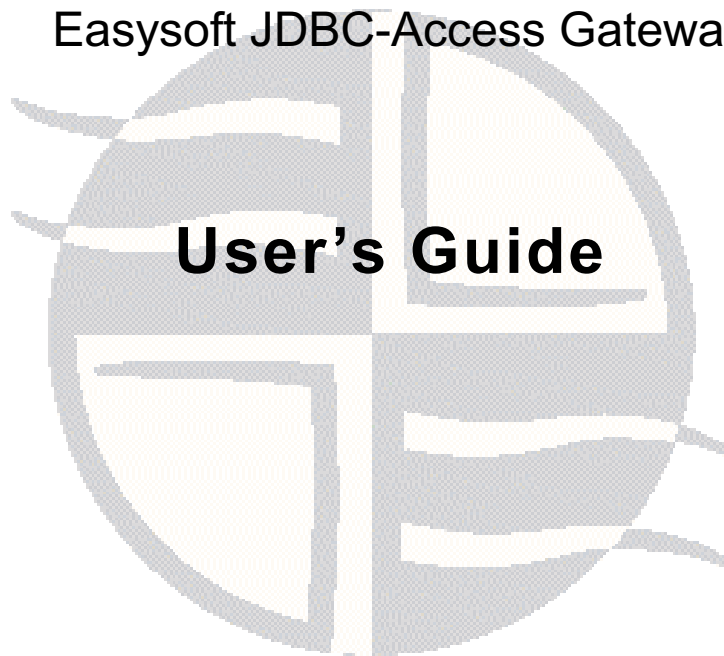


# Easysoft Data Access

Easysoft JDBC-Access Gateway



This manual documents version 1.0.n of the Easysoft JDBC-Access Gateway.

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# PREFACE

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## About this manual

This manual is intended for use by anyone who wants to install the Easysoft JDBC-Access Gateway, configure it, and then access Microsoft Access databases from Java.

---

### Chapter Guide

- **Intended Audience**
- **Notational Conventions**
- **Typographical Conventions**
- **Contents**
- **Trademarks**



## **PREFACE**

*Easysoft JDBC-Access Gateway*

---

### **Intended Audience**

The sections written for the Microsoft Windows platform require some familiarity with the use of buttons, menus, icons and text boxes. If you have any experience of Apple Macintosh computers, Microsoft Windows or the X Window System, you will have no difficulty with these sections.

---

### **Displaying the Manual**

This manual is available in the following formats:

- Portable Document Format (PDF), which can be displayed and printed by using the Adobe Reader, available free from Adobe at <http://www.adobe.com>.
- HTML.



---

## Notational Conventions

A *note box* provides additional information that may further your understanding of a particular topic in this manual:

**Note** Note boxes often highlight information that you may need to be aware of when using a particular feature.

A *platform note* provides platform-specific information for a particular procedural step:

### Linux

On Linux, you must log on as the `root` user to make many important changes.

A *caution box* provides important information that you should check and understand, prior to starting a particular procedure or reading a particular section of this manual:

### Caution!

Be sure to pay attention to these paragraphs because Caution boxes are important!

---

### Typographical Conventions

This manual uses the following typographical conventions:

- User interface components such as icon names, menu names, buttons and selections are displayed in **bold**, for example:

Click **Next** to continue.

- Commands to be typed are displayed in a `monospace` font, for example:

At the command prompt, type `admin`.

- File listings and system names (such as file names, directories and database fields) are displayed in a `monospace` font.

---

## **Contents**

### **Introduction**

Introduces the Easysoft JDBC-Access Gateway.

### **Installation**

Explains how to install the Easysoft JDBC-Access Gateway.

### **Connection**

Explains how to use the Easysoft JDBC-Access Gateway to connect to your Access database from Java.

Appendices

### **Technical Reference and Glossary**



## PREFACE

*Easysoft JDBC-Access Gateway*

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### Trademarks

Throughout this manual, *Windows* refers generically to Microsoft Windows 2000, XP, 2003, Vista, 2008 or 7, which are trademarks of the Microsoft Corporation. The X Window system is specifically excluded from this and is referred to as *The X Window System* or just *X*.

Note also that although the name UNIX is a registered trademark of The Open Group, the term has come to encompass a whole range of UNIX-like operating systems, including the free, public Linux and even the proprietary Solaris. Easysoft use Unix (note the case) as a general term covering the wide range of Open and proprietary operating systems commonly understood to be Unix ‘flavors’.

Easysoft and Easysoft Data Access are trademarks of Easysoft Limited.

# CHAPTER 1 INTRODUCTION

---

## Introducing the Easysoft JDBC-Access Gateway

The Easysoft JDBC-Access Gateway is a type 2 JDBC driver for Microsoft Access databases.

---

### Chapter Guide

- [Overview](#)
- [Product Status](#)
- [Deployment](#)



## INTRODUCTION

*Easysoft JDBC-Access Gateway*

---

### Overview

The Easysoft JDBC-Access Gateway provides JDBC access from Java applications, application servers and servlets to MDB files. If you configure your Java security policy to allow the Easysoft JDBC-Access Gateway to load its native component, the driver can also be used with Java applets.

---

### Product Status

The Easysoft JDBC-Access Gateway is currently available on Windows platforms. The most up to date list of Easysoft JDBC-Access Gateway platforms is available at:

[http://www.easysoft.com/products/data\\_access/jdbc-access-gateway/index.html](http://www.easysoft.com/products/data_access/jdbc-access-gateway/index.html)

Software problems can be reported to [support@easysoft.com](mailto:support@easysoft.com) by users who have either purchased support or registered at the Easysoft web site at <http://www.easysoft.com> and are evaluating Easysoft products.

---

## **Deployment**

Access has four components: a structure to hold data (tables), a way to manipulate that data (the Microsoft Jet Database Engine engine), an environment to create a front end for the data (Design view of forms and reports) and tools that can run the front end (Data view of forms and reports). Access data is stored in a database file, which has the extension .mdb.

The Easysoft JDBC-Access Gateway is a JDBC driver for Access that uses the Java Native Interface (JNI) to communicate with Microsoft's Access ODBC driver library. The Access ODBC driver is used to connect to the target .mdb file.

The Access ODBC driver must be installed on the machine on which you install the Easysoft JDBC-Access Gateway. Since Windows 2000, the Access ODBC driver (one of the Jet Database Engine Components) has shipped with Windows and so should be already present on your machine as part of the Windows installation.

The target .mdb file must be visible through the local file system on the Easysoft JDBC-Access Gateway machine. For example, in a folder on this machine or a mapped network drive or in a shared folder.

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# CHAPTER 2 INSTALLATION

---

## Installing the Easysoft JDBC-Access Gateway

This chapter explains how to install, license and remove the Easysoft JDBC-Access Gateway.

The installation can be carried out by anyone who has local administrator privileges on the target machine.

---

### Chapter Guide

- **Obtaining the Easysoft JDBC-Access Gateway**
- **What to Install**
- **Installing the Easysoft JDBC-Access Gateway**
- **Uninstalling the Easysoft JDBC-Access Gateway**



## INSTALLATION

*Easysoft JDBC-Access Gateway*

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### Obtaining the Easysoft JDBC-Access Gateway

There are three ways to obtain the Easysoft JDBC-Access Gateway:

- The Easysoft web site is available 24 hours a day at <http://www.easysoft.com> and lets you download product releases and documentation.

Choose **Download** from the Easysoft JDBC-Access Gateway section of the web site and then choose the platform release that you require.

If you have not already done so, you will need to register at the web site to download Easysoft software.

- The Easysoft FTP site is available 24 hours a day at <ftp://ftp.easysoft.com> and lets you download free patches, upgrades, documentation and beta releases of Easysoft products, as well as definitive releases.

Change to the `pub/jdbc-access-gateway` subdirectory and then choose the platform release that you require.

- You can order Easysoft software on CD. To do this, **contact us** by email, telephone or post.

---

## What to Install

The name of the Easysoft JDBC-Access Gateway distribution file name format is:

- `jdbc-access-gateway-x_y_z-windows.exe`

where  $x$  is the major version number,  $y$  is the minor version number and  $z$  is the build index, which is incremented when minor changes are made.

### **Note**

Select the highest release available for your platform within your licensed major version number (installing software with a different major version number requires a new Easysoft license).

## INSTALLATION

*Easysoft JDBC-Access Gateway*

---

### Installing the Easysoft JDBC-Access Gateway

- Execute the file distribution that you obtained from the sources described in "**Obtaining the Easysoft JDBC-Access Gateway**" on page 18.

Follow the on screen instructions.

### UPDATING FILES THAT ARE IN USE

To avoid rebooting your computer, the Easysoft JDBC-Access Gateway installer prompts you when files that it needs to update are in use by another application or service. This frees the locked files and allows the installation to complete without a system restart.

On Windows Vista and later, the Easysoft JDBC-Access Gateway installer uses the Restart Manager to locate the applications that are using files that need updating. These applications are displayed in the Files in Use dialog box. To avoid a system restart, choose **Automatically close applications and attempt to restart them after setup is complete**. The Easysoft JDBC-Access Gateway installer then uses the Restart Manager to try to stop and restart each application or service in the list. If possible, the Restart Manager restores applications to the same state and with the same data that they were in before it shut them down.

On earlier versions of Windows, when the Files in Use dialog is displayed, manually shut down each application in the list and then click **Retry** to avoid a system restart.

## L I C E N S I N G

The Easysoft JDBC-Access Gateway installer starts the Easysoft License Manager (documented in the [Licensing Guide](#)).

The following types of license are available:

- A *free time-limited trial license*, which gives you free and unrestricted use of the product for a limited period (usually 14 days).
- A *full license*, if you have purchased the product. On purchasing the product you are given an authorization code, which you use to obtain a license.

1. Enter your contact details.

You **must** complete the **Name**, **E-Mail Address** and **Company** fields.

The **E-Mail Address** value **must** be the email address that you used when you registered on the Easysoft web site.

The **Telephone** and **Facsimile** fields are important if you require Easysoft to contact you by those methods.

2. Click **Request License**.

You are asked for a license type.

## INSTALLATION

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3. For a trial license, click **Time Limited Trial** and then click **Next**.

The License Manager asks what software you are licensing:

Select **Easysoft JDBC-Access Gateway** from the drop-down list and then click **Next**.

– OR –

If you have obtained an authorization code for a purchased license, select **Non-expiring License** and then click **Next**.

The License Manager requests an authorization code.

4. Enter the authorization code and then click **Next**.

The License Manager displays a summary of your details and allows you to choose the method of applying for your license.

5. Choose **On-line Request** if your machine is connected to the internet and can make outgoing connections to port 8884.

The License Manager then transmits a network packet to the license server at Easysoft. The whole process is automatic and you can proceed to **step 6 on page 23**.

<p><b>Note</b> Only your license request identifier and contact details as they are displayed in the main License Manager screen are sent to Easysoft.</p>
--

The remaining three options (**Email Request**, **Print Request** and **View Request**) are all ways to obtain a license if your machine is offline (i.e. does not have a connection to the internet).

Each of these methods involves providing Easysoft with information including your machine number (a number unique to your machine) and then waiting to receive your license key.

Instead of emailing, faxing or telephoning your details to Easysoft, you can enter them directly at Easysoft's web site and your license key will be emailed to you automatically.

To use this method, click **View Request**, and then visit:

- [http://www.easysoft.com/support/licensing/trial\\_license.html](http://www.easysoft.com/support/licensing/trial_license.html)  
(trial licenses)
- [http://www.easysoft.com/support/licensing/full\\_license.html](http://www.easysoft.com/support/licensing/full_license.html)  
(purchased licenses)

In the Licensing page, enter your machine number (and authorization code for purchased license), click **Submit** and your license key will be emailed to you.

When you receive the license key, you can activate it either by double-clicking the email attachment or by clicking **Enter License** on the License Manager main screen and pasting the license key into the dialog box.

A message is displayed, telling you how many licenses have been added.

<p><b>Note</b> If you use the <b>Email Request</b> option, the license key is emailed to the email address as displayed on the License Manager main screen, not the <code>from:</code> address of your email.</p>
---

6. Click **Finish** in the License Manager.

The installation is complete.

A new **All Programs>Easysoft>JDBC-Access Gateway** program group is added.



## INSTALLATION

*Easysoft JDBC-Access Gateway*

### REPAIRING THE EASYSOFT JDBC-ACCESS GATEWAY INSTALLATION

The installer can repair a broken Easysoft JDBC-Access Gateway installation. For example, you can use the installer to restore missing Easysoft JDBC-Access Gateway files or registry keys.

In Windows Vista and later versions of Windows:

1. In **Control Panel**, open **Programs and Features**.
2. Right-click **Easysoft JDBC-Access Gateway**, and then click **Repair**.

In earlier versions of Windows:

1. In **Control Panel**, open **Add or Remove Programs**.
2. Select **Easysoft JDBC-Access Gateway** and click **Change/Remove**.



---

## **Uninstalling the Easysoft JDBC-Access Gateway**

This section explains how to remove the Easysoft JDBC-Access Gateway from your machine.

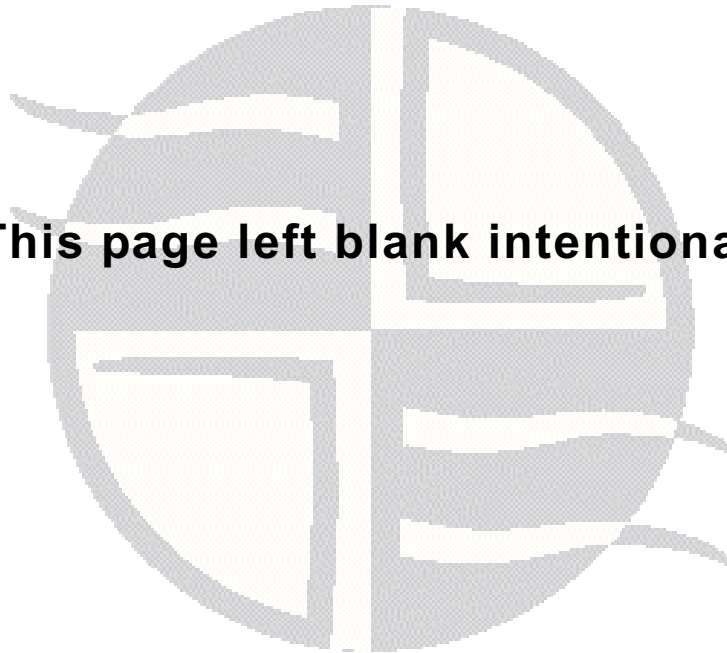
### **REMOVING THE EASYSOFT JDBC-ACCESS GATEWAY**

1. Do one of the following:
  - In Windows Vista and later, in **Control Panel**, open **Programs**, and then open **Programs and Features**.
  - In earlier versions of Windows, in **Control Panel** open **Add or Remove Programs**.
2. Do one of the following:
  - In Windows Vista and later, double-click **Easysoft JDBC-Access Gateway**.
  - In earlier versions of Windows, select **Easysoft JDBC-Access Gateway** and click **Change/Remove**.

Any licenses you obtained for the Easysoft JDBC-Access Gateway and other Easysoft products are held in the Windows registry.

Note that your licenses are not removed when you uninstall, so the product does not need to be relicensed if you reinstall or upgrade.

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# CHAPTER 3 CONNECTION

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## Connecting to Access

Before connecting to your Access database from Java, you must have successfully installed the Easysoft JDBC-Access Gateway.

For Easysoft JDBC-Access Gateway installation instructions, see **"Installation" on page 17**.

---

### Chapter Guide

- **Connecting to your Access Database**

## CONNECTION

*Easysoft JDBC-Access Gateway*

---

### Connecting to your Access Database

#### REGISTERING THE EASYSOFT JDBC-ACCESS GATEWAY

To register the Easysoft JDBC-Access Gateway JDBC driver, your Java application must specify the class `easysoft.sql.esMdbDriver`. For example:

```
Class.forName("easysoft.sql.esMdbDriver");
```

#### THE CONNECTION URL

When the Easysoft JDBC-Access Gateway JDBC driver is registered, you can establish a connection by using a connection URL and the `getConnection` method of the `DriverManager` class. For example:

```
String connectionUrl =  
"jdbc:easysoft:mdb?DBQ=C:/Users/Public/Northwind.mdb";  
Connection con = DriverManager.getConnection(connectionUrl);
```

To establish a connection with the Easysoft JDBC-Access Gateway, use a connection URL of the form:

```
jdbc:easysoft:mdb?DBQ=<path>[;<odbc-driver-attribute>=<value>]
```

where:

<path> is the path to the Access database (.mdb).

<odbc-driver-attribute> is an Access ODBC driver attribute.

You can retrieve the available Access ODBC driver attributes along with a description for each attribute by using the `getPropertyInfo` method of the `Driver` class. For example:

```
public static void driverProperties() {

    // Replace the DBQ value with the path to your Access database.
    String connectionUrl = "jdbc:easysoft:mdb?" +
        "DBQ=C:/Northwind/BlankII.mdb";

    Driver driver = null;
    DriverPropertyInfo props[] = null;

    try {
        Class.forName("easysoft.sql.esMdbDriver");
        driver = DriverManager.getDriver(connectionUrl);
        props = driver.getPropertyInfo (connectionUrl, new
Properties());

        System.out.println ("JDBC URL Attributes");

        for (int i = 0; i < props.length; i++) {
            System.out.print ("\t" + props[i].name);
            System.out.print (" = ");
            System.out.print (props[i].value);
            System.out.print (" : ");
            System.out.println (props[i].description + ".");
        }
    }
}
```

## CONNECTION

*Easysoft JDBC-Access Gateway*

```
    }  
  }  
  
  catch (Exception e) {  
    e.printStackTrace();  
  }  
}
```

### ***Example Connection URLs***

Opens an Access database and enables Jet 4.0 features:

```
jdbc:easysoft:mdb?DBQ=C:/Users/Public/Northwind.mdb;ExtendedAnsiSQL=True
```

Opens an an Access database that is stored in a shared folder:

```
jdbc:easysoft:mdb?DBQ=//mymachine/myshare/Sales.mdb
```

Opens a password-protected Access database from a mapped network drive:

```
jdbc:easysoft:mdb?DBQ=Z:/Orgdata.mdb;PWD=p455w0rd
```

# APPENDIX A TECHNICAL REFERENCE

---

## Technical Reference for the Easysoft JDBC-Access Gateway

This section contains extra information relating to the deployment of the Easysoft JDBC-Access Gateway.

---

### Appendix Guide

- [Java Runtime Environment \(JRE\) Requirements](#)
- [Setting the Class Path](#)
- [Data Types](#)
- [Cursors](#)
- [Unicode](#)
- [Tracing](#)

---

### Java Runtime Environment (JRE) Requirements

The Easysoft JDBC-Access Gateway requires the JRE 1.6.0 or later.

To check whether you have the JRE installed on your machine and that your JRE version is one the Easysoft JDBC-Access Gateway supports, open a Command Prompt window, and type `java -version`. For example:

```
c:\>java -version
```

```
java version "1.7.0"
```

```
Java(TM) SE Runtime Environment (build 1.7.0-b147)
```

```
Java HotSpot(TM) Client VM (build 21.0-b17, mixed mode, sharing)
```

If the reported JRE version is `1.5.n` or earlier (or you get the error 'java' is not recognized as an internal or external command, operable program or batch file.), you need to obtain a JRE for your machine.

If the output produced by running `java -version` contains `64-Bit Server VM`, you have a 64-bit JRE. The Easysoft JDBC-Access Gateway requires a 32-bit JRE; a 32-bit JRE (x86) will install and function correctly on a 64-bit machine. (The Easysoft JDBC-Access Gateway uses the ODBC Desktop Database Drivers, which is a 32-bit library. There is no 64-bit version of this library. The native component of the Easysoft JDBC-Access Gateway and the JRE must also be 32-bit as you cannot mix 32-bit and 64-bit libraries.)

Windows versions of the JRE are available to download from:

<http://www.oracle.com/technetwork/java/javase/downloads/index.html>



The Java Development Kit (JDK), which includes the JRE, is also available to download from this web page.

**Note** However, unless you are going to develop a Java application to run against the Easysoft JDBC-Access Gateway, you only need to download the JRE package.

---

### Setting the Class Path

The Easysoft JDBC-Access Gateway Java classes are contained in:

*easysoft\_installation\_folder*\Libs\esmdb.jar

The default location for *easysoft\_installation\_folder* is *drive*:\Program Files\Easysoft Limited\Easysoft JDBC-Access Gateway.

Because esmdb.jar is not part of the Java platform, you need to tell Java where to find the Easysoft JDBC-Access Gateway classes. To do this, you may have to:

- Include *easysoft\_installation\_folder*\Libs\esmdb.jar in the CLASSPATH environment variable value.
- Include *easysoft\_installation\_folder*\Libs\esmdb.jar in the `java -classpath` option value.
- Copy esmdb.jar to a folder that is reserved for third party .jar files by your application.

---

## Data Types

The Easysoft JDBC-Access Gateway supports the following Jet SQL data types and data type synonyms:

Data type	Synonym
BIT	LOGICAL LOGICAL1 YESNO
TINYINT	INTEGER1 BYTE
MONEY	CURRENCY
DATETIME	DATE TIME
REAL	SINGLE FLOAT4 IEEESINGLE
FLOAT	DOUBLE FLOAT8 IEEEDOUBLE NUMBER
SMALLINT	SHORT INTEGER2
INTEGER	LONG INT INTEGER4

## TECHNICAL REFERENCE

*Easysoft JDBC-Access Gateway*

<b>Data type</b>	<b>Synonym</b>
DECIMAL	NUMERIC DEC
TEXT	LONGTEXT LONGCHAR MEMO NOTE NTEXT
CHAR	CHARACTER STRING VARCHAR CHARACTER VARYING NCHAR NATIONAL CHARACTER NATIONAL CHAR NATIONAL CHARACTER VARYING NATIONAL CHAR VARYING

**Figure 1: Supported Jet SQL data types and synonyms.**

**NOTES**

- In the Microsoft Access, a Table Design View field type may have a different name to the Jet SQL data type it corresponds with. For example, the Table Design View field type for the MONEY data type is CURRENCY.
- To create columns with the data type TINYINT or DECIMAL or the synonym DEC, NTEXT, CHARACTER, CHARACTER VARYING, NCHAR, NATIONAL CHARACTER, NATIONAL CHAR, NATIONAL CHARACTER VARYING, NATIONAL CHAR VARYING, you need to set the ExtendedAnsiSQL Access ODBC driver option to 1. For example:

```
String connectionUrl =  
"jdbc:easysoft:mdb?DBQ=C:/Users/Public/Northwin  
d.mdb;ExtendedAnsiSQL=1";
```

Otherwise, your CREATE TABLE or ALTER TABLE statement will fail with the error [Microsoft] [ODBC Microsoft Access Driver] Syntax error in field definition.

## TECHNICAL REFERENCE

*Easysoft JDBC-Access Gateway*

- You cannot use literal GUIDs in SQL queries. Literal GUIDs are needed to filter records by values contained in UNIQUEIDENTIFIER or GUID columns. The Access ODBC driver does not support the Access SQL syntax for specifying GUID literals (`{GUID {nnnnnnnnn-nnnn-nnnn-nnnn-nnnnnnnnnnn}}`). For example, this query:

```
SELECT * from MyTable where  
MyUniqueIdentifierCol = {guid {019CE4C0-D57C-  
68A6-0000-000000000109}};
```

fails with the error:

```
[Microsoft] [ODBC Microsoft Access Driver] Syntax  
error (missing operator) in query expression:
```

---

## Cursors

The set of rows returned by a SQL query consists of all the rows that satisfy the conditions of that query, and is known as the result set. Applications cannot always work effectively with the entire result set as a unit. These applications need a mechanism to work with one row or a small block of rows at a time. Cursors are an extension to result sets that provide that mechanism.

The Easysoft JDBC-Access Gateway supports the following cursor types:

Cursor type	Description
TYPE_FORWARD_ONLY	The result set is not scrollable. The cursor moves only forward, from before the first row to after the last row. This is the default behaviour for a result set.
TYPE_SCROLL_INSENSITIVE	The result set is scrollable but not sensitive to changes to the data that underlies the result set; its cursor can move both forward and backward relative to the current position, and it can move to an absolute position.

Figure 2: Supported cursor types.

**TYPE\_FORWARD\_ONLY EXAMPLE**

```
try {
    // Establish the connection.
    Class.forName("easysoft.sql.esMdbDriver");
    Connection con =
DriverManager.getConnection("jdbc:easysoft:mdb?DBQ=C:/Users/Public
/Northwind.mdb");

    // Use a forward only cursor to move forwards through a result
    // set. This is the default cursor type, and so the following
    // line could be replaced with
    // Statement stmt = con.createStatement()

    Statement stmt =
con.createStatement(ResultSet.TYPE_FORWARD_ONLY,
ResultSet.CONCUR_READ_ONLY);

    ResultSet rs = stmt.executeQuery("SELECT SupplierID,
CompanyName FROM Suppliers");

    // Move forwards through the result set.
    while (rs.previous()) {
        int id = rs.getInt("SupplierID");
        String supplier = rs.getString("CompanyName");
        System.out.println(id + "\t" + supplier);
    }
}
```



```
// Handle any errors that may have occurred.
catch (Exception e) {
    e.printStackTrace();
}
```

### TYPE\_SCROLL\_INSENSITIVE EXAMPLE

```
try {
    // Establish the connection.
    Class.forName("easysoft.sql.esMdbDriver");
    Connection con =
    DriverManager.getConnection("jdbc:easysoft:mdb?DBQ=C:/Users/Public
    /Northwind.mdb");

    // Use a scrollable cursor to move backwards through a result
    // set.
    Statement stmt =
    con.createStatement(ResultSet.TYPE_SCROLL_INSENSITIVE,
    ResultSet.CONCUR_READ_ONLY);
    ResultSet srs = stmt.executeQuery("SELECT SupplierID,
    CompanyName FROM Suppliers");

    // Move the cursor to the last record in the result set.
    srs.last();
}
```

```
int id = srs.getInt("SupplierID");
String supplier = srs.getString("CompanyName");

System.out.println(id + "\t" + supplier);

// Move backwards through the remaining records.
while (srs.previous()) {
    id = srs.getInt("SupplierID");
    supplier = srs.getString("CompanyName");
    System.out.println(id + "\t" + supplier);
}

// Handle any errors that may have occurred.
catch (Exception e) {
    e.printStackTrace();
}
```

---

## Unicode

### BACKGROUND

Unicode is a computing industry standard designed to consistently and uniquely encode characters used in written languages throughout the world.

Java's native character encoding is Unicode. The primitive type `char` is a single Unicode character. The `String` class is a collection of characters.

The JDBC data types used to express character data, (`CHAR`, `VARCHAR` and `LONGVARCHAR`) can all be represented as a Java `String`. (The Easysoft JDBC-Access Gateway maps the Access `TEXT` and `CHAR` data types to the `VARCHAR` and `CHAR` JDBC data types.)

Unicode support was added in Jet version 4.0. A Jet version 4.0 `.mdb` file uses the Unicode encoding to store character data in `TEXT` and `CHAR` columns.

The Access ODBC driver supports Unicode in the form of Unicode data types and Unicode versions of the ODBC API.

### UNICODE AND THE EASYSOFT JDBC-ACCESS GATEWAY

The Easysoft JDBC-Access Gateway allows Unicode data to be specified in:

- The JDBC connection URL. For example:

```
String connectionUrl =  
"jdbc:easysoft:mdb?DBQ=C:/Users/Public/UnicodeCharsDB.mdb";  
Connection con = DriverManager.getConnection(connectionUrl);
```

- SQL statements. For example:

```
Connection con = null;  
Statement stmt = null;  
ResultSet rs = null;  
  
try {  
    Class.forName("easysoft.sql.esMdbDriver");  
    con = DriverManager.getConnection(connectionUrl);  
  
    String SQL = "INSERT INTO UnicodeCharsTable(UnicodeCharsColumn)  
VALUES ('UnicodeChars')";  
    stmt = con.createStatement();  
    stmt.execute(SQL);  
  
    SQL = "SELECT UnicodeCharsColumn FROM UnicodeCharsTable";
```

```
rs = stmt.executeQuery(SQL);

while (rs.next()) {
    System.out.println(rs.getString(1));
}
}
```

- Metadata (table names and so on). For example:

```
Connection con = null;
DatabaseMetaData dm = null;
ResultSet rs = null;

try {
    Class.forName("easysoft.sql.esMdbDriver");
    con = DriverManager.getConnection(connectionUrl);

    dm = con.getMetaData();
    rs = dm.getColumns(null, null, "UnicodeCharsTable", null);

    System.out.println("Columns");

    while (rs.next()) {
```

```
        System.out.println("\t" + rs.getString("COLUMN_NAME") +
            " : " + rs.getString("TYPE_NAME"));
    }
}
```

- SQL statement parameters in parameterised queries. For example:

```
Connection con = null;
PreparedStatement pstmt = null;
ResultSet rs = null;
ResultSetMetaData rsmd = null;

try {
    Class.forName("easysoft.sql.esMdbDriver");

    con = DriverManager.getConnection(connectionUrl);

    String SQL = "SELECT * FROM UnicodeCharsTable where
UnicodeCharsColumn = ?";

    pstmt = con.prepareStatement(SQL);

    pstmt.setString(1, "UnicodeChars");
```

```
rs = pstmt.executeQuery();

rsmd = rs.getMetaData();

while (rs.next()) {
    for (int i = 1; i <= rsmd.getColumnCount(); i++)
    {
        System.out.print(rs.getString(i) + "\t");
    }
    System.out.println();
}
}
```



## TECHNICAL REFERENCE

*Easysoft JDBC-Access Gateway*

### **Note**

If you experience text corruption when working with Unicode data (for example, you get a ? character instead of the expected character), you may need to explicitly specify a Unicode encoding in your client application. For example, when testing the Easysoft JDBC-Access Gateway with Eclipse and Apache Tomcat we need to set the character encoding to UTF-8. (In Eclipse, we set the Text file encoding to UTF-8; in Tomcat we added this line to our test JSP: `<%@page contentType="text/html; charset=UTF-8"%>`.)



---

## Tracing

This section describes how to enable tracing when using the Easysoft JDBC-Access Gateway.

To help resolve issues and problems with the Easysoft JDBC-Access Gateway, you may need to enable JDBC tracing (also known as logging). This can be a very useful debugging aid, but it should be remembered that tracing will adversely affect performance, and so should be disabled when you have resolved your problem. You enable tracing by using one of the following methods:

- The `DriverManager.setLogWriter` method lets you specify a `PrintWriter` object that will be used to log any JDBC-related information. For example:

```
try {  
    Class.forName("easysoft.sql.esMdbDriver");  
    DriverManager.setLogWriter(new PrintWriter(System.out));  
}
```

- Alternatively, if you use a `DataSource` object to get a connection, you can use the `DataSource.setLogWriter` method to enable JDBC tracing. For example:

```
try {  
    DataSource ds = (DataSource) envCtx.lookup("jdbc/Northwind");  
    ds.setLogWriter(new PrintWriter(System.out));  
}
```



## TECHNICAL REFERENCE

*Easysoft JDBC-Access Gateway*

### **Note**

The Easysoft JDBC-Access Gateway communicates with the Microsoft ODBC driver directly rather than via the Microsoft ODBC Driver Manager. For this reason, the ODBC Driver Manager tracing facility, accessible from the ODBC Data Source Administrator, cannot be used to log Easysoft JDBC-Access Gateway activity. Error messages returned by the ODBC driver are returned via the JDBC tracing mechanism however.

# APPENDIX B GLOSSARY

---

## Terms and definitions

### **Application Programmer Interface**

Stands for API, a collection of programming routines and functions that an application can use to access low-level machine services.

### **Authorization code**

You must have an authorization code for the Easysoft product you wish to license in order to obtain a purchased license. When you purchase a product your authorization code is emailed to you. You do not need an authorization code to obtain a trial license.

### **Column**

A column defines the data type, size, and other attributes of one field of a row (record) of data. All columns taken as a set define a row (record) in the database. An individual column contains data related in type and purpose throughout the table; that is, a column's definition does not change from row to row.

### **Data type**

An attribute that specifies what type of information can be stored in a column, parameter, or variable. The Jet database engine has 13 primary data types and several synonyms recognised for these data types.

### **Exclusive**

A type of access that helps protect data in a database shared over a network. When you open a database in exclusive mode, you prevent others from opening the database.



## **GLOSSARY**

*Easysoft JDBC-Access Gateway*

### **License key**

A string that is provided by Easysoft for use in the licensing process.

### **Java**

An object-oriented programming language developed by Sun Microsystems, Inc. Java is an interpreted language that runs on any platform for which the interpreter, the Java Virtual Machine (JVM), is available.

### **Jet**

Stands for Joint Engine Technology, a database engine technology used in various Microsoft products, including Microsoft Access. Since Windows 2000, the Jet database engine has shipped with Windows.

### **Jet database**

A database created with the Jet database engine. The file name extension for a Jet database is .mdb.

### **JDBC**

JDBC is a Java API that allows Java to access relational databases (and other tabular data, such as spreadsheets and flat files). The JDBC API specifies a set of Java classes that represent database connections, Structured Query Language (SQL) queries and their result sets, and other objects associated with accessing databases.

## **JDBC driver**

Software that implements the JDBC API, enabling Java to interact with a database.

There are four types of JDBC drivers, called Type 1, Type 2, Type 3, and Type 4. Type 1 and Type 2 drivers use native libraries and therefore are not pure Java.

A Type 1 JDBC driver uses a native library with a common interface. The native library is not database specific therefore.

A Type 2 JDBC driver accesses a database-specific driver through a native library.

A Type 3 JDBC driver is pure Java and has a client/server architecture.

A Type 4 JDBC driver is pure Java and communicates directly with the database.



## **GLOSSARY**

*Easysoft JDBC-Access Gateway*

### **JDK**

Stands for Java Developer's Kit, the collection of Java classes, runtime, compiler, debugger, and usually source code for a version of Java that makes up a Java development environment for writing Java applets and applications.

### **JNI**

Stands for Java Native Interface, a programming interface that lets Java code use code and code libraries written in other languages, such as C and C++.

### **JRE**

Stands for Java Runtime Environment (JRE), the Java virtual machine (JVM), runtime class libraries, and Java application launcher that are necessary to run programs written in the Java programming language.

### **JVM**

Stands for Java virtual machine, the Java interpreter that converts the compiled Java bytecode into the machine language of the platform and runs it.

### **ODBC**

Stands for Open Database Connectivity, an API that enables applications to access data in databases that use Structured Query Language (SQL) as a data access standard.

**ODBC driver**

Software that implements the functions in the ODBC API. Each driver is specific to a particular database type. For example, Microsoft produce an ODBC driver for MDB format Access databases. This ODBC driver, which accesses the database through a separate database engine called Jet, processes ODBC calls and passes SQL statements to the Jet engine for processing.

**Primitive**

In programming, a fundamental element in a language.

**Query**

To extract data from a database and present it for use.

**Read-only**

A type of access to data whereby information can be retrieved but not modified.

**Row**

A set of related columns or fields used to hold data. A row is synonymous with a record in the Jet database engine. A table is composed of zero or more rows of data.

### SQL

Stands for Structured Query Language , a language used to query, update, and manage relational databases. SQL has the following components:

- A data definition language (DDL) component, to allow the creation of database components, such as tables.
- A data manipulation language (DML) component, to allow the manipulation of database components.
- A data control language (DCL) component, to provide internal security for a database.

### Synonym

An alternative label for a Jet SQL data type. For example, the `MONEY` data type has a synonym named `CURRENCY`.

### Type

In programming, the nature of a variable. For example, integer, text character, or floating-point number.

### Unicode

A 16-bit character encoding standard developed by the Unicode Consortium between 1988 and 1991. By using 2 bytes to represent each character, Unicode enables almost all the written languages of the world to be represented using a single character set.



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