Oracle® Networking Products User's Guide

for Windows NT/95

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Oracle® Network Products User's Guide for Windows NT/95, Release 2.3, July 1996.

Part No. A44128-1

Contributors: Tina Tang Marc, Paul Lin, Jagadish Changavi, Lance Walter, Jagdish Pamnani, David Tom, Lav Kamal Jain, David Lau, Lean Wang, Stephen Caminez, Patrick Cahill, Joseph Garcia, Lisa Giambruno

Preface

This manual provides operating system-specific information on how to install, configure, and use the Oracle Protocol Adapters, SQL*Net, SQL*Net Easy Configuration, Oracle Names, and Oracle Network Manager for Windows. This preface provides detailed information about:

- Audience
- How This Manual is Organized
- Conventions Used in This Guide
- Reader Comments

Attention: To verify the version of each product described in this manual, refer to this Guide and the accompanying Release Notes included in your Oracle product kit.

Audience

This manual is for both end-users and network administrators who install, configure, and use Oracle network products. Use this manual in conjunction with a machine running Windows NT or Windows 95 (server or client workstation). This manual 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 server and client

- you know how to use a text editor to make changes to an ASCII text file

How This Manual Is Organized

This manual consists of the following chapters and appendices.

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

Installing Oracle Networking Products—Provides installation instructions (from CD-ROM) for Oracle network products.

Using SQL*Net Easy Configuration—Provides instructions on using SQL*Net Easy Configuration to automatically configure SQL*Net for users with simple configuration needs.

Using Oracle Networking Products—Explains how to log in and connect to a database.

Registry for Windows NT and Windows 95—Explains how the network administrator gains access to Oracle-related system settings.

Sample Configuration Files—Provides examples of TNSNAMES.ORA, SQLNET.ORA, and LISTENER.ORA.

Verifying Installation of Oracle Networking Products—Shows the directory structure for installed products and explains how to verify the proper installation of Oracle Network Products.

Configuring Oracle Networking Products—Provides information enabling the network administrator using Network Manager for Windows to configure the client to access an Oracle7 Server.

Messages and Codes—Lists messages that can arise during installation.

How to Use this Manual

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

Use this manual in conjunction with the Oracle network products documents listed below. This manual also describes the protocol terms and concepts and protocol-specific keywords used in the connect descriptors.

- *Understanding SQL*Net*
- *Oracle Network Manager Administrator's Guide*
- *Secure Network Services Administrator's Guide*
- *Oracle Names Administrator's Guide*
- *Oracle Network Products Troubleshooting Guide*
- *Oracle Network Products Messages Manual*
- *Oracle SNMP Support Reference Guide*
- *Oracle MultiProtocol Interchange Administrator's Guide*

Conventions Used in this Guide

Oracle Home Directories

Oracle Installer creates top-level directories on your hard disk. For Windows NT, the default home directory is \ORANT. The default Oracle home directory for Windows is named \ORAWIN; for Windows 95, it is \ORAWIN95.

Typographical Conventions

Note these typographical conventions when reading this Guide:

`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.
`|`	A vertical bar represents an "or" option between several options. You must enter only one of the options. Do not enter the vertical bar.
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 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 Windows NT command prompt of the current hard disk drive. Your prompt may differ and may, at times, reflect the subdirectory in which you are working.
\DIRECTORY	A backslash before a directory name indicates that the directory is a subdirectory.
SID	SID (system identifier) represents the unique name of an Oracle instance. The SID you assign to a particular instance becomes the value of the ORACLE_SID initialization parameter for the associated database.

Reader Comments

We value and appreciate your Comments as a user of Oracle products and a reader of our manuals. At the back of this manual 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 manual(s). If the form is missing, you can contact us at the following address:

Windows NT Documentation Manager
Oracle Corporation, M/S 659107
Redwood Shores, CA 94065
Email: ntdoc@us.oracle.com

Contents

1

Introducing Oracle Networking Products

This chapter describes Oracle network products, protocol terms, and SQL*Net concepts. Specifically, this chapter covers the following topics:

- Special Terms
- Oracle Protocol Adapters
- Client/Server Architecture Overview
- Open Systems Interconnect Model
- Supported Oracle Network Product Versions and Vendors
- Overview of Each Supported Oracle Protocol Adapter
- Additional Oracle Network Products

Special Terms

Note the following special terms when using this Guide:

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 for Windows NT is an Oracle RDBMS.
Oracle Protocol Adapter	The software component of the Oracle Transparent Network Substrate (TNS) architecture that translates TNS function calls into requests to the underlying network protocol.
Oracle Tool	Any Oracle application tool (such as SQL*Plus), an Oracle end-user tool (such as Oracle Forms), or a third-party software program that interfaces with an Oracle7 Server.
SQL	Structured Query Language—the internationally accepted standard for defining and manipulating relational databases.
SQL*Net	The Oracle client/server communication software that offers transparent operation to Oracle tools or databases over any type of network protocol and operating system.
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 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 *Oracle MultiProtocol Interchange Administrator's Guide.*
Database Tools	Oracle Database Tools are a suite of powerful, easy-to-use, graphical database management tools that help you complete database tasks efficiently.
Server utilities	Oracle7 Server Utilities are included in the server software of your Oracle7 Server for Windows NT package. Oracle7 Server Utilities include: Backup Manager, Recovery Manager, Server Manager, Import, Export, and SQL*Loader (all Windows NT versions).

Oracle Protocol Adapters

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 through the supported protocol. SQL*Net and the Oracle MultiProtocol Interchange are examples of TNS-based applications.

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, the network configuration of Oracle protocol adapters and SQL*Net, and how to upgrade version 1 of SQL*Net to version 2, see *Understanding SQL*Net.*

The Oracle Protocol Adapters support the following protocols running under Windows NT/95:

- TCP/IP
- SPX/IPX

- Named Pipes Client
- Named Pipes Server for Windows NT
- DECnet for Windows NT
- SQL*Net/DCE for Windows NT/95

For a detailed technical discussion of these protocols, see the 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*Net to be transported across the network to the server.

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.) SQL*Net must be installed on both the client and server for user input to be transferred from the client machine to the server machine.

SQL*Net on the server then delivers that user's request to the Oracle7 Server 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 and Local Data Usage

Client/server architecture makes it easy for one database to be shared by remote workstations. It allows the server to perform 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 through 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 Model

Because of the diversity of network architectures, the International Standards Organization (ISO) established a model describing 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 (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 (including making sure messages are appropriately buffered and causing retransmissions for garbled messages). 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 Server database. When the Oracle7 Server replies, the data is sent back to the client machine through 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 Oracle 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.

Supported Oracle Network Product Versions and Vendors

This table lists the Oracle network products, releases, and supported vendors covered in this Guide.

Oracle Network Products for Windows NT/95	Release	Supported Vendors
SQL*Net*	2.3	Oracle Corporation
Oracle TCP/IP Protocol Adapter	2.3	Microsoft TCP/IP
Oracle SPX Protocol Adapter	2.3	Microsoft NW Link
SQL*Net/DCE	2.3	Gradient PC-DCE/32
Oracle Named Pipes Protocol Adapter (for Windows 95 client only, for Windows NT client and server)	2.3	Microsoft NETBEUI
Oracle DECnet Protocol Adapter	2.3	Digital Pathworks
Oracle Network Manager for Windows	3.1	Oracle Corporation
Oracle Names	2.0	Oracle Corporation

*The Bequeath Protocol Adapter is automatically installed with SQL*Net Client on Windows NT. Refer to Chapter 4 for a description of Bequeath Protocol Adapter features.

Overview of Each Supported Oracle Protocol Adapter

TCP/IP

TCP/IP is a combination of network protocols:

- a transport-layer protocol, the Transmission Control Protocol (TCP)
- a network-layer protocol, the Interned 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 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

The 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 through TCP/IP (if the Oracle database is running on a host system that supports network communication using TCP/IP).

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

SPX/IPX

SPX/IPX is a combination of network protocols:

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

SPX/IPX carries data packets between clients and their servers.

SPX and IPX are specifically designed for personal computer (PC) local area network (LAN) environments. They are high-performance communications protocols suitable for memory-constrained PC workstations. SPX/IPX supports all major PC operating systems.

SPX Protocol

SPX is a high-performance communications protocol that provides transport-layer services under the OSI model. SPX 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.

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 is successfully delivered or correctly sequenced.

IPX provides network-layer services 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 Protocol Adapter

The Oracle SPX Protocol Adapter contains a dynamic link library (DLL) that enables 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 through SPX/IPX (if the Oracle7 database is running on a host system that supports network communication using SPX/IPX).

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

DECnet Protocol Adapter

DECnet is Digital Equipment Corporations' networking and proprietary communication protocol. DECnet is part of PATHWORKS for DOS and Windows. This package lets a Windows machine operate on a DECnet network. DECnet for Windows NT runs on supported IBm or IBM-compatible computers running MS-DOS.

DECnet is a collection of software and hardware communications products that lets various computer system users communicate in a network. DECnet's peer-to-peer network environment lets any computer or node running DECnet communicate with all other nodes in the network without depending on a central controlling node. Each node is equally responsive to user requests, letting network users access applications and facilities quickly on other network nodes. DECnet extends operating system use by creating an environment where client and server software is shared and accessed by other DECnet network users.

Many third party vendors on other operating systems and hardware platforms implement the DECnet protocol. DECnet capabilities include:

- file transfer
- remote login
- process-to-process communications
- datalink configuration support over Ethernet, X.25, Asynchronous, and DDCMP

SQL*Net/DCE

Oracle SQL*Net/DCE enables users to transparently use Oracle tools and applications to access Oracle7 servers in a DCE environment. Oracle's SQL*Net/DCE product is comprised of two major components: the DCE protocol adapter and the DCE CDS naming adapter.

DCE Protocol Adapter

Authenticated RPC—SQL*Net/DCE provides authenticated RPC (Remote Procedure Call) as the transport mechanism which enables multi-vendor interoperability. RPC also uses some of the other DCE services, including directory and security services, to provide location transparency and secure distributed computing.

Integrated Security—SQL*Net/DCE works with the DCE Security service to provide security within DCE cells. It enables a user logged onto DCE to securely access any Oracle application without having to specify a username or password. This is sometimes referred to as *external authentication* to the database. Also, clients and servers that are not running DCE authentication services can interoperate with systems that have DCE security by specifying an Oracle password.

Data Privacy and Integrity—SQL*Net/DCE uses the multiple levels of security that DCE provides to ensure data authenticity, privacy and integrity. For example, users have a range of choices from no protection to full encryption for each connection, with a guarantee that no data has been modified in transit. For parts of your network that do not use DCE, you may want to use Advanced Networking Option (ANO) - Network Security and Single Sign-On. ANO-Network Security and Single Sign-On is an optional product that works with SQL*Net release 2.3 and later. It provides message integrity and data encryption services in non-DCE environments, allowing administrators to ensure that all network traffic is protected against unauthorized viewing or modification, regardless of the start or end point.

Cell Directory Service (CDS) Naming Adapter

Cell Directory Service—SQL*Net/DCE registers Oracle7 connect descriptors in the DCE Cell Directory Service (CDS), allowing them to be transparently accessed across the entire DCE environment. Users can connect to Oracle database servers in a DCE environment using familiar Oracle service names.

The DCE Cell Directory Service offers a distributed, replicated repository service for name, address and attributes of objects across the network. Because servers register their name and address information in the Cell Directory Service (CDS), Oracle clients can make location-independent connections to Oracle7 servers. Services can be relocated without any changes to the client configuration. An Oracle utility is provided to load the Oracle service names (with corresponding

connect descriptors) into CDS. After this is done, Oracle connect descriptors can be viewed from a central location with standard DCE tools.

The DCE CDS naming adapter is not included in this release of SQL*Net/DCE for Windows NT/95.

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.

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

Additional Oracle Network Products

Additional Oracle network products include:

- SQL*Net Easy Configuration
- Oracle Network Manager for Windows
- Oracle Names
- Advanced Networking Option - Network Security

SQL*Net Easy Configuration

SQL*Net Easy Configuration makes configuration quick and simple by automatically configuring Oracle network products. SQL*Net Easy Configuration is documented in Chapter 3. 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, see *Oracle Network Manager Administrator's Guide* for more information.

Attention: Oracle only supports configuration files created by using SQL*Net Easy Configuration (for simple database connections) or Oracle Network Manager for Windows (for advanced SQL*Net features, such as Oracle Names and Advanced Networking Option-Network Security and Single Sign-On).

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 that network administrators use to create and modify the configuration files required by Oracle networking products.

See *Oracle Network Products User's Guide for Windows* for Oracle Network Manager for Windows installation instructions. Currently, no specific configuration tasks for this product are necessary for Windows NT or Windows 95. For further information on using Oracle Network Manager for Windows, see the *Oracle Network Manager Administrator's Guide* .

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

Oracle Names

Oracle Names provides a central names 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 the *Oracle Names Administrator's Guide.*

Oracle Names version 2.0 supports the Dynamic Discovery Option, which lets you create configuration free networking while providing all the functionality of Oracle Names. The Dynamic Discovery Option can be used as a network configuration tool instead of SQL*Net Easy

Configuration or Oracle Network Manager for Windows. Dynamic Discovery Option features include:

- Well-known Names Server addresses
- Dynamic service registration
- Replication of service definitions

These features allow:

- Services to register themselves with well-known Names Servers
- Clients to find well-known Names Servers without configuration
- Well-known Names Servers to automatically replicate their data to each other.

Refer to the *Oracle Names Administrator's Guide* for specific information.

Advanced Networking Option - Network Security and Single Sign-On

ANO - Network Security and Single Sign-On is an optional product that enables data encryption and checksumming. For more information, see the *Advanced Networking Option Administrator's Guide.*

2

Installing Oracle Networking Products

This chapter covers the following installation topics:

- Installation Overview for Configuration Tool Users
- System Requirements
- Before You Install
- CD-ROM Quick Start Installation Instructions
- CD-ROM Detailed Installation Instructions
- Windows NT Installation
- Windows 95 Installation
- Adobe Acrobat Online Documentation Installation and Viewing
- Oracle Network Manager for Windows Installation
- De-Installing Products

Installation Overview for Configuration Tool Users

This section provides an installation overview for:

- SQL*Net Easy Configuration users
- Oracle Network Manager for Windows users

Ask your network administrator which tool is the standard for your networking environment:

Attention: Oracle only supports configuration files created using SQL*Net Easy Configuration (for simple database connections) or Oracle Network Manager for Windows (for advanced SQL*Net features, such as Advanced Networking Option).

Caution: Oracle strongly recommends that every machine in the workgroup network be configured with only one configuration utility: 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.

Installation Overview for SQL*Net Easy Configuration Users

1. Start the Oracle Installer for your operating system (Windows NT or Windows 95).
2. Install the appropriate Oracle Networking Products (SQL*Net Easy Configuration is automatically installed).
3. Exit the Oracle Installer.
4. Proceed to Chapter 3.

Installation Overview for Oracle Network Manager Users

1. Start the Oracle Installer for your operating system (Windows NT or Windows 95).
2. Install the appropriate Oracle Networking Products.

3 Exit the Oracle Installer.

4 Start the Oracle Installer for Windows 3.1.

5 Install the Oracle Network Manager for Windows.

6 Exit the Oracle Installer for Windows 3.1.

7 Proceed to *Oracle Network Manager Administrator's Guide*.

System Requirements

Hardware Requirements

The Oracle Network Products hardware requirements are:

- IBM, COMPAQ, or 100%-compatible PC based on an 80486 (or higher), Pentium, or MIPS processor

Attention: SQL*Net 2.3 does not support the MIPS processor.

- network interface card supported by the network protocol vendor whose network software corresponds to the Oracle Protocol Adapter(s) you install
- connected CD-ROM drive
- floppy drive, to install third-party software for SQL*Net/DCE
- minimum of 16 megabytes (MB) extended memory
- available hard disk space:

Protocol adapter	Disk Space
Oracle TCP/IP Protocol Adapter	41K
Oracle SPX Protocol Adapter	38K
Oracle Named Pipes Protocol Adapter	28K
Oracle Names	2.3MB
Oracle DECnet Protocol Adapter	20K
SQL*Net /DCE	51K

Protocol adapter	Disk Space
SQL*Net Server (for Windows NT)	6.7K
SQL*Net Client	6.4MB
Gradient PC-DCE/32 Runtime Services Kit	11MB
Adobe Acrobat Reader (for viewing online documentation)	2MB

Software Requirements

The Oracle Network Product software requirements are:

- Windows NT 3.51, or Windows 95
- third-party network software corresponding to the Oracle Protocol Adapter(s) you install.

  For example, Gradient PC-DCE/32 Runtime Services Kit Version 1.0.3a is third-party network software.
- Oracle Network Manager for Windows, if you choose that option instead of SQL*Net Easy Configuration.

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

Note: This product is *only* necessary for using SQL*Net/DCE .

Before You Install

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

1. Install your network hardware.
2. Install Windows NT or Windows 95.
3. Install your network software.
4. Test your network hardware and software. (To test your network system connection, refer to your network system documentation.)

5. Review the accompanying *Release Notes*.
6. Read the *Customer Support Information* booklet and return your registration card to the appropriate support center.
7. Shut down the SQL*Net network listener and any other Oracle-based applications.
8. If you choose the Oracle Network Manager for Windows option instead of SQL*Net Easy Configuration, have your *Oracle Network Products User's Guide for Windows* and *Oracle Network Manager Administrator's Guide* ready.

Caution: If you previously used SQL*Net version 2.*x*, perform the following tasks before beginning installation:

9. Back up all SQL*Net version 2.x server configuration files before performing an installation. With each server (re-)installation, SQL*Net Easy Configuration automatically runs, the LISTENER.ORA file in the ORACLE_HOME\ NETWORK\ADMIN directory is renamed LISTENER.OLD, and a new LISTENER.ORA file is created.
10. Back up TNSNAMES.ORA before performing a client installation if you plan to run SQL*Net Easy Configuration multiple times.
11. ***De-install all SQL*Net client and server products.***

Caution: *Be sure to de-install previous versions of SQL*Net before installing a later release.* Installing SQL*Net 2.3.2.1.0 from this release does not de-install SQL*Net 2.2 if previously installed. The Installer makes it appear that both versions are installed, though several files are actually overwritten. If a user then de-installs the previous version, the newer version will be broken and will need to be reinstalled.

12. Install Gradient PC-DCE/32 Runtime Services Kit if you intend to install SQL*Net/DCE.

CD-ROM Quick Start Installation Instructions

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

1 Insert the CD-ROM for Oracle Network Products for Windows NT/95 into the CD-ROM drive.

2 Run the Oracle Installer:

Protocol adapter	Disk Space
Windows NT (Intel)	G:**NT_X86**\INSTALL\ORAINST or G:**NT_X86**\INSTALL\SETUP
Windows 95	G:**WIN95**\INSTALL\ORAINST or G:**WIN95**\INSTALL\SETUP

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

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

The Software Asset Manager dialog box displays the available installation options.

4 Select appropriate options for installation.

5 Click Install. Follow the on-screen installation instructions.

Note: If you only select SQL*Net for installation, you *must* install an appropriate Oracle Protocol Adapter when prompted.

CD-ROM Detailed Installation Instructions

Perform the tasks in the "Before You Install" checklist section of this chapter.

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

2 Verify that the CD-ROM reader is mapped to a drive and that you can access its files.

3 Run the Oracle Installer:

Protocol adapter	Disk Space
Windows NT (Intel)	G:**NT_X86**\INSTALL\ORAINST or G:**NT_X86**\INSTALL\SETUP
Windows 95	G:**WIN95**\INSTALL\ORAINST or G:**WIN95**\INSTALL\SETUP

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

The Language dialog box appears.

4 Select the language and choose OK.

The Oracle Installation Settings dialog box appears.

5 Enter your company name and the location of your ORACLE_HOME directory.

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

The Software Asset Manager dialog box appears.

6 Follow the appropriate operating system installation instructions:

Windows NT Installation

The Software Asset Manager dialog box displays a number of installation options, four of which allow you to install Oracle Network Products:

Protocol adapter	Disk Space
Networking Products	Selectively install the following products. Oracle Names Server SQL*Net Client SQL*Net Protocol Adapters SQL*Net Server
Oracle7 Client	Select the Database Administrator or Application User sub-option. Both sub-options display a series of products automatically selected for installation, including the following client networking products: SQL*Net Client SQL*Net Protocol Adapters
Oracle7 Server	Automatically install a series of products, including the following server networking products: SQL*Net Server SQL*Net Protocol Adapters
Selective Product Install	Selectively install Oracle client and server Network Products for Windows NT.

Note: If you only select SQL*Net Server or SQL*Net Client for installation, you *must* install an appropriate Oracle Protocol Adapter when prompted.

Note: You can choose Cancel at any time to terminate installation and return to the Software Asset Manager dialog box.

Note: These installation procedures describe only Oracle Network Products dialog boxes. Depending upon the options you select, dialog boxes for other Oracle products can appear.

Select an installation option.

a. Networking Products

b. Oracle7 Client

c. Oracle7 Server

d. Selective Product Install

Networking Products Installation

1. Click Install.

The SQL*Net V2.3 Products dialog box appears.

2. Select the products you want to install.

   a. Oracle Names Server

   b. SQL*Net Client

   c. SQL*Net Protocol Adapters

   d. SQL*Net Server

3. Choose OK.

The SQL*Net Protocol Adapters dialog box appears if you selected SQL*Net Client, SQL*Net Protocol Adapters, or SQL*Net Server.

4. Select the protocol adapter(s) you want to install.

   a. Oracle Named Pipes Adapter

   b. Oracle SPX Adapter

   c. Oracle TCP/IP Adapter

   d. DECnet Protocol Adapter

   e. SQL*Net/DCE

5. Click OK.

You are prompted to read the Release Notes after you have completed installation.

6. Click OK.

7. Select additional options for installation in the Software Asset Manager or Click Exit.

Oracle7 Client Installation

1. Select an installation suboption.
    a. Database Administrator
    b. Application User
2. Click OK.

A dialog box appears with all of the listed products highlighted.

3. De-select any products you do not want to install.
    a. SQL*Net Client
    b. SQL*Net Protocol Adapters
4. Click OK.

The SQL*Net Protocol Adapters dialog box appears.

5. Select the protocol adapters you want to install.
    a. Oracle Named Pipes Adapter
    b. Oracle SPX Adapter
    c. Oracle TCP/IP Adapter
    d. DECnet Protocol Adapter
    e. SQL*Net/DCE
6. Click OK.

You are prompted to read the Release Notes after you have completed installation.

7. Click OK.
8. Select additional options for installation in the Software Asset Manager, or click Exit.

Oracle7Server Installation

1. De-select any products you do not want to install.
    a. SQL*Net Server
    b. SQL*Net Protocol Adapters
2. Click OK.

The SQL*Net Protocol Adapters dialog box appears.

3. Select the protocol adapters you want to install.
    a. Oracle Named Pipes Adapter
    b. Oracle SPX Adapter
    c. Oracle TCP/IP Adapter
    d. DECnet Protocol Adapter
    e. SQL*Net/DCE
4. Click OK.

You are prompted to read the Release Notes after you have completed installation.

5. Click OK.
6. Select additional options for installation in the Software Asset Manager, or click Exit.

Selective Product Installation

1. Provide information you are prompted for by the dialog boxes that appear. The dialog boxes will vary, depending on which products you select to install.

You are prompted to read the Release Notes after you have completed installation.

2. Click OK.
3. Select additional options for installation in the Software Asset Manager, or click Exit.

Windows 95 Installation

The Software Asset Manager dialog box displays the following Oracle networking product options:

Protocol adapter	Disk Space
Oracle7 Client	Select the Database Administrator or Application User sub-option. Both sub-options display a series of products automatically selected for installation, including SQL*Net Client.
Selective Product Install	Selectively install Oracle client Networking Products for Windows 95.

Select an installation option.

a. Oracle7 Client

b. Selective Product Install

Note: These installation procedures describe only Oracle Networking Products dialog boxes. Depending upon the options you select, dialog boxes for other Oracle products can appear.

Oracle7 Client Installation

1. Select an installation suboption.
   a. Database Administrator
   b. Application User
2. Click OK.

A dialog box appears with all of the listed products highlighted.

3. De-select any products you do not want to install.
   a. SQL*Net Client
   b. SQL*Net Protocol Adapters
4. Click OK.

The SQL*Net Protocol Adapters dialog box appears.

5. Select the protocol adapters you want to install.

a. Oracle Named Pipes Adapter

b. Oracle SPX Adapter

c. Oracle TCP/IP Adapter

d. SQL*Net/DCE

6. Click OK.

You are prompted to read the Release Notes after you have completed installation.

7. Click OK.

8. Select additional options for installation in the Software Asset Manager, or click Exit.

Selective Product Installation

1. Provide information you are prompted for by the dialog boxes that appear. The dialog boxes will vary, depending on which products you select to install.

You are prompted to read the Release Notes after you have completed installation.

2. Click OK.

3. Select additional options for installation in the Software Asset Manager, or click Exit.

Adobe Acrobat Online Documentation Installation and Viewing

The SQL*Net documentation listed in the Preface can be viewed online in Adobe Acrobat portable document format (PDF). Adobe Acrobat PDF documentation can be:

- installed on your hard drive or left on the CD-ROM for viewing.
- accessed through an Oracle Online Documentation Library that lets you choose appropriate documents for viewing, regardless of whether they are installed on your hard drive or remain on the CD-ROM.

Follow these procedures to install and view Adobe Acrobat documentation.

From the Software Asset Manager, you can see all options available for installation. Note that you may receive documentation for products which you did not license.

1. Select Oracle Documentation, and choose Install.
2. Select whether to install Adobe Acrobat documentation on your hard drive or leave it on the CD-ROM, and choose OK.

   Note: The amount of disk space required displays on screen.

   Installation begins.
3. Choose OK when prompted to acknowledge that installation is complete.
4. Exit the Oracle Installer.
5. Choose OK to acknowledge the message stating that you must install the Adobe Acrobat Reader by running the ACROREAD.EXE file. This file is located in the \ACROBAT directory of the CD-ROM.

   An Oracle Documentation icon is created in your Oracle Program Group.

   Double-click the G:\ACROBAT\ACROREAD.EXE file in Windows File Manager (for Windows NT) or Windows Explorer (for Windows 95).
6. Follow the on-screen instructions.

   The Adobe Acrobat Reader is installed.
7. Double-click the Oracle Documentation icon to access the Oracle Online Documentation Library that lists all documents available for viewing.

   Attention: After opening several files in Acrobat Reader, you may receive an error message if you try to open an additional file. This message advises you that the file does not exist. The message is false, and it occurs due to a memory shortage. Close the open files that you are not using, and open the desired file.

Oracle Network Manager for Windows Installation

If SQL*Net Easy Configuration is the standard for your network environment, you have completed the installation tasks. Proceed to Chapter 3.

If Oracle Network Manager for Windows is the standard for your workgroup network, proceed to the next step.

1. Go to the installation chapter of the *Oracle Networking Products User's Guide for Windows.*

2 Follow the instructions to run the Oracle Installer for Windows.

3 Install the Oracle Network Manager for Windows from the Oracle Products for Windows CD.

4 Return to this manual for further guidance on Oracle Networking Products for Windows NT/95.

Note: If you had a previous SQL*Net version 2.*x* configuration, you may need to restore LISTENER.OLD in the ORACLE_HOME\NETWORK \ADMIN directory.

De-Installing Products

Follow these instructions to de-install products:

1 Select one of the following tools:

‰ File Manager (Windows NT)

‰ Windows Explorer (Windows 95)

2 Choose the drive on which you installed the Oracle Networking Products.

3 Choose the ORACLE_HOME directory icon.

ORANT (Windows NT)

ORAWIN95 (Windows 95)

4 Choose the BIN directory icon.

5 Double-click ORAINST.EXE.

6 The Software Asset Manager dialog box displays the currently installed products in the menu on the right side of the screen.

7 Select the products to de-install and choose Remove.

8 Provide responses to any messages that appear.

9 Choose Exit to exit the Oracle Installer.

10 Confirm your selection when prompted.

3

Using SQL*Net Easy Configuration

This chapter describes the following SQL*Net Easy Configuration issues:

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

Overview

SQL*Net Easy Configuration is a SQL*Net version 2 utility that allows user to configure SQL*Net automatically on client machine(s). Use SQL*Net Easy Configuration if you know the name of your server and your system ID (SID). This is the case for many users who formerly used SQL*Net version 1.

If you are a network administrator setting up a network with the Oracle MultiProtocol Interchange (MPI), Oracle Names, Advanced Networking Option - Network Security and Single Sign-On, or facilities for users who do not know the name of their server, do the following:

- use Oracle Network Manager for Windows instead of SQL*Net Easy Configuration
- see Appendices D and E.

Note: SQL*Net Easy Configuration supports the following protocols only:

- TCP/IP
- SPX/IPX
- Named Pipes

Attention: If you use DECnet or DCE, you need to configure these protocols manually.

Starting SQL*Net Easy Configuration

Caution: Oracle strongly recommends that every machine in the workgroup network be configured with 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 these instructions to start SQL*Net Easy Configuration.

1. Verify that SQL*Net is installed on your client.
2. Verify Oracle Protocol Adapters installation.

3 Open SQL*Net Easy Configuration:

For Windows NT	For Windows 95
Double-click the SQL*Net Easy Configuration icon in the Oracle for Windows NT program group.	Select Start, Programs, Oracle for Windows 95, and choose SQL*Net Easy Configuration.

Using SQL*Net Easy Configuration

The SQL*Net Easy Configuration dialog box appears after you choose 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 (for Windows 95)

Note: For Windows NT, use the Cancel button to exit.

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

Do not modify the ORACLE_HOME\NETWORK\ADMIN file or the ORACLE_HOME\NETWORK\CFG file.

Note: If you want to delete, modify, or view Bequeath Protocol Adapter addressing information, use SQL*Net Easy Configuration. The Bequeath Protocol Adapter is automatically installed with SQL*Net Client on Windows NT. Refer to Chapter 4 for a description of Bequeath Protocol Adapter features.

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 to access. The alias can be any name you choose.

   Note: The name must 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 must go to Step 7.
5. Select the protocol to use for your Database Alias name.
6. Choose OK.

   The dialog box appropriate for your protocol adapter appears:

   - Choose TCP/IP Host Name
   - Choose SPX Service Name
   - Choose Named Pipes Server Name
   - Choose SQL*Net/DCE Name
7. Enter the appropriate service name corresponding to your protocol adapter.
8. Choose OK.

   The Confirm Adding Database Alias dialog box appears.
9. Choose OK to confirm (Yes).

   The SQL*Net Easy Configuration dialog box re-appears.

   Note: You may add up to 15 new database aliases with SQL*Net Easy Configuration.

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 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 must go to step 7.

5 Select the protocol to use for your Database Alias name.

6 Choose OK.

The Enter Modification Information dialog box appears.

7 Enter the appropriate service name that 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 requires at least one alphabetical character.

Note: If you used SQL*Net version 1 in the past, you can use the same values for Service Name and Database Instance (SID) as you used for SQL*Net version 1. 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 re-appears.

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 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 re-appears.

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 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 re-appears.

Exiting the Utility

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

4

Using Oracle Networking 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
- Using SQL*Net Login Parameters
- Connecting with SQL*Net
- Using SQL*Net
- Connecting to Another System
- Connecting to a Local Windows NT Server without a Listener
- Using SQL*Net/DCE

Note: This chapter assumes you have already configured Oracle Network Products with either SQL*Net Easy Configuration or Oracle Network Manager for Windows.

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, an estimate of the round trip time in milliseconds appears. If TNSPING fails, a network error message appears without the overhead of a database connection.

Invoke TNSPING on the command line as follows:

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

where:

service_name	must exist in TNSNAMES.ORA or Oracle Names.
count	is optional and determines how many times the program attempts to reach the server.

Using SQL*Net Login Parameters

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

The configuration file is set up in one of 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 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. The network listener listens for requests to connect to the desired database.

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

To open an Oracle application:

- double-click the application icon

- enter 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*. Enter the correct values, where:

- *User Name* specifies the username required to connect to the remote database.
- *Password* specifies the password of the username.
- *Host String* specifies which service name (comparable to a SQL*Net version 1 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.

Click Cancel at any time to exit the application.

Connecting with SQL*Net

To connect to a remote database, you enter 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:

```
YVONNE
```

where YVONNE is a service name in the TNSNAMES.ORA file in the ORACLE_HOME\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, begin using SQL*Net. The network administrator or the end-user runs the server's SQL*Net listener program.

Note: The TNSNAMES.ORA file does not exist if Oracle Names is configured with Oracle Network Manager for Windows.

Start the network listener service in either of two ways:

From the Command Line, enter...	From within the LSNRCTL Utility, enter...
C:\> LSNRCTL START	LSNRCTL> 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 a local Oracle7 Server from within Server Manager with the following syntax:

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

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

If using a menu-based Oracle tool, such as Oracle Forms, enter the password and SQL*Net version 2 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, 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 pending work in the current database and logs off the current username.

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

Connecting to a Local Windows NT Server without a Listener

SQL*Net for Windows NT version 2.3 includes a new feature called the Bequeath Protocol Adapter. The Bequeath Protocol Adapter:

- does not use a listener (therefore, no server configuration is required)
- is used for local connections where a Windows NT client application (such as SQL*Plus) communicates with a Windows NT server running on the *same* machine.

The Bequeath Protocol Adapter address format in the TNSNAMES.ORA file is shown below. If you want to modify, delete, or view this address information, use SQL*Net Easy Configuration.

```
  (COMMUNITY=beq.world)

 (PROTOCOL=BEQ)
  (PROGRAM=oracle73)
  (ARGV0=oracle73ORCL)
  (ARGS= '(DESCRIPTION=(LOCAL=YES)(ADDRESS=(PROTOCOL=beq)))')
```

Note: When connecting with the Bequeath Protocol Adapter on a local Windows NT server, you only need to specify the SID. Use the default entry of localhost for the service name, since the Windows NT server is a local machine.

Using SQL*Net/DCE for Windows NT/95

After externally-identified accounts have been set up, you can take advantage of DCE authentication to log into Oracle without providing any username/password information.

To connect to an Oracle Server using SQL*Net/DCE :

1. Log into DCE by typing DCE_LOGIN at the DOS prompt to invoke the utility provided by Gradient PC-DCE/32.

   Note: You only need to log in once. If you are already logged into DCE, you do not need to log in again.

2. Connect to an Oracle Server without using a username or password.

   For example, run SQL*Plus from the Windows File Manager by entering the following at the command line:

```
C:\ORANT\BIN\PLUS33.EXE /@ORADCE
```

   or

```
C:\ORAWIN95\BIN\PLUS33.EXE /@ORADCE
```

   where *ORADCE* is the connect string specified in TNSNAMES.ORA.

A

Registry for Windows NT and Windows 95

This appendix describes how to access the following Registries to edit Oracle-related settings. Specific topics discussed are:

- Overview
- Windows NT Registry
- Windows 95 Registry

Overview

The Registry stores system settings, including Oracle-related settings. The end-user who uses SQL*Net Easy Configuration does not need to edit the Registry. The network administrator, however, can customize the Oracle environment by changing the parameters defined in the 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 your operating system documentation for more information.

Windows NT Registry

These procedures describe how to edit the Windows NT Registry for Oracle-related settings.

1. Type `REGEDT32` from a command line.

   Four windows appear, including HKEY_LOCAL_MACHINE.

2. Activate HKEY_LOCAL_MACHINE on the 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 to edit.

   The String Editor dialog box appears.

6. Make any edits in the String field.
7. Choose OK.
8. Reboot your system for changes to take effect.

Windows 95 Registry

These procedures describe how to edit the Windows 95 Registry for Oracle-related settings.

1. Type `REGEDIT` from a command line.

   The Registry Editor window appears.

2. Double-click on the 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 to edit.

   The Edit String dialog box appears.

6. Make any edits in the appropriate field(s).
7. Choose OK.
8. Reboot your system for changes to take effect.

B

Sample Configuration Files

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

- SQLNET.ORA
- LISTENER.ORA

Attention: Oracle only supports configuration files created by Oracle Network Manager for Windows or SQL*Net Easy Configuration. Some manual editing of certain files may be a necessary exception.

Note: The TNSNAMES.ORA file does not exist if Oracle Names is configured with Oracle Network Manager for Windows.

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 = ”-1055358555-1054669637”
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)
    )
  )
```

C

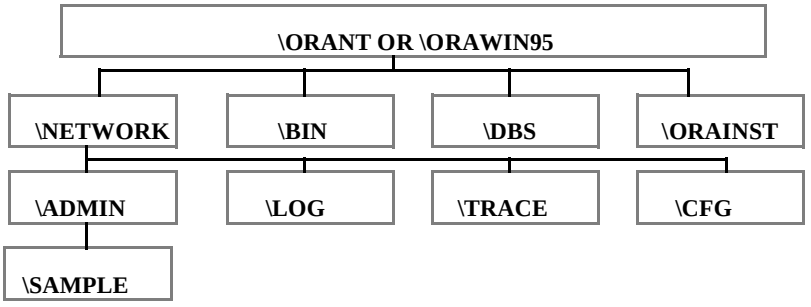
Verifying Installation of Oracle Networking Products

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

- Directory Structure of Oracle Network Products
- Installation Verification Overview
- Verifying Installation of SQL*Net Files
- Verifying Oracle Names Files
- Verifying Environment Setup

Directory Structure of Oracle Network Products

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



\ORANT or \ORAWIN95	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 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 SQL*Net Easy Configuration working directory.

Installation Verification Overview

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

This appendix outlines the steps to verify successful installation of Oracle network products, including:

- SQL*Net
- Oracle Protocol Adapters
- Oracle Network Manager for Windows
- Oracle Names

Locate the appropriate sections in this appendix to accomplish each step as they apply to your configuration needs. After you verify installation, see Appendix D to specify SQL*Net connect descriptors and Oracle Protocol Adapter addresses.

Verifying 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, check that SQL*Net is fully installed in your \BIN subdirectory. Enter the following command at the prompt:

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

or

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

The following dynamic link libraries (DLLs) 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
NASNSNT.DLL	Yes	No
NCRNT.DLL	Yes	No
NMCPI.DLL	Yes	No
NAUNTS.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 message files appear:

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

If 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 \ORACLE_HOME\BIN
directory. Enter the following command:
```

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

or

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

The following server executables appear:

- TNSLSNR.EXE
- LSNRCTL.EXE

Verifying Oracle Protocol Adapter Files

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

1 Enter the following command:

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

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

If you installed...	Corresponding DLL File...
Oracle TCP/IP Protocol Adapter	NTTNT.DLL
Oracle SPX Protocol Adapter	NTSNT.DLL

If you installed...	Corresponding DLL File...
Oracle Named Pipes Protocol Adapter (for Windows 95 client only, for Windows NT client and server)	NTNNT.DLL
Oracle DECnet Protocol Adapter	NTDNT.DLL
SQL*Net/DCE	NTODRNT.DLL

Verifying Oracle Names Files

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

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

or

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

The following Oracle Names executables appear:

- NAMES.EXE
- NAMESCTL.EXE

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

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

or

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

The following message files appear:

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

Additional Information: 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 Oracle Network Manager 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 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 are in the \ORAWIN\BIN subdirectory.

The following.DLL filenames appear:

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

Verify files at the DOS prompt by entering:

```
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 Oracle 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, 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 DNS, 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 can 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 is 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 is the name of the host associated with the Internet address.

alias is 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" is referenced in the HOSTS file as follows:

```
89.0.1.100  BOSTONSALES  [BOSTON]
```

where

89.0.1.100 is the Internet address of the remote host.

BOSTONSALE is the name of the remote host.

BOSTON is an optional alias for the BOSTONSALES host.

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

D

Configuring Oracle Networking Products

This appendix provides information on the following topics:

- Configuration Steps
- Client Configuration
- TNSNAMES.ORA Overview
- Listener Address for Each Supported Oracle Protocol Adapter
- LISTENER.ORA Overview
- Oracle Names Configuration (Windows NT Only)
- SQLNET.ORA Overview
- Configuring SQL*Net/DCE
- Starting and Stopping the Network Listener

Configuration Steps

This section outlines the steps necessary to use Oracle Network Manager for Windows and to connect to your database to configure your SQL*Net version 2 configuration files.

1. Read the *Oracle Network Manager Administrator's Guide* for information on all the configuration steps described below.
2. Use Oracle Network Manager for Windows in the following manner:
    - Start a session.
    - Make sure you are running in Enhanced mode.
    - Start Oracle Network Manager for Windows.
    - Follow the instructions in the *Oracle Network Manager Administrator's Guide.*
    - 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.
    - Generate the network configuration files.
    - Distribute the network configuration files to the appropriate nodes.
    - Exit Oracle Network Manager for Windows.
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
```

4. Start Oracle Names if you are using it 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
```

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

Oracle recommends that you use Oracle Names to facilitate connections.

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

Client Configuration

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

Configuration File	Description
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, TNSNAMES.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 is configured and a SQL*Net network listener is started on an Oracle7 Server, clients connect to the Oracle7 Server using a SQL*Net service name. The service name is mapped to the connect descriptor. Connect descriptors define protocol adapter information for the destination server's address and the system ID (SID) for the destination server.

TNSNAMES.ORA Overview

The TNSNAMES.ORA file 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 file is not necessary; the Names servers get the needed information from the network definition stored on a database.

Each entry in the TNSNAMES.ORA file includes two elements:

- a service name
- a connect descriptor

These elements are described in the following sections. In addition, elements in MultiProtocol Interchange addressing are also described.

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 to connect. (These are comparable to the aliases used for connect strings in SQL*Net version 1.) The 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 the global 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.

Additional Information: See *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 is used by two different divisions of a company, Human Resources and Finance, you can map two different service name aliases, *hr* and *finance* to the database. The TNSNAMES.ORA file has 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 SID of the database to which to connect. Database connect descriptors typically consist of two sections:

- the listener ADDRESS
- the CONNECT_DATA SID keyword

Listener ADDRESS

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 parameter values of a given protocol, see the section "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 SID Keyword

SQL*Net uses the CONNECT_DATA keyword to denote the 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 can look like:

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

CONNECT_DATA is a protocol independent keyword indicating that application-specific data is supplied at connect time. SID specifies the

Oracle SID of the database server. You must specify the SID in 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 Oracle MultiProtocol Interchange addresses, including the required protocol specific keywords.

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

Listener Address for Each Supported Oracle Protocol Adapter

This section describes the address format for the following Oracle Protocol Adapters:

- Oracle TCP/IP Protocol Adapter
- Oracle SPX Protocol Adapter
- Oracle Named Pipes Protocol Adapter
- Oracle DECnet Protocol Adapter
- SQL*Net/DCE Adapter

Definitions and explanations of the parameters can be found in the table below.

Parameter	Description
COMMUNITY	Specifies the network community of the TNS-based application.
PROTOCOL	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	Indicates the name of your Oracle7 Server computer.

Parameter	Description
SERVICE	Mandatory for server and client. Defines the name of the TNS-based application on the network. Speak to your network administrator to learn the service names of TNS-based applications on your network.
PIPE	Indicates the pipe name you use to connect to your Oracle7 Server (the same PIPE keyword you specified on your Oracle7 Server).
HOST and PORT	Identifies a TNS-based application on the network. Ask your network administrator to learn the host names and port numbers of TNS-based applications on your network.
SERVER_PRINCIPAL	Mandatory field for the server and an optional field for the client. The server authenticates itself to DCE as this principal. This field is mandatory in LISTENER.ORA and specifies the principal the server will start under. This field is optional in TNSNAMES.ORA and specifies the principal of the server the client must connect to. If not specified, then one-way authentication is used. In this case, the client does not care what principal the server is running under.
CELL_NAME	Optional parameter. If present, it specifies the DCE cell name of the database. If it is not set, the cell name defaults to the local cell (useful for single-cell environments). Optionally, the SERVICE parameter may specify the complete path (including cell name) to the service, making this parameter unnecessary.
NODE	Defines the DECnet node name of the Oracle7 Server as defined in the DECnet node database.
OBJECT	decNET database listener as specified in the LISTENER.ORA file.

Additional Information: For more detailed explanations of these parameters for SQL*Net / DCE, refer to *SQL*Net/DCE Administrator's Guide*.

TCP/IP Addresses

When using the Oracle TCP/IP Protocol Adapter, specify the address of a TNS-based application in the following format:

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

)
```

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. This file 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 Oracle7 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 Protocol Adapter, specify the address of a TNS-based application as follows:

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

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 Oracle7 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)
)
```

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 Oracle7 Server named GREENWOOD on a Named Pipes network.

```
GREEN=(DESCRIPTION=
               (ADDRESS=
                   (COMMUNITY=NMP.WORLD)
```

```
                    (PROTOCOL=NMP)
                    (SERVER=GREENWOOD)
                    (PIPE=dbpipe0)
                )
                (CONNECT_DATA=(SID=ORCL)
                )
            )
```

Oracle DECnet Address

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

```
(ADDRESS=
    (COMMUNITY=community_name)]
    (PROTOCOL=DECNet)
    (NODE=decnetnodename)
    (OBJECT=alias))
```

SQL*Net Example on a DECnet Network

The following is an example of the ADDRESS parameter used with the TNS-based product SQL*Net. The example is taken from the SQL*Net configuration file, TNSNAMES.ORA. This file 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 Oracle7 Server named ORACLE7 on a DECnet node named oracle.

```
testdnt.sample=
    (DESCRIPTION=
            (ADDRESS=
                (COMMUNITY=desktopdecnet.sample)
                (PROTOCOL=DECNet)
                (NODE=oracle)
                (OBJECT=ORACLE7)
                )
    (CONNECT_DATA=
        (SID=ORACLE7)))
```

Caution: The TNSNAMES.ORA file must be generated by using the Oracle Network Manager tool. If using the Oracle DECnet Protocol Adapter, Oracle only supports files created using Oracle Network Manager.

SQL*Net/DCE Address

DCE addresses in the LISTENER.ORA and TNSNAMES.ORA configuration files are defined by DCE parameters.

```
ADDRESS=(PROTOCOL=DCE)
        (SERVER_PRINCIPAL=server_name)
        (CELL_NAME=cell_name)
        (SERVICE=dce_service_name))
```

SQL*Net Example on a SQL*Net/DCE Network

When using the SQL*Net/DCE, specify the address of a TNS-based application as follows:

```
ORADCE.WORLD=(DESCRIPTION=
            (ADDRESS=
                (PROTOCOL=DCE)
                (SERVER_PRINCIPAL=oracle)
                (CELL_NAME=cell1)
                (SERVICE=DCE_SVC)
            (CONNECT_DATA=(SID=ORASID)))
            )
        )
```

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:

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

Note: Generate and modify the LISTENER.ORA file through the Oracle Network Manager for Windows. Do not edit LISTENER.ORA by hand. Be sure to make a back-up copy of this file before installing SQL*Net.

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 ensured because the Oracle Network Manager for Windows 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 Oracle Network Manager for Windows appends the node names and

the domain to their names so that they are 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 requires a unique name. The TURTLE node, for example, might have three listeners with the names:

- LSNR1_TURTLE.WORLD
- LSNR2_TURTLE.WORLD
- LSNR3_TURTLE.WORLD

IPC Addresses for the Listener (Windows NT Only)

The listener queries for interprocess calls (IPC) and for 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 queries. 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 in the section *TNSNAMES.ORA Overview*. In the other IPC address, the key value is equal to the database 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 database SIDs for which the listener queries. 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 SID 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 create 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.ORA file, see Appendix B.

To enable servers to function as clients 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 listed in Appendix D 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 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;
```

Additional Information: See *Understanding SQL*Net* and the *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 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 Oracle7 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, evaluate carefully whether you benefit from enabling the dead connection detection feature. Turn it on only 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 the *Oracle Network Products Troubleshooting Guide*.

Default Domains

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

Oracle Names Parameters

If you use 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 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 providing 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 you do not want IPC addresses to be sought automatically on some nodes in your network, add the following parameter to the SQLNET.ORA files for those nodes:

AUTOMATIC_IPC=OFF

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

Configuring SQL*Net/DCE

To configure SQL*Net/DCE for Windows, the network administrator configures three essential files:

- TNSNAMES.ORA (create and modify manually)
- PROTOCOL.ORA (create and modify manually)
- SQLNET.ORA (configure using Network Manager for Windows)

TNSNAMES.ORA

This section describes the parameters that the administrator needs to include in the TNSNAMES.ORA file.

Sample TNSNAMES.ORA File

TNSNAMES.ORA contains a list of Oracle service names mapped to connect descriptors of destinations or endpoints in the network. The sample DCE address below shows a network address for an Oracle server with the Oracle service name ORADCE. It is used to connect to the service registered as DCE_SVC in the CDS directory

`/.../<cell_name>/subsys/oracle/names`.

```
ORADCE.WORLD=(DESCRIPTION=
            (ADDRESS=
              (PROTOCOL=DCE)
              (SERVER_PRINCIPAL=oracle)
              (CELL_NAME=cell1)
              (SERVICE=DCE_SVC))
          (CONNECT_DATA=
              (SID=ORASID)))
```

Note: In this example, the Oracle service name and the DCE service name are different. However, they are often the same.

The keyword value pair PROTOCOL=DCE is mandatory. It appears in the address section of LISTENER.ORA and in the address section of TNSNAMES.ORA. It must be the same in both places.

The DCE parameter SERVER_PRINCIPAL is optional in TNSNAMES.ORA.

The DCE parameter SERVICE is mandatory. The value given for the DCE parameter (SERVICE= *dce_service_name)* must be the same in the LISTENER.ORA and TNSNAMES.ORA files.

The Oracle parameter SID is mandatory. It identifies the Oracle system ID; each SID value must be unique on a node. This parameter is strictly local and is not used in DCE CDS.

PROTOCOL.ORA

In this release, there are three DCE parameters located in PROTOCOL.ORA. Each parameter begins with the prefix **DCE.** to distinguish it from parameters relevant to other protocols. The parameters and their current defaults are as follows:

DCE.AUTHENTICATION=*dce_secret*
DCE.PROTECTION=*pkt_integ*
DCE.LOCAL_CELL_USERNAMES=FALSE

Configuration parameters are not case-sensitive—you can enter them in either upper-case or lower-case.

Note: If the DCE.AUTHENTICATION entry is not specified, cell-wide default authentication is used. If the DCE.PROTECTION entry is not specified, cell-wide default protection is used.

DCE.AUTHENTICATION

This parameter is optional. It indicates the authentication value to be used for each DCE RPC. The client's DCE_AUTHENTICATION value must be the same as the server's DCE_AUTHENTICATION value. The choices are as follows:

- **NONE.** No authentication.
- **DCE_SECRET.** DCE shared-secret key authentication (Kerberos). DCE_SECRET is the default authentication level.
- **DEFAULT.** The cell default.

Note: Oracle recommends using DCE_SECRET for this parameter.

DCE.PROTECTION

This is an optional field, which specifies the data integrity protection levels for the data transmission. The client's DCE_PROTECTION level must be equal to or greater than the server's DCE_PROTECTION level. The choices are as follows:

- **NONE.** Perform no protection for the current connection.
- **DEFAULT.** Use the default cell-wide protection level.
- **CONNECT.** Perform protection only when the client establishes a relationship with the server.
- **CALL.** Perform protection only at the beginning of each remote procedure call when the server receives the request.
- **PKT.** Ensures that all data received is from the expected client.
- **PKT_INTEG**. Ensures and verifies that none of the data transferred between the client and server has been modified.
- **PRIVACY**. Performs protection as specified by all of the previous levels and also encrypts each RPC argument value and all user data in each call.

DCE.LOCAL_CELL_USERNAMES

This optional parameter defines the format used to specify the principal name (username), either with or without the cell name.

The choice you make for this parameter should be determined by whether users will be making connections across cells, and if so, whether you have naming conventions that ensure that users in different cells do not have duplicate names.

- **TRUE**. Choose TRUE when using just the SERVER_PRINCIPAL format, without the CELL_NAME. An example of a user specified in this format would be:

```
oracle
```

This choice would be appropriate if users are making connections within a single cell, or if naming conventions in your network ensure that users in different cells do not have duplicate names.

- **FALSE.** Choose FALSE when using the CELLNAME/SERVER_PRINCIPAL format. An example of a user specified in this format would be:

  ```
  "CELL1/ORACLE"
  ```

  This choice would be appropriate if users are making connections across cells and there may be users in different cells with identical names.

Starting and Stopping the Network Listener

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

Server Operations

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

```
LSNRCTL START listener_name
```

The network listener only stops when you explicitly stop it. Issue the following command:

```
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 Server Manager can request a connection to a local Windows NT server as follows:

```
SVRMGR> 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.

E

Messages and Codes

This appendix lists error messages and codes that are specific to installation and operation of Oracle7 Server for Windows NT.

The error message descriptions in this appendix list possible causes for the errors and suggest corrective actions. The information in this appendix does not duplicate information in Oracle7 Server Messages.

This appendix is divided into the sections listed below.

- Logging Error Messages
- Installer Error Messages
- Codes 9200-9499: Oracle Database Messages
- Codes 4000-4999: Windows NT-Specific Oracle Messages
- Codes 6100 - 6199: SQL*Net TCP / IP Errors

Logging Error Messages

You can keep a log of the error messages you receive from the Oracle7 Server for Windows NT utilities by redirecting the messages to a file. You can record the contents of normal utility messages by using the LOGFILE parameter discussed in the Oracle7 Server Utilities. You can separately record the error message portion by using standard Windows NT file redirection. For example, you might use the following syntax to redirect the output from the Export utility:

```
C:\> EXP username/password PARFILE=filename
1> FILE1.LOG
2>FILE2.ERR
```

In this command line, FILE1.LOG receives the standard output from Export, while FILE2.ERR receives the standard error messages.

Installer Error Messages

This section lists potential error messages that can occur while using the Oracle Installer. Most of the Installer error messages are accompanied with corrective information right on the screen; therefore, they are not listed in this appendix. This appendix lists potential error messages in alphabetical order and provides the probable cause and corrective action.

Error	Cause	Action
DISK_FULLDISK_FULL	There is not enough disk space on the destination volume to copy the selected program.	Create space on the destination volume.
DRIVE_LOCKEDDRIVE_LOCKED	The device specified in the full error message is in use or locked by another process.	Terminate or release the other process, or wait for it to complete.
FILE_CORRUPTEDFILE_CORRUPTED	The file or directory specified in the full error message is damaged or not readable.	Try to repair or replace the file or repair the directory specified.
FILE_NOT_FOUNDFILE_NOT_FOUND	It was not possible to locate a file on the source or destination media.	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.
INVALID_FILE_NAMEINVALID_FILE_NAME	The file or directory name or volume label specified in the full message is syntactically incorrect.	Respecify the file, directory, or volume using correct syntax.
LEXICAL_ERRORLEXICAL_ERROR	An error has been detected in the installation scripts.	Call Oracle Customer Support.
LOCKING_VIOLATIONLOCKING_VIOLATION	A portion of the file specified in the full message has been locked by another process.	Release or terminate the other process, or wait for it to complete.

Error	Cause	Action
OS_ERROROS_ERROR	There is an unexpected operating system error.	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_DENIEDPERMISSION_DENIED	The network has denied permission to perform the selected action.	Check with the network administrator; make sure you have Supervisor privileges and can perform the selected action.
READ_ERRORREAD_ERROR	A problem has been detected on the source or destination media while executing an I/O operation.	1: If in a network environment, verify that you have read permission for the networked file. 2: 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.
RECALIBRATION_FAILURERECALIBRATION_FAILURE	A hardware problem has been detected on the hard drive to which you are installing.	Run a utility program to diagnose the hard drive.
SHARING_VIOLATIONSHARING_VIOLATION	The file specified in the full message has been locked by another process. (This error is similar to the LOCKING_VIOLATION message, which relates to a portion of a file.	Release or terminate the other process, or wait until it completes.

Error	Cause	Action
TOO_MANY_OPEN_FILESTOO_MANY_OPEN_FILES	Too many files are open on Windows NT.	Close some of the open files.
WRITE_ERRORWRITE_ERROR	A problem has been detected on the destination media while executing an I/O operation.	1: If you are in a network environment and installing onto the network, verify that you have permission to write to a network directory. 2: 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.
WRITE_PROTECTEDWRITE_PROTECTED	The file or directory specified in the full message (in which Oracle software is to be installed) is write protected.	Remove the write-protection from the specified file or directory.

Codes 9200-9499: Oracle Database Messages

The messages in this section are Oracle messages issued by the database. Each one is triggered by an Oracle operating-system-dependent (OSD) message specific to Windows NT specifying the error condition signal. (The OSD messages appear in the next section.) When you receive one of these messages, look up the accompanying OSD message number in the following section for an explanation of the error.

Message	Signal
ORA-09200	sfccf: error creating file
ORA-09201	sfcopy: error copying file
ORA-09202	sfifi: error identifying file
ORA-09203	sfofi: error opening file
ORA-09204	sfotf: error opening temporary file
ORA-09205	sfqio: error reading or writing to disk
ORA-09206	sfrfb: error reading from file
ORA-09207	sfsrd: error reading from file
ORA-09208	sftcls: error closing file
ORA-09209	sftget: error reading from file
ORA-09210	sftopn: error opening file
ORA-09211	sfwfb: error writing to file
ORA-09212	sfwfbmt: error writing to file
ORA-09213	slgfn: error fabricating file name
ORA-09214	sfdone: I/O error detected
ORA-09215	sfqio: error detected in I/O completion routine

Message	Signal
ORA-09216	sdnfy: bad value '%s' for parameter %s
ORA-09217	sfsfs: failed to resize file
ORA-09218	sfrfs: failed to refresh file size
ORA-09240	smpalo: error allocating PGA memory
ORA-09241	smsalo: error allocating SGA memory
ORA-09242	smscre: error creating SGA
ORA-09243	smsget: error attaching to SGA
ORA-09244	smprset: error setting memory protections
ORA-09245	smcstk: error switching stacks
ORA-09246	sfsmap: unable to map SGA
ORA-09247	smsdes: error destroying the SGA
ORA-09260	sigpidu: error obtaining process id
ORA-09261	spdcr: error creating detached (background) process
ORA-09262	spdde: error terminating detached (background) process
ORA-09263	spini: error initializing process
ORA-09264	sptpa: error flagging process
ORA-09265	spwat: error temporarily suspending process
ORA-09266	spawn: error starting an oracle process
ORA-09270	szalloc: error allocating memory for security
ORA-09271	szlon: error verifying user name
ORA-09272	remote OS login is not allowed

Message	Signal
ORA-09273	szrfc: error verifying role name
ORA-09274	szrfc: insufficient role name buffer space
ORA-09280	sllfcf: error closing file
ORA-09281	sllfop: error opening file
ORA-09282	sllfrb: error reading records
ORA-09283	sllfsk: error skipping records
ORA-09290	lsksaalo: error allocating memory for archival
ORA-09291	sksachk: invalid device specification for LOG_ARCHIVE_DEST
ORA-09292	sksabln: unable to build file name
ORA-09293	sksasmo: unable to send message to console
ORA-09300	osncon: unable to connect, DPMI not available
ORA-09301	osncon: local kernel only supported in standard mode
ORA-09310	sclgt: error freeing latch
ORA-09311	slsleep: error temporarily suspending process
ORA-09312	slspool: error spooling file to printer
ORA-09313	slsprom: error prompting user
ORA-09314	sltln: error translating logical name
ORA-09315	sql2tt: two-task error translating ORACLE_EXECUTABLE
ORA-09316	szrpc: unable to verify password for role
ORA-09317	szprv: insufficient privileges
ORA-09318	slkhst: error hosting out to operating system

Message	Signal
ORA-09319	slgtd: unable to obtain the current date and time
ORA-09320	szrfc: unable to obtain the list of valid OS roles
ORA-09321	slzdtb: unable to convert zoned decimal to binary
ORA-09322	slpdtb: unable to convert packed decimal to binary
ORA-09330	session terminated internally by Oracle or by an Oracle DBA
ORA-09331	scgcan: unable to process lk_sync_cancel return code
ORA-09332	scgcc: unable to process lk_close return code
ORA-09333	scggc: unable to process lk_open_convert return code
ORA-09334	scggc: unable to process lk_convert return code
ORA-09335	scgcm: unable to process return code in completion procedure
ORA-09340	specified ORACLE_SID is either invalid or too long
ORA-09341	scumnt: unable to mount database
ORA-09350	Windows NT two-task driver unable to allocate context area
ORA-09351	Windows NT two-task driver unable to allocate shared memory
ORA-09352	Windows NT two-task driver unable to spawn new Oracle task
ORA-09353	Windows NT two-task driver unable to open event semaphore
ORA-09354	Windows NT two-task driver: Oracle task unexpectedly died

Codes 4000-4999: Windows NT-Specific Oracle Messages

The messages in this section are Oracle operating-system-dependent (OSD) messages that issue in response to an error condition in Windows NT. Each message in this section triggers an Oracle database message (listed in the preceding section).

File I/O Errors: OSD-4000 to OSD-4099

Error	Cause	Action
OSD-04000 logical block size mismatch	The database block size specified in the initialization parameter file does not match the block size of the actual database files.	Use matching logical block sizes.
OSD-04001 invalid logical block size	The logical block size is not a multiple of 512 bytes, or it is too large.	Change the value of DB_BLOCK_SIZE in the initialization parameter file.
OSD-04002 unable to open file	The specified path or filename is invalid, or the destination device is full. This error can also be caused by insufficient Windows NT file handles.	Make sure that the path and file exist, and that the device has free space. If this fails, increase the number of Windows NT file handles.
OSD-04003 unable to read file header block	The media has been damaged.	Recover the file if necessary, and verify that Windows NT is functioning correctly.
OSD-04004 invalid file header	The file is corrupted.	Recover the file.
OSD-04005 SetFilePointer() failure, unable to read from file	There was an unexpected return from the Windows NT system service, SetFilePointer().	Check the operating system error code and consult the Windows NT documentation.
OSD-04006 ReadFile() failure, unable to read from file	There was an unexpected return from the Windows NT system service, ReadFile().	Check the operating system error code and consult the Windows NT documentation.
OSD-04007 truncated read	The system encountered an unexpected end-of-file, which is due to damaged media.	Verify that the file is not damaged.
OSD-04008 WriteFile() failure, unable to write to file	There was an unexpected return from the Windows NT system service, WriteFile().	Check the operating system error code and consult the Windows NT documentation.

Error	Cause	Action
OSD-04009 truncated write	The destination device is full or the media is damaged.	Verify that the device has free space and the file is not damaged.
OSD-04010 option specified, file already exists	The file that you attempted to create already exists.	Delete the existing file or use the REUSE option in the SQL statement.
OSD-04011 GetFileInformationByHandle( ) failure, unable to obtain file info	There was an unexpected return from the Windows NT system service, GetFileInformationByHandle( ).	Check the operating system error code and consult the Windows NT documentation.
OSD-04012 file size mismatch	The file to be reused is either too large or too small	Specify the correct file size or delete the existing file.
OSD-04013 unable to read line from file	This error is caused by an operating system error or by damaged media.	Check the operating system error code (if available) and consult the Windows NT documentation. If no operating system error code is presented, verify that the media is not damaged.
OSD-04014 unable to close file	The media has been damaged.	Recover the file, if necessary, and verify that Windows NT is functioning correctly.
OSD-04015 asynchronous I/O request returned an error	There was an unexpected return from the Windows NT system service.	Check the operating system error code and consult the Windows NT documentation.
OSD-04016 error queuing an asynchronous I/O request	There was an unexpected return from the Windows NT system service.	Check the operating system error code and consult the Windows NT documentation.
OSD-04017 unable to open the specified RAW device	An invalid path or filename was specified or the device is full.	Make sure the file exists and/or device is not full; verify that the operating system is functioning correctly.

Error	Cause	Action
OSD-04018 unable to access the specified directory or device	An invalid path name was specified.	Make sure the directory or device exists and is accessible.
OSD-04019 unable to set file pointer	This error is caused by an operating system error or by damaged media.	Check the operating system error code (if available) and consult the Windows NT documentation. If no operating system error code is presented, verify that the media is not damaged.
OSD-0402 unable to set eof file marker	This error is caused by an operating system error or by damaged media.	Check the operating system error code (if available) and consult the Windows NT documentation. If no operating system error code is presented, verify that the media is not damaged.
OSD-04023 SleepEx() failure, unable to Sleep	There was an unexpected return from the Windows NT system service.	Check the operating system error code and consult the Windows NT documentation.
OSD-04016 error queuing an asynchronous I/O request	There was an unexpected return from the Windows NT system service.	Check the operating system error code and consult the Windows NT documentation.

Memory Errors: OSD-4100 to OSD-4199

Error	Cause	Action
OSD-04100 malloc() failure, unable to allocate memory	The program is out of memory.	Shutdown all unnecessary processes or install more memory in the machine.
OSD-04101 invalid SGA: SGA not initialized	The System Global Area (SGA) has been allocated but not initialized.	Wait until the STARTUP has completed before attempting to connect.
OSD-04102 unable to open/create file for shared memory object	There was an unexpected return from the Windows NT system service, CreateFile().	Check the operating system error code and consult the Windows NT documentation.
OSD-04103 unable to attach to SGA: SGA does not exist	The System Global Area (SGA) does not exist.	Start up an Oracle instance.
OSD-04104 unable to map shared memory (SGA) into the address space	There was an unexpected return from the Windows NT system service, MapViewOfFileEx().	Check the operating system error code and consult the Windows NT documentation.
OSD-0410 shared memory (SGA) mapped to wrong address	There was an unexpected return from the Windows NT system service, MapViewOfFileEx().	Check the operating system error code and consult the Windows NT documentation.

Process Errors: OSD-4200 to OSD-4299

Error	Cause	Action
OSD-04200 unable to begin another thread	The program has run out of system resources.	Shutdown all unnecessary processes; install more memory in the machine.
OSD-04201 no pid structure supplied to spdcr()	This is an internal error, not normally expected to occur.	Contact Oracle Customer Support.
OSD-04202 DosSetPriority() failure, unable to set process priority	There was an unexpected return from the Windows NT system service, DosSetPriority().	Check the operating system error code and consult the Windows NT documentation.
OSD-04203 DosKillProcess() failure, unable to kill process	There was an unexpected return from the Windows NT system service, DosKillProcess().	Check the operating system error code and consult the Windows NT documentation.
OSD-04204 invalid pid	Process id not recognized by system, process previously terminated.	Verify that process ID is correct and that process is active.
OSD-04205 CreateProcess() failure, unable to spawn process	There was an unexpected return from the Windows NT system service, CreateProcess().	Check the operating system error code and consult the Windows NT documentation.
OSD-04207 invalid priority specified in CONFIG parameter ORACLE_PRIORITYi	The priority specified is invalid or out of range.	Specify a valid setting for ORACLE_PRIORITY.
OSD-04208 OpenProcess() failure, unable to open process handle	There was an unexpected return from the Windows NT system service, OpenProcess().	Check the operating system error code and consult the Windows NT documentation.

Error	Cause	Action
OSD-04209 Incorrect or unknown background image name given to spdcr()	There was an unexpected background name given to spdcr().	Contact Oracle Customer Support.
OSD-04210 Timeout waiting for thread semaphore	An Oracle7 thread died holding the semaphore.	Restart Oracle7 instance.
OSD-04211 Thread information not found	An Oracle7 thread died without deleting its information.	Restart Oracle7 instance.
OSD-04212 Maximum number of Oracle threads reached	The maximum number of Oracle7 threads for the instance is reached.	Wait until some connections exit before trying again.
OSD-04213 Oracle thread unable to DuplicateHandle()	This is an internal error, not normally expected to occur.	Contact Oracle Customer Support.
OSD-04214 Oracle thread unable to CreateEvent()	This is an internal error, not normally expected to occur.	Contact Oracle Customer Support.
OSD-04215 Bad function code supplied to ssthreadop	This is an internal error, not normally expected to occur.	Contact Oracle Customer Support.
OSD-04216 Unable to find file handle for that thread	This is an internal error, not normally expected to occur.	Contact Oracle Customer Support.

Loader Errors: OSD-4300 to OSD-4399

Error	Cause	Action
OSD-04300 unable to read complete record from data file	The data file ended in the middle of a record. This error occurs when loading files with a fixed record length.	Verify that the data file is of the correct length and contains complete records.
OSD-04301 record size too large	The specified record size is too large to load.	Reduce record size and reload the data.
OSD-04302 invalid record type and / or load options	The control file's Windows NT file processing options string contains an invalid option or keyword.	Set the Windows NT file processing options string to an acceptable value.

Semaphore Errors: OSD-4400 to OSD-4499

Error	Cause	Action
OSD-04400 unable to acquire internal semaphore for process	Oracle7 Server for Windows NT has exceeded the maximum number of connections.	Delete any unused connections and try again.
OSD-04401 WaitForSingleObject() failure, unable to obtain semaphore	There was an unexpected return from the Windows NT system service, WaitForSingleObject().	Check the operating system error code and consult the Windows NT documentation.

Miscellaneous Errors: OSD-4500 to OSD-4599

Error	Cause	Action
OSD-04500 illegal option specified	This is an internal error, not normally expected to occur.	Contact Oracle Customer Support.
OSD-04501 internal buffer overflow	This is an internal error, not normally expected to occur.	Contact Oracle Customer Support.
OSD-04502 translations nested too deep	The program encountered too many intermediate translations while attempting to translate a configuration variable.	Simplify the values of configuration parameters to include fewer intermediate translations.
OSD-04503 text contains no translatable elements	The program cannot recognize variables in the text to be translated.	Check and, if necessary, correct the text to be translated.
OSD-04505 stdin not responding	The system is unable to receive input from the standard input stream.	Verify that the process has access to an input device.
OSD-04506 unable to spawn process via system()	The system is out of memory or the executable is invalid.	Shutdown unnecessary processes; install more memory in machine. Verify the name of the executable.
OSD-04507 password for 'internal' is incorrect	An attempt was made to connect as 'internal' with an invalid password.	Verify that the password is correct and try again.
OSD-04508 no password given	An attempt was made to connect as 'internal' without a password.	Enter a valid password when connecting as internal.
OSD-04509 no password found	Oracle was unable to locate and retrieve the password for 'internal'.	Verify that Oracle is installed and configured correctly.

Error	Cause	Action
OSD-04510 operating system roles are not supported	An attempt was made to use an operating system role.	Only use roles that were created 'IDENTIFIED BY password' as opposed to 'IDENTIFIED EXTERNALLY'.
OSD-04511 unable to get date and time from the operating system	There was an unexpected return from GetLocalTime() call.	Verify that the system time is correct on the computer.
OSD-04512 unable to translate the 'USERNAME' configuration variable on server	The 'USERNAME' configuration parameter variable on the host is not properly set.	Verify the 'USERNAME' variable is set.
OSD-04513 'REMOTE_OS_AUTHENT' variable not set to TRUE'	For remote operating system logins to function, the 'REMOTE_OS_AUTHENT' parameter must be set to TRUE.	Shut down and start up the instance with 'REMOTE_OS_AUTHENT = TRUE' in the initialization parameter file.
OSD-04514 The NT Group name is too long for internal buffer	The NT Group name is too long.	Use a shorter NT group name.

Codes 6100 - 6199: SQL*Net TCP/IP Errors

The messages in this section apply only if you are using SQL*Net V1. For messages relating to use of SQL*Net V2, see Oracle Network Products Messages Manual.

Error	Cause	Action
ORA-06102: NETTCP: cannot allocate context area	The dynamic memory available for the connection context area is insufficient.	Contact your Oracle Customer Support representative.
ORA-06105: NETTCP: remote host is unknown	The host name specified in the login (connect) string is unknown.	Verify the spelling of the host name. Make sure the name exists in the TCP/IP HOST file, and try again.
ORA-06106: NETTCP: socket creation failure	The process open file quota was probably exceeded.	Contact your Oracle Customer Support representative.
ORA-06107: ETTCP: ORACLE network server not found	The entry for Oracle7 Server for Windows NT in the SERVICES file is missing.	Add "orasrv" to the TCP/IP SERVICES file.
ORA-06108: NETTCP: connect to host failed	The attempt to connect to a remote host has failed. The SQL*Net TCP/IP server on the remote host is not up, or the host itself is not up. Check the latter possibility by targeting it with Telnet.	Start the SQL*Net TCP/IP server process on the remote host.
ORA-06109: NETTCP: message receive failure	An I/O error occurred while attempting a network read operation.	Contact your Oracle Customer Support representative.
ORA-06110: NETTCP: message send failure	An I/O error occurred while attempting a network write operation.	Contact your Oracle Customer Support representative.

Error	Cause	Action
ORA-06111: NETTCP: disconnect failure	An error occurred while attempting to close a socket.	Contact your Oracle Customer Support representative.
ORA-06112: NETTCP: invalid buffer size	The buffer size specified in the login string exceeds 4096.	Specify the correct buffer size (4096 or less in length).
ORA-06113: NETTCP: Too many connections	The number of concurrently open connections has exceeded the maximum.	Close a connection by exiting an application with an open connection that is no longer needed.
ORA-06114: NETTCP: SID lookup failure	The database SID specified in the login (connect) string was not recognized (from the remote host's SQL*Net TCP/IP server).	Add the appropriate SID entry to the parameter file on the remote host, then restart the SQL*Net TCP/IP server.
ORA-06115: NETTCP: unable to create ORACLE logicals	The host's SQL*Net TCP/IP server was unable to create the necessary logicals required by the Oracle7 Server for Windows NT process.	See the SQL*Net TCP/IP server log file for more information. Contact your system administrator.
ORA-06116: NETTCP: unable to create ORASRV process	The host's SQL*Net TCP/IP server was unable to create the Oracle7 Server for Windows NT process.	See the SQL*Net TCP/IP server log file for more information. Contact your system administrator.
ORA-06117: NETTCP: unable to create ORASRV: quota exceeded	The host's SQL*Net TCP/IP server was unable to create the Oracle7 Server for Windows NT process because of quota depletion.	Increase the quota allocations to the SQL*Net TCP/IP server process.
ORA-06118: NETTCP: unable to complete handshake with ORASRV	The Oracle7 Server for Windows NT process was started but failed to complete its initialization.	Contact your Oracle Customer Support representative.

Error	Cause	Action
ORA-06119: NETTCP: spurious client request	The host's SQL*Net TCP/IP server was unable to recognize the connection request.	See the SQL*Net TCP/IP server log file for more information. Contact your Oracle Customer Support representative.
ORA-06120: NETTCP: network driver not loaded	The TCP/IP network driver is not loaded.	Verify that the TCP/IP driver loads correctly.
ORA-06121: NETTCP: access failure	The host's SQL*Net TCP/IP server was unable to test the accessibility of the SID mapping file (specified in the configuration file) associated with this connection request.	Check the log file for the operating system-specific error code. Contact your Oracle Customer Support representative.
ORA-06122: NETTCP: setup failure	The host's SQL*Net TCP/IP server was unable to set up the appropriate environment to service this connection request.	Check the log file for the operating system-specific error code. Contact your Oracle Customer Support representative.
ORA-06123: NETTCP: cannot set KEEPALIVE	The host's SQL*Net TCP/IP server was unable to set the socket KEEPALIVE option.	Check the log file for the operating system-specific error code. Contact your Oracle Customer Support representative.
ORA-06124: NETTCP: timeout waiting for ORASRV	The Oracle7 Server for Windows NT process was started but failed to respond after a period of time (n seconds).	This failure can occur on heavily-loaded systems. Increase the value of n (the default is 30) by adding the following entry in the initialization parameter file: SQLNET ORASRV_WAIT = number

Error	Cause	Action
ORA-06125: NETTCP: ORASRV exited unexpectedly	The Oracle7 Server for Windows NT process was started but exited unexpectedly. Two possible causes: 1. There were insufficient quotas to run ORASRV on the Oracle7 Server for Windows NT. 2. Oracle7 is not installed.	See the ORASRV output file for more information. The ORASRV output file resides in the ORA_SQLNET directory and has a name in the following form: ORA_SRVTnn_[SID].OUT. If the ORASRV output file does not indicate the appropriate action, contact your Oracle Customer Support representative.
ORA-06126: NETTCP: ORASRV unable to open network connection	The Oracle7 Server for Windows NT process was started but was unable to open the socket that TCPSRV passed to it.	Contact your Oracle Customer Support representative.
ORA-06127: NETTCP: unable to change username	The host's SQL*Net TCP/IP server could not establish a Proxy login connection because the client username is unknown to the host operating system.	Create new user account on the host and retry the connection.
ORA-06128: NETTCP: unable to create mailbox	The host's SQL*Net TCP/IP server was unable to create a mailbox needed for IPC communication with the Oracle7 Server for Windows NT process.	See the SQL*Net TCP/IP server log file for more information. Contact your Oracle Customer Support representative.
ORA-06129: NETTCP: unable to transfer socket ownership to ORASRV	The host's SQL*Net TCP/IP server was unable to transfer the network communication handle to the Oracle7 Server for Windows NT process.	Check the log file for the operating system-specific error code. Contact your Oracle Customer Support representative.

Error	Cause	Action
ORA-06130: NETTCP: host access denied	The host's SQL*Net TCP/IP server rejected this connection request because the client node does not have sufficient access privileges.	To grant access, add the appropriate entry to the host's Valid Node Table (VNT).
ORA-06131: NETTCP: user access denied	The host's SQL*Net TCP/IP server rejected this connection request because the client username does not have sufficient access privileges. Privileges are determined by the contents of the Username Mapping Table (UMT), a subset of the host's configuration parameters.	To grant access, add the appropriate entry to the host's UMT.
ORA-06132: NETTCP: access denied, wrong password	The host SQL*Net TCP/IP server rejected this connection request because the client password did not match the host password.	To grant access, make sure the passwords are the same.
ORA-06133: NETTCP: file not found	The host's SQL*Net TCP/IP server could not find the SID mapping file associated with this connection request.	Verify the spelling and existence of the SID mapping file.
ORA-06134: NETTCP: file access privilege violation	The host's SQL*Net TCP/IP server did not have READ/EXECUTE permissions for the SID mapping file associated with this connection request.	Change the protection on the SID mapping file.
ORA-06135: NETTCP: connection rejected; server is stopping	The host's SQL*Net TCP/IP server rejected this connection request because the server is in the process of stopping.	Restart SQL*Net TCP/IP server.

Error	Cause	Action
ORA-06136: NETTCP: error during connection handshake	A network I/O failure occurred while communicating with the host's SQL*Net TCP/IP server.	Check the log file for the operating system-specific error code. Contact your Oracle Customer Support representative.
ORA-06137: NETTCP: error during connection handshake	A network I/O failure occurred while communicating with the host's SQL*Net TCP/IP server.	Check the log file for the operating system-specific error code. Contact your Oracle Customer Support representative.
ORA-06138: NETTCP: error during connection handshake	A network I/O failure occurred while communicating with the host's SQL*Net TCP/IP server.	Check the log file for the operating system-specific error code. Contact your Oracle Customer Support representative.
ORA-06140: NETTCP: no such userN	A Proxy login connect attempt failed because the client username is not defined on the host.	Contact your network administrator.
ORA-06141: NETTCP: no privilege for user	A proxy login connect attempt failed because the SQL*Net TCP/IP server had insufficient privileges to access the proxy account.	Change the account protection, change the server privileges, or both.
ORA-06142: NETTCP: error getting user information	A proxy login connect attempt failed because the SQL*Net TCP/IP server was unable to access the proxy account.	Check the log file for the operating system-specific error code. Contact your Oracle Customer Support representative.

Error	Cause	Action
ORA-06143: NETTCP: maximum connections exceeded	The connect failed because the number of concurrent connections has exceeded the maximum supported by the host's SQL*Net TCP/IP server.	Wait for a short period and retry the operation.
ORA-06144: NETTCP: SID (database) is unavailable	The database administrator on the host has taken the database to which you are requesting access offline.	Wait for it to be brought back online.
ORA-06145: NETTCP: unable to start ORASRV: images not installed	The host's SQL*Net TCP/IP server was unable to start the Oracle7 Server for Windows NT process because the Oracle7 protected images were not installed.	Install the images.

Codes 6220 - 6400: SQL*Net Named Pipes Errors

The messages in this section apply only if you are using SQL*Net V1. For messages relating to use of SQL*Net V2, see Oracle Network Products Messages Manual.

Error	Cause	Action
ORA-06220: NETNMP: Server not specified in command line	A hostname is not specified in the DOS command-line after -p:".	Specify the hostname after the network prefix and retry, or set the LOCAL parameter in your configuration parameter file.
ORA-06221: NETNMP: Named pipe busy	Either the database to which you are trying to connect does not exist, or all available Named Pipes instances are in use.	1: Check your connect string 2: Close any unused connections and retry the operation.
ORA-06222: NETNMP: Error allocating memory	The system is unable to allocate memory block.	Resubmit the entry. If the error persists, contact your DBA.
ORA-06223: NETNMP: Error receiving data from pipe	Oracle encountered an error when receiving data from the pipe.	Check all LAN connections and cables. If any connections are loose, secure them and retry. Otherwise, reboot your machine and reload the SQL*Net Named Pipes driver. If the error persists, contact your DBA.

Error	Cause	Action
ORA-06224: NETNMP: Error sending data to pipe	The system encountered an error sending data to the pipe.	Check all LAN connections and cables. If any connections are loose, secure them and retry. Otherwise, reboot the machine and reload the SQL*Net Named Pipes driver. If the error persists, contact your DBA.
ORA-06225: NETNMP: Invalid packet type	The system received erroneous data.	Check all LAN connections and cables. If any connections are loose, secure them and retry. Otherwise, reboot the machine and reload the SQL*Net Named Pipes driver. If the error persists, contact your DBA.
ORA-06226: NETNMP: Send byte count error	An error was encountered in sending data.	Check all LAN connections and cables. If any connections are loose, secure them and retry. Otherwise, reboot the machine and reload the SQL*Net Named Pipes driver. If the error persists, contact your DBA.
ORA-06227: NETNMP: Error resetting connection	The system encountered an error when resetting the connection.	Check all LAN connections and cables. If any connections are loose, secure them and retry. Otherwise, reboot the machine and reload the SQL*Net Named Pipes driver. If the error persists, contact your DBA.

Error	Cause	Action
ORA-06228: NETNMP: Unable to open named pipe	Your workstation is not logged on to a valid account, or you do not have appropriate privileges to create a pipe.	Log onto a valid account (do not use the default guest account). Alternatively, ask your DBA assign appropriate privileges for creating a pipe to your account.
ORA-06229: NETNMP: Windows NT failed to create or access shared memory	Unable to open shared memory segment containing the connection status of Oracle Server.	Ensure that Oracle Server has been properly started so that the shared memory segment is available.
ORA-06230: NETNMP: SQL*Net handshake error	An error occurred during the SQL*Net handshake.	Ensure pipe has been created successfully. Check SQL*Net versions on your Server machine and reinstall matching versions if different.
ORA-06231: NETNMP: Unable to put pipe into listening mode	Named pipe was not properly created.	Restart Oracle7 Server for Windows NT and attempt the connection again.
ORA-06232: NETNMP: Unable to create a pipe instance	Named pipe could not be properly opened.	Ensure that Named Pipes software is installed properly in Windows NT and that the Server machine is successfully started.

Codes 6401 - 6430: NETCMN Errors

This section lists and explains the error codes you might receive when using SQL*Net. The error message descriptions in this section list possible causes for the errors and suggest corrective actions. The messages in this section apply only if you are using SQL*Net V1. For messages relating to use of SQL*Net V2, see Oracle Network Products Messages Manual.

Error	Cause	Action
ORA-06401: NETCMN: invalid driver designator	The specified driver is unknown.	Check the last entry and resubmit the connect string using the designated name for the SQL*Net driver.
ORA-06402: NETCMN: error receiving break message	The SQL*Net driver detected that its server has unexpectedly exited.	Check the network operating system and resubmit the connect string.
ORA-06403: NETCMN: cannot allocate context area	The SQL*Net driver could not allocate heap space for the context area.	Resubmit the connect string. Contact your DBA.
ORA-06404: NETCMN: invalid login string	The SQL*Net driver detected a syntax error in the database ID portion of the user's logon string.	Check the logon string and then correct the syntax error.
ORA-06405: NETCMN: reset protocol error	The SQL*Net driver detected an error while trying to reset the connection from a break state.	Resubmit the connect string.
ORA-06406: NETCMN: error sending break message	The SQL*Net driver could not correctly handle an incoming out-of-band message.	Resubmit the connect string.
ORA-06407: NETCMN: unable to set up break handling environment	The SQL*Net driver could not set up out-of-band break handler.	Resubmit the connect string.

Error	Cause	Action
ORA-06408: NETCMN: incorrect message format	A message from a partner contains a bad header.	Contact your Oracle Customer Support representative.
ORA-06409: NETCMN: message send failure	SQL*Net driver failed to send a message across the communication channel.	Resubmit the connect string.
ORA-06410: NETCMN: message receive failure	SQL*Net driver failed to receive a message across the communication channel.	Resubmit the connect string. Contact the DBA if the error message persists.
ORA-06411: NETCMN: message send failure	The SQL*Net driver failed to send a complete message across the communication channel.	Resubmit the connect string. Contact the DBA if the error message persists.
ORA-06412: NETCMN: message receive failure	The SQL*Net driver failed to receive a complete message from the communication channel.	Resubmit the connect string. Contact the DBA if the error message persists.
ORA-06413: NETCMN: connection not open	The SQL*Net driver was unable to open a connection with a remote node.	Check node or wait for available connection to open, then re-submit the connect string.
ORA-06414: NETCMN: disconnect failure	The SQL*Net driver was unable to close a connection.	Check the node or wait for an available connection to close and then re-submit the connect string.
ORA-06415: NETCMN: incompatible versions	The version of SQL*Net driver loaded differs from SQL*Net listener process opened.	Check the installation of SQL*Net on both Windows and Windows NT. Upgrade the software to the same version on both sides of the network.

Error	Cause	Action
ORA-06416: NETCMN: error on test	An error occurred while testing the I/O status of the network connection.	Contact your Oracle Customer Support representative.
ORA-06419: NETCMN: server cannot start oracle	The Server was unable to start an Oracle process.	Make sure permissions on the remote Oracle program are correctly set. Contact your system administrator.
ORA-06420: NETCMN: SID lookup failure	Oracle7 Server for Windows NT failed to recognize the database SID specified in the login (connect) string.	Verify that the instance is running. If it is, verify that the services for the instance are present and running. If they are not, create the services and restart the machine.
ORA-06421: NETCMN: error detected in the read-in data	An error occurred in the recomputation of checksum or CRC. There is a possible hardware failure in the communication nodes.	Contact your system administrator.
ORA-06422: NETCMN: error in sending data	SQL*Net was unable to transmit data to Oracle7 Server for Windows NT.	Attempt to reconnect to the Server. Contact your system administrator.
ORA-06423: NETCMN: error in receiving data	SQL*Net was unable to receive data from the Server.	Attempt to reconnect to the Server. Contact your system administrator.

Index

Symbols

A

B

C

D

E

F

G

H

I

K

L

M

N

O

P

R

S

T

U

V

W

Oracle® Networking Products User's Guide for Windows NT/95
A44128-2

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Windows NT Documentation Manager
Server Technologies Division
Oracle Corporation
500 Oracle Parkway
Box 659107
Redwood Shores, CA 94065

Email: ntdoc@us.oracle.com

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