IBM DB2 Connect
Enterprise Edition
for OS/2 and Windows NT**

IBM

Quick Beginnings

Version 6

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Enterprise Edition
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Before using this information and the product it supports, be sure to read the general information under "Appendix H. Notices" on page 185.

Contents

Welcome to DB2 Connect!

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

This *Quick Beginnings* book will guide
you through the planning,
installation, migration (if necessary),
and set up of a DB2 Connect
Enterprise Edition server. First, you
will ensure that your host or AS/400
database is enabled for
communications. Next you will
install DB2 Connect and test its
connection to the host or AS/400.
Once you have established this
connection, you will install a DB2
client and configure it to use DB2
Connect to communicate with the
host or AS/400 database.

DB2
Universal
Database

How This Book is Structured

Setting up DB2 Connect is a multi-step process. The sections in this book
follow the typical sequence of tasks necessary to go from installing DB2
Connect to using client applications with your database. DB2 Connect
Enterprise Edition is often installed with hundreds or thousands of clients in
mind. For this reason, we advocate doing a test installation, as described
below. After the test configuration has proven stable, you can use it as the
template for an unattended installation of DB2 Connect and your clients
across your organization.

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

Step 1. Determine how you want to use DB2 Connect in your network. For
the available options, see "Accessing Host or AS/400 DB2 Data from
the Desktop Using DB2 Connect Enterprise Edition" on page 4.

Step 2. Verify that you have the correct hardware and software prerequisites
on both your workstation and the host database server. See
"Chapter 2. Planning for Installation" on page 23 for prerequisites.

Step 3. Verify that your host or AS/400 database server is configured to
accept connections from DRDA Application Requesters such as DB2

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Connect. See "Part 3. Preparing Host and AS/400 Databases for DB2 Connect Communications" on page 45.

Step 4. The next step is to install your DB2 Connect software. You will use this workstation to configure and verify your host and AS/400 connections. For DB2 Connect installation instructions, see "Part 2. DB2 Connect Installation" on page 21.

Step 5. After installation, you will establish the connection between DB2 Connect and your host or AS/400 database system. DB2 Connect can locate and configure all TCP/IP and most SNA connections for you. If you are using a supported SNA product that DB2 Connect does not automatically configure, see the chapter in "Part 4. Configuring Access to Host and AS/400 Databases" on page 63 that corresponds to your SNA product.

Step 6. Bind the programs and utilities provided with DB2 Connect to your host or AS/400 database. For instructions on binding programs and utilities provided with your DB2 Connect product, see "Step 6. Bind Utilities and Applications to the Database Server" on page 96.

Step 7. You will need to test the connection. See "Chapter 7. Configuring DB2 Connect to Host or AS/400 Communications Using the CCA" on page 65 for more information.

Step 8. Enable the Multisite Update feature if you wish. See "Chapter 9. Enabling Multisite Updates (Two-Phase Commit)" on page 99 for more information.

Step 9. If you are planning to use Net.Data, WebSphere, transaction monitors (for example, CICS, Encina, Tuxedo, MQSeries, Component Broker) or your own application server software, install these products or applications now. For information on installing Net.Data or WebSphere consult the documentation provided with these products as part of the DB2 Connect Enterprise Edition product package. For other products consult the installation documentation provided with the product.

Step 10. Choose a representative run-time client workstation and install and configure DB2 Run-Time Client. You will use this workstation to test connectivity from DB2 run-time clients to host and AS/400 servers, as well as to test applications that use this connectivity. For instructions on installing a client, see "Part 5. Installing and Configuring Clients" on page 105.

Step 11. Install DB2 Run-Time clients on all end-user workstations that will use applications that connect to host and AS/400 database servers. For instructions on deploying DB2 Run-Time Client on a large number of workstations, refer to the *Installation and Configuration Supplement.*

Step 12. You are now ready to use DB2 Connect with all your applications. For ongoing administration of your OS/390 database servers and DB2 Connect Enterprise Edition servers, select a workstation and install the DB2 Administration Client. You can install the DB2 Administration client on a dedicated workstation, or on the same machine where DB2 Connect is running. See "Part 5. Installing and Configuring Clients" on page 105 for instructions on installing and configuring DB2 Administration clients.

Step 13. Workstations that will be used for application development should have the DB2 Software Developer's Kit installed. See "Part 5. Installing and Configuring Clients" on page 105 for instructions on installing and configuring the DB2 Software Developer's Kit.

Step 14. If you want to use this workstation to administer DB2 for OS/390 or DB2 Universal Database for UNIX, Windows NT or OS/2 servers, install the DB2 Administration Client component of DB2 Connect. For more information on using Client tools, see "Appendix C. Using the Control Center to Administer DB2 for OS/390 and DB2 Connect Enterprise Edition servers" on page 167.

Conventions

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

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

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

For a complete description of the DB2 library, see "Appendix B. How the DB2 Library Is Structured" on page 151.

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

Part 1. Introduction to DB2 Connect for OS/2 and Windows NT

1

Chapter 1. About DB2 Connect

DB2 Connect Enterprise Edition

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

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

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

DB2 Connect Personal Edition

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

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

Working with DB2 Data

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

Accessing DB2 Data from Remote Clients

DB2 clients provide a run-time environment that enables client applications to access one or more remote databases. With a DB2 Administration Client, you can remotely administer DB2 or DB2 Connect servers. Local applications, and all Java applications (either local or remote), access a database through a DB2 client. All remote applications that are not Java applets must have a DB2 client installed on the client machine before they can access the remote database.

DB2 Version 6 clients are supported on:
- Windows 9x or Windows NT
- UNIX (AIX, HP-UX, Linux, SGI IRIX, and Solaris)
- OS/2

DB2 clients for the following releases and platforms are available for download from the web:
- DB2 Version 1.2 for DOS
- DB2 Version 2.1 for Macintosh
- DB2 Version 2.1 for SCO Open Server
- DB2 Version 5.2 for SCO UnixWare 7
- DB2 Version 2.1 for SINIX
- DB2 Version 5.2 for Windows 3.1

To obtain these clients, connect to the IBM DB2 clients web site at `http://www.software.ibm.com/data/db2/db2tech/clientpak.html`

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

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

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

DB2 Connect Enterprise Edition is most appropriate for environments where:

- Host and AS/400 database servers do not support native TCP/IP connectivity and direct connectivity from desktop workstations via SNA is not desirable (see Figure 1 on page 7).
- Application is implemented using data-aware Java applets (see Figure 5 on page 12).
- Web servers are used to implement web-based applications (see Figure 6 on page 14, Figure 5 on page 12 and Figure 4 on page 10).
- Middle-tier application server is employed.
- Transaction monitor such as CICS, Encina, Microsoft Transaction Server (MTS), Tuxedo, Component Broker, and MQSeries are used (see Figure 2 on page 8).

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

A great deal of the data in many large organizations is managed by DB2 for AS/400, DB2 for MVS/ESA, DB2 for OS/390, or DB2 for VSE & VM. Applications that run on any of the supported platforms can work with this data transparently, as if a local database server managed it. DB2 Connect Enterprise Edition is required for supporting applications which access host or AS/400 data and exploit transaction monitors (for example, CICS, Encina, Microsoft Transaction Server) as well as applications that are implemented as Java applets. In addition, you can use a wide range of off-the-shelf or custom-developed database applications with DB2 Connect and its associated tools. For example, you can use DB2 Connect products with:

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

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

Transaction Processor (TP) monitor, or other 3-tier application server machines with multiple local SQL application processes and threads. In these cases, you can choose to install DB2 Connect on the same machine for simplicity, or on a separate machine to off-load CPU cycles.

A DB2 Connect server enables multiple clients to connect to host or AS/400 data and can significantly reduce the effort that is required to establish and maintain access to enterprise data. Figure 1 on page 7 illustrates IBM's solution for environments in which you want to use a DB2 client making an indirect connection to a host or AS/400 database server through DB2 Connect Enterprise Edition.

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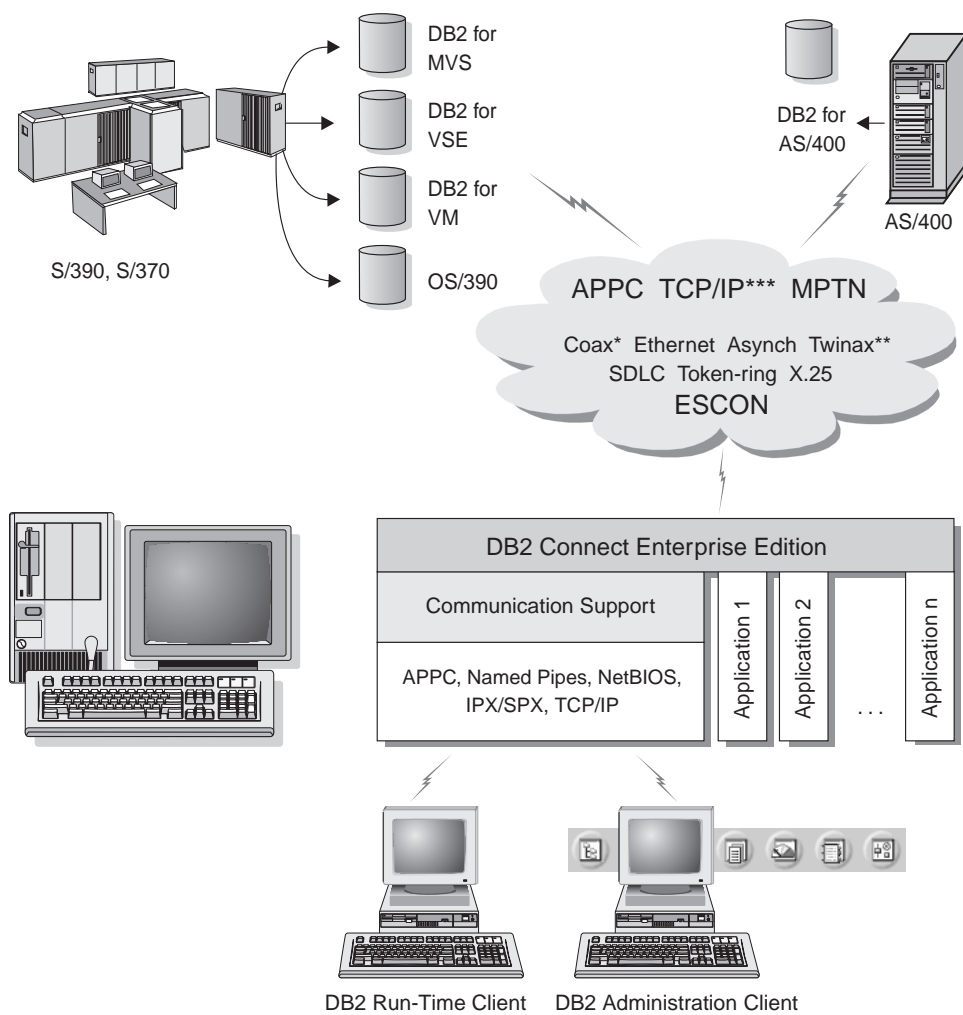
DB2 for
MVS

DB2 for
VSE

DB2 for
VM

OS/390

S/390, S/370

DB2 for
AS/400

AS/400

APPC TCP/IP*** MPTN

Coax* Ethernet Asynch Twinax**
SDLC Token-ring X.25
ESCON

DB2 Connect Enterprise Edition

Communication Support

APPC, Named Pipes, NetBIOS,
IPX/SPX, TCP/IP

Application 1

Application 2

. . .

Application n

DB2 Run-Time Client   DB2 Administration Client

Not all protocols are supported for all platforms.

  * For Host connections only

 ** For AS/400

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

Figure 1. DB2 Connect Enterprise Edition

DB2 for MVS

DB2 for VSE

DB2 for VM

OS/390

S/390, S/370

DB2 for AS/400

AS/400

APPC TCP/IP*** MPTN

Coax* Ethernet Asynch Twinax**
SDLC Token-ring X.25
ESCON

DB2 Connect Enterprise Edition

TP Monitor
(eg. CICS, ENCINA, MTS)

Application Business Logic

Application 1

Application 2

. . .

Application n

TP Monitor Client

Not all protocols are supported for all platforms.

  * For Host connections only

 ** For AS/400

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

Figure 2. Using Transaction Monitors with DB2 Connect.

Not all protocols are supported for all platforms.

  * For Host connections only

 ** For AS/400

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

Figure 3. Java Server Support.

DB2 for
MVS

DB2 for
VSE

DB2 for
VM

OS/390

S/390, S/370

DB2 for
AS/400

AS/400

APPC TCP/IP*** MPTN

Coax* Ethernet Asynch Twinax**
SDLC Token-ring X.25
ESCON

Windows NT Server 4.0
with Option Pack 2

DB2 Connect Enterprise Edition

IIS
&
MTS

ADO

Application 1

Application 2

. . .

Application n

ASPs, COM Objects

Web Browser

Not all protocols are supported for all platforms.

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

Figure 4. DB2 Connect working with Microsoft IIS.

Accessing DB2 Data from the Web Using Java

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

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

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

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

Figure 5. Using Java Applets.

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

DB2 for MVS

DB2 for VSE

DB2 for VM

OS/390

S/390, S/370

DB2 for AS/400

AS/400

APPC   TCP/IP***   MPTN

Coax* Ethernet Asynch Twinax**
SDLC Token-ring X.25
ESCON

DB2 Connect Enterprise Edition

Web Server

JDBC driver

DB2 JDBC Applet Server

Application 1

Application 2

...

Application n

Java-enabled Web Browser

Not all protocols are supported for all platforms.

* For Host connections only

** For AS/400

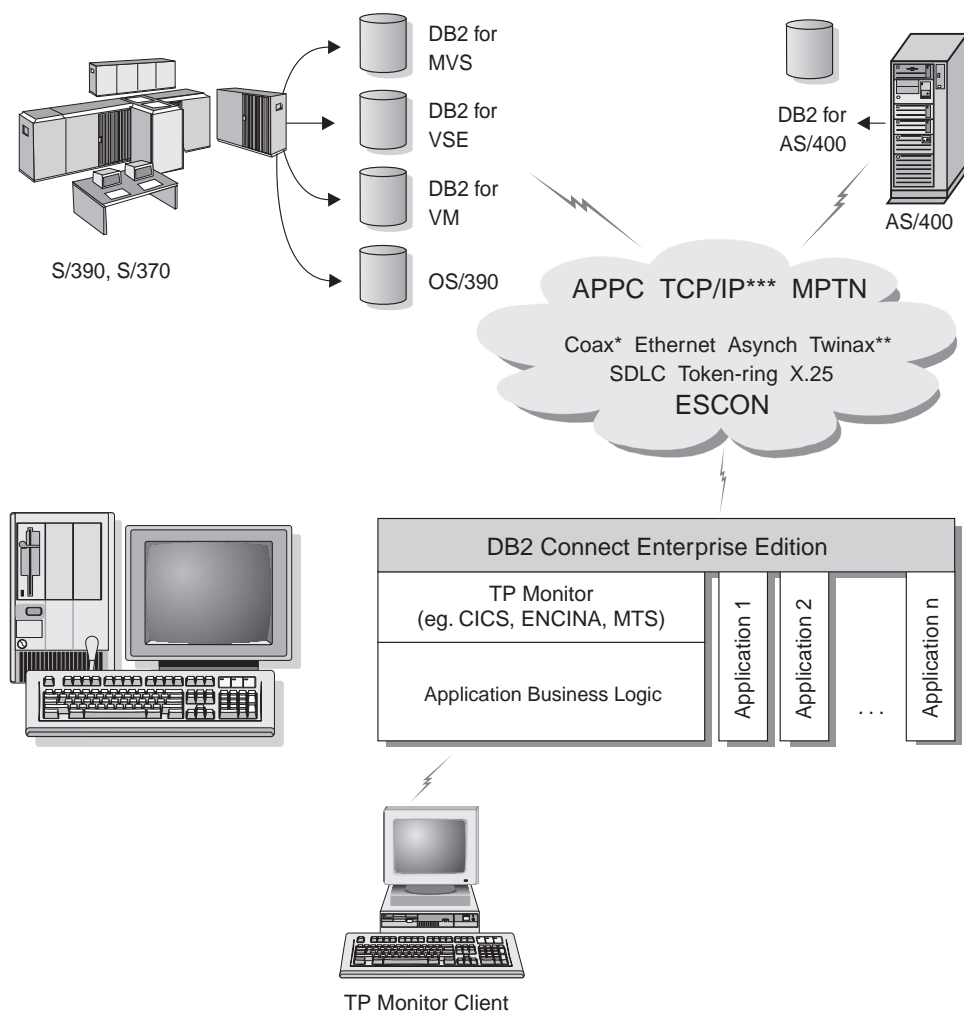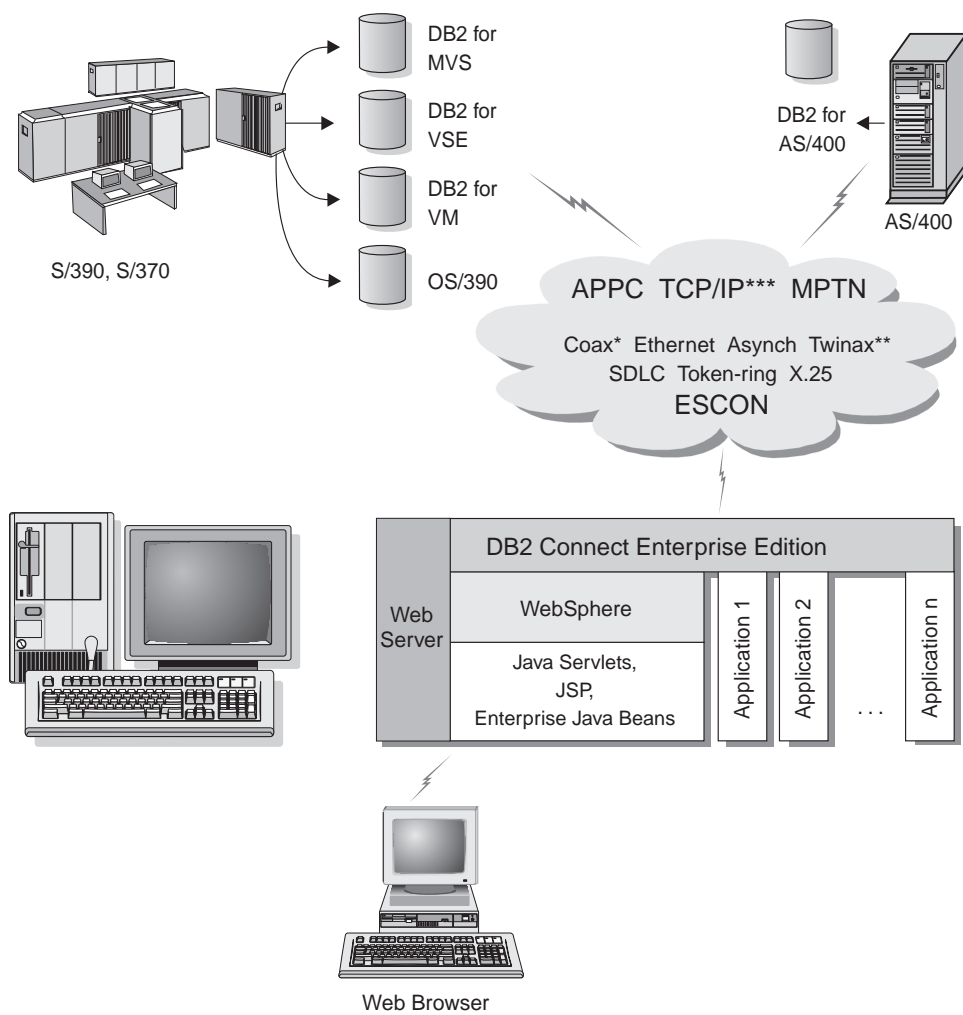*** TCP/IP connectivity requires DB2 for OS/390 V5R1, DB2 for AS/400 V4R2, or DB2 for VM V6.1

Figure 5. Using Java Applets.

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

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

Accessing DB2 Data from the Web Using Net.Data

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

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

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

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

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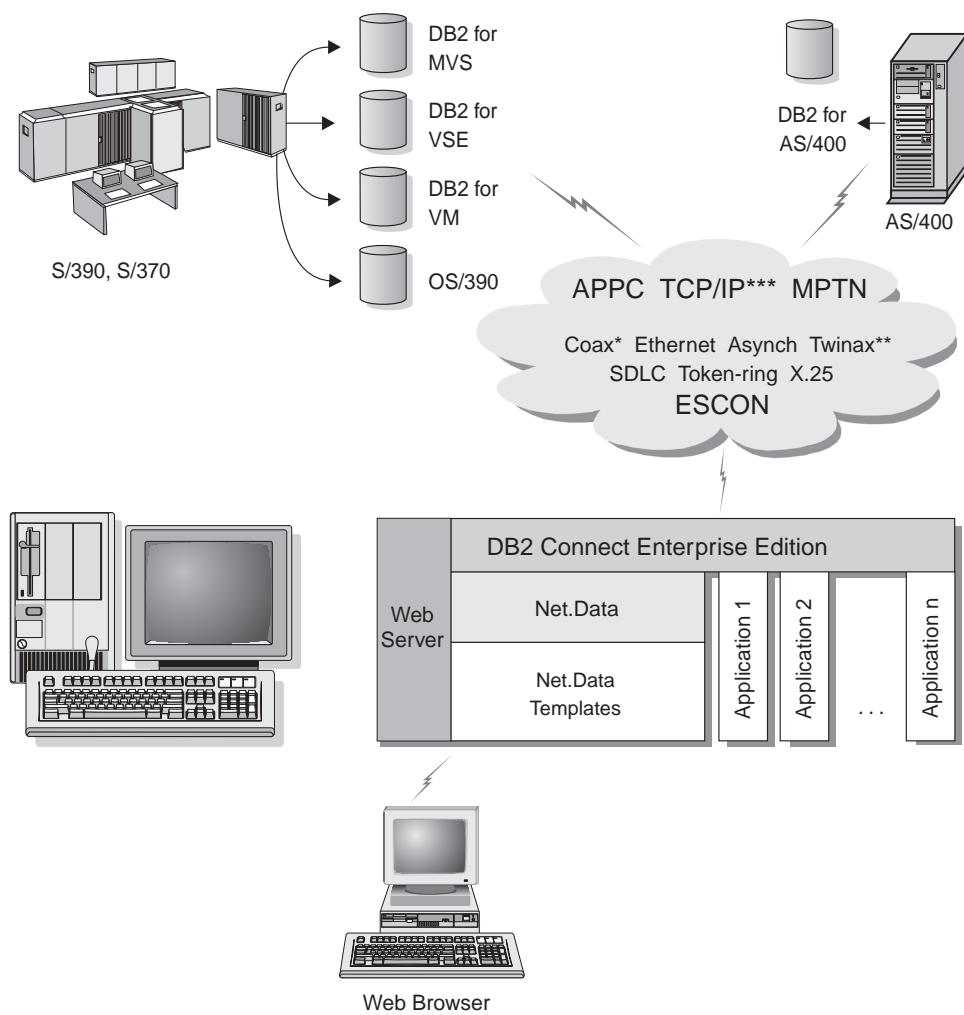
DB2 for
MVS

DB2 for
VSE

DB2 for
VM

OS/390

S/390, S/370

DB2 for
AS/400

AS/400

APPC TCP/IP*** MPTN

Coax* Ethernet Asynch Twinax**
SDLC Token-ring X.25
ESCON

Web
Server

DB2 Connect Enterprise Edition

Net.Data

Net.Data
Templates

Application 1

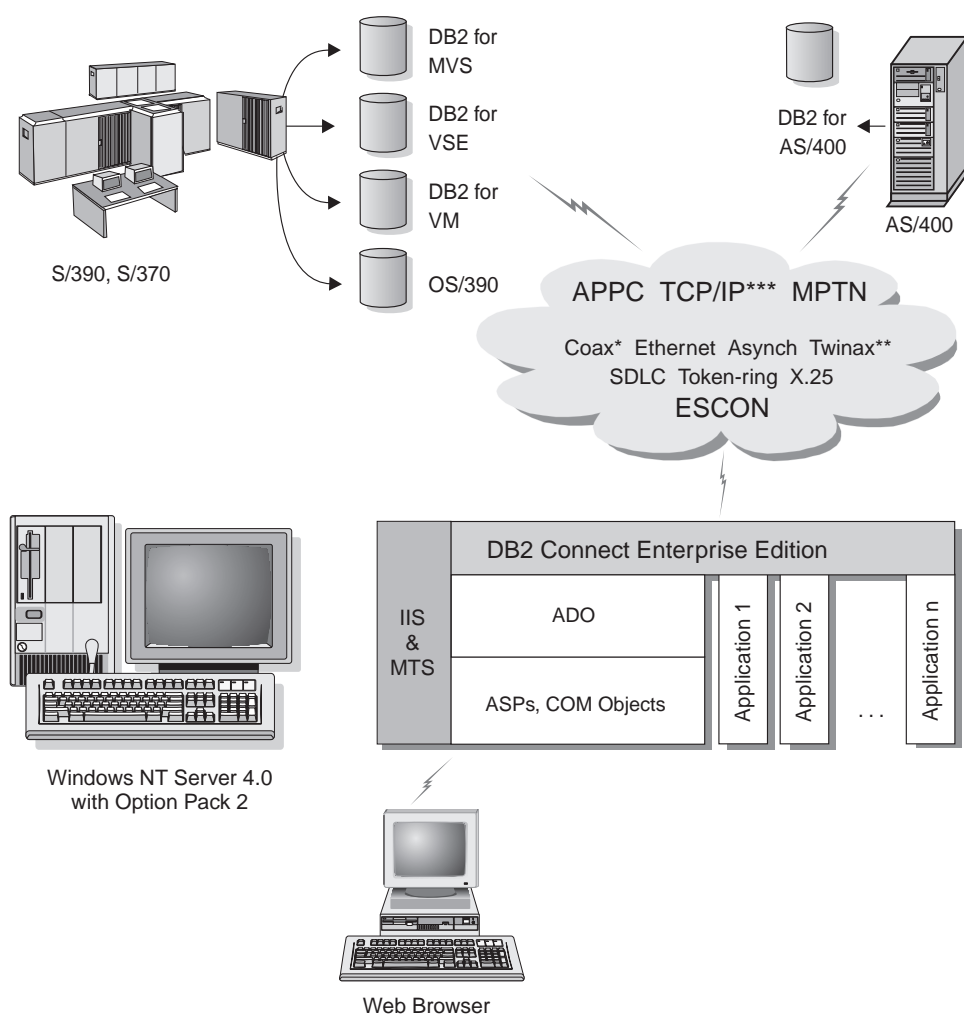Application 2

. . .

Application n

Web Browser

Not all protocols are supported for all platforms.

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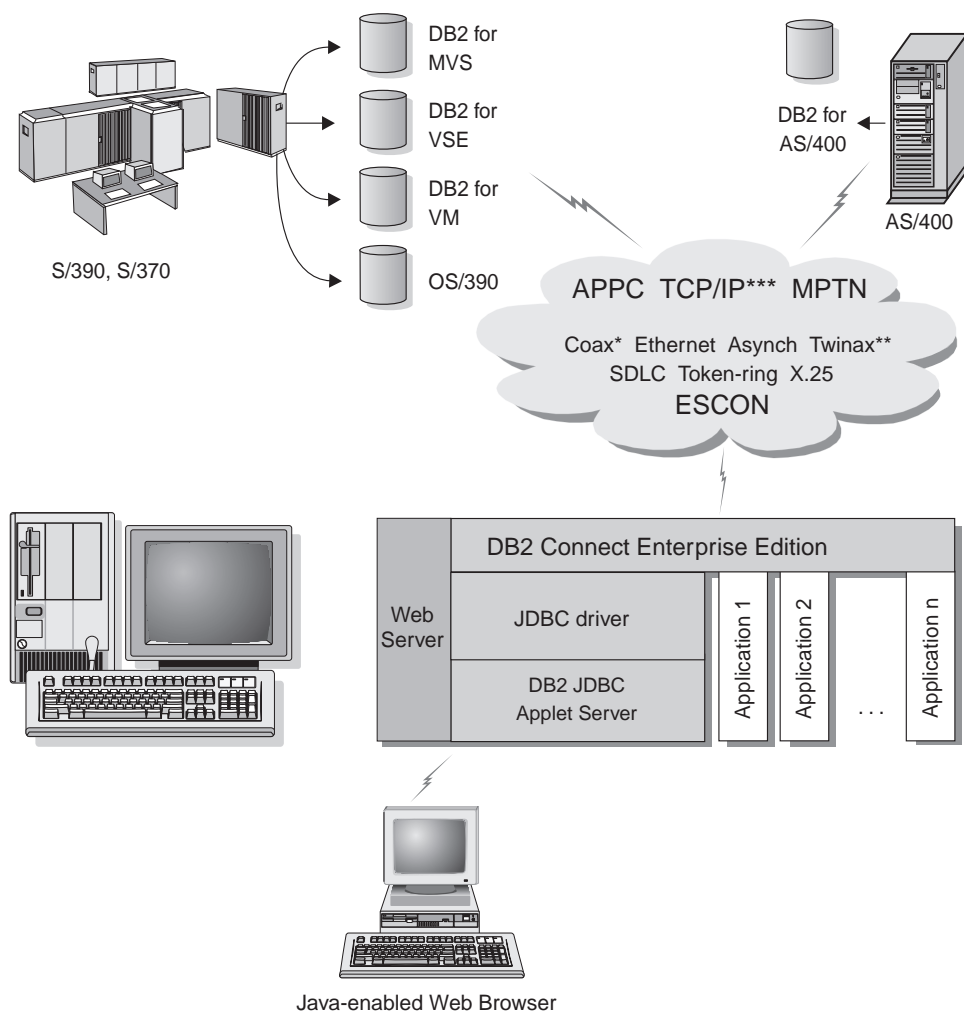   or DB2 for VM V6.1

Figure 6. Net.Data with DB2 Connect.

Administering Instances and Databases with the DB2 Administration Tools

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

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

Note: This option is only available on DB2 Enterprise Edition, DB2 Enterprise - Extended Edition, DB2 Connect Personal Edition, and DB2 Connect Enterprise Edition.

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

Managing Communications on the Server

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

> By default, the setup program automatically detects and configures most communication protocols that it detects on your system.

- Export database information in a profile that can be used to configure clients by clicking with the right mouse button on a system and selecting the **Export** option from the pop-up menu.

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

Monitoring Databases Using DB2 Performance Monitor

With the DB2 Performance Monitor, you can:

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

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

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

> You are also able to use the Windows NT Performance Monitor to monitor both database and system performance. For information on how to register DB2 resources and to use the Windows NT Performance Monitor, refer to the *Administration Guide*.

Viewing SQL Access Plans Using Visual Explain

Visual Explain helps database administrators and application developers to:

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

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

Note: You cannot use Visual Explain to administer host databases.

Managing Connections to Databases Using the Client Configuration Assistant

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

With the Client Configuration Assistant, you can:
- Catalog databases so that they can be used by applications. Three methods are available:
  - Search the network for available databases and selecting 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. Client access is automatically set up for that database.
  - Manually configure a connection to a database by entering the required connection parameters.
- Remove cataloged databases, or change the properties of a cataloged database.
- Test connections to local or remote databases identified on your system.
- Bind applications to a database by selecting utilities or bind files from a list.
- Tune the client configuration parameters on your system. Parameters are logically grouped and suggested settings are provided on the interface as parameters are selected.

Understanding the Administration Server

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

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

Developing Applications Using the DB2 Software Developer's Kit

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

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

The DB2 Software Developer's Kit allows you to develop applications that use the following interfaces:
- Embedded SQL
- Call Level Interface (CLI) development environment (which is compatible with ODBC from Microsoft)
- Java Database Connectivity (JDBC)
- Embedded SQL for Java (SQLJ)
- DB2 Application Programming Interfaces (APIs) that use administrative functions to manage a DB2 database.

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

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

Running Your Own Applications

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

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

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

Part 2. DB2 Connect Installation

Chapter 2. Planning for Installation

If you know that your system meets all the hardware and software requirements, and you want to begin installing your DB2 product right away, go to "Chapter 4. Installing DB2 Connect on Windows NT" on page 35 or "Chapter 5. Installing DB2 Connect on OS/2" on page 41.

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

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

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

Memory Requirements

This section shows the *suggested* amount of memory that is required to run a DB2 product. The memory requirements listed here are estimates; 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.

DB2 Connect Requirements

The amount of memory that you require depends on the applications you intend to run. We suggest that you have a minimum of 32 MB of memory to access host or AS/400 databases using DB2 Connect Enterprise Edition.

Complete the provided worksheet in Table 1 and calculate the approximate values for memory that your system will require.

Table 1. Memory Requirements for DB2 Connect

Number of Clients Connecting to a Server	
___ 5 Concurrent Connections	64 MB
___ 10 Concurrent Connections	80 MB
___ 25 Concurrent Connections	96 MB
___ 50 Concurrent Connections	186 MB
___ DB2 Administration Tools	30 MB
Total Memory Requirements	__ MB

DB2 Client Requirements

The amount of memory you require to run a DB2 Run-Time Client is approximately 16 MB. If you are planning to run a DB2 Administration Client, your client workstation should have approximately 32 MB of available memory.

Disk Requirements

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

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

Estimating Fixed Disk Requirements

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

Server Components

Use Table 2 on page 25 to estimate the amount of disk space you need to install DB2 and associated components on your operating system.

Table 2. Estimating Disk Requirements

	Recommended Minimum Disk (MB)
DB2 Connect for OS/2	
DB2 Connect Enterprise Edition	55 MB
DB2 GUI Tools	60 MB
DB2 Connect Support (this is not available with DB2 Workgroup Edition)	1 MB
Online documentation in HTML format (English)	31 MB
Far-East Code Page Conversion Support	5 MB
Total Disk Space Required	__ MB
DB2 Connect for Windows NT	
DB2 Connect Enterprise Edition for Windows NT	77 MB
DB2 GUI Tools	68 MB
Online documentation in HTML format (English)	31 MB
Far-East Code Page Conversion Support	5 MB
Total Disk Space Required	__ MB

Client Components

Use Table 3 to estimate the amount of disk space you need on each of your client workstations.

If you are planning to use a DB2 client that is not listed in this table, but is supported by DB2, refer to the *Installation and Configuration Supplement* for more information.

If you are installing the Control Center or the online documentation on a Windows NT FAT or a Windows 9x FAT16 disk partition, you may require additional amounts of disk space.

Table 3. Disk Requirements for Client Components

	Recommended Minimum Disk (MB)
OS/2	
DB2 Run-Time Client (Base)	11 MB
- Client Configuration Assistant	6 MB
or	
DB2 Administration Client (Base)	11 MB
- DB2 Administration Tools	68 MB
- Client Configuration Assistant	6 MB
Total Disk Space Required	__ MB

Table 3. Disk Requirements for Client Components (continued)

	Recommended Minimum Disk (MB)
Windows 32-bit Operating Systems	
DB2 Run-Time Client (Base)	11 MB
- Client Configuration Assistant	6 MB
or	
DB2 Administration Client (Base)	11 MB
- DB2 Administration Tools	68 MB
- Client Configuration Assistant	6 MB
Total Disk Space Required	__ MB

Software Requirements

DB2 Connect Enterprise Edition products use communication software for establishing host connectivity and connectivity to DB2 Universal Database servers. In addition, DB2 Connect Enterprise Edition requires connectivity software to support connections from remote client workstations.

For the host connectivity, software requirements will depend on:

- The protocol that you will be using, that is, SNA (APPC), TCP/IP, or MPTN (APPC over TCP/IP or vice versa)
- Whether you will be using direct connection.

Server Product Requirements

Table 4 on page 27 lists the operating system and communications software required for DB2 Connect.

Table 4. Software Requirements

Product	Hardware/Software Requirements	Communications
		OS/2
• DB2 Connect Enterprise Edition	• OS/2 Warp Version 3 and Version 4 • OS/2 Warp Connect Version 3 • OS/2 Warp Server Version 4 • OS/2 Warp Server Advanced V4 • OS/2 Warp Server Advanced V4 with SMP Feature • OS/2 Warp Server for e-business Versions of OS/2 with built-in communications capabilities such as OS/2 Warp Connect, Warp Server, Warp Server Advanced, and OS/2 Warp Version 4 are recommended. **Notes:** 1. If you plan to install DB2 Connect using TME 10 SystemView, you must have TME 10 SystemView LAN Client provided by the OS/2 Warp Server. 2. The DB2 SNMP subagent requires DPI 2.0 support provided by the OS/2 Warp Server installed. If you plan to use DB2 SNMP subagent for system management, you will have to use OS/2 Warp Server.	APPC, IPX/SPX, NetBIOS, or TCP/IP • For local IPX/SPX connectivity, you require Novell NetWare Requester, Version 2.10 or later. • Named Pipes is supported locally in WIN-OS/2 sessions on OS/2 Warp Server. • For local NetBIOS connectivity, you require IBM NTS/2 Version 1.0, or IBM Communications Manager Version 1.x or later, or IBM OS/2 LAN Requester. • For TCP/IP connectivity, you require IBM TCP/IP Version 3.0 or later for OS/2 Warp Versions 3 and 4, and for OS/2 Warp Connect Version 3. The OS/2 Warp Server Version 4 base operating system provides TCP/IP connectivity, if selected during installation. • For SNA (APPC) connectivity, one of the following communications products is required: – IBM eNetwork Communications Server for OS/2 Warp Version 5 – IBM eNetwork Personal Communications for OS/2 Warp Version 4.2 – IBM Communication Server for OS/2 Version 4 **Notes:** 1. If you plan to use DCE (Distributed Computing Environment) Security for authenticating users that connect to host databases, you do not have to install DCE products on your DB2 Connect workstation. However, you will have to: • Ensure that you are connecting to DB2 for OS/390 V5.1 database that is enabled for DCE support using OS/390 DCE Base Services Version 3 if you wish to use DB2 Connect. You must install DCE Directory Services on both the client and the DRDA Server, but you do not need DCE installed on the DB2 Connect Enterprise Edition server. • Ensure that client workstations, using DCE security, have a DCE product that is at OSF DCE Level 1.1 with the IBM Directory and Security Server for OS/2 Warp Version 4. 2. If you plan to use two-phase commit with DB2 Connect and DRDA host systems, you must install the Syncpoint Manager (SPM) function and its prerequisites. 3. The DB2 SNMP Subagent requires DPI 2.0 support provided by the OS/2 Warp Server. 4. Installing clients and servers using TME 10 Netfinity requires TME 10 Netfinity LAN Client provided by the OS/2 Warp Server.

Table 4. Software Requirements (continued)

Product	Hardware/Software Requirements	Communications
Windows 32-bit Operating Systems		

• DB2 Connect Enterprise Edition (Windows NT only)	• Windows NT Version 4.0 with Service Pack 3, or later	APPC, TCP/IP, and MPTN (APPC over TCP/IP)
		
		• The Windows NT base operating system provides NetBIOS, IPX/SPX, Named Pipes, and TCP/IP connectivity.
		
		For SNA (APPC) connectivity, one of the following communication products is required:
		
		• IBM Communications Server for Windows NT Version 5.01 or later
		
		• IBM Personal Communications for Windows NT Version 4.1 or later
		
		• Microsoft SNA Server Version 4 Service Pack 2 or later
		
		Notes:
		
		1. If SNA two-phase commit is necessary, then IBM Communications Server for Windows NT Version 5.01 or later is required.
		
		2. If you plan to use DCE (Distributed Computing Environment) with Version 6 of DB2 Universal Database, you will need:
		  • A DCE product that is at OSF DCE level 1.1 with IBM DCE for Windows NT Version 2.0.
		  • To ensure that if you are connecting to DB2 for OS/390 V5.1 database that it is enabled for DCE support using OS/390 DCE Base Services Version 3.
		
		In addition, DB2 also supports Gradient PC-DCE for Windows 32-bit operating systems Version 2.0 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.
		
		3. If you plan to use LDAP (Lightweight Directory Access Protocol), you require the IBM eNetwork LDAP Directory Client Version 3.1. For more information, refer to the *Administration Guide*.
		
		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 3 or later.
		
		5. If you have the IBM Antivirus program installed on your operating system, it must be Version 3.0 or later.
		
		6. If you plan to use the Simple Network Management Protocol (SNMP) subagent, you require DPI 2.0 provided by IBM Netfinity Agent.

Client Product Requirements

Table 5 on page 29 lists the software requirements needed for a DB2 Administration Client, DB2 Run-Time Client, or a DB2 Software Developer's Kit.

Table 5. Software Requirements for Clients

Component	Hardware/Software Requirements	Communications
• DB2 Run-Time Client for OS/2 • DB2 Administration Client for OS/2 • DB2 Software Developer's Kit for OS/2	• OS/2 Warp Version 3 and Version 4 • OS/2 Warp Connect Version 3 • OS/2 Warp Server Version 4 • OS/2 Warp Server Advanced V4 • OS/2 Warp Server Advanced V4 with SMP Feature • OS/2 Warp Server for e-business	APPC, IPX/SPX, NetBIOS, or TCP/IP • For APPC connectivity, you require IBM eNetwork Communications Server for OS/2 Warp Version 5 or IBM eNetwork Personal Communications for OS/2 Warp Version 4.2. • For IPX/SPX connectivity, you require the Novell NetWare client for OS/2 Version 2.10 or later. IPX/SPX can only be used to connect to local databases. It cannot be used to connect to host or AS/400 databases. • For NetBIOS connectivity, you require IBM NTS/2 Version 1.0, IBM eNetwork Communications Server for OS/2 Warp Version 5, IBM eNetwork Personal Communications for OS/2 Warp Version 4.2, or IBM OS/2 LAN Requester. NetBIOS can only be used to connect to local databases. It cannot be used to connect to host or AS/400 databases. • 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. Net.Data requires OS/2 Warp Version 3 or later and a Web server such as IBM's Internet Connection Server. 2. For DCE Cell Directory Services Support (CDS) for DB2 Clients for OS/2, you must install IBM Distributed Computing Environment Cell Directory Service client, Version 2.10, on each client workstation. 3. If you are planning to use ADSM, PTF 3 for ADSTAR Distributed Storage Manager (ADSM) Version 3 is required for an OS/2 client.
• DB2 Run-Time Client for Windows 9x • DB2 Administration Client for Windows 9x • DB2 Software Developer's Kit for Windows 9x	• Windows 95 4.00.950 or later • Windows 98	IPX/SPX, Named Pipes, NetBIOS, or TCP/IP • The Windows 9x base operating system provides NetBIOS, IPX/SPX, TCP/IP, and Named Pipes connectivity. **Note:** IPX/SPX connectivity is only supported to Windows NT servers. • If you plan to use LDAP (Lightweight Directory Access Protocol), you require the IBM eNetwork LDAP Directory Client Version 3.1. For more information, refer to the *Administration Guide.*

Table 5. Software Requirements for Clients (continued)

Component	Hardware/Software Requirements	Communications

• DB2 Run-Time Client for Windows NT
• DB2 Administration Client for Windows NT
• DB2 Software Developer's Kit for Windows NT
	• Windows NT Version 4.0 with Service Pack 3 or later
	• Windows Terminal Server (can only run the DB2 Run-Time Client)
		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 eNetwork Communications Server for Windows NT V5.01 or later.
		  – IBM eNetwork Personal Communications for Windows NT V4.2 or later.
		  – Microsoft SNA Server Version 4 Service Pack 2 or later
		  – Wall Data Rumba
		
		If you plan to use DCE (Distributed Computing Environment) with Version 6 of DB2 Universal Database, you will need to ensure that if you are connecting to DB2 for OS/390 V5.1 database that it is enabled for DCE support using OS/390 DCE Base Services Version 3.
		
		• If you plan to use LDAP (Lightweight Directory Access Protocol), you require the IBM eNetwork LDAP Directory Client Version 3.1. For more information, refer to the *Administration Guide*.
		• 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 3 or later.
		• If you have the IBM Antivirus program installed on your operating system, it must be Version 3.0 or later.

Possible Client-to-Server Connectivity Scenarios

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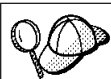
> DB2 Workgroup, DB2 Enterprise, and DB2 Enterprise - Extended Editions can service requests from host or AS/400 clients (DRDA ARs).

Table 6. Possible Client-to-Server Connectivity Scenarios

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

Table 6. Possible Client-to-Server Connectivity Scenarios (continued)

Client	Server					
	AIX	HP-UX	Linux	OS/2	Solaris	Windows NT
HP-UX	APPC TCP/IP	TCP/IP	TCP/IP	APPC TCP/IP	APPC TCP/IP	APPC TCP/IP
Linux	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP
MVS	SNA	N/A	N/A	SNA	SNA	SNA
OS/2	APPC IPX/SPX(1),(2) TCP/IP	TCP/IP	TCP/IP	APPC IPX/SPX(1),(2) NetBIOS TCP/IP	APPC IPX/SPX(1) TCP/IP	APPC IPX/SPX(1) NetBIOS TCP/IP
OS/390	SNA TCP/IP	TCP/IP	TCP/IP	SNA TCP/IP	SNA TCP/IP	SNA TCP/IP
Silicon Graphics IRIX	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP	TCP/IP
SQL/DS	SNA	N/A	N/A	SNA	SNA	SNA
Solaris	APPC TCP/IP	TCP/IP	TCP/IP	APPC TCP/IP	APPC TCP/IP	APPC TCP/IP
VSE & VM V6	SNA	N/A	N/A	SNA	SNA	SNA
VSE V6	SNA	N/A	N/A	SNA	SNA	SNA
VM V6	SNA TCP/IP	TCP/IP	TCP/IP	SNA TCP/IP	SNA TCP/IP	SNA TCP/IP
Windows 9x	TCP/IP	TCP/IP	TCP/IP	NetBIOS TCP/IP	TCP/IP	IPX/SPX(1) NPIPE NetBIOS TCP/IP
Windows NT	APPC IPX/SPX(1) TCP/IP	TCP/IP	TCP/IP	APPC IPX/SPX(1) NetBIOS TCP/IP	APPC IPX/SPX(1) TCP/IP	APPC IPX/SPX(1) NPIPE NetBIOS TCP/IP

1. Direct Addressing
2. File Server Addressing

Chapter 3. Security Requirements

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

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

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

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

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

DB2 Universal Database for OS/390 or DB2 for MVS
> BINDADD privilege, plus CREATE IN COLLECTION NULLID, SYSCTRL, or SYSADM authority.

DB2 for VSE & VM
> DBA authority

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

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

Chapter 4. Installing DB2 Connect on Windows NT

This section describes how to install DB2 Connect Enterprise Edition on Windows 32-bit operating systems. If you want to install a DB2 client, go to "Part 5. Installing and Configuring Clients" on page 105. For information on how to deploy this product using a distributed installation, refer to the *Installation and Configuration Supplement.*

Before You Begin

Before you begin the installation, ensure that you have the following items and information:

__ 1. Ensure that your system meets all of the memory, hardware, and software requirements to install your DB2 product. For more information, see "Chapter 2. Planning for Installation" on page 23.

__ 2. The protocol to be used for host connectivity:

    __ a. SNA

    __ b. TCP/IP

    __ c. MPTN

__ 3. A user account that will be used to perform the installation. The account you specify must:

- Be defined on the local machine.
- Belong to the Local Administrator's group.
- Have the *Act as part of the operating system* advanced user right.

> You can perform the installation without the *Act as part of the operating system* advanced user right, however, the setup program will be unable to validate the account that you specify for the Administration Server. We recommend that any user account used to install this product have this advanced user right.

For information on how to grant user rights, refer to the Windows NT online help.

__ 4. During installation, you will provide a user account that will be used by the Administration Server to log on to the system and to start itself as a service. The account you specify must:

- Be defined on the local machine.
- Belong to the Local Administrator's group.
- Have the *Act as part of the operating system* advanced user right.

By default, the setup program will create a user account using the username db2admin and password db2admin. You can accept these default values, create you own user account by modifying the default values, or provide you own. If you create or provide you own user account, ensure that it conforms to DB2's naming rules. For more information, see "Appendix F. Naming Rules" on page 177.

> If you use the default user account db2admin, and do not change the default password on the setup screen, you should change this password immediately following the installation since db2admin is the default password for any installation and is therefore well known.
>
> To change the password that is associated with the Administration Server, entering the following command:
>
>   db2admin setid *username password*

__ 5. To verify that DB2 installed correctly, you will need to have a user account that belongs to the System Administrative (SYSADM) group, is 8 characters or less, and complies with all of DB2's naming rules.

By default, any user that belongs to the *Local Administrators* group, on the local machine where the account is defined, has SYSADM authority on the instance. For more information, see "Working with the System Administrative Group" on page 148. For more information on valid DB2 usernames, see "Appendix F. Naming Rules" on page 177.

Performing the Installation

To install your DB2 product, perform the following steps:

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

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

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

> To manually invoke the setup program, perform the following steps:
> a. Click on **Start** and select the **Run** option.
> b. In the **Open** field, enter the following command:
>
>   `x:\setup /i` *language*
>
>   where:
>   - *x:* represents your CD-ROM drive
>   - *language* represents the country code for your language (for example, EN for English). Table 12 on page 171 lists the code for each available language.
> c. Click on **OK**.

Step 4.   The Welcome window opens.

Step 5.   Respond to the setup program's prompts. Online help is available to guide you through the remaining steps. Invoke the online help by clicking on the **Help** push button or pressing the **F1** key at any time. You can click on the **Cancel** push button at any time to end the installation.

> The next step applies only if you are using Microsoft SNA Server for Windows NT as your communication product. If you are using another communications product, such as IBM eNetwork Communications Server for Windows NT, skip the next step.

Step 6. After your workstation has rebooted, check that the network adapter is bound to the DLC communications subsystem by completing the following steps:

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

b. Double-click on the **Network** icon.

c. In the Network window, select the **Bindings** tab.

d. Select **All Adapters** from the **Show bindings for** drop-down box.

e. Double-click on the adapter for which you want to see the bounded protocols

f. Ensure that **DLC** is enabled. If it is not, click on the **Enable** push button to enable the bind the network adapter to the communications subsystem.

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

Based on your component selections, the installation program has:

- Created DB2 program groups and items (or shortcuts).
- Created the following services on Windows NT: DB2 Governor, DB2 JDBC Applet Server, DB2 Security Server.
- Updated the Windows registry.

> To set up connections to host or AS/400 database servers, go to one of the following sections:
>
> - "Chapter 7. Configuring DB2 Connect to Host or AS/400 Communications Using the CCA" on page 65
>
> - "Chapter 8. Configuring APPC Communications on the DB2 Connect Workstation" on page 75

Software Registration

The Software Registration tool is used to register IBM Software with IBM and update IBM's Software Customer Profiles. A customer profile contains identification and demographic information about the users of each IBM software product. The software registration tool contains information and instructions on how to register IBM software by modem, telephone, Internet, FAX, or postal service. To register your software with IBM, perform the following steps:

Step 1. Start the IBM Software Registration tool. For more information, see "Starting the Software Registration Tool" on page 143.

Step 2. Enter the appropriate information and complete the IBM Software Registration Smart Guide. Click on the **Help** push button if you need assistance.

Upgrading from a Try-and-Buy License

To upgrade from a Try-and-Buy license, perform the following steps:

Step 1. Start the Control Center. For more information, see "Starting the Control Center" on page 144.

Step 2. Click on the **License Center** icon from the Control Center toolbar. The License Center opens.

Step 3. Complete the steps to upgrade your DB2 license. For more information, refer to the License Center's online help by pressing the **F1** key.

If you are upgrading your DB2 product to a higher entitlement, you must ensure that you uninstall your current installation of DB2 and then reinstall your new licensed product.

For example, if you have a Try-and-Buy version of DB2 Workgroup Edition installed on your machine, and you purchased a license for DB2 Enterprise Edition, you must ensure that you remove the installed copy of DB2 Workgroup Edition and then reinstall DB2 Enterprise Edition.

If you did not install the DB2 tools, you can upgrade your Try-and-Buy license using the **db2licm** command. For more information, refer to the *Command Reference.*
Note: *Your Proof of Entitlement* and *License Information* booklets identify the products for which you are licensed.

You are now ready to use DB2 Connect Enterprise Edition.

Chapter 5. Installing DB2 Connect on OS/2

This section describes how to install DB2 Connect Enterprise Edition on an OS/2 workstation. For information on how to deploy this product using a distributed installation, refer to the *Installation and Configuration Supplement*.

Before You Begin

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

__ 1. Ensure that your system meets all of the memory, hardware, and software requirements to install your DB2 product. For more information, see "Chapter 2. Planning for Installation" on page 23.

__ 2. The protocol to be used for host connectivity:
    __ a. SNA
    __ b. TCP/IP
    __ c. MPTN

__ 3. A user ID to perform the installation.

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

If UPM is not installed, DB2 will install it and set up the userid `USERID` with password `PASSWORD`.

__ 4. A user ID for the Administration Server.

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

If UPM is not installed, DB2 will install it and the userid specified for the Administration Server will be created.

__ 5. To verify that DB2 installed correctly, you will need to have a user account that belongs to the System Administrative (SYSADM) group, is 8 characters or less, and complies with all of DB2's naming rules.

By default, any user that belongs to the *Local Administrators* group, on the local machine where the account is defined, has SYSADM authority on the instance. For more information, see "Working with the System Administrative Group" on page 148. For more information on valid DB2 usernames, see "Appendix F. Naming Rules" on page 177.

Performing the Installation

To install your DB2 product, perform the following steps:

Step 1. Log on to the system with the user ID that you created to perform the installation.

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

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

```
cd x:
```

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

Step 4. Enter the following command:

```
x:\install
```

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

> To manually invoke the installation program, enter the following command:
>
> ```
> x:\install /i language
> ```
>
> where x: represents your CD-ROM drive and *language* represents the country code for your language.

Step 5. The Welcome window opens.

Step 6. Respond to the install program's prompts. Online help is available to guide you through the remaining steps. Invoke online help by

clicking on the **Help** push button or the **F1** key at any time. You can click on the **Cancel** push button at any time to end the installation.

For information on errors encountered during installation, see the `l1.log` and `l2.log` files. These files store general information and error messages resulting from installation and uninstall activities. By default, these files are located in the `x:\db2log` directory; where x: represents the drive on which your operating system is installed.

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

To set up connections to host or AS/400 database servers, go to one of the following sections:
- "Chapter 7. Configuring DB2 Connect to Host or AS/400 Communications Using the CCA" on page 65
- "Chapter 8. Configuring APPC Communications on the DB2 Connect Workstation" on page 75

Software Registration

The Software Registration tool is used to register IBM Software with IBM and update IBM's Software Customer Profiles. A customer profile contains identification and demographic information about the users of each IBM software product. The software registration tool contains information and instructions on how to register IBM software by modem, telephone, Internet, FAX, or postal service. To register your software with IBM, perform the following steps:

Step 1. Start the IBM Software Registration tool. For more information, see "Starting the Software Registration Tool" on page 143.

Step 2. Enter the appropriate information and complete the IBM Software Registration Smart Guide. Click on the **Help** push button if you need assistance.

Upgrading from a Try-and-Buy License

To upgrade from a Try-and-Buy license, perform the following steps:

Step 1. Start the Control Center. For more information, see "Starting the Control Center" on page 144.

Step 2. Click on the **License Center** icon from the Control Center toolbar. The License Center opens.

Step 3. Complete the steps to upgrade your DB2 license. For more information, refer to the License Center's online help by pressing the **F1** key.

If you are upgrading your DB2 product to a higher entitlement, you must ensure that you uninstall your current installation of DB2 and then reinstall your new licensed product.

For example, if you have a Try-and-Buy version of DB2 Workgroup Edition installed on your machine, and you purchased a license for DB2 Enterprise Edition, you must ensure that you remove the installed copy of DB2 Workgroup Edition and then reinstall DB2 Enterprise Edition.

If you did not install the DB2 tools, you can upgrade your Try-and-Buy license using the **db2licm** command. For more information, refer to the *Command Reference.*
Note: *Your Proof of Entitlement* and *License Information* booklets identify the products for which you are licensed.

You are now ready to use DB2 Connect Enterprise Edition.

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

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Chapter 6. Configuring Host and AS/400 Databases for DB2 Connect

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

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

- The *DB2 for OS/390 Installation Guide* (GC26-8970) contains the most complete and up-to-date information for DB2 Universal Database for OS/390.

- The online *Connectivity Supplement* provided with DB2 Connect contains selected information on setting up a host or AS/400 database server communications.

- *Distributed Relational Database Cross Platform Connectivity and Applications* (SG24-4311) contains useful post-configuration information.

The sample values used in this section match those used elsewhere in this book. When you follow the instructions provided you *must* substitute your own values for elements such as network name, LU name, and mode name.

Preparing MVS/ESA or OS/390 for DB2 Connect

Your VTAM administrator and your host system administrator must configure VTAM and OS/390 (or MVS/ESA) to prepare DB2 Universal Database for OS/390 (or DB2 for MVS/ESA) to receive inbound connection requests from your DB2 Connect workstation.

This section provides:

- Examples of VTAM definitions required at your DB2 Universal Database for OS/390 host for use with DB2 Connect SNA connections. These should be compared with current definitions. See "Configuring VTAM" on page 48.

- Instructions for establishing TCP/IP network connections between DB2 Connect and DB2 Universal Database for OS/390. See "Configuring TCP/IP for DB2 Universal Database for OS/390" on page 55.

- DB2 host configuration steps (see "Configuring DB2 Universal Database for OS/390" on page 52, or "Configuring DB2 for MVS/ESA" on page 53).

Many details of these steps have changed with the introduction of DB2 Universal Database for OS/390 Version 5.1. Most of these steps apply to SNA users, but some also apply to users who will connect to DB2 Universal Database for OS/390 via TCP/IP.

For a summary of the example VTAM names used throughout this book, see "Sample Network Element Names (VTAM)" on page 49. For TCP/IP names, see "Configuring TCP/IP for DB2 Universal Database for OS/390" on page 55.

> If you anticipate that DB2 for OS/390 will participate in a multisite update transaction (two phase commit) then please refer to "Chapter 9. Enabling Multisite Updates (Two-Phase Commit)" on page 99. The additional steps required to set up multisite updates are not documented here.

Summary of Steps

In order to prepare DB2 Universal Database for OS/390 or DB2 for MVS/ESA to receive connection requests from DB2 Connect, you must complete the following steps at your DB2 Universal Database for OS/390 host:

Step 1. Verify that the following PTFs for OS/390 are installed:
- PTF UQ06843 for APAR PQ05771
- PTF UQ09146 for APAR PQ07537.

Step 2. Configure VTAM - see "Configuring VTAM", or:

Step 3. Configure TCP/IP - see "Configuring TCP/IP for DB2 Universal Database for OS/390" on page 55, or:

Step 4. Configure DB2 Universal Database for OS/390 or DB2 for MVS/ESA - see "Configuring DB2 Universal Database for OS/390" on page 52, or "Configuring DB2 for MVS/ESA" on page 53.

Configuring VTAM

To configure VTAM, your VTAM Administrator needs to determine the names and options to be used on your system. The following definitions must be provided to enable the DB2 Connect workstation to connect to the host:

1. The VTAM APPL Definition for DB2 Universal Database for OS/390 or DB2 for MVS/ESA. (The APPL name (LU name) for the DB2 subsystem is NYM2DB2 in these examples.)
2. The VTAM PU and LU Definitions for DB2 Connect. (The PU and LU definitions for the DB2 Connect workstation are NYX1 and NYX1GW01 respectively in these examples.)
3. The VTAM Log Mode Definition for DB2. (The log mode entry to be used for the connection is IBMRDB in these examples.)

The sample VTAM definitions are provided in the sections that follow. These samples use parameters that match the parameters used elsewhere in this book.

Sample Network Element Names (VTAM)

Figure 7 shows the sample VTAM definitions used to configure a host database server.

```
DB2 Connect Server:
        - Network ID             : SPIFNET
        - Local Node Name        : NYX1        (PU name)
        - Local Node ID          : 05D27509

        - LU Name                : SPIFNET.NYX1GW01 (the same LU is used
                                                for DB2 Connect,
                                                for DB2 Universal Database,
                                                and for the SPM)
        - LU Alias               : NYX1GW01

HOST:
        - Network ID             : SPIFNET
        - Node Name              : NYX

        - LU Name                : SPIFNET.NYM2DB2
        - LU Alias               : NYM2DB2
        - LAN Destination Address : 400009451902 (NCP TIC address)

MODE DEFINITION:
        - Mode Name              : IBMRDB

DB2 for MVS/ESA:
        - Location               : NEW_YORK3

SECURITY:
        - Security Type          : Program
        - Authentication Type    : DCS
```

Figure 7. Network Element Names Used in the VTAM Examples

In this scenario, both userid and password are checked only at the host. If you use Authentication SERVER, which is the default, then authentication will also take place at the DB2 Connect server.

Sample VTAM APPL Definition for OS/390

Figure 8 on page 50 shows the sample VTAM application major node definitions. In most cases, such a definition will already exist with a different LU name. Otherwise, this *application major node* must be defined, and DB2

Universal Database for OS/390 must be customized in order to use the LU name defined. This name is the Partner LU name required by DB2 Connect.

```
----+----1----+----2----+----3----+----4----+----5----+----6----+----7--

DB2APPLS VBUILD TYPE=APPL

NYM2DB2  APPL  APPC=YES,                                          X
               AUTH=(ACQ),                                        X
               AUTOSES=1,                                         X
               DLOGMOD=IBMRDB,                                    X
               DMINWNL=512,                                       X
               DMINWNR=512,                                       X
               DSESSLIM=2048,                                     X
               EAS=6000,                                          X
               MODETAB=RDBMODES,                                  X
               PARSESS=YES,                                       X
               PRTCT=SFLU,                                        X
               MODETAB=RDBMODES,                                  X
               SECACPT=ALREADYV,                                  X
               SRBEXIT=YES,                                       X
               VERIFY=NONE,                                       X
               VPACING=8
```

Figure 8. Sample VTAM APPL Definition for DB2 Universal Database for OS/390 or DB2 for MVS/ESA

Note: Continuations must begin in column 16, with continuation marks in column 72.

Sample VTAM PU and LU Definitions for DB2 Connect

If your security policies allow it, it is recommended that you enable DYNPU and DYNLU in VTAM to allow any PU and LU access through VTAM. Contact your VTAM administrator for more information.

To enable a specific LU or PU, Figure 9 on page 51 shows the sample VTAM switched major node definitions.

If you already use SNA applications on the DB2 Connect workstation, then a PU definition already exists. However, an independent LU definition might not. The independent LU definition required for DB2 Connect must have LOCADDR=0 specified.

```
----+----1----+----2----+----3----+----4----+----5----+----6----+----7--

          SWITCHED MAJOR NODE DEFINITION FOR PU NYX1 and
          INDEPENDENT LU NYX1GW01

LOC300    VBUILD TYPE=LOCAL

NYX1           ADDR=01,IDBLK=071,IDNUM=27509,ANS=CONT,DISCNT=NO,        X
               IRETRY=YES,ISTATUS=ACTIVE,MAXDATA=4302,MAXOUT=7,         X
               MAXPATH=1,PUTYPE=2,SECNET=NO,MODETAB=RDBMODES            X
               SSCPFM=USSSCS,PACING=0,VPACING=2

NYX1GW01  LOCADDR=000,MODETAB=RDBMODES,DLOGMODE=IBMRDB

OTHERLU   LOCADDR=002
```

Figure 9. Sample VTAM Switched Major Node Definition for DB2 Connect

Sample VTAM Log Mode Definition for DB2

Figure 10 on page 52 shows the sample VTAM logon mode table definition for the IBMRDB and SNASVCMG modes. Note that this example specifies a 4K *RUSIZE*, which may not be suitable for your environment (for example, if you are using Ethernet, which has a maximum Frame Size of 1536 bytes). Your VTAM Administrator should check these values and advise you which mode table entry name and *RUSIZE* to specify for DB2 Connect.

```
----+----1----+----2----+----3----+----4----+----5----+----6----+----7---

RDBMODES MODTAB

IBMRDB   MODEENT LOGMODE=IBMRDB,   DRDA DEFAULT MODE                    *
                 TYPE=0,            NEGOTIABLE BIND                     *
                 PSNDPAC=X'01',     PRIMARY SEND PACING COUNT           *
                 SSNDPAC=X'01',     SECONDARY SEND PACING COUNT         *
                 SRCVPAC=X'00',     SECONDARY RECEIVE PACING COUNT      *
                 RUSIZES=X'8989',   RUSIZES IN-4K    OUT-4K             *
                 FMPROF=X'13',      LU6.2 FM PROFILE                    *
                 TSPROF=X'07',      LU6.2 TS PROFILE                    *
                 PRIPROT=X'B0',     LU6.2 PRIMARY PROTOCOLS             *
                 SECPROT=X'B0',     LU6.2 SECONDARY PROTOCOLS           *
                 COMPROT=X'D0B1',   LU6.2 COMMON PROTOCOLS              *
                 PSERVIC=X'0602000000000000000122F00'   LU6.2 LU TYPE

SNASVCMG MODEENT LOGMODE=SNASVCMG, DRDA DEFAULT MODE                    *
                 PSNDPAC=X'00',     PRIMARY SEND PACING COUNT           *
                 SSNDPAC=X'02',     SECONDARY SEND PACING COUNT         *
                 SRCVPAC=X'00',     SECONDARY RECEIVE PACING COUNT      *
                 RUSIZES=X'8585',   RUSIZES IN-1K    OUT-1K             *
                 FMPROF=X'13',      LU6.2 FM PROFILE                    *
                 TSPROF=X'07',      LU6.2 TS PROFILE                    *
                 PRIPROT=X'B0',     LU6.2 PRIMARY PROTOCOLS             *
                 SECPROT=X'B0',     LU6.2 SECONDARY PROTOCOLS           *
                 COMPROT=X'D0B1',   LU6.2 COMMON PROTOCOLS              *
                 PSERVIC=X'060200000000000000000300'    LU6.2 LU TYPE
```

Figure 10. Sample VTAM Log Mode Definition for DB2 Connect

> You must define the *SNASVCMG* logon mode when using APPC.

Configuring DB2 Universal Database for OS/390

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

The following tables need to be updated, depending on the type of connections you are using (SNA or TCP/IP):
- SYSIBM.LUNAMES for SNA connections
- SYSIBM.IPNAMES for TCP/IP connections

The sections that follow contain examples of commands to update these tables for DB2 Universal Database for OS/390. Work with your DB2 Administrator to determine the updates required for your DB2 Universal Database for OS/390 system. For more information on the DB2 Universal Database for OS/390 Communications Database tables, refer to the *DB2 Universal Database for OS/390 SQL Reference.*

Updating SYSIBM.LUNAMES

To permit database connection requests to be accepted from any incoming DB2 Connect LU, just insert a blank row. Use an SQL similar to the following:

```
INSERT INTO SYSIBM.LUNAMES (LUNAME) VALUES ('          ')
```

Alternatively, if you want to restrict access by LU name, you can use an SQL command similar to the following to update this table:

```
INSERT INTO SYSIBM.LUNAMES (LUNAME,
                            SECURITY_OUT,
                            ENCRYPTPSWDS,
                            USERNAMES)
                   VALUES('NYX1GW01','P','N','O');
```

Result:

```
COLUMN              EXAMPLE            REMARK
======              =======            ======
LUNAME              NYX1GW01           Name of the DB2 Connect LU
SECURITY_OUT        P
ENCRYPTPSWDS        N
USERNAMES           O
```

Updating SYSIBM.IPNAMES

If you want to permit inbound database connection requests for TCP/IP nodes, you can use an SQL command such as the following to update this table:

```
INSERT INTO SYSIBM.IPNAMES (LINKNAME) VALUES('          ')
```

Configuring DB2 for MVS/ESA

Before you can use the DB2 Connect connection, your DB2 for MVS/ESA Administrator must configure DB2 for MVS/ESA to permit connections from the DB2 Connect workstation. To configure DB2 for MVS/ESA, the following tables need to be updated:

- SYSIBM.SYSUSERNAMES
- SYSIBM.SYSLUNAMES
- SYSIBM.SYSLUMODES

The sections that follow contain examples of commands to update these tables. Work with your DB2 Administrator to determine the options required for your DB2 for MVS/ESA system.

Updating SYSIBM.SYSUSERNAMES

If you want to use secondary authorization IDs, you can use the following SQL command to update this table:

```
INSERT INTO SYSIBM.SYSUSERNAMES VALUES('I','ADBUSER','NYX1GW01',' ',' ');
```

Result:

```
COLUMN              EXAMPLE            REMARK
======              =======            ======
Type                  I
Authid                ADBUSER
LU Name               NYX1GW01         Name of the DB2 Connect LU
NewAuthID             (blank)
Password              (blank)
```

USERNAME types are: O (outbound translation), I (inbound translation), B (both inbound and outbound) and blank (no authorization ids are translated, and no passwords are sent to the server).

Updating SYSIBM.SYSLUNAMES

If you want to restrict access by LU name, you can use an SQL command similar to the following to update this table:

```
INSERT INTO SYSIBM.SYSLUNAMES VALUES('NYX1GW01','IBMRDB','A','N',' ','I');
```

Result:

```
COLUMN              EXAMPLE            REMARK
======              =======            ======
LUNAME                NYX1GW01         Name of the DB2 Connect LU
SYSMODENAME           IBMRDB
USERSECURITY          A
ENCRYPTPSWDS          N
MODESELECT
USERNAMES             I
```

Alternatively, just insert a blank row, and this will allow any incoming DB2 Connect LUs to be accepted.

Updating SYSIBM.SYSLUMODES

You can use an SQL command such as the following to update this table:

```
INSERT INTO SYSIBM.SYSLUMODES VALUES ('NYX1    ', 'IBMRDB', 150, 'Y');
```

where:
- *NYX1* represents the PU name of server involved
- *IBMRDB* represents the name of VTAM logon mode
- *150* represents the maximum number of conversations
- *Y* represents the number of sessions preallocated at startup. This can also be left as N, or blank (the default) for deferred at startup.

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

This section describes how to configure TCP/IP communications between your DB2 Connect workstation and DB2 Universal Database for OS/390 Version 5.1 or later. It assumes that:
- You are connecting to a single host database via TCP/IP. Multiple host connections will be handled in exactly the same way, although the *port number* and *service number* required in each case may be different.
- The target database resides on DB2 Universal Database for OS/390 Version 5.1 or later.
- All the necessary software prerequisites are installed.
- DB2 clients have been set up as required.

Prerequisite OS/390 Software for TCP/IP Support

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

The following informational APARS for DB2 for OS/390 are regularly updated with information about PTFs to install for various OS/390 components, particularly TCP/IP for OS/390. If you use TCP/IP connectivity with DB2 for OS/390 it is extremely important that you review and apply PTFs and APAR fixes described in the following DB2 for OS/390 information APARs:
- II11164
- II11263
- II10962

The following fixes are recommended for DB2 for OS/390:
- DB2 for MVS Version 3.1: PTF UQ13906
- DB2 for MVS Version 4.1: PTF UQ13907
- DB2 for OS/390 Version 5.1: PTF UQ13908, PTF UQ17755

Collecting Information

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

- The location of the TCP/IP `services` file at the DB2 Connect workstation:
  - On a UNIX system, the location of this file is usually `/etc/services`.
  - On OS/2 Warp Version 4 the location of this file is determined by the `ETC` environment variable.
  - On Windows NT, the location of this file is `<NT install directory>\system32\drivers\etc\services`.
- The location of the TCP/IP `hosts` file at the DB2 Connect workstation:
  - On a UNIX system, the location of this file is usually `/etc/hosts`.
  - On OS/2 Warp Version 4, the location of this file is usually `\mptn\etc\hosts`.
  - On Windows NT, the location of this file is usually `<NT install path>\system32\drivers\etc\hosts`.

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

Refer to your local network administrator and your DB2 for OS/390 administrator for help getting this information. Use one copy of the example work sheet, Table 7 on page 57, to plan *each* TCP/IP connection between DB2 Connect and a host database server.

Example Worksheet:

Table 7. Example Worksheet for Planning TCP/IP Connections to DB2 Universal Database for OS/390

Ref.	Description	Sample Value	Your Value
User Information			
`TCP-1`	User Name	A.D.B.User	
`TCP-2`	Contact Info	(123)-456-7890	
`TCP-5`	User ID	ADBUSER	
`TCP-6`	Database Type	db2390	
`TCP-7`	Connection type (must be TCPIP).	TCPIP	TCPIP
Network Elements at the Host			
`TCP-8`	Host name	MVSHOST	
`TCP-9`	Host IP address	9.21.152.100	
`TCP-10`	Service name	db2inst1c	
`TCP-11`	Port number	446	
`TCP-12`	LOCATION NAME	NEW_YORK3	
`TCP-13`	User ID		
`TCP-14`	Password		
Network Elements at the DB2 Connect Workstation			
`TCP-18`	Host name	mcook02	
`TCP-19`	IP address	9.21.27.179	
`TCP-20`	Service name	db2inst1c	
`TCP-21`	Port number	446	
DB2 Directory Entries (at the DB2 Connect workstation)			
`TCP-30`	Node name	MVSIPNOD	
`TCP-31`	Database name	nyc3	
`TCP-32`	Database alias	mvsipdb1	
`TCP-33`	DCS database name	nyc3	

Notes:

1. To obtain the host's IP address `TCP-9`, enter at the host:

   `TSO NETSTAT HOME`

2. To obtain the port number `TCP-11`, look for `DSNL004I` in the DB2 master address space or system log.

Configuring the TCP/IP Connection

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

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

Note that some additional planning considerations may apply, for example if you are using DCE. See the *DB2 Connect User's Guide*.

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

```
ping remote_host_name -p port_number
```

Update the DB2 Connect Configuration: At a command line prompt, issue the following command to update the Database Manager Configuration:

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

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

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

Update the DB2 Connect Directories:

1. At a command line prompt, issue the following command to catalog the DB2 for MVS/ESA node:

   ```
   db2 catalog tcpip node MVSIPNOD remote MVSHOST server db2inst1c
   ```

   where:
   - *MVSIPNOD* is the local DB2 Connect node name to be used for the host.
   - *MVSHOST* is the eight-character TCP/IP host name for the DB2 Universal Database for OS/390 host. TCP/IP name lookup must resolve this name to the correct destination Internet address, either through an entry in the local hosts file on the DB2 Connect workstation, or via a Domain Name Server (DNS) referenced by the DB2 Connect workstation.
   - *db2inst1c* is the *port number* defined at the DB2 Connect workstation. This must resolve to the same port number as that defined for use by DB2 Connect at the DB2 for MVS/ESA host. Alternatively, you can specify the *service name* associated with that port.

2. Create entries for the Database and Data Connection Services directories, as follows (this shows the values used in the sample worksheet):

   ```
   db2 catalog dcs database NYC3 as NEW_YORK3
   db2 catalog database NYC3 as MVSIPDB1 at node MVSIPNOD authentication dcs
   ```

   where:
   - *MVSIPDB1* is user-defined and represents the DB2 Connect database alias for the host database.
   - *NYC3* is the DB2 Connect database name for the host database.
   - *MVSIPNOD* is the DB2 Connect node name for the host.
   - *NEW_YORK3* is the DB2 Universal Database for OS/390 *LOCATION NAME* for the target database.

CONNECT and BIND: Finally, connect to the target host server and bind the utilities and applications to the server using commands similar to the following in the command line processor:

```
connect to MVSIPDB1 user USERID using PASSWORD
bind path/bnd/@ddcsmvs.lst blocking all
    sqlerror continue blocking all grant public
disconnect all
```

where *path* corresponds to the *DB2PATH* registry value.

These commands are described in detail in the *Command Reference.*

Preparing DB2 Universal Database for AS/400 for DB2 Connect

DB2 Connect gives applications on remote systems access to data in your DB2 Universal Database for AS/400 system. In order to set up the connection, the person installing DB2 Connect needs the following information:

__ 1. The local network name. You can get this information by entering **DSPNETA**.

__ 2. The local adapter address. You can get this information by entering **WRKLIND (*trlan)**.

__ 3. The mode name. You can get a list of mode names by entering **WRKMODD**. If the mode IBMRDB has been defined on your AS/400 system, you should use it.

__ 4. The local control point name. You can get this information by entering **DSPNETA**.

__ 5. The remote transaction program name. The default is X'07'6DB (X'07F6C4C2'). The default is always used by DB2 Universal Database for AS/400. If entering a hexadecimal number is not convenient, an alias is QCNTEDDM.

__ 6. The relational database name. You can get this information by entering **DSPRDBDIRE**. This will display a list. The line containing *LOCAL in the Remote Location column identifies the RDBNAME which must be defined to the client. If there is no *LOCAL entry, you can add one, or use the system name obtained from the DSPNETA command on the server.

Here is an example screen:

```
                  Display Relational Database Directory Entries

   Position to  . . . . . .

   Type options, press Enter.
     5=Display details    6=Print details

          Relational          Remote
   Option Database            Location  Text

     _     _____
     _     DLHX               RCHAS2FA
     _     JORMT2FA           JORMT2FA
     _     JORMT4FD           JORMT4FD
     _     JOSNAR7B           RCHASR7B
     _     RCHASR7B           *LOCAL
     _     RCHASR7C           RCHASR7C
     _     R7BDH3SNA          RCH2PDH3
     _     RCHASDH3           RCHASDH3
```

When you have obtained these parameters from OS/400, enter your values into the worksheet that follows:

Table 8. Configuration Parameters from OS/400

Item	Parameter	Example	Your value
A-1	Local network name	SPIFNET	
A-2	Local adapter address	400009451902	
A-3	Mode name	IBMRDB	
A-4	Local control point name	SYD2101A	
A-5	Remote transaction program	X'07F6C4C2'(default)	
A-6	Relational database name	NEW_YORK3	

For further information about how to set up DB2 Universal Database for AS/400 as an application server, refer to the online *Connectivity Supplement* provided with your DB2 Connect product.

More detailed information can also be found in the *DRDA Connectivity Guide*, and on the World Wide Web at the V4R4 AS/400 Information Center. The Information Center can be found at the following URL:

```
http://as400bks.rochester.ibm.com
```

Preparing DB2 for VSE & VM

For information about how to set up DB2 for VSE & VM as an application server, refer to the *Connectivity Supplement* online document.

More detailed information can also be found in the *DRDA Connectivity Guide.*

Part 4. Configuring Access to Host and AS/400 Databases

Chapter 7. Configuring DB2 Connect to Host or AS/400 Communications Using the CCA

This section describes how to use the Client Configuration Assistant (CCA) to configure your DB2 Connect workstation to access host or AS/400 DB2 databases. The configuration steps described in this section apply if you are connecting to the host or AS/400 system using TCP/IP or SNA (APPC).

> The CCA cannot auto-detect or configure the following SNA (APPC) subsystems:
> - IBM eNetwork Communications Server
> - Communications Server for Windows NT SNA API Client
> - Microsoft SNA Server for Windows NT

To complete the steps in this section, you should be familiar with how to start the CCA. For more information, see "Starting the Client Configuration Assistant" on page 143.

To configure communications to a non-host or AS/400 based DB2 database, go to "Chapter 13. Configuring Client-to-Server Communications Using the Client Configuration Assistant" on page 115.

To configure communications to a host or AS/400 DB2 database using the command line processor, or if an SNA product cannot be configured by the CCA, go to the section that describes the communications protocol that you want to configure:

- TCP/IP - refer to the *Installation and Configuration Supplement* online document.
- APPC - see "Chapter 8. Configuring APPC Communications on the DB2 Connect Workstation" on page 75.

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 databases to be configured as CLI or ODBC data sources.
- Export client profiles, or import client and server 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.

- Change your server password.

The CCA provides three methods to set up a database connection to a server:
- Using a profile.
- Searching the network for databases.
- Manually entering database and communication protocol information for a server.

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

Configuration Steps

To configure your workstation to access a host or AS/400 database, perform the following steps:

Step 1. Log on to the system with a valid DB2 user ID. For more information, see "Appendix F. Naming Rules" on page 177.

> If you are adding a database to a system that has a DB2 Connect server product installed, log on to this system as a user with System Administrative (SYSADM) or System Controller (SYSCTRL) authority on the instance. For more information, see "Working with the System Administrative Group" on page 148.
>
> This restriction is controlled by the *catalog_noauth* database manager configuration parameter. For more information, refer to the *Administration Guide*.

Step 2. Start the CCA. For more information, see "Starting the Client Configuration Assistant" on page 143.

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

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

Go to the section that describes the configuration method that you want to use:
- "Adding a Database Using a Profile" on page 67.
- "Adding a Database Using Discovery" on page 68.
- "Adding a Database Manually" on page 70.

Adding a Database Using a Profile

A profile contains information about instances and databases on a system, and databases within each instance. For information on profiles, see "Creating and Using Profiles" on page 122.

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

Step 1. Select the **Use an access profile** radio button and click on the **Next** push button.

Step 2. Click on the **...** push button and select a profile.

Step 3. You are presented with a list of systems, instances, and databases. Select the database that you want to add to your system.

Step 4. Select the type of connection that you want to make to the host or AS/400 database:

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

Step 5. Click on the **Next** push button.

Step 6. Enter a local database alias name in the **Database alias** field and add a comment that describes this database in the **Comment** field. Click on the **Next** push button.

> If you do not specify a database alias name, the default will be the same as the remote database alias name.

Step 7. Register this database as an ODBC data source.

> If you are not planning to use ODBC, click on the **Done** push button and go to the next step.

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

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

- If you would like all users on your system to have access to this data source, select the **As a system data source** radio button.
- If you would like only the current user to have access to this data source, select the **As a user data source** radio button.

c. If you would like to create an ODBC data source file to share
      database access, select the **Create a file data source** check box
      and enter the path and filename for this file in the **File data
      source name** field.

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

   e. Click on the **Done** push button to add the database that you
      selected. The Confirmation window opens.

Step 8. Click on the **Test Connection** push button to test the connection. The
   Connect to DB2 Database window opens.

   If the database that you want to add was not added successfully,
   click on the **Change** push button to change any settings that you may
   have incorrectly specified or click on the **Help** push button for more
   information. For even more detailed information, refer to the
   Troubleshooting Guide.

Step 9. Enter your user ID and password and click on **OK**. If the connection
   is successful, a message confirming the connection appears.

Step 10. You are now able to use this database. To finish using the Add
   Database SmartGuide, click on the **Close** push button; you can then
   add more databases by clicking on the **Add** push button or exit the
   CCA.

Adding a Database Using Discovery

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

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

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

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

Step 3. Click on the **[+]** sign beside a system to get a list of the instances
   and databases on it.

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

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

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

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

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

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

a. Click on the **Add System** push button

b. Enter the required communication protocol parameters for the remote Administration Server and click on **OK**. A new system is added. For more information, click on the **Help** push button.

c. Select the database that you want to add and click on the **Next** push button.

Step 4. You are presented with a list of systems, instances, and databases. Select the database that you want to add to your system.

Step 5. Select the type of connection that you want to make to the host or AS/400 database:

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

Step 6. Click on the **Next** push button.

Step 7. Enter a local database alias name in the **Database alias** field and add a comment that describes this database in the **Comment** field. Click on the **Next** push button.

> If you do not specify a database alias name, the default will be the same as the remote database alias name.

Step 8. Register this database as an ODBC data source.

If you are not planning to use ODBC, click on the **Done** push button and go to the next step.

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

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

- If you would like all users on your system to have access to this data source, select the **As a system data source** radio button.

- If you would like only the current user to have access to this data source, select the **As a user data source** radio button.

c. If you would like to create an ODBC data source file to share database access, select the **Create a file data source** check box and enter the path and filename for this file in the **File data source name** field.

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

e. Click on the **Done** push button to add the database that you selected. The Confirmation window opens.

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

If the database that you want to add was not added successfully, click on the **Change** push button to change any settings that you may have incorrectly specified or click on the **Help** push button for more information. For even more detailed information, refer to the *Troubleshooting Guide*.

Step 10. Enter your user ID and password and click on **OK**. If the connection is successful, a message confirming the connection appears.

Step 11. You are now able to use this database. To finish using the Add Database SmartGuide, click on the **Close** push button; you can then add more databases by clicking on the **Add** push button or exit the CCA.

Adding a Database Manually

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

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

Step 1. Select the **Manually configure a connection to a DB2 database** radio button and click on the **Next** push button.

> If you are not using Lightweight Directory Access Protocol (LDAP), this tab will not be shown, skip this step and go to Step 3.

Step 2. Select the radio button that corresponds to the location where you would like your DB2 directories to be maintained.

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

Step 3. Select the radio button that corresponds to the protocol that you want to use from the **Protocol** list and click on the **Next** push button.

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

Step 5. Enter the database alias name of the remote database that you want to add in the **Database name** field and a local database alias name in the **Database alias** field. Add a comment that describes this database in the **Comment** field and click on the **Next** push button.

If you are adding a database that resides on a host or AS/400 system, the **Database name** field will appear as follows:

OS/390 or MVS
Location name

AS/400
RDB name

VM or VSE
DBNAME

> When a database is created on the remote server, if a database alias is not specified during database creation, the database is created with a database alias=*database_name*; otherwise, the database alias is the name that was specified when the database was created.

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

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

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

- If you would like all users on your system to have access to this data source, select the **As a system data source** radio button.
- If you would like only the current user to have access to this data source, select the **As a user data source** radio button.

c. If you would like to create an ODBC data source file to share database access, select the **Create a file data source** check box and enter the path and filename for this file in the **File data source name** field.

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

e. Click on the **Done** push button to add the database that you selected. The Confirmation window opens.

If you are adding a database using the *manual* method, you can also select the **Node Options** tab, the **Security Options** tab, or the **Host or AS/400 Options** tab (if you are adding a host or AS/400 database) to specify more detailed catalog information. Refer to the online help in each tab for more information.

If you want to use the default settings for the node, security, and host or AS/400 (if applicable) options, click on the **Done** push button and go to the next step.

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

If the database that you want to add was not added successfully, click on the **Change** push button to change any settings that you may have incorrectly specified or click on the **Help** push button for more information. For even more detailed information, refer to the *Troubleshooting Guide.*

Step 8. Enter your user ID and password and click on **OK**. If the connection is successful, a message confirming the connection appears.

Step 9. You are now able to use this database. To finish using the Add Database SmartGuide, click on the **Close** push button; you can then add more databases by clicking on the **Add** push button or exit the CCA.

When you have finished adding the host or AS/400 database to your system, we recommended that you bind any DB2 utilities or applications to the database you just added by performing the following steps:

Step 1. Log on to the system with a user ID that has System Administrative (SYSADM), Database Administrative (DBADM), or Bind Add (BINDADD) authority on the database.

Step 2. Start the CCA.

Step 3. Select the database that you want to bind the utilities and packages against.

Step 4. Click on the **Bind** push button.

Step 5. Select the type of bind that you want to perform:

- Select the **Bind DB2 utilities** radio button if you want to bind utilities against the database
- Select the **Bind applications** radio button if you want to bind applications against the database

Step 6. Click on the **Continue** push button.

Step 7. Enter a user ID and password to connect to the database.

Step 8. Select the utilities or applications that you want to bind and click on **OK**.

Now that you have configured host connections, go to "Chapter 9. Enabling Multisite Updates (Two-Phase Commit)" on page 99 if you want to enable the multisite updates feature, or "Chapter 10. Installing DB2 Clients" on page 107 to install DB2 clients.

Chapter 8. Configuring APPC Communications on the DB2 Connect Workstation

This section describes how to configure a DB2 Connect workstation to communicate with a host or AS/400 database server using the APPC communication protocol. The instructions that follow assume that APPC is supported on the DB2 Connect and host or AS/400 machines.

You will only need to refer to the instructions in this section if you wish to configure your APPC connection to a host or AS/400 database by hand. APPC can often be configured automatically using the Client Configuration Assistant (CCA). For more information about the CCA, see "Chapter 7. Configuring DB2 Connect to Host or AS/400 Communications Using the CCA" on page 65. For further information about the communications requirements of your platform, see "Software Requirements" on page 26. See "Possible Client-to-Server Connectivity Scenarios" on page 30 for the protocols supported for communication between your particular client and server.

The following steps are required to set up a DB2 Connect workstation to use APPC communications with a host or AS/400 database server:

Step 1. Identify and record parameter values.

Step 2. Update the APPC profiles on the DB2 Connect workstation.

Step 3. Catalog the database.

Step 4. Catalog the APPC or APPN Node.

Step 5. Catalog the database as a Database Connection Service (DCS) database.

Step 6. Bind utilities and applications to the database server.

Step 7. Test the Host or AS/400 Connection.

Step 1. Identify and Record Parameter Values

Before you configure the DB2 Connect workstation, have your host-side administrator and LAN administrator fill in copies of the worksheet in Table 9 on page 76 for *each* host or AS/400 database to which you want to connect.

After you fill in the *Your Value* entries, you can use the worksheet to configure APPC communications for DB2 Connect. During the configuration process, replace the sample values that appear in the configuration instructions with your values from the worksheet, using the boxed numbers (for example, **1**) to relate the configuration instructions to the worksheet values.

Note: The worksheet and configuration instructions supply suggested or sample values for required configuration parameters. For other parameters, use the communications program's default values. If your network configuration is different from that used in the instructions, consult your Network Administrator for values that are appropriate to your network.

In the configuration instructions, the ✱ symbol denotes entries that need to be changed but do not have a representation on the worksheet.

Table 9. Worksheet for Planning Host and AS/400 Server Connections

Ref.	Name at the DB2 Connect Workstation	Network or VTAM Name	Sample Value	Your Value
Network Elements at the Host				
1	Host name	Local Network Name	SPIFNET	
2	Partner LU Name	Application Name	NYM2DB2	
3	Network ID		SPIFNET	
4	Partner Node name	Local CP or SSCP Name	NYX	
5	Target database name (*target_dbname*)	**OS/390 or MVS:** LOCATION NAME **VM/VSE:** DBNAME **AS/400:** RDB Name	NEWYORK	
6	Link Name or Mode Name		IBMRDB	
7	Connection name (Link name)		LINKHOST	
8	Remote Network or LAN address	Local Adapter or Destination Address	400009451902	
Network Elements at the DB2 Connect Workstation				
9	Network or LAN ID		SPIFNET	
10	Local Control Point Name		NYX1GW	
11	(Local) LU name		NYX1GW0A	
12	(Local LU) alias		NYX1GW0A	

Table 9. Worksheet for Planning Host and AS/400 Server Connections (continued)

Ref.	Name at the DB2 Connect Workstation	Network or VTAM Name	Sample Value	Your Value
13	Local Node or Node ID	ID BLK	071	
14		ID NUM	27509	
15	Mode name		IBMRDB	
16	Symbolic Destination name		DB2CPIC	
17	(Remote) Transaction program (TP) name		**OS/390 or MVS:** X'07F6C4C2' or DB2DRDA **VM/VSE:** AXE for VSE, or the DB2 for VM db name for VM **AS/400:** X'07F6C4C2' or QCNTEDDM	
DB2 Directory Entries (at the DB2 Connect workstation)				
19	Node name		db2node	
19	Security		program	
20	Local database name (*local_dcsname*)		ny	

For each server that you are connecting to, fill in a copy of the worksheet as follows:

1. For *network ID*, determine the network name of both the host and the DB2 Connect workstations (**1** , **3** , and **9**). Usually these values will be the same. (For example, SPIFNET.)

2. For the *partner LU name* (**2**), determine the VTAM application (APPL) name for OS/390, MVS, VSE, or VM. Determine the local CP name for AS/400.

3. For *partner node name* (**4**), determine the System Services Control Point (SSCP) name for OS/390, MVS, VM, or VSE. Determine the local control point name for an AS/400.

4. For *database name* (**5**), determine the name of the host database. This is the *LOCATION NAME* for OS/390 or MVS, the *RDB_NAME* for VM or VSE, or a relational database name for AS/400.

5. For *mode name* (**6** and **15**), usually the default IBMDRB is sufficient.

6. For *remote network address* (**8**), determine the controller address or local adapter address of the target host or AS/400 system.

7. Determine the *local control point name* (**10**) of the DB2 Connect workstation. This is usually the same as the PU name for the system.

8. Determine the *local LU name* to be used by DB2 Connect (**11**). If you use a Syncpoint Manager to manage multisite updates (two-phase commit), the local LU should be the LU used for the SPM. In this case, that LU cannot also be the Control Point LU.

9. For *local LU alias* (**12**), you usually use the same value as for the local LU name (**11**).

10. For *local node* or *node ID* (**13** plus **14**), determine the IDBLK and IDNUM of the DB2 Connect workstation. The default value should be correct.

11. For *symbolic destination name* (**16**), choose a suitable value.

12. For (remote) *transaction program (TP) name* (**17**), it is recommended that you use the defaults listed in the worksheet.

13. Leave the other items blank for now (**18** to **21**).

Step 2. Update the APPC Profiles on the DB2 Connect Workstation

Use the completed worksheet in Table 9 on page 76 to configure DB2 Connect APPC communications for access to a remote host or AS/400 database server.


Go to the sections that describe how to configure APPC communications on the platforms that are present in your network:

- "Configuring IBM eNetwork Communications Server for Windows NT SNA API Client"
- "Configuring Microsoft SNA Server for Windows NT" on page 81
- "Configuring Microsoft SNA Client" on page 90

Configuring IBM eNetwork Communications Server for Windows NT SNA API Client

Read this section if you have a Windows NT workstation that has IBM eNetwork Communications Server for Windows NT SNA API Client Version 5.0 or higher installed and you want to connect to an IBM eNetwork Communications Server for Windows NT server.

The Communications Server for Windows NT server and its SNA API client act as a split client. This configuration requires that you have an APPC-enabled application (such as DB2 Connect) running on the SNA API client workstation.
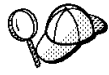
> The instructions in this section use a Windows NT client. The instructions for other supported operating systems are similar; refer to your Communications Server for Windows NT documentation for more information.

To configure the Windows NT SNA API client for APPC communications, complete the following steps:

Step 1. Create a user account for the SNA API client on the Communications Server for Windows NT server

   a. Click on the **Start** button and select **Programs**->**Administrative Tools (Common)**->**User Manager**. The User Manager window opens.

   b. Select **Users**->**New User** from the menu bar. The New User window opens.

   c. Fill in the fields for the new SNA client user accout. For more information, refer to the Windows NT online help.

   d. Ensure that this user account is a member of the *Administrators, IBMCSADMIN,* and *IBMCSAPI* groups:

      1) Click on the **Groups** push button

      2) Select a group from the **Not member of** box and click on the <- **Add** push button. Repeat this step for each group that your user account must belong to.

   e. Click on **OK**.

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

Step 2. Start the configuration GUI for the IBM eNetwork CS/NT SNA API Client. Click on the **Start** push button and select **Programs**->**IBM Communications Server SNA Client**->**Configuration**. The CS/NT

SNA Client Configuration window opens.
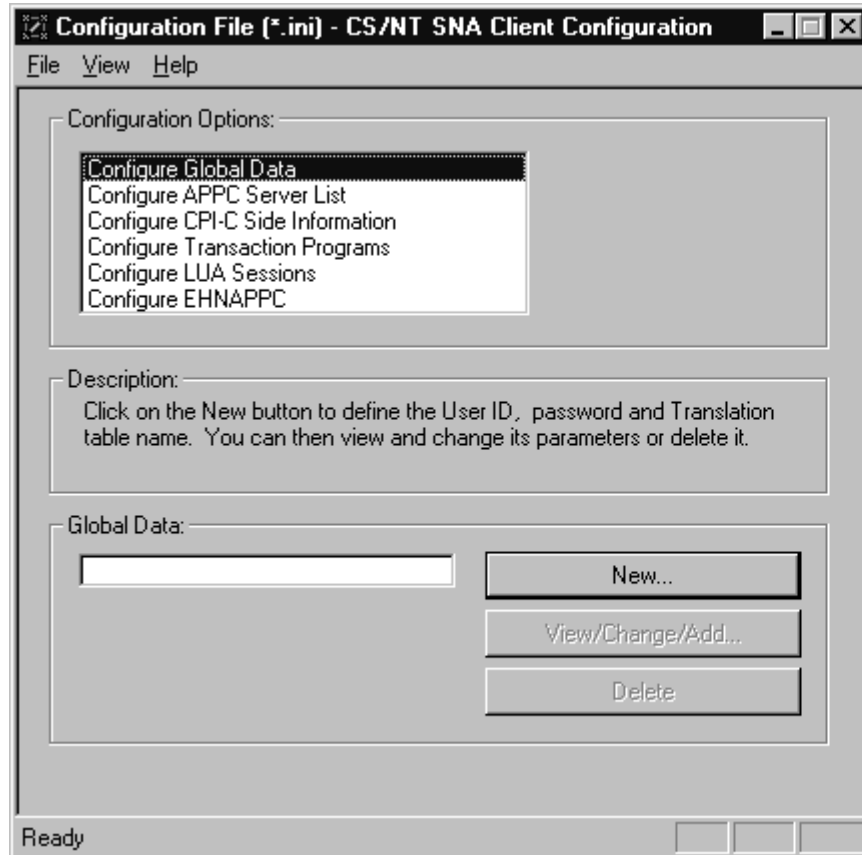
Step 3. Configure Global Data

    a. In the **Configuration options** box, select the **Configure Global Data** option and click on the **New** push button. The Define Global Data window opens.

    b. Enter the user name for the SNA API client in the **User name** field. This is the user name that was defined in Step 1.

    c. Enter the password for the user account in the **Password** and **Confirm Password** fields.

    d. Click on **OK**.

Step 4. Configure APPC Server List

    a. In the **Configuration options** box, select the **Configure APPC Server List** option. Click on the **New** push button. The Define APPC Server list window appears.

b. Type in the IP address of the server (for example, 123.123.123.123).

c. Click on **OK**.

Step 5. Configure CPI-C Side Information

a. In the **Configuration options** box, select the **Configure CPI-C side information** option and click on the **New** push button. The Define CPI-C side information window opens.

b. Enter the symbolic destination name (**16**) in the **Symbolic destination name** field.

c. Enter your Local LU alias (**12**) in the **Local LU alias** field.

d. Enter the mode name (**15**) in the **Mode name** field.

e. Enter the transaction program name (**17**) in the **TP name** field.

f. Select the **For SNA API Client use** check box for this transaction program.

g. Enter the network ID (**3**) and partner LU name (**2**) in the **Partner LU name** field.

h. Click on **OK**.

Step 6. Save the Configuration

a. Select **File**->**Save As** from the menu bar. The Save As window opens.

b. Type in a file name, and click on the **Save** push button.

You now need to update the DB2 directories, bind utilities and applications to the server, and test the connection.

The easiest way to do this is to use the Client Configuration Assistant (CCA). For more information on using the CCA, go to "Chapter 7. Configuring DB2 Connect to Host or AS/400 Communications Using the CCA" on page 65. However, you can also perform these steps manually, as described in "Step 3. Catalog the APPC or APPN Node" on page 93 and the sections that follow.

Configuring Microsoft SNA Server for Windows NT

This section describes how to configure Microsoft SNA Server Version 4.0 for Windows NT on your DB2 Connect workstation to connect to host or AS/400 database servers using APPC. Although Microsoft SNA Server will run on Windows NT 4.0 Workstation, Windows NT 4.0 Server is recommended.


For instructions on how to configure Microsoft SNA Client for Windows NT, go to "Configuring Microsoft SNA Client" on page 90.

You can define the properties of your SNA connections in the Microsoft SNA Server Manager (Server Manager). The Server Manager uses an interface

similar to that of the Windows NT Explorer. The following illustration shows the interface. There are two panes in the main window of the Server Manager. All the configuration options we will be using can be accessed by right-clicking on objects in the left-hand pane of the window. Every object has a *context menu* that you can access by right-clicking on the object.

To configure APPC communications for use by DB2 Connect using Microsoft SNA Server Manager, perform the following steps:

Step 1. Start the Server Manager by clicking on the **Start** button and selecting **Programs**->**Microsoft SNA Server**->**Manager**. The Microsoft SNA Server Manager window opens.
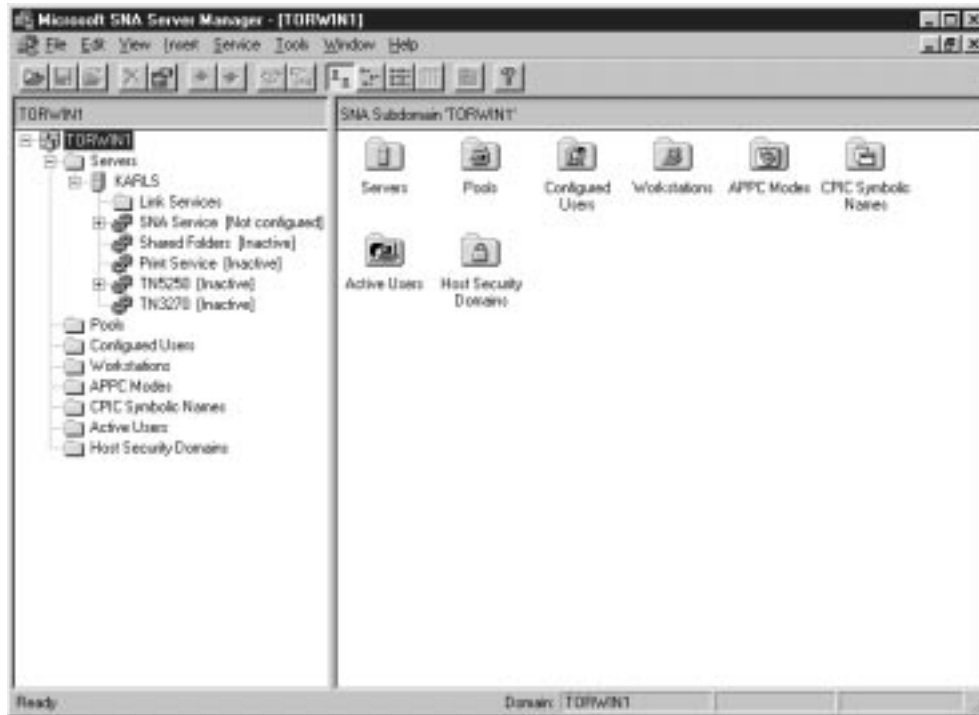
Step 2. Define the control point name
  a. Click on the [+] sign beside the **Servers** folder.
  b. Right-click on **SNA Service** folder and select the **Properties** option. The Properties window opens.
  c. Enter the correct **NETID** (**9**) and **Control Point Name** (**10**) in the corresponding fields.
  d. Click on **OK**.
Step 3. Define the link service (802.2)

a. Right-click on the **SNA Service** icon and select the **Insert**->**Link Service** option. The Insert Link Service window opens.
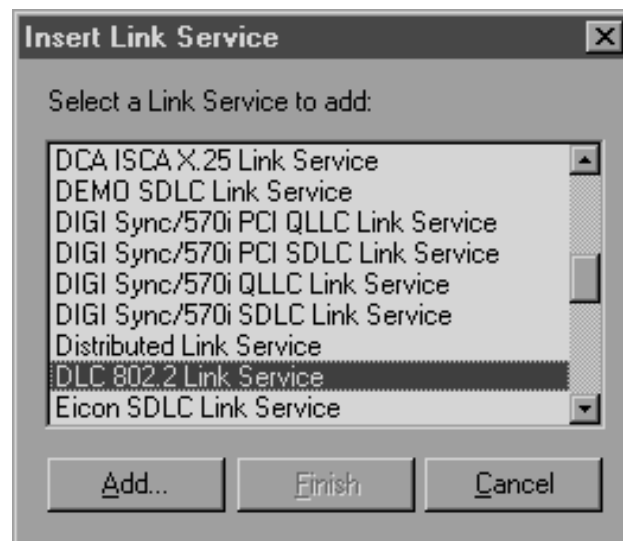
b. Select DLC 802.2 Link Service.
c. Click on the **Add** push button.
d. Click on the **Finish** push button.

Step 4. Define the connection properties

a. Right-click on **SNA Service** and select the **Insert**->**Connection**->**802.2** option. The Connection Properties window opens.

b. Enter a connection name (**7**) in the **Name** field.
c. Click on the **Link Service** drop-down box and select the **SnaDlc1** option.
d. Select the **Remote End** radio button from the **Host System** box.
e. Select the **Both Directions** radio button from the **Allowed Directions** box.
f. Select the **On Server Startup** radio button from the **Activation** box.
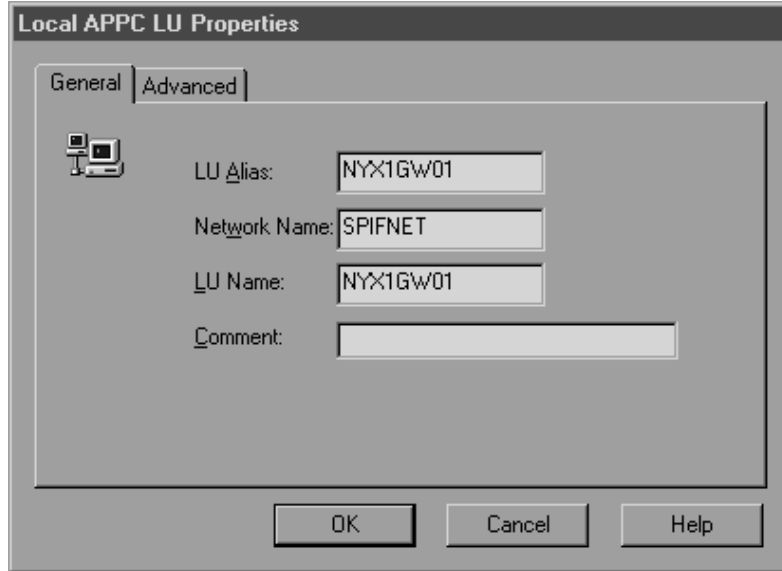
g. Select the **Address** tab.

h. Fill in the **Remote Network Address** field (**8**). Accept the default numbers in the other fields.

i. Select the **System Identification** tab.

j. Enter the following information:

1) For the **Local Node Name**, add the **Network ID** (**9**), the **Local PU Name** (**10**), and the **Local Node ID** (**1** plus **14**). Accept the **XID Type** default.

2) For the **Remote Node Name**, add the **NETID** (**1**) and the **Control Point Name** (**4**). Accept the other defaults

k. Click on **OK**.

Step 5. Define a local LU

a. Right-click on the **SNA Service** icon and select the **Insert**->**APPC**->**Local Lu** option. The Local APPC LU Properties

window opens.

b. Enter the following information:
   - The **LU Alias** (**12**).
   - The **NETID** (**9**).
   - The **LU Name** (**11**).
c. Select the **Advanced** tab.
d. Select the **Member of Default Outgoing Local APPC LU Pool** option. Accept the other defaults.
e. Click on **OK**.

Step 6. Define a remote LU

a. Right-click on **SNA Services** icon and select the **Insert**->**APPC**->**Remote LU** option. The Remote APPC Lu Properties window opens.
b. Click on the **Connection** drop down box and select the appropriate connection name (**7**).
c. Enter the partner LU name (**2**) in the **LU Alias** field.
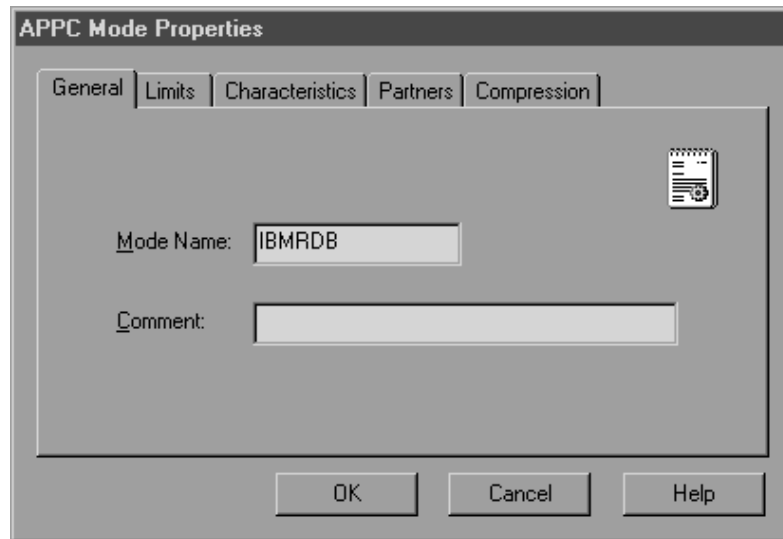d. Enter the Network ID (**1**) in the **Network Name** field.

> The other fields will be filled in by the program. If your LU alias is not the same as your LU Name, make sure you specify the LU Name in the appropriate field. The program will fill it in automatically, but it will be incorrect if the alias and the name are not the same.

e. Click on **OK**.

Step 7. Define a mode
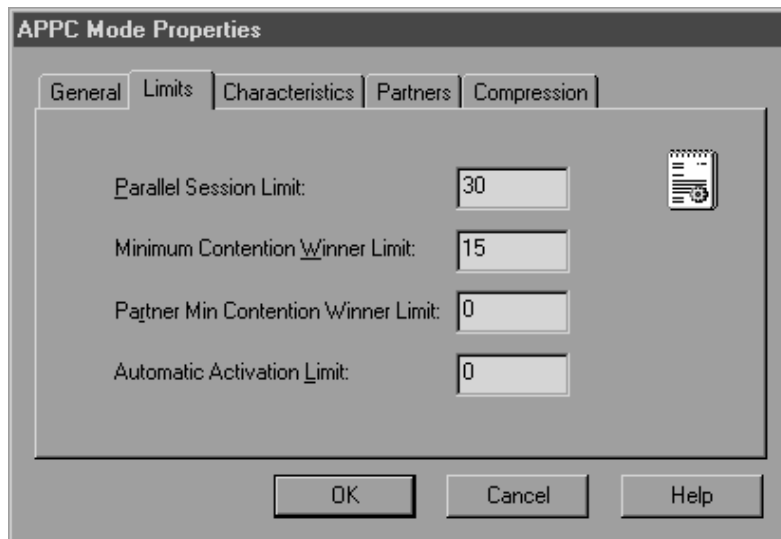 a. Right-click on **APPC Modes** folder and select the
     Insert->**APPC**->**Mode Definition** option. The APPC Mode
     Properties window opens.

  b. Enter the Mode Name **6** in the **Mode Name** field.
  c. Select the **Limits** tab.

d. Enter appropriate numbers for the **Parallel Session Limit** and **Minimum Contention Winner Limit** fields. Your Host-Side or LAN administrator should be able to supply you with the numbers if you do not know the limits you should place here.

e. Accept the other defaults, and click on **OK**.

Step 8. Define the CPIC name properties

a. Right-click on **CPIC Symbolic Name** folder icon and select the **Insert**->**APPC**->**CPIC Symbolic Name** option. The CPIC Name Properties window opens.

b. Enter the Symbolic Destination Name (**16**) in the **Name** field.

c. Click on the **Mode Name** drop down box and select a mode name, for example, **IBMRDB**.

d. Select the **Partner Information** tab.

e. In **Partner TP Name** box, select the **SNA Service TP (in hex)** radio button and enter the Service TP name (**17**), or select the **Application TP** radio button and enter the Application TP name (**17**).

f. In the **Partner LU Name** box, select the **Fully Qualified** radio button.

g. Enter the fully-qualified Partner LU Name (**1** and **2**) or alias.

h. Click on **OK**.

i. Save the configuration

1) Select **File**->**Save** from the menu bar of the Server Manager window. The Save File window opens.

2) Type a unique name for your configuration into the **File Name** field.

3) Click on the **Save** push button.

You now need to update the DB2 directories, bind utilities and applications to the server, and test the connection.

The easiest way to do this is to use the Client Configuration Assistant (CCA). For more information on using the CCA, go to "Chapter 7. Configuring DB2 Connect to Host or AS/400 Communications Using the CCA" on page 65. However, you can also perform these steps manually, as described in "Step 3. Catalog the APPC or APPN Node" on page 93 and the sections that follow.

Configuring Microsoft SNA Client

Read this section if you have a Windows NT workstation that has DB2 Connect installed. This section provides step-by-step instructions for setting up the communications between your DB2 Connect workstation and a Windows NT workstation that has Microsoft SNA Server V4.0 (or later) installed.

For instructions on how to configure Microsoft SNA Server Version 4.0 for Windows NT, go to "Configuring Microsoft SNA Server for Windows NT" on page 81.

Figure 11 on page 91 illustrates the example DB2 Connect Server scenario.
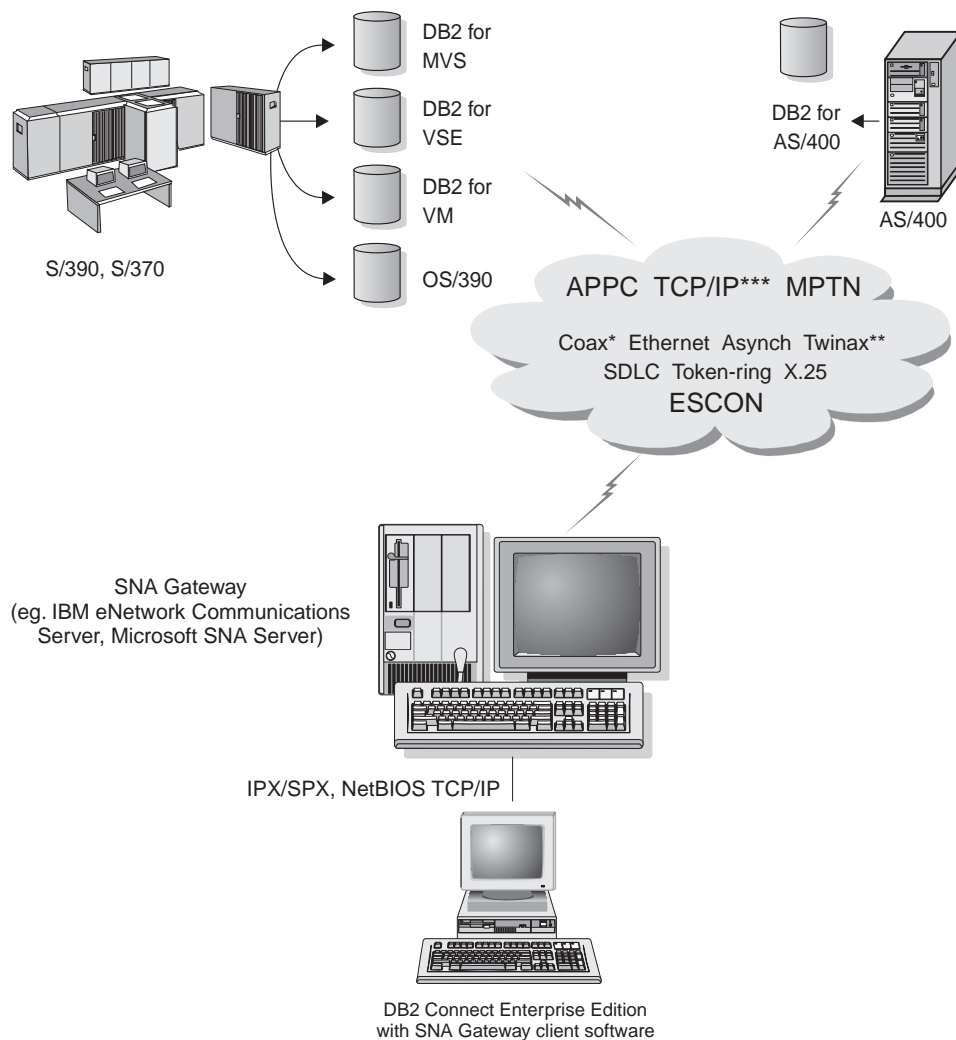
* For Host connections only

** For AS/400

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

Figure 11. Indirect Connection to host or AS/400 database server via SNA Communications Gateway

The rest of this section assumes:

1. The Microsoft SNA Server has already been configured for APPC communications with the host, and is enabled for ODBC and DRDA. Refer to the Microsoft SNA Server documentation for further information.

2. Microsoft SNA Client Version 2.11 is not already installed on your DB2 Connect workstation.

To configure the Microsoft SNA client perform the following steps:

Step 1. Obtain Required Information

For your Microsoft SNA client software to function properly you must have access to a properly configured Microsoft SNA Server. Request that your SNA Server administrator:

Step 1. Obtain the proper license for you to use Microsoft SNA Client on your workstation.

Step 2. Define a user ID and password for you on the SNA Server domain.

Step 3. Define connections to the host and AS/400 databases that you need to access, as described in "Configuring Microsoft SNA Server for Windows NT" on page 81.

Step 4. Provide you with the symbolic destination name (**16**), database name (**5**), and user account to use for each database connection defined in the previous step.

If you plan to change host passwords, the SNA administrator will also need to provide you with symbolic destination names for password management tasks on each host.

Step 5. Provide you with the Microsoft SNA Server domain name and the protocol used for communicating with the SNA server (TCP/IP, NetBEUI, IPX/SPX).

Step 2. Install the Microsoft SNA Client on the DB2 Connect Workstation

1. Obtain the Microsoft SNA Client software, and follow its instructions to start the installation program.

2. Follow the instructions on the screen to complete the installation. Choose your SNA Server domain name and communication protocol according to the instructions provided by your SNA Server administrator.

3. When you reach the Optional Components window, *deselect* Install ODBC/DRDA driver so that it will not be installed.

4. Complete the installation.

Step 3. Install DB2 Connect for Windows

Step 1. Install DB2 Connect.

Step 2. Open the DB2 Folder, and click on the **Client Configuration Assistant** to start the configuration dialog.

Step 3. Click on the **Start** button and select **Programs**->**DB2 for Windows NT**->**Client Configuration Assistant**.

Step 4. You need to provide the following information:

__ a. The Symbolic destination name (**16**) defined at the Microsoft SNA Server for the Partner LU (**2**) of the target host or AS/400 database server.

__ b. The real database name (**5**).

You now need to update the DB2 directories, bind utilities and applications to the server, and test the connection.

The easiest way to do this is to use the Client Configuration Assistant (CCA). For more information on using the CCA, go to "Chapter 7. Configuring DB2 Connect to Host or AS/400 Communications Using the CCA" on page 65. However, you can also perform these steps manually, as described in "Step 3. Catalog the APPC or APPN Node" and the sections that follow.

Step 3. Catalog the APPC or APPN Node

You must add an entry to the DB2 Connect workstations's node directory to describe the remote node. In most cases, you will add an APPC node entry to the node directory. For OS/2, Windows 9x, and Windows NT, you can alternatively add an APPN node entry if your local SNA node has been set up as an APPN node.

To catalog the node, perform the following steps:

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

Step 2. To catalog an APPC node, specify the chosen alias (*node_name*), Symbolic destination name (*sym_dest_name*), and the APPC security type (*security_type*) that the client will use for the APPC connection. Enter the following commands:

```
catalog "appc node node_name remote sym_dest_name
    security security_type"
terminate
```

> The *sym_dest_name* parameter is case-sensitive and *must* exactly must match the case of the Symbolic destination name you defined previously.

For example, to catalog a remote database server with the Symbolic destination name *DB2CPIC* on the node called *db2node*, using APPC Security type *program*, enter the following commands:

```
catalog appc node db2node remote DB2CPIC security program
terminate
```

Step 3. To catalog an APPN node, specify the chosen alias (*node_name*), the network ID (**9**), the remote partner LU (**4**), the transaction

Chapter 8. Configuring APPC Communications on the DB2 Connect Workstation **93**

program name (**17**), the mode (**15**), and the security type. Enter the following commands substituting your values from the worksheet in Table 9 on page 76:

```
catalog "appn node db2node network SPIFNET remote NYM2DB2
        tpname QCNTEDDM mode IBMRDB security PROGRAM"
terminate
```

Note: To connect to DB2 for MVS, it is recommended that you use security PROGRAM.

> If you need to change values that were set with the **catalog node** command, perform the following steps:
>
> Step 1. Run the **uncatalog node** command in the command line processor as follows:
>
> > uncatalog node *node_name*
>
> Step 2. Recatalog the node with the values that you want to use.

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

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

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

Step 2. Enter the following commands:

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

where:

- *local_dcsname* is the local name of the host or AS/400 database.
- *target_dbname* is the name of database on the host or AS/400 database system.

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

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

Step 5. Catalog the Database

Before a client application can access a remote database, the database must be cataloged on the host system node and on any DB2 Connect workstation nodes that will connect to it. When you create a database, it is automatically cataloged on the host with the database alias (*database_alias*) the same as the

database name (*database_name*). The information in the database directory, along with the information in the node directory, is used on the DB2 Connect workstation to establish a connection to the remote database.

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

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

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

Table 10. Worksheet: Parameter Values for Cataloging Databases

Parameter	Description	Sample Value	Your Value
Database name (*database_name*)	The local DCS database name (*local_dcsname*) of the *remote* database. You specified this when you catalogued the DCS database directory. For example, *ny*.	ny	
Database alias (*database_alias*)	An arbitrary local nickname for the remote database. 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 the database from a client.	localny	
Node name (node_name)	The name of the node directory entry that describes where the database resides. Use the same value for node name (*node_name*) that you used to catalog the node in the previous step.	db2node	

Step 3. Catalog the database by entering the following commands:

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

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

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

> If you need to change values that were set with the **catalog** *database* command, perform the following steps:
>
> Step a. Run the **uncatalog** *database* command:
>
>   uncatalog database *database_alias*
>
> Step b. Recatalog the database with the value that you want to use.

Step 6. Bind Utilities and Applications to the Database Server

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

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

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

For example:

```
db2 connect to NYC3 user myuserid using mypassword
db2 "bind /sqllib/myapps@ddcsmvs.lst blocking all sqlerror continue
     messages mvs.msg grant public"
db2 connect reset
```

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

Further information about these commands can be found in the *DB2 Connect User's Guide*.

Step 7. Test the Host or AS/400 Connection

When you have finished configuring the DB2 Connect workstation for communications, you need to test the connection to the remote database.

Enter the following command at the DB2 Connect workstation, remembering to substitute the *db_alias* value you defined in "Step 3. Catalog the APPC or APPN Node" on page 93 :

```
connect to db_alias user userid using password
```

For example, enter the following command:

```
connect to nyc3 user userid using password
```

The *userid* and *password* values required are those defined at the host or AS/400 system, and must be provided to you by your DB2 Administrator. For more information, refer to the *DB2 Connect User's Guide.*

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

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

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

If the connection fails, check the following items at the DB2 connect workstation:

__ 1. The node was cataloged with the correct symbolic destination name (*sym_dest_name*).
__ 2. The node name (*node_name*) that was specified in the database directory points to the correct entry in the node directory.
__ 3. The database was cataloged properly, using the correct *real_host_dbname* for the database on the host or AS/400 server.

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

Chapter 9. Enabling Multisite Updates (Two-Phase Commit)

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

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

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

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

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

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

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

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

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

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

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

Host and AS/400 multisite update scenarios that require SPM.				
Yes	TCP/IP	Yes	• DB2 Connect Enterprise Edition • DB2 Universal Database Enterprise Edition • DB2 Universal Database Enterprise-Extended Edition	• DB2 for OS/390 V5.1 • DB2 Universal Database for OS/390 V6.1
Yes	SNA	Yes	• DB2 Connect Enterprise Edition* • DB2 Universal Database Enterprise Edition* • DB2 Universal Database Enterprise-Extended Edition* **Note:** *AIX, OS/2 and Windows NT platforms only.	• DB2 for MVS/ESA V3.1 and 4.1 • DB2 for OS/390 V5.1 • DB2 Universal Database for OS/390 V6.1 • DB2/400 V3.1 or later • DB2 Server for VM or VSE V5.1 or later

Host and AS/400 multisite update scenarios that require SPM.				
No	TCP/IP	No	• DB2 Connect Personal Edition • DB2 Connect Enterprise Edition • DB2 Universal Database Enterprise Edition • DB2 Universal Database Enterprise-Extended Edition	• DB2 for OS/390 V5.1 • DB2 Universal Database for OS/390 V6.1
No	SNA	Yes	• DB2 Connect Enterprise Edition* • DB2 Universal Database Enterprise Edition* • DB2 Universal Database Enterprise-Extended Edition* **Note:** *AIX, OS/2 and Windows NT platforms only	• DB2 for MVS/ESA V3.1 and 4.1 • DB2 for OS/390 V5.1 • DB2 Universal Database for OS/390 V6.1 • DB2/400 V3.1 or later • DB2 Server for VM and VSE V5.1 or later

Note:

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

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

1. Set your Web browser to the following URL:

   `http://www.software.ibm.com/data/db2/library/`

2. Select ″DB2 Universal Database″.

3. Search for ″Technotes″ using the search keywords ″DDCS″, ″SPM″, ″MTS″, ″CICS″, and ″ENCINA″.

Enabling Multisite Updates Using the Control Center

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

Starting the Multisite Update Smartguide

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

Smartguide Steps

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

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

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

Step 2. Specify the communications protocols you will use.

Step 3. Specify a Transaction Manager database.

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

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

Step 5. Specify the Syncpoint Manager settings.

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

Testing the Multisite Update Feature

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

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Step 2. Select the databases you wish to test from the available databases in the left sub-window. You can use the arrow buttons in the middle to move selections to and from the **Selected Databases** sub-window.

Step 3. When you have finished your selection, press the **Test...** button at the bottom of the window. The **Multi-Site Update Test Result** window opens.

Step 4. The **Multi-Site Update Test Result** window shows which of the databases you selected succeeded or failed the update test. The window will show sql codes and error messages for those that failed.

Part 5. Installing and Configuring Clients

Chapter 10. Installing DB2 Clients

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

DB2 Administration Clients are available for the following platforms: AIX, HP-UX, Linux, OS/2, Silicon Graphics IRIX, Solaris, Windows 9x, and Windows NT. For more information on using Administration Client tools, see "Appendix C. Using the Control Center to Administer DB2 for OS/390 and DB2 Connect Enterprise Edition servers" on page 167.

DB2 Run-Time Clients and DB2 Software Developer's Kits are available for the following platforms: AIX, HP-UX, Linux, OS/2, Silicon Graphics IRIX, Solaris, Windows 9x, and Windows NT.

Clients that connect to a server must have the appropriate DB2 Administration Client, DB2 Run-Time Client, or DB2 Software Developer's Kit installed.

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

Go to the section that provides installation instructions for the DB2 client that you want to install:

- "Chapter 11. Installing DB2 Clients on Windows 32-Bit Operating Systems" on page 109

- "Chapter 12. Installing DB2 Clients on OS/2 Operating Systems" on page 113

For information on how to install all other Version 6 DB2 clients or DB2 Software Developer's Kits, refer to the *Installation and Configuration Supplement*.

To download installation packages for all supported DB2 clients, which include pre-Version 6 DB2 clients such as DOS, Macintosh, SCO OpenServer, SCO Unixware, SINIX, and Windows 3.x, connect to the IBM DB2 Client Application Enabler Web site at http://www.software.ibm.com/data/db2/db2tech/clientpak.html.

Chapter 11. Installing DB2 Clients on Windows 32-Bit Operating Systems

This section contains the information you need to install a DB2 client or DB2 Software Developer's Kit on Windows 32-bit operating systems.

Before You Begin

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

__ 1. Ensure that your system meets all of the memory, hardware, and software requirements to install your DB2 product. For more information, see "Chapter 2. Planning for Installation" on page 23.

__ 2. A user account to perform the installation.

Windows 9x
Any valid Windows 9x user.

Windows NT
Any user account that does not belong to the *Guests* group on the machine where the account is defined.

Installation Steps

To install a DB2 Client or Software Developer's Kit, perform the following steps:

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

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

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

> To manually invoke the setup program, perform the following steps:
>
> a. Click on **Start** and select the **Run** option.
>
> b. In the **Open** field, enter the following command:
>
>   `x:\setup /i` *language*
>
>   where:
>   - *x:* represents your CD-ROM drive
>   - *language* represents the country code for your language (for example, EN for English). Table 12 on page 171 lists the code for each available language.
>
> c. Click on **OK**.

Step 4. The Welcome window opens.

Step 5. Respond to the setup program's prompts. Online help is available to guide you through the remaining steps. Invoke online help by clicking on the **Help** push button, or by pressing the **F1** key at any time.

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

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

The setup program has:
- Created DB2 program groups and items (or shortcuts).
- Updated the Windows registry.
- Created a default client instance called DB2.

> To configure your client to access remote servers, go to "Chapter 13.
> Configuring Client-to-Server Communications Using the Client
> Configuration Assistant" on page 115.

Chapter 12. Installing DB2 Clients on OS/2 Operating Systems

This section contains the information that you need to install a DB2 client or Software Developer's Kit on OS/2 operating systems. If you have a pre-Version 6 DB2 client for OS/2, the WIN-OS/2 support installed will be kept at its current level.

Before You Begin

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

__ 1. Ensure that your system meets all of the memory, hardware, and software requirements to install your DB2 product. For more information, see "Chapter 2. Planning for Installation" on page 23.

__ 2. The protocol to be used for host connectivity:

    __ a. SNA

    __ b. TCP/IP

    __ c. MPTN

__ 3. A user ID to perform the installation.

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

If UPM is not installed, DB2 will install it and set up the userid USERID with password PASSWORD.

__ 4. To verify that DB2 installed correctly, you will need to have a user account that belongs to the System Administrative (SYSADM) group, is 8 characters or less, and complies with all of DB2's naming rules.

By default, any user that belongs to the *Local Administrators* group, on the local machine where the account is defined, has SYSADM authority on the instance. For more information, see "Working with the System Administrative Group" on page 148. For more information on valid DB2 usernames, see "Appendix F. Naming Rules" on page 177.

Installation Steps

To install a DB2 client or Software Developer's Kit for OS/2, perform the following steps:

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

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

> `x:\install`

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

Step 3. The Welcome window opens.
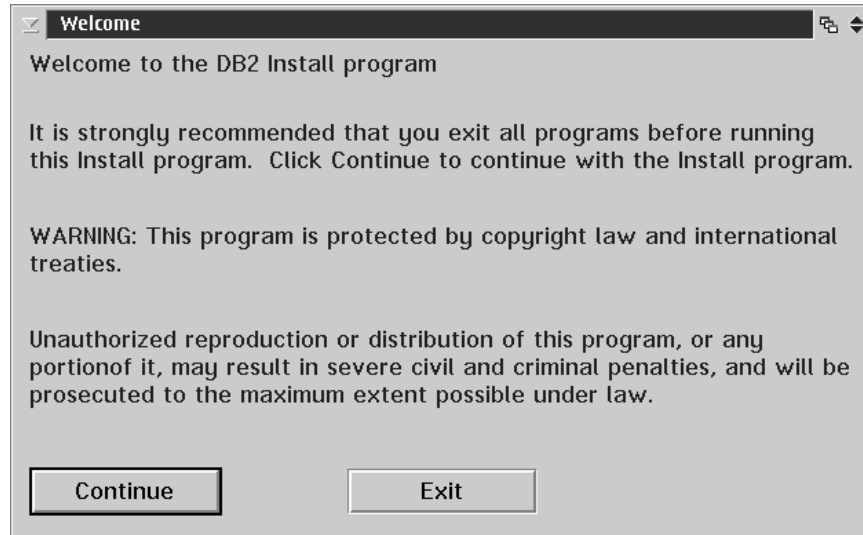
Step 4. Respond to the install program's prompts. Online help is available to guide you through the remaining steps. Invoke online help by clicking on the **Help** push button, or by pressing the **F1** key at any time.

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

> To configure your client to access remote servers, go to "Chapter 13. Configuring Client-to-Server Communications Using the Client Configuration Assistant" on page 115.

Chapter 13. Configuring Client-to-Server Communications Using the Client Configuration Assistant

To configure communications from a DB2 client to a server, the remote server must be configured to accept inbound client requests. By default, the server installation program automatically detects and configures most protocols on the server for inbound client connections.

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

If you are adding a host or AS/400 database, go to "Chapter 7. Configuring DB2 Connect to Host or AS/400 Communications Using the CCA" on page 65.

The information in this section describes how to use the Client Configuration Assistant (CCA) to configure your OS/2, Windows 9x, or Windows NT clients to access remote servers. To complete the steps in this section, you should be familiar with how to start the CCA, for more information, see "Starting the Client Configuration Assistant" on page 143.

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 databases to be configured as CLI or ODBC data sources.
- Export client profiles, or import client and server 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.
- Change your server password.

The CCA provides three methods to set up a database connection to a server:
- Using a profile.
- Searching the network for databases.
- Manually entering database and communication protocol information for a server.

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

Configuration Steps

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

Step 1. Log on to the system with a valid DB2 user ID. For more information, see "Appendix F. Naming Rules" on page 177.

> If you are adding a database to a system that has a DB2 Connect server product installed, log on to this system as a user with System Administrative (SYSADM) or System Controller (SYSCTRL) authority on the instance. For more information, see "Working with the System Administrative Group" on page 148.
>
> This restriction is controlled by the *catalog_noauth* database manager configuration parameter. For more information, refer to the *Administration Guide*.

Step 2. Start the CCA. For more information, see "Starting the Client Configuration Assistant" on page 143.

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

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

> Go to the section that describes the configuration method that you want to use:
> - "Adding a Database Using a Profile".
> - "Adding a Database Using Discovery" on page 118.
> - "Adding a Database Manually" on page 120.

### Adding a Database Using a Profile

A profile contains information about instances and databases on a system, and databases within each instance. For information on profiles, see "Creating and Using Profiles" on page 122.

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

Step 1. Select the **Use an access profile** radio button and click on the **Next** push button.

Step 2. Click on the **...** push button and select a profile.

Step 3. Enter a local database alias name in the **Database alias** field and add a comment that describes this database in the **Comment** field. Click on the **Next** push button.
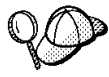
> If you do not specify a database alias name, the default will be the same as the remote database alias name.

Step 4. Register this database as an ODBC data source.

> If you are not planning to use ODBC, click on the **Done** push button and go to the next step.

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

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

- If you would like all users on your system to have access to this data source, select the **As a system data source** radio button.

- If you would like only the current user to have access to this data source, select the **As a user data source** radio button.

    c. If you would like to create an ODBC data source file to share database access, select the **Create a file data source** check box and enter the path and filename for this file in the **File data source name** field.

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

    e. Click on the **Done** push button to add the database that you selected. The Confirmation window opens.

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

If the database that you want to add was not added successfully, click on the **Change** push button to change any settings that you may have incorrectly specified or click on the **Help** push button for more information. For even more detailed information, refer to the *Troubleshooting Guide.*

Step 6. Enter your user ID and password and click on **OK**. If the connection is successful, a message confirming the connection appears.

Step 7. You are now able to use this database. To finish using the Add Database SmartGuide, click on the **Close** push button; you can then add more databases by clicking on the **Add** push button or exit the CCA.

Adding a Database Using Discovery

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

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

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

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

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

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

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

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

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

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

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

a. Click on the **Add System** push button

b. Enter the required communication protocol parameters for the remote Administration Server and click on **OK**. A new system is added. For more information, click on the **Help** push button.

c. Select the database that you want to add and click on the **Next** push button.

Step 4. Enter a local database alias name in the **Database alias** field and add a comment that describes this database in the **Comment** field. Click on the **Next** push button.

> If you do not specify a database alias name, the default will be the same as the remote database alias name.

Step 5. Register this database as an ODBC data source.

> If you are not planning to use ODBC, click on the **Done** push button and go to the next step.

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

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

- If you would like all users on your system to have access to this data source, select the **As a system data source** radio button.

- If you would like only the current user to have access to this data source, select the **As a user data source** radio button.

c. If you would like to create an ODBC data source file to share database access, select the **Create a file data source** check box and enter the path and filename for this file in the **File data source name** field.

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

e. Click on the **Done** push button to add the database that you selected. The Confirmation window opens.

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

If the database that you want to add was not added successfully, click on the **Change** push button to change any settings that you may have incorrectly specified or click on the **Help** push button for more information. For even more detailed information, refer to the *Troubleshooting Guide*.

Step 7. Enter your user ID and password and click on **OK**. If the connection is successful, a message confirming the connection appears.

Step 8. You are now able to use this database. To finish using the Add Database SmartGuide, click on the **Close** push button; you can then add more databases by clicking on the **Add** push button or exit the CCA.

Adding a Database Manually

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

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

Step 1. Select the **Manually configure a connection to a DB2 database** radio button and click on the **Next** push button.

> If you are not using Lightweight Directory Access Protocol (LDAP), this tab will not be shown, skip this step and go to Step 3.

Step 2. Select the radio button that corresponds to the location where you would like your DB2 directories to be maintained.

- If you would like to maintain the DB2 directories locally, select the **Add database to your local machine** radio button and click on the **Next** push button.

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

Step 3. Select the radio button that corresponds to the protocol that you want to use from the **Protocol** list and click on the **Next** push button.

> If you have installed a DB2 Connect product or the DB2 Connect Server Support feature available with DB2 Enterprise Edition or DB2 Enterprise - Extended Edition, and have selected the **TCP/IP** or **APPC** radio button, select the radio button from the **Target operating system** list that corresponds to the type of system where the database that you are trying to connect to resides.

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

Step 5. Enter the database alias name of the remote database that you want to add in the **Database name** field and a local database alias name in the **Database alias** field. Add a comment that describes this database in the **Comment** field and click on the **Next** push button.

If you are adding a database that resides on a host or AS/400 system, the **Database name** field will appear as follows:

OS/390 or MVS
Location name

AS/400
RDB name

VM or VSE
DBNAME

> When a database is created on the remote server, if a database alias is not specified during database creation, the database is created with a database alias=*database_name*; otherwise, the database alias is the name that was specified when the database was created.

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

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

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

- If you would like all users on your system to have access to this data source, select the **As a system data source** radio button.

- If you would like only the current user to have access to this data source, select the **As a user data source** radio button.

c. If you would like to create an ODBC data source file to share database access, select the **Create a file data source** check box and enter the path and filename for this file in the **File data source name** field.

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

e. Click on the **Done** push button to add the database that you selected. The Confirmation window opens.

If you are adding a database using the *manual* method, you can also select the **Node Options** tab, the **Security Options** tab, or the **Host or AS/400 Options** tab (if you are adding a host or AS/400 database) to specify more detailed catalog information. Refer to the online help in each tab for more information.

If you want to use the default settings for the node, security, and host or AS/400 (if applicable) options, click on the **Done** push button and go to the next step.

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

If the database that you want to add was not added successfully, click on the **Change** push button to change any settings that you may

have incorrectly specified or click on the **Help** push button for more information. For even more detailed information, refer to the *Troubleshooting Guide.*

Step 8. Enter your user ID and password and click on **OK**. If the connection is successful, a message confirming the connection appears.

Step 9. You are now able to use this database. To finish using the Add Database SmartGuide, click on the **Close** push button; you can then add more databases by clicking on the **Add** push button or exit the CCA.

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

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

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

Creating and Using Profiles

The information in this section describes how to create and use profiles to set up connections between DB2 clients and servers. You can use either a *Server Profile* or a *Client Profile* to configure database connections on a client.

> Go to the section that describes the type of profile that you want to use:
> - "Server Profiles".
> - "Client Profiles" on page 123.

Server Profiles

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

To generate a Server Profile, use the Export Server Profile function provided in the Control Center. When a profile is generated, it includes instances that

have the *discover_inst* database manager configuration parameter and databases with the *discover_db* database configuration parameter set to *ENABLE*. The *discover* parameter in the Administration Server's configuration file must be set to either *SEARCH* or *KNOWN* to generate a profile for a server system.

The default settings for these configuration parameters enable you to discover all instances and databases on your network. For information on setting the *discover_inst, discover_db,* and *discover* configuration parameters, refer to the *Administration Guide.*

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

To create a Server Profile, perform the following steps:

Step 1. Start the Control Center. For more information, refer to "Starting the Control Center" on page 144.

Step 2. Select the system that you want to create a profile for and click on the right mouse button.
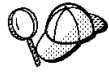
> If the system that you want to create a profile for is not shown, select the **Systems** icon, click on the right mouse button, and select the **Add** option. Click on the **Help** push button and follow the online help.

Step 3. Select the **Export server profile** option.

Step 4. Enter a path and filename for this profile and click on the **Export** push button.

> You are ready to use this profile on your system. For more information on how to add a database to your system using a Server Profile, go to "Configuration Steps" on page 116.

Client Profiles

Information in a Client Profile can be used to configure clients using the Import function in the Client Configuration Assistant (CCA). These clients can import all or a subset of the configuration information in a profile.

> This scenario assumes that the database connections configured on one client will be exported and used to set up one or more clients.

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

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

To create a Client Profile, perform the following steps:

Step 1. Start the CCA. For more information, see "Starting the Client Configuration Assistant" on page 143.

Step 2. Click on the **Export** push button. The Select Export Option window opens.

Step 3. Select one of the following export options:

- If you want to create a profile that contains all of the databases cataloged on your system, and all of the configuration information for this client, select the **All** radio button, click on **OK**, and go to Step 6.

- If you want to create a profile that contains all of the databases cataloged on your system *without* any of the configuration information for this client, select the **Database connection information** radio button, click on **OK**, and go to Step 6.

- If you want to select a subset of the databases that are cataloged on your system, or a subset of the configuration information for this client, select the **Customize** radio button, click on **OK**, and go to the next step.

Step 4. Select the databases to be exported from the **Available DB2 databases** box and add them to the **Selected databases** box by clicking on the > push button.

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

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

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

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

Step 7. Enter a path and file name for this Client Profile and click on **OK**. The DB2 Message window opens.

Step 8. Click on **OK**.

To import a Client Profile, perform the following steps:

Step 1. Start the CCA. For more information, see "Starting the Client Configuration Assistant" on page 143.

Step 2. Click on the **Import** push button. The Select Profile window opens.

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

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

- To import all the databases defined in a Client Profile, select the **All** radio button.

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

Step 5. Click on **OK**.

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

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

Step 7. Enter a local database alias name in the **Database alias** field and add a comment that describes this database in the **Comment** field. Click on the **Next** push button.

If you do not specify a database alias name, the default will be the same as the remote database alias name.

Step 8. Register this database as an ODBC data source.

If you are not planning to use ODBC, click on the **Done** push button and go to the next step.

---

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

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

- If you would like all users on your system to have access to this data source, select the **As a system data source** radio button.
- If you would like only the current user to have access to this data source, select the **As a user data source** radio button.

   c. If you would like to create an ODBC data source file to share database access, select the **Create a file data source** check box and enter the path and filename for this file in the **File data source name** field.

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

   e. Click on the **Done** push button to add the database that you selected. The Confirmation window opens.

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

If the database that you want to add was not added successfully, click on the **Change** push button to change any settings that you may have incorrectly specified or click on the **Help** push button for more information. For even more detailed information, refer to the *Troubleshooting Guide*.

Step 10. Enter your user ID and password and click on **OK**. If the connection is successful, a message confirming the connection appears.

Step 11. You are now able to use this database. To finish using the Add Database SmartGuide, click on the **Close** push button; you can then add more databases by clicking on the **Add** push button or exit the CCA.

Part 6. Using DB2 Connect

Chapter 14. Running Your Own Applications

Various types of applications can access DB2 databases:

- Applications developed using the DB2 Software Developer's Kit that include embedded SQL, APIs, stored procedures, user-defined functions or calls to the DB2 CLI.
- ODBC applications such as Lotus Approach.
- 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 bind files to each database before they can be used with that database. In a network environment, if you are using multiple clients that run on different operating systems or are at different versions or service levels of DB2, you must bind the utilities once for each operating system and DB2-version combination.

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

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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.

Binding to Host Databases

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

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

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

Running CLI/ODBC Programs

The DB2 Call Level Interface (CLI) run-time environment and the DB2 CLI/ODBC driver are included with DB2 clients as optional components during install.

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 packaged with your DB2 server.

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 129 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.

Step 1. Use the Client Configuration Assistant (CCA) to add the database (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 **Local** icon.) If you do not have access to this program you can use the **catalog** command in the command line processor.

Step 2. On all platforms other than OS/2 the DB2 CLI/ODBC driver is an optional component during the DB2 client install. Be sure it is selected at that point. On OS/2 you must use the **Install ODBC Driver** icon to install both the DB2 CLI/ODBC driver and the ODBC driver manager.

Step 3. To access the DB2 database from ODBC:

    a. The ODBC Driver Manager (From Microsoft or other vendor) must already be installed (this is done by default during the installation of DB2 only on 32-bit Windows systems).

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

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

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

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

Platform Specific Details for CLI/ODBC Access

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

- "Windows 32-bit operating systems Client Access to DB2 using CLI/ODBC"

- "OS/2 Client Access to DB2 using CLI/ODBC" on page 133

Windows 32-bit operating systems Client Access to DB2 using CLI/ODBC

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

Step 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 refer to the on-line help in the CCA (or the **CATALOG DATABASE** and **CATALOG NODE** commands in the *Command Reference*).

Step 2. Verify that the Microsoft ODBC Driver Manager and the DB2 CLI/ODBC driver are installed. On Windows 32-bit operating systems they are both installed with DB2 unless the ODBC component is manually unselected during the install.

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.**

b. Click on the **ODBC Drivers** tab.

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 on Windows 32-bit operating systems.

Step 3. Register the DB2 database with the ODBC driver manager as a *data source*. On Windows 32-bit operating systems 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 32-bit operating systems you can use the radio buttons to add the data source as either a user or system data source.

- Using the Microsoft **32-bit 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 32-bit operating systems 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 32-bit operating systems 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.

  The *Command Reference* contains more information on the CATALOG command:

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

Step 4. Configure the DB2 CLI/ODBC driver using the CCA: (Optional)

    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 *Installation and Configuration Supplement* online manual.

Step 5. 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

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 there is an ODBC Driver Manager installed. The ODBC Driver Manager is not installed with DB2; we suggest you use the

Driver Manager that was shipped with your ODBC application. Also ensure that the DB2 CLI/ODBC driver is installed:

1) Run the ODBC Administration tool as described in its documentation. This is usually done in one of two ways:

   - Double-click on 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 the ODBC Driver Manager is not installed then follow the installation instructions that came with your ODBC application. If the IBM DB2 CLI/ODBC driver is not installed then double-click on the **Install ODBC Driver** icon in the DB2 folder to install the DB2 CLI/ODBC driver.

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 ODBC Driver Manager:
     1) Run the ODBC Driver Manager, as described in its documentation. This is usually done in one of two ways:
        - Double-click on the **ODBC** Folder in OS/2, and double-click on the **ODBC Administrator** icon.
        - Run **odbcadm.exe** from the command line.
     2) Click on the **Add** push button from the Data Sources window. The Add Data Source Window opens.
     3) Double-click on the IBM DB2 ODBC DRIVER in the list.
     4) Select the DB2 database to add and click on **OK**.

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

   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 *Installation and Configuration Supplement* 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 131 should provide you with all of the information you require. *Installation and Configuration Supplement* 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 in the *Installation and Configuration Supplement* online manual:

- 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 develop Java programs to access DB2 databases with the appropriate Java Development Kit (JDK) on AIX, HP-UX, Linux, OS/2, Silicon Graphics IRIX, Solaris, or Windows 32-bit operating systems. The JDK includes Java Database Connectivity (JDBC), a dynamic SQL API for Java.

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

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

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

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

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

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

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

```
http://www.software.ibm.com/data/db2/java
```

Configuring the Environment

To build and run DB2 Java programs, you need to install and configure the appropriate version of the Java Development Kit (JDK) on your development machine:

AIX: The Java Development Kit (JDK) Version 1.1.2 for AIX from IBM.

HP-UX:
   The HP-UX Developer's Kit for Java Release 1.1.3 or later from Hewlett-Packard.

Linux: The Java Development Kit (JDK) 1.1.7, Version 1a or later for Linux from the Blackdown Organization.

OS/2:   The Java Development Kit (JDK) Version 1.1.4 for OS/2 from IBM.

Silicon Graphics IRIX:
   The Java Development Environment 3.1 (Sun JDK 1.1.5) and the Java Execution Environment 3.1 (Sun JRE 1.1.5) from Silicon Graphics, Inc.

Solaris:
> The Java Development Kit (JDK) Version 1.1.4 for Solaris, and the Solaris Native Thread pack, from Sun Microsystems.

Windows 32-bit operating systems
> The Java Development Kit (JDK) Version 1.1 for Win32 from Sun Microsystems.

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

```
http://www.software.ibm.com/data/db2/java
```

For all supported platforms, you must also install and configure a DB2 client with the DB2 Java Enablement component. To bind SQLJ programs to a database, you must install and configure a DB2 Administrative Client with the DB2 Java Enablement component.

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

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

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

You can check the DB2 database manager configuration to verify the correct value for the JDK11_PATH field by entering the following command:

```
db2 get dbm cfg
```

You may want to pipe the output to a file for easier viewing. The JDK11_PATH field appears near the beginning of the output. For more information on these commands, refer to the *Command Reference*.

> On Solaris, some Java Virtual Machine implementations do not work well in programs that run in a ″setuid″ environment. The shared library that contains the Java interpreter, libjava.so, may fail to load. As a workaround, you can create symbolic links for all needed JVM shared libraries in /usr/lib, with a command similar to the following (depending on where Java is installed on your machine):
>
> ```
> ln -s /opt/jdk1.1.3/lib/sparc/native_threads/*.so /usr/lib
> ```
>
> For more information on this and other workarounds available, please visit:
>
> ```
> http://www.software.ibm.com/data/db2/java/v5/faq.html
> ```

To run Java programs, the following environment variables are automatically updated during DB2 installation on OS/2 and the Windows Operating System, and during instance creation on UNIX platforms.

On UNIX platforms:
- CLASSPATH includes ″.″ and the file `sqllib/java/db2java.zip`
- On AIX, Linux, Silicon Graphics IRIX, and Solaris: LD_LIBRARY_PATH includes the directory `sqllib/lib`; on HP-UX: SHLIB_PATH includes the directory `sqllib/lib`
- On Solaris only: THREADS_FLAG is set to ″native″

On Windows and OS/2 platforms:
- CLASSPATH includes ″.″ and the file `%DB2PATH%\java\db2java.zip`

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

On UNIX platforms:
- `sqllib/java/sqlj.zip` (required to build SQLJ programs)
- `sqllib/java/runtime.zip` (required to run SQLJ programs)

On Windows and OS/2 platforms:
- `%DB2PATH%\java\sqlj.zip` (required to build SQLJ programs)
- `%DB2PATH%\java\runtime.zip` (required to run SQLJ programs)

Java Applications

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

```
java prog_name
```

where `prog_name` is the name of the program.

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

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

Java Applets

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

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

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

then you would enter:

```
db2jstrt 6789
```

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

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

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

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

Part 7. Appendixes

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Appendix A. Basic Task Knowledge

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

Go to the task that you want to perform:

- "Starting the Software Registration Tool".
- "Starting the Client Configuration Assistant".
- "Starting the Control Center" on page 144.
- "Entering Commands Using the Command Center" on page 144.
- "Entering Commands Using the Command Line Processor" on page 146.
- "Working with the System Administrative Group" on page 148.

Starting the Software Registration Tool

Start the Software Registration Tool as follows:

OS/2 Click on **OS/2 Warp** and select **DB2 for OS/2**–>**Registration**

Windows 9x or Windows NT
Click on **Start** and select **Programs**->**DB2 for Windows**->**Registration**

Starting the Client Configuration Assistant

Start the Client Configuration Assistant (CCA) as follows:

OS/2 Click on **OS/2 Warp**, and select **DB2 for OS/2**–>**Client Configuration Assistant**

Windows 9x or Windows NT
Click on **Start** and select **Programs**->**DB2 for Windows**->**Client Configuration Assistant**

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

Starting the Control Center

Start the Control Center in one of the following ways:

On OS/2

- Enter the **db2cc** command at a command prompt.

  or

- Click on the **OS/2 Warp** button and select **DB2 for OS/2**–>**Control Center**.

  Note: You must have the prerequisite Java Runtime Environment (JRE) level to launch the Control Center using this command. For more information, refer to the Control Center readme, which can be found in the `x:\sqllib\cc\prime` directory, where *x:* is drive where you installed your DB2 product.

On Windows 9x or Windows NT

- Enter the **db2cc** command at a command prompt.

  or

- Click on **Start** and select **Programs**->**DB2 for Windows**->**Control Center**.

You can also run the Control Center as an applet through a web browser. For more information, refer to the Control Center readme, which can be found in the `x:\sqllib\cc\prime` directory, where *x:* is drive where you installed your DB2 product.

Entering Commands Using the Command Center

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

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

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

Start the Command Center in one of the follows ways:
- Click on the **Command Center** icon in the Control Center.
- Enter the **db2cctr** command.
- Launch the Command Center from the toolbar as follows:

  On Windows 9x or Windows NT

  – Click on the **Start** button and select **Programs**->**DB2 for Windows**->**Command Center**.

  On OS/2

  – Click on the **OS/2 Warp** button and select **DB2 for OS/2 –>Command Center**.

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

> In the Command Center, you do not have to enter a command with the db2 prefix; instead you just enter the DB2 command. For example:
>
>   list database directory
>
> To enter operating system commands, precede the operating-system command with an exclamation mark (!). For example:
>
>   !dir

If you want to enter multiple commands, you must end each command with the termination character, then press then **Enter** key to start the next command on a new line. The default termination character is a semicolon (;). To specify a different termination character, click on the **Tools Settings** icon in the menu toolbar.

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

    connect to sample;
    list tables for system

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

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

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

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

Entering Commands Using the Command Line Processor

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

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

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

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

Command Line Mode

To invoke a DB2 Command window, do the following:

OS/2
> Click on **OS/2 Warp**, and select **DB2 for OS/2**->**Command
> Line Processor**, or open any command window.

Windows 9x or Windows NT
> Click on **Start** and select **Programs**->**DB2 for
> Windows**->**Command Window**

> You can also invoke the DB2 command window by entering the
> **db2cmd** command at an MS-DOS prompt.

If you are entering commands via the Command Window, you must include
the db2 prefix. For example:

```
db2 list database directory
```

> If the DB2 command contains characters that have special meaning on the operating system you are using, you will need to enter the command in quotation marks to ensure that it is run properly.
>
> For example, the following command would retrieve all the information from the *employee* table, even if the * character has a special meaning on the operating system:
>
> ```
> db2 "select * from employee"
> ```

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

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

Interactive Input Mode

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

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

Windows 9x or Windows NT
              Click on **Start**, and select **Programs**->**DB2 for Windows**->**Command Line Processor**.

> You can also invoke the command line processor in interactive input mode by entering the **db2cmd** command followed by the **db2** command at an MS-DOS prompt.

In interactive input mode, the prompt looks like this:

```
db2 =>
```

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

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

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

```
db2 => !dir
```

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

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

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

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

Working with the System Administrative Group

By default, System Administrative (SYSADM) authority is granted to the following:

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

Windows NT Any valid DB2 user account which belongs to the local Administrators group on the machine where the account is defined.

For example, if a user logs on to a domain account and tries to access a DB2 database, DB2 will go to a Domain Controller to enumerate groups (including the Administrator's group). You can change this behavior in either of two ways:

1. Set the registry variable `DB2_GRP_LOOKUP=local` and add the domain accounts (or global groups) to the local Administrators group.

2. Update the database manager configuration file to specify a new group. If you want that group enumerated on the local machine, the you must also set the `DB2_GRP_LOOKUP` registry variable.

> By default, in a Windows NT domain environment, only domain users that belong to the Administrators group at the Primary Domain Controller (PDC) have SYSADM authority on an instance. Since DB2 always performs authorization at the machine where the account is defined, adding a domain user to the local Administrators group on the server does not grant the domain user SYSADM authority to this group.
>
> To avoid adding a domain user to the Administrators group at the PDC, we suggest that you create a global group and add the users (both domain and local) that you want to grant SYSADM authority. To do so, enter the following commands:
>
> ```
> db2stop
> db2 update dbm cfg using sysadm_group global_group
> db2start
> ```

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

Appendix B. How the DB2 Library Is Structured

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

To access product information online, you can use the Information Center. You can view task information, DB2 books, troubleshooting information, sample programs, and DB2 information on the Web. See "Accessing Information with the Information Center" on page 162 for details.

Completing Tasks with SmartGuides

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

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

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

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SmartGuide	Helps You to...	How to Access...
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**.
Index	Advise which indexes to create and drop for all your queries.	From the Control Center, click with the right mouse button on the **Index** icon and select **Create**->**Index using SmartGuide**.
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 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**.

Accessing Online Help

Online help is available with all DB2 components. The following table describes the various types of help. You can also access DB2 information through the Information Center. For information see "Accessing Information with the Information Center" on page 162.

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, while ? `catalog database` displays help for the CATALOG DATABASE command.

Type of Help	Contents	How to Access...
Control Center Help *Client Configuration Assistant Help* *Event Analyzer Help* *Command Center Help*	Explains the tasks you can perform in a window or notebook. The help includes prerequisite information you need to know, and describes how to use the window or notebook controls.	From a window or notebook, click the **Help** push button or press the F1 key.
Message Help	Describes the cause of a message, and any action you should take.	From the command line processor in interactive mode, enter: ? *XXXnnnnn* where *XXXnnnnn* is a valid message identifier. For example, ? `SQL30081` displays help about the SQL30081 message. To view message help one screen at a time, enter: ? *XXXnnnnn* | `more` To save message help in a file, enter: ? *XXXnnnnn* > *filename.ext* where *filename.ext* is the file where you want to save the message help.
SQL Help	Explains the syntax of SQL statements.	From the command line processor in interactive mode, enter: `help` *statement* where *statement* is an SQL statement. For example, **help** SELECT displays help about the SELECT statement. **Note:** SQL help is not available on UNIX-based platforms.
SQLSTATE Help	Explains SQL states and class codes.	From the command line processor in interactive mode, enter: **?** *sqlstate* or **?** *class-code* where *sqlstate* is a valid five-digit SQL state and *class-code* is the first two digits of the SQL state. For example, ? `08003` displays help for the 08003 SQL state, while ? `08` displays help for the 08 class code.

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

Cross-platform books
    These books contain the common DB2 information for all platforms.

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

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

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

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

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

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

View   See "Viewing Online Information" on page 161.

Search   See "Searching Online Information" on page 164.

Print   See "Printing the PostScript Books" on page 164.

Order   See "Ordering the Printed Books" on page 165.

Name	Description	Form Number File Name for Online Book	HTML Directory
	Cross-Platform Books		
Administration Guide	*Administration Guide, Design and Implementation* contains information required to design, implement, and maintain a database. It also describes database access using the Control Center(whether local or in a client/server environment), auditing, database recovery, distributed database support, and high availability. *Administration Guide, Performance* contains information that focuses on the database environment, such as application performance evaluation and tuning. You can order both volumes of the *Administration Guide* in the English language in North America using the form number SBOF-8922.	Volume 1 SC09-2839 db2d1x60 Volume 2 SC09-2840 db2d2x60	db2d0
Administrative 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.	SC09-2841 db2b0x60	db2b0
Application Building Guide	Provides environment setup information and step-by-step instructions about how to compile, link, and run DB2 applications on Windows, OS/2, and UNIX-based platforms. This book combines the *Building Applications* books for the OS/2, Windows, and UNIX-based environments.	SC09-2842 db2axx60	db2ax
APPC, CPI-C and SNA Sense Codes	Provides general information about APPC, CPI-C, and SNA sense codes that you may encounter when using DB2 Universal Database products. **Note:** Available in HTML format only.	No form number db2apx60	db2ap

Name	Description	Form Number File Name for Online Book	HTML Directory
Application Development Guide	Explains how to develop applications that access DB2 databases using embedded SQL or JDBC, how to write stored procedures, user-defined types, user-defined functions, and how to use triggers. It also discusses programming techniques and performance considerations. This book was formerly known as the *Embedded SQL Programming Guide*.	SC09-2845 db2a0x60	db2a0
CLI Guide and Reference	Explains how to develop applications that access DB2 databases using the DB2 Call Level Interface, a callable SQL interface that is compatible with the Microsoft ODBC specification.	SC09-2843 db2l0x60	db2l0
Command Reference	Explains how to use the command line processor, and describes the DB2 commands you can use to manage your database.	SC09-2844 db2n0x60	db2n0
Data Movement Utilities Guide and Reference	Explains how to use the Load, Import, Export, Autoloader, and Data Propogation utilities to work with the data in the database.	SC09-2858 db2dmx60	db2dm
DB2 Connect Personal Edition Quick Beginnings	Provides planning, installing, and configuring information for DB2 Connect Personal Edition.	GC09-2830 db2c1x60	db2c1
DB2 Connect User's Guide	Provides concepts, programming and general usage information about the DB2 Connect products.	SC09-2838 db2c0x60	db2c0
Connectivity Supplement	Provides setup and reference information on how to use DB2 for AS/400, DB2 for OS/390, DB2 for MVS, or DB2 for VM as DRDA application requesters with DB2 Universal Database servers, and on how to use DRDA application servers with DB2 Connect application requesters. **Note:** Available in HTML and PostScript formats only.	No form number db2h1x60	db2h1
Glossary	Provides a comprehensive list of all DB2 terms and definitions. **Note:** Available in HTML format only.	No form number db2t0x50	db2t0

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

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

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

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

Notes:

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

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

Swedish	s
Trad. Chinese	t
Turkish	m

2. For late breaking information that could not be included in the DB2 books:
   - On UNIX-based platforms, see the `Release.Notes` file. This file is located in the `DB2DIR/Readme/%L` directory, where `%L` is the locale name and `DB2DIR` is:
     - `/usr/lpp/db2_06_01` on AIX
     - `/opt/IBMdb2/V6.1` on HP-UX, Solaris, SCO UnixWare 7, and Silicon Graphics IRIX
     - `/usr/IBMdb2/V6.1` on Linux.
   - On other platforms, see the `RELEASE.TXT` file. This file is located in the directory where the product is installed.
   - Under Windows `Start` menu

Viewing Online Information

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

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

To view online books or sample programs on all platforms other than SCO UnixWare 7:

- If you are running DB2 administration tools, use the Information Center. See "Accessing Information with the Information Center" on page 162 for details.

- Select the `Open Page` menu item of your Web browser. The page you open contains descriptions of and links to DB2 information:
  - On UNIX-based platforms, open the following page:
    ```
    file:/INSTHOME/sqllib/doc/%L/html/index.htm
    ```
    where *%L* is the locale name.
  - On other platforms, open the following page:
    ```
    sqllib\doc\html\index.htm
    ```
    The path is located on the drive where DB2 is installed.

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

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

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

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

Accessing Information with the Information Center

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

Depending on your system, you can access the Information Center from the:
- Main product folder
- Toolbar in the Control Center
- Windows Start menu
- Help menu of the Control Center

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

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 some search capabilities, so you can look for specific topics, and filter capabilities to limit the scope of your searches.

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

The HTML search server is usually started automatically. If a search in the HTML information does not work, you may have to start the search server by double-clicking its icon on the Windows or OS/2 desktop.

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

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

Setting Up a Document Server

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

1. Copy all files and subdirectories from \sqllib\doc\html on your local system to a Web server. Each book has its own subdirectory containing all the necessary HTML and GIF files that make up the book. Ensure that the directory structure remains the same.
2. Configure the Web server to look for the files in the new location. For information, see the NetQuestion Appendix in *Installation and Configuration Supplement*.
3. If you are using the Java version of the Information Center, you can specify a base URL for all HTML files. You should use the URL for the list of books.
4. Once you are able to view the book files, you should bookmark commonly viewed topics. Among those, you will probably want to bookmark the following pages:

- List of books
- Tables of contents of frequently used books
- Frequently referenced articles, such as the *ALTER TABLE* topic
- The Search form

For information about setting up a search, see the NetQuestion Appendix in *Installation and Configuration Supplement* book.

Searching Online Information

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

- Click on **Search the DB2 Books** at the bottom of any page in the HTML books. Use the search form to find a specific topic. This function is not available in the Linux or Silicon Graphics IRIX environments.
- Click on **Index** at the bottom of any page in an HTML book. Use the index to find a specific topic in the book.
- Display the table of contents or index of the HTML book, and then use the find function of the Web browser to find a specific topic in the book.
- Use the bookmark function of the Web browser to quickly return to a specific topic.
- Use the search function of the Information Center to find specific topics. See "Accessing Information with the Information Center" on page 162 for details.

Printing the PostScript Books

If you prefer to have printed copies of the manuals, you can decompress and print PostScript versions. For the file name of each book in the library, see the table in "DB2 Information – Hardcopy and Online" on page 154. Specify the full path name for the file you intend to print.

On OS/2 and Windows platforms:

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

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

3. Ensure that your default printer is a PostScript printer capable of printing Level 1 (or equivalent) files.

4. Enter the following command from a command line:

```
print filename.ps
```

On UNIX-based platforms:

1. Mount the CD-ROM. Refer to your *Quick Beginnings* manual for the procedures to mount the CD-ROM.

2. Change to `/cdrom/doc/%L/ps` directory on the CD-ROM, where */cdrom* is the mount point of the CD-ROM and *%L* is the name of the desired locale. The manuals will be installed in the previously-mentioned directory with file names ending with `.ps.Z`.

3. Decompress and print the manual you require using the following command:
   - For AIX:

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

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

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

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

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

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

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

Ordering the Printed Books

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

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

You can also order books individually by the form number listed in "DB2 Information – Hardcopy and Online" on page 154. 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.

Appendix C. Using the Control Center to Administer DB2 for OS/390 and DB2 Connect Enterprise Edition servers

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

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

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

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Preparing DB2 for OS/390 Servers for the Control Center

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

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

Using the Control Center

Before you can work with a server and its databases you will need to catalog information about the server on the Control Center workstation. The DB2 Control Center only works with servers and databases that are catalogued on the workstation where the Control Center is running. The easiest way to accomplish this on Windows 95, 98, NT and OS/2 workstations is to use the DB2 Client Configuration Assistant (CCA). For information about using the CCA, see "Chapter 7. Configuring DB2 Connect to Host or AS/400 Communications Using the CCA" on page 65.

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

Appendix D. db2cpic.dll - Extended SNA Security Codes on Windows NT and Windows 95

Extended SNA Security Codes were not implemented by some SNA subsystem providers. This may affect customers using one or more of the following:

- DB2 Universal Database (UDB) for Windows NT Version 5 (all editions).
- DB2 Connect Enterprise Edition for Windows NT Version 5
- DB2 Connect Personal Edition Version 5 (when running on Windows 95 or Windows NT).

A new DLL, called db2cpic2.dll has been provided in order to support Extended SNA Security Codes in these environments. The new DLL was originally packaged with FixPak 1 for DB2 Universal Database Version 5. It is identical to the original DLL db2cpic.dll, except that it includes a call to extract secondary information (cmesi()).

Table 11. Which version of db2cpic.dll to use?

If you have this SNA subsystem	On Windows NT use	On Windows 95 use
IBM Communications Server for Windows NT	db2cpic2.dll (new)	db2cpic.dll (old)
IBM Personal Communications for Windows (also Integrated SNA Support provided with DB2 Connect Personal Edition)	db2cpic2.dll	db2cpic.dll
Microsoft SNA Server	db2cpic.dll	db2cpic.dll

If DB2 fails to load db2cpic2.dll, you can do the following in the directory where it has been installed:

```
copy db2cpic2.dll db2cpic2.bak
copy db2cpic.dll db2cpic2.dll
```

This will make db2cpic2.dll the same as db2cpic.dll.

Note: If you wish to use Extended Security Support with DB2 UDB Version 5.0 on Windows 95, we recommend using IBM Personal Communications (PComm) for Windows 95 Version 4.2 (not Version 4.1). Copy db2cpic.dll to db2cpic.bak and copy db2cpic2.dll to db2cpic.dll. This will make db2cpic.dll the same as db2cpic2.dll.

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Appendix E. National Language Support (NLS)

This section contains information about configuring national language support for the DB2 Connect product, and includes information on:

- Which languages are supported by DB2 Connect Enterprise Edition and DB2 Connect Personal Edition.
- How DB2 Connect handles the conversion of data between unalike systems.
- How to customize your DB2 Connect workstation for your particular national language environment.
- How to customize your host Coded Character Set Identifier (CCSID) setting.

Code Page and Language Support

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

> You must ensure that your regional settings are set correctly. DB2 may not produce the expected results if the country, code page, or regional settings are incorrect for the intended language.

Table 12 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*\win32\install would be *x:*\en\win32\install for English. For more detailed information on the languages and code pages support, refer to the *Administration Guide*.

Table 12. Languages and Code Pages

Country Code	Language
bg	Bulgarian
br	Brazilian Portuguese
cn	Simplified Chinese (PRC)
cz	Czech
de	German
dk	Danish

Table 12. Languages and Code Pages (continued)

Country Code	Language
en	English
es	Spanish
fi	Finnish
fr	French
gr	Greek
hu	Hungarian
il	Hebrew
it	Italian
jp	Japanese
kr	Korean
nl	Dutch
no	Norwegian
pl	Polish
pt	Portuguese
ru	Russian
se	Swedish
si	Slovenian
tr	Turkish
tw	Traditional Chinese (Taiwan)

Conversion of Character Data

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

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

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

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

For example, if DB2 Connect is used to access DB2 Universal Database for OS/390 or DB2/MVS data, the following happens:

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

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

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

Table 13. Workstation Code Page to Host CCSID Conversion

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

Table 13. Workstation Code Page to Host CCSID Conversion (continued)

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

Notes:

1. Code page 1004 is supported as code page 1252.

2. In general, data can be converted from a code page to a CCSID and back again to the same code page with no change. The following are the only exceptions to that rule:

   - In double-byte character set (DBCS) code pages, some data containing user-defined characters may be lost.

   - For single-byte code pages defined within mixed-byte code pages, and for some newer single-byte code pages, characters that do not exist in both the source and the target may be mapped to substitution characters and then lost when the data is converted back to the original code page.

3. For bidirectional languages, a number of special ″BiDi CCSIDS″ have been defined by IBM and are supported by DB2 Connect Version 6.

   If the bidirectional attributes of the database server are different from those of the client you can use these special CCSIDS to manage the difference.

   Refer to the *Administration Guide* for details of these special CCSIDs. Refer to the Release Notes for DB2 Connect Version 6 for detailed information about how to set them up for DRDA host connections.

Bidirectional CCSID Support

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

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

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

Bidirectional-specific CCSIDs

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

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

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

Where CDRA String Types are defined:

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

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

Appendix F. Naming Rules

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

- "General Naming Rules"
- "Database, Database Alias, and Catalog Node Name Rules"
- "Object Name Rules" on page 178
- "Username, User ID, Group Name, and Instance Name Rules" on page 179
- "Password Rules" on page 180
- "DB2SYSTEM Naming Rules" on page 180
- "Workstation Name (nname) Rules" on page 179

General Naming Rules

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

- A through Z

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

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

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

- A through Z
- @, #, and $

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

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

Database, Database Alias, and Catalog Node Name Rules

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

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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 177.

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

> To avoid potential problems, do not use the special characters @, #, and $ in a database name if you intend to have a client remotely connect to a host database. Also, because these characters are not common to all keyboards, do not use them if you plan to use the database in another country.
>
> On Windows NT systems, ensure that no instance name is the same as a service name.

Object Name Rules

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

When naming database objects, see "General Naming Rules" on page 177.

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

> Using delimited identifiers, it is possible to create an object that violates these naming rules; however, subsequent use of the object could result in errors.
>
> For example, if you create a column with a + or – sign included in the name and you subsequently use that column in an index, you will experience problems when you attempt to reorganize the table. To avoid potential problems with the use and operation of your database, *do not* violate these rules.

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

Usernames or *User IDs* are the identifiers assigned to individual users. When naming users, groups, or instances, see "General Naming Rules" on page 177.

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:

  OS/2   Use uppercase names.

  UNIX   Use lowercase names.

  Windows 32-bit operating systems
  Use any case.

Workstation Name (nname) Rules

A *workstation* name specifies the NetBIOS name for a database server or client that resides on the local workstation. This name is stored in the database manager configuration file. The workstation name is known as the *workstation nname*. When naming workstations, see "General Naming Rules" on page 177.

In addition, the name you specify:

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

DB2SYSTEM Naming Rules

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

When creating a *DB2SYSTEM* name, see "General Naming Rules" on page 177.

In addition, the name you specify:

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

Password Rules

When determining passwords, consider the following rules:

OS/2   A maximum of 14 characters.

UNIX   A maximum of 8 characters.

Windows 9x or Windows NT
                  A maximum of 14 characters.

Appendix G. List Files, Bind Files, and Packages

This appendix lists the bind files contained in different `.lst` files shipped with the product. Although the contents of these lists are similar for each platform, the bind packages are generated specifically for each platform. Each package name can be mapped back to the client platform.

Note that the Bind function in the DB2 Client Configuration Assistant chooses the correct bind files for you automatically.

Note: In the following tables, under the **Package Name** columns, each DB2 bind package is represented as follows. For example, in the file name SQLabxYz:
- SQL identifies the bind package as a DB2 utility,
- *ab* identifies the utility,
- *x* represents the last digit of the year the product became available,
- *Y* represents the platform of the client,
- *z* represents the modification level.

Users on OS/2, Windows 32-bit operating systems, and AIX systems can use the **ddcspkgn** command to determine the package name for for individual bind files or list (.lst) files. This command is found in the `bin` directory under the DB2 installation directory. For example, on an AIX system, enter the following command with the bind file in the local directory:

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

The following list maps *Y* values to platforms:

xAz   Clients for AIX

xHz   Clients for HP-UX

xLz   Clients for Linux

xUz   Clients for Solaris

xXz   Clients for SINIX

xPz   Clients for Power PC

xDz   Clients for OS/2

xWz   Clients for Windows

xNz   Clients for Windows 32-bit operating systems

xMz   Clients for Macintosh

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List Files Associated with DRDA Servers

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

DRDA Server
> **List File**

OS/390 and MVS
> ddcsmvs.lst

VSE   ddcsvse.lst

VM   ddcsvm.lst

OS/400
> ddcs400.lst

Table 14. DRDA Bind Files and Packages

Component	Bind File Name	Package Name	MVS	VM/VSE	OS/400
DB2 Call Level Interface					
Isolation level CS	db2clics.bnd	sqll1*xyz*	yes	yes	yes
Isolation level RR	db2clirr.bnd	sqll2*xyz*	yes	yes	yes
Isolation level UR	db2cliur.bnd	sqll3*xyz*	yes	no	yes
Isolation level RS	db2clirs.bnd	sqll4*xyz*	no	no	yes
Isolation level NC	db2clinc.bnd	sqll5*xyz*	no	no	yes
Using MVS table names	db2clims.bnd	sqll7*xyz*	yes	no	no
Using OS/400 table names (OS/400 3.1 or later)	db2clias.bnd	sqlla*xyz*	no	no	yes
Using VSE/VM table names	db2clivm.bnd	sqll8*xyz*	no	yes	no
Command Line Processor					
Isolation level CS	db2clpcs.bnd	sqlc2*xyz*	yes	yes	yes
Isolation level RR	db2clprr.bnd	sqlc3*xyz*	yes	yes	yes
Isolation level UR	db2clpur.bnd	sqlc4*xyz*	yes	yes	yes
Isolation level RS	db2clprs.bnd	sqlc5*xyz*	no	no	yes
Isolation level NC	db2clpnc.bnd	sqlc6*xyz*	no	no	yes

Table 14. DRDA Bind Files and Packages (continued)

Component	Bind File Name	Package Name	MVS	VM/VSE	OS/400
REXX					
Isolation level CS	db2arxcs.bnd	sqla1*xyz*	yes	yes	yes
Isolation level RR	db2arxrr.bnd	sqla2*xyz*	yes	yes	yes
Isolation level UR	db2arxur.bnd	sqla3*xyz*	yes	yes	yes
Isolation level RS	db2arxrs.bnd	sqla4*xyz*	yes	yes	yes
Isolation level NC	db2arxnc.bnd	sqla5*xyz*	no	no	yes
Utilities					
Export	db2uexpm.bnd	sqlub*xyz*	yes	yes	yes
Import	db2uimpm.bnd	sqluf*xyz*	yes	yes	yes
Import	db2uimtb.bnd	db2uk*xyz*	yes	yes	yes

Note: If your DB2 for MVS/ESA system has APAR PN60988 installed (or if it is a later release than Version 3 Release 1), you can add the bind files for isolation level NC to the ddcsmvs.lst file.

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C Set++	SP
C/370	SQL/DS
DATABASE 2	SQL/400
DataHub	S/370
DataJoiner	System/370
DataPropagator	System/390
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If you have a technical problem, please take the time to review and carry out the actions suggested by the *Troubleshooting Guide* before contacting DB2 Customer Support. Depending on the nature of your problem or concern, this guide will suggest information you can gather to help us to serve you better.

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

Telephone

If you live in the U.S.A., call one of the following numbers:
- 1-800-237-5511 to learn about available service options.
- 1-800-IBM-CALL (1-800-426-2255) or 1-800-3IBM-OS2 (1-800-342-6672) to order products or get general information.
- 1-800-879-2755 to order publications.

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

`http://www.ibm.com/support/`

then performing a search using the keyword "handbook".

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

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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

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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.

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