

# Linking Oracle Tables to Microsoft Access

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## 1. Introduction

The Forest Service has the capability to access data residing in Oracle and other databases with Office 2000. Microsoft Access is part of the Office 2000 suite and has a strong ability to “link” to tables in other databases including Oracle. The purpose of this paper is to explain how to configure a PC for the linkage and illustrate how to make the connection. The primary benefit of using Access to manipulate data is its rich interface to quickly design queries, reports, and forms for data entry.

The connection is done through the use of a standard called Open Database Connectivity (ODBC). This is a specification for accessing relational database's that has been in existence for many years.

## 2. Set Up

Two additional software packages must be installed on the PC in addition to Office 2000. The software required includes SQL\*Net (an Oracle product) and an ODBC driver (supplied by many software vendors). These additional software packages are already installed on Round 12 corporate PC's as part of the software image. To get the software for earlier round PC's, you must have your System Administrator schedule your PC for a software distribution from Missoula OSE (contact your System Admin). ODBC drivers for Oracle are included with the Office 2000 installation as well as from the Oracle package distributed by Missoula OSE.

## 2.1. Overview and Requirements

The architecture of the communications between Access and Oracle is shown in Figure 2-1.

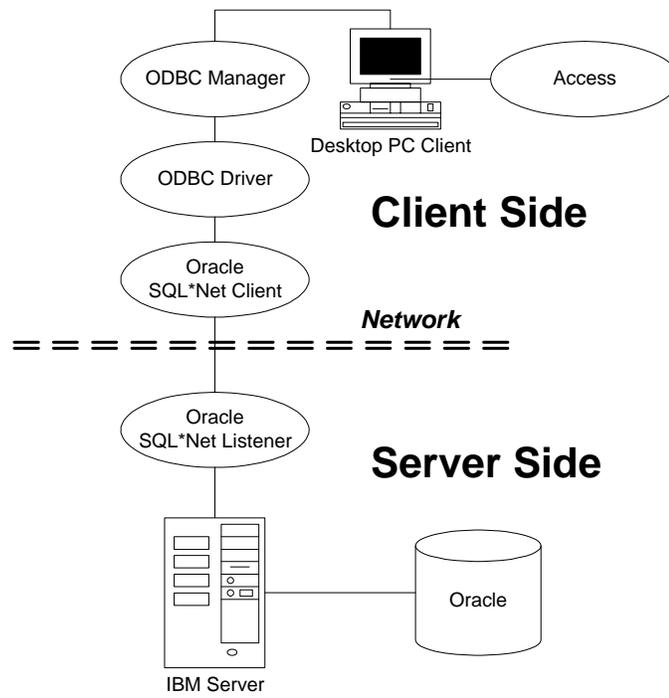


Figure 2-1 Application Architecture

There are several layers that act as intermediate processes. Figure 2-1 shows how Access talks directly to the ODBC driver (through the ODBC Manager) which in turns passes statements to Sql\*Net on the PC. Sql\*Net passes the statements over the network to Oracle on the IBM server. The process is reversed for responses coming back from the Oracle server

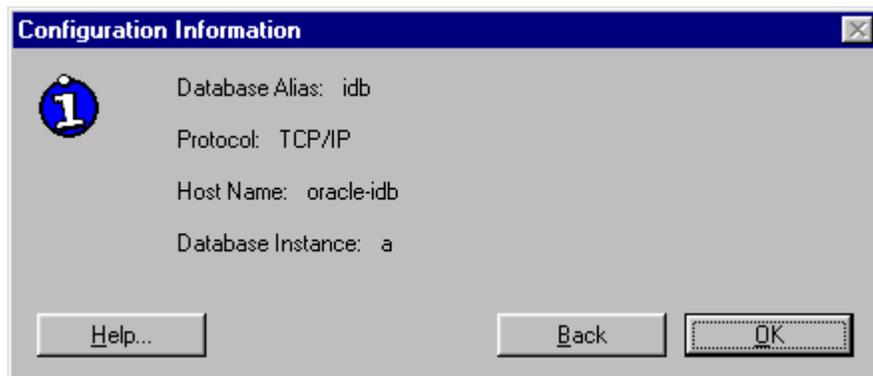
## 2.2. Server Side Setup

There is nothing that needs to be done on the server from the users perspective. It's convenient if the Database Administrator creates a duplicate user accounts within Oracle that are formatted like the users normal account name but drops the OPS\$ prefix. This is entirely optional and it does complicate database administration but it makes it easier for the user. Some ODBC drivers do not allow the use of OPS\$ logins. The ODBC driver included with Office 2000 (Microsoft ODBC for Oracle ver 2.573.3711.00 1/5/99 msorcl32.dll), does not support the OPS\$ functionality. The ODBC driver from Oracle Corporation (Oracle 73 ver 2.5, real ver 2.05.03.01 8/3/1997 sqo32\_73.dll) does not support this functionality either. The Oracle ODBC driver is the default driver set up from Missoula OSE.

## 2.3. Client Side Setup

The tasks in this section should already be completed on your PC if the Oracle package from OSE has been installed properly or the PC is installed from round 12 orders or later. The information is included for reference in case something is wrong or if you want to connect to databases on other units.

1. Run the SQL Net Easy Configuration utility (Under the Oracle for Windows 95 program group) and check that a connection to Oracle on your unit is configured. Select the View Configuration Information and click Ok. You should see a Database Alias named **idb** that is configured as shown in Figure 2-2. This is the standard name that should be set up on each PC.



*Figure 2-2 SQL\*Net Easy Configuration for Home Cell Database*

You can also configure connections to point to other forests. You need to know how the database name is referenced on the network. This information is contained in the tnsnames.ora file on the IBM located in the /usr/csapps/db/network/admin directory of the database server. In general the format of the Host Name in Region 6 is oracle-idb.f#.r#.fs.fed.us where # is either the forest or region number. In most other parts of the county, it is coded as the actual forest name not a unit number. Since the standard was not always followed, it's always good to check the tnsnames.ora file.

Table 2-1 contains the Host Name references for all forests within Region Six. For example, to set up an alias that points to the Willamette NF Oracle database, the alias would be set up as shown in Figure 2-3.

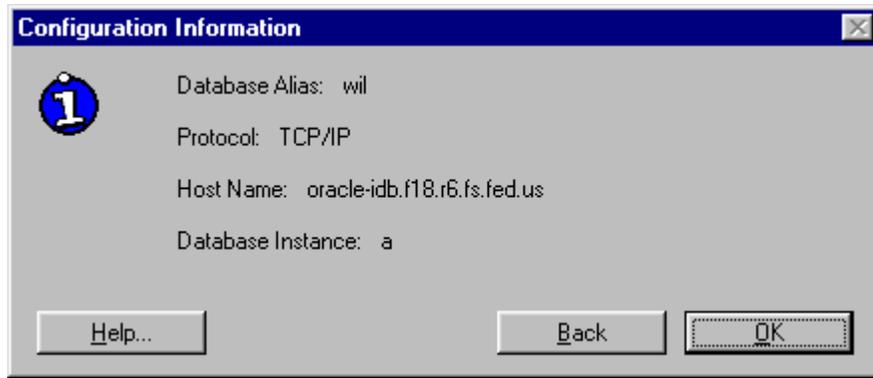


Figure 2-3 SQL\*Net Easy Configuration for Foreign Cell Database

The ultimate reference for the Host Name is the tnsnames.ora file on the IBM. If you have any trouble connecting, you should review the file on your home unit for the reference to the remote unit you are trying to connect to. The alias and host names shown in Table 2-1 are recommended for use on all PC's in Region Six.

Table 2-1 Recommended SQL\*Net Alias Strings for Region Six

Unit	Alias	Host Name
Local database (generic)	idb	oracle-idb
Colville	col	oracle-idb.f21.r6.fs.fed.us
Deschutes	des	oracle-idb.f01.r6.fs.fed.us
Fremont	fre	oracle-idb.fremont.r6.fs.fed.us
Gifford Pinchot	gip	oracle-idb.f3.r6.fs.fed.us
Malhuer	mal	oracle-idb.f4.r6.fs.fed.us
Mt. Baker-Snoqualmie	mbs	oracle-idb.f5.r6.fs.fed.us
Mt. Hood	mth	oracle-idb.f6.r6.fs.fed.us
Ochoco	och	oracle-idb.f7.r6.fs.fed.us
Okanogan	oka	oracle-idb.f8.r6.fs.fed.us
Rogue River	ror	oracle-idb.f10.r6.fs.fed.us
Siskiyou	sis	oracle-idb.f11.r6.fs.fed.us
Siuslaw	siu	oracle-idb.f12.r6.fs.fed.us
Umatilla	uma	oracle-idb.f14.r6.fs.fed.us
Umpqua	ump	oracle-idb.f15.r6.fs.fed.us
Wallowa-Whitman	w-w	oracle-idb.f16.r6.fs.fed.us
Wenatchee	wen	oracle-idb.wen.r6.fs.fed.us
Willamette	wil	oracle-idb.f18.r6.fs.fed.us
Winema	win	oracle-idb.f20.r6.fs.fed.us
Regional Office	r6	oracle-idb.r6.fs.fed.us

- Once you have created the Database Alias's to use with Sql\*Net Easy, you should test the connection with the SQL Plus tool in the Oracle for Windows

95 program group. This will verify that the Sql\*Net configurations are done properly before proceeding onto configuring the ODBC driver. Start up SQL Plus and login into the database using the Alias name you configured with Sql\*Net Easy as the Host String in the login box. If you are having trouble with invalid user account names, first try signing in as User: fs\_public with Password: fs\_public. The fs\_public account is a generic public account that is maintained on all Forest Service Oracle databases but only allows select access to tables and views.



*Figure 2-4 Testing the connection with SQL Plus*

If you see a SQL> prompt in the window, you have successfully configured Sql\*Net. You can log into the database with a / as the username and no password if you have set up your windows login name to be the same as your login name on the IBM servers.

3. Check that the Oracle ODBC driver is installed and configured properly. Start the ODBC 32 manager in the Windows Control Panel to start the configuration. The ODBC Manager control dialog should pop up as shown in Figure 2-5.

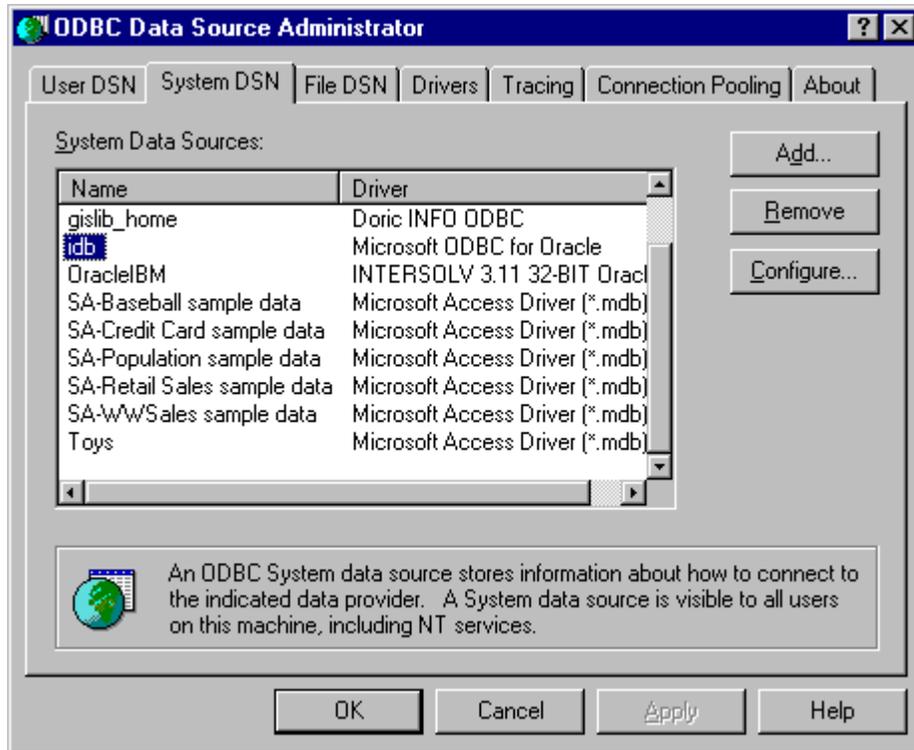
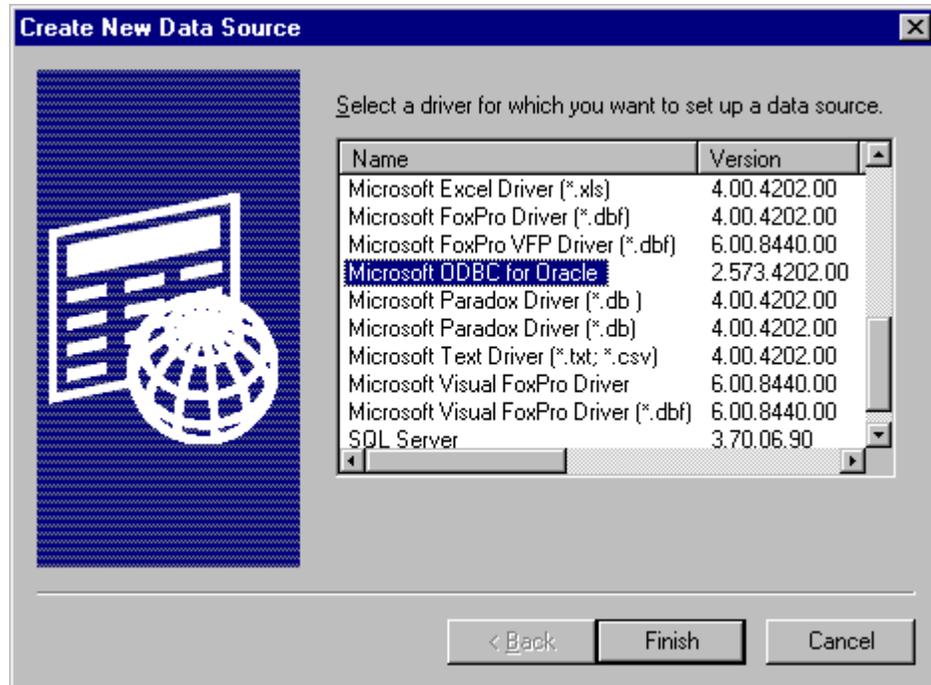


Figure 2-5 ODBC Data Source Administrator

There are three tabs along the top of the dialog that govern what type of Data Source will be set up. It is highly recommended that the System DSN be used. This means that the data source name (DSN) will be set up in the system registry and will be available to any user that logs onto the computer. The User DSN creates a connection under the users profile name and the File DSN stores it on disk.

You should see a Data Source Name called **idb**. This is the standard DSN that is set up from OSE when the Oracle package is installed. If you want to link to data on other forests, you need to create a series of DSN's that reference the Database Alias's that were configured for them. Click the Add button and then select the Microsoft ODBC for Oracle driver from the Create New Data Source dialog box as shown in Figure 2-6. You may see several drivers for Oracle on the computer. The Microsoft ODBC for Oracle driver is manufactured by Microsoft Corporation and the Oracle 73 ver2.5 driver is manufactured by Oracle corporation. There are differences between these two drivers in their compliance with ODBC standards and how they operate. The Oracle driver does not show links to oracle data dictionary objects while the Microsoft driver does. The oracle driver also does not show links to Public

synonyms while the Microsoft driver does. The Microsoft driver comes from the installation of Office 2000 while the Oracle driver comes from the Oracle package installation from Missoula OSE. There are yet further differences in ODBC drivers from other commercial sources. For example, Merant Corporation(Intersolv) has manufactured Oracle ODBC drivers for many years and their current version (ver 3.5+) does allow for signing on with the use of OPSS\$ accounts. As previously mentioned, you can also use the Oracle ODBC driver to logon with your OPSS\$ account if you have signed into Windows with the same login name as your IBM server username.



*Figure 2-6 Selecting the Microsoft ODBC Driver for Oracle*

Once you select the driver and click Finish, the ODBC for Oracle driver box will pop up as shown in Figure 2-7. The Data Source Name is an arbitrary name. You can call it anything you want but it's recommended to use the same name as the Database Alias in Sql\*Net. You **must** put in a user name to force the driver to log you in as a registered user. If you don't, it will log you in as public and you won't be able to edit data. This is a quirk that is specific to the Oracle ODBC driver. Finally, input the server name, **which is the name of the Database Alias you set up in Sql\*Net Easy not the name of the physical server.**

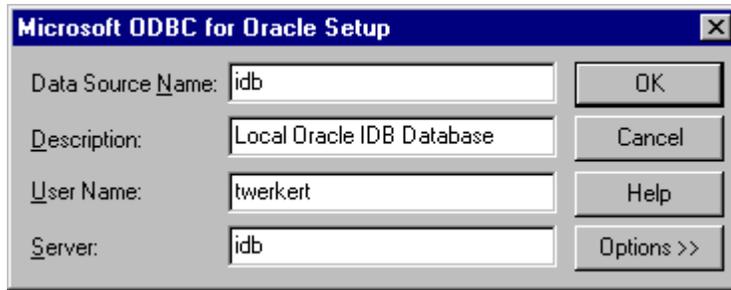


Figure 2-7 Microsoft ODBC Oracle Driver Setup

### 3. Linking to Oracle Tables from Access

Once the PC has been set up to access Oracle data sources, you can link to any table within an Oracle server. Start up Access and create or open a database file. This should bring up the database container as shown in Figure 3-1.

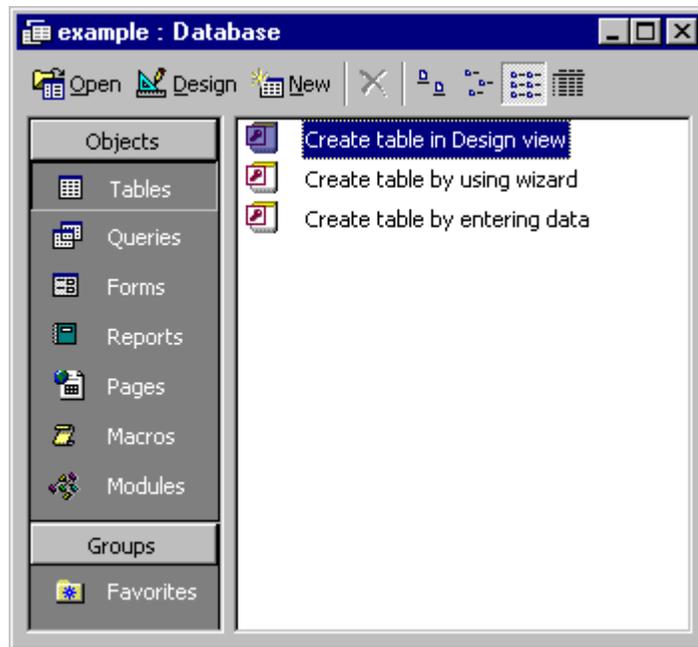
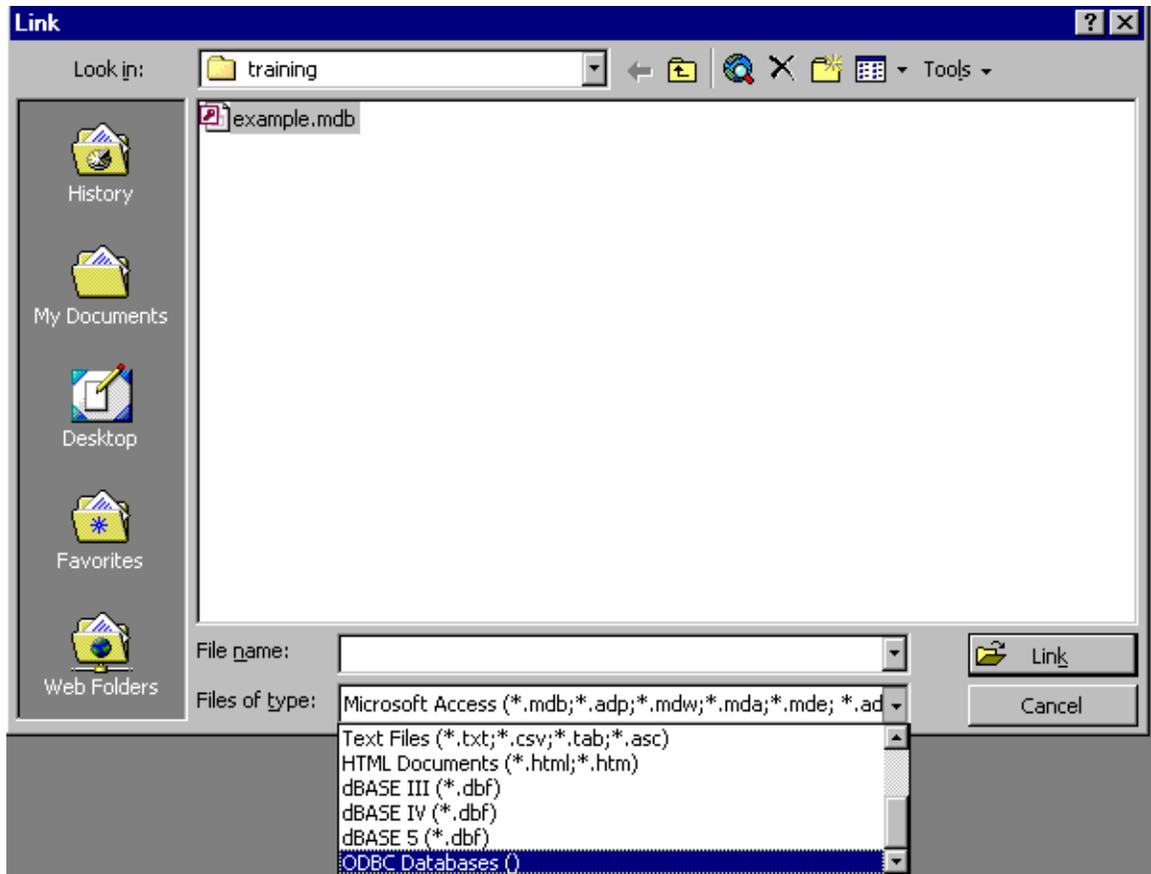


Figure 3-1 Access Database Container

To link to Oracle tables:

1. Start the linking process by either selecting File -> Get External Data -> Link Tables or right click within the Tables list and select Link Tables from the pop up menu. The Link dialog will pop up as shown in Figure 3-2.



*Figure 3-2 Link Dialog Box*

2. Select the **ODBC Databases** in the **Files of type** drop down list at the bottom of the screen. This will tell Access that you want to link to an ODBC data source and will pop up the Select Data Source dialog box as shown in Figure 3-3.

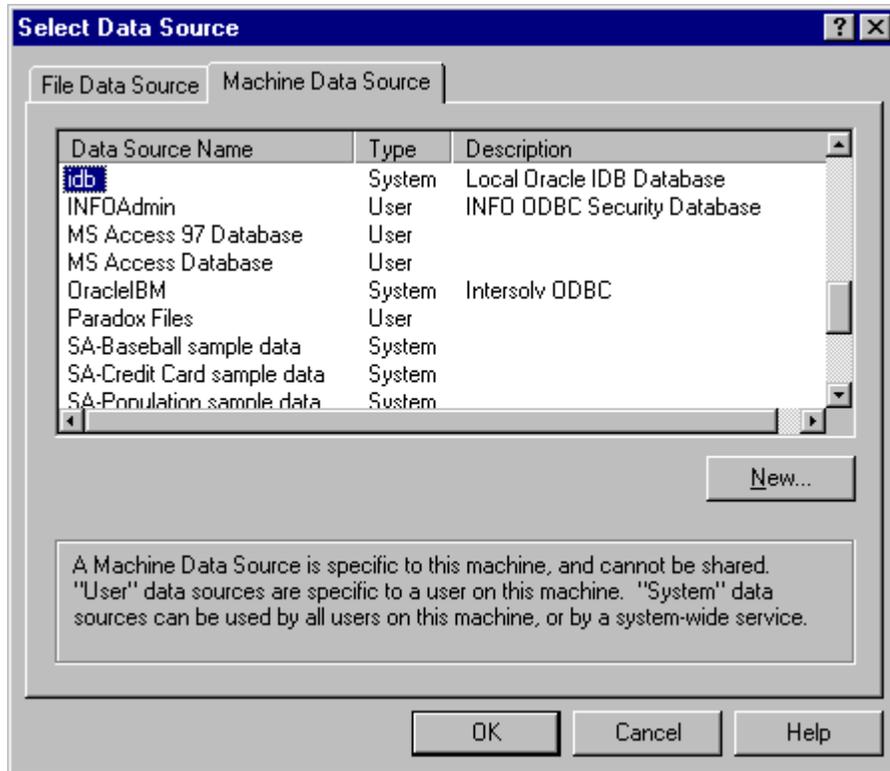


Figure 3-3 Select ODBC Data Source for Linking To

3. Select the Machine Data Source tab and select the appropriate Data Source Name in the list (See section 2.3 for setting up the data sources) and click Ok. This will open up a login dialog box as shown in Figure 3-4.

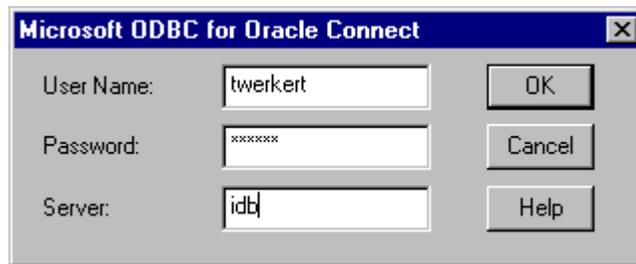
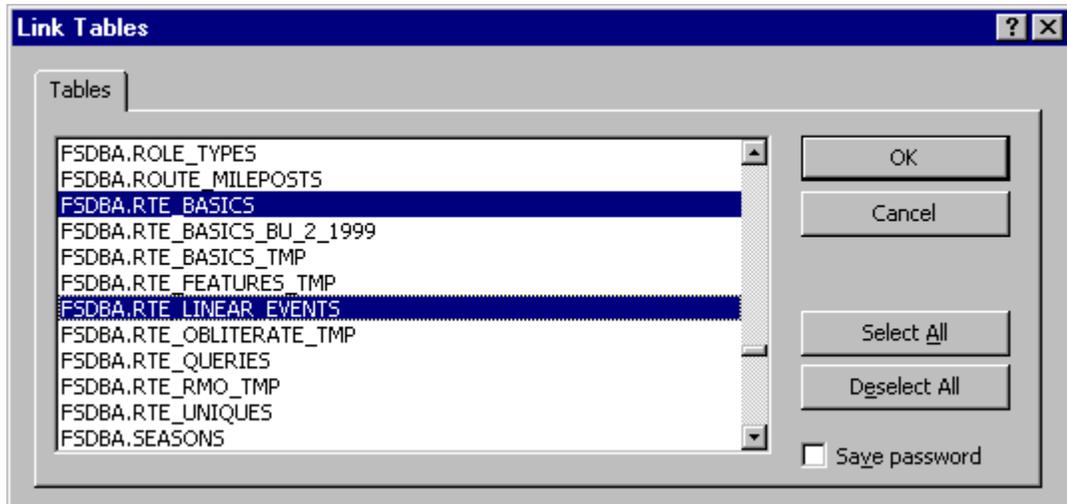


Figure 3-4 Microsoft ODBC for Oracle Connect Login Dialog

Type in your user name and password in the dialog box and click Ok. The **server** refers to the database alias name that was set up in **Sql\*Net Easy**. The Oracle ODBC driver for Oracle allows you to enter in a / for OPS\$ user names. If you are using another driver, your Database Administrator will have to set up dual accounts (one in addition to your OPS\$ account) as most other ODBC drivers will not allow you to login in as OPS\$.

4. Once you login successfully onto Oracle, a list of tables and views will pop up in a dialog box as shown in Figure 3-5. You can select multiple objects in this list by holding down the shift key while selecting the table or view.

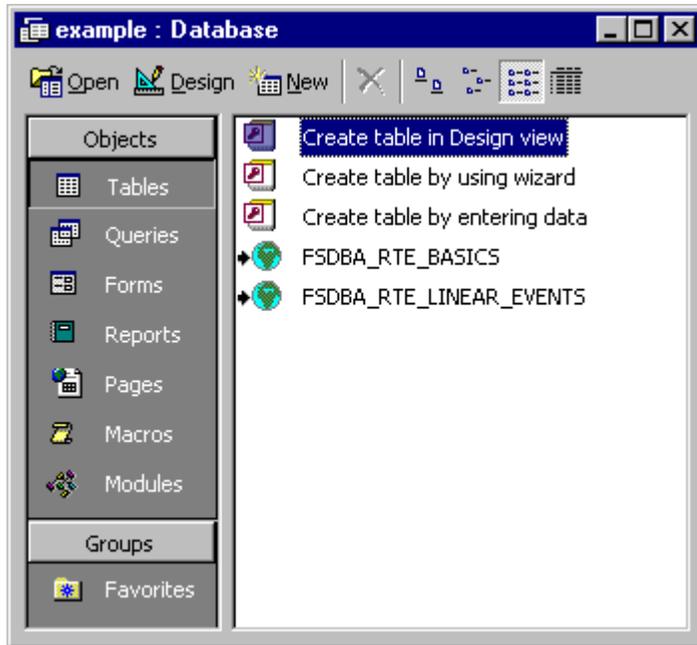


*Figure 3-5 Link Tables List*

Select all objects of interest and click Ok. You should always link to the tables or views that have the owner name prefixed to them (FSDBA.) This is a quirk with the Microsoft ODBC driver. If you select tables with just the base name, you will be selecting public synonyms and the driver will be confused on what object you really want to access.

You may see a dialog pop up for some tables that asks to identify column(s) that uniquely identify rows. If you want to edit data in these tables, they must have a primary key defined for them within the Oracle server.

5. After a short time, you should see the tables in the Database Container as shown in Figure 3-6. The two primary travel routes tables are shown in Figure 3-6 as an example.



*Figure 3-6 Tables Linked*

Notice how each table has a world icon next to it with an arrow pointing to it. This is to symbolize that the table is a linked ODBC table. The table is recorded with the owner and an underscore character as a prefix to the name. These tables can be renamed at will by right clicking on the table name in the database container and select rename from the pop-up menu. This will only rename the table in the local Access database, not on the server.

6. You should be able to use these tables just as you would use any internal Access table. You will be able to update the data if you have permissions to do so in the Oracle server. There are some notable exceptions though. Tables that don't have a primary key defined or have a primary key that contains floating-point numbers are not updateable. A primary example of the latter is the RTE\_LINEAR\_EVENTS table in the INFRA application (see Section 4).

## 4. Linking to Travel Routes Tables and Views

There are a few known problems when linking to the several of the Travel Routes tables. The RTE\_LINEAR\_EVENTS is the primary table where there is a problem. If you link to this table and open it directly from the database container, you will see #Deleted# placeholders in most rows and columns. The problem is caused by the combination of columns used as a primary key (index).

Access uses a local index cache to uniquely identify rows in the attached table. If the primary key for the table contains any columns with floating point numbers (i.e. Number with a decimal specified) Access thinks it could be rounded. Therefore Access thinks that another user has changed the data and therefore fills in the placeholders with #Deleted#. The long-term solution is for the INFRA design team to change the primary key for the table to a typical control number. The team has been contacted about the problem.

You can still query the table from the query designer and see the results by setting the Query Recordset Type to Snapshot instead of Dynaset. This tells Access that you only want to see the data and you will not be editing it. The example in Figure 4-1 shows a query that joins the RTE\_BASICS and RTE\_LINEAR\_EVENTS tables and sets the query properties to correct the #Deleted# problem. You must open the properties of the query to change the Recordset Type property.

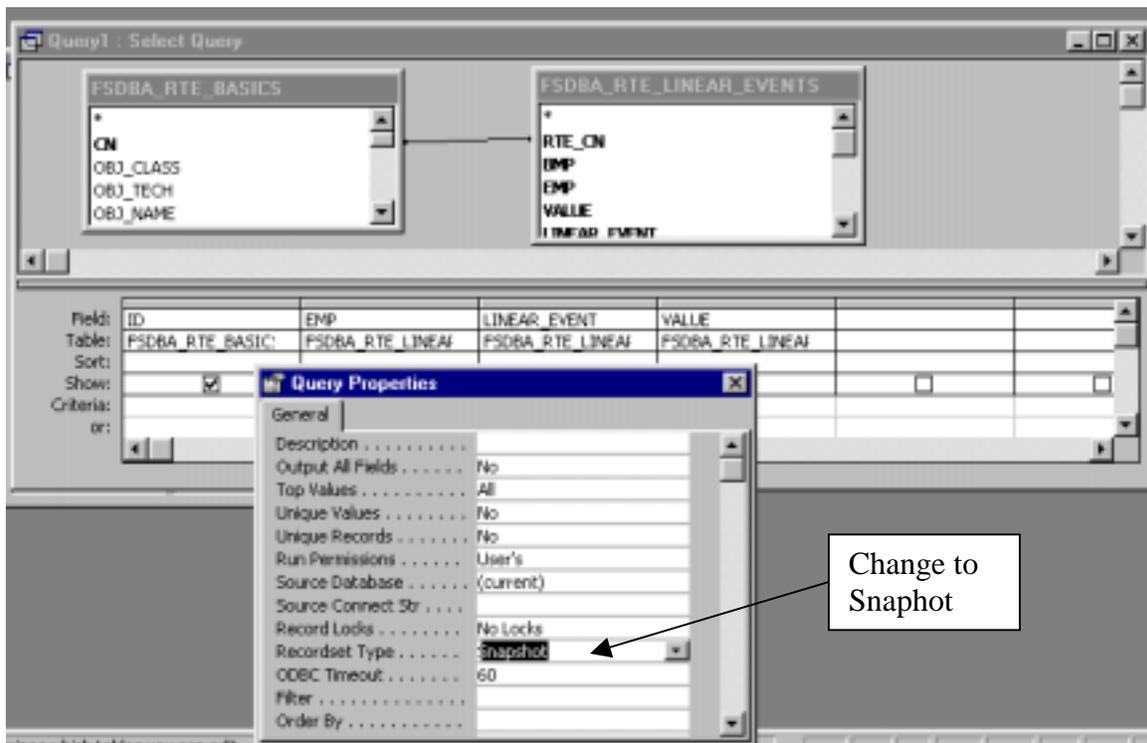


Figure 4-1 RTE\_LINEAR\_EVENTS table Problem

## 5. Cautions

If you have signed into the Oracle database, your permissions on the server govern what permissions you have to any given table. If you sign on and you have full permissions to a table, you can delete or change data easily. With this ease comes a responsibility to ensure that data is not mistakenly changed or deleted.

Query results in Access are live. This means the data returned from a query in most cases is a link to the real data **NOT** a copy. If you run a query and change the data in the resulting datasheet from the query, you are changing the data in the source tables not a copy. Users of Paradox should be especially careful that the query results are not an “answer” table but a live linkage to the data in the source tables.