

IBM® DB2® Warehouse Manager Standard Edition



Installation Guide

Version 8.2

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Version 8.2

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About this book

This book provides the information that you need to install the following Warehouse Manager components: Information Catalog Center tools, warehouse agents, and warehouse transformers. Be sure to read the readme file that is included with DB2 Universal Database for important updates to product information.

Who should read this book

You should read this book if you are an Information Catalog Center administrator or if you are responsible for installing Warehouse Manager components on workstations. You should be familiar with database concepts, client/server architectures, TCP/IP connectivity, and networking concepts.

Prerequisite publications

The following publications contain information that you need before and during the installation of Warehouse Manager components:

- *Data Warehouse Center Administration Guide*
- *Information Catalog Center Administration Guide*
- *Message Reference*

About this book

Chapter 1. Overview of the DB2 Warehouse Manager components

The DB2 Warehouse Manager package contains components that enhance the warehousing capability provided by the Data Warehouse Center, which is a part of DB2 Universal Database. Before you install any DB2 Warehouse Manager components, you should be familiar with the function each component provides, and the hardware and software prerequisites for each component.

DB2 Warehouse Manager installation CD

The DB2 Warehouse Manager Standard Edition CD contains the main components of the DB2 Warehouse Manager. These components are:

- Client Support tools
- Information Catalog Manager tools
- Application Development tools
- Data Warehouse Center tools
- Administration tools

When you install DB2 Warehouse Manager, you can install different sets of components on different computers within your environment. For evaluation purposes, you can install all components on a single machine.

When you insert the DB2 Warehouse Manager Standard Edition CD, the Setup launchpad opens. You can specify which features to install. For a description of a feature, select the feature and see the **Description** box. By default, all features included in a typical installation are selected. Features that are selected and disabled must be installed.

The following list provides examples of which features you must install to use certain components on various workstation configurations.

- If you use components for a single-partitioned instance or the first node in a multiple-partitioned database instance, you must install the warehouse agent and the warehouse transformers.
- If you use components for additional partitions in a partitioned database environment, you must install the warehouse transformers.
- If you install components for an administrator workstation, you must install the Information Catalog Center and the Manage Information Catalog utility.
- If you install components for a development workstation, you must install the warehouse samples and the Information Catalog Manager samples.
- If you want to install components for a Web server, you must install the Information Catalog Center for the Web.

The following table shows example configurations of DB2 Warehouse Manager components installed on different computers.

Warehouse Manager overview

Table 1. Sample configurations of Warehouse Manager components

Computer type	DB2 Warehouse Manager component
Administration	Client Support tools: <ul style="list-style-type: none">• Interfaces• Base Client Support• Java Runtime Environment• Communication Protocols Information Catalog Manager tools: <ul style="list-style-type: none">• Information Catalog Center Administration tools: <ul style="list-style-type: none">• Control Center• Configuration Assistant
Development	Client Support tools: <ul style="list-style-type: none">• Interfaces• Base Client Support• Java Runtime Environment• Communication Protocols Application Development tools: <ul style="list-style-type: none">• Warehouse Samples Administration tools: <ul style="list-style-type: none">• Control Center• Configuration Assistant
Remote Data Warehouse Center source and target	Client Support tools: <ul style="list-style-type: none">• Interfaces• Base Client Support• Java Runtime Environment• Communication Protocols Data Warehouse tools: <ul style="list-style-type: none">• Warehouse Manager Agent
Metadata Management	Client Support tools: <ul style="list-style-type: none">• Interfaces• Base Client Support• Java Runtime Environment• Communication Protocols Information Catalog Manager tools: <ul style="list-style-type: none">• Information Catalog Center

Information Catalog Manager

The Data Warehouse Center is a metadata-driven system. Metadata, or information about your data, provides administrators and business users with descriptions of the data that is stored in the data warehouse. You can create information catalogs that describe business metadata in business terms, organize the metadata into subject areas, and customize it to your workgroup or enterprise's needs. Then, you can use the Information Catalog Manager to provide a graphical representation of data relationships and object definitions for warehouse steps.

The Information Catalog Manager provides a powerful, business-oriented solution to help users locate, understand, and access enterprise data. It enables business users to view aggregations, histories, data derivations, data sources, and descriptions of data.

The Information Catalog Center is the graphical interface for the Information Catalog Manager functions. The Information Catalog Manager Tools consists of the following components: The Information Catalog Center, the Manage Information Catalog Wizard, the Information Catalog Manager samples, and the Information Catalog Center for the Web.

You must run the Manage Information Catalog wizard to create or migrate your information catalogs.

You can use the Information Catalog Center to enable metadata exchange and to keep your information catalog current with the warehouse control database. Information Catalog Center functions change depending on the user's authorities. A user can simply access the information available in the information catalog. A power user has the same authority as a user but can also define objects and update or delete objects that this person has already defined. An administrator has the same authority as a power user, but is also responsible for managing the content and use of an information catalog. Administrators can also grant levels of authority to users.

The Information Catalog Center includes utilities that extract descriptive data from JDBC data sources. The Information Catalog Center also includes a sample information catalog with data. See the *Information Catalog Center Tutorial* for more information about extractors and the sample information catalog.

You can use the Information Catalog Center for the Web from any browser to access information catalogs and obtain descriptions of available data, including format, currency, owner, and location.

Related tasks:

- "Installing the Information Catalog Manager components" on page 6
- "Installing the Information Catalog Center" on page 7
- "Installing the Information Catalog Center for the Web on Windows" on page 8
- "Installing the Information Catalog Center for the Web on AIX" on page 9

Warehouse agents

Warehouse agents manage the flow of data between the data sources and the target warehouses. Warehouse agents are available for the Solaris™ Operating Environment and on Windows® NT, Windows 2000, Windows XP, Linux, AIX®, z/OS™, and iSeries™ operating systems. Warehouse agents use Open Database Connectivity (ODBC) drivers or DB2® CLI to communicate with different databases, including text files. Several warehouse agents can handle the transfer of data between sources and target warehouses.

Related tasks:

- "Preparing to install warehouse agents" on page 19
- "Installing a Windows warehouse agent" on page 26
- "Installing the z/OS warehouse agent" on page 27

Warehouse Manager overview

- “Installing the iSeries warehouse agent” on page 43
- “Installing the AIX, Linux, and Solaris Operating Environment warehouse agents” on page 52

Warehouse transformers

Warehouse transformers are stored procedures and user-defined functions that you can use to transform data in a warehouse step. In the Data Warehouse Center, you use steps to create and maintain a warehouse. Steps control how data is transformed into meaningful business information. You can use warehouse transformers in a step to clean, invert, and pivot data; generate primary keys and period tables; and calculate various statistics.

Related concepts:

- “Install the Java Development Kit for warehouse transformers” on page 66

Related tasks:

- “Updating the environment variables on Windows for warehouse transformers” on page 67
- “Updating the environment variables on AIX for warehouse transformers” on page 68
- “Installing warehouse transformers” on page 73
- “Setting up warehouse transformers on DB2 for z/OS” on page 78
- “Updating the environment variables on the Solaris Operating Environment for warehouse transformers” on page 69
- “Updating the environment variables on Linux for warehouse transformers” on page 70

Related reference:

- “National language support for warehouse transformers” on page 81

Chapter 2. Installing Information Catalog Manager tools

This chapter describes the installation process for the Information Catalog Manager tools, which includes the Information Catalog Center, the Manage Information Catalog wizard, the Information Catalog Manager samples, and the Information Catalog Center for the Web.

Preparing to install the Information Catalog Manager components

You can install the following components of the Information Catalog Manager Tools:

- Information Catalog Center (required)
- Manage Information Catalog wizard (required to initialize or migrate catalogs)
- Information Catalog Manager samples (optional)
- Information Catalog Center for the Web (optional)

An information catalog administrator will typically want to install the Information Catalog Center, the Manage Information Catalog wizard, and the Information Catalog Manager samples. The Information Catalog Center for the Web should be installed on a Web server to allow business users who want a Web interface to access the information catalog.

You need to install the Information Catalog Center on a workstation running Windows[®] NT, Windows 2000, Windows XP, AIX[®], Solaris[™] Operating Environment, or Linux operating system that your administrators will use to create an information catalog or to migrate existing information catalogs. Then, you can choose to install the Information Catalog Center on additional workstations (for business users) running any Windows operating system (Windows 98, Windows ME, Windows NT[®], Windows 2000, or Windows XP) or Unix-based operating system (Linux, Solaris Operating Environment, or AIX). These workstations must have connectivity to the workstation where your DB2[®] Universal Database is located. Business users also have the option of using the Information Catalog Center for the Web to access the information catalog if they prefer.

After you install the Information Catalog Center, the remote database in which an information catalog is located must be cataloged on the local system.

Related concepts:

- “Information Catalog Manager” on page 2

Related tasks:

- “Installing the Information Catalog Manager components” on page 6

Related reference:

- “Environment structure for Information Catalog Manager components” on page 83

Installing the Information Catalog Manager components

The Information Catalog Manager tools include the Information Catalog Center, the Information Catalog Manager samples, the Manage Information Catalog wizard, and the Information Catalog Center for the Web.

Prerequisites:

You can install the Information Catalog Center on additional workstations running any Windows operating system (Windows 98, Windows ME, Windows NT, Windows 2000, or Windows XP) or Unix-based operating system (Linux, Solaris Operating Environment, or AIX). These workstations must have connectivity to the server where your DB2 Universal Database is located.

DB2 Warehouse Manager components require a DB2 Version 8 client or DB2 server, depending on the component. Unless otherwise mentioned, the DB2 Version 8 client is installed when you install DB2 Warehouse Manager components, if the DB2 client is not already installed.

Procedure:

To install the Information Catalog Manager tools:

1. Insert the Warehouse Manager CD into your CD drive. The launchpad opens.
2. Click **Install** from the launchpad.
3. In the Select Features window, clear all the check boxes except the **Information Catalog Manager Tools**. You can also expand the category to select specific Information Catalog Manager Tools components.
4. Click **Next** The next window allows you to initialize a new catalog or migrate an existing catalog to the version 8 format. If you skip this step, you can use the Manage Information Catalog Wizard later to initialize or migrate information catalogs. The metadata in your information catalogs must be in the version 8 format to use the Information Catalog Manager Tools components.
5. Click **Next** to continue the installation program. When you have reached the last window, click **Finish**. The installation program completes.
6. Run the Manage Information Catalog wizard to prepare new information catalogs or migrate existing information catalogs to the version 8 format.

Related concepts:

- “Preparing to install the Information Catalog Manager components” on page 5
- “Information Catalog Manager” on page 2

Running the Manage Information Catalog wizard

Run the Manage Information Catalog wizard to create an information catalog or migrate existing information catalogs. The wizard is only required if you did not prepare or migrate an information catalog during installation.

Procedure:

To run the Manage Information Catalog wizard:

1. Create a database in DB2 Universal Database or locate an existing database that contains an information catalog.

2. On AIX, set the EXTSHM environment variable to on by entering the following commands at a DB2 command prompt:

```
db2stop
export EXTSHM=on
db2set DB2ENVLIST=EXTSHM
db2start
```

Turning on the EXTSHM environment variable might affect performance.

3. On Windows, click **Start** → **Programs** → **IBM DB2** → **Set-up tools** → **Manage Information Catalog wizard**. The Manage Information Catalog wizard opens.

On AIX, you can start the Manage Information Catalog wizard by entering the following command at a DB2 command line prompt:

```
db2iccwz
```

4. Type the information required on each page of the Manage Information Catalog wizard, review the information you have entered on the summary page, and click **Finish**. The Manage Information Catalog wizard closes, and the information catalog is successfully initialized or migrated.

Related concepts:

- “Information Catalog Manager” on page 2

Related tasks:

- “Installing the Information Catalog Manager components” on page 6
- “Installing the Information Catalog Center” on page 7

Installing the Information Catalog Center

You can install the Information Catalog Center separately from the Information Catalog Manager Tools (on the Warehouse Manager Installation CD) on any Windows operating system (Windows 98, Windows ME, Windows NT, Windows 2000, or Windows XP) or Unix operating system (AIX Version 4, AIX Version 5, Solaris Operating Environment, or Linux)

Prerequisites:

Information catalogs can also be hosted on Version 8 or later of the following DB2 family databases:

- DB2 Universal Database for Windows NT
- DB2 Universal Database for AIX
- DB2 Universal Database for Solaris Operating Environment
- DB2 Universal Database for Linux

or on earlier versions of the following DB2 family databases:

- DB2 Universal Database for iSeries (Version 5 Release 1 or later)
- DB2 Universal Database for OS/390 and z/OS (Version 7 or later)

You also need a connection to your LAN.

You will need to install the Manage Information Catalog wizard to prepare new information catalogs or to migrate existing information catalogs to the version 8 format.

Procedure:

To install the Information Catalog Center:

1. Close all Windows programs.
2. Insert the DB2 Warehouse Manager CD into your CD drive. The auto-run feature automatically starts the DB2 Setup launchpad.
3. Click **Install Products** from the launchpad.
4. Ensure that **DB2 Warehouse Manager** is selected, then click **Next**.
5. Proceed as prompted by the DB2 Setup wizard.
6. Expand the **Information Catalog Manager tools** list and select only the features that you want to install, such as the Information Catalog Center. Then click **Next**.
7. Proceed as prompted by the DB2 Setup wizard. Online help is available to guide you through the remaining steps.

Related concepts:

- “Information Catalog Manager” on page 2

Related tasks:

- “Installing the Information Catalog Manager components” on page 6

Installing the Information Catalog Center for the Web on Windows

You can install the Information Catalog Center for the Web on any operating system that supports a JDBC connection to DB2 Universal Database, and runs IBM WebSphere. A Web server such as IBM HTTP server is also required.

Procedure:

To install the Information Catalog Center for the Web:

1. Install the Information Catalog Center for the Web files onto your Web server:
 - a. Insert the DB2 Universal Database Enterprise Server Edition CD into the CD drive on the Web server. The launchpad opens.
 - b. Click **Install Products** from the launchpad.
 - c. Ensure that **DB2 UDB Enterprise Server Edition** is selected, then click **Next**.
 - d. Proceed as prompted by the DB2 Setup wizard.
 - e. In the list of features to install, deselect every feature except for **Information Catalog Center for the Web**, then click **Next**.
 - f. Proceed as prompted by the DB2 Setup wizard. Online help is available to guide you through the remaining steps.
2. Follow the steps in “Configuring the Information Catalog Center for the Web after installation” before using the Information Catalog Center for the Web.

Related concepts:

- “Information Catalog Manager” on page 2

Related tasks:

- “Installing the Information Catalog Manager components” on page 6
- “Installing the Information Catalog Center” on page 7
- “Installing the Information Catalog Center for the Web on AIX” on page 9

- “Configuring the Information Catalog Center for the Web with WebSphere Application Server 4” on page 10
- “Configuring the Information Catalog Center for the Web with WebSphere Application Server 5” on page 13

Installing the Information Catalog Center for the Web on AIX

You can install the Information Catalog Center for the Web on any operating system that supports a JDBC connection to DB2 Universal Database, and runs IBM WebSphere. A Web server such as IBM HTTP Server is also required.

Procedure:

To install the Information Catalog Center for the Web:

1. Install the Information Catalog Center for the Web files onto your Web server:
 - a. Insert the DB2 Universal Database Enterprise Server Edition CD into the CD drive on the Web server. The launchpad opens.
 - b. Click **Install Products** from the launchpad.
 - c. Ensure that **DB2 UDB Enterprise Server Edition** is selected, then click **Next**.
 - d. Proceed as prompted by the DB2 Setup wizard.
 - e. In the list of features to install, deselect every feature except for **Information Catalog Center for the Web**, then click **Next**.
 - f. Proceed as prompted by the DB2 Setup wizard. Online help is available to guide you through the remaining steps.
 2. Set the EXTSHM environment variable to ON by entering the following commands at a DB2 command prompt:

```
db2stop
export EXTSHM=ON
db2set DB2ENVLIST=EXTSHM
db2start
```
- Note:** Turning the EXTSHM environment variable on might affect performance.
3. Follow the steps in “Configuring the Information Catalog Center for the Web” before using the Information Catalog Center for the Web.

Related concepts:

- “Information Catalog Manager” on page 2

Related tasks:

- “Installing the Information Catalog Manager components” on page 6
- “Installing the Information Catalog Center” on page 7
- “Installing the Information Catalog Center for the Web on Windows” on page 8
- “Configuring the Information Catalog Center for the Web with WebSphere Application Server 4” on page 10
- “Configuring the Information Catalog Center for the Web with WebSphere Application Server 5” on page 13

Configuring the Information Catalog Center for the Web with WebSphere Application Server 4

Prerequisites:

Before you access information catalogs through the Information Catalog Center for the Web, ensure that the database manager is started on the database servers and that the Web server is started.

Notify users of their user IDs and passwords, and inform them of the Web address that they can use to access the Information Catalog Center for the Web.

To access the Information Catalog Center for the Web, client workstations must have a Web browser installed that is enabled for JavaScript and HTML Version 3.2 or higher. The following information was verified using WebSphere Application Server Advanced Edition Version 4.0.1 and IBM HTTP Server Version 1.3.19 (which is embedded in the WebSphere Application Server Advanced Edition Version 4.0.1). Refer to the IBM WebSphere Application Server Advanced Edition documentation for its prerequisites.

Restrictions:

Starting in the DB2 Warehouse Manager Standard Edition Version 8.2, you must install WebSphere Application Server 5. DB2 Warehouse Manager Version 8.2 or later does not support WebSphere Application Server 4.

Procedure:

AIX users: If you are using the Information Catalog Center on an AIX operating system, you might receive a SQL1224N error. If you receive this error, look at the message help text for a list of possible causes. If the problem involves the number of shared memory segments, see the Administrative API reference documentation for information regarding threaded applications with concurrent access, which presents workarounds for this situation including setting the environment variable EXTSHM or defining a loop-back to the database being accessed.

To configure the Information Catalog Center for the Web:

1. Start the IBM WebSphere Administrative Server:
 - For Windows:
Click **Start** → **Programs** → **IBM WebSphere** → **Application Server V4.0 AE** → **Start Admin Server**.
 - For AIX:
 - a. Navigate to your WebSphere Application Server home directory; for example, `cd /usr/WebSphere/AppServer/bin`.
 - b. Enter `startupServer.sh &`
2. Start the IBM WebSphere Administrative Console:
 - For Windows:
Click **Start** → **Programs** → **IBM WebSphere** → **Application Server V4.0 AE** → **Administrative Console**.
 - For AIX:
 - a. Navigate to your WebSphere Application Server home directory; for example, `cd /usr/WebSphere/AppServer/bin`

- b. Enter `adminclient.sh &`
3. Expand **WebSphere Administrative Domain**.
 - a. Right-click **Enterprise Applications** and click **Install Enterprise Application**. The **Install Enterprise Application Wizard** opens.
 - b. Enter the name of the node in the **Browse for file on node** field. Check that **Install Application (*ear)** is selected. Enter the full path name for the `icweb.ear` file in the **Path** field. Enter `icweb` in the **Application name** field. Click **Next**.
 - c. Leave the default settings for the rest of the pages in the wizard and click **Finish** to save the settings.
4. To regenerate the Web server plug-in configuration:
 - a. Expand **WebSphere Administrative Domain** on the Administrative Console.
 - b. Expand **Nodes**.
 - c. Right-click your node and select **Regen Webserver Plugin**.
5. To update the application classpath:
 - a. Expand **WebSphere Administrative Domain** on the Administrative Console.
 - b. Expand **Nodes**.
 - c. Expand your node.
 - d. Click **Application Servers**. The properties panels are displayed to the right.
 - e. Click the **JVM Settings** tab.
 - f. For Windows users, update the classpath with:
 - `C:\Program Files\IBM\SQLLIB\java\db2java.zip`
 - `C:\Program Files\IBM\SQLLIB\java\Common.jar`
 - `C:\Program Files\IBM\SQLLIB\tools\db2cmn.jar`
 Make necessary changes to the paths if you installed DB2 in another directory.
 - g. For AIX users, update the classpath with:
 - `/home/db2admin/sqllib/java/db2java.zip`
 - `/home/db2admin/sqllib/java/Common.jar`
 - `/home/db2admin/sqllib/tools/db2cmn.jar`
 Make necessary changes to the paths if you installed DB2 in another directory.
 - h. Click **Apply**.
6. Edit the file `Webgui.conf`. Add a link for each information catalog that you want users to access from the Information Catalog Center for the Web. Update each line to reflect your system and catalog settings. Use the following format (with examples) to update your Information Catalog Center for the Web Settings:
 - `html=/usr/WebSphere/AppServer/installedApps/icweb.ear/icweb.war/html`
The system directory where the Information Catalog Center for the Web HTML files are stored.
 - `servlet=http://yournode/icweb/`
The URL for the application that is set up in IBM WebSphere. In the URL, *yournode* must be your fully qualified server name.
 - `databasename=ICMSAMP`
The Information Catalog Center database name.

- `catalogname=catalog name:description`

The catalog name is followed by descriptive text that will be used as a link to the catalog. For example:

```
catalogname=ICM:Sample 8.1 Information Catalog
```

Update the heap size by entering the following command in a DB2 command prompt:

```
db2 update db cfg for databasename using applheapsz 4096
```

7. If your database is remote, catalog the server node and databases by using the necessary DB2 client function. From the DB2 Command Line Processor, verify that the server can connect successfully to the databases.

8. Configure the security:

- a. Click the **Console** menu item in the Administrative Console. Click **Security Center**
- b. Check **Enable Security** on the General page.
- c. Click to the Authentication page. Select **Local Operating System** for the Authentication Mechanism and enter the security server ID and password. The local operating system authentication uses the local user registry. You will have to create the local operating system users so that they can access the Information Catalog Center for the Web. Another option is to use LDAP authentication, a centralized user repository. You will have to set up your LDAP directory and create LDAP users to have access to Information Catalog Center for the Web.
- d. Click **OK**. The user ID and password will be verified against the local operating system.
- e. Expand **Enterprise Applications** on the Administrative Console.
- f. Click `icweb`. Select the **User/Role mappings** tab. The default `icwebsec` role is displayed.
- g. Click **Select**. The **Select Users/Groups** window opens.
- h. Check the **Select Users/Groups** box. Enter an (*) as the search string and click **Search**. The results will list all of the users and groups. Add the users and groups you want to have access to the information catalog. Click **Apply**.

9. In the `httpd.conf` file, which is located in the subdirectory `conf` (for example `/usr/IBMHttpServer/conf`), add an alias that maps to the location of your DB2 messages files:

```
Alias /icwebhelp/your sqllib directory/msg/
```

10. Optional: To enable Information Catalog Center for the Web to launch programs that are specific to object types, your Web server must be configured so that the object's location (its URL path) maps to a directory location. For example, assume that you have defined a Spreadsheet object. This object has a property, "Spreadsheet filename", whose value might be set to `C:\Program Files\IBM\SQLLIB\samples\icmdemo\sale1q00.wks` and another property, "URL to access data", that might have a value set to `http://yournode/icmsample/sale1q00.wks`. To enable Web users to launch programs, you must add the following line in the Aliases section of the `httpd.conf` file, which is located in the subdirectory `conf`, under the IBM HTTP Server home directory:

```
Alias /icmsample/ "C:/Program Files/IBM/SQLLIB/samples/icmdemo/"
```

After you make this change, you must stop and then restart the HTTP server. When you open the Spreadsheet in a Web browser by clicking the URL associated with the "URL to access data" property, Lotus 1-2-3 is invoked to display the Spreadsheet.

11. Restart the HTTP server.
12. Restart the IBM WebSphere Application Server.
13. Open a Web browser and enter `http://yournode/icweb`, where *yournode* is the name of your node.
You will be prompted to enter a user ID and password. Enter the DB2 user ID you want to use to connect to the information catalog.

Your Web users can access the information catalog from any Web browser at `http://yournode/icweb`, where *yournode* is the name of your node. You can link to this URL from any Web page for easy access by Information Catalog Center for the Web users. Users will be prompted each time they open a new browser to enter a valid user ID and password.

Related concepts:

- "Information Catalog Manager" on page 2

Related tasks:

- "Installing the Information Catalog Manager components" on page 6
- "Installing the Information Catalog Center for the Web on Windows" on page 8
- "Installing the Information Catalog Center for the Web on AIX" on page 9

Configuring the Information Catalog Center for the Web with WebSphere Application Server 5

You can configure the Information Catalog Center for the Web to make the information catalog easily accessible to Web users.

Prerequisites:

Starting in the DB2 Warehouse Manager Standard Edition Version 8.2, you must install WebSphere Application Server 5. DB2 Warehouse Manager Version 8.2 or later does not support WebSphere Application Server 4.

Verify that the Information Catalog Center for the Web component is installed by checking for the presence of the `icweb.ear` file in the `sqllib\tools\icweb` directory.

Before you access information catalogs through the Information Catalog Center for the Web, ensure that the database manager is started on the database servers and that the web server is started.

Notify users of their user IDs and passwords, and inform them of the Web address that they can use to access the Information Catalog Center for the Web.

You must be running IBM WebSphere Application Server Advanced Edition Version 5.0. To access the Information Catalog Center for the Web, client workstations must have a web browser installed that is enabled for JavaScript and HTML Version 3.2 or higher. The following information was verified using WebSphere Application Server Advanced Edition Version 5.0 and IBM HTTP Server Version 1.3.26 (which is embedded in the WebSphere Application Server Advanced

Edition Version 5.0). Refer to the IBM WebSphere Application Server documentation for prerequisites pertaining to that product.

Procedure:

AIX users: If you are using the Information Catalog Center on an AIX operating system, you might receive a SQL1224N error. If you receive this error, look at the message help text for a list of possible causes. If the problem involves the number of shared memory segments, see the Administrative API reference documentation for information regarding threaded applications with concurrent access. This documentation presents workarounds for this situation including setting the environment variable EXTSHM or defining a loop-back to the database being accessed.

To configure the Information Catalog Center for the Web:

1. Start the WebSphere Application Server.
2. Start the Administrative Console.
3. Prepare for the application installation:
 - a. In the left frame of the Administrative Console, expand **Applications**.
 - b. Click **Install New Application**.
 - c. In the right frame, specify the location of the icweb.ear file.
 - d. Click **Next**.
 - e. Accept the defaults and continue to Step 4, Map security roles to users/groups.
 - f. Select **icwebsec**.
 - g. Click either **Lookup users** to authorize users to use the application or **Lookup groups** to authorize groups.
 - h. On the Summary page, click **Finish**.
 - i. Click **Save to Master Configuration** and then click **Save**.
4. Regenerate the Web server plug-in configuration:
 - a. In the left frame, expand **Environment**.
 - b. Click **Update Web Server Plugin**.
 - c. Click **OK**.
5. Update the application classpath:
 - a. In the left frame, expand **Servers** and click **Application Servers**.
 - b. Select your server.
 - c. In the Additional Properties table on the Configuration page, click **Process Definition**.
 - d. Click **Java Virtual Machine**.
 - e. In the General Properties table on the Configuration page, update the classpath with:

Windows:

```
C:\Program Files\ibm\sql1lib\java\db2java.zip  
C:\Program Files\ibm\sql1lib\java\Common.jar  
C:\Program Files\ibm\sql1lib\tools\db2cmn.jar
```

AIX:

```
/home/db2admin/sql1lib/java/db2java.zip  
/home/db2admin/sql1lib/java/Common.jar  
/home/db2admin/sql1lib/tools/db2cmn.jar
```

Make appropriate changes to the paths if you installed DB2 in another directory.

f. Click **OK**.

6. Edit the WebGUI.conf file. Add a link for each information catalog that you want users to access from the Information Catalog Center for the Web. Update each line to reflect your system and catalog settings. For example:

The system directory where the Information Catalog Center for the Web HTML files are stored.

```
html=C:\WebSphere\AppServer\installedApps\nodename\icweb.ear\icweb.war\html
```

The URL for the application set up in IBM WebSphere. In the URL, *nodename* should be your fully qualified server name.

```
servlet=http://nodename/icweb/
```

If your server does not listen on the default port number, you will have to specify the port number. For example,

```
servlet=http://nodename:portnumber/icweb/.
```

The Information Catalog Center database name.

```
databasename=ICMSAMP
```

The catalog name is followed by descriptive text that will be used as a link to the catalog.

```
catalogname=catalog name:description
```

For example: catalogname=ICM:Sample 8.1 Information Catalog

7. Update the heap size by entering the following command in a DB2 command prompt:

```
db2 update db cfg for databasename using applheapsz 4096
```

If your database is remote, catalog the server node and databases by using the necessary DB2 client function. From the DB2 Command Line Processor, verify that the server can connect successfully to the databases.

8. Configure security:

- a. In the left frame, expand **Security Center**.

- b. Expand **User Registries** and click the user registry that you will be using.

- c. Enter the Server ID and password for the registry that you selected, and click **OK**.

- d. On the Global Security page, click **Global Security**.

- e. On the configuration page in the right frame, select **Enabled**.

- f. Clear **Enforce Java 2 security**, and accept all other defaults.

- g. Set the Active User Registry to the user registry that you are using. Other authorization mechanisms are available. For more information, see to the WebSphere Application Server Version 5 documentation.

- h. Click **OK**.

9. In the httpd.conf file, which is located in the subdirectory conf (for example /usr/IBMHttpServer/conf), add an alias that maps to the location of your DB2 messages files:

```
Alias /icwebhelp/your sqllib directory/msg/
```

10. Optional: Enable Information Catalog Center for the Web to launch programs that are specific to object types.

- a. Configure your web server so that the object's location (its URL path) maps to a directory location. For example, assume that you have defined a Spreadsheet object. This object has a property, "Spreadsheet filename",

whose value might be set to C:\Program Files\IBM\SQLLIB\samples\icmdemo\sale1q00.wks and another property, "URL to access data", that might have a value set to http://yournode/icmsample/sale1q00.wks. To enable Web users to launch programs, you must add the following line in the Aliases section of the httpd.conf file, which is located in the subdirectory conf, under the IBM HTTP Server home directory:

```
Alias /icmsample/ "C:/Program Files/IBM/SQLLIB/samples/icmdemo/"
```

- b. Stop and then restart the HTTP server.

When you open the Spreadsheet in a Web browser by clicking the URL associated with the "URL to access data" property, Lotus 1-2-3 is invoked to display the Spreadsheet.

11. Restart the HTTP server:
12. Restart the IBM WebSphere Application Server.
13. Open a Web browser and enter http://<nodename>:<portnumber>/icweb, where <nodename> is the name of your node. You will be prompted to enter a user ID and password. Enter the DB2 user ID that you want to use to connect to the information catalog. Web users can access the information catalog from any Web browser by using this URL. Users will be prompted each time they open a new browser to enter a valid user ID and password. In addition, you can connect to only one information catalog for each Information Catalog Center for the Web application, because Web users who log on access the catalog with the same DB2 user ID.

Configuring the Information Catalog Center for the Web with the DB2 Embedded Application Server

You can configure the Information Catalog Center for the Web to make the information catalog easily accessible to Web users. Starting in the DB2[®] Warehouse Manager Standard Edition Version 8.2, you can use the DB2 Embedded Application Server to configure the Information Catalog Center for the Web.

Prerequisites:

Verify that the Information Catalog Center for the Web component is installed by checking for the presence of the icweb.ear file in the sqllib\tools\icweb directory.

Confirm that you can start the wsadmin script tools and the DB2 Command Line Processor.

Check that the settings in the ICCConfig.properties file, such as the DB2PATH and WASPATH settings, match the environment settings for your operating system.

Procedure:

To configure the Information Catalog Center for the Web with the DB2 Embedded Application Server:

1. Start the DB2 Embedded Application Server.
2. Run the ICCConfig.jacl script in either batch installation mode or menu mode to configure the Information Catalog Center for the Web. Enter one of the following commands on a DB2 command line:

For batch installation mode:

```
wsadmin options -f ICCConfig.jacl install [property_file_name]
```

For menu mode:

```
wsadmin options -f ICCConfig.jacl menu [property_file_name]
```

options The wsadmin options (except for **-f**), such as **-conntype**, **-user**, and **-password**. You can specify more than one option by separating the options with a space. For example, **-user myid -password mypassword**.

property_file_name

The name of the property file. The default is ICCConfig.properties.

3. Restart the HTTP server.
4. Restart the DB2 Embedded Application Server.
5. Open a Web browser and enter `http://nodename:portnumber/icweb`, where *nodename* is the name of your node. You will be prompted to enter a user ID and password. Enter the DB2 user ID that you want to use to connect to the information catalog. Web users can access the information catalog from any Web browser by using this URL. Users will be prompted each time they open a new browser to enter a valid Web user ID and password. Because all of the Web users will be accessing the catalog with the same DB2 user ID, you can connect to only one information catalog per Information Catalog Center for the Web application.

Before you access information catalogs through the Information Catalog Center for the Web, ensure that the database manager is started on the database servers and that the Web server is started.

Notify users of their user IDs and passwords, and inform them of the Web address that they can use to access the Information Catalog Center for the Web.

Chapter 3. Installing warehouse agents

When you install the warehouse server with DB2 Universal Database on Windows NT, Windows 2000, Windows XP, or AIX, a default agent is installed. If you require a warehouse agent that can accept commands from more than one warehouse server or if you require a warehouse agent that is remote from the warehouse server, you can install another warehouse agent using the DB2 Warehouse Manager.

The warehouse server and all of the warehouse agents must be at the same version and fixpak level.

Warehouse agents are available for the Windows NT, Windows 2000, Windows XP, Linux, AIX, iSeries, and z/OS operating systems, and for the Solaris Operating Environment. When you install warehouse agents on Windows NT, Windows 2000, Windows XP, AIX, Linux, and the Solaris Operating Environment, the warehouse ODBC drivers and driver manager are also installed.

Preparing to install warehouse agents

The following sections describe how to prepare for warehouse agent installation.

Preparing to install warehouse agents

Warehouse agent sites must have access to warehouse sources and warehouse targets. If the source is a Client Connect source, your client must also catalog the DB2 server. If you choose to access warehouse sources and targets through ODBC on Windows, Linux, AIX, and the Solaris Operating Environment, you must register these source and target databases with ODBC as system DSNs. On AIX, Linux, or the Solaris Operating Environment, you must specify warehouse sources and targets in the `.odbc.ini` file that is located in the home directory of the user ID that the agent runs under.

If you are using a UNIX warehouse agent and you define a HOME environment variable in the `IWH.environment` file, you must put the `.odbc.ini` file in the directory path specified in `$HOME`. If you install the warehouse server on AIX and you use the default agent to access warehouse sources and targets, you must also catalog warehouse sources and targets to the server workstation for data that is accessed by the default agent. The warehouse sources and targets must be cataloged where the warehouse server and default agent are installed. If the `/usr/opt/db2_08_01/bin/IWH2AGNT` soft link is pointing to `IWH2AGNT.ivodbc`, the default agent will be using the ODBC version of the AIX agent and the data sources and targets referenced by the default agent must be cataloged as ODBC sources in `.odbc.ini`.

Prerequisites:

Warehouse agents are available for these operating systems:

- Microsoft Windows NT Workstation or Windows NT Server Version 4.0 with Service Pack 6 or later.
- Microsoft Windows 2000 or Windows XP.
- IBM AIX Version 4.3.3 FixPak 2 or later.

- IBM OS/390 Version 2.10 or later.
- Linux for 32-bit Intel processors. Linux distributions with the following levels are supported: kernel 2.4.7, glibc 2.2.4.
- IBM iSeries V5R1 or later, with PTF SI11316 and any other prerequisite software fix packs and PTFs. See the readme file for these prerequisites, see the readme file. To determine what software is installed on your iSeries workstation, enter DSPSFWRSC at an iSeries command prompt.
- Solaris Operating Environment Version 7 or later.

Note: Future releases of the Linux platforms might or might not be supported. See the DB2 Universal Database for Linux Web site for more information.

If you are using the DB2 OLAP steps, you must have either DB2 OLAP Server (Version 7 or later) or Essbase (Version 6 or later) installed. On the Solaris Operating Environment, you must have DB2 OLAP Server Version 7, FixPak 8 or later (Essbase Version 6.2) or DB2 OLAP Server Version 8 (Essbase Version 6.5).

For iSeries, you must have a user ID that has ALLOBJ and JOBCTL authority. This level of authority is required for both the iSeries RSTLICPGM command and the STRVWD and ENDVWD commands. Also, the user profile that starts the warehouse agent daemon must have *PGMR (bind capability) as the User Class.

Warehouse agents on AIX, Linux, Windows, and the Solaris Operating Environment require 50 MB each of fixed disk space.

The z/OS warehouse agent requires approximately 95 MB of HFS space.

Fixed disk space is not applicable to warehouse agents on iSeries.

Procedure:

Install TCP/IP on the warehouse agent site to establish connectivity between the warehouse agent site and the warehouse server.

To serve a remote client from a DB2 server, set the DB2COMM environment variable on the DB2 server:

```
db2set -i instance DB2COMM=TCPIP
```

This setting allows the server to accept TCP/IP requests from remote clients.

Related concepts:

- “Warehouse agents” on page 3

Related tasks:

- “Configuring a database connection manually using the Configuration Assistant (CA)” in the *Quick Beginnings for DB2 Servers*
- “Installing a Windows warehouse agent” on page 26
- “Installing the z/OS warehouse agent” on page 27
- “Installing the iSeries warehouse agent” on page 43
- “Installing the AIX, Linux, and Solaris Operating Environment warehouse agents” on page 52

Non-DB2 source database access using ODBC

You can access several non-DB2 warehouse sources from agent sites by using ODBC drivers. The Data Warehouse ODBC driver for AIX, Linux, the Solaris Operating Environment, and Windows (ODBC driver only) are installed when you install a warehouse agent on one of these operating systems. The Data Warehouse ODBC drivers for non-DB2 sources are the DataDirect ODBC drivers provided by DataDirect Technologies, Inc.

For NFS or SNA connectivity, you need additional connectivity software. The software that you need depends on the communication protocol that is used on the agent site.

Validating the connectivity of an ODBC data source for warehouse agents

The Warehouse Manager provides a test program, called `odbctest`, which you can run at your Windows and UNIX warehouse agent sites to validate connectivity from your Windows and UNIX warehouse agent sites to your ODBC data sources. This program attempts to connect to the database you specify and lists the contents of the database catalog. If the test program is able to connect to the database, then the connectivity is properly set up and the warehouse agent should be able to connect. If the test program is not able to connect to the source database, then the error code that was encountered will be displayed, as will any ODBC driver messages. These messages will help you to configure and fix the connection to the source database.

Prerequisites:

If your operating system is AIX, Linux, or the Solaris Operating Environment, ensure that your current home directory has the `.odbc.ini` file defined and that the source to which you are trying to connect is defined in that file. If your operating system is Windows ensure that the source is defined as an ODBC system DSN.

Procedure:

The location of the `odbctest` program varies with the operating system.

- Windows: `...\SQLLIB\bin`
- AIX: `/usr/opt/db2_08_01`
- Solaris Operating Environment/Linux: `/opt/IBM/db2/V8.1`

To validate the connectivity of your ODBC data source for warehouse agents:

1. If you are running the program from a UNIX warehouse agent site, type the following:
 - On AIX, run this command: `/usr/opt/db2_08_01/bin/IWH.environment`.
 - On the Solaris Operating Environment and Linux, run this command: `/opt/IBM/db2/V8.1/bin/IWH.environment`
2. From a Windows command prompt or UNIX command line, type `odbctest <dbName> <userID> <password>`, where:
 - `<dbName>` is the name of the ODBC system (Windows) database you are attempting to connect to
 - `<userID>` is a valid user ID to connect to the database

- <password> is the password that is associated with <userID>
3. To verify the connection to the system ODBC data source (called in this example target), enter the following command from a Windows command prompt or from an AIX, Linux, or Solaris Operating Environment terminal on the agent site: odbctest target <userID> <password>.

For example, odbctest target labriejj mylpw. If the connectivity is set up properly the following should be output to the screen:

```

| Operation: Enter ODBC Test Program, RETCODE = 0
| Operation: Completed Initialization, RETCODE = 0
| Operation: SQLAllocEnv, RETCODE = 0
| Operation: SQLAllocConnect, RETCODE = 0
| target labriejj mylpw
| Operation: SQLConnect, RETCODE = 0
| Environment variable Files\SQLLIB\LOGGING/odbctest.set not defined
| Operation: Environment settings written to $(VWS_LOGGING)/odbctest.set, RETCODE = 0
| (1) Operation: SQLConnectOptions, RETCODE = -1
| (1) SQLSTATE = S1092
| (1) SQLCODE = -99999
| (1) Error Message:
| (1) [IBM][CLI Driver] CLI0133E Option type out of range. SQLSTATE=S1092
| Operation: SQLAllocStmt, RETCODE = 0
| Operation: SQLTables, RETCODE = 0
| Table type=TABLE, VIEW, SYSTEM TABLE, ALIAS
| IWH.APPEND, type= TABLE, remarks=
| IWH.EDITIONS, type= TABLE, remarks=
| IWH.MARY2, type= TABLE, remarks=
| IWH.NOMAPS, type= TABLE, remarks=
| LABRIEJJ.DB2STAT, type= TABLE, remarks=
| LABRIEJJ.KARL1, type= TABLE, remarks=
| LABRIEJJ.KARL2, type= TABLE, remarks=
| LABRIEJJ.MR_DB2STAT3, type= TABLE, remarks=
| SYSCAT.ATTRIBUTES, type= VIEW, remarks=
| SYSCAT.BUFFERPOOLNODES, type= VIEW, remarks=
| SYSIBM.SYSDUMMY1, type= SYSTEM TABLE, remarks=
| SYSSTAT.COLDIST, type= VIEW, remarks=
| SYSSTAT.COLUMNS, type= VIEW, remarks=
| SYSSTAT.FUNCTIONS, type= VIEW, remarks=
| SYSSTAT.INDEXES, type= VIEW, remarks=
| SYSSTAT.TABLES, type= VIEW, remarks=
| SYSSTAT.TABLES, type= VIEW, remarks=
| Operation: SQLFetch, RETCODE = 100
| SQLSTATE = 00000
| SQLCODE = 0
| Error Message:
|
| Operation: SQLDisconnect, RETCODE = 0
| Operation: Exit ODBC Test Program, RETCODE = 0

```

If there is something wrong with either the definition or the connectivity an error should be output to the screen. In this example the user was trying to verify connectivity to a data source called myTEXT:

```

Operation: Enter ODBC Test Program, RETCODE = 0
Operation: Completed Initialization, RETCODE = 0
Operation: SQLAllocEnv, RETCODE = 0
Operation: SQLAllocConnect, RETCODE = 0
myTEXT labriejj mylpw
Operation: SQLConnect, RETCODE = -1
SQLSTATE = IM002
SQLCODE = 0
Error Message:
[Microsoft][ODBC Driver Manager] Data source name not found and no
default driver specified
Environment variable Files\SQLLIB\LOGGING/odbctest.set not defined
Operation: Environment settings written to $(VWS_LOGGING)/odbctest.set, RETCODE = 0
Operation: SQLConnectOptions, RETCODE = 0

```

```
Operation: SQLAllocStmt, RETCODE = -1
SQLSTATE = 08003
SQLCODE = 0
Error Message:
    [Microsoft][ODBC Driver Manager] Connection not open
Table type=TABLE, VIEW, SYSTEM TABLE, ALIAS
Operation: SQLDisconnect, RETCODE = -1
SQLSTATE = 08003
SQLCODE = 0a
Error Message:
    [Microsoft][ODBC Driver Manager] Connection not open
Operation: Exit ODBC Test Program, RETCODE = 0
```

Attention:

- An error might sometimes occur when setting connection options. This is normal as the ODBCTEST program is a generic program for all source types and some connection options might not be available for all database types. This error will not affect the operation of this test program.
- The Windows agent must have the database catalog as a system ODBC data source. Database connectivity cannot require the use of user environment variables.
- UNIX agents must have an entry for this source in the .odbc.ini file (located in the home directory of the user ID under which the UNIX agent is executing).

Related tasks:

- “Configuring the AIX, Linux, and Solaris Operating Environment warehouse agent environments” on page 55

Warehouse agent connectivity with warehouse sources and targets

You must establish connectivity from warehouse agent sites to your warehouse sources and targets. In order to access your warehouse sources and targets, you must have the Data Warehouse Center ODBC drivers or DB2[®] Connect, connectivity software (such as TCP/IP), and database clients on your warehouse agent sites.

Data Warehouse Center ODBC drivers for several non-DB2 databases are installed when you install a warehouse agent. Your DB2 Universal Database[™] CD also includes ODBC drivers for DB2.

Related concepts:

- “Connectivity products for warehouse sources and targets” on page 23
- “Database clients on warehouse agent sites and warehouse servers” on page 24

Related tasks:

- “Verifying TCP/IP connectivity between the warehouse server and the warehouse agent” on page 24

Connectivity products for warehouse sources and targets

Install the connectivity products that are needed to access remote warehouse sources and targets. This might include TCP/IP or NetBIOS customization, SNA Client for Windows[®], or SNA Server for Windows.

You need to install the connectivity products on the warehouse server (if you are using a local warehouse agent) and on your warehouse agent sites. For example, you can access a DB2® family database through TCP/IP or NetBIOS. You can also access a DB2 z/OS™ database through TCP/IP or NetBIOS if a DB2 Connect™ gateway is accessible on the network with connectivity to the host database that you need. Client Connect users must establish connectivity to warehouse sources and targets on the client, since Client Connect uses JDBC and does not make use of the warehouse server or agent.

Related concepts:

- “Warehouse agent connectivity with warehouse sources and targets” on page 23
- “Database clients on warehouse agent sites and warehouse servers” on page 24

Related tasks:

- “Defining a warehouse target” in the *Data Warehouse Center Administration Guide*
- “Verifying TCP/IP connectivity between the warehouse server and the warehouse agent” on page 24
- “Defining DB2 warehouse sources” in the *Data Warehouse Center Administration Guide*

Related reference:

- “Supported non-DB2 data sources” in the *Data Warehouse Center Administration Guide*

Database clients on warehouse agent sites and warehouse servers

Install the client component of a remote non-DB2 database wherever you want to access a remote database (if you are using a local warehouse agent).

For the DB2® family of databases, the necessary DB2 client function is included with the DB2 Universal Database™.

Related concepts:

- “Warehouse agent connectivity with warehouse sources and targets” on page 23
- “Connectivity products for warehouse sources and targets” on page 23

Related tasks:

- “Verifying TCP/IP connectivity between the warehouse server and the warehouse agent” on page 24

Verifying TCP/IP connectivity between the warehouse server and the warehouse agent

You can test to ensure that there is connectivity between workstations.

Prerequisites:

A warehouse server must have a static TCP/IP address. A warehouse agent can have a static or dynamic TCP/IP address.

Procedure:

Test TCP/IP connectivity between the following workstations:

- Warehouse server to the warehouse agent sites
- Warehouse agent sites to the warehouse server
- Data Warehouse Center administrative client to the warehouse server
- Warehouse server to the Data Warehouse Center administrative client

To test the connectivity, enter `ping hostname` where *hostname* is the TCP/IP host name of the warehouse server, Data Warehouse Center administrative client, or warehouse agent site.

On AIX, Linux, and Windows operating systems, you will see several messages in the window that verify the TCP/IP connection, similar to those shown in the following example.

```
[C:\]ping dgntserv2.stl.ibm.com
PING dgntserv2.stl.ibm.com: 56 data bytes
64 bytes from 9.112.46.127: icmp_seq=1. time=0. ms
64 bytes from 9.112.46.127: icmp_seq=2. time=0. ms
64 bytes from 9.112.46.127: icmp_seq=3. time=0. ms
64 bytes from 9.112.46.127: icmp_seq=4. time=0. ms

----dgntserv2.stl.ibm.com PING Statistics----
5 packets transmitted, 4 packets received, 20% packet loss
round-trip (ms)  min/avg/max = 0/0/0
```

Figure 1. Sample response from PING command

On the Solaris Operating Environment, the ping command will return the following information:

```
host is alive
```

For a workstation with AIX or Linux warehouse agents, ensure that you can ping the workstation by using only the host name without the local domain name. For example, enter `ping dgntserv2` instead of `ping dgntserv2.stl.ibm.com`. You might need to add an entry in the `/etc/hosts` file such as:

```
123.45.67.89      dgntserv2      dgntserv2.stl.ibm.com
```

Test ODBC connectivity between any non-DB2 database clients and servers. If you are using a Windows warehouse agent, verify that connectivity can be established as a Windows system process. You can use the `odbc` test program shipped with the warehouse agent to test proper connectivity and configuration.

Related concepts:

- “Warehouse agent connectivity with warehouse sources and targets” on page 23
- “Connectivity products for warehouse sources and targets” on page 23
- “Database clients on warehouse agent sites and warehouse servers” on page 24

Related tasks:

- “Testing for bidirectional communication between the iSeries warehouse agent and the warehouse server” on page 47
- “Determining the source of connectivity errors for the iSeries warehouse agent” on page 48

Related reference:

- “Post-installation considerations for iSeries warehouse agents” on page 45

Installing the Windows warehouse agent

The following section describes how to install the Windows warehouse agent.

Installing a Windows warehouse agent

When you install the warehouse server with DB2 Universal Database on Windows NT, Windows 2000, or Windows XP, a default agent is installed. If you require a warehouse agent that is remote from the warehouse server, you can use the DB2 Warehouse Manager to install another warehouse agent.

Prerequisites:

Before you install a Windows warehouse agent, you must prepare for the installation.

Procedure:

To install a Windows warehouse agent:

1. Close all Windows programs.
2. Insert the DB2 Warehouse Manager CD-ROM into your CD-ROM drive. The auto-run feature automatically starts the DB2 Setup launchpad.
3. Click **Install Products** from the launchpad.
4. Ensure that **DB2 Warehouse Manager** is selected, then click **Next**.
5. Proceed as prompted by the DB2 Setup wizard.
6. In the list of features, select **Warehouse agent**, then click **Next**.
7. Proceed as prompted by the DB2 Setup wizard. Online help is available to guide you through the remaining steps.

After you install the warehouse agent, register your source and target databases as system DSNs.

Related concepts:

- “Warehouse agents” on page 3
- “Warehouse agent connectivity with warehouse sources and targets” on page 23

Related tasks:

- “Preparing to install warehouse agents” on page 19

Related reference:

- “Non-DB2 source database access using ODBC” on page 21

Installing and configuring the z/OS warehouse agent

The following sections describe how to install and configure the z/OS warehouse agent.

Overview of the z/OS warehouse agent

DB2® Warehouse Manager for z/OS™ includes a z/OS warehouse agent. You can use the agent to communicate between DB2 Universal Database™ for z/OS and other databases, including DB2 databases on other operating systems and non-DB2 databases. The warehouse agent can communicate with supported data sources that use an Open Database Connectivity (ODBC) connection. The warehouse agent runs on UNIX® Systems Services requires OS/390® Version 2 Release 10 or later, and is compatible with DB2 for z/OS and OS/390 Versions 6 and 7.

The z/OS warehouse agent supports the following tasks:

- Copy data from a DB2 database source to a DB2 database target
- Produce sample contents from a table or file
- Run user-defined programs
- Access non-DB2 databases through DB2 Information Integrator
- Run DB2 Universal Database for z/OS utilities
- Run the apply job for IBM® DataPropagator™
- Execute warehouse-supplied transformers

Related tasks:

- “Installing the z/OS warehouse agent” on page 27
- “Starting the z/OS warehouse agent daemon” on page 31
- “Starting the agent daemon as a z/OS started task” on page 38
- “Running multiple warehouse agent daemons on one z/OS subsystem” on page 39

Related reference:

- “z/OS warehouse agent support for Trillium user-defined program steps” on page 42

Installing the z/OS warehouse agent

The *DB2 Warehouse Manager Program Directory* is included with the z/OS warehouse agent and contains information about requirements for storage, programming, and your driving and target systems.

Prerequisites:

The z/OS warehouse agent requires the following software:

- OS/390 Version 2.10 or later
- DB2 Universal Database for OS/390 Version 6 or later
- OS/390 UNIX System Services

The following table shows the APARs that you must apply to your DB2 subsystem before installing the z/OS agent.

Table 2. Requisite APARs

DB2 Universal Database Version	Requisite APAR
DB2 for OS/390 Version 6	PQ36585, PQ46261
DB2 for z/OS and OS/390 Version 7	PQ36585, PQ46261

Restrictions:

The z/OS warehouse agent requires the following access privileges:

- User ID with Authorized Program Facility (APF) authority (to work with UNIX System Services)
- EXECUTE authority on your ODBC plan
- READ and WRITE authority to the logging and ODBC trace directories (if running with logging or ODBC trace on)

Procedure:

To install the z/OS warehouse agent:

1. Unload the code for the warehouse agent from the SMP/E tape. The program directory is supplied with the product.

One of the target libraries that results from the SMP/E installation is a UNIX Systems Services directory, which contains the warehouse agent executables. The default name of this directory is /usr/lpp/DWC81. This directory contains the executable files for the warehouse agent.

2. Set up a home directory within UNIX Systems Services for each user ID that will start the agent daemon. The agent requires environment variables, which point to various DB2 libraries and output directories. The best way to set these variables is to put them in a .profile file in the home directory of the user who will start the agent daemon. That way, when the user signs on, the .profile file runs automatically and sets the environment variables.

This example shows the contents of a sample .profile file:

```
export VWS_LOGGING=/usr/lpp/DWC81/logs
export VWP_LOG=/usr/lpp/DWC81/vwp.log
export VWS_TEMPLATES=/usr/lpp/DWC81
export DSNA0INI=/u/userid/dsnaoini
export LIBPATH=/usr/lpp/DWC81/:$LIBPATH
export PATH=/usr/lpp/DWC81/:$PATH
export STEPLIB=DSN710.SDSNEXIT:DSN710.SDSNLOAD
```

3. Set up kernel and daemon connections. To set up these connections, add the following lines to your /etc/services file or TCPIP.ETC.SERVICESFILE:

```
wkernel 11000/tcp
vwd 11001/tcp
vwlogger 11002/tcp
```

To set up connections between the z/OS warehouse agent and databases, add any remote databases to your z/OS communications database.

This example shows sample communications database inserts to connect a database that is running on Windows NT to a database on z/OS:

```
INSERT INTO SYSIBM.LOCATIONS
  (LOCATION, LINKNAME, PORT)
VALUES
  ('NTDB', 'VWNT704', '60002');
INSERT INTO SYSIBM.IPNAMES
  (LINKNAME, SECURITY_OUT, USERNAMES, IPADDR)
VALUES
  ('VWNT704', 'P', 'O', 'VWNT704.STL.IBM.COM');
INSERT INTO SYSIBM.USERNAMES
  (TYPE, AUTHID, LINKNAME, NEWAUTHID, PASSWORD)
VALUES
  ('O', 'MVSUID', 'VWNT704', 'NTUID', 'NTPW');
```

- Bind ODBC to databases locally and remotely. Because the z/OS warehouse agent uses ODBC to communicate with DB2, you must bind your ODBC plan to all of the local and remote databases that your agent will access.

The following example shows some sample bind package statements for a local DB2 for z/OS database. The example assumes that your local system is named *DWC6*, and that you want to use the name *DWC6CLI* for your ODBC package name on that subsystem:

```
DSN SYSTEM(DWC6)
BIND PACKAGE (DWC6CLI) MEMBER(DSNCLICS) ISO(CS)
BIND PACKAGE (DWC6CLI) MEMBER(DSNCLINC) ISO(NC)
BIND PACKAGE (DWC6CLI) MEMBER(DSNCLIRR) ISO(RR)
BIND PACKAGE (DWC6CLI) MEMBER(DSNCLIRS) ISO(RS)
BIND PACKAGE (DWC6CLI) MEMBER(DSNCLIUR) ISO(UR)
BIND PACKAGE (DWC6CLI) MEMBER(DSNCLIQR) ISO(QR)
BIND PACKAGE (DWC6CLI) MEMBER(DSNCLIMS)
BIND PACKAGE (DWC6CLI) MEMBER(DSNCLIC1)
BIND PACKAGE (DWC6CLI) MEMBER(DSNCLIC2)
BIND PACKAGE (DWC6CLI) MEMBER(DSNCLIF4)
```

The following example shows some sample bind package statements for a remote DB2 for z/OS database, where *REMLOC* is the location name of the remote DB2 for z/OS system that is registered in the Communications Database:

```
DSN SYSTEM(DWC6)
BIND PACKAGE (REMLOC.DWC6CLI) MEMBER(DSNCLICS) ISO(CS)
BIND PACKAGE (REMLOC.DWC6CLI) MEMBER(DSNCLINC) ISO(NC)
BIND PACKAGE (REMLOC.DWC6CLI) MEMBER(DSNCLIRR) ISO(RR)
BIND PACKAGE (REMLOC.DWC6CLI) MEMBER(DSNCLIRS) ISO(RS)
BIND PACKAGE (REMLOC.DWC6CLI) MEMBER(DSNCLIUR) ISO(UR)
BIND PACKAGE (REMLOC.DWC6CLI) MEMBER(DSNCLIQR) ISO(QR)
BIND PACKAGE (REMLOC.DWC6CLI) MEMBER(DSNCLIMS)
BIND PACKAGE (REMLOC.DWC6CLI) MEMBER(DSNCLIC1)
BIND PACKAGE (REMLOC.DWC6CLI) MEMBER(DSNCLIC2)
BIND PACKAGE (REMLOC.DWC6CLI) MEMBER(DSNCLIF4)
```

The following example shows some sample bind package statements for a DB2 Universal Database that is running on Windows NT:

```
BIND PACKAGE (NTDB.DWC6CLI) MEMBER(DSNCLICS) ISO(CS)
BIND PACKAGE (NTDB.DWC6CLI) MEMBER(DSNCLINC) ISO(NC)
BIND PACKAGE (NTDB.DWC6CLI) MEMBER(DSNCLIRR) ISO(RR)
BIND PACKAGE (NTDB.DWC6CLI) MEMBER(DSNCLIRS) ISO(RS)
BIND PACKAGE (NTDB.DWC6CLI) MEMBER(DSNCLIUR) ISO(UR)
BIND PACKAGE (NTDB.DWC6CLI) MEMBER(DSNCLIC1)
BIND PACKAGE (NTDB.DWC6CLI) MEMBER(DSNCLIC2)
BIND PACKAGE (NTDB.DWC6CLI) MEMBER(DSNCLIQR)
BIND PACKAGE (NTDB.DWC6CLI) MEMBER(DSNCLIF4)
BIND PACKAGE (NTDB.DWC6CLI) MEMBER(DSNCLIV1)
BIND PACKAGE (NTDB.DWC6CLI) MEMBER(DSNCLIV2)
```

Here is a sample bind statement to bind the ODBC packages for all locations together in a plan:

```
DSN SYSTEM(DWC6)
BIND PLAN(DWC6CLI) PKLIST(*.DWC6CLI.* )
```

When you complete binding the ODBC packages, verify that the *DSNAOINI* environment variable in your .profile file points to the ODBC initialization file that uses the ODBC plan that you just bound.

For example, if the ODBC plan is named *DWC6CLI* and the local system is named *DWC6*, the ODBC initialization file should contain the following information:

```
;SUBSYSTEM stanza
[DWC6]
MVSATTACH=CAF
PLANNAME=DWC6CLI
```

5. Set up your ODBC initialization file. A sample ODBC initialization file, INISAMP, is included in the `usr/lpp/DWC81/` directory. You can edit this file to work with your system, or you can create your own file.

To ensure that the file works correctly, verify that it is properly configured:

- The DSNAOINI environment variable must point to the initialization file.
- The file must include `CONNECTTYPE=2` in the common stanza.
- The PLANNAME value in the subsystem stanza must be the name of the ODBC plan that you bound in the last step.
- The file must include `MVSATTACHTYPE=CAF` in the subsystem stanza.

Ensure that you have a data source stanza for your DB2 system. It must specify the location name of the local DB2 system.

This is an example of a DSNAOINI file:

```
[COMMON]
MVSDEFAULTSSID=DWC6
CONNECTTYPE=2
;APPLTRACE=1
;APPLTRACEFILENAME=/usr/lpp/DWC81/logs/application.CLITRACE
;TRACEFLUSH=1
;Example SUBSYSTEM stanza for DWC6 subsystem
[DWC6]
MVSATTACHTYPE=CAF
PLANNAME=DWC6CLI
;DATA SOURCE stanza for ISC710P1 data source
[LOCATION_DSN]
```

To turn ODBC tracing on, remove the semicolons in the first column of the COMMON section.

You can use the `odbctest` program to test connectivity to remote databases. To run the program, enter the following command under the UNIX System Services shell:

```
odbctest <dsn> <userid> <password> <<towner>> <<tname>> <<sqlstmt>>
```

where `dsn` represents the LOCATION value entered above, `userid` represents the DB2 user ID, `password` represents the password for the DB2 user ID, `towner` specifies that all tables with this table schema will be returned, `tname` specifies that column information for table `towner.tname` will be returned, and `sqlstmt` is a quoted SQL statement to be run.

Only the first three parameters `dsn`, `userid`, and `password` are required. The program will return information about the DB2 system that you are connecting to and will provide a list of all of the users' tables. The parameters `towner`, `tname`, and `sqlstmt` each require the previous parameter to be entered.

6. The z/OS warehouse agent is a daemon process. Because the agent daemon uses the `_password()` function, define these agent executable programs to RACF program control:

```
libt1s4d.d11
iwhcomnt.d11
vwd
```

To define the executable programs to RACF program control, change to the directory where the Data Warehouse Center executable files are stored, and run the following commands:

```
extattr +p libt1s4d.d11
extattr +p iwhcomnt.d11
extattr +p vwd
```

To use the `extattr` command with the `+p` parameter, you must have at least READ access to the `BPX.FILEATTR.PROGCTL FACILITY` class.

This example shows the RACF command that is used to give this permission to user ID JOEUSER:

```
RDEFINE FACILITY BPX.FILEATTR.PROGCTL UACC(NONE)
PERMIT BPX.FILEATTR.PROGCTL CLASS(FACILITY) ID(JOEUSER)
ACCESS(READ)
SETROPTS RACLIST(FACILITY) REFRESH
```

7. Start the agent daemon. Use Telnet to connect to OS/390 UNIX Systems Services through the z/OS and OS/390 host name and USS port.

Related concepts:

- “Sample contents of DB2 tables and flat files for z/OS and OS/390” on page 35
- “Warehouse agents” on page 3
- “Overview of the z/OS warehouse agent” on page 27

Related tasks:

- “Starting the z/OS warehouse agent daemon” on page 31
- “Starting the agent daemon as a z/OS started task” on page 38

Starting the z/OS warehouse agent daemon

In general, the user ID that starts the z/OS warehouse agent daemon should not be permitted to use the BPX.DAEMON FACILITY class profile. The agent daemon issues the `setuid()` command, which is a controlled function. When a user ID runs a program that issues a command that is a controlled function, the UNIX Systems Services kernel checks to see if the user ID has been permitted to use the BPX.DAEMON facility class profile. If it has, then the kernel checks whether all programs loaded into the address space have been defined to Program Control. If an uncontrolled program has been loaded, then the address space is marked dirty. In that case, the program cannot execute any controlled functions such as `setuid()`. When this is the case, an EMVSERR return code will be displayed with a JRENVIRTY reason code. The message: “BPXP014I ENVIRONMENT MUST BE CONTROLLED FOR DAEMON (BPX.DAEMON) PROCESSING” means that:

- The user ID that started the agent daemon has been permitted to use the BPX.DAEMON facility class profile
- A command was issued that was a controlled function
- At least one uncontrolled program has been loaded

Procedure:

To start the daemon in the foreground, enter `vwd` on a command line under a UNIX Systems Services shell.

To start the daemon in the background, enter

```
vwd>/usr/lpp/DWC81/logs/vwd.log 2>&1 &
```

on a command line under a UNIX Systems Services shell, where `/usr/lpp/DWC81/logs/vwd.log` is the name of the path and the file where you want to pipe the daemon output.

To verify that the z/OS warehouse agent daemon is running, enter `ps -e | grep vwd` on a UNIX shell command line.

Or, enter `D OMVS,a=all` on the z/OS console and search for the string `vwd`. You can also enter `D J,vwdproc` on the z/OS or OS/390 console, where `vwdproc` is the name

of the procedure you created above. It will appear that two agent daemons are running with the same name. This is not the case, as one of the jobs is the started task JCL and the other is the agent daemon running in UNIX System Services.

Related concepts:

- “Warehouse agents” on page 3
- “Overview of the z/OS warehouse agent” on page 27

Related tasks:

- “Installing the z/OS warehouse agent” on page 27
- “Starting the agent daemon as a z/OS started task” on page 38

DB2 Warehouse Manager user-defined programs

The DB2[®] Warehouse Manager for z/OS[™] package includes the following user-defined programs:

- The VWPFTP program runs an FTP command file.
- The VWPMVS program submits a JCL jobstream.
- The VWPRCPY program copies a file using FTP.
- XTClient is a client trigger program.
- The sendWTO program provides z/OS console notification of step completion.

In addition, you can create user-defined programs and stored procedures in the Data Warehouse Center. The z/OS warehouse agent supports any executable programs that run under UNIX[®] Systems Services.

A user-defined program is assigned to one or more steps. When you run a user-defined program, the following actions occur:

- The agent runs the user-defined program.
- The user-defined program returns a return code and a feedback file to the agent.
- The agent returns the results to the kernel.

Use the VWP_LOG environment variable to define a directory where the user-defined programs can write output.

To use a user-defined program to transfer a job with FTP, you must first create the JCL and data that you want to submit. The job name in the JCL must be USERIDX, where X is a 1-character letter or number (example: JOEUSERA). The output class for the MSGCLASS and SYSOUT files that are contained in your JCL must specify a JES-held output class.

The maximum LRECL for the submitted job is 254 characters. JES scans only the first 72 characters of JCL.

Related concepts:

- “z/OS transformers” on page 76
- “Overview of the z/OS warehouse agent” on page 27

Related tasks:

- “Installing the z/OS warehouse agent” on page 27
- “Reducing the number of characters in the environment variable data set for the z/OS warehouse transformers” on page 79

Related reference:

- “z/OS warehouse agent support for Trillium user-defined program steps” on page 42

Scheduling warehouse steps with the trigger program (XTClient)

Use the trigger program to schedule warehouse steps from z/OS or OS/390. Either you or an OS/390 job scheduler can submit a job that triggers a step in the Data Warehouse Center. If the step is successful, the trigger step in the JCL returns a return code of 0.

Prerequisites:

You must have the Software Developer’s Kit (SDK) 1.3 or later installed on your UNIX Systems Services to use the trigger program.

Procedure:

To start the trigger program, start XTServer on the computer where your warehouse server is running.

When XTServer is started on Windows, either start the XTClient on Unix System Services or by using batch JCL.

This is a sample JCL to start the trigger:

```
//DBA1A JOB 1, 'XTCLIENT', CLASS=A, MSGCLASS=H,
// MSGLEVEL=(1,1), REGION=4M, NOTIFY=&SYSUID
//*****
//* submit iwhetrig
//*****
//BRADS EXEC PGM=BPXBATCH,
// PARM=('sh cd /usr/lpp/DWC81/; java XTClient 9.317.171.133 1100x
//          9 drummond pw bvmvs2nt 1 1 100')
//STDOUT DD PATH='/tmp/xtclient.stdout',
// PATHOPTS=(OWRONLY, OCREAT),
// PATHMODE=SIRWXU
//STDERR DD PATH='/tmp/xtclient.stderr',
// PATHOPTS=(OWRONLY, OCREAT),
// PATHMODE=SIRWXU
//
```

The previous sample JCL shows that the parameters continue to a new line. Type the parameters up to column 71, put an X in column 72 and continue in column 16 on the next line. The first part of the parameter (cd /usr/lpp/DWC81/;) is a statement that changes to the directory where the z/OS warehouse agent is installed.

The second part of the parameter starts XTClient and passes the following parameters:

- Your DWC server host name or IP address
- Your DWC server port number the XTServer is listening on (ex: 11009)
- Your DWC user ID
- Your DWC password
- The name of the step to run
- The XTserver command, where:

- 1 = populate the step
- 2 = promote the step to test mode
- 3 = promote the step to production mode
- 4 = demote the step to test mode
- 5 = demote the step to development mode
- The option whether to wait for the step completion, where 1= yes and 0 = no
- The maximum number of rows (use 0 or blank to fetch all rows)

Related concepts:

- “z/OS transformers” on page 76

Related tasks:

- “Installing the z/OS warehouse agent” on page 27

Related reference:

- “z/OS warehouse agent support for Trillium user-defined program steps” on page 42

Setting up z/OS console notification of step completion

Use the sendWTO program if you want the z/OS console notified when a step completes. This program takes any string as input and issues a WTO message on the console. This program is supplied only with the z/OS agent, and runs on z/OS or OS/390 under UNIX Systems Services (USS). An agent running on any platform could call sendWTO using the user-defined program VWPMVS to execute JCL to run BPXBATCH with sendWTO, but sendWTO must execute on z/OS or OS/390.

Procedure:

To run the sendWTO program from a USS shell, issue the command `sendWTO 'wto string'`. You can define the sendWTO program as a user-defined program in the same way that you define any other user-defined program.

Related concepts:

- “DB2 Warehouse Manager user-defined programs” on page 32

Related tasks:

- “Scheduling warehouse steps with the trigger program (XTClient)” on page 33

Changing the Data Warehouse Center template for FTP support

The Data Warehouse Center installs a JCL template for transferring files using FTP. If you plan to use the FTP commands GET or PUT to transfer files from a z/OS host to another remote host, you need to change the account information in the JCL template for your z/OS system.

Procedure:

To change the Data Warehouse Center template for FTP support:

1. Log on with a user ID that has authority to copy and update files in the `usr/lpp/DWC81` directory.

2. Find the ftp.jcl file and copy it with the new file name *systemname.ftp.jcl*, where *systemname* is the name of the z/OS system.
3. Create a copy of this file for each z/OS system on which you plan to run steps which submit JCL, such as, VWPMVS.
For example, if you want to run a step which submits JCL on STLMVS1, create a copy of the file named *STLMVS1.ftp.jcl*.
4. Use a text editor to customize the JCL to meet your requirements.
5. Change the account information to match the standard account information for your OS/390 MVS system. Do not change any parameters that are contained in brackets, such as [USERID] and [FTPFILE]. The brackets are the hexadecimal characters X'AD' and X'BD', respectively. If your TSO terminal type is not set to 3278A in SPF Option 0, these values might display as special characters rather than as brackets. This is not a problem if you do not change the X'AD' or the X'BD', or any of the data that is between the characters.
6. Check that the environment variable VWS_TEMPLATES points to the directory of the created template file.

The Data Warehouse Center includes this sample JCL template:

```

|[USERID]A JOB , 'PUT/GET',
|/* THE NAME OF THE JOB MUST BE THE NAME OF THE
|/* MVS USER ID FOLLOWED BY ONE ALPHANUMERIC
|/* CHARACTER. THIS IS A RESTRICTION OF FTP/MVS.
|   CLASS=A,
|   USER=&SYSUID,
|   NOTIFY=&SYSUID,
|   TIME=(,30),
|   MSGCLASS=H
|STEP1 EXEC PGM=FTP,PARM='( EXIT'
|INPUT DD DSN=[FTPFILE],DISP=SHR
|OUTPUT DD SYSOUT=*
|SYSPRINT DD SYSOUT=*

```

Related concepts:

- “DB2 Warehouse Manager user-defined programs” on page 32
- “z/OS transformers” on page 76
- “Overview of the z/OS warehouse agent” on page 27

Related tasks:

- “Installing the z/OS warehouse agent” on page 27

Sample contents of DB2 tables and flat files for z/OS and OS/390

Using the z/OS™ warehouse agent, you can display a sample of the contents of DB2® tables or view the contents of any file (with or without column definitions). Sampling contents of flat files is a limited capability. The warehouse displays only character data from flat files. In addition, when you set the file as a source, you must define the individual fields in the file definition so that the agent can display the data at the correct offset and length for each field.

The agent also has a limited capability to display Unix Systems Services and native z/OS sequential files. For these files, the warehouse displays only character data. In addition, you must define the individual fields in the file definition so that the agent can display the data at the correct offset and length for each field.

Related concepts:

- “DB2 Warehouse Manager user-defined programs” on page 32
- “Overview of the z/OS warehouse agent” on page 27

Related tasks:

- “Installing the z/OS warehouse agent” on page 27
- “Running DB2 for z/OS utilities” on page 36

Access to databases outside of the DB2 family with the z/OS warehouse agent

To access non-DB2 Universal Database systems, the z/OS™ warehouse agent uses DB2® Information Integrator to access a non-DB2 family database.

DB2 Information Integrator can access Oracle®, Sybase, Microsoft® SQL Server, Teradata®, and any other database that has an ODBC driver that runs on Windows®, AIX®, Linux, or the Solaris™ Operating Environment.

Related concepts:

- “z/OS transformers” on page 76
- “Warehouse transformers” on page 4

Related tasks:

- “Installing warehouse transformers” on page 73

Running DB2 for z/OS utilities

DSNUTILS is a DB2 for z/OS and OS/390 stored procedure that runs in a WLM and RRS environment. The DB2 Warehouse Manager provides an interface to DSNUTILS so that you can include DB2 utilities in Data Warehouse Center steps. You can use DSNUTILS to run any installed DB2 utilities by using the user-defined stored procedure interface. The DB2 for z/OS and OS/390 LOAD, REORG, and RUNSTATS utilities have property sheets that you can use to change how the utility runs. In addition, the UTILITY step has a property sheet that contains a list of the 41 DSNUTILS parameters with entry fields for each parameter, so that you can run any utility that DB2 for z/OS supports.

Procedure:

To run DB2 for z/OS utilities:

1. Run the DSNTIJSG job when you install DB2 to set and bind the DSNUTILS stored procedure. Ensure that the definition of DSNUTILS includes PARAMETER STYLE GENERAL.
2. Enable the WLM-managed stored procedures.
3. Set up your RRS and WLM environments.
4. Optional: Run the sample batch DSNUTILS programs supplied by DB2.
5. Bind the DSNUTILS plan with the DSNCLI plan so that the ODBC can call the stored procedure:


```

      BIND PLAN(DSNAOCLI) PKLIST(*.DSNAOCLI.*, *.DSNUTILS.*)
      
```
6. Set up a step using the Data Warehouse Center and run the step. The population type must be APPEND. If it is not, the Data Warehouse Center deletes everything in the table before it runs the utility.

Related concepts:

- “z/OS transformers” on page 76
- “Warehouse transformers” on page 4

Related tasks:

- “Installing the z/OS warehouse agent” on page 27

Related reference:

- “z/OS warehouse agent support for Trillium user-defined program steps” on page 42

Copying data between DB2 for z/OS tables using the LOAD utility

When you want to copy a table by unloading it into a flat file and then loading the flat file to a different table, you normally must unload the data, edit the load control statements that unload produces, then load the data. Using the z/OS warehouse agent, you can specify that you want to reload data to a different table without stopping between steps and manually edit the control statements.

The following procedure will work for any DB2 for z/OS source and target tables on the same or different DB2 subsystems. You can specify the table name with a schema (:TABLE:DBVW.INVENTORY) or without a schema (:TABLE:INVENTORY) to use a default schema.

Procedure:

To copy data between DB2 for z/OS tables using the LOAD utility:

1. Create a step that unloads a file using the UNLOAD utility or the REORG TABLESPACE utility. Both of these utilities produce two output data sets, one with the table data and one with the utility control statement that can be added to the LOAD utility.

This is an example of the DSNUTILS parameters you might use for the Reorg Unload step:

```
UTILITY_ID REORGULX
RESTART NO
UTSTMT REORG TABLESPACE DBVW.USAINENT UNLOAD EXTERNAL
UTILITY_NAME REORG TABLESPACE
RECDSN DBVW.DSNURELD.RECDSN
RECDEVT SYSDA
RECSPACE 50
PNCHDSN DBVW.DSNURELD.PNCHDSN
PNCHDEVT SYSDA
PNCHSPACE 3
```

2. Use the DB2 for z/OS Utility interface to create a load step. The DSNUTILS utility statement parameter specifies a utility control statement. The warehouse utility interface allows you to include a file name in the utility statement field. You can specify the file that contains the valid control statement using the keyword :FILE:, and the name of the table that you want to load using the keyword :TABLE:.
3. To use the LOAD utility to work with the output from the previous example, apply the following parameter values in the LOAD properties:

```

UTILITY_ID LOADREORG
RESTART_NO
UTSTMT :FILE:DBVW.DSNURELD.PNCHDSN:TABLE:[DBVW].INVENTORY
UTILITY_NAME LOAD
RECDSN DBVW.DSNURELD.RECDSN
RECDEVT SYSDA

```

4. In the UTSTMT field, type either a load statement or the name of the file that was produced from the REORG utility with the UNLOAD EXTERNAL option. The previous example will work for any DB2 for z/OS source table or target table, whether these tables are on the same or different DB2 subsystems. The control statement flat file can be either HFS or native MVS files.

Related concepts:

- “z/OS transformers” on page 76

Related tasks:

- “Running DB2 for z/OS utilities” on page 36

Starting the agent daemon as a z/OS started task

Setting up the agent daemon as a started task allows you to start the daemon from the z/OS console.

Prerequisites:

- You must define a user ID to associate with the procedure. The user ID must be able to write to STDOUT and STDERR and to read from STDENV.
- The user ID and its group must have an OMVS segment defined.

Procedure:

To start the agent daemon as a z/OS started task:

1. Create a file which contains the environment variables for the agent daemon. For example, create an environment file which contains the environment variables (without the export command. Add /bin to the PATH environment variable and add the environment variables _BPX_BATCH_SPAWN and _BPX_SHAREAS as shown. The environment variable file might be named /u/USERID/BPXprofile and contain:

```

STEPLIB=DSN710.SDSNEXIT:DSN710.SDSNLOAD:$STEPLIB
LIBPATH=/usr/lpp/DWC81
PATH=/bin:/usr/lpp/DWC81
CXA_CONFIG=/usr/lpp/DWC81/cxa.ini
VWS_LOGGING=/u/USERID/logs
VWP_LOG=/u/USERID/logs/vwp.log
DSNAOINI=/u/USERID/dsnaoini
IBM_MIXED_MODE_THRESHOLD=0
_BPX_BATCH_SPAWN=YES
_BPX_SHAREAS=NO

```
2. Create a procedure in a procedure library. You might need to contact your system programmer to determine what procedure library to use. The procedure will use BPXBATCH to start the agent daemon. Point the STDENV DD card to the environment variable file created in step 1. The following is an example of a procedure to start the agent daemon.

```

//*****
//* Start the 390 agent daemon in batch
//*****

```

```

//VWDPROC EXEC PGM=BPXBATCH,PARM='pgm /usr/lpp/DWC81/vwd',
//
//STDOUT DD PATH='/tmp/stdout',
// PATHOPTS=(OWRONLY,OCREAT),
// PATHMODE=(SIRWXU,SIRWXG,SIRWXO)
//STDERR DD PATH='/tmp/stderr',
// PATHOPTS=(OWRONLY,OCREAT),
// PATHMODE=(SIRWXU,SIRWXG,SIRWXO)
//STDENV DD PATH='/u/USERID/BPXprofile',
// PATHOPTS=ORDONLY

```

To start the agent daemon from a console, enter `S vwdproc.vwd001`, where `vwdproc` is the name of the procedure you created, and `.vwd001` is an identifier that can be used to cancel the started task. The identifier can be anything up to 8 characters long, and the first character must be alphabetical. The identifier must be different than the started task name.

To stop the agent daemon from a console, enter `C vwd001`, where `vwd001` is the identifier you used.

Related concepts:

- “Sample contents of DB2 tables and flat files for z/OS and OS/390” on page 35
- “Overview of the z/OS warehouse agent” on page 27

Related tasks:

- “Installing the z/OS warehouse agent” on page 27
- “Setting up Java stored procedures on your DB2 subsystem for the warehouse transformers” on page 77
- “Running DB2 for z/OS utilities” on page 36
- “Running multiple warehouse agent daemons on one z/OS subsystem” on page 39

Running multiple warehouse agent daemons on one z/OS subsystem

The default well-known port that the agent daemon listens to is 11001. There can only be one daemon listening at port 11001, and its environment can only point to one `DSNAOINI` file. A `DSNAOINI` file can only point to one DB2 subsystem. That means that a particular z/OS agent can only make a `LOCAL` connection to one DB2 subsystem per instance of z/OS. However, the agent can connect to many DB2 subsystems via the use of data sharing or through `DRDA`. You can also have multiple daemons running on one z/OS system, each locally connected to a DB2 subsystem.

Procedure:

To run multiple warehouse agent daemons on one z/OS system:

1. Add a new entry to `/etc/services` or `TCPIP.ETC.SERVICES` on z/OS. For example:

```
vwda          11014/tcp      <--- use a new port number
```

2. In the `.profile` that is used to execute this new daemon, add:

```
export vwdPortName=vwda    <---matches the name in services file
```

3. On the warehouse server, change the entry in `c:\winnt\system32\drivers\etc\services` for Windows or `/etc/services` on UNIX to match the new port number:

<code>vwd</code>	<code>11014/tcp</code>
------------------	------------------------

Related concepts:

- “Overview of the z/OS warehouse agent” on page 27

Related tasks:

- “Installing the z/OS warehouse agent” on page 27
- “Starting the z/OS warehouse agent daemon” on page 31
- “Setting up Java stored procedures on your DB2 subsystem for the warehouse transformers” on page 77
- “Starting the agent daemon as a z/OS started task” on page 38

Using the z/OS warehouse agent to automate replication apply steps

You can use the z/OS warehouse agent to automate your replication apply steps. Replication requires a source database, a control database, and a target database (these can be different databases or the same). Replication control tables must be installed on these databases. A capture job reads the DB2 log to determine which of the rows in the source database are added, updated, or deleted. The job then writes the changes to a change-data table (also known as a CD table). An apply job is then run to apply the changes to a target database. The DB2 Warehouse Manager package can automate the apply job by creating a replication step. Use the Data Warehouse Center to define a step for the apply job to run and when to run it. The warehouse agent runs the Apply program when the warehouse step is run.

In order to use DB2 II Replication Version 8, you must update the STEPLIB and PATH environment variable to point to the replication library and directory of the executables. DB2 II Replication Version 8 does not require a JCL template.

When using DataPropagator Version 7 (or earlier), you must use a JCL template (included in the DB2 Warehouse Manager package) for replication support. If you plan to use the z/OS warehouse agent to run the Apply program, you need to change the account and data set information in this template for your OS/390 or z/OS system.

Procedure:

To use the z/OS warehouse agent to automate DataPropagator Version 7 (or earlier) steps:

1. Log on with an ID that has authority to copy and update files in the `/usr/lpp/DWC81/` directory.
2. Find the `apply.jcl` file and copy it as `systemname.apply.jcl`, where `systemname` is the name of the OS/390 MVS system.
For example, on STLMVS1, create a copy of the file named `STLMVS1.apply.jcl`.
3. Use a text editor to customize the JCL to meet your requirements. Change the account information to match the standard account information, and change the data set for STEPLIB DD and MSGS DD for your OS/390 MVS system.
4. If necessary, change the program name on the EXEC card.

Do not change any parameters that are contained in brackets, such as [USERID] and [APPLY_PARMS]. The brackets are the hexadecimal characters X'AD' and X'BD', respectively. If your TSO terminal type is not set to 3278A in SPF Option 0, these values might display as special characters rather than as brackets. This is not a problem if you do not change the XAD or the X BD, or any of the data that is between the characters.

5. Update the environment variable VWS_TEMPLATES to point to the directory of the copied template file.

This is the JCL template that is included with the Data Warehouse Center:

```
//[USERID]A JOB ,MSGCLASS=H,MSGLEVEL=(1,1),
// REGION=2M,TIME=1440,NOTIFY=&SYSUID
//* DON'T CHANGE THE FIRST LINE OF THIS TEMPLATE.
//* THE REMAINING JCL SHOULD BE MODIFIED FOR YOUR SITE.
//*****
//* RUN APPLY/MVS ON OS/390 DB2 6.1 *
//*****
//ASNARUN EXEC PGM=ASNAPV66,REGION=10M,
// [APPLY_PARMS]
//STEPLIB DD DISP=SHR,DSN=DPROPR.V6R1M0.SASNLINK
// DD DISP=SHR,DSN=DSN610.SDSNLOAD
//MSGS DD DSN=DPROPR.V2R1M0A.MSGS,DISP=SHR
//ASNASPL DD DSN=&ASNASPL
//,DISP=(NEW,DELETE,DELETE),
// UNIT=SYSDA,SPACE=(CYL,(10,1)),
// DCB=(RECFM=VB,BLKSIZE=6404)
//SYSTEM DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//
```

Related concepts:

- “Overview of the z/OS warehouse agent” on page 27

Related tasks:

- “Installing the z/OS warehouse agent” on page 27
- “Starting warehouse agent logging” on page 41

Starting warehouse agent logging

Many DB2 Warehouse Manager components such as the server, the logger, agents, and some Data Warehouse Center programs write logs to the logging directory, which is specified in the VWS_LOGGING environment variable. These log files are plain text. IBM Software Support might ask you to turn on logging for debugging purposes.

Procedure:

To start warehouse agent daemon logging, add the -t option when entering the vwd command. For a higher level of tracing, add -t x where x is a number between 1 and 4.

To start agent logging from the Data Warehouse Center:

1. From the left pane, right-click **Warehouse**, and click **Properties**.
2. On the Trace Level page, change the settings to the trace level that you want.

The agent trace supports levels 0-5:

- Level 1 - entry/exit tracing

- Level 2 - level 1 plus debugging trace
- Level 3 - level 2 plus data tracing
- Level 4 - internal buffer tracing

When trace is set higher than level 1, performance will decrease. Turn on tracing only for debugging purposes. The tracing information is stored in the file AGNTxxx.LOG. Environment information is stored in the file AGNTxxx.SET.

Related concepts:

- “Trace files for the DB2 for iSeries load utilities” in the *Data Warehouse Center Administration Guide*
- “Warehouse agents” on page 3
- “Component trace data” in the *Data Warehouse Center Administration Guide*
- “Start error trace files” in the *Data Warehouse Center Administration Guide*

Related tasks:

- “Viewing trace files for the DB2 for iSeries load utilities” in the *Data Warehouse Center Administration Guide*
- “Running a Data Warehouse Center component trace” in the *Data Warehouse Center Administration Guide*
- “Tracing Apply program errors” in the *Data Warehouse Center Administration Guide*

Related reference:

- “Warehouse agent environment structures” on page 83

z/OS warehouse agent support for Trillium user-defined program steps

The z/OS warehouse agent supports the Trillium Batch System User-Defined Program created by the Data Warehouse Center Import Trillium Metadata window. You can start the JCL with the z/OS warehouse agent.

When you create the Trillium Batch System User-Defined Program step using the Import Trillium Metadata window, you must always select **Remote host** for the z/OS warehouse agent, even when the JCL is on the same system as the agent. In addition, all parameters for **Remote host** must be entered.

After you create the Trillium User-Defined Program step, you must change the agent site in the Properties notebook of the Trillium Batch System step to the z/OS warehouse agent site that you want to use.

The Import Trillium Metadata window requires you to enter a JCL file name and an output error file name. If either of these names contains quotation marks or parentheses, you must enclose it in quotation marks.

Related concepts:

- “Sample contents of DB2 tables and flat files for z/OS and OS/390” on page 35
- “Overview of the z/OS warehouse agent” on page 27

Related tasks:

- “Installing the z/OS warehouse agent” on page 27

- “Running DB2 for z/OS utilities” on page 36
- “Running multiple warehouse agent daemons on one z/OS subsystem” on page 39

Installing and configuring the iSeries warehouse agent

The following sections describe how to install and configure the iSeries warehouse agent.

Installing the iSeries warehouse agent

You can install a warehouse agent on an iSeries workstation.

Prerequisites:

Before you install an iSeries warehouse agent:

- Remove any previously installed iSeries warehouse agent.
- Define security and privileges for your warehouse.
- Ensure that the following software is installed:
 - IBM DB2 Warehouse Manager Version 8
 - IBM AS/400 V5R1 or later
- Ensure that you have the following authority levels:
 - *ALLOBJ (to use the RSTLICPGM command to install the product)
 - *JOBCTL (to use the STRVWD and ENDVWD commands)
 - *SECOFR (optional for installation but necessary if you want to verify installation). You can also run the DSPSFWRSC command.
 - *USE object authority (to access all commands). Additional authority is required to create a library.

Procedure:

To install the iSeries warehouse agent:

1. Insert the DB2 Warehouse Manager CD into your iSeries CD drive.
2. Log on to the iSeries system.
3. At an iSeries command prompt, enter:

```
RSTLICPGM LICPGM(5765F42) DEV(OPT01)
```

where *OPT01* is the CD drive. The `/QIBM/UserData/IWH` subdirectory and the `/QIBM/ProdData/IWH` subdirectory are created by the install process. Traces are written to the `/QIBM/UserData/IWH` subdirectory.

4. On the Work with Licensed Programs screen, verify that you successfully installed the iSeries warehouse agent. From the iSeries command prompt, enter `GO LICPGM` to use Option 10 (Display Licensed Installed Programs).

Related concepts:

- “Warehouse agents” on page 3

Related tasks:

- “Preparing to install warehouse agents” on page 19
- “Removing iSeries warehouse agents” on page 44

Related reference:

- “Non-U.S. English installations of the iSeries warehouse agent” on page 44
- “Post-installation considerations for iSeries warehouse agents” on page 45

Removing iSeries warehouse agents

Before you install any iSeries agent, you must remove any previously installed iSeries warehouse agent.

Procedure:

To remove iSeries warehouse agent code, at an iSeries command prompt, enter the following command `DLTLICPGM LICPGM(PRODUCT ID)`, where *PRODUCT ID* is any iSeries or AS/400 version previously installed.

This command performs the following actions:

- Removes the SRVTBLE entries
- Removes the /QIBM/ProdData/IWH subdirectory
- Stops the daemon
- Deletes the product

Related concepts:

- “Warehouse agents” on page 3

Related tasks:

- “Installing the iSeries warehouse agent” on page 43
- “Troubleshooting for iSeries warehouse agents” on page 46

Non-U.S. English installations of the iSeries warehouse agent

Only one language version of the iSeries warehouse agent can be present on the iSeries system. The iSeries warehouse agent is language independent. All data is represented internally in Unicode.

All traces and messages created by the STRVWD and ENDVWD commands are displayed in U.S. English on non-U.S. English systems. Messages the agent creates are interpreted on the workstation; messages are displayed in the language that your version of DB2 Warehouse Manager supports.

The user profile that you use to start the daemon must be set to the correct locale for the CCSID that is being used. If the correct locale is not selected, the agent might stop with the error IWH9149, particularly if you are using a DBCS computer.

You can obtain a list of all the available *LOCALE files on your system by entering the command `WRKOBJPDM QSYS *ALL *LOCALE`.

Scroll down until you find the name of the locale that corresponds to the CCSID under which you are running the iSeries warehouse agent. To configure your user profile for the locale that you selected, use the CHGUSRPRF command. On the Change User Profile screen, press F10 to display more options. Scroll down until you find the LOCALE option. Enter the fully qualified locale path using the following syntax:

```
/QSYS.LIB/your_locale.LOCALE
```

where *your_locale* is the locale that corresponds to the CCSID that you selected for your user profile. For example, the locale path for CCSID 500 is: /QSYS.LIB/FR_CA.LOCALE.

Use the following command to install the U.S. English iSeries warehouse agent on your non-US English iSeries system:

```
RSTLICPGM LICPGM(5765F42) DEV(OPT01) LNG(2924)
```

where *OPT01* is the name of the CD-ROM drive.

Related tasks:

- “Preparing to install warehouse agents” on page 19
- “Installing the iSeries warehouse agent” on page 43
- “Removing iSeries warehouse agents” on page 44

Post-installation considerations for iSeries warehouse agents

All parameters that the Data Warehouse Center passes to warehouse programs are passed as string parameters. If you have applications that require packed decimal parameters, wrap the applications in a CL script that converts the input parameters to a non-string format.

SQL-driven processes are not supported for the flat-file source types. Because there is no equivalent to the ODBC flat-file driver on the iSeries system, you cannot use SQL to retrieve data from, for example, comma-delimited files. Most files on the iSeries system are DB2 tables. However, many applications produce fixed-field or comma-delimited text files. To address the need to load flat file data into a DB2/400 table, see the instructions for working with flat files on an iSeries system. You can complete the transfer using the warehouse programs that are included with the iSeries warehouse agent.

You cannot use DBCS step names with the iSeries warehouse agent. Also, DB2 for iSeries does not support DBCS object names, including column names, table names, and schema names.

Related tasks:

- “Preparing to install warehouse agents” on page 19
- “Installing the iSeries warehouse agent” on page 43
- “Removing iSeries warehouse agents” on page 44
- “Working with flat files on the iSeries system” on page 50

Related reference:

- “Non-U.S. English installations of the iSeries warehouse agent” on page 44

iSeries warehouse agent security

The QIWH library, where the DB2[®] Warehouse Manager product is installed, contains a file named FTPCMD. The DB2 Warehouse Manager uses this file for the sample programs VWPFTP and VWPRCPY. The *QSYS user owns this file, and grants *PUBLIC and *CHANGE authority to this file so that any user profile can run the DB2 Warehouse Manager programs. However, using the VWPRCPY program increases your risk for a security exposure. During the operation of

VWPRCPY, the program creates a temporary command file that contains the user ID and password of the remote system that you are connecting to.

Related tasks:

- “Installing the iSeries warehouse agent” on page 43
- “Removing iSeries warehouse agents” on page 44

Related reference:

- “Post-installation considerations for iSeries warehouse agents” on page 45

Troubleshooting for iSeries warehouse agents

Use the information contained in this topic to diagnose problems with the iSeries agent.

Procedure:

To troubleshoot the iSeries warehouse agent:

1. Look up the error message.

Every error message contains return codes. The RC2 (Return Code 2) error field is a multipurpose field with different meanings in different contexts. It can store a Data Warehouse Center error code (which starts with *DWC*), a system code, or an application return code, depending on what the primary error (RC 1) was.

- When there is an error during normal agent processing, the warehouse server will always issue an RC 1 = 7356 error. When the server issues a 7356 error, check the RC2 field, which will contain the error number that was reported by the agent.
 - When a failure occurs while a warehouse program is running, RC 1 = 8410 and RC 2 = the application return code.
 - When there is a communications failure or a failure to run some system function, the Data Warehouse Center error codes are in the 6000 and 9000 ranges. RC 2 usually contains the error number returned by the iSeries system C/C++ language environment. These error numbers (“errno” values) can help you to pinpoint the cause of an error.
2. Look at the appropriate DB2 Warehouse Manager trace.
 3. Check the iSeries job log.

After you locate the relevant error message, use the information to determine the source of the problem and the course of action that is required to fix it. The information about your error message should be the first information that you provide to IBM Software Support when you report a problem.

Related concepts:

- “iSeries warehouse agent security” on page 45

Related tasks:

- “Preparing to install warehouse agents” on page 19
- “Installing the iSeries warehouse agent” on page 43
- “Removing iSeries warehouse agents” on page 44
- “Reading iSeries warehouse agent trace files” on page 48

- “Testing for bidirectional communication between the iSeries warehouse agent and the warehouse server” on page 47
- “Determining the source of connectivity errors for the iSeries warehouse agent” on page 48

Related reference:

- “Post-installation considerations for iSeries warehouse agents” on page 45
- “iSeries agent trace files” on page 49

Testing for bidirectional communication between the iSeries warehouse agent and the warehouse server

While using the iSeries warehouse agent, you might get this error message:

Return Code = 7183 (Method = VWRemoteAgent::Initialize; Secondary Code = 9117) Message: *The warehouse server tried to spawn an agent but did not receive a valid start up acknowledgement from either the agent or the daemon.*

The most common cause of RC7183 is improper configuration of TCP/IP connectivity between the warehouse server and the iSeries warehouse agent. Communication between the server and the agent is bidirectional; the server sends messages to the agent, and the agent sends messages back to the server. Ensure that the warehouse server is connected to the iSeries warehouse agent and vice versa.

Procedure:

To test for bidirectional communication between the iSeries warehouse agent and the warehouse server:

1. Ping the TCP/IP host name. Your host name is specified on the Parameters page for the iSeries warehouse agent site definition, which you can locate from your warehouse server.

If the ping fails, check that:

- The iSeries system is registered with your domain name server or that there is an entry for the system in the TCP/IP HOSTS file in the `\winnt\system32\drivers\etc` directory.
- The iSeries system is running.
- The network is active.

2. Ping the fully qualified TCP/IP host name for the warehouse server from the iSeries command line. You must use the fully qualified name (hostname.domain), for example `yourmachine.yourcompany.com`. The fully qualified host name is the return address that the server gives the agent.

If the ping fails, be sure that:

- The warehouse server is registered with your domain name server or has a host table entry on the iSeries server. Use the `CFGTCP` command to check that you are using the correct fully qualified TCP/IP host name.
- The warehouse server is running.
- The network is active.

If both of the ping attempts were successful, verify that the numeric IP address returned by the ping is actually the IP address of the workstation that you are trying to connect to.

Related tasks:

- “Installing the iSeries warehouse agent” on page 43
- “Working with flat files on the iSeries system” on page 50

Related reference:

- “Non-U.S. English installations of the iSeries warehouse agent” on page 44
- “Post-installation considerations for iSeries warehouse agents” on page 45

Determining the source of connectivity errors for the iSeries warehouse agent

If you get an error message when connecting to a local database from an iSeries database, use this procedure to determine the source of the connection error.

Procedure:

To determine the source of connectivity errors for the iSeries warehouse agent:

1. Add your local database in RDBDIRE on iSeries. Be sure to use the correct port number. To find the correct port number, go to the C:\WINNT\system32\drivers\etc directory and open the services file. Look for the port that is defined for DB2 instance.
2. Check that your iSeries database is in the Client Configuration Assistant. If not, add it.
3. To test the connection, open the Interactive SQL Assistant and try to connect to your local database using the correct user name and password.

Related concepts:

- “iSeries warehouse agent security” on page 45
- “Warehouse agent connectivity with warehouse sources and targets” on page 23

Related tasks:

- “Installing the iSeries warehouse agent” on page 43
- “Verifying TCP/IP connectivity between the warehouse server and the warehouse agent” on page 24
- “Troubleshooting for iSeries warehouse agents” on page 46
- “Validating the connectivity of an ODBC data source for warehouse agents” on page 21

Related reference:

- “Post-installation considerations for iSeries warehouse agents” on page 45
- “iSeries agent trace files” on page 49

Reading iSeries warehouse agent trace files

Many Data Warehouse Center trace files are stored in the iSeries Integrated File System. To read these trace files, you can either use FTP to move these files to the workstation or use Client Access for iSeries.

Procedure:

To read Data Warehouse Center trace files:

1. Add your system connection in the Client Access Operations Navigator.
2. Expand your system name.
3. Expand the File Systems tree.
4. Right-click on **Integrated File System** and click **Properties**.
5. Select all file extensions, for example .log, .iwh4msgq, .trc and click **Add**.
6. Click **OK**.

Related concepts:

- “Warehouse agents” on page 3

Related tasks:

- “Installing the iSeries warehouse agent” on page 43

Related reference:

- “iSeries agent trace files” on page 49

iSeries agent trace files

Many Data Warehouse Center trace files are stored in the iSeries Integrated File System. The following tables give information about the trace files that are produced by the iSeries warehouse agent.

Agent trace

Shows all the information that is passed to the agent from the warehouse server and the command steps that are completed

Location

/QIBM/UserData/IWH directory (root of IFS).

File name

AGNTxxxxx.LOG, where xxxxx is the process ID of the agent instance.

When to use

Check this trace file first if the error message does not give enough information to solve the problem.

How to use

You can view the trace with any text editor. Scroll down until you find the operation that failed. The parameters sent from the warehouse server for that operation appear below the line that contains the failing operation. This information can help you solve most problems.

Message queue trace

Traces the functions of the message queue process and prints dumps of received message buffers both before and after code page conversion.

Location

/QIBM/UserData/IWH directory (root of IFS).

File name

VWxxxxxx.IWH4MSGQ, where xxxxxx is the process ID of the process that started the message queue process.

When to use

Useful for communications problems that cannot be diagnosed with the error code information alone. Can also be used for Cancel and Get Row Count problems.

How to use

This trace is started automatically when tracing is turned on for either the agent or the daemon. To read this trace, use Microsoft Wordpad or any other Unicode-enabled editor. This trace might contain non-printable characters and will not format correctly on a basic text editor like Notepad.

An additional trace file can be produced by the message queue process. The msgq_err.log file is a cumulative trace file that records all nonrecoverable message queue errors. This file is useful for tracking down terminations of the message queue process that cannot be recorded in the regular message queue trace file.

Daemon trace

A cumulative trace that records operations that the daemon could not complete successfully.

Location

/QIBM/UserData/IWH directory (root of IFS).

File name

vwd_err.log

When to use

Most useful for diagnosing problems where the agent terminated or abended before it could begin its own trace. Also useful for diagnosing nonrecoverable errors in the daemon.

How to use

This trace is automatically appended when the daemon encounters any error condition during processing.

Sample warehouse program traces

Functional traces of the major events during the execution of a sample iSeries warehouse program.

Location

/QIBM/UserData/IWH

File name**When to use**

VWxxxxxx.yyyyyyyy, where xxxxxx is the process ID under which the warehouse program was started and yyyyyyyy is the name of the warehouse program. If the warehouse program is started by the agent process, it will run in the same job as the agent process, so it will share the same process ID. The message queue trace, agent trace, and the warehouse program trace will all share the same xxxxxx value.

How to use

Use this trace to determine the cause of a non zero return code.

Related tasks:

- "Reading iSeries warehouse agent trace files" on page 48
- "Working with flat files on the iSeries system" on page 50
- "Troubleshooting for iSeries warehouse agents" on page 46

Working with flat files on the iSeries system

Use the following steps to define a step to load a local flat file into a DB2/400 table. This process will start the warehouse program AS/400 Load with Replace (iSeries CPYFRMIMPF utility).

Restrictions:

You cannot use SQL statements on flat files. SQL is not supported in the current version of the iSeries warehouse agent. You also cannot use sample contents of a flat file using the iSeries warehouse agent. The data must be transferred using the AS/400 Load with Replace warehouse program.

Procedure:

To define a process to load a local file into a local table:

1. Define a flat-file warehouse source for your source file. In the **File name** field, type the fully qualified file name (see iSeries Load with Replace documentation for naming rules).
2. Create a step with the warehouse-supplied AS/400 Load with Replace program.
3. Select your flat-file source, and add the source file to the step.
4. Select your target table from warehouse target and connect with the step.
5. Promote the step to test mode and run it. The target table now contains all the source data from your flat file.

Related concepts:

- “iSeries warehouse agent security” on page 45

Related tasks:

- “Installing the iSeries warehouse agent” on page 43

Related reference:

- “iSeries agent trace files” on page 49

Using the warehouse FTP utility with the iSeries warehouse agent

The iSeries™ warehouse agent provides two FTP utilities:

- Copy File using FTP
- Run FTP Command File

Both of these utilities can be used to copy a file from a remote system to the iSeries warehouse agent system. The Run FTP Command File utility allows you to create an FTP script on the iSeries system and use it on the Parameters page of the step properties notebook.

Related tasks:

- “Installing the iSeries warehouse agent” on page 43
- “Working with flat files on the iSeries system” on page 50
- “Troubleshooting for iSeries warehouse agents” on page 46

Related reference:

- “Post-installation considerations for iSeries warehouse agents” on page 45

Installing the AIX, Linux, and Solaris Operating Environment warehouse agents

The following sections describe how to install and configure warehouse agents on AIX, Linux, and the Solaris Operating Environment.

Installing the AIX, Linux, and Solaris Operating Environment warehouse agents

You can install warehouse agents on AIX, Linux, or the Solaris Operating Environment.

Prerequisites:

Before you install the AIX or Solaris Operating Environment warehouse agents, you must remove any earlier AIX or Solaris Operating Environment agents that are located on that workstation.

If you have both versions 7 and 8 of DB2 Warehouse Manager, the soft link to the default agent must point to the agent executable that you want to use. The default path for Version 7 is `/usr/bin/`; the default path for Version 8 is `/usr/opt/db2_08_01/bin`.

On AIX, the default agent is the executable pointed to by the soft link in `/usr/opt/db2_08_01/bin/IWH2AGNT`. You can use the CLI agent, `IWH2AGNT.db2cli`, or the ODBC agent, `IWH2AGNT.ivodbc`. If you choose to use the ODBC agent for your default agent on AIX, you must also install DB2 Warehouse Manager for the drivers that the ODBC agent requires.

Procedure:

Use the `db2setup` utility to install a warehouse agent on AIX, Linux, or the Solaris Operating Environment.

Before you install the warehouse agent, you should create and configure at least one DB2 instance.

To install the AIX, Linux, and Solaris Operating Environment warehouse agents using the `db2setup` utility:

1. Log in as a user with root authority.
2. Insert and mount the DB2 Warehouse Manager CD.
3. Change to the directory where the CD is mounted by entering `cd /cdrom`, where `cdrom` is the mount point of your product CD.
4. Change to one of the following directories:

AIX	<code>/cdrom/db2/aix</code>
Linux	<code>/cdrom/db2/linux</code>
Solaris	<code>/cdrom/unnamed_cdrom/db2/solaris</code>
5. Enter the `./db2setup` command. After a few moments, the DB2 Setup wizard opens.
6. Click **Install Products** once the DB2 launchpad opens.
7. Ensure that the **DB2 Warehouse Manager** is selected, then click **Next**.

8. Proceed as prompted by the DB2 Setup wizard.
9. In the list of features, select **Warehouse agent**, then click **Next**.
10. Proceed as prompted by the DB2 Setup wizard. Online help is available to guide you through the remaining steps.
11. Log out.

When the installation process completes, your warehouse agent is installed in the following directory:

- On AIX, the `/usr/opt/db2_08_01` directory
- On Linux and the Solaris Operating Environment, the `/opt/IBM/db2/V8.1/` directory

If the installation failed, contact IBM Software Support.

Related concepts:

- “Connectivity products for warehouse sources and targets” on page 23

Related tasks:

- “Configuring the AIX, Linux, and Solaris Operating Environment warehouse agent environments” on page 55
- “Removing a z/OS warehouse agent” on page 54

Related reference:

- “Database connections for the AIX, Linux, and Solaris Operating Environment warehouse agents” on page 62

Removing an AIX warehouse agent

Remove previously installed AIX agents before you install AIX warehouse agents.

Procedure:

To remove an AIX agent:

1. Log on to AIX as *root*.
2. Enter `smit`.
The System Management window opens.
3. Select **Software Installation and Maintenance**.
The Software Installation and Maintenance window opens.
4. Select **Maintain Installed Software**.
The Maintain Installed Software window opens.
5. Select **Remove Software Products**.
The Remove Software Products window opens.
6. Click the arrow next to the **Software Name** field.
7. Select `db2_07_01.dwa`.
8. Click **OK**.
The Remove Software Products configuration window opens.
9. Type `No` in the **Preview only?** field.
10. Click **OK**.
A confirmation window opens.

11. Click **OK** to confirm your selection.

After the AIX agent is removed, the Output window opens. The Results column at the bottom of the Output window displays the status of the removal process. If the removal process fails, contact IBM Software Support.

Related tasks:

- “Removing iSeries warehouse agents” on page 44
- “Removing a Solaris Operating Environment warehouse agent” on page 54
- “Removing a z/OS warehouse agent” on page 54

Removing a Solaris Operating Environment warehouse agent

Remove previously installed Solaris Operating Environment agents before you install Solaris Operating Environment agents.

Procedure:

To remove a Solaris Operating Environment agent, enter one of the following commands at a command prompt:

For Version 7:

```
usr/sbin/pkgrm db2dwa71
```

For Version 8:

```
/usr/sbin/pkgrm db2dwc81
```

To confirm the removal of the Solaris Operating Environment agent, enter yes in the confirmation display.

Related tasks:

- “Removing iSeries warehouse agents” on page 44
- “Removing an AIX warehouse agent” on page 53
- “Removing a z/OS warehouse agent” on page 54

Removing a z/OS warehouse agent

The following section describes how to remove a z/OS warehouse agent on DB2 Version 8.

Removing a z/OS warehouse agent

The procedure for removing a z/OS warehouse agent on DB2 Version 8.

To remove the z/OS warehouse agent, use SMP/E.

Related tasks:

- “Removing iSeries warehouse agents” on page 44
- “Removing DB2 products using the db2_deinstall command (UNIX)” in the *Quick Beginnings for DB2 Servers*

Chapter 4. Configuring the AIX, Linux, and Solaris Operating Environment warehouse agent environments

After you install an AIX, Linux, or Solaris Operating Environment warehouse agent, you must configure the warehouse agent environment and catalog the DB2 nodes and databases. This chapter describes how to configure the warehouse agent environment.

Configuring the AIX, Linux, and Solaris Operating Environment warehouse agent environments

You must set certain environment variables in your IWH.environment file to configure the warehouse agent environment. All the environment variables that you must change are located between the START and END comment lines.

Prerequisites:

The following rules apply to both ODBC and DB2 CLI users:

1. You must set the DB2INSTANCE variable in all situations.
2. For DB2 CLI access, you need to set only the variables in the DB2 environment section.

To access warehouse sources or targets in DB2 databases, you must configure the variables in the DB2 environment section.

3. You must remove the comment characters (#) for the variables that you set.

The following rules apply to ODBC users:

1. For ODBC access, you must set the IS_ODBC variable to the ODBC install path. This variable must not have comments.

On AIX, the default path is `/usr/opt/db2_08_01/odbc`. On Linux and Solaris Operating Environment, the default path is `/opt/IBM/db2/V8.1/odbc`.

2. You must set the ODBC environment variables for any databases that you selected by uncommenting the appropriate sections in the IWH.environment file.

In order to publish metadata from an AIX server to an information catalog, you must set the following variables in the IWH.environment file:

```
#CLASSPATH=/home/db2inst/sqllib/java/db2java.zip:/home/db2inst/sqllib/java/sqllj.zip:/home/db2inst/sqllib/java/runtime.zip:/home/db2inst/sqllib/tools/ibmjssc.jar:/home/db2inst/sqllib/tools/db2_vw_web.jar:/home/db2inst/sqllib/java/Common.jar:/home/db2inst/sqllib/tools/db2_vw.jar:/home/db2inst/sqllib/tools/db2vwcom.jar:/home/db2inst/sqllib/tools/db2vwddd.jar:/home/db2inst/sqllib/tools/db2cmn.jar:/home/db2inst/sqllib/java/db2jcc.jar:
```

```
#export CLASSPATH
```

```
#PATH=./usr/bin:/usr/bins/etc:/usr/sbin:/usr/ucb:/usr/bin/ X11:/sbin:/home/db2inst/sqllib/bin:
```

```
#export PATH
```

When you change settings in the IWH.environment file, you must restart the warehouse agent daemon.

Procedure:

To configure the warehouse agent environment:

1. Set the connection type:
 - a. Log on as root.
 - b. Change to the bin subdirectory in the install directory by entering one of the following commands:
 - On AIX, enter `cd /usr/opt/db2_08_01/bin`
 - On Linux and the Solaris Operating Environment, enter `cd /opt/IBM/db2/V8.1/bin`
 - c. Establish the correct soft link to IWH2AGNT. To do this, run the `IWH.agent.db.interface` command. The syntax for this command is:
`IWH.agent.db.interface [intersolv | db2cli]`
The warehouse agent executable file has two versions:
 - The `IWH2AGNT.db2cli` file is the DB2 CLI link.
This is the default link.
 - The `IWH2AGNT.ivodbc` file is the ODBC link.
2. To access IBM and non-IBM data source or target data, set the following variables in your `IWH.environment` file. On AIX, the file is located in the `/usr/opt/db2_08_01/bin` directory. On Linux and the Solaris Operating Environment, the file is located in the `/opt/IBM/db2/V8.1/bin` directory. You need to set these variables whether you use a double-byte character set (DBCS) or a single-byte character set (SBCS).

DB2INSTANCE	The name of the DB2 instance on which you plan to run the warehouse agent. If you have multiple DB2 instances, you must choose one instance to be the master DB2 instance. This master DB2 instance must be a 32-bit instance.
LANG	Your local locale.
LC_ALL	Your local locale. The <code>LANG</code> and <code>LC_ALL</code> environment variables direct the warehouse agent to set the locale to your local locale.
DB2CODEPAGE	The code page of the client database. The <code>DB2CODEPAGE</code> variable overrides the system code page. This variable is used to communicate with servers that cannot interpret the default code page from the client. The <code>DB2CODEPAGE</code> variable sets the default code page to a code page that the server supports.

3. To access ODBC data using the Data Warehouse Center ODBC driver, set the following variables in your `IWH.environment` file:
 - `IS_ODBC` = the base directory where you installed the Data Warehouse Center ODBC driver. On AIX, the default path is `/usr/opt/db2_08_01/odbc`. On Linux and Solaris Operating Environment, the default path is `/opt/IBM/db2/V8.1/odbc`
 - To access Oracle data, set the following environment variables:
 - `ORACLE_HOME`
 - `TNS_ADMIN`
 - `ORACLE_SID`

- To access Sybase data, set the following environment variables:
 - SYBASE
 - DSQUERY
 - To access Informix data, set the following environment variables:
 - INFORMIXDIR
 - INFORMIXSERVER
4. To access Essbase or DB2 OLAP Server™ data, set the ARBORPATH environment variable in your IWH.environment file. If you will be using the Data Warehouse OLAP programs, update the PATH and LIBPATH environment variables so that they include the executables needed by Essbase or DB2 OLAP. In Linux and the Solaris Operating Environment, update the LD_LIBRARY_PATH environmental variable so that it includes the executable files that are needed by Essbase or DB2 OLAP.
- The HOME environment variable of the agent instance must point to the directory where the Essbase.id file is located, and the agent process must have read/write access to this file. The Essbase.id file is created the first time the OLAP client is run.
5. Optional: Customize your environment further by setting the following variables in your IWH.environment file:
- VWS_LOGGING = the directory where the warehouse agent trace files, program output logs, and environment output files are stored. The default directory is /var/IWH.
 - VWSPATH = the warehouse agent base install directory.
 - VWA_LOCALE_TABLE = locale conversion table.
- If you are using a national language version of the Solaris Operating Environment warehouse agent, you might need to choose a user-defined conversion table that the agent can use for string conversions. To do this, add the environment variable VWA_LOCALE_TABLE to the IWH.environment file and set its value to the code set that you want to use (for example, 8859-1 for en_US).
6. If you are using a shared /etc/services file in the NFS or AFS environment, add the following services to the shared /etc/services file. You must add these services because the install process updates only your local /etc/services file.

Service Name Port Number

vwd 11001/tcp

If these port numbers are already in use in your operating environment, you can change them in the /etc/services file on your system. However, you must also change the same port numbers on the workstation where the warehouse server is installed, and on all the associated warehouse agent sites.

You must add these services because the install process updates only your local /etc/services file.

7. For these changes to take effect in the IWH.environment file, stop and restart the warehouse agent daemon:
- a. Determine the daemon process ID by entering:


```
ps -e | grep vwdaemon
```
 - b. Stop the daemon by entering:


```
kill pid
```

 where pid is the daemon process ID.

After you stop the daemon, it will restart automatically. However, on Linux you must restart the daemon manually. If you installed the AIX warehouse server, you must also restart the server daemons after changing the IWH.environment file using the command db2vsvr.

Related tasks:

- “Cataloging the DB2 nodes and databases after installing the AIX, Linux, or Solaris Operating Environment warehouse agent” on page 61
- “Installing the AIX, Linux, and Solaris Operating Environment warehouse agents” on page 52
- “Using the Data Warehouse Center external trigger” on page 63
- “Starting and stopping the warehouse server and logger (AIX)” in the *Data Warehouse Center Administration Guide*
- “Running DB2 Warehouse Manager on a 64-bit DB2 instance” in the *Data Warehouse Center Administration Guide*

Related reference:

- “Database connections for the AIX, Linux, and Solaris Operating Environment warehouse agents” on page 62
- “Sample IWH.environment file for AIX, Linux, and the Solaris Operating Environment” on page 58

Sample IWH.environment file for AIX, Linux, and the Solaris Operating Environment

The IWH.environment file contains environment variables that you must set when you configure your warehouse agent environment.

```
#!/bin/bash
#####
#
# Licensed Materials - Property of IBM
#
# 5648-B90
# (C) COPYRIGHT International Business Machines Corp. 1993, 2002
#
# 5648-B91
# (C) COPYRIGHT International Business Machines Corp. 1993, 2002
#
# 5648-B95
# (C) COPYRIGHT International Business Machines Corp. 1993, 2002
#
# 5648-B97
# (C) COPYRIGHT International Business Machines Corp. 1993, 2002
#
# 5648-B99
# (C) COPYRIGHT International Business Machines Corp. 1993, 2002
#
# All Rights Reserved
# US Government Users Restricted Rights - Use, duplication or
# disclosure restricted by GSA ADP Schedule Contract with IBM Corp.
#
#####
# NAME: IWH.environment
#
#####

DB2DIR="/usr/opt/db2_08_01"
```

```

# Data Warehouse environment setup script.
# Please Update this script to setup environment variables for other databases.

# NOTE :
# After adding new setup, the daemon process named : vwdaemon should
# be terminated using command: "kill <PID>" for changes to
# take effect.
# DO NOT EXECUTE vwdaemon. It will be re-executed immediately by init process.

# !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! ATTENTION !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
# !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! ATTENTION !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
# !      START OF MUST SET ENVIRONMENT VARIABLES SECTION      !
# !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! ATTENTION !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
# !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! ATTENTION !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

# DB2 environment section. Please set DB2 instance id
DB2INSTANCE=db2inst1 # make sure this is correct!

# These are the defaults. To change any of them, uncomment it and make
# the change.
#LANG=en_US
#VWS_LOGGING=/var/IWH
#VWA_LOCALE_TABLE=8859-1
#LC_ALL=en_US
#DB2CODEPAGE=819
#VWSPATH=${DB2DIR?}
#VWS_TEMPLATES=${VWSPATH?}/templates

# If you are using the Data Warehouse Center publish to Information
# Catalog Manager function, you must
# update the Classpath and Path variables. In this example,
# db2inst is the name of the DB2 instance.
#CLASSPATH=:/home/db2inst/sqllib/java/db2java.zip:/home/db2inst/
sqllib/java/sqlj.zip:/home/db2inst/sqllib/java/runtime.zip:/home/
db2inst/sqllib/tools/ibmjsse.jar:/home/db2inst/sqllib/tools/
db2_vw_web.jar:/home/db2inst/sqllib/java/Common.jar:/home/db2inst
/sqllib/tools/db2_vw.jar:/home/db2inst/sqllib/tools/db2vwcom.jar:/
home/db2inst/sqllib/tools/db2vwddd.jar:/home/db2inst/sqllib/tools/
db2cmn.jar:/home/db2inst/sqllib/java/db2jcc.jar:
#export CLASSPATH

#PATH=./usr/bin:/usr/bins/etc:/usr/sbin:/usr/ucb:/usr/bin/
X11:/sbin:/home/db2inst/sqllib/bin:

#export PATH

# If you are running a Java application using JDBC and the AIX
# warehouse agent to access a DB2 AIX server, and you may get
# the SQL1224N error message when attempting to start another
# warehouse agent. If you receive this error, look at the message
# help text for a list of possible causes. If the problem involves
# the number of shared memory segments, see the Administrative API
# reference documentation for information regarding threaded
# applications with concurrent access, which presents workarounds
# for this situation including setting the environment variable
# EXTSHM or defining a loop-back to the database being accessed.

#EXTSHM=ON
#export EXTSHM

#The following setting is needed to run the warehouse agent on Linux.
#The .bashrc file is the configuration file for the "bash" shell.
#export LD_LIBRARY_PATH=:/home/db2inst8/sqllib/lib, into .bashrc file

# If using InterSolv odbc drivers, set the IS_ODBC
# environment variable to the path for Intersolv odbc

```

```

# directory.
#
# IS_ODBC=<.../intersolv/.../odbc> # Should have path for Intersolv odbc dir

# For essbase udp, set the following path. HOME must be set to a directory
# to which the agent has write authority:

# ARBORPATH=<.../essbase>
# export ARBORPATH

# For Replication using the Data Warehouse agent on any Unix type
# system (AIX, Sun, and Linux) you need to set the HOME variable in
# the IWH.environment file in the /sqllib/bin directory using the
# current userid. This is a requirement of the Replication Apply program.

# HOME=/home/<userid>

# If using Oracle InterSolv driver, set the following paths:
#
# ORACLE_HOME=<... your Oracle client HOME dir ....>
# TNS_ADMIN=<... your TNS_ADMIN dir ....>
# ORACLE_SID=<... your ORACLE_SID ....>
# export ORACLE_HOME TNS_ADMIN ORACLE_SID

# If using Sybase InterSolv driver, set the following paths:
#
# SYBASE=<... your Sybase client dir ....>
# DSQUERY=<... your DSQUERY value ....>
# export SYBASE DSQUERY

# If using Informix InterSolv driver, set the following paths:
#
# INFORMIXDIR=<... your Informix client dir ....>
# INFORMIXSERVER=<... your Informix Server ....>
# export INFORMIXDIR INFORMIXSERVER

#If using Red Brick Warehouse, set the following paths:
#
# RB_CONFIG=<...your Red Brick RB_CONFIG dir ....>
# RB_HOST=<...your Red Brick RB_HOST ....>
# export RB_CONFIG RB_HOST

# !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
# !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
# !           END OF MUST SET ENVIRONMENT VARIABLES SECTION           !
# !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
# !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

# For the following, uncomment out the appropriate section(s)

# if [ "${INFORMIXDIR}" != "" ]; then
#   PATH=${INFORMIXDIR?}/bin:${PATH?}
#   LIBPATH=${LIBPATH:-""}:${INFORMIXDIR?}/lib
# else
#   INFORMIXDIR=${IS_ODBC?}
#   export INFORMIXDIR
# fi
#
# if [ "${SYBASE}" != "" ]; then
#   PATH=${SYBASE?}/bin:${PATH?}
#   LIBPATH=${LIBPATH:-""}:${SYBASE?}/lib
# fi
#
# if [ "${ORACLE_HOME}" != "" ]; then
#   PATH=${ORACLE_HOME?}/bin:${PATH?}
#   LIBPATH=${LIBPATH:-""}:${ORACLE_HOME?}/lib

```

```

# fi
#
# if [ "${ARBORPATH}" != "" ]; then
#     PATH=$PATH:${ARBORPATH?}/bin
#     LIBPATH=${LIBPATH:-""}:${ARBORPATH?}/api/lib
# fi
#
# if [ "${RB_CONFIG}" != "" ]; then
#     PATH=${RB_CONFIG?}/bin:${PATH}
#     LIBPATH=${RB_CONFIG?}/lib:${LIBPATH}
#     export PATH LIBPATH
# fi
#
# if [ "${IS_ODBC}" != "" ]; then
#     # for intersolv odbc
#     LIBPATH=${LIBPATH:-""}:${IS_ODBC?}/lib
#     IV_GLS_LCDIR=${IS_ODBC?}/gls/lc11
#     IV_GLS_REGISTRY=${IS_ODBC?}/gls/cm3/registry
#     export IV_GLS_LCDIR IV_GLS_REGISTRY
# fi

```

Cataloging the DB2 nodes and databases after installing the AIX, Linux, or Solaris Operating Environment warehouse agent

After you install the AIX, Linux, or Solaris Operating Environment warehouse agent and configure the warehouse agent environment, you must configure the DB2 nodes and databases.

Procedure:

To catalog the DB2 nodes and databases after installing the AIX, Linux, or Solaris Operating Environment warehouse agent:

1. Log on to the DB2 instance ID.
2. Catalog the DB2 nodes and databases that you plan to access.

If you have multiple DB2 instances on the same workstation, note the value of the DB2INSTANCE variable in the IWH.environment file. Any databases that are not created on this instance must be cataloged as remote.
3. Ensure that the .odbc.ini file is in the correct location:
 - For ODBC users: When you define the DB2 data source in the appropriate .odbc.ini file, ensure that the DSN is the true name of the DB2 database name or database alias name. The .odbc.ini file must reside in the home directory of the user ID that is used on the agent site.
 - For Red Brick Warehouse users, the .odbc.ini file must reside in the home directory of the user ID that is executing the Red Brick UDP steps on the agent site. The ODBC DSN for Red Brick must be properly registered in the .odbc.ini file.

Tip: If you are using Data Warehouse Center ODBC driver, see the sample .odbc.ini file. On AIX, this file is located in the /usr/opt/db2_08_01/odbc directory. On Linux and the Solaris Operating Environment, this file is located in the /opt/IBM/db2/V8.1/odbc directory. The name of the file is odbc.ini.intersolv.

Related tasks:

- “Configuring the AIX, Linux, and Solaris Operating Environment warehouse agent environments” on page 55

- “Using the Data Warehouse Center external trigger” on page 63

Related reference:

- “Database connections for the AIX, Linux, and Solaris Operating Environment warehouse agents” on page 62

Database connections for the AIX, Linux, and Solaris Operating Environment warehouse agents

DB2 CLI

This connection type accesses the following sources:

- DB2 family (through CLI)
- Heterogeneous data sources through federated support provided by DB2 Information Integrator, including:
 - Oracle
 - Sybase
 - Microsoft SQL Server
 - Informix

If you use the DB2 CLI connection type, you must have DB2 Information Integrator for heterogeneous data access.

Data Warehouse ODBC

This connection type accesses the following sources:

- DB2 family (through ODBC)
- Oracle
- Sybase
- Microsoft SQL Server
- Informix
- Flat file

Both connection types support the following warehouse target databases:

- DB2 Universal Database Enterprise Server Edition
- DB2 Universal Database Enterprise Edition
- DB2 Universal Database Enterprise - Extended Edition
- DB2 Universal Database for iSeries
- DB2 for z/OS
- Oracle (through DB2 Information Integrator)
- Sybase (through DB2 Information Integrator)
- Informix (through DB2 Information Integrator)
- Microsoft SQL Server (through DB2 Information Integrator)

Related tasks:

- “Configuring the AIX, Linux, and Solaris Operating Environment warehouse agent environments” on page 55
- “Cataloging the DB2 nodes and databases after installing the AIX, Linux, or Solaris Operating Environment warehouse agent” on page 61
- “Installing the AIX, Linux, and Solaris Operating Environment warehouse agents” on page 52
- “Using the Data Warehouse Center external trigger” on page 63

Using the Data Warehouse Center external trigger

If you will be using the Data Warehouse Center external trigger to externally start steps, or to promote or demote steps to or from development, test, or production status, you must reserve port number 11004 so that the Data Warehouse external trigger can communicate with the Data Warehouse Center server.

Related tasks:

- “Configuring the AIX, Linux, and Solaris Operating Environment warehouse agent environments” on page 55
- “Cataloging the DB2 nodes and databases after installing the AIX, Linux, or Solaris Operating Environment warehouse agent” on page 61
- “Installing the AIX, Linux, and Solaris Operating Environment warehouse agents” on page 52

Related reference:

- “Database connections for the AIX, Linux, and Solaris Operating Environment warehouse agents” on page 62

Chapter 5. Preparing for and installing warehouse transformers

This chapter describes how to install and enable warehouse transformers.

Preparing your environment for warehouse transformers

Warehouse transformers are stored procedures and user-defined functions that you can use to transform data in a warehouse step. To use warehouse transformers, you must install them at the agent site and enable them for use at the target warehouse. Prepare your environment before you enable warehouse transformers.

Procedure:

To prepare your environment for warehouse transformers:

1. Install a warehouse agent.
2. Install the SDK for your operating system. If your target database is DB2 Universal Database Version 7.2 or earlier, the Software Developer's Kit (SDK) Version 1.1.8 or later must be installed on the database where you plan to use the warehouse transformers. If your target database is DB2 Universal Database Version 8, the Software Developer's Kit (SDK) Version 1.3.0 or later must be installed on the database where you plan to use the warehouse transformers. The DB2 Application Development Client includes the SDK for AIX, the Solaris Operating Environment, Linux, and Windows.
3. Update the environment variables.
4. Update the database manager configuration for the target DB2 instance.
5. Update the database configuration for the target database.

Related concepts:

- "Install the Java Development Kit for warehouse transformers" on page 66
- "z/OS transformers" on page 76
- "Warehouse transformers" on page 4

Related tasks:

- "Updating the environment variables on Windows for warehouse transformers" on page 67
- "Updating the environment variables on AIX for warehouse transformers" on page 68
- "Updating the database manager configuration before installing warehouse transformers" on page 72
- "Updating the database configuration for the target database" on page 72
- "Installing warehouse transformers" on page 73
- "Enabling warehouse transformers" on page 74
- "Setting up warehouse transformers on DB2 for z/OS" on page 78
- "Updating the environment variables on the Solaris Operating Environment for warehouse transformers" on page 69
- "Updating the environment variables on Linux for warehouse transformers" on page 70

Related reference:

- “National language support for warehouse transformers” on page 81

Install the Java Development Kit for warehouse transformers

Ensure that you install the Java™ Development Kit for your system before you install warehouse transformers (for the Linux transformer, you must use the IBM® Java Development Kit for Linux).

The DB2® Application Development Client includes the Java Development Kit for AIX®, Linux, and Windows®:

- When you install the DB2 Application Development Client on AIX and Linux, the Java Development Kit is installed if an earlier version of the Java Development Kit is not detected.
- When you install the DB2 Application Development Client on Windows, the Java Development Kit is always installed.

To obtain and install the Java Development Kit for the Solaris™ Operating Environment, go to <http://www.sun.com/solaris/java> and follow the instructions provided.

Related concepts:

- “z/OS transformers” on page 76
- “Warehouse transformers” on page 4

Related tasks:

- “Updating the environment variables on Windows for warehouse transformers” on page 67
- “Updating the environment variables on AIX for warehouse transformers” on page 68
- “Updating the database manager configuration before installing warehouse transformers” on page 72
- “Updating the database configuration for the target database” on page 72
- “Installing warehouse transformers” on page 73
- “Enabling warehouse transformers” on page 74
- “Preparing your environment for warehouse transformers” on page 65
- “Setting up warehouse transformers on DB2 for z/OS” on page 78
- “Updating the environment variables on the Solaris Operating Environment for warehouse transformers” on page 69

Related reference:

- “National language support for warehouse transformers” on page 81

Updating environment variables for warehouse transformers

The following sections describe how to update environment variables for warehouse transformers.

Updating the environment variables on Windows for warehouse transformers

You must update the environment variables on Windows before you enable warehouse transformers.

Procedure:

To update the environment variables on Windows for warehouse transformers:

1. Open the Windows Control Panel.
2. Double-click **System**.
3. Click the **Environment** tab to view the variables.
4. Click the **Path** system variable and add the path of the SDK bin subdirectory to the end of the path. The default path is `c:\sql11ib\java\jdk`.
5. Click **Set**.
6. Click the **CLASSPATH** system variable. Add the path where the transformers are installed, and the path of the directory that contains the DB2 Java support classes. Separate the path names with a semicolon. If the CLASSPATH variable does not exist, you must define it.
For example, you might add
`C:\SQLLIB\FUNCTION;C:\SQLLIB\JAVA\DB2JAVA.ZIP;` to your CLASSPATH variable.
7. Click **Set**.
8. Click **OK** to close the window.

Related concepts:

- “Install the Java Development Kit for warehouse transformers” on page 66
- “z/OS transformers” on page 76
- “Warehouse transformers” on page 4

Related tasks:

- “Updating the environment variables on AIX for warehouse transformers” on page 68
- “Updating the database manager configuration before installing warehouse transformers” on page 72
- “Updating the database configuration for the target database” on page 72
- “Installing warehouse transformers” on page 73
- “Enabling warehouse transformers” on page 74
- “Preparing your environment for warehouse transformers” on page 65
- “Setting up warehouse transformers on DB2 for z/OS” on page 78
- “Updating the environment variables on the Solaris Operating Environment for warehouse transformers” on page 69
- “Updating the environment variables on Linux for warehouse transformers” on page 70

Related reference:

- “National language support for warehouse transformers” on page 81

Updating the environment variables on AIX for warehouse transformers

Update the environment variables before you install warehouse transformers.

Procedure:

To update the environment variables on AIX for warehouse transformers:

1. Ensure that the current directory is in the CLASSPATH variable by entering the following command:

```
$ echo $CLASSPATH
```

For example:

```
./INSTHOME/sql1lib/java/db2java.zip
```

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

2. Enter the following commands to change the CLASSPATH variable:

```
CLASSPATH=./$CLASSPATH
export CLASSPATH
```

3. Ensure that *INSTHOME/sql1lib/function* is in the CLASSPATH variable by entering the following command:

```
$ echo $CLASSPATH
```

4. Enter the following commands to change the CLASSPATH variable:

```
CLASSPATH=INSTHOME/sql1lib/function:$CLASSPATH
export CLASSPATH
```

5. Make sure that the PATH variable includes */sql1lib/bin*. For example:

```
INSTHOME/sql1lib/bin
```

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

6. Make sure that the LIBPATH variable includes */sql1lib/lib*. For example:

```
INSTHOME/sql1lib/lib
```

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

Related concepts:

- “Install the Java Development Kit for warehouse transformers” on page 66
- “z/OS transformers” on page 76
- “Warehouse transformers” on page 4

Related tasks:

- “Updating the environment variables on Windows for warehouse transformers” on page 67
- “Updating the database manager configuration before installing warehouse transformers” on page 72
- “Updating the database configuration for the target database” on page 72
- “Installing warehouse transformers” on page 73
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- “Preparing your environment for warehouse transformers” on page 65
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Related reference:

- “National language support for warehouse transformers” on page 81

Updating the environment variables on the Solaris Operating Environment for warehouse transformers

Update the environment variables before you install warehouse transformers.

Procedure:

To update the environment variables on the Solaris Operating Environment so that you can install warehouse transformers:

1. Add the following environment variables to your userprofile or usercshrc files:

- If you use Bourne Shell (sh) or derivatives such as ksh and bash, add the following line to your userprofile file:

```
AddtoString LD_LIBRARY_PATH sdk_path/lib/sparc/native_threads
```

where *sdk_path* is the subdirectory where the Software Developer’s Kit (SDK) is installed.

The userprofile file is located in the sqllib subdirectory (for example, */home/db2inst1/sqllib/userprofile*, where */home/db2inst1/home/db2inst1* is the home directory of the instance that you are setting up).

- If you use C Shell (csh) or derivatives such as tcsh, update the usercshrc file to include the following line:

```
if ("LD_LIBRARY_PATH" ! ~*sdk_path/lib/sparc/native_threads*)  
setenv LD_LIBRARY_PATH $LD_LIBRARY_PATH sdk_path/lib/sparc/native_threads
```

where *sdk_path* is the subdirectory where the SDK is installed.

The usercshrc file is located in the sqllib subdirectory (for example, */home/db2inst1/sqllib/usercshrc*, where */home/db2inst1/home/db2inst1* is the home directory of the instance that you are setting up).

2. Ensure that the current directory is in the CLASSPATH variable:
 - a. Enter the following command to view the CLASSPATH variable:

```
$ echo $CLASSPATH
```

For example:

```
./INSTHOME/sqllib/java/db2java.zip
```

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

- b. If the CLASSPATH variable does not contain the current directory, change the CLASSPATH variable by entering the following commands:

```
CLASSPATH=.:$CLASSPATH  
export CLASSPATH
```

3. Ensure that *INSTHOME/sqllib/function* is in the CLASSPATH variable:

- a. Enter the following command to view the CLASSPATH variable:

```
$ echo $CLASSPATH
```

- b. If the CLASSPATH variable does not contain *INSTHOME/sqllib/function*, change the CLASSPATH variable by entering the following commands:

```
CLASSPATH=INSTHOME/sqllib/function:$CLASSPATH  
export CLASSPATH
```

4. Make sure that the PATH variable includes sqllib/bin. For example:

```
INSTHOME/sqllib/bin
```

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

Related concepts:

- “Install the Java Development Kit for warehouse transformers” on page 66
- “z/OS transformers” on page 76
- “Warehouse transformers” on page 4

Related tasks:

- “Updating the environment variables on Windows for warehouse transformers” on page 67
- “Updating the environment variables on AIX for warehouse transformers” on page 68
- “Installing warehouse transformers” on page 73
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- “Preparing your environment for warehouse transformers” on page 65
- “Setting up warehouse transformers on DB2 for z/OS” on page 78
- “Updating the environment variables on Linux for warehouse transformers” on page 70

Related reference:

- “National language support for warehouse transformers” on page 81

Updating the environment variables on Linux for warehouse transformers

Update the environment variables before you install warehouse transformers.

Prerequisites:

To run warehouse transformers (Java stored procedures or user-defined functions) on DB2 Universal Database for Linux, the Linux runtime linker must be able to access certain Java shared libraries. You can either add the location of the Java shared libraries to */etc/ld.so.conf*, or create symbolic links to the libraries in the */usr/lib* directory. If you decide to create symbolic links for the libraries in */usr/lib*, the list of libraries to link to is different for different versions of the IBM Developer Kit for Java.

For IBM Developer Kit for Java Version 1.1.8 (which you use for warehouse transformers installed on a DB2 Universal Database Version 7.2 or earlier database), you must have symbolic links pointing to: *libjava.so libjipc.so libmath.so libzip.so*. For Version 1.2.2 or 1.3 of the IBM Developer Kit for Java, you must have symbolic links pointing to: *libjava.so libjvm.so libhpi.so*.

Once you either add the location of the Java shared libraries to */etc/ld.so.conf* or create the symbolic links, you must refresh the runtime linker cache by running the following command as root: `bash# ldconfig`. To run with version 1.2.2 or 1.3 of the IBM Developer Kit for Java, you also need to enter the following commands: `bash$ db2set DB2_USE_SDK12=true bash$ db2stop bash$ db2start`. Please note that you should only use IBM SDK 1.3 for DB2 Universal Database Version 8 and higher.

Procedure:

To update the environment variables on Linux for warehouse transformers:

1. Make sure that the current directory is in the CLASSPATH variable by entering the following command:

```
$ echo $CLASSPATH
```

 For example:

```
./INSTHOME/sql11ib/java/db2java.zip
```

 where /INSTHOME is the home directory of the instance owner.
2. Enter the following commands to change the CLASSPATH variable:

```
CLASSPATH=.:$CLASSPATH
export CLASSPATH
```
3. Ensure that INSTHOME/sql11ib/function is in the CLASSPATH variable by entering the following command:

```
$ echo $CLASSPATH
```
4. Enter the following commands to change the CLASSPATH variable:

```
CLASSPATH=INSTHOME/sql11ib/function:$CLASSPATH
export CLASSPATH
```
5. Make sure that the PATH variable includes sql11ib/bin.
 For example:

```
/INSTHOME/sql11ib/bin
```

 where /INSTHOME is the home directory of the instance owner.
6. Make sure that the library path variable (LD_LIBRARY_PATH or LIBPATH as applicable) includes /sql11ib/lib.
 For example:

```
/INSTHOME/sql11ib/lib
```

 where /INSTHOME is the home directory of the instance owner.

Related concepts:

- “Install the Java Development Kit for warehouse transformers” on page 66
- “z/OS transformers” on page 76
- “Warehouse transformers” on page 4

Related tasks:

- “Updating the environment variables on Windows for warehouse transformers” on page 67
- “Updating the environment variables on AIX for warehouse transformers” on page 68
- “Installing warehouse transformers” on page 73
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- “Preparing your environment for warehouse transformers” on page 65
- “Setting up warehouse transformers on DB2 for z/OS” on page 78
- “Updating the environment variables on the Solaris Operating Environment for warehouse transformers” on page 69

Related reference:

- “National language support for warehouse transformers” on page 81

Updating the database manager configuration for warehouse transformers

The following sections describe how to update the database manager configuration for warehouse transformers.

Updating the database manager configuration before installing warehouse transformers

Use the DB2 Command Line Processor to update the database manager configuration for the target DB2 instance before you install warehouse transformers.

Procedure:

To update the database manager configuration before installing warehouse transformers:

- Set the SDK path parameter (SDK_PATH) to the subdirectory where the SDK is installed:

```
UPDATE DATABASE MANAGER CONFIGURATION USING SDK_PATH path
```

where *path* is the subdirectory where the SDK is installed.

Note: Do not include the bin directory in SDK_path. If you are using a DB2 Universal Database Version 7.2 (or earlier) target that has transformers installed, you should update SDK11_PATH as opposed to SDK_PATH.

- Set the Java Virtual Machine heap size parameter (JAVA_HEAP_SZ) to 4096:

```
UPDATE DATABASE MANAGER CONFIGURATION USING JAVA_HEAP_SZ 4096
```

Related concepts:

- “Warehouse transformers” on page 4

Related tasks:

- “Updating the environment variables on Windows for warehouse transformers” on page 67
- “Updating the environment variables on AIX for warehouse transformers” on page 68
- “Updating the database configuration for the target database” on page 72
- “Installing warehouse transformers” on page 73
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- “Setting up warehouse transformers on DB2 for z/OS” on page 78

Related reference:

- “National language support for warehouse transformers” on page 81

Updating the database configuration for the target database

Update the database configuration for the target database before you install warehouse transformers.

Procedure:

To update the database configuration for the target database, use the DB2 Command Line Processor to set the default application heap parameter (APPLHEAPSZ) for this database to 1024:

```
UPDATE DATABASE CONFIGURATION FOR warehouse_database_name USING APPLHEAPSZ 1024
```

Related concepts:

- “Install the Java Development Kit for warehouse transformers” on page 66
- “z/OS transformers” on page 76
- “Warehouse transformers” on page 4

Related tasks:

- “Updating the environment variables on Windows for warehouse transformers” on page 67
- “Updating the environment variables on AIX for warehouse transformers” on page 68
- “Updating the database manager configuration before installing warehouse transformers” on page 72
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Related reference:

- “National language support for warehouse transformers” on page 81

Installing and enabling warehouse transformers

The following sections describe how to install and enable warehouse transformers.

Installing warehouse transformers

Warehouse transformers are stored procedures. Before you enable the warehouse transformers, certain authorization levels are needed for the database in which the target warehouse resides.

Prerequisites:

The authorization ID of the statement must hold at least one of the following authorities or privileges:

- SYSADM or DBADM authority
- IMPLICIT_SCHEMA authority on the database, if the implicit or explicit schema name of the procedure does not exist
- CREATEIN privilege on the schema, if the schema name of the procedure refers to an existing schema

To create a fenced stored procedure, no additional authorities or privileges are required.

To create a not-fenced stored procedure, the authorization ID of the statement must also hold one of the following authorities:

- CREATE_NOT_FENCED authority on the database
- SYSADM or DBADM authority

Procedure:

To install warehouse transformers:

1. Insert the DB2 Warehouse Manager CD into your CD drive. The auto-run feature automatically starts the DB2 Setup launchpad.
2. Click **Install Products** from the launchpad.
3. Ensure that **DB2 Warehouse Manager** is selected, then click **Next**.
4. Proceed as prompted by the DB2 Setup wizard.
5. In the list of features, select **Warehouse transformers**, then click **Next**.
6. Proceed as prompted by the DB2 Setup wizard. Online help is available to guide you through the remaining steps.

Related concepts:

- “Install the Java Development Kit for warehouse transformers” on page 66
- “z/OS transformers” on page 76
- “Warehouse transformers” on page 4

Related tasks:

- “Updating the environment variables on Windows for warehouse transformers” on page 67
- “Updating the environment variables on AIX for warehouse transformers” on page 68
- “Updating the database manager configuration before installing warehouse transformers” on page 72
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Related reference:

- “National language support for warehouse transformers” on page 81

Enabling warehouse transformers

Warehouse transformers are Java stored procedures. A single database can contain several warehouse targets; however, you must enable the warehouse transformers for each warehouse target. If you have multiple warehouse targets in a single database and you change these settings for one warehouse target, the other warehouse targets in that database will be affected.

For example, if you drop the warehouse transformers after enabling them for several warehouse targets, a message is displayed, indicating that this change will affect other warehouse targets defined to the database. The names of the other warehouse targets will be listed in the message. You can choose to cancel the drop procedure or to continue. If you continue, any processes or steps in those warehouse targets that use warehouse transformers will not run, unless you recreate the warehouse transformers.

Prerequisites:

Before you enable the warehouse transformers, you must:

- Install a warehouse agent and warehouse transformers.
- Install the SDK for your operating system.
- Update the environment variables.
- Update the database manager configuration for the target DB2 instance.
- Update the database configuration for the target database.

Procedure:

To enable warehouse transformers:

1. Start the Data Warehouse Center.
2. In the tree view on the left, locate the warehouse target for which you want to enable warehouse transformers, and open the Properties notebook.
3. On the Database page, in the **Target database** area, click either **Create transformers and register as fenced** or **Create transformers and register as unfenced**.
4. In the **Warehouse target** area, click **Enable target for transformers**.
5. Click **OK**.
6. Close the notebook.

If you change the warehouse transformers from fenced to unfenced, or from unfenced to fenced, and there are multiple warehouse targets defined to the database, a message is displayed, indicating that this change will affect other warehouse targets defined to the database. The names of the other warehouse targets will be listed in the message. You can choose to cancel the change or to continue. If you continue, the transformers will be dropped, then recreated as specified.

Related concepts:

- “Install the Java Development Kit for warehouse transformers” on page 66
- “z/OS transformers” on page 76
- “Warehouse transformers” on page 4

Related tasks:

- “Updating the environment variables on Windows for warehouse transformers” on page 67
- “Updating the environment variables on AIX for warehouse transformers” on page 68
- “Updating the database manager configuration before installing warehouse transformers” on page 72
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Related reference:

- “National language support for warehouse transformers” on page 81

z/OS transformers

The Data Warehouse Center includes transformers, which are Java™ stored procedures that provide some basic data transformations. To run transformers, you must first set up Java stored procedures on your DB2® subsystem.

You can run the following transformers with the z/OS™ agent:

- IWH.CLEAN
- IWH.PERIODTABLE
- IWH.KEYTABLE
- IWH.CHISQUARE
- IWH.CORRELATION
- IWH.STATISTICS
- IWH.INVERTDATA
- IWH.PIVOTDATA
- IWH.REGRESSION
- IWH.ANOVA
- IWH.SUBTOTAL
- IWH.MOVINGAVERAGE

Related concepts:

- “Install the Java Development Kit for warehouse transformers” on page 66
- “Warehouse transformers” on page 4

Related tasks:

- “Updating the environment variables on Windows for warehouse transformers” on page 67
- “Updating the environment variables on AIX for warehouse transformers” on page 68
- “Updating the database configuration for the target database” on page 72
- “Installing warehouse transformers” on page 73
- “Enabling warehouse transformers” on page 74
- “Preparing your environment for warehouse transformers” on page 65
- “Setting up Java stored procedures on your DB2 subsystem for the warehouse transformers” on page 77
- “Setting up warehouse transformers on DB2 for z/OS” on page 78
- “Reducing the number of characters in the environment variable data set for the z/OS warehouse transformers” on page 79
- “Updating the environment variables on the Solaris Operating Environment for warehouse transformers” on page 69
- “Updating the environment variables on Linux for warehouse transformers” on page 70

Related reference:

- “National language support for warehouse transformers” on page 81

Setting up Java stored procedures on your DB2 subsystem for the warehouse transformers

The following instructions provide a brief version of how to set up Java stored procedures.

Procedure:

To set up Java stored procedures on your DB2 subsystem for the warehouse transformers:

1. Install Visual Age for Java 2.0 or later on your z/OS system.
2. Install Java Database Connectivity (JDBC) and bind the JDBC packages in your DB2 subsystem.
3. Set up the Revised Report on Scheme (RRS) and DB2 Work Load Manager (WLM) stored procedures for your DB2 subsystem.
4. Set up Java stored procedures for your DB2 subsystem. This includes creating a Java WLM startup procedure for the Java stored procedures address space.
5. Under WLM, associate your Java WLM startup procedure with a WLM environment name.
6. Specify the WLM application environment name for the WLM_ENVIRONMENT option on CREATE or ALTER PROCEDURE to associate a stored procedure or user-defined function with an application environment.
7. Ensure that the owner of your DB2 subsystem's started tasks has access to the libraries in the Java WLM startup procedure.

Related concepts:

- "Install the Java Development Kit for warehouse transformers" on page 66
- "z/OS transformers" on page 76
- "Warehouse transformers" on page 4

Related tasks:

- "Updating the environment variables on Windows for warehouse transformers" on page 67
- "Updating the environment variables on AIX for warehouse transformers" on page 68
- "Updating the database configuration for the target database" on page 72
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- "Preparing your environment for warehouse transformers" on page 65
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- "Reducing the number of characters in the environment variable data set for the z/OS warehouse transformers" on page 79
- "Updating the environment variables on the Solaris Operating Environment for warehouse transformers" on page 69
- "Updating the environment variables on Linux for warehouse transformers" on page 70

Related reference:

- "National language support for warehouse transformers" on page 81

Setting up warehouse transformers on DB2 for z/OS

The following instructions describe how to set up the warehouse transformers on DB2 for z/OS and OS/390.

Procedure:

To set up warehouse transformers on DB2 for z/OS:

1. Define your transformer sources to the warehouse.
2. To define the transformers to DB2 for z/OS, go to the directory that contains the required SQL statement and apply the SQL statement. The location of the SQL statement varies with the version of DB2.

Table 3. SQL statement location according to DB2 Universal Database version

DB2 Universal Database Version	SQL statements location
DB2 for OS/390 Version 6	Use SQL statements in the /usr/lpp/DWC81/createXfSQL directory
DB2 for z/OS and OS/390 Version 7	Use SQL statements in the /usr/lpp/DWC81/createXfSQLV7 directory

When you set up Java stored procedures, use WLM to associate the Java WLM startup procedure with a WLM environment name. The environment name is specified in the WLM ENVIRONMENT option of the CREATE PROCEDURE statement. DSNWLMJ is the WLM environment name included with the transformer definitions. You can either add a WLM association name of DSNWLMJ, or change the WLM ENVIRONMENT option for each transformer definition to a name that is already associated with your startup procedure.

3. Set up links from UNIX Systems Services to the transformer load modules in IWH810.SIWHLOAD:
 - a. Use telnet to connect to UNIX Systems Services on your OS/390 or z/OS host system.
 - b. Change to the directory where you installed the z/OS warehouse agent. The default installation directory is /usr/lpp/DWC81.
 - c. If you are using DB2 V7, go to step 3e. If you are using DB2 Version 5 or Version 6, edit the trlinks data set in the installed directory.
 - d. Make this line a comment by putting a pound sign (#) in column 1. For example: #ln -e IWHXF xf.jll;. Remove the comment from this line by removing the pound sign (#) in column 1. For example: ln -e IWHXFV7 xf.jll;. Save your changes.
 - e. Type trlinks and press Enter. An xf.jll link is created in the /usr/lpp/DWC81/com/ibm/data directory. The link will direct the agent to load either the IWHXF or IWHXFV7 modules.
4. APF-authorize IWH810.SIWHPDSE, then add it to the STEPLIB concatenation in your DB2 Java stored procedures startup procedure.
5. Add the directory where the xf.jll link is (the default is /usr/lpp/DWC81) to the CLASSPATH and LIBPATH environment variables in the WLM environment data set. To find the WLM environment data set, look in the DB2 Java stored procedures startup procedure. The WLM environment data set is the one that your JAVAENV DD card points to.
6. Start the stored procedures, then create and run your warehouse steps.

Related concepts:

- “Install the Java Development Kit for warehouse transformers” on page 66
- “z/OS transformers” on page 76
- “Warehouse transformers” on page 4

Related tasks:

- “Updating the environment variables on Windows for warehouse transformers” on page 67
- “Updating the environment variables on AIX for warehouse transformers” on page 68
- “Updating the database configuration for the target database” on page 72
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- “Preparing your environment for warehouse transformers” on page 65
- “Setting up Java stored procedures on your DB2 subsystem for the warehouse transformers” on page 77
- “Updating the environment variables on the Solaris Operating Environment for warehouse transformers” on page 69
- “Updating the environment variables on Linux for warehouse transformers” on page 70

Related reference:

- “National language support for warehouse transformers” on page 81

Reducing the number of characters in the environment variable data set for the z/OS warehouse transformers

The environment variable data set cannot contain more than 244 characters.

Prerequisites:

When you install JDBC, you run the installVAJDLL command. This command creates an sqlj.jll link to the JDBC driver. The name of the directory where you installed this sqlj.jll link must be added to the CLASSPATH and LIBPATH statements in your environment variable data set.

SQLJ is included in a Java package named /COM/ibm/db2os390/. For example, if the sqlj.jll link is in the /usr/lpp/db2710/COM/ibm/db2os390/ directory, you need to add /usr/lpp/db2710/ to your CLASSPATH and LIBPATH statements.

Procedure:

To reduce the number of characters in the environment variable data set:

1. Create a directory such as /u/userid/links. Include both the JDBC link and the transformer link in the /u/userid/links directory:

```
/u/userid/links/com/ibm/data/xf.jll
/u/userid/links/COM/ibm/db2os390/sqlj.jll
```

2. Change the LIBPATH statement to LIBPATH=/u/userid/links.
3. Change the CLASSPATH statement to /u/userid/links.

If you move the links, you must execute authorities again for the .jll files so that the extended bit is on.

To determine whether the extended bit is on:

1. Go to the directory that contains the links, and enter the command `ls -lt`.
The permission bit contains e in the high-order bit position. For example, `erwxrwxrwx`.
2. If the high order bit is 1 (for example, `lwxrwxrwx`), and you are running DB2 for OS/390 Version 5 or Version 6, you need to create the link again using the command:

```
ln -e DSNAQJLL sqlj.j11
ln -e IWHXF xf.j11
```

If the high order bit is 1, and you are running DB2 for z/OS and OS/390 Version 7, create the link again using the command:

```
ln -e IWHXFV7 xf.j1
```

Java objects in the signature of a stored procedure are supported only in DB2 for z/OS and OS/390 Version 7. In DB2 for OS/390 Version 5 and Version 6, the transformers do not support null values in their parameters. In these versions, if you pass a null parameter, it is considered a zero. DB2 Version 5 and Version 6 transformers treat zero parameters like null strings.

DB2 supports the COMMIT SQL statement in stored procedures only in DB2 for z/OS and OS/390 Version 7. The INVERTDATA stored procedure drops and recreates a table within the stored procedure; therefore, it requires a COMMIT statement. IWH.INVERTDATA is not supported in DB2 for OS/390 Version 5 or Version 6.

DB2 for z/OS and OS/390 does not support Java user-defined functions, so IWH.FORMATDATE is not supported on the S/390 platform.

This is a sample startup procedure for Java stored procedures:

```
//DSNWLMJ PROC DB2SSN=DSN,NUMTCB=5,APPLENV=DSNWLMJ
//*****
//* THIS PROC IS USED TO START THE WLM-ESTABLISHED SPAS *
//* ADDRESS SPACE FOR THE DSNWLMJ APPLICATION ENVIRONMENT *
//* V WLM,APPLENV=DSNWLMJ,RESUME *
//*****
//DSNWLMJ EXEC PGM=DSNX9WLM,TIME=1440,REGION=0M,
// PARM='&DB2SSN, &NUMTCB, &APPLENV'
// DD DSN=IWH810.SIWHPDSE,DISP=SHR
// DD DSN=DSN.HPJSP.PDSE.JDBC,DISP=SHR
// DD DSN=SYS1.PP.PDSELINK,DISP=SHR
// DD DSN=DSN710.SDSNEXIT,DISP=SHR
// DD DSN=DSN710.SDSNLOAD,DISP=SHR
// DD DSN=SYS1.SCEERUN,DISP=SHR
// DD DSN=DSN.PDSE,DISP=SHR
//JAVAENV DD DSN=DSN.WLMENVJ.JSPENV,DISP=SHR
//CEEDUMP DD SYSOUT=A
//DSSPRINT DD SYSOUT=A
//JSPDEBUG DD SYSOUT=A
//SYSABEND DD SYSOUT=A
//SYSPRINT DD SYSOUT=A
```

In this example, the IWH810.SIWHPDSE library contains the transformer load modules. DSN.HPJSP.PDSE.JDBC contains the High Performance Java (HPJ) DLLs from HPJ setup. In DB2 for z/OS Version 7, this library is named DSN710.SDSNLOAD2. SYS1.PP.PDSELINK and contains the HPJ run time libraries. DSN.PDSE contains HPJ setup information. DSN.WLMENVJ.JSPENV contains the environment variables.

This is an environment variable data set:

```
ENVAR("TZ=PST07",  
"DB2SQLJPROPERTIES=/usr/lpp/db2/jdbc/db2710/classes/db2sqljdbc.properties",  
"LIBPATH=/usr/lpp/DWC81",  
"VWSPATH=/usr/lpp/DWC81",  
"CLASSPATH=/usr/lpp/db2/jdbc/db2710/classes:/usr/lpp/DWC81:/usr/lpp/hpj/lib"),  
MSGFILE(JSPDEBUG)
```

Related concepts:

- "Install the Java Development Kit for warehouse transformers" on page 66
- "z/OS transformers" on page 76
- "Warehouse transformers" on page 4

Related tasks:

- "Updating the environment variables on Windows for warehouse transformers" on page 67
- "Updating the environment variables on AIX for warehouse transformers" on page 68
- "Updating the database configuration for the target database" on page 72
- "Installing warehouse transformers" on page 73
- "Enabling warehouse transformers" on page 74
- "Preparing your environment for warehouse transformers" on page 65
- "Setting up Java stored procedures on your DB2 subsystem for the warehouse transformers" on page 77
- "Setting up warehouse transformers on DB2 for z/OS" on page 78
- "Updating the environment variables on the Solaris Operating Environment for warehouse transformers" on page 69
- "Updating the environment variables on Linux for warehouse transformers" on page 70

Related reference:

- "National language support for warehouse transformers" on page 81

National language support for warehouse transformers

Most messages produced by the z/OS warehouse agent are sent to the warehouse server system to be interpreted, so in most cases the message language is dependent on how DB2 Universal Database was installed.

Transformers are an exception. For transformers, the message language is not dependent on how the warehouse server was installed. The z/OS warehouse agent includes the following message files for the transformers:

Table 4. National language support message files for transformers

File name	Language
Xf.properties_Fi_FI	Finnish
Xf.properties_No_NO	Norwegian
Xf.properties_Ru_RU	Russian
Xf.properties_Zh_CN	Simplified Chinese
Xf.properties_Zh_TW	Traditional Chinese
Xf.properties_Da_DK	Danish

Table 4. National language support message files for transformers (continued)

File name	Language
Xf.properties_De_DE	German
Xf.properties_En_US	U.S. English
Xf.properties_Es_ES	Spanish
Xf.properties_Fr_FR	French
Xf.properties_It_IT	Italian
Xf.properties_Ja_JP	Japanese
Xf.properties_Ko_KR	Korean
Xf.properties_Pt_BR	Brazilian Portuguese
Xf.properties_Sv_SE	Swedish

If your transformer messages are in a language other than English, select one of the files in Table 4 on page 81 and copy its contents to the `Xf.properties` file.

Related concepts:

- “Install the Java Development Kit for warehouse transformers” on page 66
- “z/OS transformers” on page 76
- “Warehouse transformers” on page 4

Related tasks:

- “Updating the environment variables on Windows for warehouse transformers” on page 67
- “Updating the environment variables on AIX for warehouse transformers” on page 68
- “Updating the database configuration for the target database” on page 72
- “Installing warehouse transformers” on page 73
- “Enabling warehouse transformers” on page 74
- “Preparing your environment for warehouse transformers” on page 65
- “Setting up warehouse transformers on DB2 for z/OS” on page 78
- “Updating the environment variables on the Solaris Operating Environment for warehouse transformers” on page 69
- “Updating the environment variables on Linux for warehouse transformers” on page 70

Appendix.

Environment structure for Information Catalog Manager components

When you install the Information Catalog Center, entries are added or modified for the several Windows environment variables and user variables. In the following tables, the drive letter C indicates a local drive.

Table 5. Environment variable updates for Information Catalog Manager components

The environment variable:	Is added to, or modified, to include:
PATH	C:\SQLLIB\BIN
INCLUDE	C:\SQLLIB\LIB
VWS_TEMPLATES	C:\SQLLIB\TEMPLATES

Table 6. User variable updates for the Information Catalog Manager

The user variable:	Is added to, or modified, to include:
LOCPATH	%LOCPATH%
LIB	%LIB%
INCLUDE	%INCLUDE%

Warehouse agent environment structures

The information in this appendix describes the structure of the AIX, Linux, and Solaris Operating Environment warehouse agent environments. Use this information to help you configure the AIX, Linux, and Solaris Operating Environment warehouse agent environments.

The following tables show the directory structures for the AIX, Linux, and Solaris Operating Environment warehouse agents.

Table 7. Directory structures for the AIX warehouse agent

This directory:	Contains:
/usr/opt/db2_v8_01/bin/IWH.startup	Agent daemon and server startup file.
/usr/opt/db2_08_01/bin	Agent, step executables, user-defined executable files, and the environment setup file. This is the default install directory.
/usr/opt/db2_08_01/odbc	Sample .odbc.ini file and Data Warehouse Center ODBC driver.
/var/IWH	Trace files. This is the default directory for the daemon traces, agent traces, and user-defined program output files.

Table 8. Directory structures for the Solaris Operating Environment and Linux warehouse agents

This directory:	Contains:
/opt/IBM/db2/V8.1/bin	Agent daemon startup file.
/opt/IBM/db2/V8.1/	Default install base directory.

| Table 8. Directory structures for the Solaris Operating Environment and Linux warehouse agents (continued)

This directory:	Contains:
/opt/IBM/db2/V8.1/bin	Agent, step executables, user-defined executable files, and the environment setup file.
/opt/IBM/db2/V8.1/odbc	Sample .odbc.ini file and Data Warehouse Center ODBC driver.
/opt/IBM/db2/V8.1/lib	Solaris Operating Environment and Linux run-time library.
/var/IWH	Trace files. This is the default directory for the daemon traces, agent traces, and user-defined program output files.

Related concepts:

- “Communications between Data Warehouse Center clients and servers” on page 86
- “Communications between Data Warehouse Center servers and warehouse agents” on page 87

Identifying ports for Data Warehouse Center components if your system configuration uses a firewall

If you install the Data Warehouse Center server, client, and agent components across a firewall, you need to identify the ports that these components will use to communicate with each other. To identify these ports to your system, you will update the `.../etc/services` file on each of the systems where a Data Warehouse Center component is installed. You will also add service information for each system in the `.../etc/services` file, and you will make this information available to the firewall administrator.

If you plan to use firewall protection between any Data Warehouse Center component, you must set up the ports on all of the systems where a Data Warehouse Center component is installed, not just on the systems where communication across the firewall will occur. Failure to do this might cause a Data Warehouse Center component to allocate a port outside the firewall port range and cause a firewall security alert.

Procedure:

To support a firewall, you must specify a set of ports to be used by the Data Warehouse Center and the firewall administrator. These ports will enable communications between the various Data Warehouse Center components (server, client, and warehouse agents). You must identify a range of ports that the various Data Warehouse Center components can use to communicate with each other. This must be done on any system on which the component is installed.

To identify ports for Data Warehouse Center components when your system configuration uses a firewall:

1. On client systems, open the `.../etc/services` file and add the following lines:

Service Name Service Port

DWC_MIN nnnnn

DWC_MAX nnnnn + x

where:

- nnnnn is the lowest port number that you want the Data Warehouse Center client to use when it communicates with a Data Warehouse Center server across the firewall
- nnnnn + x is the highest port number that you want the Data Warehouse Center client to use when it communicates with a Data Warehouse Center server across the firewall

You will need to make sure that the range between the value of `DWC_MIN` and `DWC_MAX` is sufficient to support two ports for each client that might run concurrently on that system. For example, say that you install the Data Warehouse Center client on a Solaris Operating Environment system. You want the Data Warehouse Center components to communicate with each other starting at port 11010, and you want to have a maximum of 10 clients running concurrently on that system. You should set `DWC_MIN` to 11010 and `DWC_MAX` to 11030 (10 concurrent clients = 20 ports).

The Data Warehouse Center client will now communicate only across ports within the `DWC_MIN` and `DWC_MAX` range. If a new Data Warehouse Center client tries to log on and finds no available ports in that range, an error message will be displayed. The client must wait until ports within that range become available, or the system administrator will need to increase the number of available ports by increasing the value of the `DWC_MAX` to accommodate additional clients.

2. On server systems, open the `.../etc/services` file and add the following lines:

Service Name Port Number

`DWC_MIN` nnnnn

`DWC_MAX` nnnnn + x

where:

- nnnnn is the lowest port number that you want the Data Warehouse Center server to use when it communicates with a Data Warehouse Center client or agent across the firewall
- nnnnn + x is the highest port number that you want the Data Warehouse Center server to use when it communicates with a Data Warehouse Center client or agent across the firewall

You will need to make sure that the range between the value of `DWC_MIN` and `DWC_MAX` is sufficient to support two ports for each client that could run concurrently on that system, one port for each Data Warehouse Center agent instance with which the server will communicate concurrently, and one port for communications with the Data Warehouse Center logger.

For example, say that you installed the Data Warehouse Center server on a Windows NT system and this server will communicate with ten Data Warehouse Center clients on an AIX system and five Data Warehouse Center clients on Windows systems. The server will communicate with the local Data Warehouse Center logger and an AIX, Windows, and z/OS agent (of which a maximum of five instances can be run concurrently). If you want the Data Warehouse Center components to communicate with each other starting at port 11055, set `DWC_MIN` to 11055 and set `DWC_MAX` to 11101 (15 concurrent clients = 30 ports) , 3 agents with 5 concurrent instances each = 15 ports, and 1 logger = 1 port for a total of 46 ports).

The Data Warehouse Center server will now communicate only across ports within the `DWC_MIN` and `DWC_MAX` range. If the Data Warehouse Center server tries to respond to a new Data Warehouse Center client logon attempt or to start a new agent instance, but no ports are available within the defined range, an error message will be displayed. The client must wait until ports

within the defined range become available, or the system administrator must specify a larger number of available ports by increasing the value of the `DWC_MAX` to accommodate additional clients or agent instances.

3. On warehouse agent site systems, open the `.../etc/services` file and add the following lines:

Service Name **Port Number**

`DWC_MIN` `nnnnn`

`DWC_MAX` `nnnnn + x`

where:

- `nnnnn` is the lowest port number that you want the warehouse agent to use when it communicates with a Data Warehouse Center server across the firewall
- `nnnnn + x` is the highest port number that you want the warehouse agent to use when it communicates with a Data Warehouse Center server across the firewall

You will need to make sure that the range between the value of `DWC_MIN` and `DWC_MAX` is sufficient to support one port for each warehouse agent instance that could run concurrently on that system.

For example, say that you install the Data Warehouse Center server on a Windows system. You want to have the Data Warehouse Center server communicate with the warehouse agent starting at port 11025, and you want to have a maximum of ten agents running concurrently (ten Data Warehouse Center steps that could be run concurrently by this agent will cause ten agent instances to execute concurrently). You should set `DWC_MIN` to 11025 and `DWC_MAX` to 11035 (10 concurrent steps = 10 concurrent agent instances = 10 ports).

Related concepts:

- “Communications between Data Warehouse Center clients and servers” on page 86
- “Communications between Data Warehouse Center servers and warehouse agents” on page 87

Communications between Data Warehouse Center clients and servers

When the Data Warehouse Center client tries to log on to the Data Warehouse Center server, it first finds an available port on its system. Then the client sends a message to the Data Warehouse Center server using port 11000 to request a logon. The message specifies the available port on the client system. The client uses this port to listen for a response from the server. When the server receives the message to log on, it validates the client system that made the request and then searches the message to determine the port on which it is to respond. Next, the server opens communication with the client (on the port that the client specified). The server also specifies to the client the port through which the client should communicate with the server.

Each Data Warehouse Center client (Data Warehouse Center Admin Client and Work in Progress client) that will connect to a Data Warehouse Center server must open a communications pipe with a server as described in this section. In this way, a server can process many client requests concurrently. The server must have a separate communications pipe (open TCPIP port) with each concurrently connected client.

Related concepts:

- “Communications between Data Warehouse Center servers and warehouse agents” on page 87

Related reference:

- “Warehouse agent environment structures” on page 83

Communications between Data Warehouse Center servers and warehouse agents

When the Data Warehouse Center server is asked to complete a task that requires the use of a warehouse agent (for example, to run a step with a schedule or to read metadata from the database catalogs), the server finds an available port on its system and then sends a message to the warehouse agent daemon (listening on port 11001) at the agent site. The message contains the number of the port to which the agent can respond. The warehouse agent daemon receives this message and does some basic validation. After the message is validated, the warehouse agent daemon starts a warehouse agent instance to process the request from the server. The warehouse agent starts and accepts the message sent by the Data Warehouse Center server, finds an available port on its system, and responds to the server, using the port specified in the message from the server. During the response, the warehouse agent also indicates the port on the warehouse agent system that it will use to receive additional requests from the server.

Every time the Data Warehouse Center server needs an agent do a specific task, it must perform a handshake on the ports over which it communicates with the agent. Because the server can handle multiple schedules and client requests at one time, many communication pipes between an agent and a server might be open at the same time.

Related concepts:

- “Communications between Data Warehouse Center clients and servers” on page 86

Related reference:

- “Warehouse agent environment structures” on page 83

DB2 Universal Database technical information

DB2 documentation and help

DB2[®] technical information is available through the following tools and methods:

- DB2 Information Center
 - Topics
 - Help for DB2 tools
 - Sample programs
 - Tutorials
- Downloadable PDF files, PDF files on CD, and printed books
 - Guides
 - Reference manuals
- Command line help
 - Command help
 - Message help
 - SQL state help
- Installed source code
 - Sample programs

You can access additional DB2 Universal Database[™] technical information such as technotes, white papers, and Redbooks[™] online at ibm.com[®]. Access the DB2 Information Management software library site at www.ibm.com/software/data/pubs/.

DB2 documentation updates

IBM[®] may periodically make documentation FixPaks and other documentation updates to the DB2 Information Center available. If you access the DB2 Information Center at <http://publib.boulder.ibm.com/infocenter/db2help/>, you will always be viewing the most up-to-date information. If you have installed the DB2 Information Center locally, then you need to install any updates manually before you can view them. Documentation updates allow you to update the information that you installed from the *DB2 Information Center CD* when new information becomes available.

The Information Center is updated more frequently than either the PDF or the hardcopy books. To get the most current DB2 technical information, install the documentation updates as they become available or go to the DB2 Information Center at the www.ibm.com site.

Related concepts:

- “CLI sample programs” in the *CLI Guide and Reference, Volume 1*
- “Java sample programs” in the *Application Development Guide: Building and Running Applications*
- “DB2 Information Center” on page 90

Related tasks:

- “Invoking contextual help from a DB2 tool” on page 107

- “Updating the DB2 Information Center installed on your computer or intranet server” on page 99
- “Invoking message help from the command line processor” on page 108
- “Invoking command help from the command line processor” on page 108
- “Invoking SQL state help from the command line processor” on page 109

Related reference:

- “DB2 PDF and printed documentation” on page 101

DB2 Information Center

The DB2[®] Information Center gives you access to all of the information you need to take full advantage of DB2 family products, including DB2 Universal Database[™], DB2 Connect[™], DB2 Information Integrator and DB2 Query Patroller[™]. The DB2 Information Center also contains information for major DB2 features and components including replication, data warehousing, and the DB2 extenders.

The DB2 Information Center has the following features if you view it in Mozilla 1.0 or later or Microsoft[®] Internet Explorer 5.5 or later. Some features require you to enable support for JavaScript[™]:

Flexible installation options

You can choose to view the DB2 documentation using the option that best meets your needs:

- To effortlessly ensure that your documentation is always up to date, you can access all of your documentation directly from the DB2 Information Center hosted on the IBM[®] Web site at <http://publib.boulder.ibm.com/infocenter/db2help/>
- To minimize your update efforts and keep your network traffic within your intranet, you can install the DB2 documentation on a single server on your intranet
- To maximize your flexibility and reduce your dependence on network connections, you can install the DB2 documentation on your own computer

Search

You can search all of the topics in the DB2 Information Center by entering a search term in the **Search** text field. You can retrieve exact matches by enclosing terms in quotation marks, and you can refine your search with wildcard operators (*, ?) and Boolean operators (AND, NOT, OR).

Task-oriented table of contents

You can locate topics in the DB2 documentation from a single table of contents. The table of contents is organized primarily by the kind of tasks you may want to perform, but also includes entries for product overviews, goals, reference information, an index, and a glossary.

- Product overviews describe the relationship between the available products in the DB2 family, the features offered by each of those products, and up to date release information for each of these products.
- Goal categories such as installing, administering, and developing include topics that enable you to quickly complete tasks and develop a deeper understanding of the background information for completing those tasks.

- Reference topics provide detailed information about a subject, including statement and command syntax, message help, and configuration parameters.

Show current topic in table of contents

You can show where the current topic fits into the table of contents by clicking the **Refresh / Show Current Topic** button in the table of contents frame or by clicking the **Show in Table of Contents** button in the content frame. This feature is helpful if you have followed several links to related topics in several files or arrived at a topic from search results.

Index You can access all of the documentation from the index. The index is organized in alphabetical order by index term.

Glossary

You can use the glossary to look up definitions of terms used in the DB2 documentation. The glossary is organized in alphabetical order by glossary term.

Integrated localized information

The DB2 Information Center displays information in the preferred language set in your browser preferences. If a topic is not available in your preferred language, the DB2 Information Center displays the English version of that topic.

For iSeries™ technical information, refer to the IBM eServer™ iSeries information center at www.ibm.com/eserver/series/infocenter/.

Related concepts:

- “DB2 Information Center installation scenarios” on page 91

Related tasks:

- “Updating the DB2 Information Center installed on your computer or intranet server” on page 99
- “Displaying topics in your preferred language in the DB2 Information Center” on page 100
- “Invoking the DB2 Information Center” on page 98
- “Installing the DB2 Information Center using the DB2 Setup wizard (UNIX)” on page 94
- “Installing the DB2 Information Center using the DB2 Setup wizard (Windows)” on page 96

DB2 Information Center installation scenarios

Different working environments can pose different requirements for how to access DB2® information. The DB2 Information Center can be accessed on the IBM® Web site, on a server on your organization’s network, or on a version installed on your computer. In all three cases, the documentation is contained in the DB2 Information Center, which is an architected web of topic-based information that you view with a browser. By default, DB2 products access the DB2 Information Center on the IBM Web site. However, if you want to access the DB2 Information Center on an intranet server or on your own computer, you must install the DB2 Information Center using the DB2 Information Center CD found in your product Media Pack. Refer to the summary of options for accessing DB2 documentation which follows, along with the three installation scenarios, to help determine which

method of accessing the DB2 Information Center works best for you and your work environment, and what installation issues you might need to consider.

Summary of options for accessing DB2 documentation:

The following table provides recommendations on which options are possible in your work environment for accessing the DB2 product documentation in the DB2 Information Center.

Internet access	Intranet access	Recommendation
Yes	Yes	Access the DB2 Information Center on the IBM Web site, or access the DB2 Information Center installed on an intranet server.
Yes	No	Access the DB2 Information Center on the IBM Web site.
No	Yes	Access the DB2 Information Center installed on an intranet server.
No	No	Access the DB2 Information Center on a local computer.

Scenario: Accessing the DB2 Information Center on your computer:

Tsu-Chen owns a factory in a small town that does not have a local ISP to provide him with Internet access. He purchased DB2 Universal Database™ to manage his inventory, his product orders, his banking account information, and his business expenses. Never having used a DB2 product before, Tsu-Chen needs to learn how to do so from the DB2 product documentation.

After installing DB2 Universal Database on his computer using the typical installation option, Tsu-Chen tries to access the DB2 documentation. However, his browser gives him an error message that the page he tried to open cannot be found. Tsu-Chen checks the installation manual for his DB2 product and discovers that he has to install the DB2 Information Center if he wants to access DB2 documentation on his computer. He finds the *DB2 Information Center CD* in the media pack and installs it.

From the application launcher for his operating system, Tsu-Chen now has access to the DB2 Information Center and can learn how to use his DB2 product to increase the success of his business.

Scenario: Accessing the DB2 Information Center on the IBM Web site:

Colin is an information technology consultant with a training firm. He specializes in database technology and SQL and gives seminars on these subjects to businesses all over North America using DB2 Universal Database. Part of Colin's seminars includes using DB2 documentation as a teaching tool. For example, while teaching courses on SQL, Colin uses the DB2 documentation on SQL as a way to teach basic and advanced syntax for database queries.

Most of the businesses at which Colin teaches have Internet access. This situation influenced Colin's decision to configure his mobile computer to access the DB2 Information Center on the IBM Web site when he installed the latest version of DB2 Universal Database. This configuration allows Colin to have online access to the latest DB2 documentation during his seminars.

However, sometimes while travelling Colin does not have Internet access. This posed a problem for him, especially when he needed to access to DB2 documentation to prepare for seminars. To avoid situations like this, Colin installed a copy of the DB2 Information Center on his mobile computer.

Colin enjoys the flexibility of always having a copy of DB2 documentation at his disposal. Using the **db2set** command, he can easily configure the registry variables on his mobile computer to access the DB2 Information Center on either the IBM Web site, or his mobile computer, depending on his situation.

Scenario: Accessing the DB2 Information Center on an intranet server:

Eva works as a senior database administrator for a life insurance company. Her administration responsibilities include installing and configuring the latest version of DB2 Universal Database on the company's UNIX[®] database servers. Her company recently informed its employees that, for security reasons, it would not provide them with Internet access at work. Because her company has a networked environment, Eva decides to install a copy of the DB2 Information Center on an intranet server so that all employees in the company who use the company's data warehouse on a regular basis (sales representatives, sales managers, and business analysts) have access to DB2 documentation.

Eva instructs her database team to install the latest version of DB2 Universal Database on all of the employee's computers using a response file, to ensure that each computer is configured to access the DB2 Information Center using the host name and the port number of the intranet server.

However, through a misunderstanding Migual, a junior database administrator on Eva's team, installs a copy of the DB2 Information Center on several of the employee computers, rather than configuring DB2 Universal Database to access the DB2 Information Center on the intranet server. To correct this situation Eva tells Migual to use the **db2set** command to change the DB2 Information Center registry variables (DB2_DOCHOST for the host name, and DB2_DOCPORT for the port number) on each of these computers. Now all of the appropriate computers on the network have access to the DB2 Information Center, and employees can find answers to their DB2 questions in the DB2 documentation.

Related concepts:

- "DB2 Information Center" on page 90

Related tasks:

- "Updating the DB2 Information Center installed on your computer or intranet server" on page 99
- "Installing the DB2 Information Center using the DB2 Setup wizard (UNIX)" on page 94
- "Installing the DB2 Information Center using the DB2 Setup wizard (Windows)" on page 96

Related reference:

- "db2set - DB2 Profile Registry Command" in the *Command Reference*

Installing the DB2 Information Center using the DB2 Setup wizard (UNIX)

DB2 product documentation can be accessed in three ways: on the IBM Web site, on an intranet server, or on a version installed on your computer. By default, DB2 products access DB2 documentation on the IBM Web site. If you want to access the DB2 documentation on an intranet server or on your own computer, you must install the documentation from the *DB2 Information Center CD*. Using the DB2 Setup wizard, you can define your installation preferences and install the DB2 Information Center on a computer that uses a UNIX operating system.

Prerequisites:

This section lists the hardware, operating system, software, and communication requirements for installing the DB2 Information Center on UNIX computers.

- **Hardware requirements**

You require one of the following processors:

- PowerPC (AIX)
- HP 9000 (HP-UX)
- Intel 32-bit (Linux)
- Solaris UltraSPARC computers (Solaris Operating Environment)

- **Operating system requirements**

You require one of the following operating systems:

- IBM AIX 5.1 (on PowerPC)
- HP-UX 11i (on HP 9000)
- Red Hat Linux 8.0 (on Intel 32-bit)
- SuSE Linux 8.1 (on Intel 32-bit)
- Sun Solaris Version 8 (on Solaris Operating Environment UltraSPARC computers)

Note: The DB2 Information Center runs on a subset of the UNIX operating systems on which DB2 clients are supported. It is therefore recommended that you either access the DB2 Information Center from the IBM Web site, or that you install and access the DB2 Information Center on an intranet server.

- **Software requirements**

– The following browser is supported:

- Mozilla Version 1.0 or greater

- The DB2 Setup wizard is a graphical installer. You must have an implementation of the X Window System software capable of rendering a graphical user interface for the DB2 Setup wizard to run on your computer. Before you can run the DB2 Setup wizard you must ensure that you have properly exported your display. For example, enter the following command at the command prompt:

```
export DISPLAY=9.26.163.144:0.
```

- **Communication requirements**

- TCP/IP

Procedure:

To install the DB2 Information Center using the DB2 Setup wizard:

1. Log on to the system.
2. Insert and mount the DB2 Information Center product CD on your system.
3. Change to the directory where the CD is mounted by entering the following command:

```
cd /cd
```

where */cd* represents the mount point of the CD.

4. Enter the **./db2setup** command to start the DB2 Setup wizard.
5. The IBM DB2 Setup Launchpad opens. To proceed directly to the installation of the DB2 Information Center, click **Install Product**. Online help is available to guide you through the remaining steps. To invoke the online help, click **Help**. You can click **Cancel** at any time to end the installation.
6. On the **Select the product you would like to install** page, click **Next**.
7. Click **Next** on the **Welcome to the DB2 Setup wizard** page. The DB2 Setup wizard will guide you through the program setup process.
8. To proceed with the installation, you must accept the license agreement. On the **License Agreement** page, select **I accept the terms in the license agreement** and click **Next**.
9. Select **Install DB2 Information Center on this computer** on the **Select the installation action** page. If you want to use a response file to install the DB2 Information Center on this or other computers at a later time, select **Save your settings in a response file**. Click **Next**.
10. Select the languages in which the DB2 Information Center will be installed on **Select the languages to install** page. Click **Next**.
11. Configure the DB2 Information Center for incoming communication on the **Specify the DB2 Information Center port** page. Click **Next** to continue the installation.
12. Review the installation choices you have made in the **Start copying files** page. To change any settings, click **Back**. Click **Install** to copy the DB2 Information Center files onto your computer.

You can also install the DB2 Information Center using a response file.

The installation logs `db2setup.his`, `db2setup.log`, and `db2setup.err` are located, by default, in the `/tmp` directory.

The `db2setup.log` file captures all DB2 product installation information, including errors. The `db2setup.his` file records all DB2 product installations on your computer. DB2 appends the `db2setup.log` file to the `db2setup.his` file. The `db2setup.err` file captures any error output that is returned by Java, for example, exceptions and trap information.

When the installation is complete, the DB2 Information Center will be installed in one of the following directories, depending upon your UNIX operating system:

- AIX: `/usr/opt/db2_08_01`
- HP-UX: `/opt/IBM/db2/V8.1`
- Linux: `/opt/IBM/db2/V8.1`
- Solaris Operating Environment: `/opt/IBM/db2/V8.1`

Related concepts:

- “DB2 Information Center” on page 90
- “DB2 Information Center installation scenarios” on page 91

Related tasks:

- “Installing DB2 using a response file (UNIX)” in the *Installation and Configuration Supplement*
- “Updating the DB2 Information Center installed on your computer or intranet server” on page 99
- “Displaying topics in your preferred language in the DB2 Information Center” on page 100
- “Invoking the DB2 Information Center” on page 98
- “Installing the DB2 Information Center using the DB2 Setup wizard (Windows)” on page 96

Installing the DB2 Information Center using the DB2 Setup wizard (Windows)

DB2 product documentation can be accessed in three ways: on the IBM Web site, on an intranet server, or on a version installed on your computer. By default, DB2 products access DB2 documentation on the IBM Web site. If you want to access the DB2 documentation on an intranet server or on your own computer, you must install the DB2 documentation from the *DB2 Information Center CD*. Using the DB2 Setup wizard, you can define your installation preferences and install the DB2 Information Center on a computer that uses a Windows operating system.

Prerequisites:

This section lists the hardware, operating system, software, and communication requirements for installing the DB2 Information Center on Windows.

- **Hardware requirements**

You require one of the following processors:

- 32-bit computers: a Pentium or Pentium compatible CPU

- **Operating system requirements**

You require one of the following operating systems:

- Windows 2000
- Windows XP

Note: The DB2 Information Center runs on a subset of the Windows operating systems on which DB2 clients are supported. It is therefore recommended that you either access the DB2 Information Center on the IBM Web site, or that you install and access the DB2 Information Center on an intranet server.

- **Software requirements**

– The following browsers are supported:

- Mozilla 1.0 or greater
- Internet Explorer Version 5.5 or 6.0 (Version 6.0 for Windows XP)

- **Communication requirements**

- TCP/IP

Restrictions:

- You require an account with administrative privileges to install the DB2 Information Center.

Procedure:

To install the DB2 Information Center using the DB2 Setup wizard:

1. Log on to the system with the account that you have defined for the DB2 Information Center installation.
2. Insert the CD into the drive. If enabled, the auto-run feature starts the IBM DB2 Setup Launchpad.
3. The DB2 Setup wizard determines the system language and launches the setup program for that language. If you want to run the setup program in a language other than English, or the setup program fails to auto-start, you can start the DB2 Setup wizard manually.

To start the DB2 Setup wizard manually:

- a. Click **Start** and select **Run**.
- b. In the **Open** field, type the following command:

```
x:\setup.exe /i 2-letter language identifier
```

where *x*: represents your CD drive, and *2-letter language identifier* represents the language in which the setup program will be run.

- c. Click **OK**.
4. The IBM DB2 Setup Launchpad opens. To proceed directly to the installation of the DB2 Information Center, click **Install Product**. Online help is available to guide you through the remaining steps. To invoke the online help, click **Help**. You can click **Cancel** at any time to end the installation.
 5. On the **Select the product you would like to install** page, click **Next**.
 6. Click **Next** on the **Welcome to the DB2 Setup wizard** page. The DB2 Setup wizard will guide you through the program setup process.
 7. To proceed with the installation, you must accept the license agreement. On the **License Agreement** page, select **I accept the terms in the license agreement** and click **Next**.
 8. Select **Install DB2 Information Center on this computer** on the **Select the installation action** page. If you want to use a response file to install the DB2 Information Center on this or other computers at a later time, select **Save your settings in a response file**. Click **Next**.
 9. Select the languages in which the DB2 Information Center will be installed on **Select the languages to install** page. Click **Next**.
 10. Configure the DB2 Information Center for incoming communication on the **Specify the DB2 Information Center port** page. Click **Next** to continue the installation.
 11. Review the installation choices you have made in the **Start copying files** page. To change any settings, click **Back**. Click **Install** to copy the DB2 Information Center files onto your computer.

You can install the DB2 Information Center using a response file. You can also use the **db2rspgn** command to generate a response file based on an existing installation.

For information on errors encountered during installation, see the `db2.log` and `db2wi.log` files located in the 'My Documents'\DB2LOG\ directory. The location of the 'My Documents' directory will depend on the settings on your computer.

The `db2wi.log` file captures the most recent DB2 installation information. The `db2.log` captures the history of DB2 product installations.

|

| **Related concepts:**

- “DB2 Information Center” on page 90
- “DB2 Information Center installation scenarios” on page 91

|

| **Related tasks:**

- “Installing a DB2 product using a response file (Windows)” in the *Installation and Configuration Supplement*
- “Updating the DB2 Information Center installed on your computer or intranet server” on page 99
- “Displaying topics in your preferred language in the DB2 Information Center” on page 100
- “Invoking the DB2 Information Center” on page 98
- “Installing the DB2 Information Center using the DB2 Setup wizard (UNIX)” on page 94

|

| **Related reference:**

- “db2rspgn - Response File Generator Command (Windows)” in the *Command Reference*

Invoking the DB2 Information Center

|

| The DB2 Information Center gives you access to all of the information that you

| need to use DB2 products for Linux, UNIX, and Windows operating systems such

| as DB2 Universal Database, DB2 Connect, DB2 Information Integrator, and DB2

| Query Patroller.

You can invoke the DB2 Information Center from one of the following places:

- Computers on which a DB2 UDB client or server is installed
- An intranet server or local computer on which the DB2 Information Center installed
- The IBM Web site

|

| **Prerequisites:**

Before you invoke the DB2 Information Center:

- *Optional:* Configure your browser to display topics in your preferred language
- *Optional:* Configure your DB2 client to use the DB2 Information Center installed on your computer or intranet server

|

| **Procedure:**

To invoke the DB2 Information Center on a computer on which a DB2 UDB client or server is installed:

- From the Start Menu (Windows operating system): Click **Start** → **Programs** → **IBM DB2** → **Information** → **Information Center**.
- From the command line prompt:
 - For Linux and UNIX operating systems, issue the **db2icdocs** command.
 - For the Windows operating system, issue the **db2icdocs.exe** command.

To open the DB2 Information Center installed on an intranet server or local computer in a Web browser:

- Open the Web page at <http://<host-name>:<port-number>/>, where <host-name> represents the host name and <port-number> represents the port number on which the DB2 Information Center is available.

To open the DB2 Information Center on the IBM Web site in a Web browser:

- Open the Web page at publib.boulder.ibm.com/infocenter/db2help/.

Related concepts:

- “DB2 Information Center” on page 90

Related tasks:

- “Invoking contextual help from a DB2 tool” on page 107
- “Updating the DB2 Information Center installed on your computer or intranet server” on page 99
- “Invoking message help from the command line processor” on page 108
- “Invoking command help from the command line processor” on page 108
- “Invoking SQL state help from the command line processor” on page 109

Updating the DB2 Information Center installed on your computer or intranet server

The DB2 Information Center available from <http://publib.boulder.ibm.com/infocenter/db2help/> will be periodically updated with new or changed documentation. IBM may also make DB2 Information Center updates available to download and install on your computer or intranet server. Updating the DB2 Information Center does not update DB2 client or server products.

Prerequisites:

You must have access to a computer that is connected to the Internet.

Procedure:

To update the DB2 Information Center installed on your computer or intranet server:

1. Open the DB2 Information Center hosted on the IBM Web site at: <http://publib.boulder.ibm.com/infocenter/db2help/>
2. In the Downloads section of the welcome page under the Service and Support heading, click the **DB2 Universal Database documentation** link.
3. Determine if the version of your DB2 Information Center is out of date by comparing the latest refreshed documentation image level to the documentation level you have installed. The documentation level you have installed is listed on the DB2 Information Center welcome page.
4. If a more recent version of the DB2 Information Center is available, download the latest refreshed *DB2 Information Center* image applicable to your operating system.
5. To install the refreshed *DB2 Information Center* image, follow the instructions provided on the Web page.

Related concepts:

- “DB2 Information Center installation scenarios” on page 91

Related tasks:

- “Invoking the DB2 Information Center” on page 98
- “Installing the DB2 Information Center using the DB2 Setup wizard (UNIX)” on page 94
- “Installing the DB2 Information Center using the DB2 Setup wizard (Windows)” on page 96

Displaying topics in your preferred language in the DB2 Information Center

The DB2 Information Center attempts to display topics in the language specified in your browser preferences. If a topic has not been translated into your preferred language, the DB2 Information Center displays the topic in English.

Procedure:

To display topics in your preferred language in the Internet Explorer browser:

1. In Internet Explorer, click the **Tools** → **Internet Options** → **Languages...** button. The Language Preferences window opens.
2. Ensure your preferred language is specified as the first entry in the list of languages.
 - To add a new language to the list, click the **Add...** button.

Note: Adding a language does not guarantee that the computer has the fonts required to display the topics in the preferred language.

- To move a language to the top of the list, select the language and click the **Move Up** button until the language is first in the list of languages.
3. Refresh the page to display the DB2 Information Center in your preferred language.

To display topics in your preferred language in the Mozilla browser:

1. In Mozilla, select the **Edit** → **Preferences** → **Languages** button. The Languages panel is displayed in the Preferences window.
2. Ensure your preferred language is specified as the first entry in the list of languages.
 - To add a new language to the list, click the **Add...** button to select a language from the Add Languages window.
 - To move a language to the top of the list, select the language and click the **Move Up** button until the language is first in the list of languages.
3. Refresh the page to display the DB2 Information Center in your preferred language.

Related concepts:

- “DB2 Information Center” on page 90

DB2 PDF and printed documentation

The following tables provide official book names, form numbers, and PDF file names. To order hardcopy books, you must know the official book name. To print a PDF file, you must know the PDF file name.

The DB2 documentation is categorized by the following headings:

- Core DB2 information
- Administration information
- Application development information
- Business intelligence information
- DB2 Connect information
- Getting started information
- Tutorial information
- Optional component information
- Release notes

The following tables describe, for each book in the DB2 library, the information needed to order the hard copy, or to print or view the PDF for that book. A full description of each of the books in the DB2 library is available from the IBM Publications Center at www.ibm.com/shop/publications/order

Core DB2 information

The information in these books is fundamental to all DB2 users; you will find this information useful whether you are a programmer, a database administrator, or someone who works with DB2 Connect, DB2 Warehouse Manager, or other DB2 products.

Table 9. Core DB2 information

Name	Form Number	PDF File Name
<i>IBM DB2 Universal Database Command Reference</i>	SC09-4828	db2n0x81
<i>IBM DB2 Universal Database Glossary</i>	No form number	db2t0x81
<i>IBM DB2 Universal Database Message Reference, Volume 1</i>	GC09-4840, not available in hardcopy	db2m1x81
<i>IBM DB2 Universal Database Message Reference, Volume 2</i>	GC09-4841, not available in hardcopy	db2m2x81
<i>IBM DB2 Universal Database What's New</i>	SC09-4848	db2q0x81

Administration information

The information in these books covers those topics required to effectively design, implement, and maintain DB2 databases, data warehouses, and federated systems.

Table 10. Administration information

Name	Form number	PDF file name
<i>IBM DB2 Universal Database Administration Guide: Planning</i>	SC09-4822	db2d1x81

Table 10. Administration information (continued)

Name	Form number	PDF file name
<i>IBM DB2 Universal Database Administration Guide: Implementation</i>	SC09-4820	db2d2x81
<i>IBM DB2 Universal Database Administration Guide: Performance</i>	SC09-4821	db2d3x81
<i>IBM DB2 Universal Database Administrative API Reference</i>	SC09-4824	db2b0x81
<i>IBM DB2 Universal Database Data Movement Utilities Guide and Reference</i>	SC09-4830	db2dmx81
<i>IBM DB2 Universal Database Data Recovery and High Availability Guide and Reference</i>	SC09-4831	db2hax81
<i>IBM DB2 Universal Database Data Warehouse Center Administration Guide</i>	SC27-1123	db2ddx81
<i>IBM DB2 Universal Database SQL Reference, Volume 1</i>	SC09-4844	db2s1x81
<i>IBM DB2 Universal Database SQL Reference, Volume 2</i>	SC09-4845	db2s2x81
<i>IBM DB2 Universal Database System Monitor Guide and Reference</i>	SC09-4847	db2f0x81

Application development information

The information in these books is of special interest to application developers or programmers working with DB2 Universal Database (DB2 UDB). You will find information about supported languages and compilers, as well as the documentation required to access DB2 UDB using the various supported programming interfaces, such as embedded SQL, ODBC, JDBC, SQLJ, and CLI. If you are using the DB2 Information Center, you can also access HTML versions of the source code for the sample programs.

Table 11. Application development information

Name	Form number	PDF file name
<i>IBM DB2 Universal Database Application Development Guide: Building and Running Applications</i>	SC09-4825	db2axx81
<i>IBM DB2 Universal Database Application Development Guide: Programming Client Applications</i>	SC09-4826	db2a1x81
<i>IBM DB2 Universal Database Application Development Guide: Programming Server Applications</i>	SC09-4827	db2a2x81
<i>IBM DB2 Universal Database Call Level Interface Guide and Reference, Volume 1</i>	SC09-4849	db2l1x81

Table 11. Application development information (continued)

Name	Form number	PDF file name
<i>IBM DB2 Universal Database Call Level Interface Guide and Reference, Volume 2</i>	SC09-4850	db2l2x81
<i>IBM DB2 Universal Database Data Warehouse Center Application Integration Guide</i>	SC27-1124	db2adx81
<i>IBM DB2 XML Extender Administration and Programming</i>	SC27-1234	db2sxx81

Business intelligence information

The information in these books describes how to use components that enhance the data warehousing and analytical capabilities of DB2 Universal Database.

Table 12. Business intelligence information

Name	Form number	PDF file name
<i>IBM DB2 Warehouse Manager Standard Edition Information Catalog Center Administration Guide</i>	SC27-1125	db2dix81
<i>IBM DB2 Warehouse Manager Standard Edition Installation Guide</i>	GC27-1122	db2idx81
<i>IBM DB2 Warehouse Manager Standard Edition Managing ETI Solution Conversion Programs with DB2 Warehouse Manager</i>	SC18-7727	iwhe1mstx80

DB2 Connect information

The information in this category describes how to access data on mainframe and midrange servers using DB2 Connect Enterprise Edition or DB2 Connect Personal Edition.

Table 13. DB2 Connect information

Name	Form number	PDF file name
<i>IBM Connectivity Supplement</i>	No form number	db2h1x81
<i>IBM DB2 Connect Quick Beginnings for DB2 Connect Enterprise Edition</i>	GC09-4833	db2c6x81
<i>IBM DB2 Connect Quick Beginnings for DB2 Connect Personal Edition</i>	GC09-4834	db2c1x81
<i>IBM DB2 Connect User's Guide</i>	SC09-4835	db2c0x81

Getting started information

The information in this category is useful when you are installing and configuring servers, clients, and other DB2 products.

Table 14. Getting started information

Name	Form number	PDF file name
IBM DB2 Universal Database Quick Beginnings for DB2 Clients	GC09-4832, not available in hardcopy	db2itx81
IBM DB2 Universal Database Quick Beginnings for DB2 Servers	GC09-4836	db2isx81
IBM DB2 Universal Database Quick Beginnings for DB2 Personal Edition	GC09-4838	db2i1x81
IBM DB2 Universal Database Installation and Configuration Supplement	GC09-4837, not available in hardcopy	db2iyx81
IBM DB2 Universal Database Quick Beginnings for DB2 Data Links Manager	GC09-4829	db2z6x81

Tutorial information

Tutorial information introduces DB2 features and teaches how to perform various tasks.

Table 15. Tutorial information

Name	Form number	PDF file name
Business Intelligence Tutorial: Introduction to the Data Warehouse	No form number	db2tux81
Business Intelligence Tutorial: Extended Lessons in Data Warehousing	No form number	db2tax81
Information Catalog Center Tutorial	No form number	db2aix81
Video Central for e-business Tutorial	No form number	db2twx81
Visual Explain Tutorial	No form number	db2tvx81

Optional component information

The information in this category describes how to work with optional DB2 components.

Table 16. Optional component information

Name	Form number	PDF file name
IBM DB2 Cube Views Guide and Reference	SC18-7298	db2aax81
IBM DB2 Query Patroller Guide: Installation, Administration and Usage Guide	GC09-7658	db2dwx81
IBM DB2 Spatial Extender and Geodetic Extender User's Guide and Reference	SC27-1226	db2sbx81

Table 16. Optional component information (continued)

Name	Form number	PDF file name
IBM DB2 Universal Database Data Links Manager Administration Guide and Reference	SC27-1221	db2z0x82
DB2 Net Search Extender Administration and User's Guide	SH12-6740	N/A

Note: HTML for this document is *not* installed from the HTML documentation CD.

Release notes

The release notes provide additional information specific to your product's release and FixPak level. The release notes also provide summaries of the documentation updates incorporated in each release, update, and FixPak.

Table 17. Release notes

Name	Form number	PDF file name
DB2 Release Notes	See note.	See note.
DB2 Installation Notes	Available on product CD-ROM only.	Not available.

Note: The Release Notes are available in:

- XHTML and Text format, on the product CDs
- PDF format, on the PDF Documentation CD

In addition the portions of the Release Notes that discuss *Known Problems and Workarounds* and *Incompatibilities Between Releases* also appear in the DB2 Information Center.

To view the Release Notes in text format on UNIX-based platforms, see the Release.Notes file. This file is located in the DB2DIR/Readme/%L directory, where %L represents the locale name and DB2DIR represents:

- For AIX operating systems: /usr/opt/db2_08_01
- For all other UNIX-based operating systems: /opt/IBM/db2/V8.1

Related concepts:

- "DB2 documentation and help" on page 89

Related tasks:

- "Printing DB2 books from PDF files" on page 106
- "Ordering printed DB2 books" on page 106
- "Invoking contextual help from a DB2 tool" on page 107

Printing DB2 books from PDF files

You can print DB2 books from the PDF files on the *DB2 PDF Documentation* CD. Using Adobe Acrobat Reader, you can print either the entire book or a specific range of pages.

Prerequisites:

Ensure that you have Adobe Acrobat Reader installed. If you need to install Adobe Acrobat Reader, it is available from the Adobe Web site at www.adobe.com

Procedure:

To print a DB2 book from a PDF file:

1. Insert the *DB2 PDF Documentation* CD. On UNIX operating systems, mount the DB2 PDF Documentation CD. Refer to your *Quick Beginnings* book for details on how to mount a CD on UNIX operating systems.
2. Open `index.htm`. The file opens in a browser window.
3. Click on the title of the PDF you want to see. The PDF will open in Acrobat Reader.
4. Select **File** → **Print** to print any portions of the book that you want.

Related concepts:

- “DB2 Information Center” on page 90

Related tasks:

- “Mounting the CD-ROM (AIX)” in the *Quick Beginnings for DB2 Servers*
- “Mounting the CD-ROM (HP-UX)” in the *Quick Beginnings for DB2 Servers*
- “Mounting the CD-ROM (Linux)” in the *Quick Beginnings for DB2 Servers*
- “Ordering printed DB2 books” on page 106
- “Mounting the CD-ROM (Solaris Operating Environment)” in the *Quick Beginnings for DB2 Servers*

Related reference:

- “DB2 PDF and printed documentation” on page 101

Ordering printed DB2 books

If you prefer to use hardcopy books, you can order them in one of three ways.

Procedure:

Printed books can be ordered in some countries or regions. Check the IBM Publications website for your country or region to see if this service is available in your country or region. When the publications are available for ordering, you can:

- Contact your IBM authorized dealer or marketing representative. To find a local IBM representative, check the IBM Worldwide Directory of Contacts at www.ibm.com/planetwide
- Phone 1-800-879-2755 in the United States or 1-800-IBM-4YOU in Canada.

- Visit the IBM Publications Center at <http://www.ibm.com/shop/publications/order>. The ability to order books from the IBM Publications Center may not be available in all countries.

At the time the DB2 product becomes available, the printed books are the same as those that are available in PDF format on the *DB2 PDF Documentation CD*. Content in the printed books that appears in the *DB2 Information Center CD* is also the same. However, there is some additional content available in DB2 Information Center CD that does not appear anywhere in the PDF books (for example, SQL Administration routines and HTML samples). Not all books available on the DB2 PDF Documentation CD are available for ordering in hardcopy.

Note: The DB2 Information Center is updated more frequently than either the PDF or the hardcopy books; install documentation updates as they become available or refer to the DB2 Information Center at <http://publib.boulder.ibm.com/infocenter/db2help/> to get the most current information.

Related tasks:

- “Printing DB2 books from PDF files” on page 106

Related reference:

- “DB2 PDF and printed documentation” on page 101

Invoking contextual help from a DB2 tool

Contextual help provides information about the tasks or controls that are associated with a particular window, notebook, wizard, or advisor. Contextual help is available from DB2 administration and development tools that have graphical user interfaces. There are two types of contextual help:

- Help accessed through the **Help** button that is located on each window or notebook
- Infopops, which are pop-up information windows displayed when the mouse cursor is placed over a field or control, or when a field or control is selected in a window, notebook, wizard, or advisor and F1 is pressed.

The **Help** button gives you access to overview, prerequisite, and task information. The infopops describe the individual fields and controls.

Procedure:

To invoke contextual help:

- For window and notebook help, start one of the DB2 tools, then open any window or notebook. Click the **Help** button at the bottom right corner of the window or notebook to invoke the contextual help.

You can also access the contextual help from the **Help** menu item at the top of each of the DB2 tools centers.

Within wizards and advisors, click on the Task Overview link on the first page to view contextual help.

- For infopop help about individual controls on a window or notebook, click the control, then click **F1**. Pop-up information containing details about the control is displayed in a yellow window.

Note: To display infopops simply by holding the mouse cursor over a field or control, select the **Automatically display infopops** check box on the **Documentation** page of the Tool Settings notebook.

Similar to infopops, diagnosis pop-up information is another form of context-sensitive help; they contain data entry rules. Diagnosis pop-up information is displayed in a purple window that appears when data that is not valid or that is insufficient is entered. Diagnosis pop-up information can appear for:

- Compulsory fields.
- Fields whose data follows a precise format, such as a date field.

Related tasks:

- “Invoking the DB2 Information Center” on page 98
- “Invoking message help from the command line processor” on page 108
- “Invoking command help from the command line processor” on page 108
- “Invoking SQL state help from the command line processor” on page 109
- “How to use the DB2 UDB help: Common GUI help”
- “Setting up access to DB2 contextual help and documentation: Common GUI help”

Invoking message help from the command line processor

Message help describes the cause of a message and describes any action you should take in response to the error.

Procedure:

To invoke message help, open the command line processor and enter:

```
? XXXnnnnn
```

where *XXXnnnnn* represents a valid message identifier.

For example, ? SQL30081 displays help about the SQL30081 message.

Related concepts:

- “Introduction to messages” in the *Message Reference Volume 1*

Related reference:

- “db2 - Command Line Processor Invocation Command” in the *Command Reference*

Invoking command help from the command line processor

Command help explains the syntax of commands in the command line processor.

Procedure:

To invoke command help, open the command line processor and enter:

```
? command
```

where *command* represents a keyword or the entire command.

For example, `? catalog` displays help for all of the CATALOG commands, while `? catalog database` displays help only for the CATALOG DATABASE command.

Related tasks:

- “Invoking contextual help from a DB2 tool” on page 107
- “Invoking the DB2 Information Center” on page 98
- “Invoking message help from the command line processor” on page 108
- “Invoking SQL state help from the command line processor” on page 109

Related reference:

- “db2 - Command Line Processor Invocation Command” in the *Command Reference*

Invoking SQL state help from the command line processor

DB2 Universal Database returns an SQLSTATE value for conditions that could be the result of an SQL statement. SQLSTATE help explains the meanings of SQL states and SQL state class codes.

Procedure:

To invoke SQL state help, open the command line processor and enter:

```
? sqlstate or ? class code
```

where *sqlstate* represents a valid five-digit SQL state and *class code* represents the first two digits of the SQL state.

For example, `? 08003` displays help for the 08003 SQL state, and `? 08` displays help for the 08 class code.

Related tasks:

- “Invoking the DB2 Information Center” on page 98
- “Invoking message help from the command line processor” on page 108
- “Invoking command help from the command line processor” on page 108

DB2 tutorials

The DB2[®] tutorials help you learn about various aspects of DB2 Universal Database. The tutorials provide lessons with step-by-step instructions in the areas of developing applications, tuning SQL query performance, working with data warehouses, managing metadata, and developing Web services using DB2.

Before you begin:

You can view the XHTML versions of the tutorials from the Information Center at <http://publib.boulder.ibm.com/infocenter/db2help/>.

Some tutorial lessons use sample data or code. See each tutorial for a description of any prerequisites for its specific tasks.

DB2 Universal Database tutorials:

Click on a tutorial title in the following list to view that tutorial.

Business Intelligence Tutorial: Introduction to the Data Warehouse Center

Perform introductory data warehousing tasks using the Data Warehouse Center.

Business Intelligence Tutorial: Extended Lessons in Data Warehousing

Perform advanced data warehousing tasks using the Data Warehouse Center.

Information Catalog Center Tutorial

Create and manage an information catalog to locate and use metadata using the Information Catalog Center.

Visual Explain Tutorial

Analyze, optimize, and tune SQL statements for better performance using Visual Explain.

DB2 troubleshooting information

A wide variety of troubleshooting and problem determination information is available to assist you in using DB2[®] products.

DB2 documentation

Troubleshooting information can be found throughout the DB2 Information Center, as well as throughout the PDF books that make up the DB2 library. You can refer to the "Support and troubleshooting" branch of the DB2 Information Center navigation tree (in the left pane of your browser window) to see a complete listing of the DB2 troubleshooting documentation.

DB2 Technical Support Web site

Refer to the DB2 Technical Support Web site if you are experiencing problems and want help finding possible causes and solutions. The Technical Support site has links to the latest DB2 publications, TechNotes, Authorized Program Analysis Reports (APARs), FixPaks and the latest listing of internal DB2 error codes, and other resources. You can search through this knowledge base to find possible solutions to your problems.

Access the DB2 Technical Support Web site at

<http://www.ibm.com/software/data/db2/udb/winos2unix/support>

DB2 Problem Determination Tutorial Series

Refer to the DB2 Problem Determination Tutorial Series Web site to find information on how to quickly identify and resolve problems you might encounter while working with DB2 products. One tutorial introduces you to the DB2 problem determination facilities and tools available, and helps you decide when to use them. Other tutorials deal with related topics, such as "Database Engine Problem Determination", "Performance Problem Determination", and "Application Problem Determination".

See the full set of DB2 problem determination tutorials on the DB2 Technical Support site at

<http://www.ibm.com/software/data/support/pdm/db2tutorials.html>

Related concepts:

- "DB2 Information Center" on page 90
- "Introduction to problem determination - DB2 Technical Support tutorial" in the *Troubleshooting Guide*

Accessibility

Accessibility features help users with physical disabilities, such as restricted mobility or limited vision, to use software products successfully. The following list specifies the major accessibility features in DB2[®] Version 8 products:

- All DB2 functionality is available using the keyboard for navigation instead of the mouse. For more information, see “Keyboard input and navigation.”
- You can customize the size and color of the fonts on DB2 user interfaces. For more information, see “Accessible display.”
- DB2 products support accessibility applications that use the Java[™] Accessibility API. For more information, see “Compatibility with assistive technologies” on page 112.
- DB2 documentation is provided in an accessible format. For more information, see “Accessible documentation” on page 112.

Keyboard input and navigation

Keyboard input

You can operate the DB2 tools using only the keyboard. You can use keys or key combinations to perform operations that can also be done using a mouse. Standard operating system keystrokes are used for standard operating system operations.

For more information about using keys or key combinations to perform operations, see Keyboard shortcuts and accelerators: Common GUI help.

Keyboard navigation

You can navigate the DB2 tools user interface using keys or key combinations.

For more information about using keys or key combinations to navigate the DB2 Tools, see Keyboard shortcuts and accelerators: Common GUI help.

Keyboard focus

In UNIX[®] operating systems, the area of the active window where your keystrokes will have an effect is highlighted.

Accessible display

The DB2 tools have features that improve accessibility for users with low vision or other visual impairments. These accessibility enhancements include support for customizable font properties.

Font settings

You can select the color, size, and font for the text in menus and dialog windows, using the Tools Settings notebook.

For more information about specifying font settings, see Changing the fonts for menus and text: Common GUI help.

Non-dependence on color

You do not need to distinguish between colors in order to use any of the functions in this product.

Compatibility with assistive technologies

The DB2 tools interfaces support the Java Accessibility API, which enables you to use screen readers and other assistive technologies with DB2 products.

Accessible documentation

Documentation for DB2 is provided in XHTML 1.0 format, which is viewable in most Web browsers. XHTML allows you to view documentation according to the display preferences set in your browser. It also allows you to use screen readers and other assistive technologies.

Syntax diagrams are provided in dotted decimal format. This format is available only if you are accessing the online documentation using a screen-reader.

Related concepts:

- “Dotted decimal syntax diagrams” on page 112

Dotted decimal syntax diagrams

Syntax diagrams are provided in dotted decimal format for users accessing the Information Center using a screen reader.

In dotted decimal format, each syntax element is written on a separate line. If two or more syntax elements are always present together (or always absent together), they can appear on the same line, because they can be considered as a single compound syntax element.

Each line starts with a dotted decimal number; for example, 3 or 3.1 or 3.1.1. To hear these numbers correctly, make sure that your screen reader is set to read out punctuation. All the syntax elements that have the same dotted decimal number (for example, all the syntax elements that have the number 3.1) are mutually exclusive alternatives. If you hear the lines 3.1 USERID and 3.1 SYSTEMID, you know that your syntax can include either USERID or SYSTEMID, but not both.

The dotted decimal numbering level denotes the level of nesting. For example, if a syntax element with dotted decimal number 3 is followed by a series of syntax elements with dotted decimal number 3.1, all the syntax elements numbered 3.1 are subordinate to the syntax element numbered 3.

Certain words and symbols are used next to the dotted decimal numbers to add information about the syntax elements. Occasionally, these words and symbols might occur at the beginning of the element itself. For ease of identification, if the word or symbol is a part of the syntax element, it is preceded by the backslash (\) character. The * symbol can be used next to a dotted decimal number to indicate that the syntax element repeats. For example, syntax element *FILE with dotted decimal number 3 is given the format 3 * FILE. Format 3* FILE indicates that syntax element FILE repeats. Format 3* * FILE indicates that syntax element * FILE repeats.

Characters such as commas, which are used to separate a string of syntax elements, are shown in the syntax just before the items they separate. These characters can appear on the same line as each item, or on a separate line with the same dotted decimal number as the relevant items. The line can also show another symbol giving information about the syntax elements. For example, the lines 5.1*, 5.1 LASTRUN, and 5.1 DELETE mean that if you use more than one of the

LASTRUN and DELETE syntax elements, the elements must be separated by a comma. If no separator is given, assume that you use a blank to separate each syntax element.

If a syntax element is preceded by the % symbol, this indicates a reference that is defined elsewhere. The string following the % symbol is the name of a syntax fragment rather than a literal. For example, the line 2.1 %OP1 means that you should refer to separate syntax fragment OP1.

The following words and symbols are used next to the dotted decimal numbers:

- ? means an optional syntax element. A dotted decimal number followed by the ? symbol indicates that all the syntax elements with a corresponding dotted decimal number, and any subordinate syntax elements, are optional. If there is only one syntax element with a dotted decimal number, the ? symbol is displayed on the same line as the syntax element, (for example 5? NOTIFY). If there is more than one syntax element with a dotted decimal number, the ? symbol is displayed on a line by itself, followed by the syntax elements that are optional. For example, if you hear the lines 5 ?, 5 NOTIFY, and 5 UPDATE, you know that syntax elements NOTIFY and UPDATE are optional; that is, you can choose one or none of them. The ? symbol is equivalent to a bypass line in a railroad diagram.
- ! means a default syntax element. A dotted decimal number followed by the ! symbol and a syntax element indicates that the syntax element is the default option for all syntax elements that share the same dotted decimal number. Only one of the syntax elements that share the same dotted decimal number can specify a ! symbol. For example, if you hear the lines 2? FILE, 2.1! (KEEP), and 2.1 (DELETE), you know that (KEEP) is the default option for the FILE keyword. In this example, if you include the FILE keyword but do not specify an option, default option KEEP will be applied. A default option also applies to the next higher dotted decimal number. In this example, if the FILE keyword is omitted, default FILE(KEEP) is used. However, if you hear the lines 2? FILE, 2.1, 2.1.1! (KEEP), and 2.1.1 (DELETE), the default option KEEP only applies to the next higher dotted decimal number, 2.1 (which does not have an associated keyword), and does not apply to 2? FILE. Nothing is used if the keyword FILE is omitted.
- * means a syntax element that can be repeated 0 or more times. A dotted decimal number followed by the * symbol indicates that this syntax element can be used zero or more times; that is, it is optional and can be repeated. For example, if you hear the line 5.1* data area, you know that you can include one data area, more than one data area, or no data area. If you hear the lines 3*, 3 HOST, and 3 STATE, you know that you can include HOST, STATE, both together, or nothing.

Notes:

1. If a dotted decimal number has an asterisk (*) next to it and there is only one item with that dotted decimal number, you can repeat that same item more than once.
 2. If a dotted decimal number has an asterisk next to it and several items have that dotted decimal number, you can use more than one item from the list, but you cannot use the items more than once each. In the previous example, you could write HOST STATE, but you could not write HOST HOST.
 3. The * symbol is equivalent to a loop-back line in a railroad syntax diagram.
- + means a syntax element that must be included one or more times. A dotted decimal number followed by the + symbol indicates that this syntax element must be included one or more times; that is, it must be included at least once

| and can be repeated. For example, if you hear the line 6.1+ data area, you must
| include at least one data area. If you hear the lines 2+, 2 HOST, and 2 STATE,
| you know that you must include HOST, STATE, or both. Similar to the * symbol,
| the + symbol can only repeat a particular item if it is the only item with that
| dotted decimal number. The + symbol, like the * symbol, is equivalent to a
| loop-back line in a railroad syntax diagram.

| **Related concepts:**

- "Accessibility" on page 111

| **Related tasks:**

- "Contents : Common help"

| **Related reference:**

- "How to read the syntax diagrams" in the *SQL Reference, Volume 2*

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