CHAPTER 31

Adaptive Server Anywhere as an Open Server

About this chapter

Adaptive Server Anywhere can appear to client applications as an Open Server. This provides native support for the Sybase Open Client programming interface, and therefore native support for Sybase applications such as Replication Server and OmniConnect. This chapter describes how to use Adaptive Server Anywhere as an Open Server, and how to configure Open Client and Adaptive Server Anywhere to work together.

For information on developing Open Client applications for use with Adaptive Server Anywhere, see "The Open Client Interface" on page 143 of the book *Adaptive Server Anywhere Programming Interfaces Guide*.

Contents

Open Clients, Open Servers, and TDS

This chapter describes how Adaptive Server Anywhere fits into the Sybase Open Client/Open Server client/server architecture. This section describes the key concepts of this architecture, and provides the conceptual background for the rest of the chapter.

If you simply wish to use a Sybase application with Adaptive Server Anywhere, you do not need to know any details of Open Client, Open Server, or TDS. However, an understanding of how these pieces fit together may be helpful for configuring your database and setting up applications. This section explains how the pieces fit together, and avoids any discussion of the internal features of the pieces.

Open Clients and Open Servers

Adaptive Server Anywhere and other members of the Adaptive Server family act as **Open Servers**. Client applications communicate with Open Servers using the **Open Client** libraries available from Sybase. Open Client includes both the Client Library (CT-Library) and the older DB-Library interfaces.

Tabular Data Stream

Open Clients and Open Servers exchange information using an application protocol called the **tabular data stream** (TDS). All applications built using the Sybase Open Client libraries are also TDS applications, because the Open Client libraries handle the TDS interface. However, some applications (such as Sybase jConnect) are TDS applications even though they do not use the Sybase Open Client libraries—they communicate directly to the TDS layer.

At the other end of the client/server connection, while many Open Servers use the Sybase Open Server libraries to handle the interface to TDS, some applications have a direct interface to TDS of their own. Sybase Adaptive Server Enterprise and Adaptive Server Anywhere both have internal TDS interfaces. They appear to client applications as an Open Server, but do not use the Sybase Open Server libraries.

Programming Interfaces and application protocols

Adaptive Server Anywhere supports two application protocols. TDS is used for Open Client applications and for other Sybase applications such as Replication Server and OmniConnect. A separate application protocol specific to Adaptive Server Anywhere is used for ODBC and Embedded SQL applications.

TDS uses TCP/IP

Application protocols such as TDS sit on top of lower level communications protocols that handle network traffic. Adaptive Server Anywhere supports TDS only over the TCP/IP network protocol. In contrast, the Adaptive Server Anywhere-specific application protocol supports several network protocols as well as a shared memory protocol designed for same-machine communication.

Sybase applications and Adaptive Server Anywhere

The ability of Adaptive Server Anywhere to act as an Open Server enables Sybase applications such as Replication Server and OmniConnect to work with Adaptive Server Anywhere.

Replication Server support

The Open Server interface enables support for Sybase Replication Server: Replication Server connects through the Open Server interface, enabling databases to act as replicate sites in Replication Server installations.

For your database to act as a primary site in a Replication Server installation, you must also purchase the Replication Agent for Sybase Adaptive Server Anywhere, also called a **Log Transfer Manager**. This is available from Sybase as a separate product.

OmniConnect support

Sybase OmniConnect provides a unified view of disparate data within an organization, allowing users to access multiple data sources without having to know what the data looks like or where it is located. In addition, OmniConnect performs heterogeneous joins of data across the enterprise, enabling cross-platform table joins of targets such as DB2, Sybase Adaptive Server Enterprise, Oracle, and VSAM.

Using the Open Server interface, Adaptive Server Anywhere can act as a data source for OmniConnect.

Setting up Adaptive Server Anywhere as an Open Server

This section describes how to set up an Adaptive Server Anywhere server to receive connections from Open Client applications.

Comparison with SQL Anywhere Version 5

SQL Anywhere Version 5 provided support for Open Client applications using the separate Open Server Gateway executable. This executable enabled SQL Anywhere to appear as an Open Server to Open Client applications.

There is no Open Server Gateway in Adaptive Server Anywhere Version 6. Instead, the Adaptive Server Anywhere database server can be set up to act as an Open Server itself. This change simplifies setup, improves performance, and cuts down dramatically on the memory and disk resources required to provide Open Client access to your databases.

System requirements

There are separate requirements at the client and server for using Adaptive Server Anywhere as an Open Server.

Server-side requirements

At the server side, in order to use Adaptive Server Anywhere as an Open Server, you must have the following:

- **Adaptive Server Anywhere server components** You must use the network server (*dbsrv6.exe*) if you want to access an Open Server over a network. You can use the personal server (*dbeng6.exe*) as an Open Server only for connections from the same machine.
- **TCP/IP** You must have a TCP/IP protocol stack in order to use Adaptive Server Anywhere as an Open Server, even if you are not connecting over a network.
- **TDS** The Open Server interface uses the Tabular Data Stream (TDS) protocol for exchanging data between client and server.

Client-side requirements

In order to use Sybase client applications to connect to an Open Server, including Adaptive Server Anywhere, you need the following:

- **Open Client components** The Open Client libraries provide the network libraries that your application needs to communicate via TDS.

- **DSEdit** You need *dsedit*, the directory services editor, to make server names available to your Open Client application.

Starting the database server as an Open Server

If you wish to use Adaptive Server Anywhere as an Open Server, you must ensure that it is started using the TCP/IP protocol. By default, all available communications protocols are started by the server, but you can limit the protocols started by listing them explicitly on the command line. For example, the following command lines are both valid:

```
dbsrv6 -x tcpip,ipx asademo.db
dbsrv6 -x tcpip -n myserver asademo.db
```

The first command line uses both TCP/IP and IPX protocols, of which TCP/IP is available for use by Open Client applications. The second line uses only TCP/IP.

You can use the personal database server as an Open Server for communications on the same machine, because it supports the TCP/IP protocol.

The server can serve other applications through the TCP/IP protocol or other protocols using the Adaptive Server Anywhere- specific application protocol at the same time as serving Open Client applications over TDS.

Port numbers

Every application using TCP/IP on a machine uses a distinct TCP/IP **port**, so that network packets end up at the right application. The default port for Adaptive Server Anywhere is port 2638. It is recommended that you use the default port number, as Adaptive Server Anywhere has been granted that port number by the Internet Assigned Numbers Authority (IANA). If you wish to use a different port number, you can specify which one using the **ServerPort** network option:

```
dbsrv6 -x tcpip{ServerPort=2629} -n myserver asademo.db
```

Open Client settings

To connect to this server, the interfaces file at the client machine must contain an entry specifying the machine name on which the database server is running, and the TCP/IP port it uses.

For details on setting up the client machine, see "Configuring Open Servers with DSEDIT" on page 821.

Configuring your database for use with Open Client

Your database must be initialized or upgraded to Adaptive Server Anywhere Version 6 or at least version 5.5.03 of SQL Anywhere.

Ensure your database is compatible

Any Adaptive Server Anywhere database that is recent enough (5.5.03 or above) can be accessed using the Open Server interface. However, if you are using Adaptive Server Anywhere together with Adaptive Server Enterprise, you should ensure that your database is created for maximum compatibility with Adaptive Server Enterprise.

For information on creating Adaptive Server Enterprise-compatible databases, see "Creating a Transact-SQL-compatible database" on page 792.

Maximum compatibility not required for Replication Server
If you are using your database strictly for Replication Server, it is not critical to deviate from default settings. If you want to use other Open Client applications, such as OmniConnect, then it is important to use the Adaptive Server Enterprise compatible settings.

Configuring Open Servers with DSEDIT

Adaptive Server Anywhere can communicate with other Adaptive Servers, Open Server applications, and client software on the network. Clients can talk to one or more servers, and servers can communicate with other servers via remote procedure calls. In order for products to interact with one another, each needs to know where the others reside on the network. This network service information is stored in the interfaces file.

The interfaces file

The interfaces file is usually named *sql.ini* on PC operating systems and *interfaces*, or *interfac* on UNIX operating systems.

The interfaces file is like an address book. It lists the name and address of every database server known to Open Client applications on your machine. When you use an Open Client program to connect to a database server, the program looks up the server name in the interfaces file and then connects to the server using the address.

The name, location, and contents of the interfaces file differ between operating systems. Also, the format of the addresses in the interfaces file differs between network protocols.

When you install Adaptive Server Anywhere, the setup program creates a simple interfaces file that you can use for local connections to Adaptive Server Anywhere over TCP/IP. It is the System Administrator's responsibility to modify the interfaces file and distribute it to users so that they can connect to Adaptive Server Anywhere over the network.

Using the DSEDIT utility

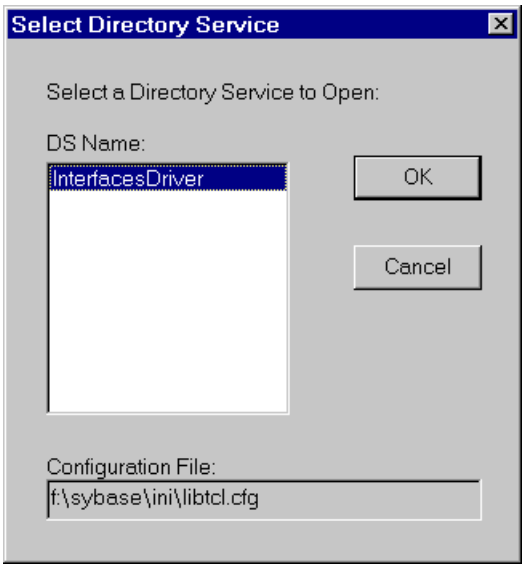
The *dsedit* utility is a Windows 95 and Windows NT utility that allows you to configure the interfaces file (*sql.ini*). The following sections explain how to use the *dsedit* utility to configure the interfaces file.

☞ These sections describe how to use *dsedit* for those tasks required for Adaptive Server Anywhere. It is not complete documentation for the *dsedit* utility. For more information on *dsedit*, see the *Utility Programs* book for your platform, included with other Sybase products.

Starting dsedit

The *dsedit* executable is held in the *SYBASE\bin* directory, which is added to your path on installation. You can start *dsedit* either from the command line or from the Windows Explorer in the standard fashion.

When you start *dsedit*, the Select Directory Service window appears.



Opening a Directory Services session

The Select Directory Service window allows you to open a session with a directory service. You can open a session to edit one of the following:

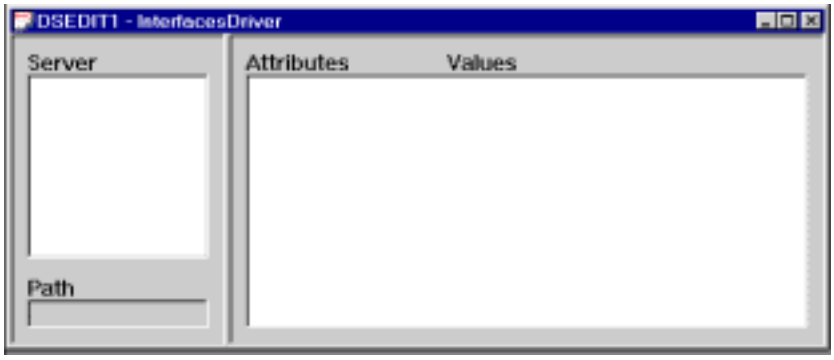
- Any directory service that has a driver listed in the *libtcl.cfg* file
- The interfaces file (*sql.ini*).

❖ **To open a session:**

- Click the local name of the directory service you want to connect to, as listed in the DS Name box, and click the OK button.

  For Adaptive Server Anywhere, you should select the Interfaces Driver.

SYBASE environment variable must be set
The *dsedit* utility uses the SYBASE environment variable to locate the *libtcl.cfg* file. If the SYBASE environment variable is not set correctly, *dsedit* cannot locate the *libtcl.cfg* file.



You can add, modify, or delete entries for servers, including Adaptive Server Anywhere servers, in this window.

Adding a server entry

❖ **To add a server entry:**

1. Choose Add from the Server Object menu. The Input Server Name window appears.
2. Type a server name in the Server Name box, and click OK to enter the server name.

The server entry appears in the Server box. To specify the attributes of the server, you must modify the entry.

Server entry name need not match server command-line name

The server name entered here does not need to match the name provided on the Adaptive Server Anywhere command line. The server *address*, not the server name, is used to identify and locate the server.

It server name field is purely an identifier for Open Client. For Adaptive Server Anywhere, if the server has more than one database loaded, the DSEDIT server name entry identifies which database to use.

Adding or changing the server address

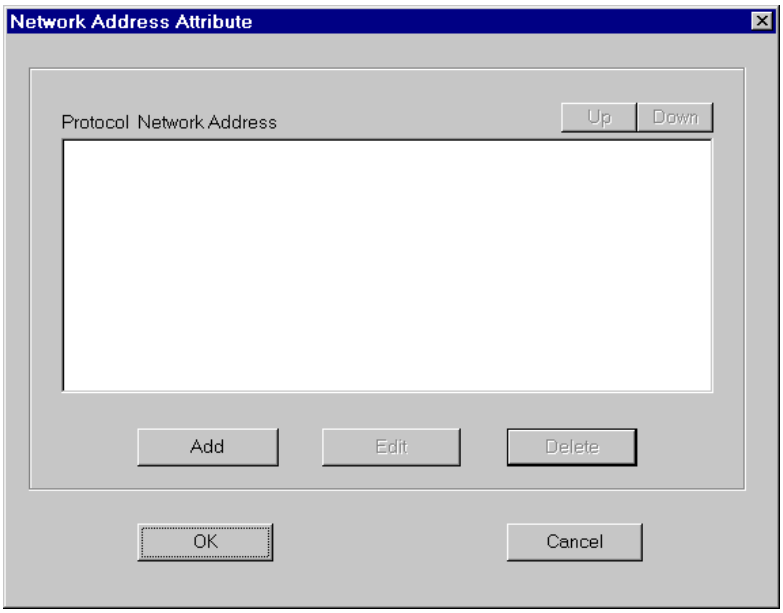
Once you have entered a Server Name, you need to modify the Server Address to complete the interfaces file entry.

❖ **To enter a Server Address:**

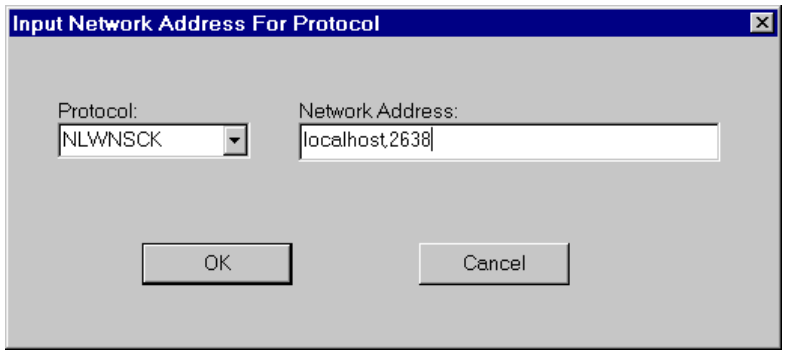
1 Select a server entry in the Server box.

2 Right-click the Server Address in the Attributes box.

3 Choose Modify Attribute from the popup menu. A window appears that shows the current value of the address. If you have no address entered, the box will be empty.



4 Click Add. The Network Address for Protocol window appears. Select NLWNSCK from the Protocol list box (this is the TCP/IP protocol) and enter a value in the Network Address text box.



For TCP/IP addresses take one of the following two forms:

- computer name,port number
- IP-address,portnumber

The address or computer name is separated from the port number by a comma.

Machine name

The machine on which the server is running is identified by a name or an IP address. On Windows and Windows NT you can find the machine name in Network Settings, in the Control Panel.

If your client and server are on the same machine, you must still enter the machine name. In this case, you can use **localhost** to identify the current machine.

Port Number

The port number you enter must match the port specified on the Adaptive Server Anywhere database server command line, as described in "Starting the database server as an Open Server" on page 819. The default port number for Adaptive Server Anywhere servers is 2638. This number has been assigned to Adaptive Server Anywhere by the Internet Adapter Number Authority, and use of this port is recommended unless there are good reasons for explicitly using another port.

The following are valid server address entries:

```
elora,2638
123.85.234.029,2638
```

Verifying the server address

You can verify your network connection by using the Ping command from the Server Object menu.

Database connections not verified
Verifying a network connection confirms that a server is receiving requests on the machine name and port number specified. It does not verify anything about database connections.

❖ **To ping a server:**

1 Ensure that the database server is running.

2 Click the server entry in the Server box of the *dsedit* session window.

3 Select Ping from the Server Object menu. The Ping window appears.

4 Click the address that you want to ping. Click Ping.

A message box appears, to notify you if the connection is successful or not. A message box for a successful connection states that both Open Connection and Close Connection succeeded.

Renaming a server entry

You can rename server entries from the *dsedit* session window.

❖ **To rename a server entry:**

1 Select a server entry in the Server box.

2 Choose Rename from the Server Object menu. The Input Server Name window appears.

3 Type a new name for the server entry in the Server Name box. Click OK to make the change.

Deleting server entries

You can delete server entries from the *dsedit* session window.

❖ **To delete a server entry:**

1 Click a server entry in the Server box.

2 Choose Delete from the Server Object menu.

Characteristics of Open Client and jConnect connections

When Adaptive Server Anywhere is serving applications over TDS, it automatically sets relevant database options to values that are compatible with Adaptive Server Enterprise default behavior. These options are set temporarily, for the duration of the connection only. They can be overridden by the client application at any time.

Default settings

The database options that are set on connection using TDS are as follows:

Option	Set to
ALLOW_NULLS_BY_DEFAULT	OFF
ANSINULL	OFF
ANSI_BLANKS	ON
ANSI_INTEGER_OVERFLOW	ON
AUTOMATIC_TIMESTAMP	ON
CHAINED	OFF
CONTINUE_AFTER_RAISERROR	ON
DATE_FORMAT	YYYY-MM-DD
DATE_ORDER	MDY
ESCAPE_CHARACTER	OFF
ISOLATION_LEVEL	1
FLOAT_AS_DOUBLE	ON
QUOTED_IDENTIFIER	OFF
TIME_FORMAT	HH:NN:SS.SSS
TIMESTAMP_FORMAT	YYYY-MM-DD HH:NN:SS.SSS
TSQL_HEX_CONSTANT	ON
TSQL_VARIABLES	ON

How the startup options are set

The default database options are set for TDS connections using a system procedure named **sp_tsql_environment**. This procedure sets the following options:

```
SET TEMPORARY OPTION TSQL_VARIABLES='ON';
SET TEMPORARY OPTION ANSI_BLANKS='ON';
SET TEMPORARY OPTION TSQL_HEX_CONSTANT='ON';
SET TEMPORARY OPTION CHAINED='OFF';
```

```
SET TEMPORARY OPTION QUOTED_IDENTIFIER='OFF';
SET TEMPORARY OPTION ALLOW_NULLS_BY_DEFAULT='OFF';
SET TEMPORARY OPTION AUTOMATIC_TIMESTAMP='ON';
SET TEMPORARY OPTION ANSINULL='OFF';
SET TEMPORARY OPTION CONTINUE_AFTER_RAISERROR='ON';
SET TEMPORARY OPTION FLOAT_AS_DOUBLE='ON';
SET TEMPORARY OPTION ISOLATION_LEVEL='1';
SET TEMPORARY OPTION DATE_FORMAT='YYYY-MM-DD';
SET TEMPORARY OPTION TIMESTAMP_FORMAT='YYYY-MM-DD
HH:NN:SS.SSS';
SET TEMPORARY OPTION TIME_FORMAT='HH:NN:SS.SSS';
SET TEMPORARY OPTION DATE_ORDER='MDY';
SET TEMPORARY OPTION ESCAPE_CHARACTER='OFF'
```

Do not edit the sp_tsql_environment procedure
You should not alter the procedure yourself. It is for system use only.

The procedure only sets options for connections that use the TDS communications protocol. This includes Open Client and JDBC connections using jConnect. Other connections (ODBC and Embedded SQL) have the default settings for the database.

You can change the options for TDS connections as follows:

❖ **To change the option settings for TDS connections:**

1 Create a procedure that sets the database options you want. For example, you could use a procedure such as the following:

```
CREATE PROCEDURE my_startup_procedure()
BEGIN
  IF connection_property('CommProtocol')='TDS' THEN
    SET TEMPORARY OPTION QUOTED_IDENTIFIER='OFF';
  END IF
END
```

This procedure changes only the QUOTED_IDENTIFIER option from the default settings.

2 Set the LOGIN_PROCEDURE option to the name of a new procedure:

```
SET OPTION LOGIN_PROCEDURE=
'dba.my_startup_procedure'
```

3 Future connections will use the procedure.

For more information about database options, see "Database Options" on page 127 of the book *Adaptive Server Anywhere Reference Manual*.

Data type mappings

If you are developing Open Client applications, you should be aware of mappings between the data types supported by Adaptive Server Anywhere and those expected by Open Client.

For more information about these data type mappings, see "Data type mappings" on page 145 of the book *Adaptive Server Anywhere Programming Interfaces Guide*.