

Connecting Client Applications to Informix Databases with IBM Informix Connect and ODBC

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Introduction

Recently, at the IDUG conference in Denver, CO, where I to gave a presentation on this topic, a colleague asked me, "So, James, what is your presentation on?" I told him it was about installing and configuring Informix Connect and ODBC for connecting client applications to Informix databases. His reply was, "Boy James, that is really a little basic, don't you think?"

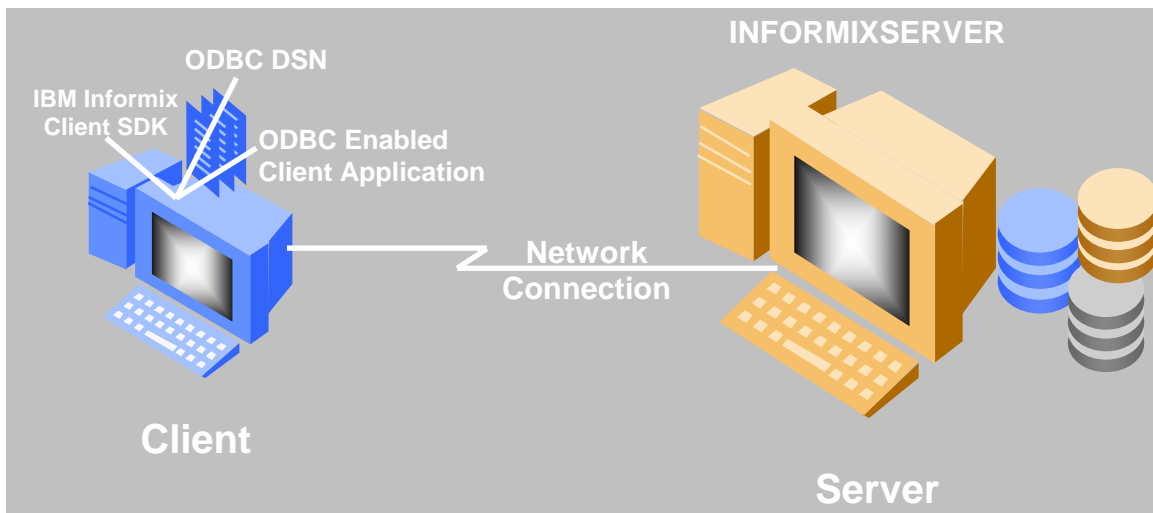
Well, yes, maybe, but it is the nuts and bolts, every day kind of stuff that I have done in every job I've had since 1996 when I started working with Informix products. Whether it be in a very large organization with desktop software managed across the enterprise, or connecting a single computer to a single database, a step by step approach to this process may save you time and frustration.

I started working with Informix in 1996 as a DBA on an Army project. There was a significant software development effort underway using PowerBuilder. The decision was made to connect the application to the database using ODBC. At that time, the Informix ODBC database driver came bundled in a product called Informix CLI (Call Level Interface). I distinctly remember my manager approaching me and assigning me the responsibility of being the expert on installing and configuring the client computers to connect to the Informix databases. This was new to everyone on the project, and since nobody knew exactly how to configure it and why it didn't always work, I was poised to become the resident expert.

This article discusses how to enable third-party tools and client applications running on Microsoft Windows platforms to access Informix databases through ODBC by installing and configuring IBM Informix Connect.

IBM Informix Connect is a free product available as a download from the IBM website. It is also included as a component of the IBM Informix Client Software Developers Kit (CSDK). The CSDK is a single packaging of several application programming interfaces (APIs) needed to develop applications for Informix servers as well as components for client/Informix database connectivity. There are versions of Connect and CSDK for Unix and Linux platforms, and although this article addresses the use for Windows platforms, the concept is similar.

Application development tools like PowerBuilder and Visual Basic enable a developer to create client applications to access RDBMS databases. Products like BrioQuery give the user a front-end tool to report on their data located on a database server. Or maybe you want a simple front end to link to an Informix database using Microsoft Access.



The connection from a Windows client to an Informix database server can be easily achieved by utilizing the Microsoft Open Database Connectivity (ODBC) standard. ODBC is an API specification that enables access to multiple DBMS's using SQL. ODBC enforces a standard that gives client applications interoperability across database platforms.

An ODBC enabled application gains access to a database through the use of an ODBC driver. Each DBMS requires a different driver. The Informix ODBC drivers are bundled in the IBM Informix Client SDK.

The latest version of the IBM Informix Connect and IBM Informix CSDK is v2.90.

Client SDK Components

The CSDK contains many components that can be used for developing and running applications in a variety of programming languages. The component required to connect client applications to Informix databases at runtime is IBM Informix Connect. All of the runtime libraries are included in the IBM Informix Client SDK, along with the many development components. However, if you desire only to distribute the connectivity component for application runtime, install IBM Informix Connect. (Update: Applications developed in .NET require the CSDK to be installed on the client machine running the application).

The IBM Informix CSDK contains several components for application development support. It includes programmer API's for C++, ESQL/C, Java and .NET. A full listing of the Client SDK Components follows taken from the IBM web site.

Informix Client SDK V2.9 includes the following components:

Informix ESQL/C V2.9

Informix ODBC driver V2.9

Informix OLEDB Provider V2.9 (Win32 only)

Informix Object Interface for C++ V2.9

Informix JDBC driver V3.0 (Type 4) and Informix Embedded SQLJ V1.01

Informix Connect V2.9

Informix .NET Provider V2.9 (Windows only)

Installing the IBM Informix CSDK for Windows

The installation is fairly easy and straightforward. The download file is about 30 MB and named something like “clientsdk-290-TC1.NT.zip”. Unzip this file into a temporary directory. Be sure to reference the readme.txt file and the release notes contained in the “Doc” directory. When you are ready to install, execute the “setup.exe” and follow the steps in the installation wizard. Once the software is installed, it will need to be configured.

Configuring a Windows Client Database Connection

The services file

The first item to configure is to add an entry to the services file on the client machine. This is identical to the /etc/services file in the UNIX environment. The entry consists of the service name, listening port number and protocol. On the client, the service name must match the service name specified from the server entry created in Setnet32. The listening port number must match the number specified on for the server. The protocol for a tcp/ip network will be “tcp”.

The services file for the Windows client is located in the windows home directory. However, the specific location depends on the operating system. For Windows 95 and 98, the file is c:\windows\services. For Windows NT/2k/XP, the file is c:\winnt\system32\drivers\etc\services. Use an ASCII editor (i.e. Notepad) to open the file and insert a line to identify the service. The format of the service entry is documented at the top of the file.

An example of a services file entry is:

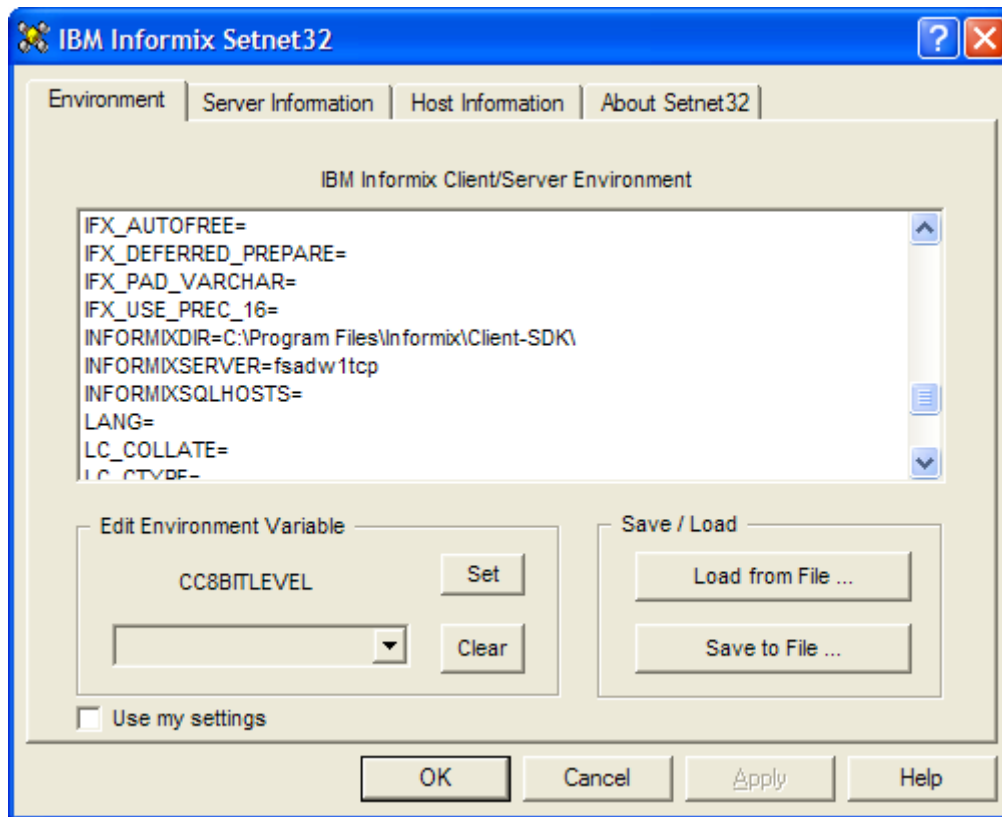
```
fsadw1tcp      1526/tcp      #Informix database instance
```

Defining the Database Server with Setnet32

The next configuration step is to create a server entry on the Windows client machine by using a utility called “Setnet32” that is installed in the “IBM Informix Client SDK” windows program group. Its function is to provide the Windows client with the information it needs to connect to the server by defining the database server, host machine, network protocol and user account information. Setnet32 saves these entries in the Windows registry in the client equivalent to the Informix server “sqlhosts” file. A helpful feature of this utility is the ability to save the configuration to a file and load it from a file for installing a configuration on multiple machines.

Refer to the *IBM Informix Client Products Installation Guide* for additional documentation on using this utility for distributing client applications.

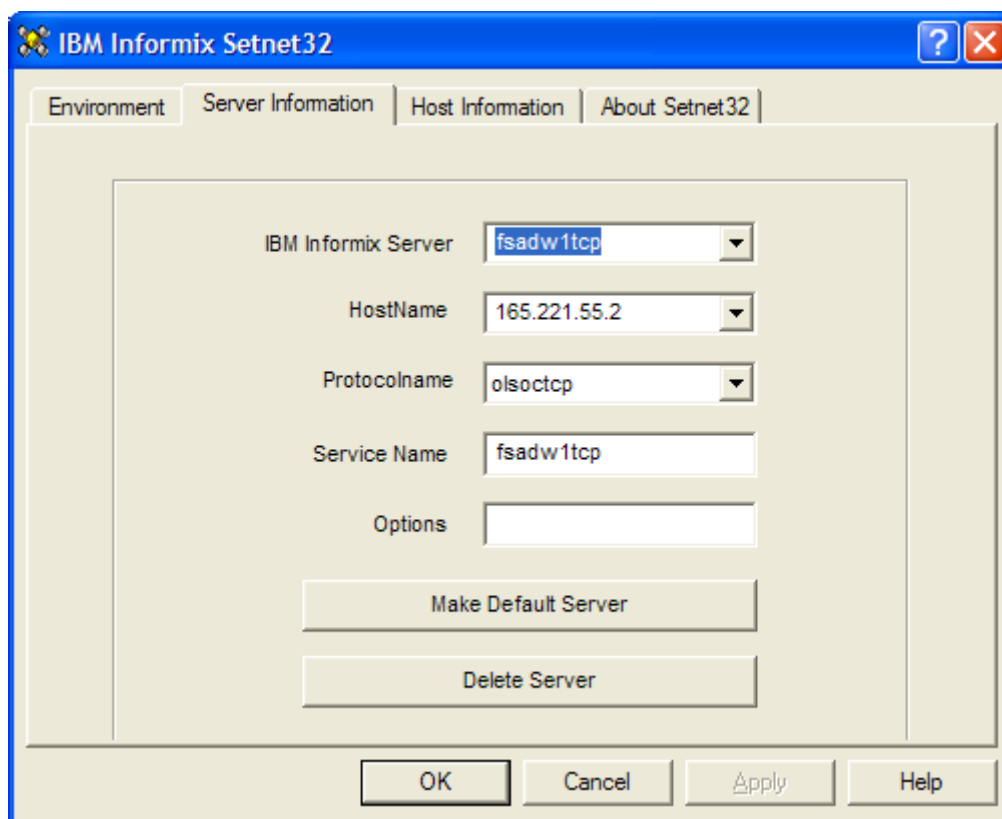
To use Setnet32 on the Windows client, start the Setnet32 utility. The “IBM Informix Setnet32” dialog window appears. In the “Environment” tab, a list of environment variables is displayed. Only 2 of the environment variables are required for connecting to the Informix database server and the rest are for ESQL/C function calls and GLS programming. We will focus on two variables used to establish client/server connectivity.



The Environment tab of Setnet32

In the environment screen, scroll down through the list toward the bottom and check the settings for INFORMIXDIR and INFORMIXSERVER. The INFORMIXDIR variable is automatically set with the directory value specified during the software setup and installation. The INFORMIXSERVER variable can be set manually, or it will automatically be set as a result of entering values in the Server Information tab.

In the Server Information tab, define an entry for the server.



The Server Information tab of Setnet32

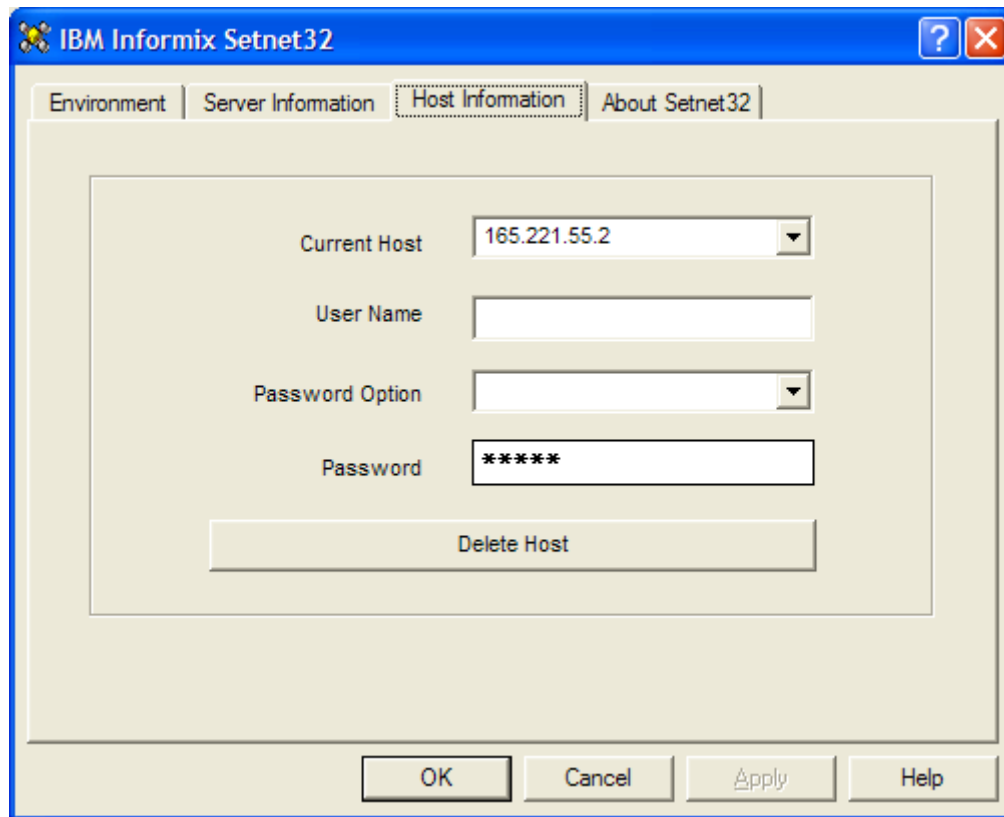
Server Information Tab Option	Description
IBM Informix Server	The Informix database server/instance name.
HostName	The name of the host machine where the database server resides (if defined in the "hosts" file. The IP address can also be specified).
Protocolname	The network communication protocol (see documentation).
Service Name	The service name defined in the services file (see "Services File" section above) that corresponds to the listening port (the specific TCP/IP port could also be specified). You can also specify the port # here instead of the service name.
Options	For defining groups – see "Help"

After the information has been entered, click on "Apply". The INFORMIXSERVER variable in the Environment tab will be set with the value from the "Informix Server" field when you click on the "Make Default Server" button to make a particular server entry the default. When defining additional servers, just type new values into the entry fields and click on "Apply". Define as many as needed and switch between servers by selecting from the pull down list.

If you are familiar with setting up Informix Dynamic Server for UNIX, you will find these entries are identical to the information entered in the sqlhosts file. This information is saved in the Windows registry under a key value - SQLHOSTS. As a result, there is no need to have a sqlhosts file on the Windows machine. Rather, the

INFORMIXSQLHOSTS variable in the Environment tab contains the name of the client machine name where the registry entry resides.

The “Host Information” tab is used to set parameters associated with a given host. The “Current Host” automatically displays the host from the server chosen in the “Server Information” tab. The user and password fields are optional. For specific information regarding these entries, click on the “Help” button in the Setnet32 dialog box.

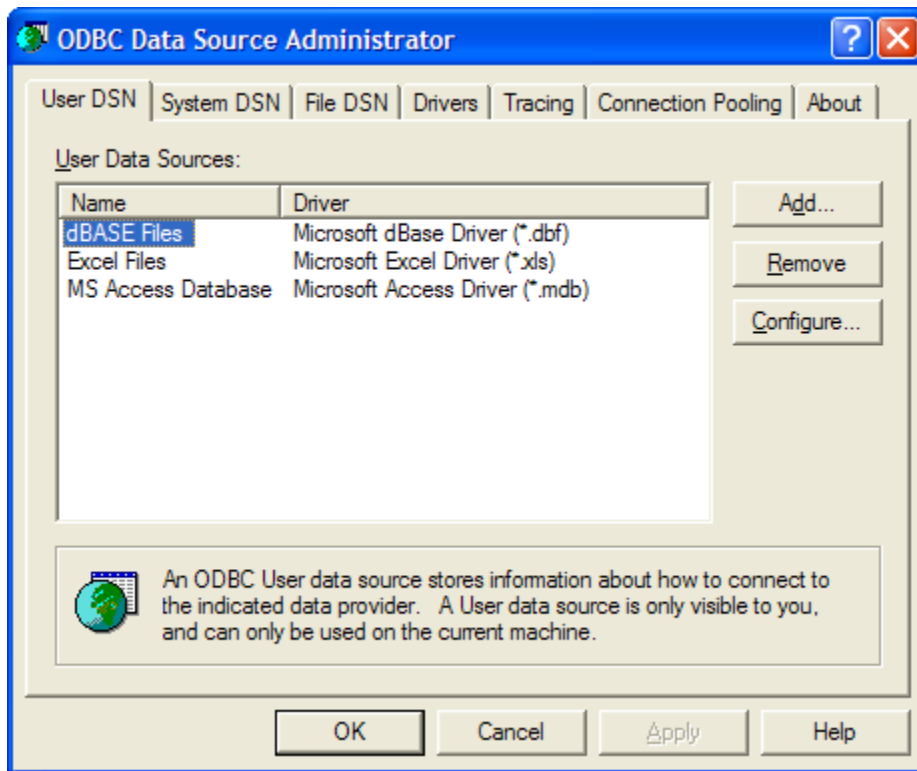


The Host Information tab of Setnet32

Defining an ODBC Data Source

A Data Source consists of an ODBC driver, a database name and the database server information. The server information is the same information defined previously in Setnet32. A Data Source is created using the ODBC Driver Manager or ODBC Data Source Administrator which is part of the Windows operating system. The ODBC Data Source Administrator is started from the Windows Control Panel. In more recent versions of Windows (i.e. 2000, XP), ODBC administration is behind the “Administration Tools” icon in Control Panel.

Start the “Data Sources (ODBC)” administrator. The “ODBC Data Source Administrator” dialog window appears.

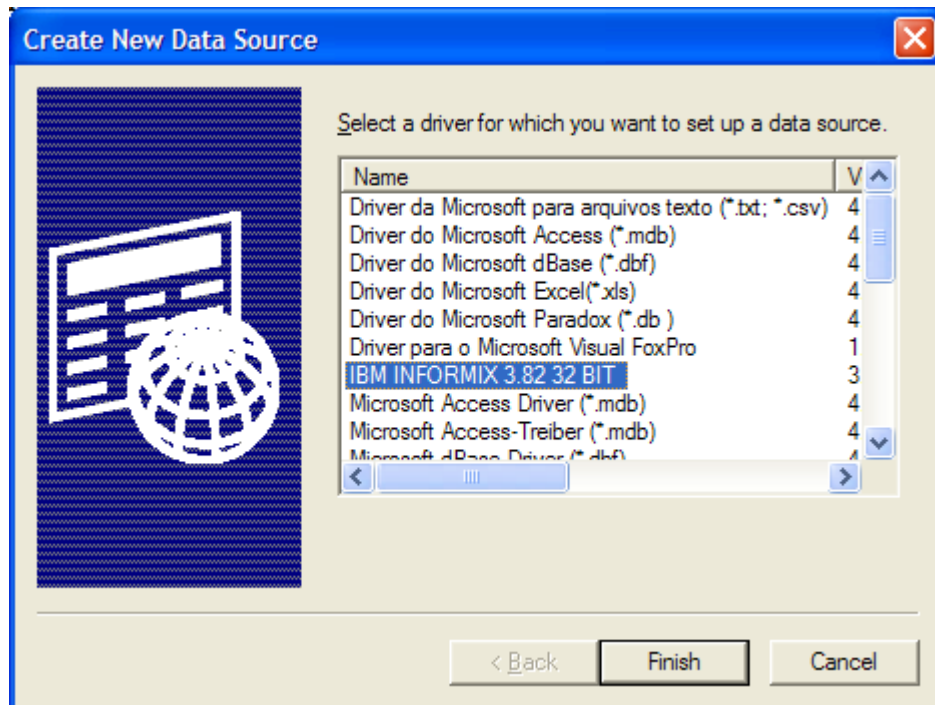


ODBC Data Source Administrator User DSN tab

Data Source Name (DSN) tabs are for Adding a new DSN, removing or setup of existing DSNs.

User DSN	These data sources are local to a computer and accessible only by the current user.
System DSN	These data sources are local to a computer but not user-dedicated; any user with privileges can access a system DSN.
File DSN	Adds, deletes, or sets up file-based data sources that can be shared among all users who have the same drivers installed. These data sources need not be user-dedicated or local to a computer.

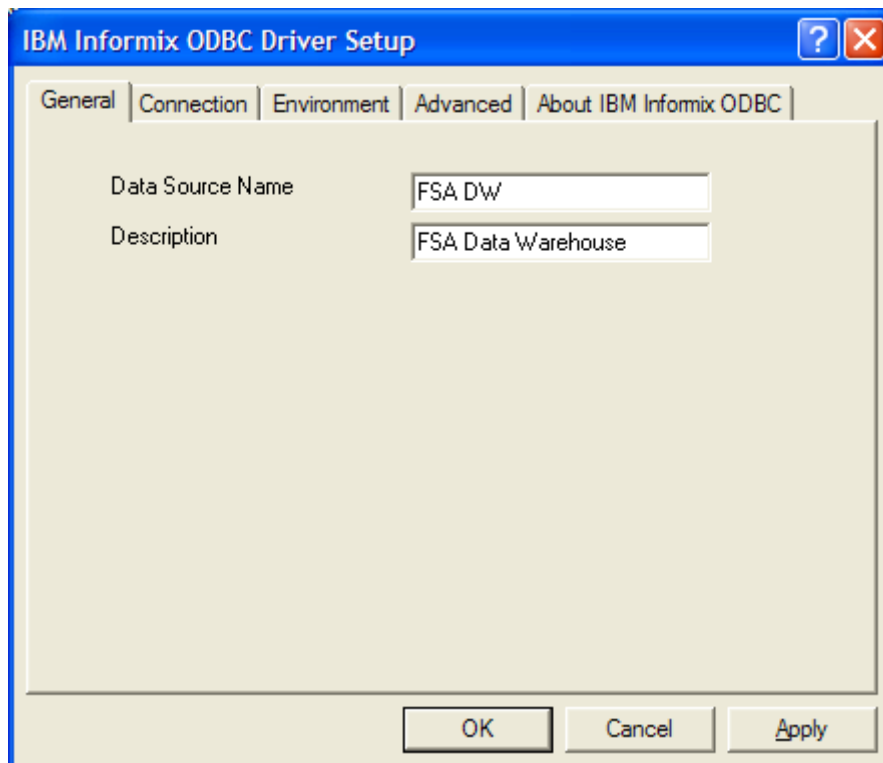
After selecting the desired DSN tab, click on the "Add" button to create a new data source. A list is displayed showing all of the ODBC drivers installed on the Windows client. From this list you can see the version numbers and actual file names of the drivers.



Selecting the ODBC driver during data source creation

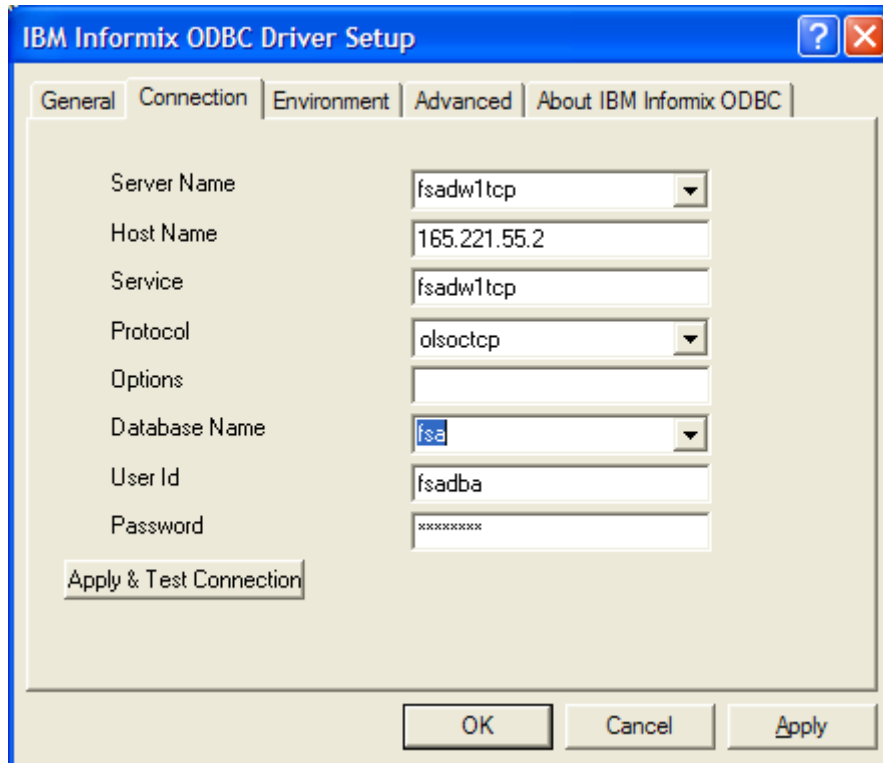
To reiterate, the latest version of the Informix ODBC driver is automatically installed with the CSDK Connect component. Select the IBM INFORMIX ODBC driver and click on "Finish".

The following screen shots illustrate creating an ODBC data source.



"General" tab: Entering the Data Source Name (DSN) and description during data source creation

In the General tab, enter the Data Source Name (DSN) and description. The DSN will be what is referenced in the ODBC enables software on the Windows client.



"Connection" tab: The Server Name, Host Name, Service, and Protocol are filled in from the "default server" specification in Setnet32

In the Connection tab, the default server information is automatically filled in from the server creation in the Setnet32 utility. If this particular data source needs to connect to a server other than the default, the choice can be made from the "Server Name" pull down list. Once the information is entered in the "General" and "Connection" tabs, click on "Apply & Test Connection". If the test is successful then the ODBC DSN setup is complete.

For our purposes, the "Environment" and "Advanced" tabs are not discussed because there is nothing to change in these settings.

Testing the connection

After the server is defined to the client and the services file entry has been created, the client to server connection needs to be tested. The ILogin program is provided as part of the product install to help verify that all of the information is correct for the client to connect to the server. Execute the utility on the Windows client by clicking on the Start, Programs, the Informix program group created for the CSDK, then "ILogin Demo". Enter

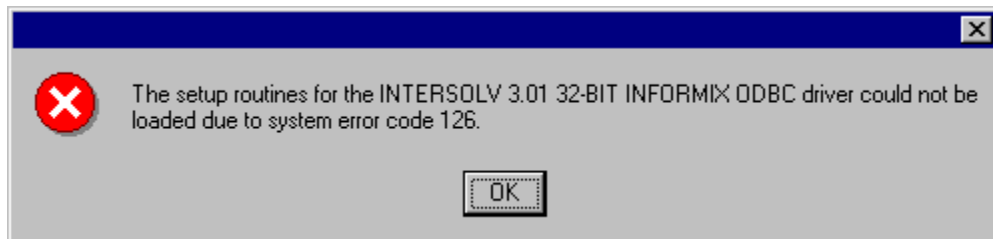
a valid user-id and password, and ILogin will automatically attempt to connect to the default server and run a query against the customer table of the stores7 database. This is a useful tool for trouble shooting the client to server connection.

The database connection defined in the data source needs to be verified using an ODBC-enabled application. The application references the data source by the Data Source Name (DSN). Refer to the product documentation for referencing a DSN. Your connectivity setup is complete once you have established the connection from the application software to the database.

Troubleshooting

The first several times I attempted to configure a client with Setnet32 and ODBC, I would experience a different error. However, by reading documentation, consulting with others, and through trial and error, I was able to get to the point where I could accomplish the process without any problems. I've included some of the "gotchas" that I experienced.

1. Informix error -908. Verify the listening port number defined on the server matches the client.
2. Informix error -931. Verify the service file entry matches the service name in the Setnet32 Server Information tab.
3. Informix errors -951 and -956. These errors indicate the user and/or the host machine does not trust the client machine. The client machine name may need to be added to the /etc/hosts.equiv and/or the .rhost file in the user's UNIX home directory on the server machine.
4. You may experience this error during the ODBC setup in the ODBC Data Source Administrator:



The solution to this problem is to explicitly set the INFORMIXDIR and PATH environment variables in the Environment tab under System Properties in the Control Panel. Create the INFORMIXDIR variable and supply the value of the directory where IBM Informix CSDK is installed on the client. Add the Informix home directory path plus the "bin" to the beginning of the PATH variable. Set these in the System Variables section.

Setting up the client server connectivity may involve more in depth troubleshooting and analysis. Be prepared to allow time for these activities.

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