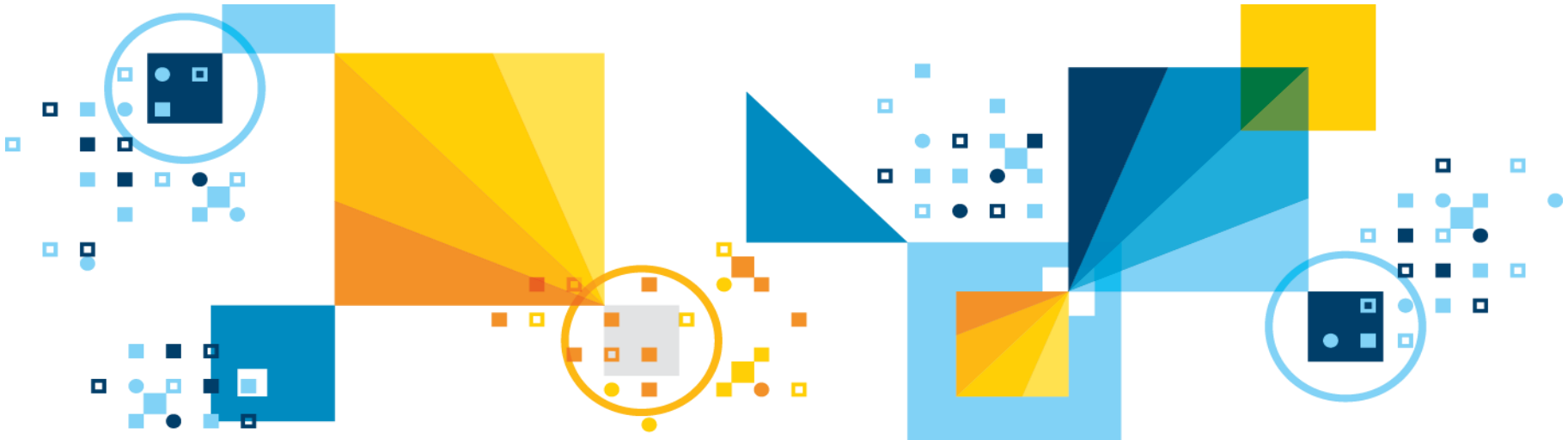


# IBM Data Studio

**Module ID** | 10102

**Length** | 1 hour + 1 hour Hands on Lab



For questions about this presentation contact [askdata@ca.ibm.com](mailto:askdata@ca.ibm.com)

January 30, 2015

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## Module Information

- You should have completed or acquired the necessary knowledge for the following modules in order to complete this module:
  - DB2 Fundamentals
  
- After completing this module, you should be able to:
  - Describe the major functions of Data Studio
  - Able to perform:
    - Establish a database connection
    - Browse database objects
    - Leverage task assistants to carry out administrative tasks
    - Analyze data access plans using Visual Explain

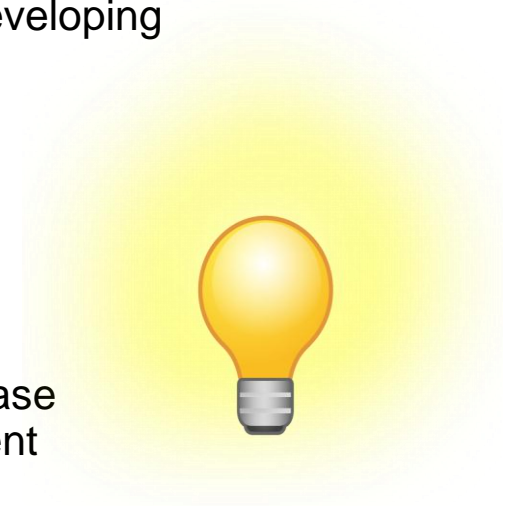
## Module Content

- **IBM Data Studio**
  - Past and Future
  - Installation
  - UI layout and basic navigation
  - Administration using Data Studio
    - System administrative tasks
    - Database objects management
    - Query development
    - Query tuning
    - DB2 10 features support
- **Monitor using Data Studio Web Console**
- **Optim Query Workload Tuner**
- **IBM DB2 Advanced Recovery Feature**
- **Infosphere Optim Query Capture Replay**

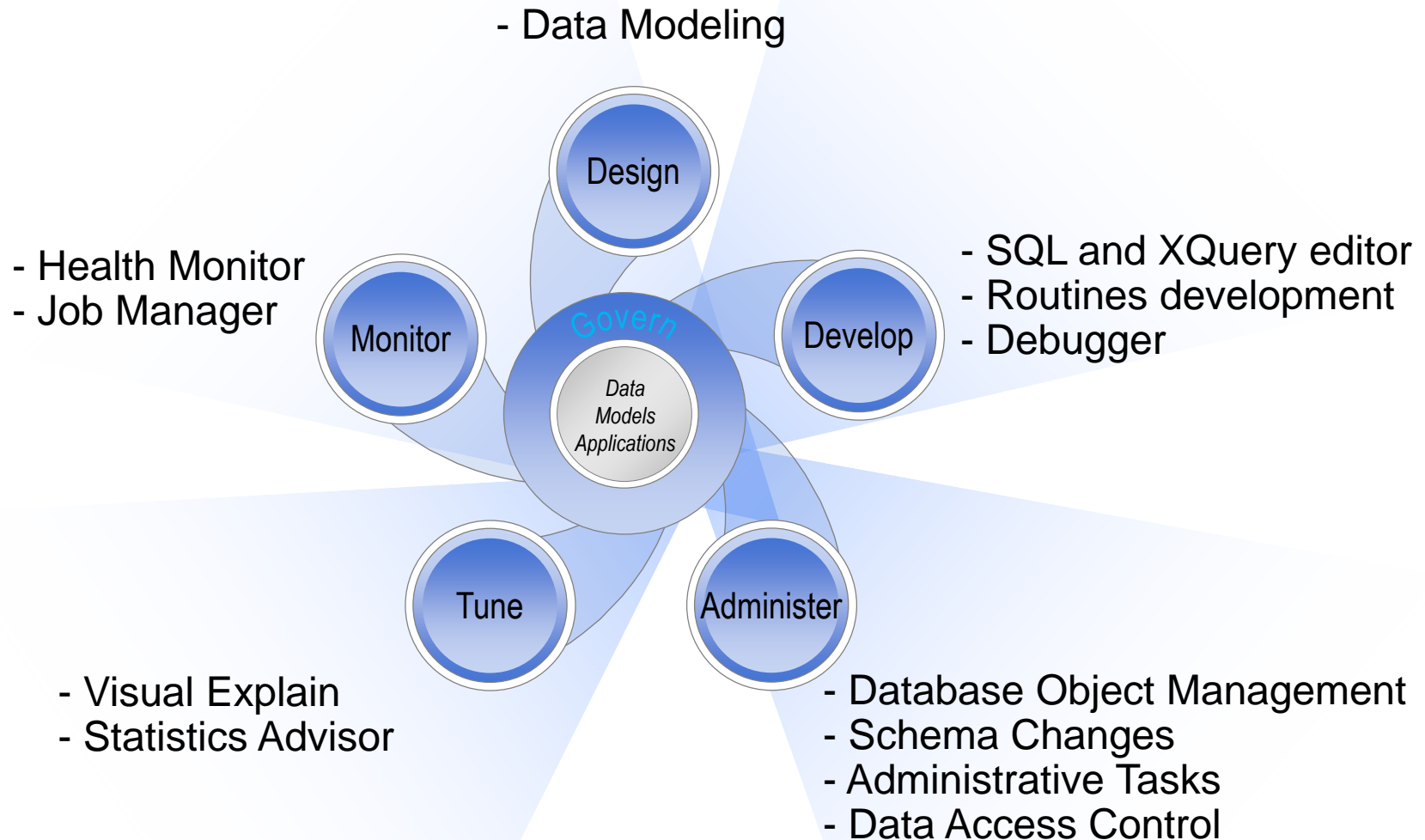


# What is IBM Data Studio?

- **Comprehensive data management tool**
  - An integrated environment for managing databases and developing database applications
- **Replaces Control Center in DB2 10**
- **Built on the popular Eclipse framework**
- **Support for Red Hat Linux, SUSE Linux, Windows**
- **2 packaging options:**
  - **Full client:** integrated development environment for database administration and routine and Java application development
  - **Administration client:** smaller foot-print, non-Java routine development
- **Optional extra component**
  - **Data Studio Web console:** health and availability monitoring
- **FREE to download!**



# Data Lifecycle Management



## Past and Future

IBM Data Studio 2.2



Optim Development Studio 2.2



Optim Database Administrator 2.2



### IBM Data Studio 3.1.1

- Merges the functionality of all three tools into a single product
- Supports DB2 10 specific features
  - RCAC, Multi-temp, Adaptive Compression and more!
- Supports set of discontinued functions from Control Center

Oct/2011



2014



### IBM Data Studio 4.1.1

- Tooling support for
  - BLU Acceleration
  - HADR Multiple Standbys
  - DB2 for pureScale
  - and more!

NEW

# Installation

## ▪ Install Data Studio **full client** or **administration client**:

- Installation Manager wizard
- Silent install using a response file
- Migrating or upgrading existing installation is not supported in version 3.1
- Saved workspace information is unaffected in the installation process

## ▪ Install Data Studio **web console**:

- Can be installed running the installation wizard, installing in console mode, or installing silently
- Upgrading from earlier versions is supported
  - database connections, alert settings, and user authentication settings stored locally or in the repository database are retained during upgrade





# Basic Navigation

**Web browser-like navigation bar**

**Object List**

- Listing objects
- Editing scripts
- Running tasks

**Administration Explorer**

- Connect to databases
- Browse database objects
  - Organized in folders by their type

**Object Properties / Results view**

Privileges	PUBLIC	Group	ALTER	DELETE	INDEX	INSERT	REFERENCES	SELECT
Distribution Key	SYSDEBUG	Role	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Data Partitions	SYSDEBUGP...	Role	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Table Spaces	ADMINISTR...	User	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MDC	DDA	User	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

## Creating a Database Connection

- The Administration Explorer contains a list of saved database connections
- If DB2 aliases have been configured, database connections are automatically created
  - This behavior can be changed in the Preferences menu
- To manually create a database connection, use the New Connection wizard

Administration Explorer

All Databases

localhost

DB2

SAMPLE

New Connection to a Database

Not connected to database

Connected to database

Support multiple database server targets

Fill out database name, host, port and login credentials

New Connection

Connection Parameters

Select the database manager and a JDBC driver, and specify required connection parameters.

Connection identification

☒ Use default naming convention

Connection Name: SAMPLE1

Local Connection Configurations

Select a database manager:

- Big SQL for InfoSphere BigInsights
- DB2 for i
- DB2 for Linux, UNIX, and Windows
- DB2 for z/OS
- Derby
- Generic JDBC
- HSQLDB
- Informix
- MaxDB
- MySQL
- Oracle
- SQL Server
- Sybase

JDBC driver: IBM Data Server Driver for JDBC and SQLJ (JDBC 4.0) Default

Properties

General Tracing Optional

Database: SAMPLE

Host: localhost

Port number: 50000

☐ Use client authentication

User name: administrator

Password: .....

☐ Save password

Default schema:

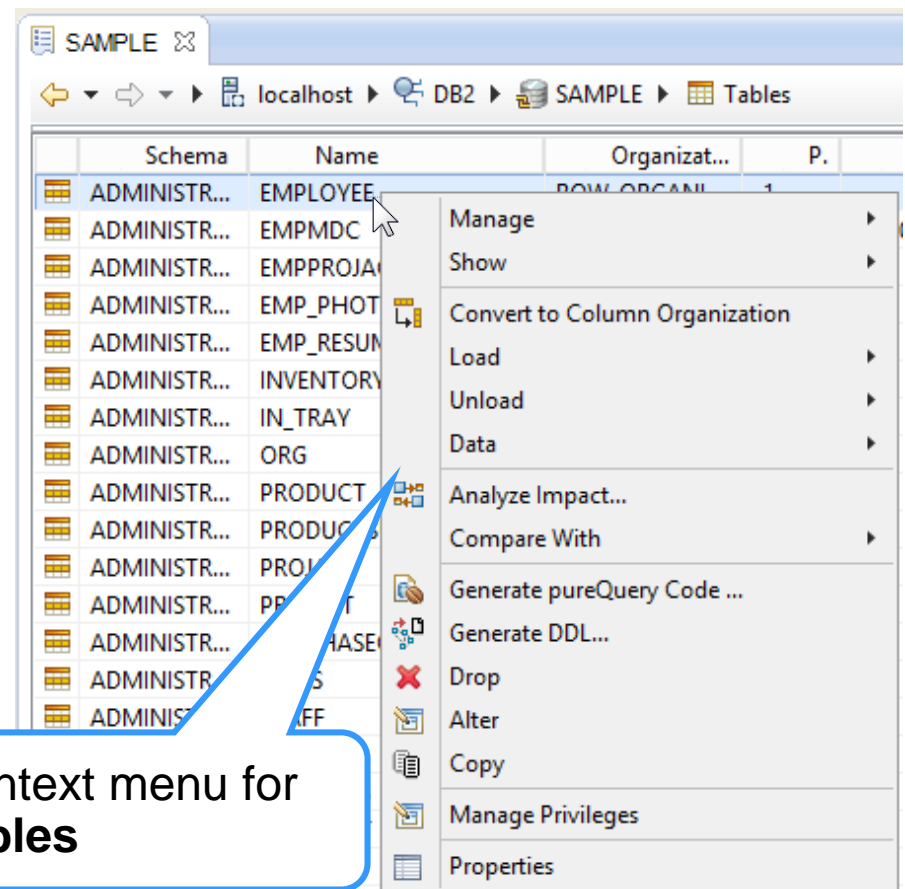
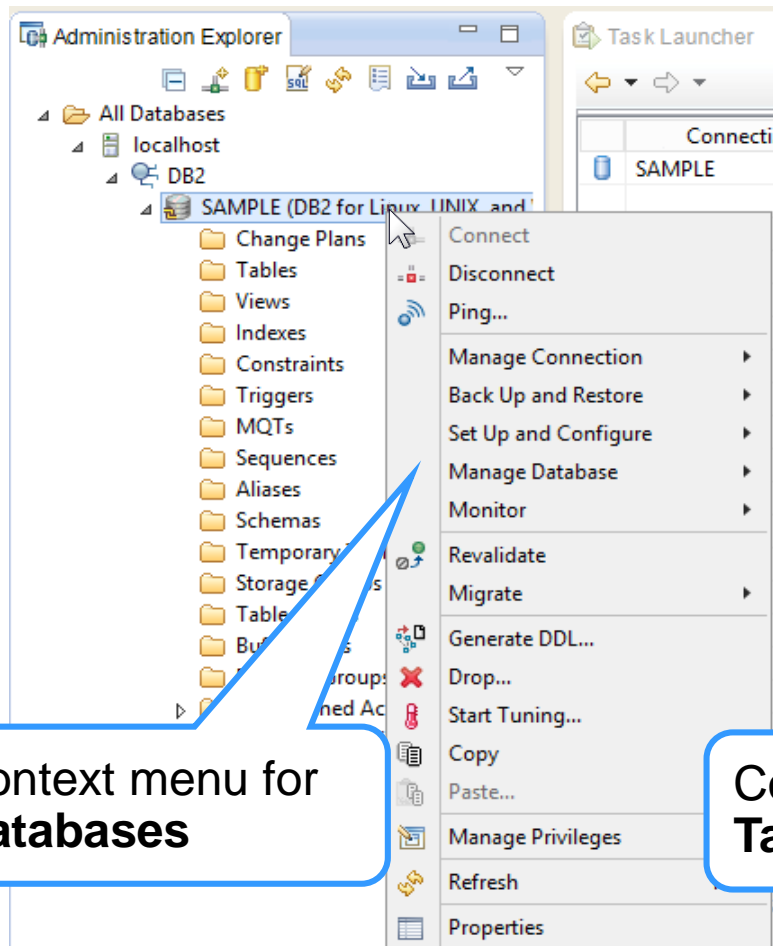
Connection URL: jdbc:db2://localhost:50000/SAMPLE:retrieveMessagesFromServerOnGetMessage=true;

Test Connection

< Back Next > Finish Cancel

## Basic Navigation

- **Right-click on an object for a context-based menu**, which lists all supported tasks for that object.
  - More complex task (e.g.: setting up HADR) are carried out by **Task Assistants**



## Administrative Tasks – Task Assistants Overview

- **Data Studio's Task Assistants** are dialogs that help you **create and run database administration commands**, similar to **Control Center's Wizards**
  - E.g. database backup task assistant


1. Configure the task step by step, following the instructions on the screen

**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 ready.

👉 [Preview Command](#) 

**Backup Information**

- Backup Type
- Backup Image
- Backup Options
- Backup Performance

**Confirm the details of your database**

Verify that the database listed below is the database that you want to backup. The type of logging for your database affects the backup options that are available. If you use circular logging, you can perform only an offline backup of the entire database. You can modify the type of logging for the database by configuring the parameters for the database.

Database details

Database: DB2-SAMPLE  
Database state: AVAILABLE

Last backup time: No information is available.  
Automatic database backup: DISABLED

Logging type: C  
Online backup a

► **Command**

► **Messages**

3. Press RUN button to execute the task

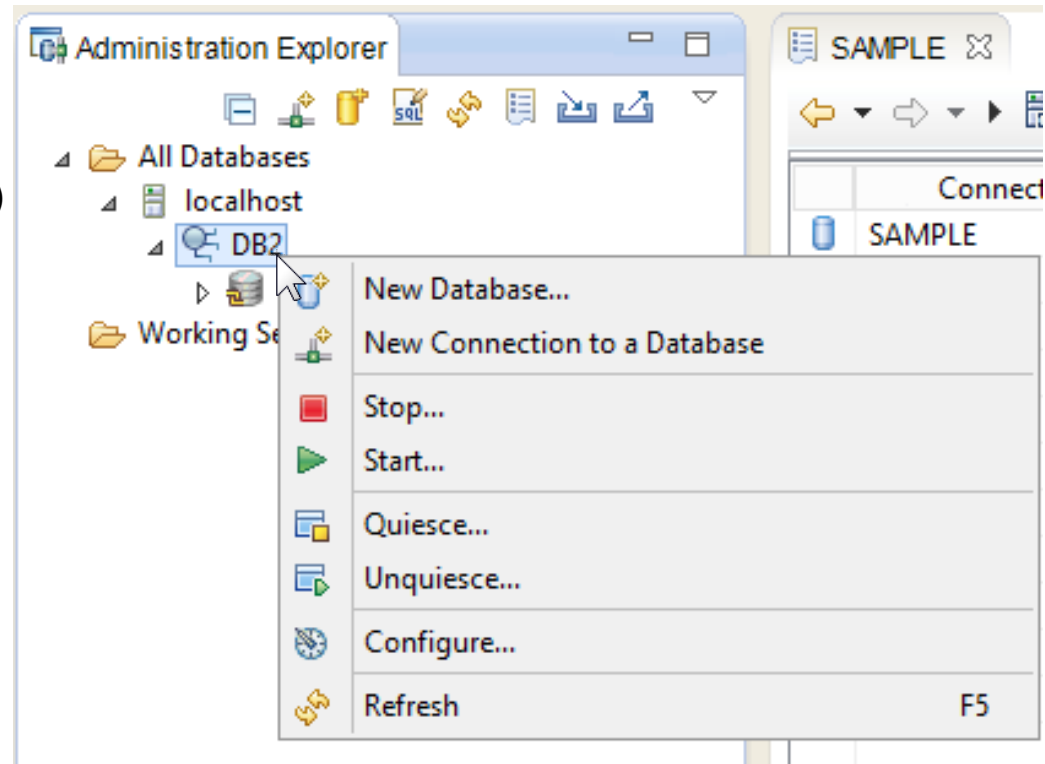
2. Review the commands that will be executed

4. Check the execution results

## Administrative Tasks – Instances

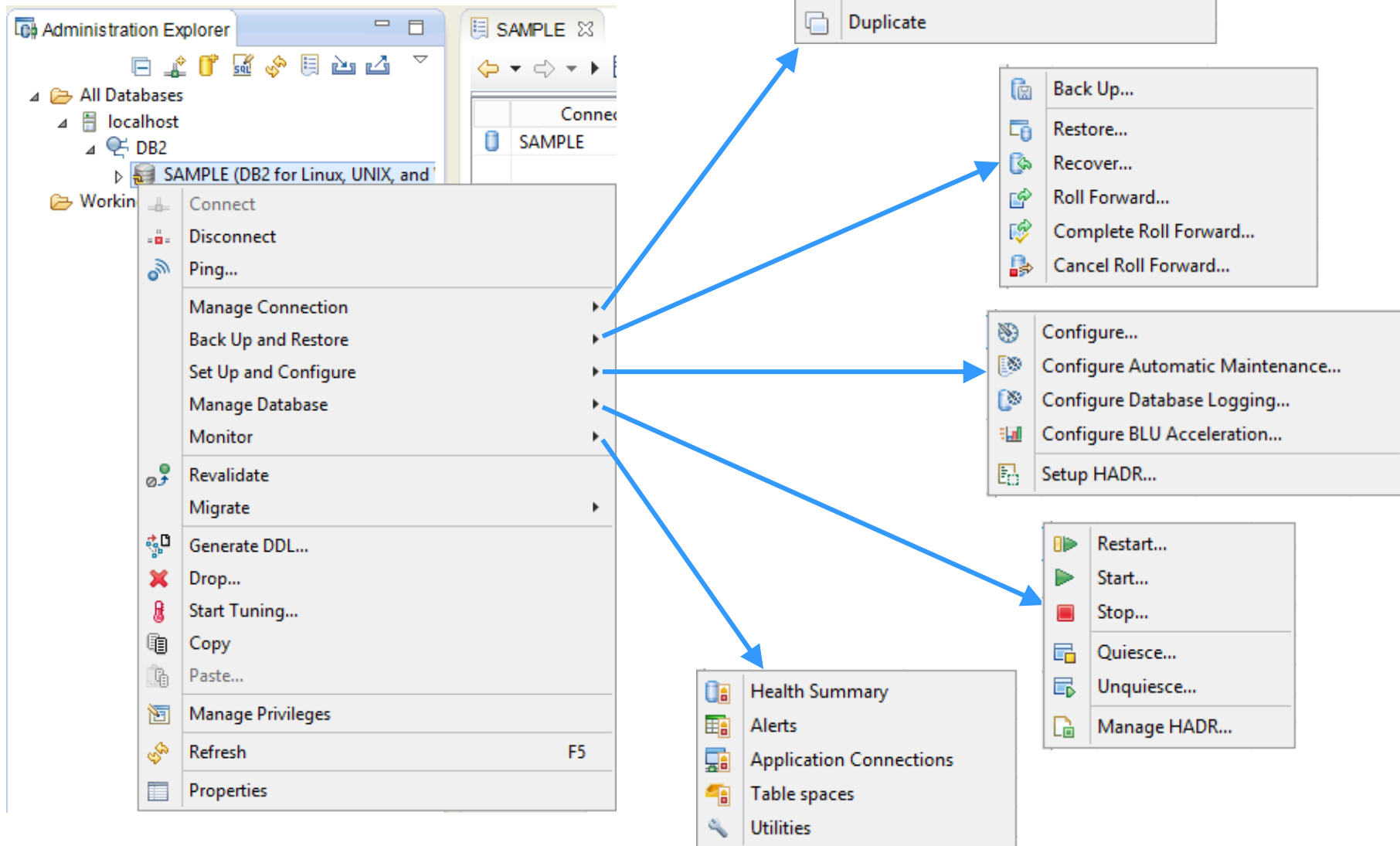
### ▪ Managing Instances

- Create new database
- Start / Stop
- Quiesce / Unquiesce
- Configure (DBM config. params)



# Administrative Tasks – Databases

## Managing Databases



## Database Object Management :: Browsing

- 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.

The screenshot shows the IBM Administration Explorer interface. On the left, the 'All Databases' tree is expanded to 'SAMPLE (DB2 for Linux, UNIX)'. The 'Tables' folder is selected and highlighted with a red box. A large blue arrow points from this folder to the 'Object List' table on the right. The 'Object List' table is also highlighted with a red dashed border. A blue callout box labeled 'Multi-purpose navigation bar' points to the toolbar above the table. Another blue callout box labeled 'Object List' points to the table itself.

**Multi-purpose navigation bar**

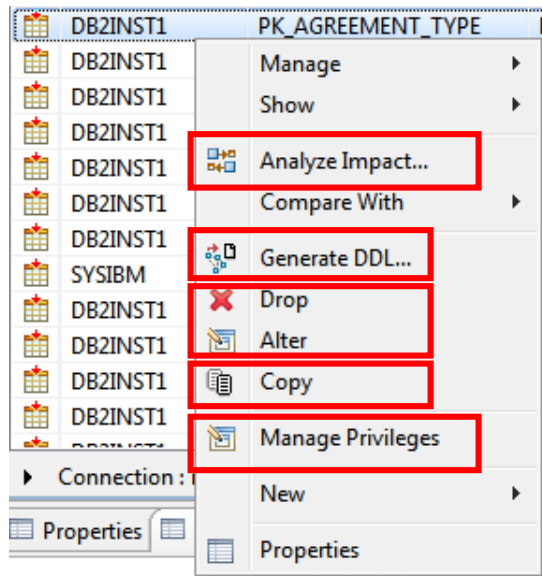
Schema	Name	Percent Free	Row Count	Log Mode	Primary Key	Partition Mode	Regular Ti
KEVIN	ACT	0	18		PK_ACT		USERSPA
KEVIN	CATALOG	0			PK_CATALOG		IBMDB2S
KEVIN	CL_SCHED	0					USERSPA
KEVIN	CONNHEADER_DEAD_EVENTS	0	0				IBMDB2S
KEVIN	CONTROL_DEAD_EVENTS	0	0				IBMDB2S
KEVIN	CUSTOMER	0	6		PK_CUSTOM...		IBMDB2S
KEVIN	DEADLOCK_DEAD_EVENTS	0	0				IBMDB2S
KEVIN	DEPARTMENT	0			PK_DEPART...		USERSPA
KEVIN	DLCONN_DEAD_EVENTS	0	0				IBMDB2S
KEVIN	DLLOCK_DEAD_EVENTS	0	0				IBMDB2S
KEVIN	EMPLOYEE	0	42		PK_EMPLOY...		USERSPA
KEVIN	EMPMDC	0	10000				IBMDB2S
KEVIN	EMPPROJECT	0					USERSPA
KEVIN	EMP_PHOTO	0			PK_EMP_PH...		USERSPA
KEVIN	EMP_RESUME	0			PK_EMP_RE...		USERSPA
KEVIN	INVENTORY	0			PK_INVENT...		IBMDB2S
KEVIN	IN_TRAY	0					USERSPA
KEVIN	ORG	0	8				USERSPA
KEVIN	PRODUCT	0			PK_PRODUCT		IBMDB2S
KEVIN	PRODUCTSUPPLIER	0			PK_PRODUC...		IBMDB2S
KEVIN	PROJECT	0			PK_PROJECT		USERSPA
KEVIN	PURCHASEORDER	0			PK_PURCHA...		IBMDB2S
KEVIN	SALES	0					USERSPA
KEVIN	STAFF	0					USERSPA

**Object List**

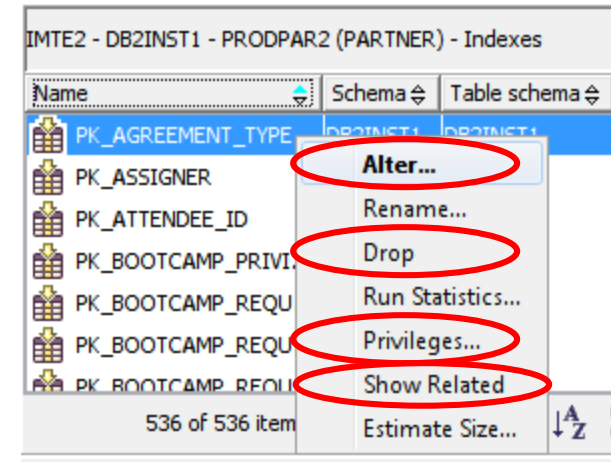
## Database Object Management :: Working with Database Objects

- **Context menu displays different options based on the object type. Some of these options are common to all objects.**
- **Most database objects support the following actions:**
  - Create New, Drop, Alter
  - Copy and Paste
  - Generate DDL
  - Analyze Impact (similar to CC's "Show Related" function)
  - Manage Privileges

Indexes



Comparing to **Control Center**





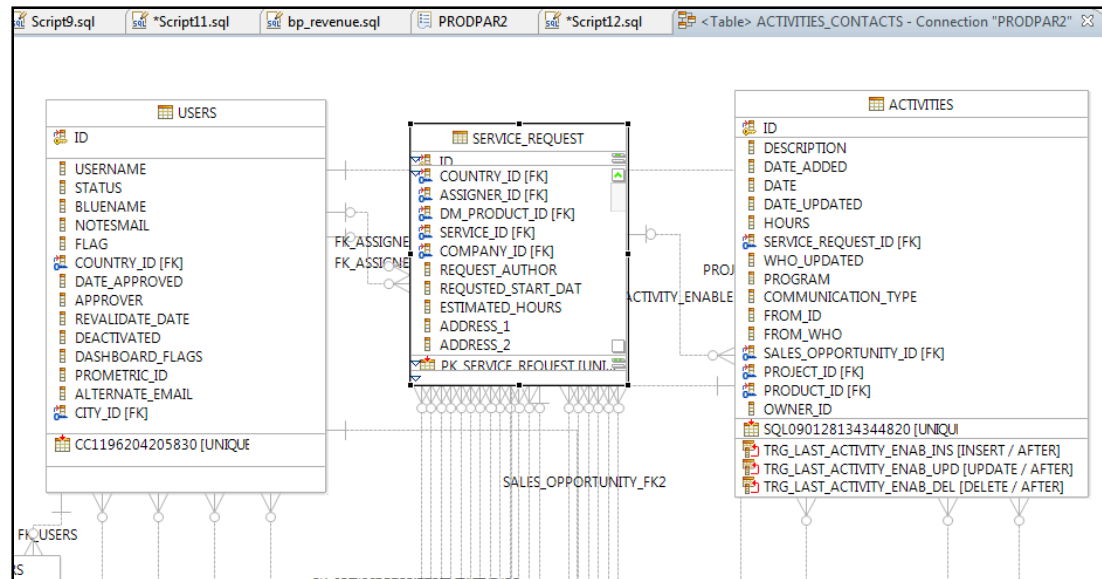
# Database Object Management

## ▪ Copying database objects

- Can copy between homogeneous (e.g. **DB2** ↔ **DB2**) or heterogeneous databases (e.g. **DB2** ↔ **Oracle**)
- Support for tables, indexes, views, triggers, user-defined-types, etc
- Simple **Copy and Paste** mechanism.
  - Task assistant helps to fine tune the task
- Generated DDL for running on the target database can be modified before executing
- Not intended for copying large data sets, but for testing and development purpose.

## ▪ Visualize relationships between data objects using **Overview Diagrams**

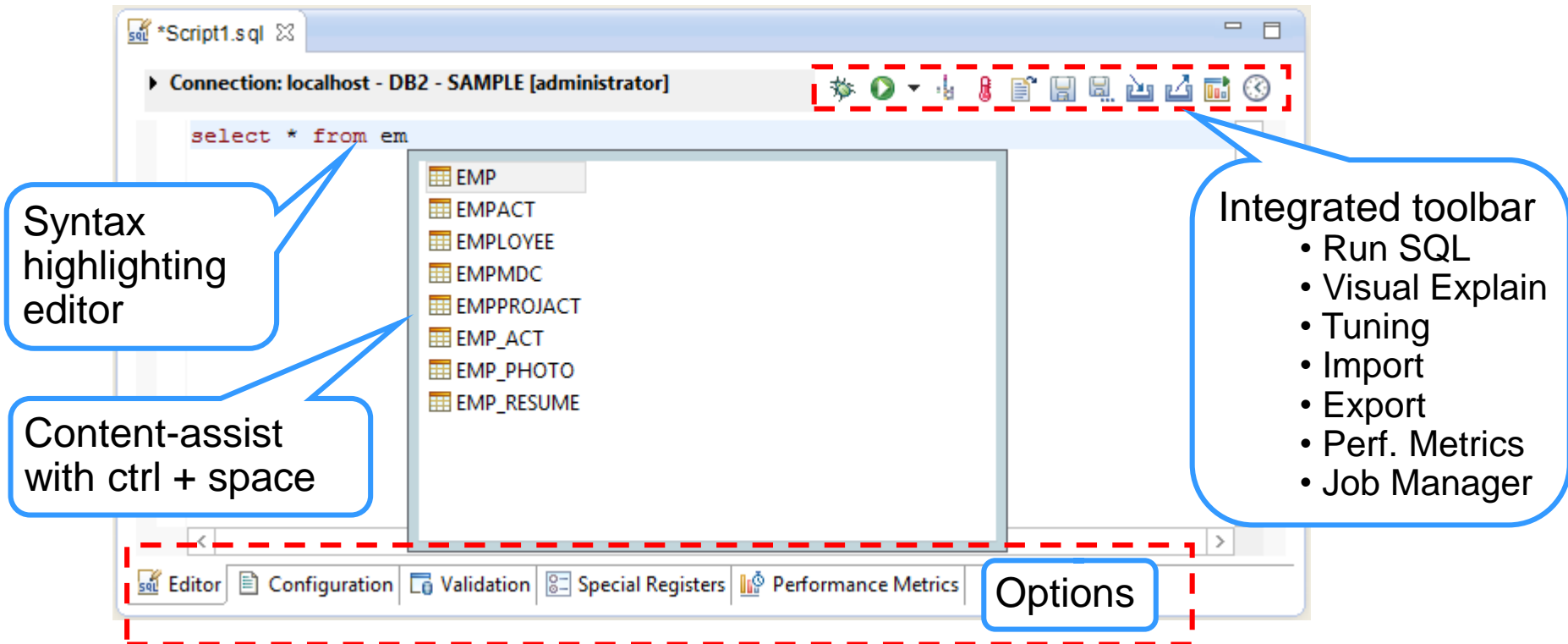
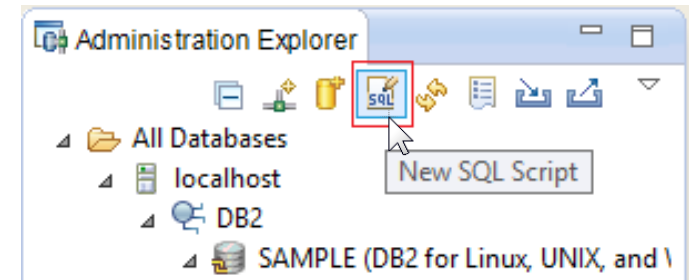
- Support IE (information engineering) or UML diagrams for data modeling



# Working with SQL Statements


## ■ SQL Scripts Editor

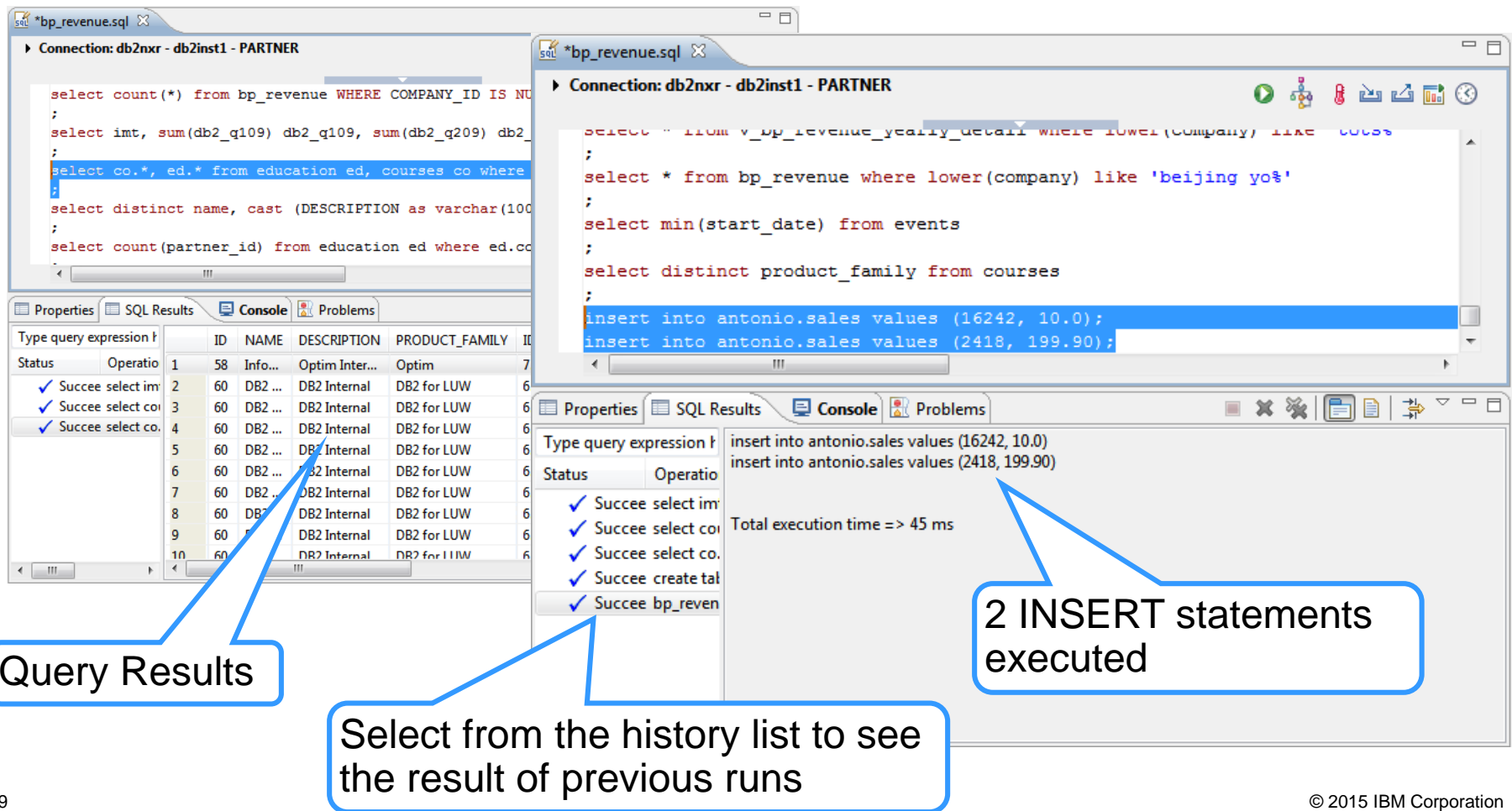
- Launch with **New SQL Script**
- **Integrated toolbar** for easy access to common tasks
- Options to specify database connection, run method, validate syntax against a particular database, etc.
- Advanced editor capabilities: Syntax highlighting and validations, Format SQL, Toggle comments, Content tip, Content Assist, Compare/Replace with local history, etc.



## Working with SQL Statements :: Executing SQL scripts

### ■ Executing SQL Scripts

- Press **F5** to execute highlighted or all statements. Or click the  button
- Results are displayed at the **SQL Results** tab
- You can browse previous results by selecting a previous run



Connection: db2nxr - db2inst1 - PARTNER

```

select count(*) from bp_revenue WHERE COMPANY_ID IS NU
;
select imt, sum(db2_q109) db2_q109, sum(db2_q209) db2
;
select co.*, ed.* from education ed, courses co where
;
select distinct name, cast (DESCRIPTION as varchar(100
;
select count(partner_id) from education ed where ed.co

```

Properties | SQL Results | Console | Problems

Type query expression	ID	NAME	DESCRIPTION	PRODUCT_FAMILY
1	58	Info...	Optim Inter...	Optim
2	60	DB2 ...	DB2 Internal	DB2 for LUW
3	60	DB2 ...	DB2 Internal	DB2 for LUW
4	60	DB2 ...	DB2 Internal	DB2 for LUW
5	60	DB2 ...	DB2 Internal	DB2 for LUW
6	60	DB2 ...	DB2 Internal	DB2 for LUW
7	60	DB2 ...	DB2 Internal	DB2 for LUW
8	60	DB2 ...	DB2 Internal	DB2 for LUW
9	60	DB2 ...	DB2 Internal	DB2 for LUW
10	60	DB2 ...	DB2 Internal	DB2 for LUW

Properties | SQL Results | Console | Problems

```

select * from bp_revenue where lower(company) like 'beijing yo%'
;
select min(start_date) from events
;
select distinct product_family from courses
;
insert into antonio.sales values (16242, 10.0);
insert into antonio.sales values (2418, 199.90);

```

Properties | SQL Results | Console | Problems

Type query expression	Status	Operation
insert into antonio.sales values (16242, 10.0)	✓	Succes select im
insert into antonio.sales values (2418, 199.90)	✓	Succes select co
	✓	Succes select co.
	✓	Succes create tal
	✓	Succes bp_reven


Total execution time => 45 ms

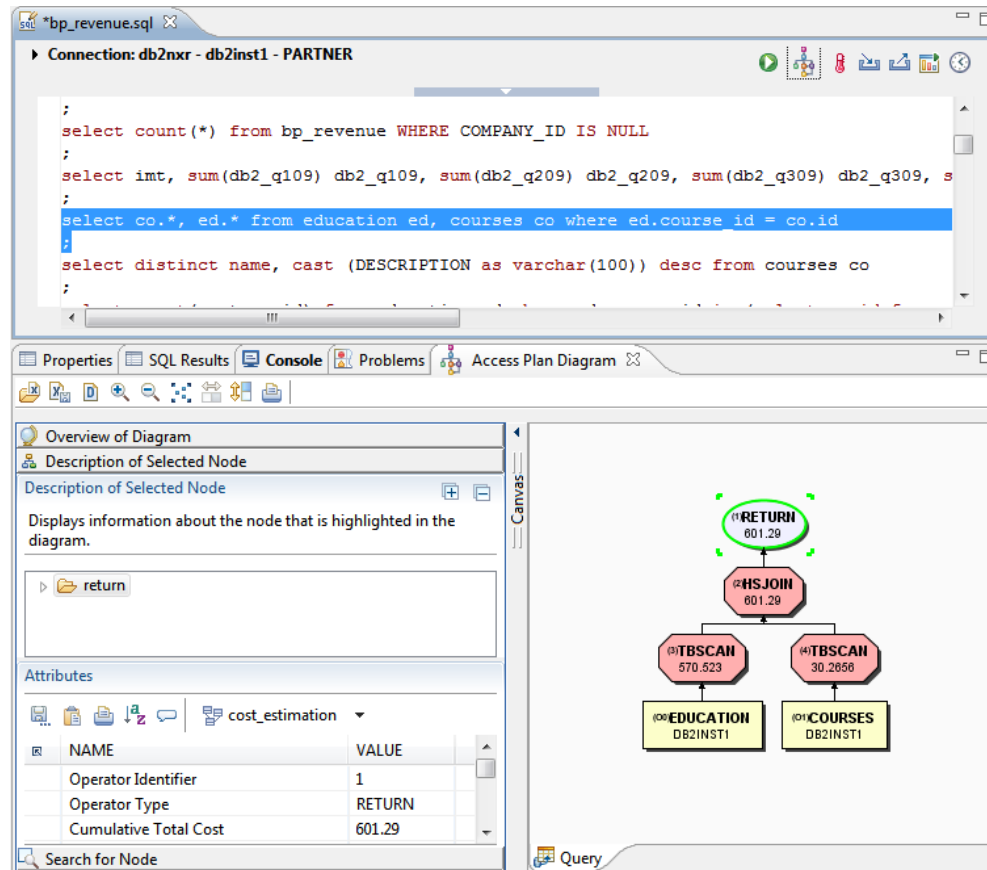
2 INSERT statements executed

Query Results

Select from the history list to see the result of previous runs

## Working with SQL Statements :: Visual Explain

- Explains SQL statements as a **graph**, which can be used to **tune SQL queries for better performance**
- **How to open Visual Explain**
  - Highlight a query in SQL Editor
  - Click the Visual Explain button 
  - Access plan can be seen in the **Access Plan Diagram** tab



## Support for DB2 10.5 with BLU Acceleration

- **BLU Acceleration supported statements and related user interfaces**
  - **Configure BLU Acceleration menu**
  - **New option added on LOAD for column-organized tables**
  - **Convert to Column Organization –single/multi-selection at table level**
  - **CREATE**
    - **ORGANIZE BY ROW/COLUMN**

The screenshot displays the DB2 TPCDSLOI interface. The 'Review and Deploy' window is open, showing the 'Review Commands and Select Deployment Options' section. The 'Connection' is set to 'hotel51.torolab.ibm.com - DB2 for Linux, UNIX, and Windows - TPCDSLOI'. The 'Save data' checkbox is checked. The generated SQL command is shown as:

```
-- <ScriptOptions statementTerminator=";" />  
CREATE TABLE LOIC.EMPLOYEE ( ID CHAR(5), NAME CHAR(5) ) ORGANIZE BY COLUMN;
```

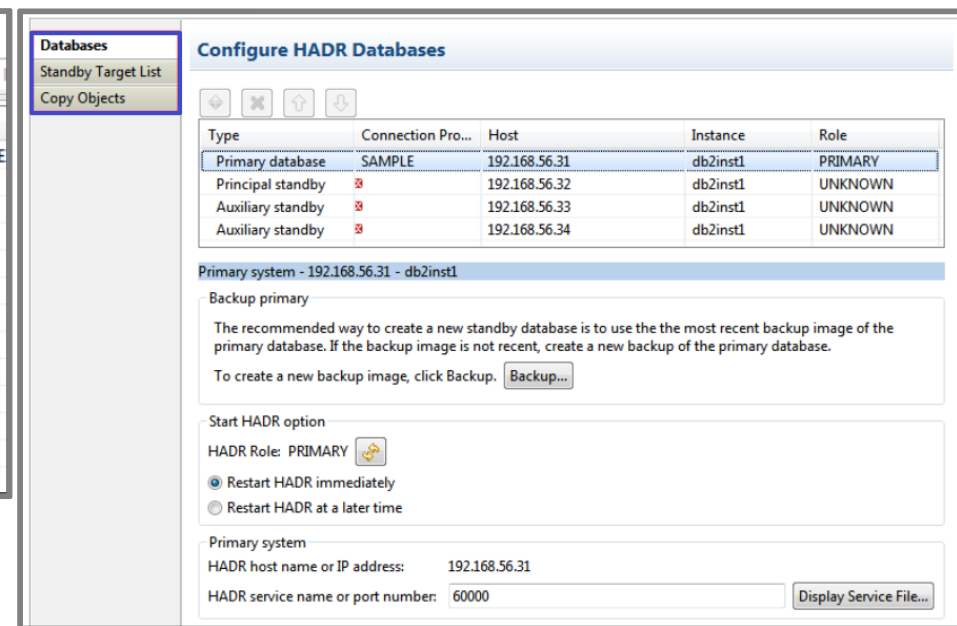
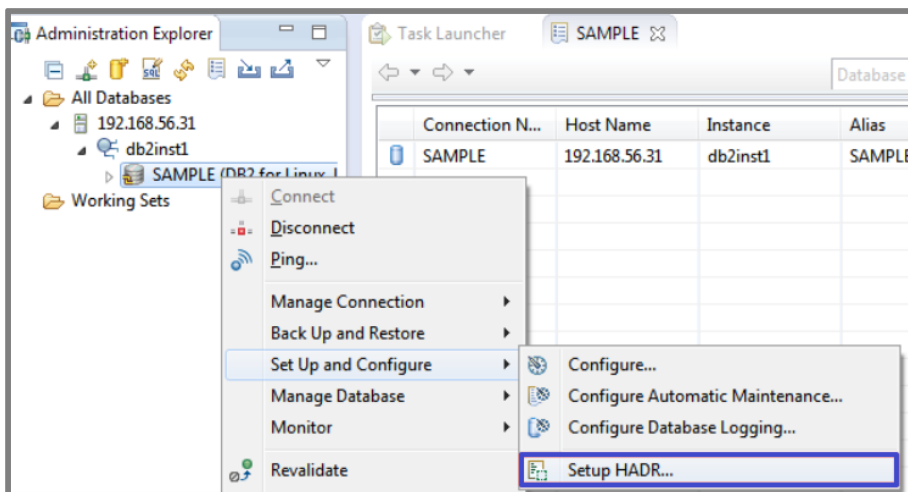
The 'Generate DDL' dialog box is also open, showing the 'Save and Run DDL' section. The 'Folder' is set to '.sqlxeditor\_project' and the 'File name' is 'Script.sql'. The 'Preview DDL' section shows the following SQL script:

```
--<ScriptOptions statementTerminator=";" />  
  
CREATE TABLE "LOIC"."EMPLOYEE" (  
    "ID" CHAR(5 OCTETS),  
    "NAME" CHAR(5 OCTETS)  
)  
ORGANIZE BY COLUMN  
DATA CAPTURE NONE  
IN "WCCTS";
```

# Support for HADR Multiple Standby

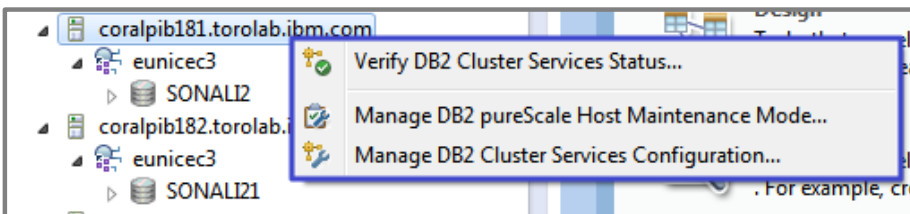
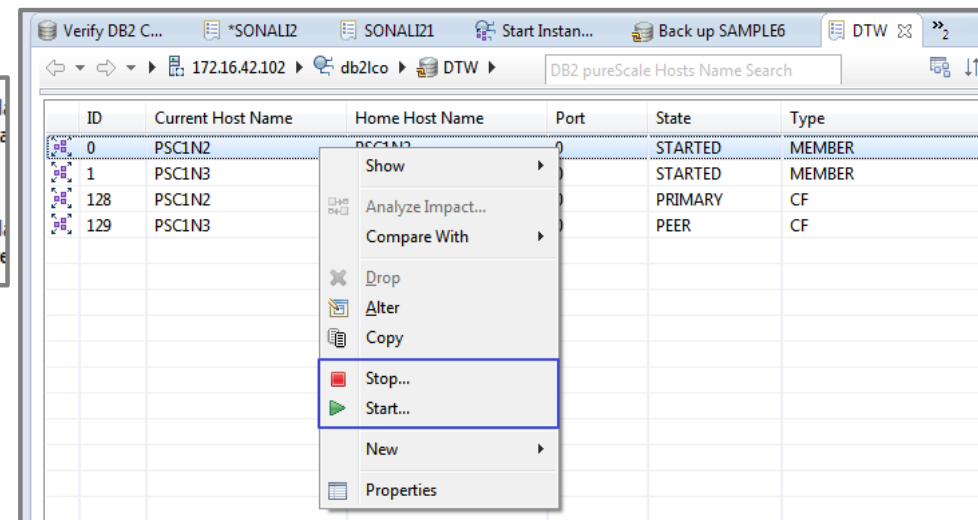
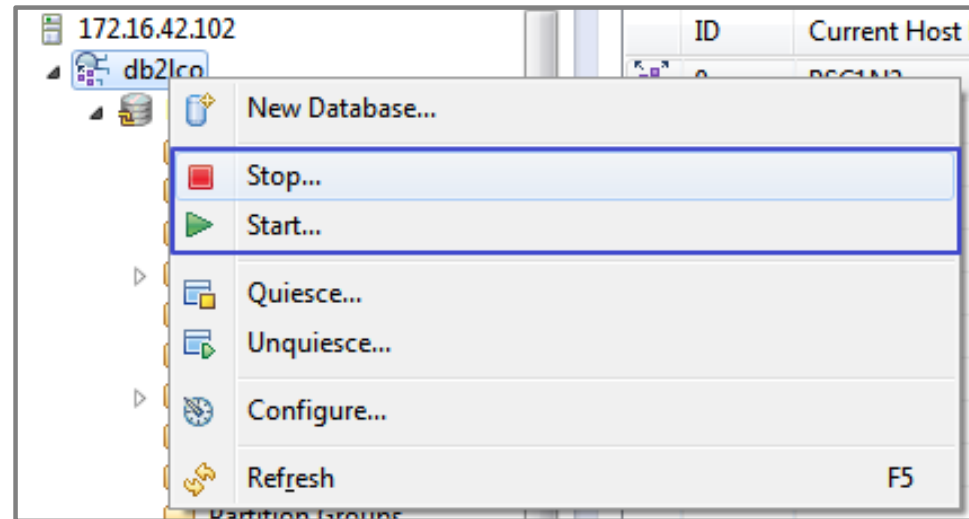
## ■ HADR Multiple Standby - Prerequisite

- DB2 for LUW 10.1 (or later)
- Primary database – only applicable to archive logging
- Standby machine – require similar hardware and software configuration
- Limitation: HADR is not supported for DPF




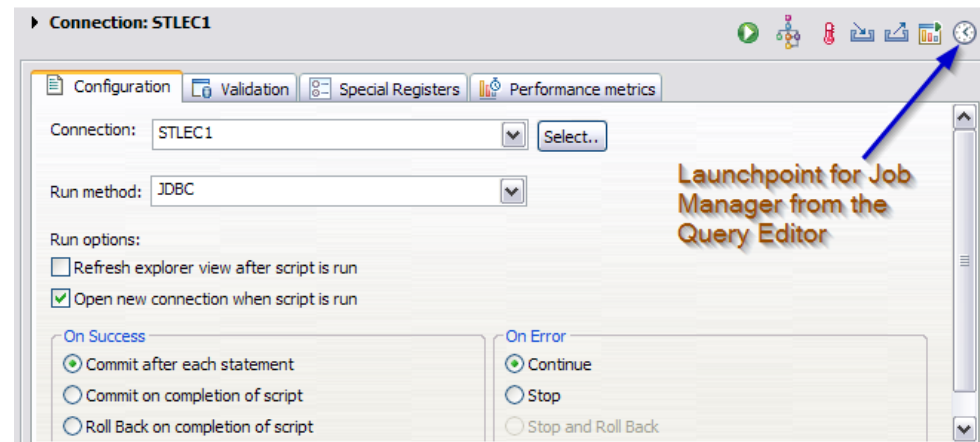
# PureScale support - Overview

- Start/Stop pureScale instance
- Start/Stop instance on selected Hosts
- Start/Stop members or CFs
- List pureScale hosts
- Manage DB2 pureScale host maintenance mode
- Manage DB2 cluster service configuration
- Verify DB2 cluster service status

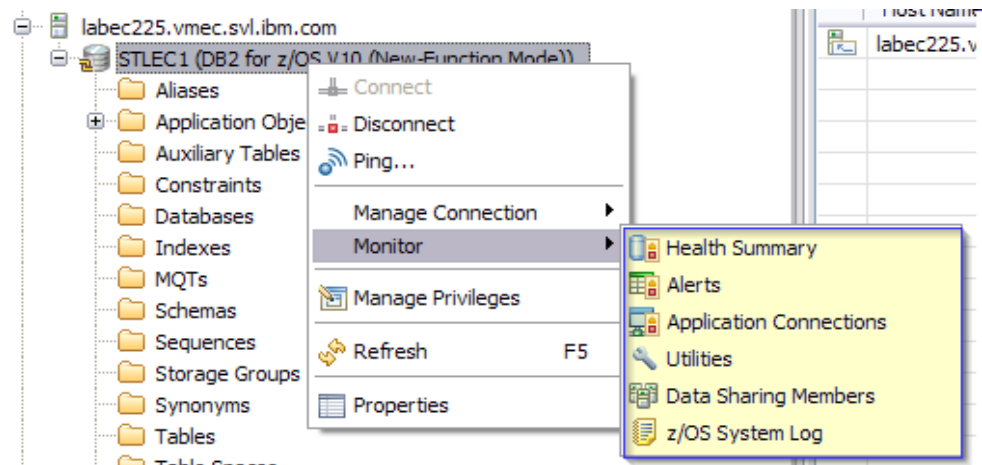


## Data Studio Web Console

- To monitor health and availability and to create and manage jobs on your DB2 for Linux, UNIX, and Windows and DB2 for z/OS® databases.
- How to launch Web Console?
  - Schedule tasks from Query Editor 



- Monitor task assistant in
  - Administration Explorer









# Data Studio Web Console

## Job Manager

- View schedules
- Add schedules
- Edit a schedule
- Delete a schedule




Job List Schedules Notifications History								
Instructions text goes here...								
New Schedule... Open  								
Schedule ID	Interval	Start Time	Database	▲	Job ID	Job Name	Chain	Notifications
14522-2	Monthly Every Third Wednesday	3:00 PM GMT		1	14522	Cleanup Job		1
14511-3	Weekly Every Monday	12:00 AM GMT		10	14511	Backup Job		1
14510-2	Daily	12:00 AM GMT		1	14510	Backup Job		2
14509-1	Daily	1:00 AM GMT		1	14509	Cleanup Job		0
14508-1	Weekly Every Tuesday	1:00 AM GMT		0	14508	Cleanup Job		0

14511 Backup x

14522 Cleanup x

Select View


- Description
- Script
- Schedules
- Chain
- Notifications

Save Reset   

View Job Schedules View Execution History

Schedule ID: 14511-1


Schedule Details

\* Start Date: 3/17/2011 

\* Start Time: 3:00 PM GMT

☒ Repeats: Weekly Every
 

☒ Monday
 ☐ Tuesday
 ☐ Wednesday
 ☐ Thursday

☒ Until: 4/17/2012 

Runtime Specifications

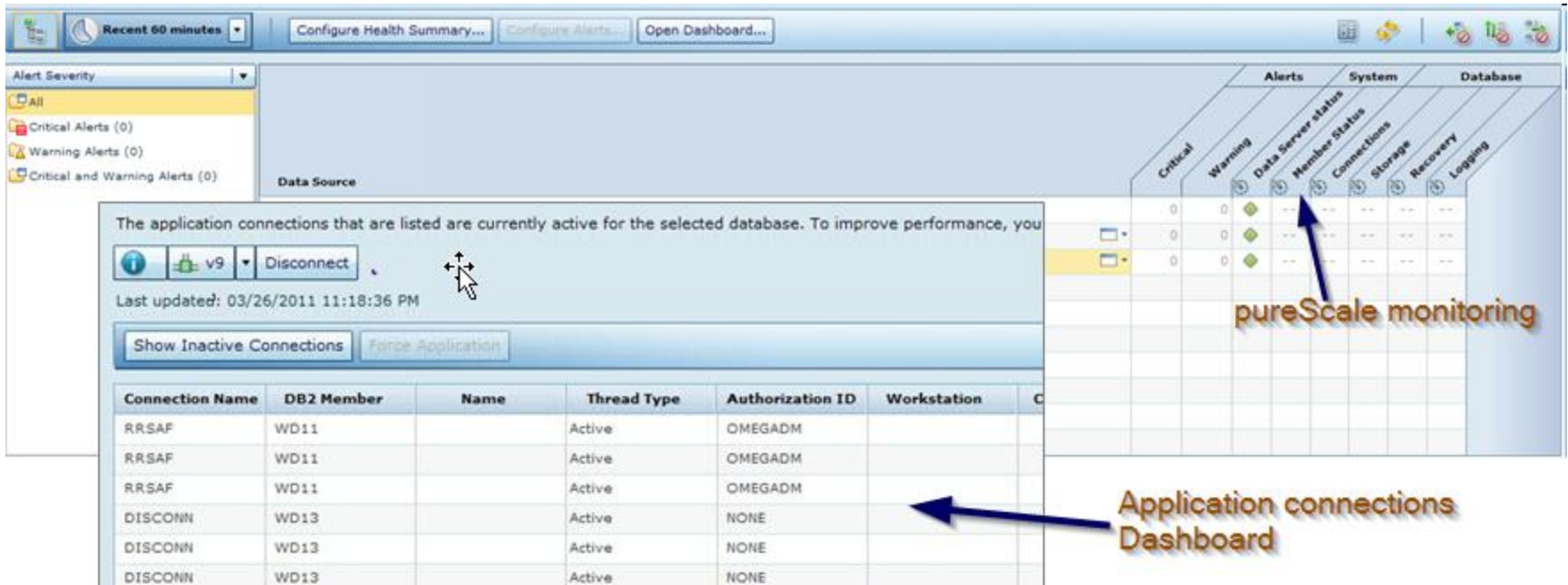
Select Databases...

Selected Databases	User
DB01	Default User
DB02	Default User
DB03	Default User
DB04	Default User
DB05	Default User

# Data Studio Web Console

## ■ Monitor

- Health summary
- Alert list
- Current application connections
- Data Sharing Members
- Current utilities
- System log
- Current Table spaces

The screenshot displays the Data Studio Web Console interface. The top navigation bar includes links for 'Configure Health Summary...', 'Configure Alerts...', and 'Open Dashboard...'. The left sidebar shows 'Alert Severity' filters: 'All', 'Critical Alerts (0)', 'Warning Alerts (0)', and 'Critical and Warning Alerts (0)'. The main content area is titled 'Data Source' and displays a message: 'The application connections that are listed are currently active for the selected database. To improve performance, you...'. Below this message is a 'v9' version indicator and a 'Disconnect' button. A timestamp indicates 'Last updated: 03/26/2011 11:18:36 PM'. There are buttons for 'Show Inactive Connections' and 'Force Application'. A table lists active connections:

Connection Name	DB2 Member	Name	Thread Type	Authorization ID	Workstation
RRSAF	WD11		Active	OMEGADM	
RRSAF	WD11		Active	OMEGADM	
RRSAF	WD11		Active	OMEGADM	
DISCONN	WD13		Active	NONE	
DISCONN	WD13		Active	NONE	
DISCONN	WD13		Active	NONE	

On the right side, there is a 'pureScale monitoring' overlay with a grid showing various metrics: Alerts (Critical, Warning), System (Data Server status, Member status, Connections, Storage, Recovery), and Database (Logging). A blue arrow points from the 'pureScale monitoring' text to the 'Data Server status' column. Another blue arrow points from the 'Application connections Dashboard' text to the table of active connections.

# Optim Query Workload Tuner- Overview

- Identify query candidates
  - DB2 catalog
  - Statement cache
  - Data Studio hot spots
  - Query or performance monitors
  - Editors, ...
- Facilitate analysis
  - Query formatting
  - Query annotation
  - Access path visualization and annotation
- Get expert tuning advice
  - Improve statistics quality
  - Improve database design
  - Improve query design
- Validate results
  - Compare iterations

**Run Single-Query Advisors And Analysis Tools**

Specify EXPLAIN options and runtime environment options for the query. Then, run the enabled advisors and tools, or select which of them to run.

EXPLAIN options and runtime environment options

Query number: 111      Current degree:      Current refresh age:      Current maintained:      Optimization hint:

SQLID: ADMF001

Schema: ADMF001

☒ Use upper case for the SQLID and schema

☒ Re-EXPLAIN the query

▼ Query Text - Query 1

```

SELECT
  IX.TBCREATOR AS TBCTR
, IX.TBNAME AS TBNAME
, IX.CREATOR AS IXCTR
, IX.NAME AS IXNAME
, IX.COLCOUNT AS IXCCNT
, IX.UNIQUERULE AS IXNUQ
, IX.CLUSTERING AS IXCLG
, KY.COLSEQ AS COLSEQ
, KY.COLNAME AS CLNAME
, KY.ORDERING AS ORD
, KY.COLNO AS COLNO
FROM
  SYSTEM.SYSTABLES TB
  
```

**Select Query-Tuning Activities**

☒ Query Format and Annotation

☒ Access Plan Graph

☒ Access Plan Explorer

☐ Statistics Advisor

☐ Query Advisor

☐ Access Path Advisor

☐ Index Advisor

☐ Summary Report

☐ Access Path Reports

**Recommendations - 1 Initial Analysis**

Advisor	Number	Priority	Description
Recommendations			
Statistics Advisor	1	HIGH	Repair statistics problems for this query. Gather missing statistics. Recollect conflicting st...
Query Advisor	2	MEDIUM	Provide a join predicate based on the referential constraint between tables DSN8910.EM...
Query Advisor	3	MEDIUM	Provide a predicate on column WORKDEPT.
Access Path Advisor	4	LOW	Avoid reading all index keys on an index scan (QBLOCKNO = 1, PLANNO = 1).
Index Advisor	5	LOW	Index recommendations found.

# Diagnose using Query Tuner

The image displays the IBM Query Tuner interface, which is used for diagnosing and optimizing SQL queries. It consists of three main components:

- Execution Plan:** A graphical representation of the query execution plan. It shows the flow of data from the tables to the final result. The plan includes:
  - TABLES:** GSALESCT.CUST\_ORDER\_DETAIL and GSALESCT.CUST\_ORDER\_HEADER.
  - JOINS:** HSJOIN (Hash Join) and NLJOIN (Nested Loop Join).
  - PREDICATES:** Various predicates are shown, including date ranges and equality conditions.
  - Costs:** Each step in the plan has an associated cost, such as 354.851 for the TBSCAN operation.
- Query Window:** A window showing the SQL query being executed. The query is:
 

```
SELECT CU.CUST_CODE
      , CU.CUST_LAST_NAME
      , COH.CUST_ORDER_NUMBER
      , DATE(COH.CUST_ORDER_DATE) AS CUST_ORDER_DATE
      , COD.PRODUCT_NUMBER
      , COD.CUST_QUANTITY
FROM GSALESCT.CUST_CUSTOMER AS CU
      , GSALESCT.CUST_ORDER_HEADER AS COH
      , GSALESCT.CUST_ORDER_DETAIL AS COD
WHERE DATE(COH.CUST_ORDER_DATE) BETWEEN ? AND ?
      AND CU.CUST_CODE IN (
          ?
          ?
          ?
      )
      AND COH.CUST_ORDER_NUMBER = COD.CUST_ORDER_NUMBER
      AND CU.CUST_CODE = COH.CUST_CODE
```
- Table Statistics:** A table showing the statistics for the tables used in the query. The statistics include the number of rows, the number of pages, and the number of columns.
 

Table	CARD	NPAGES	COLCARD	MAX_FR
GSALESCT.CUST_CUSTOMER	31255	640	31255	MAX_FR
GSALESCT.CUST_ORDER_HEADER	39389	250	39389/35840	MAX_FR
GSALESCT.CUST_ORDER_DETAIL	60252	305	31255/31255	MAX_FR

Callouts highlight key features:

- Examine access path information:** Points to the HSJOIN operation in the execution plan.
- Examine table statistics and additional information:** Points to the table statistics table.
- Easily see tables, sections, join predicates, etc.:** Points to the overall execution plan structure.

# Improve Query Design

## Guard against errors and oversights:

Further constrain query, increase index utilization, and reduce data reads

View analysis summary

Highlights relevant components of the query

Filter recommendations by severity

- Query Advisor checks for
- Missing join predicate for referential constraint
  - Predicates that can be rewritten as indexable
  - Stage 2 predicates that can be rewritten as stage 1 predicates

Recommendation and rationale

Statements Recommendation Summary Workload Query Advisor Workload Index Advisor Workload Query Advisor

The following is a summary of the queries analyzed in the workload. Use this criteria to filter.

Statements Sorted by	Number
Statements Analyzed Successfully	22
Statements with Warnings	4
Number of High Severity Warnings	0
Number of Medium Severity Warnings	0
Number of Low Severity Warnings	7
Statements with High Severity Warnings	0
Statements with Medium Severity Warnings	0
Statements with Low Severity Warnings	4

### SQL Text

```
SELECT A.EMPNO
, A.FIRSTNAME
, A.LASTNAME
, A.JOB
, A.SALARY
, A.BONUS
, A.COMM
, B.LOCATION
, C.PROJNAME
FROM DSN8910.DEPT AS B
, DSN8910.EMP AS A
, DSN8910.EPROJ AS C
WHERE ( A.EMPNO IN ( SELECT DSN8910.DEPT.MGRNO
FROM DSN8910.DEPT
WHERE DSN8910.DEPT.MGRNO IS NOT NULL
```

### Selected Recommendation:

#### Recommendation Details






















Provide a join predicate based on the referential constraint between tables DSN8910.EMP and DSN8910.DEPT.

There is a referential constraint between these two tables, but there is no join predicate that uses the foreign keys and their corresponding primary keys. Consider adding join predicates between columns EMPNO in table DSN8910.EMP and columns MGRNO in table DSN8910.DEPT to avoid fetching redundant data in the result set.

#### Explanation

If a referential constraint is defined between two tables, the queries that join the two tables generally have corresponding join predicates that map to the referential constraint.

## Contents of Eclipse-based Query Tuning offerings

	Data Studio	Optim Query Workload Tuner for LUW
Queries from all sources		
Reports		
Query Formatter		
Access Plan Graph		
Query Statistics Advisor		
Query Annotation		
Visual Plan Hint		
Query Index Advisor		
Test Candidate Indexes		
Query Advisor		
Access Path Explorer		
Access Path Advisor		
Workload Statistics Advisor		
Workload Index Advisor		
Statistical View Advisor		
MQT, MDC, Partitioning Advisor (3.1.1)		



# IBM DB2 Advanced Recovery Feature

*\*New – Buy all 3 products in one bundle*

## *DB2 Merge Backup*

- Improve speed of your backup & recovery processes
  - Minimize application impact

**Backup**

## *DB2 Recovery Expert*

- Recover faster with greater granularity while protecting your critical business data
  - Eliminate data errors before they compound into costly business mistakes
- Track and report data changes in response to auditing requests

**Recover**

## *Optim High Performance Unload*

- Extract large amounts of data quickly and with minimal impact on system productivity
- Perform full data and system migrations from one DB2 instance to another

**Unload**

**All products  
support DB2  
10.5 for LUW**

## What's New - DB2 Advanced Recovery Feature 10.5

- **DB2 Recovery Expert**
  - Support for pureScale
  - Remote log analysis
    - No impact on production
  - Support for Adaptive Compression/ Multi-Temp Storage
  - Non-root install
  - Quiet Time Reporting
- **DB2 Merge Backup**
  - Mix DB2 backup types
  - Unload backups to pipe
- **Optim High Performance Unload**
  - Optim Masking on Demand Integration
  - Easier Install and Configuration
  - Better Performance





# Enterprise Changes Can Cause Production Problems

- Change in Hardware
  - Platform switch, for example move to Linux
  - O/S Upgrade
- Change in Database
  - Change in schema, index, table space, etc.
  - Change in configuration
  - Increased data volume
  - Database upgrade – new version or fixpack
- Change in Workload
  - Increase in transactions due to expanded application rollout
- Change in Application
  - New application deployment
  - Changes to existing applications

# InfoSphere Optim Query Capture Replay



Capture production workloads  
and replay them in testing  
environments

Application



Source Database



 Record

InfoSphere Optim  
Query Capture  
and Replay

 Play

Test  
Database



Now also available  
for DB2 for z/OS

## Requirements

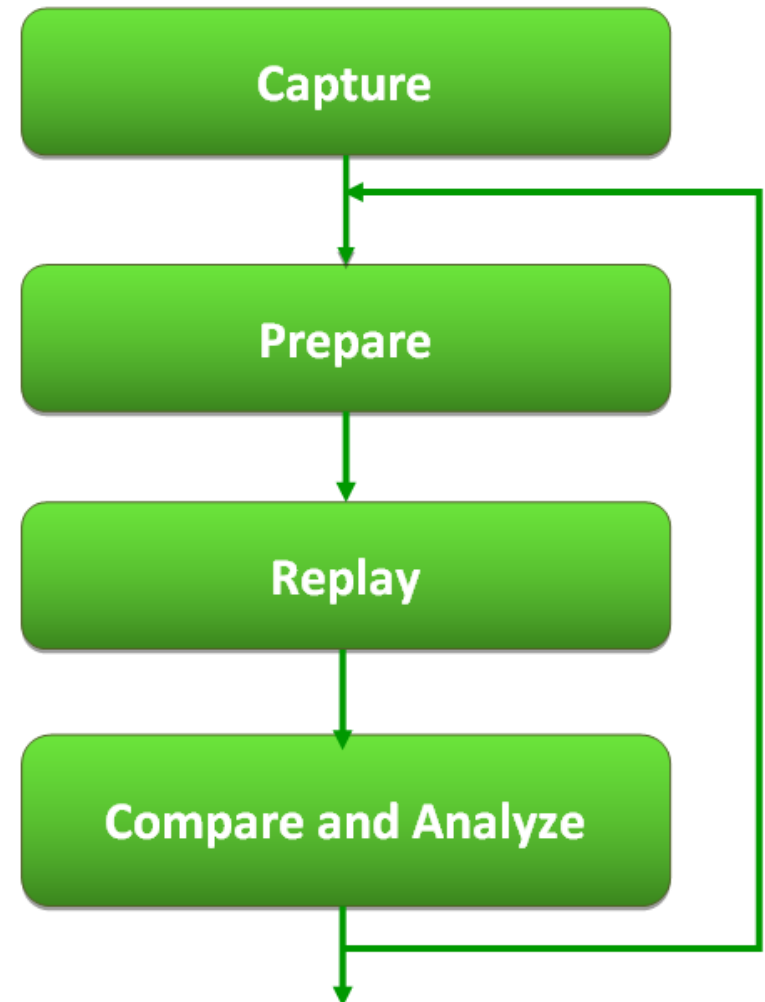
- Minimize unexpected production problems
- Shorten testing cycles
- Develop more realistic database testing scenarios

## Benefits

- Identify database problems sooner with validation reports and performance tuning
- Use actual production workloads for testing rather than fabricated scenarios
- Extend quality testing efforts to include the data layer

## Solution Overview

- Capture production workload with real load, timing & concurrency characteristics
- Prepare the workload replay
- Replay workload with full production characteristics
- Compare and analyze replay with original capture
  - Validate correct SQL execution behavior
  - Identify performance regressions and/or improvements
  - Establish baseline

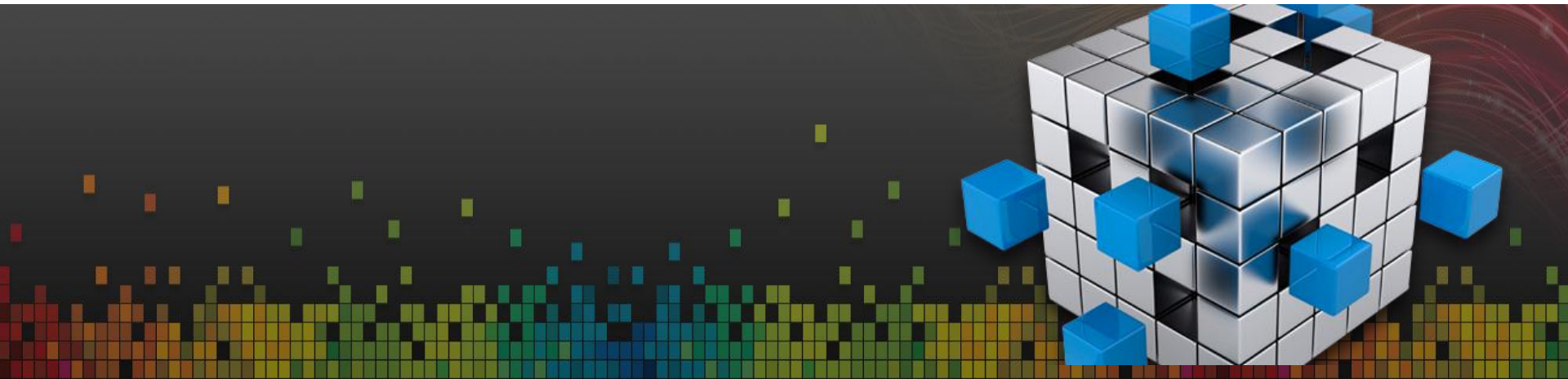


## Summary

- **Data Studio replaces Control Center in DB2 10**
- **Offers more features in addition to the major functionality in Control Center**
- **Multi OS support**
- **Multi data server types support**
- **Free to download**
- **Start using today!**



# The next steps...



## The Next Steps...

- Complete the Hands on Lab for this module
  - Log onto SKI, go to “My Learning” page, and select the “In Progress” tab.
  - Find the module
  - Download the workbook and the virtual machine image
  - Follow the instructions in the workbook to complete the lab
- Complete the online quiz for this module
  - Log onto SKI, go to “My Learning” page, and select the “In Progress” tab.
  - Find the module and select the quiz
- Provide feedback on the module
  - Log onto SKI, go to “My Learning” page
  - Find the module and select the “Leave Feedback” button to leave your comments



# Questions?

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