

IBM DB2 Connect
Personal Edition
for Linux**



Quick Beginnings

Version 6

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Personal Edition
for Linux**



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Version 6

Before using this information and the product it supports, be sure to read the general information under “Appendix G. Notices” on page 123.

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Welcome to DB2 Connect!

The DB2 Connect Quick Beginnings books provide a focused introduction to the installation and configuration of DB2 Connect products.

This *Quick Beginnings* book will guide you through the planning, installation, and set up of a DB2 Connect Personal Edition workstation. Once the DB2 Connect Personal Edition workstation has been installed and configured, you will configure a connection from the workstation to a host or AS/400 DB2 server using the command line processor.

If you plan to use your DB2 Connect Personal Edition workstation as a DB2 client to a LAN-based DB2 server, you will also be guided through the steps required to establish these communications as well.



How This Book is Structured

Setting up DB2 Connect is a multi-step process. The sections in this book follow the typical sequence of tasks necessary to go from installing DB2 Connect to using client applications with your database.

The typical steps to installing and configuring DB2 Connect are as follows:

- Step 1. Determine how you want to use DB2 Connect in your network. For the available options, see “Accessing Host or AS/400 DB2 Data Using DB2 Connect Personal Edition” on page 4.
- Step 2. Verify that you have the correct hardware and software prerequisites on both your workstation and the host database server. See “Chapter 2. Planning for Installation” on page 23 for prerequisites.
- Step 3. Verify that your host or AS/400 database server is configured to accept connections from Distributed Relational Database Architecture

(DRDA) Application Requesters such as DB2 Connect. See “Part 3. Preparing Host and AS/400 Databases for DB2 Connect Communications” on page 35.

- Step 4. Install your DB2 Connect software. You will use this workstation to configure and verify your host and AS/400 connections. For DB2 Connect installation instructions, see “Chapter 4. Installing and Configuring DB2 Connect Personal Edition” on page 29.
- Step 5. After installation, you will establish the connection between DB2 Connect and your host or AS/400 database system.
- Step 6. Bind the programs and utilities provided with DB2 Connect to your host or AS/400 database. For instructions on binding programs and utilities provided with your DB2 Connect product, see “Chapter 8. Running Your Own Applications” on page 65.
- Step 7. You will need to test the connection. For testing instructions, see “Chapter 6. Configuring Communications to Host or AS/400–Based Servers Using the Command Line Processor” on page 45.
- Step 8. You are now ready to use DB2 Connect with all your applications. If you want to use this workstation to administer DB2 for OS/390, DB2 Connect, or DB2 Universal Database servers, install the DB2 Administration Client component of DB2 Connect. For more information, refer to the *Installation and Configuration Supplement* online document.
- Step 9. Workstations that will be used for application development should have the DB2 Software Developer’s Kit installed. Refer to the *Installation and Configuration Supplement* online document for instructions on installing and configuring the DB2 Software Developer’s Kit.

Conventions

This book uses the following highlighting conventions:

- **Boldface** indicates commands or graphical user interface (GUI) controls such as names of fields, folders, icons, or menu choices.
- *Italics* indicates variables that you should replace with your own value. It is also used to indicate book titles and to emphasize words.
- Monospace indicates file names, directory paths, and examples of text you enter exactly as shown.



This icon marks a fast path. A fast path guides you to information specific to your configuration where multiple options are available.



This icon marks a tip. It provides additional information that can help you complete a task.

For a complete description of the DB2 library, see “Appendix F. How the DB2 Library Is Structured” on page 107.



- If you do not follow the documented installation method with the recommended defaults, it may be necessary to refer to the *Administration Guide* and the *Command Reference* to complete the installation and configuration.
- The term *Windows 32-bit operating systems* refers to Windows 95, Windows 98, or Windows NT.
- The term *DB2 Connect workstation* refers to a DB2 Connect Personal Edition workstation.
- The term *Windows 9x* refers to Windows 95 or Windows 98.
- The term *DB2 client* refers to a DB2 Run-Time Client or a DB2 Administration Client.
- The term *DB2 Universal Database* refers to DB2 Universal Database on OS/2, UNIX, and Windows 32-bit operating systems, unless otherwise stated.

Part 1. Introduction to DB2 Connect

Chapter 1. About DB2 Connect

DB2 Connect Enterprise Edition

DB2 Connect Enterprise Edition is a connectivity server that concentrates and manages connections from multiple desktop clients and web applications to DB2 database servers running on host or AS/400 systems. IBM's DB2 for AS/400, DB2 for OS/390, and DB2 for VSE & VM databases continue to be the systems of choice for managing most critical data for the world's largest organizations. While these host and AS/400 databases manage the data, there is a great demand to integrate this data with applications running on Windows, UNIX, OS/2 and Apple workstations.

DB2 Connect Enterprise Edition enables local and remote client applications to create, update, control, and manage DB2 databases and host systems using Structured Query Language (SQL), DB2 APIs (Application Programming Interfaces), ODBC (Open Database Connectivity), JDBC (Java Database Connectivity), SQLJ (Embedded SQLJ for Java), or DB2 CLI (Call Level Interface). In addition, DB2 Connect supports Microsoft Windows data interfaces such as ActiveX Data Objects (ADO), Remote Data Objects (RDO), and OLE DB.

DB2 Connect Enterprise Edition is currently available for AIX, HP-UX, Linux, OS/2, Solaris, and Windows NT operating systems. These servers provide support for applications running on Windows 3.1, Windows 9x, Windows NT, UNIX (AIX, SCO OpenServer, SCO UnixWare 7, Solaris, HP-UX, Linux, Silicon Graphics IRIX, SINIX), OS/2, and Apple Macintosh workstations.

DB2 Connect Personal Edition

DB2 Connect Personal Edition provides access from a single workstation to DB2 databases residing on servers such as MVS/ESA, OS/390, OS/400, VM and VSE, as well as to DB2 Universal Database servers on Windows NT, UNIX, and OS/2. DB2 Connect Personal Edition provides the same rich set of APIs as DB2 Connect Enterprise Edition, and also features integrated SNA support on all Windows platforms.

This product is currently available for Linux, OS/2, Windows 9x, and Windows NT operating systems.

Working with DB2 Data

As well as providing a relational database to store your data, DB2 Connect Personal Edition for Linux lets you issue requests to administer, query, update, insert, or delete data using local or remote client applications.

The remaining sections in this chapter provide a general overview of DB2 Connect Personal Edition and DB2 Connect Enterprise Edition for all supported platforms.



DB2 Connect Personal Edition for Linux only supports connections to host or AS/400 databases using TCP/IP. Therefore, DB2 Connect Personal Edition for Linux can only access

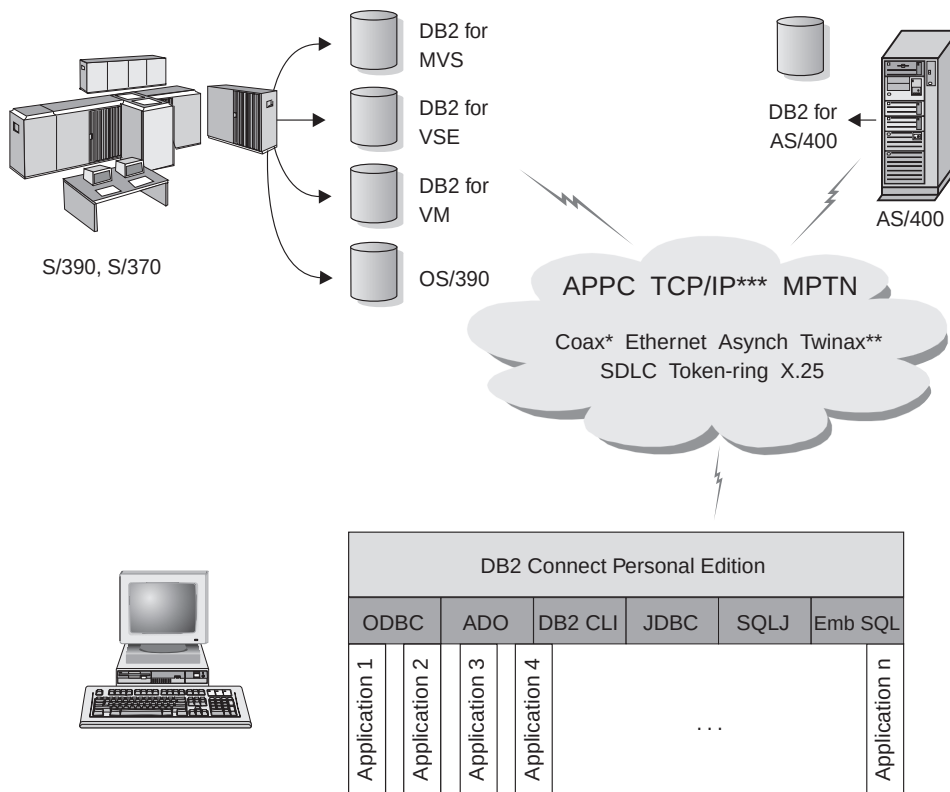
- DB2 for OS/390 Version 5.1 or later
- DB2 for AS/400 Version 4.2 or later
- DB2 for VM Version 6.1 or later

Accessing Host or AS/400 DB2 Data Using DB2 Connect Personal Edition

Direct connection without intermediate servers is a very convenient and desirable configuration. This is especially true for situations where the host or the AS/400 database server supports TCP/IP connectivity (for example, DB2 for OS/390 V5.1, or DB2 for AS/400 V4R2, or DB2 for VM 6.1). In such a configuration, each DB2 Connect workstation establishes a direct TCP/IP connection to DB2 for OS/390 or, for platforms with integrated SNA Support, connects via APPC to DB2 for MVS and other host and AS/400 databases.

TCP/IP connectivity requires that the host or AS/400 database support TCP/IP. At this point, DB2 for OS/390 V5.1, DB2/400 V4R2, and DB2 for VM V6.1 support native TCP/IP connections. An alternative to native TCP/IP is MPTN connectivity. MPTN connections require that IBM AnyNet products be installed on the target database system, but do not require the host or AS/400 database to provide native TCP/IP support.

Figure 1 on page 5 shows workstations directly connected to a host or AS/400 database server. Each workstation has DB2 Connect Personal Edition installed.



Not all protocols are supported for all platforms.

* For Host connections only

** For AS/400

*** TCP/IP connectivity requires DB2 for OS/390 V5R1, DB2 for AS/400 V4R2, or DB2 for VM V6.1

Figure 1. Direct Connection Between DB2 Connect and a host or AS/400 database server

In this environment, if you are using DB2 Connect Personal Edition for Linux, you can only connect to your host or AS/400 based database using TCP/IP. Users of Windows 32-bit operating systems can use the DB2 Connect Personal Edition Integrated SNA Support to connect directly to the host or AS/400 servers. DB2 Connect Integrated SNA Support permits connections over a variety of local and wide area networks, such as Token-Ring, Ethernet, SDLC, Twinax, Coax and Asynchronous dial-up. The DB2 Connect Integrated SNA Support implements both APPC and MPTN connections over networks using hosts and AS/400 systems that have IBM AnyNet products installed. Users of OS/2 workstations can use IBM Personal Communications for OS/2, or IBM Communications Server for OS/2 to achieve direct APPC and MPTN connectivity.

Connections via Communications Gateway

Some organizations prefer to concentrate access to SNA networks through dedicated **SNA Gateways**, such as IBM eNetwork Communications Server, Microsoft SNA Server, or Novell Netware for SAA. DB2 Connect products support connections through gateways, so this can be a good choice if you need terminal emulation and other SNA services not provided by DB2 Connect. Figure 2 on page 7 illustrates such a situation.

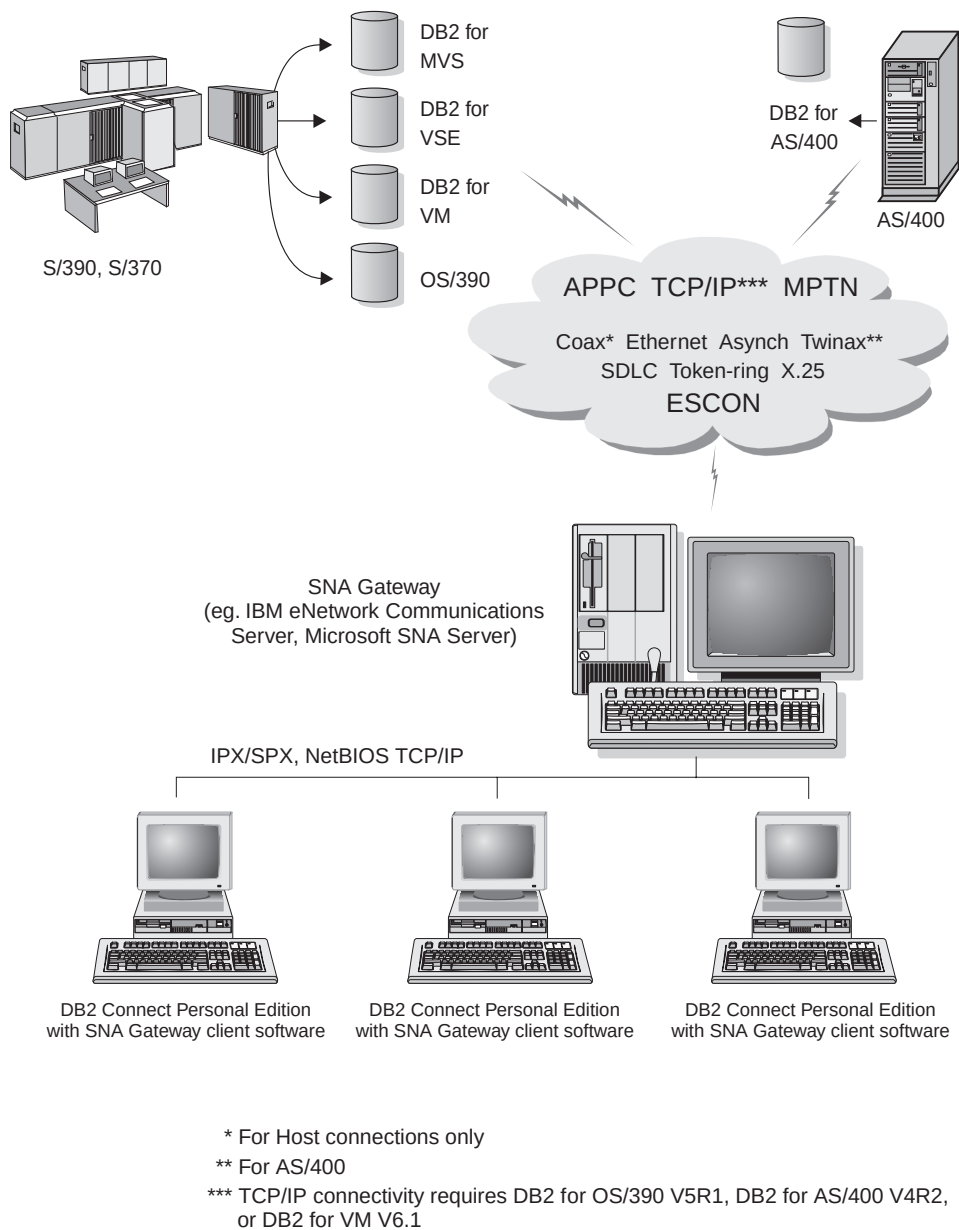


Figure 2. Indirect Connection to host or AS/400 database server via SNA Communications Gateway

Although you can use DB2 Connect Personal Edition with SNA gateways, you may find DB2 Connect Enterprise Edition a better choice if you want to use many DB2 Clients. DB2 Connect Enterprise Edition can be installed on the

same machine as IBM eNetwork Communications Server or Microsoft SNA Server, and in many cases it can provide a less expensive and better-performing solution.

Contact your authorized IBM reseller for additional information about DB2 Connect Enterprise Edition.

Accessing Host or AS/400 DB2 Data from the Desktop Using DB2 Connect Enterprise Edition

A DB2 Connect server enables DB2 clients on a LAN access to data that is stored on host or AS/400 systems.



DB2 Universal Database Enterprise Edition and DB2 Universal Database Enterprise - Extended Edition include the **DB2 Connect Server Support** component. All references to DB2 Connect Enterprise Edition also apply to the DB2 Connect Server Support component.

DB2 Connect Enterprise Edition is most appropriate for environments where:

- Host and AS/400 database servers do not support native TCP/IP connectivity and direct connectivity from desktop workstations via SNA is not desirable (see Figure 3 on page 10).
- Application is implemented using data-aware Java applets (see Figure 7 on page 15).
- Web servers are used to implement web-based applications (see Figure 8 on page 17, Figure 7 on page 15 and Figure 6 on page 13).
- Middle-tier application server is employed.
- Transaction monitors such as CICS, Encina, Microsoft Transaction Server (MTS), Tuxedo, Component Broker, and MQSeries are used (see Figure 4 on page 11).

Applications are provided with transparent access to host or AS/400 data through a standard architecture for managing distributed data. This standard is known as Distributed Relational Database Architecture (DRDA). Use of DRDA allows your applications to establish a fast connection to host and AS/400 databases without expensive host components or proprietary gateways.

A great deal of the data in many large organizations is managed by DB2 for AS/400, DB2 for MVS/ESA, DB2 for OS/390, or DB2 for VSE & VM. Applications that run on any of the supported platforms can work with this data transparently, as if a local database server managed it. DB2 Connect Enterprise Edition is required for supporting applications which access host or AS/400 data and exploit transaction monitors (for example, CICS, Encina, Microsoft Transaction Server) as well as applications that are implemented as

Java applets. In addition, you can use a wide range of off-the-shelf or custom-developed database applications with DB2 Connect and its associated tools. For example, you can use DB2 Connect products with:

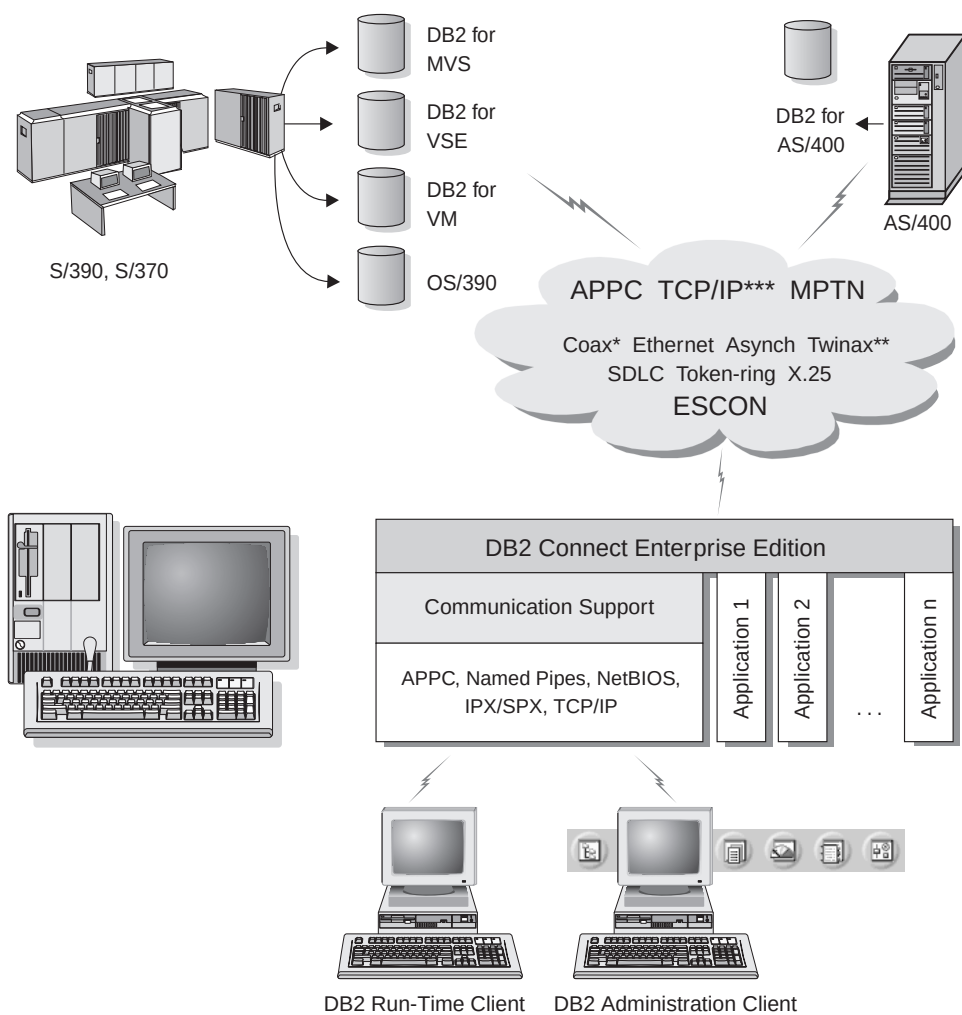
- *Spreadsheets*, such as Lotus 1-2-3 and Microsoft Excel, to analyze real-time data without having the cost and complexity of data extract and import procedures.
- *Decision support tools*, such as Business Objects, Brio and Cognos, and Crystal Reports, to provide real-time information.
- *Database products*, such as Lotus Approach and Microsoft Access.
- *Development tools*, such as PowerSoft PowerBuilder, Microsoft Visual Basic, and Borland Delphi, to create client/server solutions.

Although DB2 Connect is often installed on an intermediate server machine to connect DB2 clients to a host or AS/400 database, it is also installed on machines where multiple local users want to access the host or AS/400 servers directly. For example, DB2 Connect may be installed on a large machine with many local users. It may also be installed on a Web server, Transaction Processor (TP) monitor, or other 3-tier application server machines with multiple local SQL application processes and threads. In these cases, you can choose to install DB2 Connect on the same machine for simplicity, or on a separate machine to off-load CPU cycles.

A DB2 Connect server enables multiple clients to connect to host or AS/400 data and can significantly reduce the effort that is required to establish and maintain access to enterprise data. Figure 3 on page 10 illustrates IBM's solution for environments in which you want to use a DB2 client making an indirect connection to a host or AS/400 database server through DB2 Connect Enterprise Edition.



In the example, you could replace the DB2 Connect server with a DB2 server that has the DB2 Connect Server Support component installed.



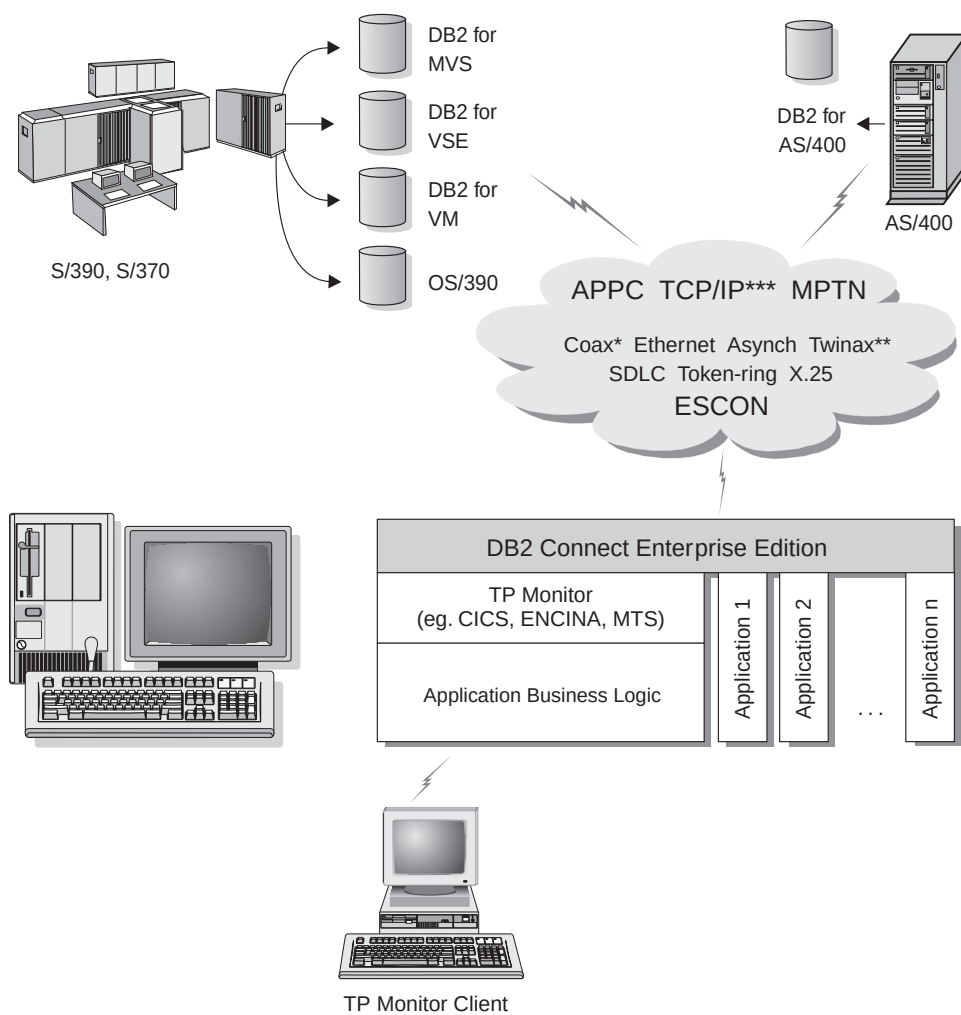
Not all protocols are supported for all platforms.

* For Host connections only

** For AS/400

*** TCP/IP connectivity requires DB2 for OS/390 V5R1, DB2 for AS/400 V4R2, or DB2 for VM V6.1

Figure 3. DB2 Connect Enterprise Edition



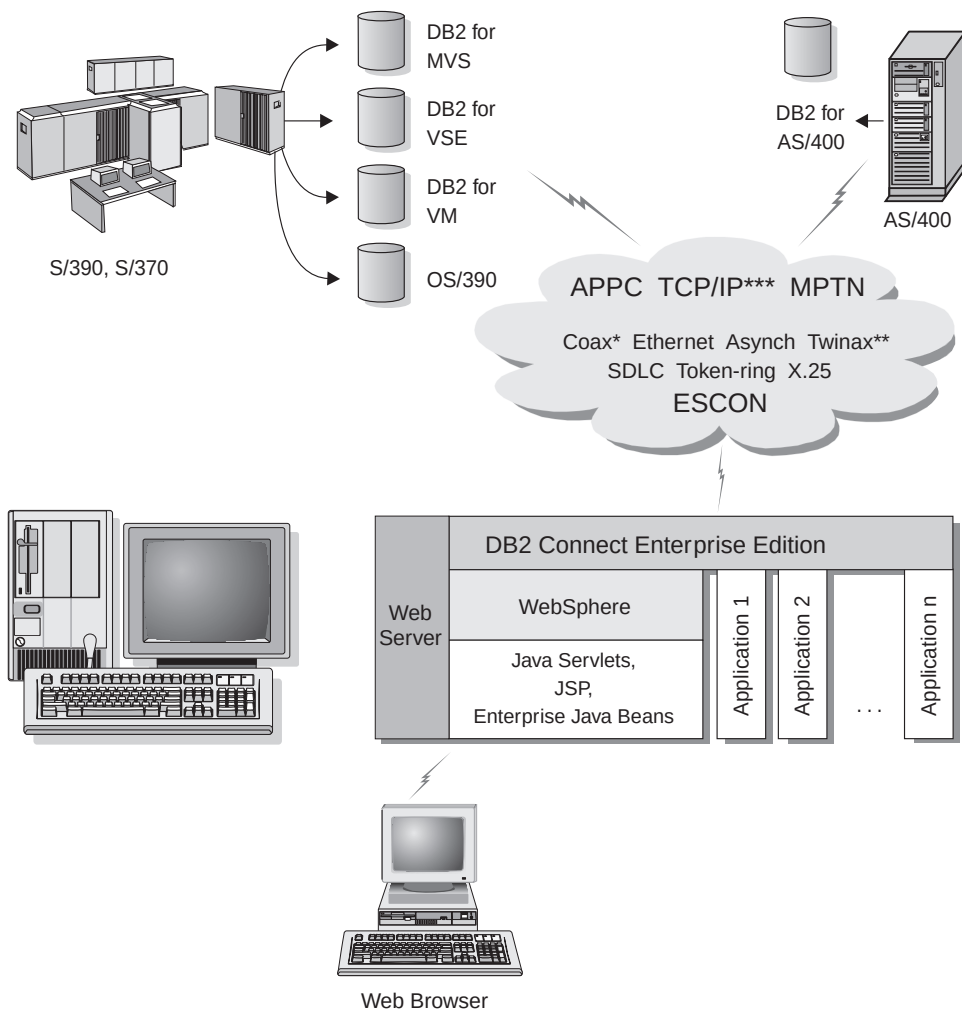
Not all protocols are supported for all platforms.

* For Host connections only

** For AS/400

*** TCP/IP connectivity requires DB2 for OS/390 V5R1, DB2 for AS/400 V4R2, or DB2 for VM V6.1

Figure 4. Using Transaction Monitors with DB2 Connect



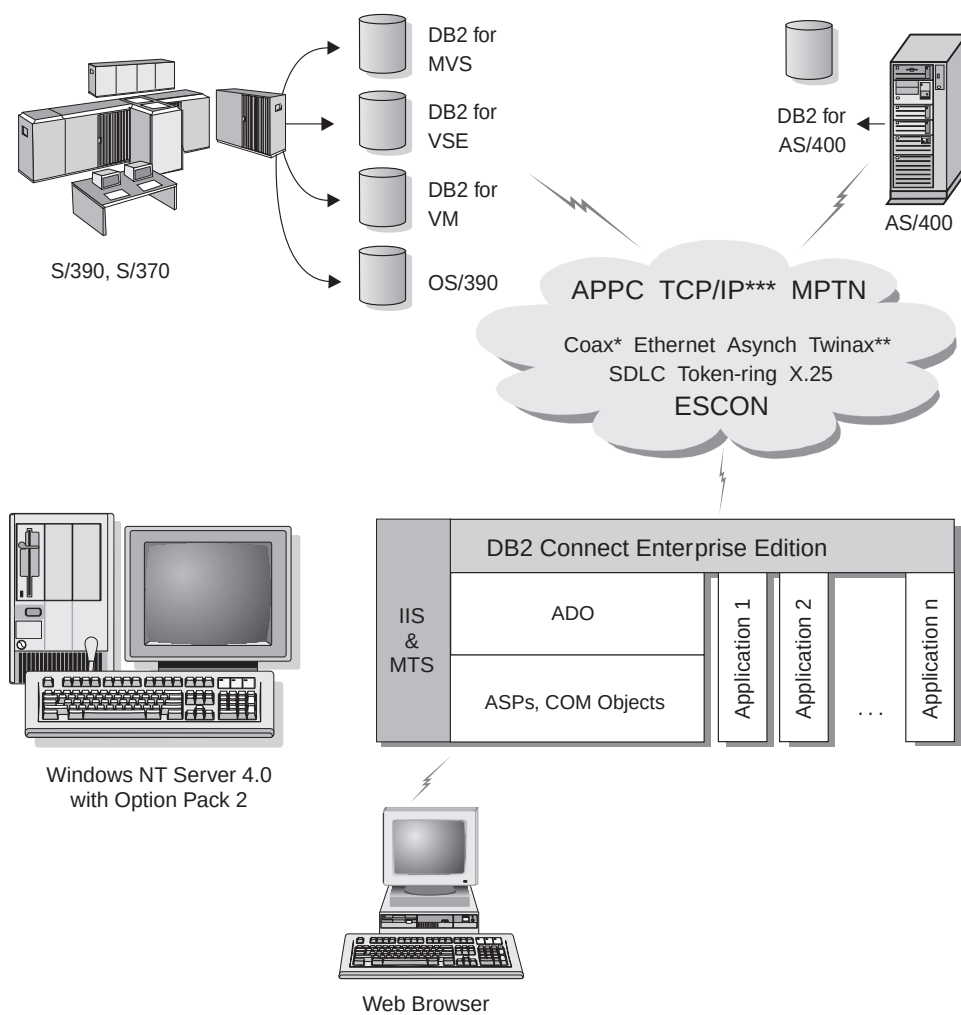
Not all protocols are supported for all platforms.

* For Host connections only

** For AS/400

*** TCP/IP connectivity requires DB2 for OS/390 V5R1, DB2 for AS/400 V4R2, or DB2 for VM V6.1

Figure 5. Java Server Support.



Not all protocols are supported for all platforms.

* For Host connections only

** For AS/400

*** TCP/IP connectivity requires DB2 for OS/390 V5R1, DB2 for AS/400 V4R2, or DB2 for VM V6.1

Figure 6. DB2 Connect working with Microsoft IIS.

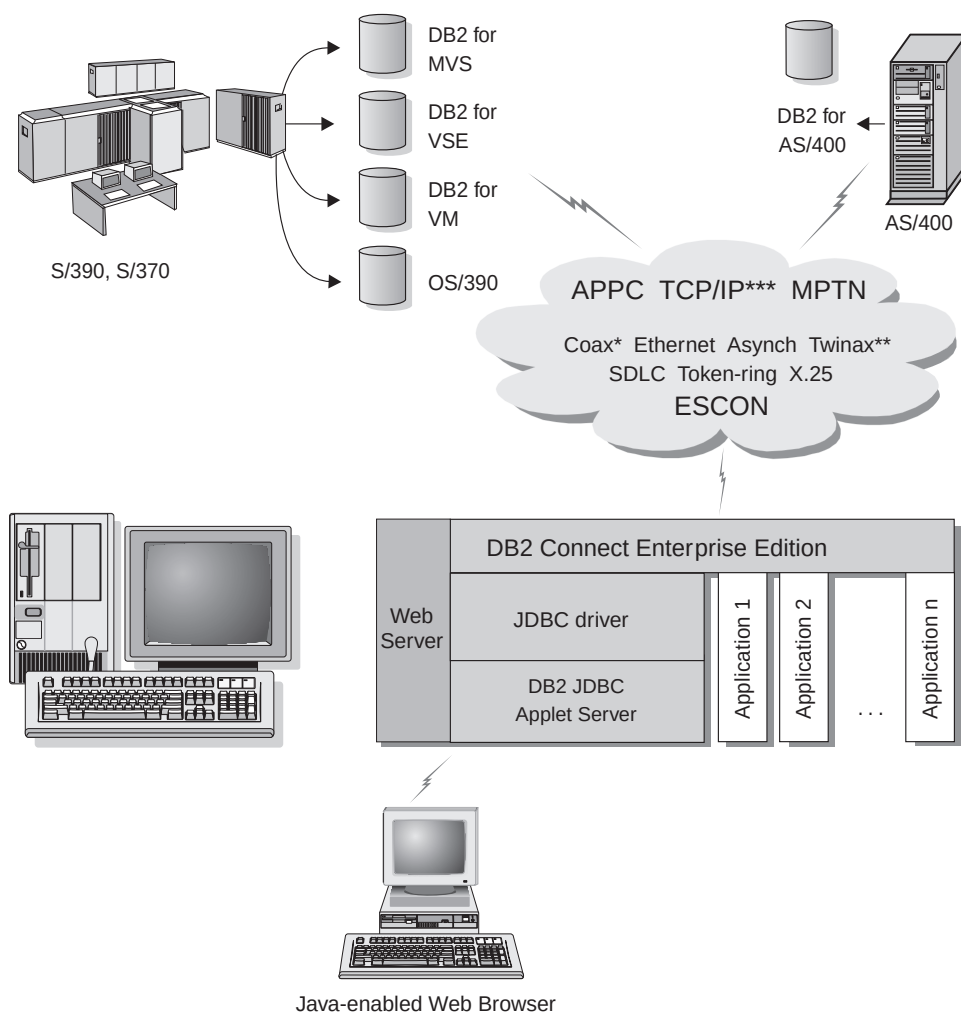
Accessing DB2 Data from the Web Using Java

Java Database Connectivity (JDBC) and Embedded SQL for Java (SQLJ) are provided with DB2 to allow you to create applications that access data in DB2 databases from the Web.

Programming languages containing embedded SQL are called host languages. Java differs from the traditional host languages C, COBOL, and FORTRAN, in ways that significantly affect how it embeds SQL:

- SQLJ and JDBC are open standards, enabling you to easily port SQLJ or JDBC applications from other standards-compliant database systems to DB2 Universal Database.
- All Java types representing composite data, and data of varying sizes, have a distinguished value, `null`, which can be used to represent the SQL NULL state, giving Java programs an alternative to NULL indicators that are a fixture of other host languages.
- Java is designed to support programs that, by nature, are heterogeneously portable (also called "super portable" or simply "downloadable"). Along with Java's type system of classes and interfaces, this feature enables component software. In particular, an SQLJ translator written in Java can call components that are specialized by database vendors in order to leverage existing database functions such as authorization, schema checking, type checking, transactional, and recovery capabilities, and to generate code optimized for specific databases.
- Java is designed for binary portability in heterogeneous networks, which promises to enable binary portability for database applications that use static SQL.
- You can run JDBC applets inside a web page on any system with a Java-enabled browser, regardless of the platform of your client. Your client system requires no additional software beyond this browser. The client and the server share the processing of JDBC and SQLJ applets and applications.

The JDBC server and the DB2 client must reside on the same machine as the Web server. The JDBC server calls the DB2 client to connect to local, remote, host, and AS/400 databases. When the applet requests a connection to a DB2 database, the JDBC client opens a TCP/IP connection to the JDBC server on the machine where the Web server is running.



Not all protocols are supported for all platforms.

* For Host connections only

** For AS/400

*** TCP/IP connectivity requires DB2 for OS/390 V5R1, DB2 for AS/400 V4R2, or DB2 for VM V6.1

Figure 7. Using Java Applets.

JDBC and SQLJ applications can be run from any system that has a DB2 client installed; a Web browser and a Web server are not required.

For more information on Java enablement, refer to the DB2 Java Enablement web page at <http://www.software.ibm.com/data/db2/java/>. For more information on the JDBC API, point your browser to <http://splash.javasoft.com/>.

Accessing DB2 Data from the Web Using Net.Data

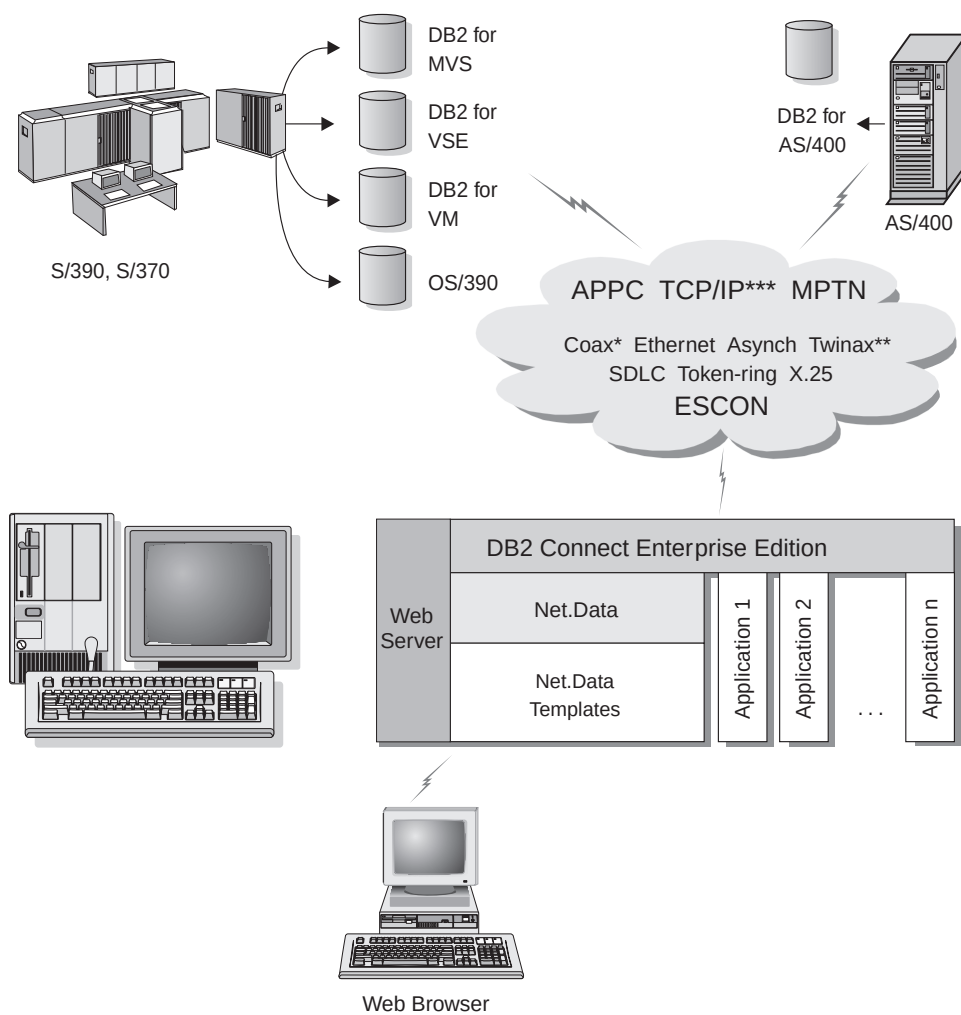
Net.Data is provided with DB2 to allow you to create applications that access data in DB2 databases from the Web.

Use *Net.Data* to create applications that are stored on a Web server and viewable from any Web browser. While viewing these documents, users can either select automated queries or define new ones that retrieve the specified information directly from a DB2 database.

Automated queries do not require user input; they are links in an HTML document and, when selected, they trigger existing SQL queries and return the results from a DB2 database. These links can be triggered repeatedly to access current DB2 data. Customized queries require user input. Users define the search characteristics on the Web page by selecting options from a list or by entering values in fields. They submit the search by clicking on a push button. Net.Data uses the information that is supplied by the user to dynamically build a complete SQL statement, and it sends the query to the DB2 database.

A demonstration of Net.Data applications is available from the IBM Software Net.Data page at <http://www.software.ibm.com/data/net.data>.

Net.Data can be installed with a DB2 server to allow local access to databases. Net.Data can be installed with a DB2 client to allow remote access to databases. In both cases, Net.Data and the Web server must be installed on the same system.



Not all protocols are supported for all platforms.

* For Host connections only

** For AS/400

*** TCP/IP connectivity requires DB2 for OS/390 V5R1, DB2 for AS/400 V4R2, or DB2 for VM V6.1

Figure 8. Net.Data with DB2 Connect.

Administering Instances and Databases with the DB2 Administration Tools

You can administer local or remote servers using the DB2 Administration Tools. Use the *Control Center* to perform administration tasks such as configuring DB2 instances and databases, backing up and recovering data, scheduling jobs, and managing media, all from a graphical interface.

The Control Center for Version 6 has additional support for DB2 UDB for OS/390.

If you want to access DB2 for OS/390 functions from the Control Center:

1. Verify the following information with your systems administrator:
 - a. You have a DB2 for OS/390 license (Version 5 or later).
 - b. You are using DB2 Connect Enterprise Edition.
2. Apply a function modification identifier. Read the DB2 for OS/390 Program Directory. The program directory identifies and describes the contents of FMIDs for each tape or cartridge.
3. Apply any additional service to DB2 as described in the program directory.
4. Ensure that you enabled the stored procedures address space.

Developing Applications Using the DB2 Software Developer's Kit

The DB2 Software Developer's Kit is a collection of tools that are designed to meet the needs of database application developers. It includes libraries, header files, documented APIs, and sample programs to build character-based, multimedia, or object-oriented applications.

A platform-specific version of the DB2 Software Developer's Kit is available for each of the supported operating systems and is currently available in the DB2 Universal Developer's Edition and the DB2 Personal Developer's Edition. Applications that are developed with the DB2 Software Developer's Kit will run on any platform where the equivalent DB2 client component is installed. Through a DB2 client, these applications can access all servers and, by using the DB2 Connect product (or the DB2 Connect functionality supplied with DB2 Enterprise - Extended or DB2 Enterprise Edition), they can also access DB2 Universal Database for AS/400, DB2 Universal Database for OS/390, and DB2 for VSE & VM database servers.

The DB2 Software Developer's Kit allows you to develop applications that use the following interfaces:

- Embedded SQL
- Call Level Interface (CLI) development environment (which is compatible with ODBC from Microsoft)

- Java Database Connectivity (JDBC)
- Embedded SQL for Java (SQLJ)
- DB2 Application Programming Interfaces (APIs) that use administrative functions to manage a DB2 database.

The DB2 Software Developer's Kit includes:

- Precompilers for Java, C, C++, COBOL, and FORTRAN.
- Libraries, include files, and code samples to develop applications that use SQLJ and DB2 CLI.
- JDBC and SQLJ support to develop Java applications and applets.
- Interactive SQL, through the CLP, to prototype SQL statements and perform ad-hoc database queries.
- An API to enable other application development tools to implement precompiler support for DB2 directly with their products.
- An SQL92 and MVS Conformance Flagger to identify embedded SQL statements in applications not conforming to the ISO/ANSO SQL92 Entry Level standard, or which are not supported by DB2 for OS/390.

For complete information on the functionality of the Software Developer's Kit, and instructions on how to use them, as well as a full list of supported compilers for your platform, refer to the *Application Building Guide*.

Running Your Own Applications

Various types of applications can access DB2 databases:

- Applications developed using a DB2 Software Developer's Kit that include embedded SQL (including Java SQLJ applications and applets), APIs, stored procedures, user-defined functions, calls to DB2 CLI, or calls to JDBC applications and applets.
- ODBC applications such as Lotus Approach, Microsoft Visual Basic, PowerSoft PowerBuilder, Borland Delphi and thousands more.
- Net.Data macros containing HTML and SQL.

For more information on running your own applications, refer to the *Installation and Configuration Supplement*.

Part 2. DB2 Connect: Planning and Installation

Chapter 2. Planning for Installation



If you know that your system meets all hardware and software requirements, and you want to begin installing your DB2 product right away, go to “Chapter 4. Installing and Configuring DB2 Connect Personal Edition” on page 29.

For information on the DB2 family of products, see “Chapter 1. About DB2 Connect” on page 3.

There are many components that you might want to use in your environment. Use the product and planning information in this section to ensure that your system meets the prerequisites and to decide which components you want to install.

Before you begin your DB2 product installation, you should determine the requirements for the system that you are planning to install and configure.

Memory Requirements

The amount of memory that you require depends on the applications you intend to run. We suggest that you have a minimum of a 128 MB of memory and a minimum 128 MB of swap space to access host or AS/400 databases using DB2 Connect Personal Edition.

Disk Requirements

This section shows the *minimum* amount of disk space that is required to install your DB2 product and components. It does not include the disk requirements necessary for the operating system, application development tools, and communications products. Consult each product’s documentation for these values. Estimates for disk space requirements are listed here; the actual amounts required depend on the functions you are using.

For information about space requirements for data, refer to the *Administration Guide*.

Estimating Fixed Disk Requirements

To estimate the disk requirements for a particular configuration, add the recommended minimum disk sizes for the products and components that you want to install. Include an allowance for your application data and indexes.

Components

Use Table 1 to estimate the amount of disk space you need to install DB2 and associated components on your operating system.

Table 1. Estimating Disk Requirements

	Recommended Minimum Disk (MB)
DB2 Connect Personal Edition for Linux	
DB2 Connect Personal Edition for Linux	96 MB
DB2 GUI Tools	63 MB
Online documentation in HTML format (English)	65 MB
Far-East Code Page Conversion Support	5 MB
Total Disk Space Required	___ MB

Software Requirements

This section outlines the software required to run DB2 products.

Product Requirements

Table 2 lists the operating system and communications software required for DB2 Universal Database.

Table 2. Software Requirements

Product	Hardware/Software Requirements	Communications
		Linux
• DB2 Connect Personal Edition	• Linux kernel 2.0.35 or higher. • <i>glibc</i> Version 2.0.7. • <i>pdksh</i> package (required to run the DB2 command line processor). • <i>libstdc++</i> Version 2.8. To install DB2, you will need the Red Hat Package Manager (<i>rpm</i>).	TCP/IP • For TCP/IP connectivity, no additional software is required.

Possible Client-to-Server Connectivity Scenarios

The following table shows the communication protocols that can be used when connecting a specific LAN, host or AS/400 DB2 client to a specific DB2 server or DB2 Connect server.



DB2 Workgroup, DB2 Enterprise, and DB2 Enterprise - Extended Editions can service requests from host or AS/400 clients (DRDA ARs).

Table 3. Possible Client-to-Server Connectivity Scenarios

Client	Server					
	AIX	HP-UX	Linux	OS/2	Solaris	Windows NT
AS/400 V4R1	APPC	N / A	N / A	APPC	APPC	APPC
AS/400 V4R2	APPC TCP/IP	TCP/IP	TCP/IP	APPC TCP/IP	APPC TCP/IP	APPC TCP/IP
AIX	APPC TCP/IP	TCP/IP	TCP/IP	APPC TCP/IP	APPC TCP/IP	APPC TCP/IP
HP-UX	APPC TCP/IP	TCP/IP	TCP/IP	APPC TCP/IP	APPC TCP/IP	APPC TCP/IP
Linux	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP
MVS	APPC	N / A	N / A	APPC	APPC	APPC
OS/2	APPC IPX/SPX(1),(2) TCP/IP	TCP/IP	TCP/IP	APPC IPX/SPX(1),(2) NetBIOS TCP/IP	APPC IPX/SPX(1) TCP/IP	APPC IPX/SPX(1) NetBIOS TCP/IP
OS/390	APPC TCP/IP	TCP/IP	TCP/IP	APPC TCP/IP	APPC TCP/IP	APPC TCP/IP
Silicon Graphics IRIX	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP
SQL/DS	APPC	N / A	N / A	APPC	APPC	APPC
Solaris	APPC TCP/IP	TCP/IP	TCP/IP	APPC TCP/IP	APPC TCP/IP	APPC TCP/IP
VSE V6	APPC	N / A	N / A	APPC	APPC	APPC
VM V6	APPC TCP/IP	TCP/IP	TCP/IP	APPC TCP/IP	APPC TCP/IP	APPC TCP/IP
Windows 9x	TCP/IP	TCP/IP	TCP/IP	NetBIOS TCP/IP	TCP/IP	IPX/SPX(1) NPIPE NetBIOS TCP/IP
Windows NT	APPC IPX/SPX(1) TCP/IP	TCP/IP	TCP/IP	APPC IPX/SPX(1) NetBIOS TCP/IP	APPC IPX/SPX(1) TCP/IP	APPC IPX/SPX(1) NPIPE NetBIOS TCP/IP
1. Direct Addressing 2. File Server Addressing						

Chapter 3. Security Requirements

Since you will be accessing data managed by other systems, you will require a user ID and password so that you can be authenticated by the system. To obtain these, contact the administrator responsible for the system where the data resides.

In addition, to access the system, you will require authorization to access data objects on the target database server; for example, tables, views, and program packages. To obtain the appropriate authorization, contact your database administrator.

An additional DB2 security mechanism called *binding* allows database administrators to limit access to specific applications. This mechanism is used to build program packages or *plans*. The database administrator then grants authority to users to execute these packages.

If you will be running an application developed using embedded SQL, a package will be supplied with your application. You must bind this package to each database that the application will access. Package files are usually supplied with the file type `.bnd`. CLI/ODBC users do not bind individual applications; instead, they must bind the CLI/ODBC driver itself to each database that will be accessed.

To bind applications or the CLI/ODBC driver, you require the following privileges on each database:

DB2 Universal Database for OS/390

- SYSADM
- SYSCTRL
- BINDADD privilege, plus CREATE IN COLLECTION NULLID

DB2 for VM DBA authority

DB2/400 *CHANGE authority or higher on the NULLID collection.

If your database administrator will not grant you these privileges, another user (usually the administrator) must perform the required binds.

Chapter 4. Installing and Configuring DB2 Connect Personal Edition

This section describes how to install DB2 Connect Personal Edition on a Linux-based workstation. If you want to install a DB2 Administration Client, Run-Time Client, or Software Developer's Kit on a Linux-based workstation, refer to the *Installation and Configuration Supplement*. For information on how to deploy this product using a distributed installation, refer to the *Installation and Configuration Supplement*.

We assume in these instructions that you install and configure DB2 Connect products using the DB2 Installer program. We also assume that you select to install the Control Center and create an instance using the DB2 Installer program.

Before You Begin

Before you begin the installation, be sure you have the following items and information:

- ___ 1. Ensure that your system meets all of the memory, hardware, and software requirements to install your DB2 product. For more information, see "Chapter 2. Planning for Installation" on page 23.
- ___ 2. A username for the default DB2 instance. We recommend that you create a new group and use it as the primary group for the DB2 instance owner.

You can have the DB2 Installer create this username, or you can create it manually. The username for the default instance should conform to both your operating system's naming rules, and those of DB2. For more information on naming rules, see "Appendix C. Naming Rules" on page 99.



When you use the DB2 Installer program, you should be aware of the following:

- The DB2 Installer's **db2setup** command only works with Bash, Bourne, and Korn shells. Other shells are not supported.
- You can generate a trace log, *db2setup.trc*, to record errors experienced during the installation. Run the **db2setup** command as follows:

```
db2setup -d
```

This creates a trace file, */tmp/db2setup.trc*.

Installation Steps

To install DB2 Universal Database on Linux systems, perform the following steps:

Step 1. Identify and Record Parameter Values

Table 4 will help you determine the values required to install DB2 products and set up a DB2 instance. Before proceeding with the installation and configuration, complete the *Your Value* column in the table. If you want to choose the default value for a parameter, you do not need to provide any value in the *Your Value* column for that parameter. In Table 4, the only parameter for which a value is required is *DB2 Product Name*. All other parameters either have a default value or are optional.

Table 4. Parameter Values Required for Installation

Information Required for DB2 Installer	Default Value	Your Value
Product/Component		
DB2 Product Name ¹	None	
DB2 Product Messages ²	None	
Documentation ²	None	
DB2 Instance		
User Name	db2inst1	
UID	System-generated UID	
Group Name	db2iadm1	
GID	System-generated GID	
Password	ibmdb2	
Note: You must select at least one DB2 product to install. You can optionally select one or more filesets in this product. There is a separate fileset for each locale. Refer to the <i>Installation and Configuration Supplement</i> online document for the names of filesets for DB2 Product Messages and Documentation.		

Step 2. Mount the CD-ROM

To install your DB2 product using the DB2 Installer program, you must first mount the CD-ROM. Once you have mounted the CD-ROM, you can start the installation.

To mount the CD-ROM on a Linux workstation, perform the following steps:

Step 1. Log on to the system as a user with root authority.

Step 2. Insert the CD-ROM in the drive and mount it with a command similar to the following:

```
mount -t iso9660 -o ro /dev/cdrom /cdrom
```

where */cdrom* represents the mount point of the CD-ROM.

Step 3. Log out.

Step 3. Install the DB2 Products

After you mount the CD-ROM file system, use the DB2 Installer program to install DB2.

To install your DB2 product, perform the following steps:

Step 1. Log on to the system as a user with root authority.

Step 2. Change to the directory where the CD-ROM is mounted by entering the following command:

```
cd /cdrom
```

where */cdrom* represents mount point of the CD-ROM.

Step 3. Enter the **./db2setup** command to start the DB2 Installer program. The **Install DB2 V6** window opens.



It will take some time for the DB2 Installer program to start up, as it is scanning your system for information.

+----- Install DB2 V6 -----+

Select the products you are licensed to install. Your Proof of Entitlement and License Information booklet identify the products for which you are licensed.

To see the preselected components or customize the selection, select Customize for the product.

☐ DB2 Administration Client	:	Customize. . . :
☒ DB2 Connect Personal Edition	:	Customize. . .]
☐ DB2 Software Developer's Kit	:	Customize. . . :

To choose a language for the following components, select Customize for the product.

DB2 Product Messages	[	Customize. . .]
DB2 Product Library	[	Customize. . .]

[OK]
[Cancel]
[Help]

+-----+

Step 4. From the product list on the *Install DB2 V6* screen, select the products that you want to install.

Press the **Tab** key to change the highlighted option and the **Enter** key to select or deselect an option.

To display the components for a DB2 product that you want to install, select **Customize**. To go back to a previous window at any times, select **Cancel**.



To refresh the current screen, press the **F5** key or **Ctrl+L**.

When you have finished selecting the DB2 product and its components, select **OK** to complete the installation.

For more information or assistance during the installation of any DB2 product or component, select **Help**.



The DB2 Installer program will ask you to specify a username for fenced user defined functions (UDFs) and stored procedures. When installing DB2 Connect Personal Edition, this does not apply; simply accept the default values.

When the installation is complete, DB2 software is installed in the `/usr/IBMdb2/V6.1` directory.



You can use the DB2 Installer program to add additional products or components after your initial installation. To create or add a new instance, an Administration Server, or additional DB2 products and components, enter the following command:

```
/usr/IBMdb2/V6.1/install/db2setup
```

Software Registration

DB2 software registration is handled automatically if you installed your DB2 product from a CD-ROM using the DB2 Installer program. If you installed DB2 using your Linux operating system's native installation tools, you must use the **db2licm** command to register DB2. Refer to the *Command Reference* for more information.

Part 3. Preparing Host and AS/400 Databases for DB2 Connect Communications

Chapter 5. Configuring Host and AS/400 Databases for DB2 Connect

This section describes the steps required to configure host and AS/400 database servers to accept connections from DB2 Connect workstations. These steps must be performed by users who have the necessary system privileges and special expertise, such as your network or system administrator and your DB2 administrator.

For more information on configuring host and AS/400 database servers, refer to the following publications:

- The *DB2 for OS/390 Installation Guide* (GC26-8970) contains the most complete and up-to-date information for DB2 Universal Database for OS/390.
- The online *Connectivity Supplement* provided with DB2 Connect contains selected information on setting up a host or AS/400 database server communications.
- *Distributed Relational Database Cross Platform Connectivity and Applications* (SG24-4311) contains useful post-configuration information.

The sample values used in this section match those used elsewhere in this book. When you follow the instructions provided you *must* substitute your own values.



Go to the section that describes the type of system that you want to configure to accept connections from DB2 Connect workstations:

- To configure OS/390 systems for DB2 Connect, see “Preparing OS/390 for DB2 Connect”.
 - To configure AS/400 systems for DB2 Connect, refer to the *Connectivity Supplement*.
 - To configure VM systems for DB2 Connect, refer to the *Connectivity Supplement*.
-

Preparing OS/390 for DB2 Connect

Your VTAM administrator and your host system administrator must configure VTAM and OS/390 to receive inbound connection requests from your DB2 Connect workstation. Usually your host system has already been configured for communications. For more information, contact your VTAM administrator and your host system administrator or refer to the *Connectivity Supplement*.



This section assumes that your DB2 for OS/390 server has already been configured for remote client access, if this is not the case, refer to the *Connectivity Supplement* for the required VTAM configuration steps.

Verify that the Correct PTFs Have Been Applied to your OS/390 SystemDB2 Universal Database for OS/390

Before you configure you OS/390 system to accept inbound requests for data from your DB2 Connect Personal edition workstation, you must verify that the following PTFs have been applied:

- PTF UQ06843 for APAR PQ05771
- PTF UQ09146 for APAR PQ07537.

Configure DB2 Universal Database for OS/390

Before you can use DB2 Connect, your DB2 Universal Database for OS/390 Administrator must configure DB2 Universal Database for OS/390 to permit connections from DB2 Connect workstations. This section indicates the *minimum* updates required in order to permit a DB2 Connect client to make a connection to the DB2 Universal Database for OS/390 database server. For more detailed examples, refer to the *Connectivity Supplement*, and the *DB2 for OS/390 Installation Reference*.

Configure TCP/IP for DB2 Universal Database for OS/390

This section describes how to configure TCP/IP communications between your DB2 Connect workstation and DB2 Universal Database for OS/390 Version 5.1 or later. It assumes that:

- You are connecting to a single host database via TCP/IP. Multiple host connections will be handled in exactly the same way, although the *port number* and *service number* required in each case may be different.
- The target database resides on DB2 Universal Database for OS/390 Version 5.1 or later.
- All the necessary software prerequisites are installed.

Prerequisite OS/390 Software for TCP/IP Support

OS/390 R3+ is the minimum operating system level required for TCP/IP support. OS/390 V2R5+ is the recommended operating system level, and the best performer.

The following informational APARS for DB2 for OS/390 are regularly updated with information about PTFs to install for various OS/390 components,

particularly TCP/IP for OS/390. If you use TCP/IP connectivity with DB2 for OS/390, it is extremely important that you review and apply the following PTFs and APAR fixes:

- II11164
- II11263
- II10962
- DB2 for OS/390 Version 5.1: PTF UQ13908, PTF UQ17755

Collecting Information

Before you can use DB2 Connect over a TCP/IP connection, you must collect information about both the host database server and the DB2 Connect workstation. For each host server that you are connecting to via TCP/IP, you must have the following information:

- The locations of the equivalent files at the target DB2 Universal Database for OS/390 host.
- The TCP/IP *port number* defined to DB2 Universal Database for OS/390. (Note that the associated *service name* information is not exchanged between the DB2 Connect workstation and DB2 Universal Database for OS/390). Port number 446 has been registered as the default for communication from a DB2 Connect workstation.
- The TCP/IP addresses and hostnames for both the host and the DB2 Connect workstation.
- The LOCATION NAME of the DB2 for OS/390 database server
- The user ID and password to be used when issuing *CONNECT* requests for the database at the host.

Refer to your local network administrator and your DB2 for OS/390 administrator for help getting this information. Use one copy of the example work sheet, Table 5, to plan *each* TCP/IP connection between DB2 Connect and a host database server.

Example Worksheet:

Table 5. Example Worksheet for Planning TCP/IP Connections to DB2 Universal Database for OS/390

Ref.	Description	Sample Value	Your Value
User Information			
TCP-1	User Name	A.D.B.User	
TCP-2	Contact Info	(123)-456-7890	
TCP-5	User ID	ADBUSER	
TCP-6	Database Type	db2390	

Table 5. Example Worksheet for Planning TCP/IP Connections to DB2 Universal Database for OS/390 (continued)

Ref.	Description	Sample Value	Your Value
TCP-7	Connection type (must be TCPIP).	TCPIP	TCPIP
Network Elements at the Host			
TCP-8	Host name	nyx	
TCP-9	Host IP address	9.21.15.235	
TCP-10	Service name	db2inst1c	
TCP-11	Port number	446	
TCP-12	LOCATION NAME	newyork	
TCP-13	User ID		
TCP-14	Password		
Network Elements at the DB2 Connect Workstation			
TCP-18	Host name	mcook02	
TCP-19	IP address	9.21.27.179	
TCP-20	Service name	db2inst1c	
TCP-21	Port number	446	

Notes:

1. To obtain the host's IP address **TCP-9** , enter at the host:
TSO NETSTAT HOME
2. To obtain the port number **TCP-11** , look for DSNL004I in the DB2 master address space or system log.

Configuring the TCP/IP Connection

Use the manual steps in this section to complete the configuration and make the connection.

Step 1. Complete the Worksheet: Complete a copy of the example worksheet for each TCP/IP host:

1. Fill in the values to be used for the TCP/IP address and hostname of the DB2 Universal Database for OS/390 host (items 8 and 9).
2. Fill in the values to be used for the TCP/IP address and hostname of the DB2 Connect workstation (items 18 and 19).
3. Determine the *port number* or *service name* to be used for the connection (items 10 and 11, or 20 and 21).
4. Determine the LOCATION NAME of the DB2 for OS/390 database server to which you wish to connect.

5. Determine the values to be used for *user ID* and *PASSWORD* when connecting to the host database.

Note that some additional planning considerations may apply, refer to the *DB2 Connect User's Guide* for more information.

Step 2. Update the DB2 Universal Database for OS/390 Host: At your OS/390 host:

1. Verify the *host address* or the *host name*.
2. Verify the *port number* or the *service name*.
3. Update the services file with the correct port number and service name if necessary.
4. Update the hosts file (or the Domain Name Server used by the DB2 Universal Database for OS/390 system) with the hostname and IP address of the DB2 Connect workstation.
5. Ensure the new definitions are active before attempting to test the connection. Refer to your host network administrator or change control staff if necessary.
6. Check with the DB2 Universal Database for OS/390 administrator that you have a valid user ID, password, and database *LOCATION NAME*.
7. *PING* the DB2 Connect workstation, using the correct port number if that option is supported by TCP/IP on the host system. For example:

```
ping remote_host_name -p port_number
```

Part 4. Configuring DB2 Connect to Communicate with Host and AS/400 Databases

Chapter 6. Configuring Communications to Host or AS/400-Based Servers Using the Command Line Processor

This section assumes that TCP/IP is functional on the DB2 Connect workstation and the host or AS/400 system where the DB2 data resides. See “Software Requirements” on page 24 for the communication protocol requirements for your platform.

To set up TCP/IP communications between your DB2 Connect workstation and a host or AS/400 DB2 server, perform the following steps:

- Step 1. Identify and record parameter values.
- Step 2. Configure the DB2 Connect workstation:
 - a. Resolve the host's IP address.
 - b. Update the services file.
- Step 3. Catalog the TCP/IP node.
- Step 4. Catalog the database.
- Step 5. Catalog the database as a Database Connection Service (DCS) database.
- Step 6. Bind utilities and applications to the database server.
- Step 7. Update the DB2 Connect configuration.
- Step 8. Test the host or AS/400 connection.



Due to the characteristics of the TCP/IP protocol, TCP/IP may not be immediately notified of the failure of a partner on another host. As a result, a client application accessing a remote DB2 server using TCP/IP, or the corresponding agent at the server, may sometimes appear to be hung. DB2 uses the TCP/IP SO_KEEPALIVE socket option to detect when there has been a failure and the TCP/IP connection has been broken.

If you are experiencing problems with your TCP/IP connection, refer to the *Troubleshooting Guide* for information on how to adjust this parameter and other common TCP/IP problems.

Step 1. Identify and Record Parameter Values

As you proceed through the configuration steps, complete the *Your Value* column in the following table. You can fill in some of the values before you start configuring this protocol.

Table 6. TCP/IP Values Required at the DB2 Connect Workstation

Parameter	Description	Sample Value	Your Value
Host Name • Hostname (<i>hostname</i>) or • IP address (<i>ip_address</i>)	Use the <i>hostname</i> or <i>ip_address</i> of the remote host. To resolve this parameter: • Contact your network administrator to obtain the <i>hostname</i>. • Contact your network administrator to obtain the <i>ip_address</i> or enter the ping <i>hostname</i> command.	nyx or 9.21.15.235	

Table 6. TCP/IP Values Required at the DB2 Connect Workstation (continued)

Parameter	Description	Sample Value	Your Value
Service Name • Connection Service name (<i>svcename</i>) or • Port number / Protocol (<i>port_number/tcp</i>)	Values required in the services file. The Connection Service name is an arbitrary name that represents the Connection port number (<i>port_number</i>) on the client. The port number for the DB2 Connect workstation must be the same as the port number that the <i>svcename</i> parameter maps to in the services file at the host database server. (The <i>svcename</i> parameter is located in the database manager configuration file on the host.) This value must not be in use by any other applications, and must be unique within the services file. This value generally must be 1024 or higher. Contact your database administrator for the values used to configure the host system.	host1 or 446/tcp	
Target database name (<i>target_dbname</i>)	The database name as it is known on the host or AS/400 system. • If you are connecting to a DB2 for OS/390 system, use the location name. • If you are connecting to a DB2 for AS/400 system, use the local RDB name. • If you are connecting a DB2 for VM, use the dbname.	newyork	

Table 6. TCP/IP Values Required at the DB2 Connect Workstation (continued)

Parameter	Description	Sample Value	Your Value
Local database name (<i>local_dcsname</i>)	An arbitrary local nickname for use by DB2 Connect that represents the remote host or AS/400 database.	ny	
Node name (<i>node_name</i>)	A local alias, or nickname, that describes the node to which you are trying to connect. You can choose any name you want; however, all node name values within your local node directory must be unique.	db2node	

Step 2. Configure the DB2 Connect Workstation

The following steps configure this protocol on the DB2 Connect Workstation. Replace the sample values with your worksheet values.

A. Resolve the Host's IP Address



If your network has a name server, or you are planning to directly specify the IP address (*ip_address*) of the server, skip this step and proceed to "B. Update the Services File" on page 49.

The DB2 Connect workstation must know the address of the host system to which it is attempting to establish communications. If a name server does not exist on your network, you may directly specify a hostname that maps to the IP address (*ip_address*) of the host system in the local hosts file. On your Linux system, the hosts file is located in the /etc directory.



If you are planning on supporting a UNIX client that is using Network Information Services (NIS), and you are not using a domain name server on your network, you must update the hosts file located on your NIS master server.

Using a text editor, add an entry to the DB2 Connect workstation's hosts file for the host system's hostname. For example:

```
9.21.15.235    nyx    # host address for nyx
```

where:

9.21.15.235
represents the *ip_address*

nyx represents the *hostname*

represents a comment describing the entry



If the host system is not in the same domain as the DB2 Connect Workstation, you must provide a fully qualified domain name such as *nyx.spifnet.ibm.com*, where *spifnet.ibm.com* is the domain name.

B. Update the Services File



If you are planning to catalog a TCP/IP node using a port number (*port_number*), skip this step and go to “Step 3. Catalog the TCP/IP Node”.

Using a text editor, add the Connection Service name and port number to the DB2 Connect workstation’s services file. This file is located in the same directory as the local hosts file that you may have edited in “A. Resolve the Host’s IP Address” on page 48. On your Linux system, the services file is located in the */etc* directory. For example:

```
host1 446/tcp # DB2 connection service port
```

where:

host1 represents the Connection Service name

446 represents the Connection port number

tcp represents the communication protocol that you are using

represents a comment describing the entry

The port number used on the DB2 Connect workstation must match the port number used on the host system. Also, ensure that you did not specify a port number that is being used by any other process.



If you are planning on supporting a UNIX client that uses Network Information Services (NIS), you must update the services file located on your NIS master server.

Step 3. Catalog the TCP/IP Node

You must add an entry to the DB2 Connect workstation’s node directory to describe the remote node. This entry specifies the chosen alias (*node_name*), the *hostname* (or *ip_address*), and the *svcname* (or *port_number*) that the client will use to access the remote host.

To catalog a TCP/IP node, perform the following steps:

- Step 1. Log on to the system as a user with System Administrative (SYSADM) or System Controller (SYSCTRL) authority.
- Step 2. Set up the instance environment and invoke the DB2 command line processor. Run the start-up script as follows:

```
. INSTHOME/sqllib/db2profile    (for Bourne or Korn shell)
source INSTHOME/sqllib/db2cshrc (for C shell)
```

where *INSTHOME* is the home directory of the instance.

- Step 3. Catalog the node by entering the following commands:
- ```
db2 catalog tcpip node node_name remote [hostname|ip_address]
 server [svcname|port_number]
db2 terminate
```

For example, to catalog the remote host *nyx* on the node called *db2node*, using the service name *host1*, enter the following:

```
db2 catalog tcpip node db2node remote nyx server host1
db2 terminate
```

To catalog a remote server with the IP address *9.21.15.235* on the node called *db2node*, using the port number *446*, enter the following:

```
db2 catalog tcpip node db2node remote 9.21.15.235 server 446
db2 terminate
```



If you need to change values that were set with the **catalog node** command, perform the following steps:

- Step 1. Run the **uncatalog node** command in the command line processor as follows:

```
db2 uncatalog node node_name
```

- Step 2. Recatalog the node with the values that you want to use.

---

## Step 4. Catalog the Database as a Database Connection Service (DCS) Database

To catalog the remote database as a Data Connection Services (DCS) database, perform the following steps:

- Step 1. Log on to the system as a user with System Administrative (SYSADM) or System Controller (SYSCTRL) authority.
- Step 2. Enter the following commands:

```
catalog dcs db local_dcsname as target_dbname
terminate
```

where:

- *local\_dcsname* is the local name of the host or AS/400 database.
- *target\_dbname* is the name of database on the host or AS/400 database system.

For example, to make *ny* the local database name for DB2 Connect, for the remote host or AS/400 database called *newyork*, enter the following commands:

```
catalog dcs db ny as newyork
terminate
```

---

## Step 5. Catalog the Database

Before a client application can access a remote database, the database must be cataloged on the host system node and on any DB2 Connect workstation nodes that will connect to it. When you create a database, it is automatically cataloged on the host with the database alias (*database\_alias*) the same as the database name (*database\_name*). The information in the database directory, along with the information in the node directory, is used on the DB2 Connect workstation to establish a connection to the remote database.

To catalog a database on the DB2 Connect Workstation, perform the following steps.

**Step 1.** Log on to the system as a user with System Administrative (SYSADM) or System Controller (SYSCTRL) authority.

**Step 2.** Fill in the *Your Value* column in the following worksheet.

Table 7. Worksheet: Parameter Values for Cataloging Databases

| Parameter                                   | Description                                                                                                                                                                                                                         | Sample Value | Your Value |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|
| Database name<br>( <i>database_name</i> )   | The local DCS database name ( <i>local_dcsname</i> ) of the <i>remote</i> database. You specified this when you catalogued the DCS database directory. For example, <i>ny</i> .                                                     | ny           |            |
| Database alias<br>( <i>database_alias</i> ) | An arbitrary local nickname for the remote database. If you do not provide one, the default is the same as the database name ( <i>database_name</i> ). This is the name that you use when connecting to the database from a client. | localny      |            |
| Node name<br>( <i>node_name</i> )           | The name of the node directory entry that describes where the database resides. Use the same value for node name ( <i>node_name</i> ) that you used to catalog the node in the previous step.                                       | db2node      |            |

**Step 3.** Set up the instance environment and invoke the DB2 command line processor. Run the start-up script as follows:

```
. INSTHOME/sqllib/db2profile (for Bourne or Korn shell)
source INSTHOME/sqllib/db2cshrc (for C shell)
```

where *INSTHOME* is the home directory of the instance.

Step 4. Catalog the database by entering the following commands in the command line processor:

```
db2 catalog database database_name as database_alias at node node_name
db2 terminate
```

For example, to catalog the DCS known database *ny* so that it has the local database alias *localny*, on the node *db2node*, enter the following commands:

```
db2 catalog database ny as localny at node db2node
db2 terminate
```



If you need to change values that were set with the **catalog database** command, perform the following steps:

Step a. Run the **uncatalog database** command in the command line processor as follows:

```
db2 uncatalog database database_alias
```

Step b. Recatalog the database with the value that you want to use.

---

## Step 6. Bind Utilities and Applications to the Database Server

The steps you have just completed set up the DB2 Connect workstation to communicate with the host or AS/400 system. You must now bind the utilities and applications to the host or AS/400 database server.

To bind the utilities and applications to the host or AS/400 database server, enter the following commands:

```
db2 connect to dbalias user userid using password
db2 "bind path@ddcsmvs.lst blocking all sqlerror continue
 messages mvs.msg grant public"
db2 connect reset
```

For example:

```
db2 connect to localny user myuserid using mypassword
db2 "bind /sqllib/myapps@ddcsmvs.lst blocking all sqlerror continue
 messages mvs.msg grant public"
db2 connect reset
```



The *userid* and *password* specified must have the authority to bind applications against the target database.



For more information about these commands, refer to the *DB2 Connect User's Guide*.

---

## Step 7. Update the DB2 Connect Configuration



If you are not planning to use applications that employ multisite updates, skip this step and go to “Step 6. Bind Utilities and Applications to the Database Server” on page 52.

If multisite update (two phase commit) applications will be used at this workstation, you will need to provide information regarding the required DB2 Transaction Manager Database. This assigned database will be used by DB2 to store information about inflight transactions. You have a can use the `TM_DATABASE`.

At a command line prompt, enter the following command to update the Database Manager Configuration:

```
db2 update dbm config using TM_DATABASE 1st_conn
```

where `TM_DATABASE` can have one of the following settings:

- `1ST_CONN`, the first database that a connection is established to will be used as the Transaction Manager database for transactions. If this option is used, then the first database connected to must be either a DB2 Universal Database Version 5 or later database, or a DB2 Universal Database for OS/390 Version 5.1 or later database. This is the recommended setting, and it is the default value for `TM_DATABASE`.
- `database_name`, the named database that is connected to will be used. If this option is used, we recommend that the named database should be either a DB2 Universal Database version 5 or later database, or a DB2 Universal Database for OS/390 Version 5.1 or later database.

---

## Step 8. Test the Host or AS/400 Connection

When you have finished configuring the DB2 Connect workstation for communications, perform the following steps to test the connection:



You will need to connect to a remote database to test the connection.

- Step 1. Start the database manager by entering the **db2start** command on the host database server (if it was not already started).
- Step 2. Enter the following command in the DB2 Connect workstation's Command Center or command line processor to connect to the remote database:

`connect to database_alias user userid using password`

The values for *userid* and *password* must be valid for the system on which they are authenticated. By default, authentication takes place on the host or AS/400 database server.

Authentication for connecting to host databases is set while configuring DB2 Connect. For more information, refer to the *DB2 Connect User's Guide*.

If the connection is successful, you will get a message showing the name of the database to which you have connected. You are now able to retrieve data from that database. For example, to retrieve a list of all the table names listed in the system catalog table, enter the following SQL command in the Command Center or command line processor:

```
"select tabname from syscat.tables"
```

When you are finished using the database connection, enter the **connect reset** command to end the database connection.



You are now ready to start using DB2. For more advanced topics, refer to the *Administration Guide* and the *Installation and Configuration Supplement*.

## Test the Host Connection

If the connection fails, check the following items:

At the *host*:

- \_\_\_ 1. The *db2comm* registry value includes the value *tcpip*.
- \_\_\_ 2. The *services* file was updated correctly.
- \_\_\_ 3. The service name (*svcname*) parameter was updated correctly in the database manager configuration file.
- \_\_\_ 4. The database was created and cataloged properly.
- \_\_\_ 5. The database manager was stopped and started again (enter the **db2stop** and **db2start** commands on the server).
- \_\_\_ 6. The port number specified is not being used by any other process.



If there are problems starting a protocol's connection managers, a warning message appears and the error messages are logged in the *db2diag.log* file.

For more information on the *db2diag.log* file, refer to the *Troubleshooting Guide*.

At the *DB2 Connect workstation*:

- \_\_\_ 1. If used, the *services* and *hosts* files were updated correctly.

- \_\_\_ 2. The node was cataloged with the correct hostname (*hostname*) or IP address (*ip\_address*).
- \_\_\_ 3. The port number must match, or the service name must map to, the port number used on the host.
- \_\_\_ 4. The node name (*node\_name*) that was specified in the database directory points to the correct entry in the node directory.
- \_\_\_ 5. The database was cataloged properly, using the *hosts's* database alias (*database\_alias*) that was cataloged when the database was created on the host, as the database name (*database\_name*) on the DB2 Connect workstation.

If the connection still fails after you verify these items, refer to the *Troubleshooting Guide*.



---

## Chapter 7. Enabling Multisite Updates (Two-Phase Commit)

This chapter provides an overview of the multisite update function as it applies to scenarios that involve host and AS/400 database servers. It describes products and components needed to implement PC, UNIX and web applications that update multiple DB2 databases in the same transaction.

Multisite update, also known as Distributed Unit of Work (DUOW) and Two-Phase commit, is a function that enables your applications to update data in multiple remote database servers with guaranteed integrity. A good example of a multisite update is a banking transaction that involves the transfer of money from one account to another in a different database server. In such a transaction it is critical that updates that implement debit operation on one account do not get committed unless updates required to process credit to the other account are committed as well. The multisite update considerations apply when data representing these accounts is managed by two different database servers.

DB2 products provide comprehensive support for multisite update. This support is available for applications developed using regular SQL as well as applications that utilize Transaction Monitor products that implement X/Open XA interface specification. Examples of such Transaction Monitor products include IBM TxSeries (CICS and Encina), Message and Queuing Series, Component Broker Series, San Francisco Project as well as Microsoft Transaction Server (MTS), BEA Tuxedo, NCR TopEnd and several others. There are different setup requirements depending on whether native SQL multisite update or TP Monitor multisite update is used.

Both the native SQL and TP Monitor multisite update programs must be precompiled with the `CONNECT 2 SYNCPOINT TWOPHASE` options. Both can use the SQL Connect statement to indicate which database they want to be used for the SQL statements that follow. If there is no TP Monitor to tell DB2 it is going to coordinate the transaction (as indicated by DB2 receiving the `xa_open` calls from the TP monitor to establish a database connection), then the DB2 software will be used to coordinate the transaction.

When using TP monitor multisite update, the application must request commit or rollback by using the TP monitor's API, e.g. CICS `SYNCPOINT`, Encina `Abort()`, MTS `SetAbort()`. When using native SQL multisite update, the normal SQL `COMMIT` and `ROLLBACK` must be used.

TP Monitor multisite update can coordinate a transaction that accesses both DB2 and non-DB2 resource managers such as Oracle, Informix, SQLServer, etc. Native SQL multisite update is used with DB2 servers only.

For a multisite update transaction to work, each of the databases participating in a distributed transaction must be capable of supporting Distributed Unit of Work. At the time of this writing, the following DB2 servers provided DUOW support that enabled them to participate in distributed transactions:

- DB2 Common Server V2
- DB2 Universal Database V5 and V6
- DB2 for MVS/ESA V3.1 and 4.1
- DB2 for OS/390 V5.1
- DB2 Universal Database for OS/390 V6.1
- DB2/400 V3.1 or later (using SNA only at this time)
- DB2 Server for VM and VSE V5.1 and 6.1

A distributed transaction can update any mix of supported database servers. For example, your application can update several tables in DB2 Universal Database on Windows NT, a DB2 for OS/390 database and a DB2/400 database all within a single transaction.

Host and AS/400 database servers require DB2 Connect to participate in a distributed transaction originating from PC, UNIX, and web applications. In addition, many of the multisite update scenarios that involve host and AS/400 database servers require that the Syncpoint Manager (SPM) component be configured. The need for SPM is dictated by the choice of protocol (SNA vs. TCP/IP) and use of a TP monitor. See the following table for a summary of scenarios that require use of the SPM. The table shows that DB2 Connect is required for any access to the host or AS/400 from Intel or UNIX machines. In addition, for multisite updates, the SPM component of DB2 Connect is required if the access is via SNA or uses a TP monitor.

| <b>Host and AS/400 multisite update scenarios that require SPM.</b> |          |             |                               |                                    |
|---------------------------------------------------------------------|----------|-------------|-------------------------------|------------------------------------|
| TP Monitor Used?                                                    | Protocol | SPM Needed? | Product Required (choose One) | Host and AS/400 Database Supported |
|                                                                     |          |             |                               |                                    |

| <b>Host and AS/400 multisite update scenarios that require SPM.</b> |          |     |                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------|----------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Yes                                                                 | TCP / IP | Yes | <ul style="list-style-type: none"> <li>• DB2 Connect Enterprise Edition</li> <li>• DB2 Universal Database Enterprise Edition</li> <li>• DB2 Universal Database Enterprise-Extended Edition</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>• DB2 for OS/390 V5.1</li> <li>• DB2 Universal Database for OS/390 V6.1</li> </ul>                                                                                                                            |
| Yes                                                                 | SNA      | Yes | <ul style="list-style-type: none"> <li>• DB2 Connect Enterprise Edition*</li> <li>• DB2 Universal Database Enterprise Edition*</li> <li>• DB2 Universal Database Enterprise-Extended Edition*</li> </ul> <p><b>Note:</b> *AIX, OS/2 and Windows NT platforms only.</p> | <ul style="list-style-type: none"> <li>• DB2 for MVS/ESA V3.1 and 4.1</li> <li>• DB2 for OS/390 V5.1</li> <li>• DB2 Universal Database for OS/390 V6.1</li> <li>• DB2/400 V3.1 or later</li> <li>• DB2 Server for VM or VSE V5.1 or later</li> </ul> |

| Host and AS/400 multisite update scenarios that require SPM. |        |     |                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------|--------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No                                                           | TCP/IP | No  | <ul style="list-style-type: none"> <li>• DB2 Connect Personal Edition</li> <li>• DB2 Connect Enterprise Edition</li> <li>• DB2 Universal Database Enterprise Edition</li> <li>• DB2 Universal Database Enterprise-Extended Edition</li> </ul>                         | <ul style="list-style-type: none"> <li>• DB2 for OS/390 V5.1</li> <li>• DB2 Universal Database for OS/390 V6.1</li> </ul>                                                                                                                             |
| No                                                           | SNA    | Yes | <ul style="list-style-type: none"> <li>• DB2 Connect Enterprise Edition*</li> <li>• DB2 Universal Database Enterprise Edition*</li> <li>• DB2 Universal Database Enterprise-Extended Edition*</li> </ul> <p><b>Note:</b> *AIX, OS/2 and Windows NT platforms only</p> | <ul style="list-style-type: none"> <li>• DB2 for MVS/ESA V3.1 and 4.1</li> <li>• DB2 for OS/390 V5.1</li> <li>• DB2 Universal Database for OS/390 V6.1</li> <li>• DB2/400 V3.1 or later</li> <li>• DB2 Server for VM and VSE V5.1 or later</li> </ul> |

**Note:**

For more information about DUOW refer to the *DB2 Connect User's Guide*.

For additional information about DB2 Connect two-phase commit support, as well as instructions for setting up for several popular TP monitors, please see the *Administration Guide* or access the DB2 Product and Service Technical Library on the World Wide Web:



1. Set your Web browser to the following URL:  
`http://www.software.ibm.com/data/db2/library/`
2. Select "DB2 Universal Database".
3. Search for "Technotes" using the search keywords "DDCS", "SPM", "MTS", "CICS", and "ENCINA".

---

## Enabling Multisite Updates Using the Control Center

As of Version 6, you can use the Control Center to provide multisite update. The procedure is very simple, and is outlined below. For more information about the multisite update configuration process, including how to configure your system manually, refer to the on-line *Connectivity Supplement*.

### Starting the Multisite Update Smartguide

From the Control Center, click on the [+] sign to expand the tree view. With the right mouse button, select the instance that you wish to configure. A popup menu opens. Select **Multisite Update->Configure** from this menu.

### Smartguide Steps

The Smartguide provides a notebook-type interface. Each page of the notebook will prompt you for certain information about your configuration. The pages are shown below in the order in which you will encounter them.

Step 1. Specify a Transaction Processor (TP) monitor.

This field will show the defaults for the TP Monitor you have enabled. If you do not wish to use a TP monitor, select **Do Not Use a TP Monitor**.

Step 2. Specify the communications protocols you will use.

Step 3. Specify a Transaction Manager database.

This panel defaults to the first database you connect to (1ST\_CONN). You can leave this default or select another catalogued database.

Step 4. Specify the types of database servers involved in the update, and also whether or not TCP/IP is to be used exclusively.

Step 5. Specify the Syncpoint Manager settings.

This page will only appear if the settings on the previous page indicate that you need to use DB2's Syncpoint Manager in a multisite update scenario.

### Testing the Multisite Update Feature

Step 1. Select the instance with the right mouse button and choose the **Multisite Update->Test** menu option from the pop-up menu. The **Test Multi-Site Update** window opens.

- Step 2. Select the databases you wish to test from the available databases in the left sub-window. You can use the arrow buttons in the middle to move selections to and from the **Selected Databases** sub-window.
- Step 3. When you have finished your selection, press the **Test...** button at the bottom of the window. The **Multi-Site Update Test Result** window opens.
- Step 4. The **Multi-Site Update Test Result** window shows which of the databases you selected succeeded or failed the update test. The window will show sql codes and error messages for those that failed.

---

## Part 5. Using DB2 Connect



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## Chapter 8. Running Your Own Applications

Various types of applications can access DB2 databases:

- Applications developed using the DB2 Software Developer's Kit that include embedded SQL, APIs, stored procedures, user-defined functions or calls to the DB2 CLI.
- ODBC applications such as Lotus Approach.
- Java applications and applets (JDBC and SQLJ).
- Net.Data macros containing HTML and SQL.

An application on a DB2 client can access a remote database without knowing its physical location. The DB2 client determines the location of the database, manages the transmission of the requests to the database server, and returns the results.

In general, to run a database client application, perform the following steps:

Step 1. Ensure the server is configured and running.

Be sure that the database manager is started on the database server to which the application program is connecting. If it is not, you must issue the **db2start** command at the server before starting the application.

Step 2. Ensure that you can connect to the database that the application uses.

Step 3. Bind the utilities and the applications to the database. See "Binding Database Utilities" for information about binding the utilities.

Step 4. Run the application program.

---

### Binding Database Utilities

You must bind the database utilities (import, export, reorg, the command line processor) and DB2 CLI bind files to each database before they can be used with that database. In a network environment, if you are using multiple clients that run on different operating systems or are at different versions or service levels of DB2, you must bind the utilities once for each operating system and DB2-version combination.

Binding a utility creates a *package*, which is an object that includes all of the information that is needed to process specific SQL statements from a single source file.

The bind files are grouped together in different .lst files in the bnd directory, under the installation directory. Each file is specific to a server.

## Binding to Host Databases

To bind the utilities and applications to the DRDA server, connect to the DRDA server and use commands similar to the following:

```
connect to dbalias user userid using password
bind path/bnd/@ddcsmvs.lst blocking all sqlerror continue
 messages mvs.msg grant public
connect reset
```

where *path* corresponds to the *DB2PATH* registry value. These commands are described in detail in the *DB2 Connect User's Guide*.

## Binding to DB2 Universal Databases

On a Linux workstation, you bind the database utilities to a database using the command line processor. To bind the database utilities, perform the following steps:

Step 1. Change to the /bnd directory, which is *INSTHOME*/sqllib/bnd, where *INSTHOME* is the home directory of the instance owner.

Step 2. Connect to the database using the command:

```
db2 connect to database_alias
```

where *database\_alias* is the name of the database to which you want to connect.

Step 3. Enter the following commands in the Command Center or the command line processor:

```
db2 "bind @db2ubind.lst messages bind.msg grant public"
db2 "bind @db2cli.lst messages clibind.msg grant public"
```

In this example, *bind.msg* and *clibind.msg* are the output message files, and EXECUTE and BINDADD privileges are granted to *public*.

Step 4. Reset the connection to the database by entering the following command:

```
db2 connect reset
```

For more information on the **bind** command, refer to the *Command Reference*.

### Notes:

1. The *db2ubind.lst* file contains the list of bind (.bnd) files required to create the packages for the database utilities. The *db2cli.lst* file contains the list of bind (.bnd) files required to create packages for the DB2 CLI and the DB2 ODBC driver.

2. Binding may take a few minutes to complete.
3. If you have BINDADD authority, the first time you use the DB2 CLI or ODBC driver, the DB2 CLI packages will be bound automatically.

---

## Running CLI/ODBC Programs

The DB2 Call Level Interface/ODBC driver (which consists of the DB2 Call Level Interface run-time environment and the DB2 ODBC driver) is included with the DB2 Connect Personal Edition.

This support enables applications developed using ODBC and DB2 CLI APIs to work with any DB2 server or DB2 Connect Personal Edition workstation. DB2 CLI application development support is provided by the DB2 Software Developer's Kit (DB2 SDK) which is packaged with a DB2 Connect server.

Before DB2 CLI or ODBC applications can access DB2, the DB2 CLI packages must be bound on any remote server to be accessed by this application. See "Binding Database Utilities" on page 65 for specific details.

The following general steps are required on DB2 Connect Personal Edition to give DB2 CLI and ODBC applications access to remote DB2 databases. These instructions assume that you have successfully connected to DB2 using a valid user ID and password. Depending on the platform many of these steps are automatic.

- Step 1. Use the Control Center to add the database so that its instances and databases can be made known to the Control Center, then add the instances and databases for that system. (Your local system is represented by **Local** icon.) If you do not have access to this program you can use the **catalog** command in the command line processor.
- Step 2. The DB2 CLI/ODBC driver is an optional component that you can install. Be sure it is was installed at that point.
- Step 3. To access the DB2 database from ODBC:
  - a. The ODBC Driver Manager (From Microsoft or other vendor) must already be installed.
  - b. The DB2 databases must be registered as ODBC data sources. The ODBC driver manager does not read the DB2 catalog information; instead it references its own list of data sources.
  - c. If a DB2 table does not have a unique index then many ODBC applications will open it as read-only. A unique index should be created for each DB2 table that is to be updated by an ODBC application. Refer to the **CREATE INDEX** statement in the *SQL Reference*. Using the Control Center you would alter the settings of the table, then select the **Primary Key** tab and move one or more

columns from the available columns list over to the primary key columns list. Any column you select as part of the primary key must be defined as NOT NULL.

- Step 4. If necessary, you can set various CLI/ODBC Configuration Keywords to modify the behavior of DB2 CLI/ODBC and the applications using it.

If you followed the above steps to install ODBC support, and added DB2 databases as ODBC data sources, your ODBC applications will now be able to access them.

## Platform Specific Details for CLI/ODBC Access

Before DB2 CLI and ODBC applications can successfully access a DB2 database from a UNIX client, perform the following steps on the client system:

1. The DB2 database (and node if the database is remote) must be cataloged. To do so, use the command line processor.  
For more information see the **CATALOG DATABASE** and **CATALOG NODE** commands in the *Command Reference*.
2. The DB2 CLI/ODBC driver is an optional component during the DB2 client install. Be sure it is selected at that point.
3. If you are using ODBC applications to access DB2 data, perform the following steps. (If you are using only CLI applications, skip this step and go to the next step.)

- a. When using an ODBC application you must ensure that an ODBC Driver Manager is installed and that each user that will use ODBC has access to it. DB2 does not install an ODBC Driver Manager, you must use the ODBC Driver Manager that was supplied with your ODBC client application or ODBC SDK in order to access DB2 data using that application.

- b. The Driver Manager uses two initialization files.

**odbcinst.ini** ODBC Driver Manager's configuration file indicating which database drivers are installed. Each user that will use ODBC must have access to this file.

**.odbc.ini** End-user's data source configuration. Each user ID has a separate copy of this file in their home directory. Note that the file starts with a dot.

### Setting up odbcinst.ini

The settings in this file impact all of the ODBC drivers on the machine.



Use an ASCII editor to update this file. It must have a stanza (section) called [IBM DB2 ODBC DRIVER], with a line starting with "Driver" indicating the full path to the DB2 ODBC driver (db2.o). For example, if the home directory of your end user is /home/thisuser/ and the sqllib directory is installed there, then the correct entry would be:

```
[IBM DB2 ODBC DRIVER]
Driver=/home/thisuser/sqllib/lib/db2.o
```

### Setting up .odbc.ini

The settings in this file are associated with a particular user on the machine; different users can have different odbc.ini files.

The .odbc.ini file must exist in the end user's home directory (note the dot at the start of the file name). Update this file, using an ASCII editor, to reflect the appropriate data source configuration information. To register a DB2 database as an ODBC data source there must be one stanza (section) for each DB2 database.

The .odbc.ini file must contain the following lines:

- in the [ODBC Data Source] stanza:

```
SAMPLE=IBM DB2 ODBC DRIVER
```

Indicates that there is a data source called SAMPLE that used the IBM DB2 ODBC DRIVER.

- in the [SAMPLE] stanza:

```
[SAMPLE]
Driver=/home/thisuser/sqllib/lib/db2.o
Description=Sample DB2 ODBC Database
```

Indicates that the SAMPLE database is part of the DB2 instance located in the directory /home/thisuser.

- in the [ODBC] stanza:

```
InstallDir=/home/thisuser/sqllib/odbc/lib
```

Indicates that /home/thisuser/sqllib/odbc/lib should be treated as the location where ODBC is installed.

- Ensure that the InstallDir correctly points to the ODBC Driver Manager location.

For example, if the ODBC Driver Manager has been installed in /opt/odbc, the [ODBC] stanza would look like:

```
[ODBC]
Trace=0
TraceFile=odbctrace.out
InstallDir=/opt/odbc
```

See the sample file in the `sqllib/odbccli` subdirectory for an example.

Once the `.ini` files are set up you can run your ODBC application and access DB2 databases. Refer to the documentation that comes with your ODBC application for additional help and information.

#### 4. Configure the DB2 CLI/ODBC driver (Optional).

There are various keywords and values that can be used to modify the behavior of DB2 CLI/ODBC and the applications using it. The keywords are associated with the database *alias name*, and affect all DB2 CLI/ODBC applications that access the database.

For information on manually editing this file (`db2cli.ini`), see “Configuring `db2cli.ini`” on page 71. For information about the specific keywords see the *CLI Guide and Reference*.



If you require additional information at this point you can refer to the following topics in “Detailed Configuration Information”:

- “How to Bind the DB2 CLI/ODBC Driver to the Database”
  - “How to Set CLI/ODBC Configuration Keywords” on page 71
  - “Configuring `db2cli.ini`” on page 71
- 

## Detailed Configuration Information

The section “Platform Specific Details for CLI/ODBC Access” on page 68 should provide you with all of the information you require. The following additional information is useful where DB2 tool support is not available, and for administrators who require more detailed information.



The following topics are covered in this section:

- “How to Bind the DB2 CLI/ODBC Driver to the Database”
  - “How to Set CLI/ODBC Configuration Keywords” on page 71
  - “Configuring `db2cli.ini`” on page 71
- 

### How to Bind the DB2 CLI/ODBC Driver to the Database

The CLI/ODBC driver will autobind on the first connection to the database, provided the user has the appropriate privilege or authorization. The administrator may want to perform the first connect or explicitly bind the required files.

See “Binding Database Utilities” on page 65 for more information.

## How to Set CLI/ODBC Configuration Keywords

DB2 CLI can be configured further by manually editing the `db2cli.ini` file.

This file contains various keywords and values that can be used to modify the behavior of DB2 CLI and the applications using it. The keywords are associated with the database *alias name*, and affect all DB2 CLI and ODBC applications that access the database.

By default, the location of the CLI/ODBC configuration keyword file is located in the `INSTHOME/sqllib/cfg` directory (where *INSTHOME* is the home directory of the instance owner) that is running the CLI/ODBC applications on Linux platforms.

The environment variable *DB2CLIINIPATH* can also be used to override the default and specify a different location for the file.

The configuration keywords enable you to:

- Configure general features such as data source name, user name, and password.
- Set options that will affect performance.
- Indicate query parameters such as wild card characters.
- Set patches or work-arounds for various ODBC applications.
- Set other, more specific features associated with the connection, such as code pages and IBM Graphic data types.

For a complete description of all the keywords and their usage, refer to the *Installation and Configuration Supplement* online document.

**Configuring `db2cli.ini`:** The `db2cli.ini` initialization file is an ASCII file which stores values for the DB2 CLI configuration options. A sample file is shipped to help you get started. Refer to the *CLI Guide and Reference* for information on each keyword.

See “Platform Specific Details for CLI/ODBC Access” on page 68 for more information on how to modify this file on your platform.

---

## Running Java Programs

You can develop Java programs to access DB2 databases with the appropriate Java Development Kit (JDK) on Linux platforms. The JDK includes Java Database Connectivity (JDBC), a dynamic SQL API for Java.

For DB2 JDBC support, you must include the DB2 Java Enablement component when you install the DB2 Connect Personal Edition. With DB2 JDBC support, you can build and run JDBC applications and applets. These contain dynamic SQL only, and use a Java call interface to pass SQL statements to DB2.

The DB2 Software Developer's Kit (DB2 SDK) provides support for Java embedded SQL (SQLJ). With DB2 SQLJ support and DB2 JDBC support you can build and run SQLJ applications and applets. These contain static SQL and use embedded SQL statements that are bound to the DB2 database.

Java can also be used on the server to create JDBC and SQLJ stored procedures and user-defined functions (UDFs).

Building and running different types of Java programs requires support from different components of DB2:

- To build JDBC applications, you must install a DB2 client with the DB2 Java Enablement component. To run JDBC applications, your DB2 client with the DB2 Java Enablement component must connect to a DB2 server.
- To build SQLJ applications, you must install the DB2 SDK. To run SQLJ applications, your DB2 client with the DB2 Java Enablement component must connect to a DB2 server.
- To build JDBC applets, you must install a DB2 client with the DB2 Java Enablement component. To run JDBC applets, the client machine does not require any DB2 components.
- To build SQLJ applets, you must install the DB2 SDK. To run SQLJ applets, the client machine does not require any DB2 components.

For detailed information on building and running JDBC and SQLJ programs see *Application Building Guide*. For more information on DB2 programming in Java, refer to the *Application Development Guide*. This covers creating and running JDBC and SQLJ applications, applets, stored procedures and UDFs.

For the latest, updated DB2 Java information, visit the Web Page at:

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

## Configuring the Environment

To build and run DB2 Java programs, you need to install and configure the appropriate version of the Java Development Kit (JDK) on your development machine. For your DB2 Connect Personal Edition for Linux product, you require the Java Development Kit (JDK) 1.1.7, Version 1a or later for Linux from the Blackdown Organization.

For information on installing and configuring any of the above JDKs, please refer to:

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

For all supported platforms, you must also install and configure a DB2 client with the DB2 Java Enablement component. To bind SQLJ programs to a database, you must install and configure the Software Developer's Kit.

To run DB2 Java stored procedures or UDFs, you also need to update the DB2 database manager configuration to include the path where the JDK version 1.1 is installed on your development machine. You can do this by entering the following on the command line:

```
db2 update dbm cfg using JDK11_PATH /home/smith/jdk11
```

where /home/smith/jdk11 is the path where the JDK version 1.1 is installed.

You can check the DB2 database manager configuration to verify the correct value for the JDK11\_PATH field by entering the following command:

```
db2 get dbm cfg
```

You may want to pipe the output to a file for easier viewing. The JDK11\_PATH field appears near the beginning of the output. For more information on these commands, refer to the *Command Reference*.

To run Java programs, the following environment variables are automatically updated when you install DB2 Connect Personal Edition:

- CLASSPATH includes "." and the file sqllib/java/db2java.zip
- LD\_LIBRARY\_PATH includes the directory *INSTHOME*/sqllib/lib, where *INSTHOME* is the home directory of the instance owner.

In order to build and run SQLJ programs, CLASSPATH is also automatically updated to include the following files:

- sqllib/java/sqlj.zip
- sqllib/java/runtime.zip

## Java Applications

Start your application from the command line by running the Java interpreter on the executable program with this command:

```
java prog_name
```

where prog\_name is the name of the program.

The DB2 JDBC driver handles the JDBC API calls from your application and uses the DB2 client to communicate the requests to the server and receive the

results.



An SQLJ application must be bound to the database before it is run.

## Java Applets

Because Java applets are delivered over the web, a web server must be installed on your DB2 machine (server or client).

To run your applet, make sure your .html file is properly configured. Start the JDBC applet server on the TCP/IP port specified in the .html file. For example, if you specified:

```
param name=port value='6789'
```

then enter the following command in the command line processor:

```
db2jstrt 6789
```

You must ensure that your working directory is accessible to your web browser. If it is not, copy your applet's .class and .html files into a directory that is accessible. For SQLJ applets, you must also copy the profile .class and .ser files as well.

Copy the sql1lib/java/db2java.zip file into the same directory as these other files. For SQLJ applets, also copy the sql1lib/java/runtime.zip file into this directory. Then on your client machine start your web browser (which supports JDK 1.1) and load the .html file.

When your applet calls the JDBC API to connect to DB2, the JDBC driver establishes separate communications with the DB2 database through the JDBC applet server residing on the DB2 server.



An SQLJ applet must be bound to the database before it is run.

---

## Chapter 9. Configuring Client to LAN-Based Server Communications Using the Command Line Processor



To configure a client to communicate with a server, the remote server must be configured to accept in-bound requests for the communication protocol that you want to use. By default, the installation program automatically detects and configures any protocols running on your server.

If you have added a new protocol to your network, or wish to change any of the default settings on the server, refer to the *Installation and Configuration Supplement*.

This section describes how to configure a DB2 client to communicate with a non-host or AS/400-based DB2 server using the command line processor.

For instructions on entering DB2 commands, see “Entering Commands Using the Command Center” on page 88 or “Entering Commands Using the Command Line Processor” on page 89.

---

### Configuring TCP/IP on the Client

This section assumes that TCP/IP is functional on the client and server workstations. See “Software Requirements” on page 24 for the communication protocol requirements for your platform. See “Possible Client-to-Server Connectivity Scenarios” on page 25 for the supported communication protocols for your particular client and server.

To set up TCP/IP communications on a DB2 client, perform the following steps:

- Step 1. Identify and record parameter values.
- Step 2. Configure the client:
  - a. Resolve the server’s host address.
  - b. Update the services file.
  - c. Catalog a TCP/IP node.
  - d. Catalog the database.
- Step 3. Test the connection between the client and server.



Due to the characteristics of the TCP/IP protocol, TCP/IP may not be immediately notified of the failure of a partner on another host. As a result, a client application accessing a remote DB2 server using TCP/IP, or the corresponding agent at the server, may sometimes appear to be hung. DB2 uses the TCP/IP SO\_KEEPALIVE socket option to detect when there has been a failure and the TCP/IP connection has been broken.

If you are experiencing problems with your TCP/IP connection, refer to the *Troubleshooting Guide* for information on how to adjust this parameter and other common TCP/IP problems.

## Step 1. Identify and Record Parameter Values

As you proceed through the configuration steps, complete the *Your Value* column in the following table. You can fill in some of the values before you start configuring this protocol.

Table 8. TCP/IP Values Required at the Client

| Parameter                                                                                  | Description                                                                                                                                                                                                                                                                                                                     | Sample Value                            | Your Value |
|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------------|
| Host Name<br>• Hostname<br>( <i>hostname</i> ) or<br>• IP address<br>( <i>ip_address</i> ) | Use the <i>hostname</i> or <i>ip_address</i> of the remote server workstation.<br><br>To resolve this parameter:<br>• Enter the <b>hostname</b> command at the server to obtain the <i>hostname</i> .<br>• Contact your network administrator to obtain the <i>ip_address</i> or enter the <b>ping</b> <i>hostname</i> command. | serverhost<br><br>or<br><br>9.21.15.235 |            |



Table 8. TCP/IP Values Required at the Client (continued)

| Parameter                                                                                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Sample Value                   | Your Value |
|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------|
| Service Name<br>• Connection Service name ( <i>svcename</i> ) or<br>• Port number/Protocol ( <i>port_number/tcp</i> ) | <p>Values required in the services file.</p> <p>The Connection Service name is an arbitrary name that represents the Connection port number (<i>port_number</i>) on the client.</p> <p>The port number for the client must be the same as the port number that the <i>svcename</i> parameter maps to in the services file at the server. (The <i>svcename</i> parameter is located in the database manager configuration file on the server.) This value must not be in use by any other applications, and must be unique within the services file.</p> <p>This value generally must be 1024 or higher.</p> <p>Contact your database administrator for the values used to configure the server.</p> | <p>server1</p> <p>3700/tcp</p> |            |
| Node name ( <i>node_name</i> )                                                                                        | <p>A local alias, or nickname, that describes the node to which you are trying to connect. You can choose any name you want; however, all node name values within your local node directory must be unique.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | db2node                        |            |

## Step 2. Configure the Client

The following steps configure this protocol on the client. Replace the sample values with your worksheet values.

## A. Resolve the Server's Host Address



If your network has a name server, or you are planning to directly specify the IP address (*ip\_address*) of the server, skip this step and proceed to “Step B. Update the Services File”.

The client must know the address of the server with which it is attempting to establish communications. If a name server does not exist on your network, you may directly specify a hostname that maps to the IP address (*ip\_address*) of the server in the local hosts file. The hosts file for your platform is located in the `/etc` directory.



If you plan to support a Linux client that uses Network Information Services (NIS), and your network does not use a name server, you must update the hosts file located on your NIS master server.

Edit the client's hosts file and add an entry for the server's hostname. For example:

```
9.21.15.235 serverhost # host address for serverhost
```

where:

*9.21.15.235* represents the *ip\_address*

*serverhost* represents the *hostname*

*#* represents a comment describing the entry



If the server is not in the same domain as the client, you must provide a fully qualified domain name such as *serverhost.vnet.ibm.com*, where *vnet.ibm.com* is the domain name.

## Step B. Update the Services File



If you plan to catalog a TCP/IP node using a port number (*port\_number*), skip this step and go to “Step C. Catalog a TCP/IP Node” on page 79.

Using a local text editor, add the Connection Service name and port number to the client's services file for TCP/IP support. The services file for your platform is located in the `/etc` directory. For example:

```
server1 3700/tcp # DB2 connection service port
```

where:

*server1* represents the Connection Service name

*3700* represents the Connection port number

*tcp* represents the communication protocol that you are using

# represents a comment describing the entry

The port number used on the client must match the port number used on the server.



If you are planning on supporting a Linux client that uses Network Information Services (NIS), you must update the `services` file located on your NIS master server.

The file called `services` is located in the `/etc` directory.

### Step C. Catalog a TCP/IP Node

You must add an entry to the client's node directory to describe the remote node. This entry specifies the chosen alias (*node\_name*), the *hostname* (or *ip\_address*), and the *svcname* (or *port\_number*) that the client will use to access the remote server.

To catalog a TCP/IP node, perform the following steps:

**Step 1.** Log on to the system with a valid DB2 user ID. For more information, see “Appendix C. Naming Rules” on page 99.



If you are adding a database to a system that has a DB2 Connect server product installed, log on to this system as a user with System Administrative (SYSADM) or System Controller (SYSCtrl) authority on the instance. For more information, see “Working with the System Administrative Group” on page 91.

This restriction is controlled by the `catalog_noauth` database manager configuration parameter. For more information, refer to the *Administration Guide*.

**Step 2.** Set up the instance environment and invoke the DB2 command line processor by entering one of the following commands:

```
. INSTHOME/sql/lib/db2profile (for Bash, Bourne or Korn shell)
source INSTHOME/sql/lib/db2cshrc (for C shell)
```

where *INSTHOME* represents the home directory of the instance.

**Step 3.** Catalog the node by entering the following commands:

```
db2 catalog tcpip node node_name remote [hostname|ip_address]
server [svcname|port_number]
db2 terminate
```

For example, to catalog the remote server *serverhost* on the node called *db2node*, using the service name *server1*, enter the following commands:

```
db2 catalog tcpip node db2node remote serverhost server server1
db2 terminate
```

To catalog a remote server with the IP address 9.21.15.235 on the node called *db2node*, using the port number 3700, enter the following:

```
db2 catalog tcpip node db2node remote 9.21.15.235 server 3700
db2 terminate
```



If you need to change values that were set with the **catalog node** command, perform the following steps:

Step 1. Run the **uncatalog node** command in the command line processor as follows:

```
db2 uncatalog node node_name
```

Step 2. Recatalog the node with the values that you want to use.

Step D. Catalog the Database

Before a client application can access a remote database, the database must be cataloged on the server node and on any client nodes that will connect to it. When you create a database, it is automatically cataloged on the server with the database alias (*database\_alias*) the same as the database name (*database\_name*). The information in the database directory, along with the information in the node directory, is used on the client to establish a connection to the remote database.

To catalog a database on the client, perform the following steps:

Step 1. Log on to the system with a valid DB2 user ID. For more information, see “Appendix C. Naming Rules” on page 99.



If you are adding a database to a system that has a DB2 Connect server product installed, log on to this system as a user with System Administrative (SYSADM) or System Controller (SYSCTRL) authority on the instance. For more information, see “Working with the System Administrative Group” on page 91.

This restriction is controlled by the *catalog\_noauth* database manager configuration parameter. For more information, refer to the *Administration Guide*.

Step 2. Fill in the *Your Value* column in the following worksheet.

Table 9. Worksheet: Parameter Values for Cataloging Databases

| Parameter                                 | Description                                                                                                                                                                                                                                                   | Sample Value | Your Value |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|
| Database name<br>( <i>database_name</i> ) | The database alias ( <i>database_alias</i> ) of the <i>remote</i> database. When you create a database, it is automatically cataloged on the server with the database alias ( <i>database_alias</i> ) the same as the database name ( <i>database_name</i> ). | sample       |            |

Table 9. Worksheet: Parameter Values for Cataloging Databases (continued)

| Parameter                                   | Description                                                                                                                                                                                                                                      | Sample Value | Your Value |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|
| Database alias<br>( <i>database_alias</i> ) | An arbitrary local nickname for the remote database, on the client. If you do not provide one, the default is the same as the database name ( <i>database_name</i> ). This is the name that you use when connecting to a database from a client. | tor1         |            |
| Node name<br>( <i>node_name</i> )           | The name of the node directory entry that describes where the database resides. Use the same value for node name ( <i>node_name</i> ) that you used to catalog the node in the previous step.                                                    | db2node      |            |

Step 3. Set up the instance environment and invoke the DB2 command line processor by entering one of the following commands:

```
. INSTHOME/sql1lib/db2profile (for Bash, Bourne or Korn shell)
source INSTHOME/sql1lib/db2cshrc (for C shell)
```

where *INSTHOME* represents the home directory of the instance.

Step 4. Catalog the database by entering the following commands:

```
db2 catalog database database_name as database_alias at node node_name
db2 terminate
```

For example, to catalog a remote database called *SAMPLE* so that it has the alias *tor1*, on the node *db2node*, enter the following commands:

```
db2 catalog database sample as tor1 at node db2node
db2 terminate
```



If you need to change values that were set with the **catalog database** command, perform the following steps:

Step a. Enter the **uncatalog database** command as follows:

```
db2 uncatalog database database_alias
```

Step b. Recatalog the database with the value that you want to use.

### Step 3. Test the Client-to-Server Connection

When you have finished configuring the client for communications, perform the following steps to test the connection:



You will need to connect to a remote database to test the connection.

Step 1. Start the database manager by entering the **db2start** command on the server (if it was not automatically started at boot time).

Step 2. Enter the following command to connect the client to the remote database:

```
db2 connect to database_alias user userid using password
```

The values for *userid* and *password* must be valid for the system on which they are authenticated. By default, authentication takes place on the server for a DB2 server and on the host or AS/400 machine for a DB2 Connect server.

Authentication for connecting to host databases is set while configuring the DB2 Connect server. For more information, refer to the *DB2 Connect User's Guide*.

If the connection is successful, you will get a message showing the name of the database to which you have connected. You are now able to retrieve data from that database. For example, to retrieve a list of all the table names listed in the system catalog table, enter the following SQL command in the Command Center or command line processor:

```
"select tabname from syscat.tables"
```

When you are finished using the database connection, enter the **db2 connect reset** command to end the database connection.



You are now ready to start using DB2. For more advanced topics, refer to the *Administration Guide* and the *Installation and Configuration Supplement*.

## Troubleshooting the Client-to-Server Connection

If the connection fails, check the following items:

At the server:

- \_\_\_ 1. The *db2comm* registry value includes the value *tcpip*.



Check the settings for the *db2comm* registry value by entering the **db2set DB2COMM** command. For more information, refer to the *Administration Guide*.

- \_\_\_ 2. The services file was updated correctly.
- \_\_\_ 3. The service name (*svcename*) parameter was updated correctly in the database manager configuration file.
- \_\_\_ 4. The database was created and cataloged properly.
- \_\_\_ 5. The database manager was stopped and started again (enter the **db2stop** and **db2start** commands on the server).



If there are problems starting a protocol's connection managers, a warning message appears and the error messages are logged in the `db2diag.log` file. This file is located in the `INSTHOME/sql/lib/db2dump` directory, where `INSTHOME` represents home directory of the instance owner.

For more information on the `db2diag.log` file, refer to the *Troubleshooting Guide*.

At the *client*:

- \_\_\_ 1. If used, the services and hosts files were updated correctly.
- \_\_\_ 2. The node was cataloged with the correct hostname (*hostname*) or IP address (*ip\_address*).
- \_\_\_ 3. The port number matches, or the service name maps to, the port number used on the server.
- \_\_\_ 4. The node name (*node\_name*) that was specified in the database directory points to the correct entry in the node directory.
- \_\_\_ 5. The database was cataloged properly, using the *server's* database alias (*database\_alias*) that was cataloged when the database was created on the server, as the database name (*database\_name*) on the client.

If the connection still fails after you verify these items, refer to the *Troubleshooting Guide*.





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## Part 6. Appendixes



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## Appendix A. Basic Task Knowledge

This section describes the basic tasks that you will need to know to use this product effectively.



Go to the section that describes the task that you want to perform:

- “Starting the Software Registration Tool”.
- “Starting the Control Center”.
- “Entering Commands Using the Command Center” on page 88.
- “Entering Commands Using the Command Line Processor” on page 89.
- “Working with the System Administrative Group” on page 91.

---

### Starting the Software Registration Tool

DB2 software registration is handled automatically if you installed your DB2 product from CD-ROM using the DB2 Installer program. If you installed DB2 using your Linux operating system’s native installation tools, you must enter the **db2licm** command to register DB2. Refer to the *Command Reference* for further information.

---

### Starting the Control Center

You must have the prerequisite Java Runtime Environment (JRE) level to launch the Control Center using this command. For more information, refer to the Control Center README, which can be found in the *INSTHOME*/sql/lib/cc/prime directory, where *INSTHOME* represents the home directory of the instance owner.

To start the Control Center, enter the **db2cc** command at a command prompt.



You can also run the Control Center as an applet through an application viewer. For more information, refer to the Control Center README, which can be found in the *INSTHOME*/sql/lib/cc/prime directory (where *INSTHOME* represents the home directory of the instance owner) where you installed your DB2 product.

---

## Entering Commands Using the Command Center

This section describes how to enter commands using the Command Center. The Command Center provides an interactive window to:

- Run SQL statements, DB2 commands, and operating system commands.
- See the execution result of SQL statements and DB2 commands in a results window. You can scroll through the results and save the output to a file.
- Save a sequence of SQL statements and DB2 commands to a script file. You can then schedule the script to run as a job. When a saved script is modified, all jobs dependent on the saved script inherit the new modified behavior.
- Recall and run a script file.
- See the execution plan and statistics associated with a SQL statement before execution. You do this by invoking Visual Explain in the interactive window.
- Get quick access to database administrative tools from the main tool bar.
- Display all the command scripts known to the system through the Script Center, with summary information listed for each.

Start the Command Center in one of the follows ways:

- Click on the **Command Center** icon in the Control Center.
- Enter the **db2cctr** command.



You must have the prerequisite Java Runtime Environment (JRE) level to launch the Command Center using this command.

The Command Center contains a large input area in which you enter your commands. To run the commands you have entered, click on the **Execution** icon (the gears icon), or press **CTRL+Enter**.



In the Command Center, you do not have to enter a command with the db2 prefix; instead, you just enter the DB2 command. For example:

```
list database directory
```

To enter operating system commands, precede the operating-system command with an exclamation mark (!). For example:

```
!ls
```

If you want to enter multiple commands, you must end each command with the termination character, then press then **Enter** key to start the next

command on a new line. The default termination character is a semicolon (;). To specify a different termination character, click on the **Tools Settings** icon in the menu toolbar.

For example, you could connect to a database called SAMPLE and list all the system tables by entering the following command:

```
connect to sample;
list tables for system
```

After you have clicked on the **Execution** icon (or pressed **CTRL+Enter**), the Command Center switches to the Results window which informs you how the commands are proceeding.

To recall commands that you have entered, select the **Script** Tab, click on the drop down box, and select a command.

To save commands as scripts, select **Script->Save as** from the menu bar. For more information, click on the **Help** push button or press the **F1** key.



If you want to store commonly used SQL statements or DB2 commands as scripts, click on the **Script Center** icon from the main tool bar. For more information, click on the **Help** push button or press the **F1** key.

---

## Entering Commands Using the Command Line Processor

You can use the command line processor to enter DB2 commands, SQL statements, and operating system commands. It operates in the following modes:

### Command Line Mode

Operates at any shell prompt. You can enter DB2 commands and SQL statements by prefixing the command or statement with the db2 prefix. Operating systems commands are entered directly as this is an ordinary shell prompt.

### Interactive Input Mode

The db2 prefix that you use for DB2 commands (in Command Line Mode) is pre-entered for you. You can enter operating systems commands, DB2 commands, or SQL statements and view their output.

### File Input Mode

Processes commands that are stored in a file. For information on the file input mode, refer to the *Command Reference*.

## Command Line Mode

You can use any command window to enter a DB2 command. If you are entering commands via the Command Line Mode, you must include the `db2` prefix. For example:

```
db2 list database directory
```



If the DB2 command contains characters that have special meaning on the operating system you are using, you will need to enter the command in quotation marks to ensure that it is run properly.

For example, the following command would retrieve all the information from the *employee* table, even if the `*` character has a special meaning on the operating system:

```
db2 "select * from employee"
```

If you need to enter a long command that does not fit on one line, use the line continuation character, `\`. When you have reached the end of the line, press the **Enter** key to continue entering the command on the next line. For example:

```
db2 select empno, function, firstname, lastname, birthdate, from \
> employee where function='service' and \
> firstname='Lily' order by empno desc
```

## Interactive Input Mode

To invoke the command line processor in interactive input mode, enter the **db2** command from the command line processor

In interactive input mode, the prompt looks like this:

```
db2 =>
```

In interactive input mode, you do not have to enter DB2 commands with a `db2` prefix; instead, you just enter the DB2 command. For example:

```
db2 => list database directory
```

To enter operating system commands in interactive mode, precede the operating-system command with an exclamation mark (`!`). For example:

```
db2 => !ls
```

If you need to enter a long command that does not fit on one line, use the line continuation character, `\`. When you have reached the end of the line, press the **Enter** key to continue entering the command on the next line. For example:

```
db2 => select empno, function, firstname, lastname, birthdate, from \
db2 (cont.) => employee where function='service' and \
db2 (cont.) => firstname='Lily' order by empno desc
```

To end interactive input mode, enter the **quit** or **terminate** command.

For more information on advanced topics using the CLP, refer to the *Command Reference*.

---

## Working with the System Administrative Group

By default, System Administrative (SYSADM) authority is granted to any valid DB2 username that belongs to the primary group of the instance owner's username.

For information on how to change the default SYSADM settings and how to assign this authority to a different user or set of users, refer to the *Administration Guide*.





---

## Appendix B. National Language Support (NLS)

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### Language and Codeset Support for UNIX Operating Systems

---

DB2 supports many code sets and locales without translating the messages for the corresponding languages. Supporting a locale means that you can create and use a database in that locale, but you may have to view all panels and messages in a different language, if translated messages are not available in DB2. For a complete list of locales supported, refer to the *Administration Guide*.

If you want to operate in a different language environment, perform the following steps:

- Step 1. Ensure that the appropriate message option for the desired language has been installed.
- Step 2. Set the *LANG* environment variable to the desired locale.  
For example, to use fr\_FR messages on DB2 for Linux, you must have the fr\_FR message option installed and must set *LANG* to fr\_FR.

The selected message catalog filesets are placed in the following directory on the target workstation:

```
/usr/IBMDB2/V6.1/msg/%L
```

where %L is equal to the locale name of the message catalog.

---

### Conversion of Character Data

---

When character data is transferred between machines, it must be converted to a form that the receiving machine can use.

For example, when data is transferred between the DB2 Connect workstation and a host or AS/400 database server, it is usually converted from a workstation code page to a host CCSID, and vice versa. If the two machines use different code pages or CCSIDs, code points are mapped from one code page or CCSID to the other. This conversion is always performed at the receiver.

Character data sent *to* a database consists of SQL statements and input data. Character data sent *from* a database consists of output data. Output data that is interpreted as bit data (for example, data from a column declared with the

FOR BIT DATA clause) is not converted. Otherwise all input and output character data is converted if the two machines have different code pages or CCSIDs.

For example, if DB2 Connect is used to access OS/390 data, the following happens:

1. DB2 Connect sends an SQL statement and input data to OS/390.
2. DB2 Universal Database for OS/390 converts the data to an EBCDIC CCSID and processes it.
3. DB2 Universal Database for OS/390 sends the result back to the DB2 Connect workstation.
4. DB2 Connect converts the result to an ASCII or ISO code page and returns it to the user.

The table that follows shows the conversions that are supported between code pages (on the workstation) and CCSIDs (on the host).

For more detailed information about supported code page conversions, refer to the *Administration Guide*.

Table 10. Workstation Code Page to Host CCSID Conversion

| Host CCSIDs                                                 | Code Page                                            | Countries                                                                                                                                                                                                                      |
|-------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 037, 273, 277, 278, 280, 284, 285, 297, 500, 871, 1140-1149 | 437, 819, 850, 858, 860, 863, 1004, 1051, 1252, 1275 | Albania, Australia, Austria, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Latin America, Netherlands, New Zealand, Norway, Portugal, South Africa, Spain, Sweden, Switzerland, UK, USA |
| 423, 875                                                    | 737, 813, 869, 1253, 1280                            | Greece                                                                                                                                                                                                                         |
| 870                                                         | 852, 912, 1250, 1282                                 | Croatia, Czech Republic, Hungary, Poland, Romania, Serbia/Montenegro (Latin), Slovakia, Slovenia                                                                                                                               |
| 1025                                                        | 855, 866, 915, 1251, 1283                            | Bulgaria, FYR Macedonia, Russia, Serbia/Montenegro (Cyrillic)                                                                                                                                                                  |
| 1026                                                        | 857, 920, 1254, 1281                                 | Turkey                                                                                                                                                                                                                         |
| 424                                                         | 862, 916, 1255                                       | Israel - see note 3 below                                                                                                                                                                                                      |
| 420                                                         | 864, 1046, 1089, 1256                                | Arabic countries - see note 3 below                                                                                                                                                                                            |

Table 10. Workstation Code Page to Host CCSID Conversion (continued)

| Host CCSIDs          | Code Page                | Countries                  |
|----------------------|--------------------------|----------------------------|
| 838                  | 874                      | Thailand                   |
| 930, 939, 5026, 5035 | 932, 942, 943, 954, 5039 | Japan                      |
| 937                  | 938, 948, 950, 964       | Taiwan                     |
| 933, 1364            | 949, 970, 1363           | Korea                      |
| 935, 1388            | 1381, 1383, 1386         | People's Republic of China |
| 1112, 1122           | 921, 922                 | Estonia, Latvia, Lithuania |
| 1025                 | 915, 1131, 1251, 1283    | Belarus                    |
| 1123                 | 1124, 1125, 1251         | Ukraine                    |

**Notes:**

- Code page 1004 is supported as code page 1252.
- In general, data can be converted from a code page to a CCSID and back again to the same code page with no change. The following are the only exceptions to that rule:
  - In double-byte character set (DBCS) code pages, some data containing user-defined characters may be lost.
  - For single-byte code pages defined within mixed-byte code pages, and for some newer single-byte code pages, characters that do not exist in both the source and the target may be mapped to substitution characters and then lost when the data is converted back to the original code page.
- For bidirectional languages, a number of special "BiDi CCSIDS" have been defined by IBM and are supported by DB2 Connect Version 6.  
If the bidirectional attributes of the database server are different from those of the client you can use these special CCSIDS to manage the difference.  
Refer to the *Administration Guide* for details of these special CCSIDS. Refer to the Release Notes for DB2 Connect Version 6 for detailed information about how to set them up for DRDA host connections.

---

## Bidirectional CCSID Support

The following BiDi attributes are required for correct handling of Bidirectional data on different platforms:

- Text type (LOGICAL vs VISUAL)
- Shaping (SHAPED vs UNSHAPED)
- Orientation (RIGHT-TO-LEFT vs LEFT-TO-RIGHT)
- Numeral shape (ARABIC vs HINDI)
- Symmetric swapping (YES or NO)

Since defaults on different platforms are not the same, problems appear when DB2 data is sent from one platform to another. For example, Windows platforms use LOGICAL UNSHAPED data, while data on OS/390 is usually in SHAPED VISUAL format. Therefore, without any support for these attributes data sent from DB2 Universal Database for OS/390 to DB2 UDB on a Windows 32-bit operating systems workstation displays incorrectly.

## Bidirectional-specific CCSIDs

The following bidirectional Coded Character Set Identifiers (CCSID) have been defined and are implemented with DB2 UDB:

| CCSID             | Code | String |
|-------------------|------|--------|
| -                 | Page | Type   |
| -----+-----+----- |      |        |
| 00420             | 420  | 4      |
| 00424             | 424  | 4      |
| 08612             | 420  | 5      |
| 08616             | 424  | 6      |
| 12708             | 420  | 7      |
| X'3F00'           | 856  | 4      |
| X'3F01'           | 862  | 4      |
| X'3F02'           | 916  | 4      |
| X'3F03'           | 424  | 5      |
| X'3F04'           | 856  | 5      |
| X'3F05'           | 862  | 5      |
| X'3F06'           | 916  | 5      |
| X'3F07'           | 1255 | 5      |
| X'3F08'           | 1046 | 5      |
| X'3F09'           | 864  | 5      |
| X'3F0A'           | 1089 | 5      |
| X'3F0B'           | 1256 | 5      |
| X'3F0C'           | 856  | 6      |
| X'3F0D'           | 862  | 6      |
| X'3F0E'           | 916  | 6      |
| X'3F0F'           | 1255 | 6      |
| X'3F10'           | 420  | 6      |
| X'3F11'           | 864  | 6      |
| X'3F12'           | 1046 | 6      |
| X'3F13'           | 1089 | 6      |
| X'3F14'           | 1256 | 6      |
| X'3F15'           | 424  | 8      |
| X'3F16'           | 856  | 8      |
| X'3F17'           | 862  | 8      |
| X'3F18'           | 916  | 8      |
| X'3F19'           | 420  | 8      |
| X'3F1A'           | 420  | 9      |
| X'3F1B'           | 424  | 10     |
| X'3F1C'           | 856  | 10     |
| X'3F1D'           | 862  | 10     |
| X'3F1E'           | 916  | 10     |
| X'3F1F'           | 1255 | 10     |
| X'3F20'           | 424  | 11     |

|         |      |    |
|---------|------|----|
| X'3F21' | 856  | 11 |
| X'3F22' | 862  | 11 |
| X'3F23' | 916  | 11 |
| X'3F24' | 1255 | 11 |

Where CDRA String Types are defined:

| String<br>Type | Text<br>Type | Numerical<br>Shape | Orientation   | Shaping      | Symmetrical<br>Swapping |
|----------------|--------------|--------------------|---------------|--------------|-------------------------|
| -----+         | -----+       | -----+             | -----+        | -----+       | -----+                  |
| 4              | Visual       | Arabic             | LTR           | Shaped       | OFF                     |
| 5              | Implicit     | Arabic             | LTR           | Unshaped     | ON                      |
| 6              | Implicit     | Arabic             | RTL           | Unshaped     | ON                      |
| 7(*)           | Visual       | Arabic             | Contextual(*) | Unshaped-Lig | OFF                     |
| 8              | Visual       | Arabic             | RTL           | Shaped       | OFF                     |
| 9              | Visual       | Passthru           | RTL           | Shaped       | ON                      |
| 10             | Implicit     |                    | Contextual-L  |              | ON                      |
| 11             | Implicit     |                    | Contextual-R  |              | ON                      |

**Note:** Field orientation is left-to-right (LTR) when the first alphabetic character is a Latin one, and right-to-left (RTL) when it is a bidirectional (RTL) character. Characters are unshaped, but LamAlef ligatures are kept, and not broken into constituents.



---

## Appendix C. Naming Rules



Go to the section that describes the naming rules that you require information on:

- “General Naming Rules”
  - “Database, Database Alias, and Catalog Node Name Rules”
  - “Object Name Rules” on page 100
  - “Username, User ID, Group Name, and Instance Name Rules” on page 101
  - “Password Rules” on page 102
  - “DB2SYSTEM Naming Rules” on page 101
- 

---

### General Naming Rules

Unless otherwise specified, all names can include the following characters:

- A through Z



When used in most names, characters A through Z are converted from lowercase to uppercase.

- 0 through 9
- @, #, \$, and \_ (underscore)

Unless otherwise specified, all names must begin with one of the following characters:

- A through Z
- @, #, and \$

Do not use SQL reserved words to name tables, views, columns, indexes, or authorization IDs.

For a list of SQL reserved words, refer to the *SQL Reference*.

---

### Database, Database Alias, and Catalog Node Name Rules

*Database names* are the identifying names assigned to databases in the database manager.

*Database alias names* are synonyms given to remote databases. Database aliases must be unique within the System Database Directory in which all aliases are stored.

When naming a database or database alias, see “General Naming Rules” on page 99.

In addition, the name you specify can *only* contain 1 to 8 characters.



To avoid potential problems, do not use the special characters @, #, and \$ in a database name if you intend to have a client remotely connect to a host database. Also, because these characters are not common to all keyboards, do not use them if you plan to use the database in another country.

---

## Object Name Rules

Database objects include:

- Tables
- Views
- Columns
- Indexes
- User-defined functions (UDFs)
- User-defined types (UDTs)
- Triggers
- Aliases
- Table spaces
- Schemas

When naming database objects, see “General Naming Rules” on page 99.

In addition, the name you specify:

- Can contain 1 to 18 characters *except* for the following:
  - Table names (including view names, summary table names, alias names, and correlation names), which can contain up to 128 characters; and
  - column names, which can contain up to 30 characters
- Cannot be any of the SQL reserved words that are listed in the *SQL Reference*.





Using delimited identifiers, it is possible to create an object that violates these naming rules; however, subsequent use of the object could result in errors.

For example, if you create a column with a + or – sign included in the name and you subsequently use that column in an index, you will experience problems when you attempt to reorganize the table. To avoid potential problems with the use and operation of your database, *do not* violate these rules.

---

## Username, User ID, Group Name, and Instance Name Rules

*Username*s or *User IDs* are the identifiers assigned to individual users. When naming users, groups, or instances, see “General Naming Rules” on page 99.

In addition, the name you specify:

- Can contain 1 to 8 characters
- Cannot be any of the following:
  - USERS
  - ADMINS
  - GUESTS
  - PUBLIC
  - LOCAL
- Cannot begin with:
  - IBM
  - SQL
  - SYS
- Cannot include accented characters
- In general, when naming users, groups, or instances, Linux users should use lowercase names.

---

## DB2SYSTEM Naming Rules

DB2 uses the *DB2SYSTEM* name to identify a physical DB2 machine, system, or workstation within a network. On Linux, the *DB2SYSTEM* name defaults to the TCP/IP hostname.

When selecting a *DB2SYSTEM* name, see “General Naming Rules” on page 99.

In addition, the name you specify:

- Must be unique within a network

- Can contain a maximum of 21 characters

---

## Password Rules

When determining passwords, Linux users should restrict the length of the password to a maximum of 8 characters.

---

## **Appendix D. Using the Control Center to Administer DB2 for OS/390 and DB2 Connect Enterprise Edition Servers**

DB2 Control Center is an easy to use application provided as part of the DB2 Administration tools. The Control Center gives database administrators a powerful tool for managing DB2 Family databases. In Version 6, the Control Center has been greatly enhanced to deliver new management functions to database administrators who need to manage DB2 for OS/390 V5.1 and V6.1 database servers. Version 6 of the Control Center has also been enhanced to manage operational and performance characteristics of DB2 Connect Enterprise Edition connectivity servers. The combination of DB2 for OS/390 server management and new DB2 Connect monitoring support provide complete end-to-end administration and monitoring for desktop and web applications that work with DB2 for OS/390 servers.

The DB2 Control Center uses the familiar "explorer" interface to allow database administrators to easily navigate between different database servers and the database objects they manage. Context sensitive right-mouse activated menus provide administrators with the ability to change attributes of database objects and to launch commands and utilities. Database objects are presented in a consistent fashion for all DB2 family servers. This greatly reduces the amount of learning that is required for administrators who need to manage both DB2 for OS/390 and DB2 Universal Databases on Windows NT, UNIX and OS/2 servers. While the Control Center preserves consistency across servers, it does not hide capabilities that are unique to each DB2 server. This gives database administrators the power to perform all aspects of their tasks.

The ability to manage DB2 Connect connectivity servers is delivered through management of user connections and by keeping vital statistics on various performance aspects of the connectivity server. For example, database administrators can easily view all of the users connected through a particular DB2 Connect server, and their connection characteristics. Administrators can also collect load and performance information such as the number of SQL statements and transactions executed, number of bytes sent and received, statement and transaction execution times and much more. Collected data can be displayed using easy to understand live graphs.

---

## Preparing DB2 for OS/390 Servers for the Control Center

The DB2 Control Center uses stored procedures to deliver many of its management functions. Therefore, for the Control Center to function properly each DB2 for OS/390 server that will be managed from the Control Center needs to have stored procedures enabled and the proper stored procedures installed on that server.

Consult the *DB2 for OS/390 Program Directory* for additional information on applying service and required Function Modification Identifiers.

---

## Using the Control Center

Before you can work with a server and its databases you will need to catalog information about the server on the Control Center workstation. The DB2 Control Center only works with servers and databases that are catalogued on the workstation where the Control Center is running. To catalog information about a remote server on Linux systems, use the command line processor. For more information, see “Chapter 9. Configuring Client to LAN-Based Server Communications Using the Command Line Processor” on page 75.

Once the Control Center is running, start by clicking on the plus sign next to the server you want to administer. Select the database or connectivity server objects that you want to administer and click the right mouse button on the object to work with object properties or to execute actions on the object. Remember to press F1 to display help as you work.

---

## Appendix E. List Files, Bind Files, and Packages

This appendix lists the bind files contained in different .lst files shipped with the product. Bind packages are generated specifically for each platform. Each package name can be mapped back to the client platform.

In the following tables, under the **Package Name** columns, each DB2 bind package is represented in a coded format. For example, for the file name SQLabxYz:

- SQL identifies the bind package as a DB2 utility,
- *ab* identifies the utility,
- *x* represents the last digit of the year the product became available,
- *Y* represents the platform of the client,
- *z* represents the modification level.

You can use the **ddcspkgn** command to determine the package name for individual bind files or list (.lst) files. This command is found in the *INSTHOME*/sqllib/bin directory, where *INSTHOME* is the home directory of the instance owner.

For example, on an Linux system, enter the following command with the bind file in the local directory:

```
INSTHOME/sqllib/bin/ddcspkgn db2ajgrt.bnd
```

The *Y* value for Linux platforms maps to xLz,

---

### List Files Associated with DRDA Servers

The following table lists which bind files are included in the .lst file associated with a particular DRDA host. The package associated with each bind file is also listed:

| DRDA Server | List File   |
|-------------|-------------|
| OS/390      | ddcsmvs.lst |
| VM          | ddcsvm.lst  |
| OS/400      | ddcs400.lst |

Table 11. DRDA Bind Files and Packages

| Component                                      | Bind File Name | Package Name | AS/400 | VM  | OS/400 |
|------------------------------------------------|----------------|--------------|--------|-----|--------|
| <b>DB2 Call Level Interface</b>                |                |              |        |     |        |
| Isolation level CS                             | db2clics.bnd   | sql11xyz     | yes    | yes | yes    |
| Isolation level RR                             | db2clirr.bnd   | sql12xyz     | yes    | yes | yes    |
| Isolation level UR                             | db2cliur.bnd   | sql13xyz     | yes    | no  | yes    |
| Isolation level RS                             | db2clirs.bnd   | sql14xyz     | yes    | no  | yes    |
| Isolation level NC                             | db2clinc.bnd   | sql15xyz     | yes    | no  | yes    |
| Using MVS table names                          | db2clims.bnd   | sql17xyz     | no     | no  | no     |
| Using OS/400 table names (OS/400 3.1 or later) | db2clias.bnd   | sql1axyz     | yes    | no  | yes    |
| Using VSE/VM table names                       | db2clivm.bnd   | sql18xyz     | no     | yes | no     |
| <b>Command Line Processor</b>                  |                |              |        |     |        |
| Isolation level CS                             | db2clpcs.bnd   | sqlc2xyz     | yes    | yes | yes    |
| Isolation level RR                             | db2clprrr.bnd  | sqlc3xyz     | yes    | yes | yes    |
| Isolation level UR                             | db2clpur.bnd   | sqlc4xyz     | yes    | yes | yes    |
| Isolation level RS                             | db2clprs.bnd   | sqlc5xyz     | yes    | no  | yes    |
| Isolation level NC                             | db2clpnc.bnd   | sqlc6xyz     | yes    | no  | yes    |
| <b>REXX</b>                                    |                |              |        |     |        |
| Isolation level CS                             | db2arxcs.bnd   | sqla1xyz     | yes    | yes | yes    |
| Isolation level RR                             | db2arxrr.bnd   | sqla2xyz     | yes    | yes | yes    |
| Isolation level UR                             | db2arxur.bnd   | sqla3xyz     | yes    | yes | yes    |
| Isolation level RS                             | db2arxrs.bnd   | sqla4xyz     | yes    | yes | yes    |
| Isolation level NC                             | db2arxnc.bnd   | sqla5xyz     | yes    | no  | yes    |
| <b>Utilities</b>                               |                |              |        |     |        |
| Export                                         | db2uexpm.bnd   | sqlubxyz     | yes    | yes | yes    |
| Import                                         | db2uimpb.bnd   | sqlufxyz     | yes    | yes | yes    |
| Import                                         | db2uimtb.bnd   | db2ukxyz     | yes    | yes | yes    |

---

## Appendix F. How the DB2 Library Is Structured

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

To access product information online, you can use the Information Center. You can view task information, DB2 books, troubleshooting information, sample programs, and DB2 information on the Web. See “Accessing Information with the Information Center” on page 118 for details.

---

### Completing Tasks with SmartGuides

SmartGuides help you complete some administration tasks by taking you through each task one step at a time. SmartGuides are available through the Control Center and the Client Configuration Assistant. The following table lists the SmartGuides.

**Note:** Create Database, Index, and Configure Multisite Update SmartGuide are available for the partitioned database environment.

| SmartGuide                                   | Helps You to...                                                                | How to Access...                                                                                                                                        |
|----------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Add Database</i>                          | Catalog a database on a client workstation.                                    | From the Client Configuration Assistant, click <b>Add</b> .                                                                                             |
| <i>Back up Database</i>                      | Determine, create, and schedule a backup plan.                                 | From the Control Center, click with the right mouse button on the database you want to back up and select <b>Backup-&gt;Database using SmartGuide</b> . |
| <i>Configure Multisite Update SmartGuide</i> | Perform a multi-site update, a distributed transaction, or a two-phase commit. | From the Control Center, click with the right mouse button on the <b>Database</b> icon and select <b>Multisite Update</b> .                             |
| <i>Create Database</i>                       | Create a database, and perform some basic configuration tasks.                 | From the Control Center, click with the right mouse button on the <b>Databases</b> icon and select <b>Create-&gt;Database using SmartGuide</b> .        |

| <b>SmartGuide</b>                | <b>Helps You to...</b>                                                                                       | <b>How to Access...</b>                                                                                                                                  |
|----------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Create Table</i>              | Select basic data types, and create a primary key for the table.                                             | From the Control Center, click with the right mouse button on the <b>Tables</b> icon and select <b>Create-&gt;Table using SmartGuide</b> .               |
| <i>Create Table Space</i>        | Create a new table space.                                                                                    | From the Control Center, click with the right mouse button on the <b>Table spaces</b> icon and select <b>Create-&gt;Table space using SmartGuide</b> .   |
| <i>Index</i>                     | Advise which indexes to create and drop for all your queries.                                                | From the Control Center, click with the right mouse button on the <b>Index</b> icon and select <b>Create-&gt;Index using SmartGuide</b> .                |
| <i>Performance Configuration</i> | Tune the performance of a database by updating configuration parameters to match your business requirements. | From the Control Center, click with the right mouse button on the database you want to tune and select <b>Configure using SmartGuide</b> .               |
| <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, click with the right mouse button on the database you want to restore and select <b>Restore-&gt;Database using SmartGuide</b> . |

## Accessing Online Help

Online help is available with all DB2 components. The following table describes the various types of help. You can also access DB2 information through the Information Center. For information see “Accessing Information with the Information Center” on page 118.

| <b>Type of Help</b> | <b>Contents</b>                                                | <b>How to Access...</b>                                                                                                                                                                                                                                                                                                     |
|---------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <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><i>? command</i></p> <p>where <i>command</i> is 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> |



| Type of Help                                                                                             | Contents                                                                                                                                                                           | How to Access...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control Center Help<br>Client Configuration Assistant Help<br>Event Analyzer Help<br>Command Center Help | Explains the tasks you can perform in a window or notebook. The help includes prerequisite information you need to know, and describes how to use the window or notebook controls. | From a window or notebook, click the <b>Help</b> push button or press the F1 key.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Message Help                                                                                             | Describes the cause of a message, and any action you should take.                                                                                                                  | <p>From the command line processor in interactive mode, enter:</p> <p><code>? XXXnnnnn</code></p> <p>where <i>XXXnnnnn</i> is a valid message identifier.</p> <p>For example, <code>? SQL30081</code> displays help about the SQL30081 message.</p> <p>To view message help one screen at a time, enter:</p> <p><code>? XXXnnnnn   more</code></p> <p>To save message help in a file, enter:</p> <p><code>? XXXnnnnn &gt; filename.ext</code></p> <p>where <i>filename.ext</i> is the file where you want to save the message help.</p> |
| SQL Help                                                                                                 | Explains the syntax of SQL statements.                                                                                                                                             | <p>From the command line processor in interactive mode, enter:</p> <p><code>help statement</code></p> <p>where <i>statement</i> is an SQL statement.</p> <p>For example, <b>help</b> SELECT displays help about the SELECT statement.</p> <p><b>Note:</b> 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> <p><code>? sqlstate</code> or <code>? class-code</code></p> <p>where <i>sqlstate</i> is a valid five-digit SQL state and <i>class-code</i> is the first two digits of the SQL state.</p> <p>For example, <code>? 08003</code> displays help for the 08003 SQL state, while <code>? 08</code> displays help for the 08 class code.</p>                                                                                                                                |

---

## DB2 Information – Hardcopy and Online

The table in this section lists the DB2 books. They are divided into two groups:

### Cross-platform books

These books contain the common DB2 information for all platforms.

### Platform-specific books

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

### Cross-platform sample programs in HTML

These samples are the HTML version of the sample programs that are installed with the SDK. They are for informational purposes and do not replace the actual programs.

Most books are available in HTML and PostScript format, or you can choose to order a hardcopy from IBM. The exceptions are noted in the table.

On OS/2 and Windows platforms, HTML documentation files can be installed under the doc\html subdirectory. Depending on the language of your system, some files may be in that language, and the remainder are in English.

On UNIX platforms, you can install multiple language versions of the HTML documentation files under the doc/%L/html subdirectories. Any documentation that is not available in a national language is shown in English.

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

|               |                                                  |
|---------------|--------------------------------------------------|
| <b>View</b>   | See “Viewing Online Information” on page 117.    |
| <b>Search</b> | See “Searching Online Information” on page 120.  |
| <b>Print</b>  | See “Printing the PostScript Books” on page 120. |
| <b>Order</b>  | See “Ordering the Printed Books” on page 121.    |

| Name                 | Description | Form Number<br>File Name for<br>Online Book | HTML<br>Directory |
|----------------------|-------------|---------------------------------------------|-------------------|
| Cross-Platform Books |             |                                             |                   |

| Name                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Form Number<br>File Name for<br>Online Book                                           | HTML<br>Directory |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------|
| <i>Administration Guide</i>            | <p><i>Administration Guide, Design and Implementation</i> contains information required to design, implement, and maintain a database. It also describes database access using the Control Center(whether local or in a client/server environment), auditing, database recovery, distributed database support, and high availability.</p> <p><i>Administration Guide, Performance</i> contains information that focuses on the database environment, such as application performance evaluation and tuning.</p> <p>You can order both volumes of the <i>Administration Guide</i> in the English language in North America using the form number SBOF-8922.</p> | <p>Volume 1<br/>SC09-2839<br/>db2d1x60</p> <p>Volume 2<br/>SC09-2840<br/>db2d2x60</p> | db2d0             |
| <i>Administrative API Reference</i>    | Describes the DB2 application programming interfaces (APIs) and data structures you can use to manage your databases. Explains how to call APIs from your applications.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | SC09-2841<br>db2b0x60                                                                 | db2b0             |
| <i>Application Building Guide</i>      | <p>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.</p> <p>This book combines the <i>Building Applications</i> books for the OS/2, Windows, and UNIX-based environments.</p>                                                                                                                                                                                                                                                                                                                                                              | SC09-2842<br>db2axx60                                                                 | db2ax             |
| <i>APPC, CPI-C and SNA Sense Codes</i> | <p>Provides general information about APPC, CPI-C, and SNA sense codes that you may encounter when using DB2 Universal Database products.</p> <p><b>Note:</b> Available in HTML format only.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                               | No form number<br>db2apx60                                                            | db2ap             |

| Name                                                 | Description                                                                                                                                                                                                                                                                                                                                                 | Form Number<br>File Name for<br>Online Book | HTML<br>Directory |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-------------------|
| <i>Application Development Guide</i>                 | Explains how to develop applications that access DB2 databases using embedded SQL or JDBC, how to write stored procedures, user-defined types, user-defined functions, and how to use triggers. It also discusses programming techniques and performance considerations.<br><br>This book was formerly known as the <i>Embedded SQL Programming Guide</i> . | SC09-2845<br>db2a0x60                       | 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.                                                                                                                                                                       | SC09-2843<br>db2l0x60                       | db2l0             |
| <i>Command Reference</i>                             | Explains how to use the command line processor, and describes the DB2 commands you can use to manage your database.                                                                                                                                                                                                                                         | SC09-2844<br>db2n0x60                       | db2n0             |
| <i>Data Movement Utilities Guide and Reference</i>   | Explains how to use the Load, Import, Export, Autoloader, and Data Propagation utilities to work with the data in the database.                                                                                                                                                                                                                             | SC09-2858<br>db2dmx60                       | db2dm             |
| <i>DB2 Connect Personal Edition Quick Beginnings</i> | Provides planning, installing, and configuring information for DB2 Connect Personal Edition.                                                                                                                                                                                                                                                                | GC09-2830<br>db2c1x60                       | db2c1             |
| <i>DB2 Connect User's Guide</i>                      | Provides concepts, programming and general usage information about the DB2 Connect products.                                                                                                                                                                                                                                                                | SC09-2838<br>db2c0x60                       | db2c0             |
| <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, and on how to use DRDA application servers with DB2 Connect application requesters.<br><b>Note:</b> Available in HTML and PostScript formats only.                    | No form number<br>db2h1x60                  | db2h1             |
| <i>Glossary</i>                                      | Provides a comprehensive list of all DB2 terms and definitions.<br><b>Note:</b> Available in HTML format only.                                                                                                                                                                                                                                              | No form number<br>db2t0x50                  | db2t0             |

| <b>Name</b>                                      | <b>Description</b>                                                                                                                                                                                                                                                                                                                          | <b>Form Number</b><br><b>File Name for</b><br><b>Online Book</b> | <b>HTML</b><br><b>Directory</b> |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|---------------------------------|
| <i>Installation and Configuration Supplement</i> | Guides you through the planning, installation, and set up of platform-specific DB2 clients. This supplement contains information on binding, setting up client and server communications, DB2 GUI tools, DRDA AS, distributed installation, and the configuration of distributed requests and access methods to heterogeneous data sources. | GC09-2857<br>db2iyx60                                            | db2iy                           |
| <i>Message Reference</i>                         | Lists messages and codes issued by DB2, and describes the actions you should take.                                                                                                                                                                                                                                                          | GC09-2846<br>db2m0x60                                            | db2m0                           |
| <i>Replication Guide and Reference</i>           | Provides planning, configuration, administration, and usage information for the IBM Replication tools supplied with DB2.                                                                                                                                                                                                                    | SC26-9642<br>db2e0x60                                            | db2e0                           |
| <i>SQL Getting Started</i>                       | Introduces SQL concepts, and provides examples for many constructs and tasks.                                                                                                                                                                                                                                                               | SC09-2856<br>db2y0x60                                            | db2y0                           |
| <i>SQL Reference, Volume 1 and Volume 2</i>      | Describes SQL syntax, semantics, and the rules of the language. Also includes information about release-to-release incompatibilities, product limits, and catalog views.<br><br>You can order both volumes of the <i>SQL Reference</i> in the English language in North America with the form number SBOF-8923.                             | SBOF-8923<br>Volume 1<br>db2s1x60<br>Volume 2<br>db2s2x60        | db2s0                           |
| <i>System Monitor Guide and Reference</i>        | Describes how to collect different kinds of information about databases and the database manager. Explains how to use the information to understand database activity, improve performance, and determine the cause of problems.                                                                                                            | SC09-2849<br>db2f0x60                                            | db2f0                           |
| <i>Troubleshooting Guide</i>                     | Helps you determine the source of errors, recover from problems, and use diagnostic tools in consultation with DB2 Customer Service.                                                                                                                                                                                                        | S10J-8169                                                        | db2p0                           |

| <b>Name</b>                                                        | <b>Description</b>                                                                                                                                                                                                  | <b>Form Number</b><br><b>File Name for</b><br><b>Online Book</b> | <b>HTML</b><br><b>Directory</b> |
|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|---------------------------------|
| <i>What's New</i>                                                  | Describes the new features, functions, and enhancements in DB2 Universal Database, Version 6.0, including information about Java-based tools.                                                                       | SC09-2851<br>db2q0x60                                            | db2q0                           |
| <b>Platform-Specific Books</b>                                     |                                                                                                                                                                                                                     |                                                                  |                                 |
| <i>Administering Satellites Guide and Reference</i>                | Provides planning, configuration, administration, and usage information for satellites.                                                                                                                             | GC09-2821<br>db2dsx60                                            | db2ds                           |
| <i>DB2 Personal Edition Quick Beginnings</i>                       | Provides planning, installation, migration, and configuration information for DB2 Universal Database Personal Edition on the OS/2, Windows 95, and Windows NT operating systems.                                    | GC09-2831<br>db2i1x60                                            | db2i1                           |
| <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. Also contains installing and setup information for many supported clients.       | GC09-2834<br>db2i2x60                                            | db2i2                           |
| <i>DB2 for UNIX Quick Beginnings</i>                               | Provides planning, installation, migration, and configuration information for DB2 Universal Database on UNIX-based platforms. Also contains installing and setup information for many supported clients.            | GC09-2836<br>db2ixx60                                            | db2ix                           |
| <i>DB2 for Windows NT Quick Beginnings</i>                         | Provides planning, installation, migration, and configuration information for DB2 Universal Database on the Windows NT operating system. Also contains installing and setup information for many supported clients. | GC09-2835<br>db2i6x60                                            | db2i6                           |
| <i>DB2 Enterprise - Extended Edition for UNIX Quick Beginnings</i> | Provides planning, installation, and configuration information for DB2 Enterprise - Extended Edition for UNIX. Also contains installing and setup information for many supported clients.                           | GC09-2832<br>db2v3x60                                            | db2v3                           |

| <b>Name</b>                                                                    | <b>Description</b>                                                                                                                                                                                                                                                                                                                         | <b>Form Number</b><br><b>File Name for</b><br><b>Online Book</b> | <b>HTML</b><br><b>Directory</b> |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|---------------------------------|
| <i>DB2 Enterprise - Extended Edition for Windows NT Quick Beginnings</i>       | Provides planning, installation, and configuration information for DB2 Enterprise - Extended Edition for Windows NT. Also contains installing and setup information for many supported clients.                                                                                                                                            | GC09-2833<br>db2v6x60                                            | db2v6                           |
| <i>DB2 Connect Enterprise Edition for OS/2 and Windows NT Quick Beginnings</i> | Provides planning, migration, installation, and configuration information for DB2 Connect Enterprise Edition on the OS/2 and Windows NT operating systems. Also contains installation and setup information for many supported clients.<br><br>This book was formerly part of the <i>DB2 Connect Enterprise Edition Quick Beginnings</i> . | GC09-2828<br>db2c6x60                                            | db2c6                           |
| <i>DB2 Connect Enterprise Edition for UNIX Quick Beginnings</i>                | Provides planning, migration, installation, configuration, and usage information for DB2 Connect Enterprise Edition in UNIX-based platforms. Also contains installation and setup information for many supported clients.<br><br>This book was formerly part of the <i>DB2 Connect Enterprise Edition Quick Beginnings</i> .               | GC09-2829<br>db2cyx60                                            | db2cy                           |
| <i>DB2 Data Links Manager for AIX Quick Beginnings</i>                         | Provides planning, installation, configuration, and task information for DB2 Data Links Manager for AIX.                                                                                                                                                                                                                                   | GC09-2837<br>db2z0x60                                            | db2z0                           |
| <i>DB2 Data Links Manager for Windows NT Quick Beginnings</i>                  | Provides planning, installation, configuration, and task information for DB2 Data Links Manager for Windows NT.                                                                                                                                                                                                                            | GC09-2827<br>db2z6x60                                            | db2z6                           |
| <i>DB2 Query Patroller Administration Guide</i>                                | Provides administration information on DB2 Query Patrol.                                                                                                                                                                                                                                                                                   | SC09-2859<br>db2dwx60                                            | db2dw                           |
| <i>DB2 Query Patroller Installation Guide</i>                                  | Provides installation information on DB2 Query Patrol.                                                                                                                                                                                                                                                                                     | GC09-2860<br>db2iwx60                                            | db2iw                           |
| <i>DB2 Query Patroller User's Guide</i>                                        | Describes how to use the tools and functions of the DB2 Query Patrol.                                                                                                                                                                                                                                                                      | SC09-2861<br>db2wwx60                                            | db2ww                           |

| Name                                          | Description                                                                                                                                                                                                                                                                                                                                                                 | Form Number<br>File Name for<br>Online Book | HTML<br>Directory                                                                                                            |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Cross-Platform Sample Programs in HTML</b> |                                                                                                                                                                                                                                                                                                                                                                             |                                             |                                                                                                                              |
| Sample programs in HTML                       | Provides the sample programs in HTML format for the programming languages on all platforms supported by DB2 for informational purposes (not all samples are available in all languages). Only available when the SDK is installed.<br><br>See <i>Application Building Guide</i> for more information on the actual programs.<br><b>Note:</b> Available in HTML format only. | No form number                              | db2hs/c<br>db2hs/cli<br>db2hs/clp<br>db2hs/cpp<br>db2hs/cobol<br>db2hs/cobol_mf<br>db2hs/fortran<br>db2hs/java<br>db2hs/rexx |

**Notes:**

1. The character in the sixth position of the file name indicates the language of a book. For example, the file name db2d0e60 indicates that the *Administration Guide* is in English. The following letters are used in the file names to indicate the language of a book:

| 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. For late breaking information that could not be included in the DB2 books:

- On UNIX-based platforms, see the `Release.Notes` file. This file is located in the `DB2DIR/Readme/%L` directory, where %L is the locale name and DB2DIR is:
  - `/usr/lpp/db2_06_01` on AIX
  - `/opt/IBMdb2/V6.1` on HP-UX, Solaris, SCO UnixWare 7, and Silicon Graphics IRIX
  - `/usr/IBMdb2/V6.1` on Linux.
- On other platforms, see the `RELEASE.TXT` file. This file is located in the directory where the product is installed.
- Under Windows Start menu

---

## Viewing Online Information

The manuals 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 on all platforms other than SCO UnixWare 7:

- If you are running DB2 administration tools, use the Information Center. See “Accessing Information with the Information Center” on page 118 for details.
- Select the Open Page menu item of your Web browser. The page you open contains descriptions of and links to DB2 information:
  - On UNIX-based platforms, open the following page:
 

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

where %L is 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 on the **DB2 Online Books** icon. Depending on the system you are using, the icon is in the main product folder or the Windows Start menu.

To view online books or sample programs on the SCO UnixWare 7:

- DB2 Universal Database for SCO UnixWare 7 uses the native SCOhelp utility to search the DB2 information. You can access SCOhelp by the following methods:
  - entering the "scohelp" command on the command line,
  - selecting the Help menu in the Control Panel of the CDE desktop or
  - selecting Help in the Root menu of the Panorama desktop

For more information on SCOhelp, refer to the *Installation and Configuration Supplement*.

## 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.

Depending on your system, you can access the Information Center from the:

- Main product folder
- Toolbar in the Control Center
- Windows Start menu
- Help menu of the Control Center

The Information Center provides the following kinds of information. Click the appropriate tab to look at the information:

|                        |                                                                                                                                                     |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tasks</b>           | Lists tasks you can perform using DB2.                                                                                                              |
| <b>Reference</b>       | Lists DB2 reference information, such as keywords, commands, and APIs.                                                                              |
| <b>Books</b>           | Lists DB2 books.                                                                                                                                    |
| <b>Troubleshooting</b> | Lists categories of error messages and their recovery actions.                                                                                      |
| <b>Sample Programs</b> | Lists sample programs that come with the DB2 Software Developer's Kit. If the Software Developer's Kit is not installed, this tab is not displayed. |
| <b>Web</b>             | Lists 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 some search capabilities, so you can look for specific topics, and filter capabilities to limit the scope of your searches.

For a full text search, click the Search button of the Information Center follow the *Search DB2 Books* link in each HTML file.

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 by double-clicking its icon on the Windows or OS/2 desktop.

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

**Note:** Search function is not available in the Linux and Silicon Graphics environments.

---

## 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, use the following instructions:

1. Copy all files and subdirectories from `\sqlib\doc\html` on your local system to a Web server. Each book has its own subdirectory containing 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, see the NetQuestion Appendix in *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. Once you are able to view the book files, you should bookmark commonly viewed topics. Among those, 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 setting up a search, see the NetQuestion Appendix in *Installation and Configuration Supplement* book.

---

## Searching Online Information

To search for information in the HTML books, you can do the following:

- Click on **Search the DB2 Books** at the bottom of any page in the HTML books. Use the search form to find a specific topic. This function is not available in the Linux or Silicon Graphics IRIX environments.
- Click on **Index** at the bottom of any page in an HTML book. Use the index to find a specific topic in the book.
- Display the table of contents or index of 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 118 for details.

---

## Printing the PostScript Books

If you prefer to have printed copies of the manuals, you can decompress and print PostScript versions. For the file name of each book in the library, see the table in “DB2 Information – Hardcopy and Online” on page 110. Specify the full path name for the file you intend to print.

On OS/2 and Windows platforms:

1. Copy the compressed PostScript files to a hard drive on your system. The files have a file extension of .exe and are located in the `x:\doc\language\books\ps` directory, where `x:` is the letter representing the CD-ROM drive and `language` is the two-character country code that represents your language (for example, EN for English).
2. Decompress the file that corresponds to the book that you want. Each compressed book is a self-extracting executable file. To decompress the

book, simply run it as you would run any other executable program. The result from this step is a printable PostScript file with a file extension of .ps.

3. Ensure that your default printer is a PostScript printer capable of printing Level 1 (or equivalent) files.
4. Enter the following command from a command line:  

```
print filename.ps
```

On UNIX-based platforms:

1. Mount the CD-ROM. Refer to your *Quick Beginnings* manual for the procedures to mount the CD-ROM.
2. Change to /cdrom/doc/%L/ps directory on the CD-ROM, where /cdrom is the mount point of the CD-ROM and %L is the name of the desired locale. The manuals will be installed in the previously-mentioned directory with file names ending with .ps.Z.
3. Decompress and print the manual you require using the following command:
  - For AIX:  

```
zcat filename | qprt -P PSprinter_queue
```
  - For HP-UX, Solaris, or SCO UnixWare 7:  

```
zcat filename | lp -d PSprinter_queue
```
  - For Linux:  

```
zcat filename | lpr -P PSprinter_queue
```
  - For Silicon Graphics IRIX:  

```
zcat < filename | lp -d PSprinter_queue
```

where *filename* is the full path name and extension of the compressed PostScript file and *PSprinter\_queue* is the name of the PostScript printer queue.

For example, to print the English version of *DB2 for UNIX Quick Beginnings* on AIX, you can use the following command:

```
zcat /cdrom/doc/en/ps/db2ixe60.ps.Z || qprt -P ps1
```

---

## Ordering the Printed Books

You can order the printed DB2 manuals either as a set or individually. There are three sets of books available. The form number for the entire set of DB2 books is SB0F-8926-00. The form number for the books listed under the heading "Cross-Platform Books" is SB0F-8924-00.

**Note:** These form numbers only apply if you are ordering books that are printed in the English language in North America.

You can also order books individually by the form number listed in “DB2 Information – Hardcopy and Online” on page 110. To order printed versions, contact your IBM authorized dealer or marketing representative, or phone 1-800-879-2755 in the United States or 1-800-IBM-4YOU in Canada.

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## Appendix G. Notices

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| AnyNet                                       | PowerPC          |
| APPN                                         | QMF              |
| AS/400                                       | RACF             |
| CICS                                         | RISC System/6000 |
| C Set++                                      | SP               |
| C/370                                        | SQL/DS           |
| DATABASE 2                                   | SQL/400          |
| DataHub                                      | S/370            |
| DataJoiner                                   | System/370       |
| DataPropagator                               | System/390       |
| DataRefresher                                | SystemView       |
| DB2                                          | VisualAge        |
| DB2 Connect                                  | VM/ESA           |
| DB2 Universal Database                       | VSE/ESA          |
| Distributed Relational Database Architecture | VTAM             |
| DRDA                                         | WIN-OS/2         |
| Extended Services                            |                  |
| FFST                                         |                  |
| First Failure Support Technology             |                  |
| IBM                                          |                  |
| IMS                                          |                  |
| LAN Distance                                 |                  |

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## Contacting IBM

This section lists ways you can get more information from IBM.

If you have a technical problem, please take the time to review and carry out the actions suggested by the *Troubleshooting Guide* before contacting DB2 Customer Support. Depending on the nature of your problem or concern, this guide will suggest information you can gather to help us 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.

### Telephone

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

- 1-800-237-5511 to learn about available service options.
- 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.

For information on how to contact IBM outside of the United States, see Appendix A of the IBM Software Support Handbook. You can access this document by accessing the following page:

<http://www.ibm.com/support/>

then performing a search using the keyword “handbook”.

Note that in some countries, IBM-authorized dealers should contact their dealer support structure instead of the IBM Support Center.

### World Wide Web

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

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

The DB2 World Wide Web pages provide current DB2 information about news, product descriptions, education schedules, and more. The DB2 Product and Service Technical Library provides access to frequently asked questions, fixes, books, and up-to-date DB2 technical information. (Note that this information may be in English only.)

### Anonymous FTP Sites

<ftp.software.ibm.com>

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

**Internet Newsgroups**

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

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

**CompuServe**

**GO IBMDB2** to access the IBM DB2 Family forums

All DB2 products are supported through these forums.

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| To find out about the IBM Professional Certification Program for DB2 Universal Database, go to <a href="http://www.software.ibm.com/data/db2/db2tech/db2cert.html">http://www.software.ibm.com/data/db2/db2tech/db2cert.html</a> |
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