

IBM[®] DB2[®] Universal Database



What's New

Version 7

IBM[®] DB2[®] Universal Database



What's New

Version 7

Before using this information and the product it supports, be sure to read the general information under "Appendix B. Notices" on page 45.

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Welcome to DB2 Universal Database Version 7

Database management software has evolved into the core of enterprise computing. As companies move into an Internet age of broad-band communications, databases must be able to store and serve huge multimedia files, manage ever increasing volumes of data, handle the tremendous growth in the number of users, deliver steadily improved performance, and support the next generation of applications. With its virtually unlimited ability to scale, its multimedia extensibility, its industry-leading performance and reliability, and its platform openness, DB2 Universal Database has helped lead this evolution.

DB2 Universal Database is the first multimedia, Web-ready relational database management system, strong enough to meet the demands of large corporations and flexible enough to serve medium-sized and small businesses. With DB2 Universal Database Version 7, IBM continues its role as the database innovator in:

- **e-business**

DB2 Universal Database powers the most demanding e-business applications, such as electronic commerce, enterprise resource planning, customer relationship management, supply-chain management, Web self-service, and business intelligence. It's about a scalable, industrial-strength database that can be the data management foundation for your evolution into e-business.

- **Business Intelligence**

DB2 Universal Database means using data assets to make better business decisions. It's about data access, data analysis, and decisions that help control costs, uncover new opportunities, boost market share, and increase customer loyalty.

- **Data Management**

DB2 Universal Database data management is more than simply running queries and applications. It's about where to store data, how to access it quickly, how to protect it against loss, and how to administer databases for optimum performance on your hardware and for your mix of applications.

- **DB2 Family**

DB2 Universal Database continues to meet the demands of today's heterogeneous computing environments. It's about open solutions that can access and integrate data from multiple, geographically separated sources on different platforms.

Universal Database is an ambitious name. It suggests a product that is designed to be used for a variety of purposes and in a variety of environments, and that is a good description of DB2 Universal Database. Each new release of DB2 Universal Database builds on the strong foundation of the previous version. This book describes the new DB2 functions and enhancements available with DB2 Universal Database Version 7.

Who Should Read This Book

This book is for current owners of DB2 who are upgrading or considering upgrading from one of these:

- DB2 Version 2 or Database Server Version 4
- DB2 Universal Database Version 5 or Version 6
- DB2 Enterprise - Extended Edition Version 5 or Version 6
- DDCS Version 2 or DB2 Connect Version 5 or Version 6
- Visual Warehouse Version 3 or Version 5

If you are considering DB2 Universal Database or DB2 Connect for the first time, you should start by reading the appropriate *Quick Beginnings* book for your operating system to get basic DB2 information.

How This Book Is Structured

This book begins with an overview of some of the major DB2 enhancements for Version 7 and then describes these new features and enhancements.

Chapter 1. Introducing Version 7 describes the main DB2 product enhancements available with DB2 Universal Database Version 7 such as additional platform support for existing products, and describes the migration support provided to help you migrate from previous versions of DB2 to Version 7.

Chapter 2. e-business Enhancements describes the enhancements for building and running e-business applications that leverage existing data and help to transform business into e-business.

Chapter 3. Business Intelligence Enhancements describes how the ability to copy, consolidate, and analyze operational data has been enhanced for better business decisions that can often lead to competitive advantage.

Chapter 4. Data Management Enhancements describes the enhancements in DB2 function and performance.

Chapter 5. DB2 Family Enhancements describes how DB2 continues to expand its support for users from legacy systems through to the newest generation of handheld devices.

Appendix A. Using the DB2 Library describes the DB2 library; including books and online help.

Appendix B. Notices contains notice and trademark information.

Chapter 1. Introducing Version 7

This section provides a brief summary of the enhancements for the latest version of DB2 Universal Database, including the support DB2 provides for migrating to Version 7 from previous versions of the product.

Ease of Use

This section describes some of the Version 7 enhancements that make DB2 Universal Database even easier to use.

Launchpads

DB2 Universal Database provides launchpads to assist you with some of your DB2 tasks.

Installation Launchpad

When you insert the DB2 Universal Database Version 7 product CD-ROM, the auto-run feature no longer takes you to the first screen in the DB2 setup program. Instead, it initiates the DB2 Launchpad. The DB2 Launchpad is a window that gives you the following options:

- Release Notes
- Installation Prerequisites
- Quick Tour
- Install
- Exit

The DB2 Launchpad gives you access to needed information from the CD-ROM before starting a DB2 installation.

Warehouse Launchpad

The first time you open the Data Warehouse Center, the Warehouse Launchpad also opens. This launchpad simplifies the job of populating a warehouse by leading you through the related tasks. You can use the launchpad whenever you need to create warehouse objects by selecting it from the Data Warehouse Center menu.

First Steps

In Version 7, the First Steps tool that is used to create and view the SAMPLE database on a DB2 server has been extended to allow client options. On a client, you have the option to connect to the SAMPLE database (using the Client Configuration Assistant) or create a SAMPLE database on a remote DB2 server.

You can also create sample databases for warehousing and online analytical processing (OLAP). You will need these databases for the Business Intelligence tutorial (see “Business Intelligence Tutorial” on page 12).

As First Steps is a Java application, it can be used on all DB2-supported operating systems, provided that the appropriate Java Run-Time Environment (JRE) is installed on the workstation. Refer to the DB2 Universal Database *Quick Beginnings* manuals for your operating system for more information.

Quick Tour

The DB2 Universal Database Quick Tour is a high-level presentation that, in a short time (20 to 25 minutes), introduces you to changes, features, benefits, capabilities, and sources of information associated with DB2 Universal Database. It has a special emphasis on e-business, business intelligence (BI), and data management. The Quick Tour navigation is flexible, giving you control over your learning experience.

Information Center

The Information Center, accessible by selecting Help → Information Center from the Control Center, is now easier to use. In the Information Center you can now view information by subject or by category. The Information Center now contains a link to search the entire DB2 library.

Wizard Enhancements

All wizards (called SmartGuides in previous versions) have a new look with a Table of Contents (TOC) on the left side. You can resize the TOC to make it larger so that all text can be displayed or hidden altogether. (Some wizards contain an Introduction page that introduces the wizard and a Summary page that summarizes the information that has been entered).

Help or instructions can be found on each page of the wizard, in the infopops for each field or control, and in the links that are identified as underlined text. A *Hints* feature is also available.

Information Feedback

When you have a comment about the information you’re reading, you can now send it directly to the DB2 Universal Database team.

From any HTML DB2 document (books or online help), you can click the Feedback link in the top frame of your browser. This takes you to a form on the World Wide Web where you can submit issues regarding the DB2 Universal Database documentation.

Note: The DB2 Universal Database team will read all your feedback but cannot respond directly to you. Use normal channels to reach Customer Support or Customer Service.

New Products and Packages

This section contains information on products and packages that have joined the DB2 family or have changed for Version 7.

DB2 Warehouse Manager

This new offering brings together the tools to build, manage, govern, and access DB2 data warehouses. The DB2 Warehouse Manager simplifies and speeds warehouse prototyping, development, and deployment. It gives the data center the control for governing queries, analyzing costs, managing resources, and tracking usage. It helps satisfy user requirements for finding, accessing, and understanding information. It provides flexible tools and techniques for building, managing, and accessing the warehouse. And it meets the most common reporting needs for enterprises of any size.

The DB2 Warehouse Manager adds to the basic warehouse and analytical functions available in DB2 Universal Database by providing:

- Additional warehouse scalability through warehouse agents co-located with the database. Warehouse agents manage the flow of data between warehouse sources and warehouse targets.
- Advanced transformations using Java stored procedures and user-defined functions including cleaning data, pivoting tables, generating keys, and more.
- An integrated business information catalog to guide users to relevant information that they can use for decision making.
- Sophisticated query governing and workload distribution.
- Query reporting that satisfies the common reporting needs of most enterprises.

The offering applies to DB2 Universal Database Enterprise Edition and Enterprise - Extended Edition only.

QMF for Windows

QMF for Windows is included with the DB2 Warehouse Manager. It provides a multipurpose query tool for business reporting, data sharing, server resource protection, robust application development, and native connectivity to all of the DB2 workstation platforms.

QMF for Windows provides native support for TCP/IP connectivity to Version 5 and later. It is architecturally coupled with DB2 using Distributed Relational Database Architecture (DRDA). Support for a heterogeneous database environment is available through DB2 DataJoiner, which allows users to access other vendor and non-relational workstation databases. See “QMF” on page 13 for more Version 7 information.

DB2 Query Patroller

Query Patroller for DB2 Universal Database is now available for Enterprise Edition and provides support for HP-UX and NUMA-Q, in addition to Windows 32-bit operating systems, AIX, and Solaris platforms. This allows you to manage, govern, and schedule business analysis queries and to more fully utilize the resources available on those DB2 servers. See “Query Patroller” on page 13 for other Version 7 enhancements.

DB2 Query Patroller is now part of the Warehouse Manager offering.

DB2 Relational Connect

DB2 Relational Connect enhances the distributed request functionality included with DB2 Universal Database by allowing users and applications to access data stored in Oracle databases. This can be used in conjunction with built-in distributed query capabilities to formulate queries across DB2, Oracle, and OLE DB databases. It can also be used with the Data Warehouse Center to accelerate select performance from Oracle sources for loading a DB2 data warehouse (see “Native OLE DB Support” on page 19).

A DB2 Universal Database system that has been configured as a federated system and on which DB2 Relational Connect has been installed is capable of referencing multiple DB2 family and Oracle databases within a single query. A federated system is a database management system (DBMS) that supports applications and users submitting SQL statements referencing two or more DBMSs or databases in a single statement. For more information about federated database concepts, see the *Administration Guide: Planning*.

DB2 Relational Connect is supported on DB2 Universal Database Enterprise Edition or DB2 Universal Database Enterprise - Extended Edition for Windows 32-bit operating systems and AIX systems.

Workgroup Edition on UNIX

In Version 7, a Workgroup Edition of DB2 is available for all DB2 supported UNIX-based platforms (except for NUMA-Q).

DB2 OLAP Starter Kit

DB2 Universal Database includes the DB2 OLAP Starter Kit which is functionally based on DB2 OLAP Server Version 7. The DB2 OLAP Server Starter Kit lets users of DB2 Universal Database explore and apply online analytical capabilities before acquiring the full product, DB2 OLAP Server, for more complex analysis or deployment to large groups of users. Applications developed by the DB2 OLAP Starter Kit can continue to be extended and used in the full product. Both the DB2 OLAP Starter Kit and DB2 OLAP Server are based on Essbase, the market-leading OLAP technology from Hyperion Solutions. See “OLAP Capability” on page 12 for more information.

DB2 Spatial Extender

The DB2 Spatial Extender can now be hosted directly by DB2 Universal Database. This facilitates the inclusion of spatial attributes, such as distance or driving time, into business analyses. This integration allows spatial data to exploit the performance benefits available with a database management system (DBMS). DB2 Spatial Extender conforms to the OpenGIS Consortium (OGS) and ISO standards for storing, indexing, and querying spatial data. See the *Spatial Extender User's Guide and Reference* for more information.

DB2 Net Search Extender

DB2 Universal Database Net Search Extender provides a high performance method of searching text stored in DB2 databases. Searching with it can be particularly advantageous in Internet applications where performance is an important factor.

Net Search Extender can add the power of fast full-text retrieval to Net.Data, Java, and CLI applications. Its features let you store unstructured text documents of up to 2 gigabytes in databases. It offers application developers a fast, versatile, and intelligent method of searching through such documents.

Application Development Client

The Software Developer's Kit is now called the DB2 Application Development Client.

Migration to Version 7

DB2 provides migration support to allow you to convert back-level DB2 databases and instances to a format usable by DB2 Universal Database Version 7. The following DB2 releases are supported by the DB2 Universal Database Version 7 migration process:

Migration to DB2 Universal Database Version 7

- DB2 for AIX Version 5.x and Version 6
- DB2 for HP-UX Version 5.x and Version 6
- DB2 for OS/2 Version 5.x and Version 6
- DB2 for Solaris Version 5.x and Version 6
- DB2 for Windows NT Version 5.x and Version 6
- DB2 for NUMA-Q Version 6
- DB2 for Linux Version 6

Migration to DB2 Enterprise - Extended Edition Version 7

- DB2 for AIX Version 5.x and Version 6
- DB2 for HP-UX Version 6
- DB2 for Solaris Version 5.x and Version 6

- DB2 for Windows NT Version 5.x and Version 6
- DB2 Enterprise - Extended Edition for AIX Version 5.x and Version 6
- DB2 Enterprise - Extended Edition for Solaris Version 5.x and Version 6
- DB2 Enterprise - Extended Edition for Windows NT Version 5.x and Version 6
- DB2 for NUMA-Q Version 6

Note: DB2 migration does not support migration across operating systems. You can only migrate from a previous version of DB2 on one operating system to DB2 Version 7 on the same operating system. For example, if your current database server is DB2 for Windows NT Version 6.1, you can only migrate to DB2 for Windows NT Version 7.

Depending on your platform, there may be certain pre-installation and post-installation tasks that you must perform to migrate successfully to the Version 7 format. For more information on migrating to DB2 Version 7, refer to the *Quick Beginnings* manuals for your platform.

Migrating from Visual Warehouse Version 3.1 or Version 5.2

The function provided by the Visual Warehouse product has been integrated into DB2 Universal Database and DB2 Warehouse Manager. This function is accessed in DB2 Universal Database through the Data Warehouse Center. For migration information see the *DB2 for Windows Quick Beginnings*.

Chapter 2. e-business Enhancements

Behind every significant e-business application is a database, and the robustness of that database and its associated components will determine your online success. With DB2 Universal Database, e-business is really enterprise computing, transformed through the power of the Internet.

XML Extender Support

DB2 now allows you to store eXtended Markup Language (XML) documents as a new column data type. You also have the ability to decompose and store XML in its component parts as columns in multiple tables. In both cases, indexes can be defined over the element or attribute of an XML document for fast retrieval. In addition, text search and section search can be enabled on the XML column or its decomposed part using text extenders. You can also formulate an XML document from your existing DB2 tables for data interchange in a business-to-business environment. Net.Data and XML Extender can be used to generate XML documents from DB2 and distributed to consumers for viewing with a browser.

Net.Data Enhancements

Net.Data, which connects Web applications to DB2, now has built in XML exploitation. This allows you to generate XML tags as output from your Net.Data macro, instead of manually entering the tags. You can also specify an XML style sheet (XSL) to be used to format and display the generated output. See the *DB2 Connect* documentation for your operating system for more information.

Stored Procedures

Application performance can be improved with these enhancements to the stored procedure capabilities of DB2 Universal Database.

Stored Procedure Builder

Stored Procedure Builder has been enhanced to simplify the process of building your stored procedures and also to make it easier to debug and deploy them in your enterprise:

- AIX and Solaris clients are now supported.
- The Stored Procedure Builder can be launched from the Control Center.
- Java stored procedures can be built on DB2 for OS/390.
- SQL Procedure Language support is available across the entire DB2 Family. See "SQL Procedure Language" on page 8 for more information.

For more information on the Stored Procedure Builder see the *Online Help*.

Nested Stored Procedure Support

DB2 now delivers nested stored procedure support that not only simplifies the migration of applications from other database vendors, but also allows application developers to use and exploit stored procedures in a more effective way. See the *Application Development Guide* for more information.

SQL Procedure Language

SQL Procedure Language support is now available for DB2 on Windows, OS/2, and UNIX, in addition to DB2 Universal Database for OS/390 and AS/400. It supports building DB2 stored procedures that employ SQL in a manner consistent with the Persistent Stored Module definition of the ANSI SQL99 standard. See the *Application Development Guide* and the *Application Building Guide* for more information.

Visual Basic Stored Procedures

DB2 Universal Database now enables you to write a Visual Basic OLE automation stored procedure and deploy it on a DB2 for Windows 32-bit operating system server. You can specify OLE as the language in which the stored procedure is implemented and call it from a client application written in any of the languages supported by DB2. See “Native OLE DB Support” on page 19 for more information on DB2 OLE support.

Calling Stored Procedures

Stored procedures can now be called from the command line processor (CLP), using the CALL command. See the *SQL Reference, Volume 1* for more information.

Stored Procedure Samples

An enhanced set of stored procedure samples is available with the Application Development Client. The samples are written using embedded SQL in C/C++, CLI in C, JDBC in Java, and SQL procedures. They demonstrate the capability of client applications in one language to call a stored procedure written in another language. Separate source files for CREATE PROCEDURE statements, client applications, stored procedures, and DROP PROCEDURE statements make it easy to copy and modify the sample code to create your own stored procedures.

Java Stored Procedure Class Loader

With the Java class loader, DB2 Universal Database enables you to improve the performance of your Java stored procedures and increase the availability of your production servers. The Java class loader enables you to perform online replacement of your Java stored procedure classes. When you issue the CALL SQLJ.REFRESH_CLASSES() statement, DB2 continues to run, and the Java Virtual Machine (JVM) remains loaded in memory, ready to execute the refreshed stored procedure classes. Stored procedures can use the new classes

without the need to stop the database manager. See the *Application Development Guide* for more information.

Chapter 3. Business Intelligence Enhancements

DB2 Universal Database includes the built-in foundation for creating, populating, storing, and maintaining data warehouses and OLAP cubes. DB2 Warehouse Manager extends those basic functions with greater scalability, manageability, and accessibility.

Data Warehouse Center

The power of Visual Warehouse and the simplicity of the DB2 Control Center have been merged to provide a single, new user interface for business intelligence customers. You can use the Data Warehouse Center to register and access data sources, define data extraction and transformation steps, populate data warehouses, automate and monitor warehouse management processes, and manage and interchange metadata. The Warehouse Launchpad simplifies the job of populating a warehouse by leading you through the related tasks. The Data Warehouse Center supports full refresh and incremental update data movement options including leveraging the power of IBM's integrated data replication functions. Integrated SQL Assist capabilities (see "SQL Assist" on page 19) help customers define over 100 transformations using the rich SQL available with DB2. Users can also build custom transformation routines using Stored Procedure Builder (see "Stored Procedure Builder" on page 7).

See the *Data Warehouse Center Administration Guide* and the *Data Warehouse Center Application Integration Guide* for more warehousing information.

Star Schema Builder

Within the Data Warehouse Center, the Warehouse Schema Modeler is a specialized tool for generating and storing schema associated with a data warehouse. Any schema resulting from this process can be passed easily as metadata to an OLAP tool. See the *Data Warehouse Center Administration Guide* for more information.

Process Modeler

The Process Modeler allows users to graphically link the steps needed to build and maintain data warehouses and dependent data marts. Dependency relationships, conditional processing, and notifications can all be included in the model. Processes can be scheduled for one-time or repeating execution, or triggered by internal or external processes.

OLAP Capability

DB2 Universal Database provides powerful tools for business analysis, including online analytical processing (OLAP) tools.

OLAP Starter Kit

DB2 Universal Database provides you with integrated online analytical processing capabilities through the DB2 OLAP Starter Kit. It allows users to easily define multidimensional applications. The applications can be linked and populated with warehouse data, and shared among a work group. The Starter Kit prepares you for more complex OLAP applications which require the full function DB2 OLAP Server product.

The Starter Kit is based on the DB2 OLAP Server product and Hyperion's industry-leading Essbase technology.

Relational OLAP Capabilities

New SQL functions for moving aggregates, such as moving average and moving sum (for example, the balance column of a bank statement), are now available for analytical queries. These additional computational functions expand your OLAP capabilities and improve the performance of these typically challenging queries.

Business Intelligence Tutorial

The DB2 Universal Database tutorial for business intelligence is an online HTML document that provides an end-to-end guide to typical business intelligence tasks. The lessons in the tutorial provide step-by-step instructions for data warehousing and OLAP tasks, using the sample databases that come with DB2. The tutorial is accessible from the First Steps window, the Information Center, and the Data Warehouse Center and OLAP components of DB2 Universal Database.

Metadata Interchange

Metadata interchange has been expanded to support the industry's Common Warehouse Metadata Interchange standard from the Object Management Group (OMG), facilitating solution integration among heterogeneous tools. The OMG standard has the support of industry leaders including IBM, Oracle, NCR, and Hyperion.

Heterogeneous Distributed Query

DB2 Universal Database users now have the power of distributed query across any DB2 family database or OLE DB source. This means that users and applications can use the DB2 Universal Database SQL syntax and APIs to access data that resides at heterogeneous data sources. With this functionality,

users and applications have the capability of referencing multiple data sources in a single SQL statement. With Relational Connect, distributed queries can also include Oracle databases (see “DB2 Relational Connect” on page 4).

This is the first phase of the integration of DB2 DataJoiner into DB2 Universal Database. DataJoiner is IBM’s middleware product for integrating heterogeneous data sources. See the *Administration Guide: Planning* and the *Administration Guide: Implementation* for more information.

Query Patroller

DB2 Query Patroller, now packaged inside the DB2 Warehouse Manager, can trap the SQL going to a DB2 Server by integrating the trap into the client code. This allows all dynamic SQL, regardless of operating system, to be managed, scheduled, and governed by Query Patroller.

A query retry mechanism allows jobs that have been aborted for various reasons to be resubmitted and run again to completion.

It is possible to issue a global start command that starts Query Patroller on all nodes. This gives you a single point of control for starting and stopping Query Patroller.

Query Patroller is available for Enterprise Edition and provides support for HP-UX and NUMA-Q, in addition to Windows 32-bit operating systems, AIX, and Solaris platforms.

QMF

An intuitive quick start interface allows QMF for Windows users to build their queries and reports, or use the new Java-based query capability to launch queries from their favorite browser. Query results can be easily integrated with any OLE 2 desktop tools, including spreadsheets, charting and analysis tools, and desktop databases.

The QMF for Windows Administrator component prevents waste and abuse through detailed permissions organized on each server by group, schedule, or a combination of the two.

With QMF for Windows, application developers gain a robust Windows application programming interface that lets them rapidly build data access and update applications. It provides full exploitation of DB2 performance, SQL syntax, and advanced database performance techniques (for example, static SQL).

Global Snapshot

The database system monitor now allows you to monitor your DB2 Universal Database Enterprise - Extended Edition system from a single partition. It collects data and aggregates values across all partitions and returns a single result. This provides database administrators with a single point of control for monitoring their entire data warehouse. The database system monitor collects information on the operation and performance of database activities ranging from reads and writes through to locks and deadlocks. See the *System Monitor Guide and Reference* for more information.

Convert ODBC (Dynamic SQL) to Static SQL

You can now convert your ODBC queries into static SQL. This provides a performance gain if you repeatedly run the same ODBC queries.

Temporary Table Support

DB2 now delivers temporary table support. DB2 will create and use temporary tables within a single connection, providing you with performance gains for the type of query workloads that can make use of intermediary tables. See the *Administration Guide* for more information.

Object Relational Features

Abstract or structured data types are *type* mechanisms for modeling and storing complex objects in a relational database. Structured types may have multiple fields embedded within them, for example, a geometric shape (a list of Cartesian coordinates), or an employee (name, address, gender, birth date, and employee number) can be modeled and stored in DB2 Universal Database.

Structured Types

Structured type support has been extended to provide the ability to create tables with structured type columns. Additionally, structured types can be nested within a structured type. This means that the attributes of a structured type are no longer restricted to the base SQL types, they can now be of another structured type.

In Version 7, you can define functions with input parameters or parameters on the RETURNS clause that are structured types. You can also define *methods* for each structured data type, which permit the encapsulation of behavior with data. A method is defined very much like a function, but its use is strictly associated with structured types. It is essentially a routine with a structured type instance as its implicit first argument.

The Reorganize Table (REORG) and the db2look utilities can be used on tables with structured type columns. See the *Command Reference* for more information on REORG and the *Administration Guide: Implementation* and *Administration Guide: Performance* for more information on structured types and db2look.

Transform Functions

Transform functions enable the use of structured type columns with user written programs. Transform functions convert the complex structure within a structured data type into an ordered set of its base SQL types. They also convert the base attributes back to their structured types. These transforms are required to move structured types in and out of a database. See the *Administration Guide: Implementation* for more information.

SQL-bodied Functions

An SQL-bodied function contains expressions or SELECT statements within its body, which is embedded into the calling SQL (similar to a macro). This allows the query compiler to optimize the whole SQL statement including the SQL-bodied function. Structured data types make use of SQL-bodied functions for their transform functions (see “Transform Functions”) and methods (see “Structured Types” on page 14).

Typed Tables

You can now use referential integrity constraints and triggers with typed tables.

User-Defined Extended Index Types

User-defined extended index types allow you to create and apply your own logic for the three primary components that make up how an index works. The three components are index maintenance, index search, and index exploitation. You define index maintenance and index search with the CREATE INDEX EXTENSION statement. Index exploitation occurs in the evaluation of the search method.

You can now create indexes on spatial objects stored in a database. Only a structured type or a distinct type column can use the index extension to create a user-defined extended index type on these objects.

See the *Administration Guide: Implementation* and the *SQL Reference* for more information.

Replication

Replication is a process of maintaining a defined set of data in more than one location. DB2 DataPropagator can replicate changes between any DB2 relational databases. It involves copying designated changes from one location (a source) to another (a target), and synchronizing the data in both locations.

Data Links

A data link is a link to a file with data like drawings, reports, and sound and other multimedia data. The size of these files can be very large. Accessing these types of files over a remote network would cause delays and increase network traffic. If the data does not change frequently and accessing the most current data is not a requirement, DB2 DataPropagator provides a good solution to this problem. However, since these files are not part of the database, a mechanism is required to replicate the files and ensure that the data and files are in sync at the target site. Data links replication can solve this problem.

With a data type of DATALINK, the database server has control over the remote files, and the files are treated as if they are part of the database. Data links replication replicates not only database data, but also files in a synchronized way.

In Version 7, DB2 Data Propagator replicates DATALINK columns and invokes a user exit routine to replicate the external files to which the DATALINK columns point. The user exit program maps the source data link value to a link in the target system and then copies the referenced file to the target file system. A sample user exit program is shipped with the product and it uses FTP to copy the files. See the *Replication Guide and Reference* for more information.

For more information on data links, see the *DB2 Data Links Manager Quick Beginnings*.

Capture and Apply

On Windows 32-bit operating systems, you can use the Capture and Apply programs on demand using the ASNSAT command. This command provides more flexibility when using DB2 DataPropagator functions and in handling error conditions.

You can start both the Capture and Apply programs from within an application by using the new asnCapture and asnApply application programming interfaces.

See the *Replication Guide and Reference* for more information.

If you are using DB2 DataPropagator Relational (DPropR) Version 1, you must migrate to Version 5 before migrating to Version 6 or Version 7.

Chapter 4. Data Management Enhancements

With each new release, DB2 Universal Database extends its capabilities, which in turn expands the abilities of the end user, administrator, and application programmer. As businesses flock to the Web and more workers take business on the road, DB2 Universal Database continues to enhance its performance, reliability, and scalability to meet the demand for powerful database solutions.

DB2 Data Links Manager

DB2 Data Links Manager capabilities have been expanded to allow you to use it in a more heterogeneous environment. DB2 Data Links Manager can now manage files that are stored in a DFS file system on AIX. Also, it now supports the use of the Veritas' XBSA interface for backup and restore using NetBackup. Data Links Manager is also available for the Solaris operating system.

For more information see the *DB2 Data Links Manager Quick Beginnings*. For information on replicating Data link files see, "Data Links" on page 16.

Native OLE DB Support

DB2 is now both an OLE DB provider and an OLE DB consumer. This support gives customers with OLE DB-based applications the ability to extract or query DB2 data using this native OLE interface. In addition, you can load data into DB2 or simply access OLE DB data using OLE DB table functions. OLE DB table functions combined with DB2's distributed query capability enable distributed query on OLE DB, DB2, and other data sources.

SQL Assist

With SQL Assist and some knowledge of SQL, you can create SELECT, INSERT, UPDATE, and DELETE statements. SQL Assist is an online tool that uses a notebook to help you organize the information that you need to create an SQL statement. SQL Assist is available in the Control Center, the Stored Procedure Builder, and the Data Warehouse Center. See the *Online Help* for more information.

Closing Log After Backup

After an online backup is complete, DB2 forces the currently active log to be closed and as a result it will be archived off. This ensures that your online backup has a complete set of archived logs available for recovery. See the *Administration Guide: Implementation* for more information.

On Demand Log Archive Support

You can now force the currently active log to close and force that log to be archived. This feature gives database administrators more granular control over their backup and restore strategy. See the *Administration Guide: Implementation* for more information.

Identity Column Support

DB2 now allows you to generate a unique numeric value for each row in a table. For example, an identity column can be used to generate unique primary key values. You can also port applications that use identity columns from other RDBMS vendors to DB2. See the *Administration Guide: Implementation* for more information.

Externalized Savepoint Support

You can now programmatically roll back to a specified savepoint rather than rolling back an entire unit of work. This support gives application developers more control over rollback processing. See the *Administration Guide: Implementation* and the *SQL Reference, Volume 2* for more information.

Increase Log Limit to 32GB

The size of log files has been increased from 4GB to 32GB. This enables you to perform extremely large amounts of work within a single transaction. See the *Administration Guide: Implementation* for more information.

Rename a Table Space

When you create a table space you specify its name. In previous releases, there was no way of changing that name during the lifetime of the table space object. Now, you can rename a table space with the `RENAME TABLESPACE` statement. See the *Administration Guide: Implementation* for more information.

Chapter 5. DB2 Family Enhancements

It's a heterogeneous world and you need a database server that can integrate fully with a multi-platform environment, so your enterprise can enjoy the full benefits of data warehousing, business intelligence, and e-business.

Mobile Computing

DB2's mobile computing offerings are designed to give mobile workers, using portable devices, access to corporate data and applications. This gives these workers the power of the enterprise from any location at any time.

Satellite Edition

DB2 Universal Database Satellite Edition on Windows 32-bit operating systems brings the power of DB2 Universal Database to occasionally connected remote systems. Whether mobile or stationary, DB2 Satellite Edition provides you with new ways of enabling your employees to conveniently access corporate information and easily conduct business directly with your customers. It provides:

- A full-function, high performance satellite database system that can be completely hidden from the end user
- Robust, bi-directional, update-anywhere replication between satellite systems and any DB2 server in your enterprise
- Simplified configurable mass rollouts of satellite systems through DB2 installation enhancements
- Easy creation and maintenance of scripts for managing groups of satellite systems with the Satellite Administration Center
- Scalable management of thousands of satellite systems using centralized script and replication management from Windows 32-bit operating system servers

DB2 Everywhere

The DB2 Everywhere Sync Server extends the power of your DB2 enterprise to handheld devices. Designed for Personal Digital Assistants (PDAs), Handheld Personal Computers (HPCs), and soon to be enabled for cellular phones, DB2 Universal Database Everywhere makes your DB2 data completely mobile. DB2 Everywhere is a slimmed down database that empowers handheld computing devices with enterprise data. With the DB2 Everywhere Sync Server, it mobilizes professionals with e-business information anywhere, anytime. It extends the power of your enterprise DB2 to a wide range of handheld devices, such as those running the Palm Operating System and Windows CE.

>8 Character Userid Support

The userID length supported by DB2 Universal Database has been increased from 8 characters to 30 characters for some operating systems. The following list shows the Version 7 level of support for:

- userID
All DB2 Universal Database Version 7 servers running Windows 32-bit operating systems support userIDs of up to 30 characters. All DB2 Universal Database Version 7 clients support userIDs of up to 30 characters. For example, any Version 7 client can connect to a Version 7 Windows 32-bit server with a 30 byte userID. But a Version 7 client with 30 byte userID can not connect to a non-Windows 32 bit server.
- authID
All DB2 Universal Database Version 7 support authIDs of up to 30 characters.
- schema
All DB2 Universal Database Version 7 support schema names of up to 30 characters.

See the *Quick Beginnings* for your operating system for more information. You should also review the following sections.

Pre-Version 7 Servers

Pre-Version 7 servers do not support userIDs, authIDs, and schemas that are longer than 8 characters. Version 7 applications that are designed to exploit the >8 character support will fail when connecting with down-level DB2 servers.

Replication

The length of userID and schema names supported by replication has been increased from 8 characters to 18 characters. See the *Replication Guide and Reference* for more information.

OS/390

OS/390 supports only 8-character userIDs and authIDs. Similar length restrictions apply to the schema name in any statements being sent to the host.

OS/400

OS/400 supports only 10-character userIDs and authIDs. Similar length restrictions apply to the schema name in any statements being sent to the host.

Import and Export

Version 7 databases with a schema name greater than 8 characters cannot be imported or exported with pre-Version 7 code because truncation occurs.

Stored Procedures

Existing stored procedures that assume that userIDs, authIDs, and schema names are limited to 8 characters should be examined. Unexpected behavior might occur if these stored procedures are used in a Version 7 environment.

LOAD Authority

The LOAD authority, in previous releases only available with DB2 Universal Database for OS/390, is now available for the DB2 Universal Database family. Users granted LOAD authority can run the LOAD utility without the need for SYSADM or DBADM authority. This allows users to perform more DB2 functions, and gives database administrators more granular control over the administration of their database. See the *Data Movement Utilities Guide and Reference* for more information.

USE OF TABLESPACE Authority

The USE OF TABLESPACE authority, in previous releases only available with DB2 Universal Database for OS/390, is now available for the DB2 Universal Database family. USE OF TABLESPACE authority allows users to create tables only in those table spaces that they have been granted access to. It also provides the administrators with more control over their database. See the *Administration Guide: Implementation* for more information.

BIND Options

The SQLERROR(CONTINUE) and VALIDATE(RUN) bind options, in previous releases only available with DB2 Universal Database for OS/390, are now available for the DB2 Universal Database family. This allows you to port your DB2 Universal Database for OS/390 applications that make use of these options to the rest of the DB2 Universal Database family. See the *Application Development Guide* for more information.

OS/390 in the Control Center

New DB2 Universal Database for OS/390 functions have been incorporated into the Control Center.

Generate DDL

The Generate DDL function allows the user to selectively generate the DDL statements used to create database objects and optionally, dependent objects. As an example, a user can request that the DDL be generated for a table, including all its indexes and all views based on the table. The generated statements can then be saved either on OS/390 as a data set or in a local

workstation file. When running Control Center as an applet, the workstation file resides on the Web server. See the *Control Center Online Help* for more information.

OS/390 Utilities

The Control Center gives you the ability to restart OS/390 utilities that have stopped. Any utilities whose status is active or stopped can be displayed using the display utility command. Utilities whose status is stopped can be restarted. There are two ways to restart utilities: from the last committed point (Current) or the last committed phase (Phase). Stopped utilities that were not started from Command Center cannot be restarted.

Each time a utility is run, a Utility ID is generated. In Version 7, you can modify the ID generated by the Control Center, and replace it with a default Utility ID that the user can specify on the Tools Settings window.

After a utility has been run, you may need to delete or rename the data sets that remain. You can use the Command Center's new OS/390 DATASET object to manage these data sets.

You can use wildcards and dynamic allocation to develop DB2 for OS/390 utility control statements to manage a large number of database objects. Utilities have the ability to dynamically build lists of database objects and dynamically allocate the data sets that they use or produce. LIST, TEMPLATE, and JOB STEP objects have been added to the Control Center in support of DB2 for OS/390.

See the *Control Center Online Help* for more information on OS/390 utility support.

DB2 Connect

DB2 Connect managed access to database servers that implement the Distributed Relational Database Architecture (DRDA) enjoys the following enhancements for Version 7.

Support DCL SNA Stack

Users of the Solaris operating system have a new way to communicate with DB2 databases on Solaris or host and AS/400 servers. With Version 7, DB2 Connect now supports DCL SNAP-IX V6.1.0 for SPARC Solaris. Previously, DB2 Connect only supported the SUNLINK SNA product. This new DCL SNA stack is very similar to CS/AIX V5 in its implementation.

For SUNLINK, outbound connections using CPIC APIs and inbound connections using APPC APIs are now supported. For DCL, in addition to the

above, SPM high level description is also supported. See the *DB2 Connect Enterprise Edition for UNIX Quick Beginnings* for more information.

XA Concentrator

This major enhancement to DB2 Connect permits a DB2 Connect gateway to manage more than 10,000 concurrent client connections. It also supports tightly coupled XA transactions for OS/390 and OS/400.

The XA Concentrator consists of changes to the way Engine Dispatchable Units (EDUs) are created and coordinated in DB2. New Logical and Worker Agents balance connections among applications, allowing X number of client application connections to be multiplexed among N EDUs, where $X \geq N$. Having fewer EDUs reduces real memory requirements and also reduces the task switching overhead of the operating system.

The XA Concentrator feature is enabled using a new MAX_LOGICAGENTS database manager configuration parameter. See the *Administration Guide: Implementation* and the *DB2 Connect User's Guide* for more information.

Multisite Update Improvements

The *test connection* feature of the Configure Multisite Update wizard has been expanded to permit testing of remote instances. In addition, you can associate a different user and password with each database entry in the test list. See the *DB2 Connect User's Guide* for more information.

Windows 32-bit Operating Systems

The following enhancements have been made in Version 7 of DB2 Universal Database for Windows.

Windows 2000

DB2 Universal Database supports the following Windows 2000 features:

- DB2 services are published in the Active Directory containing the protocol configuration information that allows client applications to connect to the DB2 database server.
- DB2 authentication can be accomplished using the single sign-on facilities of Kerberos. DB2 authentication is unchanged for environments without Kerberos.
- The DB2 Universal Database Control Center can be launched from Microsoft Management Console (MMC).

Visual C++ Application Development

DB2 Universal Database for Windows 32-bit operating systems includes two components to ease your DB2 application development efforts with Microsoft

Visual C++ using embedded SQL. The DB2 Visual C++ Add-Ins provide you with graphical user interfaces that are consistent with the Visual C++ development environment.

- The DB2 Visual C++ Tools Add-In is a toolbar that launches some useful DB2 administration and development tools from within the Visual C++ integrated development environment (IDE).
- The DB2 Visual C++ Project Add-In provides management tools and wizards that plug into the Visual C++ IDE that help you to develop, package, and deploy client applications and stored procedures for DB2 servers on Windows 32-bit operating systems.

Visual Studio Integration

DB2 Universal Database provides a collection of tools and wizards to simplify the building and deploying of applications for DB2 Universal Database for Windows. They employ embedded SQL from within the Visual C++ Integrated Development Environment (IDE).

Appendix A. Using the DB2 Library

The DB2 Universal Database library consists of online help, books (PDF and HTML), and sample programs in HTML format. This section describes the information that is provided, and how you can access it.

To access product information online, you can use the Information Center. For more information, see “Accessing Information with the Information Center” on page 41. You can view task information, DB2 books, troubleshooting information, sample programs, and DB2 information on the Web.

DB2 PDF Files and Printed Books

DB2 Information

The following table divides the DB2 books into four categories:

DB2 Guide and Reference Information

These books contain the common DB2 information for all platforms.

DB2 Installation and Configuration Information

These books are for DB2 on a specific platform. For example, there are separate *Quick Beginnings* books for DB2 on OS/2, Windows, and UNIX-based platforms.

Cross-platform sample programs in HTML

These samples are the HTML version of the sample programs that are installed with the Application Development Client. The samples are for informational purposes and do not replace the actual programs.

Release notes

These files contain late-breaking information that could not be included in the DB2 books.

The installation manuals, release notes, and tutorials are viewable in HTML directly from the product CD-ROM. Most books are available in HTML on the product CD-ROM for viewing and in Adobe Acrobat (PDF) format on the DB2 publications CD-ROM for viewing and printing. You can also order a printed copy from IBM; see “Ordering the Printed Books” on page 37. The following table lists books that can be ordered.

On OS/2 and Windows platforms, you can install the HTML files under the `sql1ib\doc\html` directory. DB2 information is translated into different

languages; however, all the information is not translated into every language. Whenever information is not available in a specific language, the English information is provided

On UNIX platforms, you can install multiple language versions of the HTML files under the `doc/%L/html` directories, where `%L` represents the locale. For more information, refer to the appropriate *Quick Beginnings* book.

You can obtain DB2 books and access information in a variety of ways:

- “Viewing Information Online” on page 40
- “Searching Information Online” on page 44
- “Ordering the Printed Books” on page 37
- “Printing the PDF Books” on page 36

Table 1. DB2 Information

Name	Description	Form Number PDF File Name	HTML Directory
DB2 Guide and Reference Information			
<i>Administration Guide</i>	<i>Administration Guide: Planning</i> provides an overview of database concepts, information about design issues (such as logical and physical database design), and a discussion of high availability.	SC09-2946 db2d1x70	db2d0
	<i>Administration Guide: Implementation</i> provides information on implementation issues such as implementing your design, accessing databases, auditing, backup and recovery.	SC09-2944 db2d2x70	
	<i>Administration Guide: Performance</i> provides information on database environment and application performance evaluation and tuning.	SC09-2945 db2d3x70	
	You can order the three volumes of the <i>Administration Guide</i> in the English language in North America using the form number SBOF-8934.		
<i>Administrative API Reference</i>	Describes the DB2 application programming interfaces (APIs) and data structures that you can use to manage your databases. This book also explains how to call APIs from your applications.	SC09-2947 db2b0x70	db2b0

Table 1. DB2 Information (continued)

Name	Description	Form Number PDF File Name	HTML Directory
<i>Application Building Guide</i>	Provides environment setup information and step-by-step instructions about how to compile, link, and run DB2 applications on Windows, OS/2, and UNIX-based platforms.	SC09-2948 db2axx70	db2ax
<i>APPC, CPI-C, and SNA Sense Codes</i>	Provides general information about APPC, CPI-C, and SNA sense codes that you may encounter when using DB2 Universal Database products.	No form number db2apx70	db2ap
	Available in HTML format only.		
<i>Application Development Guide</i>	Explains how to develop applications that access DB2 databases using embedded SQL or Java (JDBC and SQLJ). Discussion topics include writing stored procedures, writing user-defined functions, creating user-defined types, using triggers, and developing applications in partitioned environments or with federated systems.	SC09-2949 db2a0x70	db2a0
<i>CLI Guide and Reference</i>	Explains how to develop applications that access DB2 databases using the DB2 Call Level Interface, a callable SQL interface that is compatible with the Microsoft ODBC specification.	SC09-2950 db2l0x70	db2l0
<i>Command Reference</i>	Explains how to use the Command Line Processor and describes the DB2 commands that you can use to manage your database.	SC09-2951 db2n0x70	db2n0
<i>Connectivity Supplement</i>	Provides setup and reference information on how to use DB2 for AS/400, DB2 for OS/390, DB2 for MVS, or DB2 for VM as DRDA application requesters with DB2 Universal Database servers. This book also details how to use DRDA application servers with DB2 Connect application requesters.	No form number db2h1x70	db2h1
	Available in HTML and PDF only.		

Table 1. DB2 Information (continued)

Name	Description	Form Number PDF File Name	HTML Directory
<i>Data Movement Utilities Guide and Reference</i>	Explains how to use DB2 utilities, such as import, export, load, AutoLoader, and DPROP, that facilitate the movement of data.	SC09-2955 db2dmx70	db2dm
<i>Data Warehouse Center Administration Guide</i>	Provides information on how to build and maintain a data warehouse using the Data Warehouse Center.	SC26-9993 db2ddx70	db2dd
<i>Data Warehouse Center Application Integration Guide</i>	Provides information to help programmers integrate applications with the Data Warehouse Center and with the Information Catalog Manager.	SC26-9994 db2adx70	db2ad
<i>DB2 Connect User's Guide</i>	Provides concepts, programming, and general usage information for the DB2 Connect products.	SC09-2954 db2c0x70	db2c0
<i>DB2 Query Patroller Administration Guide</i>	Provides an operational overview of the DB2 Query Patroller system, specific operational and administrative information, and task information for the administrative graphical user interface utilities.	SC09-2958 db2dwx70	db2dw
<i>DB2 Query Patroller User's Guide</i>	Describes how to use the tools and functions of the DB2 Query Patroller.	SC09-2960 db2wwx70	db2ww
<i>Glossary</i>	Provides definitions for terms used in DB2 and its components. Available in HTML format and in the <i>SQL Reference</i> .	No form number db2t0x70	db2t0
<i>Image, Audio, and Video Extenders Administration and Programming</i>	Provides general information about DB2 extenders, and information on the administration and configuration of the image, audio, and video (IAV) extenders and on programming using the IAV extenders. It includes reference information, diagnostic information (with messages), and samples.	SC26-9929 dmbu7x70	dmbu7
<i>Information Catalog Manager Administration Guide</i>	Provides guidance on managing information catalogs.	SC26-9995 db2dix70	db2di

Table 1. DB2 Information (continued)

Name	Description	Form Number PDF File Name	HTML Directory
<i>Information Catalog Manager Programming Guide and Reference</i>	Provides definitions for the architected interfaces for the Information Catalog Manager.	SC26-9997 db2bix70	db2bi
<i>Information Catalog Manager User's Guide</i>	Provides information on using the Information Catalog Manager user interface.	SC26-9996 db2aix70	db2ai
<i>Installation and Configuration Supplement</i>	Guides you through the planning, installation, and setup of platform-specific DB2 clients. This supplement also contains information on binding, setting up client and server communications, DB2 GUI tools, DRDA AS, distributed installation, the configuration of distributed requests, and accessing heterogeneous data sources.	GC09-2957 db2iyx70	db2iy
<i>Message Reference</i>	Lists messages and codes issued by DB2, the Information Catalog Manager, and the Data Warehouse Center, and describes the actions you should take. You can order both volumes of the Message Reference in the English language in North America with the form number SBOF-8932.	Volume 1 GC09-2978 db2m1x70 Volume 2 GC09-2979 db2m2x70	db2m0
<i>OLAP Integration Server Administration Guide</i>	Explains how to use the Administration Manager component of the OLAP Integration Server.	SC27-0787 db2dpx70	n/a
<i>OLAP Integration Server Metaoutline User's Guide</i>	Explains how to create and populate OLAP metaoutlines using the standard OLAP Metaoutline interface (not by using the Metaoutline Assistant).	SC27-0784 db2upx70	n/a
<i>OLAP Integration Server Model User's Guide</i>	Explains how to create OLAP models using the standard OLAP Model Interface (not by using the Model Assistant).	SC27-0783 db2lpx70	n/a
<i>OLAP Setup and User's Guide</i>	Provides configuration and setup information for the OLAP Starter Kit.	SC27-0702 db2ipx70	db2ip
<i>OLAP Spreadsheet Add-in User's Guide for Excel</i>	Describes how to use the Excel spreadsheet program to analyze OLAP data.	SC27-0786 db2epx70	db2ep

Table 1. DB2 Information (continued)

Name	Description	Form Number PDF File Name	HTML Directory
<i>OLAP Spreadsheet Add-in User's Guide for Lotus 1-2-3</i>	Describes how to use the Lotus 1-2-3 spreadsheet program to analyze OLAP data.	SC27-0785 db2tpx70	db2tp
<i>Replication Guide and Reference</i>	Provides planning, configuration, administration, and usage information for the IBM Replication tools supplied with DB2.	SC26-9920 db2e0x70	db2e0
<i>Spatial Extender User's Guide and Reference</i>	Provides information about installing, configuring, administering, programming, and troubleshooting the Spatial Extender. Also provides significant descriptions of spatial data concepts and provides reference information (messages and SQL) specific to the Spatial Extender.	SC27-0701 db2sbx70	db2sb
<i>SQL Getting Started</i>	Introduces SQL concepts and provides examples for many constructs and tasks.	SC09-2973 db2y0x70	db2y0
<i>SQL Reference, Volume 1 and Volume 2</i>	Describes SQL syntax, semantics, and the rules of the language. This book also includes information about release-to-release incompatibilities, product limits, and catalog views. You can order both volumes of the <i>SQL Reference</i> in the English language in North America with the form number SBOF-8933.	Volume 1 SC09-2974 db2s1x70 Volume 2 SC09-2975 db2s2x70	db2s0
<i>System Monitor Guide and Reference</i>	Describes how to collect different kinds of information about databases and the database manager. This book explains how to use the information to understand database activity, improve performance, and determine the cause of problems.	SC09-2956 db2f0x70	db2f0
<i>Text Extender Administration and Programming</i>	Provides general information about DB2 extenders and information on the administration and configuring of the text extender and on programming using the text extenders. It includes reference information, diagnostic information (with messages) and samples.	SC26-9930 desu9x70	desu9

Table 1. DB2 Information (continued)

Name	Description	Form Number PDF File Name	HTML Directory
<i>Troubleshooting Guide</i>	Helps you determine the source of errors, recover from problems, and use diagnostic tools in consultation with DB2 Customer Service.	GC09-2850 db2p0x70	db2p0
<i>What's New</i>	Describes the new features, functions, and enhancements in DB2 Universal Database, Version 7.	SC09-2976 db2q0x70	db2q0
DB2 Installation and Configuration Information			
<i>DB2 Connect Enterprise Edition for OS/2 and Windows Quick Beginnings</i>	Provides planning, migration, installation, and configuration information for DB2 Connect Enterprise Edition on the OS/2 and Windows 32-bit operating systems. This book also contains installation and setup information for many supported clients.	GC09-2953 db2c6x70	db2c6
<i>DB2 Connect Enterprise Edition for UNIX Quick Beginnings</i>	Provides planning, migration, installation, configuration, and task information for DB2 Connect Enterprise Edition on UNIX-based platforms. This book also contains installation and setup information for many supported clients.	GC09-2952 db2cyx70	db2cy
<i>DB2 Connect Personal Edition Quick Beginnings</i>	Provides planning, migration, installation, configuration, and task information for DB2 Connect Personal Edition on the OS/2 and Windows 32-bit operating systems. This book also contains installation and setup information for all supported clients.	GC09-2967 db2c1x70	db2c1
<i>DB2 Connect Personal Edition Quick Beginnings for Linux</i>	Provides planning, installation, migration, and configuration information for DB2 Connect Personal Edition on all supported Linux distributions.	GC09-2962 db2c4x70	db2c4
<i>DB2 Data Links Manager Quick Beginnings</i>	Provides planning, installation, configuration, and task information for DB2 Data Links Manager for AIX and Windows 32-bit operating systems.	GC09-2966 db2z6x70	db2z6

Table 1. DB2 Information (continued)

Name	Description	Form Number PDF File Name	HTML Directory
<i>DB2 Enterprise - Extended Edition for UNIX Quick Beginnings</i>	Provides planning, installation, and configuration information for DB2 Enterprise - Extended Edition on UNIX-based platforms. This book also contains installation and setup information for many supported clients.	GC09-2964 db2v3x70	db2v3
<i>DB2 Enterprise - Extended Edition for Windows Quick Beginnings</i>	Provides planning, installation, and configuration information for DB2 Enterprise - Extended Edition for Windows 32-bit operating systems. This book also contains installation and setup information for many supported clients.	GC09-2963 db2v6x70	db2v6
<i>DB2 for OS/2 Quick Beginnings</i>	Provides planning, installation, migration, and configuration information for DB2 Universal Database on the OS/2 operating system. This book also contains installation and setup information for many supported clients.	GC09-2968 db2i2x70	db2i2
<i>DB2 for UNIX Quick Beginnings</i>	Provides planning, installation, migration, and configuration information for DB2 Universal Database on UNIX-based platforms. This book also contains installation and setup information for many supported clients.	GC09-2970 db2ixx70	db2ix
<i>DB2 for Windows Quick Beginnings</i>	Provides planning, installation, migration, and configuration information for DB2 Universal Database on Windows 32-bit operating systems. This book also contains installation and setup information for many supported clients.	GC09-2971 db2i6x70	db2i6
<i>DB2 Personal Edition Quick Beginnings</i>	Provides planning, installation, migration, and configuration information for DB2 Universal Database Personal Edition on the OS/2 and Windows 32-bit operating systems.	GC09-2969 db2i1x70	db2i1
<i>DB2 Personal Edition Quick Beginnings for Linux</i>	Provides planning, installation, migration, and configuration information for DB2 Universal Database Personal Edition on all supported Linux distributions.	GC09-2972 db2i4x70	db2i4

Table 1. DB2 Information (continued)

Name	Description	Form Number PDF File Name	HTML Directory
<i>DB2 Query Patroller Installation Guide</i>	Provides installation information about DB2 Query Patroller.	GC09-2959 db2iwx70	db2iw
<i>DB2 Warehouse Manager Installation Guide</i>	Provides installation information for warehouse agents, warehouse transformers, and the Information Catalog Manager.	GC26-9998 db2idx70	db2id
Cross-Platform Sample Programs in HTML			
Sample programs in HTML	Provides the sample programs in HTML format for the programming languages on all platforms supported by DB2. The sample programs are provided for informational purposes only. Not all samples are available in all programming languages. The HTML samples are only available when the DB2 Application Development Client is installed. For more information on the programs, refer to the <i>Application Building Guide</i> .	No form number	db2hs
Release Notes			
<i>DB2 Connect Release Notes</i>	Provides late-breaking information that could not be included in the DB2 Connect books.	See note #2.	db2cr
<i>DB2 Installation Notes</i>	Provides late-breaking installation-specific information that could not be included in the DB2 books.	Available on product CD-ROM only.	
<i>DB2 Release Notes</i>	Provides late-breaking information about all DB2 products and features that could not be included in the DB2 books.	See note #2.	db2ir

Notes:

1. The character *x* in the sixth position of the file name indicates the language version of a book. For example, the file name *db2d0e70* identifies the English version of the *Administration Guide* and the file name *db2d0f70* identifies the French version of the same book. The following letters are used in the sixth position of the file name to indicate the language version:

Language	Identifier
Brazilian Portuguese	b

Bulgarian	u
Czech	x
Danish	d
Dutch	q
English	e
Finnish	y
French	f
German	g
Greek	a
Hungarian	h
Italian	i
Japanese	j
Korean	k
Norwegian	n
Polish	p
Portuguese	v
Russian	r
Simp. Chinese	c
Slovenian	l
Spanish	z
Swedish	s
Trad. Chinese	t
Turkish	m

2. Late breaking information that could not be included in the DB2 books is available in the Release Notes in HTML format and as an ASCII file. The HTML version is available from the Information Center and on the product CD-ROMs. To view the ASCII file:
 - On UNIX-based platforms, see the `Release.Notes` file. This file is located in the `DB2DIR/Readme/%L` directory, where `%L` represents the locale name and `DB2DIR` represents:
 - `/usr/lpp/db2_07_01` on AIX
 - `/opt/IBMDB2/V7.1` on HP-UX, PTX, Solaris, and Silicon Graphics IRIX
 - `/usr/IBMDB2/V7.1` on Linux.
 - On other platforms, see the `RELEASE.TXT` file. This file is located in the directory where the product is installed. On OS/2 platforms, you can also double-click the **IBM DB2** folder and then double-click the **Release Notes** icon.

Printing the PDF Books

If you prefer to have printed copies of the books, you can print the PDF files found on the DB2 publications CD-ROM. Using the Adobe Acrobat Reader, you can print either the entire book or a specific range of pages. For the file name of each book in the library, see Table 1 on page 28.

You can obtain the latest version of the Adobe Acrobat Reader from the Adobe Web site at <http://www.adobe.com>.

The PDF files are included on the DB2 publications CD-ROM with a file extension of PDF. To access the PDF files:

1. Insert the DB2 publications CD-ROM. On UNIX-based platforms, mount the DB2 publications CD-ROM. Refer to your *Quick Beginnings* book for the mounting procedures.
2. Start the Acrobat Reader.
3. Open the desired PDF file from one of the following locations:
 - On OS/2 and Windows platforms:
x:\doc\language directory, where *x* represents the CD-ROM drive and *language* represent the two-character country code that represents your language (for example, EN for English).
 - On UNIX-based platforms:
/cdrom/doc/%L directory on the CD-ROM, where */cdrom* represents the mount point of the CD-ROM and *%L* represents the name of the desired locale.

You can also copy the PDF files from the CD-ROM to a local or network drive and read them from there.

Ordering the Printed Books

You can order the printed DB2 books either individually or as a set (in North America only) by using a sold bill of forms (SBOF) number. To order books, contact your IBM authorized dealer or marketing representative, or phone 1-800-879-2755 in the United States or 1-800-IBM-4Y0U in Canada. You can also order the books from the Publications Web page at <http://www.elink.ibm.com/pbl/pbl>.

Two sets of books are available. SBOF-8935 provides reference and usage information for the DB2 Warehouse Manager. SBOF-8931 provides reference and usage information for all other DB2 Universal Database products and features. The contents of each SBOF are listed in the following table:

Table 2. Ordering the printed books

SBOF Number	Books Included	
SBOF-8931	<ul style="list-style-type: none"> • Administration Guide: Planning • Administration Guide: Implementation • Administration Guide: Performance • Administrative API Reference • Application Building Guide • Application Development Guide • CLI Guide and Reference • Command Reference • Data Movement Utilities Guide and Reference • Data Warehouse Center Administration Guide • Data Warehouse Center Application Integration Guide • DB2 Connect User's Guide • Installation and Configuration Supplement • Image, Audio, and Video Extenders Administration and Programming • Message Reference, Volumes 1 and 2 	<ul style="list-style-type: none"> • OLAP Integration Server Administration Guide • OLAP Integration Server Metaoutline User's Guide • OLAP Integration Server Model User's Guide • OLAP Integration Server User's Guide • OLAP Setup and User's Guide • OLAP Spreadsheet Add-in User's Guide for Excel • OLAP Spreadsheet Add-in User's Guide for Lotus 1-2-3 • Replication Guide and Reference • Spatial Extender Administration and Programming Guide • SQL Getting Started • SQL Reference, Volumes 1 and 2 • System Monitor Guide and Reference • Text Extender Administration and Programming • Troubleshooting Guide • What's New
SBOF-8935	<ul style="list-style-type: none"> • Information Catalog Manager Administration Guide • Information Catalog Manager User's Guide • Information Catalog Manager Programming Guide and Reference 	<ul style="list-style-type: none"> • Query Patroller Administration Guide • Query Patroller User's Guide

DB2 Online Documentation

Accessing Online Help

Online help is available with all DB2 components. The following table describes the various types of help.

Type of Help	Contents	How to Access...
<i>Command Help</i>	Explains the syntax of commands in the command line processor.	<p>From the command line processor in interactive mode, enter:</p> <p style="padding-left: 40px;"><i>? command</i></p> <p>where <i>command</i> represents a keyword or the entire command.</p> <p>For example, <i>? catalog</i> displays help for all the CATALOG commands, while <i>? catalog database</i> displays help for the CATALOG DATABASE command.</p>
<i>Client Configuration Assistant Help</i>	Explains the tasks you can perform in a window or notebook. The help includes overview and prerequisite information you need to know, and it describes how to use the window or notebook controls.	From a window or notebook, click the Help push button or press the F1 key.
<i>Command Center Help</i>		
<i>Control Center Help</i>		
<i>Data Warehouse Center Help</i>		
<i>Event Analyzer Help</i>		
<i>Information Catalog Manager Help</i>		
<i>Satellite Administration Center Help</i>		
<i>Script Center Help</i>	<p>From the command line processor in interactive mode, enter:</p> <p style="padding-left: 40px;"><i>? XXXnnnnn</i></p> <p>where <i>XXXnnnnn</i> represents a valid message identifier.</p> <p>For example, <i>? SQL30081</i> displays help about the SQL30081 message.</p> <p>To view message help one screen at a time, enter:</p> <p style="padding-left: 40px;"><i>? XXXnnnnn more</i></p> <p>To save message help in a file, enter:</p> <p style="padding-left: 40px;"><i>? XXXnnnnn > filename.ext</i></p> <p>where <i>filename.ext</i> represents the file where you want to save the message help.</p>	

Type of Help	Contents	How to Access...
SQL Help	Explains the syntax of SQL statements.	<p>From the command line processor in interactive mode, enter:</p> <pre>help <i>statement</i></pre> <p>where <i>statement</i> represents an SQL statement.</p> <p>For example, help SELECT displays help about the SELECT statement.</p> <p>Note: SQL help is not available on UNIX-based platforms.</p>
SQLSTATE Help	Explains SQL states and class codes.	<p>From the command line processor in interactive mode, enter:</p> <pre>? <i>sqlstate</i> or ? <i>class code</i></pre> <p>where <i>sqlstate</i> represents a valid five-digit SQL state and <i>class code</i> represents the first two digits of the SQL state.</p> <p>For example, ? 08003 displays help for the 08003 SQL state, while ? 08 displays help for the 08 class code.</p>

Viewing Information Online

The books included with this product are in Hypertext Markup Language (HTML) softcopy format. Softcopy format enables you to search or browse the information and provides hypertext links to related information. It also makes it easier to share the library across your site.

You can view the online books or sample programs with any browser that conforms to HTML Version 3.2 specifications.

To view online books or sample programs:

- If you are running DB2 administration tools, use the Information Center.
- From a browser, click **File** —> **Open Page**. The page you open contains descriptions of and links to DB2 information:
 - On UNIX-based platforms, open the following page:

```
INSTHOME/sql1lib/doc/%L/html/index.htm
```

where %L represents the locale name.

- On other platforms, open the following page:

```
sql1lib\doc\html\index.htm
```

The path is located on the drive where DB2 is installed.

If you have not installed the Information Center, you can open the page by double-clicking the **DB2 Information** icon. Depending on the system you are using, the icon is in the main product folder or the Windows Start menu.

Installing the Netscape Browser

If you do not already have a Web browser installed, you can install Netscape from the Netscape CD-ROM found in the product boxes. For detailed instructions on how to install it, perform the following:

1. Insert the Netscape CD-ROM.
2. On UNIX-based platforms only, mount the CD-ROM. Refer to your *Quick Beginnings* book for the mounting procedures.
3. For installation instructions, refer to the `CDNAVnn.txt` file, where *nn* represents your two character language identifier. The file is located at the root directory of the CD-ROM.

Accessing Information with the Information Center

The Information Center provides quick access to DB2 product information. The Information Center is available on all platforms on which the DB2 administration tools are available.

You can open the Information Center by double-clicking the Information Center icon. Depending on the system you are using, the icon is in the Information folder in the main product folder or the Windows **Start** menu.

You can also access the Information Center by using the toolbar and the **Help** menu on the DB2 Windows platform.

The Information Center provides six types of information. Click the appropriate tab to look at the topics provided for that type.

Tasks	Key tasks you can perform using DB2.
Reference	DB2 reference information, such as keywords, commands, and APIs.
Books	DB2 books.
Troubleshooting	Categories of error messages and their recovery actions.
Sample Programs	Sample programs that come with the DB2 Application Development Client. If you did not install the DB2 Application Development Client, this tab is not displayed.
Web	DB2 information on the World Wide Web. To access this information, you must have a connection to the Web from your system.

When you select an item in one of the lists, the Information Center launches a viewer to display the information. The viewer might be the system help viewer, an editor, or a Web browser, depending on the kind of information you select.

The Information Center provides a find feature, so you can look for a specific topic without browsing the lists.

For a full text search, follow the hypertext link in the Information Center to the **Search DB2 Online Information** search form.

The HTML search server is usually started automatically. If a search in the HTML information does not work, you may have to start the search server using one of the following methods:

On Windows

Click **Start** and select **Programs** → **IBM DB2** → **Information** → **Start HTML Search Server**.

On OS/2

Double-click the **DB2 for OS/2** folder, and then double-click the **Start HTML Search Server** icon.

Refer to the release notes if you experience any other problems when searching the HTML information.

Note: The Search function is not available in the Linux, PTX, and Silicon Graphics IRIX environments.

Using DB2 Wizards

Wizards help you complete specific administration tasks by taking you through each task one step at a time. Wizards are available through the Control Center and the Client Configuration Assistant. The following table lists the wizards and describes their purpose.

Note: The Create Database, Create Index, Configure Multisite Update, and Performance Configuration wizards are available for the partitioned database environment.

Wizard	Helps You to...	How to Access...
<i>Add Database</i>	Catalog a database on a client workstation.	From the Client Configuration Assistant, click Add .
<i>Back up Database</i>	Determine, create, and schedule a backup plan.	From the Control Center, right-click the database you want to back up and select Backup → Database Using Wizard .

Wizard	Helps You to...	How to Access...
<i>Configure Multisite Update</i>	Configure a multisite update, a distributed transaction, or a two-phase commit.	From the Control Center, right-click the Databases folder and select Multisite Update .
<i>Create Database</i>	Create a database, and perform some basic configuration tasks.	From the Control Center, right-click the Databases folder and select Create → Database Using Wizard .
<i>Create Table</i>	Select basic data types, and create a primary key for the table.	From the Control Center, right-click the Tables icon and select Create → Table Using Wizard .
<i>Create Table Space</i>	Create a new table space.	From the Control Center, right-click the Table Spaces icon and select Create → Table Space Using Wizard .
<i>Create Index</i>	Advise which indexes to create and drop for all your queries.	From the Control Center, right-click the Index icon and select Create → Index Using Wizard .
<i>Performance Configuration</i>	Tune the performance of a database by updating configuration parameters to match your business requirements.	From the Control Center, right-click the database you want to tune and select Configure Performance Using Wizard . For the partitioned database environment, from the Database Partitions view, right-click the first database partition you want to tune and select Configure Performance Using Wizard .
<i>Restore Database</i>	Recover a database after a failure. It helps you understand which backup to use, and which logs to replay.	From the Control Center, right-click the database you want to restore and select Restore → Database Using Wizard .

Setting Up a Document Server

By default, the DB2 information is installed on your local system. This means that each person who needs access to the DB2 information must install the same files. To have the DB2 information stored in a single location, perform the following steps:

1. Copy all files and subdirectories from `\sql11ib\doc\html` on your local system to a Web server. Each book has its own subdirectory that contains all the necessary HTML and GIF files that make up the book. Ensure that the directory structure remains the same.

2. Configure the Web server to look for the files in the new location. For information, refer to the NetQuestion Appendix in the *Installation and Configuration Supplement*.
3. If you are using the Java version of the Information Center, you can specify a base URL for all HTML files. You should use the URL for the list of books.
4. When you are able to view the book files, you can bookmark commonly viewed topics. You will probably want to bookmark the following pages:
 - List of books
 - Tables of contents of frequently used books
 - Frequently referenced articles, such as the ALTER TABLE topic
 - The Search form

For information about how you can serve the DB2 Universal Database online documentation files from a central machine, refer to the NetQuestion Appendix in the *Installation and Configuration Supplement*.

Searching Information Online

To find information in the HTML files, use one of the following methods:

- Click **Search** in the top frame. Use the search form to find a specific topic. This function is not available in the Linux, PTX, or Silicon Graphics IRIX environments.
- Click **Index** in the top frame. Use the index to find a specific topic in the book.
- Display the table of contents or index of the help or the HTML book, and then use the find function of the Web browser to find a specific topic in the book.
- Use the bookmark function of the Web browser to quickly return to a specific topic.
- Use the search function of the Information Center to find specific topics. See “Accessing Information with the Information Center” on page 41 for details.

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Contacting IBM

If you have a technical problem, please review and carry out the actions suggested by the *Troubleshooting Guide* before contacting DB2 Customer Support. This guide suggests information that you can gather to help DB2 Customer Support to serve you better.

For information or to order any of the DB2 Universal Database products contact an IBM representative at a local branch office or contact any authorized IBM software remarketer.

If you live in the U.S.A., then you can call one of the following numbers:

- 1-800-237-5511 for customer support
- 1-888-426-4343 to learn about available service options

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If you live in the U.S.A., then you can call one of the following numbers:

- 1-800-IBM-CALL (1-800-426-2255) or 1-800-3IBM-OS2 (1-800-342-6672) to order products or get general information.
- 1-800-879-2755 to order publications.

<http://www.ibm.com/software/data/>

The DB2 World Wide Web pages provide current DB2 information about news, product descriptions, education schedules, and more.

<http://www.ibm.com/software/data/db2/library/>

The DB2 Product and Service Technical Library provides access to frequently asked questions, fixes, books, and up-to-date DB2 technical information.

Note: This information may be in English only.

<http://www.elink.ibm.com/pbl/pbl/>

The International Publications ordering Web site provides information on how to order books.

<http://www.ibm.com/education/certify/>

The Professional Certification Program from the IBM Web site provides certification test information for a variety of IBM products, including DB2.

ftp.software.ibm.com

Log on as anonymous. In the directory /ps/products/db2, you can find demos, fixes, information, and tools relating to DB2 and many other products.

comp.databases.ibm-db2, bit.listserv.db2-l

These Internet newsgroups are available for users to discuss their experiences with DB2 products.

On CompuServe: GO IBMDB2

Enter this command to access the IBM DB2 Family forums. All DB2 products are supported through these forums.

For information on how to contact IBM outside of the United States, refer to Appendix A of the *IBM Software Support Handbook*. To access this document, go to the following Web page: <http://www.ibm.com/support/>, and then select the IBM Software Support Handbook link near the bottom of the page.

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