Getting Started with Cloudscape™

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Before using this information and the product it supports, be sure to read the information in Notices.

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1   Introducing Cloudscape

Welcome to Cloudscape! Cloudscape is a Java- and SQL-based object-relational database management system (ORDBMS). This chapter describes the Cloudscape products.

- Deployment Options
- Product Configuration

Deployment Options

Cloudscape can be deployed in a number of different ways:

- Embedded in a single-user Java application. Cloudscape can be practically invisible to the user, since it requires no administration and runs in the same Java virtual machine (JVM) as the application.
- Embedded in a multi-user application such as a Web server, an application server, or a shared development environment.
- Embedded in a server framework.

Product Configuration

Cloudscape allows you to build the following types of applications:

- Applications with Cloudscape as a built-in, zero-administration data manager for single-user applications. To deploy these applications, you must purchase single-user deployment licenses.

- Applications with Cloudscape as a built-in data manager for multiple-user application servers. Cloudscape includes row-level locking, but the application servers must provide their own network security. To deploy these applications, you must purchase deployment licenses for multiple users.

2 A Road Map for Brand New Users

If you are new to Cloudscape and JDBC programming, follow the steps below to get started using the product. If you're already an experienced JDBC programmer, you probably want to skip to Chapter 3, "Quick Start for Experienced JDBC Users".

1) Install a JVM of 1.1.8 or Higher.

2) Set the PATH Environment Variable for the JVM.

3) Read the Release Notes.

4) Set the DB2J_INSTALL Environment Variable.

5) Set the Class Path.

6) Set Path to Use the Tools and Startup Utilities (Windows™ or UNIX™).

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10) Read and do the lessons in *Learning Cloudscape: The Tutorial*.

1) Install a JVM of 1.1.8 or Higher

Before you use the Cloudscape software, your system must contain a JDK or a JVM.

The following table shows the JDK version required by the various Cloudscape products:

Table 2-1

Products	JDK Version Required
Cloudscape engine and ij (an SQL scripting tool)	JDK 1.1.8 or greater
Cloudscape using disk encryption, JDBC 2.0 and its extensions, or JTA	JDK 1.2 or greater
Cview (the graphical user interface)	JDK 1.2 or greater (JDK 1.3 recommended)

JIf you need to install a JDK and are working on a popular platform, see *http://java.sun.com/j2se/*. Users on other platforms should contact a JVM vendor for your specific platform.

Be sure to follow the full installation instructions, which require that you update the PATH and CLASSPATH environment variables.

2) Set the PATH Environment Variable for the JVM

You need to set your PATH environment variable so the JVM and Java applications run correctly. The PATH variable enables your operating system to find the appropriate executables from any directory. If you have more than one JDK installed, the JDK you wish to use must appear before any of the others in the PATH variable.

NOTE:　This is one of the basic steps in installing a JVM. We are including it here to make sure you don't miss it!

To set the PATH environment variable:

Add the *bin* subdirectory of the JDK directory to the beginning of the path.

For example, if the directory is *C:\JDK1.3*, add *C:\JDK1.3\bin* to the beginning of the path.

Testing Your Path

Here's a test you can run to make sure you set the path correctly.

In a command window, try the following command:

```
java -version
```

If the path is set correctly, you will see a printout telling you the version of your JVM.

---

3) Read the Release Notes

Read the Cloudscape release notes for late-breaking installation information. The release notes are found in the db2j base directory, the directory in which you installed the software.

4) Set the DB2J_INSTALL Environment Variable

The installation program asked you to choose a base directory where the software was installed; we recommended that you name it *db2j_5.0*. This document refers to that directory as the db2j base directory.

If your operating system supports it, create an environment variable called DB2J_INSTALL. Set the value of this variable to the path of the db2j base directory. For example, if you installed the product in *c:\db2j_5.0*, set DB2J_INSTALL to c:\db2j_5.0, like this:

```
set DB2J_INSTALL=c:\db2j_5.0
```

5) Set the Class Path

The JVM (compiler or interpreter) needs to know the path (operating system–specific instructions about location) of every class file needed by your application. The class path is a list of the class libraries needed by the JVM and other Java applications in order to run your program.

There are two ways to set the class path. You can set the operating system's CLASSPATH environment variable, permanently or temporarily. If you set the environment variable temporarily, you must set it each time you open a new command window. Alternately, you can set the class path with the runtime option, which means specifying the class path at the time you start your Java application and the JVM.

In most development environments, it works best to set the operating system's CLASSPATH environment variable temporarily. Cloudscape provides some scripts to help you set your class path this way; information about them appears below. Run a script every time you open a new command window.

Scripts Provided by Cloudscape

The scripts that Cloudscape provides to help you set class path are located *%DB2J_INSTALL%/bin.* Their names reflect the environment for which they should be used. For example, to set class path for an embedded environment, use *setEmbeddedCP.*

The script names end with either a *.bat* extension (for Windows environments), or and a *.ksh extension* (for UNIX environments).

If you work in a Windows or UNIX environment, executing one of these scripts (or copying and modifying it) will help you set class path. If you are running in another environment, you can modify one of the script files to create a command appropriate for your environment. If necessary, refer to the lesson on setting the class path in *Learning Cloudscape: The Tutorial* for information on modifying these scripts for your environment.

NOTE: Most users who are just getting started with Cloudscape work with it in an embedded environment. The instructions that follow assume that environment.

Run the *setEmbeddedCP* script to get started in an embedded environment. (Run either */bin/setEmbeddedCP.bat* or */bin/setEmbeddedCP.ksh*, depending on your environment.)

For example, the script *setEmbeddedCP.bat* looks like this:

```
set CLASSPATH=%DB2J_INSTALL%\lib\db2j.jar;
%DB2J_INSTALL%\lib\db2jtools.jar;
%DB2J_INSTALL%\lib\db2jcview.jar;
%DB2J_INSTALL%\lib\jh.jar;%CLASSPATH%
```

The script sets your class path to include the libraries *db2j.jar* (the primary Cloudscape library), *db2jtools.jar* (the utilities library for Cloudscape), and *db2jcview.jar* and *jh.jar* (the libraries required for Cview).

See Appendix A, "Cloudscape Libraries and Scripts: Complete Reference" for more information about the libraries referenced in the scripts.

NOTE: These scripts do not include the libraries for any sample application. To work with a sample application, follow the directions for the particular application to add the appropriate libraries to the class path.

Cloudscape Terminology

The Cloudscape documentation uses some specialized terms. They are explained here:

environment	How your application interacts with Cloudscape. Sometimes referred to as a framework. The two environments are *embedded environment* and *client/server environment*.
embedded environment	When an application starts up an instance of Cloudscape within its JVM, the application is said to run in an embedded environment. In this environment, only a single application can access a database at one time, and no network access occurs.
client/server environment	When multiple applications connect to Cloudscape over the network, they are said to run in a client/server environment. Cloudscape runs embedded in a server framework that allows multiple network connections. (The framework itself starts up an instance of Cloudscape and, strictly speaking, *it* is running in an embedded environment; the client applications, however, are not.)

About the Versions of Cloudscape Libraries

The Cloudscape libraries must be "in version" with one another. For example, you cannot use *db2j.jar* version 5.0 and *db2jtools.jar* version 5.0.1. If your versions do not match, you may get unexplained and confusing errors in your programs.

You can use Cloudscape's sysinfo tool to check the versions of Cloudscape products:

```
java com.ibm.db2j.tools.sysinfo
```

The following excerpt from near the end of sysinfo's output indicates a problem, because there are two different version numbers:

```
----------------Cloudscape Info------------------
[d:\db2j\db2j.jar] version 5.0.0 #8648
[d:\db2j\db2jtools.jar] version 5.0.1 #8688
[License Type] Development. Valid.
-------------------------------------------
```

Testing Your Class Path

Cloudscape provides a tool to help you test your class path for your environment. You run the utility like this:

```
java com.ibm.db2j.tools.sysinfo -cp embedded
```

After the required argument, the following arguments are optional:

- utils—looks for the libraries for using the Cloudscape utilities
- cview—looks for the libraries for using Cview
- sampleApp—looks for the libraries for using the sample application (tours)
- *anyClass*.class—looks for any class that you specify

The utility provides a message indicating success or failure and lists any missing libraries. For example, to test an embedded environment using the utilities:

```
java com.ibm.db2j.tools.sysinfo -cp embedded util
```

See Chapter 2 in *Learning Cloudscape: The Tutorial* for more information about setting the class path.

6) Set Path to Use the Tools and Startup Utilities (Windows™ or UNIX™)

Cloudscape tools and utilities include Cview, ij, sysinfo, and the import and export and database class utilities. The */bin* directory contains scripts for running some of the Cloudscape tools and utilities. The scripts have self-explanatory names such as *cview.bat* or *ij.ksh*. Like the class path scripts, these scripts end with either a *.bat* or *.ksh* extension, to use in either a Windows or UNIX environment.

NOTE: These scripts serve as examples to help users on all platforms get started with these tools and utilities. However, they may require modification in order to run properly even on Windows or UNIX platforms.

Add the /bin directory to your path to use shortened commands to start the Cloudscape tools.

NOTE: Users on UNIX platforms need to turn on the execute bit for these files. For example:

```
chmod +x fileName
```

For reference on these scripts, see "Scripts Provided by Cloudscape" on page A-2.

If You Have Problems Installing, Provide Information to IBM

If you encounter any problem using the installation program, make a careful note of any error messages. If possible, run the utility *com.ibm.db2j.tools.sysinfo* to display system and product configuration:

```
java com.ibm.db2j.tools.sysinfo
```

The error message and output of *sysinfo* will be used by your support representative.

7) Browse the Cloudscape Documents

The Cloudscape installation provides you with a complete documentation set. Read about the documentation in *Using the Cloudscape Documentation.*

8) Bring up Cview Against a Sample Database

/demo/databases contains a pre-built version of the Cloudscape sample database, called *toursDB*.

NOTE: Cview works best in a Java 2 environment. Use a JDK of version 1.2 or higher if available.

Start Cview from a command window that has PATH and CLASSPATH appropriately set.

UNIX

  1   Open a command window.
  2   Change directories to the */demo/databases* subdirectory of the db2j base directory.
  3   Type *cview.*
  4   Choose File->Open by Name, and type *toursDB*.
  5   Click OK.

Windows

Users in other environments can start Cview against the sample database by following these steps:

  1   Open a command window.

2 Change directories to the *\demo\databases* subdirectory of the db2j base directory.

3 Type:

```
java -ms32M -mx32M com.ibm.db2j.tools.cview toursDB
```

9) Start Programming with the Examples

- "Simple" on page 10
- "A More Complex Example: The JBMSTours Tutorial" on page 10

Simple

/demo/programs/simple contains a simple Java application, along with step-by-step instructions for compiling and running it. It illustrates basic tasks such as:

- starting Cloudscape, loading the Cloudscape JDBC driver
- running in an embedded environment
- establishing a connection
- turning off auto-commit
- creating a table
- inserting and selecting data
- disconnecting
- shutting down an Cloudscape system

In this directory, the file *demo/programs/simple/example.html* contains the instructions for compiling and running the application.

A More Complex Example: The JBMSTours Tutorial

demo/programs/tours contains a complete sample application that builds and runs against the sample database, *toursDB*. The application consists of the Java package *JBMSTours*.

Learning Cloudscape: The Tutorial takes you step-by-step through building the database and then running queries and applications against it.

You can use the pre-built version of the database as well. From Cview, you can browse its data and dictionary objects and enter queries and other SQL-J statements from its SQL window.

In addition, you can do some of the lessons as stand-alone examples. These examples include:

- storing images in the database
- creating a servlet
- creating a JDBC applet
- accessing external data through Cloudscape's Virtual Table Interface

3 Quick Start for Experienced JDBC Users

This chapter is for experienced JDBC programmers who already know the basics about how to set class path, how to run a Java program, and how to use a JDBC driver. Such programmers just want the basics.

- "Environment Quick Start" on page 3-13
- "Libraries and Class Path" on page 3-14
- "Driver" on page 3-14
- "Database Connection URL" on page 3-14

NOTE: You'll find more help on similar topics in the first chapters of the *Cloudscape Developer's Guide* and the *Cloudscape Tools and Utilities Guide*.

Environment Quick Start

Before you try to configure your system for running Cloudscape, it is useful to understand something about the different environments in which Cloudscape can run, because these environments affect the class path, driver name, and database connection URL.

Embedded Environment

When an application starts up an instance of Cloudscape within its JVM, the application is said to run in an *embedded environment*. In this environment, only a single application can access a database at one time, and no network access occurs. Loading the embedded driver starts Cloudscape.

Client/Server Environment

When multiple applications connect to Cloudscape over the network, they are said to run in a client/server environment. Cloudscape runs embedded in a server framework that allows multiple network connections. (The framework itself starts up an instance of Cloudscape and, strictly speaking, Cloudscape is running in an embedded environment; the client applications, however, are not. See "Cloudscape Terminology" on page 2-7.)

It is also possible to embed Cloudscape in any Java server framework.

Libraries and Class Path

See "Cloudscape Libraries and Scripts: Complete Reference" on page A-1 for complete reference.

Driver

- *com.ibm.db2j.jdbc.DB2jDriver*

  For embedded environments, when Cloudscape runs in the same JVM as the application

Database Connection URL

For the Cloudscape-provided driver listed above, here is the format for the database connection URL for connecting to an existing database:

- jdbc:db2j:*databaseName*;*URLAttributes*

  For embedded environments

The italicized items stand for something the user fills in:

- *databaseName*

  The name of the database you want to connect to

- *URLAttributes*

  One or more of the supported attributes of the database connection URL, such as ;*locale=ll_CC* or ;*create=true*. For more information, see the *Cloudscape Developer's Guide*.

Appendix A   Cloudscape Libraries and Scripts: Complete Reference

- "Libraries Provided by Cloudscape" on page A-1
- "Libraries Not Provided by Cloudscape" on page A-2
- "Scripts Provided by Cloudscape" on page A-2

Libraries Provided by Cloudscape

Table 1-1

Library Name and Path	Use
Engine Libraries. (Put only one in your class path.) You always need this library for embedded environments. For client/server environments, you need this library on the server only.	
db2j.jar	For embedded databases
Tools Libraries For embedded environments, you need a library in the class path to use a tool. For a client/server environment, you need a library on the client only.	
db2jtools.jar	Required for running all the Cloudscape tools (such as *ij*) except *Cview*. Also required if using import/export in *Cview*.
db2jcview.jar	Required for running *Cview*.

Table 1-1

Library Name and Path	Use
jh.jar	Required for running *Cview*'s help system (javax.help.* extensions).
The Sample Database and Application Libraries For embedded environments.	
/demo/programs/tours	Allows you to use the sample database (*toursDB*) and sample application (JBMSTours).

Libraries Not Provided by Cloudscape

Some special Cloudscape features require that you install additional libraries and place them in your class path:

- Disk encryption (see the *Cloudscape Developer's Guide*)
- LDAP or NIS+ user authentication (see the *Cloudscape Developer's Guide*)
- JTA (see the *Cloudscape Reference Manual)*
- JDBC 2.0 Extensions (see the *Cloudscape Reference Manual)*
- Cview

  If you want to use a pre-1.2 JDK (JDK 1.1.6 or higher), you will need *swingall.jar.*

Scripts Provided by Cloudscape

Cloudscape provides scripts in the */bin* directory. These scripts are generally described in "Scripts Provided by Cloudscape" on page 2-5. Each script comes in two flavors, one ending in *.bat* and one ending in *.ksh*. Here is a complete listing:

- */bin/cview*

  Starts Cview.
- */bin/ij*

  Starts ij.
- */bin/setCP*

  Puts all the Cloudscape libraries in the class path.

- */bin/setEmbeddedCP*
  Puts all the Cloudscape libraries for an embedded environment in the class path.
- */bin/sysinfo*
  Runs sysinfo.

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