IBM DB2 Universal Database
for Windows NT**
Quick Beginnings
Version 5

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Before using this information and the product it supports, be sure to read the general information under Appendix D, "Notices" on page 227.

Contents

Welcome to DB2 Universal Database

This book describes how to install and use the basic functions of DB2 Universal Database in a simple environment.

Part 1 gives an overview of DB2 Universal Database.

Part 2 provides planning, installing, and basic configuration information for the DB2 Universal Database.

Part 3 describes how to install the DB2 Client Application Enabler or the DB2 Software Developer's Kit on the Windows and OS/2 operating systems.

Part 4 provides information on configuring communications between DB2 Universal Database and its clients.

Part 5 describes how to use DB2 Universal Database.

Part 6 describes how to perform advanced installation and configuration tasks, such as performing an unattended install of DB2 products on OS/2, Windows 95 or Windows NT operating systems, and performing administration tasks using the Client Configuration Assistant, or using the command line processor for setting up communications.

Part 7 contains reference information and describes viewing, printing, and ordering the manuals that are provided in online format.

DB2
Universal
Database

Conventions

This book uses these highlighting conventions:

- **Boldface type** indicates commands or graphical user interface (GUI) controls such as names of fields, folders, icons, or menu choices.

- `Monospace type` indicates examples of text you enter exactly as shown.

- *Italics* indicates variables that you should replace with a value. It is used also to indicate book titles, and to emphasize words.

This is a fast path icon. It tells you if you can skip sections to get to the "how to" information. It is shown to indicate where you should go next.

This icon marks a Tip – additional information that can help you complete a task.

Road Map

Use the following table to find the information you need quickly.

If you want to...	Refer to...
Understand the relationship between DB2 and related products,	Chapter 2, "About DB2 Universal Database" on page 9.
Plan your network configuration,	Chapter 4, "Planning for Installation" on page 27.
Confirm that your system meets the DB2 hardware and software prerequisites,	"Disk Requirements" on page 31 and "Software Requirements" on page 34.
Migrate from a previous release of DB2,	Chapter 18, "Migrating from Previous Versions" on page 121.
Install the DB2 Universal Database product from a CD-ROM,	Chapter 5, "Installing and Configuring DB2 Server" on page 39.
Install the client products,	Chapter 6, "Installing DB2 Clients" on page 51.
Remotely install DB2 clients on OS/2, Windows 3.1, Windows 95 or Windows NT,	Chapter 19, "Unattended DB2 Installation on OS/2 or Windows 3.x Workstations" on page 131 or Chapter 20, "Unattended DB2 Installation on Windows 95 or Windows NT Workstations" on page 143

If you want to...	Refer to...
Use the DB2 components,	Chapter 12, "Getting Started with the DB2 Universal Database" on page 73.
Set up communications on the client to access databases,	Chapter 10, " Configuring Client to DB2 Server Communications Using the CCA" on page 65 .
Connect to a database,	"Connecting to a Database" on page 75.
Create the sample database,	"Creating the Sample Database" on page 74.
Print or view online documentation,	"Printing the PostScript Books" on page 215 or "Viewing Online Books" on page 216.
Set up a DB2 Call Level Interface or ODBC environment to enable ODBC applications such as Lotus Approach to access DB2 data,	"Running CLI/ODBC Programs" on page 89.
Control access to database objects,	"Changing Default Privileges for Users" on page 76.
Use the DB2 Command Center or the DB2 command line processor to enter SQL statements or DB2 commands interactively,	Chapter 15, "Entering DB2 Commands and SQL Statements" on page 97.
Learn about last-minute changes to the product,	The Installation Notes on the CD-ROM or the Release Notes that are installed with the products.

Part 1. Introduction to DB2 Universal Database

Chapter 1. Introducing IBM Software Servers

When you choose the newest version of *DB2 Universal Database* you'll be putting your business on the fast path toward client/server and network computing.

One of the best network enhancements you can make, this exciting new server and client software is part of a family of IBM*, Lotus**, and Tivoli** products. They comprise middleware plus administration and end-user tools. These software products run in hardware servers and are designed to support state-of-the-art applications, so we refer to them as **application servers.**

IBM Software Servers are packaged to help you to quickly install and make use of a family of multifunctional, compatible application servers — designed to work in harmony. With modular IBM Software Servers, you can build a high-function, reliable environment for decision support, messaging and groupware, transaction processing, and other client/server functions vital to today's business. And with new Web functions, you can exploit new technologies and move into the world of network computing.

The family of products provides:

- New Web functions and improved integration, now available in Version 5.0

- Popular software chosen by application providers to run their applications

- Greatest depth and breadth of application servers — providing unequaled depth in each server, as well as the widest breadth of application servers — making it easy to grow from the smallest departmental servers to the largest systems of a modern enterprise.

- Open solutions available on multiple platforms — popular clients (such as Windows, Windows 95, Windows NT **, Macintosh**, OS/2*, UNIX**, and popular browsers used on the Internet or in intranets) and servers (such as OS/2, Windows NT, and AIX*) — and in conformance with all key industry-standard interfaces

- Support for existing investments, since IBM Software Servers work with your existing systems, are thoroughly tested, and work together

- Growth paths for future needs, allowing you to add new servers when needed, move applications to more powerful platforms as demand grows, and extend your existing systems with new technologies in the move to collaborative and network computing

- Ease of installation and simple administration, with common packaging and documentation

The IBM Software Servers family includes several servers, designed to meet your needs.

IBM Communications Server

IBM Communications Server will meet your requirements for interconnecting diverse networks and prove to be a winner for your business. With Communications Server, workstation users and applications can communicate with other workstations and central computer applications. Communications Server has full-function gateways to connect clients to hosts, plus support of a broad range of industry-standard networking protocols. Communications Server will help you to get users communicating with each other in networks of all sizes, from small workgroups to large corporate headquarters.

Communications Server provides businesses with a variety of opportunities to:

- Expand the use of applications, while protecting current network investments

- Reduce operation and management costs by connecting networks without impacting existing applications

- Increase productivity and convenience by giving employees access to applications while at work, home, or when traveling

- Reduce costs of central computer and peer-to-peer connectivity by sharing communication resources

- Gain efficiency in response times by assigning priority to short, interactive data transmissions rather than to batch-oriented bulk data traffic.

IBM Directory and Security Server

With IBM Directory and Security Server, you can simplify the effort involved in having increased control over complex networks, multivendor systems, and multiple platforms, while maintaining security within your network. With Directory and Security Server, you can generate and manage secure, distributed applications that are interoperable and portable. Directory services make it easy to combine multiple directories, even across WANs, into a simple, single view. Plus, it can be done without deleting users and resources with the same names. You get a single integrated view of all available

resources, including printers, files, and applications — no matter where they are located.

Directory and Security Server gives systems administrators a single logical view of all LAN and WAN resources — regardless of installed platforms and vendors. And users get convenient single sign-on, providing transparent access to any authorized enterprise resource, which can include the IBM Software Servers.

The security services are based on the Kerberos security model, which uses a third-party authentication server. This server authenticates both the client and server, making impersonation virtually impossible. Another security measure allows only authentication tickets to flow over the network, to protect passwords. Data encryption standard (DES) and commercial data masking facility (CDMF) data encryption technologies are also available for total data privacy.

IBM Transaction Series

IBM Transaction Series lets you make flexible and strategic use of new technology, while continuing to meet your business needs using established technology. Transaction Series coordinates and integrates the functions of multiple application servers, locally or throughout your enterprise. This helps you to produce and manage very high-performance applications. It also enables organizations to get and use the operational data needed on customer transactions and stay a jump ahead of the competition.

Transaction Series provides the ideal environment for applications to run anywhere, any time, no matter where they reside in the network. No matter how demanding your applications and requirements are, Transaction Series gives you the safety, security, and integrity you need for your business.

Transaction Series offers two flexible programming styles. The CICS* API is available for those who want to leverage existing CICS applications. Encina supports those who want to exploit an open-standards-based API.

IBM MQSeries

In an open-systems environment, communications coding is complex and difficult to manage. IBM MQSeries simplifies things, giving you time to develop the solutions that deliver your business mission. IBM MQSeries messaging software enables business applications to exchange information across different operating system platforms in a way that is straightforward and easy for programmers to implement.

IBM's MQSeries simplifies the task of connecting your applications across unlike environments. Programs communicate using the IBM MQSeries API, an easy-to-use, high-level program interface that shields your programmers from the complexities of different operating systems and underlying networks. You focus on the business logic, while IBM MQSeries manages your connections to the computer systems.

IBM MQSeries also provides an immensely flexible infrastructure, on which you can build mobile communications, multimedia applications, transaction-based systems, and a whole new generation of network applications.

Tivoli Management Servers

Controlling distributed computing resources can be difficult, expensive, and time consuming. Companies need to be business-driven, not technology-driven.

With Tivoli Management Servers, you can take control of your distributed computing environment and concentrate on what's important — the business that makes you money. These servers bring state-of-the-art systems management to your desktop.

Tivoli Management Servers provide total, open, flexible systems management. Some functions include:

- Host connectivity
- Help desk utilities
- Asset management
- Virus protection
- Software distribution
- License metering
- System monitoring
- User administration
- Performance management
- Job scheduling

These are just a few! With Tivoli Management Servers you get the best of IBM SystemView technology and Tivoli's TME10** technology.

IBM Internet Connection Server

If you've browsed the Internet, you know what a valuable resource it can be. If you want to market your products and services around the world, IBM has the server software to get you started — IBM Internet Connection Server.

With Internet Connection Server, you can host and manage Hypertext Markup Language (HTML) pages and other online documents, and create your own corporate Web site. From the corporate home page, your company can:

- Distribute up-to-date information to the world using text, high-quality graphics, audio, and video.
- Create information that customers and suppliers can access through electronic forms or e-mail.
- Publish product descriptions and price lists with electronic order forms, so customers can purchase your products and services with a credit card — right from their own computers.
- Track how customers, suppliers, and personnel use your published information, so you can tell when you are reaching your target audience.
- Gain a competitive edge by creating a worldwide presence for your company.

IBM DB2 Universal Database

IBM DB2* Universal Database gives you the foundation for reliable data management, offering complete integrity, high availability, and fast performance. DB2 Universal Database makes it easy to create multimedia applications to present your data through video, audio, and image techniques. Local and remote users can store, retrieve, manipulate, manage, and share data — easily and reliably, using the latest and highly tested technology in the relational database industry.

With the IBM DB2 family of products, you can access data on multiple platforms. Access to IBM and non-IBM relational and nonrelational data is available through optional components of the DB2 family.

Lotus Domino

Lotus Domino transforms Lotus Notes into an interactive Web application server, allowing any Web client to participate in Notes applications securely. Domino bridges the open networking environment of Internet standards and protocols with the powerful application development facilities of Notes. You get a solution that combines messaging, groupware, and the Internet — all built in.

With Domino, you can rapidly develop a broad range of business applications for the Internet and intranet. Plus, you get support for many popular operating systems for both clients and servers, as well as Web browsers. Domino can be your central access point for finding and sharing the information you need — whether it's centrally located in an e-mail message, a relational database, a host-based system, in your favorite desktop application, or on the World Wide Web. How? You can combine with Lotus Domino any of the other Software Servers, plus other vendors' application servers and applications.

Chapter 2. About DB2 Universal Database

DB2 is a *relational* database management system that is web-enabled with Java support; scalable from single processors to symmetric multi-processors; and multimedia capable with image, audio, video, and text support. The DB2 products and components provided on your CD-ROM include: *DB2 Enterprise Edition*, *DB2 Workgroup Edition*, and *DB2 Client Application Enabler*. Features of each are listed below.

DB2 Workgroup Edition

- The *DB2 Universal Database server* enables local and remote clients and applications to create, update, control, and manage relational databases using Structured Query Language (SQL), ODBC, or CLI.

- The *DB2 Client Pack* CD-ROM contains all the latest DB2 Client Application Enablers. With DB2 Client Application Enabler, clients from a variety of platforms can connect to any DB2 Universal Database, DB2 Connect and DataJoiner multi-user products.

- The *DB2 Net.Data* CD-ROM contains all supported DB2 Net.Data (formerly known as DB2 World Wide Web Connection) products. DB2 Net.Data enables application developers to create Internet applications that access data from DB2 databases.

- DB2 Workgroup Edition is licensed on a per user basis.

DB2 Enterprise Edition

The DB2 Enterprise Edition includes all the functions provided in the DB2 Workgroup Edition, plus support for host connectivity providing users with access to DB2 databases residing on host systems such as MVS/ESA, OS/390, AS/400, VM, and VSE.

The DB2 Enterprise Edition supports unlimited LAN database access.

DB2 Client Application Enabler

The *DB2 Client Application Enabler* enables a client workstation to access the DB2 server.

There are a variety of other DB2 products, which you can order separately:

- *DB2 Application Developer's Kit (AD Kit)* contains a collection of DB2 Universal Database products, clients, DB2 Connect products, DB2 Software Developer's Kits, and application development tools for all supported platforms. The AD Kit gives you all the tools you need to create multimedia database applications that can run on a variety of platforms and can connect to any DB2 server, including DataJoiner.

- *DB2 Universal Database Personal Edition* allows you to create and use local databases and to access remote databases if they are available. This product is available for the OS/2, Windows NT, and Windows 95 operating systems.

- *DB2 Connect Enterprise Edition* (formerly known as DDCS Multi-User Gateway) provides access from clients on the network to DB2 databases residing on host systems such as MVS/ESA, OS/390, OS/400, VM, and VSE.

- *DB2 Connect Personal Edition* (formerly known as DDCS Single-User) provides access from a single workstation to DB2 databases residing on host systems such as MVS/ESA, OS/390, OS/400, VM, and VSE, as well as access to DB2 Universal Databases. This product is available for the OS/2, Windows 3.1x, Windows NT, and Windows 95 operating systems.

- *DB2 Universal Database Extended Enterprise Edition* (formerly known as DB2 Parallel Edition) provides the ability for a database to be partitioned across multiple independent computers of a common platform. To the end-user and application developer, it still appears as a single database on a single computer. This fully scalable database system enables an application to use a database that is simply too large for a single computer to handle efficiently. SQL operations and utilities can operate in parallel on the individual database partitions, thereby speeding up the execution time of a single query or utility.

Note: DB2 Workgroup Edition, DB2 Enterprise Edition, DB2 Personal Edition, and DB2 Extended Enterprise Edition are commonly referred to as DB2 server throughout this book.

Working with Data Using DB2 Universal Database

As well as providing a relational database to store your data, DB2 lets you administer requests to query, update, insert, or delete data from local or remote client applications.

DB2 Universal Database includes graphical tools that enable you to tune performance, access remote DB2 servers, manage all servers from a single site, develop powerful applications, and process SQL queries. These tools are described in "Administering Databases with DB2 Tools" on page 13.

Accessing DB2 Data from Remote Clients

The DB2 Universal Database can run applications locally and can be accessed by applications running on remote clients that have the DB2 Client Application Enabler installed. The DB2 Client Application Enabler provides a run-time environment that enables client applications to access one or more remote databases. Software on the *DB2 Client Pack* CD-ROM provides support for clients on the following operating systems:

- OS/2

- Windows NT, Windows 95, Windows 3.x
- UNIX (AIX, HP-UX, Solaris, SINIX, Silicon Graphics IRIX, SCO OpenServer)
- Macintosh

The Client Application Enabler for DOS V1.2 is available only from the Web. See Chapter 6, "Installing DB2 Clients" on page 51 for information on how to download the DOS client.

Figure 1 shows a DB2 Universal Database with local applications and applications running on remote clients. Either DB2 Workgroup Edition or DB2 Enterprise Edition is installed on the server. This is the system that contains your databases. Any applications running on this system are known as local applications. The client systems need one of the DB2 Client Application Enabler products installed, which allows applications to access the data on the remote server system.

DB2 Universal Database Remote Client Support

NOTE: CAE is Client Application Enabler. Not all protocols are supported for all the clients.
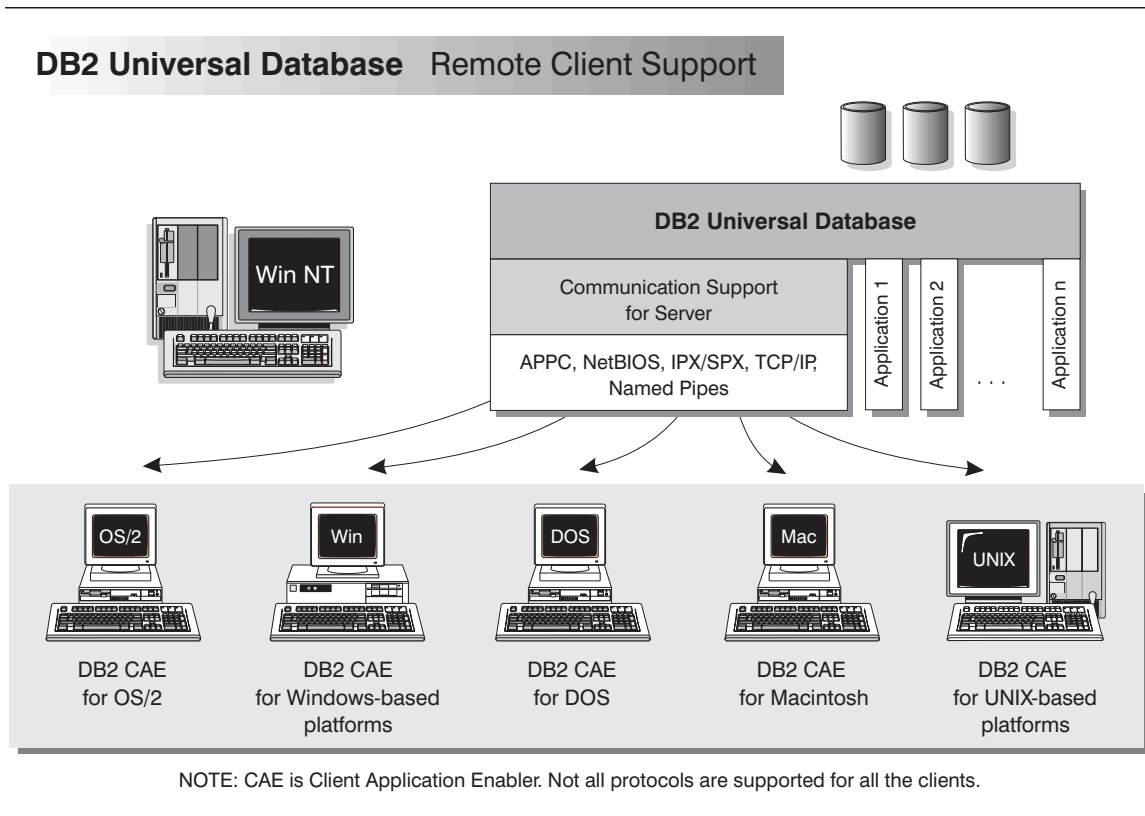
Figure 1. DB2 with Local Applications and Remote Clients

In addition to accepting requests from the clients listed above, DB2 Universal Database has the DRDA Application Server feature built in. It accepts requests from MVS, OS/400, VM, and other DRDA clients. Refer to the *Administration Guide* for more information.

Accessing Multiple DB2 Servers

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

For example, you can have a DB2 server on a Windows NT workstation that is connected to a LAN located in Montreal, and another DB2 server on an OS/2 workstation connected to a LAN located in Toronto. As long as there is a connection between the two LANs, clients on either network can access either server. See Figure 2.

Communicating between DB2 Universal Database Servers
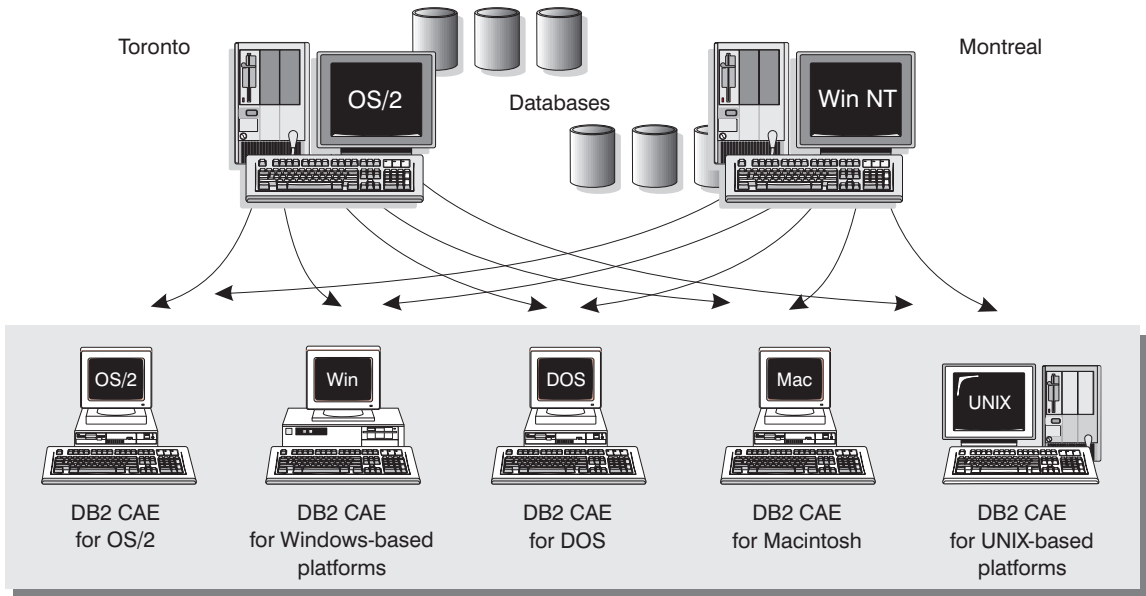
NOTE: CAE is Client Application Enabler.

Figure 2. 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.

Administering Databases with DB2 Tools

You can perform database administration tasks locally or remotely using the DB2 Administration tools. Use the *Control Center* to graphically perform server administrative tasks such as configuring, backing up and recovering data, managing directories, scheduling jobs, and managing media. Use the *Command Center* to access and manipulate databases from a graphical interface.

Managing Databases Using the Control Center

The Control Center displays database objects (such as databases, tables, and packages) and their relationships to each other. Using the Control Center, you can manage a local database server or multiple remote database servers and the database objects within them, all from a single point of control. See Figure 3 for an example of the main Control Center window. You can choose to have the Control Center installed on OS/2, Windows NT, or Windows 95 workstations.
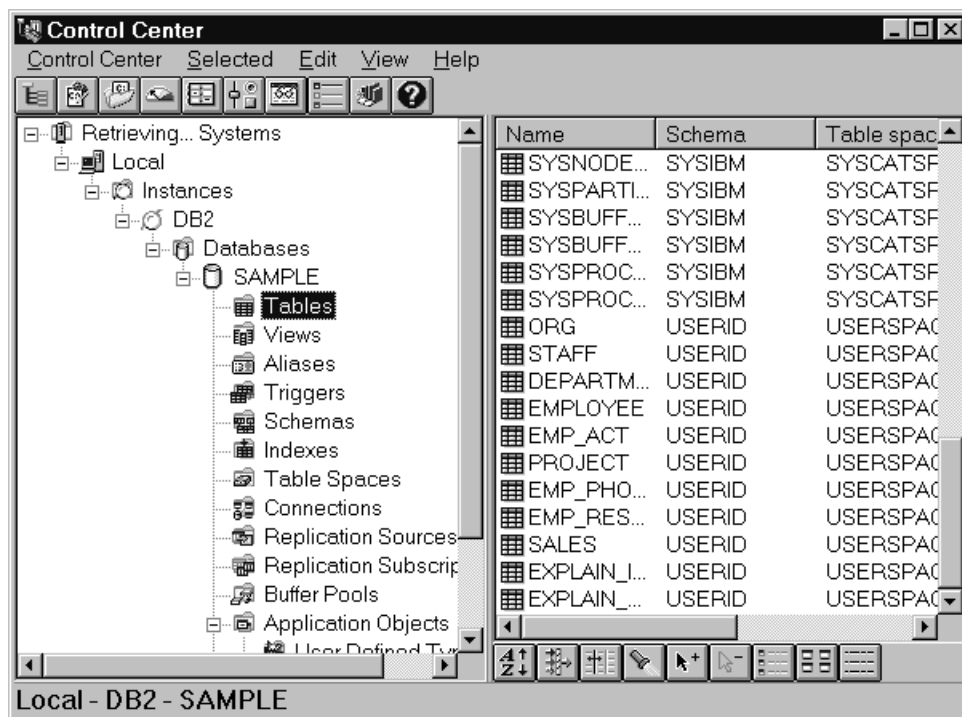
Figure 3. Control Center Main Window

From the Control Center you can perform the following tasks on database objects:

- 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

You can also manage database manager environments (known as DB2 instances). You can:

- Maintain the communications protocols
- Set database manager configuration values that affect performance

SmartGuides are provided to help you perform complex tasks. For example, a SmartGuide is available to tune the performance of your system. See "SmartGuides" on page 207 for descriptions of the various SmartGuides and how to invoke them.

The Control Center provides additional facilities to assist you in managing your DB2 servers:

	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.
	Use the **Script Center** to create mini applications called scripts, which can be stored and invoked 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 backups.
	Use the **Journal** to view all available information about jobs that are pending execution, executing, or that have completed execution; the recovery history log; the alerts log; and the messages log. The Journal also allows you to review the results of jobs that are run unattended.
	Use the **Alert Center** to monitor your system for early warnings of potential problems or to automate actions to correct problems discovered.
	Use the **Tools Setting** to change the settings for the Control Center, Alert Center, and Replication.

You can run these facilities from the Control Center toolbar or from icons in the Administration Tools folder.

You can install the following options for the Control Center:

DB2 Performance Monitor	Use the **DB2 Performance Monitor** to monitor the performance of your DB2 system. You can monitor activity using snapshots of data over a period of time or using data for a particular event. See "Monitoring Databases Using DB2 Performance Monitor" for more information.
Visual Explain	Use **Visual Explain** to graphically analyze and tune SQL statements and to analyze query access plans. See "Viewing SQL Access Plans Using Visual Explain" on page 16 for more information.

You can find additional information in the *Administration Getting Started* Guide or in the Control Center's online help.

Understanding the Administration Server

The Administration Server is used as a service by the DB2 Administration Tools to satisfy requests. It is implemented as a DB2 instance, and has interfaces to start, stop, catalog, and configure it. The Administration Server resides on every DB2 server that you want to administer and detect. The Administration Server is required in order to use any of the administration tools described above. The Administration Server is automatically created and started for you; its default name is DB2DAS00.

Monitoring Databases Using DB2 Performance Monitor

With the DB2 Performance Monitor, you can:

- Identify and analyze performance problems in the database applications or the database manager.
- Identify exception conditions based on thresholds you define.
- 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 snapshots or events. The Snapshot Monitor allows you to capture point-in-time information at specified intervals. The Event Monitor allows you to record information over the duration of an event such as a connection.

You can find additional information in the *Administration Getting Started* Guide or in the online help for DB2 Performance Monitor.

You are also able to use the Windows NT Performance Monitor to monitor both database and system performance. See Chapter 17, "Using the Windows NT Performance Monitor" on page 115 for details on how to register DB2 resources and to use the Windows NT Performance Monitor.

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 the 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 statement execution.
- Use the portable snapshot function to view snapshots from any remote DB2 server.
- Display access plans for parallel and SMP systems.

You can find additional information in the *Administration Getting Started* or in the online help for Visual Explain.

Managing Communications on the Server

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

- Configure database manager communications parameters.
- Generate database information in a profile that can be used to configure clients.

You can find additional information in the online help for the Control Center.

Managing Connections to Databases Using the Client Configuration Assistant

The Client Configuration Assistant helps you manage your database connections to remote database servers. The Client Configuration Assistant is available on OS/2, Windows 95, and Windows NT systems. With the Client Configuration Assistant, you can:

- Define connections to databases (catalogs) so that the databases can be used by applications. Three methods are available:
    - Search the network for available databases and select one. Client access is automatically set up for that database.

- – Use a database access profile provided by a database administrator to automatically define your connections.
- – Manually configure a connection to a database by entering a few required connection parameters.
- Remove cataloged databases, or modify the properties of a cataloged database.
- Test connections to local or remote databases identified on your system to ensure that you can make a connection to the server that you need.
- 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 hints are provided on the interface as parameters are selected.
- Set up a connection to a DRDA server if DB2 Connect is installed.

Developing Applications Using the DB2 Software Developer's Kit

The DB2 Software Developer's Kit (DB2 SDK) 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.

You can install DB2 SDK on the server with the DB2 Universal Database, or on a remote workstation. If you install it on the server, the DB2 SDK can access both remote and local databases. If you install it on a client, the DB2 SDK can access only remote databases.

There is a platform-specific version of the DB2 SDK available for each of the supported operating systems. The *DB2 Application Developer's Kit (DB2 AD Kit)* product provides the DB2 Software Developer's Kits for all supported platforms, the DB2 Extender development toolset, and VisualAge for Basic. Applications developed with the DB2 SDK will run on any platform where the equivalent DB2 Client Application Enabler component is installed. Through the DB2 Client Application Enabler, these applications can access all DB2 servers and, by using DB2 Connect, they can also access other database servers that support DRDA.

The DB2 SDK 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).
- Application programming interfaces to access database utilities.

DB2 SDK supports several programming languages (including COBOL, C, and C++) for application development, and provides precompilers for the supported languages. Refer to the *Building Applications for UNIX Environments* or the *Building Applications for Windows and OS/2 Environments* manuals for complete information on using the DB2 SDK, and for a list of the supported compilers.

Accessing Host Data from the Desktop Using DB2 Connect Enterprise Edition

DB2 Connect Enterprise Edition gives clients on your LAN access to data that is stored on host systems. It provides applications with transparent access to host 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 databases on MVS, OS/390, OS/400, VM, and VSE hosts.

A great deal of the data in large organizations is managed by DB2 on systems such as DB2 for MVS/ESA, DB2 for OS/390, DB2 for AS/400, and 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.

The following tools and products can access host data easily using DB2 Connect:

- *Spreadsheets*, such as Lotus 1-2-3 and Microsoft Excel, to analyze real-time data without the cost and complexity of data extract procedures and import procedures.

- *Decision support tools*, such as Business Objects, Intersolv Q+E Database Editor, and Crystal Reports, to provide real-time information.

- *Personal database products*, such as Lotus Approach and Microsoft Access.

- *Development tools*, such as IBM VisualAge, PowerBuilder, Microsoft VisualBasic, and Borland Delphi to create client/server solutions.

DB2 Connect Enterprise Edition enables multiple clients to connect to host data and can significantly reduce the effort that is required to establish and maintain access to enterprise data. See Figure 4 on page 19 for an example of clients connecting to host databases through the DB2 Connect Enterprise Edition.
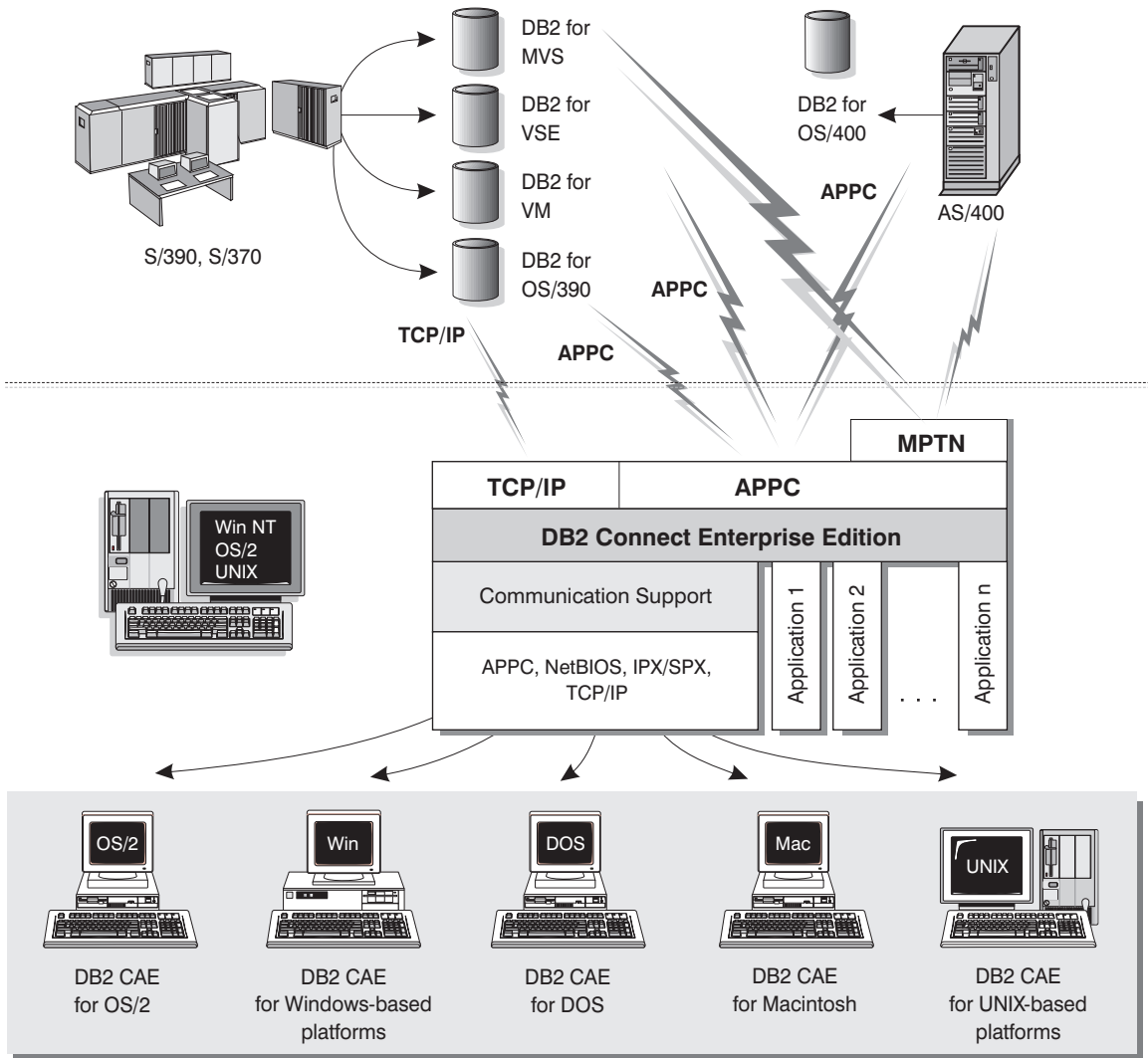
DB2 Connect Enterprise Edition

NOTE: CAE is Client Application Enabler. Not all protocols are supported for all the clients.

Figure 4. DB2 Connect Enterprise Edition

Accessing DB2 Data from the Web

The popularity of the Internet and the World Wide Web has created a demand for Web access to enterprise data. Java Database Connectivity (JDBC) and Net.Data are provided with DB2 to allow you to create applications that access data in DB2 databases.

Use *Java Database Connectivity* to create applications or applets that access data in DB2 databases. JDBC applets can be run inside HTML web pages on any system with a Java-enabled browser, regardless of the platform of your client. No additional software is required on your client system beyond this browser. The processing of JDBC applets is shared between the client and the server.

The JDBC server and the DB2 Client Application Enabler must reside on the same machine as the Web server. The JDBC server calls into the DB2 Client Application Enabler to connect to local or remote databases, or into MVS/ESA to connect to host databases. When a connection to a DB2 database is requested by the applet, the JDBC client opens a TCP/IP socket to the JDBC server on the machine where the Web server is running. See Figure 5 for an example of Java-enabled browsers accessing data from DB2 databases remotely.

Accessing DB2 Data Using JDBC
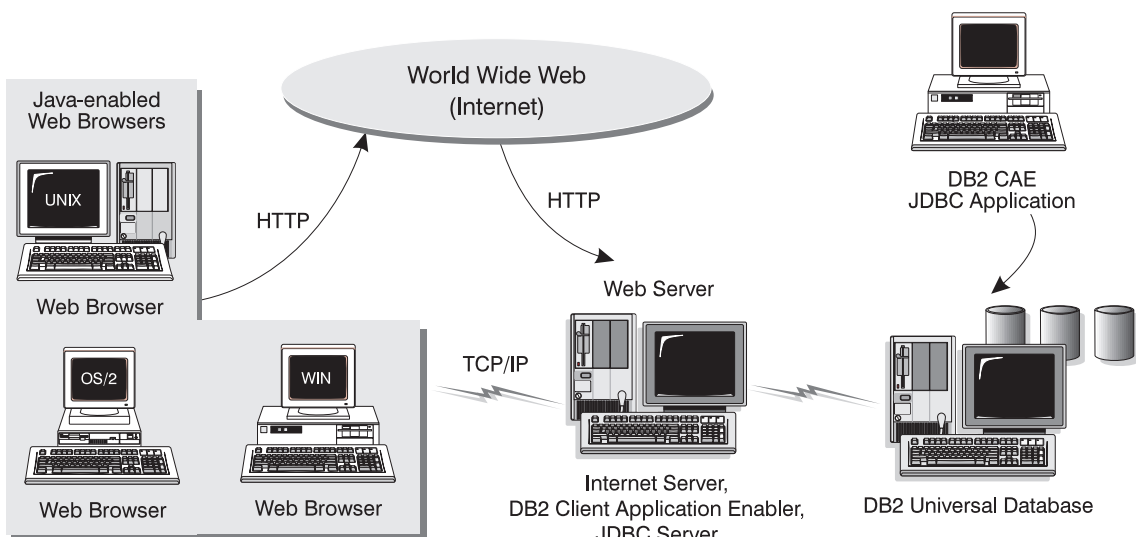
Figure 5. Accessing Internet Data Stored on DB2 Using JDBC

JDBC applications can be run from any system that has the DB2 Client Application Enabler software installed: a Web browser and a Web server are not required.

For more information on Java enablement, see the IBM Software Page under the Data Management link (http://www.software.ibm.com/data/db2/java). For more information on the JDBC API, see http://splash.javasoft.com.

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 the HTML (hypertext markup language) document and, when selected, they trigger existing SQL queries and return the results from the DB2 database. These links can be triggered repeatedly to access current DB2 data. Customized queries require user input. Users define the search criteria on the Web page by selecting options from a list or by typing values in the entry 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 database.

A demonstration of Net.Data applications is available from the IBM Software Page (http://www.software.ibm.com) under the Data Management link.

Net.Data can be installed with the server, DB2 Universal Database, to allow local access to databases. Net.Data can be installed with DB2 Client Application Enabler software to allow remote access to databases. In both cases, Net.Data and a Web Server must be installed on the same system. See Figure 6 on page 22 for an example of Net.Data accessing data from DB2 databases remotely.
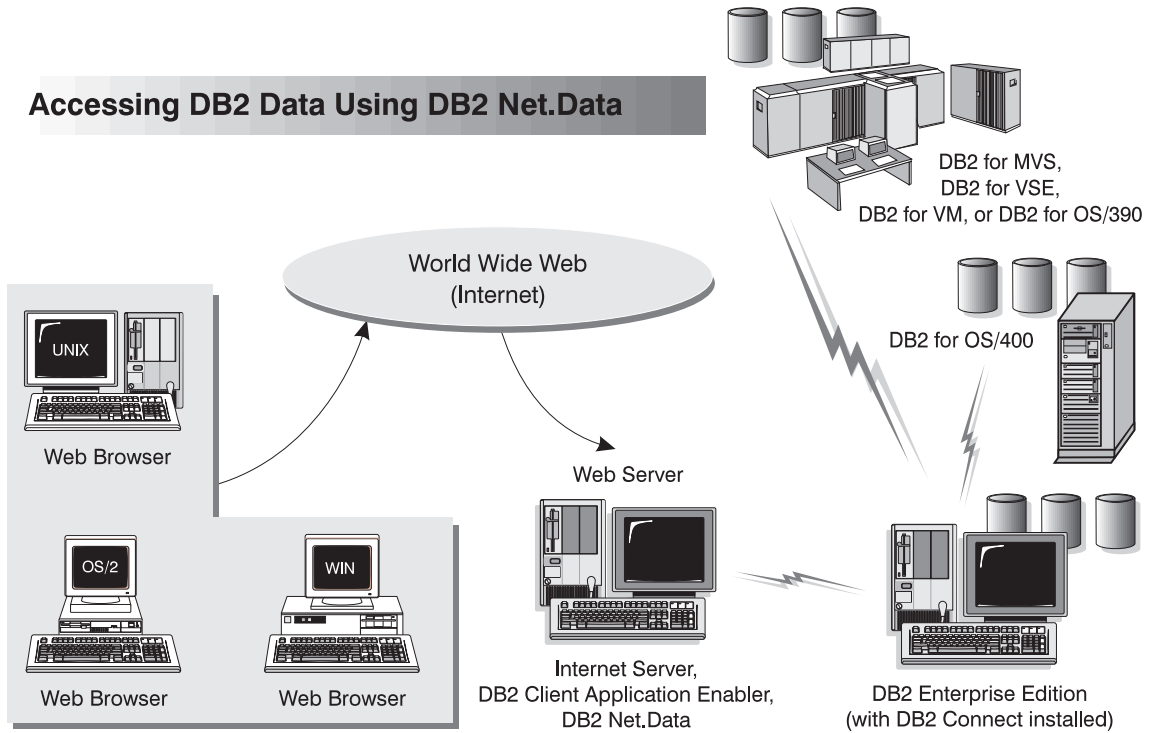
Figure 6. Accessing Internet Data Stored on DB2 Using Net.Data

Chapter 3. What's New in DB2 Version 5?

Version 5 of DB2 Universal Database is the follow-on product to DB2 Version 2 and Database Server Version 4, and offers many new features and enhancements. This section describes some of the major changes for this version, and points you to sources of more information in the DB2 library. The numerous enhancements include:

Exploitation of symmetric multiprocessors (SMP) for improved scalability and performance

DB2 now exploits the ability of an SMP system to share resources across multiple processors, performing your SQL queries more quickly. Utilities like LOAD, BACKUP, and RESTORE also take advantage of the multiprocessor environments.

For more information on parallelism, refer to the *Administration Guide*. The utilities are described in more detail in the *Command Reference*.

New graphical tools that make it easy to install, configure, and administer DB2 databases

From the Control Center on OS/2, Windows 95, and Windows NT platforms, you can accomplish just about any administrative task. A number of SmartGuides walk you through common tasks, such as configuring communications and creating tables. You can also use the graphical tools from an OS/2, Windows 95, or Windows NT client to administer DB2 servers on UNIX platforms. Improved online help and the Information Center help you easily find the information you need to use DB2. For more details, refer to Chapter 2, "About DB2 Universal Database" on page 9 or try out the Control Center.

Extensions to SQL, including support for online analytical processing

With the new CUBE and ROLLUP aggregations, you can now create "super groups", like "overall total" and "cross-tabulation", for improved online analytical processing. You can also perform outer joins, rename tables, define unique constraints on tables, and create your own table functions. DB2 has refined its authorization support, so you can grant authority at a more granular level; you can also create schemas to grant various attributes and privileges. For more details on these and other new SQL features, refer to the *SQL Reference*.

Performance, capacity, and memory improvements

DB2 now provides global caching for SQL statements, creating a public repository that improves performance. You can create multiple buffer pools of various sizes to better control the data in memory. Client/server communications are more efficient, crash and rollforward recovery are faster, and LOAD features numerous performance enhancements. For information on how to exploit these enhancements, refer to the *Administration Guide*.

Security enhancements, including support for Open Software Foundation's Distributed Computing Environment (DCE)

You can now use the DCE architecture to manage users, passwords, and groups more easily, and authenticate users more securely. DB2 also provides a "Trusted Clients" option so you can choose whether to trust all clients or only those that come from an operating system with inherent security. Security considerations are described more fully in the *Administration Guide*.

Additional support for communicating with host databases using DB2 Connect and the Distributed Relational Database Architecture (DRDA)

You can now communicate with host systems using TCP/IP, as well as SNA. In addition, DB2 servers can accept requests from host systems using TCP/IP, meaning you can use your DB2 workstation server as an application server to the host. On OS/2 and UNIX platforms, you can perform two-phase commits using DB2 Connect and TCP/IP; if you're using SNA, you can invoke a two-phase commit involving both the host and the DB2 server. For more details about connecting to host databases, refer to the *DB2 Connect Enterprise Edition Quick Beginnings* and *DB2 Connect User's Guide*.

Enhancements to application programming for DB2

The DB2 Call Level Interface (DB2 CLI) now reflects the Microsoft Open Database Connectivity 3.0 specifications, meaning that you can connect to DB2 databases from ODBC 3.0 applications. Additions to user-defined functions include scrollable cursors and the UCT_UNIQUE function to return a unique value to use in a table column. You can also invoke external UDFs that are methods of OLE automation servers. For more details on these and other improvements, refer to the *CLI Guide and Reference*, *Embedded SQL Programming Guide*, and *API Reference*.

There are many other new features, from the DB2 Governor, which you can use to handle application behavior, to table space features, such as recovery to a point in time and selective restore, to improved error messages. For a comprehensive list of what's new, see the Information Center.

Part 2. Installing DB2 Server

Chapter 4. Planning for Installation

If you know that your system meets DB2's hardware and software requirements, and you want to start installing DB2 right away, go directly to Chapter 5, "Installing and Configuring DB2 Server" on page 39.

DB2 provides many components that you might want to use in your environment. Use the product and planning information in this section to confirm that your system has the prerequisites, and to decide which components you want to install.

Memory Requirements

Before you install the product, decide what system configuration you need.

This section shows diagrams of the most common configurations that use the DB2 components. Each diagram shows the software components that are required for each system in the network (excluding operating system and communication requirements) and the approximate amount of memory required for such a configuration.

Configuration for Accessing DB2 Servers on the LAN

If you want to access data across the LAN from a database server, use the configuration shown in Figure 7 on page 28. The diagram shows DB2 Universal Database Workgroup Edition installed on the server machine and various clients connected to this server to access data. The same configuration is also possible with the DB2 Universal Database Enterprise Edition product. You must install the DB2 Client Application Enabler component on each client.

Connect the clients to DB2 Universal Database Enterprise Edition or DB2 Universal Database Workgroup Edition using one of the supported protocols: APPC, IPX/SPX, Named Pipes, NetBIOS, or TCP/IP.

DB2 Workgroup Edition - Memory Requirements

32MB

LAN with various clients

UNIX

CAE
for UNIX-based
platforms

DB2 Workgroup Edition
(5 Concurrent Clients)

OS/2
Win NT
Win 95

24MB

OS/2

WIN

CAE for OS/2

CAE for
Windows-based
platforms

Administration Client
(CAE with Graphical Tools)

Amount of memory depends on application.
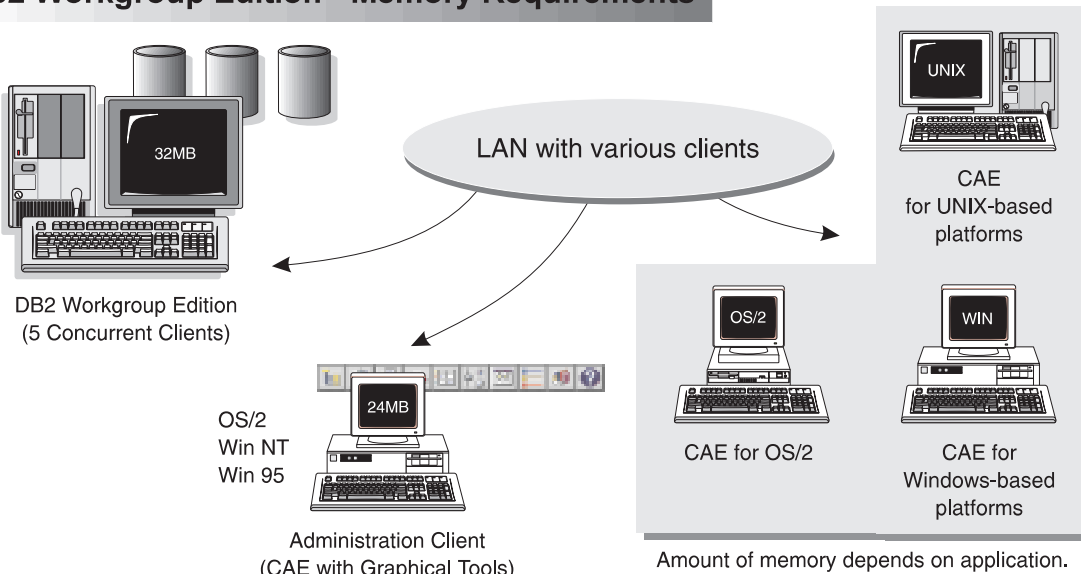
Figure 7. Configuration for Accessing DB2 Servers on the LAN

The amount of memory you need on your server depends on the number of concurrent users you will have, and the size of the databases. The diagram shows a scenario with five concurrent clients connected to the server with a simple application using static SQL. For the server, it is recommended that a minimum of 32 MB of memory be installed to accommodate five concurrent clients. We suggest that you have a minimum of 48 MB of memory to accommodate 25 concurrent clients and 64 MB of memory for 50 concurrent clients. (If you have a more complex application environment, your server may require significantly more memory.) Use these guidelines to determine the amount of memory necessary in your environment.

An administration client is shown in the diagram. This client can be on an OS/2, Windows 95, or Windows NT workstation and can be used to remotely manage the DB2 servers on your network. A minimum of 24 MB of memory is required to run all the graphical tools you will need for an administration client.

For the DB2 clients in your environment, the amount of memory required depends on the database applications you are running.

Configuration for Accessing LAN and Host Data

If you want to access databases on both your local LAN and on host systems such as OS/390, MVS, OS/400, VM, or VSE, use the configuration shown in Figure 8 on page 30. You will need to install the DB2 Connect Support option of the DB2 Enterprise Edition.

Connect clients to DB2 Enterprise Edition or DB2 Workgroup Edition using one of the supported protocols: APPC, IPX/SPX, Named Pipes, NetBIOS, or TCP/IP. DB2 Connect then connects to the appropriate host database management system using DRDA and either APPC or TCP/IP. (TCP/IP is supported on DB2 for OS/390 Version 5.1 or later.)

DB2 Enterprise Edition - Memory Requirements
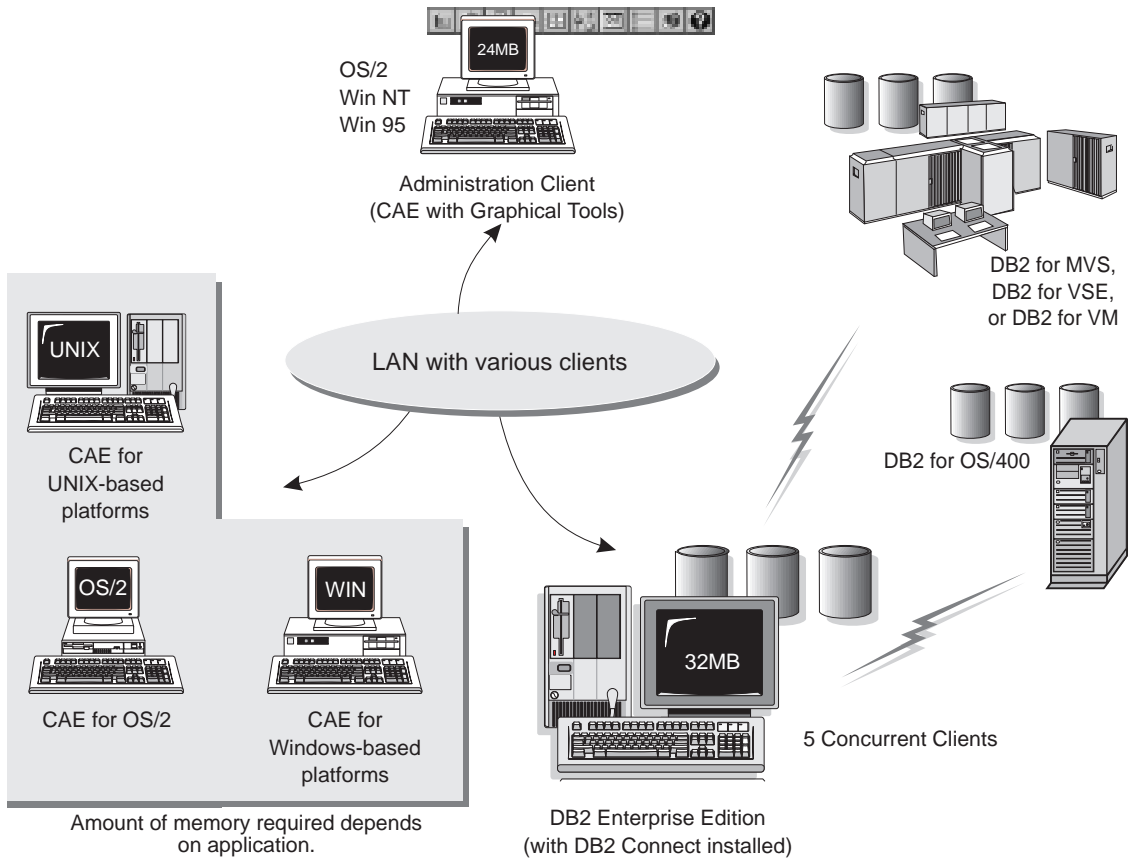
Figure 8. Configuration for Accessing LAN and Host Data

The amount of memory you need on your system to use both DB2 Connect and DB2 Universal Database Enterprise Edition depends on the number of concurrent clients you intend to connect. The diagram shows a scenario with five concurrent clients connected to the server using a simple application with static SQL. For the server, it is recommended that a minimum of 32 MB of memory be installed to accommodate five concurrent clients. We suggest that you have a minimum of 48 MB of memory to accommodate 25 concurrent clients and 64 MB of memory for 50 concurrent clients. (If you have a more complex application environment, your server may require significantly more memory.) Use these guidelines to determine the amount of memory necessary in your environment.

An administration client is shown in the diagram. This client can be on an OS/2, Windows 95, or Windows NT workstation and can be used to remotely manage the DB2 servers on your network. A minimum of 24 MB of memory is required to run all the graphical tools you will need for an administration client.

For the DB2 clients in your environment, the amount of memory required depends on the database applications you are running.

Configuration for Accessing from the Web

If you want Internet clients using Web browsers to access data in databases on both LAN and host-based DB2 servers, use the configuration shown in Figure 6 on page 22 or Figure 5 on page 20.

Follow the guidelines in "Configuration for Accessing DB2 Servers on the LAN" on page 27 and "Configuration for Accessing LAN and Host Data" on page 29 to determine the memory required on your DB2 server and administration client.

Disk Requirements

This section shows the *minimum* amount of disk space that is required by DB2 products. It does not include the disk requirements necessary for the operating system, application development tools, and communications products. Consult each product's documentation for these values. Estimates for disk space requirements are listed here. The actual amounts required depend on the functions you are using. Use this information to plan for systems with a large number of concurrent clients or databases.

Estimating Fixed Disk Requirements

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

Disk Requirements Table

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

Table 1. Estimating Disk Requirements

	Recommended Minimum Disk (MB)
DB2 Universal Database Enterprise Edition	
DB2 Universal Database Enterprise Edition — this amount includes the following components:	72 MB
• DB2 Connect Support	1 MB
• Graphical Tools (Client Configuration Assistant, Control Center, Performance Monitor, and Visual Explain)	35 MB
• East Asian Conversion Support	5 MB
Online documentation in HTML format	30 MB
DB2 Universal Database Workgroup Edition	
DB2 Universal Database Workgroup Edition — this amount includes the following components:	70 MB
• Graphical Tools (Client Configuration Assistant, Control Center, Performance Monitor, and Visual Explain)	35 MB
• East Asian Conversion Support	5 MB
Online documentation in HTML format	30 MB

Note: The disk amounts listed are approximations.

Client Components

Use Table 2 to estimate the amount of disk space you need on each of your client workstations.

Table 2. Estimating Disk Requirements for Client Components

	Recommended Minimum Disk (MB)
DB2 Client Application Enabler for OS/2	
DB2 Client Application Enabler for OS/2 — this amount includes the following components:	55 MB
• Client Configuration Assistant	5 MB
• Graphical Tools	5 MB
• Control Center	30 MB
• Performance Monitor	10 MB
• Visual Explain	5 MB
Online documentation in HTML format	25 MB
DB2 Client Application Enabler for Windows 3.1x	
DB2 Client Application Enabler for Windows	10 MB
• Online documentation in HTML format	10 MB
DB2 Client Application Enabler for Windows 95 & Windows NT	
DB2 Client Application Enabler for Windows 95 & Windows NT — this amount includes the following components:	54 MB
• Graphical Tools (Client Configuration Assistant, Control Center, Performance Monitor, and Visual Explain)	35 MB
Online documentation in HTML format	25 MB

Software Requirements

This section outlines the software required to run the DB2 Universal Database and its associated products or components. These associated products include the DB2 Client Application Enabler, DB2 Software Developer's Kit, Net.Data, and DB2 Connect.

Server Product Requirements

Table 3 lists the operating system and communications software required for the Server products.

Table 3. Software Requirements for DB2 Servers

Product	Operating System	Communications
• DB2 Universal Database Enterprise Edition (including DB2 Connect Enterprise Edition) • DB2 Universal Database Workgroup Edition	• Windows NT Version 3.51 • Windows NT Version 4.0 or later	APPC, IPX/SPX, NetBIOS, TCP/IP, or Named Pipes • For APPC connectivity, you require one of: – IBM Communications Server for NT Version 5.0 – Microsoft SNA Server Version 2.11 or later • The Windows NT base operating system provides NetBIOS, IPX/SPX, Named Pipes, and TCP/IP connectivity. **Notes:** 1. DB2 Connect for Windows NT supports APPC, NetBIOS, IPX/SPX, TCP/IP and Named Pipes for LAN connections. 2. For host connectivity, you require IBM Communications Server for Windows NT Version 5.0. **Note:** Windows 95 cannot be used as a server or gateway. 3. If you want to use DCE (Distributed Computing Environment) with Version 5 of the DB2 Universal Database products, you require a DCE product that is at OSF DCE level 1.1 with Gradient PC-DCE for Windows NT or 95 Version 2.0 Release, Runtime Media Kit. For DB2 Connect support, you require DB2/MVS Version 5.1 plus its prerequisite, OS/390 DCE Base Services version 3 for DCE support. **Note:** With DB2 Connect, you must install DCE Directory Services on the client and the DRDA server. You do not need DCE installed on a DB2 Connect Enterprise Edition server. 4. If you plan to use the ADSTAR Distributed Storage Manager (ADSM) facilities for backup and restore of your databases, you require the ADSM Client Version 2.1.0.6. 5. If you have the IBM Antivirus program installed on your operating system, it must be Version 3.0 or later.

Client Product Requirements

Table 4 lists the software requirements needed for the DB2 client products.

Table 4 (Page 1 of 2). Software Requirements for Clients

Component	Operating System	Communications
• DB2 Client Application Enabler for OS/2 • DB2 Software Developer's Kit for OS/2 • Net.Data for OS/2	• OS/2 Warp Version 3 or Version 4 • OS/2 Warp Connect Version 3 • OS/2 Warp Server Version 4 • OS/2 Warp Server Advanced V4 • OS/2 Warp Server SMP	APPC, IPX/SPX, Named Pipes (Local), NetBIOS, or TCP/IP • For APPC connectivity, you require IBM Communications Manager Version 1.x or later. • For NetBIOS connectivity, you require IBM NTS/2 Version 1.0, IBM Communications Manager Version 1.1, or IBM OS/2 LAN Requester. • For IPX/SPX connectivity, you require Novell NetWare Requester, Version 2.10 or later. • For TCP/IP connectivity, you require IBM TCP/IP Version 2.0 or later. • The OS/2 base operating system provides Named Pipes (Local) connectivity. Named Pipes is supported in DOS and WIN-OS/2 sessions. **Notes:** 1. OS/2 Warp Server provides the SystemView LAN client that SystemView LAN needs for installing clients and servers. 2. Net.Data requires OS/2 Warp Version 3 or later and a Web server such as IBM's Internet Connection Server. 3. For DCE Cell Directory Services Support (CDS) for DB2 Client Application Enabler for OS/2, you must install IBM Distributed Computing Environment Cell Directory Service client, Version 2.10, on each client workstation.

• DB2 Client Application Enabler for Windows, (Windows 3.1 and Windows for Workgroups)
• DB2 Software Developer's Kit for Windows
	• Microsoft Windows 3.1
	• Windows for Workgroups 3.11
		IPX/SPX, NetBIOS, or TCP/IP
		
		• For IPX/SPX connectivity, you require Novell NetWare client for Windows, which comes with Novell Netware Server Version 3.x or Version 4.x; or Novell NetWare Workstation for Windows Version 1.0 or later with the latest update kit installed.
		• For NetBIOS connectivity, you require the LAN Adapter and Protocol Support in any of these products:
		  – IBM LAN Support Program Version 1.2.1 or later
		  – DOS LAN Services (LAN Server 4.0)
		  – Banyan Vines NetBIOS Version 5.52
		  – NetBEUI (available with Microsoft Windows for Workgroups 3.11)
		• For TCP/IP connectivity, you require one of the following:
		  – IBM TCP/IP for DOS Version 2.1.1 or later
		  – PC/TCP Network Software for DOS Version 2.3 or later from FTP Software Inc.
		  – TCP/IP compliant with the Windows Sockets Version 1.1 specification

Table 4 (Page 2 of 2). Software Requirements for Clients

Component	Operating System	Communications
• DB2 Client Application Enabler for Windows (WIN-OS/2) • DB2 Software Developer's Kit for Windows (WIN-OS/2)	• OS/2 Warp Version 3 or Version 4 • OS/2 Warp Connect Version 3 • OS/2 Warp Server Version 4 • OS/2 Warp Server Advanced V4 • OS/2 Warp Server SMP	NetBIOS, IPX/SPX, TCP/IP, or Named Pipes (Local) • For NetBIOS connectivity, you require IBM NTS/2 Version 1.0, IBM Communications Manager Version 1.1, or IBM OS/2 LAN Requester. • For IPX/SPX connectivity, you require Novell NetWare client for OS/2 Version 2.10 or later with virtual session support. • For TCP/IP connectivity, you require IBM TCP/IP for OS/2 with the Windows Access kit.
• DB2 Client Application Enabler for Windows 95 • DB2 Software Developer's Kit for Windows 95	• Windows 95 4.00.950 or later	IPX/SPX, Named Pipes, NetBIOS, or TCP/IP • The Windows 95 base operating system provides NetBIOS, IPX/SPX, TCP/IP, and Named Pipes connectivity.

• DB2 Client Application Enabler for Windows NT
• DB2 Software Developer's Kit for Windows NT
• Net.Data for Windows NT
	• Windows NT Version 3.51
	• Windows NT Version 4.0 or later
		APPC, IPX/SPX, Named Pipes, NetBIOS, or TCP/IP
		
		• The Windows NT base operating system provides NetBIOS, IPX/SPX, TCP/IP, and Named Pipes connectivity.
		• For APPC connectivity, you require one of the following products:
		  – IBM Communications Server for Windows NT Version 5.0.
		  – Microsoft SNA Server Version 2.11 or later on the LAN. You do not have to install the SNA Server on the same workstation as the DB2 Client Application Enabler for Windows NT.
		  – PCOMM AS/400 and 3270 V4.1 or later
		  – Wall Data Rumba
		
		Note: If you have the IBM Antivirus program installed on your operating system, it must be Version 3.0 or later.

Possible Client-to-DB2 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.

Table 5. Possible Client-to-Server Connectivity Scenarios	
Client	**DB2 for Windows NT Server**
OS/2	APPC IPX/SPX[1] NetBIOS TCP/IP
Windows 3.1x	IPX/SPX[1] NetBIOS TCP/IP
Windows 95	IPX/SPX[1] Named Pipes NetBIOS TCP/IP
Windows NT	APPC IPX/SPX[1] Named Pipes NetBIOS TCP/IP
1 Direct Addressing	

Understanding System Administrative (SYSADM) Authority

System Administrative authority is required in order to perform administration tasks such as cataloging, starting the database manager, or creating the sample database. By default, any user belonging to the Administrators group has System Administrative authority on the instance created during the installation. Throughout the book, IDs that have this authority are referred to as having SYSADM authority. To change the group that has SYSADM authority on the default instance, see "Changing Default Privileges for Users" on page 76.

Chapter 5. Installing and Configuring DB2 Server

If you are migrating from previous versions of DB2, you must complete certain procedures before installing DB2 Version 5. See Chapter 18, "Migrating from Previous Versions" on page 121 for further information.

This section gives instructions on installing the DB2 product interactively. You can also run unattended installations of DB2 products to remote target machines running Windows NT. See Chapter 20, "Unattended DB2 Installation on Windows 95 or Windows NT Workstations" on page 143 for further information.

See Chapter 6, "Installing DB2 Clients" on page 51 for information on how to install the DB2 clients.

Before You Begin

Read and perform the steps in this section before you begin the installation to ensure that you have the required items and information that you will need.

Creating Usernames for DB2 Installation and Operation

This section describes the usernames required to install the DB2 product and its components.

Creating a Username for Installing DB2 Products

You need to have a username that will be used to install DB2. The username must belong to the Administrators group, and also be a valid DB2 username or have the *"Act as part of the operating system"* advanced user right.

A valid DB2 username is eight characters or less, and complies with DB2's naming rules. For more information on DB2's naming rules, see Appendix C, "Naming Rules" on page 221.

If this username does not comply with DB2's naming rules, but has the *"Act as part of the operating system"* advanced user right, the setup program will create the username *DB2ADMIN* to perform the installation.

> This username will be removed from the system when the installation is complete, unless it will be used by the Administration Server. See "Determining the Username for the Administration Server" for more information.

Determining the Username for the Administration Server

During installation, you will be asked to provide a username and password that will be used by the Administration Server to log on to the system and to start itself as a service.

By default, the setup program will fill the **Username**, **Password**, and **Confirm Password** fields with *db2admin*. You can accept these default values, or provide your own. If you provide your own username, you must ensure that it is eight characters or less and complies with DB2's naming rules. For more information, see Appendix C, "Naming Rules" on page 221.

The setup program will check to see if the username specified for the Administration Server exists, if it does not, it will be created. If it does exist, the setup program will:

- Verify that the username is a member of the Administrators group.

- Verify that the password is valid; provided that the username used to install DB2 has the *"Act as part of the operating system"* advanced user right.

> If you use the default username *db2admin*, and did not change the default password for this username, you should change this password immediately following the installation.
>
> When the setup program creates the *db2admin* username, it also makes it a member of the Administrators group. Since its password is well known, you should do the following:
>
> **1** Change the password for *db2admin*, using the User Manager function of Administration Tools.
>
> **2** Change the password for the *DB2-DB2DAS00* service to match the new password that you specified for the *db2admin* username.

Selecting Products and Components

The following table lists the products and selectable components that you can install on a DB2 server. For information on the products and components, see Chapter 2, "About DB2 Universal Database" on page 9. The check marks in the columns for **Typical Install** and **Compact Install** indicate the components that are installed when these types of install are used. See "Performing the Installation" on page 42 for more information on install types.

Table 6. Products and Components for DB2 for Windows NT			
Product	**Components and Subcomponents**	**Typical Install**	**Compact Install**
DB2 Universal Database Enterprise Edition (Server)	▫ Graphical Tools	√	
	▫ Client Configuration Assistant	√	
	▫ Control Center	√	
	▫ Performance Monitor	√	
	▫ Visual Explain	√	
	▫ DB2 ODBC Driver	√	√
	▫ DB2 Connect Support	√	
	▫ East Asian Conversion Support		
	▫ Documentation	√	
DB2 Universal Database Workgroup Edition (Server)	▫ Graphical Tools	√	
	▫ Client Configuration Assistant	√	
	▫ Control Center	√	
	▫ Performance Monitor	√	
	▫ Visual Explain	√	
	▫ DB2 ODBC Driver	√	√
	▫ East Asian Conversion Support		
	▫ Documentation	√	
DB2 Client Application Enabler	▫ Graphical Tools	√	
	▫ Client Configuration Assistant	√	
	▫ Control Center		
	▫ Performance Monitor		
	▫ Visual Explain		
	▫ DB2 ODBC Driver	√	√
	▫ Documentation	√	

> The appropriate East Asian Conversion Support Subcomponent is part of the Typical install for East Asian countries using DBCS (double byte character set).

Performing the Installation

To install DB2 server on a Windows NT workstation:

1 Log on as a user that meets the requirements for installing DB2. For more information, see "Creating Usernames for DB2 Installation and Operation" on page 39.

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

3 Insert the 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, see the tip that follows.

To manually invoke the setup program, do the following:

1 Click on the **Start** button and select **Run**

2 Type the following in the **Open** field:

```
x:\setup /i=LANGUAGE
```

where

- `x:` represents your CD-ROM drive
- `LANGUAGE` represents the two-character country code for your language (for example, EN for English). Table 17 on page 220 lists the code for each available language.

3 Select **OK**

---

4 The Welcome window opens. Click on the **Next** push button to open the Select Products window, as shown below. Select the product that you want to install and click on the **Next** push button.

Select Products [×]

Select the product(s) you are licensed to install. Your Proof of
Entitlement and License Information booklet identify the
product(s) for which you are licensed.

- ☐ DB2 Universal Database Enterprise Edition
- ☐ DB2 Universal Database Workgroup Edition
- ☐ DB2 Client Application Enabler

Description

DB2 Enterprise Edition provides the functions to create and
manage databases on LAN servers, and a gateway to access
DRDA application servers. It supports large numbers of users
accessing data on the LAN server and in DB2 host
databases.

< _B_ack   _N_ext >   Canc_e_l   _H_elp

5 You can select the installation type you prefer by clicking on the appropriate
graphic push button:

> The setup program does not detect or configure an APPC communications
> subsystem; as a result, the setup program will not automatically configure
> your DB2 server to support APPC.
>
> If you want to set up your DB2 server to support inbound client requests
> using APPC, you must perform a Custom Installation. The setup program
> will allow you to select support for APPC and provide the required DB2
> parameters; however, it cannot configure the APPC communications
> subsystem.
>
> Refer to the *DB2 Connect Enterprise Edition Quick Beginnings* manual for
> information on how to configure an APPC communications subsystem for a
> Windows NT workstation.
>
> If you are installing DB2 Universal Database Workgroup Edition, this manual
> will not be installed on your workstation. Go to DB2 Product and Service
> Technical Library, located at http://www.software.ibm.com/data/db2/library/
> to view this manual.
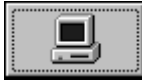
Typical Install: Installs those DB2 components that are used most often, including all required components, ODBC support, documentation, and commonly-used DB2 tools such as the Information Center, the Client Configuration Assistant, and the Control Center. The DB2 instance and the Administration server are created and customized to use the protocols detected on your system.

Compact Install: Installs only required DB2 components and ODBC support. The DB2 instance and the Administration server are created and customized to use the protocols detected on your system.

Custom Install: Installs only those components that you select. The DB2 instance and the Administration server are created and customized to use the protocols detected on your system. The default for a Custom install is to install those components and subcomponents you would get in a Typical install.

The Control Center is a graphical tool used for DB2 administration tasks. Use the DB2 Control Center to:

- Manage databases
- Manage tables, views, and indexes
- Configure DB2 systems
- Perform database backup and recovery tasks
- Schedule jobs
- Replicate data.

If the Control Center is not installed, you will have to use the Command Line Processor to administer your DB2 server. See Chapter 2, "About DB2 Universal Database" on page 9 for a complete description of the Control Center's features.

Note: You cannot selectively uninstall components after the setup program completes the installation.

6 Respond to the setup program's prompts. Online help is available to walk you through the remaining steps. Invoke online help by clicking on the **Help** push button at any time.

> **Note:** If a DB2 Version 5 product is already installed on the workstation, you must install the product on the same drive and in the same directory.

You can click on the **Cancel** push button at any time to end the installation.

7 After you install the product, you must reboot your workstation before you can begin to use it. Select a reboot option and click on the **Finish** push button.

This completes the installation. When your system restarts, log on with a username that belongs to the Administrators group and meets DB2's naming rules. The DB2 First Steps tool executes automatically (only after the first reboot when the installation is completed). Use First Steps to create the sample database.

First Steps can be invoked at any time by clicking on the **Start** button and selecting **Programs**->**DB2 for Windows NT**->**First Steps**. See Chapter 12, "Getting Started with the DB2 Universal Database" on page 73 for more information.

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

The installation program has:

- Created DB2 program groups and items (or shortcuts).

- Registered a security service.

- Updated the Windows registry.

- Created a default instance named DB2, added it as a service, and configured it for communications. If you selected to **Automatically start the DB2 instance a boot time**, the service's startup type was set to **Automatic**; otherwise, it was set to **Manual**.

- Created the DB2 Administration Server, added it as a service, and configured it so that DB2 tools can administer the server. The service's start type was set to **Automatic**.

- Activated First Steps following the first boot after installation.

> If you used the default username *db2admin*, remember to change the default password for this username. You should change this password immediately following the installation.

You have completed all the installation steps. Go to "Verifying the Installation" on page 46 to verify the installation.

By default, any user belonging to the System Administrators group has System Administrative (SYSADM) authority on the instance created during the installation. To change the group that has SYSADM authority on the default instance, go to "Changing Default Privileges for Users" on page 76.

Verifying the Installation

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

1. Log on to the system with a valid DB2 user ID that has System Administrative (SYSADM) authority.

2. Create the sample database using one of the following methods:

   - Click on the **Create the SAMPLE Database** graphic button on the main panel of First Steps.

   - Issue the **db2sampl** command from the the Command Window.

3. Once the database is created, click on the **View the SAMPLE Database** graphic button on the main panel of First Steps to select data from the SAMPLE database. This starts the Command Center allowing you to use the supplied script that shows some of the data from the database. Click on the execute icon to begin the query.

4. Click on the **Work with the SAMPLE Database** graphic button on the main panel of First Steps to start the Control Center. This allows you to see the tables that are in the SAMPLE database and enables you to perform actions on them.

> After you have verified the installation, you can remove the sample database to free up disk space. Issue the **drop database** *sample* command from the command line processor to remove the sample database.

Creating a Server Access Profile

> At least one database should be created on your server before creating a profile.

To make it easy to set up a client, you can create a profile of your server that contains detailed information that the client needs to make a connection. This information includes the names and locations of all databases and instances on your server system. Creating a profile makes it easy to set up a single client as well as hundreds of clients. Follow these steps to create a profile that you can use to configure your clients:

1. Click on the **Start** button and select **Programs**->**DB2 for Windows NT**->**Administration Tools**->**Control Center**.

2 Expand the **System** directory tree by clicking on the plus sign (**+**).

3 Click with the right mouse button on the system for which you want the profile. Select the **Generate Access Profile** option from the pop-up menu.

Follow the instructions in the help to write the profile to a diskette or to a file on the network that is accessible to the client workstations.

Now that you have successfully installed DB2, go to Chapter 6, "Installing DB2 Clients" on page 51 to install remote clients to access DB2 databases.

If you are migrating from a previous version, go to Chapter 18, "Migrating from Previous Versions" on page 121 for information on how to complete the migration process.

Part 3. Installing Clients

Chapter 6. Installing DB2 Clients

Use the instructions in this section to perform an interactive installation of a DB2 client. You can also run unattended installations of DB2 products to remote target machines running OS/2, Windows 3.x, Windows 95, or Windows NT.

Go to the section that gives instructions for the DB2 client that you want to install.

- Chapter 7, "Installing DB2 Clients on Windows 95 or Windows NT Workstations" on page 53.
- Chapter 8, "Installing DB2 Clients on OS/2 Workstations" on page 57.
- Chapter 9, "Installing DB2 Clients on Windows 3.x Workstations" on page 59.
- Chapter 19, "Unattended DB2 Installation on OS/2 or Windows 3.x Workstations" on page 131.
- Chapter 20, "Unattended DB2 Installation on Windows 95 or Windows NT Workstations" on page 143.

Clients on a LAN that will connect to a DB2 Universal Database must have the DB2 Client Application Enabler or the DB2 Software Developer's Kit installed.

The DB2 Client Application Enabler is installed with any DB2 Version 5 product. If a DB2 Version 5 product currently exists on this workstation, the DB2 Client Application Enabler component has already been installed, and there is no need to install a DB2 Client Application Enabler. To configure your client to access remote servers, go to Chapter 10, " Configuring Client to DB2 Server Communications Using the CCA" on page 65.

DB2 Client Application Enablers and DB2 SDKs are available for the following operating systems: AIX, DOS, HP-UX, Macintosh, OS/2, SCO OpenServer, Silicon Graphics IRIX, SINIX, Solaris, Windows 3.1x, Windows 95, and Windows NT.

You may install DB2 Client Application Enablers on any number of workstations; there are no licensing restrictions for installation. DB2 Enterprise Edition allows an unlimited number of users to connect to the server, DB2 Workgroup has use-based entitlement restrictions for the number of users that can connect to the server.

The DB2 Software Developer's Kits are on the DB2 SDK CD-ROM that comes with the AD Kit. The DB2 Client Application Enablers (except the DOS client) are on the Client Pack CD-ROM.

> To obtain DB2 Client Application Enablers for all clients, including DOS, connect to the IBM Web site (http://www.software.ibm.com), search for the `IBM Database 2 Client Application Enabler Pack`, and follow the instructions provided.

To install and configure UNIX or Macintosh clients, refer to the *Installing and Configuring DB2 Clients* manual, available on the Client Pack CD-ROM.

Chapter 7. Installing DB2 Clients on Windows 95 or Windows NT Workstations

This section contains the information you need to install the DB2 Client Application Enabler on Windows 95 or Windows NT workstations.

Before You Begin

Read and perform the steps in this section before you begin the installation to ensure that you have the required items and information that you will need.

Creating a Username for Installing DB2 Products

Windows 95
The username must be a valid DB2 username.

A valid DB2 username is eight characters or less, and complies with DB2's naming rules. For more information on DB2's naming rules, see Appendix C, "Naming Rules" on page 221.

Windows NT
You need to have a username that will be used to install DB2. The username must belong to the Administrators group, and also be a valid DB2 username or have the *"Act as part of the operating system"* advanced user right.

A valid DB2 username is eight characters or less, and complies with DB2's naming rules. For more information on DB2's naming rules, see Appendix C, "Naming Rules" on page 221.

If this username does not comply with DB2's naming rules, but has the *"Act as part of the operating system"* advanced user right, the setup program will create the username *DB2ADMIN* to perform the installation.

> This username will be removed from the system when the installation is complete.

Performing the Installation

To install a DB2 Client Application Enabler for Windows 95 or Windows NT:

1 Log on as a user that meets the requirements for installing DB2. For more information, see "Creating a Username for Installing DB2 Products" on page 53.

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

3 Insert the DB2 Client Pack CD-ROM that contains the Windows 95 or Windows NT client 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, see the tip that follows.

> To manually invoke the setup program, do the following:
>
> **1** Click on the **Start** button and select **Run**
>
> **2** Type the following in the **Open** field:
>
>   x:\setup /i=LANGUAGE
>
> where
>
> - x: represents your CD-ROM drive
> - LANGUAGE represents the two-character country code for your language (for example, EN for English). Table 17 on page 220 lists the code for each available language.
>
> **3** Select **OK**

4 The Welcome window opens.

Click on the **Next** push button to continue.

5 The Enable Remote Administration window opens. Select the **Install components required to administer remote servers** check box if you would like to administer remote servers from this client, then click on the **Next** push button.

6 Select the installation type you prefer:

 Typical Install: Installs those DB2 components that are used most often, including all required components, ODBC support, documentation, and commonly-used DB2 tools such as the Client Configuration Assistant and the Information Center. The DB2 instance is created.

 Compact Install: Installs only the required DB2 components and ODBC support. The DB2 instance is created.

 Custom Install: Installs only those components that you select. The DB2 instance is created.

> The Client Configuration Assistant (CCA) component makes it easy for you to configure and administer connections to databases and bind applications and utilities to a database. See "Managing Connections to Databases Using the Client Configuration Assistant" on page 16 for a complete description of the CCA's features.
>
> If the CCA is not installed, you will need to use the command line processor to configure connections to a DB2 server.
>
> Refer to the online *Installing and Configuring DB2 Clients* manual for information on setting up clients for communications using the command line processor.

7 Respond to the setup program's prompts. Online help is available to walk you through the remaining steps. Invoke online help by clicking on the **Help** push button at any time.

   Note: If a DB2 Version 5 product is already installed on the workstation, you must install the product on the same drive and in the same directory.

   You can click on the **Cancel** push button at any time to end the installation.

8 After you install the product, you must reboot your workstation before you can begin to use it. Select a reboot option and click on the **Finish** push button. This completes the installation.

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

The installation program has:

- Created DB2 program groups and items (or shortcuts).
- Updated the Windows registry.
- Created a default client instance called DB2.
- Registered a security service.

Chapter 8. Installing DB2 Clients on OS/2 Workstations

This section contains the information you need to install the DB2 Client Application Enabler or the DB2 Software Developer's Kit on OS/2 workstations.

To install the DB2 Client Application Enabler for OS/2:

1 Insert the DB2 Client Pack CD-ROM that contains the OS/2 client into the drive.

2 Begin the installation program as follows:

- Open an OS/2 windows and set the drive to *x:*, where *x* is the letter that represents your CD-ROM drive.

- Set the current directory to \db2\os2*language*\install, where *language* is the two-character country code that represents your language (for example, EN for English). Table 17 on page 220 lists the code for each available language.

- Enter the command **install**.

The IBM DB2 for OS/2 Version 5 Installation window opens.
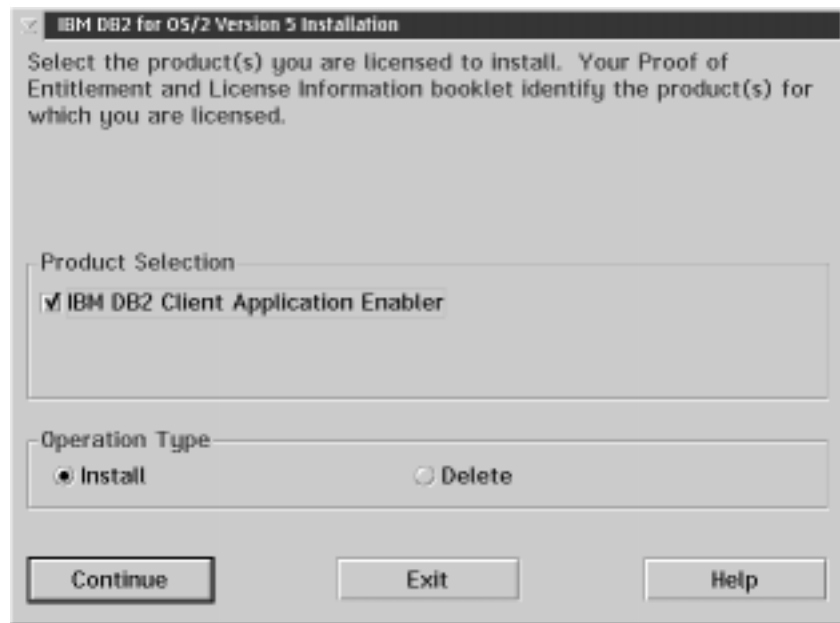
To select the product that you want to install on your system, click on the **Continue** push button. The Update CONFIG.SYS File window opens.

3 Indicate whether or not you want to update the config.sys file as part of the installation.

- If you want the config.sys file updated, click on **OK**. A backup copy of your existing file is kept as config.0xx.

- If you do not want the config.sys file updated, clear the **Update CONFIG.SYS** check box and click on **OK**. You will need to manually update your config.sys file with the values that are stored in the config.add file.

4 The Install - Directories window provides a list of the product's components. You can choose which of the components you want to install on your system.

For the Install - Directories window, complete the entries as follows:

a Select each of the components you want to install.

You have the option of installing the Client Configuration Assistant component. The Client Configuration Assistant makes it easy for you to configure and administer connections to databases and to bind applications and utilities to a database. If the Client Configuration Assistant is not installed, you will need to manually configure connections to DB2 servers. Refer to "Managing Connections to Databases Using the Client Configuration Assistant" on page 16 for a complete description of the Client Configuration Assistant's features.

b In the **File directory** field, type the directory where you want the product installed. The default value is c:\sqllib.

Note: If a DB2 Version 5 product is already installed on the workstation, you must install on the same drive and directory.

c Click on the **Disk Space** push button to see how much space you have on each of the drives on your machine and to change disks if necessary.

d Click on the **Install** push button to continue.

A progress window appears until the installation is complete. You can click on the **Stop** push button at any time to end the installation.

5 At the end of the installation, shut down and reboot your workstation before you can use the client.

Note: If you want to run Windows 3.1 applications on your OS/2 client, you must also install the DB2 Client Application Enabler for Windows 3.1 component on your system. You should install this client component in the same directory as DB2 Client Application Enabler for OS/2. Having both DB2 Client Application Enablers in the same directory merges the DB2 directories and allows the CCA to be used to configure the access to remote DB2 databases for both OS/2 and Windows 3.x applications.

To configure your client to access remote servers, go to Chapter 10, " Configuring Client to DB2 Server Communications Using the CCA" on page 65.

Chapter 9. Installing DB2 Clients on Windows 3.x Workstations

Note: If you have a previous version of the DB2 Client Application Enabler for Windows 3.1 installed on your system, it is recommended that you back it up before beginning this installation procedure.

To install the DB2 Client Application Enabler on Windows 3.x workstations:

1 Insert the DB2 Client Pack CD-ROM that contains the Windows 3.x client into the drive.

2 To begin the installation program enter:

`x:\db2\windows\`*language*`\install\install.exe`

where *x:* is the letter representing your CD-ROM drive and where *language* is the two-character country code that represents your language (for example, EN for English). Table 17 on page 220 lists the code for each available language.

The Install window opens.
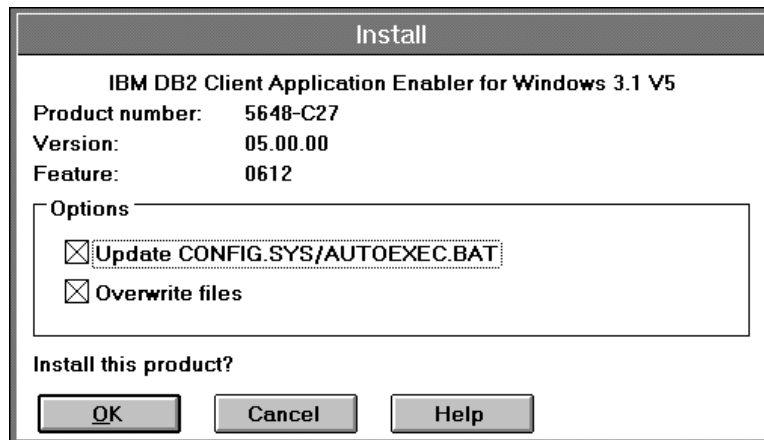
3 In the Install window, indicate whether or not you want to update the autoexec.bat file as part of the installation.

- If you want the autoexec.bat file updated, check that the **Update CONFIG.SYS/AUTOEXEC.BAT** check box is selected, then click on **OK**. A backup copy, called autoexec.bak, is created in the same directory as your autoexec.bat file.

- If you do not want the autoexec.bat file updated, clear the **Update CONFIG.SYS/AUTOEXEC.BAT** check box. You will need to manually update your autoexec.bat file with the values that are stored in the autoexec.add file.

> The **Overwrite files** check box is selected by default, it is recommend that you do not change this setting.

4 Click on **OK** to continue. The Install-directories window opens.

```
┌─────────────────────────────────────────────────────────────┐
│                    Install - directories                     │
├─────────────────────────────────────────────────────────────┤
│  Select the components that you want to install:             │
│  ┌──────────────────────────────────┐   ┌──────────────────┐ │
│  │ Client Application Enabler       │   │  Descriptions... │ │
│  │ Documentation                    │   └──────────────────┘ │
│  │                                  │   ┌──────────────────┐ │
│  │                                  │   │   Select all     │ │
│  │                                  │   └──────────────────┘ │
│  │                                  │   ┌──────────────────┐ │
│  │                                  │   │   Deselect all   │ │
│  └──────────────────────────────────┘   └──────────────────┘ │
│  Bytes needed:            Unknown                            │
│  ┌───────────────────────────────────────────────────────┐  │
│  │ Enter the directories where you want to install the   │  │
│  │ components. These directories will be created if they │  │
│  │ do not already exist.                                 │  │
│  │                                                        │  │
│  │  File directory:        ┌──────────────────────┐  ▲   │  │
│  │                         │ C:\SQLLIB            │      │  │
│  │                         └──────────────────────┘  ▼   │  │
│  └───────────────────────────────────────────────────────┘  │
│   ┌──────────┐ ┌────────────┐ ┌──────────┐ ┌────────┐       │
│   │ Install..│ │ Disk space.│ │  Cancel  │ │  Help  │       │
│   └──────────┘ └────────────┘ └──────────┘ └────────┘       │
└─────────────────────────────────────────────────────────────┘
```

5 In the **File directory** field, type the directory where you want the product installed. The default value is c:\sqllib.

> If you are installing the DB2 Client Application Enabler for Windows 3.x on an OS/2 system that already has the DB2 Client Application Enabler for OS/2 Version 5 product installed, enter the same directory in the **File directory** field as the DB2 Client Application Enabler for OS/2 product. This will merge the two DB2 directories together, allowing tools like the Client Configuration Assistant to be used to configure clients to access a remote DB2 database for both Windows 3.x and OS/2 applications.

6 Select the components that you want to install.

7 Click on the **Install** push button to start the installation. A progress window appears until the installation is complete.

You can click on the **Stop** push button at any time to end the installation.

8 Once you have completed the installation, shut down and reboot your system.

To configure your client to access a remote DB2 server, refer to the online *Installing and Configuring DB2 Clients* manual.

Part 4. Configuring DB2 Communications

Chapter 10. Configuring Client to DB2 Server Communications Using the CCA

Use the information in this section to use the Client Configuration Assistant to configure OS/2, Windows 95, and Windows NT workstations to access remote DB2 Universal Database servers.

To configure all other clients, refer to the online *Installing and Configuring DB2 Clients* manual.

Use the Client Configuration Assistant to configure your OS/2, Windows 95, or Windows NT client workstation to access remote DB2 Universal Database servers. The Client Configuration Assistant provides three configuration methods: one makes use of a server's access profile, one searches the network for databases, and the other requires that you enter the database name and the communication protocol values of the DB2 server.

Perform the following steps to configure your workstation to access remote servers:

1. Start the Client Configuration Assistant (CCA).

   For OS/2:
   Double-click on the **Client Configuration Assistant** icon, located in the **DB2 for OS/2** folder.

   For Windows 95 or Windows NT:
   Click on **Start** and select **Programs**->**DB2 for Windows**->**Client Configuration Assistant**.

   The Welcome panel opens each time you start the CCA, until you have added at least one database to your client.

2. Click on the **Add Database** or **Add** push button to configure connections using the Add Database SmartGuide. Choose one of the following configuration methods:

   - If your administrator provided you with a file containing database access information, select the **Use an access profile** radio button and click on the **Next** push button.

     a. Click on the **Browse** push button to select an access profile, or enter the path and name of the file in the **File** field.

     b. You are presented with a list of systems, instances, and databases. Select the database that you want to use and proceed to Step 3.

   - If you want to search the network for databases, select the **Search the network** radio button and click on the **Next** push button.

> The **Other Systems (Search the network)** icon will only appear if the client's *discover* parameter is set to SEARCH.

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

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

    c If the system that contains the database that you want is not listed, click on the **[+]** sign beside the **Other Systems (Search the network)** icon to search the network for additional systems. Click on the **[+]** sign beside the system to get a list of the instances and databases on it. Select the database that you want to add and proceed to Step 3.

    d If the system you want is still not listed, it can be added to the list of systems by clicking on the **Add Systems** push button. Enter the required communication protocol parameters and click on the **Next** push button. For more information, click on the **Help** push button.

       Select the database that you want to add and proceed to Step 3.

- If you have the protocol information for the database that you want to connect to, select the **Manually configure a connection to a DB2 database** radio button and click on the **Next** push button.

    a Select the radio button that corresponds to the protocol that you want to use from the **Protocol** list. Click on the **Next** push button.

    b Enter the required communication protocol parameters and click on the **Next** push button. For more information, click on the **Help** push button.

    c Specify the name of the database that you want to connect to in the **Target database** field and proceed to Step 3.

3 To specify the database alias name or to add a description, click on the **Next** push button. If you do not specify a database alias name, the default will be the same as the database name.

4 If you want to run ODBC-enabled applications, click on the **Next** push button. If you do not plan to use ODBC, click on the **Done** push button to finish using the Add Database SmartGuide and proceed to Step 6.

5 If you are using ODBC applications, select the **Register this database for ODBC** check box, select the radio button that describes the type of data source that you want to register this database as, and select the application that you want to use from the **Application** drop down box. Click on the **Done** push button to finish using the Add Database SmartGuide.

6 The Confirmation window opens. Click on the **Test Connection** push button to test the connection to the specified database.

7 Enter your user ID and password to access the database and click on **OK**. If the connection is successful, a message confirming the connection appears. If the connection fails, click on the **Help** push button for more information. If you require additional information, refer to the *Troubleshooting Guide*.

8 You are now able to use the database. If you want to access another database, select the **Add Another** push button. To finish using the Add Database SmartGuide, click on the **Close** push button.

Verifying the Connection

When the configuration of the server and client is complete, use the following steps to verify that you can access data from a remote database:

> You will need to connect to a remote database to test the connection. If you do not have a database on the server, create the SAMPLE database on the server to test the connection. See "Creating the Sample Database" on page 74 for more information.

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

2 Issue the following command in the client's Command Center or command line processor to connect the client to the remote database:

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

The database alias (database_alias) is an arbitrary local nickname for the remote database on the client. If you do not provide one, the default is the same as the database name (*database_name*). This is the name that you use when connecting to a database from a client.

The values for *userid* and *password* must be valid for the system on which they are authenticated. By default, authentication takes place on the SERVER. If the database manager is configured for CLIENT authentication, the *userid* and *password* must be valid on the client.

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

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

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

You are ready to start using the DB2 client to communicate with a DB2 server . See Chapter 12, "Getting Started with the DB2 Universal Database" on page 73 for details.

Chapter 11. Configuring DB2 Server Communications Using the Control Center

> To configure the Administration Server for communications, go to Chapter 22, "Setting up Communications on the Server Using the Command Line Processor" on page 179.

The Control Center is a graphical tool available on OS/2, Windows 95, and Windows NT operating systems. Use the Control Center's Setup Communications function to configure communications on the server. The Control Center allows you to:

- Display the protocols and configuration parameters that a server instance is configured to use.

- Maintain the configured protocols:

  - You can modify the parameter values of a configured protocol.

  - You can add or delete a protocol.

    When you add support for a new protocol to the server system, the Setup Communications function detects and generates parameter values for the new protocol; you can accept or modify them before use. When you remove support for an existing protocol from the server system, the Setup Communications function detects the protocol that has been removed and disables its use by the instance.

    You can add a protocol that has not been detected, however, you must supply all parameter values before you proceed.

The Setup Communications function can be used to maintain communications of both local and remote server instances.

Modifying the DB2 Communication Configuration of DB2 Server Instances

1 To start the Control Center on a Windows NT system, click on the **Start** button and select **Programs**->**DB2 for Windows NT**->**Administration Tools**->**Control Center**.

2 Click on the **[+]** sign beside the **Systems** icon in the Control Center to get a list of systems.

3 Click on the **[+]** sign beside the system name to get a list of that system's database instances.

4 Select the instance you want to configure and click on the right mouse button.

5 Select the **Setup communications** option from the pop-up list. The Setup Communications window opens.

6 Use the Setup Communications window to configure communication protocols for the instance. Click on the **Help** push button for more information.

7 You must stop and start the instance for these changes to take effect.

    a To stop the database manager instance, select the instance and click with the right mouse button on the instance and select the **Stop** option from the pop-up menu.

    b To start the database manager instance, select the instance and click with the right mouse button on the instance and select the **Start** option from the pop-up menu.

> Modifying an instance's communications settings may require you to update the database connection configuration on the client.

Part 5. Using DB2 Universal Database

Chapter 12. Getting Started with the DB2 Universal Database

This section describes how to use the DB2 Universal Database in a variety of ways.

Go to the section that gives instructions for the tasks that you want to perform.

- "Logging on to the System."
- "Creating the Sample Database" on page 74.
- "Connecting to a Database" on page 75.
- "Changing Default Privileges for Users" on page 76.
- "Software Registration" on page 77.
- "Counting Concurrent Users" on page 78.
- "Upgrading from a Try-and-Buy License" on page 79.

Logging on to the System

To use DB2, log on with a valid user ID that has the appropriate authority level for the commands you want to execute. If the *SYSADM_GROUP* parameter is defined in the database manager configuration file, the user performing administration tasks (such as cataloging, starting the database manger, or creating the sample database) must belong to the System Administrative group. The *SYSADM_GROUP* parameter is not set when DB2 is first installed; therefore, the following criteria are used to determine SYSADM authority:

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

Windows 95　Any Windows 95 user.

Windows NT　A valid DB2 username which belongs to Administrators group.

> You can override this default case by explicitly providing a group name for the SYSADM_GROUP parameter. If you do this, the only way to assign SYSADM authority is by membership to this group.
>
> See "Changing Default Privileges for Users" on page 76 for more information

See Appendix C, "Naming Rules" on page 221 for a list of restrictions on valid usernames.

As well as using the local operating system security to authenticate users, there is also the option of using DCE security. Refer to the *Administration Guide* for information on DCE security.

Creating the Sample Database

You might want to create the sample database, called SAMPLE, that is provided with DB2 Universal Database. It contains tables, views, and fictitious data that you can use to verify that DB2 is correctly installed. For a detailed description of the sample database, refer to the *Administration Guide*.

The SAMPLE database requires approximately 9 MB of disk space and by default is created in the drive where DB2 is installed. It is automatically cataloged as the database alias SAMPLE when it is created.

To create the sample database, use one of the following methods:

- Click on the **Create the SAMPLE Database** graphic button in the First Steps main panel. (To start First Steps, click on the **Start** button and select **Programs**->**DB2 for Windows NT**->**First Steps**.)

- Enter the **db2sampl** command from the DB2 Command Window or in the operating system's command prompt. By default, the sample database will be created on the drive where DB2 was installed (you can optionally create the database on a different drive). For example, to create it on the F: drive, type:

      db2sampl F:

This command may take a few minutes to process. There is no completion message, when the command prompt returns the process is complete.

To remove the SAMPLE database, enter the following command in the Control Center or the command line processor:

    drop database sample

Connecting to a Database

You need to connect to the database before you can use SQL statements to query or update it. The `CONNECT` statement associates a database connection with a user ID.

A database is created in an instance using one of three different authentication types: CLIENT, SERVER, or DCS. If an authentication type is not specified when the instance is created, the default SERVER authentication is used. You connect to a database differently depending on the authentication type and where the database resides.

Connecting to a local database

To connect to a local database called SAMPLE, type the following command in the Command Center or the command line processor:

```
connect to sample
```

Connecting to a remote database

- To connect a client to a database called `SAMPLE`, using SERVER authentication, type the following command in the Command Center or the command line processor:

  ```
  connect to sample user userid using password
  ```

  (Be sure to choose values for *userid* and *password* that are valid on the server system.)

- To connect a client to a database called `SAMPLE`, using CLIENT authentication, type the following command in the Command Center or the command line processor:

  ```
  connect to sample
  ```

> If you are connecting to the database from an OS/2 system, and are not currently logged on, you will be prompted to log on using a user ID and password.
>
> If you are connecting to a database, from a Windows NT client using CLIENT authentication and you are providing a user ID and password on the **CONNECT** command, you must start the DB2 for Windows NT Security Service on the system. The Security Service is installed by DB2 and set up as a Windows NT service; however, it is not started automatically.
>
> To start the DB2 Security Service, double-click on the **Services** icon in the **Control Panel** folder. Select the **DB2 Security Server** option and click on the **Start** push button.

When a successful connection is made, a message similar to the following is displayed:

```
Database product     = DB2/NT 5.0.0
SQL authorization ID = USERID
Local database alias = SAMPLE
```

If you receive an error message, make sure that the SAMPLE database exists on the server and the database manager was started on the server.

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

Changing Default Privileges for Users

By default, System Administrative (SYSADM) privileges are granted to the following:

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

Windows 95 Any Windows 95 user.

Windows NT A valid DB2 username which belongs to Administrators group.

You can change the users who have administrator privileges for each DB2 instance by changing the *SYSADM_GROUP* parameter; but before you do, ensure that the group exists. To check to see if this group exists, do the following:

- Use the Windows NT User Manager Administrative Tool.

To use another group as the System Administrative group (SYSADM_GROUP), update the database manager configuration file.

> The *SYSADM_GROUP* parameter is not used for the Windows 95 operating system.

- To change the System Administrative group (SYSADM_GROUP) on the server instance:

  1 Start the Control Center.

  2 Click on the **[+]** sign beside the **Systems** icon to list all the systems known to your workstation.

  3 Click on the **[+]** sign for the system that contains the instance you want to update.

  4 Select the instance that you want to change the *SYSADM_GROUP* parameter for and click on the right mouse button.

  5 Select the **Configure** option.

  6 Select the **Administration** tab.

7 Select the System Administration Authority Group parameter and enter the name of an existing group that you want to assign this privilege to in the **Value** box.

8 Click on **OK**.

9 Stop and Start the database instance.

- To change the System Administrative group (SYSADM_GROUP) on the client instance:

    1 Start the Client Configuration Assistant (CCA).

    2 Click on the **Client Settings** push button.

    3 Select the **Administration** tab.

    4 Select the parameter you want to change and enter the name of an existing group that you want to assign this privilege to in the **Value** box.

    5 Click on **OK**.

    6 Stop all applications that are using DB2, including the CCA. When restarted they will be using the new value for SYSADM_GROUP.

- Using the command line processor:

    To change the System Administrative group (SYSADM_GROUP) parameter to *dbadmin* on the server instance, use:

    ```
    update dbm cfg using SYSADM_GROUP dbadmin
    db2stop
    db2start
    ```

    To change the System Administrative group (SYSADM_GROUP) parameter to *dbadmin* on the client instance, use:

    ```
    update dbm cfg using SYSADM_GROUP dbadmin
    terminate
    ```

    Stop all applications that are using DB2. When restarted they will be using the new value for SYSADM_GROUP.

Software Registration

The **Registration** icon, located in the DB2 folder, is used to access and update the IBM Software Customer Profile and to register IBM Software with IBM. The customer profile contains identification and demographic information about the user of each IBM software product. The IBM software registration contains the information and the instructions on how to register IBM software by modem, telephone, Internet, FAX, or postal service.

Counting Concurrent Users

DB2 Enterprise Edition allows an unlimited number of users to connect to the server.

DB2 Workgroup Edition and DB2 Connect Enterprise Edition products are priced per user. If you need to support more users than currently entitled, you must acquire entitlements for additional users. An entitlement for additional users does not require a new license key. It is up to you, the purchaser of the product, to ensure that you have sufficient entitlements for the number of users.

To assist you in tracking the number of concurrent users connecting to a DB2 Workgroup Edition server or a DB2 Connect Enterprise Edition server, DB2 uses the License Use Runtime client. It provides a way to monitor the number of concurrent users on your system, but it does not enforce the maximum limit; however, the runtime client will log an entry in the db2diag.log file each time the number of entitlements that you are licensed to is exceeded.

To update the number of concurrent users you are entitled to support, use the Nodelock Administration Tool (NAT) as follows:

1 Double-click on the **License Use Runtime - Client** folder on the desktop.

2 Double-click on the **Nodelock Administration Tool** icon.

3 Double-click on the product for which you want to monitor the number of concurrent users.

4 Select the **Concurrent** check box.

5 Update the **Licenses** field to reflect the number of concurrent users you are entitled to run.

6 Click on **OK**.

Check the db2diag.log file (located in the instance directory) to see if you have exceeded the maximum number of concurrent users that you are entitled to support. For example, an entry in the db2diag.log file might look like this:

```
SQL8009W The number of concurrent users of the DB2 Server
         product has exceeded the defined entitlement of
         "5".  Concurrent user count is "6".
```

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

To acquire additional entitlements, you must purchase additional licenses from IBM or an IBM dealer. After you acquire the additional entitlements, use the NAT tool to updated the number of concurrent users allowed.

Upgrading from a Try-and-Buy License

To upgrade your DB2 product from a demonstration license to a product license, you simply need to copy the license file from the DB2 CD-ROM to the system where DB2 is installed; you do not need to reinstall the product.

Note: **Your Proof of Entitlement** and **License Information** booklets identify the products for which you are licensed.

The following steps describe how to upgrade the license:

> If you have purchased a product, other than the one that you have installed from the Try-and-Buy CD-ROM, you must first uninstall this product and install the one you have purchased. The setup program will automatically install the required license.

1 Put the product CD-ROM in the CD-ROM drive.

2 Double-click on the **Nodelock Administration Tool** icon in the **License Use Runtime - Client** folder to start the Nodelock Administration Tool.

3 Select **Products**->**New** from the menu bar.

4 Click on the **Import** push button.

5 In the Import window, locate the db2\license directory on your CD-ROM. A list of files is shown.

6 Select the license file that corresponds to the specific product that you have purchased and installed on your system:

db2work.lic   DB2 Universal Database Workgroup Edition
db2entr.lic   DB2 Universal Database Enterprise Edition

7 Click on **OK**.

Chapter 13. Working with DB2 Instances

The information in this chapter describes DB2 server instances and how to work with them.

Note: This chapter does not apply to DB2 for Windows 3.x and DB2 for Macintosh clients.

A DB2 instance is a logical database manager environment where you catalog databases and set configuration parameters. Depending on your needs, you can create more than one instance. You can use multiple DB2 instances to do the following:

- Use one instance for a development environment and another instance for a production environment.
- Tune a database instance for a particular environment.
- Restrict access to sensitive information.
- Control the assignment of SYSADM, SYSCTRL, and SYSMAINT authority for each instance.
- Optimize the database manager configuration for each database instance.
- Limit the impact of an instance crash. In the unlikely event of an instance crash, only one instance is impacted. The other instance may continue to function normally.

However, multiple instances have some minor disadvantages:

- Additional system resources (virtual memory and disk space) are required for each instance.
- More administration is required because you have additional instances to manage.

At Install Time

A default instance (called DB2) is created when you install DB2. The instance name is used to set up the directory structure.

To support the immediate use of this instance, the following are set during installation:

- The environment variable DB2INSTANCE is set to DB2.
- The DB2 registry value DB2INSTDEF is set to DB2.

These settings establish DB2 as the default instance. You can change the instance that is used by default, but first you have to create an additional instance.

Creating Instances

If you are a user that belongs to the Administrators group, you can create additional
DB2 instances using the **db2icrt** command. Run the **db2icrt** command at a command
prompt. The command syntax is:

    db2icrt *instance_name*

where *instance_name* is a string up to eight alphanumeric characters long. Refer to the
Appendix C, "Naming Rules" on page 221 for more information about valid names.

> You can change the location of the instance directory from DB2PATH using
> the DB2INSTPROF environment variable. You require write-access for the
> instance directory. If you want the directories created in a path other than
> DB2PATH, you have to set DB2INSTPROF before entering the **db2icrt**
> command. See Chapter 16, "Controlling Your DB2 Environment" on
> page 103 for further information.

Note: On Windows 95 only, for each additional instance you need to assign a different
memory location to which the system will allocate shared memory. The memory
location assigned to the default instance, DB2, is 90000000.

Use the DB2DBMSADDR registry value to assign a different value from the
range 80000000 to BFFFFFFF. So, if one instance were at 80000000, the next
address must be at least 83000000.

For example:

    db2set db2dbmsaddr=A0000000 -i *instance_name*

where *instance_name* is the name of the additional instance.

Listing Instances

To get a list of all the database instances that are available on a system, run the
db2ilist command.

Selecting an Instance

When starting or stopping a DB2 server instance, the one that is used is determined by the value of DB2INSTANCE. This is determined as follows:

- The current session's environment variables are examined to see if DB2INSTANCE is set. You can set it in a session by issuing the following command at a command prompt:

      set db2instance=new_instance_name

- If DB2INSTANCE is not set in the current session, the system environment variables are examined to see if it is set.

  On Windows NT, system environment variables are set in System Environment. On Windows 95, they are set in the autoexec.bat file. On OS/2, they are set in the config.sys file. See "DB2 Registry Values and Environment Variables" on page 108 for instructions on setting DB2INSTANCE on Windows 95 and Windows NT.

- If DB2INSTANCE is not set by either of the environment variables, then you must use the DB2 Profile Registry value, DB2INSTDEF. It is set at the global level of the registry. For more information on setting it at this level, see "DB2 Registry Values and Environment Variables" on page 108.

  Note: The same search order is used when a client instance is activated by a DB2 call from an application.

To determine which database instance applies in the current session, enter:

      db2set db2instance

Setting the Default Instance

You can change the setting of the default instance by setting the DB2INSTDEF registry value. It is set at the global level of the registry using the following command:

      db2set db2instdef=*new_instance_name* -g

Remember, if there is a value for the environment variable DB2INSTANCE set at either the session or system level, it will override the setting of DB2INSTDEF.

For more information on setting registry values, refer to Chapter 16, "Controlling Your DB2 Environment" on page 103.

Starting and Stopping a DB2 Server Instance

You must start a DB2 server instance before you can perform the following tasks:

- Connect to a database on the instance.
- Precompile an application.
- Bind a package to a database.
- Use DB2 Connect Enterprise Edition.

To start a single database instance:

1 Log in with a username that has SYSADM authority on the instance.

2 Use one of these methods to start the database instance:

- From the Control Center, click with the right mouse button on the instance that you want to start and select the **Start** option from the pop-up menu.

- From a command line, enter the **db2start** command.

  Note: The **db2start** command will resolve the DB2INSTANCE value as described in "Selecting an Instance" on page 83.

To stop an instance use one of these methods:

- From the Control Center, click with the right mouse button on the instance that you want to stop and select the **Stop** option from the pop-up menu.

- From a command line, enter the **db2stop** command.

  Note: If command line processor sessions are attached to an instance, you must issue the **terminate** command to end each session before issuing the **db2stop** command.

Running Multiple Instances Concurrently

You can start multiple DB2 instances as long as they belong to the same level of code (for example: DB2 Version 5). To run multiple instances concurrently, you can use one of the following methods:

- From the Control Center, click with the right mouse button on another instance that you want to start and select **START**.

- From the command line, enter:

  1 Set the DB2INSTANCE variable to the name of the other instance that you want to start using the command:

  ```
  set db2instance=another_instance_name
  ```

  2 Start the instance by entering the **db2start** command.

See Chapter 16, "Controlling Your DB2 Environment" on page 103 for information on configuring each instance with different environment variables.

Removing Instances

To remove a DB2 instance, perform the following steps:

1 End all applications that are currently using the instance.

2 Stop the Command Line Processor by issuing **db2 terminate** commands in each DB2 command window.

3 Stop the instance by issuing the **db2stop** command.

4 Back up files in the sqllib*instance_name* directory, if needed. For example, you might want to save the database manager configuration file, db2systm.

> **Note:** If the DB2INSTPROF environment variable is set, these files will be in a different location than the one used in this example.

5 Execute the **db2idrop** command:

```
db2idrop instance_name
```

where *instance_name* is the name of the instance being dropped. This command removes the instance entry from the list of instances and removes the sqllib*instance_name* directory.

Chapter 14. Running Your Own Applications

Various types of applications can access DB2 databases:

- Applications developed using the DB2 SDK that include embedded SQL, APIs, stored procedures, user-defined functions or calls to the DB2 CLI.
- ODBC applications such as Lotus Approach.
- JDBC applications and applets.
- Net.Data macros containing HTML and SQL.

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

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

1 Ensure the server is configured and running.

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

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

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

4 Run the application program.

Binding Database Utilities

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

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

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

How you bind the database utilities to a database depends on your workstation's operating system:

- On OS/2, Windows 95, and Windows NT operating systems, you can use the Client Configuration Assistant:

    1 Start the Client Configuration Assistant (CCA).

    2 Select the database to which you want to bind the utilities.

    3 Click on the **Bind** push button.

    4 Select the **Bind DB2 Utilities** radio button.

    5 Click on the **Continue** push button.

    6 Enter a user ID and password to connect to the database. The user ID must have the authority to bind new packages against the database.

    7 Select the utilities you want to bind and click on **OK**.

- On all operating systems, you can use the command line processor:

    1 Change to the bnd directory in the install path. For example: x:\sqllib\bnd, where x: is the drive where you installed DB2

    2 Connect to the database using the command:

        connect to database_alias

    where database_alias is the name of the database to which you want to connect.

    3 Issue the following commands in the Command Center or the command line processor:

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

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

    4 Reset the connection to the database by issuing the following command:

        connect reset

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

Notes:

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

2. Binding may take a few minutes to complete.

3. To bind to databases that reside on OS/390, MVS, VM, or AS/400, refer to the *DB2 Connect User's Guide* for instructions.

> If the applications that you are using require binding to the database, you can use the Client Configuration Assistant's Bind facility, or the command line processor, to perform the bind action.

Running CLI/ODBC Programs

The DB2 Call Level Interface (CLI) run-time environment and the ODBC driver are included with the DB2 Client Application Enabler. This is contained on the DB2 Client Pack CD-ROM or can be downloaded from the Web page at http://www.software.ibm.com/data/db2.

This support enables applications developed using ODBC and DB2 CLI APIs to work with any DB2 server. DB2 CLI application development support is provided by the DB2 Software Developer's Kit (DB2 SDK) which is part of the separately orderable DB2 Application Development Kit product.

Before DB2 CLI or ODBC applications can access DB2, the DB2 CLI packages must be bound on the server. Although this will occur automatically on the first connection if the user has the required authority to bind the packages, it is recommended that the administrator do this first with each version of the client on each platform that will access the server. See "Binding Database Utilities" on page 87 for specific details.

The following general steps are required on the client system to give DB2 CLI and ODBC applications access to DB2 databases. These instructions assume that you have successfully connected to DB2 using a valid user ID and password. Depending on the platform many of these steps are automatic. For complete details, see the section that deals specifically with your platform.

1 Use the CCA to add the remote system (if you have separate client and server machines) so that its instances and databases can be made known to the Control Center, then add the instances and databases for that system. (Your local system is represented by the icon labelled **Local**.) If you do not have access to this program you can use the **catalog** command in the command line processor.

2 On all platforms other than OS/2 and Windows 3.1, the DB2 CLI/ODBC driver is automatically installed when the DB2 Client Application Enabler is installed, and therefore nothing needs to be done. On OS/2 and Windows 3.1 you must use the **Install ODBC Driver** icon to install both the DB2 CLI/ODBC driver and the ODBC driver manager.

3 To access the DB2 database from ODBC:

    a The Microsoft, Visigenic, or other ODBC Driver Manager must already be installed (this is done by default during the installation of DB2).

    b The DB2 databases must be registered as ODBC data sources. The ODBC driver manager does not read the DB2 catalog information; instead it references its own list of data sources.

    c If a DB2 table does not have a unique index then many ODBC applications will open it as read-only. Create a unique index for each DB2 table that is to be updated by an ODBC application. Refer to the **CREATE INDEX** statement in the *SQL Reference*. Using the Control Center you would alter the settings of the table, then click on the **Primary Key** tab and move one or more columns from the available columns list over to the primary key columns list. Any column you select as part of the primary key must be defined as NOT NULL.

4 Various CLI/ODBC Configuration Keywords can be set to modify the behavior of DB2 CLI/ODBC and the applications using it.

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

Platform Specific Details for CLI/ODBC Access

The platform specific details on how to give DB2 CLI and ODBC applications access to DB2 are divided into the following categories:

- "Windows 3.1, Windows 95 and Windows NT Client Access to DB2 using CLI/ODBC" on page 91
- "OS/2 Client Access to DB2 using CLI/ODBC" on page 93

Windows 3.1, Windows 95 and Windows NT Client Access to DB2 using CLI/ODBC

Before DB2 CLI and ODBC applications can successfully access a DB2 database from a Windows 3.1, Windows 95, or Windows NT client, perform the following steps on the client system:

1 The DB2 database (and node if the database is remote) must be cataloged. To do so, use the CCA (or the command line processor). See "Configuring Database Connections" on page 168 for more details.

For more information refer to the on-line help in the CCA (or the **catalog** command in the *Command Reference*).

2 Verify that the Microsoft ODBC Driver Manager and the DB2 CLI/ODBC driver are installed. On Windows 95 and Windows NT they are both installed with DB2 unless the ODBC component is manually unselected during the install. On Windows 3.1 you must use the **Install ODBC Driver** icon to install the Microsoft ODBC Driver Manager and the DB2 CLI/ODBC driver.

To verify that they both exist on the machine:

    a Run the Microsoft ODBC Administrator from the icon in the Control Panel, or issue the appropriate command from the command line: **odbcad32.exe** for Windows 95 or Windows NT operating systems, **odbcadm.exe** on Windows 3.1.

    b Click on the **Drivers** push button, or the **ODBC Drivers** tab (depending on the platform).

    c Verify that "IBM DB2 ODBC Driver" is shown in the list.

If either the Microsoft ODBC Driver Manager or the IBM DB2 CLI/ODBC driver is not installed, then rerun the DB2 install and select the ODBC component in Windows 95 or Windows NT, or double-click on the **Install ODBC Driver** icon in the DB2 program group in Windows 3.1.

3 Register the DB2 database with the ODBC driver manager as a *data source*. On Windows 95 and Windows NT you can make the data source available to all users of the system (a system data source), or only the current user (a user data source). Use either of these methods to add the data source:

- Using the CCA:

    a Select the DB2 database alias that you want to add as a data source.

    b Click on the **Properties** push button. The Database Properties window opens.

    c Select the **Register this database for ODBC** check box.

    d On Windows 95 and Windows NT you can use the radio buttons to add the data source as either a user or system data source.

- Using the Microsoft **32bit ODBC Administration tool**, which you can access from the icon in the Control Panel or by running **odbcad32.exe** from the command line:

   a On Windows 95 and Windows NT the list of user data sources appears by default. If you want to add a system data source click on the **System DSN** button, or the **System DSN** tab (depending on the platform).

   b Click on the **Add** push button.

   c Double-click on the IBM DB2 ODBC Driver in the list.

   d Select the DB2 database to add and click on **OK**.

- On Windows 95 and Windows NT there is a command that can be issued in the command line processor to register the DB2 database with the ODBC driver manager as a data source. An administrator could create a command line processor script to register the required databases. This script could then be run on all of the machines that require access to the DB2 databases through ODBC.

   See the

   ```
   CATALOG [ user | system ] ODBC DATA SOURCE
   ```

   command in the *Command Reference* for more information.

4 Optional: Configure the DB2 CLI/ODBC driver using the CCA:

   a Select the DB2 database alias you want to configure.

   b Click on the **Properties** push button. The Database Properties window opens.

   c Click on the **Settings** push button. The CLI/ODBC Settings window opens.

   d Click on the **Advanced** push button. You can set the configuration keywords in the window that opens. These keywords are associated with the database *alias name*, and affect all DB2 CLI/ODBC applications that access the database. The online help explains all of the keywords, as does an appendix in the *Installing and Configuring DB2 Clients* manual.

5 Optional: Using 16-bit ODBC applications:

Although not directly related to DB2, some users have experienced problems when running 16-bit ODBC applications on Windows 95 or Windows NT.

Both 16- and 32-bit applications use the same 32-bit IBM DB2 CLI/ODBC Driver. The Microsoft ODBC Driver Manager takes care of the conversion between the 16-bit application and the 32-bit ODBC driver.

Some 16-bit applications were shipped with an old set of 16-bit Driver Manager DLLs (that is, before 1995). These DLLs do not function well in the 32-bit environment. The following symptoms may occur when running the old DLLs:

- Traps occur in odbc.dll or other ODBC related DLLs.
- 16-bit applications do not see data sources cataloged using the 32-bit ODBC Administrator (from the Control Panel).

If (and only if) you are experiencing these problems you may want to update the Microsoft 16-bit ODBC Driver Manager DLLs. These files are provided with DB2 in the SQLLIB\MSODBC16 subdirectory. Use these new DLLs to replace the older versions that are located in the system subdirectory of the Windows operating system directory.

6 If you have installed ODBC access (as described above), you can now access DB2 data using ODBC applications. Start the ODBC application and go to the Open window. Select the **ODBC databases** file type. The DB2 databases that you added as ODBC data sources will be selectable from the list. Many ODBC applications will open the table as read-only unless a unique index exists.

OS/2 Client Access to DB2 using CLI/ODBC

Before DB2 CLI and ODBC applications can successfully access a DB2 database from an OS/2 client, perform the following steps on the client system:

1 The DB2 database (and node if the database is remote) must be cataloged. To do so, use the CCA (or the command line processor).

For more information see the on-line help in the CCA or "Configuring Database Connections" on page 168.

2 If you are using ODBC applications to access DB2 data, perform the following steps. (If you are using only CLI applications, skip this step and go to the next step.)

    a Check that the ODBC Driver Manager (Visigenic or Intersolv) and the DB2 CLI/ODBC driver are installed:

        1 Run the ODBC Administration tool in one of two ways:

- Double-click on the **Control Panel** icon from the **Main** Folder in WIN-OS/2 or the **ODBC** Folder in OS/2, and double-click on the **ODBC Administrator** icon.
- Run **odbcadm.exe** from the command line.

        The Data Sources window opens.

        2 Click on the **Drivers** push button. The Drivers window opens.

        3 Verify that "IBM DB2 ODBC Driver" is shown in the list.

If either the ODBC Driver Manager or the IBM DB2 CLI/ODBC driver is not installed then double-click on the **Install ODBC Driver** icon in the DB2 folder to install both the DB2 CLI/ODBC driver and the ODBC driver manager.

b Register the DB2 database with the ODBC driver manager as a *data source* using either of these methods:

- Using the CCA:

  1 Select the DB2 database alias that you want to add as a data source.

  2 Click on the **Properties** push button.

  3 Select the **Register this database for ODBC** check box.

- Using the Visigenic **ODBC Administration tool**, which you can access from the **ODBC** folder or by running **odbcadm.exe** from the command line:

  1 Click on the **Add** push button from the Data Sources window. The Add Data Source Window opens.

  2 Double-click on the IBM DB2 ODBC Driver in the list.

  3 Select the DB2 database to add and click on **OK**.

3 Optional: Configure the DB2 CLI/ODBC driver using the CCA:

a Select the DB2 database alias you want to configure.

b Click on the **Properties** push button. The Database Properties window opens.

c Click on the **Settings** push button. The CLI/ODBC Settings window opens.

d Click on the **Advanced** push button. You can set the configuration keywords in the window that appears. These keywords are associated with the database *alias name*, and affect all DB2 CLI/ODBC applications that access the database. The online help explains all of the keywords, as does an appendix in the *Installing and Configuring DB2 Clients* manual.

4 If you have installed ODBC access (as described above), you can now access DB2 data using ODBC applications. Start the ODBC application and go to the Open window. Select the **ODBC databases** file type. The DB2 databases that you added as ODBC data sources will be selectable from the list. Many ODBC applications will open the table as read-only unless a unique index exists.

Detailed Configuration Information

The section "Platform Specific Details for CLI/ODBC Access" on page 90 should provide you with all of the information you require. *Installing and Configuring DB2 Clients* includes additional information on setting up and using DB2 CLI and ODBC applications. This information is useful where DB2 tool support is not available, and for administrators who require more detailed information.

The following topics are covered:

- How to Bind the DB2 CLI/ODBC Driver to the Database
- How to Set CLI/ODBC Configuration Keywords
- Configuring db2cli.ini

Running Java Programs

You can use DB2 Java Database Connectivity (JDBC) support to run the following types of Java programs:

- Java applications, which rely on the DB2 Client Application Enabler to connect to DB2.

- Java applets, that do not require any other DB2 component code on the client.

Java can also be used on the server to write user-defined functions, stored procedures, and table functions.

For further information on developing Java applications that access DB2 databases refer to the Web page located at http://www.software.ibm.com/data/db2/java/ and the *Road Map to DB2 Programming*.

Configuring the Environment

The following environment variables must be set to run Java programs:

OS/2, Windows 95 and Windows NT

- CLASSPATH includes "." and the file sqllib\java\db2java.zip

- PATH includes the directory sqllib\bin

- LIBPATH includes the directory sqllib\dll (OS/2 only)

Java Applications

Start your application from the desktop or command line, like any other application. The DB2 JDBC driver handles the JDBC API calls from your application and uses the DB2 Client Application Enabler to communicate the requests to the server and receive the results.

Java Applets

Because Java applets are delivered over the Web, you treat them a bit differently than Java applications. You must install DB2 (server or client) on the same machine as your Web server, then install the Java Development Kit (JDK) Version 1.1 from Sun Microsystems on the server as well (refer to http://www.software.ibm.com/data/db2/java for details).

To run your applet, you need only a Java-enabled Web browser on the client machine. When you load your HTML page, the applet tag downloads the Java applet to your machine, which then downloads the Java class files, including the COM.ibm.db2.java.sql and COM.ibm.db2.jdbc.net classes and DB2's JDBC driver. When your applet calls the JDBC API to connect to DB2, the JDBC driver establishes separate communications with the DB2 database through the JDBC applet server residing on the DB2 server.

To run your applets, do the following:

1 Start the DB2 JDBC applet server on your Web server by entering:

db2jstrt *portno*

where *portno* is the number of the unused TCP/IP port that you specified in the DB2Applt.java file.

2 On your client system, start your Web browser and load the HTML file that imbeds your applet.

Chapter 15. Entering DB2 Commands and SQL Statements

You can use the Command Center to enter DB2 commands and SQL statements if you are working with DB2 on an OS/2, Windows 95, or Windows NT workstation. Otherwise, you can issue commands in the command line processor or a system command prompt.

Task: Entering DB2 commands, SQL statements, and operating system commands	
Operating System	**Tools**
OS/2	• Command Center • command line processor • command prompt
Windows 95 or Windows NT	• Command Center • command line processor • command window
Windows 3.1	• command line processor

Using the Command Center

On OS/2, Windows 95 and Windows NT operating systems, the Command Center provides an interactive window that allows you to:

- Run SQL statements, DB2 commands, and operating system commands.

- See the execution result of one or many SQL statements and DB2 commands in a result window. You can scroll through the results and save the output to a file.

- Save a sequence of SQL statements and DB2 commands to a script file. You can then schedule the script to run as a job. When a saved script is modified, all jobs dependent on the saved script inherit the new modified behavior.

- Recall and run a script file.

- See the execution plan and statistics associated with a SQL statement before execution. You do this by invoking Visual Explain in the interactive window.

- Get quick access to database administrative tools such as the Control Center and the Journal from the main tool bar.

- Display all the command scripts known to the system through the Script Center, with summary information listed for each.

To invoke the Command Center on OS/2 operating systems:

1 Double-click the **DB2 for OS/2** folder.

2 Double-click on the **Command Center** icon.

To invoke the Command Center on Windows 95 and Windows NT:

1 Click on **Start**.

2 Select **Programs**->**DB2 for Windows**->**Command Center**.

The Command Center contains a large input area in which you type your commands. To start a command on a new line use the Enter key. To run the commands you have entered, select the **Start or stop execution** icon from the menu bar, or use CTRL+Enter.

Do not type the commands with a db2 prefix; instead, enter the command as follows:

```
list node directory;
```

If you want to run multiple commands, you must end each command with a semicolon, then press Enter to start the next command on a new line.

Note: The semicolon is optional at the end of a single quick command, and at the end of the final command in a series.

After you run a command, the Command Center displays the Results window, which informs you how the commands are proceeding.

To recall commands that you have typed in interactive mode, click on the arrow beside the narrow input window. To save commands entered in interactive mode as scripts, select **Script**->**Save as** from the menu bar.

If you want to store commonly used SQL statements or DB2 commands as scripts, select the **Script** icon from the main tool bar.

Using the Command Line Processor

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

Interactive Input Mode   You can enter DB2 commands or SQL statements and view their output.

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

File Input Mode   Refer to the *Command Reference* for information on the file input mode.

Interactive Input Mode

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

- On OS/2:

    1 Double-click the **DB2 for OS/2** folder.

    2 Double-click on the **Command Line Processor** icon.

- On Windows 95 and Windows NT operating systems:

    1 Click on **Start**.

    2 Select **Programs**->**DB2 for Windows**->**Command Line Processor**.

- On Windows 3.1, use one of the following methods:

    – From a DOS full screen, enter the **win db2clpw** command.

    – From Windows:

        1 Double-click the **DB2** folder.

        2 Double-click on the **Command Line Processor** icon.

You can also invoke the command line processor in interactive input mode, by entering the following command at a command prompt:

- On OS/2 and UNIX, enter **db2**.

- On Windows 95 and Windows NT, enter **db2cmd**, then enter **db2**.

In interactive input mode, the prompt looks like this:

```
db2 =>
```

This prompt indicates that you do not type DB2 commands with a `db2` prefix; instead, you just type the DB2 command. For example:

```
list node directory
```

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

```
!dir db2*.log
```

Note: Windows 3.1x does not support this method of running operating-system commands.

If you need to enter a long command that does not fit on one line, use the line continuation character, \. For example:

```
db2 => select firstname, lastname, dateofbirth, from \
db2 (cont.) => staff where height=123, order by \
db2 (cont.) => lastname
```

Note: You do not need to use a line continuation character when entering long commands in interactive input mode on Windows 3.1 workstations.

To end interactive input mode, type **terminate**.

Command Line Mode

On OS/2, you can issue DB2 commands from a command prompt. You must include the `db2` prefix. For example:

```
db2 list node directory
```

To invoke the command line processor in command line mode on Windows 95 and Windows NT operating systems, use one of the following methods:

- Click on **Start** and select **Programs**->**DB2 for Windows**->**Command Window**.
- Enter the **db2cmd** command at a command prompt.

After you invoke the DB2 command environment, you can enter DB2 commands at the command prompt. You must include the `db2` prefix.

Notes:

1. If the DB2 command contains characters that have special meanings 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 will successfully retrieve all information from the *employee* table, even if the * character has a special meaning on the operating system:

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

2. Command line mode is not available on Windows 3.1x systems.

For further information on using the command line processor, refer to the *Command Reference*.

Chapter 16. Controlling Your DB2 Environment

Registry values, environment variables, and configuration parameters control your database environment.

- To set registry values through the DB2 profile registry, see "Controlling the DB2 Profile Registry" on page 104.
- To set DB2 environment variables, see:
  - "Setting Your Environment on OS/2" on page 105.
  - "Setting Your Environment on Windows 95 and Windows NT" on page 106.
  - "Setting Your Environment on Windows 3.1" on page 107.
- To set database manager configuration parameters on a client instance, see "Configuration Parameters" on page 112.

Prior to the introduction of the DB2 profile registry in Version 5, changing your DB2 environment on OS/2, Windows 95 or Windows NT workstations required you to change your system's environment variables and reboot.

With Version 5, almost all of the environment variables have been moved to the DB2 profile registry. Users with system administrative (SYSADM) authority for a given instance can update registry values for that instance. Use the **db2set** command to update DB2 registry values without rebooting your system. The DB2 registry applies the updated information to DB2 server instances and DB2 applications started after the changes are made.

Note: The concept of the DB2 profile registry is not supported on Windows 3.1. See "Setting Your Environment on Windows 3.1" on page 107 for more information.

DB2 configures its operating parameters by checking for variable values according to the following search order:

- The environment variable settings.
- Profile registry values set with the **db2set** command in the instance-level profile.
- Profile registry values set with the **db2set** command in the global-level profile.

See "DB2 Registry Values and Environment Variables" on page 108 for descriptions of the subset of registry values and environment variables that you may want to adjust to get DB2 up and running. For more detailed information about all registry values and environment variables, refer to the *Administration Guide*.

Controlling the DB2 Profile Registry

The DB2 profile registry stores DB2 registry values. The "levels" of registry values are as follows:

DB2 instance-level profile:
> This profile contains instance level variable settings and overrides. Values defined in this level will override their settings in the global level.

DB2 global-level profile:
> This profile contains system-wide variable settings. Any variable not defined in the node or instance levels will be evaluated at this level.

To modify registry variable values, use the **db2set** command. The syntax of the **db2set** command is as follows:

- To set a parameter for the current instance, type:

      db2set *parameter=value*

- To set a parameter's value for a specific instance, type:

      db2set *parameter=value* -i *instance-name*

- To set a parameter at the global profile level, type:

      db2set *parameter=value* -g

  Notes:

  1. Some parameters will always default to the global level profile. They cannot be set at the instance or node level profiles. Examples of this are DB2SYSTEM and DB2INSTDEF.

- To delete a parameter's value at a specified level, you can use the same command syntax to set the parameter but specify nothing for the parameter value. For example, to delete the parameter's setting at the node level, type:

      db2set *parameter=* -i *instance-name node-number*

- To explicitly unset a parameter's value at a specified level and prevent evaluating the parameter at the next level, use the -null option. To use the parameter's setting at the instance level, type:

      db2set *parameter=* -null -i *instance-name*

  The -null option allows you to set the value of a parameter globally, but unset the value for a specific instance. For example, you can set *DB2COMM* to TCPIP at the global level, and if you have four instances on your system, you can set three of the instances to default to the global setting, but use the -null option to unset *DB2COMM* on the fourth instance.

- To evaluate the current session's parameter's value, type:

    db2set *parameter*

- To evaluate the parameter's value at all levels, type:

    db2set *parameter* -all

- To view a list of all values defined in the profile registry, type:

    db2set -all

For more information on the **db2set** command and remote administering of the DB2 profile registry, refer to the *Command Reference*.

Setting Your Environment on OS/2

It is strongly recommended that all DB2 specific registry values be defined in the DB2 profile registry. If DB2 variables are set outside of the registry, remote administration of those variables will not be possible, and the workstation will have to be rebooted in order for the variable values to take effect.

On OS/2 operating systems there are three system environment variables, DB2INSTANCE, DB2PATH, and DB2INSTPROF, that are not stored in the DB2 profile registry. DB2INSTANCE and DB2PATH are set when DB2 is installed; DB2INSTPROF can be set after installation. On OS/2, the environment variable DB2PATH must be set; normally it is set during install and you should not modify it. Setting DB2INSTANCE and DB2INSTPROF is optional. Because the system environment variables are not set in the profile registry, you will need to reboot if you change their settings.

To change the setting of an environment variable, enter the following command:

    set *parameter* = value

To determine the setting of an environment variable, enter:

    echo %variable-name%

To modify system environment variables you must edit the config.sys file, then reboot to make the changes take effect.

Setting Your Environment on Windows 95 and Windows NT

It is strongly recommended that all DB2 specific registry values be defined in the DB2 profile registry. If DB2 variables are set outside of the registry, remote administration of those variables will not be possible, and the workstation will have to be rebooted in order for the variable values to take effect.

Windows 95 and Windows NT have one system environment variable, DB2INSTANCE, that can only be set outside the profile registry. However, you are not required to set DB2INSTANCE; the DB2 profile registry variable *db2instdef* may be set in the global level profile to specify the instance name to use if DB2INSTANCE is not defined.

To determine the setting of an environment variable, enter:

```
echo %variable-name%
```

To set system environment variables, do the following:

On Windows 95:
Edit the autoexec.bat file and reboot to make the change take effect.

On Windows NT:
Set environment variables as follows:

1 Click on **Start** and select **Settings**->**Control Panel**.

2 Double-click on the **System** icon.

3 In the **System Properties** panel, select the **Environment** tab and do the following:

> **a** If the variable does not exist:
>
> > **1** Select any environment variable in the System Variables window.
> >
> > **2** Change the name in the **Variable** field to the name of the environment variable you want to set, for example DB2INSTANCE.
> >
> > **3** Change the **Value** field to the instance name, for example, db2inst.
>
> **b** If the variable already exists in the System Variables window, you can set a new value:
>
> > **1** Select the environment variable you want to append, for example DB2INSTANCE.
> >
> > **2** Change the **Value** field to the instance name, for example, db2inst.
>
> **c** Click on the **Set** push button.

d Click on **OK**.

e You may have to reboot your system for these changes to take effect.

Note: The environment variable DB2INSTANCE can also be set at the session
(process) level. For example, if you want to start a second DB2 instance called
TEST, issue the following commands in a command window.

```
set db2instance=TEST
db2start
```

Setting Your Environment on Windows 3.1

The DB2 environment on Windows 3.1 is not controlled by profile registries. Instead,
Windows 3.1 clients define environment keywords in the file db2.ini (typically found in
c:\windows directory).

> On Windows 3.1, the parameters that control the DB2 environment are
> called environment keywords. However, because many Windows 3.1
> keywords are also used on operating systems that use the DB2 profile
> registries, environment keywords may also be referred to as registry values
> in this manual.

The db2.ini initialization file is an ASCII file that stores values for the Windows 3.1 client
environment keywords. Within the file, there is just one section header titled [DB2
Client Application Enabler].

The parameters are set by specifying a keyword with its associated keyword value in
the form:

Keyword=*keywordValue*

Notes:

1. All the keywords and their associated values must be located below the section
   header.

2. The keywords are not case sensitive; however, their values can be if the values
   are character based.

3. Comment lines use a semi-colon in the first position of a new line.

4. Blank lines are permitted. If duplicate entries for a keyword exist, the first entry is
   used (and no warning is given).

The following is a sample db2.ini file:

```
[DB2 Client Application Enabler]
DB2PATH=C:\SQLLIB\WIN
DB2INSTANCE=DB2
DB2INSTPROF=C:\SQLLIB
DB2TRACEON=N
```

This file is located in the Windows product directory. For example, it would typically be found in c:\windows directory in a native Windows environment.

On Windows 3.1, Client Application Enabler for DB2 Version 2.1 and Version 5 must set this information *only* in the db2.ini file.

DB2 Registry Values and Environment Variables

The following subset of the DB2 registry values and environment variables are those that you may need to know about to get up and running. Each has a brief description; some may not apply to your environment.

You can view a list of all supported variables for your platform. On all operating systems except Windows 3.1, enter the following db2set command:

```
db2set -lr
```

Note: Windows 3.1 clients define environment variables in the file db2.ini. See "Setting Your Environment on Windows 3.1" on page 107 for details.

Parameter	Operating System	Values	Description
General			
DB2ACCOUNT	All	Default: (not set)	The accounting string that is sent to the remote host. Refer to the *DB2 Connect User's Guide* for details.

Parameter	Operating System	Values	Description
DB2CODEPAGE	All	Default: derived from the language ID, as specified by the operating system.	Specifies the code page of the data presented to DB2 for database client application. The user should not set *db2codepage* unless explicitly stated in DB2 documents, or asked to do so by DB2 service. Setting *db2codepage* to a value not supported by the operating system can produce unexpected results. Normally, you do not need to set *db2codepage* because DB2 automatically derives the code page information from the operating system.
DB2COUNTRY	All	Default: derived from the language ID, as specified by the operating system.	Specifies the country code of the client application, which influences date and time formats.
DB2DBDFT	All	Default: (not set)	Specifies the database alias name of the database that will be implicitly connected to when applications are started and no implicit connect has been done. This keyword is ignored if it is set.
DB2DISCOVERYTIME	OS/2, Windows 95, and Windows NT	Default=40 seconds, minimum=20 seconds	Specifies the amount of time that SEARCH discovery will search for DB2 systems.
DB2INCLUDE	All	Default=current directory	Specifies a path to be used during the processing of the SQL INCLUDE text-file statement during DB2 PREP processing. It provides a list of directories where the INCLUDE file might be found. Refer to the *Embedded SQL Programming Guide* for descriptions of how *db2include* is used in the different precompiled languages.
DB2INSTDEF	OS/2, Windows 95 and Windows NT	Default=DB2 (on OS/2, Windows 95 and Windows NT)	Sets the value to be used if *DB2INSTANCE* is not defined.
DB2OPTIONS	All except Windows 3.1 and Macintosh	Default=null	Sets command line processor options.

Parameter	Operating System	Values	Description
DB2SLOGON	Windows 3.1	Default: NO	Enables a secure logon in DB2 for Windows 3.1. If *db2slogon*=YES DB2 does not write user IDs and passwords to a file, but instead uses a segment of memory to maintain them. When *db2slogon* is enabled, the user must logon each time Windows 3.1 is started.
DB2TIMEOUT	Windows 3.1 and Macintosh	Default: (not set)	Used to control the timeout period for Windows 3.1 and Macintosh clients during long SQL queries. After the timeout period has expired a dialog box pops up asking if the query should be interrupted or allowed to continue. The minimum value for this variable is 30 seconds. If *db2timeout* is set to a value between 1 and 30, the default minimum value will be used. If *db2timeout* is set to a value of 0, or a negative value, the timeout feature is disabled. This feature is disabled by default.
DB2TRACENAME	Windows 3.1 and Macintosh	Default=DB2WIN.TRC	On Windows 3.1 and Macintosh, specifies the name of the file where trace information is stored. The default is *db2tracename*=DB2WIN.TRC, and is saved in your current instance directory (for example, \sqllib\db2). We strongly recommend that you specify the full path name when naming the trace file.
DB2TRACEON	Windows 3.1 and Macintosh	Default=N, values: Y, N	On Windows 3.1 and Macintosh, turns trace on to provide information to IBM in case of a problem. (It is not recommended that you turn trace on unless you encounter a problem you cannot resolve.) Refer to the *Troubleshooting Guide* for information on using the trace facility with DB2 Client Application Enabler.
DB2TRCFLUSH	Windows 3.1 and Macintosh	Default=N, values: Y, N	On Windows 3.1 and Macintosh, *db2trcflush* can be used in conjunction with *db2traceon* = Y. *db2trcflush* = Y will cause each trace record to be written immediately into the trace file. Setting this will slow down your DB2 system considerably, so the default setting is *db2trcflush* = N. This setting is useful in cases where an application hangs the system and therefore needs to be rebooted. Setting this keyword guarantees that the trace file and trace entries are not lost by the reboot.

Parameter	Operating System	Values	Description
DB2TRCSYSERR		Default=1, values: 1 - 32767	Specifies the number of system errors to trace before the client turns off tracing. The default value traces one system error, after which, trace is turned off.
DB2YIELD	Windows 3.1	Default=N, values: Y, N	Specifies the behavior of the Windows 3.1 client while communicating with a remote server. When N is set, the client will not yield the CPU to other Windows 3.1 applications, and the Windows environment is halted while the client application is communicating with the remote server. You must wait for the communications operation to complete before you can resume any other tasks. When set to Y, your system functions as normal. It is recommended that you try to run your application with *db2yield*=YES. If your system crashes, you will need to set *db2yield*=NO. For application development, ensure your application is written to accept and handle Windows messages while waiting for a communications operation to complete.
System Environment			
DB2INSTANCE	All	Default=*db2instdef* on OS/2, Windows 95, and Windows NT	The environment variable used to specify the instance that is active by default. On UNIX, users must set the environment variable *DB2INSTANCE*.
DB2INSTPROF	OS/2, Windows 95, and Windows NT		The environment variable used to specify the location of the instance directory on OS/2, Windows 95 and Windows NT operating systems, if different than *DB2PATH*.
DB2PATH	OS/2, Windows 95 and Windows NT		The environment variable used to specify the directory where the product is installed on OS/2, Windows 95 and Windows NT operating systems. By default it is set to x:\sqllib\win on Windows 95 and Windows NT.
Communications			
DB2COMM	All, server only	Default= null, values: any combination of APPC,IPXSPX, NETBIOS, NPIPE,TCPIP	Specifies the communication managers that are started when the database manager is started. If this is not set, no DB2 communications managers are started at the server.

Parameter	Operating System	Values	Description
DB2NBADAPTERS	OS/2, Windows 95, and Windows NT, server only	Default=0, Range: 0-15, Multiple values should be separated by commas	Used to specify which local adapters to use for DB2 NetBIOS LAN communications. Each local adapter is specified using its logical adapter number.
DB2NETREQ	Windows 3.1	Default=3, Range: 0-25	Specifies the number of NetBIOS requests that can be run concurrently on Windows 3.1 clients. The default value is 3. The number can range from 0 to 25. The higher you set this value, the more memory below the 1MB level will be used. When the concurrent number of requests to use NetBIOS services reaches the number you have set, subsequent incoming requests for NetBIOS services are held in a queue and become active as the current requests complete. If you enter 0 (zero) for *db2netreq*, the Windows database client issues NetBIOS calls in synchronous mode using the NetBIOS wait option. In this mode, the database client allows only the current NetBIOS request to be active and does not process another one until the current request has completed. This can affect other application programs. The 0 value is provided for backwards compatibility only. It is strongly recommended that 0 not be used.

Configuration Parameters

Configuration parameters are values that affect the operating characteristics of a database or database management system.

Database management configuration parameters exist on servers and clients. However, only certain database management configuration parameters can be set on the client. These parameters are a subset of the database management configuration parameters that can be set on the server.

Database configuration parameters can be set only on the server.

For information on setting server database or database management configuration parameters, refer to the *Administration Guide*.

Setting Database Manager Configuration Parameters on a Client Instance

To control database management configuration parameters on a client instance on OS/2, Windows 95, or Windows NT, use the Client Configuration Assistant (CCA).

- On OS/2:

    1 Double-click on the **Client Configuration Assistant** icon in the **DB2 for OS/2** folder.

    2 Click on the **Client Settings** push button.

- On Windows 95 and Windows NT:

    1 Click on **Start** and select **Programs**->**DB2 for Windows**->**Client Configuration Assistant**. The Client Configuration window opens.

    2 Click on the **Client Settings** push button.

Follow the hints and online help to modify configuration parameter values.

- For information on using Client Configuration Assistant, see Chapter 21, "Administering Clients Using the CCA" on page 167.

Chapter 17. Using the Windows NT Performance Monitor

There are two performance monitors available to DB2 for Windows NT users:

DB2 Performance Monitor
The DB2 Performance Monitor provides snapshot and event data related to DB2 only. (For more information, click on the **Help** push button in the Control Center and see the Getting Started online help.)

Windows NT Performance Monitor
The Windows NT Performance Monitor enables you to monitor both database and system performance, retrieving information from any of the performance data providers registered with the system. Windows NT also provides performance data on all aspects of machine operation, including:

- CPU usage

- Memory utilization

- Disk activity

- Network activity

To set up and use the Windows NT Performance Monitor with DB2, refer to:

- "Registering DB2 with the Windows NT Performance Monitor" on page 116

- "Enabling Remote Access to DB2 Performance Information" on page 116

- "Displaying DB2 Performance Values" on page 117

- "Accessing Remote DB2 Performance Information" on page 118

- "Resetting DB2 Performance Values" on page 118.

Registering DB2 with the Windows NT Performance Monitor

> The setup program automatically registers DB2 with the Windows NT Performance Monitor for you.

To make DB2 performance information accessible to the Windows NT Performance Monitor, you must register the DLL for the DB2 for Windows NT Performance Counters. This also enables any other Windows NT application using the Win32 performance APIs to get performance data.

To install and register the DB2 for Windows NT Performance Counters DLL (DB2Perf.DLL) with the Windows NT Performance Monitor, type:

```
db2perfi /i
```

This copies the DLL to the directory \SYSTEM32 under the system directory. To find the name of the system directory, type

```
echo %systemroot%
```

Registering the DLL also creates a new key in the services section of the registry. One entry gives the name of the DLL, which provides the counter support. Three other entries give names of functions provided within that DLL. These functions are:

Open   Called when the DLL is first loaded by the system in a process.

Collect   Called to request performance information from the DLL.

Close   Called when the DLL is unloaded.

Enabling Remote Access to DB2 Performance Information

In order to see Windows NT performance objects from another DB2 for Windows NT machine, you must register an administrator username and password with DB2. (The default Windows NT Performance Monitor username, *SYSTEM*, is a DB2 reserved word and cannot be used.) To register the name, type:

```
db2perfr -r username password
```

Note: The username you choose must conform to the naming rules in Appendix C, "Naming Rules" on page 221.

The username and password data is held in a key in the registry, with security that allows access only by administrators and the SYSTEM account. The data is encoded, to prevent security concerns about storing an administrator password in the registry.

Notes:

1. Once a username and password combination has been registered with DB2, even local instances of the Performance Monitor will explicitly log on using that username and password. This means that if the username information registered with DB2 does not match, local sessions of the Performance Monitor will not show DB2 performance information.

2. The username and password combination must be maintained to match the username and password values stored in the Windows NT Security database. If the username or password is changed in the Windows NT Security database, the username and password combination used for remote performance monitoring must be reset.

3. To deregister, type:

    ```
    db2perfr -u
    ```

Displaying DB2 Performance Values

To display DB2 performance values using the Performance Monitor, simply choose the performance values you want displayed from the **Add to** box. This box displays a list of performance objects providing performance data. Select an object to see a list of the counters it supplies.

A performance object can also have multiple instances. For example, the LogicalDisk Object provides counters such as '% Disk Read Time' and 'Disk Bytes/sec'; it also has an instance for each logical drive in the machine, including 'C:' and 'D:'.

Windows NT provides the following performance objects:

Windows NT Database Manager
This object provides general server information for a single Windows NT server instance. The DB2 instance being monitored appears as the object instance.

For practical and performance reasons, you can only get performance information from one DB2 server instance at a time. The DB2 instance that the Performance Monitor shows is governed by the *db2instance* registry value in the Performance Monitor process. If you have multiple DB2 server instances running simultaneously and want to see performance information from more than one, you must start a separate session of

the Performance Monitor, with *db2instance* set to the relevant value for each DB2 instance to be monitored.

Windows NT Databases
This object provides information for a particular database. Information is available for each currently active database.

Windows NT Applications
This object provides information for a particular DB2 application. Information is available for each currently active DB2 application.

Accessing Remote DB2 Performance Information

Enable remote access to DB2 (see "Enabling Remote Access to DB2 Performance Information" on page 116) if you want the Performance Monitor to remotely access performance information on another machine. In the **Add to** box, select another computer to monitor. This brings up a list of all the available performance objects on that computer.

Resetting DB2 Performance Values

When an application calls the DB2 monitor APIs, the information returned is normally the cumulative values since the DB2 server was started. However, often it is useful to:

- Reset performance values
- Run a test
- Reset the values again
- Re-run the test.

To reset database performance values, use the **db2perfc** program.

Type:

```
db2perfc
```

By default, this resets performance values for all active databases. However, you can also specify a list of databases to reset. The program resets the values for ALL programs currently accessing database performance information for the relevant DB2 server instance (that is, the one held in *db2instance* in the session in which you run **db2perfc**).

Invoking **db2perfc** also resets the values seen by anyone remotely accessing DB2 performance information when the **db2perfc** command is executed.

Note: There is a DB2 API, sqlmrset, that allows an application to reset the values it sees locally, not globally, for particular databases.

Part 6. Advanced Installation and Configuration

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Chapter 18. Migrating from Previous Versions

DB2 migration involves the following procedures:

- "Pre-Installation Checks."
- "Installing DB2 Version 5" on page 125.
- "Post-Installation Steps" on page 125.

To avoid difficulties during database migration, read this entire section before starting the migration process. It is strongly recommended that you follow all the steps listed in this chapter.

Pre-Installation Checks

This procedure helps you to ensure that all databases on your system can be migrated to Version 5, following the installation of Version 5 of DB2 on your operating system. It is possible that some of your databases will not be migratable to Version 5 if you do not complete these procedures prior to the installation of Version 5 of DB2. You need to perform the following steps.

Step 1. Prepare Databases for Verification

You have to complete the following steps to prepare databases for verification so that they can be migrated:

1 Complete all database transactions.

2 Ensure all applications disconnect from each database.

3 Ensure all databases are cataloged.

> The database migration verification tool, **db2ckmig** does not verify uncataloged databases. See "Step 2. Verify that Databases Can Be Migrated" on page 122 for a description of how **db2ckmig** works.

4 Make a backup copy of all databases. Refer to your current copy of the *Administration Guide* for information on making backup copies of databases and to the *Command Reference* for the syntax of the backup command.

> **Note:** Make sure that this is the most recent backup copy of the database before you start the next procedure.

5 Stop the database manager.

Step 2. Verify that Databases Can Be Migrated

Version 5 of DB2 provides the **db2ckmig** utility to check that databases can be migrated, prior to installing Version 5. The utility is located on the product CD-ROM.
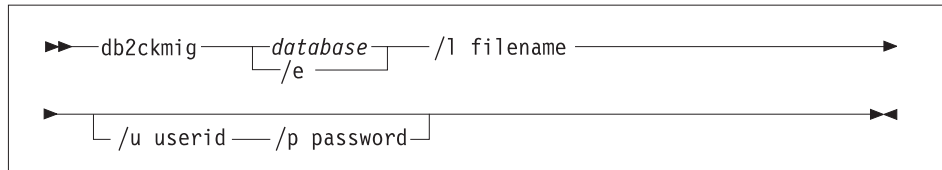
To run this utility:

1 Insert the CD-ROM into your operating system's CD-ROM drive.

> **Note:** If your operating system is Windows NT 4.0 or Windows 95, the **setup** program is started automatically via the operating system's **autorun** facility. Do not proceed with the install. Instead, cancel and proceed to the next step.

2 Change to the x:\db2*language*\install directory on the CD-ROM

where x: is the CD-ROM drive and *language* is the two-character file name that represents your language (for example, en for English; Table 17 on page 220 lists the file name for each available language).

3 Run the migration check utility, **db2ckmig**, using the following command:

```
►►──db2ckmig──┬──database──┬──/l filename ──────────────────────►
              └──/e ───────┘

►──────────────────────────────────────────────────────────────►◄
       └─ /u userid ──── /p password ─┘
```

database	Specifies an alias name of a database to be verified.
/e	Specifies that all cataloged databases are to be verified.
/l	Specifies a target file to keep a list of errors and warnings generated for the scanned database. A path may be specified, but it must exist. This is a required parameter.
/u	Is an optional parameter that specifies the user ID used to connect to the database.
/p	Is an optional parameter that specifies the password of the user ID used to connect to the database.

> **Note:** You can run the **db2ckmig** utility on remote systems; the database parameter must specify the alias name of the remote database. The file will be written on your local system.

4 The utility produces a log file. If there are errors, see Table 7 on page 123 for suggested corrective actions. Once the errors have been corrected, re-run the **db2ckmig** utility to ensure that the databases are ready to be migrated.

Table 7 (Page 1 of 2). Correcting Error Messages	
Error	**Action**
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 log and stop.
`Table space ID 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 `Database transaction inconsistent` state	Restart the database to return it to a consistent state.
The database contains database objects that have a schema name of SYSCAT, SYSSTAT, or SYSFUN	These schema names are reserved for the Version 5 database manager. To correct this error, do the following: **1** Back up the database. **2** Export the data from the database object (catalogs or tables). **3** Drop the object. **4** Recreate the object with the corrected schema name. **5** Import/Load the data into the object. **6** Run **db2ckmig** against the database again, ensuring that the database passes the **db2ckmig** check. **7** Make a backup copy of the database.

Table 7 (Page 2 of 2). Correcting Error Messages	
Error	**Action**
The database contains database objects that have a dependency on the SYSFUN.DIFFERENCE function. Possible violated database objects are: • Constraint • Function • Trigger • View	The SYSFUN.DIFFERENCE function must be dropped and recreated during database migration. However, if there is a database object that is dependent on this function, migration will fail. To ensure that database migration is successfully completed and correct this error, do the following: **Constraint** Issue the **alter table** command to drop the constraint. **Function** Issue the **drop function** command to drop the function dependent on SYSFUN.DIFFERENCE. **Trigger** Issue the **drop trigger** command to drop the trigger. **View** Issue the **drop view** command to drop the view. **Note:** Any package dependent on SYSFUN.DIFFERENCE will be marked inoperative after migration. Therefore, the **db2ckmig** program will not report any package that is dependent on the SYSFUN.DIFFERENCE function.

Migration Considerations for the User Exit Program

Follow these instructions if you are using the user exit program, **db2uexit**, with previous versions of DB2.

DB2 Version 5 has changed the interface it uses to invoke the user exit program to archive and retrieve log files. These new interfaces are documented in the *Administration Guide*. The name for the user exit program has changed to **db2uext2** in Version 5; in previous versions, it was called **db2uexit**.

The following should be considered before installing Version 5. The installation of Version 5 automatically migrates Version 2 instances.

- If the Version 2 user exit program, **db2uexit.exe** is found in sqllib\bin before installation, it will remain in this directory after installation. The **db2uext2.exe**

program will also be installed in this directory. Its function is to invoke **db2uexit.cmd** or **db2uexit.exe** using the Version 2 interface. This allows the old user exit program to be used on Version 5.

- If **db2uexit.exe** is in a directory other than sqllib\bin, it will remain there after installation, but **db2uext2.exe** will not be installed in sqllib\bin. Following installation, if you want to use the old user exit, you will have to copy it to sqllib\bin, then copy **db2uext2.v2** from sqllib\misc to sqllib\bin, and rename it to **db2uext2.exe**.

At a convenient time, you should modify your user exit program to use the new Version 5 interfaces. The new user exit program should replace **db2uext2** in the sqllib\bin directory, used to support the pre-version 5 user exit program, **db2uexit**, which should be removed.

Installing DB2 Version 5

After you have successfully completed the pre-installation checks, you can now start installing DB2 Version 5 using either the interactive or unattended method. During the installation of DB2 Version 5, instance migration for instances created in previous versions of DB2 occurs. See the following sections for installation procedures:

- Chapter 5, "Installing and Configuring DB2 Server" on page 39 for the interactive installation.
- Chapter 20, "Unattended DB2 Installation on Windows 95 or Windows NT Workstations" on page 143 for unattended installation

Note: After installing DB2 Version 5, you can now begin to migrate databases.

Post-Installation Steps

After installing the DB2 products, you can now migrate databases and complete other migration activities.

Migrating Databases

To migrate databases owned by an instance, you need to perform the following steps:

1 Log in with a user ID that has SYSADM authority.

2 Ensure that the databases you want to migrate are cataloged.

3 Migrate the database. Refer to the Version 5 *Command Reference* for the database migration syntax command.

Post Database Migrations Actions

There are optional activities you may want to undertake following database migration.

Note: You can also apply these optional activities to a down-level database backup which is restored to Version 5, because at the end of the restore, the database is migrated to Version 5.

- Unique index conversion to DB2 Universal Database Version 5 semantics

  Version 5 of DB2 supports deferred unique constraint checking until end of statement. This can result in correct processing of multiple row updates, that in previous releases of DB2, returned an error because the updates temporarily created duplicate values in the transient state. Deferred unique constraint checking will guarantee that updates, that result in a table with only unique keys (for example, key = key + 1), will succeed regardless of the order of the data.

  Note: This change only applies for unique indexes that are created in Version 5 of DB2.

  All unique indexes in a migrated database do not automatically migrate to Version 5 semantics during database migration because of the following 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.

  > All existing applications will continue to work even if the unique indexes are not converted to Version 5 semantics. You have to convert unique indexes to Version 5 semantics only if support for deferred uniqueness checking is required.

  To convert unique indexes, you need to perform the following steps:

  1 Log in with a user ID that has SYSADM authority.

  2 Issue the **db2start** command.

3 Run the **db2uiddl** command against your migrated database. Refer to the Version 5 *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, and make changes, if needed. Comments in the output will flag any situations that require your attention.

   5 Execute the file as a DB2 Command Line Processor command file, using a command similar to the following:

   ```
   db2 -tvf filename
   ```

   where filename is an output file from **db2uiddl**.

   DB2 interprets the re-creation of an already-existing unique index to signal that the index is ready to be converted to Version 5 semantics.

- Update Statistics

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

   Refer to the Version 5 *Command Reference* for the syntax of the **RUNSTATS** command. For details on the statistics, refer to the Version 5 *Administration Guide*.

- Rebind Packages

   During database migration, all existing packages are invalidated. After the migration, each package is rebuilt when it is used for the first time by the Version 5 database manager. However, for better performance, we recommend that you run the **db2rbind** command to rebuild all packages stored in the database, after database migration is complete. Refer to the Version 5 *Command Reference* for the syntax of this command.

- Update database and database manager configuration

   Some of the database configuration parameters are changed to Version 5 defaults or to other values during database migration. The same is true for database manager configuration parameters which may have changed, during instance migration, to Version 5 defaults or to other values.

   The following database manager configuration parameters are changed to Version 5 defaults:

   – **Sort heap threshold (sheapthres)**

      If the migrating database configuration file has this parameter at a value which is less than the Version 5 default, the parameter is reset to its Version 5 default value.

- **Backup buffer (backbufsz)**

  If the migrating database configuration file has this parameter at a value which is less than the Version 5 minimum, the parameter is reset to its Version 5 minimum value.

- **Restore buffer (restbufsz)**

  If the migrating database configuration file has this parameter at a value which is less than the Version 5 minimum, the parameter is reset to its Version 5 minimum value.

- **Number of concurrent databases running against the database manager (numdb)**

  If the migrating database configuration file has this parameter at a value which is greater than the Version 5 maximum, the parameter is reset to its Version 5 maximum value.

- **TM-database (tmdatabase)**

  If the migrating database configuration file has this parameter set to NULL, the parameter is reset to 1ST_CONNECT.

- **Query heap size (queryheapsz)**

  If the migrating database configuration file has this parameter at a value less than the Application Support Layer heap size (aslheapsz) of the same file, the parameter is reset to aslheapsz + 1.

- **Maximum number of idle agents (idleagents)**

  If the migrating database configuration file has this parameter greater than the Maximum Simultaneous agents (maxagents) of the same file, the parameter is reset to maxagents - 1.

The following database configuration parameters are changed to Version 5 defaults:

- **Application Control heap size (app_ctl_heap_sz)**

  If the migrating database configuration file has this parameter at a value which is less than the Version 5 default, the parameter is reset to its Version 5 default value.

- **Lock List (locklist)**

  For Version 1 DB2 databases, the lock list parameter will be first adjusted to locklist * 32 / 25. If the migrating database configuration file has this parameter at a value less than the Version 5 default value, the parameter is reset to its Version 5 default value.

- **Database Heap (dbheap)**

  For Version 1 DB2 databases, the database heap size will first be adjusted to dbheap * 16. If the migrating database configuration file has this parameter at a value that is less than the Version 5 default, the parameter is reset to its Version 5 default value.

- **Default log space (logfilsiz)**

    The database migration process will attempt to increase the logfilsiz value, if the log file related parameters have a total logfilsiz that is less than the default logfilsiz value.

  - **Application Heap size (applheapsz)**

    For Version 1 DB2 databases, application heap size will be first adjusted to applheapsz * 16. If the migrating database configuration file has this parameter at a value which is less than the Version 5 default, the parameter is reset to its Version 5 default value.

  - **Sort heap (sortheap)**

    For Version 1 DB2 databases, the value of the sort heap parameter will be adjusted to sortheap * 16.

  For better performance, you may want to tune your database and database manager configuration parameters to take advantage of Version 5 enhancements. Refer to the Version 5 *Command Reference* for the syntax of updating database and database manager configuration.

- Migrate Explain Tables

If you are not using explain tables in DB2 Version 2, skip this task.

Version 5 of DB2 has added several new columns to the explain tables. These columns provide for the capture of:

- Data for new SQL features added in Version 5
- More detailed access plan information.

While the explain function in Version 5 will continue to work with explain tables created for Version 2, the new Version 5 data will not be captured in them.

For better performance of SQL statements, we recommend that the Version 2 explain tables be dropped and new explain tables be created; see the *SQL Reference* and the *Administration Guide* for details on creating new explain tables. If, however, there are Version 2 explain tables that you need for ongoing comparison, you can use the EXPLMIG.DDL script to migrate them.

To migrate the explain tables in a database that has been migrated to Version 5, connect to the database and run the following command from the sqllib\misc\ directory:

```
db2 -tf sqllib\misc\EXPLMIG.DDL
```

The explain tables belonging to the user ID that is used to connect to the database will be migrated. To migrate explain tables belonging to another user, connect to the database with that user ID and run the command.

Chapter 19. Unattended DB2 Installation on OS/2 or Windows 3.x Workstations

During a regular installation, you interact with the install program, filling in a series of panels to set up and configure the DB2 product.

In an unattended installation, these tasks run automatically without any intervention by you. The setup and configuration data is supplied by response files you set in place beforehand.

You can use this feature to install DB2 products on OS/2 or Windows 3.x operating systems:

- Locally, from a CD-ROM (refer to "Installing DB2 Products from a Code Server Hard Disk or CD-ROM").

- Remotely, across a network connection from a code server hard disk/CD-ROM (refer to "Installing DB2 Products from a Code Server Hard Disk or CD-ROM").

- Remotely, using SystemView LAN if it is installed on your system (refer to "Installing DB2 Products Remotely Using SystemView LAN" on page 138).

> If you need to install the same DB2 product on several machines, you can use unattended installation's "response file" feature to create a customized configuration, save the customized response file, then reuse it as a template for each installation.

Installing DB2 Products from a Code Server Hard Disk or CD-ROM

To install DB2 products for OS/2 or Windows 3.x, from a code server hard disk or CD-ROM, on local or remote workstations, perform the steps in the following sections:

- "Step 1. Make DB2 Files Available for Installation" on page 132

- "Step 2. Create a Response File for Unattended Installation" on page 133

- "Step 3. Run the CMD/BAT File from the Remote Workstation" on page 136

> You can also use the following procedure to *remove* all DB2 products from a target workstation. Simply follow the instructions below, but when editing the command file, specify D (Delete) instead of I (Install).

Step 1. Make DB2 Files Available for Installation

In this section, you make the DB2 install files accessible to the client machine where DB2 will be installed.

- If performing *remote* installs directly from the CD-ROM:

    1 Insert the appropriate CD-ROM into the drive.

    2 Ensure that the CD-ROM will remain in the drive for as long as it is needed for the install. If the drive is often used for other tasks as well, consider installing from the code server hard disk instead.

- If installing from a code server hard disk, you must copy the required files from the CD-ROM directories to the code server's hard disk. At the command prompt, use the **xcopy** command with the **/s** option.

    - For OS/2, the syntax for the two commands required is:

        ```
        xcopy x:\db2\os2\language e:\clients\language /s
        xcopy x:\db2\os2\common e:\clients\common /s
        ```

        where:

        - *x* is the letter that designates the CD-ROM drive
        - *e* is the letter that designates the code server's hard disk
        - *language* is the two-character code that represents your language (for example, EN for English). Table 17 on page 220 lists the code for each available language.

    - For Windows 3.x, the command syntax is:

        ```
        xcopy x:\windows\language\client\*.*  e:\ins /s
        ```

        where:

        - *x* is the letter that designates the CD-ROM drive
        - *e* is the letter that designates the code server's hard disk
        - *language* is the two-character code that represents your language (for example, EN for English). Table 17 on page 220 lists the code for each available language.

If performing a remote installation, you must enable your network clients to access the DB2 install files.

Grant *shared access* authority to the directory that you just created, or to the CD-ROM drive if installing directly from CD-ROM.

Step 2. Create a Response File for Unattended Installation

During an interactive installation, you provide the information needed to install DB2 and configure its environment. During an unattended installation, this information is provided as keywords and values in a response file. DB2's install package includes a ready-to-use sample response file, with default entries already in place.

If you intend to use the sample response file provided, without making any changes to its values, you can skip this step and go to "Step 3. Run the CMD/BAT File from the Remote Workstation" on page 136.

To edit the sample response file:

1 Find the correct sample response files for the platform you are installing to, and for the product you want to install.

If installing directly from the CD-ROM, substitute x:\os2 or x:\windows (depending on the target workstation's operating system) for e:\clients in the directory names below.

- For OS/2, edit one of:
    - e:\clients*language*\db2entr.rsp for DB2 Universal Database Enterprise Edition
    - e:\clients*language*\db2work.rsp for DB2 Universal Database Workgroup Edition
    - e:\clients*language*\db2cae.rsp for DB2 Client Application Enabler

    where *language* is the two-character country code that represents your language (for example, EN for English). Table 17 on page 220 lists the code for each available language.

- For Windows 3.x, use one of:
    - e:\clients\db2caew.rsp for DB2 Client Application Enabler

2 The response file contains:

- Keywords unique to installation
- Environment variable settings
- Configuration parameter settings.

For more information on:

- DB2 environment variables, see "DB2 Registry Values and Environment Variables" on page 108, or refer to the *Administration Guide*.
- Configuration parameters, refer to the *Administration Guide*.

3 To activate an item in the response file, remove the asterisk (*) to the left of the keyword/registry value, erase the current setting to the right of the value and type in a new setting. The possible settings are listed to the right of the current setting.

An example section of a response file appears below:

```
...
FILE              = c:\sqllib
COMP              = Client Application Enabler
...
*DB2ACCOUNT       = BLANK or char(199)
*DB2BQTIME        = BLANK or 1 - MAX
...
```

Keywords unique to installation are parameters that are only specified in a response file during an unattended installation. The following is a list of keywords unique to OS/2 and Windows 3.1 unattended installation:

- *FILE*

  Specifies the destination directory for DB2. If you do not change this value, it defaults to x:\sqllib where *x* is the drive on which your operating system is installed.

  - Install DB2 products only on a drive which is local to the target workstation. Installing on a non-local drive can cause performance and availability problems.

- *COMP*

  Specifies the components you want installed. By default, all components of the DB2 product are installed. If you do not want to install a component, add an asterisk (*) to the left of the *COMP* line for that component in the response file.

- *OVERWRITE*

  Specifies whether to automatically overwrite files during installation. Valid values for this keyword are YES and NO.

- *CFGUPDATE*

  Specifies whether the CONFIG.SYS file is automatically updated. Valid values for this keyword are:

  - AUTO

    Automatically updates CONFIG.SYS.

  - MANUAL

    Does not update CONFIG.SYS.

- *SAVEBACKUP*

  Specifies whether to save a backup version of the product when it is updated. Valid values for this keyword are YES and NO.

- *DB2SYSTEM*

  On OS/2, specifies a name for the system which is unique within a network.

  Note: This parameter must be specified.

- *AUTO_CTRL_CENTER*

  On OS/2, specifies whether or not to automatically start the Control Center each time the system is rebooted.

  Note: By default the Control Center will be automatically started unless this parameter is set to N0.

- *DB2.AUTOSTART*

  On OS/2, specifies whether or not to automatically start the DB2 instance each time the system is rebooted.

  Note: By default the DB2 instance will be automatically started unless this parameter is set to N0.

- *AUTOSTART_FIRST_STEPS*

  On OS/2 servers, specifies whether or not to automatically start the First Steps application the first time the system is rebooted.

  Note: By default, First Steps will be automatically started. When installing on remote systems, you can set the parameter to N0 so that First Steps does not start.

- *ADMIN.USERID* and *ADMIN.PASSWORD*

  On OS/2, specifies the user ID and password that will be used to log on and start the Administration Server each time your system is started. If UPM already exists on your system, the user ID and password you provide must exist and have one of the following:

  – UPM administrator authority on your system.

  – UPM local administrator authority on your system.

  If UPM is not on your system, it will be installed as part of the DB2 installation and the user ID and password you provide will be set up with the appropriate authority.

4 Exit the file. If you have made any changes, save the file under a new file name to preserve the original sample response file.

If you are installing directly from the CD-ROM, you must store the renamed response file on another drive.

Step 3. Run the CMD/BAT File from the Remote Workstation

A command (CMD) or batch (BAT) file contains the commands which will start the installation program. You must edit this file before running the installation.

1 Find and open the correct CMD or BAT file.

If installing directly from the CD-ROM, substitute x:\os2 or x:\windows (depending on the target workstation's operating system) for e:\clients in the directory names below.

- For OS/2, the CMD files are available in the e:\clients*language* directory where *language* is the two-character country code that represents your language (for example, EN for English). Table 17 on page 220 lists the code for each available language. For example:

  - `db2entr.cmd` for DB2 Universal Database Enterprise Edition
  - `db2work.cmd` for DB2 Universal Database Workgroup Edition
  - `db2cae.cmd` for DB2 Client Application Enabler

- For Windows 3.x, the BAT files are:

  - `e:\clients\db2caew.bat` for DB2 Client Application Enabler

2 Edit the command in the file, to fill in the information needed for the installation.

- For OS/2:

  a In the command file, you must specify the location of the install files. Use the following command:
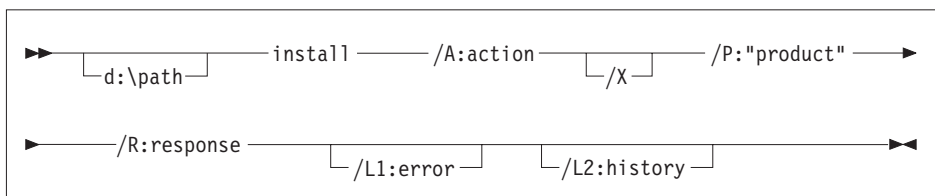
  ```
  set beginlibpath=drive:\db2path
  ```

  For example, if you are installing from the code server's hard drive, specify the directory created in Step 1:

  ```
  set beginlibpath=x:\clients\language\install
  ```

  where *x* is the letter that designates the CD-ROM drive and *language* is the two-character country code that represents your language (for example, EN for English). See Table 17 on page 220

  b You must also specify the complete install command. A complete command requires the following syntax:

The following is an example of a complete command in the sample command files:

```
e:\clients\language\install\install /A:I /X
    /P:"IBM DB2 Client Application Enabler"
    /R:e:\clients\language\db2cae.rsp /L1:d:\error.log
    /L2:d:\history.log
```

where:

/d:\path   Specifies the location of the install files. If installing from the code server's hard drive, specify the directory created in Step 1.

/A   Specifies the action to be performed.

    I   Specifies install.

        Note: If you want to *remove* all DB2 products from a target workstation, specify D (Delete) instead of I (Install).

/X   Specifies that the installation will run in unattended mode.

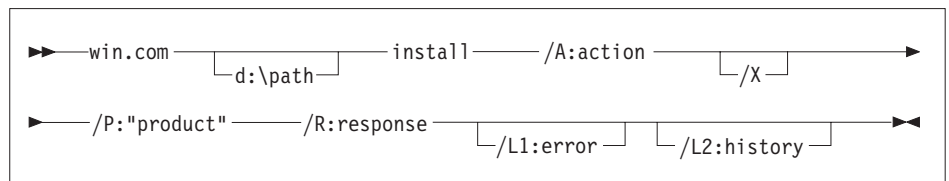**/P**   Specifies the name of the product you want to install.

/R   Specifies the fully qualified response file name. If you changed and renamed the sample response file provided, make sure this parameter matches the new name.

/L1   Specifies the fully qualified log file name, where setup information and any errors occurring during setup are logged.

/L2   Specifies the fully qualified history log name, where all the files processed by the installation program are listed.

- On Windows 3.1:

  A complete command requires the following syntax:

The following is an example of a complete command in the sample command files:

```
win e:\ins\install\install /A:I /X
    /P:"IBM Client Application Enabler for Windows 3.1 V5
    /R:e:\ins\db2caew.rsp /L1:d:\L1 /L2:\L2
```

where:

/d:\path   Specifies the location of the install files. If installing from the code server's hard drive, specify the directory created in Step 1.

/R	Specifies the fully qualified response file name. If you changed and renamed the sample response file provided, make sure this parameter matches the new name.
/A	Specifies the action to be performed.
	I Specifies install.
	Note: If you want to *remove* all DB2 products from a target workstation, specify D (Delete) instead of I (Install).
/X	Specifies that the installation will run in unattended mode.
/P	Specifies the name of the product you want to install.
/L1	Specifies the fully qualified log file name, where setup information and any errors occurring during setup are logged.
/L2	Specifies the fully qualified history log name, where all the files processed by the installation program are listed.

3 Save and exit the CMD or BAT file.

If you are installing directly from the CD-ROM, you must rename the CMD or BAT file, store it on another drive, and use that file name in the next step.

4 Start the installation by typing the CMD or BAT file's name on the command line.

5 When installation is complete, check the error and history logs for any errors or problems.

To configure your DB2 Connect workstation to access remote hosts, go to *DB2 Connect Enterprise Edition Quick Beginnings*. To configure your client to access remote servers, go to Chapter 10, " Configuring Client to DB2 Server Communications Using the CCA" on page 65.

Installing DB2 Products Remotely Using SystemView LAN

To install a DB2 product in a TME10 SystemView LAN environment, perform the steps in the following sections:

- "Step 1. Copy the DB2 Install Files to the Code Server" on page 139
- "Step 2. Add the DB2 Product to the Software Library" on page 139
- "Step 3. Configure the DB2 Product" on page 140
- "Step 4. Install DB2 Products on the Remote Workstation" on page 141

Note: SystemView LAN cannot be used for Windows 3.x workstations.

Step 1. Copy the DB2 Install Files to the Code Server

1 Insert the appropriate CD-ROM into the drive.

2 Copy the required files from the CD-ROM directories to the code server's hard drive. At the command prompt, use the **xcopy** command with the **/s** option.

The syntax for the two commands required is:

```
xcopy x:\db2\os2\language e:\cid\img\language /s
xcopy x:\db2\os2\common e:\cid\img\common /s
```

where

- *x* is the letter that designates the CD-ROM drive
- *language* is the two-character code that represents your language (for example, EN for English. Table 17 on page 220 lists the code for each available language.
- *e* is the letter that designates the code server's hard disk

3 Leave the CD-ROM in the drive; it is required for the next step.

Step 2. Add the DB2 Product to the Software Library

> Once you have added a particular DB2 product to the software library, you can omit this step for later installations of that product.

To add a DB2 product to the software library:

1 Start SystemView LAN.

2 Double-click on the **SystemView LAN Service Manager** icon.

3 Double-click on the **CID Software Preparation** icon.

4 Double-click on the **Software Library** icon.

5 Select **Software**->**New** from the menu bar on the Software Library window.

6 Enter the name of the product you are adding.

7 Select the **Find** push button.

8 In the Find definition file window, select:

- The CD-ROM drive letter in the **Drive** list
- en\install*.adf in the **Directory** list

- The appropriate .adf file name in the **File** list:
    - db2entr.adf for DB2 Universal Database Enterprise Edition
    - db2work.adf for DB2 Universal Database Workgroup Edition
    - db2cae.adf for DB2 Client Application Enabler

9 Click on **OK**.

10 Select the **Add** push button to associate the application definition file with DB2.

This copies the remote installation files (.adf, .var, .cmd and .mrf) from the CD-ROM to the subdirectory where SystemView LAN resides (\sysview2).

An icon is created in the **Software Library** folder, representing the DB2 product you have just added.

Step 3. Configure the DB2 Product

In this step, you configure the DB2 product for the target workstation, just as you would during a standard interactive installation. To perform this task:

1 Double-click on the **DB2** product icon in the Software Library window.

2 Select **Configuration**->**New**.

The Settings notebook opens.

3 Enter a unique identifier to define this configuration.

4 On each page of the notebook, select each of the items in the **Variables** list and choose the setting. A description of each variable is displayed in the **Explanation** field of the notebook page.

5 When you have completed all of the pages of the notebook, click on **OK**.

6 When the message Do you want to catalog the database? appears, click on the **Yes** push button.

The values entered in the notebook are used to create a response file which will supply the information needed to run the installation.

Step 4. Install DB2 Products on the Remote Workstation

To install DB2 products on the remote workstation, you can use either the Event Scheduler or the Remote System Manager. For information on how to use these tools, refer to the SystemView LAN documentation.

After installation, you must reboot the workstation before using DB2.

To configure your DB2 Connect workstation to access remote hosts, go to the *DB2 Connect Enterprise Edition Quick Beginnings*. To configure your client to access remote servers, go to Chapter 21, "Administering Clients Using the CCA" on page 167.

Chapter 20. Unattended DB2 Installation on Windows 95 or Windows NT Workstations

During a regular installation, you interact with the install program, filling in a series of panels to set up and configure the DB2 product.

In an unattended installation, these tasks run automatically without any intervention by you. The setup and configuration data is supplied by response files you set in place beforehand.

You can use this feature to install DB2 products on Windows 95 or Windows NT operating systems:

- Locally, from a CD-ROM (refer to "Installing DB2 Products from a Code Server Hard Disk or CD-ROM")

- Remotely, across a network connection from a code server hard disk or CD-ROM (refer to "Installing DB2 Products from a Code Server Hard Disk or CD-ROM")

- Remotely, across a network connection to target workstations, using Microsoft Systems Management Server (SMS) if it is installed on your Windows NT system (refer to "Installing DB2 Products Remotely Using SMS" on page 154).

> If you need to install the same DB2 product on several machines, you can use unattended installation's "response file" feature to create a customized configuration, save the customized response file, then reuse it as a template for each installation.

Installing DB2 Products from a Code Server Hard Disk or CD-ROM

To install DB2 products for Windows 95 or Windows NT, from a code server hard disk or CD-ROM to local or remote workstations, perform the steps in the following sections:

- "Step 1. Make DB2 Files Available for Installation" on page 145

- "Step 2. Create a Response File for Unattended Installation" on page 147

- "Step 3. Run Setup from the Workstation" on page 152

You can also use this procedure to perform an *interactive* remote install instead of an unattended remote one. Follow the instructions below.

Before You Begin

Read and perform the steps in this section before you begin the installation to ensure that you have the required items and information you will need.

Creating Usernames for DB2 Installation and Operation

This section describes usernames required to install the DB2 product and its components.

Creating a Username for Installing DB2 Products:

Windows 95 The username must be a valid DB2 username.

A valid DB2 username is eight characters or less, and complies with DB2's naming rules. For more information on DB2's naming rules, see Appendix C, "Naming Rules" on page 221.

Windows NT You need to have a username that will be used to install DB2. The username must belong to the Administrators group, and also be a valid DB2 username or have the *"Act as part of the operating system"* advanced user right.

A valid DB2 username is eight characters or less, and complies with DB2's naming rules. For more information on DB2's naming rules, see Appendix C, "Naming Rules" on page 221.

If this username does not comply with DB2's naming rules, but has the *"Act as part of the operating system"* advanced user right, the setup program will create the username *DB2ADMIN* to perform the installation.

On servers, this username will be removed from the system when the installation is complete, unless it will be used by the Administration Server. See "Determining the Username for the Administration Server When Using a Response File:" for more information.

On clients, this username will be removed from the system when the installation is complete.

Determining the Username for the Administration Server When Using a Response File:

Note: This section only applies to Windows NT.

During installation, you will be asked to provide a username and password that will be used by the Administration Server to log on to the system and to start itself as a service.

By default, for installs using a response file, the setup program will set the parameters *ADMIN.USERID* to DB2ADMIN and *ADMIN.PASSWORD* to DB2ADMIN. *ADMIN.USERID* is used to specify the username for Windows NT. You can accept these default values, or provide your own. If you provide your own *ADMIN.USERID*, you must ensure that it is eight characters or less, and complies with DB2's naming rules. For more information, see Appendix C, "Naming Rules" on page 221.

The setup program will check to see if the username specified for the Administration Server exists; if it does not, it will be created. If it does exist, the setup program will:

- Verify that the username is a member of the Administrators group.

- Verify that the password is valid; provided that the username used to install DB2 has the *"Act as part of the operating system"* advanced user right.

If you use the default username *db2admin*, and did not change the default password for this username, you should change this password immediately following the installation.

When the setup program creates the *db2admin* username, it also makes it a member of the Administrators group. Since its password is well known, you should do the following:

1 Change the password for *db2admin*, using the User Manager function of Administration Tools.

2 Change the password for the *DB2-DB2DAS00* service to match the new password that you specified for the *db2admin* username.

Step 1. Make DB2 Files Available for Installation

To make the DB2 install files accessible to the machine where DB2 will be installed:

- If performing *remote* installs directly from the CD-ROM:

    1 Insert the appropriate CD-ROM into the drive.

    2 Ensure that the CD-ROM will remain in the drive for as long as it is needed for the install. If the drive is often used for other tasks as well, consider installing from the code server hard disk instead.

- If installing from a code server, you must copy the required files from the CD-ROM directories to the code server's hard disk:

    1 Insert the appropriate CD-ROM into the drive.

    2 Create a directory on the code server, for example, q:\db2prods.

    3 At the command prompt, use the **cpysetup.bat** command to copy the files necessary for a particular language install to a code server.

The command syntax is:

- *x*:\db2\common\cpysetup.bat *q*:\db2prods *language*

    for:

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

- *x*:\db2\winnt95\common\cpysetup.bat *q*:\db2prods *language*

    for:

    - DB2 Client Application Enabler

where:

- *x* is the letter that designates your CD-ROM drive
- *q* is the letter that designates the code server's disk.
- *language* is the two-character country code that represents your
    language (for example, EN for English). Table 17 on page 220

If performing a remote installation, you must enable your network clients to access the
DB2 install files.

Grant *shared access* to the directory that you just created, or to the CD-ROM drive.

To set up a share:

1 Click on **Start** and select **Programs**->**Windows Explorer**.

2 Select the directory that you want to share, for example q:\db2prods.

3 Select **Files**->**Properties** from the menu bar. The properties window for the
directory will open. Click on the **Sharing** tab.

4 Select the **Shared As** radio button.

5 In the **Share Name** field type a share name. For example, type db2nt.

6 To specify read access for everyone on Windows NT:

   a Select the **Permissions** push button. The Access Through Share
   Permissions window opens.

   b In the **Name** box, make sure that **Everyone** is selected.

   c In the **Type of Access** box, select **Read**.

   d Click on **OK**.

On Windows 95, you do not need to specify type of access when you set up a
share. By default, everyone is allowed read access.

In our example scenario, q:\db2prods uses a share name of db2nt. We will use this
value in the examples that follow.

Step 2. Create a Response File for Unattended Installation

During an interactive installation, you provide the information needed to install DB2 and configure its environment. During an unattended installation, this information is provided as keywords and values in a response file. DB2's install package includes a number of ready-to-use sample response files, with default entries already in place.

The sample response files are located in:

- *x*:\db2\common

    for:

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

- *x*:\db2\winnt95\common

    for:

    - DB2 Client Application Enabler

where *x* is the letter that designates the CD-ROM drive. There is a different response file for each product on the CD, so that the user has a valid list of parameters for each product.

If you intend to use the sample response file provided, without making any changes to its values, you can skip this step and go to "Step 3. Run Setup from the Workstation" on page 152.

Edit the sample response file using your favorite editor. For example, you can use Notepad or WordPad.

1 Open the sample response file for the package you want to install.

- db2entr.rsp for DB2 Universal Database Enterprise Edition

- db2work.rsp for DB2 Universal Database Workgroup Edition

- db2cae.rsp for DB2 Client Application Enabler

2 The response file contains:

- Keywords unique to installation

- Registry value/environment variable settings

- Database manager configuration parameter settings.

> For more information on:
>
> - DB2 environment variables and registry values, see "DB2 Registry Values and Environment Variables" on page 108, or refer to the *Administration Guide*.
> - Database manager configuration parameters, refer to the *Administration Guide*.

3 To activate an item in the response file, remove the asterisk (*) to the left of the keyword/registry value, erase the current setting to the right of the value and type in a new setting. The possible settings are listed to the right of the current setting.

An example section of a response file appears below:

```
...
FILE             = c:\sqllib
REBOOT           = No
*COMP            = Control Center
...
```

Keywords unique to installation are parameters that are only specified in a response file during an unattended installation. The following is a list of keywords unique to installation for Windows 95 and Windows NT unattended installation:

- *FILE*

  Specifies the destination directory for DB2.

  Note: Check the value for the *FILE* keyword. *FILE* specifies where to install the product. If you do not change this value, it defaults to x:\sqllib where *x* is the drive on which your operating system is installed.

- *REBOOT*

  Specifies whether to reboot the system following installation.

- *TYPE*

  Specifies the type of install. The options are:

      0=Compact
      1=Typical (default)
      2=Custom

  For 0 and 1 (compact and typical), any COMP value will be ignored.

  For all types, default communication values will be used where applicable, as follows:

  a DB2.DB2COMM and ADMIN.DB2COMM will be set for the protocols detected on your system.

> **b** If a protocol is detected on the system, or if you have specified values for `DB2.DB2COMM` or `ADMIN.DB2COMM`, values for its parameters will be generated so that the protocol will be enabled for DB2's use at the end of the install. Checks are made to ensure that the generated values are not duplicates, and that they conform to the protocols set up on your system. Default values will be generated for the following:
>
> – For NetBIOS:
>
> ```
> DB2.DB2NBADAPTERS      ADMIN.DB2NBADAPTERS
> DB2.NNAME              ADMIN.NNAME
> ```
>
> – For TCP/IP:
>
> ```
> DB2.PORTNUMBER         ADMIN.PORTNUMBER
> DB2.SVCENAME           ADMIN.SVCENAME
> ```
>
> – For IPX/SPX:
>
> ```
> DB2.FILESERVER         ADMIN.FILESERVER
> DB2.OBJECTNAME         ADMIN.OBJECTNAME
> DB2.IPX_SOCKET         ADMIN.IPX_SOCKET
> ```
>
> – For APPC:
>
> ```
> DB2.TPNAME             ADMIN.TPNAME
> ```
>
> **Note:** You may override these values; however, if the associated protocol has not been detected or specified, the values will not be used.

- *PROD*

  Specifies the product you want installed. The options are:

  – `DB2_ENTERPRISE` for DB2 Universal Database Enterprise Edition

  – `DB2_WORKGROUP` for DB2 Universal Database Workgroup Edition

  – `DB2_CAE` for DB2 Client Application Enabler

  Note: This parameter can be used more than once.

- *COMP*

  Specifies the components you want installed. Components required for a product are installed automatically. Components that are not available are ignored.

  Note: Component selections have no effect unless you specify a `custom` installation.

  The following table lists *COMP* keywords and the components they represent.

Table 8 (Page 1 of 2). Component Keywords for Windows 95 and Windows NT Unattended Install	
Keyword	**Component**
Product Components	
GRAPHICAL_TOOLS	Graphical Tools
CLIENT_CONFIGURATION_ASSISTANT	Client Configuration Assistant
CONTROL_CENTER	Control Center
PERFORMANCE_MONITOR	Performance Monitor
VISUAL_EXPLAIN	Visual Explain
ODBC-DRIVER	DB2 ODBC Driver
SAMPLE_APPLICATIONS	Sample Applications
CONNECT_SUPPORT	Connect Support
SNA_SUPPORT	Integrated SNA Support
JAPANESE_CONVERSION	Japanese Conversion Support
KOREAN_CONVERSION	Korean Conversion Support
T_CHINESE_CONVERSION	Traditional Chinese Conversion Support
S_CHINESE_CONVERSION	Simplified Chinese Conversion Support
DB2 Books	
API_REFERENCE	API Reference
ADMINISTRATION_GUIDE	Administration Guide
ADMINISTRATION_GETTING_STARTED	Administration Getting Started
DB2_PROGRAMMING_GETTING_STARTED	Road Map to DB2 Programming
BUILDING_OS2_WIN_APPLICATIONS	Building Applications for Windows and OS/2 Environments
CLI_GUIDE_REFERENCE	CLI Guide and Reference
COMMAND_REFERENCE	Command Reference
CONNECT_PERSONAL_QUICK	DB2 Connect Personal Edition Quick Beginnings
CONNECT_USERS_GUIDE	DB2 Connect User's Guide
UNIVERSAL_DB_QUICK	DB2 Universal Database Quick Beginnings
SQL_PROGRAMMING_GUIDE	Embedded SQL Programming Guide
GLOSSARY	Glossary
MASTER_INDEX	Master Index
MESSAGES_REFERENCE	Message Reference
SQL_GETTING_STARTED	SQL Getting Started
SQL_REFERENCE	SQL Reference
SYSTEM_MONITOR_GUIDE	System Monitor Guide and Reference

Table 8 (Page 2 of 2). Component Keywords for Windows 95 and Windows NT Unattended Install	
Keyword	**Component**
CONNECT_ENTERPRISE_QUICK	DB2 Connect Enterprise Edition Quick Beginnings
TROUBLE_SHOOTING_GUIDE	Troubleshooting Guide
CONNECTIVITY_SUPPLEMENT	DB2 Connectivity Supplement
UNIVERSAL_DB_PERSONAL_QUICK	DB2 Universal Database Personal Edition Quick Beginnings
REPLICATION-GUIDE	Replication Guide and Reference
INSTALLING_CONFIGURING_CLIENTS	Installing and Configuring DB2 Clients

- *AUTO_CTRL_CENTER*

  Specifies whether or not to automatically start the Control Center each time the system is rebooted.

  Note: By default the Control Center will be automatically started unless this parameter is set to N0.

- *DB2.AUTOSTART*

  Specifies whether or not to automatically start the DB2 instance each time the system is rebooted.

  Note: By default the DB2 instance will be automatically started unless this parameter is set to N0.

- *AUTOSTART_CCA*

  Specifies whether or not to automatically start the Client Configuration Assistant each time the system is rebooted.

  Note: By default the Client Configuration Assistant will be automatically started unless this parameter is set to N0.

- *AUTOSTART_FIRST_STEPS*

  Specifies whether or not to automatically start the First Steps application the first time the server system is rebooted.

  Note: By default, First Steps will be automatically started. When installing on remote systems, you can set the parameter to N0 so that First Steps does not start.

- *ADMIN.USERID*

  Specifies the username that the DB2 Administration Server will use to log on to the system. If *ADMIN.USERID* is not activated, the account DB2ADMIN/DB2ADMIN will be created and used, if applicable. See "Determining the Username for the Administration Server When Using a Response File:" on page 144

- *ADMIN.PASSWORD*

  Specifies the password for the DB2 Administration Server.

- Install DB2 products only on a drive which is local to the target workstation. Installing on a non-local drive can cause performance and availability problems.
- By default, the name of the response file will be used to determine the products to be installed. You can override this setting by providing one or more **PROD** parameter values in the response file.

---

4 Exit the file. If you have made any changes, save the file under a new file name to preserve the original sample response file.

If you are installing directly from the CD-ROM, you must store the renamed response file on another drive.

Step 3. Run Setup from the Workstation

To perform the installation:

1 At the workstation where DB2 will be installed, logon as a username that meets the requirements for installing DB2. See "Creating Usernames for DB2 Installation and Operation" on page 144 for more information.

2 If performing a remote install, connect to the shared directory of the code server hard disk, or to the CD-ROM drive, using a command similar to the following:

    net use e: \\machine\directory

where:

- *e* is the drive letter used to connect to the shared directory on the server's hard disk or CD-ROM drive.
- *machine* is the machine name of the code server.
- *directory* is the share name of the code server or CD-ROM drive.

For example, type:

    net use e: \\codeserv\db2nt

Based on the example set up in previous steps, this points to q:\db2prods on the code server.

3 Run the setup program:

   a Click on **Start** and select **Run**.

   b In the Open Window, type the path to the setup program. The path accepts the following command line arguments:

```
 ►►─┬──────────────┬──── setup ──────── /U drive:path\responsefile ───────►
    └─drive:\path──┘

 ►─────┬──────────────────────┬──────┬──────────────┬──────────────────►◄
       └─ /L drive:path\logfile ─┘    └─ /I language ─┘
```
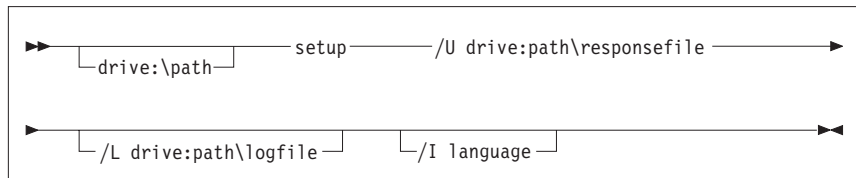
Specify the fully qualified path to invoke the program. For example:

    e:\setup /U d:\db2\common\db2setup.rsp /L db2log.log /I *language*

where:

/U   Specifies the fully qualified response file name. If you changed and
         renamed the sample response file provided, make sure this parameter
         matches the new name.

/L   Specifies the fully qualified log file name, where setup information and
         any errors occurring during setup are logged.

         If you do not specify the log file's name, DB2 names it db2.log, and
         stores it in a directory called db2log, on the drive on which your
         operating system is installed.

/I   Specifies the two-character country code that represents your
         language (for example, EN for English). Table 17 on page 220 lists
         the code for each available language.

         If you do not specify the language, setup will determine the system
         language, and launch the appropriate DB2 install for that language.

  c Click on **OK** to start the setup program.

  d The installation proceeds without further action on your part.

4 Check the messages in the log file when the installation finishes.

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

5 Following installation, you must reboot the workstation before using DB2.

  Note: If you specified *REBOOT*=yes in your response file, the workstation will
             reboot automatically.

> If you are installing a server and used the default username DB2ADMIN,
> remember to change the default password for this username. You should
> change this password immediately following installation.

To configure your DB2 Connect workstation to access remote hosts, go to *DB2 Connect Enterprise Edition Quick Beginnings*. To configure your client to access remote servers, go to Chapter 21, "Administering Clients Using the CCA" on page 167.

Installing DB2 Products Remotely Using SMS

With Microsoft Systems Management Server (SMS), you can install DB2 products across a network onto remote Windows NT systems, setting up the installation from a central location.

You can also use SMS to *remove* all DB2 products from a target workstation. Simply follow the instructions below, but when creating the SMS package, select **Uninstall DB2 Products** instead of selecting the packages to be installed.

To install DB2 products via SMS, perform the steps in the following sections:

- "Step 1. Make DB2 Files Available for Installation" on page 156
- "Step 2. Create a Response File for Unattended Installation" on page 158
- "Step 3. Import the DB2 Install Files into SMS" on page 163
- "Step 4. Distribute the DB2 Installation Package Using SMS" on page 164
- "Step 5. Run the Installation on the SMS Client" on page 165

Before You Begin

Read and perform the steps in this section before you begin the installation to ensure that you have the required items and information you will need.

Creating Usernames for DB2 Installation and Operation

This section describes usernames required to install the DB2 product and its components.

Creating a Username for Installing DB2 Products:

Windows 95 The username must be a valid DB2 username.

A valid DB2 username is eight characters or less, and complies with DB2's naming rules. For more information on DB2's naming rules, see Appendix C, "Naming Rules" on page 221.

Windows NT You need to have a username that will be used to install DB2. The username must belong to the Administrators group, and also be a valid DB2 username or have the *"Act as part of the operating system"* advanced user right.

A valid DB2 username is eight characters or less, and complies with DB2's naming rules. For more information on DB2's naming rules, see Appendix C, "Naming Rules" on page 221.

If this username does not comply with DB2's naming rules, but has the *"Act as part of the operating system"* advanced user right, the setup program will create the username *DB2ADMIN* to perform the installation.

On servers, this username will be removed from the system when the installation is complete, unless it will be used by the Administration Server. See "Determining the Username for the Administration Server When Using a Response File:" for more information.

On clients, this username will be removed from the system when the installation is complete.

Determining the Username for the Administration Server When Using a Response File:

Note: This section only applies to Windows NT.

During installation, you will be asked to provide a username and password that will be used by the Administration Server to log on to the system and to start itself as a service.

By default, for installs using a response file, the setup program will set the parameters *ADMIN.USERID* to DB2ADMIN and *ADMIN.PASSWORD* to DB2ADMIN. *ADMIN.USERID* is used to specify the username for Windows NT. You can accept these default values, or provide your own. If you provide your own *ADMIN.USERID*, you must ensure that it is eight characters or less, and complies with DB2's naming rules. For more information, see Appendix C, "Naming Rules" on page 221.

The setup program will check to see if the username specified for the Administration Server exists; if it does not, it will be created. If it does exist, the setup program will:

- Verify that the username is a member of the Administrators group.

- Verify that the password is valid; provided that the username used to install DB2 has the *"Act as part of the operating system"* advanced user right.

> If you use the default username *db2admin*, and did not change the default password for this username, you should change this password immediately following the installation.
>
> When the setup program creates the *db2admin* username, it also makes it a member of the Administrators group. Since its password is well known, you should do the following:
>
> **1** Change the password for *db2admin*, using the User Manager function of Administration Tools.
>
> **2** Change the password for the *DB2-DB2DAS00* service to match the new password that you specified for the *db2admin* username.

SMS Requirements

SMS must already be installed and configured on your network. Refer to *Microsoft's Systems Management Server for Windows NT Administrator's Guide* for information on how to:

- Set up SMS (including setting up primary and secondary sites).
- Add clients to the SMS system.
- Set up inventory collection for clients.

To create an SMS package that copies the required files directly from the CD-ROM, insert the appropriate CD-ROM into the drive and go to "Step 2. Create a Response File for Unattended Installation" on page 158.

Step 1. Make DB2 Files Available for Installation

To make the DB2 install files accessible to the machine where DB2 will be installed:

- If performing *remote* installs directly from the CD-ROM:

    1 Insert the appropriate CD-ROM into the drive.

    2 Ensure that the CD-ROM will remain in the drive for as long as it is needed for the install. If the drive is often used for other tasks as well, consider installing from the code server hard disk instead.

- If installing from a code server, you must copy the required files from the CD-ROM directories to the code server's hard disk:

    1 Insert the appropriate CD-ROM into the drive.

    2 Create a directory on the code server, for example, q:\db2prods.

    3 At the command prompt, use the **cpysetup.bat** command to copy the files necessary for a particular language install to a code server.

The command syntax is:

- *x*:\db2\common\cpysetup.bat *q*:\db2prods *language*

  for:

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

- *x*:\db2\winnt95\common\cpysetup.bat *q*:\db2prods *language*

  for:

  - DB2 Client Application Enabler

where:

- *x* is the letter that designates your CD-ROM drive
- *q* is the letter that designates the code server's disk.
- *language* is the two-character country code that represents your language (for example, EN for English). Table 17 on page 220

If performing a remote installation, you must enable your network clients to access the DB2 install files.

Grant *shared access* to the directory that you just created, or to the CD-ROM drive.

To set up a share:

1 Click on **Start** and select **Programs**->**Windows Explorer**.

2 Select the directory that you want to share, for example q:\db2prods.

3 Select **Files**->**Properties** from the menu bar. The properties window for the directory will open. Click on the **Sharing** tab.

4 Select the **Shared As** radio button.

5 In the **Share Name** field type a share name. For example, type db2nt.

6 To specify read access for everyone on Windows NT:

   a Select the **Permissions** push button. The Access Through Share Permissions window opens.

   b In the **Name** box, make sure that **Everyone** is selected.

   c In the **Type of Access** box, select **Read**.

   d Click on **OK**.

   On Windows 95, you do not need to specify type of access when you set up a share. By default, everyone is allowed read access.

In our example scenario, q:\db2prods uses a share name of db2nt. We will use this value in the examples that follow.

Step 2. Create a Response File for Unattended Installation

During an interactive installation, you provide the information needed to install the DB2 product and configure its environment. During an unattended installation, this information is provided as keywords and values in a response file. DB2's install package includes a number of ready-to-use sample response files, with default entries already in place.

The sample response files are located in:

- `x:\db2\common`

    for:

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

- `x:\db2\winnt95\common`

    for:

    - DB2 Client Application Enabler

where *x* is the letter that designates the CD-ROM drive. There is a different response file for each product on the CD, so that the user has a valid list of parameters for each product.

> If you intend to use the sample response file provided, without making any changes to its values, you can skip this step and go to "Step 4. Distribute the DB2 Installation Package Using SMS" on page 164.

Edit the sample response file using your favorite editor. For example, you can use Notepad or WordPad.

1 Open the sample response file for the package you want to install.

- `db2entr.rsp` for DB2 Universal Database Enterprise Edition
- `db2work.rsp` for DB2 Universal Database Workgroup Edition
- `db2cae.rsp` for DB2 Client Application Enabler

2 The response file contains:

- Keywords unique to installation
- Environment variable/registry value settings
- Database manager configuration parameter settings.

> For more information on:
>
> - DB2 environment variables and registry values, see "DB2 Registry Values and Environment Variables" on page 108, or refer to the *Administration Guide*.
>
> - Database manager configuration parameters, refer to the *Administration Guide*.

3 To activate an item in the response file, remove the asterisk (*) to the left of the keyword/registry value, erase the current setting to the right of the value and type in a new setting. The possible settings are listed to the right of the current setting.

An example section of a response file appears below:

```
...
FILE            = c:\sqllib
REBOOT          = No
*COMP           = Control Center
...
```

Keywords unique to installation are parameters that are only specified in a response file during an unattended installation. The following is a list of keywords unique to installation for Windows 95 and Windows NT unattended installation:

- *FILE*

  Specifies the destination directory for DB2.

  Note: Check the value for the *FILE* keyword. *FILE* specifies where to install the product. If you do not change this value, it defaults to x:\sqllib where *x* is the drive on which your operating system is installed.

- *REBOOT*

  Specifies whether to reboot the system following installation.

- *TYPE*

  Specifies the type of install. The options are:

      0=Compact
      1=Typical (default)
      2=Custom

  For 0 and 1 (compact and typical), any COMP value will be ignored.

  For all types, default communication values will be used where applicable, as follows:

  a DB2.DB2COMM and ADMIN.DB2COMM will be set for the protocols detected on your system.

  b If a protocol is detected on the system, or if you have specified values for DB2.DB2COMM or ADMIN.DB2COMM, values for its parameters will be generated so that the protocol will be enabled for DB2's use at the end of the install. Checks are made to ensure that the generated values are

not duplicates, and that they conform to the protocols set up on your system. Default values will be generated for the following:

– For NetBIOS:

```
DB2.DB2NBADAPTERS      ADMIN.DB2NBADAPTERS
DB2.NNAME              ADMIN.NNAME
```

– For TCP/IP:

```
DB2.PORTNUMBER         ADMIN.PORTNUMBER
DB2.SVCENAME           ADMIN.SVCENAME
```

– For IPX/SPX:

```
DB2.FILESERVER         ADMIN.FILESERVER
DB2.OBJECTNAME         ADMIN.OBJECTNAME
DB2.IPX_SOCKET         ADMIN.IPX_SOCKET
```

– For APPC:

```
DB2.TPNAME             ADMIN.TPNAME
```

Note: You may override these values; however, if the associated protocol has not been detected or specified, the values will not be used.

- *PROD*

  Specifies the product you want installed. The options are:

  – `DB2_ENTERPRISE` for DB2 Universal Database Enterprise Edition

  – `DB2_WORKGROUP` for DB2 Universal Database Workgroup Edition

  – `DB2_PERSONAL` for DB2 Universal Database Personal Edition

  – `DB2_CAE` for DB2 Client Application Enabler

  – `CONNECT_ENTERPRISE` for DB2 Connect Enterprise Edition

  – `CONNECT_PERSONAL` for DB2 Connect Personal Edition

  Note: This parameter can be used more than once.

- *COMP*

  Specifies the components you want installed. Components required for a product are installed automatically. Components that are not available are ignored.

  Note: Component selections have no effect unless you specify a `custom` installation.

  The following table lists *COMP* keywords and the components they represent.

Table 9 (Page 1 of 2). Component Keywords for Windows 95 and Windows NT Unattended Install	
Keyword	**Component**
Product Components	
GRAPHICAL_TOOLS	Graphical Tools
CLIENT_CONFIGURATION_ASSISTANT	Client Configuration Assistant
CONTROL_CENTER	Control Center
PERFORMANCE_MONITOR	Performance Monitor
VISUAL_EXPLAIN	Visual Explain
ODBC-DRIVER	DB2 ODBC Driver
SAMPLE_APPLICATIONS	Sample Applications
CONNECT_SUPPORT	Connect Support
SNA_SUPPORT	Integrated SNA Support
JAPANESE_CONVERSION	Japanese Conversion Support
KOREAN_CONVERSION	Korean Conversion Support
T_CHINESE_CONVERSION	Traditional Chinese Conversion Support
S_CHINESE_CONVERSION	Simplified Chinese Conversion Support
DB2 Books	
API_REFERENCE	API Reference
ADMINISTRATION_GUIDE	Administration Guide
ADMINISTRATION_GETTING_STARTED	Administration Getting Started
DB2_PROGRAMMING_GETTING_STARTED	Road Map to DB2 Programming
BUILDING_OS2_WIN_APPLICATIONS	Building Applications for Windows and OS/2 Environments
CLI_GUIDE_REFERENCE	CLI Guide and Reference
COMMAND_REFERENCE	Command Reference
CONNECT_PERSONAL_QUICK	DB2 Connect Personal Edition Quick Beginnings
CONNECT_USERS_GUIDE	DB2 Connect User's Guide
UNIVERSAL_DB_QUICK	DB2 Universal Database Quick Beginnings
SQL_PROGRAMMING_GUIDE	Embedded SQL Programming Guide
GLOSSARY	Glossary
MASTER_INDEX	Master Index
MESSAGES_REFERENCE	Message Reference
SQL_GETTING_STARTED	SQL Getting Started
SQL_REFERENCE	SQL Reference
SYSTEM_MONITOR_GUIDE	System Monitor Guide and Reference

Table 9 (Page 2 of 2). Component Keywords for Windows 95 and Windows NT Unattended Install	
Keyword	**Component**
CONNECT_ENTERPRISE_QUICK	DB2 Connect Enterprise Edition Quick Beginnings
TROUBLE_SHOOTING_GUIDE	Troubleshooting Guide
CONNECTIVITY_SUPPLEMENT	DB2 Connectivity Supplement
UNIVERSAL_DB_PERSONAL_QUICK	DB2 Universal Database Personal Edition Quick Beginnings
REPLICATION-GUIDE	Replication Guide and Reference
INSTALLING_CONFIGURING_CLIENTS	Installing and Configuring DB2 Clients

- *AUTO_CTRL_CENTER*

  Specifies whether or not to automatically start the Control Center each time the system is rebooted.

  Note: By default the Control Center will be automatically started unless this parameter is set to N0.

- *DB2.AUTOSTART*

  Specifies whether or not to automatically start the DB2 instance each time the system is rebooted.

  Note: By default the DB2 instance will be automatically started unless this parameter is set to N0.

- *AUTOSTART_CCA*

  Specifies whether or not to automatically start the Client Configuration Assistant each time the system is rebooted.

  Note: By default the Client Configuration Assistant will be automatically started unless this parameter is set to N0.

- *AUTOSTART_FIRST_STEPS*

  Specifies whether or not to automatically start the First Steps application the first time the server system is rebooted.

  Note: By default, First Steps will be automatically started. When installing on remote systems, you can set the parameter to N0 so that First Steps does not start.

- *ADMIN.USERID*

  Specifies the username that the DB2 Administration Server will use to log on to the system. If *ADMIN.USERID* is not activated, the account DB2ADMIN/DB2ADMIN will be created and used, if applicable. See "Determining the Username for the Administration Server When Using a Response File:" on page 155

- *ADMIN.PASSWORD*

    Specifies the password for the DB2 Administration Server.

> - Install DB2 products only on a drive which is local to the target
>   workstation. Installing on a non-local drive can cause performance and
>   availability problems.
> - By default, the name of the response file will be used to determine the
>   products to be installed. You can override this setting by providing one
>   or more **PROD** parameter values in the response file.

4 Exit the file. If you have made any changes, save the file under a new file name to preserve the original sample response file.

If you are installing directly from the CD-ROM, you must store the renamed response file on another drive.

Step 3. Import the DB2 Install Files into SMS

To import the DB2 install files into SMS:

1 Insert the appropriate CD-ROM into the drive.

2 Double-click on the **Systems Management Server** folder.

3 Double-click on the **SMS Administrator** icon. The SMS Administrator window opens.

4 Select **File**->**New** from the menu bar. The Package Properties window opens.

5 Click on the **Import** push button. The **File Browser** opens.

6 In the **File Name** field, select the db2.pdf file located in:

- `x:\db2\common`

    for:

    – DB2 Universal Database Enterprise Edition
    – DB2 Universal Database Workgroup Edition

- `x:\db2\winnt95\common`

    for:

    – DB2 Client Application Enabler
    – DB2 Connect Enterprise Edition

where *x* is the letter that designates your CD-ROM drive.

Step 4. Distribute the DB2 Installation Package Using SMS

In this step, you create an SMS package and send it to the SMS client where you want to install DB2.

To create the SMS package:

1 From the Package Properties window, click on the **Workstations** push button. The Setup Package For Workstations window opens, showing a list of predefined DB2 installation packages that you can use.

2 In the **Source Directory** field, type the name of the parent directory where you put the copied DB2 files (`q:\db2prods` in the example above).

3 Select the name of the product to install from the **Workstation Command Lines** list.

4 If you changed and renamed the sample response file, click on the **Properties** push button and change the value of the parameter to match the new response file name.

If you do not specify the language, setup will determine the system language, and launch the appropriate DB2 install for that language. If you want to install a different language, use the /l parameter to specifies the two-character code that represents your language (for example, EN for English). Table 17 on page 220 lists the code for each available language.

5 Click on the **Close** push button.

6 Click on **OK** to close the opened windows.

The Packages window shows the name of the new SMS package.

7 Specify where to run the package:

    a Open the Sites and Packages windows.

    b In the Packages window, select the appropriate package and drag it onto the target client in the Sites window. The Job Details window opens.

    c Select the **Run Workstation Command** check box and select the installation package that you want to use for the Run Command on Workstation job. For more information about completing the Job Details window, refer to *Microsoft's Systems Management Server for Windows NT Administrator's Guide*.

    d When the job specifications are complete, click on **OK** to close the opened windows.

The job is created and sent to the SMS client.

Step 5. Run the Installation on the SMS Client

Now that the remote installation package has been prepared and sent, the SMS client on the target machine can run the installation.

1 On the SMS client where DB2 will be installed, logon as a username that meets the requirements for installing DB2. See "Creating Usernames for DB2 Installation and Operation" on page 154 for more information.

2 Double-click on the **SMS Client** folder.

3 Double-click on the **Package Command Manager** icon. The Package Command Manager window opens.

4 When packages are sent from the SMS server, they are listed in the window. Select the DB2 package, then click on the **Execute** push button. The installation runs automatically.

5 Following installation, you must reboot the SMS client before using DB2.

   Note: If you specified *REBOOT*=yes in your response file the SMS client will reboot automatically.

> If you are installing a server and used the default username DB2ADMIN, remember to change the default password for this username. You should change this password immediately following installation.

To configure your DB2 Connect workstation to access remote hosts, go to *DB2 Connect Enterprise Edition Quick Beginnings*. To configure your client to access remote servers, go to Chapter 21, "Administering Clients Using the CCA" on page 167.

Chapter 21. Administering Clients Using the CCA

Use the information in this section to use the Client Configuration Assistant to perform administration tasks on OS/2, Windows 95, and Windows NT workstations.

When you install the DB2 server, if your protocols are set up and configured, DB2 server communications are automatically configured to allow DB2 to accept requests from remote clients.

> The CCA can be installed on OS/2, Windows 95, and Windows NT workstations. If it is not installed on your system, you can install it by reinstalling the DB2 product and choosing to install the CCA.

With the CCA, you can:

- Configure database connections that applications can use.
- Update or delete existing configured database connections.
- Display the information for existing configured connections.
- Test a connection to a database.
- Enable or disable database connections to be configured as CLI/ODBC data sources.
- Import or export client profiles which contain information for the setup of a client.
- Update client configuration settings.
- Discover remote databases (if enabled).
- Bind user applications and utilities to databases.

Configuring Database Connections

> To complete the steps in this section, you must be logged on to the local system as a user with System Administrative (SYSADM) authority on the instance.

You can configure database connections through the Add Database SmartGuide, by:

- Using a profile as a source of information to add database connections, see "Using an Access Profile."
- Searching the network for databases, see "Searching the Network for Databases" on page 171.
- Adding database connections manually, see "Manually Configure a Connection to a DB2 Database" on page 176.

Each of these is covered in more detail in the material that follows.

Using an Access Profile

You can use either a Server profile or a Client profile to configure database connections on a client.

Server Profiles

Server profiles can be generated for a DB2 server. They contain information about instances on the 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.

To generate server profiles, use the Generate Access Profile function provided in the Control Center. When a profile is generated for a DB2 server system, it includes server instances that have the *discover_inst* configuration parameter set to ENABLE, and databases with the *discover_db* configuration parameter set to ENABLE. The *discover* parameter, in the Administration Server, must be set to either *SEARCH* or *KNOWN* to generate a profile for a server system.

For information on setting the *discover_inst*, *discover_db* and *discover* configuration parameters, see "Setting Discovery Parameters" on page 175.

Generating a Server Profile: To generate an access profile, perform the following steps:

1 Start the Control Center.

2 Click on the **[+]** sign beside the **Systems** icon to get a list of systems.

3 Select the system to be profiled and click on the right mouse button.

4 Select the **Generate access profile** option.

5 Select the path and type in a file name for the profile, then click on the **Generate** push button.

To process a server profile and add its databases to the client's connection configuration list, use the Client Configuration Assistant's Import or Add functions. Using the Add function is the preferred method.

Using a Server Profile on the Client: To add a database using the Add function:

1 Start the Client Configuration Assistant (CCA).

2 Click on the **Add** push button.

3 Select the **Use an Access Profile** radio button, and click on the **Next** push button.

4 Click on the **Browse** push button to select the server profile that you want to access, or enter the path and filename in the **File** field.

5 Select a database to be added.

6 If desired, you can select the **Alias** and **ODBC** tabs at the top of the panel to specify a database alias name for the database, or to select CLI/ODBC options for the database. This step is optional.

7 Click on the **Done** push button.

8 You can test the connection that has been added by clicking on the **Test Connection** push button.

Client Profiles

Information in Client profiles can be added to the client through the following:

- Using the Add function, which allows you to selectively process the database connection data in the client profile and add it to the client. (This function invokes the Add Database SmartGuide.)

- Using the Import function, which allows you to selectively process database connection data, client configuration settings, and CLI/ODBC common parameters.

Note: This scenario assumes that the database connections configured on one client will be exported and used to set up one or more additional clients.

Exporting a Client Profile: Client profiles are generated from clients using the Export function of the CCA. Use the export function to copy the database information used by one client to other clients.

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/ODBC settings).
- Client settings (including database manager configuration parameters).
- CLI/ODBC common parameters.
- Configuration data for the local APPC communications subsystem.

Export can be used to generate a customized profile that can be imported on another client to set it up initially, or to update it.

To export a profile from the client, configure the client for communications and do the following:

1 Enter **db2cca admin** at a command prompt to start the Client Configuration Assistant in administrator mode. (You must be an administrator on the local system to perform this command.)

> The Export function of the CCA is only available when the CCA is started in administrator mode. The CCA can be started in administrator mode by modifying the **Client Configuration Assistant** icon to add the parameter *admin* to the startup of the CCA, or by issuing the **db2cca admin** command.

2 Click on the **Export** push button.

3 Select the databases to be exported from the **Available DB2 Databases** window, and add them to the **Databases to be exported** window.

4 Select the check boxes that correspond to the options that you want to set up for the target client:

- **Client Settings**
- **CLI/ODBC Common parameters**
- **APPC local stack configuration**

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 on the **Help** push button.

5 Click on **OK**.

6 Enter a path and file name for the Client profile.

Importing a Client Profile:

> The Import function can be used to easily set up new client systems. The Import function works as follows:
>
> **Client Settings**
> Configuration parameters found in the export file replace existing ones on the client; all other parameters are set to default.
>
> **CLI/ODBC Common Parameters**
> Values found in the exported file replace those on the client.
>
> **Local Configuration Data for the APPC Communications Subsystem**
> If it is not already configured, this information is used to configure the APPC communications subsystem.

Perform these steps at the client that you want to set up. You can use this process to initially set up a new client, or to update an existing one.

1 Start the Client Configuration Assistant (CCA).

2 Click on the **Import** push button.

3 Select the path and filename of the client profile you want to import and click on **OK**.

4 The Import Client Profile window opens. Select the items you want to import. For more information, click on the **Help** push button.

5 Click on **OK**.

> If databases are contained in the client profile that you are importing, and you select to import them, the Add Database SmartGuide starts to allow you to selectively import the databases you want to connect to.

Searching the Network for Databases

Instead of entering protocol information to make a connection to remote database servers, you can use the CCA to find all the databases on your local network by following these steps:

> The following scenario assumes that the installation defaults on the client and the server have not been changed, and that messages used by the *Search* method of discovery are not filtered by your network.

1 Start the Client Configuration Assistant (CCA).

2 Click on the **Add** push button on the CCA's main panel to start the Add Database SmartGuide.

3 Select the **Search the network** radio button, and click on the **Next** push button.

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

    a Click on the **[+]** sign beside the system to get a list of the instances and databases on it. Select the database that you want to add and proceed to Step 5.

    b If the system that contains the database that you want is not listed, click on the **[+]** sign beside the **Other Systems (Search the network)** icon to search the network for additional systems. Click on the **[+]** sign beside the system to get a list of the instances and databases on it. Select the database that you want to add and proceed to Step 5.

    c If the system you want is still not listed, it can be added to the list of systems by clicking on the **Add Systems** push button.

5 If desired, you can select the **Alias** and **ODBC** tabs at the top of the panel to specify a database alias name for the database, or to select CLI/ODBC options for the database. This step is optional.

6 Click on the **Done** push button.

7 You can test the connection that has been added by clicking on the **Test Connection** push button.

Searching the network can be customized to meet the needs of individual organizations. The material that follows provides details on this customization. Refer to the *Administration Guide* for more information on individual configuration parameters and profile registry values.

Choosing a Discovery Method

Network searching uses a DB2 facility called *Discovery* to obtain information from DB2 servers. This information is used to configure clients for database connections. Two discovery methods are available for searching the network:

- **Known**

  Known discovery allows you to discover instances and databases on systems that are known to your client, and add new systems so that their instances and databases can be discovered; however, it does not support searching the network for servers.

  Click on the **[+]** sign beside the **Known Systems** icon to get a list of known DB2 server systems. Click on the **[+]** sign beside the system to get a list of the instances and databases on it. Select the database that you want to add and complete the other panels in the Add Database SmartGuide.

  Initially, the list of systems will be blank; however, if you are running the CCA on the server, an entry for the local server will be shown. Add systems to the list by

clicking on the **Add System** push button. To use this option you must know a few details about the Administration Server on the DB2 system to be searched:

– A protocol configured and running on the administration server.
– The protocol's configuration information.

The Administration Server will listen for KNOWN discovery requests, from clients, on the protocols specified by the DB2COMM registry value in the Administration Server.

- **Search**

This mode provides all of the facilities of Known discovery, and adds the option to allow your local network to be searched for DB2 servers.

Searching does not require information about the Administration Server. When you click on the **[+]** sign beside the **Other Systems (Search the network)** icon, a list of DB2 server systems is displayed. Click on the **[+]** beside the system to get a list of the instances and databases on it. Select the database that you want to add and complete the other panels in the Add Database SmartGuide.

> *Search* may appear to be a simpler discovery method. However, in larger networks, network routers and bridges can filter the messages search uses to find DB2 servers on the network, resulting in an incomplete or even empty list. In this case, use the *Add System* method; its messages are not filtered by routers and bridges. If in doubt, contact your network administrator for assistance.

To have the server support Known discovery, set the *discover* parameter in the Administration Server to KNOWN. To have it support Search discovery, set this parameter to SEARCH. To prevent discovery of the server, and all of its instances and databases, set *discover* to DISABLE.

On the client, enabling discovery is also done using the *discover* parameter; however, in this case, the *discover* parameter is set in the client instance (or a server acting as a client) as follows:

KNOWN Allows the CCA to refresh systems in the known list, and to add new systems to the list by using the **Add Systems** button. When *discover* is set to KNOWN, the CCA will not be able to search the network.

SEARCH Enables all the facilities of the KNOWN setting, and enables network searching.

DISABLE Disables discovery. In this case, the **Search the network** option is not available in the Add Database SmartGuide.

> Servers configured with *discover* set to KNOWN, will not respond to search requests from clients. It is important that you consider this when changing the *discover* parameter, which was set to SEARCH during the installation.

Additional Settings for SEARCH Discovery

Search discovery requires that the configuration parameter *discover_comm* be set on both the server (in the Administration Server's configuration file) and the client (in the database manager configuration file).

The *discover_comm* parameter is used to control the communication protocols that the server will listen on for search requests from clients, and that clients will use to send out search requests. The *discover_comm* parameter can be any combination of TCP/IP and NetBIOS; the protocols supported by SEARCH discovery.

On the server, the values specified by *discover_comm* must be equal to, or a subset, of the values set by *db2comm* for the Administration Server.

> Check the settings for the *DB2COMM* registry value by issuing the **db2set DB2COMM** command. For more information, see Chapter 16, "Controlling Your DB2 Environment" on page 103.

On the server, *discover_comm* is set in the Administration Server. On the client (or a server acting as a client), *discover_comm* is set in the instance.

Note: When using discovery search mode, at least one protocol specified by the *discover_comm* parameter on the client must match those specified by *discover_comm* on the Administration Server. If there is no match, the server will not respond to the client's requests.

In addition, there are two DB2 profile registry values that can be used to tune search discovery on the client: *db2discoverytime* and *db2nbdiscoverrcvbufs*. The default values should be suitable in most cases. For more information, refer to the *Administration Guide*.

Hiding Server Instances and Databases from Discovery

You may have multiple instances, and multiple databases within these instances, on a server. You may want to hide some of these from the discovery process.

To allow clients to discover server instances on a system, set the *discover_inst* database manager configuration parameter in each server instance on the system to ENABLE (this is the default value). Set this parameter to DISABLE to hide this instance and its databases from discovery.

To allow a database to be discovered from a client, set the *discover_db* database configuration parameter to ENABLE (this is the default value). Set this parameter to DISABLE to hide the database from discovery.

Setting Discovery Parameters

discover and discover_comm

The *discover* and *discover_comm* parameters are set in the Administration Server on the server system, and in the client instance. Set these parameters as follows:

- On the Administration Server:

  Update the Administration Server's configuration file, in the command line processor, as follows:

  ```
  update admin cfg using discover [ DISABLE | KNOWN | SEARCH ]
  update admin cfg using discover_comm [ NETBIOS | TCPIP ]
  db2admin stop
  db2admin start
  ```

  Note: Search Discovery will only operate on TCP/IP and NetBIOS.

- On the client:

  1 Start the Client Configuration Assistant (CCA).

  2 Click on the **Client Settings** push button.

  3 Select the **Communications** tab.

  4 Select and change the parameters that you want to modify in the **Parameters** window.

> If the *discover_comm* includes *netbios*, you must ensure that the Workstation name (*nname*) parameter is set for the both the client and the Administration Server. Also, you must ensure that the *db2nbadapters* registry value is set to the Adapter number that you want to use. For more information, refer to the *Administration Guide*.

---

discover_inst and discover_db

Use the Control Center to set the *discover_inst* and *discover_db* parameters. To set these parameters, follow these steps:

1 Start the Control Center.

2 Select the instance that you want to configure and click on the right mouse button.

3 Select the **Configure** option from the pop-up menu. The Configuration window opens.

4 Select the **Environment** tab and select the *discover_inst* parameter.

5 Enter the desired value in the **Value** box and click on **OK**.

6 Select the database that you want to configure and click on the right mouse button.

7 Select the **Configure** option from the pop-up menu. The Configuration window opens.

8 Select the **Environment** tab and select the *discover_db* parameter.

9 Enter the desired value in the **Value** box and click on **OK**.

discoverytime and db2nbdiscoverrcvbufs

The *db2discoverytime* and *db2nbdiscoverrcvbufs* profile registry values are set in the client instance (or a server acting as a client). Set these parameters as follows:

- To set the *db2discoverytime* registry value to 35 seconds, enter the following command:

  ```
  db2set db2discoverytime=35
  ```

  This specifies that the searched discovery should wait 35 seconds for a response from servers.

- To set the *db2nbdiscoverrcvbufs* registry value to 10, enter the following command:

  ```
  db2set db2nbdiscoverrcvbufs=10
  ```

  This specifies the number of NetBIOS buffers that will be allocated for response messages from discovered servers.

Manually Configure a Connection to a DB2 Database

Manually configuring a database connection requires you to know:

- One of the protocols supported by the server instance containing the database.
- The protocol connection information required to configure the connection to the server instance.
- The name of the database on the server system.

With this information, the SmartGuide will guide you through the steps necessary to add the database connection.

1 Start the Client Configuration Assistant (CCA).

2 Click on the **Add** push button on the CCA's main panel to start the Add Database SmartGuide.

3 Select the **Manually configure a connection to a DB2 database** radio button, and click on the **Next** push button.

4 Select the protocol that you will use to connect to the database. Click on the **Next** push button.

5 Type in the required protocol parameters. Click on the **Next** push button.

6 Type in the name of the database in the **Target database** field.

7 If desired, you can select the **Alias** and **ODBC** tabs at the top of the panel to specify a database alias name for the database, or to select CLI/ODBC options for the database. This step is optional.

8 Click on the **Done** push button.

9 You can test the connection that has been added by clicking on the **Test Connection** push button.

Chapter 22. Setting up Communications on the Server Using the Command Line Processor

This section describes how to configure your DB2 server to communicate with remote client workstations.

Also described in this section are considerations when configuring the DB2 Administration Server for communications. The Control Center and the Discovery function of the Client Configuration Assistant are dependent on the Administration Server's protocol configuration.

Follow the instructions in this section if you deselected a detected communication protocol during the installation or, you have added a communication protocol to your network since running the setup program.

If you have installed the Control Center, you can use the Setup Communications function to configure the instance for communications; however, it cannot be used to set up communications for the Administration Server. The Control Center can be installed on OS/2 and Windows NT servers, or on OS/2, Windows 95, and Windows NT clients.

The Setup Communications function cannot update the APPC communications subsystem; however, it will update the required instance parameters on the server.

Go to Chapter 11, "Configuring DB2 Server Communications Using the Control Center" on page 69 for more information.

For instructions on using the command line processor, see Chapter 15, "Entering DB2 Commands and SQL Statements" on page 97.

Setting the DB2COMM Registry Value

Your DB2 server can support multiple communication protocols concurrently; however, you only need to enable the protocols that you want to use.

If you deselected a detected protocol during installation, did not install the Control Center, or have added a communication protocol to your network since installation, you must update the *DB2COMM* registry value with the protocol that you now want to support.

The *DB2COMM* registry value determines which protocol's connection managers will be enabled when the database manager is started. You can set this value for multiple communication protocols by separating the keywords with commas.

For your DB2 server, *DB2COMM* can be any combination of the following keywords:

appc   starts APPC support

ipxspx   starts IPX/SPX support

netbios   starts NetBIOS support

npipe   starts NAMED PIPE support

tcpip   starts TCP/IP support

To set the *DB2COMM* registry value for the current instance, issue the **db2set DB2COMM=** *protocol_names* command. Change the *protocol_names* parameter to reflect those protocols that you want to start when the database manager is started.

For example, to set the database manager to start connection managers for the APPC and TCP/IP communication protocols, enter:

```
db2set DB2COMM=appc,tcpip
db2stop
db2start
```

> If you are setting up communications for the Administration Server, use the **db2set** command as follows:
>
> ```
> db2set DB2COMM=appc,tcpip -i DB2DAS00
> db2admin stop
> db2admin start
> ```
>
> where:
>
> **DB2DAS00**   The name of the Administration Server's instance. If you are not sure of the instance name, issue the following command to resolve it:
>
> ```
> db2set DB2ADMINSERVER
> ```

When the **db2start** command is reissued, connection managers for the protocols specified by the *DB2COMM* registry value are started.

> If there are problems starting a protocol's connection managers, a warning message is displayed and the error messages are logged in the db2diag.log file, located in the x:\sqllib\%db2instance% directory, where *x:* is the drive that the client is installed and *%db2instance%* represents the DB2 instance.
>
> Refer to the *Troubleshooting Guide* for information on the db2diag.log file.

If *DB2COMM* is undefined or set to null, no protocol connection managers are started when the database manager is started.

For more information on setting DB2 parameters, see "Controlling the DB2 Profile Registry" on page 104.

You are now ready to configure the server workstation to use any of the following communication protocols:

- Named Pipes - see "Configuring Named Pipes on the Server"
- TCP/IP - see "Configuring TCP/IP on the Server"
- NetBIOS - see "Configuring NetBIOS on the Server" on page 185
- IPX/SPX - see "Configuring IPX/SPX on the Server" on page 188
- APPC - see "Configuring APPC on the Server" on page 191

Configuring Named Pipes on the Server

To access a remote server through Named Pipes, you must first have installed and configured communication software for both the client and DB2 server workstations. See "Software Requirements" on page 34 for the communication protocol requirements for your platform. See "Possible Client-to-DB2 Server Connectivity Scenarios" on page 37 for the supported communication protocols for your particular client and server.

If you have read and completed the instructions in "Setting the DB2COMM Registry Value" on page 179, there are no further steps required to set up Named Pipe communications on the server or to support the Administration Server.

Now that you have configured the server, you are ready to install a DB2 client. Go to Chapter 6, "Installing DB2 Clients" on page 51 for more information.

Configuring TCP/IP on the Server

To access a remote server through TCP/IP, you must first have installed and configured communication software for both the client and DB2 server workstations. See "Software Requirements" on page 34 for the communication protocol requirements for your platform. See "Possible Client-to-DB2 Server Connectivity Scenarios" on page 37 for the supported communication protocols for your particular client and server.

Before completing the steps in this section, be sure that you have completed the instructions in "Setting the DB2COMM Registry Value" on page 179.

If you are setting up communications for the Administration Server, it was configured for TCP/IP (using the registered Port number *523*) when it was created. There are no further steps required to enable the Administration Server to use TCP/IP.

The following steps are required to set up TCP/IP communications:

1 Identify and record parameter values.

2 At the server:

    a Update the services file.

    b Update the database manager configuration file.

> Due to the characteristics of the TCP/IP protocol, the TCP/IP subsystem may not be immediately notified of the failure of a partner on another host. As a result, a client application accessing a remote DB2 server using TCP/IP, or the corresponding agent at the server, may sometimes appear to be hung. DB2 uses the TCP/IP SO_KEEPALIVE socket option to detect when there has been a failure and the TCP/IP connection has been broken.
>
> If you are experiencing problems with your TCP/IP connection, refer to the *Troubleshooting Guide* for information on this parameter and other common TCP/IP problems.

Step 1. Identify and Record Parameter Values

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

Table 10 (Page 1 of 2). TCP/IP Values Required at the Server			
Parameter	**Explanation**	**Sample Value**	**Your Value**

Connection Port
• Connection Service name (*svcename*)
• Port number/Protocol (Port_number/tcp)
 	
Interrupt Port
• Interrupt Service name
• Port number/Protocol (Port_number + 1/tcp)
	Values required in the services file.
	
	The Connection and Interrupt Service names are arbitrary, but each must be unique within the services file.
	
	The Connection and Interrupt Ports must be unique within the services file, with the Interrupt Port number equal to the Connection Service Port number plus one.
		`server1`
		
		`3700/tcp`
		
		`server1i`
		
		`3701/tcp`	

Table 10 (Page 2 of 2). TCP/IP Values Required at the Server			
Parameter	**Explanation**	**Sample Value**	**Your Value**
Service name (*svcename*)	The name used to update the Service name (*svcename*) parameter in the database manager configuration file at the server. This value must be the same as the Connection Service name specified in the services file.	server1	

Step 2. Configure the Server

The following steps describe how to configure this protocol on the server. Replace the sample values with your values and record them on your worksheet.

A. Update the Services File

The TCP/IP services file specifies ports that the DB2 server will listen on for client requests. The services file must contain two entries for each database manager instance.

You need to update the services file and specify the ports that you want the DB2 server to listen on for incoming client requests. The first entry describes the Connection Port, and the second entry describes the Interrupt Port.

The services file is located in the \winnt\system32\drivers\etc directory.

> The location of the services file can depend on the products you have installed on your system. See your TCP/IP documentation for more information.

Using a local text editor, add the Interrupt Port and Connection Port entries to the services file for TCP/IP support. For example:

```
server1     3700/tcp      # DB2 connection service port
server1i    3701/tcp      # DB2 interrupt connection service port
```

where:

server1	is the Connection Service name
server1i	is the Interrupt Service name
3700 and 3701	are the Port numbers for the Connection and Interrupt Ports
tcp	is the communication protocol that you are using

B. Update the Database Manager Configuration File

You must update the database manager configuration file with the Service name (*svcename*) parameter.

To update the database manager configuration file, perform the following steps:

1 Log on to the system as a user with System Administrative (SYSADM) authority.

> If you have trouble logging on to the system, see "Logging on to the System" on page 73.

2 Update the database manager configuration file with the Service name (*svcename*) parameter using the following commands in the command line processor:

```
update database manager configuration using svcename svcename
db2stop
db2start
```

For example, if the Connection Service name in the services file was entered as *server1*, use:

```
update database manager configuration using svcename server1
db2stop
db2start
```

> The *svcename* used must match the Connection Service name specified in the services file.

View the database manager configuration file, to ensure that these changes have taken effect, by issuing the following command in the command line processor:

```
get database manager configuration
```

Now that you have configured the server, you are ready to install a DB2 client. Go to Chapter 6, "Installing DB2 Clients" on page 51 for more information.

Configuring NetBIOS on the Server

To access a remote server through NetBIOS, you must first have installed and configured communication software for both the client and DB2 server workstations. See "Software Requirements" on page 34 for the communication protocol requirements for your platform. See "Possible Client-to-DB2 Server Connectivity Scenarios" on page 37 for the supported communication protocols for your particular client and server.

Before completing the steps in this section, be sure that you have completed the instructions in "Setting the DB2COMM Registry Value" on page 179.

The following steps are required to set up NetBIOS communications:

1 Identify and record parameter values.

2 Configure the server:

    a Configure the NetBIOS Interface.

    b Update the database manager configuration file.

Step 1. Identify and Record Parameter Values

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

Table 11. NetBIOS Values Required at the Server			
Parameter	**Description**	**Sample Value**	**Your Value**
Adapter number (*Adapter_number*)	The logical network adapters that will be used for the NetBIOS connection. The server uses adapter 0 by default.	0	
Workstation name (*nname*)	The NetBIOS name of the server workstation. *nname* is a name, chosen by the user, which must be unique among all NetBIOS nodes in the network.	server1	

Step 2. Configure the Server

The following steps describe how to configure this protocol on the server. Replace the sample values with your values and record them on your worksheet.

A. Configure the NetBIOS Interface

In order for a client to connect to a Windows NT server, the network route of the adapter number used must be **Nbf** for native NetBIOS operation. If the *db2nbadapters* parameter is not set, the default adapter will be *0*. If you want to use additional server adapters, or you need to specify a server adapter other than *0*, set the *db2nbadapters* parameter to the number that you want to use.

> DB2 uses registry values to control its use of the NetBIOS resources on the server. Use the *db2nbadapters* registry parameter when you want to specify a value other than the default Logical adapter number 0.
>
> For the DB2 server, set the *db2nbadapters* parameter by issuing the **db2set db2nbadapters=***Adapter_number* command.
>
> For the Administration Server, set the *db2nbadapters* parameter by issuing the **db2set db2nbadapters=***Adapter_number -i DB2DAS00* command.
>
> For more information, see Chapter 16, "Controlling Your DB2 Environment" on page 103.

To view or modify the NetBIOS interface configuration, which maps network routes to adapter numbers, do the following:

1 Click on the **Start** button and select **Settings**->**Control Panel**.

2 Double-click on the **Network** icon and select the **Services** tab.

3 Select the **NetBIOS Interface** option from the Network Services window and click on the **Properties** push button.

4 Scroll through the network routes until you find the Logical adapter number associated with **Nbf** and record it on your worksheet.

5 To change the Logical adapter number associated with **Nbf**, select the associated **Lana Number**, and click on the **Edit** push button. Enter the new adapter number 0 (or the value that you set for *db2nbadapters*).

6 Record the new Adapter number associated with **Nbf** on your worksheet.

7 Click on **OK**.

8 Click on the **Close** push button.

9 Shutdown and reboot your system for these changes to take effect.

> Each adapter number must be uniquely associated with a network route. Windows NT has a built in checking facility that will not allow you specify the same adapter number for different network routes. If a Network route already exists that is using the adapter number *0*, assign a different number to that route. (The valid range for adapter numbers is *0* to *255*.) This will allow you to select *0* as the adapter number that corresponds to **Nbf**. Approve the changes by clicking on **OK**.

B. Update the Database Manager Configuration File

You must update the database manager configuration file with the server's Workstation name (*nname*) parameter.

To update the database manager configuration file, perform the following steps:

1 Log on to the system as a user with System Administrative (SYSADM) authority.

> If you have trouble logging on to the system, see "Logging on to the System" on page 73.

2 Update the database manager configuration file with the server's Workstation name (*nname*) parameter using the following commands in the command line processor:

```
update database manager configuration using nname nname
db2stop
db2start
```

For example, if the server's workstation name (*nname*) is server1, use:

```
update database manager configuration using nname server1
db2stop
db2start
```

If you are configuring the Administration Server for NetBIOS, you must update the admin server configuration file, use:

```
update admin configuration using nname server1
db2admin stop
db2admin start
```

Autostarting DB2 with NetBIOS

If your NetBIOS protocol was configured during installation, the setup program automatically created a dependency for the Administration Server and the default

instance (DB2) on NetBIOS. If you create additional instances of DB2, you will have to manually create a dependency on NetBIOS for each new instance.

You can create this dependency with the **db2depnb** command as follows:

1 Go to the x:\sqllib\misc directory, where x: is the drive on which DB2 was installed

2 Enter the **db2depnb** command as follows:

```
db2depnb instance_name
```

This records a dependency on the startup order which causes NetBIOS to start before DB2.

> If you remove the NetBIOS protocol from your network, you *must* remove the dependencies that were created during installation, and any dependencies that you created for additional instances. Failure to remove these dependencies may cause problems when running DB2 after the NetBIOS protocol has been removed from the network.
>
> To remove a dependency, enter the **db2depnb** command as follows:
>
> ```
> db2depnb instance_name /r
> ```

Now that you have configured the server, you are ready to install a DB2 client. Go to Chapter 6, "Installing DB2 Clients" on page 51 for more information.

Configuring IPX/SPX on the Server

To access a remote database server through IPX/SPX, you must first have installed and configured communication software for both the client and DB2 server workstations. See "Software Requirements" on page 34 for the communication protocol requirements for your platform. See "Possible Client-to-DB2 Server Connectivity Scenarios" on page 37 for the supported communication protocols for your particular client and server.

Before completing the steps in this section, be sure that you have completed the instructions in "Setting the DB2COMM Registry Value" on page 179.

If you are setting up communications for the Administration Server, it was configured for IPX/SPX (using the registered Socket number *87A2*) when it was created. There are no further steps required to enable the Administration Server to use IPX/SPX.

Your DB2 server can be set up to support IPX/SPX client communications via Direct Addressing.

In Direct Addressing, the client connects to the DB2 server by directly specifying the IPX/SPX internetwork address of the server (bypassing the NetWare file server). Using this method, a NetWare file server is not required on the network. Configure DB2 servers using this addressing method if they will be accessed solely by clients using Direct Addressing.

The following steps are required to set up IPX/SPX communications:

1 Identify and record parameter values.

2 Configure the server:

    a Update the database manager configuration file.

Step 1. Identify and Record Parameter Values

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

Table 12. IPX/SPX Values Required at the Server

Parameter	Explanation	Our Example	Your Value
File server name (*FILESERVER*)	A * value indicates that you are using Direct Addressing.	*	
DB2 server object name (*OBJECTNAME*)	A * value indicates that you are using Direct Addressing.	*	
Socket number (*IPX_SOCKET*)	Represents the connection end point in a DB2 server's internetwork address. It must be unique for all server instances, and all IPX/SPX applications running on the workstation. It is entered in hexadecimal format. DB2 has registered well known sockets with Novell in the range 0x879E to 0x87A1. If you run more than 4 instances on the server machine, you must prevent socket collisions for instances 5 and up by choosing a socket number that is not *0x0000*, in the dynamic socket range *0x4000* to *0x7FFF*, or in the range *0x8000* to *0x9100* (these are well known sockets that are registered to various applications). The maximum value for this parameter is *0xFFFF*.	879E (default)	
IPX/SPX Internetwork Address	The internetwork address required when configuring a client to communicate with a server using Direct Addressing.	09212700.400011527745.879E	

Step 2. Configure the Server

The following steps describe how to configure this protocol on the server. Replace the sample values with your values and record them on your worksheet.

A. Update the Database Manager Configuration File

You must update the database manager configuration file with the File server (*FILESERVER*), DB2 server object name (*OBJECTNAME*), and Socket number (*IPX_SOCKET*) parameters.

To update the database manager configuration file, perform the following steps:

1 Log on to the system as a user with System Administrative (SYSADM) authority.

> If you have trouble logging on to the system, see "Logging on to the System" on page 73.

2 In the database manager configuration file, update the File server (*FILESERVER*), DB2 server object name (*OBJECTNAME*), and Socket number (*IPX_SOCKET*) parameters using the following commands in the command line processor:

```
update dbm cfg using fileserver FILESERVER objectname OBJECTNAME ipx_socket IPX_SOCKET
db2stop
db2start
```

For example, if you have chosen a value of 879E for the Socket number (*IPX_SOCKET*) parameter, use:

```
update dbm cfg using fileserver * objectname * ipx_socket 879E
db2stop
db2start
```

View the database manager configuration file, to ensure that these changes have taken effect, by issuing the following command in the command line processor:

```
get database manager configuration
```

> If you are planning to only support clients that use Direct Addressing, you will be required to enter the server's IPX/SPX internetwork address as the DB2 server object name when cataloging the node on the client.
>
> Determine the value for the *OBJECTNAME* parameter by issuing the **db2ipxad** command on the server. This command is located in the sqllib\misc\ directory.

Configuring APPC on the Server

To access a remote server through APPC, you must first have installed and configured communication software for both the client and DB2 server workstations. See "Software Requirements" on page 34 for the communication protocol requirements for your platform. See "Possible Client-to-DB2 Server Connectivity Scenarios" on page 37 for the supported communication protocols for your particular client and server.

Before completing the steps in this section, be sure that you have completed the instructions in "Setting the DB2COMM Registry Value" on page 179.

The following steps are required to set up APPC communications:

1 Identify and record parameter values.

2 Configure the server:

  a Update the database manager configuration file.

  b Configure the APPC communications subsystem.

Step 1. Identify and Record Parameter Values

Before you proceed through the configuration steps, enter your value for the Transaction program name in the following table.

Table 13. APPC Values Required at the Server			
Parameter	**Description**	**Sample Value**	**Your Value**
Transaction program name (*tpname*)	The Transaction program that the server listens on for client requests.	`nyserver`	

Step 2. Configure the Server

The following steps describe how to configure this protocol on the server. Replace the sample value with your value as recorded on your worksheet.

A. Update the Database Manager Configuration File

You must update the database manager configuration file with the Transaction program name (*tpname*).

To update the database manager configuration file, perform the following steps:

1 Log on to the system as a user with System Administrative (SYSADM) authority.

> If you have trouble logging on to the system, see "Logging on to the System" on page 73.

2 Update the database manager configuration file with the server's Transaction program name (*tpname*) using the following commands in the command line processor:

```
update dbm cfg using tpname tpname
db2stop
db2start
```

For example, if the server's Transaction program name (*tpname*) is *nyserver*, use:

```
update dbm cfg using tpname nyserver
db2stop
db2start
```

If you are configuring the Administration Server to use APPC, you must update the admin server configuration file, use:

```
update admin configuration using tpname nyserver
db2admin stop
db2admin start
```

B. Configure the APPC Communications Subsystem

To configure your DB2 server to accept remote clients using APPC, you need to update the APPC communications subsystem to support the Transaction program name (*tpname*) that the server will use.

Refer to the *DB2 Connect Enterprise Edition Quick Beginnings* manual for detailed instructions on how to configure your APPC communications subsystem to support communications from the Transaction program that you specified for the server.

If you are using the DB2 Universal Database Workgroup Edition, this manual was not installed on your workstation. Go to the DB2 Product and Service Technical Library located at http://www.software.ibm.com/data/db2/library/ to view this manual.

Chapter 23. Using the DB2 Workstation as a Server for Host Applications

You can set up DB2 on the workstation to be a database server for clients or applications that use Distributed Relational Database Architecture (DRDA). The DRDA Application Server (AS) feature enables DB2 to function as a database server for DRDA Application Requesters (DRDA ARs).

DRDA AS is installed automatically with your DB2 server. However, there are some steps required to set up the connection with a DRDA AR. These steps are described in this chapter.

For more information about DRDA concepts and a detailed description of DRDA commands and bind options, refer to the following publications:

- *Distributed Relational Database Architecture Reference* (SC26-4651)

- *DDM Architecture Reference Manual Level 4* (SC21-9526)

DRDA Application Requesters Supported

DB2 Universal Database servers support the following IBM Application Requesters:

- DB2 for MVS/ESA or DB2 for OS/390 Version 3.1 (or higher), DB2 for MVS Version 4 (or higher), and DB2 for VM Version 5 (or higher) AR

  For information on setting up the connection to a DB2 server via the DRDA-AS feature, see the instructions in "Setting Up DRDA-AS Functionality" on page 195.

- DB2 for OS/390 Version 5 (or higher) AR

  For information on setting up the connection to a DB2 server via the DRDA-AS feature, refer to the *DB2 Connectivity Supplement*.

- DB2/400 AR

  For information on setting up the connection to a DB2 server via the DRDA-AS feature, refer to the *DB2 Connectivity Supplement*.

- DB2 for VM & VSE (SQL/DS) Version 3.3 and 3.4 (or higher) AR

  For information on setting up the connection to a DB2 server via the DRDA-AS feature, refer to the *DB2 Connectivity Supplement*.

For information about non-IBM ARs, contact the software support for those products.

PTFs Required for DRDA Application Servers

Note: At the time of publication of this manual, there were no PTFs for DB2 for MVS V4 or DB2 for OS/390 V5.

The PTF numbers for DB2 for MVS APAR PN60988, which allows DB2 for MVS to work with the DB2 DRDA-AS, are:

UN75959 for DB2 for MVS 3.1
UN73393 for DB2 for MVS 3.1

For DB2 for VM/ESA to use two-phase commit, the following PTFs need to be applied:

VM60922 for DB2 for VM/ESA
VM61072 for DB2 for VM/ESA

For OS/400 DRDA ARs to work against the DB2 DRDA-AS, PTFs need to be applied on the OS/400 as follows:

Table 14. OS/400 PTFs Required for DRDA-AS

OS/400 PTR#	OS/400 V2R3 PTF	OS/400 V3R0.5 PTF	OS/400 V3R1 PTF
SA42461	SF23100	SF23950	SF23270
SA43024	SF23205	SF23950	SF23277
3989448	SF23101	SF23994	SF23271
3993315	SF23722	SF23988	SF23721
3994088	SF23987	SF23986	SF23985
3994297	SF23990	SF23989	SF23960

DRDA-AS Setup for the DRDA Application Requester

This section describes the steps and conditions required to set up a connection between a DB2 Universal Database DRDA Application Server and a DRDA application requester.

Before you begin, you must determine whether your connection will use the APPC communication protocol, or the TCP/IP communication protocol.

Notes:

1. The protocol you choose may depend on the application requester:

    • APPC is supported by all application requesters

    • TCP/IP is supported by only DB2 for OS/390 V5.1 and DB Connect V5.0.

2. APPC supports both one-phase and two-phase commit; TCP/IP currently supports only one-phase commit.

3. TCP/IP is supported only for Version 5.1 of DB2 for OS/390.

Setting Up DRDA-AS Functionality

This section gives an overview of the steps required to set up DRDA-AS functionality. The example shows how to set up a connection between the DRDA AS on your DB2 server and a DB2 for MVS/ESA or DB2 for OS/390 AR:

1 Ensure DB2 for MVS/ESA or DB2 for OS/390 is installed and operational on the host.

Refer to the *DB2 Connectivity Supplement* for information on the configuration required for the DB2 for MVS/ESA or DB2 for OS/390 AR.

2 If you use APPC, ensure VTAM is installed and operational on the host.

Refer to the *DB2 Connect Enterprise Edition Quick Beginnings* and the *DB2 for OS/390 V5 Installation Guide* (GC26-8970) manual for information on configuring the DB2 for DB2 for MVS/ESA or DB2 for OS/390 AR.

3 Set up the DB2 server communications, if required. (Typically, DB2 server communication are set up as part of the DB2 installation. However, complete details are provided in Chapter 22, "Setting up Communications on the Server Using the Command Line Processor" on page 179. If you want to use two-phase commit, refer to the online *DB2 Connect Enterprise Edition Quick Beginnings* manual.)

4 Update the tables at the DB2 for MVS/ESA or DB2 for OS/390 host.

Refer to the *DB2 Connectivity Supplement* for more information.

5 Stop and restart the DB2 Universal Database instance named in DB2SERVICETPINSTANCE (that is, the instance you updated TPName in). Enter the following commands:

```
db2stop
db2start
```

6 Test the host-server DRDA connection by logging onto TSO and using DB2I/SPUFI.

For information on setting up two-phase commit, refer to the online *DB2 Connect Enterprise Edition Quick Beginnings* manual.

Using the DRDA Application Server

DRDA-AS connections over TCP/IP or APPC are treated like any other connection to the DB2 server to ensure consistency in the way the maximum number of concurrent connections to a server is measured, from both DRDA and non-DRDA clients.

The *Administration Guide* summarizes the CCSIDs that a DRDA-AR must use in order to connect to the DB2 DRDA-AS.

When using APPC, a DRDA-AR connects to the DRDA AS by specifying the Transaction Program Name (TPN) for the server. The TPN can correspond to the *tpname* parameter value in the instance's database manager configuration file. The TPN used by the DRDA-AS can also be the service transaction program X'07'6DB. When using this TPN, each separate instance of the DRDA-AS must specify a different local LU name.The instance that handles the TPN X'07'6DB is specified by the DB2 registry value DB2SERVICETPINSTANCE.

Authentication

If you choose APPC as your communication protocol, the communications subsystem may restrict the types of database manager configuration authentication setting you can use at the DB2 Universal Database server. Not all communications subsystems expose the application requester's password to the application server when security (program) is used. When this is the case, the database manager configuration authentication must not be set to SERVER. This restriction apllies to all Windows NT communications subsystems.

To overcome the restriction that prevents you from using authentication SERVER, you can set the database manager authentication to DCS. This allows DRDA APPC connections that have been authenticated by the communication subsystem to succeed. However, with this setting the DB2 Universal Database will act as if authentication SERVER is being used for all other types of connections.

Troubleshooting

The DB2 DRDA Trace utility (**db2drdat**) is provided for tracing the DRDA data flow between a DRDA AR and the DB2 DRDA AS. For more information on setting up this trace, refer to the *Troubleshooting Guide*.

DRDA Functions Supported

DRDA functions are catagorized as required or optional. Table 15 identifies which functions are implemented in the AS on the DB2 Universal Database server. The subsequent table lists the supported bind options.

Table 15. Supported DRDA Functions

Description	Required (R) Optional (O)	Supported	Not Supported
DRDA level 1 required function	R	X*	
Rebind	O	X	
Describe user privileges	O		X
Describe RDB table	O		X
Interrupt RDB request	O		X

Note: * Certain required functions are not supported.

Bind Options Supported by the DB2 DRDA AS

Table 16 (Page 1 of 5). Bind Options Supported by the DB2 DRDA AS

Bind Option	Value	Supported	Not Supported	DB2 for MVS/ESA Precompile Option (Note 1)	DB2/VM Preprocessing Option	OS/400 Precompile Option	DB2 Prep or Bind Option
Package Version Name	**Null**	X		VERSION			VERSION
	Any other value		X				
Bind Existence Checking	**Object existence optional**		X	VALIDATE (**RUN**)b	**NOEXIST**	GENLVL(**10**, 11-40)	VALIDATE **RUN**
	Object existence required	X		VALIDATE (BIND)b	EXIST	GENLVL(00-09)	VALIDATE BIND
Package Replacement Option	**Replacement allowed**	X		ACTION (**REPLACE**)	**REPLACE**	REPLACE(***YES**)	ACTION **REPLACE**
	Replacement not allowed		X	ACTION(ADD)	NEW	REPLACE(*NO)	ACTION ADD
Package Authorization Option	**Keep authorizations**	X			**KEEP**		RETAIN **YES**
	Revoke authorizations		X		REVOKE		RETAIN NO
Statement String Delimiter (Note 2)	Apostrophe	X		**APOSTSQL**	**SQLAPOST**	OPTION[...] *APOSTSQL (Note 3)	STRDEL APOSTROPHE
	Double quote		X	QUOTESQL	SQLQUOTE	OPTION[...] *QUOTESQL (Note 4)	STRDEL QUOTE
Statement Decimal Delimiter (Note 5)	Period	X		**PERIOD**	**PERIOD**	OPTION[...] *PERIOD) or OPTION[...] ***SYSVAL**) (Note 6)	DECDEL PERIOD
	Comma		X	COMMA	COMMA	OPTION[...] *COMMA) or OPTION[...] ***SYSVAL**) (Note 6)	DECDEL COMMA
Date Format (Note 7)	**ISO**	X		DATE(ISO) (Note 8)	DATE(**ISO**)	DATFMT(*ISO) (Note 8)	DATETIME **ISO** (Note 9)

Table 16 (Page 2 of 5). Bind Options Supported by the DB2 DRDA AS

Bind Option	Value	Not Sup-ported	Sup-ported	DB2 for MVS/ESA Precompile Option (Note 1)	DB2/VM Preprocessing Option	OS/400 Precompile Option	DB2 Prep or Bind Option
	USA		X	DATE(USA)	DATE(USA)	DATFMT(*USA)	DATETIME USA
	EUR		X	DATE(EUR)	DATE(EUR)	DATFMT(*EUR)	DATETIME EUR
	JIS		X	DATE(JIS)	DATE(JIS)	DATFMT(*JIS)	DATETIME JIS
Time Format (Note 7)	**ISO**		X	TIME(ISO) (Note 8)	TIME(**ISO**)	TIMFMT(*ISO) (Note 8)	DATETIME **ISO** (Note 9)
	USA		X	TIME(USA)	TIME(USA)	TIMFMT(*USA)	DATETIME USA
	EUR		X	TIME(EUR)	TIME(EUR)	TIMFMT(*EUR)	DATETIME EUR
	JIS		X	TIME(JIS)	TIME(JIS)	TIMFMT(*JIS)	DATETIME JIS
Package Isolation Level (Note 10)	Repeatable read		X	ISOLATION(**RR**)b	ISOLATION(**RR**)		ISOLATION RR
	Read Stability (All)		X		ISOLATION(RS)	COMMIT(*ALL)	ISOLATION RS
	Cursor stability		X	ISOLATION(CS)b	ISOLATION(CS)	COMMIT(*CS)	ISOLATION **CS**
	Uncommitted Read (Change)		X		ISOLATION(UR)	COMMIT(***CHG**)	ISOLATION UR
	No commit	X (Note 11)				COMMIT(*NONE)	ISOLATION NC
Bind Creation Control	**No errors allowed**		X	SQLERROR (**NOPACKAGE**)b	**NOCHECK**	OPTION[[...] *GEN) GENLVL(00-09, **10**, 11-20)	SQLERROR **NOPACKAGE**
	Check only		X		CHECK	OPTION[[...] *NOGEN)	SQLERROR CHECK

Table 16 (Page 3 of 5). Bind Options Supported by the DB2 DRDA AS

Bind Option	Value	Sup-ported	Not Sup-ported	DB2 for MVS/ESA Precompile Option (Note 1)	DB2/VM Preprocessing Option	OS/400 Precompile Option	DB2 Prep or Bind Option
	Errors allowed	X		SQLERROR (CONTINUE)[b]	ERROR	OPTION([...] *GEN) GENLVL(21-40)	SQLERROR CONTINUE
Bind Explain Option	**No SQL statements**	X		EXPLAIN(**NO**)[b]	EXPLAIN(**NO**)		EXPLAIN **NO**
	All explainable SQL statements		X	EXPLAIN(YES)[b]	EXPLAIN(YES)		EXPLAIN YES
Package Owner Identifier	_**<Authorization ID>**_	X		OWNER[b]	OWNER		OWNER
	Any other value		X				
RDB Release Option	**Release at commit**	X		RELEASE (**COMMIT**)[b]	RELEASE (**COMMIT**)		RELEASE **COMMIT**
	Release at conversation deallocation		X	RELEASE (DEALLOCATE)[b]	RELEASE (DEALLOCATE)		RELEASE DEALLOCATE
Default RDB Collection ID	_**<Authorization ID>**_	X		QUALIFIER[b]	QUALIFIER	DFTRDBCOL	QUALIFIER
	Any other value		X				
Title (Package Description)	Any value (ignored by DB2)	X			LABEL	TEXT	TEXT
Query Block Protocol Control	**Fixed row**	X		CURRENTDATA (**YES**)[b]	SBLOCK	ALWBLK(**READ**)	BLOCKING **UNAMBIG**
	Limited block	X		CURRENTDATA (NO)[b]	BLOCK	ALWBLK (*ALLREAD)	BLOCKING ALL
	Forced fixed row	X			**NOBLOCK**	ALWBLK(*NONE)	BLOCKING NO
Package Default Char. Subtype							
	Use system default	X					CHARSUB **DEFAULT**

Table 16 (Page 4 of 5). Bind Options Supported by the DB2 DRDA AS

Bind Option	Value	Supported	Not Supported	DB2 for MVS/ESA Precompile Option (Note 1)	DB2/VM Preprocessing Option	OS/400 Precompile Option	DB2 Prep or Bind Option
If Default CCSID is SBCS	BIT		X		CHARSUB(BIT)		CHARSUB BIT
If Default CCSID is SBCS	SBCS	X			CHARSUB(SBCS)		CHARSUB SBCS
If Default CCSID is SBCS	MBCS		X		CHARSUB(MBCS)		CHARSUB MBCS
If Default CCSID is MBCS	BIT		X		CHARSUB(BIT)		CHARSUB BIT
If Default CCSID is MBCS	SBCS		X		CHARSUB(SBCS)		CHARSUB SBCS
If Default CCSID is MBCS	MBCS	X			CHARSUB(MBCS)		CHARSUB MBCS
	Any other value		X				
Package Default CCSID	**Value specified when DB2 database was created**	X			CCSIDSBCS() CCSIDGRAPHIC() CCSIDMIXED()		CCSIDS CCSIDG CCSIDM
	Any other value		X				
Decimal Precision (Note 12)	31	X		DEC(31)			DEC 31
	Any other value		X	DEC(**15**)			DEC 15
Replaced Package Version Name	**Null**	X		REPLVER[b]			REPLVER
	Any other value		X				

Table 16 (Page 5 of 5). Bind Options Supported by the DB2 DRDA AS

Bind Option	Value	Sup-ported	Not Sup-ported	DB2 for MVS/ESA Precompile Option (Note 1)	DB2/VM Preprocessing Option	OS/400 Precompile Option	DB2 Prep or Bind Option

Note:

(*) Default values are in **bold**.
(1) Most are precompile options. Bind options are indicated by b.
(2) Defaults to what the target database supports. For DB2 the default is apostrophe.
(3) Default for non-COBOL applications.
(4) Default for COBOL applications.
(5) Defaults to what the target database supports. For DB2 the default is period.
(6) Depending on the installation, *SYSVAL is equivalent to *PERIOD or *COMMA.
(7) Date and time formats must be the same for the DB2 DRDA AS.
(8) Default is dependent on the installation.
(9) Format applies to both date and time. If not specified, it defaults based on the country code. This default is mapped to ISO in DRDA flow.
(10) Package isolation level has no default because an explicit value is always present in the DRDA datastream.
(11) The isolation level will be escalated to Uncommitted Read (Change).
(12) Defaults to what the target database supports. For DB2 the default is 31.

Special Considerations for DB2 for VM (SQL/DS)

Additional steps are needed to ensure the following DB2 for VM utilities work properly against a DB2 database through the DRDA Application Server.

- SQLDBSU

  1 Make sure a PTF for DB2 for VM APAR PN69073 is installed on your DB2 for VM system, either PTF UN91171 or PTF UN91172. (At the time of publication of this manual, there were no PTFs for DB2 for VM V4 or V5.)

  2 Set up dummy tables in your DB2 database by executing the **sqldbsu** utility provided with DB2 as `sqldbsu` *database_name*.

  3 Bind SQLDBSU from DB2 for VM. Refer to the "Using a DRDA Environment" in the *SQL/DS System Administration for IBM VM Systems* manual for details. (You can skip the step on creating and populating the SQLDBA.DBSOPTIONS table because this is done by the **sqldbsu** utility in the previous step.)

- ISQL

  1 Complete the steps described above for SQLDBSU.

  2 Set up dummy tables in your DB2 database by executing the **isql** utility provided with DB2 as `isql` *database_name*.

  3 Bind ISQL from DB2 for VM. Refer to the "Using a DRDA Environment" in the *SQL/DS System Administration for IBM VM Systems* manual for details.

Note: The **sqldbsu** and **isql** utilities are in DB2PATH\misc, for example:

```
c:\SQLLIB\misc\
```

If you installed DB2 on drive C, using the default directory sqllib, then no special setup is required for RXSQL; see the *SQL/DS Procedures Language Interface Installation* manual for details.

Security and Auditability

Under CPIC, DB2 system security (authentication CLIENT, SERVER, or DCS) must be used with CPIC security SAME or PROGRAM. When these combinations are used, the user ID and password sent in the AR's APPC ALLOCATE is used to CONNECT to the requested database. CPIC security level NONE is allowed only with DCE authentication. In this case, the encrypted dce ticket is flown as part of the CONNECT attempt.

Under TCP/IP, all security information is flown in the CONNECT attempt.

User ID translation is not supported by this AS.

Configuration Considerations

You configure the DRDA AS using regular DB2 database manager configuration parameters and specifically DRDA Heap Size. You may need to change the setting for some parameters because of the additional resources required for the DRDA AS.

DRDA Heap Size (drda_heap_sz)

DRDA heap size specifies the amount of memory, in segments, that is allocated for use by the DRDA AS.

See the *Administration Guide* for more information about database manager configuration.

Part 7. Appendixes

Appendix A. Obtaining Information

Information on the DB2 product is available in several different formats:

- Online Help
- PostScript (.ps)
- HTML (.htm)

All books described in this section are also available in printed form. To order printed versions, contact your IBM authorized dealer or marketing representative, or phone 1-800-879-2755 in the United States or 1-800-IBM-4YOU in Canada.

How the DB2 Library Is Structured

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

To help you access product information online, DB2 provides the Information Center on OS/2, Windows 95, and the Windows NT operating systems. You can view task information, DB2 books, troubleshooting information, sample programs, and DB2 information on the Web. "About the Information Center" on page 214 has more details.

SmartGuides

SmartGuides help you complete some administration tasks by taking you through each task one step at a time. SmartGuides are available on OS/2, Windows 95, and the Windows NT operating systems. The following table lists the SmartGuides.

SmartGuide	Helps you to...	How to Access...
Add Database	Catalog a database on a client workstation.	From the Client Configuration Assistant, click on **Add**.
Create Database	Create a database, and to perform some basic configuration tasks.	From the Control Center, click with the right mouse button on the **Databases** icon and select **Create**->**New**.
Performance Configuration	Tune the performance of a database by updating configuration parameters to match your business requirements.	From the Control Center, click with the right mouse button on the database you want to tune and select **Configure performance**.

SmartGuide	Helps you to...	How to Access...
Backup Database	Determine, create, and schedule a backup plan.	From the Control Center, click with the right mouse button on the database you want to backup and select **Backup**->**Database using SmartGuide**.
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, click with the right mouse button on the database you want to restore and select **Restore**->**Database using SmartGuide**.
Create Table	Select basic data types, and create a primary key for the table.	From the Control Center, click with the right mouse button on the **Tables** icon and select **Create**->**Table using SmartGuide**.
Create Table Space	Create a new table space.	From the Control Center, click with the right mouse button on the **Table spaces** icon and select **Create**->**Table space using SmartGuide**.

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* is a keyword or the entire command. For example, **?** *catalog* displays help for all the CATALOG commands, whereas **?** *catalog database* displays help for the CATALOG DATABASE command.
Control Center Help	Explains the tasks you can perform in a window or notebook. The help includes prerequisite information you need to know, and describes how to use the window or notebook controls.	From a window or notebook, click on the **Help** push button or press the F1 key.

Type of Help	Contents	How to Access...

Message Help	Describes the cause of a message number, and any action you should take.	From the command line processor in interactive mode, enter:
		
		? *message number*
		
		where *message number* is a valid message number.
		
		For example, **?** *SQL30081* displays help about the SQL30081 message.
		
		To view message help one screen at a time, enter:
		
		? *XXXnnnnn* **| more**
		
		where *XXX* is the message prefix, such as SQL, and *nnnnn* is the message number, such as 30081.
		
		To save message help in a file, enter:
		
		? *XXXnnnnn* > *filename.ext*
		
		where *filename.ext* is the file where you want to save the message help.
		
		Note: On UNIX-based systems, enter:
		
		    \? *XXXnnnnn* **| more** or
		
		    \? *XXXnnnnn* > *filename.ext*

SQL Help	Explains the syntax of SQL statements.	From the command line processor in interactive mode, enter: **help** *statement* where *statement* is an SQL statement. For example, **help** *SELECT* displays help about the SELECT statement.
SQLSTATE Help	Explains SQL states and class codes.	From the command line processor in interactive mode, enter: **?** *sqlstate* or **?** *class-code* where *sqlstate* is a valid five digit SQL state and *class-code* is a valid two digit class code. For example, **?** *08003* displays help for the 08003 SQL state, whereas **?** *08* displays help for the 08 class code.

DB2 Books

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

- Cross-platform books: These books are for DB2 on any of the supported platforms.
- Platform-specific books: These books are for DB2 on a specific platform. For example, there is a separate *Quick Beginnings* book for DB2 on OS/2, Windows NT, and UNIX-based operating systems.

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

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

View   To view an HTML book, you can do the following:

- If you are running DB2 administration tools on OS/2, Windows 95, or the Windows NT operating systems, you can use the Information Center. "About the Information Center" on page 214 has more details.
- Use the open file function of the Web browser supplied by DB2 (or one of your own) to open the following page:

    sqllib/doc/html/index.htm

    The page contains descriptions of and links to the DB2 books. The path is located on the drive where DB2 is installed.

    You can also open the page by double-clicking on the **DB2 Online Books** icon. Depending on the system you are using, the icon is in the main product folder or the Windows Start menu.

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

- Click on **Search the DB2 Books** at the bottom of any page in the HTML books. Use the search form to find a specific topic.
- Click on **Index** at the bottom of any page in an HTML book. Use the Index to find a specific topic in the book.
- Display the Table of Contents or Index of the HTML book, and then use the find function of the Web browser to find a specific topic in the book.
- Use the bookmark function of the Web browser to quickly return to a specific topic.
- Use the search function of the Information Center to find specific topics. "About the Information Center" on page 214 has more details.

Print   To print a book on a PostScript printer, look for the file name shown in the table.

Order   To order a hardcopy book from IBM, use the form number.

Book Name	Book Description	Form Number File Name
	Cross-Platform Books	
Administration Getting Started	Introduces basic DB2 database administration concepts and tasks, and walks you through the primary administrative tasks.	S10J-8154 db2k0x50
Administration Guide	Contains information required to design, implement, and maintain a database to be accessed either locally or in a client/server environment.	S10J-8157 db2d0x50
API Reference	Describes the DB2 application programming interfaces (APIs) and data structures you can use to manage your databases. Explains how to call APIs from your applications.	S10J-8167 db2b0x50
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.	S10J-8159 db2l0x50
Command Reference	Explains how to use the command line processor, and describes the DB2 commands you can use to manage your database.	S10J-8166 db2n0x50
DB2 Connect Enterprise Edition Quick Beginnings	Provides planning, installing, configuring, and using information for DB2 Connect Enterprise Edition. Also contains installation and setup information for all supported clients.	S10J-7888 db2cyx50
DB2 Connect Personal Edition Quick Beginnings	Provides planning, installing, configuring, and using information for DB2 Connect Personal Edition.	S10J-8162 db2c1x50
DB2 Connect User's Guide	Provides concepts, programming and general using information about the DB2 Connect products.	S10J-8163 db2c0x50
DB2 Connectivity Supplement	Provides setup and reference information for customers who want to use DB2 for AS/400, DB2 for OS/390, DB2 for MVS, or DB2 for VM as DRDA Application Requesters with DB2 Universal Database servers, and customers who want to use DRDA Application Servers with DB2 Connect (formerly DDCS) application requesters. **Note:** Available in HTML and PostScript formats only.	No form number db2h1x50
Embedded SQL Programming Guide	Explains how to develop applications that access DB2 databases using embedded SQL, and includes discussions about programming techniques and performance considerations.	S10J-8158 db2a0x50
Glossary	Provides a comprehensive list of all DB2 terms and definitions. **Note:** Available in HTML format only.	No form number db2t0x50

Book Name	Book Description	Form Number File Name
Installing and Configuring DB2 Clients	Provides installation and setup information for all DB2 Client Application Enablers and DB2 Software Developer's Kits. **Note:** Available in HTML and PostScript formats only.	No form number db2iyx50
Master Index	Contains a cross reference to the major topics covered in the DB2 library. **Note:** Available in PostScript format and hardcopy only.	S10J-8170 db2w0x50
Message Reference	Lists messages and codes issued by DB2, and describes the actions you should take.	S10J-8168 db2m0x50
Replication Guide and Reference	Provides planning, configuring, administering, and using information for the IBM Replication tools supplied with DB2.	S95H-0999 db2e0x50
Road Map to DB2 Programming	Introduces the different ways your applications can access DB2, describes key DB2 features you can use in your applications, and points to detailed sources of information for DB2 programming.	S10J-8155 db2u0x50
SQL Getting Started	Introduces SQL concepts, and provides examples for many constructs and tasks.	S10J-8156 db2y0x50
SQL Reference	Describes SQL syntax, semantics, and the rules of the language. Also includes information about release-to-release incompatibilities, product limits, and catalog views.	S10J-8165 db2s0x50
System Monitor Guide and Reference	Describes how to collect different kinds of information about your database and the database manager. Explains how you can use the information to understand database activity, improve performance, and determine the cause of problems.	S10J-8164 db2f0x50
Troubleshooting Guide	Helps you determine the source of errors, recover from problems, and use diagnostic tools in consultation with DB2 Customer Service.	S10J-8169 db2p0x50
What's New	Describes the new features, functions, and enhancements in DB2 Universal Database. **Note:** Available in HTML and PostScript formats only.	No form number db2q0x50
Platform-Specific Books		
Building Applications for UNIX Environments	Provides environment setup information and step-by-step instructions to compile, link, and run DB2 applications on a UNIX system.	S10J-8161 db2axx50
Building Applications for Windows and OS/2 Environments	Provides environment setup information and step-by-step instructions to compile, link, and run DB2 applications on a Windows or OS/2 system.	S10J-8160 db2a1x50

Book Name	Book Description	Form Number File Name
DB2 Extended Enterprise Edition Quick Beginnings	Provides planning, installing, configuring, and using information for DB2 Universal Database Extended Enterprise Edition for AIX.	S72H-9620 db2v3x50
DB2 Personal Edition Quick Beginnings	Provides planning, installing, configuring, and using information for DB2 Universal Database Personal Edition on OS/2, Windows 95, and the Windows NT operating systems.	S10J-8150 db2i1x50
DB2 SDK for Macintosh Building Your Applications	Provides environment setup information and step-by-step instructions to compile, link, and run DB2 applications on a Macintosh system. **Note:** Available in PostScript format and hardcopy for DB2 Version 2.1.2 only.	S50H-0528 sqla7x02
DB2 SDK for SCO OpenServer Building Your Applications	Provides environment setup information and step-by-step instructions to compile, link, and run DB2 applications on a SCO OpenServer system. **Note:** Available for DB2 Version 2.1.2 only.	S89H-3242 sqla9x02
DB2 SDK for Silicon Graphics IRIX Building Your Applications	Provides environment setup information and step-by-step instructions to compile, link, and run DB2 applications on a Silicon Graphics system. **Note:** Available in PostScript format and hardcopy for DB2 Version 2.1.2 only.	S89H-4032 sqlaax02
DB2 SDK for SINIX Building Your Applications	Provides environment setup information and step-by-step instructions to compile, link, and run DB2 applications on a SINIX system. **Note:** Available in PostScript format and hardcopy for DB2 Version 2.1.2 only.	S50H-0530 sqla8x00
Quick Beginnings for OS/2	Provides planning, installing, configuring, and using information for DB2 Universal Database on OS/2. Also contains installing and setup information for all supported clients.	S10J-8147 db2i2x50
Quick Beginnings for UNIX	Provides planning, installing, configuring, and using information for DB2 Universal Database on UNIX-based platforms. Also contains installing and setup information for all supported clients.	S10J-8148 db2ixx50
Quick Beginnings for Windows NT	Provides planning, installing, configuring, and using information for DB2 Universal Database on the Windows NT operating system. Also contains installing and setup information for all supported clients.	S10J-8149 db2i6x50

Notes:

1. The character in the sixth position of the file name indicates the language of a book. For example, the file name db2d0e50 indicates that the *Administration Guide* is in English. The following letters are used in the file names to indicate the language of a book:

Language	Identifier	Language	Identifier
Brazilian Portuguese	B	Hungarian	H
Bulgarian	U	Italian	I
Czech	X	Norwegian	N
Danish	D	Polish	P
English	E	Russian	R
Finnish	Y	Slovenian	L
French	F	Spanish	Z
German	G	Swedish	S

2. For late breaking information that could not be included in the DB2 books, see the README file. Each DB2 product includes a README file which you can find in the directory where the product is installed.

About the Information Center

The Information Center provides quick access to DB2 product information. The Information Center is available on OS/2, Windows 95, and the Windows NT operating systems. You must install the DB2 administration tools to see the Information Center.

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

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

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

Tasks   Lists tasks you can perform using DB2.

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

Books   Lists DB2 books.

Troubleshooting   Lists categories of error messages and their recovery actions.

Sample Programs   Lists sample programs that come with the DB2 Software Developer's Kit. If the Software Developer's Kit is not installed, this tab is not displayed.

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

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

The Information Center provides search capabilities so you can look for specific topics, and filter capabilities to limit the scope of your searches.

Ordering the Printed DB2 Books

You can also order the printed DB2 manuals. There are two sets of books available. The form number for the entire set of DB2 books is `SBOF-8915-00`. The form number for the books listed under the heading "Cross-Platform Books" is `SBOF-8914-00`.

Printing the PostScript Books

If you prefer to have printed copies of the manuals, you can uncompress and print PostScript versions as follows.

On OS/2, Windows 95, and Windows NT systems:

1 Copy the compressed PostScript files to a hard drive on your system. The files have a file extension of .exe and are located in the x:*language*\books\ps directory, where x: is the letter representing the CD-ROM drive and where *language* is the two-character country code that represents your language (for example, EN for English). Table 17 on page 220 lists the code for each available language.

2 Uncompress the file by running the book name. The result from this step is a printable PostScript file with a file extension of .ps.

3 Ensure that your default printer is a PostScript printer capable of printing Level 1 (or equivalent) files.

4 Enter the following command from a command line:

```
print filename.ps
```

Specify the full-path name for the file you intend to print.

Viewing Online Books

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

Although you can use any HTML Version 3.2-compliant browser to view the online books, a copy of the Netscape browser is available on the Portfolio CD-ROM provided with DB2 Universal Database Version 5; you can optionally install it on your system.

Installing the Netscape Browser

If you do not have an HTML Version 3.2-compliant browser installed on your system, you can install the Netscape browser from the Portfolio CD-ROM.

To install Netscape, insert the Portfolio CD-ROM into the CD-ROM drive. The Netscape installation automatically begins. Follow the instructions provided on the panels to install the product. If the installation does not automatically begin, see the README.TXT file located at the root directory on the CD-ROM for installation instructions.

The README.TXT file also contains information about the products.

Setting up a Document Server

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

1 Copy all files and sub-directories from \sqllib\doc\html on your local system to a web server. Each book has its own sub-directory containing all the necessary HTML and GIF files that make up the book. Ensure that the directory structure remains the same.

2 Configure the web server to look for the files in the new location. For information on NetQuestion, a search facility for HTML documents, see DB2 Online Books on an Intranet (http://www.software.ibm.com/data/pubs/papers/db2html.html)

3 The Information Center allows you to specify a base URL for all HTML files. The URL for the list of books should be used.

4 Once you are able to view the book files, you should bookmark commonly viewed topics such as:

- List of books.

- Tables of contents of frequently used books.

- Frequently referenced articles like the "How to use Syntax Diagrams" topic.

- Search form.

The search form provided with DB2 allows you to use several different search variations. These include:

- Local indexes and files — this works by default.

- Local indexes, remote files — use the **nqmap** command to set this up.

- Remote indexes, remote files — use the **nqmap** command and edit the search form to set this up.

- Create your own indexes for some other search engine — read the documentation provided with this search engine, and index all files in the \sqllib\doc\html directory.

Appendix B. National Language Support (NLS)

This appendix contains information about the National Language Support (NLS) provided by DB2, including information about supported languages and code pages . For more detailed information on developing applications, refer to the *Embedded SQL Programming Guide*.

Code Page and Language Support for OS/2 and Windows Operating Environments

During installation of DB2, the country, codepage and regional settings are established. You can, however, change these settings after installing DB2. This includes changing 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 you install the DBCS (double-byte character set) version of DB2 on the corresponding DBCS version of the operating system. Also, note that DB2 national language support may not produce the expected results if the country, code page and regional settings are incorrect for the intended language.

Table 17 on page 220 shows the languages into which the DB2 messages are translated.

Note: The code page values in the table that follows are also used as directory names on DB2 CD-ROMs. For example, a reference to *x*:*language*\\win16\\install would be *x*:\\EN\\win16\\install for English.

Table 17. Languages and Code Pages			
Country Code	**Language**	**Country Code**	**Language**
BG	Bulgaria	IL	Hebrew
BR	Brazilian Portuguese	IT	Italian
CN	Simplified Chinese (PRC)	JP	Japanese
CZ	Czech	KR	Korean
DE	German	NO	Norwegian
DK	Danish	PL	Polish
ES	Spain	RU	Russian
FI	Finnish	SE	Sweden
FR	French	SI	Slovenian
GR	Greece	TW	Traditional Chinese (Taiwan)
HU	Hungary	EN	English

Appendix C. Naming Rules

Use the following to find the naming rules you need:

- "General Naming Rules"
- "Database and Database Alias Names" on page 222
- "Object Names" on page 222
- "User IDs, Group Names, and Instance Names" on page 223
- "DB2SYSTEM Naming Rules" on page 225
- "Workstation Names (nname)" on page 224
- "Password Naming Rules" on page 225

General Naming Rules

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

- A through Z

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

- 0 through 9
- @
- #
- $
- _ (underscore)

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

- A through Z
- @
- #
- $

Do not use SQL reserved words to name tables, views, columns, indexes, or authorization IDs. A list of SQL reserved words is included in the *SQL Reference*.

Database and Database Alias Names

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

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

When naming a database or database alias, see "General Naming Rules" on page 221.

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

Notes:

1. 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.
2. On Windows NT systems, ensure that no instance name is the same as a service name.

Object Names

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 221.

In addition, the name you specify:

- Can contain 1 to 18 characters
- Cannot be any of the SQL reserved words that are listed in the *SQL Reference*.

Note: 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 the above rules.

User IDs, Group Names, and Instance Names

User IDs are the identifiers assigned to individual users. When naming users, groups, or instances, see "General Naming Rules" on page 221.

In addition, the name you specify:

- Can contain 1 to 8 characters
- Cannot be any of the following:
    - USERS
    - ADMINS
    - GUESTS
    - PUBLIC
    - LOCAL
- Cannot begin with:
    - IBM
    - SQL
    - SYS
- Cannot include accented characters
- In general, when naming users, groups, or instances:
    - On OS/2, use uppercase names
    - On Windows 95 and Windows NT, use any case
    - On UNIX, use lowercase names

Additional Considerations for Usernames in Windows NT

To use DB2 for Windows NT, you need to create a special username that meets DB2's naming requirements. You must use this username to install and perform DB2 administration tasks.

When you name a username in Windows NT, the name you specify:

- Must be a member of the Administrators group on the local machine
- Must be acceptable to DB2 as described previously.

Whenever an instance is created for DB2 servers or DB2 Connect servers, a Windows NT service is also created using the instance name. In addition, an instance directory is created in the sqllib using the instance name. For example, if DB2 is installed in the e:\sqllib directory, the default instance creates the following directory path: e:\sqllib\db2. Therefore two additional restrictions apply when you are naming DB2 instances:

1. DB2 instance names cannot conflict with other Windows NT service names.
2. DB2 instance names cannot be the same as the names of existing directories or files under sqllib.

Note: Do not attempt to install or administer DB2 from Windows NT's default "Administrator" username. Because that username has more than eight characters, DB2 will not accept the request.

Workstation Names (nname)

Workstation names are used to specify the NetBIOS name for a database server or database client that resides on the local workstation. This name is stored in the database manager configuration file. The workstation name is known as the *nname*. When naming workstations, see "General Naming Rules" on page 221.

In addition, the name you specify:

- Must be unique within a network
- Can contain 1 to 8 characters
- Cannot include &

DB2SYSTEM Naming Rules

DB2SYSTEM names are used by DB2 to identify a physical DB2 machine, system, server, or workstation with a network. On UNIX and OS/2, you must specify a *DB2SYSTEM* name during or after install. On Windows 95 and Windows NT, you do not need to specify a *DB2SYSTEM* name; the DB2 install program detects the NT Computer name and assigns it to *DB2SYSTEM*.

When creating a *DB2SYSTEM* name, see "General Naming Rules" on page 221.

In addition, the name you specify:

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

Password Naming Rules

When determining passwords on OS/2 and Windows 3.x, the word or name you specify can consist of a maximum of 8 characters. On all other operating systems the word or name you specify can consist of a maximum of 18 characters.

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Contacting IBM

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

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

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

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

- 1-800-237-5511 to learn about available service options.
- 1-800-IBM-CALL (1-800-426-2255) or 1-800-3IBM-OS2 (1-800-342-6672) to order products or get general information.
- 1-800-879-2755 to order publications.

For information on how to contact IBM outside of the United States, see Appendix A of the IBM Software Support Handbook. You can access this document by selecting the "Roadmap to IBM Support" item at: http://www.ibm.com/support/.

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

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

Anonymous FTP Sites
  ftp.software.ibm.com

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

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

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

CompuServe
  GO IBMDB2 to access the IBM DB2 Family forums

All DB2 products are supported through these forums.

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

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