

4D ODBC Driver

Open Database Connectivity Standard (ODBC) is an open standard application programming interface (API) that uses SQL to access one or more databases from a single application. 4D and 4D Server both provide a native SQL server that enables this functionality.

In order to set up a connection between an application and a database using ODBC, you will need to download 4D's ODBC Driver, available in 32-bit versions for Mac OS or Windows and in 64-bit versions for Windows. (64-bit versions for OS X are available starting with 4D v14 R2). It does not require any external libraries: everything is inside.

You can use this driver to retrieve data from ODBC clients such as Word, Excel, Crystal Reports®, or using a Python script, a JDBC-ODBC bridge, or any other possible ODBC clients.

4D's ODBC Driver is available on our web site:

<http://www.4d.com/downloads/products.html>

-  Installation on Windows
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Installation on Windows

4D provides two versions (a 32-bit and a 64-bit) of the ODBC Driver installer for Windows. You can download one (or both) of the following files from the 4D web site:

- 4D_ODBC_Driver_vXX_(32-bit).exe
- 4D_ODBC_Driver_vXX_(64-bit).exe

You choose your driver based on the version of your ODBC client, and not that of your 4D or 4D Server. For example, if you are using a 32-bit version of Excel 2010 with a 64-bit 4D Server, then you'll need a 32-bit ODBC Driver. You can even install both of the drivers on the same machine.

Remember to uninstall any previous versions of ODBC Driver before installing a new one.

Note: If you install the 32-bit Installer on a 64-bit OS, you must use the 32-bit ODBC Data Source Administrator instead of the default 64-bit one.

You can retrieve the appropriate ODBC administrator at the following locations:

- 32 bits: C:\WINDOWS\systemwow64\odbcad32.exe
- 64 bits: C:\WINDOWS\system32\odbcad32.exe

Warning: The 32-bit administrator is found in "syswow64" and the 64-bit one is in "system32." Since this is not intuitive, you need to make sure not to mistake one for the other.

For more information about the ODBC Data Source Administrators, please refer to the following Microsoft technical note:

<http://support.microsoft.com/kb/942976/en-us>

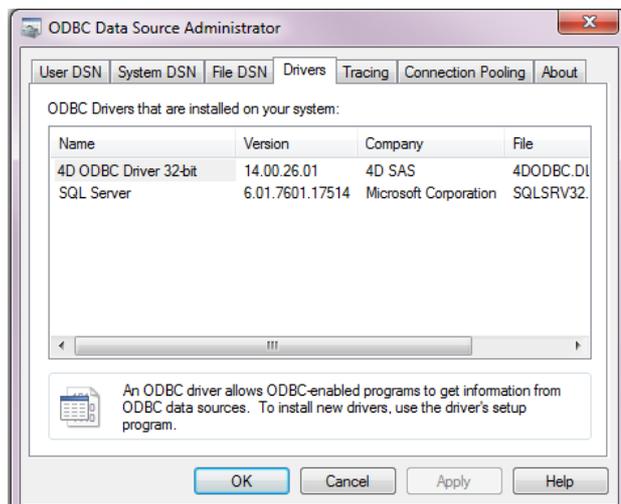
Creating a DSN

A DSN (Data Source Name) is a set of registry keys that enables an application, the ODBC client, to link to the native SQL Server of 4D or 4D Server. Applications such as Crystal Reports®, Word and/or Excel can all be ODBC clients, and you can also write your own ODBC client using Python, PHP, C, C++ or any language that enables ODBC use.

After running the ODBC Driver installer, you need to define a DSN in order to connect to the desired database.

To add a DSN, you launch the ODBC Data Source Administrator by selecting Start/Control Panel/Administrative Tools/Data Sources (ODBC).

Click on the "Drivers" tab to check that the 4D ODBC Driver is correctly installed:



To add a DSN using the 4D ODBC Driver:

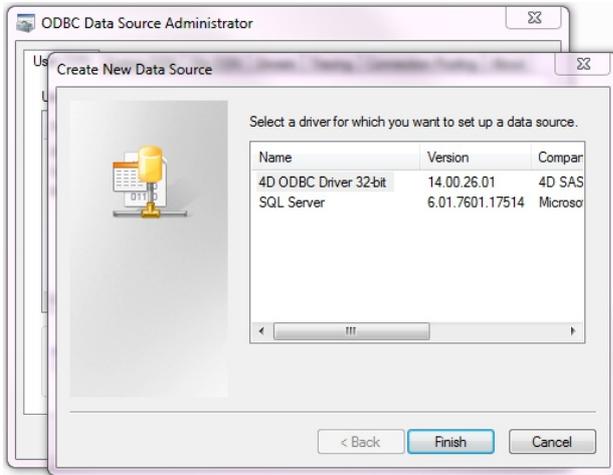
1. **Click on one of the following tabs:**

- o "User DSN" (if you want to make this data source available only to the user currently logged on to this computer. This data source can only be used on the current machine).

OR

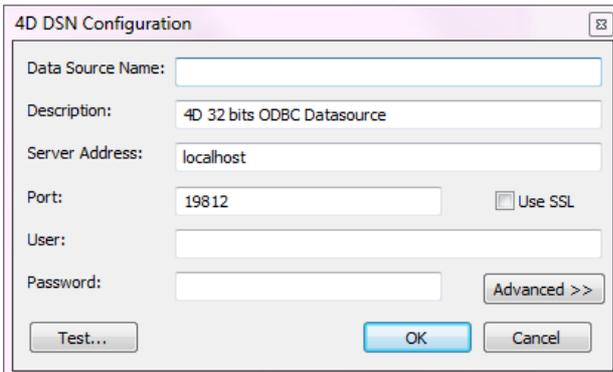
- o "System DSN" (if you want to make this data source available to all users from this computer, including NT services)

2. **Click the Add button and choose the 4D ODBC Driver from the list of configured drivers:**



3. **Click Finish.**

The 4D ODBC Driver's own configuration panel appears:



Note: When you select an existing DSN and click on the **Configure...** button, this same dialog appears pre-filled with all the DSN characteristics.

4. **Click OK to save any changes before you close the configuration panel window.**

Configuring your DSN

The fields of these dialog boxes need to be filled in with the following information:

- **Data Source Name:**

Enter a unique name for this Data Source.

Default: "".

This field is mandatory.

- **Description:**

Enter a short description of this Data Source.

Default: "".

This field is optional.

- **Server Address:**

Examples:

- "localhost" The 4D application is located on the local machine.
- "PC-1" The 4D application is located on the PC-1 machine, published on port 19812 (default port).
- "148.1.2.3" The 4D application has the IP address 148.1.2.3.

Default: "localhost".

This field is mandatory.

- **Port:**

Enter the 4D access port.

Default: "19812".

This field is optional.

- **SSL checkbox:**

Checking this option enables connection to the 4D Server if the "Enable SSL" option has been set on the SQL/Configuration page of the Database Properties.

- **User:**

Enter the user name used to test the connection with 4D.

Default: "".

This field is optional.

- **Password:**

Enter the password used (in conjunction with the user name) to test the connection with 4D.

Default: "".

This field is optional.

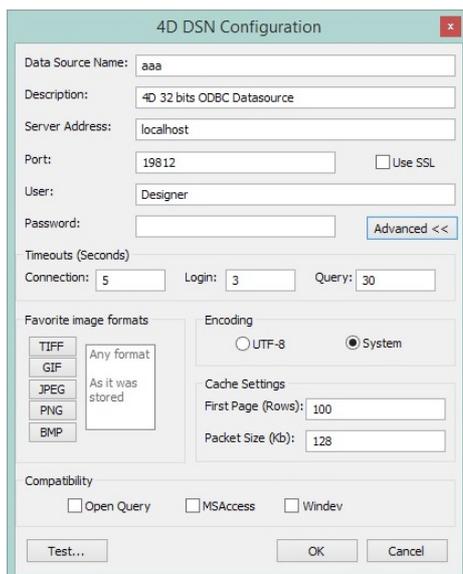
- **Test button**

Tests the connection with the current parameters.

Uses "User Name" and "Password" fields to login.

Advanced settings

Clicking on the **Advanced >>** button gives you access to additional options as shown here:



The screenshot shows the '4D DSN Configuration' dialog box with the 'Advanced <<' button highlighted. The dialog contains the following fields and options:

- Data Source Name: aaa
- Description: 4D 32 bits ODBC Datasource
- Server Address: localhost
- Port: 19812, Use SSL checkbox (unchecked)
- User: Designer
- Password: (empty), Advanced << button
- Timeouts (Seconds): Connection: 5, Login: 3, Query: 30
- Favorite image formats: TIFF, GIF, JPEG, PNG, BMP, Any format, As it was stored
- Encoding: UTF-8 (unchecked), System (checked)
- Cache Settings: First Page (Rows): 100, Packet Size (Kb): 128
- Compatibility: Open Query, MSAccess, Windev (all unchecked)
- Buttons: Test..., OK, Cancel

Timeouts (Seconds)

- **Connection:**

Enter the timeout in seconds to be used (0 means no timeout) after you log in for the driver to connect to a socket on the server:port address.

Default: "".

This field is optional.

- **Login:**

Enter the timeout in seconds to be used (0 means no timeout) when the driver sends a request and receives the status from the server.

Default: "".

This field is optional.

- **Query:**

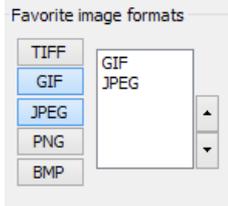
Enter the timeout in seconds to be used (0 means no timeout) when waiting for a response after a query to the server.

Default: "".

This field is optional.

Favorite image formats

Pictures stored in 4D databases are retrieved by ODBC as Blobs. This setting lets you select the formats you prefer. By default, if you do not choose any favorites, 4D selects the best format available with respect to screen display. When you choose one or more formats, 4D only provides one of those formats (in order of preference). If there are no pictures available in any of your favorite formats, 4D converts the pictures to the first format in the list. For example, if you have selected GIF and JPEG as your favorite image formats:



4D first checks whether there are any .gif or .jpeg formats available. If neither are available, then it converts the formats to .gif since it is first in the list.

Encoding: sets the text encoding.

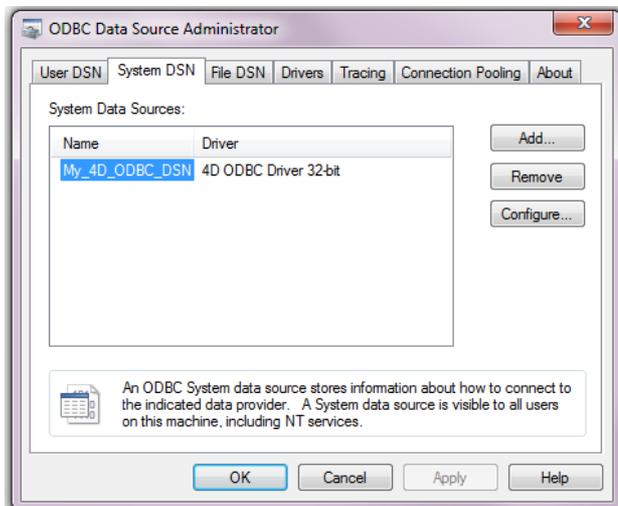
- UTF-8 (Unicode) (recommended)
- System (depends on the settings of your OS)

Cache Settings: used to modify how the network handles the cache. Generally, these settings should be left untouched.

Compatibility: settings to enable the ODBC Driver to work properly with OpenQuery, MSAccess and/or Windev. They should only be checked if you encounter problems with these particular applications.

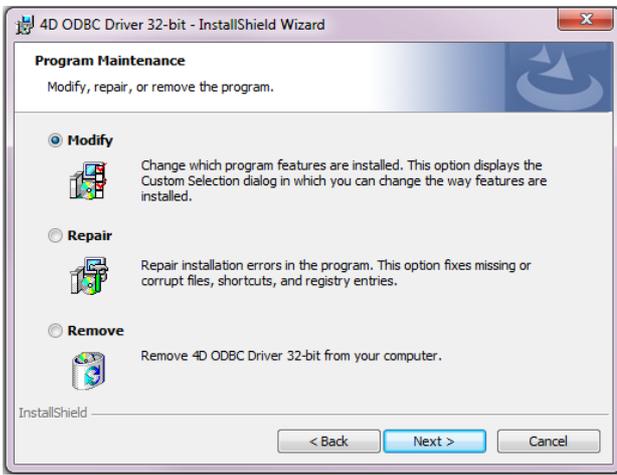
Uninstalling an ODBC Driver

If you intend to completely remove a 4D ODBC Driver, you must first remove all the Data Source Names created for this driver. This can be done from the ODBC Data Source Administrator:



If you only intend to upgrade a 4D ODBC Driver, you do not need to remove the attached DSNs.

To remove a 4D ODBC Driver, simply launch the 4D ODBC Installer and choose the Remove option; the installer will take care of the rest:



Installation on OS X

The 4D ODBC Driver on Macintosh must be installed manually. Before you begin, to enable ODBC use, make sure you have downloaded the latest iODBC framework from here:

<http://www.iodbc.org/dataspace/iodbc/wiki/iODBC/Downloads>

You download the ODBC Driver from the 4D web site. The folder contains both the 32-bit and 64-bit versions:

- 4D ODBC x32.bundle
- 4D ODBC x64.bundle

You choose your driver based on the version of your ODBC client, and not that of your 4D or 4D Server. For example, if you are using a 64-bit version of Python as your ODBC client, then you'll need a 64-bit ODBC Driver, even if you are using a 32-bit version of 4D Server. You can install both of the drivers on the same machine.

 Installing an ODBC driver on OS X

 Uninstalling an ODBC Driver on OS X

Installing an ODBC driver on OS X

To install the ODBC Driver:

1. **Copy the 4D ODBC x64.bundle and/or the 4D ODBC x32.bundle into the {Library}/ODBC/ folder**
2. **Open the *odbcinst.ini* text file found in the /Library/ODBC/ folder with a text editor and modify it as follows:**

```
[ODBC Drivers]
4D v15 Rx ODBC Driver 64-bit = Installed
4D v15 Rx ODBC Driver 32-bit = Installed

[4D v15 Rx ODBC Driver 64-bit]
Driver = /Library/ODBC/4D ODBC x64.bundle/Contents/MacOS/4D ODBC x64
Setup = /Library/ODBC/4D ODBC x64.bundle/Contents/MacOS/4D ODBC x64
APILevel = 2
ConnectFunctions = YYN
DriverODBCVer = 3.52
FileUsage = 0
SQLLevel = 3

[4D v15 Rx ODBC Driver 32-bit]
Driver = /Library/ODBC/4D ODBC x32.bundle/Contents/MacOS/4D ODBC x32
Setup = /Library/ODBC/4D ODBC x32.bundle/Contents/MacOS/4D ODBC x32
APILevel = 2
ConnectFunctions = YYN
DriverODBCVer = 3.52
FileUsage = 0
SQLLevel = 3
```

Note: You must create this *odbcinst.ini* text file if it does not already exist.

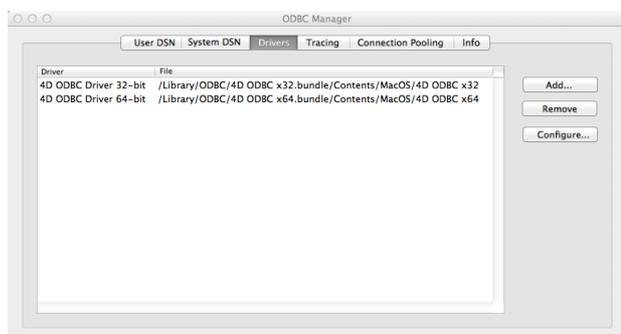
You can now launch the ODBC Manager located in the "Applications/Utilities/" folder in order to create a Data Source Name (DSN) or you can use the one provided with the iODBC framework.



Note: Since Mac OS X 10.6 Snow Leopard, the ODBC Administration Tool is no longer provided as standard. However, it can be downloaded from here:

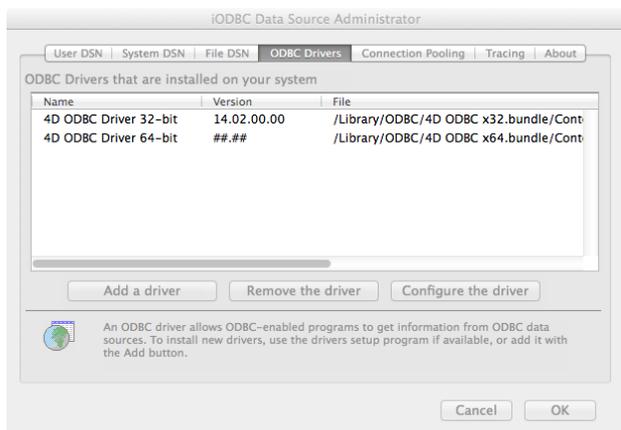
<http://support.apple.com/kb/dl895>

By clicking on the "Drivers" tab, you can check that the 4D ODBC Driver is correctly installed:



This window provides you with the complete path name for each driver installed.

You can do the same with the iODBC Administrator:



Here you can also see the version number but only for 32-bit versions.

Note: Beginning with version 14R2, version numbers include the subversion and modification date in the form: <Version><Subversion><Year><Month+Day>

For example: "14.2.2014.0217", this indicates the 14R2 version modified on February 17, 2014.

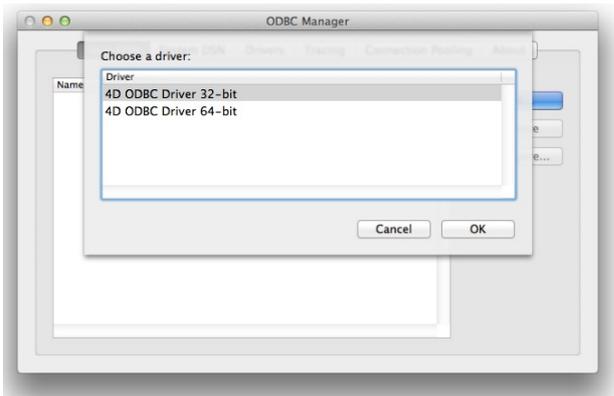
Creating a 32-bit DSN

To add a DSN using the 4D ODBC Driver:

1. **Click on the System DSN tab**

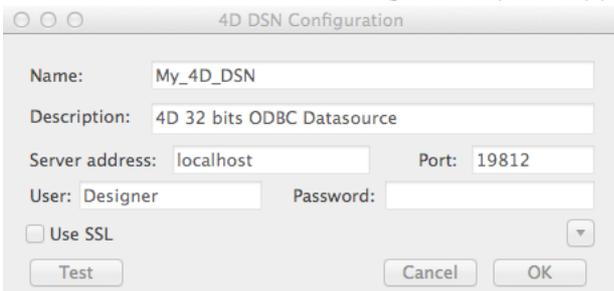
Note: On Mac OS X, we recommend that you use a System DSN and not a User DSN.

2. **Click the Add button and choose the 32-bit 4D ODBC Driver from the list of configured drivers:**



3. **Click OK.**

The 4D ODBC Driver's own configuration panel appears:



4. **Click OK to save any changes before you close the configuration panel window.**

Note: You may encounter the following anomalies when creating a DSN via the Mac OS X ODBC Administrator:

- When you create a new DSN, you may not see it right away and may need to quit and restart the Mac OS X Administrator in order for it to appear.
- Even if you add a new ODBC User data source, the ODBC Driver will create it as a System DSN.

These anomalies are both due to bugs in the Mac OS X ODBC Administrator and have nothing to do with the 4D ODBC Driver or Installer.

Configuring your DSN

The fields of these dialog boxes need to be filled in with the following information:

- **Data Source Name:**

Enter a unique name for this Data Source.

Default: "".

This field is mandatory.

- **Description:**

Enter a short description of this Data Source.

Default: "".

This field is optional.

- **Server Address:**

Examples:

"localhost"	The 4D application is located on the local machine.
"PC-1"	The 4D application is located on the PC-1 machine, published on port 19812 (default port).
"148.1.2.3"	The 4D application has the IP address 148.1.2.3.

Default: "localhost".

This field is mandatory.

- **Port:**

Enter the 4D access port.

Default: "19812".

This field is optional.

- **SSL checkbox:**

Checking this option enables connection to the 4D Server if the "Enable SSL" option has been set on the SQL/Configuration page of the Database Settings.

- **User:**

Enter the user name used to test the connection with 4D.

Default: "".

This field is optional.

- **Password:**

Enter the password used (in conjunction with the user name) to test the connection with 4D.

Default: "".

This field is optional.

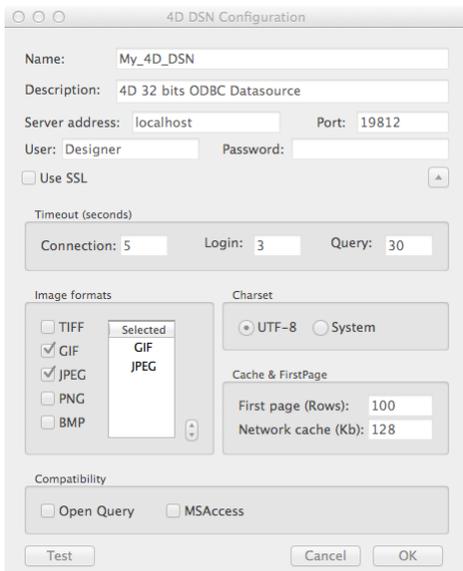
- **Test button**

Tests the connection with the current parameters.

Uses "User Name" and "Password" fields to login.

Advanced settings

Clicking on the **Advanced >>** button gives you access to additional options as shown here:



Timeouts (Seconds)

- **Connection:**

Enter the timeout in seconds to be used (0 means no timeout) after you log in for the driver to connect to a socket on the server:port address.

Default: "".

This field is optional.

- **Login:**

Enter the timeout in seconds to be used (0 means no timeout) when the driver sends a request and receives the status from the server.

Default: "".

This field is optional.

- **Query:**

Enter the timeout in seconds to be used (0 means no timeout) when waiting for a response after a query to the server.

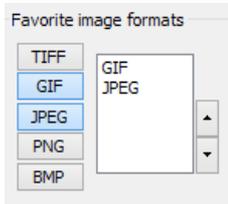
Default: "".

This field is optional.

Favorite image formats

Pictures stored in 4D databases are retrieved by ODBC as Blobs. This setting lets you select the formats you prefer. By default, if you do not choose any favorites, 4D selects the best format available with respect to screen display. When you choose one or more formats, 4D only provides one of those formats (in order of preference). If there are no pictures available in any of your favorite formats, 4D converts the pictures to the first format in the list.

For example, if you have selected GIF and JPEG as your favorite image formats:



4D first checks whether there are any .gif or .jpeg formats available. If neither are available, then it converts the formats to .gif since it is first in the list.

Encoding: sets the text encoding.

- UTF-8 (Unicode) (recommended)
- System (depends on the settings of your OS)

Cache Settings: used to modify how the network handles the cache. Generally, these settings should be left untouched.

Compatibility: settings to enable the ODBC Driver to work properly with OpenQuery and MSAccess. They should only be checked if you encounter problems with these particular applications.

Creating a 64-bit DSN

The 64-bit driver is faceless but there are two ways to create a 64-bit DSN:

- using the 32-bit driver, or
- using the ODBC Administrator.

Using the 32-bit driver

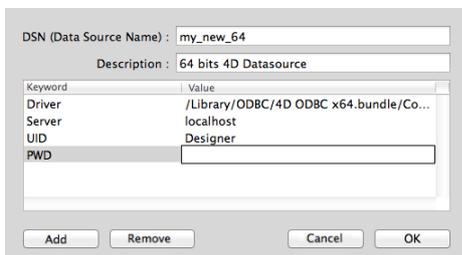
You can use the 32-bit ODBC driver to create a 32-bit DSN and then modify this DSN directly from the /Library/ODBC folder. Just open the /Library/ODBC/odbc.ini text file in a text editor and make the following edits:

1. In the [ODBC Data Sources] section: change "4D ODBC Driver **32-bit**" to "4D ODBC Driver **64-bit**"
2. In the [{your data source name}] section, change:
Driver=/Library/ODBC/4D ODBC **x32**.bundle/Contents/MacOS/4D ODBC **x32**
to:
Driver=/Library/ODBC/4D ODBC **x64**.bundle/Contents/MacOS/4D ODBC **x64**

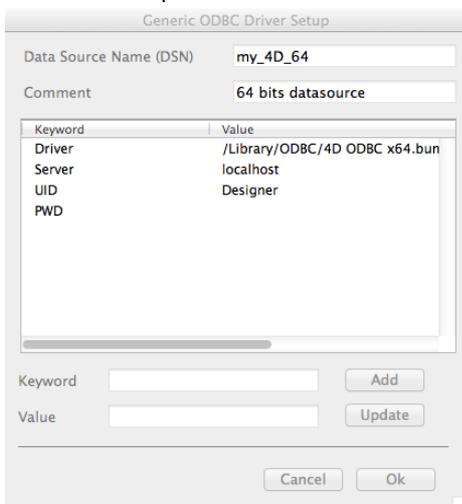
Using the ODBC Administrator or the iODBC Administrator

1. **Click on the System DSN tab.**
2. **Click the Add button and choose the 64-bit 4D ODBC Driver from the list of configured drivers. The generic DSN generator appears.**
3. **Fill in the following Keyword/Value pairs in the dialog:**

Keyword	Value
Driver	/Library/ODBC/4D ODBC x64.bundle/Contents/MacOS/4D ODBC x64
Server	<IP address of 4D Server>
UID	<User's name>
PWD	<User's password (can be left blank)>



Here is the equivalent for iODBC:

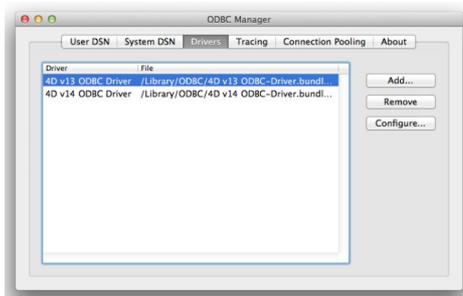


4. **Click OK**

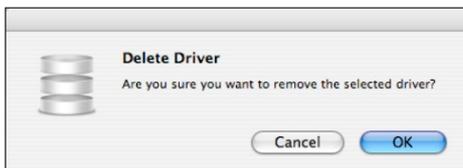
The new DSN will then be available on the System DSN tab of your ODBC Administrator.

Uninstalling an ODBC Driver on OS X

To uninstall a 4D ODBC Driver, you can just use the ODBC Administrator found in the Application Utilities folder. Launch the ODBC Administrator and click on the Drivers tab:



To remove a 4D ODBC Driver, just select it in the list of installed drivers and press the **Remove** button. You will be asked to confirm this removal:



You will then have to remove the following file manually:

/Library/4D ODBC x32.bundle

/Library/4D ODBC x64.bundle

Using a connection string

When you use the ODBC API in PHP, Python script, Java, C, C++ or any programming language, you can connect without using a DSN by means of a connection string.

Example using Python:

```
import pyodbc
conn = pyodbc.connect('Driver={4D ODBC Driver 32-bit} ;Server=187.145.45.23 ;UID=Designer
;PWD=123456')
curs = conn.cursor()
curs.execute('select (id,name) from table_1')
curs.fetchone()
curs.close()
conn.close()
```

This example uses the following keywords:

- **Driver:** set to use the 32-bit 4D ODBC Driver
- **Server:** set to use the 4D Server on the machine with the IP address= "187.145.45.23"; no port is specified so the default (19812) will be used.
- **UID and PWD:** set to connect as "Designer" using "123456" as password.

Keywords are not case sensitive and can be used in any order, with the exception of "Driver", which must come first if it is used. Whenever you do not specify a keyword, its default value is used.

A connection string can also use a DSN. When you create a DSN using the 4D Configuration window, it saves the settings in the registry or in the `odbc.ini` file using the same keywords.

For example, if you use the connection string:

```
conn=pyodbc.connect('DSN=My_4D_DSN')
```

... it is the equivalent of a connection string using all the same values set in the 'My_4D_DSN' DSN.

A description of all the keywords used in a connection string, or when configuring a DSN, is shown below.

Keywords

- **Driver**
Identifies the ODBC Driver used.
For a connection string: Use the value "{4D ODBC Driver 32-bit}" or "{4D ODBC Driver 64-bit}"
For DSN definition (OS X): Use "/Library/ODBC/4D ODBC x32.bundle/Contents/MacOS/4D ODBC x32" or "/Library/ODBC/4D ODBC x64.bundle/Contents/MacOS/4D ODBC x64" in the `odbc.ini` file or in the generic DSN configuration key/value pair.
- **DSN**
For a connection string: Indicates a DSN to be used.
In this case, it is not necessary to use other keywords since they will already be defined in the DSN.
For DSN definition: you assign a name directly and do not need a keyword.
- **Description**
For a connection string: this keyword is not used.
For DSN definition: you can enter a short description (optional).
Default value: ""
- **Server**
Indicates the IP address or the name of the 4D server to which you want to connect. Examples: "127.0.0.1",

"localhost", "2001:0db8:0000:85a3:0000:0000:ac1f:8001".

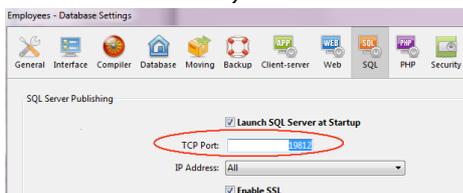
Default value: "localhost".

- **Port**

Specifies the connection port.

Default value: 19812

This port must be the same as the one provided on the SQL/Configuration page of the Database Settings (on the server machine).



- **UID**

Identifies the user name under which you will be connected.

Default value: ""

- **PWD**

Provides the password associated with the user name specified in the UID key.

Default value: ""

- **SSL**

Enables an SSL connection.

For a connection string: Can either be "True" or "False"

For DSN definition: Appears as a checkbox

Default value: "False"

- **PhysicalConnectionTimeout***

An ODBC connection begins by connecting to the TCP/IP network.

This value sets the timeout for this step.

Default value: 0

- **LoginTimeout***

Once the driver is connected to the TCP/IP network, it must then be recognized by the 4D server. It thus sends a frame containing the user, password and other information. This timeout sets the maximum time to wait for a reply.

Default value: 0

- **QueryTimeout***

Once an ODBC Driver is connected, it can also execute queries and handle data. This timeout, expressed in seconds, will be applied in this case.

Default value: 0

** Timeouts set the length of time to wait before aborting an action. Their values are expressed in seconds, with 0 being no timeout (unlimited wait time).*

- **DefaultPageSize** (advanced setting):

Value expressed in rows.

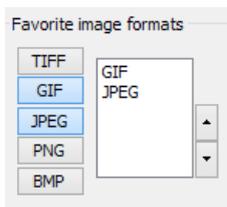
- **NetworkCacheSize** (advanced setting):

Value expressed in KB.

- **FavouriteImageFormats** (advanced setting):

For a connection string: Contains a list of accepted image formats, separated by spaces, chosen from among the following: .tiff, .gif, .jpg, .png, .bmp.

For a DSN definition: Appear as selection buttons (as shown below).



Default value: "" (accepts any image format)

- **CharsEncoding** (advanced setting):

For a connection string: Can be "UTF-8" or "System".

For a DSN definition: Shown as a radio button

Default value: UTF-8

- **OpenQuery** (advanced setting):

For a connection string: Use "True" or "False". If you use SQLServerManagementStudio and you experience difficulty connecting to 4D, it is preferable to execute the following script:

```
EXEC sp_addlinkedserver
@server = '<Your name>',
@srvproduct = '<Anything>',
@provider = 'MSDASQL',
@provstr = 'OpenQuery=true;dsn=<a 4D-defined DSN>;UID=<your 4D User>;PWD=<Password>'
```

For a DSN definition: Appears as a check box

Default value: False (not checked)

- **MSAccess** (advanced setting):

For a connection string: Use "True" or "False". If you encounter problems with dates and times, you can try setting this option to "True".

For a DSN definition: Appears as a check box

Default value: False (not checked)

- **Windev** (advanced setting):

For a connection string: Use "True" or "False". If you encounter problems with Windev, you can try setting this option to "True".

For a DSN definition: Appears as a check box

Default value: False (not checked)