Oracle Network Products for Windows NT/Windows 95 Installation and User's Guide

Release 2.2

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ORACLE®

The Relational Database Management System

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Oracle Network Products for Windows NT/Windows 95 Installation and User's Guide

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Preface

This document, *Oracle Network Products for Windows NT/Windows 95 Installation and User's Guide,* provides operating system-specific information on how to install, configure, and use:

- the Oracle Protocol Adapters
- SQL*Net
- Oracle SQL*Net Easy Configuration utility
- Oracle Names
- Oracle Network Manager for Windows

Network administrators should use this Guide as an operating system-specific document (OS Doc), in conjunction with the Oracle network product documents listed in the "Related Publications" section of this Preface.

Attention: To verify the version for each product discussed in this Guide, see the Oracle Product Versions in the "How to Use This Guide" section of this Preface or the *Release Notes* included in your Oracle product kit.

Audience

This Guide is for both end-users and network administrators who install, configure and use Oracle Network Products. Use this Guide in conjunction with a machine running Windows NT or Windows 95 (server or client workstation). This Guide assumes the following:

- you have installed and tested your network
- you are familiar with your operating system (commands for deleting and copying files; concepts of search path, configuration files, and directory structure), and concepts, such as alias, server, and client
- you know how to use a text editor to make changes to an ASCII text file

Note on Directories

The Oracle Installer creates the directory structure for all Oracle products. A main directory, the ORACLE_HOME directory, holds the Oracle subdirectories and files.

The default ORACLE_HOME directory for Windows NT is ORANT.

The default ORACLE_HOME directory for Windows 95 is ORAWIN95.

This Guide assumes that all directory names are the default names given during the installation of Oracle Network Products. If you set up your system using different directory names, substitute them for the ones in this Guide. Appendix E of this Guide lists the complete directory structure for installed Oracle Network Products and associated files for your operating system.

Special Terms

Note the Guide's special terms:

Client	A system that runs an Oracle-supported application and connects to the shared database(s) on an Oracle7 Server.
Server, or Oracle7 Server	A host system that runs a multiuser Oracle7 Relational Database Management System (RDBMS) and maintains at least one database that can be shared by remote clients. The term "Oracle7 Server" refers to the RDBMS that is using SQL*Net and is capable of serving any Oracle client.
Oracle7 database	The software used to create and maintain the database system, as well as the actual data stored in the database.
Oracle7 RDBMS	The Oracle Relational Database Management System. Oracle7 Server and Oracle Workgroup Server are examples of an Oracle RDBMS.
TNS	Transparent Network Substrate (TNS) is the Oracle networking technology that provides a single application interface to all industry-standard networking protocols.
TNS-based application	A TNS-based application uses the common functions of the TNS interface to transmit data across one or more networks. SQL*Net is a TNS-based application.
Service name	A short, convenient name mapped to a network address contained in a TNS *connect descriptor*. Users need only know the appropriate service name to make a TNS connection.
Connect descriptor	A specially formatted description of the destination for a network connection. Connect descriptors are constructed using a set of keywords and values mapped to *service names*. For example, an Oracle Tool would use a service name representing a connect descriptor to initiate a TNS connection with an Oracle7 Server. Each connect descriptor is assigned a service name in the network definition and stored in the TNSNAMES.ORA network configuration file, in an Oracle Names database, or in a native naming service.
Network listener or listener	An executable program that enables an Oracle7 server to accept connections from client machines over SQL*Net.

Oracle Names	Transparent naming software for central storage of network names and addresses in the Names servers database. Oracle Names enables network components to connect easily without regard to specific physical locations or configurations on the network. A complete description of Oracle Names and its configuration file appears in the *Oracle Names Administrator's Guide*.
Oracle Network Manager for Windows	A tool that provides on-screen forms the network administrator fills in to define network objects. The product creates the necessary configuration files for use by server and client machines. A complete description of Oracle Network Manager for Windows appears in the *Oracle Network Manager Administrator's Guide.*
TNS community	A group of TNS-based applications that communicate with one another using a single network protocol. TNS communities are commonly named according to the protocol in use. For example, "TCP/IP community" refers to a discrete network running the TCP/IP protocol.
TNS connection	A TNS connection is an application-level connection between two TNS-based applications.
Oracle Protocol Adapter	The software component of the TNS architecture that translates TNS function calls into calls of the underlying network protocol.
Oracle Tool	Any Oracle application tool, such as SQL*Plus, or an Oracle end-user tool, such as Oracle Forms, or third-party software that interfaces with an Oracle7 Server.
SQL*Net	Oracle client/server communication software that offers transparent operation to Oracle Tools or databases over various network protocols and operating systems.
protocol adapter_	A TNS-based application that enables client workstations to access Oracle7 servers.
Oracle MultiProtocol Interchange	Software that enables clients on separate networks using different protocols to communicate by translating from one protocol to another. Complete descriptions for this product and its configuration files appear in the *MultiProtocol Interchange Administrator's Guide*.

How this Guide Is Organized

This Guide includes the following chapters and appendices.

Chapter 1 Introducing Oracle Network Products

Describes each supported Oracle Protocol Adapter, SQL*Net, Oracle Network Manager for Windows, and Oracle Names.

Chapter 2 Installing Oracle Network Products

Provides installation instructions (from CD-ROM) for the Oracle Protocol Adapters, SQL*Net, Oracle Network Manager for Windows, and Oracle Names.

Chapter 3 Using SQL*Net Easy Configuration

Provides instructions on using the SQL*Net Easy Configure utility that automatically configures SQL*Net for users with simple configuration needs.

Chapter 4 Using Oracle Network Products

Explains how to log in and connect to a database.

Appendix A Oracle Installer Overview

Explains the purpose and use of the product installation utility: how it modifies the CONFIG.SYS file and how to navigate without a mouse.

Appendix B Oracle Installer Error Messages

Lists messages that might arise during installation.

Appendix C Registry for Windows NT and Windows 95

Explains how the network administrator gains access to Oracle-related system settings.

Appendix D Sample Configuration Files

Provides examples of TNSNAMES.ORA, SQLNET.ORA, and LISTENER.ORA.

Appendix E Verifying Installation of Oracle Network Products

Shows the directory structure for installed products and explains how to verify the proper installation Oracle Network Products.

Appendix F Configuring Oracle Network Products

Provides information enabling the network administrator using Network Manager for Windows to configure the client to access an Oracle7 Server.

How to Use this Guide

SQL*Net Easy Configuration is a configuration utility designed as a standard for workgroup networks with

- simple network configuration needs
- users who know their server name and service ID (SID)

Read Chapter 3 to learn how to use SQL*Net Easy Configure.

Oracle Network Manager for Windows is a configuration utility standard for the network administrator who

- administrates a complex network set up
- wants to use Oracle MultiProtocol Interchange (MPI), Oracle Names, Secure Network Services (SNS), or provide for end-users who do not know the name of their server

Read Appendix E and Appendix F if you are the network administrator using Oracle Network Manager for Windows.

Caution: Oracle strongly recommends that every machine in the workgroup network be configured with one, and only one, of the configuration utilities: SQL*Net Easy Configuration,or Oracle Network Manager for Windows.

Caution: SQL*Net Easy Configuration and Oracle Network Manager for Windows are mutually exclusive on any one machine.

Network administrators should use this Guide in conjunction with the Oracle network products documents listed in the Related Publications section of this Preface. This Guide also describes the protocol terms and concepts and protocol-specific keywords used in the connect descriptors.

The network product documents listed below use an OS Doc icon in their margins to refer users to this Guide (which is the operating system-specific manual) for installation and configuration of Oracle Network Products.

- *Understanding SQL*Net*
- *Oracle Network Manager Administrator's Guide*
- *Secure Network Services Administrator's Guide*

Oracle Product Versions

The table below lists the Oracle network products and release versions covered in this Guide.

Oracle Network Products	***Product Release Version***
Oracle TCP/IP Protocol Adapter	*Version 2.2*
Oracle SPX/IPX Protocol Adapter	*Version 2.2*
*SQL*Net*	*Version 2.2*
Oracle Names	*Version 1.1*
Oracle Network Manager for Windows	*Version 3.0*

Product Kit Contents

Your kit contains the Oracle7 products for Windows NT CD-ROM, or the Oracle7 Products for Windows

95 Version CD-ROM which holds the following products, product-related files, and online documentation:

Windows NT or Windows 95 products and product-related files

- *Oracle Installer for Windows NT or Oracle Installer for Windows 95*
- *Required Support Files*
- *Oracle TCP/IP Protocol Adapter*
- *Oracle SPX/IPX Protocol Adapter*
- *Oracle Named Pipes Protocol Adapter Client*
- *Oracle Named Pipes Protocol Adapter Server (for Windows NT only)*
- *Oracle Names*
- *SQL*Net (Server)*
- *SQL*Net (Client)*

Windows products and product-related files

- *Oracle Network Manager for Windows*
- *Oracle Installer for Windows* (for installing Oracle Network Manager for Windows)
- *Required Support Files for Windows*
- *SQL*Net (Client)*
- *Required Support Files*
- *Graphical User Interface (GUI) Common Files*
- *Oracle Network Products Installation and User's Guide*
- *Oracle Network Products Release Notes*
- *Oracle Network Products Messages Manual*
- *Understanding SQL*Net*

Related Publications

Refer to the following Oracle documents for further information on SQL*Net:

- *Oracle Network Manager for Windows Installation and User's Guide*
- *Understanding SQL*Net*

- *Oracle Network Manager Administrator's Guide*
- *Oracle Names Administrator's Guide*
- *Multiprotocol Interchange Administrator's Guide*
- *SQL*Net V1 to V2 Migration Guide*

Oracle7 Server:

- *Oracle7 Server Concepts Manual*
- *Oracle7 Server Administrator's Guide*
- *Oracle7 Server Utilities User's Guide*
- *Oracle7 Server Messages and Codes Manual*
- *Oracle7 Server Application Developer's Guide*
- *Oracle7 Server Documentation Addendum*, *Release 7.1*

SQL:

- *Oracle7 Server SQL Language Reference Manual*
- *Oracle7 Server SQL Language Quick Reference*
- *PL/SQL User's Guide and Reference*
- *PL/SQL Release 2.2 and Oracle Precompilers Release 1.7 Addendum*

Oracle Secure Network Services:

- *Secure Network Services Administrator's Guide*

  Describes the new encryption, checksuming, and authentication features that add security to network messages, including

  - an overview of the Oracle Secure Network Services product
  - the purpose and effectiveness of the security feature
  - how to enable the security features using Oracle Network Manager

Notational Conventions

This Guide uses the following notational conventions:

`Monospace text_`	Type text exactly as shown. Text typed for a command statement is not case sensitive unless noted otherwise.
[ ]_	Brackets enclose optional items or indicate a

	function key. Do not enter the brackets.
Punctuation_	Punctuation other than brackets and vertical bars must be entered in commands exactly as shown.
UPPERCASE_	Uppercase characters within the text represent command names, SQL reserved words and keywords, and example filenames.
`lowercase mono_`	Lowercase characters within command lines represent variables. You should substitute an appropriate value for the variable. In examples, lowercase characters represent sample values for the variables.
*lowercase italics_*	Lowercase italics in the text represent variables. You should substitute an appropriate value for the variable.
C:\>_	Represents the DOS prompt of the hard disk drive you are using. Your prompt designator may differ.
\DIRECTORY_	A backslash before a directory name signals that the directory is a subdirectory.

Your Comments Are Welcome

We value and appreciate your comments as a user of Oracle products and a reader of our manuals. At the back of this Guide is a Reader's Comment Form. We encourage you to use this form to tell us what you like and dislike about this (or other) Oracle manuals. If the form is missing, you can contact us at the following address:

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Redwood Shores, California 94065

Fax: (415) 506-7371

Introducing Oracle Network Products

This chapter describes Oracle Network Products, protocol terms, and SQL*Net concepts.

Specifically, this chapter covers the following topics:

- New Feature: SQL*Net Easy Configuration utility
- Oracle protocol adapters in general
- client/server architecture overview
- Open Systems Interconnect (OSI) model
- differences between SQL*Net V1.x and V2.x
- supported Oracle network product versions and vendors
- overview of each supported Oracle protocol adapter
- other Oracle Network Products

New Feature: Easy Configure

Easy Configure is a new feature for end-users that automatically configures Oracle Network Products. This convenient utility is documented in Chapter 3 of this Guide.

Suggestion: See the appendix on "Configuring Oracle Network Products" if you are a network administrator and your setup requires special configuration.

Attention: Oracle only supports configuration files created by using one of these two products: the SQL*Net Easy Configuration utility (for simple database connections), or Oracle Network Manager for Windows (for advanced SQL*Net features, such as Oracle Names and Secure Network Services).

Caution: Every machine in the workgroup network must be configured with one, and only one, of the configuration utilities: SQL*Net Easy Configuration, or Oracle Network Manager for Windows. The network cannot be configured by a mix of the two utilities.

Oracle Protocol Adapters in General

An Oracle protocol adapter translates (or adapts) function calls of specific network protocols into equivalent function calls of Oracle's Transparent Network Substrate (TNS). Conversely, an Oracle protocol adapter translates (or adapts) TNS function calls into function calls for the underlying network protocol.

An Oracle protocol adapter is necessary for any TNS-based application that communicates across a network via the supported protocol. SQL*Net and the Oracle MultiProtocol Interchange are examples of TNS-based applications.

Transparent Network Substrate (TNS) is the name of Oracle's networking technology, which creates a single application interface to industry-standard networking protocols.

Additional Information: For additional information about TNS architecture and the network configuration of Oracle protocol adapters and SQL*Net, see *Understanding SQL*Net.*

Additional Information: For additional information about how to upgrade version 1 of SQL*Net to version 2, see *SQL*Net V1 to V2 Migration Guide.*

The Oracle protocol adapters support the following protocols running under Windows NT/Windows 95:

- TCP/IP Client and Server
- SPX/IPX Client and Server
- Named Pipes Client
- Named Pipes Server for Windows NT

For a detailed technical discussion of these protocols, see the third-party network documentation that came with your protocol software.

Client/Server Architecture Overview

Client/server architecture is a way of separating a database application into two parts. The two parts can run on separate computers and communicate with each other over a network, as described below.

Client/User

The user requests database information from the server by supplying input to an Oracle tool running on the client machine. The Oracle tool accepts this input from the user through the keyboard and mouse, and gives it to SQL*Netto be transported across the network to the server.

SQL*Net uses an Oracle protocol adapter to establish and maintain connections to Oracle7 servers on the network. The Oracle protocol adapter translates the SQL*Net (TNS) functions into equivalent protocol-specific functions in the underlying network.

Server

The server portion runs the Oracle7 database software and a SQL*Net network listener program. The SQL*Net network listener, through an Oracle protocol adapter, accepts connections from client applications anywhere on the network. (Clients must use the same protocol or go through a MultiProtocol Interchange; see the *SQL*Net Administrator's Guide*.) SQL*Net must be installed on both the client and server so it can transfer user input from the client machine to the server machine.

SQL*Net on the server then delivers that user's request to the Oracle7 database. The database performs the function requested by the user on the client machine. Finally, SQL*Net transfers the results of the database functions to the client machine.

Database sharing,Local data usage

Client/server architecture makes it easy for one database to be shared by remote workstations. It allows the server to perform the various database management tasks, while the clients manipulate data locally without taxing server and network resources.

Distributed Processing

In a typical network configuration, the client and server portions of the database management system reside on different machines to enable the division of labor between client and server. The server must have sufficient memory, disk storage, and processing power to execute and administer the database. Clients need only enough memory to execute an application or tool that accesses the database server over a network. This separation of work between different computers is called *distributed processing*.

Distributed Databases

A *distributed database* is a network of databases stored on multiple computers. This database network appears to the user as a single logical database. Each physical database is controlled by its own local database management system, and is connected to the remote physical databases via SQL*Net.

Distributed database servers are connected by a database link, which acts as a "path" from one database to another. A server uses the database link queries and modifies information on other servers as needed,

thereby acting as a client to the other servers.

Users can access the multiple servers of a distributed database simultaneously. For example, a user can easily join tables from multiple servers into a single view. The server's database administrator (DBA) can set up database links so that the location of the data does not have to be specified by the user. This is called *location transparency*.

Each database participating in a distributed database system is said to be "site-autonomous." The databases are administered separately and independently. Using SQL*Net, a network administrator can perform tasks on Oracle servers both locally and remotely (across a network).

Open Systems Interconnect (OSI) model

Because of the diversity of network architectures, the International Standards Organization (ISO)has established a model that describes the transmission of data across networks. The Open Systems Interconnect (OSI) model outlines a seven-layer software structure for data communication. Layer 1, the lowest layer, supports physical transmissions. Layer 7, the highest layer, supports the interface to users or applications.Each OSI layer provides a service for the layer immediately above it.

The Lower OSI Layers

The first three layers of the OSI model support the hardware and electronic transmission involved in network communications.

Layer 1 **Physical**	Supports the actual physical medium used and the electronic signals transmitted, that is, wire or cable. Software found here supports Ethernet, Token Ring, or other network media.
Layer 2 **Data link**	Operating-system driver routines control the hardware, sending or receiving a single message or byte string.
Layer 3 **Network**	The routing layer, where communications software decides which network pathways to use for message traffic.

The Higher OSI Layers

The higher OSI layers support the translation, security, and sending of information from one machine on a network to another.

Layer 4 **Transport**	Responsible for reliable transmission of data (making sure messages are appropriately buffered, causing retransmissions for garbled messages, and so forth). This layer packages user messages for transmission by the lower layers.
Layer 5 **Session**	Responsible for creating, closing, and coordinating process-to-process connections. This layer permits the user to invoke file transfers and "virtual terminal" services.
Layer 6 **Presentation**	Processes that rely directly on the session layer for network services.
Layer 7 **Application**	The interface between applications (such as Oracle tools on a client workstation or Oracle7 Servers on a database server), and the network communications software.

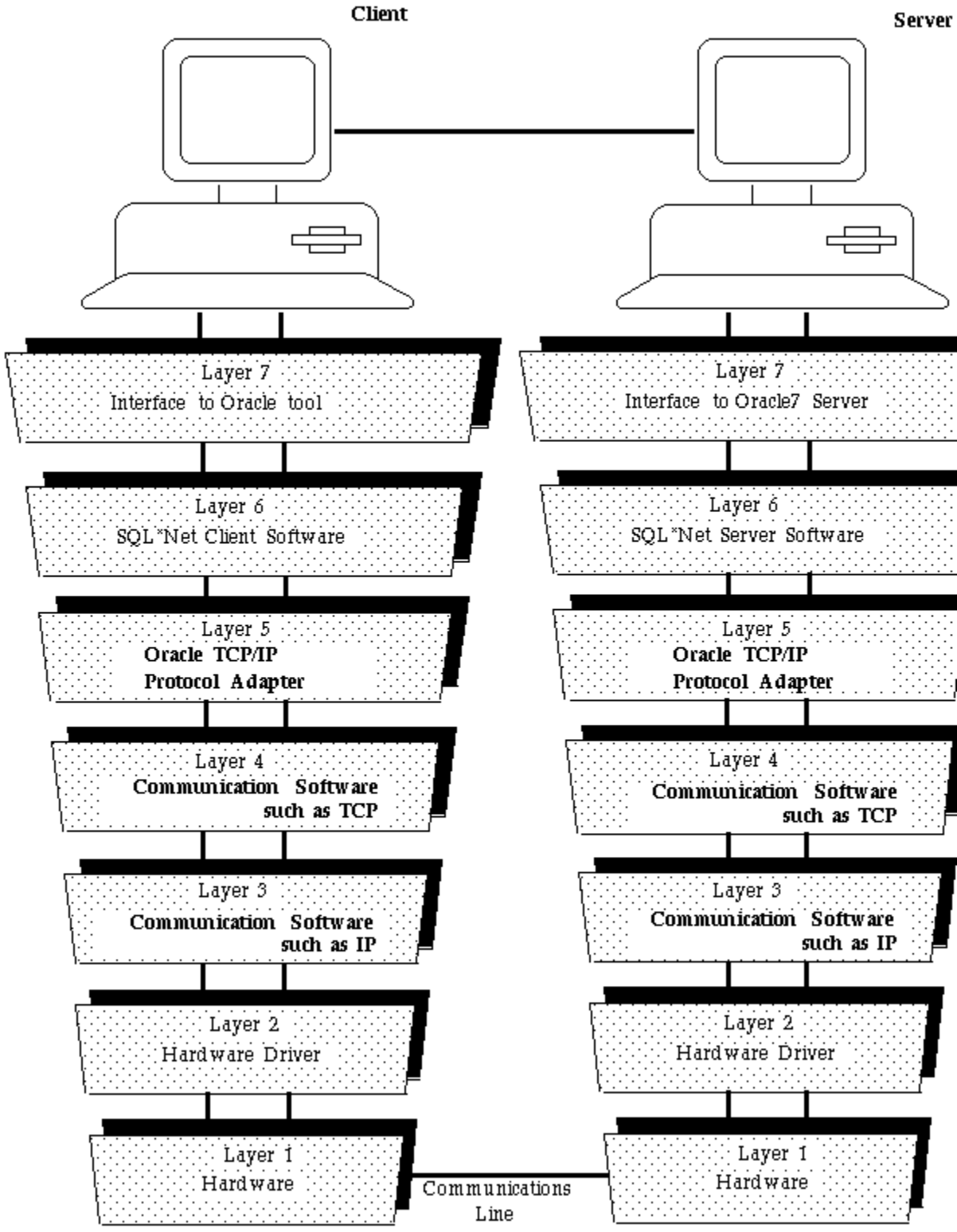
Oracle protocol adapters and the OSI model

In a client/server session, the Oracle protocol adapter and SQL*Net on the client side take the SQL requests from the application and package them for transmission. Once the network package is received by the server machine, the Oracle protocol adapter and SQL*Net on the server side assemble the SQL statements from the network package, and then pass them to the Oracle7 database. When the Oracle7 Server replies, the data is sent back to the client machine via the same mechanism.

In terms of the OSI model, Oracle protocol adapters reside at the fifth layer (session), and SQL*Net software resides at the sixth layer (presentation). The protocol adapter provides an interface to the fourth layer (transport) of the network communication software. The lower layers are invisible to SQL*Net and the Oracle protocol adapters.

This network hardware and software independence makes it possible to run the software on many networks and establish inter-network communications. The following figure shows where the Oracle protocol adapter software of both the client and the server fit into the seven-layer OSI model (layer 5).

Oracle protocol adapters and OSI model


Client
Server
Layer 7
Interface to Oracle tool
Layer 7
Interface to Oracle7 Server
Layer 6
SQL*Net Client Software
Layer 6
SQL*Net Server Software
Layer 5
Oracle TCP/IP
Protocol Adapter
Layer 5
Oracle TCP/IP
Protocol Adapter
Layer 4
Communication Software
such as TCP
Layer 4
Communication Software
such as TCP
Layer 3
Communication Software
such as IP
Layer 3
Communication Software
such as IP
Layer 2
Hardware Driver
Layer 2
Hardware Driver
Layer 1
Hardware
Communications
Line
Layer 1
Hardware

Differences Between SQL*Net Version 1.*x* and Version 2.*x*

In the SQL*Net version 1.x product, the format of a connect string varied according to the SQL*Net driver being used. SQL*Net version 2.*x* standardizes the process of connecting to Oracle7 Servers from client workstations; clients use a common set of keywords and values to describe the location of Oracle7 Servers on the network.

Attention: SQL*Net version 1.*x* and version 2.*x* products are incompatible, but they can coexist. For example, you cannot connect to a SQL*Net version 2.*x* network listener using SQL*Net version 1.*x* client software. However, SQL*Net version 1.*x* and version 2.*x* products can coexist on a client/server system if you install and run both versions of the SQL*Net network listener on your Oracle7 Server machine. Using this setup, version 1.*x* clients connect to the version 1.*x* network listener, while version 2.*x* clients connect to the version 2.*x* network listener.

Additional Information: For additional information, see *SQL*Net V1 to V2 Migration Guide*.

Supported Oracle Product Versions and Vendors

Table 1-1 lists the Oracle network products, release versions, and supported vendors covered in this Guide.

Oracle Network Products for Windows NT/Windows 95	***Oracle Product Release Versions***	***Supported Vendors***
SQL*Net	Version 2.2	Oracle Corporation
Oracle TCP/IP Protocol Adapter	Version 2.2	Microsoft TCP/IP
Oracle SPX/IPX Protocol Adapter	Version 2.2	Microsoft NW Link
Oracle Named Pipes Protocol Adapter (for Windows 95 client only, for Windows NT client and server)	Version 2.2	Microsoft NETBEUI
Oracle Network Manager for Windows	Version 3.0	Oracle Corporation

Table 1 - 1. Oracle Network Products for Windows 95/NT, Versions, and Supported Vendors

Overview of Each Supported Oracle Protocol Adapter

TCP/IP

TCP/IPis a combination of network protocols:

- a transport-layer protocol, the Transmission Control Protocol (TCP), and
- a network-layer protocol, the Internet Protocol (IP).

These protocols together facilitate transferring data across a network.

TCP Protocol

TCP provides services at Layer 4, Transport, a connection-oriented protocol for establishing reliable, sequenced data transfer.

IP Protocol

IP provides network-layer services in the OSI model, at Layer 3, Network, the routing layer close to the hardware that carries the communication.

Note: For more information on TCP and IP, see your operating system documentation.

Oracle TCP/IP Protocol Adapter

Oracle TCP/IP Protocol Adapter contains a set of dynamic link libraries (DLLs) that enable client/server conversation over a network using TCP/IP and SQL*Net. This combination of Oracle products enables an Oracle application on a client to communicate with remote Oracle databases via TCP/IP (if the Oracle database is running on a host system that supports network communication using TCP/IP.)

Oracle TCP/IP Protocol Adapter provides process-to-process connection services at Layer 5, Session.

SPX/IPX

SPX/IPXis a combination of network protocols:

- a transport-layer protocol, the Sequenced Packet Exchange (SPX), and
- a network-layer protocol, the Internetwork Packet Exchange (IPX).

These protocols carry data packets between clients and their servers.

SPX and IPX are specifically designed for PC LAN environments. They are high-performance communications protocols suitable for memory-constrained PC workstations. SPX/IPX supports all major PC operating systems.

SPX/IPX Protocol

SPX is a high-performance communications protocol that provides transport-layer services under the Open Systems Interconnect (OSI) model. It is a connection-oriented protocol for establishing a reliable, peer-to-peer connection between the source and destination of a network request before sending any data packets. SPX guarantees delivery, sequencing of packets, and correction of errors encountered.

SPX provides services at Layer 4, Transport, a connection-oriented protocol for establishing reliable, sequenced data transfer.

IPX Protocol

IPX is a connectionless protocol that provides network-layer services in the OSI model. Connectionless protocols do not establish connections between the source and destination of network requests. Data packets are addressed and sent, but the sender has no guarantee that data will be successfully delivered or correctly sequenced.

IPX provides network-layer services in the OSI model, at Layer 3, Network, the routing layer close to the hardware that carries the communication.

Note: For more information on the SPX and IPX protocols, see the Novell manual that came with your SPX/IPX software.

Oracle SPX/IPX Protocol Adapter

Oracle SPX/IPX Protocol Adapter contains a dynamic link library (DLL) that enable client/server conversation over a network using SPX/IPX and SQL*Net. This combination of Oracle products enables an Oracle application on a client to communicate with remote Oracle databases via SPX/IPX (if the Oracle database is running on a host system that supports network communication using SPX/IPX).

Oracle SPX/IPX Protocol Adapter provides process-to-process connection services at Layer 5, Session.

Named Pipes

Named Pipes is a high-level interface providing interprocess communications between clients and servers (distributed applications). One process (the server side of the application) creates the pipe, and the other process (the client side) opens it by name. What one side writes, the other can read, and vice versa.

Oracle Named Pipes Protocol Adapter allows an Oracle application on a client machine to communicate with remote Oracle databases via Named Pipes.

Other Oracle Network Products

Oracle SQL*Net Easy Configuration Utility

Oracle SQL*Net Easy Configuration is a new utility designed to make configuration quick and simple. Use SQL*Net Easy Configuration if:

- your network administrator has chosen SQL*Net Easy Configuration as your workgroup's network standard
- SQL*Net configuration for your environment is not done by a central administrator (and you know your server name)

If your network standard is Oracle Network Manager for Windows, the network adminstrator should use Oracle Network Manger for Windows. See Chapter 3 of this Guide for more information.

Attention: Oracle only supports configuration files created by using one of these two products: the SQL*Net Easy Configuration utility (for simple database connections) or Oracle Network Manager for Windows (for advanced SQL*Net features, such as Oracle Names and Secure Network Services).

Caution: Oracle strongly recommends that every machine in the workgroup network be configured with one, and only one, of the configuration utilities: SQL*Net Easy Configuration,or Oracle Network Manager for Windows.

Caution: SQL*Net Easy Configuration and Oracle Network Manager for Windows are mutually exclusive on any one machine.

Oracle Network Manager for Windows

Oracle Network Manager for Windows is a graphical user interface (GUI) tool for network administrators to create and modify the configuration files required by Oracle networking products.

This Guide contains Oracle Network Manager for Windows installation instructions in Chapter 2. Currently, no specific configuration tasks for this product are necessary for Windows NT or Windows 95. For information on using Oracle Network Manager for Windows, see *Oracle Network Manager Administrator's Guide*.

Attention: Oracle only supports configuration files created by using one of these two products: the SQL*Net Easy Configuration utility (for simple database connections) or Oracle Network Manager for Windows (for advanced SQL*Net features, such as Secure Network Services).

Caution: You must use SQL*Net Easy Configuration or Oracle Network Manager for Windows; you cannot use both together.

Oracle Names

The Oracle Names utility provides a central name service that spans across heterogeneous networks with different protocols to resolve names. Oracle Names simplifies network administration tasks, such as adding or relocating services. For more information about Oracle Names, see *Oracle Names Administrator's Guide*.

Secure Network Services

Oracle Secure Network Services is an optional product that enables data encryption and checksumming. For more information, see *Understanding SQL*Net*.

Installing Oracle Network Products

This chapter describes how to install Oracle Network Products and covers the following topics:

- installation overview for SQL*Net Easy Configuration users
- installation overview for Oracle Network Manager users
- system requirements
- before you install
- CD-ROM quick start install instructions
- CD-ROM detailed install instructions

Suggestion: See Appendix A, "Oracle Installer Overview", for general information about the Oracle Installer.

Note: The products discussed herein are for Version 2 of SQL*Net. If you are using SQL*Net V1, see *SQL*Net V1 to V2 Migration Guide*.

Attention: Oracle only supports configuration files created by using one of these two products: the SQL*Net Easy Configuration utility (for simple database connections) or Oracle Network Manager for Windows (for advanced SQL*Net features, such as Secure Network Services).

Caution: Oracle strongly recommends that every machine in the workgroup network be configured with one, and only one, of the configuration utilities: SQL*Net Easy Configuration,or Oracle Network Manager for Windows.

Caution: SQL*Net Easy Configuration and Oracle Network Manager for Windows are are mutually exclusive on any one machine.

Installation Overview (for Easy Configuration Users)

1. Install Oracle for Windows NT/Windows 95 products, including the SQL*Net Easy Configuration utility.

2. Exit the Oracle Installer.

3. Proceed to the chapter on "Using the SQL*Net Easy Configuration".

Installation Overview (for Network Manager Users)

1. Start the Oracle Installer for your operating system (Windows NT or Windows 95).
2. Install the appropriate Oracle network products.
3. Exit the Oracle Installer for your operating system.
4. Start the Oracle Installer for Windows 3.1.
5. Install Oracle Network Manager for Windows.
6. Exit the Oracle Installer for Window 3.1.
7. Proceed to the appendix on "Verifying Installation of Oracle Network Products".

System Requirements

Ask your network administrator which option is the standard in your workgroup network:

- the SQL*Net Easy Configuration utility
- Oracle Network Manager for Windows

Hardware Requirements

- an IBM, COMPAQ, or 100%-compatible PC based on an 80486 processor or better
- a network interface card supported by the network protocol vendor whose network software corresponds to the Oracle protocol adapter(s) you install
- a connected CD-ROM drive
- at least 16 megabytes (MB) extended memory
- hard disk space for the following installation options:

Listed below are the hard disk space requirements for installing Oracle Network Products with the **SQL*Net Easy Configuration** utility option.

PRODUCT	**SIZE approx. in megabytes**
SQL*Net Easy Configuration	2
SQL*Net Version 2.2: Client, or	3
Server	3.5
The appropriate SQL*Net Protocol Adapter(s):	
- Oracle TCP/IP Protocol Adapter	.31
- Oracle SPX/IPX Protocol Adapter	.12
- Oracle Named Pipes Protocol Adapter	.7
Required Support Files (RSFs)	10.6
SQL*Net V2.2 Documentation	8
Oracle Installer and related files	3

Listed below are the hard disk space requirements for installing Oracle Network Products with the **Oracle Network Manager for Windows** option.

PRODUCT	**SIZE approx. in megabytes**
Oracle Network Manager for Windows	5.1
Required Support Files for Windows (RSFs)	20
GUI Common Files for Windows	2.6
SQL*Net for Windows	2.6
SQL*Net Version 2.2	
- Client, or	3
- Server	3.5
The appropriate SQL*Net Protocol Adapter(s):	
- Oracle TCP/IP Protocol Adapter	.31
- Oracle SPX/IPX Protocol Adapter	.12
- Oracle Named Pipes Protocol Adapter	.7

Required Support Files	10.6
SQL*Net V2.2 Documentation	8
Oracle Installer and related files	3

Note: Oracle Names is an optional product that requires approximately 1.6 megabytes of hard disk space.

Software Requirements

Listed below are the software requirements for Oracle network products.

- Windows NT 3.5 or later, or Windows 95
- third party network software corresponding to the Oracle protocol adapter(s) you install. (See the "Supported Oracle Product Versions and Vendors" section in Chapter 1 of this Guide.)
- Oracle Network Manager for Windows, if you choose that option instead of the SQL*Net Easy Configuration.

Note: With Oracle Network Manager, you can choose to save your network definition on the local machine or to a database. If the network is configured for Oracle Names, the Oracle Names server stores service names and associated connect descriptors in the Oracle7 database, so Oracle Network Manager for Windows does not generate the TNSNAMES.ORA file.

Before You Install

Before you install Oracle Network Products for Windows NT/Windows 95, perform the appropriate tasks listed below:

- Install your network hardware.
- Install Windows NT or Windows 95.
- Install your network software.
- Test your network hardware and software. (To test your network system connection, refer to your network system documentation.)
- Read the *Customer Support Information* booklet and return your registration card to the appropriate support center.
- Review the accompanying *Release Notes*.
- Shut down the SQL*Net network listener and any other Oracle-based applications.
- If you choose the Oracle Network Manager for Windows option instead of the SQL*Net Easy Configuration option, have your *Oracle Network Manager for Windows Installation and User's Guide* ready.
- Make a backup copy of *ORACLE_HOME*\NETWORK\ADMIN\LISTENER.ORAeach time before you (re-)install Oracle Network Products (if you have a custom configuration of the SQL*Net listener).

CD-ROM Quick Start Install Instructions

Perform the tasks in the "Before You Install" checklist section of this chapter. For more detailed steps, see this chapter's CD-ROM Detailed Install Instructions.

Caution: With each (re-)install, the `LISTENER.ORA` file in the *`ORACLE_HOME`*\NETWORK\ADMIN directory is renamed `LISTENER.OLD` and a new `LISTENER.ORA` file is created.

Step 1 Insert the CD-ROM for Oracle7 Products for Windows NT or the CD-ROM for Oracle7 Products for Windows 95.

Step 2 Run the Oracle Installer executable by typing:

```
G:\NT_X86\INSTALL\ORAINST (for Windows NT) or

G:\WIN95\INSTALL\ORAINST (for Windows 95)
```

where `G:` is the drive letter of your CD-ROM.

Step 3 Follow the on-screen directions about language, company, ORACLE_HOME directory.

For Windows 95:

- Follow the instructions for CONFIG.SYS.
- The **Installation Options** window appears.
- Choose Custom.

Step 4 Follow the on-screen instructions to install the product(s), then exit.

Note: If you are the Network Administrator and are using Network Manager for Windows, go to *Oracle Network Manager for Windows Installation and User's Guide.* Install Oracle Network Manager for Windows from the *Oracle Products* CD-ROM using the Oracle Installer for Windows. After you have installed the Oracle Network Manager, return to this Guide for further guidance on Oracle Network Products for Windows NT/Windows 95.

CD-ROM Detailed Install Instructions

Before you install Oracle Network Products, perform the tasks in this chapter's "Before You Install" checklist section.

Caution: With each (re-)install, the `LISTENER.ORA` file in the `ORACLE_HOME\NETWORK\ADMIN` directory is renamed `LISTENER.OLD` and a new `LISTENER.ORA` file is created.

Step 1

1. Insert the Oracle CD-ROM into your CD-ROM reader.
2. Verify that the CD-ROM reader is mapped to a drive.
3. Verify that you can access the files on the CD-ROM.

Step 2

Run the Oracle Installer by typing:

```
G:\NT_X86\INSTALL\ORAINST (for Windows NT) or

G:\WIN95\INSTALL\ORAINST (for Windows 95)
```

where `G:` is the drive letter of your CD-ROM.

The **Language** dialog box appears if this is the first Oracle product you install.Otherwise, go to Step 5.

Note: The **Language** dialog box does not appear when you run the Oracle Installer from your hard drive.

Step 3

Select the Language you want displayed when you use Oracle products, and choose OK [or press Enter].

Step 4

The **Oracle Installation Settings** dialog box prompts you to enter the name of your company, as well as the location and name of your ORACLE_HOME directory.

Attention: If you change the location of your ORACLE_HOME directory, all previously installed products for that ORACLE_HOME are disabled.

Note: See Appendix A for more information about the ORACLE_HOME directory.

Step 5

Enter the company name, and choose OK.

The **(Path) Configuration** dialog box informs you that the PATH statement in the registry must be modified to include ORACLE_HOME\BIN.

Step 6

Choose Yes for automatic modification.

Note: Modifications to the PATH statement take effect the next time you log on (Windows NT) or reboot (Windows 95).

For Windows 95:

- Follow the instructions for CONFIG.SYS.
- The **Installation Options** window appears.
- Select Custom
- Choose OK.

The **Software Asset Manager** dialog box appears.

Step 7

For Windows NT:

- Select Networking Products.
- Choose Install.
- Follow the onscreen instructions.

For Windows 95:

- Select one of the following from the Products available list:
  - SQL*Net Client
  - SQL*Net Server
- Choose Install.
- Follow the onscreen instructions.

A progress bar appears as the Oracle Installer installs products onto your hard drive.

A **Notification** dialog box informs you that installation is complete.

Step 8

Choose OK.

The **Software Asset Manager** dialog box reappears.

You can see what products are listed in the Products installed window, and you can install or de-install ("remove") products.

Step 9

Choose Exit.

A **Confirmation** dialog appears.

Choose Yes to exit the Oracle Installer.

Note: If SQL*Net Easy Configuration is the standard for your workgroup network, you have completed the installation tasks. Proceed to Chapter 3, "Using SQL*Net Easy Configuration".

Note: If Oracle Network Manager for Windows is the standard for your workgroup network, proceed to Step 11.

Step 10

Go to your *Oracle Network Manager for Windows Installation Guide* (included in this kit).

Step 11

Go to Step 3 of the CD-ROM Installation Steps in the Installation chapter of *Oracle Network Manager for Windows Installation User's Guide* (included in this kit).

Step 12

Follow the instructions to run the Oracle Installer for Windows and install Oracle Network Manager for Windows.

Note: If you had a previous configuration, you may need to restore LISTENER.OLD in the *ORACLE_HOME*\NETWORK\ADMIN directory.

Using SQL*Net Easy Configuration

Oracle's SQL*Net Easy Configuration is a SQL*Net Version 2 (V2) utility that allows users to configure SQL*Net automatically on the client machine. Use SQL*Net Easy Configure if you know the name of your server and your service ID (SID). This is the case for many users who formerly used SQL*Net V1.

If you are a network administrator setting up a network with Oracle MultiProtocol Interchange (MPI), Oracle Names, Secured Network Services (SNS), or facilities for users who do not know the name of their server, use Oracle Network Manager for Windows instead of SQL*Net Easy Configuration, and see Appendices F and G.

This chapter covers the following topics:

- Starting SQL*Net Easy Configuration
- Using SQL*Net Easy Configuration

Starting SQL*Net Easy Configuration

Caution: Oracle strongly recommends that every machine in the workgroup network be configured with one, and only one, of the configuration utilities: SQL*Net Easy Configuration,or Oracle Network Manager for Windows.

Caution: SQL*Net Easy Configuration and Oracle Network Manager for Windows are mutually exclusive on any one machine.

Note: The Cancel button, which is found in every dialog box, deletes any changes made since the last confirmation and exits the utility.

Follow the instructions below to start the Oracle SQL*Net Easy Configuration utility.

1. Verify that SQL*Net Client is installed.

2. Verify that one or more Oracle protocol adapters are installed.

3. For Windows NT:

    - Open the Oracle for Windows NT program group from Program Manager.

    - Choose the SQL*Net Easy Configuration icon.

For Windows 95, choose:

- Start

- Programs

- Oracle for Windows 95

- SQL*Net Easy Configuration

Using SQL*Net Easy Configuration

The **SQL*Net Easy Configuration** dialog box is the first screen that appears after you double-click on the Oracle SQL*Net Easy Configuration icon.

The **SQL*Net Easy Configuration** dialog box allows you to:

- add a database alias
- modify a database alias
- delete a database alias
- view the configuration information
- exit SQL*Net Easy Configuration

Note: When you start SQL*Net Easy Configuration for Client for the first time, any existing *ORACLE_HOME*\NETWORK\ADMIN\TNSNAMES.ORA file is backed up as *ORACLE_HOME*\NETWORK\ADMIN\TNSNAMES.OLD.

Note: When you start SQL*Net Easy Configuration for Client for the first time, it does not make use of the existing configuration file. You must (re-)enter any configuration information the first time you use SQL*Net Easy Configuration for Client.

Adding a Database Alias

1. Select Add Database Alias.
2. Choose OK.

   The **Choose Database Alias**dialog box appears.
3. Enter a Database Alias name to identify the remote database you want to access. The alias can be any name you choose.

   Note: The name should have at least one alphabetical character.
4. Choose OK.

   The **Choose Protocol** dialog box appears if more than one supported Oracle Protocol Adapter resides in your ORACLE_HOME directory. If not, one of the dialog boxes listed in Step 6 appears and you should go to Step 7.
5. Select the protocol you wish to use for your Database Alias name.
6. Choose OK.

   The dialog box appropriate for your protocol adapter appears:

   - Choose TCP/IP Host Name and Database Instance
   - Choose SPX Service Name and Database Instance
   - Choose Named Pipes Server Name and Database Instance

7. Enter the appropriate service name, which corresponds to one of the following:

   - TCP/IP Host Name
   - SPX/IPX Service Name
   - Named Pipes Server Name

8. Accept the default Database Instance name, ORCL, or type the Database Instance name you want to connect to.

   Note: The name should have at least one alphabetical character.

   Note: If you used SQL*Net V1in the past, you can use the same values for Service Name and Database Instance(SID) as you used for SQL*Net V1. If you do not know this information, ask the person who administers your network or remote database.

9. Choose OK.

   The **Confirm Adding Database Alias** dialog box appears.

10. Choose OK.

    The **SQL*Net Easy Configuration** dialog box reappears.

Modifying a Database Alias

1. Select Modify Database Alias from the **SQL*Net Easy Configuration** dialog box.
2. Choose OK.

   The **Modify Database Alias** dialog box appears with the list of Database Aliases (if any).

3. Choose the Database Alias you wish to modify.
4. Choose OK.

   The dialog box appropriate to you protocol adapter appears if more than one supported Oracle protocol adapter resides in your ORACLE_HOME directory. If not, the **Enter Modification Information** dialog box appears and you should go to step 7.

5. Select the protocol you wish to use for your Database Alias name.
6. Choose OK.

   The **Enter Modification Information** dialog box appears.

7. Enter the appropriate service name, which corresponds to one of the following:

   - TCP/IP Host Name
   - SPX/IPX Service Name
   - Named Pipes Server Name

8. Accept the default Database Instance name, ORCL, or type the Database Instance name you want.

   Note: The name should have at least one alphabetical character.

   Note: If you used SQL*Net V1 in the past, you can use the same values for Service Nameand Database Instance (SID) as you used for SQL*Net V1. If you do not know this information, ask the person who administers your network or remote database.

9. Choose OK.

   The **Confirm Modifying Database Alias** dialog box appears.

10. Choose YES to modify the Database Alias.

    The **SQL*Net Easy Configuration** dialog box reappears.

Deleting a Database Alias

1. Select Delete Database Alias.
2. Choose OK.

   The **Delete Database Alias** dialog box appears with the list of Database Aliases.

3. Select the Database Alias you wish to delete.
4. Choose OK.

   The **Confirm Deleting Database Alias** dialog box appears with the configuration information for that Database Alias.

5. Select YES and choose OK to delete that Database Alias.

   The **SQL*Net Easy Configuration** dialog box reappears.

Viewing Configuration Information

1. Select View Configuration Information.
2. Choose OK.

   The **Choose Database Alias** dialog appears with a list of databases.

3. Select the database alias you wish to view.
4. Choose OK.

   The **Configuration Information** dialog box appears with the entries for that database alias.

5. Choose OK.

   The **SQL*Net Easy Configuration** dialog box reappears.

Exiting the Utility

Choose the Exit button, and OK, if you have finished adding, modifying, deleting, or viewing the configuration information.

Using Oracle Network Products

After Oracle Network Products are installed and configured, you can communicate across a network with SQL*Net. This chapter covers the following topics:

- verifying the network connection
- SQL*Net login parameters
- connecting with SQL*Net
- using SQL*Net
- connecting to another system

Note: This chapter assumes you have already configured Oracle Network Products with either the SQL*Net Easy Configure utility (documented in Chapter 2), or manually in conjunction with Oracle Network Manager for Windows (see the appendix on "Configuring Oracle Network Products").

Verifying the Network Connection

Use the TNSPING utility to determine whether or not you can reach a service on a SQL*Net network. The service can be an Oracle database, an Oracle Names server, or any other Oracle (TNS) service.

When you connect to a TNS service using TNSPING, TNSPING displays an estimate of the round trip time in milliseconds. If TNSPING fails, an network error message appears without the overhead of a database connection.

You invoke TNSPING on the command line as follows:

```
C:\> tnsping service_name count
```

Note: The service name must exist in TNSNAMES.ORA or Oracle Names.

Note: The count is optional and determines how many times the program attempts to reach the server.

SQL*Net Login Parameters

The appropriate Oracle protocol adapter is used automatically when the *service_name* you use to request a connection specifies that protocol in the configuration file.

The configuration file is set up in one of the following two ways:

- by the end-user using SQL*Net Easy Configuration
- by the network administrator using Oracle Network Manager for Windows to set up both the client side and the server side of this communication

For the server side, the network administrator establishes and starts a network listener that uses a specific Oracle protocol adapter, which listens for requests to connect to the desired database.

You can connect to a server using any Oracle application, such as SQL*Plus or SQL*DBA, that prompts you for a username and password.

To open an Oracle application:

- double-click on the application icon
- then type in the appropriate information in the dialog box

For instance, if you selected SQL*Plus, a logon dialog box appears requesting *User Name*, *Password* and *Host String*. Type in the correct values, where:

User Name	specifies the username required to connect to the remote database.
Password	specifies the password associated with the username.
Service Name	specifies which service name (comparable to SQL*Net V1 connect_string) to use for the desired database server. The TNSNAMES.ORA file identifies the easy-to-remember service names mapped to lengthier TNS connect descriptors.

Choose the [Cancel] button at any time to exit the application.

Connecting with SQL*Net

To connect to a remote database, you enter logon information (SQL*Net parameters) in a **Logon** dialog box.

1. Double-click on the Oracle application icon.

2. Enter a `username/password, such as` SCOTT/TIGER.

3. Enter the appropriate information in the Host String or Connect field of the **Logon** dialog box. An example might be

   ```
   YVONNE
   ```

   where YVONNE is a service name in the TNSNAMES file in the \NETWORK\ADMIN subdirectory.

Using SQL*Net

Once the LISTENER.ORA file is configured for server machines and the TNSNAMES.ORA files are configured for client machines, you can begin using SQL*Net. The network administrator or the end-user runs the server's SQL*Net listener program.

There are two ways to start the network listener service.

- to start the listener at the command line, type:

  ```
  C:\> LSNRCTL START
  ```

- to start the listener from within the LSNRCTL utility, at the command line, type:

  ```
  C:\> LSNRCTL
  ```

  Then, at the LSNRCTL prompt, type:

  ```
  START
  ```

Once you start the listener, client workstations can connect to a server using a service name, as described in the next section.

Establishing Client Connections

Once you have started a SQL*Net listener on the network, client workstations and other servers connect to the server's network listener with a service name when logging onto an Oracle7 Server. For example, you can log onto an Oracle7 Server from within SQL*DBA with the following syntax

```
SQLDBA> CONNECT username/password@service_name
```

where *username* and *password* reflect your database account information, and the easy-to-remember *service_name* is mapped to the lengthier connect descriptor defined in TNSNAMES.ORA.

If you are using a menu-based Oracle tool, such as Oracle Forms, enter the password and SQL*Net V1 connect string/SQL*Net V2 connect descriptor information in the PASSWORD entry field. You can also input the entire logon information in the username field.

If your tool does not have a third box for Connect or Host String, then type the "at" key (`@`) after the password and before the connect string, as in the following example:

```
SCOTT/TIGER@YVONNE
```

Additional Information: To learn more about establishing client connections, see *Understanding SQL*Net.*

Connecting to Another System

The SQL*Plus CONNECT command is normally used to connect to another Oracle username on the current database. You can also use CONNECT with SQL*Net parameters to connect to a different database.

The syntax for using a service name is:

```
SQL>  CONNECT username/password@service_name
```

The example below uses the slash (/) and "at" (@) separators to connect SQL*Plus user SCOTT with password TIGER to remote database YVONNE:

```
SQL>  CONNECT SCOTT/TIGER@YVONNE
```

The CONNECT command commits all of your pending work in the current database and logs off the current username.

Note: With SQL*Plus and SQL*DBA, you can log on to only one database at a time. SQL*Plus and SQL*DBA do allow you to start up multiple copies (sessions), with each individual session logged on to a different database.

Oracle Installer Overview

This appendix provides conceptual information about the Oracle Installer for Windows NT version 3.1, and the Oracle Installer for Windows 95 version 3.1. Read this appendix and the installation procedures in Chapter 2 for additional guidance in using the Oracle Installer. Specifically, this appendix covers the following:

- purpose of the Oracle Installer
- Oracle Home directory
- starting the Oracle Installer
- listing installed products and removing products

Purpose of the Oracle Installer

The Oracle Installer for Windows NT version 3.1, and the Oracle Installer for Windows 95 version 3.1 are installation utilities that allow you to install, list installed products, update and remove Oracle products for your operating system.

The Oracle Installer for Windows performs the same functions for Oracle products running in a Windows 16-bit environment.

To facilitate using Oracle products, the Oracle Installer can also modify certain system files, such as CONFIG.SYS.

Oracle Home Directory

The Oracle Home directory (ORACLE_HOME) holds the subdirectories containing files related to Oracle products. There is one, and only one, appropriate ORACLE_HOME for each operating system.

By default, the first time you install Oracle for Windows NT products on your machine, the ORACLE_HOME directory for those products is \ORANT.

By default, the first time you install Oracle for Windows 95 products on your machine, the ORACLE_HOME directory for those products is \ORAWIN95.

By default, the ORACLE_HOME directory resides on your operating system's boot drive.

You can specify another name or path for your ORACLE_HOME when prompted by the **Choose Directory** dialog box. However, if you wish to use previously installed products with the products you are currently installing, choose OK to accept the established ORACLE_HOME specified in the **Choose Directory** dialog box.

Note: If you install products in a new ORACLE_HOME, any products residing in the previously established ORACLE_HOME become unavailable.

Starting the Oracle Installer

To start the Oracle Installer from your Oracle Products CD-ROM, invoke the executable as follows:

```
[G:\] G:\NT_X86\INSTALL\ORAINST
```

for Windows NT, or

```
[G:\] G:\WIN95\INSTALL\ORAINST
```

for Windows 95,

where `G:` represents the drive letter of your CD-ROM reader.

Listing Installed Products and Removing Products

To list the names and versions of Oracle products currently installed on the hard drive:

Step 1. Shut down the SQL*Net Listener and any Oracle-based applications.

Step 2. Start the Oracle Installer (see the "Starting the Oracle Installer" section in this appendix). The Installed Products window lists the Oracle products installed on the hard drive and their version numbers.

To remove Oracle products:

Step 1. Start the Oracle Installer (see the "Starting the Oracle Installer" section in this appendix).

Step 2. From the **Installed Products** window, select the product(s) you wish to remove.

Step 3. Choose the Remove button.

The **Dependencies** dialog may appear, prompting you to verify that you want to remove product(s).

If you choose Yes, a progress bar shows the percentage of removal ("de-installation") completed.

Removing a product in this manner deletes all the files associated with that product from your hard disk, but does not delete that product's tables from the database.

Oracle Installer Error Messages

This appendix lists potential error messages that may occur while using the Oracle Installer. Following each message is the probable cause of the error and the action you can take to correct it.

Most Oracle Installer error messages display diagnostic information on the screen and are not listed in this appendix.

DISK_FULL

Cause:	Indicates there is not enough disk space on the destination volume to copy the selected program.
Action:	Create space on the destination volume.

FILE_NOT_FOUND

Cause:	It was not possible to locate a file on the source or destination media.
Action:	Run a utility program to locate any problems with the source or destination media; the media could be the CD-ROM drive, a network drive, or a floppy drive.

OS_ERROR

Cause:	There is an unexpected operating system error.
Action:	Run a utility program to locate any problems with the source or destination media; the media could be the CD-ROM drive, a network drive, or a floppy drive.

PERMISSION_DENIED

Cause:	The network has denied permission to perform the selected action.
Action:	Check with the network administrator; make sure that you have supervisor privileges and can perform the selected action.
Cause:	There is a fileshare problem with the TSR program SHARE.EXE
Action:	Modify AUTOEXEC.BAT to increase the number of files to share.
Cause:	There is a conflict between DR DOS 6.0 and Windows 3.1.
Action:	Use a different version of DOS.

READ_ERROR

Cause:	A problem has been detected on the source or destination media while executing an I/O operation.
Action:	If in a network environment, verify that you have read permission for the networked file.
Action:	Run a utility program to locate any problems with the source or destination media; the media could be the CD-ROM drive, a network drive, or a disk drive.

WRITE_ERROR

Cause:	Indicates that either (1) there is not enough disk space on the destination volume to copy the selected program, or (2) a problem has been detected on the destination media while executing an I/O operation.
Action:	Create space on the destination volume.
Action:	If you are in a network environment and installing onto the network, verify that you have permission to write to a network directory.
Action:	Run a utility program to locate any problems with the source or destination media; the media could be the CD-ROM drive, a network drive, or a disk drive.

Registry for Windows NT and Windows 95

The Registry stores system settings, including Oracle-related settings. The end-user who uses the SQL*Net Easy Configuration utility should not need to edit the Registry. The network administrator, on the other hand, might want to customize the Oracle environment by changing the parameters defined in the Registry. This appendix explains how to drill down the Registry hierarchy to edit Oracle-related settings.

Topics covered in this appendix are:

- Windows NT Registry
- Windows 95 Registry

Caution: When editing in the Registry, proceed carefully to avoid deleting or altering correct information that can affect how your system functions.

Additional Information: Refer to the documentation on your operating system for more information.

Registry for Windows NT

Below are steps for editing the Windows NT Registry for Oracle-related settings.

1. Type `REGEDT32` from a command line.

   Four windows appear, including HKEY_LOCAL_MACHINE.

2. Activate the HKEY_LOCAL_MACHINE on Local Machine window.

3. Double-click on Software.

4. Double-click on ORACLE.

   A list of values appears in the right-hand side on the window.

5. Double-click on the value you want to edit.

   The String Editor dialog box appears.

6. Make any edits in the String field.

7. Choose OK.

8. Reboot your system so that the changes take effect.

Registry for Windows 95

Below are steps for editing the Windows 95 Registry for Oracle-related settings.

1. Type `REGEDIT` from a command line.

   The Registry Editor window appears.

2. Double-click on HKEY_LOCAL_MACHINE folder located under My Computer.

3. Double-click on SOFTWARE.
4. Double-click on ORACLE.

   A list of values appears in the right-hand side on the window.
5. Double-click on the value you want to edit.

   The Edit String dialog box appears.
6. Make any edits in the appropriate field(s).
7. Choose OK.
8. Reboot your system so that the changes take effect.

Sample Configuration Files

Sample configuration files can make it easier for you to understand how to configure Oracle Network Products. This appendix provides examples of the following files:

- SQLNET.ORA
- LISTENER.ORA
- TNSNAMES.ORA

Attention: Oracle supports configuration files only if you use Oracle Network Manager for Windows to create them. Some manual editing of certain files may be a necessary exception.

SQLNET.ORA

```
################
# Filename......: sqlnet.ora
# Name..........: ASTERIX.world
# Date..........: 11-JUL-95 14:11:25
################
AUTOMATIC_IPC = ON
TRACE_LEVEL_CLIENT = OFF
SQLNET.EXPIRE_TIME = 0
NAMES.DEFAULT_DOMAIN = world
NAME.DEFAULT_ZONE = world
SQLNET.CRYPTO_SEED = "-105535855510546696 37"
SQLNET.AUTHENTICATION_SERVICES = (ALL)
```

LISTENER.ORA

```
################
# Filename......: listener.ora
# Name..........: ASTERIX.world
# Date..........: 11-JUL-95 14:11:25
################
LISTENER =
  (ADDRESS_LIST =
        (ADDRESS=
          (PROTOCOL=IPC)
          (KEY= ASTERIX.world)
        )
        (ADDRESS=
          (PROTOCOL=IPC)
          (KEY= ORCL)
        )
        (ADDRESS =
          (COMMUNITY = TCP.world)
          (PROTOCOL = TCP)
          (Host = ASTERIX)
          (Port = 1521)
        )
  )
STARTUP_WAIT_TIME_LISTENER = 0
CONNECT_TIMEOUT_LISTENER = 10
TRACE_LEVEL_LISTENER = OFF
SID_LIST_LISTENER =
```

```
  (SID_LIST =
    (SID_DESC =
      (SID_NAME = ORCL)
      (PROGRAM = oracle72)
      (PRESPAWN_MAX = 10)
    )
  )
```

TNSNAMES.ORA

```
################
# Filename......: tnsnames.ora
# Name..........: ASTERIX.world
# Date..........: 11-JUL-95 14:11:25
################
ASTERIX.world =
   (DESCRIPTION =
     (ADDRESS_LIST =
         (ADDRESS =
          (COMMUNITY = TCP.world)
          (PROTOCOL = TCP)
          (Host = ASTERIX)
          (Port = 1521)
        )
    )
    (CONNECT_DATA =
       (SID = ORCL)
       (GLOBAL_NAME = ASTERIX.world)
    )
  )
GETAFIX.world =
   (DESCRIPTION =
     (ADDRESS_LIST =
         (ADDRESS =
          (COMMUNITY = TCP.world)
          (PROTOCOL = TCP)
          (Host = GETAFIX)
          (Port = 1526)
        )
    )
    (CONNECT_DATA =
       (SID = ORCL)
       (GLOBAL_NAME = GETAFIX.world)
    )
  )
```

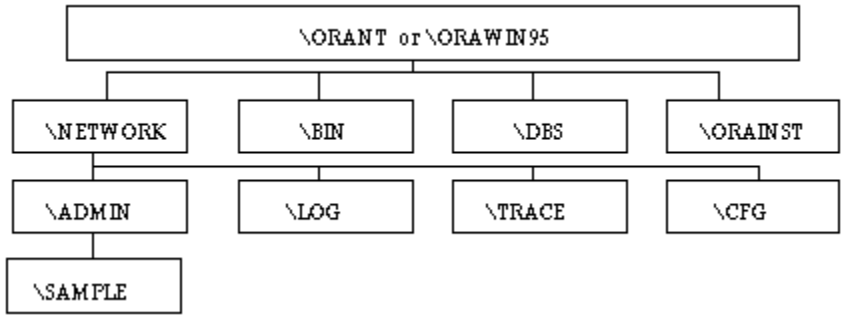
Verifying Installation of Oracle Network Products

This chapter explains how to verify successful installation of Oracle Network Products for Windows NT/Windows 95. If any files are missing, see Chapter 2 of this Guide for (re)installation instructions. Specifically, this chapter covers the following topics and tasks:

- directory structure of Oracle network products
- installation verification overview
- verifying installation of SQL*Net files
- verifying installation of other Oracle network product files
- verifying environment setup

Directory Structure of Oracle Network Products

The diagram below shows the directory structure for Oracle Network Products for Windows NT and for Oracle Network Products for Windows 95.



\ORANT	the default name of the Oracle home directory, also referred to as ORACLE_HOME.
\BIN	holds executable programs, .DLLs and batch files for Oracle tools used by SQL*Net and the Oracle Protocol Adapter.
\DBS	holds the messages and scripts.
\ORAINST	holds files used by the Oracle Installer.
\NETWORK	created when you install SQL*Net for Version 2.

The \NETWORK directory contains the following subdirectories:

\ADMIN	holds the *.ORA files used by SQL*Net Version 2.
\ADMIN\SAMPLE	holds the sample configuration files.
\LOG	holds log files placed here by default.
\TRACE	holds trace files placed here by default.
\CFG	is the working directory of the SQL*Net Easy Configuration utility.

Installation Verification Overview

After you install Oracle network products, verify files and system file parameters, including third-party software, before you begin configuring and using Oracle Network Products.

This chapter outlines the steps to verify successful installation of Oracle Network Products, including Oracle protocol adapters, SQL*Net, Oracle Network Manager for Windows and Oracle Names.

Locate the appropriate sections in this chapter to accomplish each step as they apply to your configuration needs. After you verify installation, see the chapter on "Configuring Oracle Network Products" to specify SQL*Net connect descriptors and Oracle protocol adapter addresses.

Verify Installation of SQL*Net Files

This section explains how to verify the proper installation of SQL*Net .DLL files, message files, and server executables.

Verifying SQL*Net for DLLs

Before configuring the Oracle Protocol Adapter and SQL*Net, 2.2, check that SQL*Net is fully installed in your \BIN subdirectory by typing the following command at the command prompt:

```
C:\> DIR \ORANT\BIN\*.DLL
```

or

```
C:\> DIR \ORAWIN95\BIN\*.DLL
```

The following list of dynamic link libraries (DLLs) should appear:

Note: The files listed below are for **both** SQL*Net client and server machines unless specifically stated otherwise.

FILE NAME	SERVER FILE	CLIENT FILE
NLNT.DLL	Yes	Yes
NSNT.DLL	Yes	Yes
NTNT.DLL	Yes	Yes
NTPNT.DLL	Yes	No
NTUSNT.DLL	Yes	No
SQLTNSNT.DLL	Yes	Yes

Verifying Message Files

Enter the following command to verify that the message files listed below are located under the \ORANT\DBS or \ORAWIN95\DBS subdirectory:

```
C:\> DIR \ORANT\DBS\*.MSB
```

or

```
C:\> DIR \ORAWIN95\DBS\*.MSB
```

The following list of message files appears:

NLUS.MSB	NPLUS.MSB
NMPUS.MSB	SNLUS.MSB
NNCUS.MSB	TNSUS.MSB

If you are using a language other than American English, the letters corresponding to the language you selected, such as "NL" (Netherlands), replace the "US" in each filename.

Verifying Server Executables

If you installed SQL*Net Server, verify that the server executable files listed below are in your \ORANT\BIN directory by entering the following command:

```
C:> DIR \ORANT\BIN\*.EXE
```

or

```
C:> DIR \ORAWIN95\BIN\*.EXE
```

The following server executables should appear:

- TNSLSNR.EXE
- LSNRCTL.EXE

Verifying Oracle Names Files

If you installed Oracle Names (optional), verify that the Oracle Names executables are in the ORACLE_HOME\BIN directory by entering the following command:

```
C:> DIR \ORANT\BIN\*.EXE
```

or

```
C:> DIR \ORAWIN95\BIN\*.EXE
```

The following Oracle Names executables should appear:

- NAMES.EXE
- NAMESCTL.EXE

Verify that the message files are in the \ORANT\DBS directory by entering the following command:

```
C:> DIR \ORANT\DBS\*.MSB
```

or

```
C:> DIR \ORAWIN95\DBS\*.MSB
```

The following message files should appear:

- NNOUS.MSB
- NNLUS.MSB
- NMRUS.MSB
- NNCUS.MSB

Read the *Oracle Names Administrator's Guide* to plan your use of Oracle Names. Most of the necessary decisions are part of the process of installing and configuring SQL*Net using Oracle Network Manager for Windows. However, Oracle Names requires additional decisions about domains, regions, Names Servers, and database links.

Verifying installation of the dynamic link library (.DLL) file corresponding to the the Oracle protocol adapter is a two-step process.

Step 1

Enter the following command:

```
C:> DIR\ORANT\BIN\NT*.DLL
```

Step 2

Use the table below to verify the presence of the file that corresponds to the Oracle Protocol Adapter you installed:

If you installed	***the corresponding .DLL file is***
Oracle Named Pipes Protocol Adapter	NTNNT.DLL
Oracle SPX/IPX Protocol Adapter	NTSNT.DLL
Oracle TCP/IP Protocol Adapter	NTTNT.DLL

Table 4 - 1. Oracle Protocol Adapter DLL Filenames

Verifying Installation of Other Oracle Network Product Files

Oracle Network Manager for Windows EXE Files

Use Windows File Manager to verify that Oracle Network Manager for Windows executable (.EXE) files are in the \ORAWIN\BIN subdirectory.

The following .EXE filenames should appear:

```
NETCONV.EXE
NETFETCH.EXE
NETMAN.EXE
NETPRINT.EXE
```

To verify files at the DOS prompt, type:

```
C:\> DIR  \ORAWIN\BIN\NET*.EXE
```

Oracle Network Manager for Windows DLL Files

Use Windows File Manager to verify that Oracle Network Manager dynamic link library (.DLL) filenames appear in \ORAWIN\BIN subdirectory.

The following .DLL filenames should appear:

```
NMCPI.DLL
NMC.DLL
NMO.DLL
```

To verify files at the DOS prompt, type:

```
C:\> DIR  \ORAWIN\BIN\NM*.DLL
```

Verifying Environment Setup

Use the PATH command to verify that the necessary Oracle files are in your path. At the command prompt, type the following:

```
C:> PATH
```

If SQL*Net and the TCP/IP Protocol Adapter are installed to the default home directory on drive C, the following is part of the PATH statement:

C:\ORANT\BIN

or

C:\ORAWIN95\BIN

If the correct path to the default Oracle home directory is not in your path, modify the PATH statement of your CONFIG.SYS file to include the proper ORACLE_HOME\BIN subdirectory.

Identify the Destination Address for TCP/IP

To make a SQL*Net connection, you must specify the destination host's Internet address or a host name.

Domain Name Service

Most TCP/IP transports attempt to use the Domain Name Service (DNS) to translate the host name into the host address. If a Domain Name Server is present on your network and the TCP/IP vendor supports Domain Name Service, the host name is successfully translated to the host address.

Configure the HOSTS File for TCP/IP

Depending on your vendor, workstation configuration, and network configuration, your TCP/IP software may use a HOSTS file to map host names to Internet addresses.

The mapping for each host listed in the HOSTS file is specified on a single line in the following format:

internet_address hostname [*alias*]

where

internet_address	the Internet address of the host computer (a four- byte value specified in decimal, octal, or hexadecimal). The system administrator knows the host machine's TCP/IP Internet address.
hostname	the name of the host associated with the Internet address.
alias	an optional alternate name for the host. You

can have more than one alias for any single host. Aliases can be set any time you edit the HOSTS file.

For example, a host named "BOSTONSALES" might be referenced in the HOSTS file as follows:

```
89.0.1.100  BOSTONSALES  [BOSTON]
```

where

89.0.1.100	the Internet address of the remote host.
BOSTONSALES	the name of the remote host.
BOSTON	an optional alias for the BOSTONSALES host.

Additional Information: For more information, see the documentation for your third-party network software.

Configuring Oracle Network Products

This chapter provides information on the following topics:

- configuration steps
- client configuration
- TNSNAMES.ORA overview
- address for each supported Oracle protocol adapter
- LISTENER.ORA overview
- Oracle Names configuration
- SQLNET.ORA overview
- starting an Oracle protocol adapter

Attention: Oracle only supports configuration files created by using one of these two products: the SQL*Net Easy Configuration utility (for simple database connections) or Oracle Network Manager for Windows (for advanced SQL*Net features, such as Secure Network Services).

Caution: Oracle strongly recommends that every machine in the workgroup network be configured with one, and only one, of the configuration utilities: SQL*Net Easy Configuration,or Oracle Network Manager for Windows.

Caution: SQL*Net Easy Configuration and Oracle Network Manager for Windows are mutually exclusive on any one machine.

Configuration Steps

Oracle recommends that you use Oracle Names to facilitate connections.

This section outlines the steps necessary to use Oracle Network Manager for Windows and to connect to your RDBMS to configure your SQL*Net V2 configuration files.

Step 1 Read *Oracle Network Manager Administrator's Guide*, and refer to the following:

- Chapter 4: "Quick Steps to Configure a Network"
- the "Guidelines for Creating Network Components" section of Chapter 3.

Step 2 Use Oracle Network Manager for Windowsin the following manner:

1. Start a session.
2. Make sure you are running in Enhanced mode.
3. Start Oracle Network Manager for Windows.
4. Follow the instructions in the following sections of *Oracle Network Manager Administrator's Guide:*
   - Chapter 4: "Quick Steps to Configure a Network"
   - the "Guidelines for Creating Network Components" section of Chapter 3.
5. Save the network definition to a file or to a database.
   - If Oracle Names is part of the network, you must save the network definition to a database. Oracle recommends that you save your network definition to the *ORACLE_HOME*\NETWORK\ADMIN directory.
   - If you want to copy the client files to a Windows workstation, either comment out (`REM`)--or set to the value of `OFF`--the `AUTOMATIC_IPC=ON` statement in the SQLNET.ORA file.

   Additional Information: Refer to Chapter 3 of *Oracle Network Manager Administrator's Guide* for more information.
6. Generate the network configuration files.

   Additional Information: Refer to Chapter 3 of *Oracle Network Manager Administrator's Guide* for more information.
7. Distribute the network configuration files to the appropriate nodes.

   Additional Information: Refer to Chapter 6 of *Oracle Network Manager Administrator's Guide* for more information.
8. Exit Oracle Network Manager for Windows.

Step 3 Start the network listener if this is a **Windows NT Server** by entering the following command at the prompt:

```
C:\> LSNRCTL START listener_name
```

Step 4 Start Oracle Names if you are using Oracle Names on this Server. To do so, change directories into the ORACLE_HOME\BIN directory, then invoke the Oracle Names executable. Below is an example.

```
C:> CD C:\ORANT\BIN
C:\ORANT\BIN> NAMESCTL  START
```

Additional Information: For information on how to use Oracle Names, refer to *Oracle Names Administrator's Guide*.

Client Configuration

Oracle Network Manager ensures that the information in the client configuration files matches that of the server configuration files. There are three client configuration files:

- TNSNAMES.ORA
- TNSNAV.ORA
- SQLNET.ORA

TNSNAMES.ORA contains a list of service names of network destinations (databases and Oracle MultiProtocol Interchanges) mapped to connect descriptors. If an Oracle Names server is used on the network, TNSAMES.ORA is unnecessary and is not created.

TNSNAV.ORA contains a list of the communities of which the node is a member. If the client communicates over the Oracle MultiProtocol Interchange, this file is necessary.

SQLNET.ORA contains default domains and several optional parameters.

Once your network has been configured and a SQL*Net network listener is started on an Oracle7 Server, clients can connect to the Oracle7 Server using a SQL*Net service name. The service name is mapped to the connect descriptor. Connectdescriptors define the following attributes of a TNS connection:

- protocol adapter information for the destination server's address
- the system ID for the destination server

TNSNAMES.ORA Overview

The TNSNAMES.ORAfile is used by clients and distributed database servers to identify potential destinations: servers or Oracle MultiProtocol Interchanges.

If Oracle Names is used in the network, the TNSNAMES.ORA files are not necessary; the Names servers get the needed information from the network definition stored on a database.

Each entry in the TNSNAMES.ORAfile includes two elements:

- a service name
- a connect descriptor

These elements are described in the following sections.

Service Names

All connect descriptors are assigned *service names* in the TNSNAMES.ORA file. The user specifies the service name--a single word rather than the lengthier connect descriptor--to identify the service to which the user wants to connect. (These are comparable to the aliases used for connect_strings in SQL*Net V1.) The contents of a TNSNAMES.ORA file consists of a series of service names mapped to TNS connect descriptors.

The service name for a database must be exactly the same as theglobal database name defined by the system administrator. SQL*Net limits the total length of a global database name to 64 characters. Of these, up to eight are the DB_NAME as defined by the database administrator, and the remainder show the service's place in the domain hierarchy (DB_DOMAIN). The name part of the service name can be longer than eight characters only if the DBA changes the name of the database with a RENAME GLOBAL_NAME parameter. The total global database name, or service name, must remain at or below 64 characters. See "Global Naming Issues" in Chapter 2 of *Oracle7 Server Distributed Systems, Volume I* for more information on creating a global database name.

Alternate service names, or aliases, can be assigned to a database service through the TNSNAMES.ORA file. The alternate service names can be names you choose because you find them convenient and easy to remember. For example, if a database were used by two different divisions of a company, Human Resources and Finance, you might want to map two different service name aliases, "hr" and "finance," to the database. The TNSNAMES.ORA file would then have three separate entries: a service name that is the same as the global database name, and two aliases, mapped to the same connect descriptor.

Note: Although you can have multiple aliases for the same database service, you cannot have multiple listeners for the same database service.

The service name for an Oracle MultiProtocol Interchange is the name of the Oracle MultiProtocol Interchange or its Connection Manager component. Typically, the Oracle MultiProtocol Interchange and the Connection Manager are referred to by the same name.

Connect Descriptors

Every service requires a connect descriptor. For a database, a connect descriptor describes the location of the network listener and the system identifier (SID)of the database to which to connect. Database connect descriptors commonly consist of two sections:

- the listener ADDRESS
- the database SIDpassed as application CONNECT_DATA

ADDRESS Section

The application address is the information required to reach the application within a given protocol environment. It includes the community in which the destination resides, the protocol it uses, and protocol-specific parameters. Oracle Network Manager for Windows automatically provides the correct protocol specific parameters for any protocol you use, but you must provide the appropriate values. For information about the values for the parameters for a given protocol, see the next section of this chapter, "Address for Each Supported Oracle Protocol Adapter."

Note: If you specify a TCP/IP address prefixed with a "0", it is assumed to be an octal number, not a decimal number. For example, 39.223.72.44 is a decimal number, but 039.223.72.44 is an octal number.

CONNECT DATA Section

SQL*Net uses the CONNECT_DATA keyword to denote the system identifier (SID) of the remote database. When SQL*Net on the server side receives the connection request, TNS passes the CONNECT_DATA contents to the network listener, which identifies the desired database. For SQL*Net use, sample CONNECT_DATA contents might look like:

```
(CONNECT_DATA=
  (SID=ORCL)
)
```

CONNECT_DATA is a protocol independent keyword indicating that application-specific data will be supplied at connect time, and SID specifies the Oracle System IDof the database server. You must specify the SIDin the CONNECT DATA section of the connect descriptor.

Oracle MultiProtocol Interchange Addresses

A connect descriptor for an Oracle MultiProtocol Interchange consists of only one section, an ADDRESS_LIST section. The ADDRESS_LIST section lists all the addresses of the Oracle MultiProtocol Interchange, including the required protocol specific keywords.

There is no CONNECT_DATA section in the connect descriptor of an Oracle MultiProtocol Interchange.

Address for Each Supported Oracle Protocol Adapter

This section provides the format and examples of the address for each of the following Oracle protocol adapters:

- Oracle TCP/IP Protocol Adapter
- Oracle SPX/IPX Protocol Adapter
- Oracle Named Pipes Protocol Adapter

TCP/IP Addresses

When using Oracle TCP/IP Protocol Adapter, specify the address of a TNS-based application as follows:

```
(ADDRESS=
   [(COMMUNITY=community_name)]
   (PROTOCOL=TCP)
   (HOST=host_name)
   (PORT=1521)
)
```

`COMMUNITY(optional)`	in this ADDRESS syntax, the COMMUNITY keyword (which is optional) identifies a group of network clients and servers using TNS-based software. A community is a group of machines that use the same transport-level protocol, such as TCP/IP. Machines that share a common protocol are said to be members of the same community. If your network uses an Oracle MultiProtocol Interchange, refer to the Oracle MultiProtocol Interchange documentation to define and use TNS communities.
`PROTOCOL`	the PROTOCOL keyword indicates the type of network on which the TNS-based application resides. When using Oracle TCP/IP Protocol Adapter, always use the keyword-value pair `PROTOCOL=TCP`.
`HOST` and `PORT`	the TCP/IP *host_name* and *port_number* identify a TNS-based application on the network. For example, in the case of SQL*Net, the *host_name* is the node the database is on and *port_number* identifies the location of an Oracle Server listener. Consult the network administrator to learn the host names and port numbers of TNS-based applications on your network.

SQL*Net Example on a TCP/IP Network

The following is an example of the ADDRESS keyword used with the TNS-based product, SQL*Net. The example is taken from the SQL*Net configuration file, TNSNAMES.ORA. TNSNAMES.ORA defines the location of Oracle Server machines to which a client can connect.

The entry below is taken from a client machine that connects to a single Oracle Server named GREENWOOD on a TCP/IP network.

```
GREEN=(DESCRIPTION=
    (ADDRESS =
     (COMMUNITY = tcp.world)
     (PROTOCOL = TCP)
     (Host = GREENWOOD)
     (Port = 1521)
    )
    (CONNECT_DATA=(SID=ORCL)
    )
   )
```

SPX/IPX Addresses

When using the Oracle SPX/IPX Protocol Adapter, specify the address of a TNS-based application as follows:

```
(ADDRESS=
 [(COMMUNITY=community_name)]
 (PROTOCOL=SPX)
 (SERVICE=service_name)
)
```

`COMMUNITY` in this ADDRESS syntax, the COMMUNITY keyword specifies the network community of the TNS-based application. The COMMUNITY keyword is optional, and is generally used only when the Oracle MultiProtocol Interchange product connects multiple networks. If your network uses an Oracle MultiProtocol Interchange, refer to the Oracle MultiProtocol Interchange documentation to define and use TNS communities.

`PROTOCOL` the PROTOCOL keyword indicates the type of network on which the TNS-based application resides. When using the Oracle Adapter, always use the keyword-value pair PROTOCOL=SPX.

`SERVICE` SERVICE defines the name of the TNS-based application on the network. For example, in the case of SQL*Net, the *service_name* always identifies the name of an Oracle7 Server listener. Consult your network administrator to learn the service names of TNS-based applications on your network.

SQL*Net Example on a SPX/IPX Network

The following is an example of the ADDRESS keyword used with the TNS-based product, SQL*Net. The example is taken from the SQL*Net configuration file, TNSNAMES.ORA. TNSNAMES.ORA defines the

location of Oracle7 Server machines to which a client can connect.

The entry below is taken from a client machine that connects to a single Oracle Server named GREENWOOD_LSNR_1 on an SPX/IPX network.

```
GREEN=(DESCRIPTION=
     (ADDRESS_LIST =
      (ADDRESS =
      (COMMUNITY = SPX.WORLD)
      (PROTOCOL = SPX)
      (SERVICE = GREENWOOD_LSNR_1)
     )
     (CONNECT_DATA=(SID=ORCL)
     )
    )
```

Named Pipes Addresses

When using the Oracle Named Pipes Protocol Adapter, specify the address of a TNS-based application as follows:

```
(ADDRESS=
 [(COMMUNITY=community_name)]
 (PROTOCOL=NMP)
 (SERVER=server_name)
 (PIPE=pipe_name)
)
```

COMMUNITY	in this ADDRESS syntax, the COMMUNITY keyword specifies the network community of the TNS-based application.
PROTOCOL	the PROTOCOL keyword indicates the type of network on which the TNS-based application resides. When using the Oracle Named Pipes Protocol Adapter, always use the keyword-value pair PROTOCOL=NMP.
SERVER	the SERVER keyword indicates the name of your Oracle7 Server computer.
PIPE	the PIPE keyword indicates the pipe name you use to connect to your Oracle7 Server (the same PIPE keyword you specified on your Oracle7 Server).

SQL*Net Example on a Named Pipes Network

The following is an example of the ADDRESS keyword used with the TNS-based product, SQL*Net. The example is taken from the SQL*Net configuration file, TNSNAMES.ORA. TNSNAMES.ORA defines the location of Oracle7 Server machines to which a client can connect.

The file below is taken from a client machine that connects to a single Oracle Server named GREENWOOD on a Named Pipes network.

```
GREEN=(DESCRIPTION=
    (ADDRESS=
     (COMMUNITY=NMP.WORLD)
     (PROTOCOL=NMP)
     (SERVER=GREENWOOD)
     (PIPE=dbpipe0)
    )
    (CONNECT_DATA=(SID=ORCL)
    )
   )
```

LISTENER.ORA Overview

Before a database server can receive connections from SQL*Net version 2 (and later) clients, a network listener must be active on the server platform. The configuration file for the network listener is LISTENER.ORA, which contains four parts:

- the listener name
- definition of the listener address
- description of the databases that use the listener
- parameters that influence the listener's behavior

Note: The LISTENER.ORA file should be generated and modified through the Oracle Network Manager for Windows. LISTENER.ORA should not be edited by hand.

Listener Names

The listener name can be any easy-to-use name. The default listener name is LISTENER, which is the recommended name in a standard installation that requires only one listener on a machine. The listener name must be unique on the network. However, this uniqueness is assured by the fact that the Network Manager appends the name of the node and its domain to the listener name you supply. For example, if there is a listener on a node named RACER and a listener on a node named RABBIT, the Network Manager will append the node names and the domain to their names so that they will be identified as LISTENER_RACER.WORLD and LISTENER_RABBIT.WORLD.

The listener name must be unique to the machine. If you have more than one listener on a machine, each of them must have a unique name. The TURTLE node, for example, might have three listeners with the names LSNR1_TURTLE.WORLD, LSNR2_TURTLE.WORLD, and LSNR3_TURTLE.WORLD.

IPC Addresses for the Listener (Windows NT Only)

The listener listens for interprocess calls (IPC) as well as calls from other nodes. IPC addresses must be included in the LISTENER.ORA file. Oracle Network Manager for Windows generates the IPC entries automatically, without your input.

The IPC address format, which is the same across platforms, is as follows:

```
(ADDRESS=
 (PROTOCOL=IPC)
 (KEY=string)
```

Oracle Network Manager for Windows creates two IPC addresses for each database for which a listener listens. In one, the key value is equal to the service name. This IPC address is used for connections from other applications on the same node. Service names are described later in this chapter, in the section "TNSNAMES.ORA." In the other IPC address, the key value is equal to the database system identifier (SID), which is described in the next section. This IPC address is used by the database dispatcher to identify the listener.

Note: If the service name is the same as the SID, only one IPC address is needed, and Oracle Network Manager for Windows generates only one IPC address.

If the network includes Oracle Names, and if you create an alias (a second service name) for the address using Oracle Network Manager for Windows, an IPC address using the alias as a key is included in the

LISTENER.ORA file.

Describing the Databases on the Listener

The next section of the LISTENER.ORA file describes the system identifiers (SIDs)of the databases for which the listener listens. It is made up of keyword-value pairs.

```
SID_LIST_listener_name=[(SID_LIST=]
     (SID_DESC=
        (SID_NAME=SID)
        (OS_Oracle_
      environment=db_location)
     )
     [(SID_DESC=
        (SID_NAME=SID)
        (OS_Oracle_environment=db_location)
     )]
        [()]
```

The *SID* is the Oracle system ID of the database server. In the next keyword-value pair, the keyword is operating system specific: it is indicated here as the variable *OS Oracle environment*. Its value, indicated here as *db_location,* is the specific location of the database executables.

The following example is for Windows NT:

```
(ORACLE_HOME=C:\ORANT)
```

Another OS_Oracle_environment might be:

```
(PROGRAM=ORACLE72)
```

The following example shows a complete SID_LIST_*listener_name* section for Windows NT:

```
SID_LIST_LISTENER=(SID_LIST=
     (SID_DESC=
      (SID_NAME=db1)
      (ORACLE_HOME=C:\ORANT)
     )
     (SID_DESC=
     (SID_NAME=db3)
      (ORACLE_HOME=C:\ORANT)
     )
     )
```

Note: You can obtain connections to multiple databases in two ways, using one or multiple network listeners: (1) you specifically configure one network listener to multiple databases; (2) you configure multiple network listeners, each for a specific database. All the listeners on a single machine share one LISTENER.ORA file.

Attention: For an example of a LISTENER.ORAentry for each of the supported Oracle Protocol Adapters, see Appendix D of this Guide, "Sample Configuration Files."

To enable servers to function as client in a network that includes distributed databases, the servers require their own TNSNAMES.ORA and SQLNET.ORA files.

Oracle Names Configuration (Windows NT Only)

If a network uses Oracle Names, the TNSNAMES.ORA file is not necessary and Oracle Network Manager for Windows does not generate it. Oracle Names requires the executable and library files mentioned in Chapter 2 and the NAMES.ORA configuration file generated by Oracle Network Manager for Windows.

Additional Information: For a description of the NAMES.ORA file, see the *Oracle Names Administrator's Guide*.

When a network includes Oracle Names, Oracle Network Manager for Windows automatically creates a global database link to every server from every other server in the network. These database links are not in the data dictionary, but rather in the network definition to which the Oracle Names servers refer. The database links thus created do not initially include a CONNECT TO clause, so that users reach the linked database using the same usernames and passwords they use to reach the first database. Here is a sample SQL statement illustrating this usage:

```
SQL> SELECT * FROM EMP@Green, DEPT@Red;
```

See *Understanding SQL*Net* and *Oracle Names Administrator's Guide* for further explanation and examples.

SQLNET.ORA Overview

The SQLNET.ORA file is created for all clients and nodes on the network. It contains five types of information:

- the amount of time between probes sent to determine whether a client-server connection is still alive (dead connection detection)
- optional tracing and logging parameters
- default domains
- client parameters for use with Oracle Names
- other optional parameters

These parameters are described in the following sections.

Dead Connection Detection

The optional parameter, SQLNET.EXPIRE_TIME, determines how often SQL*Net sends a probe to verify that a client-server connection is still active. If a client is abnormally terminated, a connection remains open indefinitely unless identified and closed by the system. If you specify this parameter, SQL*Net sends a probe periodically to determine whether there is an invalid connection to terminate. If it finds a dead connection, or a connection no longer in use, it returns an error, causing the server process to exit.

Specify this parameter in the Connection Expire Time field of the Client Profile property sheet of Oracle Network Manager for Windows. Enter the time, in minutes, between probes for a dead connection. The range of possible values is from one to a very large number. However, a value of approximately 10 is recommended. If no value is entered in this field, the broken connections remain indefinitely.

Note: The time set in this parameter is not necessarily the amount of time a dead connection will remain. This parameter sets the time between probes for dead connections. Depending on the underlying protocol, shutting down a dead process can take longer.

Dead connection detection has some costs associated with it.

- Additional network traffic is generated to probe for dead connections. A probe packet is very small, but one is sent on each connection at the interval specified in the SQLNET.EXPIRE_TIME parameter in the SQLNET.ORA file.

- When dead connection detection is enabled, the Oracle Server needs to do additional processing to distinguish the connection probing event from other events. You can test the performance of your application with and without the dead connection detection feature enabled.

- For some protocols, the generic SQL*Net dead connection detection feature is no better than the native mechanism available in the underlying transport protocol. In that case, it is not necessary to enable it.

In short, you should evaluate carefully whether you would benefit from enabling the dead connection detection feature. It should only be turned on if necessary.

Optional Tracing Parameters

If you select any optional tracing parameters in the Client Profile property sheet of Oracle Network Manager for Windows, the following parameters appear in the SQLNET.ORA file:

- TRACE_LEVEL_CLIENT
- TRACE_FILE_CLIENT
- TRACE_DIRECTORY_CLIENT

Note: You must create or edit the following manually instead of using Oracle Network Manager for Windows: adding tracing parameters for servers to the SQLNET.ORA file; setting optional logging parameters (to specify non-default log file names or locations for client logs or for server logs).

You can also manually add the following optional tracing parameters for the TNSPING utility to SQLNET.ORA. (They produce messages similar to the SQL*Net trace parameters mentioned above.)

- TNSPING.TRACE_LEVEL
- TNSPING.TRACE_DIRECTORY

For more information about the logging and tracing parameters in SQLNET.ORA, see Chapter 2 of the *Oracle Network Products Messages Manual*.

Default Domains

Whether or not you are using Oracle Names, the SQLNET.ORA file includes a parameter that shows the default domain.

Oracle Names Parameters

If you are using Oracle Names, another parameter, NAMES.PREFERRED_SERVERS, is required. This parameter includes one or more addresses of the Names servers the client prefers to use. Several optional Oracle Names tracing parameters can also appear; they are described in Appendix B of the *Oracle Names Administrator's Guide.* Use Oracle Network Manager for Windows to create these parameters.

Additional SQLNET.ORA Parameters

The SQLNET.ORA file is used primarily for specifying the Dead Connection Detection parameter, tracing parameters, and default domain information. However, there are additional optional parameters which provide other useful functions. The following parameters must be edited manually in the SQLNET.ORA file; they are not affected by Oracle Network Manager for Windows.

Turning Off IPCs

If for some reason you do not want IPCaddresses to be sought automatically on some nodes in your network, you should add the following parameter to the SQLNET.ORA files for those nodes:

```
AUTOMATIC_IPC=OFF
```

Without this parameter, the default is for a connection which looks for an IPC address.

Starting an Oracle Protocol Adapter

Make sure the configuration steps in the previous section have been completed.

Server operations

For server machines, you, the network administrator, issue the following command to start the network listener:

```
LSNRCTL START listener_name
```

The network listener only stops when you, the network administrator, explicitly stop it. Issue a command of the following form:

```
LSNRCTL STOP listener_name
```

Client operations

For client machines, using TCP/IP is an automatic result of using a service name whose connect descriptor specifies TCP/IP. For example, a user of SQL*DBA can request a connection as follows:

```
SQL> CONNECT username/password@service_name
```

When *service_name* represents a connect descriptor that specifies TCP/IP, the connection is requested and established using that protocol. No explicit start, load, or call is necessary on a client machine.