Results:** The bottom right pane shows the execution results. A red arrow points to the results table, labeled '4. Inspect Results'.

Status	Operation	Date	Connecti..	Result1
✓	Succes SELECT v...	12/7/13 ...	SAMPLE	Query execution time => 26 ms Script: \.sqlxeditor_project\Script9.sql Database Name: SAMPLE Authorization Id (Database): db2admin System/IP Address : svl-tkleung/9.48.102.2 User Id (System) : leungtk

So I want to run a script but stop it
in the middle to inspect the results

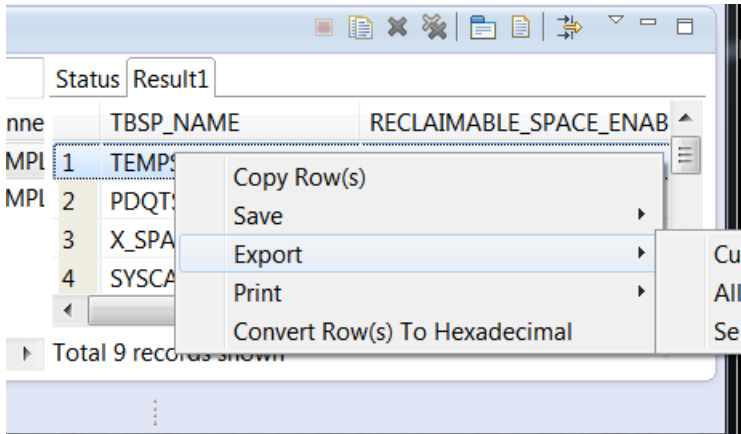
Adding a Checkpoint



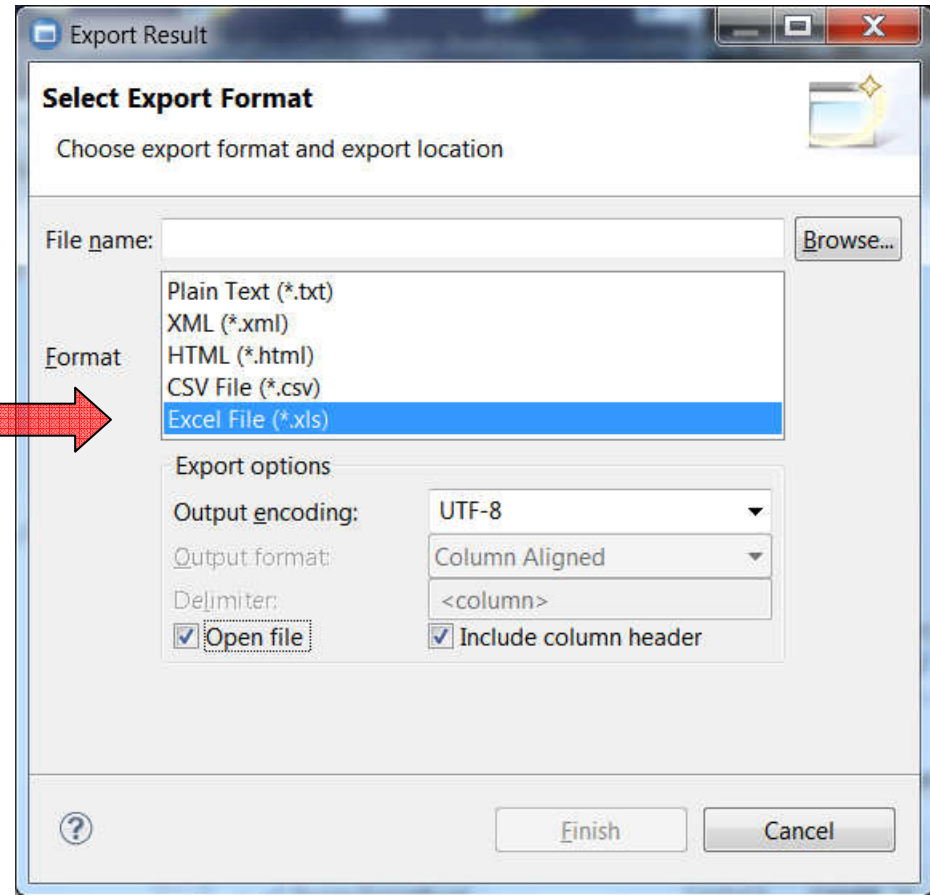
Checkpoints pauses the script so you can inspect results before continuing

I want to export my results to a spreadsheet

Export Results to Excel

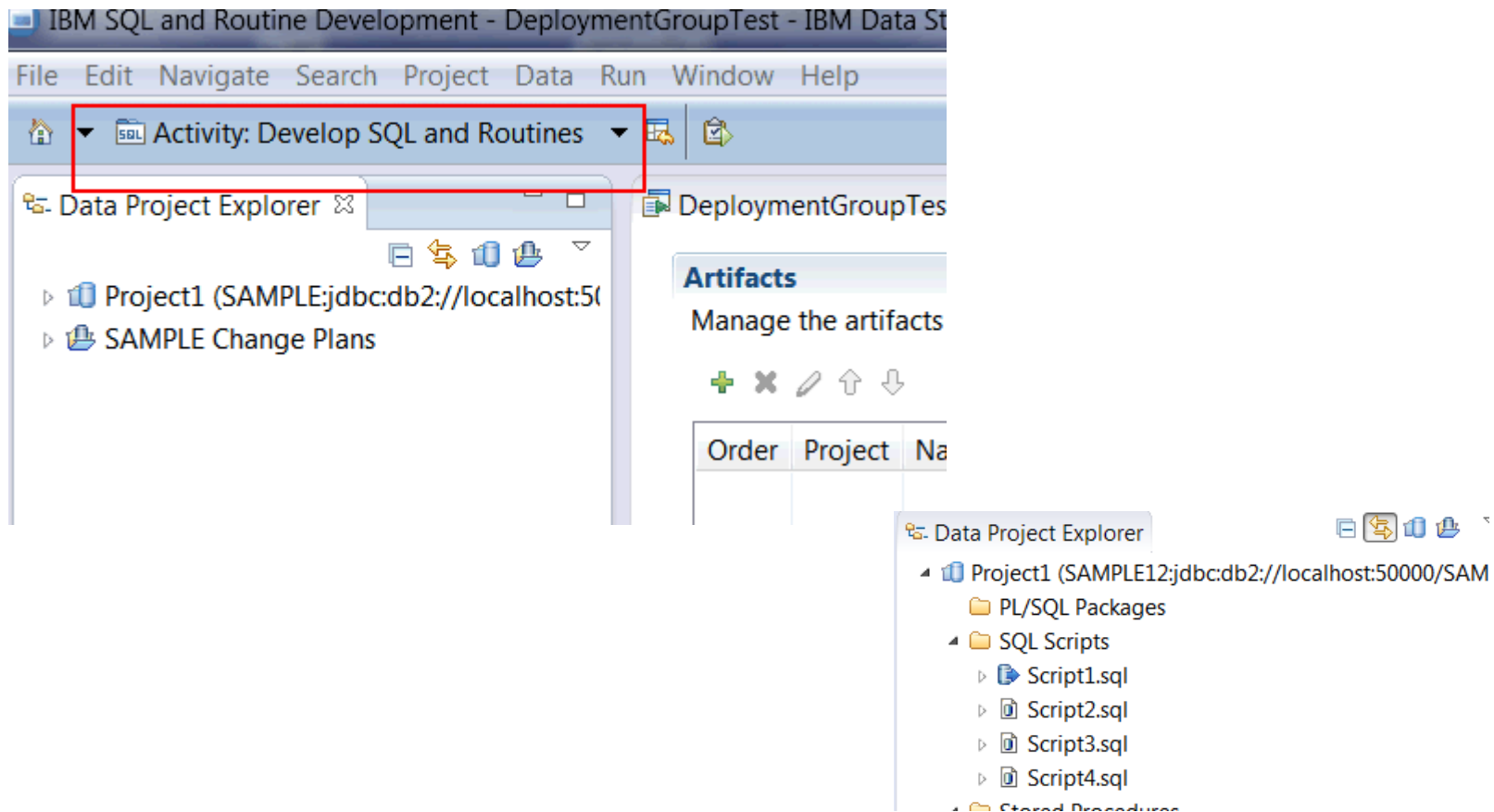


Supports Multiple Export Formats

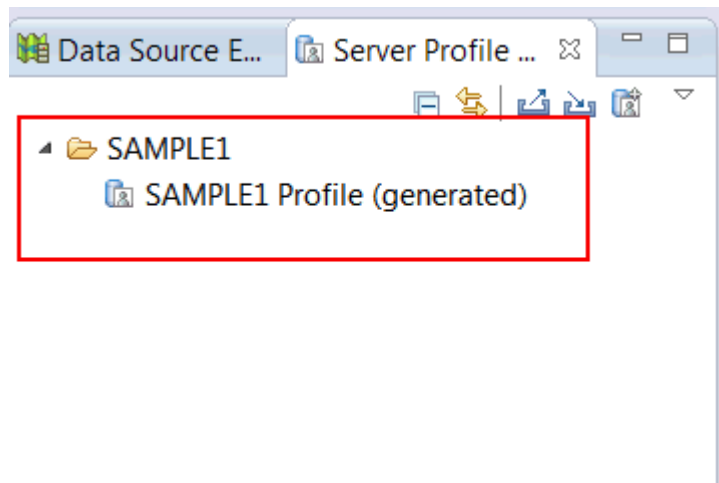


I have a script that I want to run against multiple databases

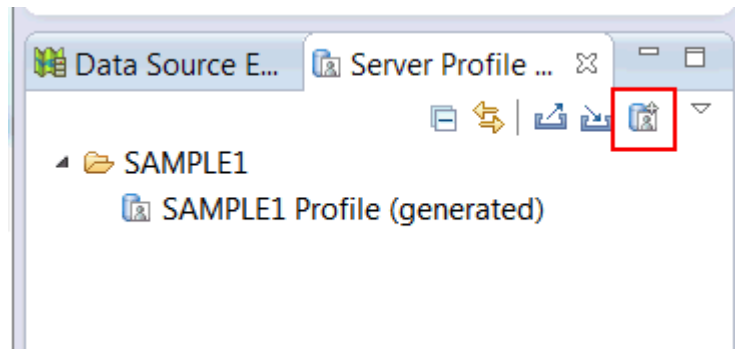
Use the "Develop SQL and Routines" activity to develop SQL scripts to deploy:



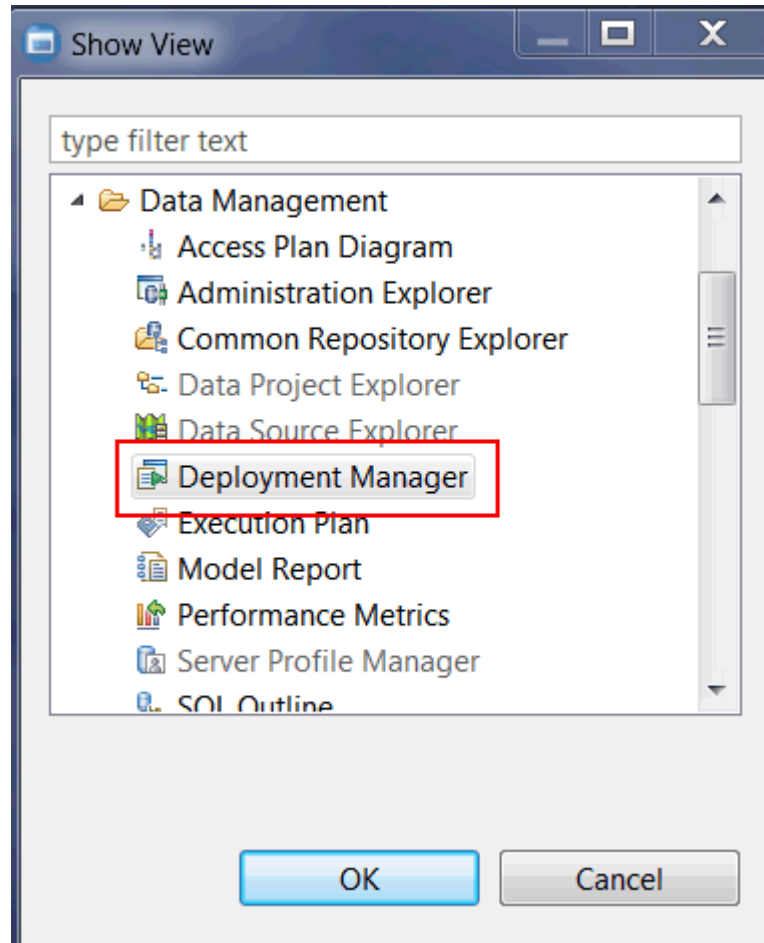
To deploy the scripts to multiple servers, you want to have server profiles for each of the server that you need to deploy your SQL to:



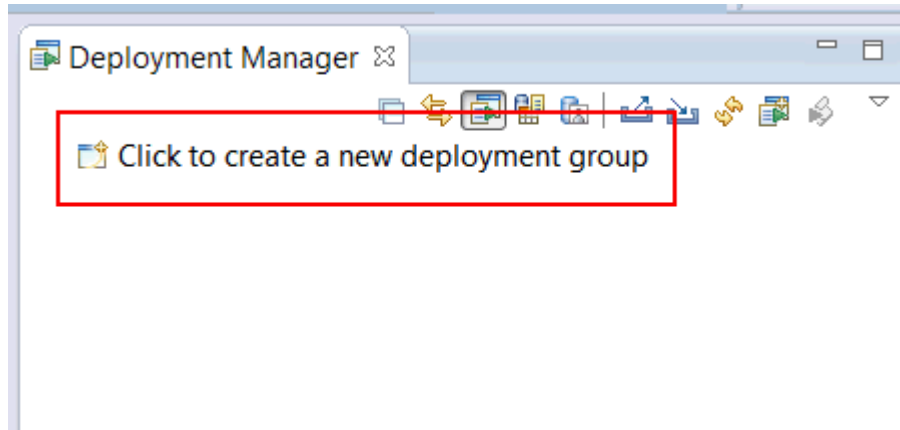
Some may have been created automatically for you. To create the missing ones, use the "New Server Profile" Button:



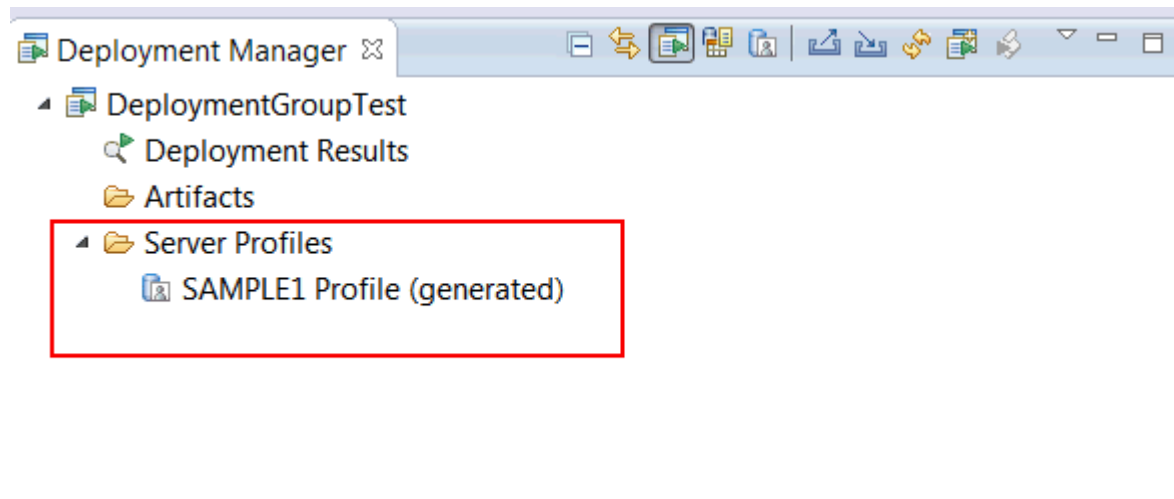
Use Window->Show View to open Deployment Manager:



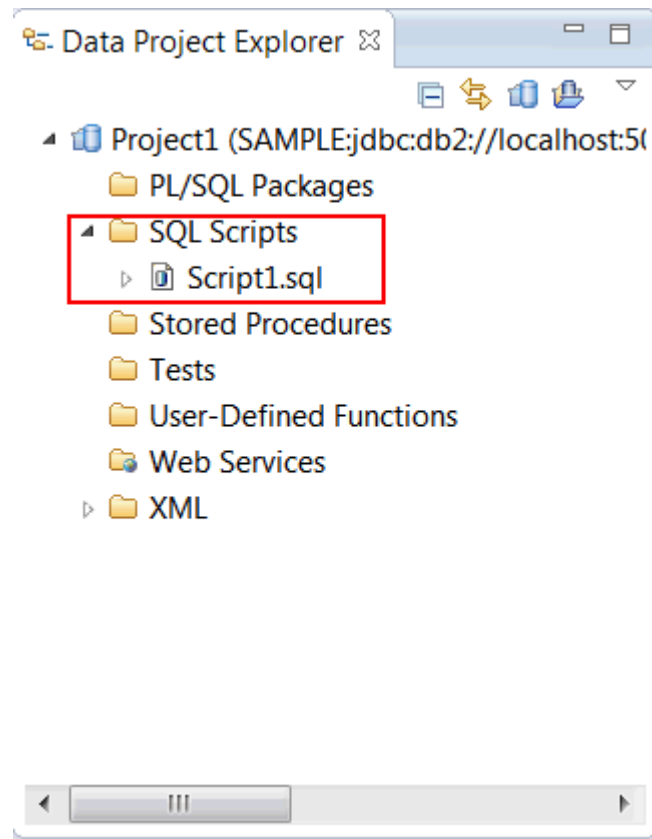
Click on the icon to create a new deployment group



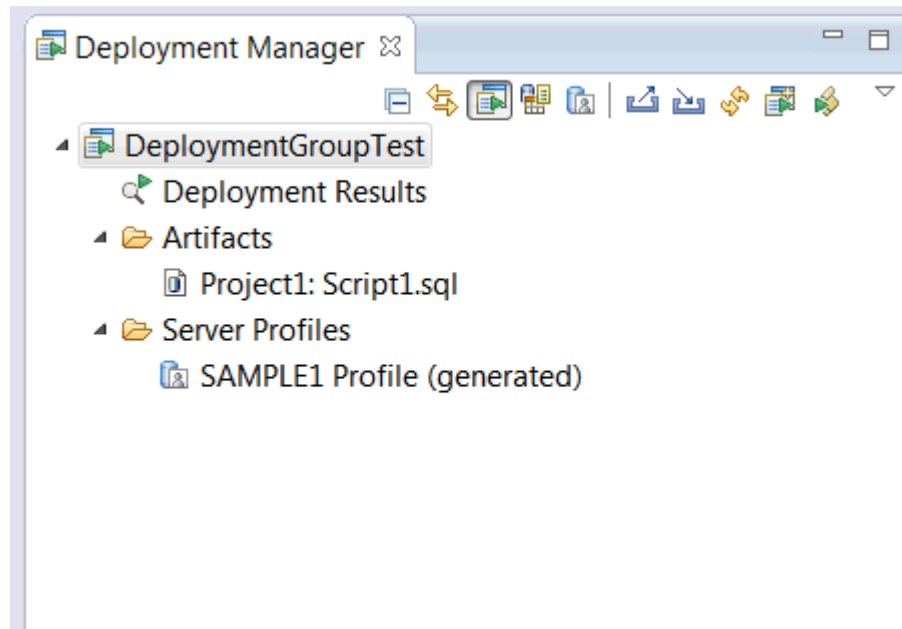
Once a deployment group is created, you can drag/drop your server profiles to the "Server Profiles" folder:



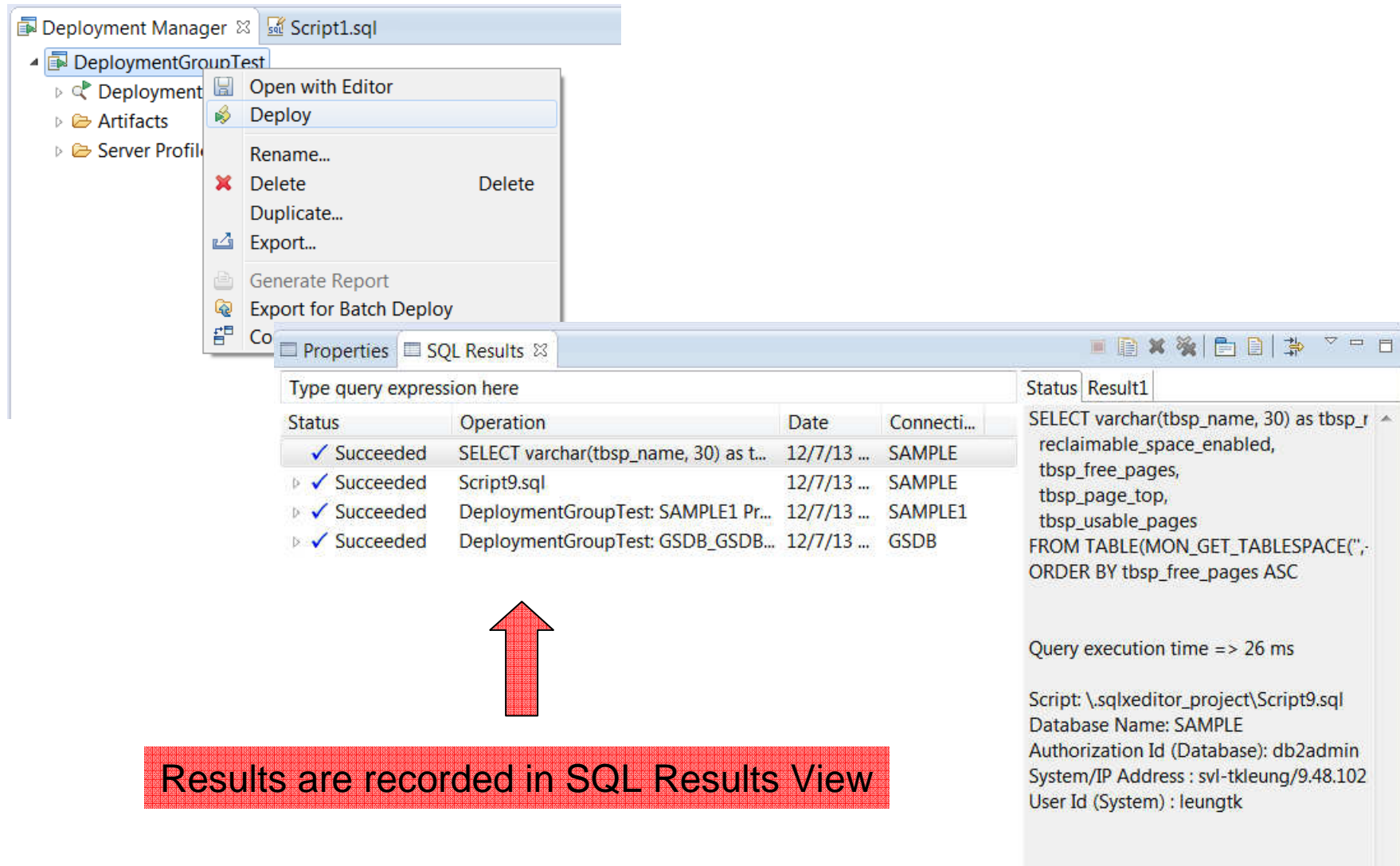
Use a Data Development Project to hold SQL scripts. You can create your own in the Data Project Explorer:



Once scripts are created, you can drag drop these scripts to the "Artifacts Folder" in your deployment group:



Use Deploy to deploy scripts to servers in Server Profiles



The screenshot displays the IBM Deployment Manager interface. A context menu is open over a file named 'Script1.sql', with the 'Deploy' option highlighted. The 'SQL Results' view is active, showing a table of deployment operations. A red arrow points from a text box at the bottom to the 'SQL Results' view.

Status	Operation	Date	Connecti...
✓ Succeeded	SELECT varchar(tbsp_name, 30) as t...	12/7/13 ...	SAMPLE
✓ Succeeded	Script9.sql	12/7/13 ...	SAMPLE
✓ Succeeded	DeploymentGroupTest: SAMPLE1 Pr...	12/7/13 ...	SAMPLE1
✓ Succeeded	DeploymentGroupTest: GSDB_GSDB...	12/7/13 ...	GSDB

Results are recorded in SQL Results View

What's the difference between my Development And Test Database

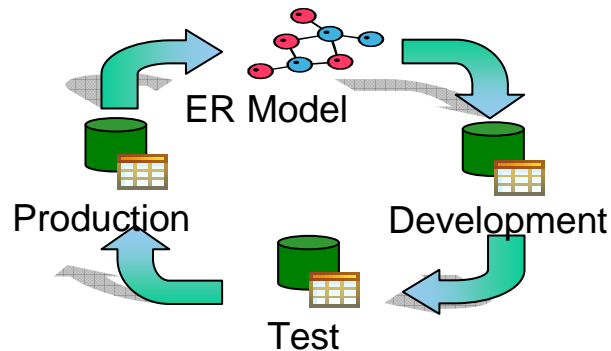
Migrate complex changes

Scenario

- Changes made out of data studio.
- Not only one way changes
- Need define migrate rule, like mask schema, ignore some objects

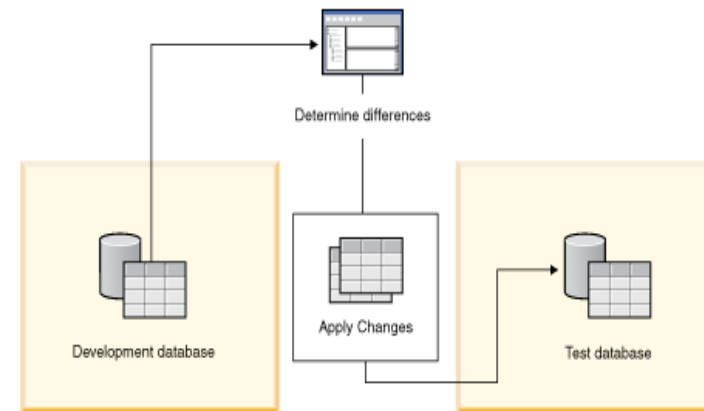
Solution:

Ideal Change Flow



Database shops have multiple database tiers i.e. development, test, and production.

Figure 1. The process of migrating changes from one database environment to another



Migrate and Sync Single Object

Migrate a data object as new one

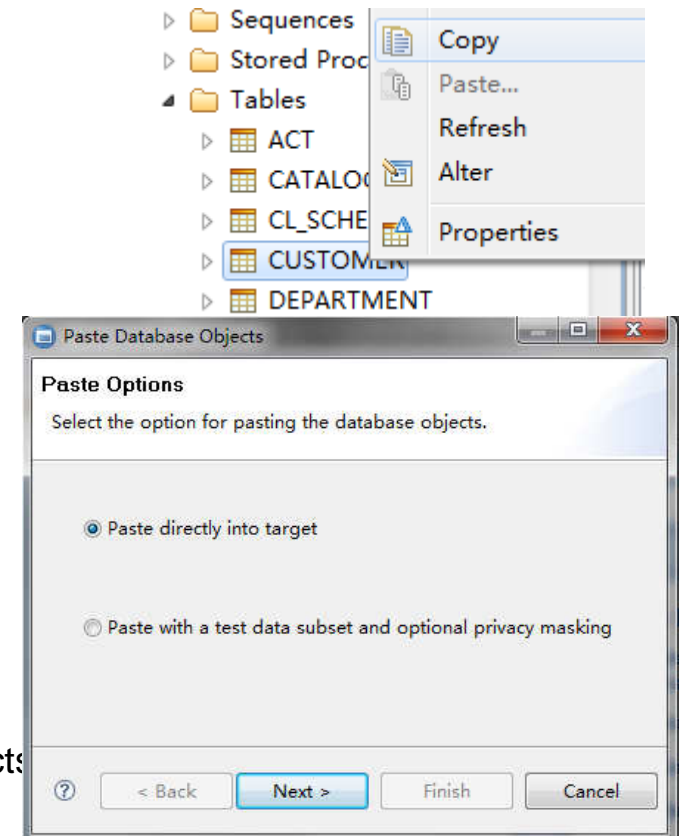
- Approach in Data Studio: Copy/Paste

- ✓ *copy the objects homogeneously*
- ✓ *copy database objects heterogeneously*

- Note:

- ✓ Not intended for copying large databases
- ✓ The object limit includes all of the dependent
and contained objects for the selected objects
- ✓ Exclude dependent and contained objects from

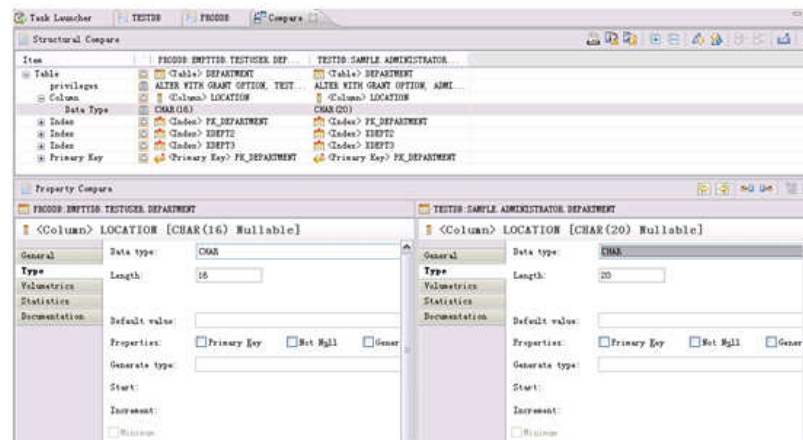
the copy process by using options on the Source/Target page in the Paste Database Objects wizard



Migrate and Sync Single Object

Migrate and Sync a data object to an exist one

- Approach in Data Studio: Compare With Another Object...



- Steps:

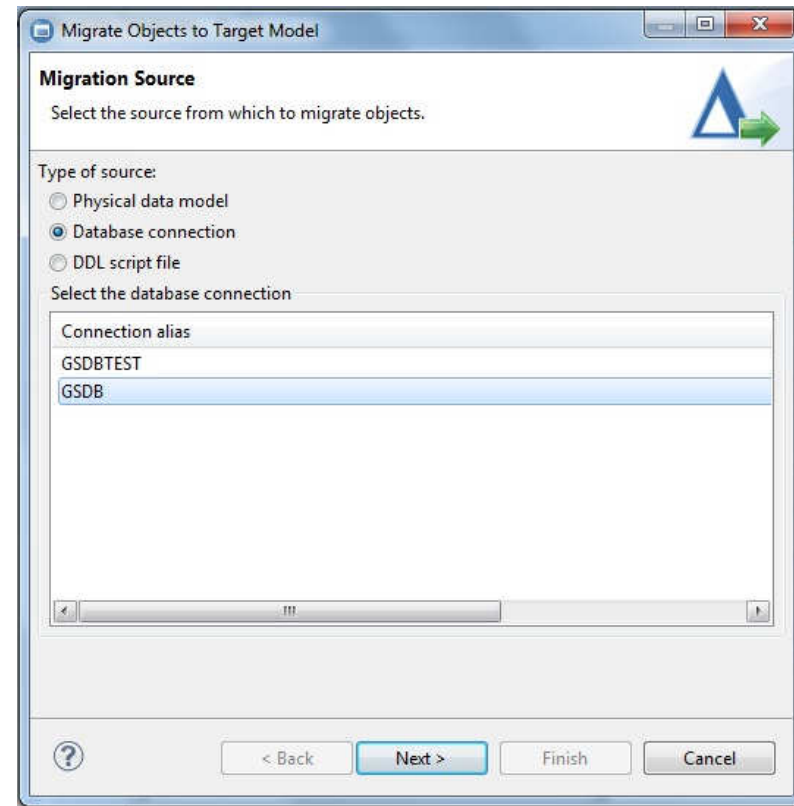
- ✓ Open Compare Editor
- ✓ Browse and Copy Changes
- ✓ Generate delta DDL and deploy changes to database

Compare and Migrate Objects

Sync GSDB and GSDBTEST

- Painpoints in migration plan:
 - ✓ Identify Changes together
 - ✓ Impact analyze for all modified objects together
 - ✓ Run DB commands together
 - ✓ Rollback changes if error occur
- Steps:

1. Identify source type and select corresponding database to migrate



Compare and Migrate Objects

2. Filter objects

Choose Source Objects
Select the source object type and specify the objects that you want to compare and migrate.

Select Object Type

- Buffer Pools
- Partition Groups
- Schemas
- Storage Groups
- Table Spaces

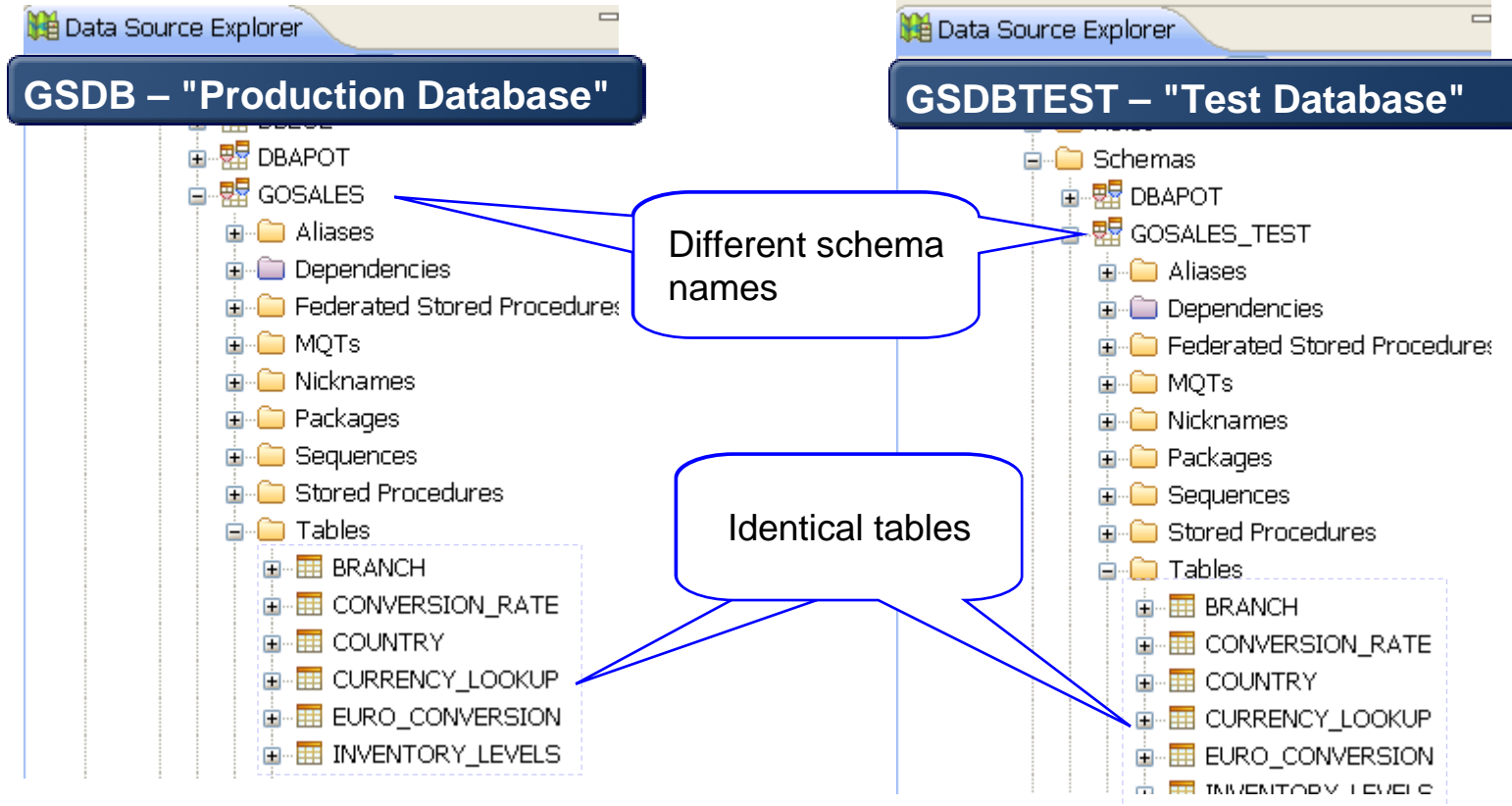
Database Object Selection

Name	Like	%
<input checked="" type="checkbox"/>	GOSALES	
<input checked="" type="checkbox"/>	GOSALESCT	
<input checked="" type="checkbox"/>	GOSALESDW	
<input checked="" type="checkbox"/>	GOSALESHR	
<input checked="" type="checkbox"/>	GOSALESMR	
<input checked="" type="checkbox"/>	GOSALESRT	
<input type="checkbox"/>	NULLID	
<input type="checkbox"/>	SQLJ	
<input type="checkbox"/>	YUANFENG	

Objects to Compare and Migrate

- <Schema> GOSALESRT
- <Schema> GOSALESMR
- <Schema> GOSALESHR
- <Schema> GOSALESDW
- <Schema> GOSALESCT

False Positives



Filter Out False Database Objects - Ignores

Ignore the difference

The screenshot shows a software dialog box titled "Migrate Objects to Target Model". It has a blue header bar with standard window controls (minimize, maximize, close) on the right. Below the header, the text "Specify any Masks and Ignores" is followed by a descriptive paragraph: "Specify any filters to simplify object comparison. Masks change the object names to match the target model and ignores remove the objects from the comparison." To the right of this text is a blue triangle icon with a green arrow pointing right.

There are two tabs: "Masks" and "Ignores". The "Ignores" tab is selected. Below the tabs, there is a text input field with the placeholder text "Specify the database object that you want to ignore." and a label "Ignore Database Object". To the right of the input field is a dropdown menu with the following items: TABLESPACES, TABLESPACES, INDEX (highlighted in blue), SCHEMA, CONTAINER, and AUTHORIZATION. To the right of the dropdown menu is a button labeled "Add Ignore". A mouse cursor is pointing at the "Add Ignore" button. A red "X" icon is visible to the right of the dropdown menu.

Below the input field and dropdown menu is a table with the following content:

Database Object
BPNAME
TABLESPACES

Filter Out False Database Objects - Ignores

Filter out those false positive

The image displays two side-by-side screenshots of the 'Migrate Objects to Target Model' application interface, illustrating the process of filtering out false positives.

Left Screenshot (Before): Shows the 'Structural Compare' table with columns for [Source]GSDB and [Target]GSDBTEST. A red horizontal box highlights the first three rows, which are false positives: a Database, a Regular Table Space, and a Schema. A yellow starburst labeled 'Before' is overlaid on the bottom left.

Item	[Source]GSDB	[Target]GSDBTEST
Database	<Database> GSDB	<Database> GSDBTEST
name	GSDB	GSDBTEST
Regular Table Space	<Regular Table Space> GOSAL...	
Schema	<Schema> GOSALESCT	
Schema	<Schema> GOSALESDW	
Schema	<Schema> GOSALESHR	
Schema	<Schema> GOSALESMR	
Schema	<Schema> GOSALESRT	
Schema	<Schema> GOSALES_TEST	<Schema> GOSALES_TEST
owner	name: SYSIBM,	name: YUANFENG,

Right Screenshot (After): Shows the same 'Structural Compare' table after filtering. The false positives are removed, and the remaining objects are checked. A yellow starburst labeled 'After' is overlaid on the bottom right.

Item	[Source]GSDB	[Target]GSDBTEST
name	GSDB	GSDBTEST
Schema	<Schema> GOSALESCT	
Schema	<Schema> GOSALESDW	
Schema	<Schema> GOSALESHR	
Schema	<Schema> GOSALESMR	
Schema	<Schema> GOSALESRT	<Schema> GOSALESRT
Schema	<Schema> GOSALES_TEST	<Schema> GOSALES_TEST
owner	name: SYSIBM,	name: YUANFENG,
Package	<Package> P2013178337	
Package	<Package> P89945495	
Stored Procedure	<Stored Procedure> ASSIGNS...	
Stored Procedure	<Stored Procedure> VERIF...	
Table	<Table> BRANCH	<Table> BRANCH
Table	<Table> CONVERSION_RATE	<Table> CONVERSION_RATE
Table	<Table> COUNTRY	<Table> COUNTRY
Table	<Table> CURRENCY_LOOKUP	<Table> CURRENCY_LOOKUP
Table	<Table> EURO_CONVERSION	<Table> EURO_CONVERSION
Table	<Table> INVENTORY_LEVELS	<Table> INVENTORY_LEVELS
Table	<Table> ORDER_DETAILS	<Table> ORDER_DETAILS
Table	<Table> ORDER_HEADER	<Table> ORDER_HEADER

Property Compare: The bottom section shows the 'Property Compare' for the selected objects. In the 'Before' state, the source is '<Database> GSDB' and the target is '<Database> GSDBTEST'. In the 'After' state, the source is '<Table> PRODUCT_FORECAST' and the target is '<Table> PRODUCT_FORECAST'.

Compare and Migrate Objects

3. Mask and Ignore database objects

Specify any Masks and Ignores

Specify any filters to simplify object comparison. Masks change the object names to match the target model and ignores remove the objects from the comparison.



Masks

Ignores

Specify the database object that you want to mask

Database object

SCHEMA

In mask

GOSALES

Out mask

GOSALES_

Add Mask

Database Object	In mask	Out mask	
SCHEMA	GOSALES	GOSALES_TEST	✖

Compare and Migrate Objects

source and target ,copy the relative change want to apply

Review and Apply Changes

The Structural Comparison table displays the source model on the left and the target model on the right. Use the up and down arrows to find the differences between the models. Use the right arrow to copy a difference to the target model.

Structural Compare

Item	[Source]GSDB	[Target]GSDBTEST
name	GSDB	GSDBTEST
Schema	<Schema> GSALESCT	
Schema	<Schema> GSALESDW	
Schema	<Schema> GSALESHR	
Schema	<Schema> GSALESMT	
Schema	<Schema> GSALESRT	<Schema> GSALESRT
Schema	<Schema> GSALES_TEST	<Schema> GSALES_TEST
owner	name: SYSIBM,	name: YUANFENG,
Package	<Package> P2013178337	<Package> P2013178337
Package	<Package> P89945495	<Package> P89945495
Stored Procedure	<Stored Procedure> ASSIGNST...	<Stored Procedure> ASSIGNST...
Stored Procedure	<Stored Procedure> VERIFY_DA...	<Stored Procedure> VERIFY_DA...
Table	<Table> BRANCH	<Table> BRANCH
Table	<Table> CONVERSION_RATE	<Table> CONVERSION_RATE
Table	<Table> COUNTRY	<Table> COUNTRY
Table	<Table> CURRENCY_LOOKUP	<Table> CURRENCY_LOOKUP
Table	<Table> EURO_CONVERSION	<Table> EURO_CONVERSION
Table	<Table> INVENTORY_LEVELS	<Table> INVENTORY_LEVELS
Table	<Table> ORDER_DETAILS	<Table> ORDER_DETAILS
Table	<Table> ORDER_HEADER	<Table> ORDER_HEADER

Property Compare

[Source]GSDB		[Target]GSDBTEST	
<Table> PRODUCT_FORECAST		<Table> PRODUCT_FORECAST	
General	Name: PRODUCT_FORECAST	General	Name: PRODUCT_FORECAST
Columns	Label:	Columns	Label:

Identify the difference

Compare and Migrate Objects

5. Click Preview Commands to generate change DDL

The screenshot shows the 'Generate DDL' dialog box in IBM Data Studio. At the top, it indicates the connection is 'localhost - DB2 for Linux, UNIX, and Windows - GSOBTEST'. There are three checked options: 'Generate undo commands', 'Specify a file location that both a DB2 fenced user and instance owner can access:', and 'Save data: C:\'. Below these are buttons for 'Column Mapping...', 'Advanced Options...', and 'Refresh DDL'. The main area contains a list of SQL commands for creating and altering tables and schemas. At the bottom, there are 'Deployment options' with three radio buttons: 'Edit commands (Stop using a change plan and open the SQL and XQuery editor)', 'Schedule to run as a job (Opens the Job Manager of the Data Studio web console)', and 'Deploy the change plan (Commands are run in auto-commit mode)'. A 'Finish' button is visible at the bottom right.

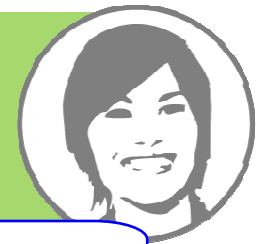
Can also generate Undo to roll back change

Application DBA can send to Operation DBA, and schedule the time to run

I want to make changes to my database

Object Management

Improve DBA productivity and reduce application outages by automating and simplifying complex DB2 structural changes.



■ **Improve DBA efficiency**

- Multiple changes in one plan
- Saves and restores data for extended alters, ensure data integrity
- Automatically manages dependent objects, mitigates risk related objects changes.
- Analyzes and reorders changes if necessary.
- Generates needed maintenance commands
- Schedule changes with Data Studio Web Console.

Schema	Name	Operation	Row Count
DB2ADMIN	EMPLOYE	ALTER	36
DB2ADMIN	EMP_B...	CREATE	0
AA	TEST	DROP	4
DB2ADMIN	EMP_V1	CREATE	0
DB2ADMIN	EMP_RESULT_I...	CREATE	0

Schema	Name	Perce...	Row Count	Log Mode	Primary Key
DB2ADMIN	EMP_RESULT	0			
AA	TEST	0			
DB2ADMIN	ACT	0	0		SQL130202214...
DB2ADMIN	APPLICATION	0	0		
DB2ADMIN	CATALOG	0	0		PK_CATALOG
DB2ADMIN	CL_SCHED	0	0		

Object Management

- **Reduce errors and downtime**
 - Provides impact analysis visualization
 - Factors in impacts and side effects automatically
 - Automatically generates commands to rollback changes

Specify a file location that both a DB2 fenced user and instance owner can access:

Save data: C:\ ... Refresh DDL

Column Mapping ... Advanced Options ...

```
-- <ScriptOptions statementTerminator=";" />
ALTER TABLE ANNFENG.TEST2 RENAME COLUMN "Column1" TO SYS1 RENAME COLUMN "Column2" TO SYS2 RENAME COLUMN
ALTER TABLE ANNFENG.TEST2 ALTER COLUMN SYS1 SET NOT NULL ALTER COLUMN SYS2 SET NOT NULL ALTER COLUMN TR
ALTER TABLE ANNFENG.TEST2 ALTER COLUMN SYS1 SET DATA TYPE TIMESTAMP(12) ALTER
CALL SYSPROC.ADMIN_CMD('REORG TABLE ANNFENG.TEST2 USE TEMPSPACE1');
SET INTEGRITY FOR ANNFENG.TEST2 OFF CASCADE DEFERRED;
ALTER TABLE ANNFENG.TEST2 ALTER COLUMN SYS1 SET GENERATED ALWAYS AS ROW BEGIN ALTER COLUMN SYS2 SET GENERATED ALWAYS AS
SET INTEGRITY FOR ANNFENG.TEST2 IMMEDIATE CHECKED FULL ACCESS FORCE GENERATED;
```

DDL with maintenance commands

Review Undo Commands

Review the commands that will undo the changes that were made to the database catalog when the change plan was deployed.

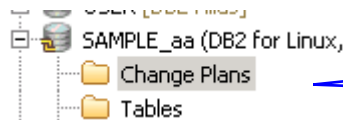
Connection: localhost - DB2 for Linux, UNIX, and Windows - SAMPLE

```
-- <ScriptOptions statementTerminator=";" />
ALTER TABLE ANNFENG.TEST3 RENAME COLUMN SYS1 TO "Column1" RENAME COLUMN SYS2 TO "Column2" RE
ALTER TABLE ANNFENG.TEST3 ALTER COLUMN "Column1" DROP GENERATED ALTER COLUMN "Column2" DROF
ALTER TABLE ANNFENG.TEST3 ALTER COLUMN "Column1" DROP NOT NULL ALTER COLUMN "Column2" DROF I
ALTER TABLE ANNFENG.TEST3 ALTER COLUMN "Column1" SET DATA TYPE CHAR(5) ALTER COLUMN "Column2
CALL SYSPROC.ADMIN_CMD('REORG TABLE ANNFENG.TEST3 USE TEMPSPACE1');
```

Undo Commands to Rollback change

Object Management

- **Foster teamwork and enhance audit ability**
 - Integrate into InfoSphere Data Architect
 - Integrate with High Performance Unload for large data set
 - Documents changes for collaboration and audit



View all history change plans

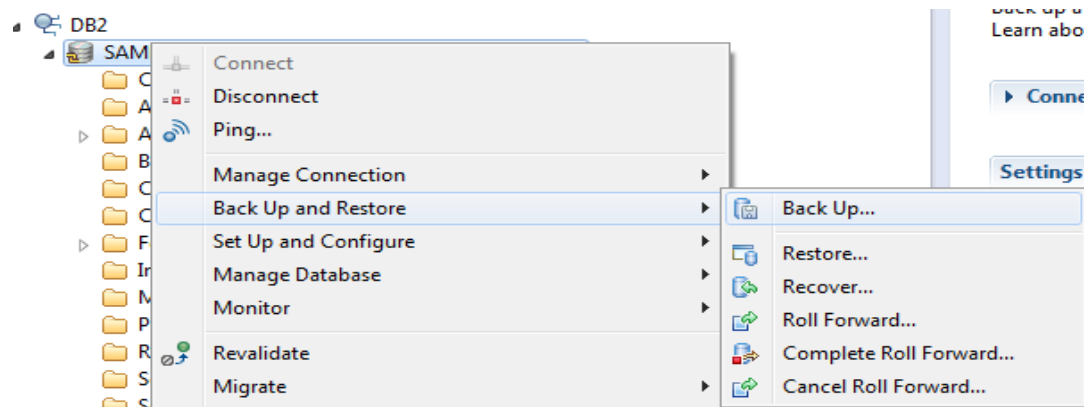
Default Change...	1	2013-09-23		Pending
Default Change...	2	2013-10-13		Pending
Default Ch		13-09-24	2013-09-24	Deployed
Default Ch		13-10-13	2013-10-13	Deployed
Default Ch		13-10-10	2013-10-10	Deployed
Default Ch		13-09-24	2013-09-24	Deployed
Default Ch		13-09-23		Pending
Default Ch		3-10-13	2013-10-13	Deployed
Default Ch		3-10-13	2013-10-13	Deployed
Default Ch		3-10-13		Pending
Default Ch		3-09-24	2013-09-24	Deployed

Deployed scripts, Report, undo scripts

What about Running Utilities

Backup a database

1. Click the Back Up menu



Back up a database

2. Specify options

The screenshot shows the 'Back up SAMPLE' dialog box in the Task Launcher. The window title is 'Task Launcher | SAMPLE | Back up SAMPLE'. The main heading is 'Back up SAMPLE'. Below the heading, there is a description: 'Back up a database or table space. Learn about [backing up a database](#). View the [command reference](#).' A connection dropdown shows 'localhost - DB2 - SAMPLE'. Under the 'Settings' section, there is a 'Preview Command' link and a 'Run' button. A sidebar on the left contains a list of settings: 'Backup Information', 'Backup Type', 'Backup Image' (which is selected), 'Backup Options', and 'Backup Performance'. The main area is titled 'Specify where to store your backup image' and contains the instruction: 'Specify the type of media on which to store your backup image and the associated options. File System is the default.' Below this, there is a 'Media type' dropdown set to 'File System'. A table lists 'Backup locations' with one entry: 'E:\tmp'. To the right of the table are three buttons: 'Add...', 'Remove', and 'Browse...'.

Task Launcher | SAMPLE | Back up SAMPLE

Back up SAMPLE

Back up a database or table space.
Learn about [backing up a database](#). View the [command reference](#).

▶ Connection : localhost - DB2 - SAMPLE

Settings

Specify any additional settings to use. Click Run when you are done.

🔍 [Preview Command](#) ▶ Run

- Backup Information
- Backup Type
- Backup Image**
- Backup Options
- Backup Performance

Specify where to store your backup image

Specify the type of media on which to store your backup image and the associated options.
File System is the default.

Media type: File System ▼

Backup locations
E:\tmp

Add...
Remove
Browse...

Backup a database

3. Review command and execute, can also go to Edit in SQL Editor and schedule in Web Console

Edit Run Save...

```
CONNECT TO SAMPLE;  
QUIESCE DATABASE IMMEDIATE FORCE CONNECTIONS;  
CONNECT RESET;  
DEACTIVATE DATABASE SAMPLE;  
BACKUP DATABASE SAMPLE TO "E:\tmp" EXCLUDE LOGS WITHOUT PROMPTING;  
CONNECT TO SAMPLE;  
UNQUIESCE DATABASE;  
CONNECT RESET;
```

Messages

Progress
Start time: 11/21/2013, 17:07:24



Looking at Data

Browsing Data

SYSIBMADM	TAD	false	true	true	true
SYSIBMADM	TBSP_UTILIZATION	false	true	false	false
SYSIBMADM	TOP_DYNAM	Show			false
SYSIBMADM	USER_ALL_T	Load			false
SYSIBMADM	USER_ARGUI	Unload			false
SYSIBMADM	USER_CATA	Data			
SYSIBMADM	USER_COL	Analyze Impact...			
SYSIBMADM	USER_CONS	Compare With			
SYSIBMADM	USER_DEPEN				

Task Launcher SAMPLE SYSIBMADM.TBSP_UTILIZATION

SYSIBMADM.TBSP_UTILIZATION

TBSP_CREATE_TIME [TIMESTAMP]	TBSP_STATE [VARCHAR(256)]	TBSP_TOTAL_SIZE_KB [DECFLOAT(34)]	TBSP.
2013-01-30 18:15:52.648	NORMAL	131072	13104
2013-01-30 18:15:52.659	NORMAL	8	8
2013-01-30 18:15:52.659001	NORMAL	65536	65280
2013-01-30 18:18:55.51	NORMAL	32768	32736
2013-02-02 21:41:17.327	NORMAL	229376	22912
2013-05-21 13:41:07.489	NORMAL	9984	9216
2013-05-23 13:36:53.708	NORMAL	7680	6912
2013-05-23 13:37:47.898	NORMAL	7680	6912
2013-08-09 14:53:55.717	NORMAL	8	8

Filter data result

Table Data Filter

Column Selection

Search

Available Columns

- SNAPSHOT_TIMESTAMP
- TBSP_ID
- TBSP_NAME
- TBSP_TYPE
- TBSP_CONTENT_TYPE
- TBSP_CREATE_TIME
- TBSP_STATE

Add >

Add All >>

< Remove

<< Remove All

Move Up

Move Down

Selected Columns	Sort Type	Sort Order
------------------	-----------	------------

Row Selection Conditions

Column	Operator	Value
TBSP_NAME	=	USERSPACE1


Add

Remove

Remove All

Match all conditions Match any conditions

Rows To Return: 500

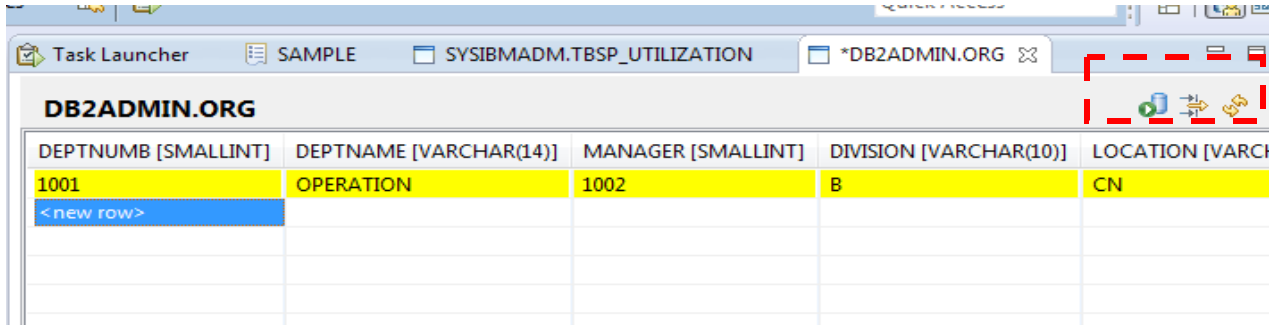
 You have not selected any columns. Select the columns that you want to display and add them to the Selected Columns list.

OK Cancel

Edit Data

Highlight the changed row.

Click  icon or Save ,Ctrl+S to commit the change



The screenshot shows a database management interface with a table titled "DB2ADMIN.ORG". The table has five columns: DEPTNUMB [SMALLINT], DEPTNAME [VARCHAR(14)], MANAGER [SMALLINT], DIVISION [VARCHAR(10)], and LOCATION [VARCHAR(10)]. The first row is highlighted in yellow and contains the values 1001, OPERATION, 1002, B, and CN. Below the first row is a blue row labeled "<new row>". The interface includes a task launcher at the top with tabs for "SAMPLE", "SYSIBMADM.TBSP_UTILIZATION", and "*DB2ADMIN.ORG". A red dashed box highlights the table area.

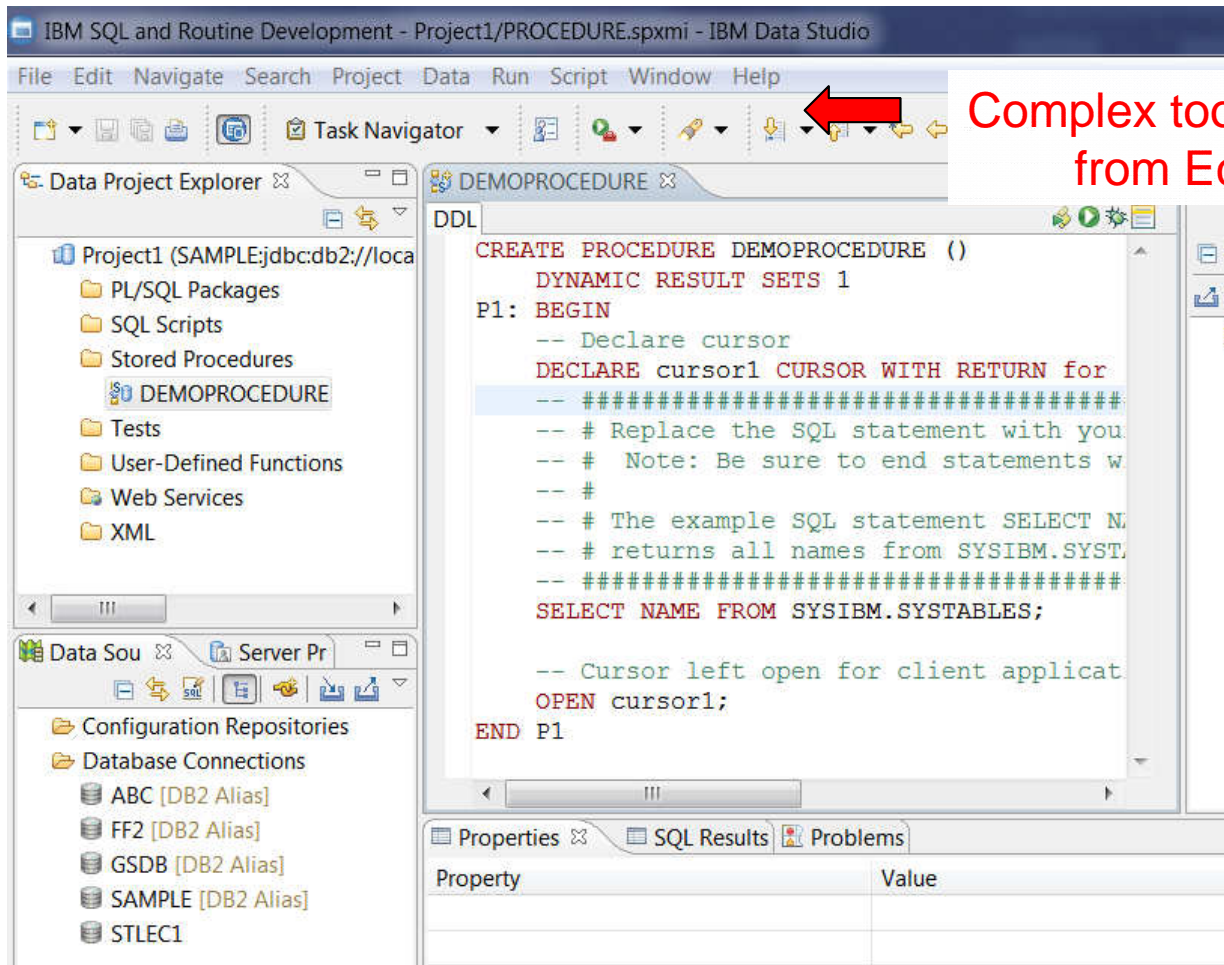
DEPTNUMB [SMALLINT]	DEPTNAME [VARCHAR(14)]	MANAGER [SMALLINT]	DIVISION [VARCHAR(10)]	LOCATION [VARCHAR(10)]
1001	OPERATION	1002	B	CN
<new row>				

Coming improvements

New Simplified UI

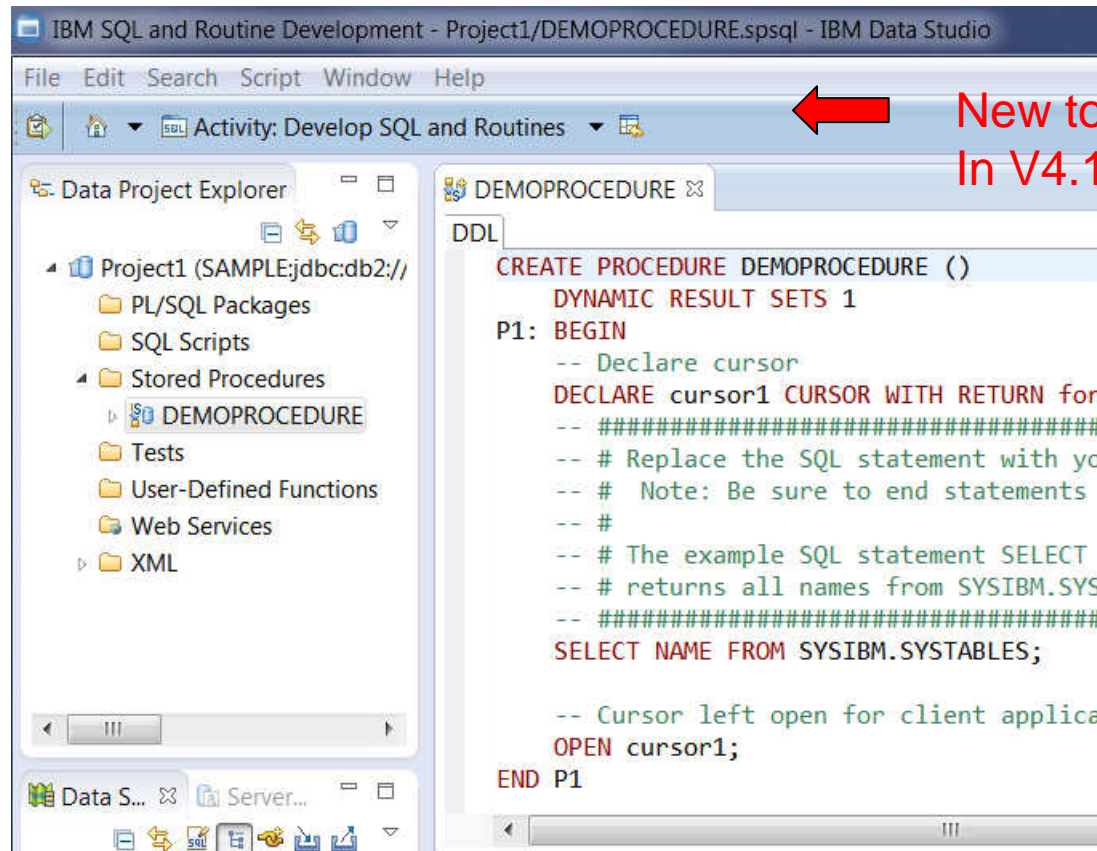
- A lot of users use only Data Studio to run queries against DB2. They feel uncomfortable with the complexities of Data Studio.
- We designed a new UI by removing features that are not used by these users, making Data Studio simpler for them to use.
- We also extended this simplification to Data Studio itself by removing some of the Eclipse features that Data Studio users will not use from the user interface.

Data Studio 3.2



Complex toolbar and menus from Eclipse

Data Studio 4.1



New toolbar and menus
In V4.1

Enterprise Deployment Support

- Allows a DBA to set up Data Studio and include the preference settings as part of a customized install image. Users who install with the customized install image will pick up the preferences that the DBA had set up, including connection information, query tuning settings, Data Studio Preferences, etc.

Optim Query Workload Tuner Agenda

- Overview
- Access Plan Graph and Access Plan Explorer
- Workload Statistics Advisor

OQWT Single Query Tuning

- Single query tuning features sometimes makes sense
 - View access plans and sort operators in the plan explorer to focus on problem areas of the statement
 - Run statistics advisor to determine if any missing statistics make sense

Facilitate Analysis: Access Plan Graph

- Visualize access path
 - See flow of query processing
 - See indexes and operations
 - See optimizer rationale

Description of Selected Node

Displays information about the node that is highlighted in the diagram.

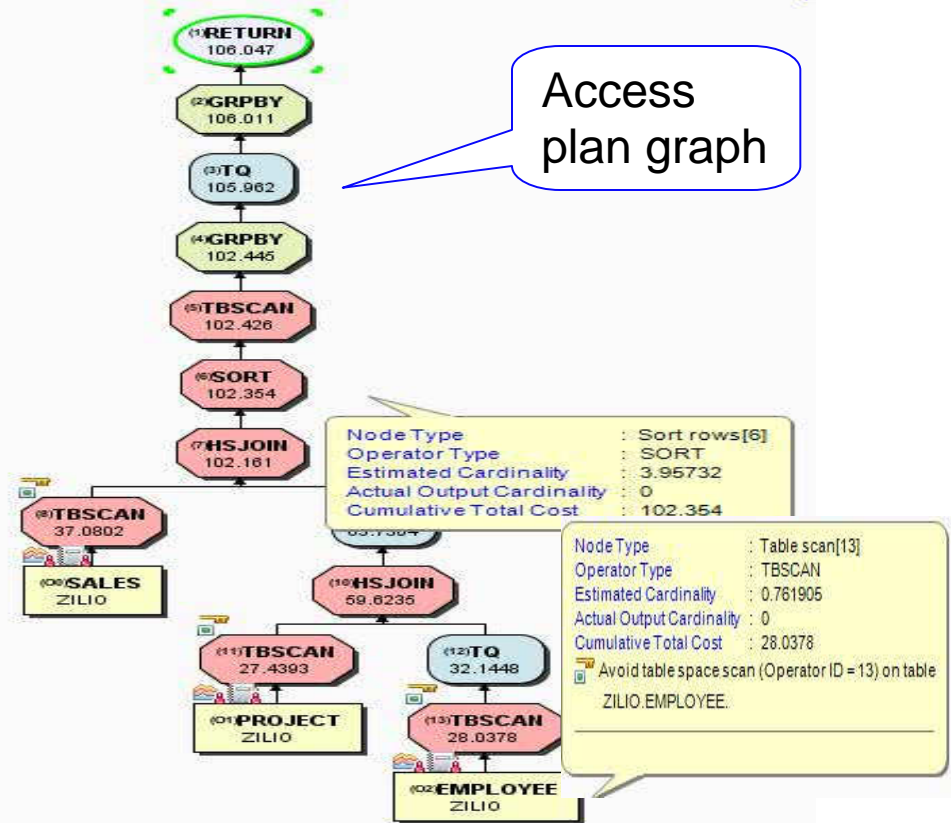
- tbscan
 - Stream
 - Argument Order Class
 - Argument Order Class
 - Argument Order Class
 - Predicates
 - @ predicate
 - @ predicate
 - @ predicate

Attributes

NAME	VALUE
Operator Identifier	13
Operator Type	TBSCAN
Estimated Output Cardinality	0.761905
Actual Output Cardinality	0
Estimated Bufferpool Buffers	1

Description of the Selected Attribute
The actual number of rows returned

Operator details area



- Assess access path stability to reduce risk of performance regression
 - Is the optimizer able to apply the filtering early?
 - Are there indexes that support an efficient path?
 - Are statistics collected?

Facilitate Analysis: Access Plan Explorer

- View operators with associated measures in one area
- Order operators based on measures to identify hot spots
- View operator details
- View table and index use
- View flow of query operator processing
- See optimizer rationale

Operator with optimizer estimates

Step	Operation	Estimated Rows	Cumulative Total Cost	Cumulative CPU Cost	Cumulative IO Cost	Total Cost
9	Hash join	2,238,660,864	8,644,224.000000	5,876,749,434,880.000000	14,368,071.000000	111,94€
10	Sort rows	2,238,660,864	102,258,296.000000	12,792,254,095,360.000000	25,328,468.000000	93,614,07€
11	Table scan	2,238,660,864	114,364,288.000000	6,633,516,032.000000	36,288,864.000000	12,105,99€
12	Group by	2,238,660,864	114,470,032.000000	69,500,000.000000	36,288,864.000000	105,74€
13	Temporary Table Construction	2,238,660,864	124,487,680.000000	73,255,000.000000	37,521,608.000000	10,017,64€
14	Table scan	746,220,224	128,050,176.000000	79,485,491,000.000000	38,754,352.000000	3,562,49€
15	Table scan - TPCDS.STORE_SALES	2,838,948,352	7,937,464.500000	2,200,000.000000		2,200,000.000000
16	Table scan - TPCDS.R_DATE_DIM	1,395	368.901611			
17	Hash join	2,238,660,864	6,049,172.500000			
18	Index scan - SYSIBM.SQ1110308192720660	12,011,616	15,787,048828			
19	Hash join	2,238,660,864	26,707,516.000000	4,100,000.000000		

Sort by measures

Operator details area

Streams

Properties

Name	Value
Operator Identifier	30
Operator Type	Table scan
Join input leg	INNER
Maximum pages for prefetch	1
Type of Prefetch	SEQUENTIAL
Scan Direction	FORWARD

Predicates

Predicate Identifier	Predicate text	R
24	Q16.D_YEAR IN (1999, 2000, 2001, 2002)	%

Table

Name	Value
Name	R_DATE_DIM
Schema	TPCDS
Object type	Table
Creation time	2011-03-08 19:28:19.901005

Improve Statistics Quality using the Statistics Advisor

■ Provides advice on:

- Missing statistics
- Conflicting statistics
- Out-of-date statistics
- Base tables and materialized query tables (MQTs)

■ Simplifies use

- Provides Runstats statements
- Run immediately or save

Review Workload Advisor Recommendations

This page shows the recommendations from the advisors that you ran.

Database connection: GSDBORIGv10 (DB2 for Linux, UNIX, and Windows V10.1.0)

Status/Description

Statements Summary Statistics Indexes

The following table lists all of the objects that are referenced in the query workload. You can show only the objects that have recommendations, the objects that have all relevant statistics, or all objects. Select one or more rows and click View RUNSTATS commands to see recommendations.

Automatic statistics collection: is enabled 44 objects have recommendations 1 objects have all relevant statistics

View RUNSTATS Objects to display: Objects that have recommendations

Check to View RUNSTATS	Object	Type	Status	Cardinality	References to Object	Cumulative Total C...	Collection Timestamp	Missing	Conflicting	Obsolete	Cardinality Unknown
<input checked="" type="checkbox"/>	SYSIBM.SYSDATATYPES	TABLE	PROBLEMATIC	63	1	41.579561	2012-08-28 13:31:53	NO	NO	YES	NO
<input checked="" type="checkbox"/>	SYSIBM.SYSCOMMENTS	TABLE	PROBLEMATIC	0	1	102.656982	2012-08-28 13:31:50	YES	NO	YES	YES
<input checked="" type="checkbox"/>	SYSIBM.SYSCOLUMNS	TABLE	PROBLEMATIC	10006	4	834.597454	2012-09-04 09:51:58	YES	NO	NO	NO
<input checked="" type="checkbox"/>	SYSIBM.SYSCOLAUTH	TABLE	PROBLEMATIC	0	1	102.656982	2012-08-28 13:42:40	YES	NO	YES	YES
<input checked="" type="checkbox"/>	SYSIBM.SYSCODEPROP	TABLE	PROBLEMATIC	241	8	1.292.821191	2012-08-28 13:31:57	YES	NO	YES	NO
<input checked="" type="checkbox"/>	GOSALESCT.CUST_ORD...	TABLE	PROBLEMATIC	39389	36	19.461,098.938713	2012-08-28 13:37:13	YES	NO	YES	NO
<input checked="" type="checkbox"/>	GOSALESCT.CUST_ORD...	TABLE	PROBLEMATIC	60252							
<input checked="" type="checkbox"/>	GOSALESCT.CUST_CUS...	TABLE	PROBLEMATIC	31255							
<input checked="" type="checkbox"/>	GOSALES.PRODUCT_N...	TABLE	PROBLEMATIC	6302							

Details for the selected object

Table name: GOSALESCT.CUST_ORDER_HEADER

Columns Frequent Values Quantile Values Column Groups Indexes Conflicts

Column	Cardinality	Low2Key	High2Key	Frequency Co...	Sum of Frequency Value Cou...	Quantile Count	Basic Status	Frequency Stat...	Quantile Status	Recommended Statistics
CUST_ORDER_NUMBER	39389	100002	202088	0	0	20	OK	MISSING	OK	UNIFORM
CUST_TOTAL	25088	+00000000000...	+00000000000...	10	589	20	OK	OK	OK	FREQ_AND_QUANTILE
CUST_CODE	31255	100002	131254	10	390	20	OK	OK	OK	FREQ_AND_QUANTILE
ORDER_METHOD_CODE	1	5	5	1	39389	2	OK	OK	OK	FREQ_AND_QUANTILE

View and run RUNSTATS recommendations

Summary for each object used in the workload

View details including distribution, column group and index statistics recommendations

Thank You

Data Studio Administration Overview

Tony Leung
leungtk@us.ibm.com

What is IBM Data Studio?

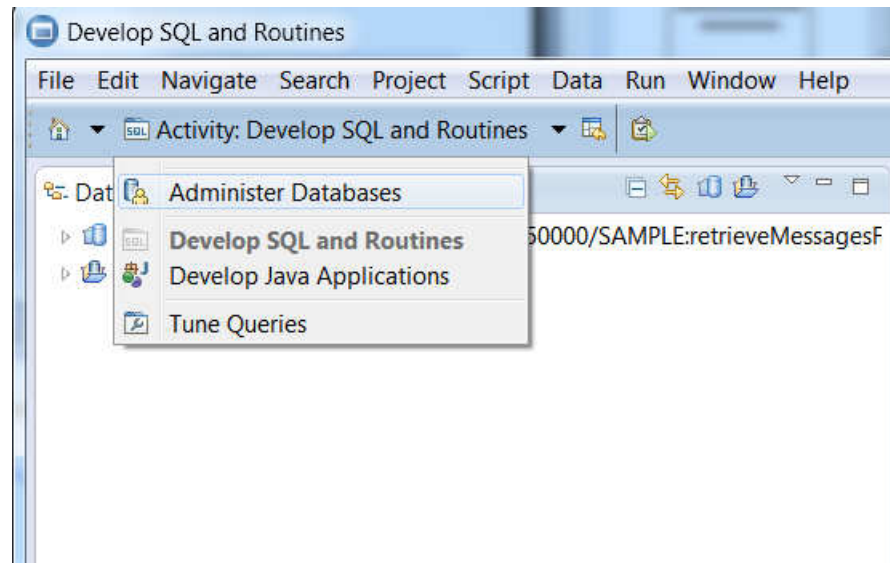
- Comprehensive **data management** tool
 - An integrated environment for managing databases and developing database applications
 - Manage database objects based on change plan: Create, Alter, Drop
 - Database Commands/Utilities Task Assistant
 - Data Management
 - Develop and execute SQL scripts
 - Impact analysis
 - Compare database objects
 - Develop, debug, and deploy database applications and database routines



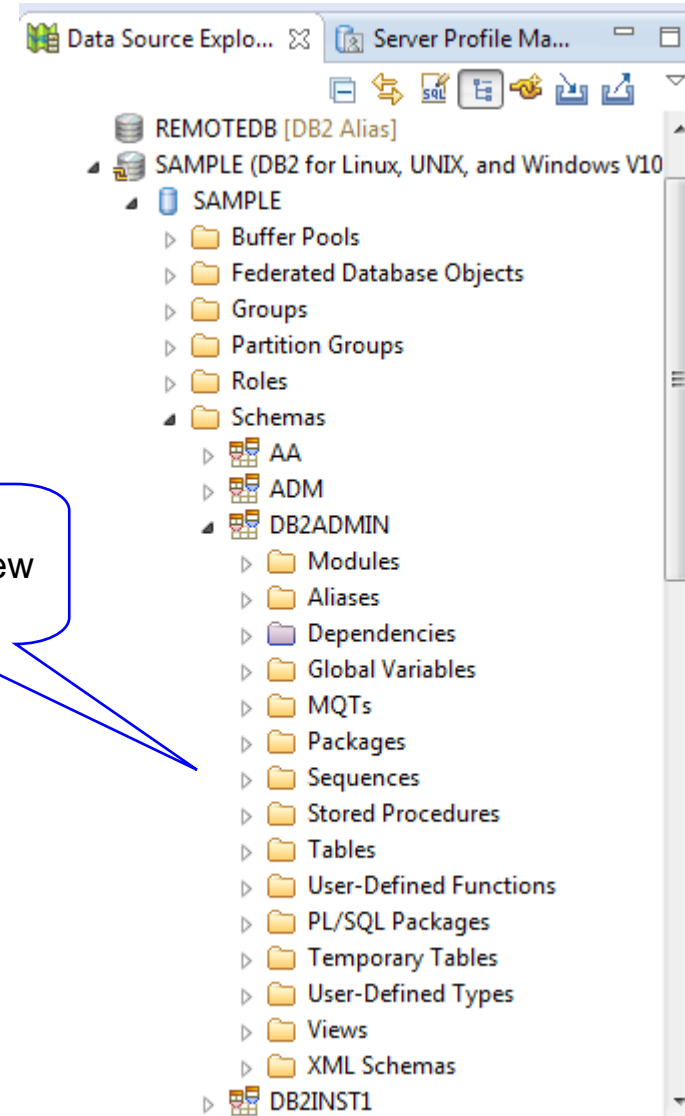
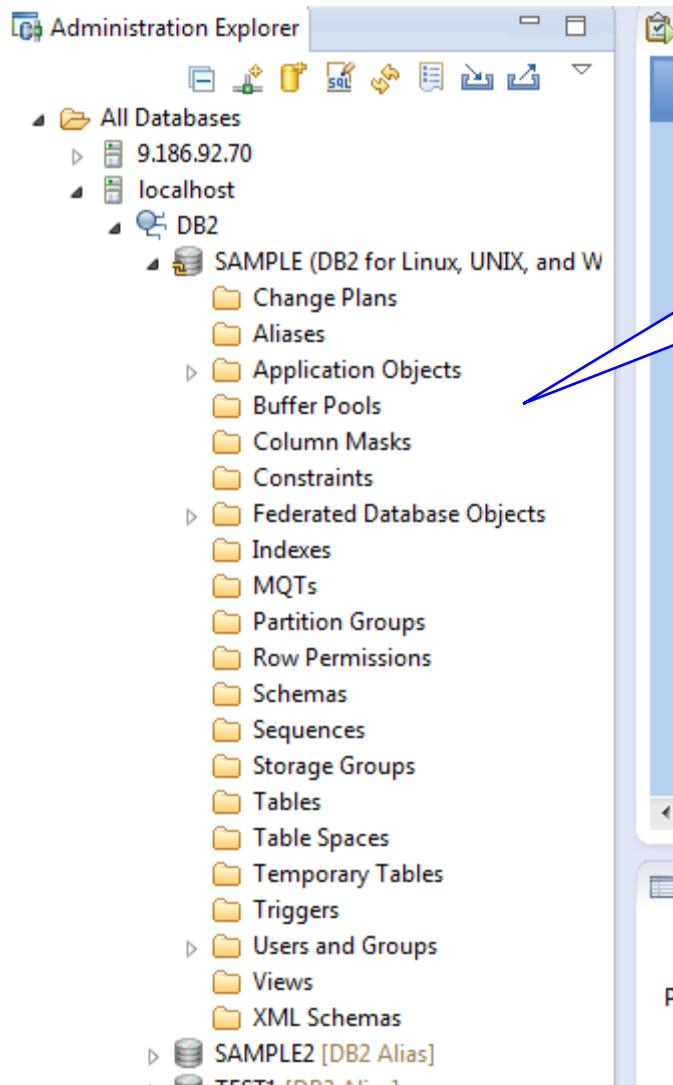
What is IBM Data Studio? (cont)

- Replaces **Control Center** from DB2 10
- Built on the popular **Eclipse** framework
- Support for Red Hat Linux, SUSE Linux, Windows
- Optional extra component
 - **Data Studio Web console**: health and availability monitoring
- **No Charge** to download and use!
- Support through PMRs and DeveloperWorks forum

Switching between Admin and Development



Flutter view and Hierarchy view



Multiple navigation

- Flatter view: Click on a type of objects in Administration Explorer to list the objects in **Object List** on the right side.
 - Object List contains several features to facilitate navigation such as: in-place searching, sorting, etc.
- Hierarchy View: Navigation in Data Source Explorer will see an object hierarchy, **Schema->Table->Index**
- User can also use the breadcrumb navigated like web browser
- Show related objects: User can also right click an object , **Show-> Show Indexes etc** to navigated to relative objects
- Object Filter: Two way filter
 - Database Catalog filter is filter the object load from data server
 - Name search in object list is only for search on UI

Object Filter

- Filter load objects

Conditions

Specify each condition with a predicate and value to return objects from the database catalog that meet those conditions.

Meet all conditions Meet any condition

Property	Operator	Value
Name	Starts With	T

Include dependent objects

Select the types of dependent objects to return from the database catalog. The database catalog returns these types that are dependent on the objects that meet the conditions in this filter. These objects and are needed for some tasks, such as analyzing impact and dependency for data objects. However, objects in the filter might impact loading performance into the Object list.

- Table
- View
- MQT
- Alias
- Stored procedure

Select All

Clear All

- Filter in current loaded objects

localhost DB2 Tables Name Search

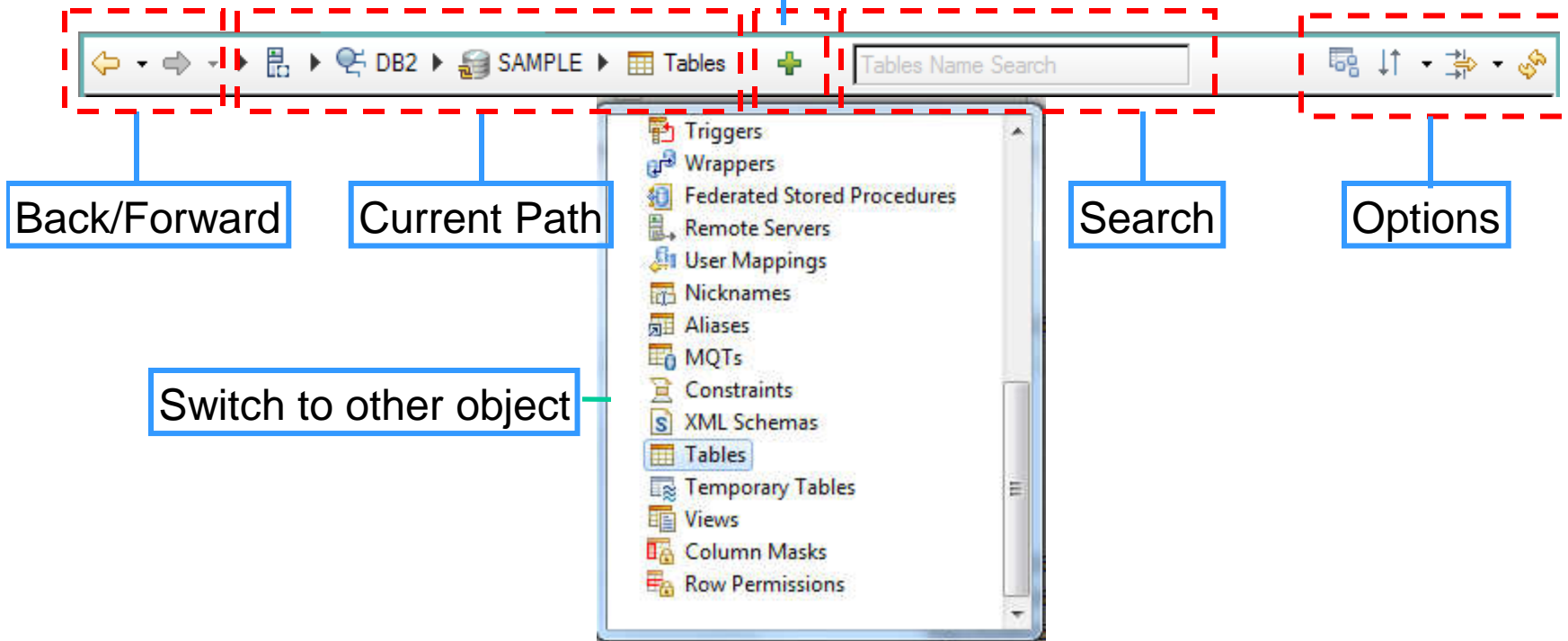
Enter a pattern to match names in the Object List

Schema	Name	Perce...	Row Count	Log Mode	Primary Key	Partition ...
--------	------	----------	-----------	----------	-------------	---------------

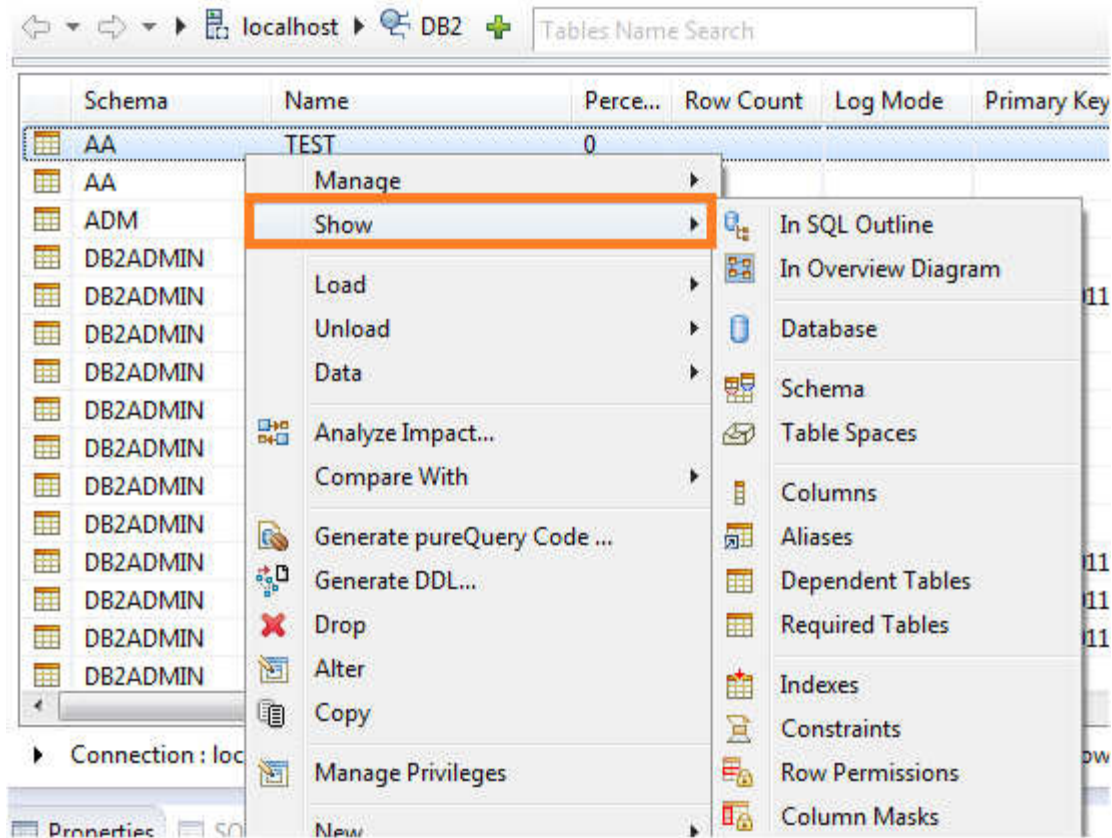
Navigation in breadcrumb

- Multi-purpose navigation bar
 - Web-browser-like back / forward navigation
 - Breadcrumb navigation facilitates moving through **hierarchy of objects**
 - Create **new object** button
 - **In-place search** function. Type object name or part of it and list is dynamically updated.
 - Support use of wildcards
 - Options to sort, filter, refresh objects list

New Object



Navigate by related objects



I Just want to run a SQL

Launching the SQL Editor

The screenshot shows the IBM Data Studio interface with the following components and annotations:

- Administration Explorer:** A tree view on the left showing the database hierarchy. A red arrow points to the 'SAMPLE (DB2 for Linux)' folder, labeled **1. Launch SQL Editor**.
- Script Editor:** The main window contains a SQL query:

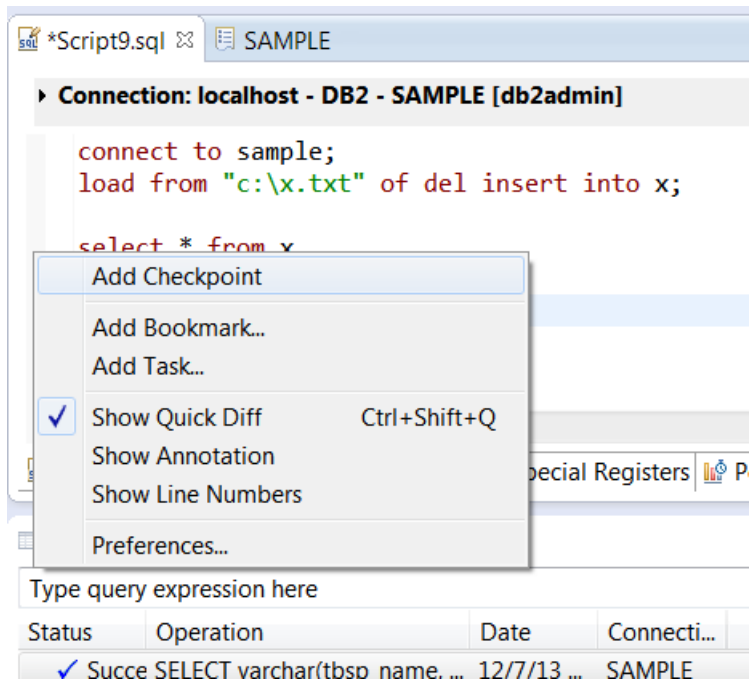

```
SELECT varchar(tbsp_name, 30) as tbsp_name,
       reclaimable_space_enabled,
       tbsp_free_pages,
       tbsp_page_top,
       tbsp_usable_pages
FROM TABLE(MON_GET_TABLESPACE(' ', -2)) AS t
ORDER BY tbsp_free_pages ASC
```

 A red arrow points to the query text, labeled **2. Type SQL**.
- Run Button:** A green play button icon in the top right of the editor window is highlighted with a red arrow, labeled **3. Run SQL**.
- SQL Results:** The bottom right pane shows the execution results. A red arrow points to the results table, labeled **4. Inspect Results**.

Status	Operation	Date	Connecti..	Result1
✓	Succe SELECT v...	12/7/13 ...	SAMPLE	Query execution time => 26 ms Script: \.sqlxeditor_project\Script9.sql Database Name: SAMPLE Authorization Id (Database): db2admin System/IP Address : svl-tkleung/9.48.102.2 User Id (System) : leungtk

So I want to run a script but stop it
in the middle to inspect the results

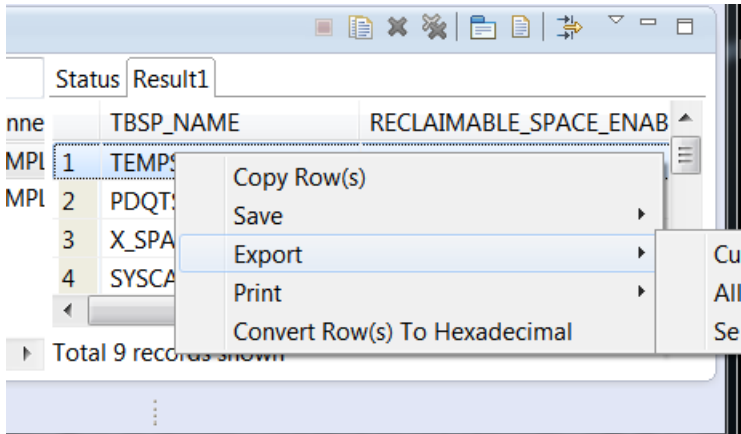
Adding a Checkpoint



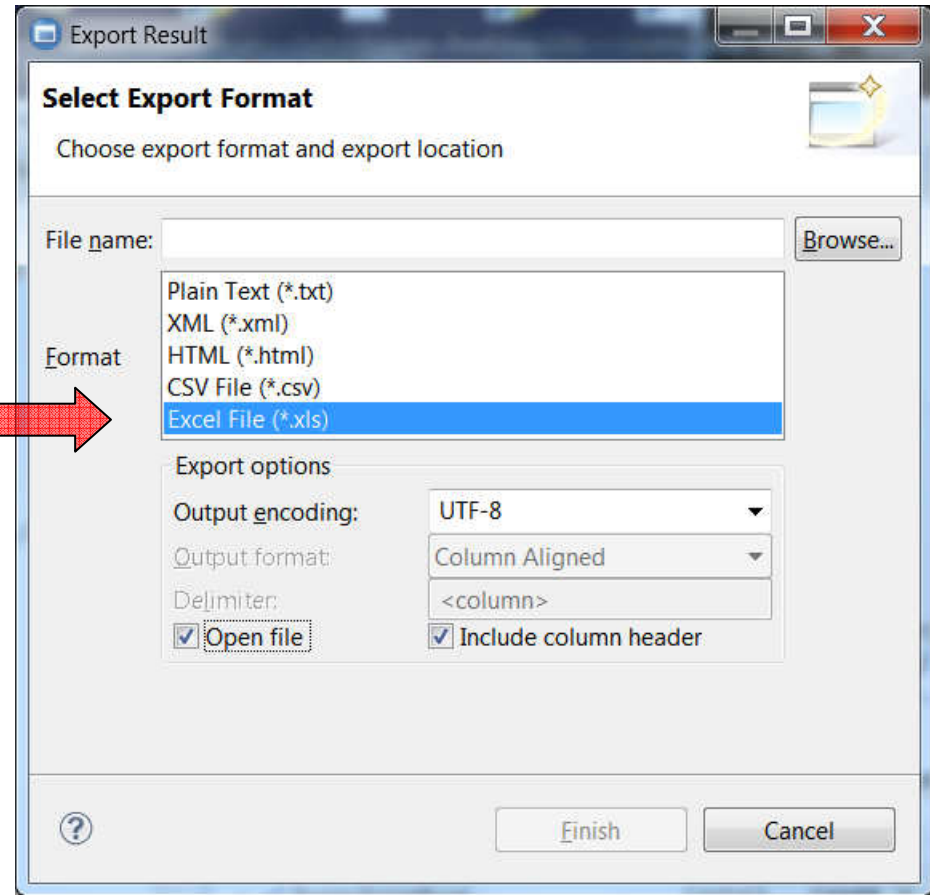
Checkpoints pauses the script so you can inspect results before continuing

I want to export my results to a spreadsheet

Export Results to Excel

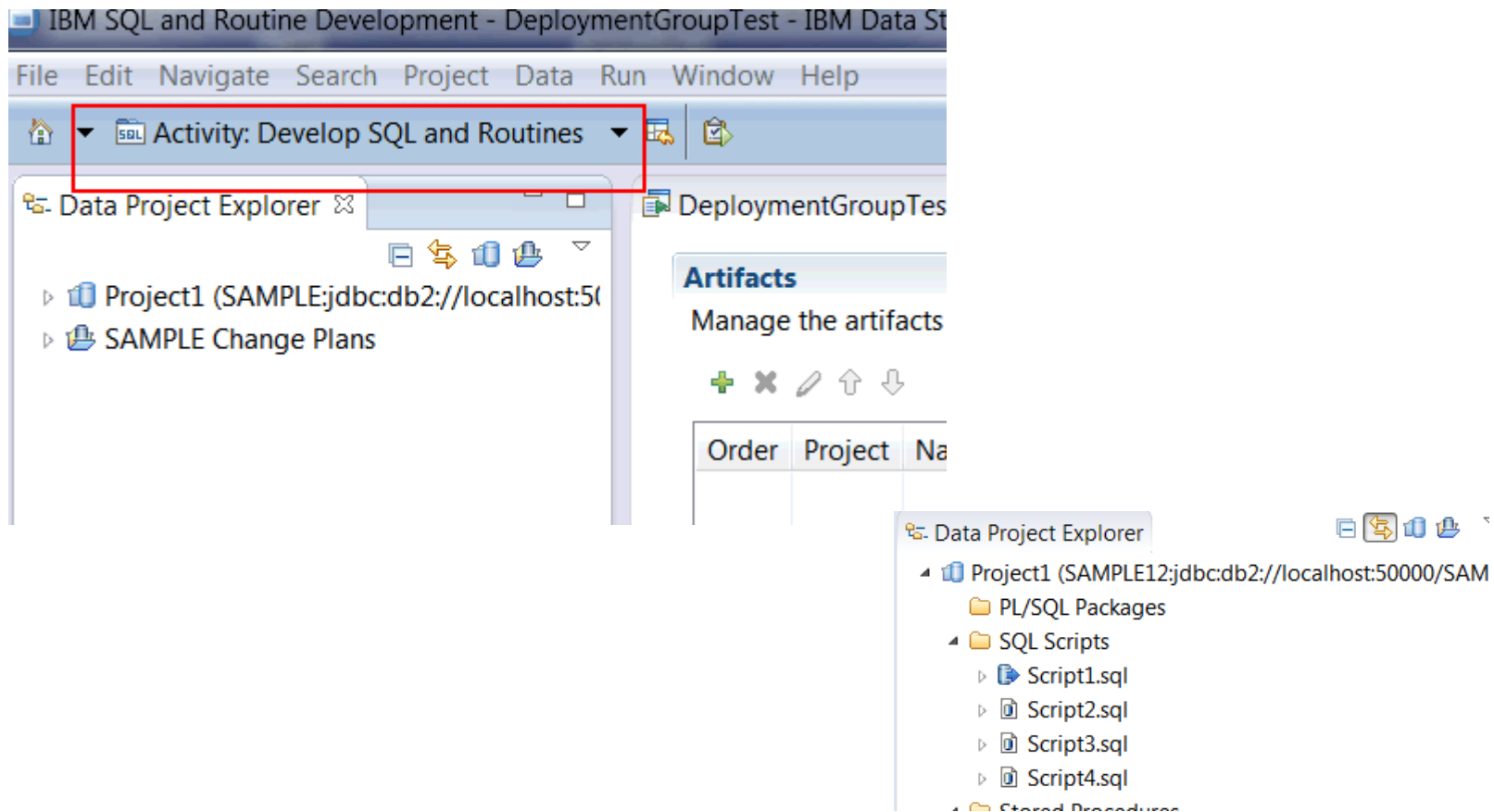


Supports Multiple Export Formats

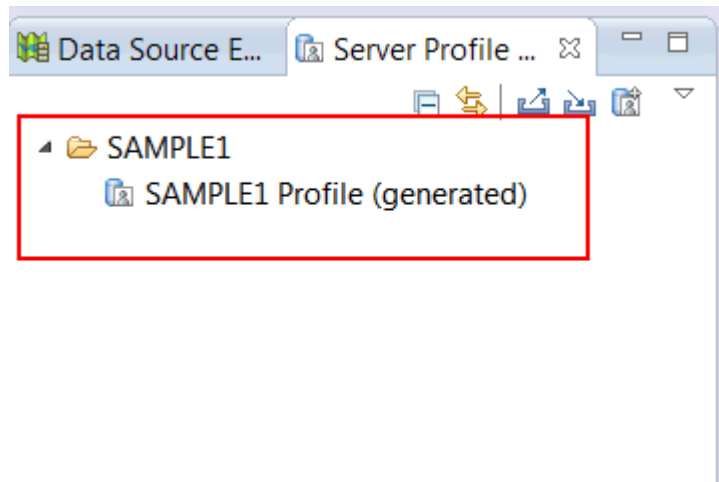


I have a script that I want to run against multiple databases

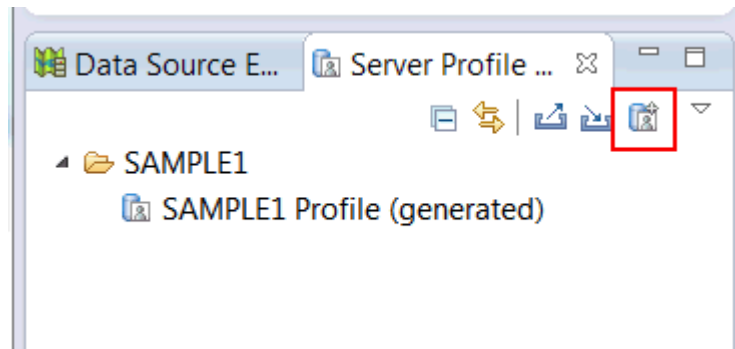
Use the "Develop SQL and Routines" activity to develop SQL scripts to deploy:



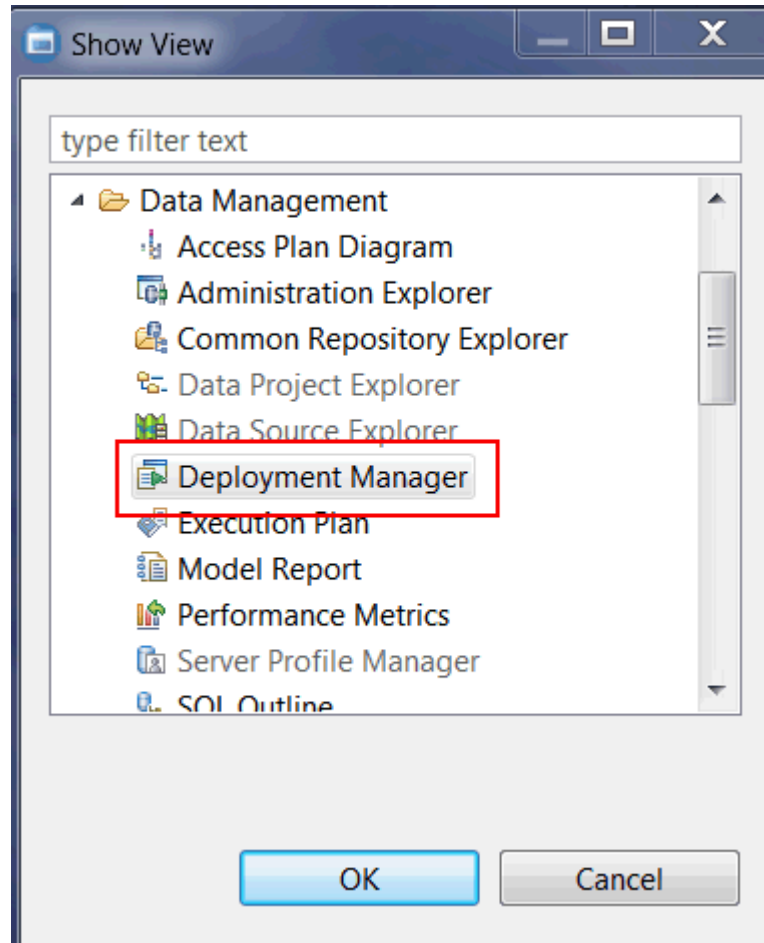
To deploy the scripts to multiple servers, you want to have server profiles for each of the server that you need to deploy your SQL to:



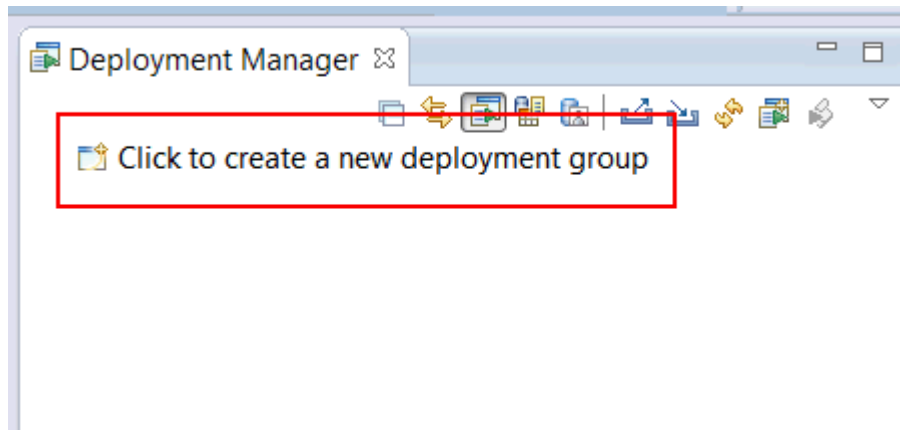
Some may have been created automatically for you. To create the missing ones, use the "New Server Profile" Button:



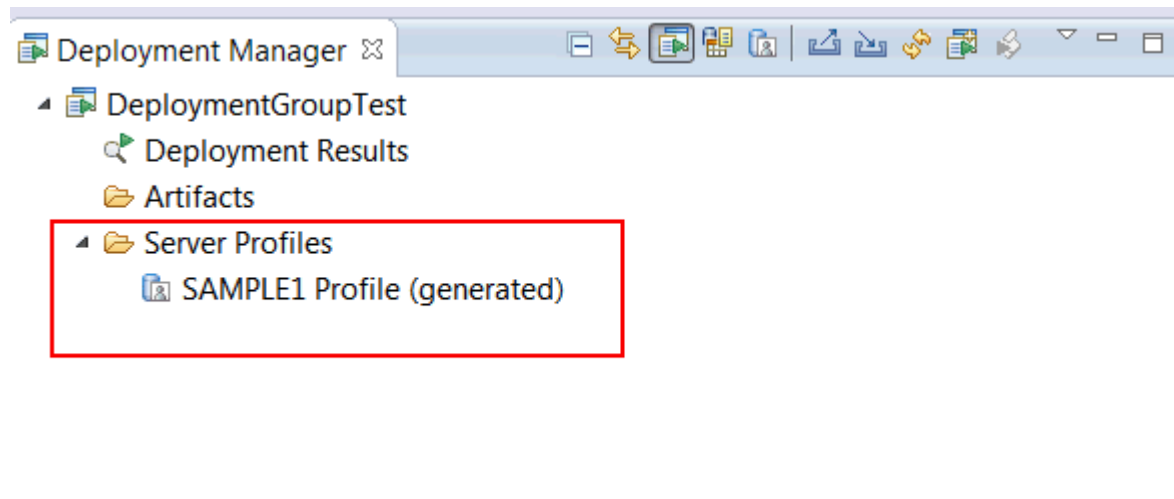
Use Window->Show View to open Deployment Manager:



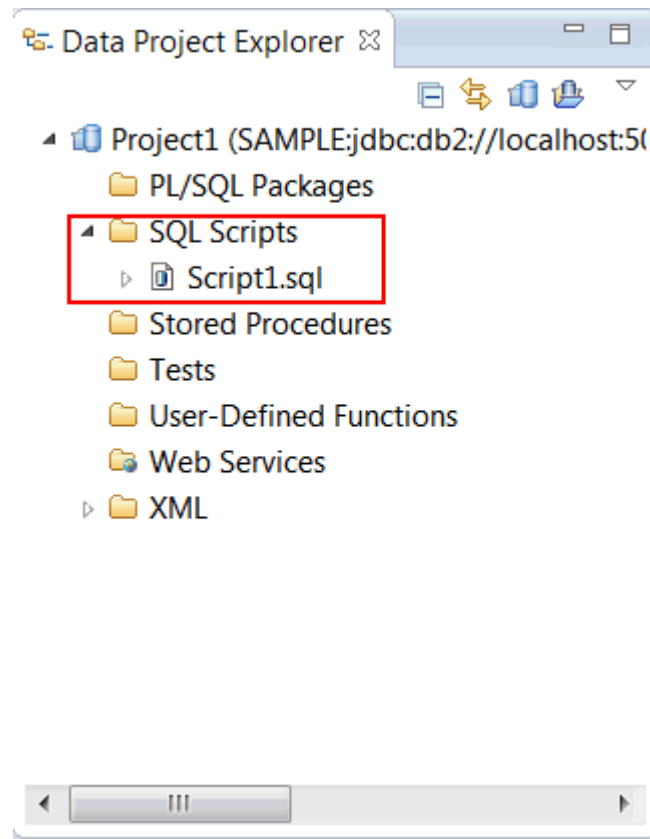
Click on the icon to create a new deployment group



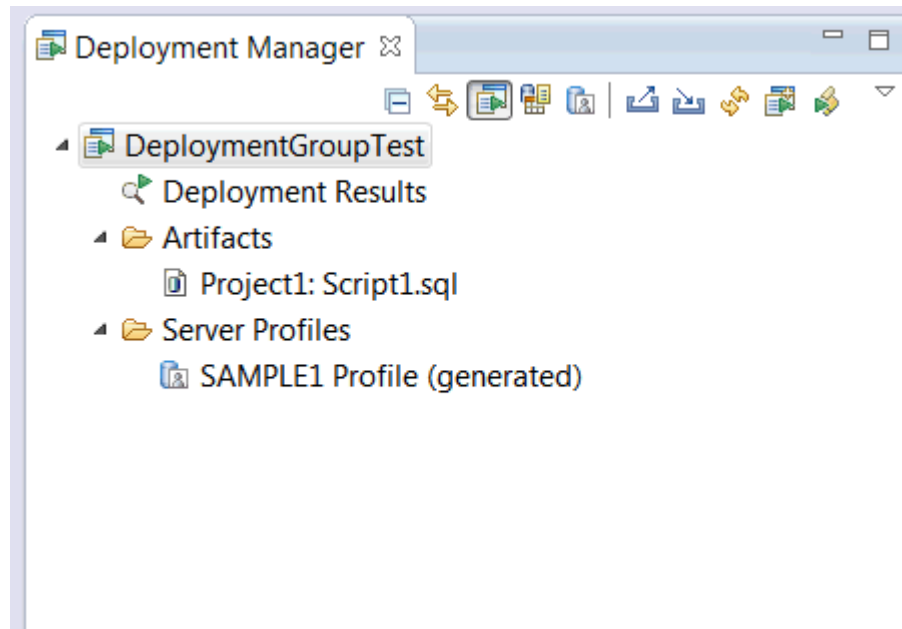
Once a deployment group is created, you can drag/drop your server profiles to the "Server Profiles" folder:



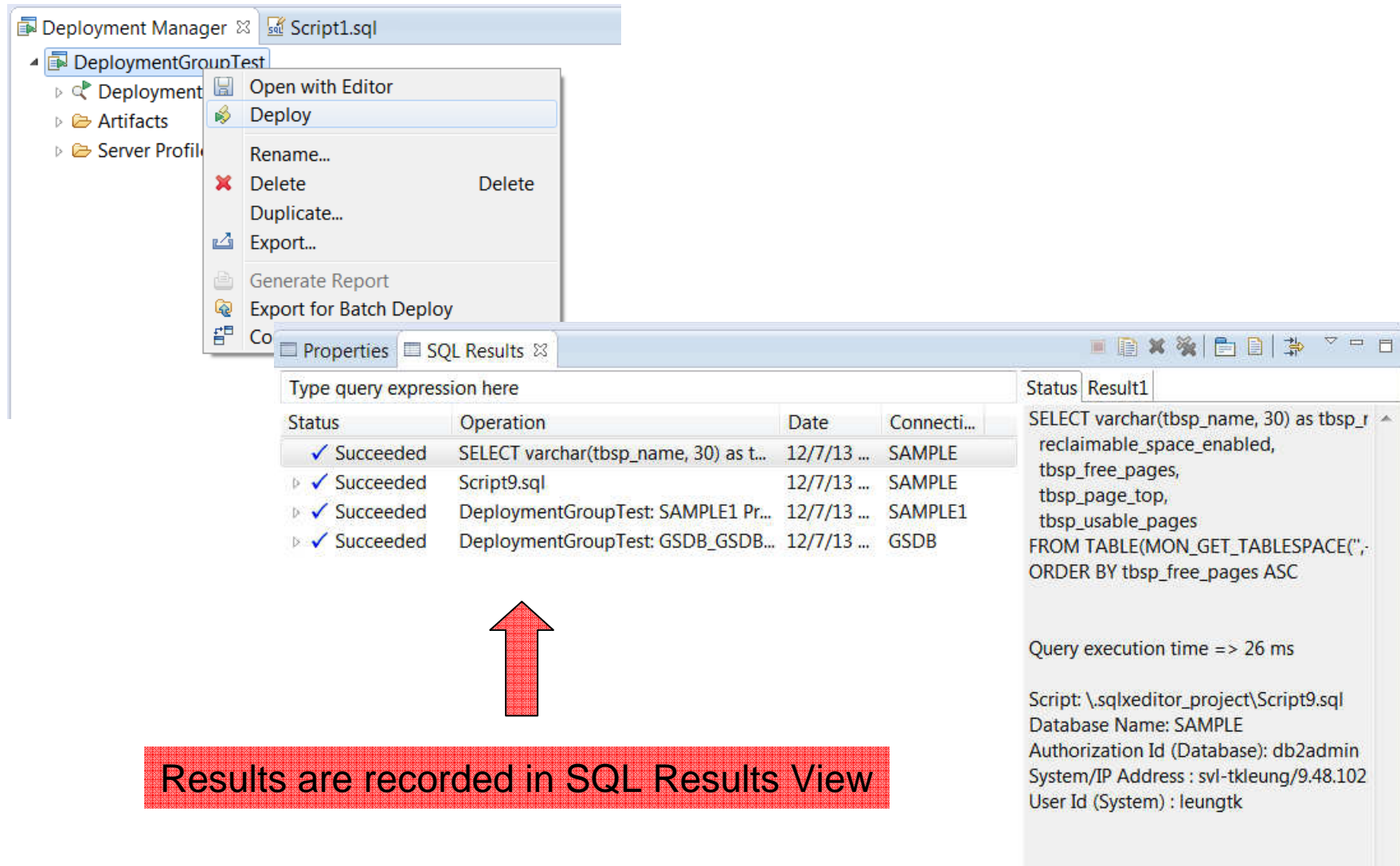
Use a Data Development Project to hold SQL scripts. You can create your own in the Data Project Explorer:



Once scripts are created, you can drag drop these scripts to the "Artifacts Folder" in your deployment group:



Use Deploy to deploy scripts to servers in Server Profiles



The screenshot displays the IBM Deployment Manager interface. A context menu is open over a file named 'Script1.sql', with the 'Deploy' option highlighted. The 'SQL Results' view is active, showing a table of deployment operations. A red arrow points from a text box at the bottom to the 'SQL Results' view.

Status	Operation	Date	Connecti...
✓ Succeeded	SELECT varchar(tbsp_name, 30) as t...	12/7/13 ...	SAMPLE
✓ Succeeded	Script9.sql	12/7/13 ...	SAMPLE
✓ Succeeded	DeploymentGroupTest: SAMPLE1 Pr...	12/7/13 ...	SAMPLE1
✓ Succeeded	DeploymentGroupTest: GSDB_GSDB...	12/7/13 ...	GSDB

Results are recorded in SQL Results View

```
SELECT varchar(tbsp_name, 30) as tbsp_r
reclaimable_space_enabled,
tbsp_free_pages,
tbsp_page_top,
tbsp_usable_pages
FROM TABLE(MON_GET_TABLESPACE(");
ORDER BY tbsp_free_pages ASC

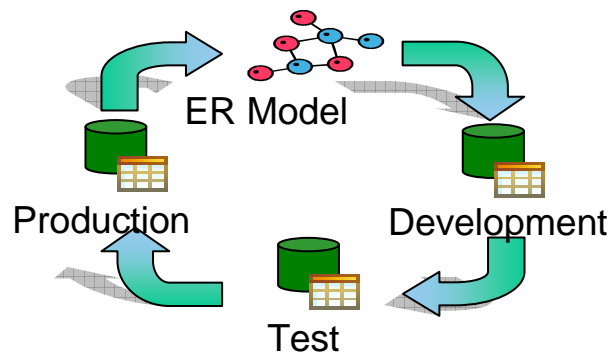
Query execution time => 26 ms

Script: \sqlxeditor_project\Script9.sql
Database Name: SAMPLE
Authorization Id (Database): db2admin
System/IP Address : svl-tkleung/9.48.102
User Id (System) : leungtk
```

What's the difference between my Development And Test Database

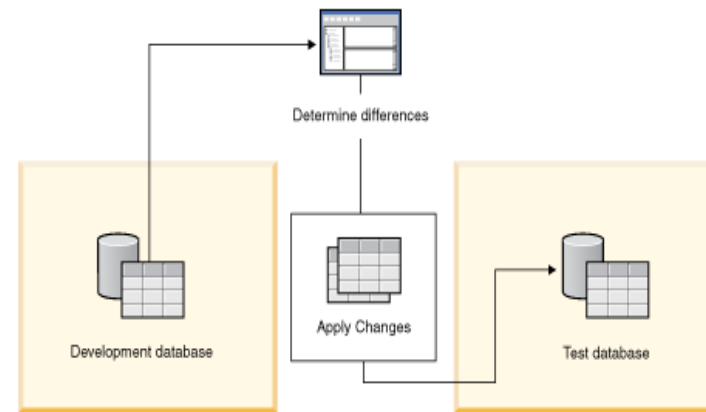
Migrate complex changes

Ideal Change Flow



Database shops have multiple database tiers i.e. development, test, and production.

Figure 1. The process of migrating changes from one database environment to another



Migrate and Sync Single Object

Migrate a data object as new one

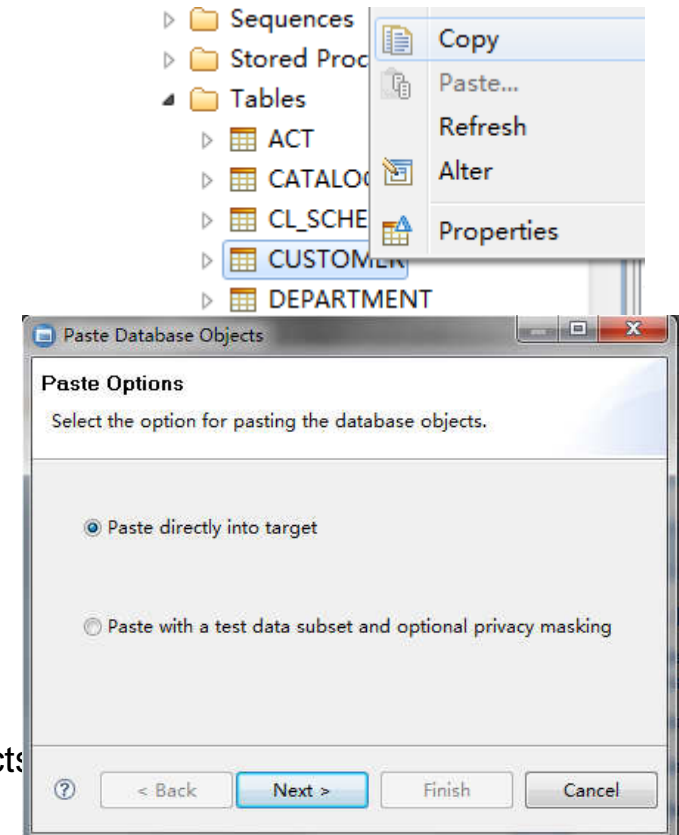
- Approach in Data Studio: Copy/Paste

- ✓ *copy the objects homogeneously*
- ✓ *copy database objects heterogeneously*

- Note:

- ✓ Not intended for copying large databases
- ✓ The object limit includes all of the dependent
and contained objects for the selected objects
- ✓ Exclude dependent and contained objects from

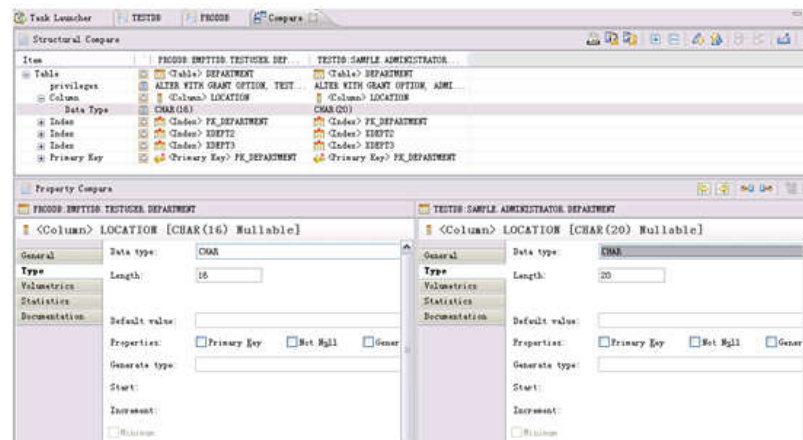
the copy process by using options on the Source/Target page in the Paste Database Objects wizard



Migrate and Sync Single Object

Migrate and Sync a data object to an exist one

- Approach in Data Studio: Compare With Another Object...



- Steps:

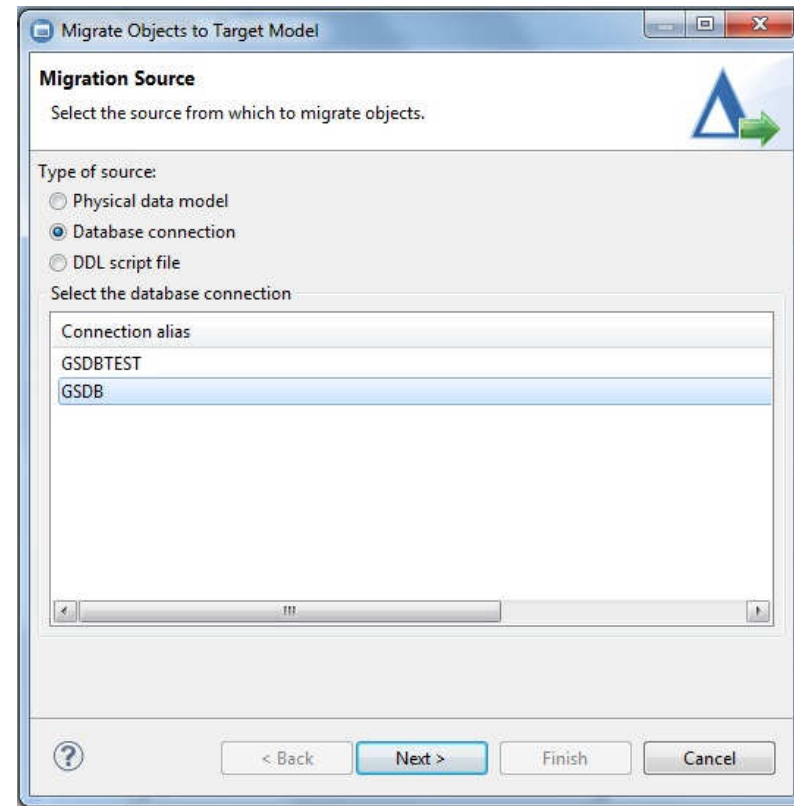
- ✓ Open Compare Editor
- ✓ Browse and Copy Changes
- ✓ Generate delta DDL and deploy changes to database

Compare and Migrate Objects

Sync GSDB and GSDBTEST

- Painpoints in migration plan:
 - ✓ Identify Changes together
 - ✓ Impact analyze for all modified objects together
 - ✓ Run DB commands together
 - ✓ Rollback changes if error occur
- Steps:

1. Identify source type and select corresponding database to migrate



Compare and Migrate Objects

2. Filter objects

Choose Source Objects
Select the source object type and specify the objects that you want to compare and migrate.

Select Object Type

- Buffer Pools
- Partition Groups
- Schemas
- Storage Groups
- Table Spaces

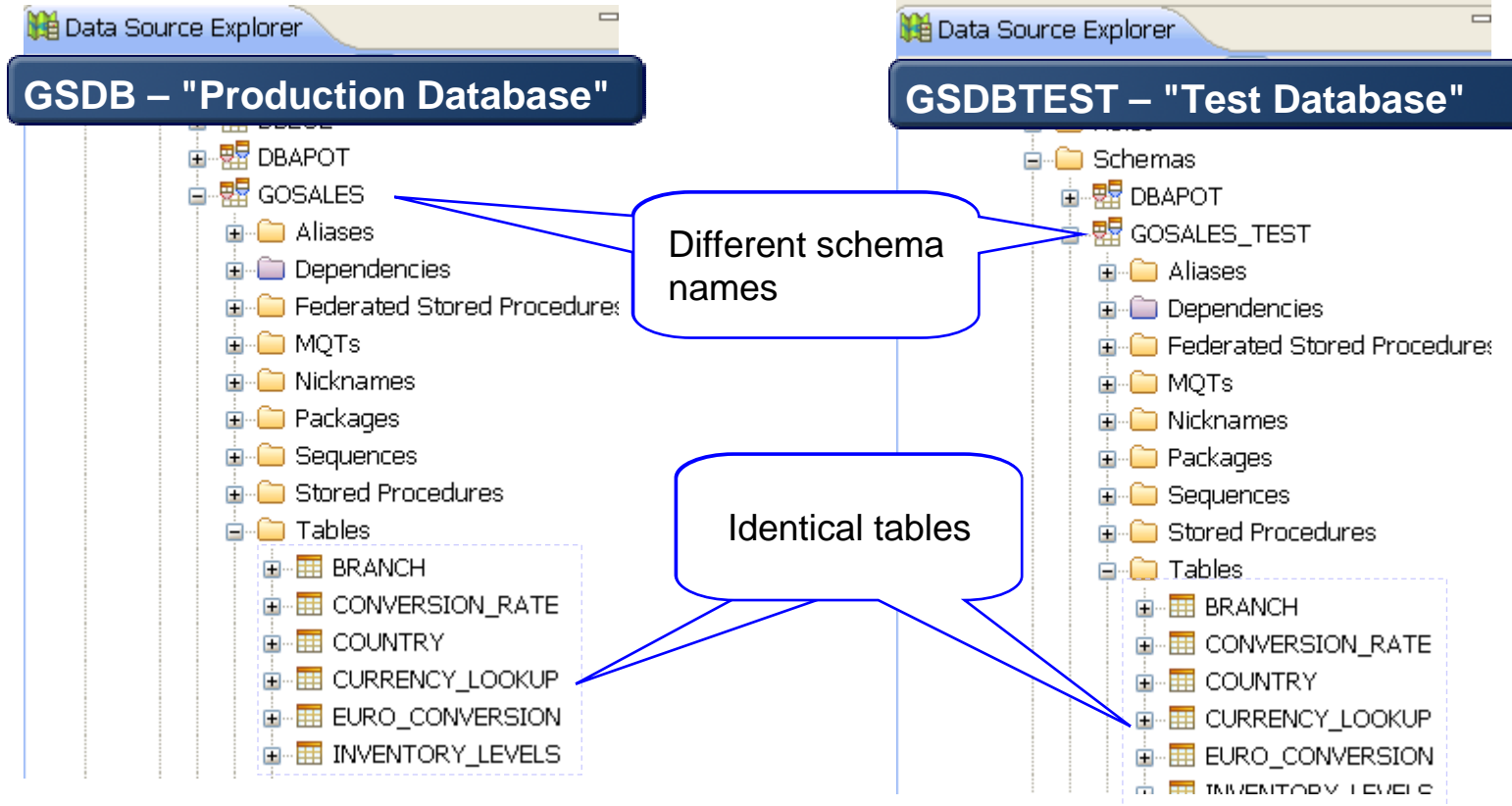
Database Object Selection

Name	Like	%
<input checked="" type="checkbox"/>	GOSALES	
<input checked="" type="checkbox"/>	GOSALESCT	
<input checked="" type="checkbox"/>	GOSALESDW	
<input checked="" type="checkbox"/>	GOSALESHR	
<input checked="" type="checkbox"/>	GOSALESMR	
<input checked="" type="checkbox"/>	GOSALESRT	
<input type="checkbox"/>	NULLID	
<input type="checkbox"/>	SQLJ	
<input type="checkbox"/>	YUANFENG	

Objects to Compare and Migrate

- <Schema> GOSALESRT
- <Schema> GOSALESMR
- <Schema> GOSALESHR
- <Schema> GOSALESDW
- <Schema> GOSALESCT

False Positives



Filter Out False Database Objects - Ignores

Ignore the difference

Migrate Objects to Target Model

Specify any Masks and Ignores

Specify any filters to simplify object comparison. Masks change the object names to match the target model and ignores remove the objects from the comparison.

Masks Ignores

Specify the database object that you want to ignore.

Ignore Database Object

Database Object	TABLESPACES	Add Ignore
BPNAME	TABLESPACES	
TABLESPACES	INDEX	
	SCHEMA	
	CONTAINER	
	AUTHORIZATION	

TABLESPACES

TABLESPACES

INDEX

SCHEMA

CONTAINER

AUTHORIZATION

+

Filter Out False Database Objects - Ignores

Filter out those false positive

Before

Item	[Source]GSDB	[Target]GSDBTEST
Database	<Database> GSDB	<Database> GSDBTEST
name	GSDB	GSDBTEST
Regular Table Space	<Regular Table Space> GOSAL...	
Schema	<Schema> GOSALESCT	
Schema	<Schema> GOSALESDW	
Schema	<Schema> GOSALESHR	
Schema	<Schema> GOSALESMR	
Schema	<Schema> GOSALESRT	
Schema	<Schema> GOSALES_TEST	<Schema> GOSALES_TEST
owner	name: SYSIBM,	name: YUANFENG,
Package	<Package> P2013178337	
Package	<Package> P89945495	
Stored Procedure	<Stored Procedure> ASSIGNS	
Stored Procedure	<Stored Procedure> VERIF...	
Table	<Table> BRANCH	<Table> BRANCH
Table	<Table> CONVERSION_RATE	<Table> CONVERSION_RATE
Table	<Table> COUNTRY	<Table> COUNTRY
Table	<Table> CURRENCY_LOOKUP	<Table> CURRENCY_LOOKUP
Table	<Table> EURO_CONVERSION	<Table> EURO_CONVERSION
Table	<Table> INVENTORY_LEVELS	<Table> INVENTORY_LEVELS
Table	<Table> ORDER_DETAILS	<Table> ORDER_DETAILS
Table	<Table> ORDER_HEADER	<Table> ORDER_HEADER

After

Item	[Source]GSDB	[Target]GSDBTEST
name	GSDB	GSDBTEST
Schema	<Schema> GOSALESCT	
Schema	<Schema> GOSALESDW	
Schema	<Schema> GOSALESHR	
Schema	<Schema> GOSALESMR	
Schema	<Schema> GOSALESRT	<Schema> GOSALESRT
Schema	<Schema> GOSALES_TEST	<Schema> GOSALES_TEST
owner	name: SYSIBM,	name: YUANFENG,
Package	<Package> P2013178337	
Package	<Package> P89945495	
Stored Procedure	<Stored Procedure> ASSIGNS	
Stored Procedure	<Stored Procedure> VERIF...	
Table	<Table> BRANCH	<Table> BRANCH
Table	<Table> CONVERSION_RATE	<Table> CONVERSION_RATE
Table	<Table> COUNTRY	<Table> COUNTRY
Table	<Table> CURRENCY_LOOKUP	<Table> CURRENCY_LOOKUP
Table	<Table> EURO_CONVERSION	<Table> EURO_CONVERSION
Table	<Table> INVENTORY_LEVELS	<Table> INVENTORY_LEVELS
Table	<Table> ORDER_DETAILS	<Table> ORDER_DETAILS
Table	<Table> ORDER_HEADER	<Table> ORDER_HEADER

Compare and Migrate Objects

3. Mask and Ignore database objects

Specify any Masks and Ignores

Specify any filters to simplify object comparison. Masks change the object names to match the target model and ignores remove the objects from the comparison.



Masks

Ignores

Specify the database object that you want to mask

Database object

SCHEMA

In mask

GOSALES

Out mask

GOSALES_

Add Mask

Database Object	In mask	Out mask	
SCHEMA	GOSALES	GOSALES_TEST	✖

Compare and Migrate Objects

source and target ,copy the relative change want to apply

Review and Apply Changes

The Structural Comparison table displays the source model on the left and the target model on the right. Use the up and down arrows to find the differences between the models. Use the right arrow to copy a difference to the target model.

Structural Compare

Item	[Source]GSDB	[Target]GSDBTEST
name	GSDB	GSDBTEST
Schema	<Schema> GSALESCT	
Schema	<Schema> GSALESDW	
Schema	<Schema> GSALESHR	
Schema	<Schema> GSALESMT	
Schema	<Schema> GSALESRT	<Schema> GSALESRT
Schema	<Schema> GSALES_TEST	<Schema> GSALES_TEST
owner	name: SYSIBM,	name: YUANFENG,
Package	<Package> P2013178337	<Package> P2013178337
Package	<Package> P89945495	<Package> P89945495
Stored Procedure	<Stored Procedure> ASSIGNST...	<Stored Procedure> ASSIGNST...
Stored Procedure	<Stored Procedure> VERIFY_DA...	<Stored Procedure> VERIFY_DA...
Table	<Table> BRANCH	<Table> BRANCH
Table	<Table> CONVERSION_RATE	<Table> CONVERSION_RATE
Table	<Table> COUNTRY	<Table> COUNTRY
Table	<Table> CURRENCY_LOOKUP	<Table> CURRENCY_LOOKUP
Table	<Table> EURO_CONVERSION	<Table> EURO_CONVERSION
Table	<Table> INVENTORY_LEVELS	<Table> INVENTORY_LEVELS
Table	<Table> ORDER_DETAILS	<Table> ORDER_DETAILS
Table	<Table> ORDER_HEADER	<Table> ORDER_HEADER

Property Compare

	[Source]GSDB	[Target]GSDBTEST
	<Table> PRODUCT_FORECAST	<Table> PRODUCT_FORECAST
General	Name: PRODUCT_FORECAST	Name: PRODUCT_FORECAST
Columns	Label:	Label:

Identify the difference

Compare and Migrate Objects

5. Click Preview Commands to generate change DDL

The screenshot shows the 'Generate DDL' dialog box in IBM Data Studio. At the top, it indicates the connection is 'localhost - DB2 for Linux, UNIX, and Windows - GSOBTEST'. There are three checked options: 'Generate undo commands', 'Specify a file location that both a DB2 fenced user and instance owner can access:', and 'Save data: C:\'. Below these are buttons for 'Column Mapping...', 'Advanced Options...', and 'Refresh DDL'. The main area contains a list of SQL commands for creating and altering tables and schemas. At the bottom, there are 'Deployment options' with three radio buttons: 'Edit commands (Stop using a change plan and open the SQL and XQuery editor)', 'Schedule to run as a job (Opens the Job Manager of the Data Studio web console)', and 'Deploy the change plan (Commands are run in auto-commit mode)'. A 'Finish' button is visible at the bottom right.

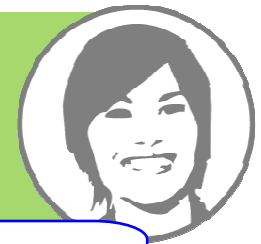
Can also generate Undo to roll back change

Application DBA can send to Operation DBA, and schedule the time to run

I want to make changes to my database

Object Management

Improve DBA productivity and reduce application outages by automating and simplifying complex DB2 structural changes.



■ **Improve DBA efficiency**

- Multiple changes in one plan
- Saves and restores data for extended alters, ensure data integrity
- Automatically manages dependent objects, mitigates risk related objects changes.
- Analyzes and reorders changes if necessary.
- Generates needed maintenance commands
- Schedule changes with Data Studio Web Console.

Schema	Name	Operation	Row Count
DB2ADMIN	EMPLOYE	ALTER	36
DB2ADMIN	EMP_B	CREATE	0
AA	TEST	DROP	4
DB2ADMIN	EMP_V1	CREATE	0
DB2ADMIN	EMP_RESULT_I...	CREATE	0

Schema	Name	Perce...	Row Count	Log Mode	Primary Key
DB2ADMIN	EMP_RESULT	0			
AA	TEST	0			
DB2ADMIN	ACT	0	0		SQL130202214...
DB2ADMIN	APPLICATION	0	0		
DB2ADMIN	CATALOG	0	0		PK_CATALOG
DB2ADMIN	CL_SCHED	0	0		

Object Management

- **Reduce errors and downtime**
 - Provides impact analysis visualization
 - Factors in impacts and side effects automatically
 - Automatically generates commands to rollback changes

Specify a file location that both a DB2 fenced user and instance owner can access:

Save data: C:\ ... Refresh DDL

Column Mapping... Advanced Options ...

```
-- <ScriptOptions statementTerminator=";" />
ALTER TABLE ANNFENG.TEST2 RENAME COLUMN "Column1" TO SYS1 RENAME COLUMN "Column2" TO SYS2 RENAME COLUMN
ALTER TABLE ANNFENG.TEST2 ALTER COLUMN SYS1 SET NOT NULL ALTER COLUMN SYS2 SET NOT NULL ALTER COLUMN TR
ALTER TABLE ANNFENG.TEST2 ALTER COLUMN SYS1 SET DATA TYPE TIMESTAMP(12) ALTER COLUMN SYS2 SET DATA TYPE
CALL SYSPROC.ADMIN_CMD('REORG TABLE ANNFENG.TEST2 USE TEMPSPACE1');
SET INTEGRITY FOR ANNFENG.TEST2 OFF CASCADE DEFERRED;
ALTER TABLE ANNFENG.TEST2 ALTER COLUMN SYS1 SET GENERATED ALWAYS AS ROW BEGIN ALTER COLUMN SYS2 SET GENERATED ALWAYS AS
SET INTEGRITY FOR ANNFENG.TEST2 IMMEDIATE CHECKED FULL ACCESS FORCE GENERATED;
```

DDL with maintenance commands

Review Undo Commands

Review the commands that will undo the changes that were made to the database catalog when the change plan was deployed.

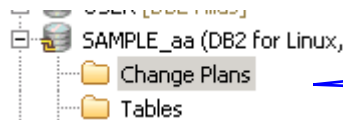
Connection: localhost - DB2 for Linux, UNIX, and Windows - SAMPLE

```
-- <ScriptOptions statementTerminator=";" />
ALTER TABLE ANNFENG.TEST3 RENAME COLUMN SYS1 TO "Column1" RENAME COLUMN SYS2 TO "Column2" RE
ALTER TABLE ANNFENG.TEST3 ALTER COLUMN "Column1" DROP GENERATED ALTER COLUMN "Column2" DROF
ALTER TABLE ANNFENG.TEST3 ALTER COLUMN "Column1" DROP NOT NULL ALTER COLUMN "Column2" DROF I
ALTER TABLE ANNFENG.TEST3 ALTER COLUMN "Column1" SET DATA TYPE CHAR(5) ALTER COLUMN "Column2
CALL SYSPROC.ADMIN_CMD('REORG TABLE ANNFENG.TEST3 USE TEMPSPACE1');
```

Undo Commands to Rollback change

Object Management

- **Foster teamwork and enhance audit ability**
 - Integrate into InfoSphere Data Architect
 - Integrate with High Performance Unload for large data set
 - Documents changes for collaboration and audit



View all history change plans

Default Change...	1	2013-09-23		Pending
Default Change...	2	2013-10-13		Pending
Default Ch		13-09-24	2013-09-24	Deployed
Default Ch		13-10-13	2013-10-13	Deployed
Default Ch		13-10-10	2013-10-10	Deployed
Default Ch		13-09-24	2013-09-24	Deployed
Default Ch		13-09-23		Pending
Default Ch		3-10-13	2013-10-13	Deployed
Default Ch		3-10-13	2013-10-13	Deployed
Default Ch		3-10-13		Pending
Default Ch		3-09-24	2013-09-24	Deployed

Deployed scripts, Report, undo scripts

Impact Analysis

1. Select object in Object List

Schema	Name	Perce...	Row Count
GOSALES	VERIFY	0	
GOSALESCCT	CUST...		17
GOSALESCCT	CUST...		23
GOSALESCCT	CUST...		31255
GOSALESCCT	CUST...		900
GOSALESCCT	CUST...		31255
GOSALESCCT	CUST...		31255
GOSALESCCT	CUST...		338
GOSALESCCT	CUST...		39
GOSALESCCT	CUST...		60252
GOSALESCCT	CUST...		30380

2. Select Analyze Impact... on database object

3. Diagram of relationship

4. List of relationship

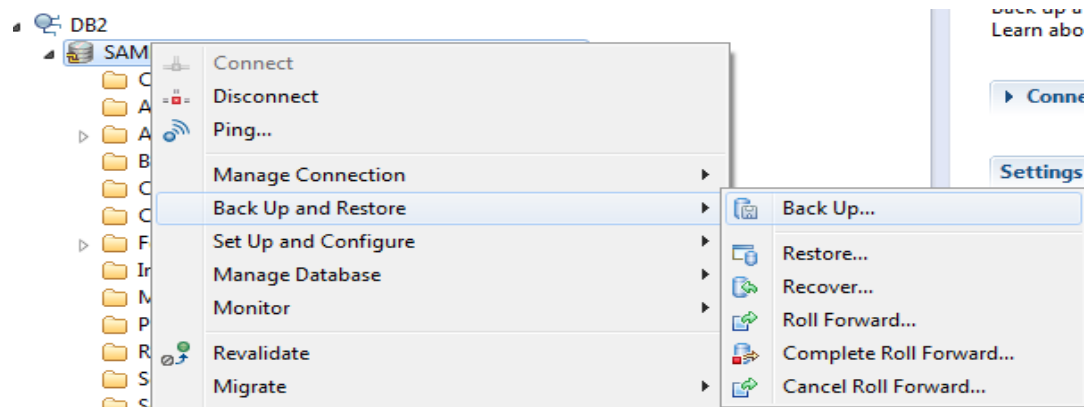
Dependent Object	Dependent Obj...	Impactor Object	Impactor Objec...	Relati
GOSALESCCT...	Table	GOSALESCCT...	Table	Refer
GOSALESCCT...	Table	GOSALESCCT...	Table	Refer
GOSALESCCT...	Table	GOSALESCCT...	Table	Refer
GOSALESCCT...	Table	GOSALESCCT...	Table	Refer
GOSALESCCT...	Table	GOSALESCCT...	Table	Refer
GOSALESCCT...	Table	GOSALESCCT...	Table	Refer
GOSALESCCT...	Table	GOSALESCCT...	Table	Refer

5. View relationships using Overview Diagram

What about Running Utilities

Backup a database

1. Click the Back Up menu



Back up a database

2. Specify options

Task Launcher SAMPLE Back up SAMPLE

Back up SAMPLE

Back up a database or table space.
Learn about [backing up a database](#). View the [command reference](#).

▶ Connection : localhost - DB2 - SAMPLE

Settings

Specify any additional settings to use. Click Run when you are done.

🔍 [Preview Command](#) ▶ Run

- Backup Information
- Backup Type
- Backup Image**
- Backup Options
- Backup Performance

Specify where to store your backup image

Specify the type of media on which to store your backup image and the associated options.
File System is the default.

Media type: File System ▼

Backup locations	
E:\tmp	Add...
	Remove
	Browse...

Backup a database

3. Review command and execute, can also go to Edit in SQL Editor and schedule in Web Console

Edit Run Save...

```
CONNECT TO SAMPLE;  
QUIESCE DATABASE IMMEDIATE FORCE CONNECTIONS;  
CONNECT RESET;  
DEACTIVATE DATABASE SAMPLE;  
BACKUP DATABASE SAMPLE TO "E:\tmp" EXCLUDE LOGS WITHOUT PROMPTING;  
CONNECT TO SAMPLE;  
UNQUIESCE DATABASE;  
CONNECT RESET;
```

Messages

Progress
Start time: 11/21/2013, 17:07:24



Looking at Data

Browsing Data

SYSIBMADM	TAD	false	true	true	true
SYSIBMADM	TBSP_UTILIZATION	false	true	false	false
SYSIBMADM	TOP_DYNAM	Show			false
SYSIBMADM	USER_ALL_T	Load			false
SYSIBMADM	USER_ARGUI	Unload			false
SYSIBMADM	USER_CATA	Data			Browse Data
SYSIBMADM	USER_COL	Analyze Impact...			Edit Data
SYSIBMADM	USER_CONS	Compare With			New "Select" Script
SYSIBMADM	USER_DEPEN				

Task Launcher SAMPLE SYSIBMADM.TBSP_UTILIZATION

SYSIBMADM.TBSP_UTILIZATION

TBSP_CREATE_TIME [TIMESTAMP]	TBSP_STATE [VARCHAR(256)]	TBSP_TOTAL_SIZE_KB [DECFLOAT(34)]	TBSP.
2013-01-30 18:15:52.648	NORMAL	131072	13104
2013-01-30 18:15:52.659	NORMAL	8	8
2013-01-30 18:15:52.659001	NORMAL	65536	65280
2013-01-30 18:18:55.51	NORMAL	32768	32736
2013-02-02 21:41:17.327	NORMAL	229376	22912
2013-05-21 13:41:07.489	NORMAL	9984	9216
2013-05-23 13:36:53.708	NORMAL	7680	6912
2013-05-23 13:37:47.898	NORMAL	7680	6912
2013-08-09 14:53:55.717	NORMAL	8	8

Filter data result

Table Data Filter

Column Selection

Search

Available Columns

- SNAPSHOT_TIMESTAMP
- TBSP_ID
- TBSP_NAME
- TBSP_TYPE
- TBSP_CONTENT_TYPE
- TBSP_CREATE_TIME
- TBSP_STATE

Add >

Add All >>

< Remove

<< Remove All

Move Up

Move Down

Selected Columns	Sort Type	Sort Order
------------------	-----------	------------

Row Selection Conditions

Column	Operator	Value
TBSP_NAME	=	USERSPACE1


Add

Remove

Remove All

Match all conditions Match any conditions

Rows To Return: 500

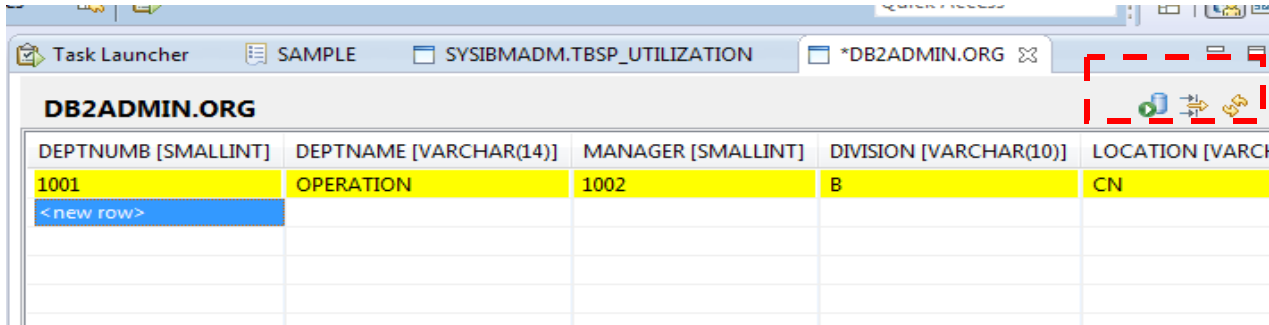
 You have not selected any columns. Select the columns that you want to display and add them to the Selected Columns list.

OK Cancel

Edit Data

Highlight the changed row.

Click  icon or Save ,Ctrl+S to commit the change



The screenshot shows a database management interface with a table titled "DB2ADMIN.ORG". The table has five columns: DEPTNUMB [SMALLINT], DEPTNAME [VARCHAR(14)], MANAGER [SMALLINT], DIVISION [VARCHAR(10)], and LOCATION [VARCHAR(10)]. The first row is highlighted in yellow and contains the values 1001, OPERATION, 1002, B, and CN. Below the first row is a blue row labeled "<new row>". The interface also shows a task launcher with tabs for SAMPLE, SYSIBMADM.TBSP_UTILIZATION, and *DB2ADMIN.ORG. A red dashed box highlights the save icon in the top right corner of the table area.

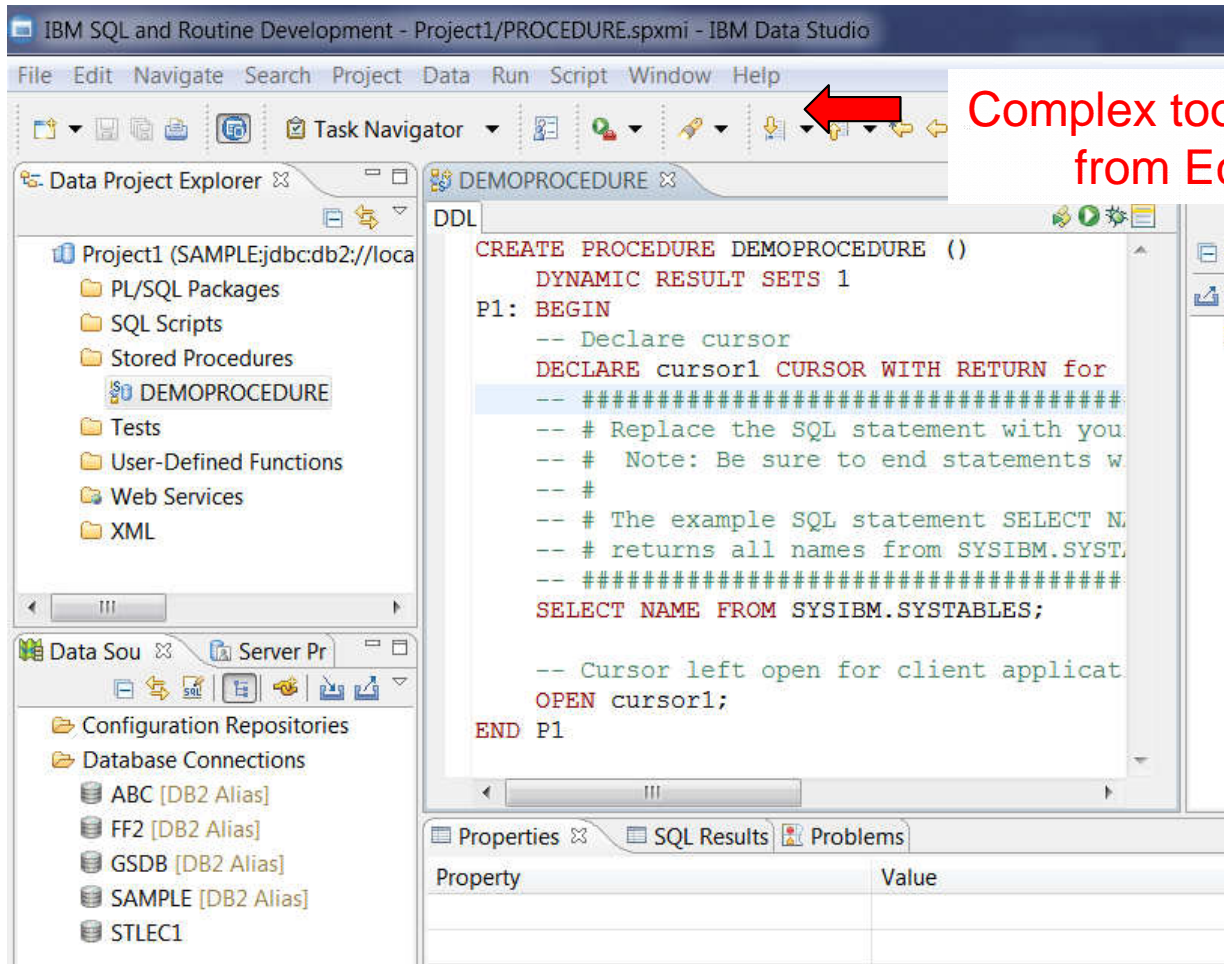
DEPTNUMB [SMALLINT]	DEPTNAME [VARCHAR(14)]	MANAGER [SMALLINT]	DIVISION [VARCHAR(10)]	LOCATION [VARCHAR(10)]
1001	OPERATION	1002	B	CN
<new row>				

Coming improvements

New Simplified UI

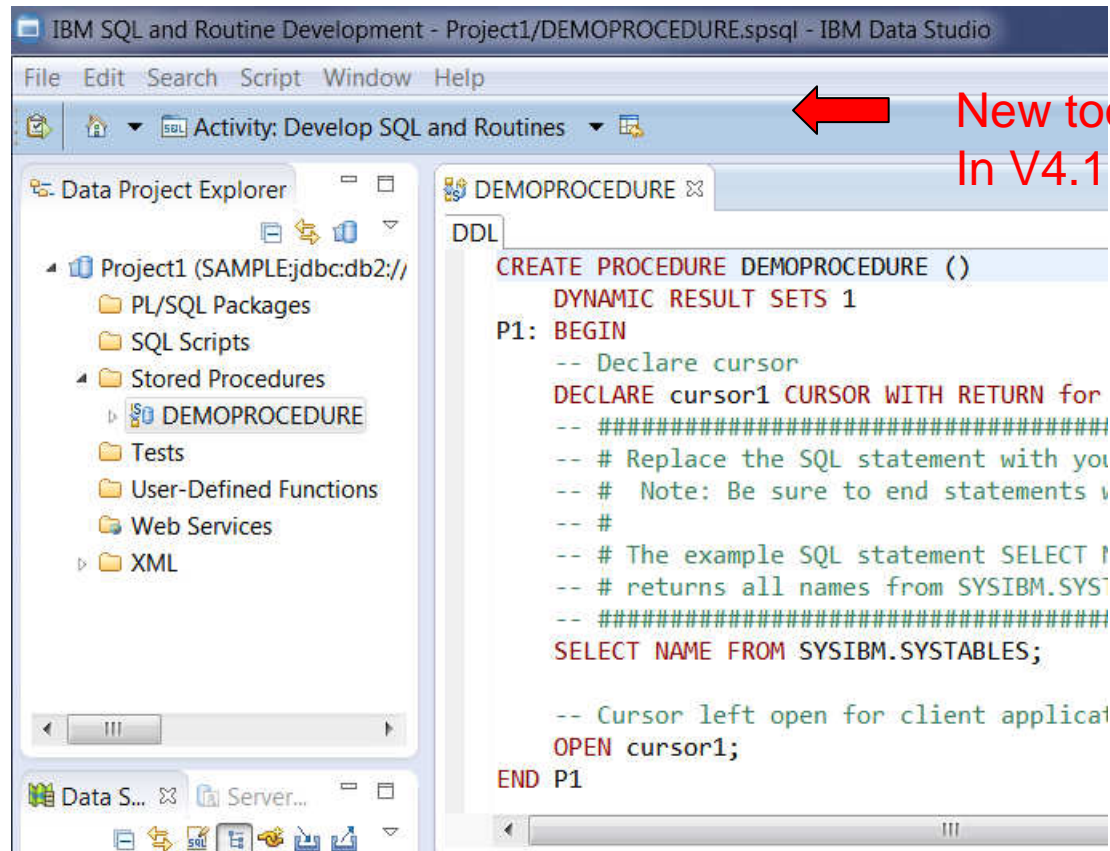
- A lot of users use only Data Studio to run queries against DB2. They feel uncomfortable with the complexities of Data Studio.
- We designed a new UI by removing features that are not used by these users, making Data Studio simpler for them to use.
- We also extended this simplification to Data Studio itself by removing some of the Eclipse features that Data Studio users will not use from the user interface.

Data Studio 3.2



Complex toolbar and menus from Eclipse

Data Studio 4.1



Enterprise Deployment Support

- Allows a DBA to set up Data Studio and include the preference settings as part of a customized install image. Users who install with the customized install image will pick up the preferences that the DBA had set up, including connection information, query tuning settings, Data Studio Preferences, etc.

Optim Query Workload Tuner Agenda

- Overview
- Access Plan Graph and Access Plan Explorer
- Workload Statistics Advisor

OQWT Single Query Tuning

- Single query tuning features sometimes makes sense
 - View access plans and sort operators in the plan explorer to focus on problem areas of the statement
 - Run statistics advisor to determine if any missing statistics make sense

Facilitate Analysis: Access Plan Graph

- Visualize access path
 - See flow of query processing
 - See indexes and operations
 - See optimizer rationale

Description of Selected Node

Displays information about the node that is highlighted in the diagram.

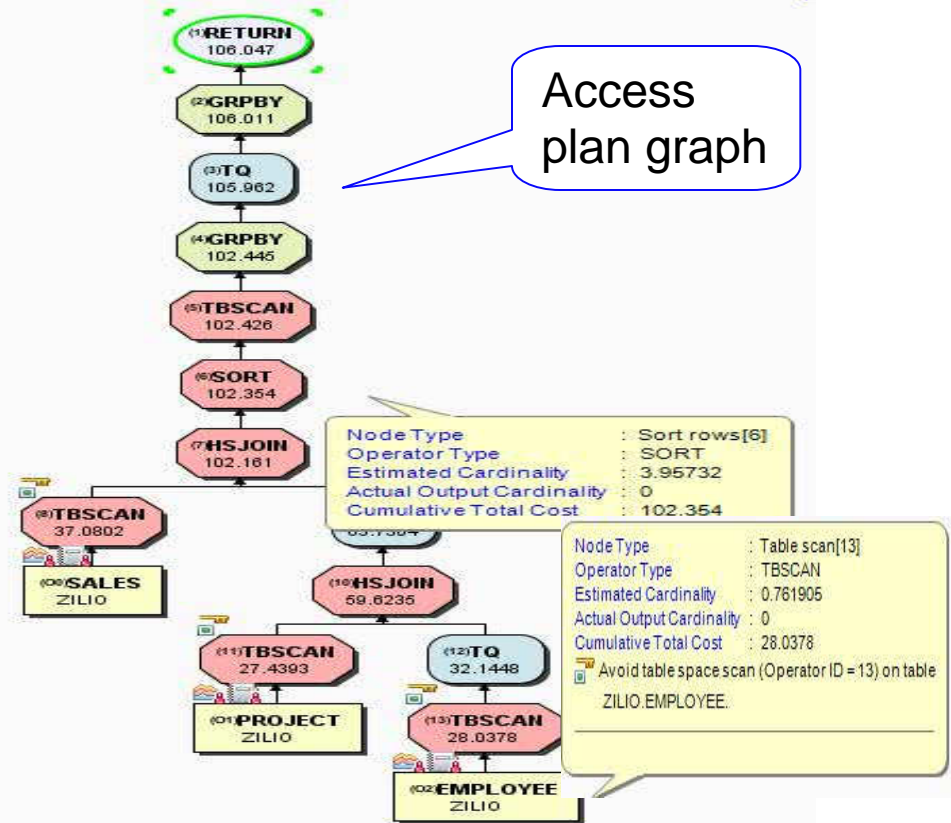
- tbscan
 - Stream
 - Argument Order Class
 - Argument Order Class
 - Argument Order Class
 - Predicates
 - @ predicate
 - @ predicate
 - @ predicate

Attributes

NAME	VALUE
Operator Identifier	13
Operator Type	TBSCAN
Estimated Output Cardinality	0.761905
Actual Output Cardinality	0
Estimated Bufferpool Buffers	1

Description of the Selected Attribute
The actual number of rows returned

Operator details area



Access plan graph

- Assess access path stability to reduce risk of performance regression
 - Is the optimizer able to apply the filtering early?
 - Are there indexes that support an efficient path?
 - Are statistics collected?

Facilitate Analysis: Access Plan Explorer

- View operators with associated measures in one area
- Order operators based on measures to identify hot spots
- View operator details
- View table and index use
- View flow of query operator processing
- See optimizer rationale

Operator with optimizer estimates

Step	Operation	Estimated Rows	Cumulative Total Cost	Cumulative CPU Cost	Cumulative IO Cost	Total Cost
9	Hash join	2,238,660,864	8,644,224.000000	5,876,749,434,880.000000	14,368,071.000000	111,94€
10	Sort rows	2,238,660,864	102,258,296.000000	12,792,254,095,360.000000	25,328,468.000000	93,614,07€
11	Table scan	2,238,660,864	114,364,288.000000	6,633,516,032.000000	36,288,864.000000	12,105,99€
12	Group by	2,238,660,864	114,470,032.000000	69,500,000,272.000000	36,288,864.000000	105,74€
13	Temporary Table Construction	2,238,660,864	124,487,680.000000	73,255,000,000.000000	37,521,608.000000	10,017,64€
14	Table scan	746,220,224	128,050,176.000000	79,485,491,000.000000	38,754,352.000000	3,562,49€
15	Table scan - TPCDS.STORE_SALES	2,838,948,352	7,937,464.500000	2,200,000,000.000000		2,164
16	Table scan - TPCDS.R_DATE_DIM	1,395	368.901611			8
17	Hash join	2,238,660,864	6,049,172.500000	2,000,000,000.000000		7
18	Index scan - SYSIBM.SQ1110308192720660	12,011,616	15,787,048828			7
19	Hash join	2,238,660,864	26,707,516.000000	4,000,000,000.000000		5€

Sort by measures

Operator details area

Streams

Properties

Name	Value
Operator Identifier	30
Operator Type	Table scan
Join input leg	INNER
Maximum pages for prefetch	1
Type of Prefetch	SEQUENTIAL
Scan Direction	FORWARD

Predicates

Predicate Identifier	Predicate text	R
24	Q16.D_YEAR IN (1999, 2000, 2001, 2002)	%

Table

Name	Value
Name	R_DATE_DIM
Schema	TPCDS
Object type	Table
Creation time	2011-03-08 19:28:19.901005

Improve Statistics Quality using the Statistics Advisor

■ Provides advice on:

- Missing statistics
- Conflicting statistics
- Out-of-date statistics
- Base tables and materialized query tables (MQTs)

■ Simplifies use

- Provides Runstats statements
- Run immediately or save

Review Workload Advisor Recommendations

This page shows the recommendations from the advisors that you ran.

Database connection: GSDBORIGv10 (DB2 for Linux, UNIX, and Windows V10.1.0)

Status/Description

Statements Summary Statistics Indexes

The following table lists all of the objects that are referenced in the query workload. You can show only the objects that have recommendations, the objects that have all relevant statistics, or all objects. Select one or more rows and click View RUNSTATS commands to see recommendations.

Automatic statistics collection: is enabled 44 objects have recommendations 1 objects have all relevant statistics

View RUNSTATS Objects to display: Objects that have recommendations

Check to View RUNSTATS	Object	Type	Status	Cardinality	References to Object	Cumulative Total C...	Collection Timestamp	Missing	Conflicting	Obsolete	Cardinality Unknown
<input checked="" type="checkbox"/>	SYSIBM.SYSDATATYPES	TABLE	PROBLEMATIC	63	1	41.579561	2012-08-28 13:31:53	NO	NO	YES	NO
<input checked="" type="checkbox"/>	SYSIBM.SYSCOMMENTS	TABLE	PROBLEMATIC	0	1	102.656982	2012-08-28 13:31:50	YES	NO	YES	YES
<input checked="" type="checkbox"/>	SYSIBM.SYSCOLUMNS	TABLE	PROBLEMATIC	10006	4	834.597454	2012-09-04 09:51:58	YES	NO	NO	NO
<input checked="" type="checkbox"/>	SYSIBM.SYSCOLAUTH	TABLE	PROBLEMATIC	0	1	102.656982	2012-08-28 13:42:40	YES	NO	YES	YES
<input checked="" type="checkbox"/>	SYSIBM.SYSCODEPROP	TABLE	PROBLEMATIC	241	8	1.292.821191	2012-08-28 13:31:57	YES	NO	YES	NO
<input checked="" type="checkbox"/>	GOSALESCT.CUST_ORD...	TABLE	PROBLEMATIC	39389	36	19.461,098.938713	2012-08-28 13:37:13	YES	NO	YES	NO
<input checked="" type="checkbox"/>	GOSALESCT.CUST_ORD...	TABLE	PROBLEMATIC	60252							
<input checked="" type="checkbox"/>	GOSALESCT.CUST_CUS...	TABLE	PROBLEMATIC	31255							
<input checked="" type="checkbox"/>	GOSALES.PRODUCT_N...	TABLE	PROBLEMATIC	6302							

Details for the selected object

Table name: GOSALESCT.CUST_ORDER_HEADER

Columns Frequent Values Quantile Values Column Groups Indexes Conflicts

Column	Cardinality	Low2Key	High2Key	Frequency Co...	Sum of Frequency Value Cou...	Quantile Count	Basic Status	Frequency Stat...	Quantile Status	Recommended Statistics
CUST_ORDER_NUMBER	39389	100002	202088	0	0	20	OK	MISSING	OK	UNIFORM
CUST_TOTAL	25088	+00000000000...	+00000000000...	10	589	20	OK	OK	OK	FREQ_AND_QUANTILE
CUST_CODE	31255	100002	131254	10	390	20	OK	OK	OK	FREQ_AND_QUANTILE
ORDER_METHOD_CODE	1	5	5	1	39389	2	OK	OK	OK	FREQ_AND_QUANTILE

View and run RUNSTATS recommendations

Summary for each object used in the workload

View details including distribution, column group and index statistics recommendations

Thank You