IBM® DB2® Universal Database
for OS/2®

Quick Beginnings

Version 7

GC09-2968-00

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Before using this information and the product it supports, be sure to read the general information under "Appendix F. Notices" on page 121.

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Contents

Welcome to DB2 Universal Database!

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

This *Quick Beginnings* book will guide you through the planning, installation, migration (if necessary), and setup of a DB2 Universal Database Workgroup Edition or Enterprise Edition server. Once the DB2 server has been installed, you will install a DB2 client. You will then configure a connection between the client and server, using the DB2 GUI tools.

For information about using the DB2 Connect Server Support feature of DB2 UDB Enterprise Edition, refer to the DB2 Connect documentation.

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 C. Using the DB2 Library" on page 95.

- 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, Windows NT, or Windows 2000.
- The term *Windows 9x* refers to Windows 95 or Windows 98.
- The term *DB2 client* refers to a DB2 Run-Time Client, a DB2 Administration Client, or a DB2 Application Development Client.
- In this book, 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. Installing and Configuring a DB2 Server

Chapter 1. Planning for Installation

Before you install DB2, you should make sure that your system meets DB2's hardware and software requirements. If you are migrating from a previous version of DB2, there are also pre-installation migration tasks you should perform to prepare your databases.

This chapter describes the following requirements you should take into consideration before installing DB2:

If you know that your system meets all the hardware and software requirements, and you want to begin installing your DB2 product right away, go to "Chapter 2. Installing DB2 Universal Database on OS/2" on page 13.

For information on the DB2 family of products, see "Appendix B. About DB2 Universal Database for UNIX, Windows, and OS/2" on page 71.

Note: If you are installing DB2 Universal Database Enterprise Edition with the DB2 Connect Support feature, see the DB2 Connect publications for additional requirements.

Memory Requirements

The amount of random-access memory (RAM) that you require to run your DB2 server depends on the size of your databases and on the administration tools you will use. For example, if you plan to use the DB2 GUI tools to administer and configure your DB2 databases, the minimum amount of RAM we recommend is 128 MB.

The DB2 GUI tools are a set of administration and configuration tools that include the Command Center, Control Center, and the Data Warehouse Center. Additional GUI tools are available on Windows 32-bit and OS/2 operating systems. These include the Client Configuration Assistant, Event Monitor and Event Analyzer. For more information about DB2 GUI tools and the platforms on which they are available, refer to the *Administration Guide*.

To run a DB2 Run-Time Client or an DB2 Application Development Client, you need a minimum of 16 MB of RAM. If you are planning to run a DB2 Administration Client, you need a minimum of 32 MB of RAM.

Disk Requirements

The actual fixed disk requirements of your installation may vary depending on your file system and the components you install. Ensure that you have included a disk space allowance for your operating system, application development tools, application data, and communications products. For more information about space requirements for data, refer to the *Administration Guide*.

DB2 Servers

A default installation of DB2 requires a minimum of 160 MB of disk space. This amount does not include the Java Runtime Environment, which is supplied on the DB2 CD-ROM.

DB2 Clients

Use Table 1 to estimate the amount of disk space you need on each of your client workstations. You may require additional amounts of disk space depending on your file system.

Table 1. Disk Requirements for Client Components

Client Components	Recommended Minimum Disk (MB)
OS/2	
DB2 Run-Time Client	30 MB
DB2 Application Development Client	125 MB, not including the Java Development Kit (JDK)
DB2 Administration Client	95 MB
UNIX platforms	
DB2 Run-Time Client	30 to 40 MB (70 MB for Silicon Graphics IRIX)
DB2 Application Development Client	90 to 120 MB, not including the JDK (40 MB for NUMA-Q)
DB2 Administration Client	80 to 110 MB
Note: PTX/NUMA-Q and Silicon Graphics IRIX operating systems do not support the DB2 Administration Client.	
Windows 32-bit Operating Systems	
DB2 Run-Time Client	25 MB
DB2 Application Development Client	325 MB, including the JDK
DB2 Administration Client	125 MB

The DB2 Application Development Client and DB2 Administration Client include tools and documentation, except on NUMA-Q systems.

Software Requirements

This section outlines the software required to run DB2 products.

Server Product Requirements

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

On all platforms you will need a Java Runtime Environment (JRE) Version 1.1.8 to run DB2's Java-based tools, such as the Control Center. If you intend to run the Control Center as an applet, you will need a Java-enabled browser. See "Chapter 4. Control Center Installation and Configuration" on page 21 for more information.

Table 2. Software Requirements

Hardware/Software Requirements	Communications
DB2 Universal Database for OS/2	
• OS/2 Warp Version 4 • OS/2 Warp Server Version 4 • OS/2 Warp Server Advanced V4 • OS/2 Warp Server Advanced V4 with SMP Feature • OS/2 Warp Server for e-business	APPC, IPX/SPX, NetBIOS, or TCP/IP • For local IPX/SPX connectivity, you require Novell NetWare Requester, Version 2.10 or later. • Named Pipes is supported locally in WIN-OS/2 sessions on OS/2 Warp Server. • The OS/2 base operating system provides NetBIOS and TCP/IP connectivity, if selected during installation. • For SNA (APPC) connectivity, one of the following communications products is required: – IBM eNetwork Communications Server for OS/2 Warp Version 5 – IBM eNetwork Personal Communications for OS/2 Warp Version 4.2 – IBM Communication Server for OS/2 Version 4 **Notes:** 1. The DB2 SNMP subagent requires DPI 1.1 support provided by TCP/IP Version 2.0 or later, or DPI 2.0 support provided by IBM SystemView Agent. 2. If you plan to use the Tivoli Storage Manager facilities to back up and restore your databases, you require the Tivoli Storage Manager Client Version 3 or later.

Client Product Requirements

Table 3 on page 6 lists the software requirements needed for a DB2 Administration Client, DB2 Run-Time Client, or a DB2 Application Development Client.

On all platforms you will need a Java Runtime Environment (JRE) Version 1.1.8 to run the DB2 tools, such as the Control Center. If you intend to run the Control Center as an applet on Windows 32-bit or OS/2 systems, you will need a Java-enabled browser. See "Chapter 4. Control Center Installation and Configuration" on page 21 for more information.

Table 3. Software Requirements for Clients

Component	Hardware/Software Requirements	Communications
• DB2 Run-Time Client for OS/2 • DB2 Administration Client for OS/2 • DB2 Application Development Client for OS/2	• OS/2 Warp Version 4 • OS/2 Warp Server Version 4 • OS/2 Warp Server Advanced V4 • OS/2 Warp Server Advanced V4 with SMP Feature • OS/2 Warp Server for e-business **Note:** When the DB2 Application Development Client is installed, the JDK is not installed. You can install the latest version of the JDK from your product CD-ROM.	APPC, IPX/SPX, NetBIOS, or TCP/IP • For APPC connectivity, you require IBM eNetwork Communications Server for OS/2 Warp Version 5 or IBM eNetwork Personal Communications for OS/2 Warp Version 4.2. • For IPX/SPX connectivity, you require the Novell NetWare client for OS/2 Version 2.10 or later. IPX/SPX can only be used to connect to databases. It cannot be used to connect to host or AS/400 databases. • The OS/2 base operating system provides NetBIOS and TCP/IP connectivity, if selected during installation. • The OS/2 base operating system provides Named Pipes (Local) connectivity. Named Pipes is supported in DOS and WIN-OS/2 sessions. **Notes:** 1. Net.Data requires a Web server such as WebSphere. 2. For DCE Cell Directory Services Support (CDS) for DB2 Clients for OS/2, you must install an IBM Distributed Computing Environment Cell Directory Service client on each client workstation. 3. If you are planning to use Tivoli Storage Manager, PTF 3 for Tivoli Storage Manager Version 3 is required for an OS/2 client.
• DB2 Run-Time Client for Windows 9x • DB2 Administration Client for Windows 9x • DB2 Application Development Client for Windows 9x	• Windows 95 4.00.950 or later • Windows 98 **Note:** When the DB2 Application Development Client is installed, the JDK 1.1.8 is installed.	IPX/SPX, Named Pipes, NetBIOS, or TCP/IP • The Windows 9x base operating system provides NetBIOS, IPX/SPX, TCP/IP, and Named Pipes connectivity. **Note:** IPX/SPX connectivity is only supported to Windows NT and Windows 2000 servers. • If you plan to use LDAP (Lightweight Directory Access Protocol), you require either a Microsoft LDAP client or an IBM SecureWay LDAP client V3.1.1. For more information, refer to the *Administration Guide*. • If you plan to use the Tivoli Storage Manager facilities for backup and restore of your databases, you require the Tivoli Storage Manager Client Version 3 or later. • If you have the IBM Antivirus program installed on your operating system, it must be disabled or uninstalled to complete a DB2 installation.

Table 3. Software Requirements for Clients (continued)

Component	Hardware/Software Requirements	Communications
• DB2 Run-Time Client for Windows • DB2 Administration Client for Windows • DB2 Application Development Client for Windows	• Windows NT Version 4.0 with Service Pack 3 or later • Windows Terminal Server (can only run the DB2 Run-Time Client) • Windows 2000 **Note:** When the DB2 Application Development Client is installed, the JDK 1.1.8 is installed.	APPC, IPX/SPX, Named Pipes, NetBIOS, or TCP/IP • The Windows NT and Windows 2000 base operating systems provide NetBIOS, IPX/SPX, TCP/IP, and Named Pipes connectivity. • For APPC connectivity, you require one of the following products: – IBM eNetwork Communications Server for Windows V5.01 or later. – Windows 2000: IBM eNetwork Personal Communications for Windows Version 4.3 CSD2 or later – Windows NT: IBM eNetwork Personal Communications for Windows Version 4.2 or later – Microsoft SNA Server Version 3 Service Pack 3 or later – Wall Data Rumba • If you plan to use DCE (Distributed Computing Environment) and connect to a DB2 for OS/390 V5.1 database, that database must be enabled for DCE support using OS/390 DCE Base Services Version 3. • If you plan to use LDAP (Lightweight Directory Access Protocol), you require either a Microsoft LDAP client or an IBM SecureWay LDAP client V3.1.1. For more information, refer to the *Administration Guide*. • If you plan to use the Tivoli Storage Manager facilities for backup and restore of your databases, you require the Tivoli Storage Manager Client Version 3 or later. • If you have the IBM Antivirus program installed on your operating system, it must disabled or uninstalled to complete a DB2 installation.

Possible Client-to-Server Connectivity Scenarios

The following table shows the communication protocols that can be used when connecting a specific DB2 client to a specific DB2 server. DB2 Workgroup, DB2 Enterprise, and DB2 Enterprise - Extended Editions can service requests from host or AS/400 clients (DRDA ARs).

Table 4. Possible Client-to-Server Connectivity Scenarios

Client	Server						
	AIX	HP-UX	Linux	OS/2	PTX/NUMA-Q	Solaris	Windows NT/ Windows 2000
AS/400 V4R1	APPC	N/A	N/A	APPC	N/A	APPC	APPC
AS/400 V4R2	APPC TCP/IP	TCP/IP	TCP/IP	APPC TCP/IP	TCP/IP	APPC TCP/IP	APPC TCP/IP

Table 4. Possible Client-to-Server Connectivity Scenarios (continued)

Client	Server						
	AIX	**HP-UX**	**Linux**	**OS/2**	**PTX/NUMA-Q**	**Solaris**	**Windows NT/ Windows 2000**
AIX	APPC TCP/IP	TCP/IP	TCP/IP	APPC TCP/IP	TCP/IP	APPC TCP/IP	APPC TCP/IP
HP-UX	APPC TCP/IP	TCP/IP	TCP/IP	APPC TCP/IP	TCP/IP	APPC TCP/IP	APPC TCP/IP
Linux	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP
MVS	APPC	N/A	N/A	APPC	N/A	APPC	APPC
OS/2	APPC IPX/SPX(1),(2) TCP/IP	TCP/IP	TCP/IP	APPC IPX/SPX(1),(2) NetBIOS TCP/IP	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	TCP/IP	APPC TCP/IP	APPC TCP/IP
PTX/NUMA-Q	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP
Silicon Graphics IRIX	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP
SQL/DS	APPC	N/A	N/A	APPC	N/A	APPC	APPC
Solaris	APPC TCP/IP	TCP/IP	TCP/IP	APPC TCP/IP	TCP/IP	APPC TCP/IP	APPC TCP/IP
VSE & VM V5	APPC	N/A	N/A	APPC	N/A	APPC	APPC
VSE V6	APPC	N/A	N/A	APPC	N/A	APPC	APPC
VM V6	APPC TCP/IP	TCP/IP	TCP/IP	APPC TCP/IP	TCP/IP	APPC TCP/IP	APPC TCP/IP
Windows 9x	TCP/IP	TCP/IP	TCP/IP	NetBIOS TCP/IP	TCP/IP	TCP/IP	IPX/SPX(1) NPIPE NetBIOS TCP/IP
Windows NT/ Windows 2000	APPC IPX/SPX(1) TCP/IP	TCP/IP	TCP/IP	APPC IPX/SPX(1) NetBIOS TCP/IP	TCP/IP	APPC IPX/SPX(1) TCP/IP	APPC IPX/SPX(1) NPIPE NetBIOS TCP/IP

1. Direct Addressing
2. File Server Addressing

Migrating from Previous Versions of DB2

If you are migrating from Version 5.0 or Version 5.2 to DB2 Version 7, you must prepare your databases and instances before installing DB2 Version 7. If you are upgrading from Version 6, there is nothing you have to do prior to installing Version 7.

The migration of pre-Version 5.0 databases and instances is not supported in DB2 Version 7.

Under Windows and OS/2, you can only have one version of DB2 installed on a machine. For example, if you have DB2 Version 6 and install Version 7, Version 6 will be deleted during the installation.

Preparing Databases and Instances for Migration

This section describes how to prepare existing DB2 Version 5.x databases and instances for migration to a format usable by DB2 Version 7. If you want to migrate more than one instance, you must repeat these steps for each instance.

To prepare your databases for migration:

1. Ensure that there are no applications using any databases owned by the DB2 instance you are preparing to migrate. To get a list of all applications owned by the instance, enter the **db2 list applications** command. If all applications are disconnected, this command will return the following message:

   ```
   SQL1611W No data was returned by the Database System Monitor.
   SQLSTATE=00000
   ```

   You can end a session by entering the **db2 terminate** command.
2. Ensure that all databases are cataloged. To view a list of all the cataloged databases in the current instance, enter the following command:

   ```
   db2 list database directory
   ```
3. Make a backup copy of all Version 5.x databases. You do not have to back up Version 6 databases. Refer to the *Administration Guide* for your DB2 product for information on making a backup copy of a database and to the *Command Reference* for the syntax of the backup command.
4. When all applications are complete and you have backed up your databases, stop all database server processes owned by the DB2 instance by entering the **db2stop** command.
5. Stop the DB2 license daemon by entering the **db2licd -end** command.
6. Stop all command line processor sessions by entering the **db2 terminate** command in each session that was running the command line processor.

Next, you should verify that all cataloged databases are ready for migration before installing DB2 Version 7.

Verifying Databases are Ready for Migration

To ensure that you can migrate your databases to the DB2 Version 7 format, you should run the **db2ckmig** command before installing DB2 Version 7.

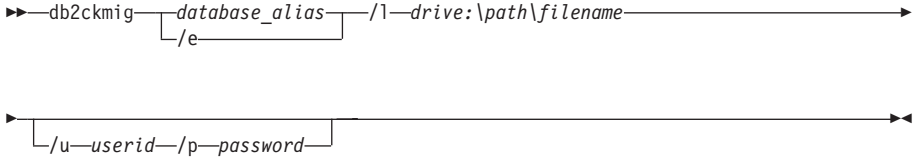
Note: This section applies to databases created with DB2 Version 5.x only. You do not have to run this command against databases created with DB2 V6.

To run the **db2ckmig** command:

1. Insert your DB2 Version 7 product CD-ROM into the drive.
2. Change to the *x:*`\db2\common` directory where *x:* represents your CD-ROM drive letter.

3. Enter the **db2ckmig** command to verify that the databases on your system can be correctly migrated. The syntax of the command is as follows:

DB2CKMIG Command



database_alias Specifies a *database_alias* name of a database to be verified for migration. This parameter is required if the **/e** parameter is not specified.

/e Specifies that all cataloged databases are to be verified for migration. This parameter is required if the *database_alias* parameter is not specified.

/l *drive:\path\filename*
Specifies a drive, target path and filename to keep a list of errors and warnings generated for the scanned database. The *path* variable is optional; if you do not specify a path, the path from which you execute the **db2ckmig** command will be used. You must specify a *filename*.

/u *userid* Specifies the user account used to connect to the database. This parameter must be specified if you are logged on as a user without connect authority.

/p *password* Specifies the password of the user account used to connect to the database. This parameter must be specified if you are logged on as a user without connect authority.

You can enter the **db2ckmig** command on remote systems. The database parameter must specify the *database_alias* name of the remote database.

For example, to check that all databases cataloged on your system can be migrated and to log all the messages from this command to the `c:\temp\message.txt` file, enter the following command:

```
x:\db2\common\db2ckmig /e /l c:\temp\message.txt
```

where *x:* represents your CD-ROM drive.

4. If any errors are found, the **db2ckmig** command generates a log file and places it in the path and file specified by the `/l` option. If there are errors, refer to the information that follows for suggested corrective actions. Once

the errors have been corrected, re-enter the **db2ckmig** command to ensure that the databases are ready to be migrated.

5. Make a backup copy of the database. For more information, refer to the *Administration Guide*.

Possible DB2CKMIG Error Conditions

A database is in backup pending state

Perform a backup of the database.

A database is in roll-forward pending state

Recover the database as required. Perform or resume a roll-forward database to end of logs and stop.

Table space ID is not in normal state

Recover the database and table space as required. Perform or resume a roll-forward database to end of logs and stop.

A database is in an inconsistent state

Restart the database to return it to a consistent state.

Structured type and function have the same name

A structured type and function (with no arguments) belonging to the same schema cannot have the same name. The type or function, and objects using the type or function, must be dropped and recreated using another name. To correct this error:

1. Back up the database.
2. Export the data from any tables that are dependent on the structured types or functions.
3. Drop any tables dependent on the structured types or functions, and then drop the structured types or functions. These drops may drop other objects such as views, indexes, triggers, or functions.
4. Create structured types or functions with different type or function names and recreate the tables using the new structured type or function names. Recreate any dropped views, indexes, triggers, or functions.
5. Import or load the data into the object.

The database contains user-defined distinct types (UDTs) that use the type name BIGINT, DATALINK, or REFERENCE.

These data type names are reserved for the Version 7 database manager. To correct this error:

1. Back up the database.

2. Export the data from any tables that are dependent on these data types.
3. Drop any tables dependent on these data types, and then drop the data types. These drops may drop other objects such as views, indexes, triggers, or functions.
4. Create data types with different type or function names and recreate the tables using the new data type names. Recreate any dropped views, indexes, triggers, or functions.
5. Import or load the data into the object.

Refer to the *Administration Guide* for more information about the actions required to correct these conditions.

NetQuestion Search System

If you installed online product documentation with your previous version of DB2 for Windows, OS/2, AIX, HP-UX or Solaris, or if you installed another IBM product like VisualAge C++ or VisualAge for Java, an online search system called NetQuestion was also installed automatically.

If the version of NetQuestion that comes with DB2 Version 7 is later than the version of NetQuestion currently present on your system, the current version will be upgraded and any existing document indices will be re-registered with NetQuestion. This will be done automatically for you during DB2 installation.

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

Your next step

After you have determined that your system meets all hardware and software requirements, and after you have prepared any existing databases and instances for migration, you can now install DB2 Version 7 using either the interactive or distributed method. For installation procedures, see the following sections:

- "Chapter 2. Installing DB2 Universal Database on OS/2" on page 13 for interactive installation.
- The *Installation and Configuration Supplement* for distributed installation.

Chapter 2. Installing DB2 Universal Database on OS/2

If you are migrating from a previous version of DB2, you must complete certain procedures before installing DB2 Universal Database Version 7. See "Migrating from Previous Versions of DB2" on page 8 for further information.

This section describes how to install DB2 Universal Database on an OS/2 workstation. If you want to install a DB2 client, go to "Chapter 5. Installing DB2 Clients" on page 37. For information on how to deploy this product using a distributed installation, refer to the *Installation and Configuration Supplement*.

Before You Begin

Before you begin the installation, be sure that 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 1. Planning for Installation" on page 3.
2. A user ID to perform the installation.

   If UPM is installed, the user ID you specify must have *Administrator* or *Local Administrator* authority. Create a user ID with these characteristics if necessary.

   If UPM is not installed, DB2 will install it and set up the user ID `USERID` with password `PASSWORD`.
3. A user ID for the Administration Server.

   If UPM is installed, the user ID you specify must have *Administrator* or *Local Administrator* authority. Create a user ID with these characteristics if necessary.

   If UPM is not installed, DB2 will install it and the user ID specified for the Administration Server will be created.
4. To verify that DB2 installed correctly, you will need to have a user account that belongs to the DB2 System Administrative (SYSADM) group. The account name must comply with DB2's naming rules, as described in "Username, User ID, Group Name, and Instance Name Rules" on page 119.

   By default, any user that belongs to the *Local Administrators* group, on the local machine where the account is defined, has SYSADM authority on the instance. For more information, see "Working with the System Administrative Group" on page 67. For more information on valid DB2 usernames, see "Appendix E. Naming Rules" on page 117.

Performing the Installation

To install your DB2 product, perform the following steps:

Step 1. Log on to the system with the user account that you want to use to perform the installation.

Step 2. Insert the CD-ROM in the drive.

Step 3. Open an OS/2 command window and set the directory to your CD-ROM drive by entering the following command:

```
x:
```

where *x:* represents your CD-ROM drive.

Step 4. Enter the following command:

```
x:\install
```

where *x:* represents your CD-ROM drive.

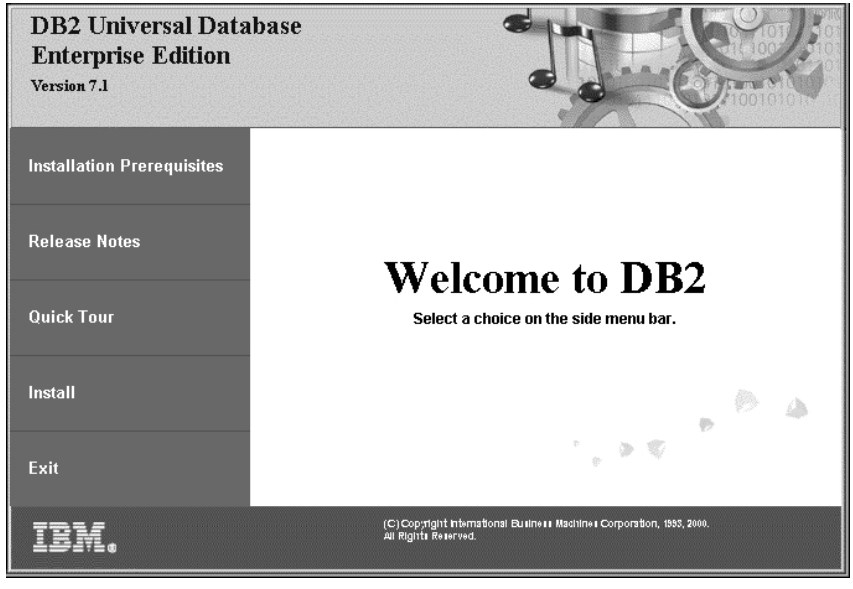
To invoke the installation program, enter the following command:

```
x:\install /i language
```

where:

- *x:* represents your CD-ROM drive
- *language* represents the country code for your language (for example, EN for English). Table 10 on page 115 lists the code for each available language.

Step 5. The DB2 Launchpad opens. It looks similar to the following:



From this window, you can view the installation prerequisites and the release notes, you can take a Quick Tour to explore the features, capabilities, and benefits of DB2 Universal Database Version 7, or you can proceed directly to the installation.

Step 6. Once you have initiated the installation, proceed by following the setup program's prompts. Online help is available to guide you through the remaining steps. To invoke the online help, click **Help** or press **F1**. You can click **Cancel** at any time to end the installation.

If you are installing this product on an SMP machine, refer to "Setting the Number of Licensed Processors" on page 68 for information about updating the product with the number of processors that you have purchased.

For information on errors encountered during installation, see the `11.log` and `12.log` files. These files store general information and error messages resulting from installation and uninstall activities. By default, these files are located in the `x:\db2log` directory; where x: represents the drive on which your operating system is installed.

For more information, refer to the *Troubleshooting Guide*.

Verifying the Installation

You can verify that DB2 is installed correctly by creating the DB2 UDB `SAMPLE` database on your system, and accessing data from the database.

If you have installed First Steps, you can verify the installation by performing the following steps.

Note: To run First Steps under OS/2, you need a Java Virtual Machine at the JRE 1.1.8 level.

Step 1. Log on to the system with the user account that you want to use to verify the installation.

Step 2. Start First Steps. For more information, see "Starting First Steps" on page 63.

Step 3. Select **Create SAMPLE databases** on the First Steps Launchpad to open the Create SAMPLE databases window.

Step 4. In the Create SAMPLE databases window, select **DB2 UDB Sample database**

Step 5. Click **OK**.

This command may take a few minutes to process. For a detailed description of the contents of the `SAMPLE` database, refer to the *Administration Guide*. When the `SAMPLE` database has been created, you will receive a completion message. Click **OK**.

Step 6. Once the database is created, select **Work with the SAMPLE databases** on the First Steps Launchpad to start the Control Center. The Control Center allows you to perform administration tasks on different instance and database objects.

In the left pane of the Control Center screen, expand the object tree to view the SAMPLE database and SAMPLE database objects. Select the Tables object to view the SAMPLE database tables in the right pane of the Control Center screen. For more information, see "Administering Instances and Databases with the DB2 Administration Tools" on page 85.

If you did not install the DB2 tools, you can verify the installation by creating the SAMPLE database and connecting to it using the command line processor as follows:

Step 1. Log on to the system with the DB2 user account that you created to verify the installation.

Step 2. Enter the **db2sampl** command to create the SAMPLE database.

By default, the SAMPLE database will be created on the drive where DB2 was installed; however, you can specify a drive on which to create this database. For example, to create the SAMPLE database on the F: drive, enter the following command:

```
db2sampl F:
```

This command may take a few minutes to process. For a detailed description of the contents of the SAMPLE database, refer to the *Administration Guide*. There is no completion message; when the command prompt returns, the process is complete.

The SAMPLE database is automatically cataloged with the database alias SAMPLE when it is created.

Step 3. Start the database manager by entering the **db2start** command.

Step 4. Enter the following commands to connect to the SAMPLE database, retrieve a list of all the employees that work in department 20, and reset the database connection:

```
db2 connect to sample
db2 "select * from staff where dept = 20"
db2 connect reset
```

For information about entering DB2 commands, see "Appendix A. Basic Task Knowledge" on page 63.

After you have verified the installation, you can remove the SAMPLE database to free up disk space. Enter the **db2 drop database sample** command to drop the SAMPLE database.

Chapter 3. DB2 Post-Installation Migration Tasks

After installing DB2 Version 7, you can now migrate databases and complete other migration activities.

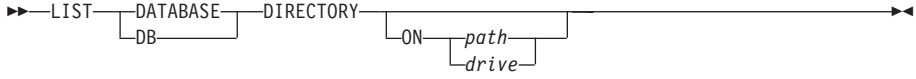
Migrating Databases

This section applies only if you are migrating databases from Version 5.x to the Version 7.1 format. If you are migrating from Version 6.1 to Version 7.1, you can skip this section.

To migrate Version 5.x databases owned by an instance:

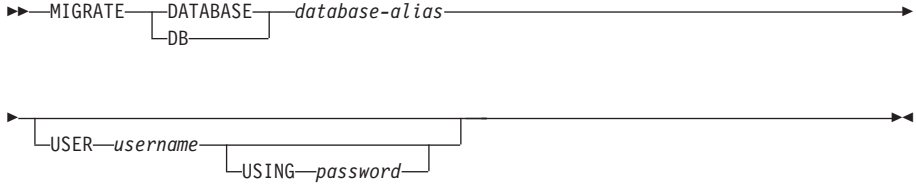
1. Log in with a user account that has SYSADM authority. See "Working with the System Administrative Group" on page 67 for more information.
2. Ensure that the databases you want to migrate are cataloged. To retrieve a list of all catalogued databases on your system, enter the **db2 list database directory** command. The syntax of this command is as follows:

   DB2 LIST DATABASE DIRECTORY command

   The `ON path/drive` parameter specifies the local database directory from which to list information. If it is not specified, the contents of the system database directory are listed. For more information and examples, refer to the *Command Reference*.
3. Migrate the database using the **db2 migrate database** command. The syntax of this command is as follows:

   DB2 MIGRATE DATABASE command

   For more information and examples, refer to the *Command Reference*.

Migrating Version 5 databases containing SYSCAT DMS tablespaces

If you are migrating Version 5 databases that contain a SYSCAT Database Managed Space (DMS) tablespace, you should ensure that you have approximately 70 percent free space in the tablespace before migrating the database. You can check the size of your tablespaces by entering the **db2 list tablespaces show detail** command.

If your tablespace does *not* have enough free space, you may receive the following error:

```
SQL1704N Database migration failed. Reason code 17.
```

In this case, you should restore your Version 5 database under a Version 5 instance, add more containers using the ALTER TABLESPACE statement, and migrate the database again. For more information about tablespaces and the ALTER TABLESPACE statement, refer to the *Administration Guide* and the *SQL Reference*.

Optional Post Migration Actions

There are optional activities you may want to undertake following database migration. You can also apply these optional activities to a down-level database backup which is restored to Version 7, because at the end of the restore, the database is migrated to Version 7.

- **Migration of Unique Indexes**

  Note: This section applies only to migration scenarios involving Version 5.x databases, or to Version 6 databases that were previously migrated from the Version 5.x format but whose unique indexes were *not* migrated using the **db2uiddl** command.

  Version 5.x unique indexes are not automatically migrated to Version 7 semantics for several reasons:

  – Converting unique indexes is a very time-consuming operation.
  – You may have applications that depend on the previous version's unique index semantics.
  – You may want to manage the staged conversion of unique indexes on your own schedule, when needed, using the **db2uiddl** command.

  All existing applications will continue to work even if the unique indexes are not converted to Version 7 semantics. You have to convert unique indexes to Version 7 semantics only if support for deferred uniqueness checking is required.

  To convert unique indexes:

1. Log in with a user account that has SYSADM authority. See "Working with the System Administrative Group" on page 67 for more information.
2. Start the database manager by entering the **db2start** command.
3. Run the **db2uiddl** command against your migrated database. Refer to the *Command Reference* for the syntax of this command.

   The **db2uiddl** command searches the database catalog tables and generates all the CREATE UNIQUE INDEX statements for user tables in an output file.
4. Review the output generated from the **db2uiddl** command. We recommend that you remove any unwanted indexes from the output file to reduce the time needed to execute it. Comments in the output will flag other situations that require your attention.
5. Connect to the database by entering the **db2 connect to** *database_alias* command, where *database_alias* is the alias of the database you are migrating.
6. Execute the commands in the output file, generated by the **db2uiddl** command, using a command similar to the following:

   ```
   db2 -tvf filename
   ```

   where *filename* is the name of the file generated by the **db2uiddl** command.

- **Update Statistics**

  When database migration is completed, the old statistics that are used to optimize query performance are retained in the catalogs. However, DB2 Version 7 has statistics that are modified or do not exist in Version 5.x. To take advantage of these statistics, you may want to execute the **runstats** command on tables, particularly those tables that are critical to the performance of your SQL queries.

  Refer to the *Command Reference* for the syntax of the **runstats** command. For details on the statistics, refer to the *Administration Guide*.
- **Rebind Packages**

  During database migration, all existing packages are invalidated. After the migration process, each package is rebuilt when it is used for the first time by the Version 7 database manager.

  For better performance we recommend that you run the **db2rbind** command to rebuild all packages stored in the database. Refer to the *Command Reference* for the syntax of this command.
- **Update database and database manager configuration**

  Some of the database configuration parameters are changed to Version 7 defaults or to other values during database migration. Refer to the *Administration Guide* for more information about configuration parameters.

We recommend that you run the DB2 Performance Monitor for suggestions in choosing appropriate configuration parameters. For more information, refer to the *Administration Guide*.

- **Migrate Explain Tables**

  To migrate the explain tables in a database that has been migrated to Version 7, run the following command:

  ```
  db2exmig -d dbname -e explain_schema [-u userid password]
  ```

  where:

  – *dbname* represents the database name. This parameter is required.

  – *explain_schema* represents the schema name of the explain tables to be migrated. This parameter is required.

  – *userid* and *password* represent the current user's ID and password. These parameters are optional.

  The explain tables belonging to the user ID that is running **db2exmig**, or that is used to connect to the database, will be migrated. The explain tables migration tool will rename the Version 5.x and Version 6 tables, create a new set of tables using the **EXPLAIN.DDL**, and copy the contents of the old tables to the new tables. Finally, it will drop the old tables. The **db2exmig** migration utility will preserve any user added columns on the explain tables.

Chapter 4. Control Center Installation and Configuration

This chapter describes how to install and configure the DB2 Control Center.

The Control Center is the main DB2 graphical tool for administering your database. It is available on Windows 32-bit, OS/2, and UNIX operating systems.

The Control Center provides a clear overview of all the systems and database objects being managed. You can also access other administration tools from the Control Center by selecting icons on the Control Center toolbar or from the Tools pop-up menu.

Application versus Applet

You can run the Control Center either as a Java application or as a Java applet through a web server. In both cases you need a supported Java Virtual Machine (JVM) installed on your machine to run the Control Center. A JVM can be a Java Runtime Environment (JRE) for running applications, or a Java-enabled browser for running applets.

- Java *applications* run just like other applications on your machine, provided you have the correct JRE installed.

  On Windows 32-bit operating systems, the correct JRE level was installed or upgraded for you during DB2 installation.

  On AIX systems, the correct JRE was installed for you during DB2 installation only if another JRE was not detected on your system. If another JRE was detected on your AIX system during DB2 installation, the JRE that comes with DB2 was not installed. In this case, you must install the correct JRE level before running the Control Center.

  On all other operating systems you must install the correct JRE level before running the Control Center. See Table 6 on page 23 for a list of correct JRE levels.

  Note: Some operating systems, including OS/2 Warp Server for e-business and AIX 4.3, have built-in Java support. For more information, check with your administrator.

- Java *applets* are programs that run within Java-enabled browsers. The Control Center applet code can reside on a remote machine and is served to the client's browser through a web server. This type of client is often called a *thin client* because a minimal amount of resources (a Java-enabled browser) is required to run the Java applet.

You must use a supported Java-enabled browser to run the Control Center as a Java applet. See Table 6 on page 23 for a list of supported browsers.

Machine Configurations

You can set up your Control Center in a number of different ways. The following table identifies four scenarios, each showing a different way of installing the required components. These scenarios are referenced throughout the Control Center Services Setup (Applet Mode only) section that follows the table.

Table 5. Control Center Machine Configuration Scenarios

Scenario	Machine A	Machine B	Machine C
1 - Stand-alone, Application	JRE Control Center application DB2 server		
2 - Two Tier, Application	JRE Control Center application DB2 client		DB2 server
3 - Two Tier, Browser	Supported Browser (Windows and OS/2 only) Control Center applet	Web server JDBC Applet Server DB2 server	
4 - Three Tier, Browser	Supported Browser (Windows and OS/2 only) Control Center applet	JDBC Applet Server DB2 client	DB2 server

Figure 1 on page 23 summarizes the four basic Control Center machine configurations:

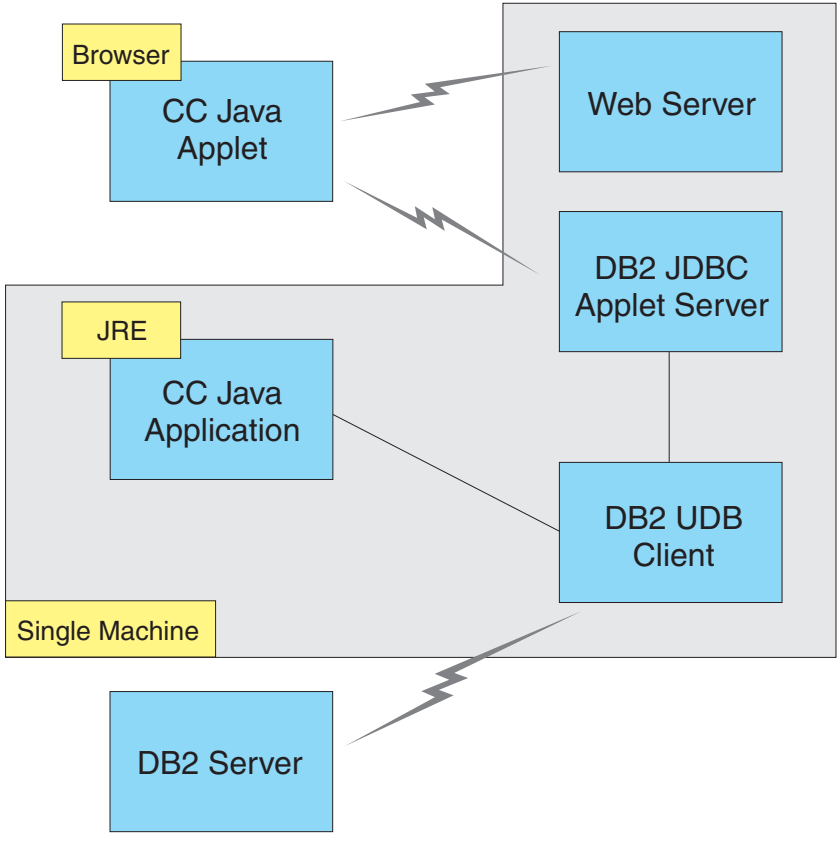


Figure 1. DB2 Control Center machine configurations

Supported Java Virtual Machines for the Control Center

The following table lists supported Java Virtual Machines (JREs and browsers) required to run the Control Center as an application or applet:

Table 6. Supported Java Virtual Machines (JVMs) for the Control Center

Operating System	Correct Java Runtime Environments	Supported Browsers
Windows 32-bit	JRE 1.1.8 (automatically installed or updated by DB2, if necessary)	Netscape 4.5 or higher (shipped), or IE 4.0 Service Pack 1 or higher
AIX	JRE 1.1.8.4 (automatically installed if no other JREs detected)	None
OS/2	JRE 1.1.8	Netscape 4.6 (shipped)
Linux	JRE 1.1.8	None

Table 6. Supported Java Virtual Machines (JVMs) for the Control Center (continued)

Operating System	Correct Java Runtime Environments	Supported Browsers
Solaris	JRE 1.1.8	None
HP-UX 11	JRE 1.1.8	None
IRIX	JRE 1.1.8 (3.1.1 SGI) + Cosmo code 2.3.1	None
PTX	JRE 1.1.8	None

For the latest information on supported JREs and browsers, go to http://www.ibm.com/software/data/db2/udb/db2cc

Setting Up and Working with the Control Center

This section describes how to set up and customize the Control Center for your environment.

Control Center Services Setup (Applet Mode only)

If you will run the Control Center as an application, skip this section and go to "Running the Control Center as a Java Application" on page 26.

To set up the Control Center to run as an applet:

1. Start the Control Center JDBC Applet Server.
2. On Windows NT or Windows 2000, start the security server.

1. Start the Control Center JDBC Applet Server

To start the Control Center JDBC Applet Server, enter the **db2jstrt** *6790* command, where *6790* represents any 4-digit port number that is not already in use.

We recommend that you start the Control Center JDBC Applet Server with a user account that has SYSADM authority.

The first time you start the Control Center JDBC Applet Server, it will create several node directory entries, together with various files for administration purposes. In Scenarios 1 and 3 in "Machine Configurations" on page 22, all of these administration files and directory entries will be created in the current DB2 instance.

Most DB2 resources are accessed over **database connect** or **instance attach**. In both cases the user must supply valid user ID and password combinations to gain access. However, some resources are accessed directly by the Control Center JDBC Applet Server, including the database and node directories (catalogs), and the Command Line Processor. Access to these resources is

performed by the Control Center JDBC Applet Server on behalf of the logged in Control Center user. Both the user and the server are required to have the proper authorization before access will be granted. For example, to update the database directory, a minimum of SYSCTRL authority is required.

It is possible to run an instance of the Control Center JDBC Applet Server with any level of security, but you will be unable to update certain resources such as database and node directories. In particular, you may encounter a **SQL1092N** message informing you of the lack of authorization for a request. The user specified in the message can be either the user signed into Control Center, or the user account running the Control Center JDBC Applet Server.

On Windows NT, you can start the Control Center JDBC Applet Server by clicking **Start** and selecting **Settings —> Control Panel —> Services**. Select the **DB2 JDBC Applet Server - Control Center** service and click **Start**.

On Windows 2000, you can start the Control Center JDBC Applet Server by clicking **Start** and selecting **Settings —> Control Panel —> Administrative Tools —> Services**. Select the **DB2 JDBC Applet Server - Control Center** service, click the **Action** menu and then select **Start**.

On any system, you can start the Control Center JDBC Applet Server by entering:

```
net start DB2ControlCenterServer
```

This step is not required if your Control Center JDBC Applet Server is autostarted.

If you start the Control Center JDBC Applet Server as a Windows NT or Windows 2000 service, you must configure the startup in the services dialog to change the account information.

2. Start the Windows NT or Windows 2000 Security Server

To work with the Control Center on Windows NT or Windows 2000, the security server must be running. During DB2 installs, the Security Server is usually set up to autostart.

You can check if the Security Server is running on Windows NT by clicking **Start** and selecting **Settings —> Control Panel —> Services**.

On Windows 2000, click **Start** and select **Settings —> Control Panel —> Administrative Tools —> Services**.

If the **DB2 Security Server** is not started on Windows NT, select it and click **Start**. On Windows 2000, select the **Action** menu and click **Start**.

After you have started the Control Center JDBC Applet Server and started the Windows NT or Windows 2000 security server (if necessary), go to "Running the Control Center as a Java Applet".

Working with the Control Center

You can run the Control Center as a Java application or as a Java applet. If your environment is configured similar to Scenarios 1 or 2 in Table 5 on page 22, you must run the Control Center as an application. If your environment is configured like Scenarios 3 or 4, you must run it as an applet.

Running the Control Center as a Java Application

To run the Control Center as a Java application, you must have the correct Java Runtime Environment (JRE) installed. See Table 6 on page 23 for the correct JRE level for your operating system.

1. To start the Control Center as an application:

   On Windows 32-bit operating systems:
   Click **Start** and select **Programs —> IBM DB2 —> Control Center**.

   On OS/2:
   Open the **IBM DB2** folder and double-click on the **Control Center** icon.

   On all supported platforms:
   Start the Control Center from a command prompt by entering the **db2cc** command.

2. The DB2 Control Center window opens.
3. You can start working with the Control Center without an existing database by creating a sample database. Enter the **db2sampl** command on the DB2 Universal Database server. On UNIX operating systems, ensure that you are logged in to the DB2 instance before you enter the **db2sampl** command.

Running the Control Center as a Java Applet

To run the Control Center as a Java applet, you must have a Web server set up on the machine that contains the Control Center applet code and the Control Center JDBC Applet Server. The Web server must allow access to the `sqllib` directory.

If you choose to use a virtual directory, substitute this directory for the home directory. For example, if you map `sqllib` to a virtual directory called `temp` on a server named `yourserver`, a client would use the URL:
http://yourserver/temp

If you do not have the DB2 documentation installed and you would like to configure your web server to work with DB2's online documentation, refer to the *Installation and Configuration Supplement*.

To run Control Center as an applet on Windows 32-bit or OS/2 operating systems, you must run **db2classes.exe** on the machine where the DB2 JDBC Applet Server resides to unzip the required Java class files.

To load the Control Center HTML page, perform the following steps:

1. Start the **Control Center Launch** page through your web server. In your browser, select **File –> Open Page**. The **Open Page** dialog box appears. Enter the URL of your Web server and the main Control Center page and click on the **Open** push button. For example, if your server is named `yourserver`, you would open http://yourserver/cc/prime/db2cc.htm
2. In the **Server port** field, enter a value for the Control Center JDBC Applet Server port. The default server port value is `6790`.
3. Click on the **Start Control Center** push button.
4. The Control Center Sign On window opens. Enter your user ID and password. This user ID must have an account on the machine that is running the Control Center JDBC Applet Server. Your initial logon will be used for all database connections. It can be changed from the Control Center pull-down menu. A unique user profile will be assigned to each user ID. Click **OK**.
5. The DB2 Control Center window opens.
6. You can start working with the Control Center without an existing database by creating a sample database. Enter the **db2sampl** command on the DB2 Universal Database server. On UNIX operating systems, ensure that you are logged in to the DB2 instance before you enter the **db2sampl** command.

Customizing Your Control Center HTML File

To automatically start the Control Center the next time you open `db2cc.htm`, perform the following steps:

- For Scenarios 1 or 2, modify the `autoStartCC` parameter tag in `db2cc.htm` from

  ```
  param name="autoStartCC" value="false"
  ```

  to

  ```
  param name="autoStartCC" value="true"
  ```

- For Scenarios 3 or 4, modify the `autoStartCC`, `hostNameText`, and `portNumberText` parameter tags in `db2cc.htm` to

  ```
  param name="autoStartCC" value="true"
  param name="hostNameText" value="yourserver"
  param name="portNumberText" value="6790"
  ```

  where `yourserver` represents the Server name or IP address and `6790` represents the server port value of the machine to which you want to connect.

Configuring Your Web Server to Work with the Control Center

For general web server configuration information, consult the setup documentation that came with your web server.

For more information on serving DB2 online documentation through a web server, refer to the *Installation and Configuration Supplement*.

Functional Considerations

If you are using the Control Center over the Internet, be aware that there is no encryption of the data flow between the Control Center JDBC Applet Server and the browser.

To use the color options of Visual Explain on Netscape, you must set your operating system to support more than 256 colors.

On OS/2 systems, you must install the Control Center on an HPFS-formatted drive. DB2 does not support the installation of the Control Center on an OS/2 FAT drive, because an OS/2 FAT drive does not support long filenames required by Java.

Every activity will be associated with an explicit DB2 connection or attachment. For security purposes, every DB2 activity will be validated.

When you are using the Control Center under Scenarios 3 or 4, the local system is Machine B. The local system is the system name as it appears in the DB2 Control Center window.

Installation Tips for Control Center Help on UNIX Operating Systems

When installing the Control Center online help on UNIX operating systems you should keep the following in mind:

- You should install the Control Center help and the product documentation at the same time. If you install the Control Center help and the DB2 online product documentation separately, you can expect the second installation to take some time. This is true regardless of which package is installed first.
- You must select the Control Center help for any non-English language explicitly. Installing the product messages for a particular language does not mean that the Control Center help for that language is automatically installed. However, if you install the Control Center help for a particular language, the product messages for that language are installed automatically.

- If you manually install the Control Center on UNIX-based workstations rather than using the db2setup utility, you must run the **db2insthtml** command to install the online documentation. For more information, refer to the *DB2 for UNIX Quick Beginnings*.

Configuring TCP/IP on OS/2

To run the Control Center on OS/2 Warp 4 while disconnected from a LAN, you will need to configure TCP/IP to enable local loopback and localhost. If you are running OS/2 Warp Server for e-business, local loopback is enabled by default.

Enabling Local Loopback

To enable local loopback on your system:

1. Open the **System Setup** folder.
2. Open the **TCP/IP Configuration** notebook.
3. View the **Network** page.
4. In the **Interface to Configure** list box, highlight **loopback interface**.
5. If the **Enable interface** check box is not selected, select it now.
6. Verify that the **IP address** is `127.0.0.1` and **Subnet Mask** is empty.

Enabling Localhost

To enable localhost on your system:

1. To check if localhost is enabled, enter the **ping localhost** command.
   - If data is returned and localhost is enabled, you can skip steps 2 and 3 below and go directly to step 4.
   - If `localhost unknown` is returned, or if the command hangs, localhost is not enabled. Go to step 2.
2. If you are on a network, make sure that loopback is enabled. To enable local loopback see "Enabling Local Loopback".
3. If you are *not* on a network, enable localhost by performing these steps:
   a. Add the following line after other `ifconfig` lines in the `MPTN\BIN\SETUP.CMD` command file:

      ```
      ifconfig lo 127.0.0.1
      ```

   b. In the TCP/IP configuration folder, perform the following steps:
      1) Go to the **Configure Name Resolution Services** page.
      2) In the **Hostname configuration without a Nameserver** table, add an entry with *IP Address* set to `127.0.0.1` and *Hostname* set to `localhost`.

      Note: If you have a hostname for your machine on the **Configure LAN Name Resolution Services** page, you must add this name as an alias when you set the *IP Address 127.0.0.1* to `localhost`.

c. Select the **Look through HOSTS list before going to the nameserver** list box. This step tells your OS/2 system that when it is looking for a host, such as `localhost`, it should use the host address found on your machine rather than checking the nameserver. If the host is not defined on your machine, OS/2 continues looking for the host by using the nameserver you configured.

d. Close **TCP/IP Configuration** and reboot the system.

e. You should be able to ping `localhost` without being connected to any network.

4. Verify that your hostname is correct. On an OS/2 command line, enter the **hostname** command. The hostname returned should match the one listed in the **TCP/IP Configuration** notebook on the **Hostnames** page and it must be less than 32 characters. If the hostname deviates from these conditions, correct it on the **Hostnames** page.

5. Verify that your hostname is set properly in CONFIG.SYS. You should see a line similar to the following:

   ```
   SET HOSTNAME=<correct_name>
   ```

   where <*correct_name*> represents the value returned by the **hostname** command. If this is not the case, make the necessary changes and reboot your system when you are finished.

Verifying TCP/IP Configuration on OS/2

If you are having trouble running the Control Center on OS/2 while disconnected from a LAN, try running the **sniffle /P** command to diagnose the problem.

Troubleshooting Information

For the latest service information on the Control Center, point your browser to http://www.ibm.com/software/data/db2/udb/db2cc

If you are having problems running the Control Center, check the following:

- Ensure the Control Center JDBC Applet Server (db2jd) is running.
- Verify that the server port number is correct.
- Check that the Control Center JDBC Applet Server is running under a user account that has SYSADM authority.
- Ensure that the Database Administration Server (DAS) is running on any DB2 Universal Database systems you are trying to administer by entering the **db2admin start** command. On UNIX-based systems, ensure that you are logged in as the DAS instance owner when you issue this command.

If you are having problems running the Control Center as an *application*, also check the following:

- Verify that the correct JRE is installed. See Table 6 on page 23 for more information.

If you are having problems running the Control Center as an *applet*, also check the following:

- Verify that you are running a supported browser. See Table 6 on page 23 for more information.
- Check your browser's Java console window for diagnostic and trace information for the Control Center.
- Make sure that the client browser does not have CLASSPATH set. To make sure CLASSPATH is not set, open a command window and enter **SET CLASSPATH=** then start your client browser from this command window. Also, note that if CLASSPATH is not set in a Windows NT or Windows 2000 environment, it may still get picked up from `autoexec.bat` from a Windows 9x installation on the same machine.
- Ensure that you are using the `db2cc.htm` file from the machine running the Control Center JDBC Applet Server.
- Remember that the Control Center works within the DB2 client's locale, and that the DB2 client is located at the Control Center JDBC Applet Server's location.

Administering DB2 for OS/390 and DB2 Connect Enterprise Edition servers with the Control Center

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 later database servers.

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, Windows 2000, 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.

For more information on applying service and required Function Modification Identifiers, refer to the *DB2 for OS/390 Program Directory*.

Working with 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 cataloged on the workstation where the Control Center is running. The easiest way to accomplish this on Windows and OS/2 workstations is to use the DB2 Client Configuration Assistant (CCA).

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 right click on the object to work with object properties or to execute actions on the object. You can invoke the online help by clicking **Help**, or by pressing **F1** at any time.

Other Sources of Information

For more information about using the Control Center to administer DB2 for OS/390, refer to the following online resource:
http://www.ibm.com/software/data/db2/os390/v6facts/db2cc.html

For complete information about DB2 for OS/390 Version 6, refer to the online library: http://www.ibm.com/software/data/db2/os390/v6books.html

For more information about stored procedures and the Control Center for OS/390, go to: http://www.ibm.com/software/data/db2/os390/cc390/

Part 2. Installing and Configuring DB2 Clients

Chapter 5. Installing DB2 Clients

This section describes the different DB2 clients, and provides information on distributed installation, and thin client configuration.

Note: DB2 clients can connect to DB2 servers *two* releases later or *one* release earlier than the client's release level, as well as to servers at the same release level. For example, a DB2 Version 5.2 client can connect to DB2 Version 5.0, 5.2, 6.1, and 7.1 servers, while a DB2 Version 7.1 client can connect to DB2 Version 6.1 and 7.1 servers.

You may install a DB2 client on any number of workstations. For information about licensing, refer to your *License Information Booklet*.

You cannot create a database on a DB2 client, only connect to databases that reside on a DB2 server.

To go to the section that provides client installation instructions:

- "Chapter 6. Installing DB2 Clients on Windows 32-Bit Operating Systems" on page 41
- "Chapter 7. Installing DB2 Clients on OS/2 Operating Systems" on page 45

For information on how to install Version 7 DB2 clients on other platforms, refer to the *Installation and Configuration Supplement*.

To download installation packages for DB2 clients supported on other platforms, and pre-Version 7 clients, connect to the IBM DB2 Client Application Enabler Web site at http://www.ibm.com/software/data/db2/db2tech/clientpak.html

DB2 Run-Time Client

A DB2 Run-Time Client provides the ability for workstations from a variety of platforms to access DB2 databases.

DB2 Run-Time Clients are available for the following platforms: AIX, HP-UX, Linux, OS/2, NUMA-Q, Silicon Graphics IRIX, the Solaris Operating Environment, and Windows 32-bit operating systems.

DB2 Administration Client

A DB2 Administration Client provides the ability for workstations from a variety of platforms to access and administer DB2 databases. The DB2 Administration Client has all the features of the DB2 Run-Time Client and also includes all the DB2 Administration tools, documentation, and support for Thin Clients.

The DB2 Administration Client also includes the client components for DB2 Query Patroller, a sophisticated query management and workload distribution tool. In order to use Query Patroller, you must have a Query Patroller server installed. For more information refer to the *DB2 Query Patroller Installation Guide*.

DB2 Administration Clients are available for the following platforms: AIX, HP-UX, Linux, OS/2, Solaris, Windows 32-bit operating systems.

DB2 Application Development Client

The DB2 Application Development Client was known as the DB2 Software Development Kit (DB2 SDK) in previous versions of DB2. DB2 Application Development Client provides the tools and environment you need to develop applications that access DB2 servers and application servers that implement Distributed Relational Database Architecture (DRDA). You can build and run DB2 applications with a DB2 Application Development Client installed. You can also run DB2 applications on a DB2 Administration Client and a DB2 Run-Time Client.

DB2 Application Development Clients are available for the following platforms: AIX, HP-UX, Linux, OS/2, NUMA-Q, Silicon Graphics IRIX, the Solaris Operating Environment, and Windows 32-bit operating systems.

The applicable DB2 Application Development Client can be found on the server product CD-ROM. The DB2 Application Development Client for all platforms can be found on the set of DB2 Application Development Client CD-ROMs.

Distributed Installation

If you are planning to install DB2 products across your network, you may consider using a distributed installation. With a network-based installation, you can roll out multiple identical copies of DB2 products. For more information on performing a distributed installation, refer to the *Installation and Configuration Supplement*.

DB2 Thin Client

You can install a DB2 client for Windows 9x, Windows NT, or Windows 2000 on a code server, and have Thin Client workstations access the code across a LAN connection. Thin Client workstations function like any other DB2 client. In the setup, the main difference is that the DB2 client code is installed on a code server, and not individually on each workstation. Thin Client workstations need only a minimal configuration to set parameters and establish links to a code server. For more information on installing DB2 Thin Clients, refer to the *Installation and Configuration Supplement*.

Chapter 6. Installing DB2 Clients on Windows 32-Bit Operating Systems

This section contains the information you need to install a DB2 client on Windows 32-bit operating systems.

Before You Begin Installing

1. Ensure that your system meets all of the memory, hardware, and software requirements to install your DB2 client. For more information, see "Chapter 1. Planning for Installation" on page 3.
2. You require a user account to perform the installation.

   Windows 9x
   Any valid Windows 9x user.

   Windows NT or Windows 2000
   A user account that belongs to a group with more authority than the Guests group. For example, the Users group or the Power Users group. For information about installing on Windows NT or Windows 2000 without administrator authority, see "Installing Without Administrator Authority".

Installing Without Administrator Authority

When installing a DB2 client without administrator authority on Windows NT and Windows 2000, you will not be able to install these components:

- Control Center
- NetQuestion
- Integrated SNA Support

The following are some specific installation scenarios:

- *A user has installed a DB2 product without having administrator authority, and then an administrator installs a DB2 product on the same machine.* In this scenario, the installation performed by the administrator will remove the previous installation performed by the user without administrator authority, resulting in a clean installation of the DB2 product. The installation performed by the administrator will overwrite all of the user's services, shortcuts, and environment variables from the previous installation of DB2.
- *A user without administrator authority has installed a DB2 product, and then a second user without administrator authority attempts to install a DB2 product on*

the same machine. In this scenario, the installation by the second user will fail, and return an error message that the user must be an administrator to install the product.

- *An administrator has installed a DB2 product, and then a user without administrator authority attempts to install a DB2 single-user product on the same machine.* In this scenario, the installation being attempted by the user without administrator authority will fail, and return an error message saying that the user must be an administrator to install the product.

Installation Steps

To install a DB2 client, perform the following steps:

Step 1. Log on to the system with the user account that you want to use to perform the installation.

Step 2. Shut down any other programs so that the setup program can update files as required.

Step 3. Insert the appropriate CD-ROM into the drive. The auto-run feature automatically starts the setup program. The setup program will determine the system language, and launch the setup program for that language. If you want to run the setup program in a different language, or the setup program failed to start, see the following tip:

To manually invoke the setup program, perform the following steps:

a. Click **Start** and select the **Run** option.

b. In the **Open** field, enter the following command:

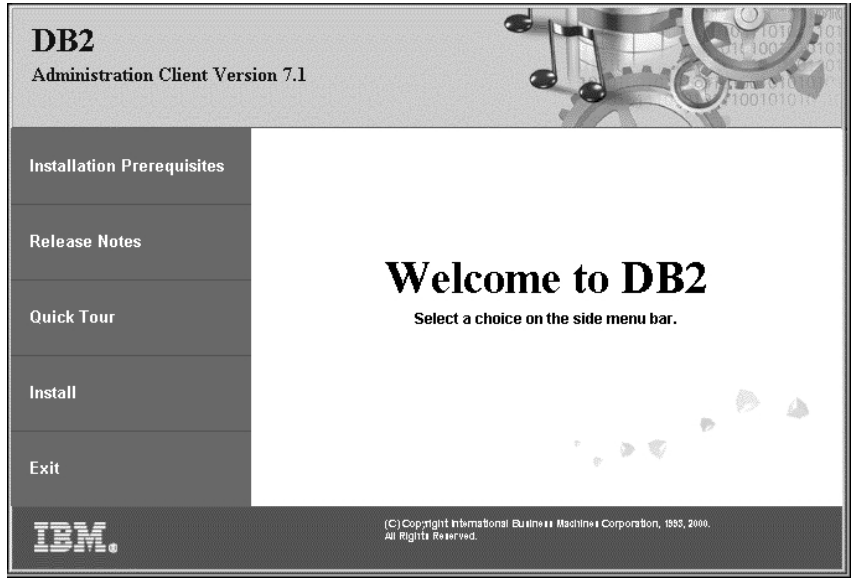
   ```
   x:\setup /i language
   ```

   where:

   - *x:* represents your CD-ROM drive
   - *language* represents the country code for your language (for example, EN for English). Table 10 on page 115 lists the code for each available language.

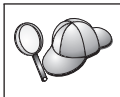
c. Click **OK**.

Step 4. The DB2 Launchpad opens. It looks similar to the following:



Step 5. From this window, you can view the Installation Prerequisites and the Release Notes, you can take a Quick Tour to explore the features, capabilities, and benefits of DB2 Universal Database Version 7, or you can proceed directly to the installation.

Once you have initiated the installation, proceed by following the setup program's prompts. Online help is available to guide you through the remaining steps. Invoke the online help by clicking **Help**, or by pressing **F1** at any time. You can click **Cancel** at any time to end the installation.



For information on errors encountered during installation, see the `db2.log` file. The `db2.log` file stores general information and error messages resulting from the install and uninstall activities. By default, the `db2.log` file is located in the *x:*`\db2log` directory, where *x:* represents the drive on which your operating system is installed.

For more information, refer to the *Troubleshooting Guide*.

The setup program performs the following actions:

- Create DB2 program groups and items (or shortcuts).
- Update the Windows registry.
- Create a default client instance called DB2.

To configure your client to access remote servers, go to "Chapter 8. Configuring Client-to-Server Communications Using the Client Configuration Assistant" on page 49.

Chapter 7. Installing DB2 Clients on OS/2 Operating Systems

This section contains the information that you need to install a DB2 client on OS/2 operating systems. If you have a pre-Version 7 DB2 client for OS/2, the WIN-OS/2 support installed will be kept at its current level.

If you want to run Windows 3.x applications on your OS/2 system, you must also install the DB2 Client Application Enabler for Windows 3.x on your system. For more information, connect to the IBM DB2 Client Application Enabler Web site at
http://www.ibm.com/software/data/db2/db2tech/clientpak.html

Before You Begin Installing

Before you begin the installation, be sure that 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 1. Planning for Installation" on page 3.
2. A user ID to perform the installation.

   If UPM is installed, the user ID you specify must have *Administrator* or *Local Administrator* authority. Create a user ID with these characteristics if necessary.

   If UPM is not installed, DB2 will install it and set up the user ID `USERID` with password `PASSWORD`.
3. To verify that DB2 installed correctly, you will need to have a user account that belongs to the DB2 System Administrative (SYSADM) group, is 8 characters or less, and complies with all of DB2's naming rules.

   By default, any user that belongs to the *Local Administrators* group, on the local machine where the account is defined, has SYSADM authority on the instance. For more information, see "Working with the System Administrative Group" on page 67. For more information on valid DB2 usernames, see "Appendix E. Naming Rules" on page 117.

Installation Steps

To install a DB2 client for OS/2, perform the following steps:

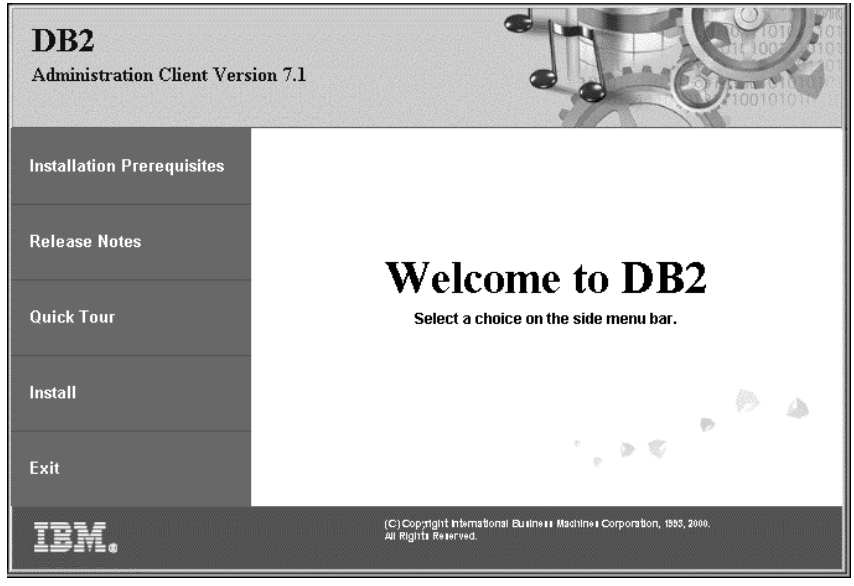
Step 1. Insert the appropriate CD-ROM into the drive.

Step 2. Open an OS/2 command window, set the directory to your CD-ROM drive, and enter the following command:

```
x:\install
```

where *x* represents your CD-ROM drive.

Step 3. The DB2 Launchpad opens. It looks similar to the following:



Step 4. From this window, you can view the installation prerequisites and the release notes, you can take a Quick Tour to explore the features, capabilities, and benefits of DB2 Universal Database Version 7, or you can proceed directly to the installation.

Once you have initiated the installation, proceed by following the install program's prompts. Online help is available to guide you through the remaining steps. To invoke the online help, click **Help**, or press **F1**.

For information on errors encountered during installation, see the `11.log` and `12.log` files. These files store general information and error messages resulting from installation and uninstall activities. By default, these files are located in the `x:\db2log` directory; where x: represents the drive on which your operating system is installed.

For more information, refer to the *Troubleshooting Guide*.

To configure your client to access remote servers, go to "Chapter 8. Configuring Client-to-Server Communications Using the Client Configuration Assistant" on page 49.

If you want to use ODBC applications with OS/2, you must ensure that the `\sqllib\dll\odbc.dll` file appears as the first `odbc.dll` in the LIBPATH parameter of the `config.sys` file. The Install program does not automatically position the dynamic link library (dll) as of Version 7. If `odbc.dll` is not the first ODBC dll listed, you may have problems connecting to DB2 through ODBC applications.

Chapter 8. Configuring Client-to-Server Communications Using the Client Configuration Assistant

This chapter describes how to configure client-to-server communications using the Client Configuration Assistant (CCA). In an LDAP-enabled environment, you may not need to perform the tasks described in this chapter.

Notes:

1. The CCA is available for DB2 clients running on OS/2 and Windows 32–bit systems.
2. LDAP support is available for Windows, AIX, and the Solaris operating environment.

LDAP Directory Support Considerations

In an LDAP-enabled environment, the directory information about DB2 servers and databases is kept in the LDAP directory. When a new database is created, the database is automatically registered in the LDAP directory. During a database connection, the DB2 client goes to the LDAP directory to retrieve the required database and protocol information and uses this information to connect to the database. There is no need to run the CCA to configure LDAP protocol information.

You may still want to use the CCA in the LDAP environment to:

- Manually catalog a database in the LDAP directory
- Register a database as an ODBC data source
- Configure CLI/ODBC information
- Remove a database cataloged in the LDAP directory

For more information about the LDAP Directory Support, refer to the *Installation and Configuration Supplement*.

Before You Begin

When you add a database using this configuration method, the CCA will generate a default node name for the server where the database resides.

To complete the steps in this section, you should be familiar with how to start the CCA. For more information, see "Starting the Client Configuration Assistant" on page 63.

Note: To configure communications from a DB2 client to a server, the remote server must be configured to accept inbound client requests. By default, the server installation program automatically detects and configures most protocols on the server for inbound client connections. It is recommended that you install and configure the communications protocols desired on the server before installing DB2.

If you have added a new protocol to your network that is not detectable, or want to modify any of the default settings, refer to the *Installation and Configuration Supplement*.

If you are adding a host or AS/400 database, refer to the "Configuring DB2 Connect to Host or AS/400 Communications Using the Client Configuration Assistant" section in your *DB2 Connect Quick Beginnings* manual.

Configuration Steps

To configure your workstation to access a database on a remote server, perform the following steps:

Step 1. Log on to the system with a valid DB2 user ID. For more information, see "Appendix E. Naming Rules" on page 117.

If you are adding a database to a system that has a DB2 server or 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 67.

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

Step 2. Start the CCA. For more information, see "Starting the Client Configuration Assistant" on page 63.

The Welcome window opens each time you start the CCA, until you add at least one database to your client.

Step 3. Click on the **Add** push button to configure a connection.

You can use one of the following configuration methods:

- "Adding a Database Using a Profile" on page 51.
- "Adding a Database Using Discovery" on page 52.
- "Adding a Database Manually" on page 54.

Adding a Database Using a Profile

A server profile contains information about server instances on a system, and databases within each server instance. For information on profiles, see "Creating and Using Profiles" on page 56.

If your administrator provided you with a profile, perform the following steps:

Step 1. Select the **Use a profile** radio button and click the **Next** push button.

Step 2. Click the **...** push button and select a profile. Select a remote database from the object tree that is displayed from the profile, and if the database selected is a gateway connection, select a connection route to the database. Click the **Next** push button.

Step 3. Enter a local database alias name in the **Database alias** field and optionally enter a comment that describes this database in the **Comment** field. Click **Next**.

Step 4. If you are planning to use ODBC, register this database as an ODBC data source.

Note: ODBC must be installed to perform this operation.

a. Ensure that the **Register this database for ODBC** check box is selected.

b. Select the radio button that describes how you would like to register this database:

- If you would like all users on your system to have access to this data source, select the **As a system data source** radio button.
- If you would like only the current user to have access to this data source, select the **As a user data source** radio button.
- If you would like to create an ODBC data source file to share database access, select the **As a file data source** radio button and enter the path and file name for this file in the **File data source name** field.

c. Click the **Optimize for application** drop down box and select the application for which you want to tune the ODBC settings.

d. Click **Finish** to add the database that you selected. The Confirmation window opens.

Step 5. Click the **Test Connection** push button to test the connection. The Connect to DB2 Database window opens.

Step 6. In the Connect To DB2 Database window, enter a valid user ID and password for the remote database and click **OK**. If the connection is successful, a message confirming the connection appears.

If the connection test failed, you will receive a help message. To change any settings you may have incorrectly specified, click the **Change** push button in the Confirmation window to return to the Add Database Wizard. If problems persist, refer to the *Troubleshooting Guide* for more information.

Step 7. You are now able to use this database. Click **Add** to add more databases, or click **Close** to exit the Add Database Wizard. Click **Close** again to exit the CCA.

Adding a Database Using Discovery

This option cannot return information about DB2 systems earlier than Version 5 or any systems where an Administration Server is not running. For more information, refer to the *Administration Guide*.

You can use the Discovery feature to search a network for databases. To add a database to your system using Discovery, perform the following steps:

Step 1. Select the **Search the network** radio button and click the **Next** push button.

Step 2. Click the **[+]** sign beside the **Known Systems** icon to list all the systems known to your client.

Step 3. Click the **[+]** sign beside a system to get a list of the instances and databases on it. Select the database that you want to add, click the **Next** push button, and proceed to Step 4.

If the system that contains the database that you want to add is not listed, perform the following steps:

a. Click on the **[+]** sign beside the **Other Systems (Search the network)** icon to search the network for additional systems.

b. Click on the **[+]** sign beside a system to get a list of the instances and databases on it.

c. Select the database that you want to add, click **Next**, and proceed to Step 4.

The Client Configuration Assistant may be unable to detect a remote system if:

- The Administration Server is not running on the remote system.
- The Discovery function times out. By default, the Discovery function will search the network for 40 seconds; this may not be long enough to detect the remote system. You can set the *DB2DISCOVERYTIME* registry variable to specify a longer period of time.
- The network that the Discovery request is running on is configured so that the Discovery request does not reach the remote system desired.
- You are using NetBIOS as the Discovery protocol. You may need to set the *DB2NBDISCOVERRCVBUFS* registry variable to a larger value to enable the client to receive more concurrent Discovery replies.

For more information, refer to the *Administration Guide*.

If the system that you want to add is still not listed, it can be added to the list of systems by performing the following steps:

a. Click **Add System**. The Add System window opens.
b. Enter the required communication protocol parameters for the remote Administration Server and click **OK**. A new system is added. For more information, click **Help**.
c. Select the database that you want to add and click **Next**.

Step 4. Enter a local database alias name in the **Database alias** field and optionally enter a comment that describes this database in the **Comment** field. Click **Next**.

Step 5. If you are planning to use ODBC, register this database as an ODBC data source.

Note: ODBC must be installed to perform this operation.

a. Ensure that the **Register this database for ODBC** check box is selected.
b. Select the radio button that describes how you would like to register this database:
   - If you would like all users on your system to have access to this data source, select the **As a system data source** radio button.
   - If you would like only the current user to have access to this data source, select the **As a user data source** radio button.

- If you would like to create an ODBC data source file to share database access, select the **As a file data source** radio button and enter the path and file name for this file in the **File data source name** field.

c. Click the **Optimize for application** drop down box and select the application for which you want to tune the ODBC settings.

d. Click **Finish** to add the database that you selected. The Confirmation window opens.

Step 6. Click the **Test Connection** push button to test the connection. The Connect to DB2 Database window opens.

Step 7. In the Connect To DB2 Database window, enter a valid user ID and password for the remote database and click **OK**. If the connection is successful, a message confirming the connection appears.

If the connection test failed, you will receive a help message. To change any settings you may have incorrectly specified, click the **Change** push button in the Confirmation window to return to the Add Database Wizard. If problems persist, refer to the *Troubleshooting Guide* for more information.

Step 8. You are now able to use this database. Click **Add** to add more databases, or click **Close** to exit the Add Database Wizard. Click **Close** again to exit the CCA.

Adding a Database Manually

If you have the information for the database you want to connect to and the server upon which it resides, you can manually enter all of the configuration information. This method is analogous to entering commands via the command line processor, however, the parameters are presented graphically for you.

To add a database to your system manually, perform the following steps:

Step 1. Select the **Manually configure a connection to a database** radio button and click **Next**.

Step 2. If you are using Lightweight Directory Access Protocol (LDAP), select the radio button that corresponds to the location where you would like your DB2 directories to be maintained:

- If you would like to maintain the DB2 directories locally, select the **Add database to your local machine** radio button and click **Next**.
- If you would like to maintain the DB2 directories globally at an LDAP server, select the **Add database using LDAP** radio button and click **Next**.

Step 3. Select the radio button that corresponds to the protocol that you want to use from the **Protocol** list.

If DB2 Connect (or the DB2 Connect Support Feature) is installed on your machine and you select TCP/IP or APPC, you can select **The database physically resides on a host or AS/400 system**. If you select this check box, you will have the option of selecting the type of connection that you want to make to the host or AS/400 database:

- To make a connection through a DB2 Connect gateway, select the **Connect to the server via the gateway** radio button.
- To make a direct connection, select the **Connect directly to the server** radio button.

Click **Next**.

Step 4. Enter the required communication protocol parameters and click **Next**. For more information, click **Help**.

Step 5. Enter the database alias name of the remote database that you want to add in the **Database name** field and a local database alias name in the **Database alias** field.

If this is a host or AS/400 database, type the Location name for an OS/390 database, the RDB name for an AS/400 database, or the DBNAME for a VSE or VM database in the **Database name** field, and optionally add a comment that describes this database in the **Comment** field.

Click **Next**.

Step 6. Register this database as an ODBC data source.

Note: ODBC must be installed to perform this operation.

a. Ensure that the **Register this database for ODBC** check box is selected.

b. Select the radio button that describes how you would like to register this database:

- If you would like all users on your system to have access to this data source, select the **As a system data source** radio button.
- If you would like only the current user to have access to this data source, select the **As a user data source** radio button.
- If you would like to create an ODBC data source file to share database access, select the **As a file data source** radio button and enter the path and file name for this file in the **File data source name** field.

c. Click the **Optimize for application** drop down box and select the application for which you want to tune the ODBC settings.

d. Click **Finish** to add the database that you selected. The Confirmation window opens.

Step 7. Click the **Test Connection** push button to test the connection. The Connect to DB2 Database window opens.

Step 8. In the Connect To DB2 Database window, enter a valid user ID and password for the remote database and click **OK**. If the connection is successful, a message confirming the connection appears.

If the connection test failed, you will receive a help message. To change any settings you may have incorrectly specified, click the **Change** push button in the Confirmation window to return to the Add Database Wizard. If problems persist, refer to the *Troubleshooting Guide* for more information.

Step 9. You are now able to use this database. Click **Add** to add more databases, or click **Close** to exit the Add Database Wizard. Click **Close** again to exit the CCA.

You can use the Export function of the CCA to create a client profile for an existing client configuration and use it to create identical target clients across your network. A client profile contains database connection, ODBC/CLI, and configuration information for an existing client. Use the CCA Import function to set up multiple clients across your network. Each target client will have the same configuration and settings as the existing client. For more information on creating and using client profiles, see "Creating and Using Profiles".

You have now completed all the tasks that are involved in *Quick Beginnings* and are ready to start using DB2 Universal Database.

If you want to deploy this product using a distributed installation, refer to the *Installation and Configuration Supplement*.

Creating and Using Profiles

The information in this section describes how to create and use profiles to set up connections between DB2 clients and servers. To configure database connections on a DB2 client, you can use either a server profile or client profile.

Server Profiles

A server profile contains information about instances on a server system, and databases within each instance. The information for each instance includes the protocol information required to set up a client to connect to databases in that instance.

We recommend that you create a server profile only after you have created the DB2 databases that you want your remote clients to access.

To create a server profile, perform the following steps:

Step 1. Start the Control Center. For more information, refer to "Starting the DB2 Control Center" on page 64.

Step 2. Select the system that you want to create a profile for and right click.

If the system that you want to create a profile for is not shown, select the **Systems** icon, click the right mouse button, and select the **Add** option. Click the **Help** push button and follow the online help.

Step 3. Select the **Export Server Profile** option.

Step 4. Enter a path and filename for this profile and select **OK**.

You are ready to use this profile on your system. For more information on how to add a database to your system using a server profile, go to "Configuration Steps" on page 50.

Client Profiles

Information in a client profile can be used to configure clients using the Import function in the Client Configuration Assistant (CCA). Clients can import all or a subset of the configuration information in a profile. The following scenario assumes that the database connections configured on one client will be exported and used to set up one or more clients.

Note: Configuration profiles can also be imported using the **db2cfimp** command. Refer to the *Command Reference* for more information.

A client profile is generated from a client using the Export function of the CCA. The information contained in a client profile is determined during the export process. Depending on the settings chosen, it can contain the existing client's:

- Database connection information (including CLI or ODBC settings).
- Client settings (including database manager configuration parameters and DB2 registry variables).
- CLI or ODBC common parameters.
- Configuration data for the local APPC or NetBIOS communications subsystem.

To create a client profile, perform the following steps:

Step 1. Start the CCA. For more information, see "Starting the Client Configuration Assistant" on page 63.

Step 2. Click **Export**. The Select Export Option window opens.

Step 3. Select one of the following export options:

- If you want to create a profile that contains all of the databases cataloged on your system, and all of the configuration information for this client, select the **All** radio button, click **OK**, and go to Step 8.
- If you want to create a profile that contains all of the databases cataloged on your system *without* any of the configuration information for this client, select the **Database connection information** radio button, click **OK**, and go to Step 8.
- If you want to select a subset of the databases that are cataloged on your system, or a subset of the configuration information for this client, select the **Customize** radio button, click **OK**, and go to the next step.

Step 4. Select the databases to be exported from the **Available databases** box and add them to the **Selected databases** box by clicking on the push button.

To add all of the available databases to the **Databases to be exported** box, click the **>>** button.

Step 5. Select the check boxes from the **Select custom export option** box that correspond to the options that you want to set up for the target client.

To customize settings, click on the appropriate **Customize** push button. The settings that you customize will only affect the profile to be exported, no changes will be made to your workstation. For more information, click **Help**.

Step 6. Click **OK**. The Export Client Profile window opens.

Step 7. Enter a path and file name for this client profile and click **OK**. The DB2 Message window appears.

Step 8. Click **OK**.

To import a client profile, perform the following steps:

Step 1. Start the CCA. For more information, see "Starting the Client Configuration Assistant" on page 63.

Step 2. Click **Import**. The Select Profile window opens.

Step 3. Select a client profile to import and click **OK**. The Import Profile window opens.

Step 4. You can select to import all or a subset of the information in a Client Profile. Select one of the following import options:

- To import everything in a client profile, select the **All** radio button.

- To import a specific database, or settings, that are defined in a Client Profile, select the **Customize** radio button. Select the check boxes that correspond to the options that you want to customize.

Step 5. Click **OK**.

If you selected the **All** radio button, you are now ready to start using your DB2 product. For more advanced topics, refer to the *Administration Guide* and the *Installation and Configuration Supplement*.

Step 6. You are presented with a list of systems, instances, and databases. Select the database that you want to add and click **Next**.

Step 7. Enter a local database alias name in the **Database alias** field and optionally enter a comment that describes this database in the **Comment** field. Click **Next**.

Step 8. If you are planning to use ODBC, register this database as an ODBC data source.

Note: ODBC must be installed to perform this operation.

a. Ensure that the **Register this database for ODBC** check box is selected.

b. Select the radio button that describes how you would like to register this database:

- If you would like all users on your system to have access to this data source, select the **As a system data source** radio button.
- If you would like only the current user to have access to this data source, select the **As a user data source** radio button.
- If you would like to create an ODBC data source file to share database access, select the **As a file data source** radio button and enter the path and file name for this file in the **File data source name** field.

c. Click the **Optimize for application** drop down box and select the application for which you want to tune the ODBC settings.

d. Click **Finish** to add the database that you selected. The Confirmation window opens.

Step 9. Click the **Test Connection** push button to test the connection. The Connect to DB2 Database window opens.

Step 10. In the Connect To DB2 Database window, enter a valid user ID and password for the remote database and click **OK**. If the connection is successful, a message confirming the connection appears.

If the connection test failed, you will receive a help message. To change any settings you may have incorrectly specified, click the **Change** push button in the Confirmation window to return to the

Add Database Wizard. If problems persist, refer to the *Troubleshooting Guide* for more information.

Step 11. You are now able to use this database. Click **Add** to add more databases, or click **Close** to exit the Add Database Wizard. Click **Close** again to exit the CCA.

Part 3. Appendixes

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 task that you want to perform:

Starting First Steps

Start First Steps as follows:

OS/2 Click on the **OS/2 Warp** button at the left side of the Warp Center, and select **IBM DB2—>First Steps**.

Windows 32-bit operating systems
Click on **Start** and select **Programs—>IBM DB2—>First Steps**

You can also start First Steps by entering the **db2fs** command at a command prompt.

Starting the Client Configuration Assistant

Start the Client Configuration Assistant (CCA) as follows:

OS/2 Click on **OS/2 Warp**, and select **IBM DB2 —> Client Configuration Assistant**

Windows 32-bit operating systems
Click on **Start** and select **Programs—>IBM DB2—>Client Configuration Assistant**

You can also start the CCA by entering the **db2cca** command at a command prompt.

Starting the DB2 Control Center

You can run the DB2 Control Center as a Java *application* or as a Java *applet*.

To run the Control Center as an application

Enter the **db2cc** command. Your system must have the correct Java Runtime Environment installed in order to run the Control Center as an application.

On Windows 32-bit and OS/2 systems, you can also start the Control Center as an application by invoking the **Control Center** icon in your **IBM DB2** program group.

To run the Control Center as an applet

You must have a Java-enabled browser and you must perform some additional configuration steps to run the Control Center as an applet. For detailed instructions on running the Control Center as an applet or application, see "Chapter 4. Control Center Installation and Configuration" on page 21.

Entering Commands Using the Command Center

This section describes how to enter commands using the Command Center. There are two versions of the Command Center. This section documents the Command Center that is accessable from the DB2 Control Center.

Note: If you do not have the Control Center installed, a Command Center with limited functionality is available through the IBM DB2 program group, or by entering the **db2cctr** command.

From the Command Center you can:

- 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.
- 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.
- Use the SQLAssist tool to build complex queries.
- Display results in an table you can edit.

To start the Command Center, click on the **Command Center** icon in the Control Center.

The Command Center contains a large input area for entering commands. To run the commands you have entered, click on the **Execute** icon (the gears icon).

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:

```
!dir
```

If you want to enter multiple commands, you must end each command with the termination character, then press **Enter** to start the next command on a new line. The default termination character is a semicolon (;).

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 **Execute** icon, the results are displayed.

To recall commands that you have entered during your session, select the **Command history** drop down box, and select a command.

To save commands, select **Interactive —> Save Command As** from the menu bar. For more information, click on the **Help** push button or press the **F1** key.

You can use the **Append to Script** button and the Script page of the Command Center to store commonly used SQL statements or DB2 commands as scripts. 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:

DB2 Command Window
The DB2 command line processor behaves like a command window from your operating system. You can enter operating system commands, DB2 commands, or SQL statements and view their output.

Interactive Input Mode
The db2 prefix that you use for DB2 commands (in the DB2 Command Window) 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*.

DB2 Command Window

To invoke a DB2 Command Window, do the following:

OS/2 Open any OS/2 command window.

Windows 32-bit operating systems
Click on **Start** and select **Programs —> IBM DB2 —> Command Window**

You can also invoke the DB2 command window by entering the **db2cmd** command at your operating system's prompt.

If you are entering commands via the Command Window, 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"
```

To enter a long command that does not fit on a single line, you must use a space followed by the line continuation character "\" at the end of one line, then press the **Enter** key to continue the command on to the next. 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
```

Interactive Input Mode

To invoke the command line processor in interactive input mode, do the following:

OS/2 Click on **OS/2 Warp** and select **IBM DB2 —> Command Line Processor** or enter the **db2** command.

Windows 32-bit operating systems
Click on **Start** and select **Programs —> IBM DB2 —> Command Line Processor**.

You can also invoke the command line processor in interactive input mode by entering the **db2cmd** command followed by the **db2** command at your operating system's prompt.

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 => !dir
```

To enter a long command that does not fit on a single line, you must use a space followed by the line continuation character "\" at the end of one line, then press the **Enter** key to continue the command on to the next. 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** 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 the following:

OS/2 Any valid DB2 user ID which belongs to the Administrator or Local Administrator group.

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*.

Setting the Number of Licensed Processors

Note: This section applies only to DB2 Enterprise Edition, DB2 Enterprise-Extended Edition, and DB2 Warehouse Manager.

If you are using an SMP machine and you have purchased additional processor entitlements, you can update this information using the **db2licm** command.

To update the number of License Processors, perform the following steps:

1. Log in as a user with SYSADM, SYSCTRL or SYSMAINT authority.
2. The **db2licm** utility can be found in the following locations:
   - For Unix-based operating systems, if `INSTHOME/sqllib/adm` is not in your PATH, change your directory.
   - For Windows 32–bit operating systems and OS/2, go to *x:*`\`*DB2DIR*`\bin`, where *x:*`\`*DB2DIR*`\`is your DB2 installation drive and path.
3. Obtain the product password by issuing the **db2licm -l** command. The DB2 products are listed as follows:

   Enterprise-Extended Edition
   DB2UDBEEE DB

   Enterprise Edition
   DB2UDBEE DB2

   Warehouse Manager
   DB2UDBWM DB2

   Relational Connect
   DB2RELC DB2

   Spatial Extenders
   DB2UDBGSE
4. Update the number of processors using:

   ```
   db2licm -n [product password] [number of processors]
   ```

Upgrading DB2 from Try and Buy Mode

You can upgrade a DB2 product from the Try and Buy mode to a licensed version in two ways. You can use the command line utility called **db2licm** or use the License Center. The License Center is a built-in feature of the Control Center.

On OS/2 and Windows 32-bit Operating Systems

To add a license using the command line:

1. Go to the <*install directory*>\bin directory, where <*install directory*> represents the directory where you installed the product.
2. To add a license, issue the following command:

   ```
   db2licm path/filename.lic
   ```

   License files are contained in the db2/license directory of the installation CD.

   For more information about the **db2licm** command, refer to the *Command Reference*.

Adding a license using the License Center

To add a license using the License Center:

1. Launch the Control Center.
2. Select **License Center** from the **Tools** menu list.
3. Refer to the online help for the License Center available from the Control Center.

Uninstalling DB2

You can uninstall DB2 as follows:

1. Drop all databases.
2. Do one of the following:
   - Windows: go to the Add/Remove Products window, and select DB2.
   - OS/2: launch the Installation Utility in the IBM DB2 folder, select the product, and then select **Action —> Delete**.
   - Go to the sqllib\bin directory, and invoke the **db2unins** command.

If you cannot run the uninstall program, for example because the installation was unsuccessful, you can remove DB2 as follows:

1. Remove any partially installed files. For example, delete the files in the c:\sqllib directory.
2. Under Windows, clean up the registry, using a registry editor such as **regedt32**. Delete the following entries:

   ```
   HKEY_LOCAL_MACHINE\SOFTWARE\IBM\DB2
   HKEY_CURRENT_USER\SOFTWARE\IBM\DB2
   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\services\name
   ```

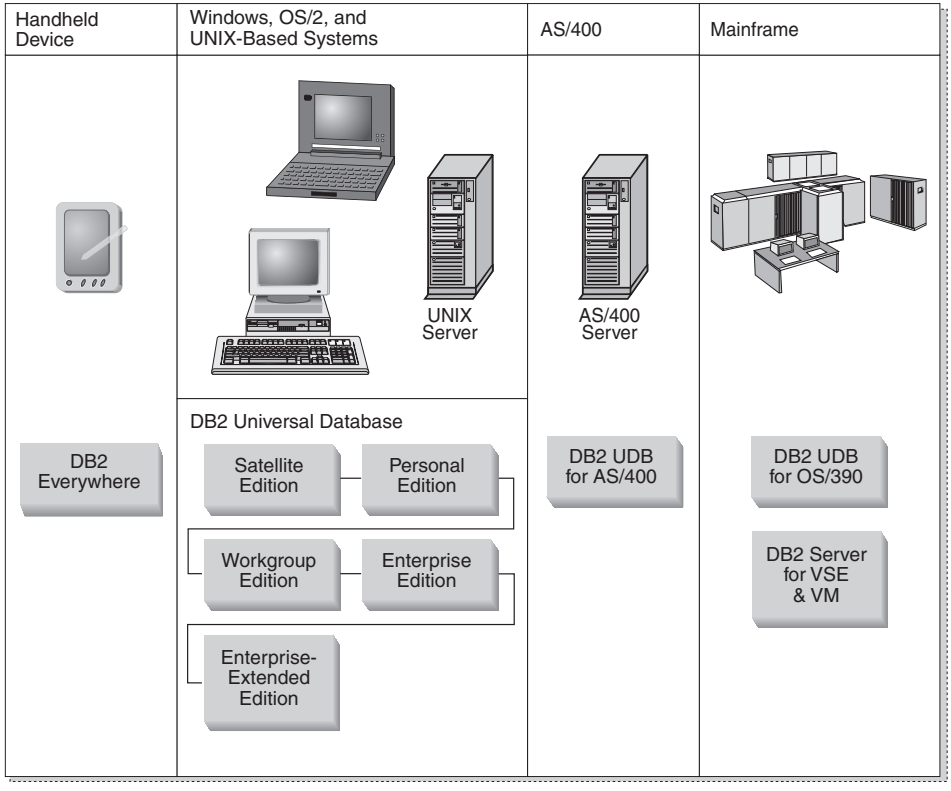
   where *name* is one of the following:

   - The instance name

- The instance name followed by **-N**
- **DB2REMOTECMD**
- **DB2DAS00**
- **DB2GOVERNOR**
- **DB2NTSECSERVER**
- **DB2JDS**
- **DB2_NT_Performance**
- **DB2LICD**
- **DB2ControlCenterServer**
- **vwd**
- **vwkernel**
- **vwlogger**
- **EssbaseService**
- **OLAPIntegrationService**
- **DlfmService**

Appendix B. About DB2 Universal Database for UNIX, Windows, and OS/2

The DB2 Product Family provides relational database solutions for a wide range of computing devices, from small handheld devices up to the largest IBM mainframe.



DB2 Products

The name DB2 is used for relational database products that run on a variety of platforms.

DB2 Everywhere

DB2 Everywhere is a very small footprint database that runs on mobile devices, such as personal digital assistants (PDAs), smart phones, and

handheld personal computers (HPCs). Each mobile device stores a subset of the data from an enterprise database, which it can use without the need for a continuous database connection.

DB2 Everywhere Sync Server, running on a mid-tier server, replicates the data in both directions between mobile devices and the enterprise database. For example, each worker in a loading dock might carry a PDA that is periodically synchronized with an inventory database on OS/390.

DB2 Universal Database

The following table shows which products are available on each platform:

Table 7. DB2 Universal Database Platforms

Edition	Windows 95/98	Windows NT/ Windows 2000	OS/2	Linux	AIX	HP-UX	Solaris	PTX/NUMA-Q
Satellite	✓	✓						
Personal	✓	✓	✓	✓				
Workgroup		✓	✓	✓	✓	✓	✓	
Enterprise		✓	✓	✓	✓	✓	✓	✓
Enterprise - Extended		✓			✓	✓	✓	✓

Note: DB2 UDB Workgroup Edition, DB2 UDB Enterprise Edition, and DB2 UDB Enterprise - Extended Edition are commonly referred to as "servers" or "DB2 servers". Various clients are provided with each server product.

Satellite Edition

DB2 UDB Satellite Edition is a single-user, small footprint version of DB2 available for Windows 32-bit operating systems. It is designed for occasionally connected remote systems, such as laptop computers.

Typically, many instances of DB2 UDB Satellite Edition are managed centrally by the same server.

Personal Edition

DB2 UDB Personal Edition is a single-user version of the full DB2 product. It contains:

- An object-relational database engine
- Business intelligence support, through the OLAP Starter Kit
- Data warehouse support, through the Data Warehouse Center
- Multimedia support, through DB2 Extenders
- Access to a variety of IBM data sources, through DB2 DataJoiner
- Replication support, through DataPropagator
- Extended GUI administration tools, through DB2 Control Center

- An application development client
- An administration client

Workgroup Edition

DB2 UDB Workgroup Edition is a multi-user version of the DB2 product, designed for a small business or departmental environment. It contains all the functionality of the Personal Edition, plus:

- The ability for remote clients to access data and perform administration on a DB2 workgroup server
- Web access, through Net.Data
- IBM WebSphere Application Server

Enterprise Edition

DB2 UDB Enterprise Edition is designed for large databases with many users. It contains all the functionality of the Workgroup Edition, plus:

- A license for an unlimited number of client connections
- A license for an unlimited number of web client connections
- DB2 Connect support, with DRDA access to host DB2 systems

Enterprise - Extended Edition

DB2 UDB Enterprise - Extended Edition is designed for the largest databases. It is ideal for scaling to very large databases for warehousing, data mining, and large-scale OLTP applications. It contains all the functionality of the Enterprise Edition, plus:

- Support for clusters of servers

Developer Editions

Two special editions of DB2 are available for people who develop DB2 applications:

- DB2 Personal Developer's Edition
- DB2 Universal Developer's Edition

DB2 Personal Developer's Edition provides tools to help a software developer create applications for a DB2 Personal Edition database. DB2 Personal Developer's Edition contains all the functionality of DB2 UDB Personal Edition, plus:

- The functionality of DB2 Connect Personal Edition
- VisualAge for Java, Entry Edition

DB2 Universal Developer's Edition provides the tools for developing client/server applications. DB2 Universal Developer's Edition contains all the functionality of DB2 UDB Enterprise Edition, plus:

- VisualAge for Java, Professional Edition

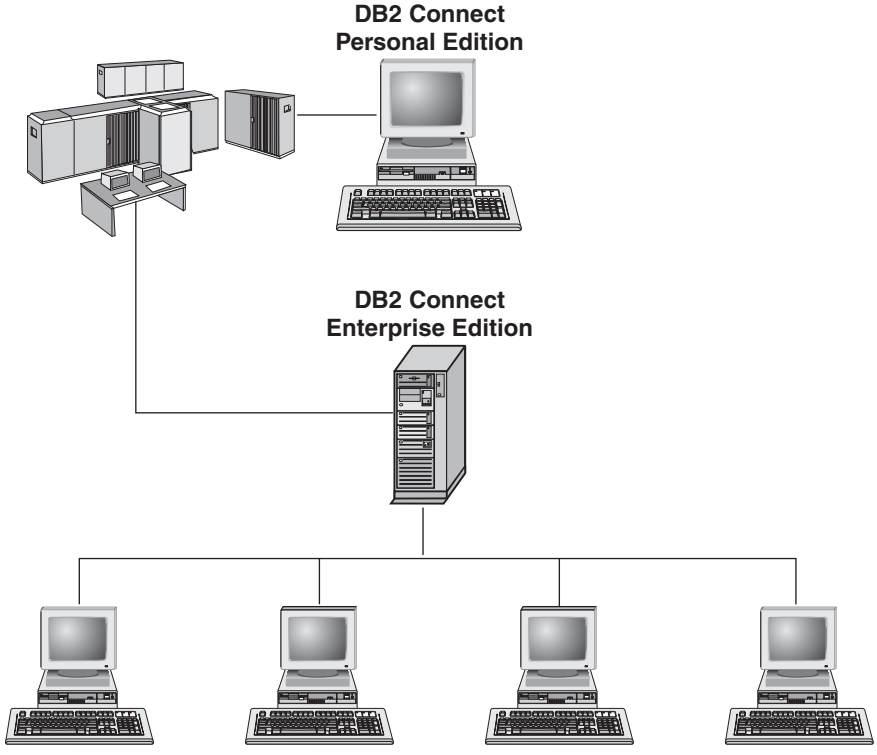
Host Databases

The following DB2 products are available for IBM midrange and mainframe systems:

- DB2 UDB for AS/400
- DB2 Server for VSE & VM
- DB2 UDB for OS/390

DB2 Connect

DB2 Connect provides connectivity to mainframe and midrange databases from Windows, OS/2, and UNIX-based platforms. You can connect to DB2 databases on OS/400, VSE, VM, MVS, and OS/390. You can also connect to non-IBM databases that comply with the Distributed Relational Database Architecture (DRDA).



The following DB2 Connect products are available:

- Personal Edition
- Enterprise Edition
- Unlimited Edition

DB2 Connect Personal Edition provides a direct connection from one Windows, OS/2, or Linux operating system to mainframe and midrange databases. It is designed for a two-tier environment, where each client connects directly to the host. DB2 Connect Personal Edition does not accept inbound client requests for data.

DB2 Connect Enterprise Edition, installed on a gateway server, connects an entire LAN to mainframe and midrange databases. It is designed for a three-tier environment, where clients connect to a host through a gateway server.

DB2 Connect Unlimited Edition provides an unlimited number of DB2 Connect Personal Edition and DB2 Connect Enterprise Edition licenses. You get all of these licenses for one price, based on the size of the OS/390 system that is being accessed.

Related Products

The following products work together with DB2 Universal Database.

DB2 Relational Connect

DB2 Relational Connect gives you the ability to access federated data by joining DB2 data with Oracle data within a query. It works under DB2 UDB Enterprise Edition or Enterprise - Extended Edition on Windows NT, Windows 2000, and AIX.

DB2 Warehouse Manager

DB2 Warehouse Manager provides a warehouse or data mart administrator with enhanced management capabilities. It provides the ability to manage the process of moving data as well as manage the ad hoc query workload going against the warehouse or mart. This product includes:

- Warehouse agents, which manage the flow of data between sources and warehouse targets.
- Warehouse transformers, which clean and transform data moving into the warehouse.
- An integrated business information catalog, which guides users to the data that they want.
- Metadata interchange with end-user repositories and CASE tools.
- A sophisticated query management and workload distribution tool, DB2 Query Patroller, which was previously a separate product. In order to use Query Patroller, you must have a Query Patroller server installed. Query Patroller client support is only available with a DB2 Administration Client. For more information, refer to *DB2 Query Patroller Administration Guide*.

This product is available for DB2 UDB Enterprise Edition and Enterprise - Extended Edition systems.

DB2 OLAP Server

DB2 OLAP Server provides fast, intuitive online analytic processing of data to afford users quick access to information. OLAP servers process multidimensional requests that calculate, consolidate, and retrieve information from multidimensional and relational databases.

With DB2 OLAP Server you can:

- Build analytical applications using built-in math, financial and statistical functions to define data in multidimensional cubes.
- View multidimensional data from various perspectives.
- Dynamically add new data dimensions, modify dimensional hierarchies, and change calculations.
- Use spreadsheets and web browsers as clients to analyze data without using separate SQL queries.
- Ensure data security by defining levels of access for individuals.

Intelligent Miner

The Intelligent Miner family consists of two products:

- DB2 Intelligent Miner for Data extracts valuable information from a large quantity of data in a relational database.
- Intelligent Miner for Text works with unstructured information, such as text files, email, and web pages.

Tivoli Enterprise

Tivoli Enterprise is a suite of management applications that let you manage an entire enterprise environment, including the data center, distributed systems, and mobile laptops as a single business unit. DB2 has been certified as Tivoli Ready.

Working with DB2 Data

DB2 is a relational database system rich in features, many of which can be accessed remotely. In addition to allowing you to store your data, DB2 lets you issue requests to administer, query, update, insert, or delete data using local or remote client applications.

Accessing DB2 Data from Remote Clients

DB2 clients provide a run-time environment that enables client applications to access one or more remote databases. With a DB2 Administration Client, you can remotely administer DB2 or DB2 Connect servers. All applications must access a database through a DB2 client. A Java applet can access a remote database through a Java-enabled browser.

DB2 Version 7 clients are supported on:

- OS/2
- UNIX (AIX, HP-UX, Linux, NUMA-Q, SGI IRIX, and the Solaris Operating Environment)
- Windows 9x, Windows NT, or Windows 2000

Figure 2 shows a server that is being accessed by local and remote applications. Remote applications must have the appropriate DB2 client installed to enable applications to access data on the remote server.

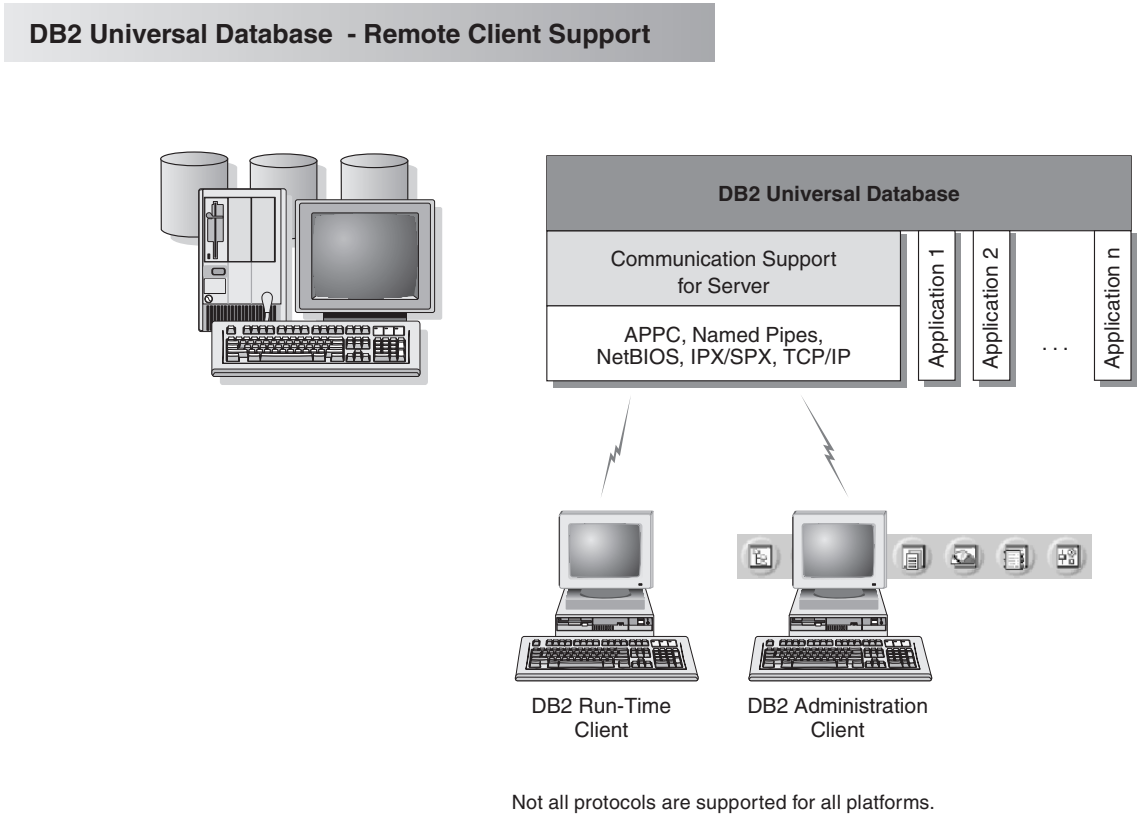


Figure 2. DB2 Server with Local Applications and Remote Clients

Accessing Multiple DB2 Servers

Once a network is operational and protocols are functional on all workstations, LAN-to-LAN connections between DB2 servers and clients require no additional software.

For example, you can have a server on a Windows NT workstation that is connected to a LAN, and another server on a UNIX workstation connected to a LAN. As long as there is a connection between the two LANs, clients on either network can access either server. See Figure 3.

Communicating Between DB2 Universal Database Servers

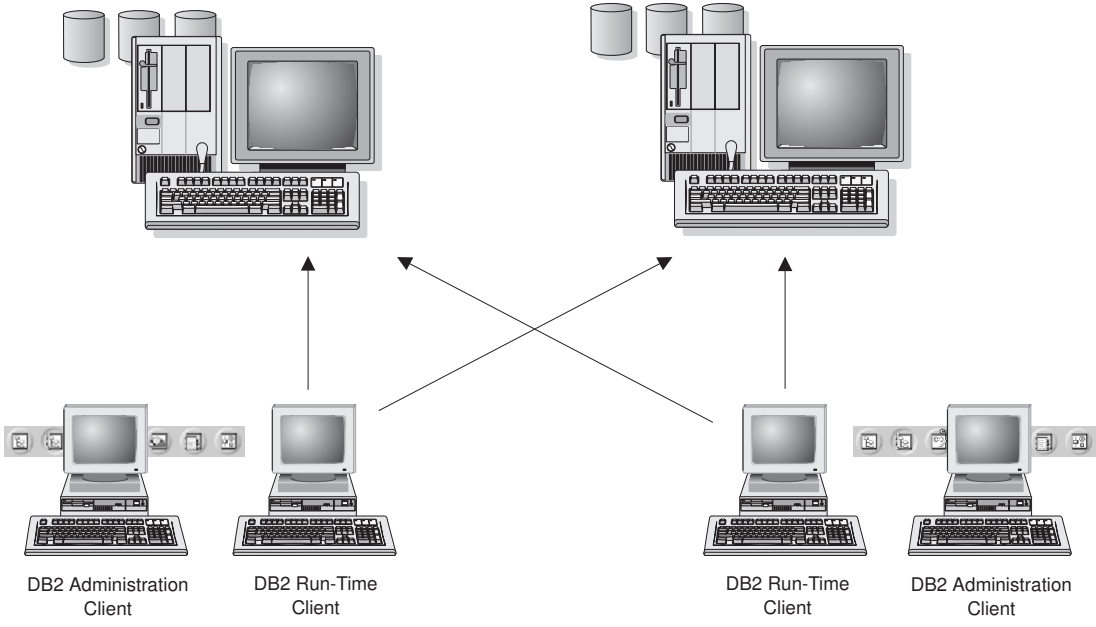


Figure 3. Accessing Data on Multiple Servers

Within a single transaction, databases on both servers are accessed and updated, and the integrity of the data on both servers is maintained. This is commonly known as two-phase commit, or distributed-unit-of-work access. Refer to the *Administration Guide* for more information.

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

A DB2 server with the DB2 Connect Server Support feature installed, or a DB2 Connect server, enables DB2 clients on a LAN access to data that is stored on host or AS/400 systems.

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, IBM TxSeries CICS and Encina Monitor, Microsoft Transaction Server, BEA Tuxedo) 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 BusinessObjects, Brio and Impromptu, 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.

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.
- Application is implemented using data-aware Java applets.
- Web servers are used to implement web-based applications.
- Middle-tier application server is employed.
- Transaction monitors such as IBM TxSeries CICS and Encina Monitor, IBM Component Broker, IBM MQSeries, Microsoft Transaction Server (MTS), and BEA Tuxedo are used.

DB2 Connect provides 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). DRDA allows your applications to establish a fast connection to host and AS/400 databases without expensive host components or proprietary gateways.

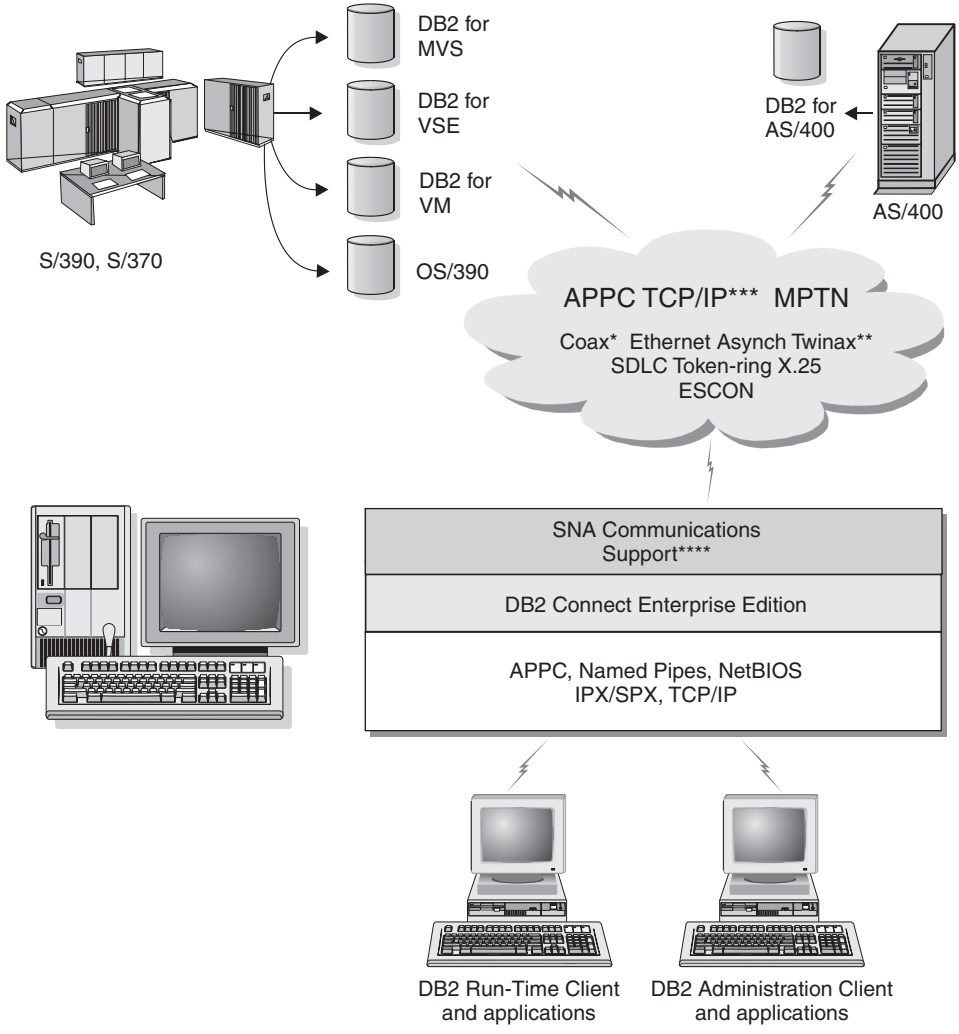
Although DB2 Connect is often installed on an intermediate server machine to connect DB2 clients to a host or AS/400 database, it is also installed on machines where multiple local users want to access the host or AS/400 servers directly. For example, DB2 Connect may be installed on a large machine with many local users.

DB2 Connect 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 server with the DB2 Connect functionality installed, or 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 4 on page 81 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.



* 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
**** SNA Comm Support is specific for each operating system and is required only in cases where native TCP/IP conectivity is not available.

Figure 4. DB2 Connect Enterprise Edition

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 DB2 JDBC Applet server and the DB2 client must reside on the same machine as the Web server. The DB2 JDBC Applet 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 DB2 JDBC Applet on the machine where the Web server is running. See Figure 5 on page 83 for an example of a Java-enabled browser accessing data from remote DB2 databases.

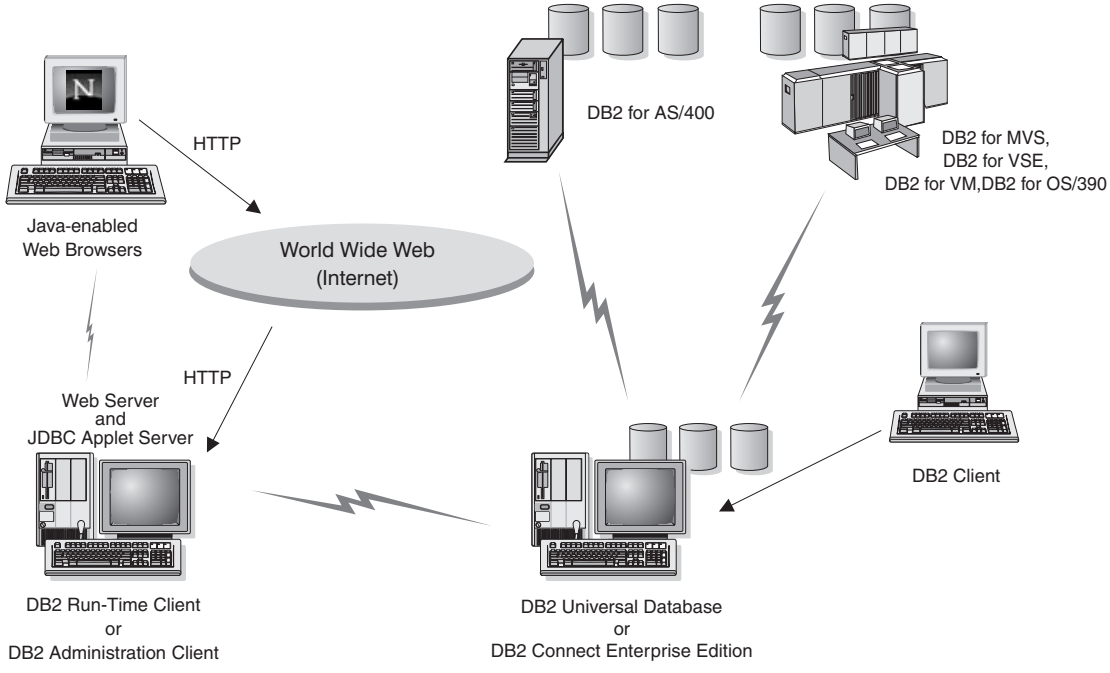


Figure 5. Accessing Data Stored on DB2 using JDBC

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.ibm.com/software/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. You can 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.ibm.com/software/data/net.data

Net.Data can be installed with a:

- DB2 server to allow local access to databases.
- DB2 client to allow remote access to databases.

In both cases, Net.Data and the Web server must be installed on the same system. See Figure 6 for an example of a workstation with Net.Data that is being used to access data from a remote DB2 database.

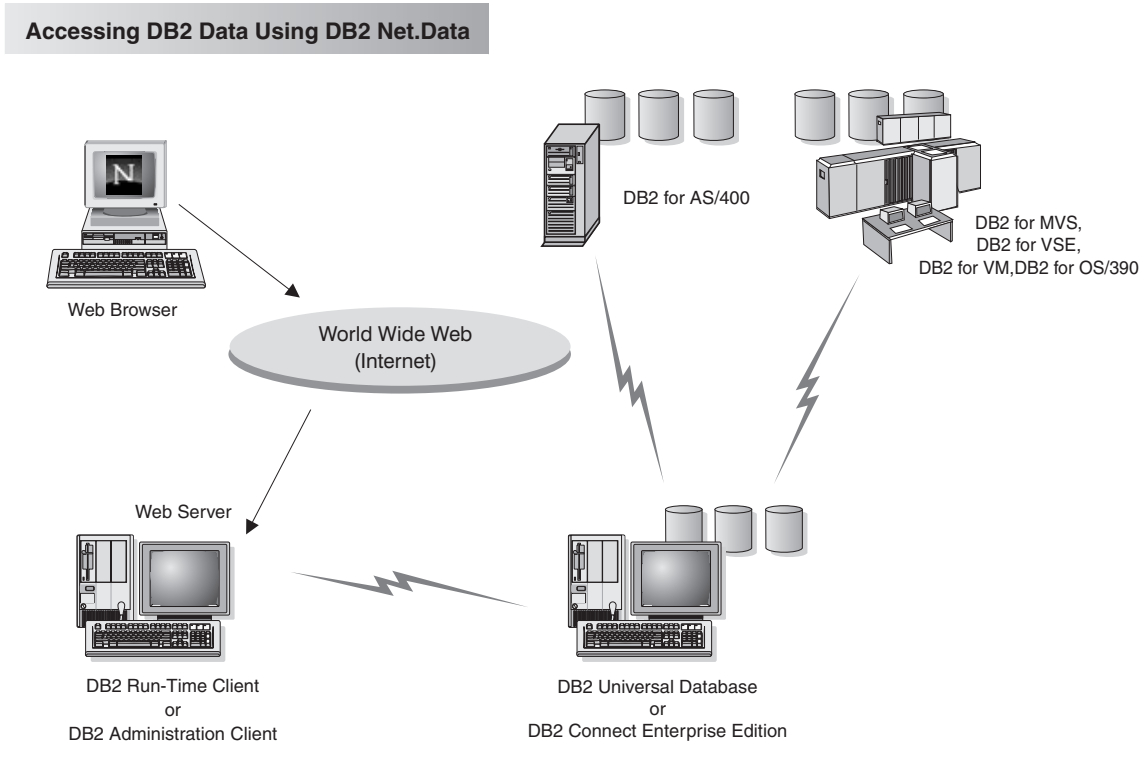


Figure 6. Accessing Internet Data Stored on DB2 using Net.Data

Accessing DB2 Data from Host and AS/400 Client Machines

The DRDA Application Server (DRDA AS) functionality gives clients or applications on host and AS/400 machines transparent access to data stored on a LAN-based DB2 Universal Database server. This access is provided through Distributed Relational Database Architecture (DRDA), a standard architecture for managing data. You can configure your server to act as a DRDA AS for host and AS/400 clients or applications; these clients or applications are known as DRDA Application Requesters (DRDA AR).

The DRDA AS feature is available for:

- DB2 Universal Database Enterprise - Extended Edition
- DB2 Universal Database Enterprise Edition
- DB2 Universal Database Workgroup Edition

For information on how to set up your DB2 Universal Database server as a DRDA AS, refer to the *Installation and Configuration Supplement*.

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.

Managing Instances and Database Objects using the Control Center

The Control Center displays instances and database objects (such as table spaces, tables, and packages) and their relationships to each other. Using the Control Center, you can manage local and remote servers from a single point of control. See Figure 7 on page 86 for an example of the main Control Center window.

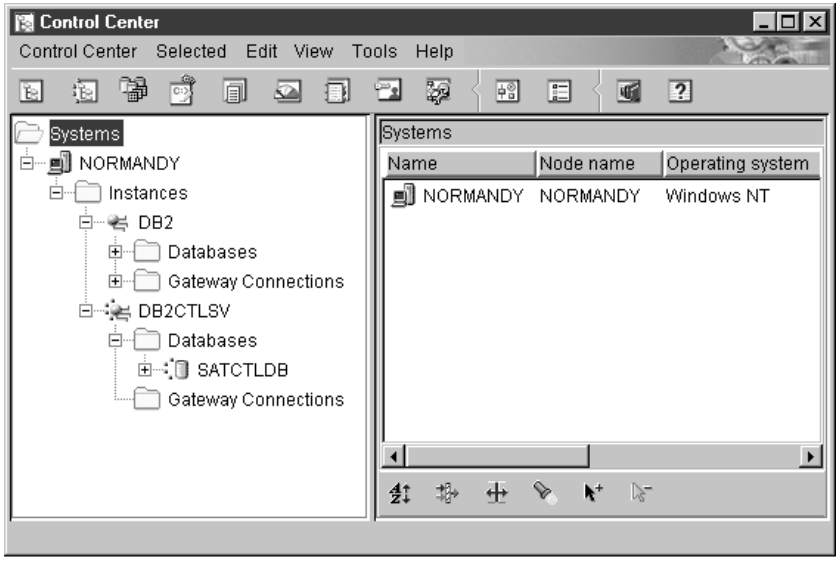


Figure 7. Control Center Main Window

From the Control Center, you can perform operations on database objects. These operations include:

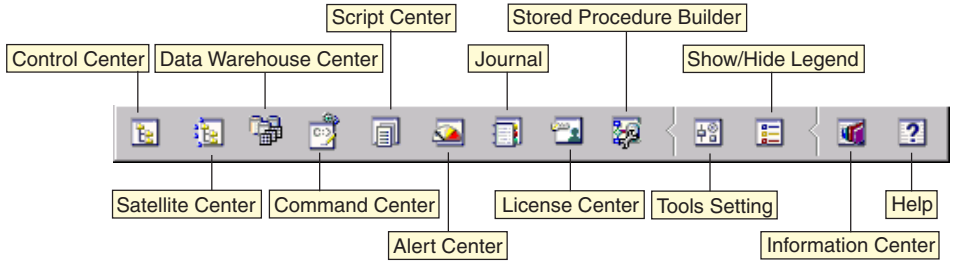
- Create and drop a database
- Create, alter, and drop a table space or table
- Create, alter, and drop an index
- Backup and recover a database or table space
- Define the replication sources and subscriptions to replicate data between systems
- Monitor resources and events on a server.

You can also control DB2 instances by:

- Maintaining communication protocols
- Setting database manager and database configuration values that affect performance.

Wizards are provided to help you perform complex tasks. For example, a wizard is available to tune the performance of your system. See "Using DB2 Wizards" on page 111 for descriptions of the various wizards and how to start them.

The Control Center provides additional functionality to assist you in managing your servers:



Control Center

Use the Control Center to start another session of the Control Center to administer a server.

Satellite Center

Use the Satellite Center to manage the Satellites that are served by a particular DB2 Control Server. It provides create, remove, modify, and manage functions for Satellites and Groups. You can also create and manage scripts to administer the Satellites.

Data Warehouse Center

Use the Data Warehouse Center to manage warehouses; create and manage warehouse objects, such as sources and targets; define, extract, transform, manipulate, and load steps and processes; and schedule and automate steps.

Command Center

Use the Command Center to enter DB2 commands and SQL statements in an interactive window and see the execution result in a result window. You can scroll through the results and save the output to a file.

Script Center

Use the Script Center to create scripts, which you can store and invoke at a later time. These scripts can contain DB2 commands, SQL statements, as well as operating system commands. Scripts can be scheduled to run unattended. These jobs can be run once or set up to run on a repeating schedule; a repeating schedule is particularly useful for tasks like backup.

Alert Center

Use the Alert Center to monitor your system for early warnings of potential problems or to automate actions to correct problems discovered.

Journal

Use the Journal to view all available information about jobs that are

pending execution, executing, or that have completed execution. You can also view the recovery history log, the alerts log, and the messages log; and review the results of jobs that are run unattended.

License Center
Use the License Center to manage licenses and display license status and usage of any DB2 products installed on your system. You can also use the License Center to configure your system for proper license monitoring.

Stored Procedure Builder
Use Stored Procedure Builder to create stored procedures, build stored procedures on local and remote DB2 servers, modify and rebuild existing stored procedures, and run stored procedures for testing and debugging the execution of installed stored procedures.

Tools Setting
Use the Tools Setting to change the settings for the DB2 Administration Tools.

Information Center
The Information Center provides quick access to DB2 product information. This product information includes such items as: database tasks, reference material, DB2 documentation, warehouse administration information, troubleshooting aids, sample programs for application development, and DB2 web-related URLs.

You can also analyze performance using the DB2 Performance Monitor and Visual Explain. These tools are available from the Control Center.

Use the **DB2 Performance Monitor** to monitor the performance of your system. You can monitor activity by sampling data over a period of time or using data for a particular event. See "Monitoring Databases using DB2 Performance Monitor" on page 89 for more information.

Use **Visual Explain** to view the access plan for explained SQL statements as a graph. You can use the information available from the graph to tune your SQL queries for better performance. See "Viewing SQL Access Plans using Visual Explain" on page 89 for more information.

You can find additional information in the *Administration Guide* or in the online help.

Managing Communications on the Server

The Control Center allows you to view, update, and reset server protocol settings. These functions are accessed by clicking with the right mouse button on an instance and selecting the **Setup communications** option from the pop-up menu. This tool helps database administrators to:

- Configure database manager parameters by clicking with the right mouse button on an instance and selecting the **Configure** option from the pop-up menu. By default, the setup program automatically detects and configures most communication protocols that it detects on your system.
- Export database information in a profile that can be used to configure clients by clicking with the right mouse button on a system and selecting the **Export Server Profile** option from the pop-up menu.

For information on how to configure server communications, refer to the *Installation and Configuration Supplement*.

Monitoring Databases using DB2 Performance Monitor

With the DB2 Performance Monitor, you can:

- Identify and analyze performance problems in database applications or the database manager.
- Use the early warning system to detect potential problems.
- Automate actions to correct problems that are discovered.
- Define your own statistics, in addition to the default set that is provided.

You can choose to monitor the current state of database activity or collect information when specific events occur. The Performance Monitor allows you to capture point-in-time information at specified intervals. The Event Analyzer allows you to view information about the occurrence of events such as deadlocks and transaction completions.

For additional information, refer to the *Administration Guide* or the online help. You are also able to use the Windows Performance Monitor (supported on Windows NT and Windows 2000) to monitor both database and system performance. For information on how to register DB2 resources and to use the Windows Performance Monitor, refer to the *Administration Guide*.

Viewing SQL Access Plans using Visual Explain

Visual Explain helps database administrators and application developers to:

- View the access plan chosen by the database manager's optimizer for a given SQL statement.
- Tune SQL statements for better performance.
- Design application programs and databases.
- View all the details of an access plan, including the statistics in the system catalogs.
- Decide whether or not to add an index to a table.
- Identify the source of problems by analyzing the access plan or performance of SQL statements.
- Use the portable snapshot function to view snapshots from any remote DB2 server.

- Display access plans for queries on all supported DB2 configurations.

For additional information, refer to the *Administration Guide* or the online help.

Managing Connections to Databases using the Client Configuration Assistant

The Client Configuration Assistant (CCA) helps you manage your database connections to remote servers. The CCA is available on OS/2 and Windows 32-bit operating systems and this is the preferred method to set up any OS/2, Windows 9x, Windows NT, or Windows 2000 client to communicate with a server.

You can use the command line processor to set up DB2 clients on any platform. For more information, refer to the *Installation and Configuration Supplement*.

With the CCA, you can:

- Catalog databases so that they can be used by applications. Three methods are available:
  - Use a profile provided by a database administrator to automatically define your connections. Client access is automatically set up for that database.
  - Search the network for available databases and select one. Client access is automatically set up for that database.
  - Manually configure a connection to a database by entering the required connection parameters.
- Remove cataloged databases, or change the properties of a cataloged database.
- Export and import client profiles that contain database and configuration information for a client.
- Test connections to local or remote databases identified on your system.
- Bind applications to a database by selecting utilities or bind files from a list.
- Tune the client configuration parameters on your system. Parameters are logically grouped and suggested settings are provided on the interface as parameters are selected.
- Export client configuration information to a profile.
- Import configuration information from a profile.
- Update the server password.

Managing Warehouses using the Data Warehouse Center

DB2 Universal Database offers the Data Warehouse Center, a component that automates data warehouse processing. You can use the Data Warehouse Center to define the data to include in the warehouse. Then, you can use the Data Warehouse Center to schedule automatic refreshes of the data in the warehouse.

From the Data Warehouse Center, you can manage specific warehousing objects, including subject areas, warehouse sources, warehouse targets, agents, agent sites, steps, and processes.

You can also perform the following tasks from the Data Warehouse Center:

- Define a subject area. You use a subject area to logically group the processes that are related to a particular topic or function.
- Explore the source data and define warehouse sources.
- Create database tables and define warehouse targets.
- Define a process that specifies how to move and transform the source data into the appropriate format for the warehouse.
- Test and schedule steps.
- Define security and monitor database currency.
- Define a star schema model.

Understanding the Administration Server

The Administration Server responds to requests from the DB2 Administration Tools and the Client Configuration Assistant (CCA). The DB2 Administration Tools allow you to start, stop, and set database manager configuration parameters for servers. The Administration Server is used by the CCA to catalog databases for a client.

The Administration Server (DAS) must reside on every server that you want to administer and detect. The Administration Server is automatically created and started for you; its default name is `DB2DAS00`.

Developing Applications using the DB2 Application Development Client

The DB2 Application Development Client 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 Application Development Client is available on each server CD-ROM. In addition the Developer Edition boxes contain the Application Development Clients for multiple supported operating

systems. The Personal Developer's Edition box contains the Application Development CD-ROMs for OS/2, Windows and Linux. The Universal Developer's Edition box contains the Application Development CD-ROMs for all supported operating systems.

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 Application Development Client 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 Application Development Client includes:

- Precompilers for Java, C, C++, COBOL, and FORTRAN.
- Libraries, include files, and code samples to develop applications that use SQLJ and DB2 CLI.
- A single control point for metadata management through the use of templates and tokens.
- 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 DB2 Application Development Client, 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 Application Development Client 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.
- Net.Data macros containing HTML and SQL.

The DB2 CLI/ODBC driver is an optional component during a DB2 client install. It is required to run CLI, ODBC, JDBC, and some SQLJ applications.

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

Appendix C. Using the DB2 Library

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

To access product information online, you can use the Information Center. For more information, see "Accessing Information with the Information Center" on page 109. You can view task information, DB2 books, troubleshooting information, sample programs, and DB2 information on the Web.

DB2 PDF Files and Printed Books

DB2 Information

The following table divides the DB2 books into four categories:

DB2 Guide and Reference Information
These books contain the common DB2 information for all platforms.

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

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

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

The installation manuals, release notes, and tutorials are viewable in HTML directly from the product CD-ROM. Most books are available in HTML on the product CD-ROM for viewing and in Adobe Acrobat (PDF) format on the DB2 publications CD-ROM for viewing and printing. You can also order a printed copy from IBM; see "Ordering the Printed Books" on page 105. The following table lists books that can be ordered.

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

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

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

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

- "Viewing Information Online" on page 108
- "Searching Information Online" on page 112
- "Ordering the Printed Books" on page 105
- "Printing the PDF Books" on page 104

Table 8. DB2 Information

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

Table 8. DB2 Information (continued)

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

Table 8. DB2 Information (continued)

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

Table 8. DB2 Information (continued)

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

Table 8. DB2 Information (continued)

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

Table 8. DB2 Information (continued)

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

Table 8. DB2 Information (continued)

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

Table 8. DB2 Information (continued)

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

Notes:

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

Language	Identifier
Brazilian Portuguese	b

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

2. Late breaking information that could not be included in the DB2 books is available in the Release Notes in HTML format and as an ASCII file. The HTML version is available from the Information Center and on the product CD-ROMs. To view the ASCII file:
   - On UNIX-based platforms, see the `Release.Notes` file. This file is located in the `DB2DIR/Readme/%L` directory, where `%L` represents the locale name and `DB2DIR` represents:
     - `/usr/lpp/db2_07_01` on AIX
     - `/opt/IBMdb2/V7.1` on HP-UX, PTX, Solaris, and Silicon Graphics IRIX
     - `/usr/IBMdb2/V7.1` on Linux.
   - On other platforms, see the `RELEASE.TXT` file. This file is located in the directory where the product is installed. On OS/2 platforms, you can also double-click the **IBM DB2** folder and then double-click the **Release Notes** icon.

Printing the PDF Books

If you prefer to have printed copies of the books, you can print the PDF files found on the DB2 publications CD-ROM. Using the Adobe Acrobat Reader, you can print either the entire book or a specific range of pages. For the file name of each book in the library, see Table 8 on page 96.

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

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

1. Insert the DB2 publications CD-ROM. On UNIX-based platforms, mount the DB2 publications CD-ROM. Refer to your *Quick Beginnings* book for the mounting procedures.
2. Start the Acrobat Reader.
3. Open the desired PDF file from one of the following locations:
   - On OS/2 and Windows platforms:

     x:\doc*language* directory, where *x* represents the CD-ROM drive and *language* represent the two-character country code that represents your language (for example, EN for English).
   - On UNIX-based platforms:

     /*cdrom*/doc/*%L* directory on the CD-ROM, where */cdrom* represents the mount point of the CD-ROM and *%L* represents the name of the desired locale.

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

Ordering the Printed Books

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

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

Table 9. Ordering the printed books

SBOF Number	Books Included	
SBOF-8931	• Administration Guide: Planning • Administration Guide: Implementation • Administration Guide: Performance • Administrative API Reference • Application Building Guide • Application Development Guide • CLI Guide and Reference • Command Reference • Data Movement Utilities Guide and Reference • Data Warehouse Center Administration Guide • Data Warehouse Center Application Integration Guide • DB2 Connect User's Guide • Installation and Configuration Supplement • Image, Audio, and Video Extenders Administration and Programming • Message Reference, Volumes 1 and 2	• OLAP Integration Server Administration Guide • OLAP Integration Server Metaoutline User's Guide • OLAP Integration Server Model User's Guide • OLAP Integration Server User's Guide • OLAP Setup and User's Guide • OLAP Spreadsheet Add-in User's Guide for Excel • OLAP Spreadsheet Add-in User's Guide for Lotus 1-2-3 • Replication Guide and Reference • Spatial Extender Administration and Programming Guide • SQL Getting Started • SQL Reference, Volumes 1 and 2 • System Monitor Guide and Reference • Text Extender Administration and Programming • Troubleshooting Guide • What's New
SBOF-8935	• Information Catalog Manager Administration Guide • Information Catalog Manager User's Guide • Information Catalog Manager Programming Guide and Reference	• Query Patroller Administration Guide • Query Patroller User's Guide

DB2 Online Documentation

Accessing Online Help

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

Type of Help	Contents	How to Access...
Command Help	Explains the syntax of commands in the command line processor.	From the command line processor in interactive mode, enter: `? command` where *command* represents a keyword or the entire command. For example, `? catalog` displays help for all the CATALOG commands, while `? catalog database` displays help for the CATALOG DATABASE command.
Client Configuration Assistant Help *Command Center Help* *Control Center Help* *Data Warehouse Center Help* *Event Analyzer Help* *Information Catalog Manager Help* *Satellite Administration Center Help* *Script Center Help*	Explains the tasks you can perform in a window or notebook. The help includes overview and prerequisite information you need to know, and it describes how to use the window or notebook controls.	From a window or notebook, click the **Help** push button or press the **F1** key.

Type of Help	Contents	How to Access...

Message Help	Describes the cause of a message and any action you should take.	From the command line processor in interactive mode, enter:
		`? XXXnnnnn`
		where *XXXnnnnn* represents a valid message identifier.
		For example, `? SQL30081` displays help about the SQL30081 message.
		To view message help one screen at a time, enter:
		`? XXXnnnnn | more`
		To save message help in a file, enter:
		`? XXXnnnnn > filename.ext`
		where *filename.ext* represents the file where you want to save the message help.

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

Viewing Information Online

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

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

To view online books or sample programs:

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

    INSTHOME/sqllib/doc/*%L*/html/index.htm

    where *%L* represents the locale name.
  - On other platforms, open the following page:

    sqllib\doc\html\index.htm

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

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

Installing the Netscape Browser

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

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

Accessing Information with the Information Center

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

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

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

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

Tasks Key tasks you can perform using DB2.

Reference DB2 reference information, such as keywords, commands, and APIs.

Books DB2 books.

Troubleshooting
Categories of error messages and their recovery actions.

Sample Programs
Sample programs that come with the DB2 Application Development Client. If you did not install the DB2 Application Development Client, this tab is not displayed.

Web DB2 information on the World Wide Web. To access this information, you must have a connection to the Web from your system.

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

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

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

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

On Windows
Click **Start** and select **Programs —> IBM DB2 —> Information —> Start HTML Search Server**.

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

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

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

Using DB2 Wizards

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

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

Wizard	Helps You to...	How to Access...
Add Database	Catalog a database on a client workstation.	From the Client Configuration Assistant, click **Add**.
Backup Database	Determine, create, and schedule a backup plan.	From the Control Center, right-click the database you want to back up and select **Backup —> Database Using Wizard**.
Configure Multisite Update	Configure a multisite update, a distributed transaction, or a two-phase commit.	From the Control Center, right-click the **Databases** folder and select **Multisite Update**.
Create Database	Create a database, and perform some basic configuration tasks.	From the Control Center, right-click the **Databases** folder and select **Create —> Database Using Wizard**.
Create Table	Select basic data types, and create a primary key for the table.	From the Control Center, right-click the **Tables** icon and select **Create —> Table Using Wizard**.
Create Table Space	Create a new table space.	From the Control Center, right-click the **Table Spaces** icon and select **Create —> Table Space Using Wizard**.
Create Index	Advise which indexes to create and drop for all your queries.	From the Control Center, right-click the **Index** icon and select **Create —> Index Using Wizard**.
Performance Configuration	Tune the performance of a database by updating configuration parameters to match your business requirements.	From the Control Center, right-click the database you want to tune and select **Configure Performance Using Wizard**. For the partitioned database environment, from the Database Partitions view, right-click the first database partition you want to tune and select **Configure Performance Using Wizard**.

Wizard	Helps You to...	How to Access...
Restore Database	Recover a database after a failure. It helps you understand which backup to use, and which logs to replay.	From the Control Center, right-click the database you want to restore and select **Restore —> Database Using Wizard**.

Setting Up a Document Server

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

1. Copy all files and subdirectories from `\sqllib\doc\html` on your local system to a Web server. Each book has its own subdirectory that contains all the necessary HTML and GIF files that make up the book. Ensure that the directory structure remains the same.
2. Configure the Web server to look for the files in the new location. For information, refer to the NetQuestion Appendix in the *Installation and Configuration Supplement*.
3. If you are using the Java version of the Information Center, you can specify a base URL for all HTML files. You should use the URL for the list of books.
4. When you are able to view the book files, you can bookmark commonly viewed topics. You will probably want to bookmark the following pages:
   - List of books
   - Tables of contents of frequently used books
   - Frequently referenced articles, such as the ALTER TABLE topic
   - The Search form

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

Searching Information Online

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

- Click **Search** in the top frame. Use the search form to find a specific topic. This function is not available in the Linux, PTX, or Silicon Graphics IRIX environments.
- Click **Index** in the top frame. Use the index to find a specific topic in the book.
- Display the table of contents or index of the help or the HTML book, and then use the find function of the Web browser to find a specific topic in the book.

- Use the bookmark function of the Web browser to quickly return to a specific topic.
- Use the search function of the Information Center to find specific topics. See "Accessing Information with the Information Center" on page 109 for details.

Appendix D. National Language Support (NLS)

This section contains information about the National Language Support (NLS) provided by DB2, including information about supported languages and code pages. For information on developing applications that use NLS, refer to the *Application Development Guide*.

Code Page and Language Support

During installation of DB2, the country, codepage, and regional settings are established. However, you can change these settings after installing DB2: including regional settings such as code page, country language (for monetary, date, and numeric formatting), and time zone. When a new connection to a database is made, the database manager uses these new values.

You must ensure that your regional settings are set correctly. DB2 may not produce the expected results if the country, code page, or regional settings are incorrect for the intended language. Table 10 shows the languages into which the DB2 messages are translated. If the setup is run on a machine that is set up using a non-supported language, then English is the default unless the user has specified otherwise.

Table 10. Languages and Code Pages

Country Code	Language
bg	Bulgarian
br	Brazilian Portuguese
cn	Simplified Chinese (PRC)
cz	Czech
de	German
dk	Danish
en	English
es	Spanish
fi	Finnish
fr	French
gr	Greek
hu	Hungarian
il	Hebrew
it	Italian

Table 10. Languages and Code Pages (continued)

Country Code	Language
jp	Japanese
kr	Korean
nl	Dutch
no	Norwegian
pl	Polish
pt	Portuguese
ru	Russian
se	Swedish
si	Slovenian
tr	Turkish
tw	Traditional Chinese (Taiwan)

Appendix E. Naming Rules

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

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 *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. *Catalog node names* are the identifying names that are assigned to entries in the node directory. Each entry in the node directory is an alias name for a computer on your network. To avoid confusions that could arise from multiple names for the same server, we recommend that you use the same catalog node name as the network name for the server.

When naming a database, database alias, or catalog node name, see "General Naming Rules" on page 117. 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 117.

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
  - column names, which can contain up to 30 characters
  - schema 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

Usernames or *User IDs* are the identifiers assigned to individual users. When naming users, groups, or instances, see "General Naming Rules" on page 117.

In addition to the general naming rules:

- User IDs on OS/2 can contain 1 to 8 characters. They cannot start with a numeric digit or end with $.
- Usernames on UNIX can contain 1 to 8 characters.
- Usernames on Windows can contain 1 to 30 characters. The Windows NT and Windows 2000 operating systems currently have a limit of 20 characters.
- Group and instance names can contain 1 to 8 characters.
- Names cannot be any of the following:
  - USERS
  - ADMINS
  - GUESTS
  - PUBLIC
  - LOCAL
- Names cannot begin with:
  - IBM
  - SQL
  - SYS
- Names cannot include accented characters.
- In general, when naming users, groups, or instances:

  OS/2 Use uppercase names.

  UNIX Use lowercase names.

  Windows 32-bit operating systems
  Use any case.

Workstation Name (nname) Rules

A *workstation* name specifies the NetBIOS name for a database server or client that resides on the local workstation. This name is stored in the database manager configuration file. The workstation name is known as the *workstation nname*. When naming workstations, see "General Naming Rules" on page 117.

In addition, the name you specify:

- Can contain 1 to 8 characters
- Cannot include &, #, and @
- Must be unique within the network

DB2SYSTEM Naming Rules

DB2 uses the *DB2SYSTEM* name to identify a physical DB2 machine, system, or workstation within a network. On UNIX, the DB2SYSTEM name defaults to the TCP/IP hostname. On OS/2, you must specify the *DB2SYSTEM* name during install. On Windows 32-bit operating systems, you do not need to specify a *DB2SYSTEM* name; the DB2 setup program detects the Windows Computer name and assigns it to *DB2SYSTEM*.

When creating a *DB2SYSTEM* name, see "General Naming Rules" on page 117.

In addition, the name you specify:

- Must be unique within a network
- Can contain a maximum of 21 characters

Password Rules

When determining passwords, consider the following rules:

OS/2 A maximum of 14 characters.

UNIX A maximum of 8 characters.

Windows 32-bit operating systems
A maximum of 14 characters.

Appendix F. Notices

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Contacting IBM

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

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

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

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

Product Information

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

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

http://www.ibm.com/software/data/
The DB2 World Wide Web pages provide current DB2 information about news, product descriptions, education schedules, and more.

http://www.ibm.com/software/data/db2/library/
The DB2 Product and Service Technical Library provides access to frequently asked questions, fixes, books, and up-to-date DB2 technical information.

Note: This information may be in English only.

http://www.elink.ibmlink.ibm.com/pbl/pbl/
The International Publications ordering Web site provides information on how to order books.

http://www.ibm.com/education/certify/
The Professional Certification Program from the IBM Web site provides certification test information for a variety of IBM products, including DB2.

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

comp.databases.ibm-db2, bit.listserv.db2-l
These Internet newsgroups are available for users to discuss their experiences with DB2 products.

On Compuserve: GO IBMDB2
Enter this command to access the IBM DB2 Family forums. All DB2 products are supported through these forums.

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

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