



IBM Software Group

IBM® Rational® Application Developer V6

Data Tools



@business on demand.

© 2004 IBM Corporation
Updated January 24, 2005

Goals

- Discuss enhancements made to database tools
- Discuss enhancements made to SQL tools
- Discuss enhancements made to SQLJ tools
- Determine how to troubleshoot tools within Application Developer

Agenda

- Database tools enhancements
- SQL tools enhancements
- SQLJ tools enhancements

Section

Database Tools Enhancements

Enhancements Overview

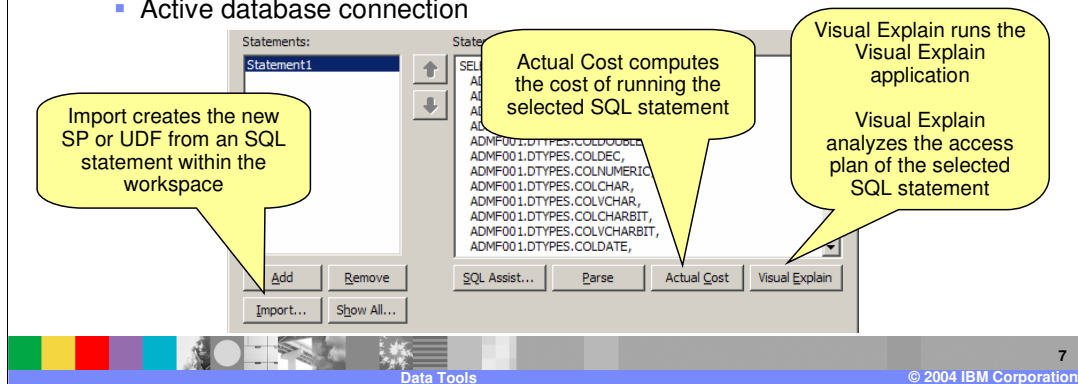
- Additional Stored Procedures (SP) and User-Defined Functions tools
 - ▶ Enhanced creation wizard
 - ▶ New Import and Export wizards
 - ▶ DDL Generation wizard additionally creates DDL statements for SPs and UDFs
 - Supported on DB2® LUW (Linux®, UNIX® and Windows™) and iSeries **only**
 - ▶ Support for exporting routines to file system or workspace project
- Enhanced Connection Wizard
- New preference settings

SP and UDF Enhancements: New Wizard

- Create new routines based on SQL statements imported from the project
- Invoke DB2 Visual Explain against selected SQL statement
 - ▶ Visual Explain allows you to analyze the statement's access plan
 - ▶ Changes made in Visual Explain are not communicated back to the wizard
 - ▶ Requirements
 - Button is visible only when working with a DB2 z/OS® database
 - Visual Explain application is only available for Windows (Visual Explain v1.0.2 or higher required)
 - Active database connection

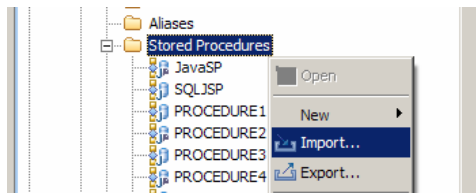
SP and UDF Enhancements: New Wizard

- Compute actual cost of running selected SQL statement against database
 - Requirements
 - Button is visible only when working with a DB2 z/OS database
 - Tables referenced in statement need to be in the workspace before executing
 - Active database connection



SP and UDF Enhancements: Import Wizard

- Creates Stored Procedures and User-Defined Functions from selected source file
 - ▶ Source file can be internal or external to the workspace
- Invoked from Stored Procedures or User-Defined Functions folder
- See appendix for supported platforms and languages

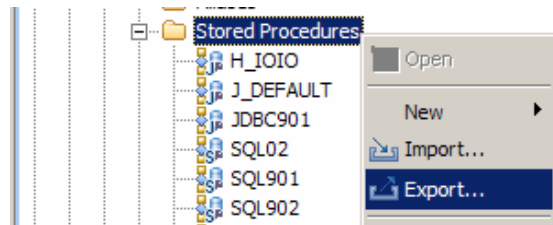


SP and UDF Enhancements: Export Wizard

- Creates DB2 or Ant scripts used in deploying Stored Procedure and User-Defined Function routines
 - ▶ Exporting within the workspace creates .xml and .sql files in the project's Scripts/Data folder
 - ▶ Exporting to the file system creates the following artifacts in the selected folder
 - DeployInstructions.txt – Describes steps necessary to use generated files
 - .sql files – DB2 script used to create SPs and UDFs
 - .xml files – Ant script used to create SPs and UDFs
 - .properties file – Used in conjunction with .xml files, holds configuration data
 - Supporting files – Used in execution of .xml and .sql files

SP and UDF Enhancements: Export Wizard

- Invoked from Stored Procedures or User-Defined Functions folder
- Database connection required when the exported routine's source code does not exist within the workspace
 - ▶ Source is retrieved when routine is exported



Export Wizard: Files Created

DB2 Type	Type of Routine	File Exported
OS/390®	SQL SP	.xml (Ant script)
	Java™ SP	.xml (Ant script)
iSeries®	SQL SP	.sql (DB2 script)
	Java SP	Not supported
LUW	SQL SP and UDF	.sql (DB2 script)
	Java SP	.xml (Ant script)

SP and UDF Enhancements: Deploying Remotely

- Routines can be deployed against a DB2 database server in several ways
 - ▶ Run “Deploy” command (replaces “Run on Database Server” command from version 5.x)
 - Deploys routines directly from within a project workspace
 - ▶ Run “Export” command and then execute the DB2 and Ant scripts by hand
 - Deploys routines from the file system
 - Follow DeployInstructions.txt to deploy routines against database server(s)
- See table for supported platforms and languages

SP and UDF Enhancements: Deploying Locally

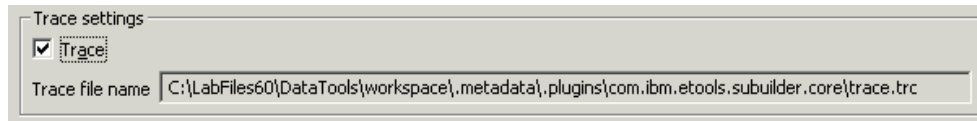
- “Run Against Local” command capable of deploying Stored Procedures and User-Defined Functions within the workspace
- Command can only be executed against .sql files
- New routine is created in Stored Procedure and User-Defined Function folders under the correct schema name

Database Connections

- Improved “New Connection” wizard
 - ▶ DB2 aliases catalogued within your local DB2 client can be used in creating new connections
 - Database details (such as DB2 version and platform type) are obtained when the connection is made to the backend
 - ▶ Test Connection button allows you to test database settings in the wizard
 - ▶ Setting filters is now part of wizard
 - In version 5.x filters had to be specified after connection was created
- Existing connections can now be edited

Preferences

- Location of SQLJ translator can be specified
 - ▶ If DB2 is installed, defaults to location of DB2's SQLJ translator
 - ▶ Configure through Preferences > Data > DB2 Stored Procedure and UDF Builder > Build options
- Tracing can be enabled for SP and UDF tools
 - ▶ Configure through Preferences > Data > DB2 Stored Procedure and UDF Builder > Process



Trace settings

Trace

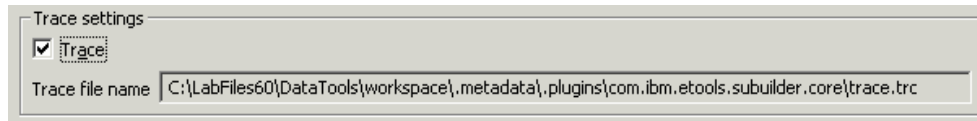
Trace file name

Limitations

- Debugging is supported for SQL stored procedures for DB2 LUW only
- Cannot build (deploy to database server) Java stored procedures using the DB2 Universal JDBC driver to a DB2 LUW 8.1 database server
 - ▶ This is a server side restriction
 - ▶ Workaround is to use DB2 Application JDBC driver
- Deploy of routines is supported only for compatible servers (LUW to LUW, z/OS to z/OS, iSeries to iSeries)

Troubleshooting

- Connections found in Database Explorer view are described in
 - ▶ *WORKSPACE_DIR*\.metadata\.plugins\org.eclipse.core.runtime\.settings\com.ibm.etools.rsc.prefs
- Debug SP and UDF tools problems by enabling trace option in preferences
 - ▶ Enable through Preferences > Data > DB2 Stored Procedure and UDF Builder > Process



Section

SQL Tools Enhancements

SQL Tools

- **SQL Query Builder**
 - ▶ Used to visually build SQL statements
 - ▶ Invoked from the Statements folder in the Data Definition view
- **SQL Wizard**
 - ▶ Wizard form of the SQL Query Builder
 - ▶ Invoked from several database tools wizards
- **SQL Scrapbook**
 - ▶ Used to develop and test SQL statements
 - ▶ Invoked from a database connection in the Database Explorer view

New Features

- Joins fully supported
- Enhanced tolerance for SQL statements not recognized by the tools
 - ▶ SQL comments
 - ▶ SELECT INTO statements
 - ▶ FOR UPDATE clause
- Expression Builder lists UDFs
- Capabilities support
 - ▶ SQL Tools are enabled with core Data capabilities

New Features

- Automatic quoting for user-entered values on character-type columns

The image shows two screenshots of the Data Tools interface. The top screenshot shows a table with columns: Columns, Conditions, Groups, Group Conditions, Value, and And. The table contains one row with the following data: Column: WSDemo.ACCOUNT.LASTNAME, Operator: LIKE, Value: Smith. A yellow callout bubble points to the 'Value' column and contains the text: 'LastName column is of type VARCHAR'. The bottom screenshot shows the same table, but the 'Value' column now contains the text 'Smith' with single quotes around it. A yellow callout bubble points to the 'Value' column and contains the text: 'When focus is moved away from the cell, the user-entered value is automatically quoted'.

- Tracing support

Preferences

- Query validation on save setting is disabled by default
 - ▶ Set through Preferences > Data > SQL Query

	Version 5.x	Version 6.0
Setting value	Validate query statements before saving	Validate query statements by executing before saving
Default	On	Off

Limitations

- Minimal content assist provided in SQL Scrapbook
 - ▶ Supports static content assist only (SQL keywords, etc.)
 - ▶ For example – if user types schema name followed by a period, they will not see a list of tables

Troubleshooting

- Verify SQL statements problems encountered in the GUI by running the same statement from a command line
- Key exceptions are automatically logged to *WORKSPACE_DIR*\.metadata\.log
- Tracing for SQL tools can be enabled by modifying the .options file in
 - ▶ *ROOT_DIR*\rwd\eclipse\plugins\com.ibm.etools.rdblib_6.0.0

Section

SQLJ Tools Enhancements

SQLJ Overview

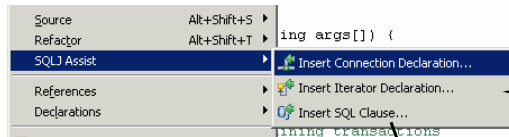
- SQLJ allows SQL statements to be embedded in Java programs
 - ▶ Alternative to accessing databases via JDBC
 - ▶ Optionally can use static SQL for improved performance
- Before an SQLJ application can be run, it must be translated, compiled, and optionally customized and bound to your database
 - ▶ Translation – SQLJ translator converts SQLJ directives into Java code
 - ▶ Customization – Creates and binds profiles containing the static SQL statements to your database

Wizard Enhancements

- “Add SQLJ Support” wizard enhanced
 - ▶ Additional JARs can be added to the classpath besides the SQLJ JAR
 - ▶ New project properties can be specified
 - Additional SQLJ translator options
 - Use long package names
- “New SQLJ File” wizard enhanced
 - ▶ Generate file based on a selected template
 - Default templates provided (SQLJ Template, SQLJ Cached Template)
 - Additional templates can be defined by the user
 - ▶ Generate file based on a new or existing SELECT statement in the workspace

Tools Enhancements

- SQLJ code assists added to the Java Editor to speed development (accessed through context menu in the Java Editor)



SQLJ wizards accessed through context menu of Java editor

"Insert SQL Clause" wizard currently only supports creating SELECT statements

A screenshot of the SQLJ Demo file in the editor. The file name is SQLJDemo.sqlj. The code is as follows:

```
...  
#sql static context petsdb with (dataSource="jdbc:db2://localhost:50000/PETSDB");  
#sql iterator MyIterator (String, String, String);  
public void myMethod() {  
    #sql [petsdb, petsdb] MyIterator = { SELECT WSDemo.ACCOUNT.FIRSTNAME, WSDemo.ACCOUNT.LASTNAME,  
    WSDemo.ACCOUNT.EMAIL FROM WSDemo.ACCOUNT };  
...  
}
```

Two yellow callout boxes are present. One points to the context menu and contains the text: "SQLJ wizards accessed through context menu of Java editor" and "Insert SQL Clause" wizard currently only supports creating SELECT statements. The other points to the code and contains the text: "Lines created by the wizards".

Lines created by the wizards

Tools Enhancements

- **New SQLJ customization wizard**
 - ▶ Defines SQLJ customization properties
 - Different database can be specified for each package
 - Multiple profiles can be included in one package
 - Optionally execute both the customize and bind command or the bind command by itself
 - ▶ Launches Ant script that executes SQLJ customize command with defined properties
- **Invoke SQLJ print command from context menu**
 - ▶ Outputs a readable plaintext version of a profile created by the SQLJ customization command

Preferences

- Specify SQLJ profile print command to use
 - ▶ If DB2 is installed, defaults to db2sqljprint
 - ▶ Configure through Preferences > Data > SQLJ

Troubleshooting

- SQLJ translation and transformation are performed by external DB2 classes
 - ▶ Determine DB2 version and fix pack level before diagnosing problems

Section

Summary and Reference

Summary

- Stored Procedure and User-Defined Function support within the tools has been greatly enhanced
- SQLJ wizards and improved command support make developing applications with SQLJ easier and more intuitive

Reference

- Optimal DB2 Performance with SQLJ and JDBC
 - ▶ http://www6.software.ibm.com/reg/devworks/dw-db2sqlj-i?S_TACT=102B7W81&S_CMP=DB2DD
- Considering SQLJ for Your DB2 V8 Java Applications
 - ▶ <http://www.ibm.com/developerworks/db2/library/techarticle/0302tsui/0302tsui.html>

SP and UDF: Language and Server Support

	Stored Procedures	User Defined Functions
DB2 zOS V7 and V8	Java and SQL	Not supported
DB2 iSeries V5R1,V5R2	SQL only	Not supported
DB2 LUW V8	Java and SQL	SQL (Scalar and Table) + Special table UDFs (MQSeries)

Supported Database Types

- Cloudscape
 - ▶ Version 5.0
 - ▶ Version 5.1
- DB2 Universal Database™ for Linux™, UNIX®, and Windows®, Enterprise Edition and Workgroup Edition
 - ▶ Version 8.1
 - ▶ Version 8.2
- DB2 Universal Database for Linux, UNIX, and Windows, Express Edition
 - ▶ Version 8.1 FixPak6
 - ▶ Version 8.2
- DB2 Universal Database for iSeries
 - ▶ V4R5
 - ▶ V5R1
 - ▶ V5R2
 - ▶ V5R3
- DB2 Universal Database for z/OS®
 - ▶ Version 7.1
 - ▶ Version 8.0
- Informix® Dynamic Server
 - ▶ 7.31
 - ▶ 2000 V9.2
 - ▶ 9.3
 - ▶ 9.4
- Microsoft® SQL Server Enterprise
 - ▶ 7.0 SP4
 - ▶ 2000 SP2
- Oracle 8i
 - ▶ Release 3 8.1.7
- Oracle 8i Enterprise Edition
 - ▶ Release 3 8.1.7
- Oracle Enterprise Edition 9i
 - ▶ V9.2
- Sybase Adaptive Server Enterprise
 - ▶ Version 12.0
 - ▶ Version 12.5

Trademarks, Copyrights, and Disclaimers

The following terms are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both:

IBM	CICS	IMS	MQSeries	Tivoli
IBM (logo)	Cloudscape	Informix	OS/390	WebSphere
e(logo)/business	DB2	iSeries	OS/400	xSeries
AIX	DB2 Universal Database	Lotus	pSeries	zSeries

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are registered trademarks of Microsoft Corporation in the United States, other countries, or both.

Intel, ActionMedia, LANDesk, MMX, Pentium and ProShare are trademarks of Intel Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Linux is a registered trademark of Linus Torvalds.

Other company, product and service names may be trademarks or service marks of others.

Product data has been reviewed for accuracy as of the date of initial publication. Product data is subject to change without notice. This document could include technical inaccuracies or typographical errors. IBM may make improvements and/or changes in the product(s) and/or program(s) described herein at any time without notice. Any statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only. References in this document to IBM products, programs, or services does not imply that IBM intends to make such products, programs or services available in all countries in which IBM operates or does business. Any reference to an IBM Program Product in this document is not intended to state or imply that only that program product may be used. Any functionally equivalent program, that does not infringe IBM's intellectual property rights, may be used instead.

Information is provided "AS IS" without warranty of any kind. THE INFORMATION PROVIDED IN THIS DOCUMENT IS DISTRIBUTED "AS IS" WITHOUT ANY WARRANTY, EITHER EXPRESS OR IMPLIED. IBM EXPRESSLY DISCLAIMS ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NONINFRINGEMENT. IBM shall have no responsibility to update this information. IBM products are warranted, if at all, according to the terms and conditions of the agreements (e.g., IBM Customer Agreement, Statement of Limited Warranty, International Program License Agreement, etc.) under which they are provided. Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products in connection with this publication and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. IBM makes no representations or warranties, express or implied, regarding non-IBM products and services.

The provision of the information contained herein is not intended to, and does not, grant any right or license under any IBM patents or copyrights. Inquiries regarding patent or copyright licenses should be made, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. All customer examples described are presented as illustrations of how those customers have used IBM products and the results they may have achieved. The actual throughput or performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput or performance improvements equivalent to the ratios stated here.

© Copyright International Business Machines Corporation 2004. All rights reserved.

Note to U.S. Government Users - Documentation related to restricted rights-Use, duplication or disclosure is subject to restrictions set forth in GSA ADP Schedule Contract and IBM Corp.