

## ***DB2 for i: 6.1 Overview***



On January 29, 2008, IBM announced a new version of IBM i. Version 6 Release 1 (6.1) of IBM i includes an updated version of DB2 for i, which is built into the operating system. In addition, several new products are available for DB2 for i in a similar timeframe as 6.1.

The DB2 for i 6.1 and additional DB2 related products cover a broad range of new function, including:

- Enhanced usability and self managing features
- Extended industry and DB2 family standards support
- Enablement of SOA applications through database modernization tools and performance improvements
- Support for complex queries required for Business Intelligence applications

### **Usability and Self Managing Features**

In 6.1, DB2 for i extends its position as a leader in ease of use and integration by extending the tools used to more easily manage and use the database. DB2 On Demand Performance Center, included with System i Navigator, is enhanced to provide more flexible reporting of DB2 performance analysis data. Customized reports, and saving the output into any number of formats, including spreadsheets, means you can more easily review and share performance data captured by the DB2 Monitors or the SQL Plan Cache. The SQL plan cache is where diagnostic information is stored in real time for SQL and queries that leverage the SQL Query Engine (SQE) first introduced in V5R2. 6.16.1

The DB2 Health Center, also part of System i Navigator, allows the user to track their environment against system limits, including archiving of that information to do trend analysis. With 6.1, DB2 run-time limits have been added to the Health Center.

Other enhancements to System i Navigator in 6.1 include:

- **Fast Summary Compare.** Compare two performance collections at a summary level, enabling you to see at a high level the differences in the captured data and then determine specifics of what detailed level data needs to be captured as a next step.
- **Index Advisor Enhancements.** With 6.1, not only can you simplify how you view index advice through an index “condenser” enhancement, but you can also more easily create multiple indexes that are advised in a single step.

- **Index Evaluator Enhancements.** The *ShowIndexes* task allows you to review index usage across an entire schema or library instead of a single table at a time.

SQL Query Engine (SQE), part of DB2 for i, adds new self learning, self adjusting attributes to improve query processing. In 6.1, the SQE optimizer will automatically analyze poor performing query plans to examine the I/O characteristics as well as record retrieval patterns and compare them to the values used during optimization of the query. If the query optimizer detects significant mismatches, then the optimizer modifies its assumptions and algorithms during the next execution of that SQL request to generate a better plan. To complement the learning optimizer, the DB2 runtime engine is also equipped with adaptive technologies that allow the plan of a currently running query to be modified on the fly to improve the efficiency of the query for the remainder of the run.

### **Extending industry and DB2 family standards support**

When porting applications to DB2 for i, you will frequently find SQL CLI is the data access programming interface used by the application. The portability of these SQL CLI applications also increases in 6.1 with the addition of support for the CLI Wide-Character APIs. The CLI Wide-Character functions are found in applications that support Unicode or Double-byte data.

The DB2 for i .NET data provider has been enhanced to exploit version 2.0 of ADO.NET as well as provide support for distributed transactions and multi-row inserts. In addition, this .NET provider provides tighter integration with Microsoft Visual Studio development environment by adding support for Visual Studio database interfaces and wizards such as Server Explorer.

Java data access is improved with the JDBC Version 4.0 enhancements along with other miscellaneous improvements to the JDBC driver.

SQL is considered the open standard for database access, and SQL Query Engine (SQE) is the latest technology in DB2 for i for processing SQL. As noted above, SQE is faster, smarter, and simpler to manage than the previous (and still existing) query optimizer called “classic” query engine, or “CQE.” So the more SQL statements that can leverage SQE, the better applications will perform with the added benefit of more tooling available to monitor and analyze the query environment.

With each new release of DB2 for i, more restrictions are removed to allow more SQL statements to leverage SQE. 6.1 is no different, with significant restrictions being removed, including national language sort sequences, UPPER/LOWER translations, and use of User Defined Table Functions. Several restrictions still remain, most notably referencing a Logical File in the SQL statement (the recommendation would be to not use the LF in the SQL Statement or replace it with an SQL Index), and Select/Omit logical file usage. For the latter (Select/Omit LFs), with 6.1 the default setting for the Ignore\_Derived\_Index parameter has been changed to allow SQL statements references databases with Select/Omit LFs to be processed by SQE.

Omnifind Text Search Server for IBM i brings a DB2 family standard text search engine to IBM i. This separately orderable (but no charge) product can be used by application developers to build complex text (including XML, .DOC file formats stored in DB2) search capabilities into their applications.

Porting applications to DB2 for i from other DB2 and other database products will be simpler in 6.1 with the following SQL enhancements:

- Automatic Hidden Timestamp Columns
- Full Outer Join
- SELECT FROM INSERT
- VALUES on FROM

### **Application Development Enhancements**

The ability to use SQL within RPG applications is significantly improved in 6.1. One of the key improvement areas in 6.1 is the SQL pre-compiler's ability to scope variables at a procedure level. In addition, the ILE SQL precompilers were enhanced to support source code stored as stream files.

SQL coding within RPG applications can be jump started with the usage of *statement templates*. SQL statement templates allow you to create an SQL statement shell that can be automatically copied into your application source code from the Content Assist menu. These templates enable you to avoid typing in SQL keywords and instead just type in the user-defined parts of an SQL statement such as the column or table name.

Coding SQL statements into RPG programs is simpler with the new SQL *syntax highlighting* available with WebSphere Development Studio Client 7.0 & Rational Developer for System i 7.1.

Developers will also have much more flexibility in coding SQL-based solutions on 6.1 with Extended Indicator Variables and the Skip Locked Data clause.

DB2 Development Center has been renamed to DB2 Data Studio, and offers a DB2 family workbench for developing/deploying DB2 stored procedures (Java or SQL) and Triggers, and otherwise working with DB2 objects to improve programmer productivity. DB2 Data Studio even includes wizards to create web services and a pureQuery runtime environment to make Java developers more productive.

In addition, the Rational Data Architect product brings an IBM data modeling tool that can import Logical File definitions to DB2 for i. This modeling tool is one way to open up your database design to concepts of modernization and SOA!

Another couple of exciting tools to support DB2 for i come from some products recently acquired by IBM. The IBM Optim suite of products include functions for archiving data and creation of test data, including masking of sensitive data.

## **DB2 for i Support for Data Warehouse and Business Intelligence Applications**

The popular DB2 Web Query for i product has significant changes to its user licensing options that will allow customers more flexibility and affordability to map a solution to how they expect to use the product. The Run-Time User Enablement feature will allow customers to define a single user license as either a report “author” that can create and edit query definitions, or as a GROUP of run-time only users that can run queries concurrently under that single user license.

Add the new DB2 Web Query Report Broker product to automate report executing and distribution. Integrate the reporting environment into applications or portals with the new DB2 Web Query Software Development Kit.

DB2 for i SQL Syntax support for relational OLAP implementations is significantly enhanced with the Grouping Sets and Super Groups support. Grouping Sets and Super Groups (via CUBE and ROLLUP) allow a user to group and aggregate data in multiple ways in a single query. Supporting multiple levels of data analysis on a single SQL statement results in less coding for your application developers.

### ***Additional Information on DB2 for i:***

DB2 for i Home Page:

<http://www.ibm.com/systems/i/db2>

DB2 Web Query for i:

<http://www.ibm.com/systems/i/db2/webquery>