Oracle® SNMP

Support Reference Guide

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Oracle SNMP Support Reference Guide, Release 9.2.0

Part No. A96672-01

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Preface

This guide covers the Oracle SNMP Support feature and the public and private
MIBs that support its use with certain products. This information is provided to
assist you in developing SNMP-based management applications for these products.

Audience

This manual is intended primarily for third-party developers of SNMP-based
management applications. While these readers may have a good working
knowledge of SNMP, they may not be as familiar with relational databases, or
Oracle products in particular. A secondary audience for this manual includes
database administrators, who may be familiar with Oracle products, but who may
be less familiar with SNMP.

Documentation Accessibility

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JAWS, a Windows screen reader, may not always correctly read the code examples in this document. The conventions for writing code require that closing braces should appear on an otherwise empty line; however, JAWS may not always read a line of text that consists solely of a bracket or brace.

Related Oracle Publications

Several other Oracle publications include information relating to topics covered in this manual. Where the system (Oracle7, Oracle8*i, or* Oracle 9*i*) is not specified, consult your system-specific documentation:

- *Oracle9i Database Concepts*

  Includes a technical introduction to the Oracle Database Server, and covers important topics including:

  - basic database structure and operation
  - system architecture
  - data access
  - programmatic constructs
  - database security
  - distributed database processing
  - database backup and recovery

  Refer to this book for further information on database topics and terms mentioned in this manual.

- *Oracle9i Database Reference*

  Includes reference information on sources from which the values for private Oracle database MIB variable are retrieved, including:

  - configuration parameters for the Oracle9*i* Server
  - data dictionary tables
  - dynamic performance tables

  Refer to this book for further information on SNMP-retrievable parameters and variables for the public and private database MIBs.

- *Oracle9i Database Performance Guide and Reference*

Describes how to tune the Oracle Server, and includes information on:

– configuration parameters for the Oracle9*i* Server

– data dictionary tables

– dynamic performance tables

Refer to this book if you choose to learn about certain SNMP-retrievable variables as they relate to various database performance tuning tasks. Such task-oriented information can provide further context for the MIB variable reference information of the *Oracle SNMP Support Reference Guide.*

■ *Oracle Net Services Reference Guide*

Describes Oracle Net Services, including:

– the purpose, function and architecture of Oracle Net Services

– configuration parameters for the various Oracle Net Services components, such as Oracle Net, the listener, and Oracle Names

Refer to this book for further information about the Oracle Net Services components.

■ Oracle operating system-specific manuals include installation instructions for Oracle SNMP Support on a given platform.

Refer to this book for installation instructions and other information that is platform or operating system specific.

■ *Oracle Net Services Reference Guide*

Refer to this book for configuration information for

– Oracle Enterprise Manager

■ *Oracle Intelligent Agent User's Guide*

Refer to this book for configuration information for

– the Intelligent Agent

– Oracle Enterprise Manager SNMP support

How This Manual Is Organized

The Oracle SNMP Support Reference Guide includes five chapters and six appendices.

Chapter 1

Provides a general overview of Oracle SNMP Support for the Oracle Database Server, Listener, Oracle Connection Manager, Oracle Names and Oracle Enterprise Manager. It covers the benefits, basic terms and components of the feature.

Chapter 2

Provides procedures to configure SNMP on Windows NT, Unix, and the Oracle Enterprise Manager.

Chapter 3

Describes the Oracle products providing SNMP support, the MIBs supporting these products, and how to interpret SNMP object identifiers (OIDs).

Chapter 4

Includes suggestions to assist you in developing the most useful management applications for Oracle products. Using a sufficient sample size to calculate ratios, presenting performance ratios graphically, scaling values dynamically, working around the wraparound, and the top twenty database performance ratios are covered.

Chapter 5

Covers the format used to describe MIB variables in the appendices of this manual.

Appendix A

Provides information to help you interpret and present individual variables of the private Oracle Database MIBs. These variables support monitoring of the Oracle Server.

Appendix B

Provides information to help you interpret and present individual variables of the private Oracle Listener MIB. These variables support monitoring of the listener service.

Appendix C

Provides information to help you interpret and present individual variables of the private Oracle Names MIB. These variables support monitoring of the Oracle Net Services components.

Appendix D

Provides information to help you interpret and present individual variables of the public RDBMS MIB. These variables support monitoring of the Oracle.

Appendix E

Provides information to help you interpret and present individual variables of the public Network Services MIB. These variables support monitoring of the Oracle Server and Oracle Net Services components.

Appendix F

Provides information to help you interpret and present individual variables of the private Oracle Enterprise Manager MIB. These variables support monitoring of databases with Oracle Enterprise Manager.

Other Related Documents

Any developer of management applications for Oracle SNMP Support must be familiar with SNMP concepts. Standard texts include:

- *How to Manage Your Network Using SNMP: The Networking Management Practicum,* Marshall T. Rose, Keith McCloghrie, Prentice Hall, 1994.

- *Managing Internetworks with SNMP,* Third edition*,* Mark A. Miller, M & T Books, 1999.

- *SNMP, SNMPv2, and RMON: The Practical Network Management*, Second edition, William Stallings, Addison-Wesley, 1996.

- *Total SNMP: Exploring the Simple Network Management Protocol*, Second Edition, Sean J. Harnedy, Prentice Hall, 1997.

Relevant RFCs include:

- RFC 1441, *Introduction to version 2 of the Internet-standard Network Management Framework.*

- RFC 1442, *Structure of Management Information for version 2 of the Simple Network Management Protocol.*

- RFC 1565, *The Network Services Monitoring MIB.*

- RFC 1697, *The RDBMS MIB.*

Relevant Oracle MIB Definitions include:

- *Oracle RDBMS MIB*

- *Oracle Listener MIB*

- *Oracle Names MIB*

Notational Conventions

The following syntax conventions are used in this manual:

```
Monospace    normal
```

Monospace shows computer display or contains text you must enter exactly as shown.

```
Monospace    italics
```

Monospace in italics represents a command parameter or variable. Substitute an appropriate value.

UPPERCASE

Uppercase characters within the text represent command names, filenames, and directory names. Note that in case-sensitive operating systems, such as UNIX, these names may not necessarily be in upper-case.

Italics

Text in italics usually indicates a variable for which you need to substitute a value. Italics are also used to draw attention to the first instance of a defined term in the text.

1

Overview of Oracle SNMP Support

This chapter provides a brief overview of Oracle SNMP support, including:

- Benefits of Oracle SNMP Support
- How SNMP Works The Components of SNMP
- How SNMP Communications Are Performed
- SNMP Support On Oracle

The Simple Network Management Protocol (SNMP) is a protocol used for Internet network management. SNMP enables a single application to first retrieve information, then push new information between a wide range of systems independent of the underlying hardware.

Designed primarily for database, network, and system administrators, Oracle SNMP support integrates the management of Oracle products into a number of existing, widely-used management systems. This feature enables key Oracle products running anywhere on an enterprise's network to be located, identified, and monitored by a management station running at a centrally located node, in much the same way and using some of the same tools as traditionally have been used to monitor the activity of the network itself. It thereby integrates the tasks of database and of network administrators, enabling both to use some of the same tools and to better integrate their tasks. Tools using SNMP traditionally provide powerful features for monitoring network components. Oracle extends this power to enable SNMP monitoring of some of its own products.

Benefits of Oracle SNMP Support

The primary benefits of Oracle SNMP support include the following:

- The monitoring of key Oracle products is quickly integrated into any management framework based upon SNMP.

- These Oracle products are located, identified, and monitored in real time across enterprise networks of any size.

- Administrators see standard Oracle icons that represent Oracle products in a network map. This map is dynamically customizable. In fact, administrators can define and customize various network maps for different purposes.

- Administrators see the current status of Oracle products, as shown by several status variables that are defined for each product in a management information base (MIB), or they can select which elements to view on the basis of their status.

- Administrators can anticipate exceptional conditions by defining thresholds and alerts, to respond to special situations as soon as they occur or to enable automatic responses.

- Administrators can more readily determine key characteristics of Oracle objects, such as database size, number of users, and activity level.

- Administrators can store and analyze historical data that has been obtained through SNMP.

- Providers of management applications can easily build customized solutions for Oracle customers because SNMP is an open standard.

Strictly speaking, Oracle SNMP support is intended more for *monitoring* Oracle products than for *managing* them. Oracle SNMP support is invaluable for tracking the status of an entire network of Oracle applications — first, to verify normal operations, and second, to spot and react to potential problems as soon as they are detected. However, for purposes of investigating and solving some problems, other Oracle tools such as Oracle SQL *Plus Worksheet may be more appropriate. This is because Oracle SNMP support is designed to query status, but not to change system parameters, whereas other tools are designed to set or tune system parameters. Oracle does not support using SNMP to change, as opposed to query, system parameters primarily because the security that SNMP currently can provide is not considered adequate.

How SNMP Works

SNMP (Simple Network Management Protocol) is a standard internet protocol enabling certain nodes in a network, the *management stations* or *managing nodes*, to query other network components or applications for information concerning their status and activities. Such a query is known as an SNMP *poll*. The items that can be so polled are called *managed elements*. Traditionally, managed elements were limited to network components such as bridges and routers, but recently the definition has been extended to include mission-critical applications such as databases.

The software used by a management station is called a *management framework* or *management platform*. The management framework uses the SNMP protocol to request information from *agents* on the nodes being managed, and those agents send back the appropriate responses. The agents can also, independently of the framework, transmit messages called *traps* to well-known addresses in response to specific events. This is done to enable quick and possibly automatic reactions to the specific conditions that the traps indicate.

All requests sent to a given network node are handled by the same *master agent*. This agent redirects the requests to the appropriate managed elements on the node, in some cases using *subagents*. The protocol used for this is not yet standardized and is not SNMP. The information that SNMP can obtain is described in a structure called a *Management Information Base (MIB)*, which is located on the node of the managed element.

Figure 1–1 shows the components of a management station and of a sample managed node.

The Components of SNMP

The components shown in Figure 1–1 are explained in the sections that follow.

Management Station

The management station refers to a node from which managed elements are monitored using the SNMP protocol. Typically, it is a stand-alone workstation that is on the same network or internetwork as the managed elements. While this book will consistently use the term management station, other terms used for it include management console, management system, or managing node.

Requirements for Implementing Oracle SNMP Support

The following components are needed to implement Oracle SNMP support on the Management Station:

- **A management platform or framework**. At least one management application is required; it is typically one of the general purpose ones, called either a platform or framework.

- **A repository**. This is where historical data regarding system activity is stored, for reporting, displaying, accounting, etc. Some frameworks do offer an Oracle database as a repository, but in other cases the format of the repository is set.

- **Various third party specialized management applications**. These are optional add-in components that often integrate with the framework and provide more in depth management of particular devices or applications.

Note: These components are not part of Oracle SNMP support.

Management Framework

At the management station, the management framework uses SNMP to request management information from other nodes. The framework collects, graphs, and possibly acts on that SNMP data, and saves some or all of it in a repository for historical analysis and reporting. Management frameworks include many tools and options. In addition to directly requesting information from managed nodes, frameworks typically use daemons to alert them when a managed node has sent a trap in response to a specific set of conditions. The traps also can be used to trigger management applications.

Note: Oracle does not provide the management framework.

Figure 1–1   Basic Components of Oracle SNMP support.
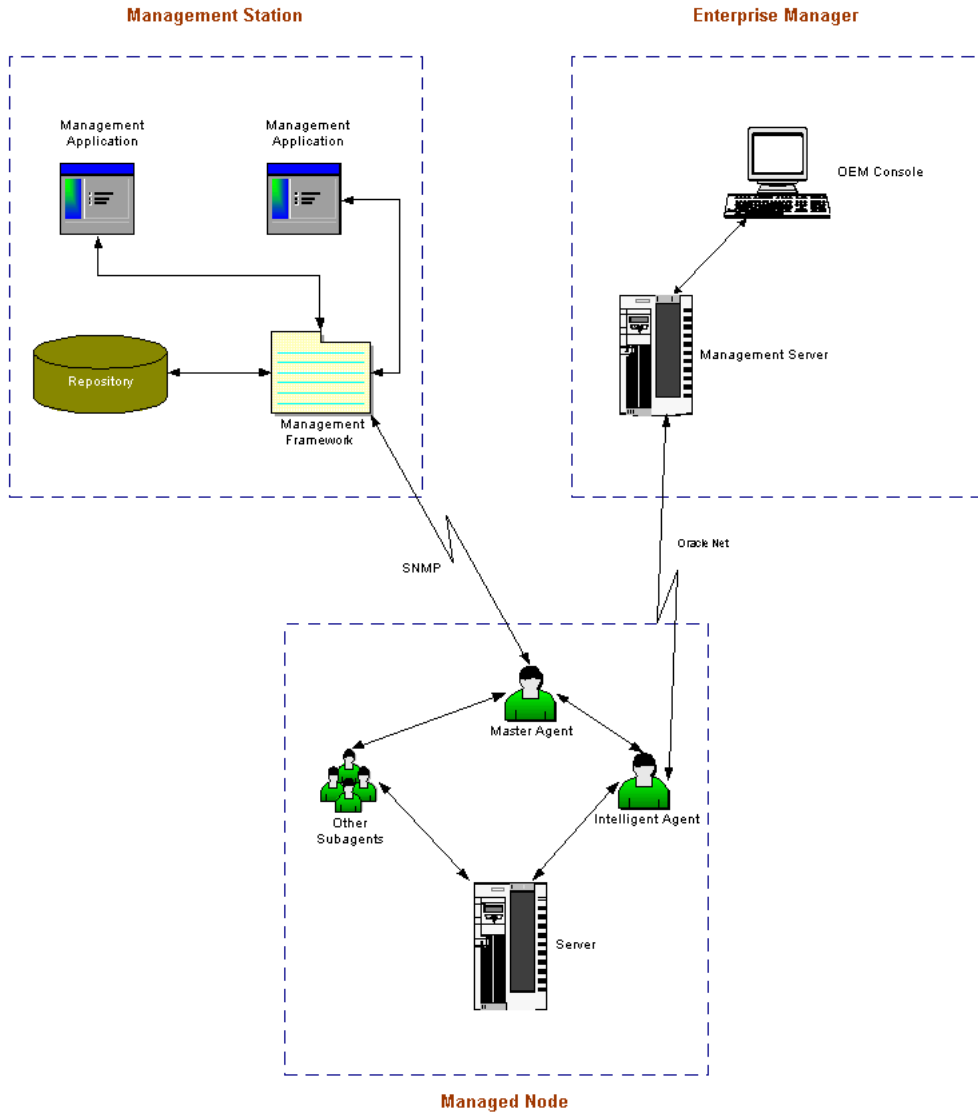
Because most frameworks use SNMP as a basis for communication, Oracle products that support SNMP can be integrated into virtually every management framework. Examples of such frameworks include:

- CA Unicenter

- HP OpenView

- Tivoli NetView

- Sun SunNet Manager

- Aprisma Spectrum

- Castle Rock SNMPc Network Manager

Most of today's management frameworks also provide a selection of graphical objects that management applications may use to build a graphical user interface that serves their particular needs, such as:

- maps illustrating logical or physical network topologies

- icons representing individual network components

- graphing tools such as dials, bar charts, line plots, and so on, for effective monitoring of management information variables

Management Application

The management applications are the tools integrated with the management framework to accomplish more specialized network or database tasks. These applications contain virtually all of the sophisticated logic associated with network management.

A customized management application can work with one or more frameworks (on different management stations) or run independently. Because Oracle SNMP support is equally accessible to any type of provider, there are many different ways that applications can utilize it.

A fundamental management application, often shipped by default along with the management framework, is one that is capable of discovering the network topology and collecting some basic identification information about each discovered network entity or service. Such an application, for instance, may discover all hosts in a subnet along with their vendor, location, and status. Using this information, the management application can subsequently build up logical maps of the environment.

Managed Node

The managed node is a platform, such as a UNIX server, on which elements to be monitored reside. In Figure 1–1, two managed elements — an Oracle Database server and Oracle Names — are located on the managed node.

Master Agent

The master agent is the process on a managed node that accepts queries, also called "polls", from the management framework and communicates with the elements to be managed in order to answer the query. It also can send SNMP traps independently in response to specific conditions. Only one master agent can exist on each managed node. Any node that does not have an agent will not be able to respond to SNMP requests, but this does not prevent other nodes on the network from doing so. In other words, it is not necessary that every node in a network be able to respond to SNMP, although this is normally desirable.

The master agent may be either *monolithic* or *extensible.* If it is monolithic, it communicates directly with the elements to be managed. Although such an agent can manage multiple elements on the same node, the set of elements that it can manage is fixed when the agent is created, because the monolithic agent itself is responsible for interfacing to the managed elements.

If, on the other hand, the master agent is extensible, it will use a specific *subagent* for each element it has toanage. That subagent is then responsible for interfacing to the element. In this scenario, new subagents can register with the master agent at any time, so new managed elements can be added dynamically.

Some operating systems supply only monolithic agents. In this case, Oracle provides a master agent that can effectively treat that monolithic agent as a subagent, enabling new managed elements to be added to the node dynamically.

Subagent

The subagent is a process that receives queries for a particular managed element from the master agent and sends back the appropriate answers to the master agent. One subagent exists for each managed element residing on the managed node (with the exception that a single subagent can handle multiple Oracle database instances on the same node). In Figure 1–1, one subagent is dedicated to the Oracle Database server application and another subagent is dedicated to the Names application. The subagent(s) and master agent communicate using a multiplexing protocol dictated by the master agent. There is no standard protocol for this connection, and, while a few protocols are widely used, none is a designated standard.

Notice that the subagent for the Database Server is a separate process that communicates with the server through Oracle Net (using the IPC protocol). The Oracle Names subagent, on the other hand, is embedded in the application software itself. Both of these approaches are acceptable, as the specific means the subagents use to extract SNMP values are opaque to the master agent and to the framework.

Oracle Enterprise Manager

Oracle Enterprise Manager is a system management tool which provides an integrated solution for managing a heterogeneous environment. It combines a graphical console, agents, common services, and tools to provide an integrated, comprehensive systems management platform for managing Oracle products.

Oracle Enterprise Manager does not use SNMP directly. Instead, it communicates with the agent over Oracle Net using Transparent Network Substrate (TNS) connections. The agent listens to SNMP requests and passes them on to Oracle Enterprise Manager.

Intelligent Agents

The agents are intelligent processes running on remote nodes in the network. An agent resides on the same node as the service it supports. However, the agent can support more than one service on a particular node. For example, if two databases are installed on one machine, a single agent can support both databases. The agents perform such tasks as running jobs and monitoring events. They are also responsible for handling SNMP requests, if SNMP is supported on the agent's platform.

The agents support SNMP so applications can communicate directly with the agent using SNMP protocol on supported platforms. The agents provide access to Oracle's database Management Information Base (MIB) variables. Although the agent supports SNMP, the Oracle Enterprise Manager Communication Daemon uses TNS to communicate with the agent. Therefore, with Oracle Enterprise Manager, you can submit jobs or events that access Oracle MIB variables through the Daemon even when the database resides on a platform that does not support SNMP.

Management Information Base (MIB)

A management information base (MIB) is a text file, written in ASN.1 notation, which describes the variables containing the information that SNMP can access. The variables described in a MIB, which are also called *MIB objects,* are the items that

can be monitored using SNMP. There is one MIB for each element being monitored. Each monolithic or subagent consults its respective MIB in order to learn the variables it can retrieve and their characteristics. The encapsulation of this information in the MIB is what enables master agents to register new subagents dynamically — everything the master agent needs to know about the subagent is contained in its MIB. The management framework and management applications also consult these MIBs for the same purpose. In Figure 1–1, two MIBs exist, one for the Oracle Server and one for Oracle Names. MIBs can be either standard (also called public) or proprietary (also called private or vendor).

The actual values of the variables are not part of the MIB, but are retrieved through a platform-dependent process called "instrumentation". The concept of the MIB is very important because all SNMP communications refer to one or more MIB objects. What is transmitted to the framework is, essentially, MIB variables and their current values.

All MIBs are, in fact, part of one large hierarchical structure, with leaf nodes containing unique identifiers, data types, and access rights for each variable and the paths providing classifications. There is a standard path structure that includes branches for private subtrees. A portion of this structure is shown in Figure 1–2.

Each leaf of this tree provides the following information about one MIB variable:

- the variable's name

- the Object Identifier (OID) of the variable

- the variable's data type

- the access rights associated with the variable

- a textual description of the meaning of the variable

The variable's name is intended to be descriptive, whereas the OID is a number that describes the path taken through the tree to reach that variable. For example, the variable named sysContact, identified by the OID 1.3.6.1.2.1.1.4 (meaning iso.org.dod and so on), is a read-write string variable that contains contact information about the administrator of the underlying system.

All objects contained under the *mgmt* branch of Figure 1–2 (in other words, all objects with OID's beginning 1.3.6.1.2) are considered standard and are tightly regulated by the Internet Engineering Task Force (IETF). For example, the standard RDBMS MIB lives under the *mgmt* branch and is supported by all relational database servers that claim to be SNMP-enabled. Oracle further adds its own MIB objects under the private branch to increase the manageability of its products. The

following MIBs are specific to Oracle Services and are found under the {private.enterprise.oracle} branch:

- the Oracle Database MIB
- the Oracle Listener MIB
- the Oracle Names MIB

Figure 1–2   The MIB Hierarchy
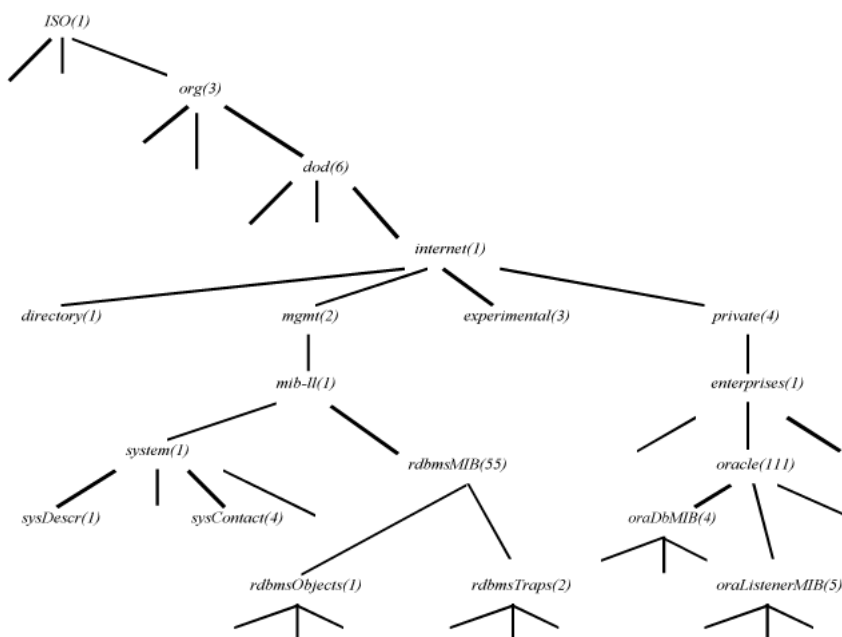
How SNMP Communications Are Performed

SNMP is based on connectionless communication between the framework and the managed nodes. Because most management information does not demand reliable delivery, SNMP packets are transmitted from one node to a well-known address of another node, but no verification of successful delivery is made. The penalty for the light-weight, connectionless SNMP communication is paid by the management applications, which need to verify that SNMP transactions get completed

successfully within a reasonable amount of time. If SNMP packets get lost in the network, the application cancels the associated transaction and possibly re-initiates it.

The most popular SNMP implementation uses the User Datagram Protocol (UDP) over the Internet Protocol (IP), although implementations also exist over other protocols, such as Novell's Internetwork Packet Exchange (IPX) and Apple's AppleTalk.

SNMP Support On Oracle

SNMP support on Oracle is provided through the Intelligent Agent. The Intelligent Agent provides direct access to Oracle's database Management Information Base (MIB) variables. Oracle SNMP support is provided for the following:

- Oracle Database Server

- Two networking services (Network Listener and Oracle Names).

- Enterprise Manager

2

Configuring SNMP for Oracle

This chapter discusses the general procedures for configuring SNMP for Oracle databases on the Windows NT and Unix platforms and Oracle Enterprise Manager. Keep in mind that the SNMP configuration is operating system specific. For more comprehensive configuration information, see the installation or configuration guide specific to your platform.

> **Note:** The SNMP configuration is case sensitive. Specify all occurences of community names in the same case.

Configuring SNMP on Windows NT

Before you can integrate SNMP with the Intelligent Agent, you need to do a few things first. These include:

- Installing the SNMP Network Service
- Configuring the SNMP Network Service
- Testing the SNMP Environment

Installing the SNMP Network Service

To install the SNMP network service on NT:

1. From the Start menu, select Settings>Control Panel>Network icon.
2. Select the Services tab and press Add.

   A generated list of available network services shows in the Network Service window.

3. From Select Network Service, select SNMP service from the list and click OK to begin the installation.

   You need the original NT installation CD to copy the SNMP service files.

4. After the installation completes, check to make sure the installation was successful.

   From the Network dialog, select the Bindings tab. This action forces the operating system to recognize the services changes.

5. Reinstall the Windows NT 4.0 Service Pack (version 6a or later) before continuing. Your system will be rebooted automatically.

   > **Note:** You must reinstall the Windows NT Service Pack previously running on your Windows NT system. Failure to do so will result in SNMP and TCP/IP system errors.

Configuring the SNMP Network Service

Follow the procedure below to configure the SNMP Network Service on Windows NT:

1. From the Start menu, select Settings > Control Panel.

2. Click the Network icon.

3. Select the Services tab and highlight SNMP Service.

4. Click the Properties button to see the SNMP Properties dialog.

5. From the Agent tab, complete the following:

   - **Contact**: Contact information for this compter.

   - **Location**: Physical location of this computer

   - **Service**: Select all Service Types (Physical, Applications, Datalink/Subnetwork, Internet and End-to-end).

6. From the Traps tab, add the following:

   - **Community Name**: The community is usually `public`.

   - **Trap Destinations**: Specify either the host name or IP addresses. This should be for all machines working with SNMP aware products that require traps. If you specify a host name, the system must be able to locate the corresponding IP address.

Integrating SNMP with the Intelligent Agent

The Oracle Intelligent Agent supports SNMP, allowing third-party systems management frameworks to use SNMP to receive SNMP traps directly from the Agent. By configuring the Agent to recognize SNMP requests from the master agent, third-party systems can gather relevant data.

Installing the Agent

1. Install the Oracle Peer SNMP Master Agent and SNMP Encapsulator Agent.

    The software must be the same version as the Intelligent Agent and installed in the same ORACLE_HOME.

    After the installation completes, the following new NT services will be created:

    ■ Oracle SNMP Peer Encapsulator

    ■ Oracle Peer SNMP Master Agent

    If you do not install the Intelligent Agent software in the default $ORACLE_ HOME, the names of all the services will begin with the following:

        Oracle<home name>

Configuring the SNMP Services File

In order for the SNMP master agent to communicate with both the standard SNMP service and the Intelligent Agent, the SNMP services file must be configured properly.

1. Specify an unused port where the encapsulated agent, Microsoft SNMP Service, should be listening. Microsoft SNMP Service typically uses port 1161.

    The port is specified in the SERVICES file located in the NT_ HOME\SYSTEM32\DRIVERS\ETC directory.

    Make sure that you have the following lines in the file:

    ```
    snmp              1161/udp        snmp
    snmp-trap         1162/udp        snmp
    ```

    > **Note:** If an entry for SNMP already exists in the file, change the port from 161 (default number) to another available port (1161 in this example).

2. In the same location, check that the HOSTS and LMHOSTS.SAM files contain the mappings of IP addresses to host names for all computers in the SNMP setup.

   System performance will improve if more computer addresses can be resolved locally. Even if you use DHCP and WINS, adding the IP addresses will speed up the SNMP integration.

Modifying the Master Peer Agent Configuration File

Use the following procedure to modify the Master Peer Agent configuration file to reflect the SNMP configuration.

1. Specify the port where the master agent is listening.

   The port is specified in the TRANSPORT section of the MASTER.CFG file located in the ORACLE_HOME\NETWORK\ADMIN directory.

   For example, add the following section to the file:

   ```
   TRANSPORT   ordinary     SNMP
     OVER UDP SOCKET
     AT PORT 1161
   ```

   > **Note:** It is recommended that you use port 161 for the Oracle Peer SNMP Master Agent since port 161 is reserved for the SNMP framework.
   >
   > However, you may specify a different available port if you can configure the management application on your NMS to send SNMP requests to the master agent listening on this port.

2. Specify the authentication in the COMMUNITY section of the MASTER.CFG file.

   ```
   COMMUNITY public
    ALLOW ALL OPERATIONS
    USE NO ENCRYPTION
   ```

3. If you need to send traps, specify the IP address (10.10.10.10 in this example) of that computer in the MANAGER section of the MASTER.CFG file.

   ```
   10.10.10.10
    SEND ALL TRAPS
    WITH COMMUNITY public
   ```

You only need to modify the manager section if you need to send traps, or use software that can manipulate and react to SNMP traps, such as HP Openview. For performance reasons, specify IP addresses here, instead of hostnames.

4. If you have more than one Master Peer Agent running on a single computer, edit the Encapsulator configuration file, ENCAPS.CFG. This file is located in the ORACLE_HOME\NETWORK\ADMIN directory and is used to specify which non-PEER master agents are to be encapsulated.

You must add at least an AGENT entry, including MIB-subtrees manageable by NMS, for the encapsulated master agent.

See the example below:

```
AGENT AT PORT 1161 WITH COMMUNITY public
SUBTREES 1.3.6.1.2.1.1,
         1.3.6.1.2.1.2,
         1.3.6.1.2.1.3,
         1.3.6.1.2.1.4,
         1.3.6.1.2.1.5,
         1.3.6.1.2.1.6,
         1.3.6.1.2.1.7,
         1.3.6.1.2.1.8,
         1.3.6.1.4.1.77
FORWARD ALL TRAPS;
```

> **Note:** The port (1161 in this example) must match the one you specified in the SERVICES file. Also, the community name must match previous definitions.

Starting the SNMP Environment

After you complete the configuration, the next step is to start the SNMP services. It is important that you:

- Verify UDP port 161 (or 1161) is unused

- Start and stop the services in the correct order

Verifying Active UDP Ports

Before you can start the SNMP environment, you need to verify that no other services are running on the designated UDP ports.

1. From the `ORANT\BIN` directory, type the following command:

   ```
   netstat -p udp -a
   ```

   The results of this command list all active UDP ports on the computer. Port 161, and the SNMP port you specified in the `SERVICES` file must be unused.

Manually Starting SNMP Services

1. From the Windows NT Task Manager, select the Process tab.

2. In the Image Name column, check that the following programs are not listed:

   - `AGENT.EXE` (Master Peer Agent)

   - `ENCAPS.EXE` (Encapsulator)

     If either program is listed, select it and click End Process.

3. From the Start menu, select Settings>Control Panel>Services icon.

4. Check the status for both SNMP and OracleAgent. If they were previous started, click Stop to terminate the programs.

5. Start the SNMP services in the following order:

   - SNMP service

   - Master Peer Agent

   - Encapsulator

   - Intelligent Agent

> **Note:** The Encapsulator is only required when you have more than one SNMP sub-agent installed and configured on the system.

Starting and Stopping SNMP Services by Batch File

You can also launch all relevant SNMP services by creating a batch file to automate the process. For example:

```
NET START "SNMP"
NET START "SNMP Trap Service"
Start C:\ORANT\BIN\AGENT  C:\ORANT\NETWORK\ADMIN\master.cfg
C:\ORANT\NETWORK\LOG\master.log
NET START "Intelligent Agent service name"
```

Testing the SNMP Environment

Once you have sucessfully installed SNMP, you are ready to query the MIBs from your Network Management Station.

One way to test the SNMP environment is by using the SNMPUTILG tool. The Windows NT 4.0 Resource Kit Support Tools contains this SNMP troubleshooting tool that you can use to get basic information about the SNMP setup. The GUI SNMP Query/Set Utility (SNMPUTILG.EXE) Figure 2–1 replaces the previous command line SNMPUTIL.EXE tool.

> **Note:** The Support Tools are not included in the full Windows NT 4.0 Resource Kit. You must download them separately at http://www.microsoft.com.

Figure 2–1   GUI SNMP Query Set/Utility
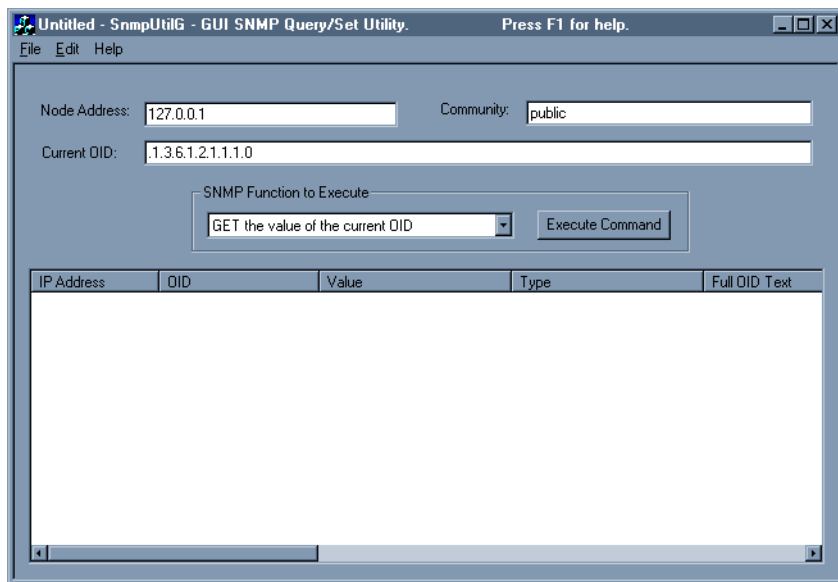
Testing the Value of an OID

To start the GUI SNMP utility and test the value of an OID:

1. From the Start menu, click Run, then type `snmputilg` on the Run line.

   The GUI SNMP Query/Set Utility window appears as shown in Figure 2–1.

2. Change the following fields to reflect your values.

   - **Node Address**: IP address of your machine. This computer must be running the SNMP service.

   - **Community Name**: The community is usually `public`.

   - **Current OID**: See the value below.

     `.1.3.6.1.2.1.1.1.0`

   - **SNMP Function to Execute**: Select GET the value of the current OID.

3. Click the Execute Command button.

   If the master agent is running correctly, it will return the sysDescr system identifier.

Testing Oracle Specific Values

Issue the following OID to test for Oracle specific values:

1. Follow the instructions in the Testing the Value of an OID section.

2. For the Current OID value, use the following:

   ```
   .1.3.6.1.4.1.111.4.1.6.1.1. "index"
   ```

   Where index is the value specified in the `SNMP_RW.ORA` file for the database you wish to query.

Configuring SNMP on UNIX Platforms

The following configuration instructions are for Unix platforms using O/S native or aster agents that use the Peer Technology. Oracle's Peer Master Agent supports.

Integrating SNMP on UNIX platforms includes the following:

- Configuring the SNMP Master Agent
- Starting the SNMP Agents

Using only an SNMP Console

Monitoring consoles use an SNMP Master Agent to communicate with the Oracle Intelligent Agent. The SNMP Master Agent and the Oracle Intelligent Agent must be configured correctly before the Oracle Intelligent Agent can communicate over SNMP to the Master Agent.

1. The following is an example of the process for configuring the SNMP Master Agent on a UNIX platform. For information on configuring the Intelligent Agent, see the *Oracle Intelligent Agent User's Guide*.

   Note: SNMP with the Intelligent Agent is not supported by all platforms. Refer to the installation or configuration guide for your specific platform to identify differences in the configuration procedures and to confirm SNMP support.

Configuring the SNMP Master Agent

The necessary SNMP files are automatically installed when you install the Oracle Intelligent Agent. After installing the Oracle Intelligent Agent, edit the following files as described below:

```
$ORACLE_HOME/network/snmp/peer/CONFIG.master
$ORACLE_HOME/network/snmp/peer/CONFIG.encap
$ORACLE_HOME/network/snmp/peer/start_peer
/etc/snmp/conf/snmpd.conf
```

CONFIG.Master (Peer Master Agent file)

To edit the CONFIG.master file, find the line beginning with MANAGER and change the IPaddress coded in this line to match the IPaddress of the machine where the SNMP traps will be sent.

CONFIG.encap (Peer Encapsulator file)

To edit the CONFIG.encap file, find the line AGENT AT PORT. It normally reads AGENT AT PORT 1161 WITH COMMUNITY public. If you modify the port number from 1161, you must also modify the start_peer script.

start_peer Script

To edit the start_peer script, find the line NEW_SNMPD_PORT= and verify that it is using the same port number listed above in the CONFIG.encap file. Find the line NEW_TRAPD_PORT= and verify the port number is different than NEW_SNMPD_PORT=.

snmpd.config File

Add the following line to the file:

```
trap <hostname or ipaddress>
```

Replace the information in brackets with the actual hostname or IPaddress of the local host where the file is located.

Starting the SNMP Agents

1. Make sure no SNMP components are running. The two main components are the master_peer, encap_peer, and snmpd. If any of these processes are running use the ps command to find them, and the kill command to terminate the processes.

   For example:

   ```
   ps -ef | grep snmp
   ```

Checks to see if the SNMP Master Agent is running.

2. Start the PEER Master Agent , PEER encapsulator, and native UNIX SNMP Agent:

```
cd $ORACLE_HOME/network/snmp/peer
su root
./start_peer -a
```

This command starts all three processes. Then use the `ps` command to determine if all three processes were started:

```
ps -ef |grep peer
ps -ef |grep snmpd
ps -ef |grep snmp
```

Loading the Oracle MIBs

Load the Oracle MIBs according to the instructions provided in your SNMP Console configuration guide.

Configuring SNMP with Enterprise Manager

The necessary SNMP files are automatically installed when you install the Oracle Intelligent Agent. For information on configuring the Intelligent Agent, see the *Oracle Intelligent Agent User's Guide.*

To configure the SNMP Master Agent, follow the steps listed in "Using only an SNMP Console." Then do the following:

1. Configure the SNMP Console to receive external traps on the managed node.

2. From the Enterprise Manager Console, register an event and check the box: "Enable Notifications to External Services (SNMP traps by Agent)".

If the proper MIBs were loaded into the SNMP console, a trap will be sent to the SNMP Master Console for each EM event that triggers.

3

Oracle MIB Overview

This chapter covers the following topics:

- Oracle Products Providing SNMP Support
- MIBs Supporting These Products
- Interpreting SNMP OIDs

Oracle Products Providing SNMP Support

This manual documents four Oracle products that provide SNMP support. These products are:

- the Oracle Database
- the Oracle Listener
- Oracle Net Services
- Oracle Enterprise Manager

Oracle Database

The Oracle Server is the relational database management system (RDBMS) developed and sold by Oracle Corporation. This RDBMS includes the database that stores information, as well as the server software that accesses and manipulates that information.

For more information about Oracle Server, see the *Oracle9i Database Concepts* manual specific to your system.

Listener

The Listener is a protocol-independent application listener that receives connections on behalf of applications running over a variety of underlying protocols. The Listener is a component of Oracle Net Services, Oracle's remote data access product, enabling client/server and server/server communications across any network. It runs as a single process or task.

For more information about the Listener, see the manual *Oracle Net Services Administrator's Guide.*

Oracle Names

Oracle Names is a product that provides a directory service, by making database address and database link information available to all nodes throughout the network.

For more information about Oracle Names, see the manual *Oracle Net Services Administrator's Guide.*

Oracle Enterprise Manager

Oracle Enterprise Manager provides Oracle database administrators with an intuitive, easy-to-use interface and a high degree of automation through remote task execution and reactive and proactive management capabilities. It also scales to accommodate both very large database configurations, while being flexible enough to handle installations with many databases. Oracle Enterprise Manager includes an open-architecture design, providing third-party vendors and customers with the ability to integrate their applications into Oracle Corporation's system management platform.

MIBs Supporting These Products

Network Services MIB

The public Network Services MIB (as described in RFC 1565) contains generic variables designed to apply to all types of network service applications. Oracle has implemented those variables of this MIB that are relevant to two of the Oracle services:

- Oracle Database
- Oracle Names

Specific values for these variables are retrieved from a variety of sources, including configuration files, tables internal to the network service application, and from the master agent itself.

The Listener does not make use of any Network Services MIB variables.

Public RDBMS MIB

The public RDBMS MIB is the proposed standard MIB for relational databases that has been defined by the IETF Working Group. This MIB allows for database discovery, identification of the database, and characterization of database size and activity level.

The public RDBMS MIB includes management variables that are both common to all RDBMSs and independent of vendor.

While this MIB makes a clear distinction between the database and its server, at this time the Oracle Database subagent only recognizes the standard Oracle configuration of one database to one server. Thus, it does not account for the Oracle Real Application Clusters server or gateways.

The information in this MIB is mostly retrieved from dynamic performance tables (V$ tables) and the INIT.ORA configuration file of the Oracle Database.

Private Oracle Database MIB

The private Oracle Database MIB contains additional RDBMS statistics that are specific to the Oracle database architecture. Like the public RDBMS MIB, the private Oracle Database MIB derives most of its information from dynamic performance tables of the database and from the INIT.ORA database configuration file.

The private Oracle Database MIB is platform-independent. Thus, one Oracle Server MIB applies, whether supported on MVS or Windows or SCO. This allows a DBA to use one MIB, regardless of the number of platforms being managed.

Other Oracle Private MIBs

In addition to the private database MIB, Oracle has defined private MIBs for the following products:

- Oracle Network Listener

- Oracle Names

- Oracle Enterprise Manager

Interpreting SNMP OIDs

This section briefly covers how SNMP object identifiers (OIDs) are assigned, as it pertains to the MIBs that Oracle has implemented. Specifically, this section covers the following topics:

- interpreting Oracle OIDs

- interpreting OIDs for Oracle-implemented public MIBs

- interpreting OIDs for instances of private Oracle MIB variables

For more information on SNMP OIDs, see any of the standard SNMP texts listed in the preface.

For easy reference, tables listing the object identifiers for each object of a given Oracle-implemented MIB can be found in the appendix covering that MIB.

Interpreting Oracle OIDs

The SNMP standard (RFC 1442) specifies that an object identifier (OID) be used to uniquely identify each object. An OID is a sequence of elements that indicates a *hierarchical* organization of identifiers. These elements take the form of a series of "dotted" integers, similar in format to an Internet address.

An example OID for an private Oracle MIB variable follows:

```
1.3.6.1.4.1.111.4.1.7.1.1
```

In this OID:

- The first element (1) refers to the *iso* object

- The second element (3) refers to the *org* object

- The third element (6) refers to the *dod* object

- The fourth element (1) refers to the *internet* object

- The fifth element (4) refers to the *private* object

- The sixth element (1) refers to the *enterprises* object

- The seventh element (111) refers to the Oracle object

Each of the elements listed above are assigned by entities outside Oracle. Thus, all objects within the Oracle ID space (that is, those objects to which Oracle has assigned OIDs), share the root OID 1.3.6.1.4.1.111.

Continuing use of the above example OID for illustration, Oracle has defined the elements of its private ID space as follows:

- The eighth element (4) is the MIB service identifier. Oracle has defined the following MIB service identifiers:
    - 4 - Oracle Private Database MIB
    - 5 - Oracle Listener MIB
    - 6 - Oracle Names MIB
    - 7 - Oracle Connection Manager MIB
- The ninth element (1) is the MIB object identifier. Oracle has defined the following MIB object identifiers for each service:
    - 1 - SNMP variable
    - 2 - SNMP trap
- The tenth element (7) is the MIB table identifier (oraDbConfigTable, in this case).
- The eleventh element (1) is the table entry identifier. This element can be considered as a place holder and is always 1.
- The twelfth element (1) is the leaf object identifier (identifying a particular variable in the table).

Interpreting OIDs for Oracle-Implemented Public MIBs

In addition to the four private Oracle MIBs that fall within Oracle OID space, Oracle is implementing portions of two public MIBs (Network Services MIB and RDBMS MIB) that fall outside Oracle OID space. The object IDs for the variables in these MIBs have been assigned in their respective RFCs.

An example OID for a public RDBMS MIB variable follows:

```
1.3.6.1.2.1.39.1.2.1.3
```

In this OID, the first four elements (1.3.6.1) match those for the Oracle root ID, indicating that this object falls under the iso, org, dod and internet objects. The fifth element (2), however, indicates that this object falls within the Internet *management* OID space. The seventh element (39) indicates that this object falls within the public RDBMS MIB. All variables of the public RDBMS MIB share this root OID of 1.3.6.1.2.1.39 The ninth element (2) indicates that this object is part of the

rdbmsDbInfoTable. The eleventh element (3) identifies this as the leaf object rdbmsDbInfoSizeUnits.

An example OID for a public Network Services MIB variable follows:

```
1.3.6.1.2.1.27.1.1.1.6
```

In this OID, the first four elements (1.3.6.1) match those for the Oracle root ID, indicating that this object falls under the iso, org, dod and internet entities. The fifth element (2), however, indicates that this object falls within Internet *management* OID space. The seventh element (27), indicates that this object falls within the public Network Services MIB. All variables of the public Network Services MIB share this root OID of 1.3.6.1.2.1.27. The ninth element (1) indicates that this object is part of the applTable. The tenth element (6) identifies this as the leaf object applOperStatus.

Interpreting OIDs for Instances of Oracle MIB Variables

Because variables in Oracle's MIBs are defined in tables, there can be multiple instances of a single variable. If, for example, there are two Oracle databases running on a given managed node, each database will have its own value for MIB variables such as applInboundAssociations, rdbmsDbName, and rdbmsSrvInfoDiskReads.

Not all variables are indexed on a per-service basis, as described above. It is also possible for a variable to have many instances for a single database. For example, while rdbmsSrvParamEntry describes a single database configuration parameter, that same managed node will have many instances of rdbmsSrvParamName.

To uniquely identify the multiple instances of these variables, each MIB table is indexed by one or more variables which, together, uniquely identify the rows of the table. (These index variables are conceptually equivalent to the primary key of a relational database table.) To refer to a particular instance of a variable, concatenate the variable's OID with the values of the index variables of the MIB table to which the variable belongs.

For instance, rdbmsDbName is defined within the rdbmsDbTable, which is indexed by the variable rdbmsDbIndex. For example, assume two databases are running on a host, one with SNMP index 2, the other with SNMP index 4. Then the name of the first database can be specified by concatenating the OID for rdbmsDbName (1.3.6.1.2.1.39.1.1.1.4) with the appropriate value of rdbmsDbIndex (2), or 1.3.6.1.2.1.39.1.1.1.4.2. Similarly, the name of the second database is the value of 1.3.6.1.2.1.39.1.1.1.4.4.

If a table is indexed by more than one variable, add the appropriate value of each index variable to the end of the OID, in the order they are listed in the table's MIB definition INDEX clause, separated by dots. The size (oraDbDataFileSizeAllocated, or 1.3.6.1.4.1.111.4.1.3.1.3) of the fifth data file (5) of the second database on the above host (whose rdbmsDbIndex is 4) is the value of 1.3.6.1.4.1.111.4.1.3.1.3.4.5.

4

Designing Management Applications Based on Oracle MIBs

This chapter covers the following topics:

- Using MIB Variables for Different Purposes
- Using a Sufficient Sample Size to Calculate Tuning Ratios
- Presenting Performance Ratios Graphically
- Scaling MIB Variable Values Dynamically
- Working Around the Wraparound
- Most Useful Database Instance Performance Ratios

Using MIB Variables for Different Purposes

MIB variables can be used for two different purposes. If they are used for fault management, the DBA is interested in significant changes in a variable's value or in a ratio over a short period of time. Once the DBA becomes aware of that change, its cause can be determined and corrected, if necessary. However, MIB variables can also be used to tune performance. In this case, the goal is to establish benchmark performance, as measured by the appropriate variable(s) or ratio(s).

Using a Sufficient Sample Size to Calculate Tuning Ratios

When MIB variables are used for performance tuning, make sure that you poll enough instances of a variable to measure performance with some certainty. Polling 1,000 separate statistics is considered acceptable for any database instance performance ratio mentioned in this chapter. When designing graphic presentations

for these ratios, consider alerting the user when less than 1,000 separate instances of a variable have been used to calculate a tuning ratio.

Presenting Performance Ratios Graphically

In general, users will be most interested in monitoring changes in performance ratios over time. Thus, a basic time series graph that plots changes in the values of these ratios against time is very useful.

Scaling MIB Variable Values Dynamically

The scalar values for MIB variables (and ratios based on these variables) measuring database performance can vary tremendously, depending on the type of database application, the number of users accessing the database, and the amount of data being processed. This fact poses a challenge to the developer of a management application presenting this information. Graphic elements intended to accommodate the full range of scalar values can mislead when presenting scalar values at the low end of the range; even large changes relative to their size can appear insignificant when plotted on a graph designed to accommodate much greater values achievable at other installations.

One good way to accommodate users at both ends of the data spectrum is to scale the presentation of data dynamically. This involves adjusting the scale of the graph measuring the data as the data attains certain thresholds. For example, if you were to plot against time the speed of a jet from takeoff to its cruising level, you might set the upper limit of the graph upon takeoff at 200 mph; when that threshold is reached, you could dynamically adjust the upper limit to 400 mph, and then adjust it twice more as thresholds of 400 and 600 mph are attained.

Working Around the Wraparound

Given the tremendous processing power available today, and given the enormous upper limit to the size of an Oracle database, it may not be surprising that the values of some MIB variables do in fact exceed (wrap around) the SNMP-defined upper limit for 32-bit counter and integer (4294967295) values. A management application designer can best work around this problem by always showing instance startup time (applUpTime) to the user, and encouraging the user to poll the values of such variables frequently enough to determine whether a wrap around has occurred. A minimum of once every one-half hour for "wrap around candidates" is suggested.

If the value of a counter variable has *decreased*, even though the database instance has continued to run, one can assume that the value has wrapped around the upper limit of the range. However, one must poll frequently enough to ensure that the delta of the value is less than the theoretical limit of the range. The values and ratios you present to the user can then take the wraparound into account.

Most Useful Database Instance Performance Ratios

This section describes those ratios that are most useful in tuning the performance of an Oracle database instance. These are the performance measures of greatest interest to potential customers of management applications for the Oracle database. Each of these ratios is based on variables of the private Oracle Database MIB. These ratios are listed alphabetically, not in order of importance.

For more information on these ratios, see the *Oracle9i Database Performance Guide and Reference* specific to your system. For information on the MIB variables that are used to calculate these ratios, see Appendix A, "Interpreting Variables of the Oracle Database MIB".

Block Changes Per Transaction
This ratio measures the amount of Data Manipulation Language (DML) work that each transaction performs. Creating or dropping indexes impacts this value, because changes to index blocks increment it.

```
oraDbSysDbBlockChanges / oraDbSysUserCalls
```

Block Get Rate
This ratio determines the block get rate. The block get rate is a basic measure of the rate at which the application system references the database. The time unit typically used in this ratio is one second.

```
(oraDbSysConsistentGets + oraDbSysDbBlockGets)/ time unit
```

Block Visits Per Transaction
This ratio measures the work database load imposed per transaction; if it is moving independently, then this strongly indicates that there has been a change in the application workload.

```
(oraDbBlockGets + oraDbSysConsistentGets)                / oraDbSysUserCommits
```

Cache Hit Ratio
This ratio measures the effectiveness of the buffer cache. The normally acceptable range is 70 - 85%.

```
(oraDbSysConsistentGets + oraDbSysBlockGets - oraDbSysPhysReads) /
(oraDbSysConsistentGets + oraDbSysBlockGets)
```

Call Rate

This ratio measures the work demand rate being placed on the instance from all work sources. It should be noted, however, that this rate may not be directly comparable across application system version changes where row at a time loop constructs have been recoded as set operations or vice versa. Use of the array interface will also affect this ratio.

```
(oraDbSysRecursiveCalls + oraDbSysUserCalls)                    / time unit
```

Calls Per Transaction

This ratio measures the number of client requests made per transaction. Calls per transaction can be used to detect changes in the application, or in the ways in which it is being used. This value may rise sharply as ad hoc queries increase.

```
oraDbSysUserCalls / oraDbSysUserCommits
```

Changed Block Ratio

This ratio measures the balance between queries and DML within this database application. Changes in this ratio indicate and/or quantify changes in indexation or application usage.

```
oraDbSysDbBlockChanges / (oraDbSysBlockGets + oraDbSysConsistentGets)
```

Consistent Change Ratio

This ratio measures the extent to which applications are having to exercise the read consistency mechanism. In this connection, it is important to realize that the query processing parts of UPDATE and/or DELETE operations are subject to read consistency.

```
oraDbSysConsistentChanges
/ oraDbSysConsistentGets
```

Continued Row Ratio

This ratio should be very close to zero, except in applications handling long LONG columns. If this ratio increases over time, usually PCTFREE has been set too low on one or more tables.

```
oraDbSysTableFetchContinuedRow / (oraDbSysTable FetchRowid + oraDbSysTableScanRows)
```

Library Cache Miss Ratio

If this ratio begins to rise, then resource usage can be expected to increase. A rising library cache miss ratio may be due to wider use of application functionality

causing more SQL statements and stored procedures to be active than had previously been the case.

```
oraDbLibraryCacheReloads) / oraDbLibraryCachePins
```

Recursive to User Call Ratio

Under Oracle7 and Oracle8, a change in this ratio can reflect an application change, or indicate a need to adjust the size of the shared pool. Any marked change in the DDL load also affects this ratio.

```
oraDbSysRecursiveCalls / oraDbSysUserCalls
```

Redo Log Space Wait Ratio

This ratio measures memory allocation. If it is greater than 1 ∕ 5,000, then the redo log buffer should be increased until the redo log space wait ratio stops failing.

```
oraDbSysRedoLogSpaceRequests / oraDbSysRedoEntries
```

Row Source Ratio

This ratio measures the percentage of the total rows retrieved which came from full table scans. As soon as this percentage starts to rise much above 0, the interpretation of other statistics may need to be reviewed.

```
oraDbSysTableScanRows / (oraDbSysTableFetchRowid + oraDbSysTableScanRows)
```

Sort Overflow Ratio

oraDbSysSortsDisks ∕ (oraDbSysSortsMemory + oraDbSysSortsDisks) is the sort overflow ratio. This ratio yields the ratio of the number of sorts which are using temporary segments. Under restricted circumstances when there is a predominance of medium size sorts, increasing the sort area size may be effective.

```
oraDbSysSortsDisks / (oraDbSysSortsMemory + oraDbSysSortsDisks)
```

Transaction Rate

The transaction rate is a basic measure of application work, and would be calibrated in transactions per second (tps) for a typical OLTP benchmark. Administrators should be particularly concerned if a fall in this value is associated with a rise in the number of connected users or vice versa. Changes in application structure or work patterns can also distort this figure.

```
oraDbSysUserCommits
```

User Call Rate

This rate measures the work demand rate being posed by client side applications running under the instance. It should be noted, however, that this may not be

directly comparable across application system version changes where code has been moved from client to server side or vice versa.

```
oraDbSysUserCalls
```

User Calls Per Parse
This ratio indicates how well the application is managing its context areas. If it changes, then application change is the most likely explanation, but it may also indicate that usage patterns are changing and users are moving from one module to another either more frequently or less frequently.

Although the shared SQL area makes the maximizing of this ratio less important than with earlier versions of Oracle, it is still possible to reduce resource usage by raising this ratio.

```
oraDbSysUserCalls / oraDbSysParseCount
```

User Rollback Ratio
oraDbSysUserRollbacks / (oraDbSysUserCommits + oraDbSysUserRollbacks) is the user rollback ratio. The user rollback ratio indicates the rate at which application transactions are failing. Rolling back a transaction uses significant resources, and would seem to indicate that all of the resources expended in executing the transaction have been wasted.

```
oraDbSysUserRollbacks / (oraDbSysUserCommits + oraDbSysUserRollbacks)
```

5

Reading the MIB Variable Descriptions

This chapter covers the format used to describe MIB variables in the six appendices that follow.

Note that the STATUS element of SNMP MIB definition, Version 2, is not included in these MIB variable descriptions. Since Oracle has implemented all MIB variables as CURRENT, this value does not vary.

Variable name

Syntax
Maps to the SYNTAX element of SNMP MIB definition, Version 2.

Max-Access
Maps to the MAX-ACCESS element of SNMP MIB definition, Version 2.

Status
Maps to the STATUS element of SNMP MIB definition, Version 2.

Explanation
Describes the function, use and precise derivation of the variable. (For example, a variable might be derived from a particular configuration file parameter or performance table field.) When appropriate, incorporates the DESCRIPTION part of the MIB definition, Version 2.

Typical Range
Describes the typical, rather than theoretical, range of the variable. For example, while integer values for many MIB variables can theoretically range up to 4294967295, a typical range in an actual installation will vary to a lesser extent. On the other hand, some variable values for a large database can actually exceed this

"theoretical" limit (a "wraparound"). Specifying that a variable value typically ranges from 0 to 1,000 or 1,000 to 3 billion will help the third-party developer to develop the most useful graphical display for the variable.

Significance
Describes the significance of the variable when monitoring a typical installation. Alternative ratings are Very Important, Important, Less Important, or Not Normally Used. Clearly, the DBA will want to monitor some variables more closely than others. However, which variables fall into this category can vary from installation to installation, depending on the application, the size of the database, and on the DBA's objectives. Nevertheless, assessing a variable's significance relative to the other variables in the MIB can help third-party developers focus their efforts on those variables of most interest to the most DBAs.

Related Variables
Lists other variables in this MIB, or other MIBs implemented by Oracle, that relate in some way to this variable. For example, the value of this variable might derive from that of another MIB variable. Or perhaps the value of this variable varies inversely to that of another variable. Knowing this information, third-party developers can develop useful graphic displays of related MIB variables.

Suggested Presentation
Suggests how this variable can be presented most usefully to the DBA using the management application: as a simple value, as a gauge, or as an alarm, for example.

A

Interpreting Variables of the Oracle Database MIB

This appendix provides information to help you interpret individual variables in the private Oracle Database MIB. Specifically, it includes sections covering SNMP variables in the following tables:

- oraDbSysTable

- oraDbTablespaceTable

- oraDbDataFileTable

- oraDbLibraryCacheTable

- oraDbLibraryCacheSumTable

- oraDbSGATable

- oraDbConfigTable

- oraRepSchemaTable

- oraRepSchemaTable

- oraRepMasterSchema Table

- oraRepSnapshotSchemaTable

- oraRepLinkTable

For information about the database instance performance ratios listed in this appendix, see the section Most Useful Database Instance Performance Ratios in Chapter 4, "Designing Management Applications Based on Oracle MIBs". For more information about the Oracle database server and specific topics covered in this appendix, see the *Oracle9i Database Reference*, the *Oracle9i Application Developer's Guide - Fundamentals*, and the *Oracle9i Database Concepts* specific to your system.

oraDbSysTable

The oraDbSysTable contains various measurements used to support database activities of current sessions on the managed node. This information has been found to be particularly useful for monitoring global database instance performance.

Each entry in the oraDbSysTable represents a current database instance on the node. Each entry is indexed by rdbmsDb Index. However, because rdbmsDbTable contains an entry for each database configured for SNMP support, whether or not it is actively open, there may or may not be a one-to-one correspondence between entries in the two tables at any point in time. (For details about this index, see Appendix D, "Interpreting Variables of the Public RDBMS MIB.") The value of each oraDbSysTable variable is retrieved directly from a corresponding field in the V$SYSSTAT table for that database instance on the managed node.

In many cases, a variable is meaningful only when considered in conjunction with other variables, often as a ratio. For more information on the ratios mentioned in the following variable descriptions, and for their significance in tuning the Oracle database server, see the *Oracle9i Database Performance Guide and Reference* specific to your system.

Table A–1   oraDbSysTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraDbSysConsistentChanges	1.3.6.1.4.1.111.4.1.1.1.1
oraDbSysConsistentGets	1.3.6.1.4.1.111.4.1.1.1.2
oraDbSysDbBlockChanges	1.3.6.1.4.1.111.4.1.1.1.3
oraDbSysDbBlockGets	1.3.6.1.4.1.111.4.1.1.1.4
oraDbSysFreeBufferInspected	1.3.6.1.4.1.111.4.1.1.1.5
oraDbSysFreeBufferRequested	1.3.6.1.4.1.111.4.1.1.1.6
oraDbSysParseCount	1.3.6.1.4.1.111.4.1.1.1.7

Table A–1   oraDbSysTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraDbSysPhysReads	1.3.6.1.4.1.111.4.1.1.1.8
oraDbSysPhysWrites	1.3.6.1.4.1.111.4.1.1.1.9
oraDbSysRedoEntries	1.3.6.1.4.1.111.4.1.1.1.10
oraDbSysRedoLogSpaceRequests	1.3.6.1.4.1.111.4.1.1.1.11
oraDbSysRedoSyncWrites	1.3.6.1.4.1.111.4.1.1.1.12
oraDbSysSortsDisk	1.3.6.1.4.1.111.4.1.1.1.13
oraDbSysSortsMemory	1.3.6.1.4.1.111.4.1.1.1.14
oraDbSysSortsRows	1.3.6.1.4.1.111.4.1.1.1.15
oraDbSysTableFetchRowid	1.3.6.1.4.1.111.4.1.1.1.16
oraDbSysTableFetchContinuedRow	1.3.6.1.4.1.111.4.1.1.1.17
oraDbSysTableScanBlocks	1.3.6.1.4.1.111.4.1.1.1.18
oraDbSysTableScanRows	1.3.6.1.4.1.111.4.1.1.1.19
oraDbSysTableScansLong	1.3.6.1.4.1.111.4.1.1.1.20
oraDbSysTableScansShort	1.3.6.1.4.1.111.4.1.1.1.21
oraDbSysUserCalls	1.3.6.1.4.1.111.4.1.1.1.22
oraDbSysUserCommits	1.3.6.1.4.1.111.4.1.1.1.23
oraDbSysUserRollbacks	1.3.6.1.4.1.111.4.1.1.1.24

Table A–1 lists each variable of the oraDbSysTable and its corresponding object ID.

A description of each of these variables follows.

oraDbSysConsistentChanges

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for CONSISTENT CHANGES in V$SYSSTAT. It is incremented each time that a consistent get operation cannot accept the block in its current state, owing to a change made since the query consistency point.

oraDbSysConsistentChanges is used to calculate the following database instance performance ratio: the consistent change ratio.

Typical Range
two or more orders of magnitude less than the value of oraDbSysConsistentGets

Significance
important

Related Variables
oraDbSysConsistentGets

Suggested Presentation
counter

oraDbSysConsistentGets

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for CONSISTENT GETS in V$SYSSTAT. This value is incremented each time that the Oracle Buffer Manager is requested to locate a database block as part of a read consistent operation (a query). Only if the requested block is not found in Oracle's Buffer Cache will consistent get result in physical I/O.

oraDbSysConsistentGets is used to calculate the following database instance performance ratios: block get rate, block visits per transaction, cache hit ratio, changed block ratio, and the consistent change ratio.

Typical Range
0 - 4294967295; can increment at several thousand per second in the largest systems, so this variable is definitely a "wraparound" candidate

Significance
very important

Related Variables
oraDbSysUserCommits, oraDbSysConsistentChanges, oraDbSysPhysReads,
oraDbSysDbBlockChanges, oraDbSysDbBlockGets

Suggested Presentation
counter

oraDbSysDbBlockChanges

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for DB BLOCK CHANGES in
V$SYSSTAT. It is incremented each time that a database block is in memory to create
a "dirty block." This statistic is a rough indication of total database work.

oraDbSysDbBlockChanges is used to calculate the following database instance
performance ratios: block changes per transaction, and the changed block ratio.

Typical Range
0 - 4294967295; can increment at several thousand per second in the largest systems,
so this variable is definitely a "wraparound" candidate; value tends to be lower
than that for oraDbSysConsistentGets

Significance
one of the lesser measures of work rate or throughput

Related Variables
oraDbSysBlockGets, oraDbSysConsistentGets, oraDbSysUserCalls

Suggested Presentation
counter

oraDbSysDbBlockGets

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for DB BLOCK GETS in
V$SYSSTAT. It is incremented each time the buffer manager is asked for a database
block in current mode, that is, regardless of read consistency. This mode is used to
locate blocks which are to be updated, and also to access control information such
as segment headers. Only if the requested block is not found in Oracle's Buffer
cache will a db block get result in physical I/O.

oraDbSysBlockGets is used to calculate the following database instance
performance ratios: block get rate, block visits per transaction, the cache hit ratio,
and the changed block ratio.

Typical Range
0 - 4294967295; can increment at several thousand per second in the largest systems,
so this variable is definitely a "wraparound" candidate.

Significance
very important

Related Variables
oraDbSysDbBlockChanges, oraDbSysConsistentGets, oraDbSysPhysReads,
oraDbSysUserCalls

Suggested Presentation
counter

oraDbSysFreeBufferInspected

Syntax
Counter32

Max-Access
read-only

Explanation
The "free buffer inspected" parameter from V$SYSTAT.

Typical Range
0 - 4294967295

Significance
This indicates the number of reusable buffers skipped over from the end of the Least Recently Used (LRU) queue in order to find a buffer. The difference between this and "dirty buffers inspected" equals the number of buffers that could not be used beause they were busy or needed to be written after rapid aging out. They may have a user, a waiter, or be being read or written.

Related Variables
oraDbSysFreeBufferRequested

Suggested Presentation
counter

oraDbSysFreeBufferRequested

Syntax
Counter32

Max-Access
read-only

Explanation
The "free buffer requested" parameter from V$SYSTAT.

Typical Range
0 - 4294967295

Significance
This is the count of the number of times a free buffer was requested to create or load a block.

Related Variables
oraDbSysFreeBufferInspected

Suggested Presentation
counter

oraDbSysParseCount

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for PARSE COUNT(total) in
V$SYSSTAT. It counts the number of parse calls received by the RDBMS from both
connected applications and recursive calls. In Oracle, parse calls are frequently
satisfied by reference to the Shared SQL area and this statistic does *not* measure the
number of parses which have taken place, only the number of calls.

oraDbSysParseCount is used to calculate the following database instance
performance ratio: user calls per parse.

Typical Range
0 - 4294967295; unlikely to increment at a rate greater than a few hundred per
second

Significance
important

Related Variables
oraDbLibraryCacheTable variables, oraDbSysUserCalls

Suggested Presentation
counter

oraDbSysPhysReads

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for PHYSICAL READS in
V$SYSSTAT. It increments each time a DB Block is retrieved from the disk

subsystem, but is not necessarily equal to the number of I/O requests made to the host operating system, as multiblock I/O may be used. A physical read can be viewed as an SGA Buffer Cache miss, hampering throughput (contention induction) and CPU (code pathlength) processing.

oraDbSysPhysReads is used to calculate the following database instance performance ratio: the cache hit ratio.

Typical Range
0 - 4294967295; unlikely to increment at a rate greater than a few hundred per second

Significance
very important

Related Variables
oraDbSysConsistentGets, oraDbSysDbBlockGets

Suggested Presentation
counter

oraDbSysPhysWrites

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for PHYSICAL WRITES in V$SYSSTAT. It increments each time a DB Block is written to disk. All writes are performed either by DBWR or LGWR, two background processes responsible for getting Blocks out of the SGA and back on disk.

Typical Range
0 - 4294967295; can increment at several thousand per second in the largest systems, so this variable is definitely a "wraparound" candidate

Significance
important

Related Variables
oraDbSysRedo family

Suggested Presentation
counter

oraDbSysRedoEntries

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for REDO ENTRIES in V$SYSSTAT. Each time that REDO data is copied into the log buffer, this counter is incremented. The value varies in relation to how many changes are being made.

oraDbSysRedoEntries is used to calculate the following database instance performance ratio: redo log space wait ratio.

Typical Range
0 - 4294967295; can increment at several thousand per second in the largest systems, so this variable is definitely a "wraparound" candidate.

Significance
important

Related Variables
oraDbSysRedoLogSpaceRequests, oraDbSysRedoSyncWrites, oraDbSysUserCommits

Suggested Presentation
counter

oraDbSysRedoLogSpaceRequests

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for REDO LOG SPACE REQUESTS in V$SYSSTAT. This counts the number of times that a server process had to wait to acquire an entry in the redo log.

oraDbSysRedoLogSpaceRequests is used to calculate the following database instance performance ratios: redo log space wait ratio.

Typical Range
0 - 10,000,000 (a value of 0 is ideal, but an increment of 1 or 2 per second might be acceptable)

Significance
important

Related Variables
oraDbSysRedoEntries

Suggested Presentation
counter

oraDbSysRedoSyncWrites

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for REDO SYNC WRITES parameter in V$SYSSTAT. It increments when a process waits for a ReDo write to complete, typically as a result of a Commit.

Typical Range
0 - 10,000,000 (typically increments at less than 1 per second)

Significance
less important

Related Variables
oraDbSysRedoEntries, oraDbSysRedoLogSpaceRequest, oraDbSysUserCommits

Suggested Presentation
counter

oraDbSysSortsDisk

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for SORTS DISKS in V$SYSSTAT. It increments for each sort which has to allocate disk work space.

oraDbSysSortsDisks is used to calculate the following database instance performance ratio: the sort overflow ratio.

Typical Range
for OLTP it should be 0

Significance
important

Related Variables
oraDbSysRedoEntries, oraDbSysRedoLogSpaceRequest, oraDbSyncWrites, oraDbSysSortsMemory, oraDbUserCommits

Suggested Presentation
counter

oraDbSysSortsMemory

Syntax
Counter32

Max-Access
read-only

Explanation

This variable is retrieved directly from the value for SORTS MEMORY in V$SYSSTAT. It is incremented for each sort which does not require the allocation of work space on disk.

oraDbSysSortsMemory is used to calculate the following database instance performance ratio: the sort overflow ratio.

Typical Range

0 - 4294967295; unlikely to increment faster than tens per second, except in the largest systems

Significance

important

Related Variables

oraDbSysRedoEntries, oraDbSysRedoLogSpaceRequest, oraDbSyncWrites, oraDbSysSortsDisks, oraDbUserCommits

Suggested Presentation

counter

oraDbSysSortsRows

Syntax

Counter32

Max-Access

read-only

Explanation

This variable is retrieved directly from the value for SORTS ROWS in V$SYSSTAT. It is incremented for each sort, regardless of whether the allocation of disk space was required.

Typical Range

0 - 4294967295

Significance

important

Related Variables
oraDbSysRedoEntries, oraDbSysRedoLogSpaceRequest, oraDbSyncWrites,
oraDbSysSortsMemory, oraDbSortsDisks, oraDbUserCommits

Suggested Presentation
counter

oraDbSysTableFetchRowid

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for TABLE FETCH BY ROWID in
V$SYSSTAT. This counter increments when a row is fetched using a RowID (usually
recovered from an index). It should be noted that this statistic records all rows
visited by the database engine, whether or not they were return to the application.

oraDbSysTableFetchRowid is used to calculate the following database instance
performance ratios: the continued row ratio and the row source ratio.

Typical Range
0 - 4294967295; can increment at several tens of thousands per second in the largest
systems, so this variable is definitely a "wraparound" candidate

Significance
important

Related Variables
oraDbSysRedoEntries, oraDbSysRedoLogSpaceRequest, oraDbSyncWrites,
oraDbSysSortsDisks, oraDbSysTableFetchContinuedRow, oraDbSysTableScanRows,
oraDbUserCommits

Suggested Presentation
counter

oraDbSysTableFetchContinuedRow

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for TABLE FETCH CONTINUED
ROW in V$SYSSTAT. It may be incremented either because a row has been
encountered which spans more than a DB block, or because a migrated row has
been retrieved by rowid.

oraDbSysTableFetchContinuedRow is used to calculate the following database
instance performance ratio: the continued row ratio.

Typical Range
close to 0 unless long LONG values are in use.

Significance
important

Related Variables
oraDbSysTable FetchRowid, oraDbSysTableScanRows

Suggested Presentation
counter

oraDbSysTableScanBlocks

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for TABLE SCAN BLOCKS
GOTTEN in V$SYSSTAT. During scanning operations, the RDBMS retrieves each
row sequentially. This counter increments each time the RDBMS steps into a new
DB Block during the scan. oraDbSysTableScanBlocks indicates how many DB Blocks

were Consistently Read from the Buffer Cache for the purpose of scanning. Comparing this to the value of oraDbSysConsistentGets suggests how much Consistent Read activity can be attributed to scanning.

Typical Range
0 - 3 billion; in OLTP very low; in DSS applications, a few thousand per second, so this variable is definitely a "wraparound" candidate.

Significance
important

Related Variables
oraDbSysConsistentGets

Suggested Presentation
counter

oraDbSysTableScanRows

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for TABLE SCAN ROWS GOTTEN in V$SYSSTAT. This counter increases each time a row is processed during a Scan operation. Note that the row need not be parsed back to the calling application in order for it to be counted here.

oraDbSysTableScanRows is used to calculate the following database instance performance ratio: the row source ratio, and the continued row ratio.

Typical Range
0 - 100,000,000 per day

Significance
important

Related Variables
oraDbSysTableFetchContinuedRow, oraDbSysTableFetchRowid

Suggested Presentation
counter

oraDbSysTableScansLong

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for TABLE SCANS LONG TABLES in V$SYSSTAT. Long tables are those whose number of data blocks below the high water mark exceeds the value of the initialization parameter SMALL _TABLE_ THRESHOLD. DB Blocks visited in Long Full Table Scans are *not* prompted in the LRS List.

Typical Range
in OLTP, typically 0

Significance
important

Related Variables
oraDbSysTableScansShort

Suggested Presentation
counter

oraDbSysTableScansShort

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for TABLE SCANS SHORT TABLES in V$SYSSTAT. Short tables can be defined as tables that do not meet the

long table criteria, as defined by oraDbSysTableScansLong. Short tables are those whose number of data blocks above the low water mark is low than the value of the initialization parameter LONG_TABLE_THRESHOLD.

Typical Range
0 - 4294967295; can increment at a few hundred per second

Significance
important

Related Variables
oraDbSysTableScansLong

Suggested Presentation
counter

oraDbSysUserCalls

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for USER CALLS in V$SYSSTAT. A user call is a Parse, an Execute, or a Fetch. With the Oracle server's deferred and bundled execution capabilities, this statistic will not necessarily correlate well with client/server message traffic.

oraDbSysUserCalls is used to calculate the following database instance performance ratios: block changes per transaction, the call rate, calls per transaction, the recursive-to-user call ratio, the user call rate, and user calls per parse.

Typical Range
0 - 10,000,000 per day

Significance
very important

Related Variables
oraDbSysDbBlockChanges, oraDbSysParseCount, oraDbSysUserCommits

Suggested Presentation
counter

oraDbSysUserCommits

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for USER COMMITS in
V$SYSSTAT. It records the number of database transactions successfully completed
and records the number of aborted database transactions.

oraDbSysUserCommits is used to calculate the following database instance
performance ratios: block visits per transaction, calls per transaction, and the
transaction rate.

Typical Range
In most real world applications, the value is less the 1 per second.

Significance
In OLTP, very important

Related Variables
oraDbBlockGets, oraDbSysConsistentGets, oraDbUserCalls

Suggested Presentation
counter

oraDbSysUserRollbacks

Syntax
Counter32

Max-Access
read-only

Explanation
This variable is retrieved directly from the value for USER ROLLBACKS in V$SYSSTAT. It records the number of aborted database transactions.

oraDbSysUserRollbacks is used to calculate the following database instance performance ratio: the user rollback ratio.

Typical Range
0 - 4294967295

Significance
important

Related Variables
oraDbSysUserCommits

Suggested Presentation
counter

oraDbTablespaceTable

The oraDbTablespaceTable contains information on tablespaces within a current Oracle database instance. A tablespace is a logical portion of an Oracle database used to allocate storage for table and index data. In a production environment, tables can fill up as transaction activity mounts. Monitoring tablespace activity is important to avoid exhausting the tablespaces and causing spaces.

Each entry in the oraDbTablespaceTable represents a given tablespace within a current database instance. Each entry is indexed first by rdbmsDbIndex, and then oraDbTablespaceIndex; thus, there will normally be a one-to-many relationship between an rdbmsDbTable entry and corresponding oraDbTablespaceTable entries. (For details about rdbmsDbIndex, see Appendix D, "Interpreting Variables of the Public RDBMS MIB". The current value of each oraDbTablespaceTable variable is retrieved directly from a join of DBA_TABLESPACES, DBA_DATA_FILES, and DBA_FREE_SPACE selecting for the tablespace in question.

Table A–2 lists each of these variables and its corresponding object.

oraDbTablespaceIndex

Table A–2   oraDbTablespaceTable Variables and Corresponding Object IDs.

Variable Name	*Object ID*
oraDbTablespaceIndex	1.3.6.1.4.1.111.4.1.2.1.1
oraDbTablespaceName	1.3.6.1.4.1.111.4.1.2.1.2
oraDbTablespaceSizeAllocated	1.3.6.1.4.1.111.4.1.2.1.3
oraDbTablespaceSizeUsed	1.3.6.1.4.1.111.4.1.2.1.4
oraDbTablespaceState	1.3.6.1.4.1.111.4.1.2.1.5
oraDbTablespaceLargestAvailableChunk	1.3.6.1.4.1.111.4.1.2.1.6

Syntax
INTEGER (1..2147483647)

Max-Access
not-accessible

Explanation
A numeric index, unique among tablespaces within a single Oracle database
instance. This index is assigned to these tablespaces based on the alphabetical order
of their names. On most platforms, a hard file limit of 1023 database files exists, so
this number is the practical upper limit. Although some administrators prefer a
one-to-one relationship between tablespaces and database files, multiple files can
comprise a tablespace.

Typical Range
1 - 1,000

Significance
very important

Related Variables
oraDbTablespaceName, rdbmsDbIndex

Suggested Presentation
not applicable

oraDbTablespaceName

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates the name of this tablespace, as retrieved from the value for
TABLESPACE-NAME in DBA_TABLESPACES.

Typical Range
0 - 30 characters

Significance
important

Related Variables
oraDbTablespaceIndex

Suggested Presentation
simple string

oraDbTablespaceSizeAllocated

Syntax
Integer32

Max-Access
read-only

Explanation
Indicates the amount of disk space (in kilobytes) allocated for this tablespace. This is
the sum of the sizes of the data files associated with the tablespace.

Typical Range
0 - 10 gigabytes

Significance
important

Related Variables
oraDbTablespaceSizeUsed

Suggested Presentation
simple string

oraDbTablespaceSizeUsed

Syntax
Integer32

Max-Access
read-only

Explanation
Indicates the amount of disk space (in kilobytes) which is actually in use for storing data. This is the difference between the sum of the size of the datafiles associated with the tablespace and the sum of the size of the free spaces associated with the tablespace.

Typical Range
0 - value of oraDbTablespaceSizeAllocated
Significance

Very important

Related Variables
oraDbTablespaceSizeAllocated

Suggested Presentation
gauge

oraDbTablespaceState

Syntax
INTEGER (1) online (2) offline, or (3) invalid

Max-Access
read-only

Explanation
Indicates the current accessibility of this tablespace, as retrieved from the value for STATUS in DBA_TABLESPACES. If a tablespace is offline (2), then SQL statements cannot reference objects contained in the tablespace. An invalid (3) tablespace is one that has been dropped.

Typical Range
enumerated 1 - 3

Significance
very important

Related Variables
none

Suggested Presentation
simple string or icon

oraDbTablespaceLargestAvailableChunk

Syntax
Integer32

Max-Access
read-only

Explanation
Indicates the size (in kilobytes) of the largest contiguous set of free data blocks in the tablespace. This variable is retrieved directly from the value for NEXT_EXTENT in DBA_TABLES. If there is any object in the tablespace whose NEXT_EXTENT value is greater than the layout chunk, that object will be unable to expand. This might cause a major problem, or it might not matter.

Typical Range
Less than or equal to (oraDbTablespaceSizeAllocated minus oraDbTablespaceSizeUsed)

Significance
important

Related Variables
oraDbTablespaceSizeAllocated, oraDbTablespaceSizeUsed

Suggested Presentation
gauge

oraDbDataFileTable

oraDbDataFileTable contains information on the data files within a current database instance on the managed node. A data file denotes an area of disk allocated for database data. Monitoring data files is important for two reasons; first, to determine whether space in files is being exhausted, and second to determine O/S response time in accessing data on disk, especially on platforms where there is no other way to measure disk queue length.

Each entry in the oraDbDataFileTable represents a given data file within a current database instance on the node. Each entry is indexed first by rdbmsDbIndex, and then by oraDbDataFileIndex; thus, there will normally be a one-to-many relationship between an rdbmsDbTable entry and corresponding oraDbDataFileTable entries. (For details about rdbmsDbIndex, see Appendix D, "Interpreting Variables of the Public RDBMS MIB") The current value of each oraDbDataFileTable variable is retrieved directly from a corresponding field in either V$FILESTAT or DBA_DATA_FILES for that data file within that database instance.

Table A–3 lists each variable of the oraDbDataFileTable and its corresponding object ID

Table A–3   oraDbDataFileTable Variables and Corresponding Object IDs.

Variable Name	*Object ID*
oraDbDataFileIndex	1.3.6.1.4.1.111.4.1.3.1.1
oraDbDataFileName	1.3.6.1.4.1.111.4.1.3.1.2
oraDbDataFileSizeAllocated	1.3.6.1.4.1.111.4.1.3.1.3
oraDbDataFileDiskReads	1.3.6.1.4.1.111.4.1.3.1.4
oraDbDataFileDiskWrites	1.3.6.1.4.1.111.4.1.3.1.5
oraDbDataFileDiskReadBlocks	1.3.6.1.4.1.111.4.1.3.1.6
oraDbDataFileDiskWrittenBlocks	1.3.6.1.4.1.111.4.1.3.1.7

Table A–3   oraDbDataFileTable Variables and Corresponding Object IDs.

Variable Name	Object ID
oraDbDataFileDiskReadTimeTicks	1.3.6.1.4.1.111.4.1.3.1.8
oraDbDataFileDiskWriteTimeTicks	1.3.6.1.4.1.111.4.1.3.1.9

oraDbDataFileIndex

Syntax
INTEGER(1..2147483647)

Max-Access
not-accessible

Explanation
A numeric index, unique among data files associated with a single tablespace. The value of oraDbDataFileIndex is retrieved directly from the value of FILE_ID in DBA_DATA_FILES. For a small database, a tablespace typically contains 1 data file; for a large database (80 Gbytes), a tablespace typically contains 200 datafiles in a tablespace. The upper limit is hard coded as 1023.

Typical Range
1 - 400

Significance
very important

Related Variables
rdbmsDbIndex

Suggested Presentation
not applicable

oraDbDataFileName

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates the fully-qualified name of this data file. The value is retrieved from the
value of FILE_NAME in DBA_DATA_FILES.

Typical Range
10 - 100 characters; about 15 for raw partitions.

Significance
important

Related Variables
oraDbTablespaceName, because the file is a member of a tablespace.

Suggested Presentation
simple string

oraDbDataFileSizeAllocated

Syntax
Integer32

Max-Access
read-only

Explanation
Indicates the allocated size (in kilobytes) of this data file, as retrieved from the value
of BYTES in DBA_DATA_FILES. Indicates how much space has been used so far.
Monitoring this variable is very important, because running out of space can
require taking the database down, depending on which table this file supports.
Normally, however, adding another data file to the Tablespace solves the problem.

Typical Range
100 Mbytes - 2 Gbytes

Significance
very important

Related Variables
none

Suggested Presentation
simple string

oraDbDataFileDiskReads

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the total number of reads issued against this data file since database
instance startup, as retrieved from the value of PHYRDS in V$FILESTAT.

Typical Range
10,000 - 100,000 or much more, depending on the life of the instance

Significance
less important

Related Variables
oraDbDataFileDiskReadBlocks, oraDbDataFileDiskReadTimeTicks

Suggested Presentation
counter

oraDbDataFileDiskWrites

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the total number of writes issued against this data file since database
instance startup, as retrieved from the value of PHYWRTS in V$FILESTAT.

Typical Range
10,000 - 100,000 or much more, depending on the life of the instance

Significance
less important

Related Variables
oraDbDataFileDiskWriteBlocks, oraDbDataFileDiskWriteTimeTicks

Suggested Presentation
counter

oraDbDataFileDiskReadBlocks

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the total number of physical blocks read from this data file since database instance startup. The value is retrieved from the value of PHYBLKRD in V$FILESTAT. The number of bytes read can be determined by multiplying this value by the value of oraDbConfigDbBlockSize, typically 2Kbytes.

Typical Range
10,000 - 100,000 or much more, depending on the life of the instance

Significance
important

Related Variables
oraDbConfigDbBlockSize, oraDbDataFileDiskReads

Suggested Presentation
counter

oraDbDataFileDiskWrittenBlocks

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the total number of physical blocks written to this data file since database instance startup. The value is retrieved from the value of PHYBLKWRT in V$FILESTAT. The number of bytes written can be determined by multiplying this value by the value of the INIT.ORA parameter, DB_BLOCK_SIZE, typically 2Kbytes.

Typical Range
10,000 - 100,000 or much more, depending on the life of the instance

Significance
important

Related Variables
oraDbDataFileDiskWrites

Suggested Presentation
counter

oraDbDataFileDiskReadTimeTicks

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the time spent writing to this data file since database instance startup IF the INIT.ORA parameter TIMED_STATISTICS is TRUE. (The unit of measurement on a UNIX platform is time ticks of 10 ms.) If TIMED_STATISTICS is FALSE, then a value of 0 is returned. The value of oraDbDataFileDiskReadTimeTicks is retrieved from the value of READTIM in V$FILESTAT.

Because knowing how long it takes to perform I/O per block is the important statistic, knowing this aggregate measure is not very significant. If the average time to do reads is generally exceeding a couple of ticks, then an I/O sybsystem response time problem exists. Most high performance disk drives can easily locate any sector on the disk in 10 ms.

Typical Range
0 - 4294967295

Significance
less important

Related Variables
oraDbDataFileDiskReads

Suggested Presentation
clock

oraDbDataFileDiskWriteTimeTicks

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the time spent writing to this data file since database instance startup IF the INIT.ORA parameter TIMED_STATISTICS is TRUE. (The unit of measurement on a UNIX platform is time ticks of 10 ms.) If TIMED_STATISTICS is FALSE, then a value of 0 is returned. The value of oraDbDataFileDiskWriteTimeTicks is retrieved from the value of WRITETIM in V$FILESTAT.

Because knowing how long it takes to perform I/O per block is the important statistic, knowing this aggregate measure is not very significant. If the average time to do writes is generally exceeding three ticks on non-mirrored data, then an I/O subsystem response time problem exists. Most high performance disk drives can easily perform a write in 15 ms.

Typical Range
Can wrap around the upper limit of 2147483647 in about three days of continuous instance operation for a busy database

Significance
less important

Related Variables
oraDbDataFileDiskWrites

Suggested Presentation
clock

oraDbLibraryCacheTable

The oraDbLibraryCacheTable contains variables measuring library cache activity since the most recent database instance startup. A library cache is a memory structure containing shared SQL and PL/SQL areas. Monitoring the library cache is important to determine whether it is necessary to resize Oracle's shared pool.

Each entry in the oraDbLibraryCacheTable represents a given library cache within a current database instance on the node. Each entry is indexed first by rdbmsDbIndex, and then by oraDbLibraryCacheIndex; thus, there will normally be a one-to-many relationship between an rdbmsDbTable entry and corresponding oraDbLibraryCacheTable entries. (For details about rdbmsDbIndex, see Appendix D, "Interpreting Variables of the Public RDBMS MIB") The current value of each oraDbLibraryCacheTable variable is retrieved directly from a corresponding field in the V$LIBRARYCACHE table for that library cache within that database instance.

Table A–4 lists each variable of the oraDbLibraryCacheTable and its corresponding object ID.

Table A–4   oraDbLibraryCacheTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraDbLibraryCacheIndex	1.3.6.1.4.1.111.4.1.4.1.1
oraDbLibraryCacheNameSpace	1.3.6.1.4.1.111.4.1.4.1.2
oraDbLibraryCacheGets	1.3.6.1.4.1.111.4.1.4.1.3
oraDbLibraryCacheGetHits	1.3.6.1.4.1.111.4.1.4.1.4
oraDbLibraryCachePins	1.3.6.1.4.1.111.4.1.4.1.5
oraDbLibraryCachePinHits	1.3.6.1.4.1.111.4.1.4.1.6
oraDbLibraryCacheReloads	1.3.6.1.4.1.111.4.1.4.1.7
oraDbLibraryCacheInvalidations	1.3.6.1.4.1.111.4.1.4.1.8

oraDbLibraryCacheIndex

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
A unique integer for each row of the oraDbLibraryCacheTable.

Typical Range
8 (only)

Significance
very important

Related Variables
oraDbLibraryCacheNameSpace

Suggested Presentation
not applicable

oraDbLibraryCacheNameSpace

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates the namespace of the V$LIBRARYCACHE table to which this row is
related. The value is retrieved from the value of NAMESPACE in
V$LIBRARYCACHE.

Typical Range
0 - 30 characters

Significance
important

Related Variables
oraDbLibraryCacheIndex

Suggested Presentation
simple string

oraDbLibraryCacheGets

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of times, since database instance startup, that the system requests handles to library objects in this namespace. The value of oraDbLibraryCacheGets is retrieved from the value of GETS in V$LIBRARYCACHE.

Typical Range
0 - 500,00 per day

Significance
important

Related Variables
oraDbLibraryCacheGetHits

Suggested Presentation
counter

oraDbLibraryCacheGetHits

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of times, since database instance startup, that the handles are already allocated in the cache. The value of oraDbLibraryCacheGetHits is retrieved from the value of GETHITS in V$LIBRARYCACHE.

Typical Range
0 - 4294967295

Significance
less important

Related Variables
oraDbLibraryCacheGets

Suggested Presentation
counter

oraDbLibraryCachePins

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of times, since database instance startup, that the system issues pin requests in order to access objects in the cache. The value of oraDbLibraryCachePins is retrieved from the value of PINS in V$LIBRARYCACHE.

oraDbLibraryCachePins is used to calculate the following database instance performance ratio: library cache miss ratio.

Typical Range
0 - 4294967295

Significance
less important

Related Variables
oraDbLibraryPinHits, oraDbLibraryCacheReloads

Suggested Presentation
counter

oraDbLibraryCachePinHits

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of times, since database instance startup, that the objects the system is pinning are already allocated and initialized in the cache. The value of oraDbLibraryCachePinHits is retrieved from the value of PINHITS in V$LIBRARYCACHE.

Typical Range
0 - 4294967295

Significance
important

Related Variables
oraDbLibraryCachePins

Suggested Presentation
counter

oraDbLibraryCacheReloads

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of times, since database instance startup, that library objects have to be reinitialized and reloaded with data because they have been aged out or invalidated. The value of oraDbLibraryCacheReloads is retrieved from the value of RELOADS in V$LIBRARYCACHE.

oraDbLibraryCacheReloads is used to calculate the following database instance performance ratio: library cache miss ratio.

Typical Range
0 - 4294967295

Significance
important

Related Variables
oraDbLibraryCachePins

Suggested Presentation
counter

oraDbLibraryCacheInvalidations

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of times, since database instance startup, that non-persistent library objects (like shared SQL areas) have been invalidated. The value of oraDbLibraryCacheInvalidations is retrieved from the value of INVALIDATIONS in V$LIBRARYCACHE.

Typical Range
0 - 4294967295

Significance
less important

Related Variables
none

Suggested Presentation
counter

oraDbLibraryCacheSumTable

The LibraryCacheSum table tracks for all library caches in a database instance as a whole the same information that the LibraryCache table tracks for the caches individually. It is primarily a convenience.

Table A–5   oraDBLibraryCacheSum Table Variables and Corresponding Object IDs

Variable Name	Object ID
oraDbLibraryCacheSumGets	1.3.6.1.4.1.111.4.1.5.1.1
oraDbLibraryCacheSumGetHits	1.3.6.1.4.1.111.4.1.5.1.2
oraDbLibraryCacheSumPins	1.3.6.1.4.1.111.4.1.5.1.3
oraDbLibraryCacheSumPinHits	1.3.6.1.4.1.111.4.1.5.1.4
oraDbLibraryCacheSumReloads	1.3.6.1.4.1.111.4.1.5.1.5
oraDbLibraryCacheSumInvalidations	1.3.6.1.4.1.111.4.1.5.1.6

oraDbLibraryCacheSumGets

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of times, since database instance startup, that the system requests handles to library objects in this namespace. The value of oraDbLibraryCacheSumGets is derived from the value of GETS in V$LIBRARYCACHE.

Typical Range
0 - 500,00 per day

Significance
important

Related Variables
oraDbLibraryCacheSumGetHits

Suggested Presentation
counter

oraDbLibraryCacheSumGetHits

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of times, since database instance startup, that the handles are already allocated in the cache. The value of oraDbLibraryCacheSumGetHits is derived from the value of GETHITS in V$LIBRARYCACHE.

Typical Range
0 - 4294967295

Significance
less important

Related Variables
oraDbLibraryCacheSumGets

Suggested Presentation
counter

oraDbLibraryCacheSumPins

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of times, since database instance startup, that the system issues pin requests in order to access objects in the cache. The value of oraDbLibraryCacheSumPins is derived from the value of PINS in V$LIBRARYCACHE.

oraDbLibraryCacheSumPins is used to calculate the following database instance performance ratio: library cache miss ratio.

Typical Range
0 - 4294967295

Significance
less important

Related Variables
oraDbLibraryPinHits, oraDbLibraryCacheSumReloads

Suggested Presentation
counter

oraDbLibraryCacheSumPinHits

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of times, since database instance startup, that the objects the system is pinning are already allocated and initialized in the cache. The value of oraDbLibraryCacheSumPinHits is derived from the value of PINHITS in V$LIBRARYCACHE.

Typical Range
0 - 4294967295

Signifcance
important

Related Variables
oraDbLibraryCacheSumPins

Suggested Presentation
counter

oraDbLibraryCacheSumReloads

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of times, since database instance startup, that library objects have to be reinitialized and reloaded with data because they have been aged out or invalidated. The value of oraDbLibraryCacheSumReloads is derived from the value of RELOADS in V$LIBRARYCACHE.

oraDbLibraryCacheSumReloads is used to calculate the following database instance performance ratio: library cache miss ratio.

Typical Range
0 - 4294967295

Significance
important

Related Variables
oraDbLibraryCacheSumPins

Suggested Presentation
counter

oraDbLibraryCacheSumInvalidations

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of times, since database instance startup, that non-persistent library objects (like shared SQL areas) have been invalidated. The value of oraDbLibraryCacheSumInvalidations is derived from the value of INVALIDATIONS in V$LIBRARYCACHE.

Typical Range
0 - 4294967295

Significance
less important

Related Variables
none

Suggested Presentation
counter

oraDbSGATable

The oraDbSGATable contains storage allocation information on the current System Global Area (SGA). The SGA is a common database storage area for information that supports current sessions. As the values of its attributes are configured in the INIT.ORA file, they do not change while the database instance is running, thus, the SGA at this aggregate level is not as important to monitor as other database structures.

Each entry in the oraDbSGATable represents the SGA for a current database instance on the node. Each entry is indexed by rdbmsDbIndex. However, because rdbmsDbTable contains an entry for each installed database configured for SNMP support, whether or not it is actively open, there may or may not be a one-to-one correspondence between entries in the two tables at any point in time. (For details about rdbmsDbIndex, see Appendix D, "Interpreting Variables of the Public RDBMS MIB") The current value of each oraDbSGATable variable is retrieved directly from a corresponding field in the V$SGA table for that database instance.

Table A–6 lists each variable of the oraDbSGATable and its corresponding object ID.

Table A–6   oraDbSGATable Variables and Corresponding Object IDs

Variable Name	Object ID
oraDbSGAFixedSize	1.3.6.1.4.1.111.4.1.6.1.1
oraDbSGAVariableSize	1.3.6.1.4.1.111.4.1.6.1.2
oraDbSGADatabaseBuffers	1.3.6.1.4.1.111.4.1.6.1.3
oraDbSGARedoBuffers	1.3.6.1.4.1.111.4.1.6.1.4

oraDbSGAFixedSize

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The size in kilobytes of the fixed-size portion of the SGA as shown in V$SGASTAT.

Typical Range
1 - 2147483647

Significance
less important

Related Variables
oraDbSGAVariableSize

Suggested Presentation
as a simple integer value

oraDbSGAVariableSize

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The size in kilobytes of the variable-size portion of the SGA as shown in V$SGASTAT.

Typical Range
1 - 2147483647

Significance
less important

Related Variables
oraDbSGAFixedSize

Suggested Presentation
as a simple integer value

oraDbSGADatabaseBuffers

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The number of database buffers allocated in the SGA as shown in V$SGASTAT.

Typical Range
4 Kbytes - 2 Gbytes

Significance
less important

Related Variables
oraDbSGARedoBuffers

Suggested Presentation
as a simple integer value

oraDbSGARedoBuffers

Syntax
INTEGER (1..2147483647)

Max-Access
read-write

Explanation
The number of redo buffers allocated in the SGA as shown in V$SGASTAT.

Typical Range
1 - 2147483647

Significance
less important

Related Variables
oraDbSGADatabaseBuffers

Suggested Presentation
as a simple integer value

oraDbConfigTable

The oraDbConfigTable contains variables whose values are retrieved directly from the V$PARAMETER table. These parameters control systemwide resources and can impact the values of variables in the rest of this MIB. This table includes those initialization parameters that closely relate to the task of monitoring database instance performance. By assigning these parameters easy-to-use, fixed object IDs, it is easier to graph them together with the dynamic performance values they impact. For more information on these parameters, see the *Oracle9i Database Reference*, and also the *Oracle9i Database Concepts* specific to your system.

Each entry in the oraDbConfigTable is indexed by rdbmsDbIndex. However, because rdbmsDbTable contains an entry for each installed database, whether or not it is actively open, there may or may not be a one-to-one correspondence between entries in the two tables at any point in time. (For details about rdbmsDbIndex, see Appendix D, "Interpreting Variables of the Public RDBMS MIB")

Table A–7 lists each variable of the oraDbConfigTable and its corresponding object ID

Table A–7   oraDbConfigTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraDbConfigDbBlockBuffers	1.3.6.1.4.1.111.4.1.7.1.1
oraDbConfigDbBlockSize	1.3.6.1.4.1.111.4.1.7.1.3
oraDbConfigDbMultiBlockReadCount	1.3.6.1.4.1.111.4.1.7.1.5
oraDbConfigDbWriters	1.3.6.1.4.1.111.4.1.7.1.6
oraDbConfigLogBuffer	1.3.6.1.4.1.111.4.1.7.1.12
oraDbConfigLogCheckpointInteval	1.3.6.1.4.1.111.4.1.7.1.13
oraDbConfigLogCheckpointTimeout	1.3.6.1.4.1.111.4.1.7.1.14
oraDbConfigLogSmallEntryMax	1.3.6.1.4.1.111.4.1.7.1.16
oraDbConfigMaxRollbackSegments	1.3.6.1.4.1.111.4.1.7.1.17

Table A–7   oraDbConfigTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraDbConfigMaxDispatchers	1.3.6.1.4.1.111.4.1.7.1.18
oraDbConfigMTSMaxServers	1.3.6.1.4.1.111.4.1.7.1.19
oraDbConfigMTSServers	1.3.6.1.4.1.111.4.1.7.1.20
oraDbConfigOpenCursors	1.3.6.1.4.1.111.4.1.7.1.21
oraDbConfigOpenLinks	1.3.6.1.4.1.111.4.1.7.1.22
oraDbConfigOptimizerMode	1.3.6.1.4.1.111.4.1.7.1.23
oraDbConfigProcesses	1.3.6.1.4.1.111.4.1.7.1.24
oraDbConfigSerializable	1.3.6.1.4.1.111.4.1.7.1.25
oraDbConfigSessions	1.3.6.1.4.1.111.4.1.7.1.26
oraDbConfigSharedPool	1.3.6.1.4.1.111.4.1.7.1.27
oraDbConfigSortAreaSize	1.3.6.1.4.1.111.4.1.7.1.28
oraDbConfigSortAreaRetainedSize	1.3.6.1.4.1.111.4.1.7.1.29
oraDbConfigTransactions	1.3.6.1.4.1.111.4.1.7.1.30
oraDbConfigTransactionsPerRollback	1.3.6.1.4.1.111.4.1.7.1.31

oraDbConfigDbBlockBuffers

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the DB_BLOCK_BUFFERS
parameter of the INIT.ORA file. Indicates the number of database blocks cached in
memory of the SGA. This parameter is the most significant determinant of the SGA
size and database instance performance. The size of each block can be determined
using oraDbConfigDbBlockSize.

Typical Range
1 - 2147483647

Significance
very important

Related Variables
oraDbConfigDbBlockSize

Suggested Presentation
gauge or simple string

oraDbConfigDbBlockSize

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the DB_BLOCK_SIZE parameter
of the INIT.ORA file. Indicates the size, in bytes, of database blocks for this
database. This information has significance for a number of other variables.

Typical Range
1024 - 8192 (O/S dependent)

Significance
important

Related Variables
none

Suggested Presentation
gauge or simple string

oraDbConfigDbMultiBlockReadCount

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the DB_FILE_MULTIBLOCK_
READ_COUNT parameter of the INIT.ORA file. Indicates the maximum number of
blocks read in one I/O operation during a sequential scan. The default is a function
of the DB_BLOCK_BUFFERS and PROCESSES parameters in the INIT.ORA file.

Typical Range
Values in the range of 4 to 32 are reasonable. Actual maximums vary by operating
system

Significance
important

Related Variables
oraDbConfigDbBlockBuffers, oraDbConfigDbProcesses

Suggested Presentation
gauge or simple string

oraDbConfigLogBuffer

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the LOG_BUFFER parameter of
the INIT.ORA file. Indicates the number of bytes allocated to the redo log buffer in
the SGA. In a busy system, a value of 65536 or higher would not be unreasonable.

Typical Range
1,000 - 100,000

Significance
important

Related Variables

Suggested Presentation
gauge or simple string

oraDbConfigLogCheckpointInterval

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the LOG_CHECKPOINT_
INTERVAL parameter of the INIT.ORA file. Indicates the amount of time (in
seconds) to pass before another checkpoint occurs. A value of 0 disables time-based
checkpoints.

Typical Range
1 - 2147483647

Significance
important

Related Variables
oraDbConfigLogCheckpointTimeout

Suggested Presentation
clock or simple string

oraDbConfigLogCheckpointTimeout

Syntax
INTEGER (0..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the LOG_CHECKPOINT_
TIMEOUT parameter of the INIT.ORA file. The amount of time (in seconds) to pass
between checkpoints. A value of 0 disables time-based checkpoints.

Typical Range
0 - 2147483647

Significance
important

Related Variables
oraDbConfigLogCheckpointInterval

Suggested Presentation
clock or simple string

oraDbConfigMaxRollbackSegments

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the MAX_ROLLBACK_ SEGMENTS parameter of the INIT.ORA file. Indicates the maximum size of the rollback segment cache in the SGA.

Typical Range
1 - 65536

Significance
important

Related Variables
none

Suggested Presentation
gauge or simple string

oraDbConfigMTSMaxDispatchers

Syntax
INTEGER (1..2147483647)

Explanation
The value of this variable is retrieved directly from the MTS_MAX_ DISPATCHERS parameter of the INIT.ORA file. Indicates the maximum number of dispatcher processes allowed to be running simultaneously.

Typical Range
1 - 2147483647

Significance
important

Related Variables
none

Suggested Presentation
gauge or simple string

oraDbConfigMTSMaxServers

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the MTS_MAX_SERVERS parameter of the INIT.ORA file. Indicates the maximum number of shared server processes allowed to be running simultaneously.

Typical Range
1 - 2147483647

Significance
important

Related Variables
none

Suggested Presentation
gauge or simple string

oraDbConfigMTSServers

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the MTS_SERVERS parameter of the INIT.ORA file. Indicates the number of server processes that are created when an instance is started.

Typical Range
1 - 2147483647

Significance
important

Related Variables
none

Suggested Presentation
gauge or simple string

oraDbConfigOpenCursors

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the OPEN_CURSORS parameter of the INIT.ORA file. Indicates the maximum number of open cursors (context areas) a single-user process can have at once.

Typical Range
1 - 2147483647

Significance
important

Related Variables
none

Suggested Presentation
gauge or simple string

oraDbConfigOpenLinks

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the OPEN_LINKS parameter of the INIT.ORA file. Indicates the maximum number of concurrent open connections to remote database instances per user process. This parameter refers only to connections used for distributed transactions; direct connections to a remote database instance specified as an application connects are not counted. If set to 0, then no distributed transactions are allowed.

Typical Range
0 - 255

Significance
important

Related Variables
none

Suggested Presentation
gauge or simple string

oraDbConfigOptimizerMode

Syntax
DisplayString

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the OPTIMIZER_MODE
parameter of the INIT.ORA file. When set to RULE, this parameter causes
rule-based optimization to be used, unless hints are specified in the query. When set
to COST, the optimizer uses a cost-based approach for an SQL statement, if there are
statistics in the dictionary for at least one table accessed in the statement.
(Otherwise, the rule-based approach is used.)

Typical Range
RULE/COST

Significance
important

Related Variables
oraDbConfigSessions

Suggested Presentation
icon or simple string

oraDbConfigProcesses

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the PROCESSES parameter of
the INIT.ORA file. For a multiple-process operation, this parameter specifies the
maximum number of user processes that can simultaneously connect to an Oracle
server. The PROCESSES parameter is used to derive the SESSIONS INIT.ORA
parameter. The default is 50.

Typical Range
6 - O/S dependent

Significance
important

Related Variables
oraDbConfigSessions, oraDbConfigTransactions

Suggested Presentation
gauge or simple string

Suggested Presentation
gauge or simple string

oraDbConfigSerializable

Syntax
TruthValue

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the SERIALIZABLE parameter of the INIT.ORA file. A value of TRUE indicates that queries acquire table-level read locks, preventing any update of objects read until the transaction containing the query is committed.

Typical Range
true/false

Significance
important

Related Variables
none

Suggested Presentation
icon or simple string

oraDbConfigSessions

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the SESSIONS parameter of the INIT.ORA file. Indicates the total number of user and system sessions. The default for parameter is derived as the value of the INIT.ORA PROCESSES parameter multiplied by 1.1.

Typical Range
1 - 2147483647

Significance
important

Related Variables
oraDbConfigProcesses

Suggested Presentation
gauge or simple string

oraDbConfigSharedPool

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the SHARED_POOL_SIZE parameter of the INIT.ORA file. Indicates the size (in bytes) of the shared pool. The shared pool contains shared cursors and stored procedures. The default is 3.5 Mbytes.

Typical Range
300 Kbytes - O/S dependent

Significance
important

Related Variables
none

Suggested Presentation
gauge or simple string

oraDbConfigSortAreaSize

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the SORT_AREA_SIZE parameter of the INIT.ORA file. Indicates the maximum amount of PGA memory to use for an exterrnal (disk) sort (in bytes). The default (O/S dependent) is adequate for most DB operations.

Typical Range
1 - 2147483647

Significance
none

Related Variables
oraDbConfigRetainedSize, oraDbConfigSortSpaceMapSize

Suggested Presentation
gauge or simple string

oraDbConfigSortAreaRetainedSize

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the SORT_AREA_RETAINED_
SIZE parameter of the INIT.ORA file. Indicates the maximum amount of session
memory (in bytes) that will be used for an in-memory sort. The default value is
equal to that assigned for the SORT_AREA_SIZE INIT.ORA parameter.

Typical Range
0..value of oraDbConfigSortAreaSize

Significance
important

Related Variables
oraConfigSortAreaSize

Suggested Presentation
gauge or simple string

oraDbConfigTransactions

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the TRANSACTIONS parameter
of the INIT.ORA file. Indicates the maximum number of concurrent transactions.
The default is the value of the PROCESSES INIT.ORA parameter multiplied by 1.1.

Typical Range
1 - 2147483647

Significance
important

Related Variables
oraDbConfigProcesses

Suggested Presentation
gauge or simple string

oraDbConfigTransactionsPerRollback

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
The value of this variable is retrieved directly from the TRANSACTIONS_PER_
ROLLBACK_SEGMENT parameter of the INIT.ORA file. Indicates the number of
concurrent transactions allowed per rollback segment. The default is 30.

Typical Range
1..O/S dependent

Significance
important

Related Variables
oraDbConfigTransactions

Suggested Presentation
gauge or simple string

oraRepSchemaTable

The oraRepSchema Table contains information about the replicated database
schemas at the current site. For each such replicated schema, there exists one
instance of this table.

The values of these variables are retrieved directly from the replication catalog. The
current replication environment's status (normal, quiescing, quiesced) and

configuration (type of replication site and database link to remote replication sites) are useful for displaying a visual representation of the replication environment.

Table A–8   oraRepSchema Table Variables and Corresponding Object IDs

Variable Name	Object ID
oraRepSchemaIndex	1.3.6.1.4.1.111.4.3.2.1.1
oraRepSchemaName	1.3.6.1.4.1.111.4.3.2.1.2
oraRepSchemaType	1.3.6.1.4.1.111.4.3.2.1.3
oraRepSchemaStatus	1.3.6.1.4.1.111.4.3.2.1.4
oraRepSchemaLinks	1.3.6.1.4.1.111.4.3.2.1.5

oraRepSchemaIndex

Syntax
INTEGER32

Max-Access
read-only

Explanation
This is a numeric index unique among replication schemas contained in this database.

Typical Range
not applicable

Significance
Provides a unique identifier for the schema.

Related Variables
none

Suggested Presentation
simple string

oraRepSchemaName

Syntax
DisplayString

Max-Access
read-only

Explanation
This is the name of the replicated schema. This name must be the same at all sites involved in the replication of the schema.

Typical Range
valid Oracle identifier

Significance
Identifies replicated schemas. Useful in displaying a visual representation of the replication environment.

Related Variables
oraRepSchemaType

Suggested Presentation
simple string

oraRepSchemaType

Syntax
INTEGER{masterdef(1), master(2), snapshot(3)}

Max-Access
read-only

Explanation
This indicates whether the replicated schema is a master definition schema, a master schema, or a snapshot schema.

Typical Range
not applicable

Significance
Most replication administration tasks can be performed only at the master
definition sites.

Related Variables
oraRepSchemaName

Suggested Presentation
color indicator or simple string

oraRepSchemaStatus

Syntax
INTEGER{normal(1), quiescing(2), quiesced(3)}

Max-Access
read-only

Explanation
This indicates the state of the replicated schema. Replication activity is suspended
in the quiesced state and the schema can then be altered.

Typical Range
1 - 3

Significance
The meanings of the values are as follows:

1. Normal operational state of a replication environment.

1. Replication activity is in the process of being suspended

1. Replication activity has been disabled. This is usually done to perform
    administrative actions.

Snapshot sites are always in state 1 (normal).

Related Variables
oraRepSchemaType

Suggested Presentation
color indicator or simple string

oraRepSchemaLinks

Syntax
INTEGER32

Max-Access
read-only

Explanation
This indicates the number of database links used in the schema for replication.

Typical Range
configuration dependent

Significance
For masters there must be at least one database link from the local site to each remote master.

For snapshots there must be at least one database link from the snapshot site to its master.

Related Variables
oraRepLinkName

Suggested Presentation
simple string

oraRepMasterSchema Table

The oraRepMasterSchema Table contains specific information for replicated schemas at the current master or master definition site. There exists one instance of this table for each replicated schema at the current site. These values are retrieved from the replication catalog.

The values in this table are useful for displaying a visual representation of multi-master configurations. Master and master definition sites are not required to have database links to their snapshot sites. Snapshot schemas are currently not registered in the replication catalog at their associated master site. Given an oraRepMasterSchema Table in an arbitrary replication environment, it is not be possible to locate all snapshot sites based solely on the information in this table.

Information is also provided for the detection of replication administration request errors and a relative count of the number of conflicts encountered at the current site.

The table provides a count of the number of resolved conflicts. Not all conflicts may be resolved (the DBA did not declare the appropriate conflict resolution method(s) or a conflict was unable to be resolved due to other problems.

Table A–9   oraRepMasterSchema Table Variables and Corresponding Object IDs

Variable Name	Object ID
oraRepMasterSchemaRequestErrors	1.3.6.1.4.1.111.4.3.3.1.1
oraRepMasterSchemaResolvedConflicts	1.3.6.1.4.1.111.4.3.3.1.2
oraRepMasterSchemaOtherMasters	1.3.6.1.4.1.111.4.3.3.1.3

oraRepMasterSchemaRequestErrors

Syntax
Gauge32

Max-Access
read-only

Explanation
This indicates the number of administration requests that have encountered errors. The errors themselves are stored in the administration queue at the source database of the request.

Typical Range
0

Significance
If the variable is > 0, then 1 or more administration commands failed at 1 or more remote sites.

Related Variables
oraRepLinkAdminRequests

Suggested Presentation
gauge or warning indicator

oraRepMasterSchemaResolvedConflicts

Syntax
Gauge32

Max-Access
read-only

Explanation
This indicates the number of conflicts that were successfully resolved at the local database. For this variable to be valid, the DBA must activate statistics collection for conflict resolution.

Typical Range
configuration dependent

Significance
If the environment is configured to be conflict-free, this value always should be 0. Otherwise, this value gives the adminsdtrator a rough count of the conflicts that are occuring, although it is imprecise because it does not include any conflicts that have not been resolved.

Related Variables
none

Suggested Presentation
gauge or simple string

oraRepMasterSchemaOtherMasters

Syntax
INTEGER32

Max-Access
read-only

Explanation
This indicates the number of remote master databases involved in the replication of the schema.

Typical Range
configuration dependent

Significance
useful for displaying a map of the replication environment.

Related Variables
oraRepSchemaLinks

Suggested Presentation
simple string

oraRepSnapshotSchemaTable

The oraRepSnapshotSchema Table contains specific information for snapshot schemas at the current snapshot site. One instance of this table exists for each snapshot schema at the current site. These values are retrieved from the replication catalog.

The values in this table are useful for displaying a visual representation of Master-Snapshot configurations. Snapshot sites are required to have database links to their master sites, but a master site is not required to have database links to its associated snapshot sites.

Table A–10   oraRepSnapshotSchema Table Variables and Corresponding Object IDs

Variable Name	Object ID
oraRepSnapshotSchemaMaster	1.3.6.1.4.1.111.4.3.4.1.1
oraRepSnapshotSchemaSnapshots	1.3.6.1.4.1.111.4.3.4.1.2

oraRepSnapshotSchemaMaster

Syntax
DisplayString

Max-Access
read-only

Explanation
This provides the name of the master database from which the snapshot schema is refreshed. A snapshot schema can be owned by only one master database at a time, but that ownership is dynamic.

Typical Range
valid Oracle identifier

Significance
useful for displaying a map of the replication environment.

Related Variables
oraRepLinkName

Suggested Presentation
simple string

oraRepSnapshotSchemaSnapshots

Syntax
INTEGER32

Max-Access
read-only

Explanation
This indicates the number of snapshots in the schema.

Typical Range
configuration dependent

Significance
Useful in displaying a visual representation of the replication environment.

Related Variables

Suggested Presentation
gauge or simple string

oraRepLinkTable

The oraRepLink Table contains information for each database link used for
replication at the current site. One instance of this table exists for each database link
used for replication at the current site. These values are retrieved from both the
replication catalog and the Deferred RPC tables.

All information is reported on a per-database link basis. For example, oraRepLinkError counts all errors from the database link oraRepLinkName within the instance of the oraRepLink Table that identifies that link. This is also true for oraRepLinkDeferredTransactions and oraRepLinkAdminRequests.

Administration requests are only made from the master definition sites to remote master sites. Snapshot sites neither send nor receive replication administration requests.

Table A–11   oraRepLink Table Variables and Corresponding Object IDs

Variable Name	Object ID
oraRepLinkIndex	1.3.6.1.4.1.111.4.3.5.1.1
oraRepLinkName	1.3.6.1.4.1.111.4.3.5.1.2
oraRepLinkDeferredTransactions	1.3.6.1.4.1.111.4.3.5.1.3
oraRepLinkErrors	1.3.6.1.4.1.111.4.3.5.1.4
oraRepLinkAdminRequests	1.3.6.1.4.1.111.4.3.5.1.5

oraRepLinkIndex

Syntax
INTEGER32

Max-Access
read-only

Explanation
This is a numeric index whose value is unique among the replication links associated with a particular schema.

Typical Range
not applicable

Significance
This provides a unique identifier for the link.

Related Variables

Suggested Presentation
simple string

oraRepLinkName

Syntax
DisplayString

Max-Access
read-only

Explanation
This provides the name of the database link.

Typical Range
valid Oracle database link name

Significance
This shows the destination to which transactions will be replicated.

Related Variables
none

Suggested Presentation

simple string

oraRepLinkDeferredTransactions

Syntax
Gauge32

Max-Access
read-only

Explanation
This is the number of deferred transactions queued for propagation to the destination of the dblink. The transactions in the queue are stored, organized by destination, at the database originating the transaction.

Typical Range
configuration dependent

Significance
As a general rule, there should not be a large backlog of queued transactions. A moderate queue size reduces poential problems with conflicts, integrity constraints, and cascading errors. This value is one measure of the cost of replication in terms of data traffic.

Related Variables
none

Suggested Presentation
gauge or simple string

oraRepLinkErrors

Syntax
Gauge32

Max-Access
read-only

Explanation
This is the number of errors at the local database that were caused by deferred transactions from the dblink in question. These errors are caused by incorrectly formed transactions or by conflicts. The errors in the queue are stored by source at the database at which the errors occurred.

Typical Range
0

Significance
Errors indicate unresolved conflicts or other problems with the replication environment (for example, replication users do not have the correct privileges or the database links were not created correctly).

Related Variables
none

Suggested Presentation
gauge or warning indicator

oraRepLinkAdminRequests

Syntax
Gauge32

Max-Access
read-only

Explanation
This is the number of administration requests queued for the local database from the dblink in question. The items in the queue are stored by the source of the requests.

Typical Range
configuration dependent

Significance
A large backlog of requests may indicate a problem in the background process which periodically pushes the queue. A gauge would be useful for displaying the percent completion of a single or of a set of adminstration requests (i.e., when the value reaches zero, all requests are complete)

Related Variables
none

Suggested Presentation
gauge or simple string

B

Interpreting Variables of the Oracle Network Listener MIB

This appendix provides information to help you interpret individual variables in the private Oracle Network Listener MIB. Specifically, it includes sections covering MIB variables in the following tables

- oraListenerTable

- oraSIDTable

- oraDedicatedSrvTable

- oraDispatcherTable

- oraPrespawnedSrvTable

- oraListenAddressTable

- oraListenerTraps

For more information about the Oracle network listener, see *Oracle Net Services Administrator's Guide.*

oraListenerTable

The oraListenerTable contains information about the generic network listeners installed on a managed node. A network listener is a server process that listens for connection requests for one or more databases on one or more network protocols. Monitoring a listener is important in order to ensure adequate database access.

Each entry in the oraListenerTable represents the network listener for a current database instance on the node. Each entry is indexed by oraListenerIndex. The

current value of each oraListenerTable variable is retrieved from either configuration files or calculated from an internal buffer of the managed listener.

Table B–1 lists the variables included in the oraListenerTable.

Table B–1   oraListenerTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraListenerIndex	1.3.6.1.4.1.111.5.1.1.1.1
oraListenerName	1.3.6.1.4.1.111.5.1.1.1.2
oraListenerVersion	1.3.6.1.4.1.111.5.1.1.1.3
oraListenerStartDate	1.3.6.1.4.1.111.5.1.1.1.4
oraListenerUptime	1.3.6.1.4.1.111.5.1.1.1.5
oraListenerTraceLevel	1.3.6.1.4.1.111.5.1.1.1.6
oraListenerSecurityLevel	1.3.6.1.4.1.111.5.1.1.1.7
oraListenerParameterFile	1.3.6.1.4.1.111.5.1.1.1.8
oraListenerLogFile	1.3.6.1.4.1.111.5.1.1.1.9
oraListenerTraceFile	1.3.6.1.4.1.111.5.1.1.1.10
oraListenerState	1.3.6.1.4.1.111.5.1.1.1.11
oraListenerNumberOfServices	1.3.6.1.4.1.111.5.1.1.1.12
oraListenerContact	1.3.6.1.4.1.111.5.1.1.1.13

A description of each of these variables follows.

oraListenerIndex

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
A numeric index, unique among all generic listeners on this managed node, as retrieved from the snmp.index.*listener-name* parameter of the SNMP.ORA

configuration file. oraListenerIndex also serves as the primary index for the oraListenAddressTable.

Typical Range
varies, depending on the value set in the snmp.index.*listener-name* field of the SNMP.ORA file

Significance
very important

Related Variables
oraListenAddress

Suggested Presentation
not applicable

oraListenerName

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates the name of this generic listener, as retrieved from the LISTENER.ORA configuration file.

Typical Range
1 - 255 characters

Significance
very important

Related Variables
none

Suggested Presentation
icon or simple string

oraListenerVersion

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates the version number of this generic listener, in vendor-specific format. This value is retrieved from an internal listener table.

Typical Range
30 - 50 characters (physical limit is 255 characters)

Significance
less important

Related Variables
none

Suggested Presentation
simple string

oraListenerStartDate

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates the date and time at which this generic listener was started, as retrieved from an internal listener table. The format is *date-month-year hours:minutes:seconds*.

Typical Range
15 - 20 characters (physical limit is 255 characters)

Significance
less important

Related Variables
none

Suggested Presentation
simple string

oraListenerUptime

Syntax
TimeTicks

Max-Access
read-only

Explanation
Indicates the value of sysUpTime at the time the generic listener was started. This value is derived from the master agent, which counts the time in hundredths of a second since the master agent was started. The value of this variable should remain as a constant across the Listener's life span. A change in this variable indicates that the counter has been refreshed.

Typical Range
0 - 4294967295

Significance
important

Related Variables
none

Suggested Presentation
clock

oraListenerTraceLevel

Syntax
INTEGER (1 - 17)

Max-Access
read-write

Explanation
Indicates the level at which a Listener should be traced. A value of 4 means that tracing at the USER level is turned on; and 6 means that tracing at the ADMIN level is turned on. A value of 17 means that tracing is turned off.

Typical Range
enumerated 1 - 17

Significance
important

Related Variables
oraNavigatorTraceFile

Suggested Presentation
as an icon, or as a simple string of characters, OFF, USER or ADMIN

oraListenerSecurityLevel

Syntax
INTEGER (1) on, or (2) off.

Max-Access
read-only

Explanation
Indicates whether or not the generic listener is password-protected, as determined from the PASSWORDS_*listener_name* parameter of the LISTENER.ORA configuration file. If security is ON (1), the password is required to perform certain DBA tasks against the Listener using the Listener control utility.

Typical Range
enumerated 1 or 2

Significance
less important

Related Variables
none

Suggested Presentation
simple string

oraListenerParameterFile

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates the name of the Listener configuration file on the managed node, as retrieved from an internal buffer of the managed listener. Default is $ORACLE_HOME/network/admin/*listener_name*.ORA

Typical Range
40 - 70 characters (physical limit is 255 characters)

Significance
important

Related Variables
none

Suggested Presentation
simple string

oraListenerLogFile

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates the directory for the log file that is automatically generated for listener events, as retrieved from the LOG_DIRECTORY parameter of the LISTENER.ORA configuration file. Default is operating system specific: on UNIX, for example, it is $ORACLE_HOME/network/log/*listener_name*.log.

Typical Range
20 - 70 characters (physical limit is 255 characters)

Significance
less important

Related Variables
none

Suggested Presentation
simple string

oraListenerTraceFile

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates the name of the file to which trace information is written, as determined from the TRACE_FILE parameter of the LISTENER.ORA configuration file. Default is $ORACLE_HOME/network/trace/*listener_name*.trc

Typical Range
20 - 70 characters (physical limit is 255 characters)

Significance
less important

Related Variables
oraListenerTraceLevel

Suggested Presentation
simple string

oraListenerState

Syntax
INTEGER (1) up, or (2) down

Max-Access
read-only

Explanation
Indicates the current state of the generic listener, as retrieved from an internal table. The DOWN value (2) indicates that the generic listener is not available for any use, but is known to the agent. The UP value (1) indicates that the generic listener is running and available for generic use. This value would be inspected by an agent on receipt of an oraListenerStateChange trap.

Typical Range
enumerated 1 or 2

Significance
important

Related Variables
oraListenerStateChange

Suggested Presentation
simple string or icon

oraListenerNumberOfServices

Syntax
INTEGER (0..2147483647)

Max-Access
read-only

Explanation
Indicates the number of different types of services, dedicated server, dispatcher, or prespawned shadow, configured with the listener:

Typical Range
1 - 25, depending on the configuration parameters

Significance
less important

Related Variables
none

Suggested Presentation
simple string

oraListenerContact

Syntax
DisplayString

Max-Access
read-write

Explanation
Free-form text providing contact information for this managed listener, including name, telephone number, email address, for example. This value is retrieved from the snmp.contact.*listener_name* parameter of the SNMP.ORA configuration file.

Range
0 - 255 characters

Significance
less important

Related Variables
none

Suggested Presentation
simple string

oraSIDTable

The oraSIDTable contains information about the status of connections to a current database instance. This information is important to monitor in order to ensure that clients seeking access to a database have that opportunity.

Each entry in the oraSIDTable represents a current database instance for whom the listener listens. Each entry is indexed by oraSIDName.

Table B–2 lists the variables included in the oraSIDTable.

Table B–2   oraSIDTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraSIDListenerIndex	1.3.6.1.4.1.111.5.1.5.1.1
oraSIDName	1.3.6.1.4.1.111.5.1.5.1.2
oraSIDCurrentConnectedClients	1.3.6.1.4.1.111.5.1.5.1.3
oraSIDReservedConnections	1.3.6.1.4.1.111.5.1.5.1.4

A description of each of these variables follows.

oraSIDListenerIndex

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
A numeric index, unique among all of the generic listeners on the managed node, that associates a listener with a database it listens on. This value is retrieved from the snmp.index.*listener_name* parameter of the SNMP.ORA configuration file.

Typical Range
varies, depending on the value set in the snmp.index.*listener-name* field of the SNMP.ORA configuration file

Significance
very important

Related Variables
oraListenerIndex

Suggested Presentation
not applicable

oraSIDName

Syntax
DisplayString

Max-Access
read-only

Explanation
A unique name identifying a database instance. This SID is in the definition of the listener, as retrieved from the SID_NAME parameter of the LISTENER.ORA configuration file. oraSIDName serves as the primary index in the oraDedicatedSrvTable, oraDispatcherTable, and oraPrespawnedSrvTable; thus, an entry for any dispatcher, dedicated server or prespawned server which listens for the database instance identified by oraSIDName can be found.

Typical Range
1 - 25 characters (physical limit is 255 characters)

Significance
very important

Related Variables
oraDedicatedSrvIndex, oraDispatcherIndex, oraPrespawnedSrvIndex

Suggested Presentation
simple string or icon

oraSIDCurrentConnectedClients

Syntax
Gauge32

Max-Access
read-only

Explanation
Indicates the total number of clients currently connected through prespawned shadows and dispatchers to this database instance, as retrieved from an internal Listener table. When the value of oraSIDCurrentConnectedClients is approaching the value of oraSIDReservedConnections, the number of connection requests to this

database instance is reaching the threshold (the reserved number of connections for clients on this database instance).

When the value of oraSIDCurrentConnectedClients equals the value of oraSIDReservedConnections, the incoming connection requests are redirected to dedicated servers. This may not be desirable, as a dedicated server requires more system resources than does a dispatcher or prespawned shadow.

Typical Range
0 - value of oraSIDReservedConnections

Significance
very important

Related Variables
 oraDispatcherCurrentConnections, oraPrespawnedSrvCurrentConnections

Suggested Presentation
gauge

oraSIDReservedConnections

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the total number of reserved connections for clients through prespawned shadows and dispatchers to this database instance.

Typical Range
0 - 1,000, depending on the number of dispatcher and prespawned shadow processes for the database

Significance
very important

Related Variables
oraDispatcherMaximumConnections, oraSIDCurrentConnectedClients

Suggested Presentation
gauge

oraDedicatedSrvTable

The oraDedicatedSrvTable contains information about the dedicated servers provided by the managed listener. A dedicated server is a process that executes Oracle server code on behalf of a particular database user process. Monitoring a dedicated server is important in order to ensure that clients seeking access to a database have that opportunity.

Each entry in the oraDedicatedSrvTable represents a dedicated server associated with a current database instance on the managed node. Each entry is indexed first by oraSIDName, and then by oraDedicatedSrvIndex; thus, there can be a one-to-many relationship between a current database instance and the dedicated servers associated with it. By indexing first by oraSIDName, all dedicated servers associated with a given SID can be found using SNMP traversal operations (get-next and get-bulk). The current value of each oraDedicatedSrvTable variable is retrieved from internal listener buffers.

Table B–3 lists the variables included in the oraDedicatedSrvTable.

Table B–3   oraDedicatedSrvTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraDedicatedSrvIndex	1.3.6.1.4.1.111.5.1.2.1.1
oraDedicatedSrvEstablishedConnections	1.3.6.1.4.1.111.5.1.2.1.2
oraDedicatedSrvRejectedConnections	1.3.6.1.4.1.111.5.1.2.1.3

A description of each of these variables follows.

oraDedicatedSrvIndex

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
A numeric index, unique among all the dedicated servers, as retrieved from an
internal listener table.

Typical Range
1 - 5, depending on the number of database instances for whom this listener listens

Significance
very important

Related Variables
oraSIDName

Suggested Presentation
not applicable

oraDedicatedSrvEstablishedConnections

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates how many incoming connection requests this dedicated server has
accepted since startup of this managed listener, as retrieved from an internal listener
table.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
oraDedicatedSrvRejectedConnections, oraDispatcherRejectedConnections,
oraPrespawnedSrvRejectedConnections

Suggested Presentation
counter

oraDedicatedSrvRejectedConnections

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates how many incoming connection requests this dedicated server has rejected since startup of this managed listener, as retrieved from an internal listener table.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
oraDedicatedSrvEstablishedConnections

Suggested Presentation
counter

oraDispatcherTable

The oraDispatcherTable contains information on the dispatchers provided by the managed listener. A dispatcher is an optional background process present only when a multi-threaded server configuration is used. Monitoring a dispatcher is important in order to ensure that clients seeking access to a database have that opportunity.

Each entry in the oraDispatcherTable represents a dispatcher associated with a current database instance. Each entry is indexed first by oraSIDName, and then by oraDispatcherIndex; thus, there can be a one-to-many relationship between a database instance and the dispatcher processes serving it. Using this indexing method, all dispatchers associated with a given SID can be found by SNMP traversal operations (get-next and get-bulk). The current value of most oraDispatcherTable variables is retrieved from internal listener tables.

Table B–4 lists the variables included in the oraDispatcherTable.

Table B–4   oraDispatcherTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraDispatcherIndex	1.3.6.1.4.1.111.5.1.3.1.1
oraDispatcherEstablishedConnections	1.3.6.1.4.1.111.5.1.3.1.2
oraDispatcherRejectedConnections	1.3.6.1.4.1.111.5.1.3.1.3
oraDispatcherCurrentConnections	1.3.6.1.4.1.111.5.1.3.1.4
oraDispatcherMaximumConnections	1.3.6.1.4.1.111.5.1.3.1.5
oraDispatcherState	1.3.6.1.4.1.111.5.1.3.1.6
oraDispatcherProtocolInfo	1.3.6.1.4.1.111.5.1.3.1.7

A description of each of these variables follows.

OraDispatcherIndex

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
A numeric index, unique among all the dispatchers, as retrieved from an internal listener buffer.

Typical Range
1 - 5, depending on the number of dispatchers configured for the database instance

Significance
very important

Related Variables
none

Suggested Presentation
not applicable

oraDispatcherEstablishedConnections

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates how many incoming connection requests this dispatcher has accepted since startup of this managed listener, as retrieved from an internal listener buffer.

When the value of oraDispatcherEstablishedConnections approaches the value of oraDispatcherMaximumConnections, this dispatcher is reaching the threshold (the greatest number of connection requests that can be accepted).

Typical Range
0 - value of oraDispatcherMaximumConnections

Significance
very important

Related Variables
oraDedicatedSrvEstablishedConnections, oraDispatcherMaximumConnections, oraDispatcherRejectedConnections, oraPrespawnedSrvEstablishedConnections

Suggested Presentation
counter

oraDispatcherRejectedConnections

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates how many incoming connection requests this dispatcher has rejected since startup of this managed listener, as retrieved from an internal listener table.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
oraDedicatedSrvEstablishedConnections, oraDispatcherEstablishedConnections,
oraDispatcherState, oraPrespawnedSrvEstablishedConnections

Suggested Presentation
counter

oraDispatcherCurrentConnections

Syntax
Gauge32

Max-Access
read-only

Explanation
Indicates the number of connection requests this dispatcher is currently redirecting,
as retrieved from an internal listener table. Monitoring
oraDispatcherCurrentConnections and oraDispatcherMaximumConnections
together indicates the load/activity of the dispatcher.

Typical Range
0 - oraDispatcherMaximumConnections

Significance
very important

Related Variables
oraSIDCurrentConnectedClients, oraDispatcherMaximumConnections

Suggested Presentation
gauge

oraDispatcherMaximumConnections

Syntax
INTEGER (1..21474836647)

Max-Access
read-only

Explanation
Indicates the greatest number of connection requests that this dispatcher can accept, as retrieved from an internal listener table.

Typical Range
0 - value of oraSIDReservedConnections

Significance
very important

Related Variables
oraDispatcherCurrentConnections, oraSIDReservedConnections

Suggested Presentation
gauge

oraDispatcherState

Syntax
INTEGER (1) blocked, or (2) ready.

Max-Access
read-only

Explanation
Indicates the current state of this dispatcher, as retrieved from an internal listener table. The BLOCKED value (1) indicates that the dispatcher is temporarily not accepting redirected connection requests. The READY value (2) indicates that this dispatcher is ready to accept any redirected connection requests.

Typical Range
enumerated 1 or 2

Significance
very important

Related Variables
oraDispatcherRejectedConnections

Suggested Presentation
icon or simple string

oraDispatcherProtocolInfo

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates the protocol for which this dispatcher listens, as well as protocol-specific information.

Typical Range
1 - 255 characters

Significance
important

Related Variables
none

Suggested Presentation
simple string or icon

oraPrespawnedSrvTable

The oraPrespawnedSrvTable contains information on the prespawned servers provided by the managed listener associated with the current database instance. A prespawned server is an optional shadow process created when the listener is started, and then available for making connections to the database. Prespawned servers reduce connect time by eliminating the need to spawn a shadow for each new connect request. Monitoring a prespawned server is important in order to ensure that clients seeking access to a database have that opportunity.

Each entry in the oraPrespawnedSrvTable represents a prespawned server associated with a current database instance. Each entry is indexed first by oraSIDName, and then by oraPrespawnedSrvIndex; thus, there can be a one-to-many relationship between a database instance and the prespawned servers serving it. Using this indexing method, all prespawned servers associated with a

given SID can be found by SNMP traversal operations (get-next and get-bulk). The current value of most oraPrespawnedSrvTable variables is retrieved from internal listener buffers.

Table B–5 lists the variables included in the oraPrespawnedSrvTable.

Table B–5   oraPrespawnedSrvTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraPrespawnedSrvIndex	1.3.6.1.4.1.111.5.1.4.1.1
oraPrespawnedSrvEstablishedConnections	1.3.6.1.4.1.111.5.1.4.1.2
oraPrespawnedSrvRejectedConnections	1.3.6.1.4.1.111.5.1.4.1.3
oraPrespawnedSrvCurrentConnections	1.3.6.1.4.1.111.5.1.4.1.4
oraPrespawnedSrvMaximumConnections	1.3.6.1.4.1.111.5.1.4.1.5
oraPrespawnedSrvState	1.3.6.1.4.1.111.5.1.4.1.6
oraPrespawnedSrvProtocolInfo	1.3.6.1.4.1.111.5.1.4.1.7
oraPrespawnedSrvProcessorID	1.3.6.1.4.1.111.5.1.4.1.8

A description of each of these variables follows.

oraPrespawnedSrvIndex

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
A numeric index, unique among the prespawned servers configured for this managed listener, as retrieved from an internal listener table.

Typical Range
1 - 1,000, depending on the number of prespawned shadows configured

Significance
very important

Related Variables
none

Suggested Presentation
not applicable

oraPrespawnedSrvEstablishedConnections

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates how many incoming connection requests have been accepted by the prespawned server since its startup, as retrieved from an internal listener table.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
none

Suggested Presentation
counter

oraPrespawnedSrvRejectedConnections

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of connection requests this prespawned server has rejected since its startup, as retrieved from an internal listener table. If the value of

oraPrespawnedSrvRejectedConnections is creeping up, oraPrespawnedState should be monitored.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
oraDedicatedSrvEstablishedConnections,
oraPrespawnedSrvEstablishedConnections, oraPrespawnedSrvState

Suggested Presentation
counter

oraPrespawnedSrvCurrentConnections

Syntax
Gauge32

Max-Access
read-only

Explanation
Indicates how many incoming connection requests currently being redirected by the prespawned server since startup of this managed listener, as retrieved from an internal listener table.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
oraPrespawnedSrvMaximumConnections

Suggested Presentation
gauge

oraPrespawnedSrvMaximumConnections

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
Indicates the greatest number of connection requests that this prespawned server can accept. The Listener updates this value in real time.

Typical Range
0 - 1,000, depending on the configuration

Significance
very important

Related Variables
oraPrespawnedSrvCurrentConnections

Suggested Presentation
gauge

oraPrespawnedSrvState

Syntax
INTEGER (1) blocked, or (2) ready.

Max-Access
read-only

Explanation
Indicates the current state of the prespawned server, as retrieved from an internal listener table. The BLOCKED value (1) indicates that the prespawned server is temporarily not accepting redirected connection requests. The READY option (2) indicates that the prespawned server is ready to accept any redirected connection requests.

Typical Range
enumerated 1 or 2

Significance
very important

Related Variables
oraPrespawnedSrvRejectedConnection

Suggested Presentation
alarm or icon

oraPrespawnedSrvProtocolInfo

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates the protocol on which this prespawned server listens, as well as protocol-specific information. This information is retrieved from an internal Listener table.

Typical Range
1 - 255 characters

Significance
important

Related Variables
none

Suggested Presentation
simple string or icon

oraPrespawnedSrvProcessorID

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates the process ID of the prespawned server, as retrieved from an internal
listener table.

Typical Range
1 - 10, depending on the O/S (physical limit is 255 characters)

Significance
less important

Related Variables
none

Suggested Presentation
simple string

oraListenAddressTable

The oraListenAddressTable contains the addresses on which the listener is listening.
These addresses are important to monitor when a Listener cannot come up during
startup; these addresses can then be examined for the proper format.

Each entry in the oraListenAddressTable represents an address on which a given
active listener is listening. Each entry is indexed first by oraListenerIndex, and then
by oraListenAddressIndex; thus, there can be a one-to-many relationship between a
listener and the addresses on which it is listening.

Table B–6 lists the variables included in the oraListenAddressTable.

Table B–6   oraListenAddressTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraListenAddressIndex	1.3.6.1.4.1.111.5.1.6.1.1
oraListenAddress	1.3.6.1.4.1.111.5.1.6.1.2

A description of each of these variables follows.

oraListenAddressIndex

Syntax
INTEGER (1..2147483647)

Max-Access
read-only

Explanation
A numeric index, unique among all of the addresses on which the listener is
listening, as retrieved from an internal listener table.

Typical Range
1 - 5, depending on configuration

Significance
important

Related Variables
oraListenAddress, oraListenIndex

Suggested Presentation
not applicable

oraListenAddress

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates an address on which this listener is listening, as retrieved from the
ADDRESS section of the LISTENER.ORA configuration file.

Typical Range
1 - 255 characters

Significance
important

Related Variables
oraListenerIndex

Suggested Presentation
simple string

oraListenerTraps

Table B–7 lists the oraListenerTraps variable.

Table B–7   oraListenerTraps Variable and Corresponding Object ID

Variable Name	Object ID
oraListenerStateChange	1.3.6.1.4.1.111.5.2.1.1.1

A description of this variable follows.

oraListenerStateChange

Objects
{oraListenerState }

Explanation
Indicates that one of the listeners managed by this agent has changed its
listenerState in a way that makes it less accessible for use.

Typical Range
2 (only)

Significance
very important

Related Variables
oraListenerState

Suggested Presentation
alarm

C

Interpreting Variables of the Oracle Names MIB

This appendix provides information to help you interpret the variables of the private Oracle Names MIB which are implemented in this release. Specifically, it includes sections covering SNMP variables in the following tables:

- oraNamesTNSTable
- oraNamesConfigTable
- oraNamesServerTable

For more information about the Oracle Names product, refer to the *Oracle Net Services Administrator's Guide.* For a listing of all variables in the Oracle Names MIB, including those not implemented in this release, see the MIB itself.

oraNamesTNSTable

The oraTNSTable contains variables which could be common to all applications running on Oracle Net. Oracle Net is Oracle's remote data access software that enables both client/server and server/server communications across any network. Monitoring these variables is useful in order to obtain basic (mostly static) information about the Oracle Names application.

Each entry in the oraNamesTNSTable represents a given active Oracle Net application located on the managed node. (In this case, that application is Oracle Names.) Each entry is indexed by applIndex. (For details about applIndex, see Appendix E, "Interpreting Implemented Variables of the Network Services MIB") The current value of each oraNamesTNSTable variable is retrieved from an internal table or from a corresponding field in the NAMES.ORA configuration file on the managed node.

Appendix C–1 lists each of these variables and its corresponding object ID.

Table C–1   oraNamesTNSTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraNamesTNSStartDate*	1.3.6.1.4.1.111.6.1.1.1.1
oraNamesTNSTraceLevel	1.3.6.1.4.1.111.6.1.1.1.2
oraNamesTNSSecurityLevel*	1.3.6.1.4.1.111.6.1.1.1.3
oraNamesTNSParameterFile	1.3.6.1.4.1.111.6.1.1.1.4
oraNamesTNSLogFile	1.3.6.1.4.1.111.6.1.1.1.5
oraNamesTNSTraceFile	1.3.6.1.4.1.111.6.1.1.1.6
oraNamesTNSState*	1.3.6.1.4.1.111.6.1.1.1.7
oraNamesTNSContact	1.3.6.1.4.1.111.6.1.1.1.8
oraNamesTNSListenAddresses*	1.3.6.1.4.1.111.6.1.1.1.9
oraNamesTNSFailedListenAddresses*	1.3.6.1.4.1.111.6.1.1.1.10
oraNamesTNSReload	1.3.6.1.4.1.111.6.1.1.1.11
oraNamesTNSRunningTime	1.3.6.1.4.1.111.6.1.1.1.12

* Variables marked with an asterisk are not supported.
  Attempts to access these variables may result in errors.

A description of each of these variables follows.

oraNamesTNSTraceLevel

Syntax
Integer32

Max-Access
read-write

Explanation
Indicates the amount and granularity (if any) of trace messages the server writes to its trace file. The higher the number, the more verbose the tracing information. Enumerated levels include 4 (user) and 6 (admin) or 17 (off). The value of this variable is retrieved from the NAMES.TRACE_LEVEL field of the NAMES.ORA file.

Typical Range
enumerated 1 - 17

Significance
less important

Related Variables
oraNamesTNSParameterFile, oraNamesTNSTraceFile

Suggested Presentation
simple string

oraNamesTNSParameterFile

Syntax
DisplayString

Max-Access
read-write

Explanation
Indicates the name of the startup file containing all site-specific configuration/
tuning settings for this server.

Typical Range
any legal filename

Significance
less important

Related Variables
oraNamesTNSListenAddresses, oraNamesTNSLogFile, oraNamesTNSTraceFile,
onsrTNSTraceLevel

Suggested Presentation
simple string

oraNamesTNSLogFile

Syntax
DisplayString

Max-Access
read-write

Explanation
Indicates the name of the file to which this server writes log information concerning normal events, errors, and possibly periodic statistical dumps.

Typical Range
any legal filename

Significance
less important

Related Variables
oraNamesTNSParameterFile

Suggested Presentation
simple string

oraNamesTNSTraceFile

Syntax
DisplayString

Max-Access
read-write

Explanation
Indicates the name of the file to which this server writes trace information when tracing is enabled. Such trace information includes internal details about this server's operation, for use in solving operational problems.

Typical Range
any legal filename

Significance
less important

Related Variables
oraNamesTNSParameterFile, oraNamesTNSTraceLevel

Suggested Presentation
simple string

oraNamesTNSContact

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates the person to contact regarding the operation or administration of this server, together with information on how to contact this person.

Typical Range
0 - 255 characters

Significance
less important

Related Variables
oraNamesTNSState

Suggested Presentation
simple string

oraNamesTNSReload

Syntax
TimeTicks

Max-Access
read-write

Explanation
Indicates the amount of time (in centiseconds) until this server reloads. This variable can be used to automatically reload this server or show when reload will occur. Reloading enables the server to reread parameter files, network definitions, and reset statistics, for example. When set to 0, the server reloads immediately.

Typical Range
0 - 4294967296 centiseconds

Significance
less important

Related Variables
oraNamesConfigTable, oraNamesTNSRunningTime, oraNamesTNSState

Suggested Presentation
stopwatch

oraNamesTNSRunningTime

Syntax
Integer32

Max-Access
read-only

Explanation
Indicates the amount of time (in seconds) that the server has been running. This variable can be used as a statistical baseline for evaluating counters and running averages.

Typical Range
0 - 2147483647

Significance
very important

Related Variables
oraNamesServerTable variables

Suggested Presentation
stopwatch

oraNamesConfigTable

The oraNamesConfigTable contains information on those Oracle Names server configuration parameters that are not included in the oraNamesTNSTable.

Monitoring this information is important in order to characterize the operation of the Oracle Names server.

Each entry in the oraNamesConfigTable represents a given active Oracle Net application on the node. Each entry is indexed by applIndex. (For details about applIndex, see Appendix E, "Interpreting Implemented Variables of the Network Services MIB") The current value of each oraNamesConfigTable variable is retrieved directly from a corresponding field in the NAMES.ORA configuration file on the managed node.

Table C–2 lists each of the variables implemented in this release, together with its corresponding object ID.

Table C–2   oraNamesConfigTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraNamesConfigAdminRegion	1.3.6.1.4.1.111.6.1.2.1.1
oraNamesConfigAuthorityRequired	1.3.6.1.4.1.111.6.1.2.1.2
oraNamesConfigAutoRefreshExpire	1.3.6.1.4.1.111.6.1.2.1.3
oraNamesConfigAutoRefreshRetry	1.3.6.1.4.1.111.6.1.2.1.4
oraNamesConfigCacheCheckpointFile	1.3.6.1.4.1.111.6.1.2.1.5
oraNamesConfigCacheCheckpointInterval	1.3.6.1.4.1.111.6.1.2.1.6
oraNamesConfigConfigCheckpointFile*	1.3.6.1.4.1.111.6.1.2.1.7
oraNamesConfigDefaultForwarders*	1.3.6.1.4.1.111.6.1.2.1.8
oraNamesConfigDefaultForwardersOnly	1.3.6.1.4.1.111.6.1.2.1.9
oraNamesConfigDomainCheckpointFile*	1.3.6.1.4.1.111.6.1.2.1.10
oraNamesConfigDomainHints*	1.3.6.1.4.1.111.6.1.2.1.11
oraNamesConfigDomains*	1.3.6.1.4.1.111.6.1.2.1.12
oraNamesConfigForwarding-Available	1.3.6.1.4.1.111.6.1.2.1.13
oraNamesConfigForwardingDesired	1.3.6.1.4.1.111.6.1.2.1.14
oraNamesConfigLogDirectory*	1.3.6.1.4.1.111.6.1.2.1.15
oraNamesConfigLogStatsInterval	1.3.6.1.4.1.111.6.1.2.1.16
oraNamesConfigLogUnique*	1.3.6.1.4.1.111.6.1.2.1.17
oraNamesConfigMaxOpenConnections*	1.3.6.1.4.1.111.6.1.2.1.18
oraNamesConfigMaxReforwards	1.3.6.1.4.1.111.6.1.2.1.19

Table C–2   oraNamesConfigTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraNamesConfigMessagePool-StartSize*	1.3.6.1.4.1.111.6.1.2.1.20
oraNamesConfigNoModifyRequests	1.3.6.1.4.1.111.6.1.2.1.21
oraNamesConfigNoRegionDatabase*	1.3.6.1.4.1.111.6.1.2.1.22
oraNamesConfigResetStatsInterval	1.3.6.1.4.1.111.6.1.2.1.23
oraNamesConfigServerName	1.3.6.1.4.1.111.6.1.2.1.24
oraNamesConfigTopologyCheckpointFile*	1.3.6.1.4.1.111.6.1.2.1.25
oraNamesConfigTraceDirectory*	1.3.6.1.4.1.111.6.1.2.1.26
oraNamesConfigTraceFunc*	1.3.6.1.4.1.111.6.1.2.1.27
oraNamesConfigTraceMask*	1.3.6.1.4.1.111.6.1.2.1.28
oraNamesConfigTraceUnique*	1.3.6.1.4.1.111.6.1.2.1.29

* Variables marked with an asterisk are not supported.
   Attempts to access these variables may result in errors.

A description of each of these variables follows.

oraNamesConfigAdminRegion

Syntax
DisplayString

Max-Access
read-write

Explanation
Indicates the name of the Administrative Region which this server serves. Identifies which area of the namespace is the responsibility of this server and the location of the network definition for the region.

Typical Range
any valid region name

Significance
important

Related Variables
none

Suggested Presentation
simple string

oraNamesConfigAuthorityRequired

Syntax
TruthValue

Max-Access
read-write

Explanation
TRUE indicates that this server requires an authoritative answer to system query requests that it generates. FALSE results in faster, but less reliable answers to the server's inquiries. Requests with Authority Required cannot be answered by a non-authoritative server out of its cache.

Typical Range
true/false

Significance
less important

Related Variables
oraNamesConfigDomainHints, oraNamesConfigDomains

Suggested Presentation
simple string

oraNamesConfigAutoRefreshExpire

Syntax
TimeTicks

Max-Access
read-write

Explanation
A running Oracle Names server periodically checks its network definition to see if it has been updated. If a check fails, the Oracle Names server retries for the period of time set in AutoRefreshExpire. In this case, the server continues operation using its current network definition, until it finds it needs to update. The default is 72 hours.

Typical Range
1 minute - ~ 3 months

Significance
less important

Related Variables
oraNamesConfigAutoRefreshRetry, oraNamesConfigAdminRegion, oraNamesTNSParameterFile

Suggested Presentation
date/time countdown with knob adjuster, or hourglass with slide adjuster

oraNamesConfigAutoRefreshRetry

Syntax
TimeTicks

Max-Access
read-write

Explanation
A running Oracle Names server periodically checks its network definition to see if it has been updated. If a check fails, the Oracle Names server retries with the frequency set in AutoRefreshRetry. In this case, the server continues operation using its current network definition, until it finds it needs to update. The default is three minutes.

Typical Range
1 minute - 10 hours

Significance
less important

Related Variables
oraNamesConfigAutoRefreshExpire, oraNamesConfigAdminRegion,
oraNamesTNSParameterFile

Suggested Presentation
knob or slide (a reostat, for example)

oraNamesConfigCacheCheckpointFile

Syntax
DisplayString

Max-Access
read-write

Explanation
The Oracle Names server periodically writes its cache to disk and then reads the
cache on startup. The value of oraNamesConfigCacheCheckpointFile is the filename
of the file to which this cache is written. Any data in this file which is still valid
(positive time to live) is retained when the new server is started up.

Typical Range
any legal filename

Significance
less important

Related Variables
none

Suggested Presentation
simple string

oraNamesConfigCacheCheckpointInterval

Syntax
TimeTicks

Max-Access
read-write

Explanation
Indicates the amount of time between cache checkpoints. If the value of
oraNamesConfigCacheCheckpointInterval is greater than 0, the server writes its
cache at the specified frequency. When the server is started again, any foreign data
in the cache which is still valid (positive time to live) will be retained. If set to 0 (the
default), then checkpointing is disabled, and any foreign data is lost when the
server is stopped.

Typical Range
0 - 3 days

Significance
less important

Related Variables
oraNamesConfigCacheCheckpointFile, oraNamesTNSParameterFile

Suggested Presentation
simple string

oraNamesConfigDefaultForwardersOnly

Syntax
TruthValue

Max-Access
read-write

Explanation
TRUE indicates that this server is to operate in DEFAULT-FORWARDERS-ONLY
mode. A server in this mode must have at least one default forwarder. The server
then operates in slave mode, forwarding all foreign requests to at least one default
forwarder, whether or not it has server information that might be more accurate.
This feature provides for administrative optimization, by presuming that a high
percentage of foreign requests are for names in the vicinity of the
DefaultForwarders.

FALSE indicates that the server operates normally, that is, foreign requests are
passed to subdomain servers if the name should reside there, or to the root.

Typical Range
true/false

Significance
less important

Related Variables
oraNamesConfigDefaultForwarders, oraNamesTNSParameterFile

Suggested Presentation
simple string

oraNamesConfigForwardingAvailable

Syntax
TruthValue

Max-Access
read-write

Explanation
Servers that do not forward will not handle the request for clients, but may refer
them to other regions. Referral is only possible when the requestor is another names
server; regular clients cannot handle referrals. Servers that do not forward cut their
work in half (at the exepense of the requestor) by "staying out of the middle."
FALSE is the default, and is only intended for regions which have no domain data,
typically the root domain. TRUE indicates that this server is willing to forward
requests for data for which it is not authoritative.

Typical Range
true/false

Significance
important

Related Variables
oraNamesTNSParameterFile

Suggested Presentation
simple string

oraNamesConfigForwardingDesired

Syntax
TruthValue

Max-Access
read-write

Explanation
TRUE indicates that this server desires other servers to forward requests which this server generates on its own. Requests which this server forwards have Forwarding Desired set by the original requestor. This server can reduce its load by a factor of the number of hops to an authoritative server if the intermediate servers are willing to forward the request, rather than refer the requestor to the next-nearest server.

Typical Range
true/false

Significance
less important

Related Variables
oraNamesTNSParameterFile

Suggested Presentation
simple string

oraNamesConfigLogStatsInterval

Syntax
TimeTicks

Max-Access
read-write

Explanation
Indicates the interval (in centiseconds) at which server statistic counters (a subset of Oracle Names MIB variables) are written to the log file. The default is 0, indicating that no variables are logged.

Typical Range
0 - 1 day

Significance
less important

Related Variables
oraNamesTNSLogFile, oraNamesTNSParameterFile

Suggested Presentation
simple string

oraNamesConfigMaxReforwards

Syntax
Integer32

Max-Access
read-write

Explanation
The server keeps a count of the number of times a given forwarded query returns
with a referral to a closer name server. When the number of referrals exceeds
oraNamesConfigMaxReforwards, the query is cancelled and an error is returned to
the requestor. Higher settings make the server more persistent in resolving failed
queries; lower settings will save the server time and reduce traffic (probably trivial).

Typical Range
1 - 15

Significance
less important

Related Variables
oraNamesTNSParameterFile

Suggested Presentation
simple string

oraNamesConfigNoModifyRequests

Syntax
TruthValue

Max-Access
read-write

Explanation
When this value is set "ON", the server refuses any requests to modify its region data.

Typical Range
true or false

Significance
Less important. Not relevant to version 2.2 of Oracle Names. When insert, update, and delete support are added in subsequent versions, this variable will enable and disable the modification of region data.

Related Variables
oraTNSParameterFile

Suggested Presentation
simple string

oraNamesConfigResetStatsInterval

Syntax
TimeTicks

Max-Access
read-write

Explanation
Indicates the interval (in centiseconds) at which all server statistic counters are reset back to zero. This parameter enables administrators to automatically reset all MIB statistics at a specified frequency without disrupting the operation of the server. If set to 0, statistics are never reset.

Typical Range
0 or 10 - 4294967295 centiseconds

Significance
less important

Related Variables
oraNamesConfigLogStatsInterval, oraNamesTNSParameterFile

Suggested Presentation
simple string

oraNamesConfigServerName

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates this server's name, as defined in the Network definition. Every service has a unique domain-qualified name.

Typical Range
any valid service name

Significance
important

Related Variables
oraNamesTNSParameterFile

Suggested Presentation
simple string

oraNamesServerTable

The oraNamesServerTable contains variables which describe the current operational status of the Oracle Names server. Monitoring these measures is important to ensure that the server is up and fully functional.

Each entry in the oraNamesServerTable represents a given active Oracle Name Resolution Server on the node. Each entry is indexed by applIndex. (For details about applIndex, see Appendix E, "Interpreting Implemented Variables of the Network Services MIB.") The current value of each oraNamesServerTable variable is retrieved from internal tables of this Oracle Names server.

Table C–3 lists each of the variables implemented in this release, together with its corresponding object ID.

Table C–3   oraNamesServerTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraNamesServerQueriesReceived	1.3.6.1.4.1.111.6.1.3.1.1
oraNamesServerLastNnamesNotFound*	1.3.6.1.4.1.111.6.1.3.1.2
oraNamesServerQueriesTotalTime	1.3.6.1.4.1.111.6.1.3.1.3
oraNamesServerDeletesReceived*	1.3.6.1.4.1.111.6.1.3.1.4
oraNamesServerDeletesRefused*	1.3.6.1.4.1.111.6.1.3.1.5
oraNamesServerDeletesTotalTime*	1.3.6.1.4.1.111.6.1.3.1.6
oraNamesServerRenamesReceived*	1.3.6.1.4.1.111.6.1.3.1.7
oraNamesServerRenamesRefused*	1.3.6.1.4.1.111.6.1.3.1.8
oraNamesServerRenamesTotalTime*	1.3.6.1.4.1.111.6.1.3.1.9
oraNamesServerUpdatesReceived*	1.3.6.1.4.1.111.6.1.3.1.10
oraNamesServerUpdatesRefused*	1.3.6.1.4.1.111.6.1.3.1.11
oraNamesServerUpdatesTotalTime*	1.3.6.1.4.1.111.6.1.3.1.12
oraNamesServerCorruptMessagesReceived	1.3.6.1.4.1.111.6.1.3.1.13
oraNamesServerResponsesSent	1.3.6.1.4.1.111.6.1.3.1.14
oraNamesServerErrorResponsesSent*	1.3.6.1.4.1.111.6.1.3.1.15
oraNamesServerAliasLoopsDetected	1.3.6.1.4.1.111.6.1.3.1.16
oraNamesServerLookupsAttempted	1.3.6.1.4.1.111.6.1.3.1.17
oraNamesServerCreatedOnLookup	1.3.6.1.4.1.111.6.1.3.1.18
oraNamesServerLookupFailures	1.3.6.1.4.1.111.6.1.3.1.19
oraNamesServerExactMatches	1.3.6.1.4.1.111.6.1.3.1.20
oraNamesServerForwardFailures	1.3.6.1.4.1.111.6.1.3.1.21
oraNamesServerForwardTimeouts	1.3.6.1.4.1.111.6.1.3.1.22
oraNamesServerResponsesReceived	1.3.6.1.4.1.111.6.1.3.1.23
oraNamesServerErrorResponsesReceived*	1.3.6.1.4.1.111.6.1.3.1.24
oraNamesServerRequestsForwarded	1.3.6.1.4.1.111.6.1.3.1.25

Table C–3   oraNamesServerTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraNamesServerLastReload*	1.3.6.1.4.1.111.6.1.3.1.26
oraNamesServerReloadCheck-Failures	1.3.6.1.4.1.111.6.1.3.1.27
oraNamesServerLastCheckpoint*	1.3.6.1.4.1.111.6.1.3.1.28
oraNamesServerName	1.3.6.1.4.1.111.6.1.3.1.29
oraNamesServerAdminRegion	1.3.6.1.4.1.111.6.1.3.1.30

* Variables marked with an asterisk are not supported.
  Attempts to access these variables may result in errors.

A description of each of these variables follows.

oraNamesServerQueriesReceived

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of query requests received by this server. Serves as an indicator of the overall load on this server.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
oraNamesServerLastNnamesNotFound,
oraNamesServerQueriesTotalTime

Suggested Presentation
rolling counter

oraNamesServerQueriesTotalTime

Syntax
TimeTicks

Max-Access
read-only

Explanation
Indicates the total time spent processing query requests (in centiseconds), including the time it takes to forward the request and get an answer. In the current version (2.2), this represents all of the server's primary activity. When delete/rename/update are supported, this variable describes the query processing load relative to the load from requests of the other three types.

Typical Range
0 - 4294967295 centiseconds

Significance
important

Related Variables
oraNamesServerQueriesReceived

Suggested Presentation
simple string

oraNamesServerCorruptMessagesReceived

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of corrupted messages this server has received. A corrupt message indicates either that a bug exists in the client or network transport, or that the caller does not intend to be calling an Oracle Names server (wrong number). The second cause is more likely, and indicates configuration inconsistencies.

Typical Range
0 - 4294967295

Significance
important

Related Variables
oraNamesServerQueriesReceived, oraNamesServerDeletesReceived,
oraNamesServerRenamesReceived, oraNamesServerUpdatesReceived,
oraNamesServerCorruptMessagesReceived, oraNamesServerResponsesReceived,
oraNamesServerErrorResponsesReceived

Suggested Presentation
rolling counter

oraNamesServerResponsesSent

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of responses of all sorts this server has sent. This variable is a
good general indicator of the cumulative load. The number of responses should
equal the sum of the requests received.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
oraNamesServerDeletesReceived, oraNamesServerQueriesReceived,
oraNamesServerRenamesReceived

Suggested Presentation
rolling counter

oraNamesServerAliasLoopsDetected

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of alias loops this server has detected. Alias loops are the result of improperly defined sets of domain data in two or more regions. Any alias loops should be corrected immediately.

Typical Range
0 - 10

Significance
important

Related Variables
none

Suggested Presentation
warning light for any non-zero value.

oraNamesServerLookupsAttempted

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the query load (number of name lookup operations) this server has performed.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
oraNamesServerCreatedOnLookup, oraNamesSeerverExactMatches
oraNamesServerLookupFailures

Suggested Presentation
rolling counter

oraNamesServerCreatedOnLookup

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of names created on lookup because they were not found.
Cache entries are created whenever the server receives a query for a certain name
for the first time. This value represents the degree of diversity of queries to foreign
regions. Higher values might indicate the need for tuning.

Typical Range
0 - 4294967295

Significance
important

Related Variables
oraNamesServerLookupsAttempted

Suggested Presentation
rolling counter

oraNamesServerLookupFailures

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of name lookups for a name not known to this server.
Frequent lookup failures might indicate configuration inconsistencies, in that clients
are looking for names in undefined domains.

Typical Range
0 - 4294967295

Significance
important

Related Variables
oraNamesServerLookupsAttempted

Suggested Presentation
rolling counter

oraNamesServerExactMatches

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the "hit rate," that is the number of name lookups resulting in an exact
match with information known to this server. This value includes both queries for
local region data and queries for foreign names which have already been cached.

Typical Range
0 - 4294967295

Significance
important

Related Variables
oraNamesServerLookupsAttempted, oraNamesServerLookupFailures

Suggested Presentation
rolling counter

oraNamesServerForwardFailures

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of forwarded requests which failed because no servers responded to the request. A high value indicates either that the names servers for some other regions are down, or that this server's topology data is incorrect.

Typical Range
0 - 4294967295

Significance
important

Related Variables
oraNamesServerRequestsForwarded

Suggested Presentation
rolling counter with siren

oraNamesServerForwardTimeouts

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of requests this server has forwarded which timed out waiting for a response. The cause might either be a high processing load at the foreign server, or some network-related delay.

Typical Range
0 - 4294967295

Significance
important

Related Variables
oraNamesServerRequestsForwarded

Suggested Presentation
rolling counter with siren

oraNamesServerResponsesReceived

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of responses this server has received. This value should match the number of requests forwarded, minus oraNamesServerForwardFailures and oraNamesServerForwardTimeouts.

Typical Range
0 - 4294967295

Significance
important

Related Variables
oraNamesServerRequestsForwarded

Suggested Presentation
rolling counter

oraNamesServerRequestsForwarded

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of requests that this server has forwarded because it is not authoritative for the requested name.

Typical Range
0 - 4294967295

Significance
important

Related Variables
oraNamesServerForwardFailure, oraNamesServerForwardTimeout, oraNamesServerErrorResponsesReceived

Suggested Presentation
rolling counter

oraNamesServerReloadCheckFailures

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the number of times this server has failed in a check to see whether the region data changed and needs reloading. Indicates that the source for this server's network definition is unavailable. These failures are likely to be innocuous, but could be the result of inaccurate configuration information for this Oracle Names server.

Typical Range
 0 - 4294967295

Significance
important

Related Variables
oraNamesConfigAdminRegion, oraNamesServerAdminRegionDescription

Suggested Presentation
rolling counter with siren

oraNamesServerName

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates this server's name, as printed in its start-up banner.

Typical Range
any valid server name

Significance
important

Related Variables
none

Suggested Presentation
simple string

oraNamesServerAdminRegion

Syntax
DisplayString

Max-Access
read-only

Explanation
This is a description that defines the server's region. It includes the region name
and the location of its network definition.

Typical Range
any valid region name

Significance
important

Related Variables
oraNamesConfigAdminRegion

Suggested Presentation
simple string

D

Interpreting Variables of the Public RDBMS MIB

This appendix provides information to help you interpret individual variables in the Oracle implementation of the public RDBMS MIB. Note that this appendix emphasizes Oracle's implementation. For information concerning other implementation alternatives for these variables, refer to MIB itself.

This appendix includes sections covering public RDBMS MIB variables that Oracle implements in the following tables

- rdbmsDbTable

- rdbmsDbInfoTable

- rdbmsSrvTable

- rdbmsSrvInfoTable

- rdbmsSrvParamTable

- rdbmsRelTable

- rdbmsTraps

Note that Oracle does not implement the following tables of the public RDBMS MIB:

- rdbmsDbParamTable

- rdbmsDbLimitedResourceTable

- rdbmsSrvLimitedResourceTable

Attempts to access any of the variables that Oracle is not implementing results in noSuchName (SNMPv1) or noSuchInstance (SNMPv2) being returned.

rdbmsDbTable

The rdbmsDbTable contains general information on each database installed on the managed node. Any installed database that has been configured for SNMP support, whether or not it is actively opened, is represented by a row in the rdbmsDbTable.

Each entry in the rdbmsDbTable represents a given database installed on the node. Each entry is indexed by rdbmsDbIndex. The current values of the rdbmsDbTable variables are retrieved from a variety of sources on the managed node.

Oracle implements all rdbmsDbTable variables; Table D–1lists each of them, together with its corresponding object ID.

Table D–1   rdbmsDbTable Variables and Corresponding Object IDs

Variable Name	Object ID
rdbmsDbIndex	1.3.6.1.2.1.39.1.1.1.1
rdbmsDbPrivateMIBOID	1.3.6.1.2.1.39.1.1.1.2
rdbmsDbVendorName	1.3.6.1.2.1.39.1.1.1.3
rdbmsDbName	1.3.6.1.2.1.39.1.1.1.4
rdbmsDbContact	1.3.6.1.2.1.39.1.1.1.5

rdbmsDbIndex

Syntax
INTEGER (1 - 2147483647)

Max-Access
not-accessible

Explanation
A numeric index, unique among all of the vendors' databases installed on this managed node. This value is a surrogate for the conceptually unique key, which is {vendorOID, databasename }. In the Oracle implementation, the value of this variable when not running Oracle Real Application Clusters is the value of rdbmsSrvIndex for this installed database server.

Typical Range
1 - 10

Significance
very important

Related Variables
rdbmsSrvIndex

Suggested Presentation
not applicable

rdbmsDbPrivateMIBOID

Syntax
OBJECT IDENTIFIER

Max-Access
read-only

Explanation
Displays the authoritative identification for the private MIB of this installed
database. In the Oracle implementation, the value of rdbmsDbVendorOID is
hardcoded as the root of Oracle's OID subtree (1.3.6.1.4.1.111).

Typical Range
1.3.6.1.4.1.111 (only)

Significance
very important

Related Variables
rdbmsSrvVendorOID

Suggested Presentation
simple string

rdbmsDbVendorName

Syntax
DisplayString

Max-Access
read-only

Explanation
Displays the name of the vendor whose RDBMS manages this installed database, for informational purposes. In the Oracle implementation, the value of this variable is hardcoded in the subagent as "Oracle."

Typical Range
6 characters (only)

Significance
important

Related Variables
rdbmsSrvVendorName

Suggested Presentation
icon or simple string

rdbmsDbName

Syntax
DisplayString

Max-Access
read-only

Explanation
Displays the name of this installed database, in product-specific format. In the Oracle implementation, the value of rdbmsDbName is retrieved from the DB__ NAME variable in SNMP.ORA. This name is globally unique and includes domain information.

Typical Range
5 - 25 characters

Significance
important

Related Variables
rdbmsSrvName

Suggested Presentation
icon or simple string

rdbmsDbContact

Syntax
DisplayString

Max-Access
read-write

Explanation
Displays the name of the contact person for this installed database, together with information indicating how to contact this person. In the Oracle implementation, the value of this variable is retrieved from the SNMP.ORA configuration file.

Typical Range
2 - 255 characters

Significance
important

Related Variables
rdbmsSrvContact

Suggested Presentation
simple string

rdbmsDbInfoTable

The rdbmsDbInfoTable contains additional general information about actively opened database instances on the managed node. If an installed database has been configured for SNMP support but is not actively opened, then attempts to access corresponding instances in this table may result in either noSuchName (SNMPv1), or noSuchInstance (SNMPv2). "Actively opened" is determined by the values of all the rdbmsRelState entries for this database in the rdbmsRelTable.

Each entry in the rdbmsDbInfoTable represents a particular actively opened database instance on the node. Each entry is indexed by rdbmsDbIndex. However, because rdbmsDbTable contains an entry for each database installed on that node, whether or not it is actively open, there may or may not be a one-to-one correspondence between entries in the two tables at any point in time. The current value of the rdbmsDbInfoTable variable are retrieved from a variety of sources on the managed node.

Table D–2 lists each rdbmsDbInfoTable variable that Oracle is implementing, together with its corresponding object ID.

Table D–2   rdbmsDbInfoTable Variables and Corresponding Object IDs

Variable Name	Object ID
rdbmsDbInfoProductName	1.3.6.1.2.1.39.1.2.1.1
rdbmsDbInfoVersion	1.3.6.1.2.1.39.1.2.1.2
rdbmsDbInfoSizeUnits	1.3.6.1.2.1.39.1.2.1.3
rdbmsDbInfoSizeAllocated	1.3.6.1.2.1.39.1.2.1.4
rdbmsDbInfoSizeUsed	1.3.6.1.2.1.39.1.2.1.5
rdbmsDbInfoLastBackup*	1.3.6.1.2.1.39.1.2.1.6

* Variables marked with an asterisk are not supported.
  Attempts to access these variables may result in errors.

Note that Oracle is not implementing rdbmsDbInfoLastBackup because Oracle allows individual tablespaces to be backed up; thus, the time of the last full database backup is not meaningful.

rdbmsDbInfoProductName

Syntax
DisplayString

Max-Access
read-only

Explanation
Displays the textual product name of the server that created or last restructured this database instance. In the Oracle implementation, the value of this variable is retrieved from the BANNER field in V$VERSION.

Typical Range
253 characters

Significance
important

Related Variables
rdbmsSrvProductName

Suggested Presentation
icon or simple string

rdbmsDbInfoVersion

Syntax
DisplayString

Max-Access
read-only

Explanation
Displays the version number of the server that created or last restructured this database instance. The format is specific to the product. In the Oracle implementation, the value of this variable is derived internally.

Typical Range
not applicable

Significance
important (depending on the application)

Related Variables
applVersion

Suggested Presentation
simple string

rdbmsDbInfoSizeUnits

Syntax
INTEGER (1) bytes, (2) kbytes, (3) mbytes, (4) gbytes, or (5) tbytes.

Max-Access
read-write

Explanation
Displays the units used to measure the size of this database instance, as indicated by the values for rdbmsDbInfoSizeAllocated and rdbmsDbInfoSizeUsed. In the Oracle implementation, the value of rdbmsDbInfoSizeUnits is the least that allows rdbmsDbInfoSizeAllocated to be expressed as a 32-bit integer.

(1) bytes, indicates size measured in bytes; (2) kbytes, indicates units of kilobytes; (3) mbytes, indicates units of megabytes; (4) gbytes, indicates units of gigabytes; or (5) tbytes, indicates units of terabytes. Each of these unit measurements are binary multiples (1K = 1024).

Typical Range
enumerated 1 - 5

Significance
very important

Related Variables
rdbmsDbInfoSizeAllocated, rdbmsDbInfoSizeUsed

Suggested Presentation
simple string

rdbmsDbInfoSizeAllocated

Syntax
INTEGER (1 - 2147483647)

Max-Access
read-write

Explanation
Displays the estimated size of this database instance (in rdbmsDbInfoSizeUnits), which is the disk space that has been allocated to it and is no longer available to users on this host. The rdbmsDbInfoSizeAllocated variable does not necessarily indicate the amount of space actually in use for database data; rdbmsDbInfoSizeUsed retrieves this value instead. In the Oracle implementation, the value of this variable is the sum of the BYTES field for the rows of the DBA_DATA_FILES tables.

Typical Range
1 - 2147483647

Significance
very important

Related Variables
rdbmsDbInfoSizeUnits, rdbmsDbInfoSizeUsed

Suggested Presentation
simple string or gauge

rdbmsDbInfoSizeUsed

Syntax
INTEGER (1 - 2147483647)

Max-Access
read-only

Explanation
Displays the estimated size of this database instance (in rdbmsDbInfoSizeUnits), actually in use for database data. In the Oracle implementation, the value of rdbmsDbInfoSizeUsed is the sum of values in the BYTES field of DBA_DATA_ FILES minus the sum of values in the BYTES field of DBA_FREE_SPACE. rdbmsDbInfoSizeUsed should always be less than or equal to rdbmsDbInfoSizeAllocated.

Typical Range
1 - 2147483647

Significance
very important

Related Variables
rdbmsDbInfoSizeAllocated, rdbmsDbInfoSizeUnits

Suggested Presentation
gauge

rdbmsSrvTable

The rdbmsSrvTable contains generic information on each database server installed on the managed node. In the standard Oracle configuration, one server supports

one database. Thus, while the content of rdbmsSrvTable essentially mirrors the content of rdbmsDbTable, Oracle has chosen to implement both tables in order to fully adhere to one of the central precepts of the public RDBMS MIB standard. This precept is that a distinction between the database and its server must be made, in order to account for other vendors' architectures.

Any installed database that has been configured for SNMP support, whether or not it is actively opened, is represented by a row in the rdbmsDbTable. Each entry in the rdbmsSrvTable represents a given database server on the node. Each entry is indexed by applIndex. The current value of each rdbmsSrvTable variable is retrieved directly from a variety of sources on the managed node.

Oracle implements all rdbmsSrvTable variables. Table D–3 lists each of them, together with its corresponding object ID.

Table D–3   rdbmsDbSrvTable Variables and Corresponding Object IDs

Variable Name	Object ID
rdbmsSrvPrivateMIBOID	1.3.6.1.2.1.39.1.5.1.1
rdbmsSrvVendorName	1.3.6.1.2.1.39.1.5.1.2
rdbmsSrvProductName	1.3.6.1.2.1.39.1.5.1.3
rdbmsSrvContact	1.3.6.1.2.1.39.1.5.1.4

rdbmsSrvPrivateMIBOID

Syntax
OBJECT IDENTIFIER

Max-Access
read-only

Explanation
Displays the authoritative identification for the private MIB for this server. In the Oracle implementation, the value of this variable is hardcoded as the root of Oracle's OID subtree (1.3.6.1.4.1.111). If no OBJECT IDENTIFIER exists for the private MIB, attempts to access this object will return noSuchName (SNMPv1) or noSuchInstance (SNMPv2).

Typical Range
1.3.6.1.4.1.111 (only)

Significance
very important

Related Variables
rdbmsDbVendorOID

Suggested Presentation
simple string

rdbmsSrvVendorName

Syntax
DisplayString

Max-Access
read-only

Explanation
Displays the name of the vendor of this installed database server. In the Oracle
implementation, the value of this variable is hardcoded in the subagent as "Oracle."

Typical Range
6 characters (only)

Significance
important

Related Variables
rdbmsDbVendorName

Suggested Presentation
icon or simple string

rdbmsSrvProductName

Syntax
DisplayString

Max-Access
read-only

Explanation
Displays the product name of this server. In the Oracle implementation, the value of this variable is hardcoded as "Oracle7 server."

Typical Range
14 characters (only)

Significance
important

Related Variables
rdbmsDbInfoProductName

Suggested Presentation
icon or simple string

rdbmsSrvContact

Syntax
DisplayString

Max-Access
read-write

Explanation
Displays the textual identification of the contact person for this managed server, together with information indicating how to contact this person. In the Oracle implementation, the value of this variable is retrieved from the SNMP.ORA configuration file.

Typical Range
0 - 255 characters

Significance
important

Related Variables
rdbmsDbContact

Suggested Presentation
simple string

rdbmsSrvInfoTable

The rdbmsSrvInfoTable contains additional information about each database server instance actively running on the managed node. The visibility of a database server instance in rdbmsSrvInfoTable is determined by the value of the corresponding applOperStatus object for that database server. (For details about applOperStatus, see Appendix E, "Interpreting Implemented Variables of the Network Services MIB") Monitoring these variables is important for tuning server functions such as I/O, access and activity.

Each entry in the rdbmsDbSrvInfoTable represents a given actively opened database server instance on the node. Each entry is indexed by applIndex. The current value of each rdbmsSrvInfoTable variable is retrieved directly from various V$ dynamic performance tables of this database server instance.

Table D–4 lists each of the rdbmsDbInfoTable variables that Oracle is implementing, together with its corresponding object ID.

Table D–4   rdbmsDbSrvInfoTable Variables and Corresponding Object IDs

Variable Name	Object ID
rdbmsSrvInfoStartupTime	1.3.6.1.2.1.39.1.6.1.1
rdbmsSrvInfoFinishedTransactions	1.3.6.1.2.1.39.1.6.1.2
rdbmsSrvInfoDiskReads	1.3.6.1.2.1.39.1.6.1.3
rdbmsSrvInfoLogicalReads	1.3.6.1.2.1.39.1.6.1.4
rdbmsSrvInfoDiskWrites	1.3.6.1.2.1.39.1.6.1.5
rdbmsSrvInfoLogicalWrites	1.3.6.1.2.1.39.1.6.1.6
rdbmsSrvInfoPageReads	1.3.6.1.2.1.39.1.6.1.7
rdbmsSrvInfoPageWrites	1.3.6.1.2.1.39.1.6.1.8
rdbmsSrvInfoDiskOutOfSpaces*	1.3.6.1.2.1.39.1.6.1.9
rdbmsSrvInfoRequestsHandled	1.3.6.1.2.1.39.1.6.1.10
rdbmsSrvInfoRequestsRecvs*	1.3.6.1.2.1.39.1.6.1.11
rdbmsSrvInfoRequestSends*	1.3.6.1.2.1.39.1.6.1.12
rdbmsSrvInfoHighwaterIn-boundAssociations	1.3.6.1.2.1.39.1.6.1.13
rdbmsSrvInfoMaxInboundAssociations	1.3.6.1.2.1.39.1.6.1.14

* Variables marked with an asterisk are not supported.

Attempts to access these variables may result in errors.

Oracle is not implementing the following rdbmsDbInfoTable variables:

- rdbmsSrvInfoDiskOutOfSpaces
- rdbmsSrvInfoRequestRecvs
- rdbmsSrvInfoRequestSends

rdbmsSrvInfoStartupTime

Syntax
DateAndTime

Max-Access
read-only

Explanation
Displays the date and time at which this server was last started. In the Oracle implementation, the value of this variable is computed from the STARTUP TIME-JULIAN and STARTUP TIME-SECONDS fields in V$INSTANCE.

Typical Range
not applicable

Significance
important

Related Variables
applUpTime

Suggested Presentation
simple string

rdbmsSrvInfoFinishedTransactions

Syntax
Gauge32

Max-Access
read-only

Explanation
Displays the number of transactions (visible to this server) upon which either
COMMIT or ABORT operations have been completed since startup of this database
server instance. Some database operations, such as read-only queries, may not
result in the creation of a transaction. In the Oracle implementation, the value of this
variable is the sum of USER ROLLBACKS and USER COMMITS from V$SYSSTAT.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
none

Suggested Presentation
counter

rdbmsSrvInfoDiskReads

Syntax
Counter32

Max-Access
read-only

Explanation
Displays the total number of reads of database files this server has issued to the
operating system since startup of this database server instance. In the Oracle
implementation, the value of this variable is retrieved from PHYSICAL READS in
V$SYSSTAT.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
rdbmsSrvInfoLogicalReads, rdbmsSrvInfoPageReads

Suggested Presentation
counter

rdbmsSrvInfoLogicalReads

Syntax
Counter32

Max-Access
read-only

Explanation
Displays the total number of logical reads of database files that this server has made internally since startup. This value and the value of rdbmsSrvInfoDiskReads reveal the effect of caching on read operations. In the Oracle implementation, the value of this variable is the sum of CONSISTENT GETS and DB BLOCK GETS in V$SYSSTAT.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
rdbmsSrvInfoDiskReads

Suggested Presentation
counter

rdbmsSrvInfoDiskWrites

Syntax
Counter32

Max-Access
read-only

Explanation
Displays the total number of writes to database files this server has issued to the operating system since startup. In the Oracle implementation, the value of this variable is retrieved from PHYSICAL WRITES in V$SYSSTAT.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
rdbmsSrvInfoPageWrites, rdbmsSrvInfoLogicalWrites

Suggested Presentation
counter

rdbmsSrvInfoLogicalWrites

Syntax
Counter32

Max-Access
read-only

Explanation
The total number of times parts of the database files have been marked "dirty" and in need of writing to the disk. This value and rdbmsSrvInfoDiskWrites give some indication of the effect of "write-behind" strategies in reducing the number of disk writes compared to database operations. Because the writes may be done by servers other than those marking the parts of the database files dirty, these values may only be meaningful when aggregated across all servers sharing a common cache. Numbers are not comparable between products. In the Oracle implementation, the value of this variable is retrieved from DB BLOCK CHANGES in V$SYSSTAT.

Typical Range
0..4294967295

Significance
very important

Related Variables
rdbmsSrvInfoDiskWrites

Suggested Presentation
counter32

rdbmsSrvInfoPageReads

Syntax
Counter32

Max-Access
read-only

Explanation
Displays the total number of pages in database files this server has read since
startup of this database server instance. "Pages" are product-specific units of disk
I/O operations. This value, together with the value of rdbmsSrvInfoDisksReads,
reveals the effect of any grouping read-ahead that may be used to enhance
performance of some queries, such as scans. In the Oracle implementation, the
value of this variable is the sum of all PHYBLKRD entries in V$FILESTAT.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
rdbmsSrvInfoDiskReads

Suggested Presentation
counter

rdbmsSrvInfoPageWrites

Syntax
Counter32

Max-Access
read-only

Explanation
Displays the total number of pages in database files this server has written since this startup of this database server instance. Pages are product-specific units of disk I/O. This value, together with the value of rdbmsSrvInfoDiskWrites, shows the effect of write strategies that collapse logical writes of continuous pages into single calls to the operating system. In the Oracle implementation, the value of this variable is the sum of all PHYBLKWRT entries in V$FILESTAT.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
rdbmsSrvInfoDiskWrites

Suggested Presentation
counter

rdbmsSrvInfoRequestsHandled

Syntax
Counter32

Max-Access
read-only

Explanation
Displays the total number of requests made to the server on inbound associations since this startup of this database server instance.

rdbmsSrvInfoRequestsHandled is intended to encapsulate high level semantic operations between clients and servers, or between peers. For example, one request might correspond to a SELECT or an INSERT statement. In contrast to rdbmsSrvInfoDiskReads or rdbmsSrvInfoDiskWrites, this variable is not intended to capture disk I/O operations.

In the Oracle implementation, the value of this variable is retrieved from "user calls" in V$SYSSTAT.

Typical Range
0 - 4294967295

Significance
very important

Related Variables
rdbmsSrvInfoRequestRecvs, rdbmsSrvInfoRequestSends

Suggested Presentation
 counter

rdbmsSrvInfoHighwaterInboundAssociations

Syntax
Gauge32

Max-Access
read-only

Explanation
Displays the greatest number of inbound associations that have been
simultaneously open to this server since this startup of this database server
instance. In the Oracle implementation, the value of this variable is retrieved from
SESSION_HIGHWATER in V$LICENSE.

Typical Range
0 - value of rdbmsSrvInfoMaxInboundAssociations

Significance
important

Related Variables
rdbmsSrvInfoMaxInboundAssociations

Suggested Presentation
gauge

rdbmsSrvInfoMaxInboundAssociations

Syntax
INTEGER (1..2147483647)

Max-Access
read-write

Explanation
Displays the greatest number of inbound associations that can be simultaneously open with this server. If there is no limit, then the value should be zero. In the Oracle implementation, the value of this variable is retrieved from SESSIONS_MAX in V$LICENSE.

Typical Range
1 - 2147483647

Significance
important

Related Variables
applInboundAssociations, rdbmsSrvInfoHighwaterInboundAssociations

Suggested Presentation
simple string

rdbmsSrvParamTable

The rdbmsSrvParamTable contains configuration parameters for a database server installed on this managed node. This table roughly corresponds to the oraDbConfigTable of the private Oracle Database MIB, covered in Appendix A. If you are developing an Oracle-specific application, you not need to concern yourself with this table; instead, you should focus your attention on oraDbConfigTable, which has been designed for more convenient use.

Each entry in the rdbmsSrvParamTable represents a particular configuration parameter for a database server on the node. Each entry is indexed first by applIndex, then by rdbmsSrvParamName, and finally by rdbmsSrvParamSubIndex; thus, there normally is a one-to-many relationship between a database server and its configuration parameters, and a one-to-many relationship between a configuration parameter and its multiple values. (For details about applIndex, see Appendix E, "Interpreting Implemented Variables of the Network Services MIB") However, in the Oracle implementation, multiple values for a configuration parameter are concatenated into a single entry for that parameter. The current value of each rdbmsSrvInfoTable variable is retrieved directly from a corresponding variable in the INIT.ORA configuration file for this database server.

Entries for a server must be present if the value of the corresponding applOperStatus object is up (1). (See Appendix E for more information on the applOperStatus object.) If an instance of applOperStatus is not up (not 1), then

attempts to access corresponding instances in this table may result in either noSuchName (SNMPv1) or noSuchInstance (SNMPv2) being returned by the agent.

Table D–5 lists each rdbmsSrvParamTable variable that Oracle is implementing, together with its corresponding object ID.

Table D–5   rdbmsDbSrvParamTable Variables and Corresponding Object IDs

Variable Name	Object ID
rdbmsSrvParamName	1.3.6.1.2.1.39.1.7.1.1
rdbmsSrvParamSubIndex	1.3.6.1.2.1.39.1.7.1.2
rdbmsSrvParamID*	1.3.6.1.2.1.39.1.7.1.3
rdbmsSrvParamCurrValue	1.3.6.1.2.1.39.1.7.1.4
rdbmsSrvComment*	1.3.6.1.2.1.39.1.7.1.5

* Variables marked with an asterisk are not supported.
  Attempts to access these variables may result in errors.

Oracle is not implementing the following rdbmsSrvParamTable variables:

- rdbmsSrvParamComment
- rdbmsSrvParamID

rdbmsSrvParamName

Syntax
DisplayString (1..64)

Max-Access
not-accessible

Explanation
Displays the name of a configuration parameter for a server. This name is product-specific. The length is limited to 64 characters to minimize traffic of keys and to fit on one line. In the Oracle implementation, the value of this variable is the name of a parameter in the INIT.ORA file.

Typical Range
1 - 45 characters

Significance
less important

Related Variables
each oraDbConfigTable variable

Suggested Presentation
simple string

rdbmsSrvParamSubIndex

Syntax
INTEGER (1 - 2147483647)

Max-Access
not-accessible

Explanation
The subindex value for this parameter. In this Oracle implementation, the value of
this variable is always 1.

Typical Range
1 (only)

Significance
less important

Related Variables
none

Suggested Presentation
not applicable

rdbmsSrvParamCurrValue

Syntax
DisplayString

Max-Access
read-write

Explanation
Displays the current value for this configuration parameter, as retrieved from the
INIT.ORA file in the Oracle implementation.

Typical Range
0 - 255 characters

Significance
less important

Related Variables
oraDbConfigTable variables

Suggested Presentation
simple string

rdbmsRelTable

The rdbmsRelTable indicates how databases and servers on this managed node are
related. In the standard Oracle implementation, one server supports one database;
nevertheless, this table has been implemented in order to fully adhere to the public
RDBMS MIB standard.

Each entry in the rdbmsDbRelTable represents a mapping between a database
server and a database on the node. Each entry is indexed first by rdbmsDbIndex,
and then by applIndex; thus, for the standard Oracle configuration of one server per
database, these two indices are the same. (For details on applIndex, see Appendix E,
"Interpreting Implemented Variables of the Network Services MIB")

Table D–6 lists the rdbmsRelTable variable that Oracle is implementing, together
with its corresponding object ID.

Table D–6   rdbmsRelTable Variables and Corresponding Object IDs

Variable Name	Object ID
rdbmsRelState	1.3.6.1.2.1.39.1.9.1.1
rdbmsRelActiveTime	1.3.6.1.2.1.39.1.9.1.2

rdbmsRelState

Syntax
INTEGER (2) active or (5) unavailable.

Max-Access
read-write

Explanation
Displays the state of this server's access to this database. Oracle implements (2) active and unavailable (5) only. Active (2) means the server is actively using the database. Unavailable (5) means the database is not available through this server.

Typical Range
2 or 5

Significance
very important

Related Variables
appleOperStatus, rdbmsStateChange

Suggested Presentation
icon or alarm

rdbmsTraps

Unlike other SNMP variables, a trap variable is not an agent's response to a management station's request for information. Rather, it is a message that an agent can send unsolicited to a management station when that agent notices that some condition has occured (a threshold has been reached, for example).

Table D–7 lists each rdbmsTraps variable and its corresponding object ID.

Table D–7   rdbmsTraps Variables and Corresponding Object IDs

Variable Name	Object ID
rdbmsStateChange	1.3.6.1.2.1.39.2.1.1.1

rdbmsStateChange

Objects
{rdbmsRelState }

Explanation
An rdbmsStateChange trap signifies that one of the database servers this on this node has changed its rdbmsRelState in a way that makes it less accessible for use. In the Oracle implementation, active (2) is considered fully accessible. The state sent with the trap is the new, less accessible state ((5) unavailable).

Typical Range
5 (only)

Significance
very important

Related Variables
rdbmsRelState

Suggested Presentation
alarm

E

Interpreting Implemented Variables of the Network Services MIB

This appendix provides information to help you interpret those variables of the public Network Services MIB, Version 2 (RFC 1565) that Oracle has implemented. Specifically, it includes a section covering SNMP variables in the following table:

- applTable

applTable

The applTable contains generic variables designed to apply to all types of network service applications. Certain variables of the applTable have been implemented for two of the Oracle services: the Oracle server and Oracle Names. (The Listener does not make use of any Network Services MIB variables.)

Each entry in the applTable represents one of these three applications on the managed node. Each applTable entry for the Oracle server applications represents a database server that has been configured in the SNMP.ORA configuration file, whether or not a current instance of that installed database server is running. In contrast, applTable entries for the Oracle Names applications only represent current instances of those services. If an Oracle Names service is configured in SNMP.ORA, but is not currently running, it would not appear as an entry in the applTable. Each applTable entry is indexed by applIndex.

Table E–1 lists the variables of the applTable and indicates which ones have been implemented for each of the three Oracle services (the Oracle server and Oracle Names).

Table E–1   applTable Variables Implemented for Two Oracle Services

Variable Name	Oracle Server	Oracle Names
applIndex	x	x
applName	x	x
applDirectoryName		
applVersion	x	x
applUptime	x	
applOperStatus	x	
applLastChange	x	
applInboundAssociations	x	
applOutboundAssociations		
applAccumulatedInboundAssociations		x
applAccumulatedOutboundAssociations		x
applLastInboundActivity		
applLastOutboundActivity		
applRejectedInboundAssociations		x
applFailedOutboundAssociations		x

The only applTable variable that is not implemented for any of these Oracle services is applDirectory, because it only has meaning for sites using OSI directory services.

Table E–2 lists the implemented variables of the applTable and their corresponding object IDs.

Table E–2   applTable Variables and Corresponding Object IDs

Variable Name	Object ID
applIndex	1.3.6.1.2.1.27.1.1.1
applName	1.3.6.1.2.1.27.1.1.2
applDirectoryName	1.3.6.1.2.1.27.1.1.3
applVersion	1.3.6.1.2.1.27.1.1.4
applUptime	1.3.6.1.2.1.27.1.1.5
applOperStatus	1.3.6.1.2.1.27.1.1.6
applLastChange	1.3.6.1.2.1.27.1.1.7
applInboundAssociations	1.3.6.1.2.1.27.1.1.8
applOutboundAssociations	1.3.6.1.2.1.27.1.1.9
applAccumulatedInboundAssociations	1.3.6.1.2.1.27.1.1.10
applAccumulatedOutboundAssociations	1.3.6.1.2.1.27.1.1.11
applLastInboundActivity	1.3.6.1.2.1.27.1.1.12
applLastOutboundActivity	1.3.6.1.2.1.27.1.1.13
applRejectedInboundAssociations	1.3.6.1.2.1.27.1.1.14
applFailedOutboundAssociations	1.3.6.1.2.1.27.1.1.15

A description of all implemented applTable variables follows.

applIndex

Syntax
INTEGER (0 - 2147483647)

Max-Access
not-accessible

Explanation
An index to uniquely identify the application. This integer is assigned in the SNMP.ORA file.

applIndex is implemented for each of the Oracle server, and Oracle Names services.

Typical Range
0 - 2147483647

Significance
very important

Related Variables
applName

Suggested Presentation
not applicable

applName

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates the name by which the network service application chooses to be known. applName is implemented for the Oracle server, and Oracle Names applications.

For the Oracle server, the value of applName is the value of the SID parameter in the SNMP.ORA configuration file.

For the Oracle Names service, the value of applName is retrieved from the NAMES.SERVER_NAME field of the NAMES.ORA file. All Oracle Names tables use appleName as an index.

Typical Range
5 - 25 characters

Significance
very important for the Oracle server (less important for Oracle Names)

Related Variables
applIndex

Suggested Presentation
simple string

applVersion

Syntax
DisplayString

Max-Access
read-only

Explanation
Indicates the version of the application software. The value is retrieved internally.

applVersion is implemented for each of the Oracle server, and Oracle Names applications.

Typical Range
1 - 15 characters

Significance
less important

Related Variables
none

Suggested Presentation
simple string

applUptime

Syntax
TimeStamp

Max-Access
read-only

Explanation
Indicates the value of sysUptime, a variable the master agent maintains, which is taken at the time the particular application instance (Oracle server) was last initialized.

If two requests for this variable return the same value, none of the counters associated with this application have been reset between the requests.

applUptime is implemented for the Oracle server.

Typical Range
0..4294967295

Significance
very important

Related Variables
none

Suggested Presentation
gauge or counter

applOperStatus

Syntax
INTEGER (1) up, and (2), down

Max-Access
read-only

Explanation
Indicates the operational status of the application. Oracle is implementing (1) up and (2) down. The UP value (1) indicates that the application is operational and available. The DOWN value (2) indicates that the application is not available. appleOperStatus is implemented for the Oracle server.

If the value of the applOperStatus variable for this application is 2, indicating that it is not available, then the subagent cannot connect to it. In this case, only those MIB table(s) that exist independently of the operational status of that application will be SNMP-accessible. For the Oracle server, these tables are the rdbmsDbTable and rdbmsSrvTable of the public RDBMS MIB only. All tables of the private Oracle Database MIB would be inaccessible when the value of applOperStatus is 2 (down).

Typical Range
enumerated 1 or 2

Significance
very important

Related Variables
none

Suggested Presentation
alarm or simple string

applLastChange

Syntax
TimeStamp

Max-Access
read-only

Explanation
Indicates the value of sysUptime at the time the network service application entered its current operational state. sysUptime is maintained by the master agent on this managed node. If the current state was entered prior to the last initialization of the local network management subsystem, then this object contains a value of 0.

applLastChange is implemented for the Oracle server.

Typical Range
0 - 4294967295

Significance
less important

Related Variables
applUpTime, sysUptime

Suggested Presentation
simple string

applInboundAssociations

Syntax
Gauge32

Max-Access
read-only

Explanation
Indicates the number of current associations to this application, for which it is the responder. applInboundAssociations is implemented for the Oracle server.

For an Oracle server configured for dynamic single threaded processes, this value is the number of application instances, as retrieved from SESSIONS_CURRENT in V$LICENSE.

Typical Range
0 - 5 (Oracle Names)1 - 1,000 (Oracle server)

Significance
less important

Related Variables
none

Suggested Presentation
gauge, ala Tach (Names

applAccumulatedInboundAssociations

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the total number of associations to this application for which it is the responder, since its initialization. This variable represents the overall request load. This variable is implemented for the Oracle Names services.

For the Oracle Names service, this value is derived from an internal table.

Typical Range
0..4294967295

Significance
very important

Related Variables
oraServerDeletesReceived (Oracle Names), oraServerQueriesReceived (Oracle Names), oraServerRenamesReceived (Oracle Names), oraServerUpdatesReceived (Oracle Names)

Suggested Presentation
rolling counter or gauge

applAccumulatedOutboundAssociations

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the forwarding load (the total number of associations to this application for which it is the initiator, since its initialization). This variable is implemented for the Oracle Names services.

For the Oracle Names service, this value is derived from an internal table.

Typical Range
0..4294967295

Significance
important

Related Variables
none

Suggested Presentation
counter

applRejectedInboundAssociations

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the total number of inbound associations the application entity has rejected, since application initialization. The variable is implemented for the Oracle Names services.

For Oracle Names, this value indicates client malfunction, or a possible inconsistency in configuration. It is retrieved from an internal table.

Typical Range
0..4294967295

Significance
important

Related Variables
None

oSuggested Presentation
rolling counter or gauge/time with warning light

applFailedOutboundAssociations

Syntax
Counter32

Max-Access
read-only

Explanation
Indicates the total number of associations since application initialization, for which the application entity is initiator and association establishment has failed. This variable is implemented for the Oracle Names services.

For Oracle Names, this variable indicates that remote servers are either down or not defined properly in this server's topology data. It is retrieved from an internal table.

Typical Range
0..4294967295

Significance
important

Related Variables
none

Suggested Presentation
rolling counter or gauge/time with warning light

applTable

F

Interpreting Variables of the Enterprise Manager MIB

This appendix provides information to help you interpret the variables of the private Oracle Enterprise Manager MIB. Specifically, it includes sections covering SNMP variables in the following tables:

- oraAgentEventTable
- oraAgentTraps

oraAgentEventTable

Table F–1 lists the variables of the oraAgentEventTable and their corresponding Object IDs.

Table F–1   oraAgentEventTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraAgentEventIndex	1.3.6.1.4.1.111.12.1.1.1.1
oraAgentEventName	1.3.6.1.4.1.111.12.1.1.1.2
oraAgentEventID	1.3.6.1.4.1.111.12.1.1.1.3
oraAgentEventService	1.3.6.1.4.1.111.12.1.1.1.4
oraAgentEventTime	1.3.6.1.4.1.111.12.1.1.1.5
oraAgentEventSeverity	1.3.6.1.4.1.111.12.1.1.1.6
oraAgentEventUser	1.3.6.1.4.1.111.12.1.1.1.7
oraAgentEventAppID	1.3.6.1.4.1.111.12.1.1.1.8
oraAgentEventMessage	1.3.6.1.4.1.111.12.1.1.1.9

Table F–1   oraAgentEventTable Variables and Corresponding Object IDs

Variable Name	Object ID
oraAgentEventArguments	1.3.6.1.4.1.111.12.1.1.1.1.10
oraAgentEventResults	1.3.6.1.4.1.111.12.1.1.1.1.11

A description of each of these variables follows.

oraAgentEventIndex

Syntax
INTEGER

Max-Access
read-only

Explanation
Index for OraAgentEventTable.

Typical Range
not applicable

Significance
very important

Related Variables
none

Suggested Presentation
alarm

oraAgentEventName

Syntax
DisplayString

Max-Access
read-only

Status
mandatory

Explanation
The name of the event that occurred.

Typical Range
not applicable

Significance
very important

Related Variables
none

Suggested Presentation
alarm

oraAgentEventID

Syntax
INTEGER

Max-Access
read-only

Status
mandatory

Explanation
The ID of the registration that generated this event occurrence.

Typical Range
not applicable

Significance
very important

Related Variables
none

Suggested Presentation
alarm

oraAgentEventService

Syntax
DisplayString

Max-Access
read-only

Status
mandatory

Explanation
The name of the service (database, Oracle Net listener, etc.) being monitored by this event.

Typical Range
not applicable

Significance
very important

Related Variables
none

Suggested Presentation
alarm

oraAgentEventTime

Syntax
DateAndTime

Max-Access
read-only

Status
mandatory

Explanation
The time at which this event was detected.

Typical Range
not applicable

Significance
very important

Related Variables
none

Suggested Presentation
alarm

oraAgentEventSeverity

Syntax
INTEGER {warning(1), alert(2)}

Max-Access
read-only

Status
mandatory

Explanation
A relative measure of the severity of the event.

Typical Range
not applicable

Significance
very important

Related Variables
none

Suggested Presentation
alarm

oraAgentEventUser

Syntax
DisplayString

Max-Access
read-only

Status
mandatory

Explanation
The name of the user who registered for this event.

Typical Range
not applicable

Significance
Very important

Related Variables

Suggested Presentation
Alarm

oraAgentEventAppID

Syntax
Integer

Max-Access
read-only

Status
mandatory

Explanation
The ID of the Enterprise Manager console application through which this event was registered.

Typical Range
not applicable

Significance
Very important

Related Variables

Suggested Presentation
Alarm

oraAgentEventMessage

Syntax
DisplayString

Max-Access
read-only

Status
mandatory

Explanation
Message associated with the event.

Typical Range
not applicable

Significance
very important

Related Variables
none

Suggested Presentation
alarm

oraAgentEventArguments

Syntax
DisplayString

Max-Access
read-only

Status
mandatory

Explanation
The arguments that were passed to the script that detected this event.

Typical Range
not applicable

Significance
very important

Related Variables
none

Suggested Presentation
alarm

oraAgentEventResults

Syntax
DisplayString

Max-Access
read-only

Status
mandatory

Explanation
The results generated by the script that detected this event.

Typical Range
not applicable

Significance
very important

Related Variables
none

Suggested Presentation
alarm

oraAgentTraps

Unlike other SNMP variables, a trap variable is not an agent's response to a management station's request for information. Rather, it is a unsolicited message that an agent can send to a management station when that agent notices that some condition has occurred (a threshold has been reached, for example).

All events discovered by the Oracle Enterprise Manager agent can be configured to send an SNMP trap when the event occurs.

Traps sent out by the Oracle Enterprise Manager agent can be received by any tool that is listening on the standard UDP port 162 and is able to perform the required ASN.1 decoding. There is a wide variety of such products, ranging from free software available over the Internet to sophisticated network management platforms including HP's OpenView, Sun's Solstice, and IBM's NetView/6000.

This feature of the Oracle Enterprise Manager agent is available on platforms that support SNMP and only if the extensible SNMP master agent is started. The agent attempts to connect to the SNMP master agent at startup time. If this fails, either because the platform does not support SNMP or the master agent is not started, then no traps are sent. The destination of all traps is determined by the configuration matter of the SNMP master agent. See your operating system-specific documentation for details.

Table F–2 lists each oraAgentTraps variable and its corresponding object ID.

Table F–2   oraAgentTraps Variables and Corresponding Object IDs

Variable Name	Object ID
oraAgentEventOcc	1.3.6.1.4.1.111.12.2.2

oraAgentEventOcc

Objects
{oraAgentEventName, oraAgentEventID, oraAgentEventService, oraAgentEventTime, oraAgentEventSeverity, oraAgentEventUser, oraAgentEventAppID, oraAgentEventMessage, oraAgentEventArguments, oraAgentEventResults}

Explanation
The Enterprise Manager agent has detected an occurrence of an event for which it has no specific trap.

Typical Range
not applicable

Significance
very important

Related Variables
oraAgentEventName, oraAgentEventID, oraAgentEventService,
oraAgentEventTime, oraAgentEventSeverity, oraAgentEventUser,
oraAgentEventAppID, oraAgentEventMessage, oraAgentEventArguments,
oraAgentEventResults

Suggested Presentation
alarm

Glossary

agent

A process on a managed node that is responsible for all SNMP transactions on that node. The agent accepts requests from the management station and answers them by returning data. It also initiates traps when exceptional conditions are detected.

ASN.1

Abstract Syntax Notation One. The notation used to define MIB variables.

control file

An administrative file that is required to start and run a database system. The control file records the physical structure of the database.

DBA_DATA_FILES

A data dictionary view that displays information about database files. Fields in DBA_DATA_FILES are used to retrieve the value of the rdbmsDbInfoSizeAllocated variable and derive the values of the rdbmsDbInfoSizeAllocated and rdbmsDbInfoSizeUsed variable (in Oracle's implementation of the standard RDBMS MIB (RFC 1565)). Also, some of the variables in the oraDbDataFileTable of the private Oracle Database MIB correspond directly to a single column of DBA_DATA_FILES.

DBA_FREE_SPACE

A data dictionary view that displays information about free extents in all tablespaces. DBA_FREE_SPACE is used to derive the value of the rdbmsDbInfoSizeUsed variable (in Oracle's implementation of the public RDBMS MIB (RFC 1565)).

DBA_TABLESPACES

The dynamic performance table containing measures of tablespace activity for an Oracle database since the last instance startup. Values for each variable in the oraDbTablespaceTable of the Oracle Private Database MIB are retrieved directly from a corresponding variable in DBA_TABLESPACES.

dynamic performance table

See V$ table.

INIT.ORA configuration file

A database system file containing a list of parameters that are read when the database system is started. The parameters identify the database and control system wide resources. By affecting the size of the SGA, they also impact the performance of the instance. Values for each variable in the oraDbConfigTable of the private Oracle Database MIB are retrieved directly from a corresponding parameter in INIT.ORA.

Interchange

See Oracle Names.

instance

As defined for the Oracle Server, A system global area (SGA) and the Oracle background processes constitute an Oracle instance. Every time a database is started, a system global area is allocated and Oracle background processes are started. The SGA is deallocated when the instance shuts down.

library

A collection of one or more PL/SQL program units that are stored together in a file or database, and that can be referenced by several displays at once.

library cache

A memory structure containing shared SQL and PL/SQL areas. The library cache is one of three parts of the shared pool.

Listener

The listener is a separate process that resides on the server whose responsibility is to listen for incoming client connection requests and manage the traffic to the server. The Listener is a component of Oracle Net, Oracle's remote data access product.

managed node

A platform, such as a UNIX server, on which objects to be monitored or managed reside.

managed object

Any entity, device, node, such as a LAN server, gateway, or client application, that can be queried by a management station for its current status.

management application

A software application that can be integrated with a management framework to accomplish more specialized network or database tasks.

management framework

A software package used to view and react to information retrieved using the SNMP protocol. See also management application.

management station

A node from which objects are monitored or managed using the SNMP protocol. Also known as management console, management system or managing node.

master agent

A process that accepts queries from the management framework and communicates with the application in order to answer the query.

MIB

Management Information Base. The collection of variables that can be queried to describe attributes of an object, such as the use, performance, and initialization parameters of a database server, for example.

MultiProtocol Interchange

This product is no longer supported past SQL* Net release 2.3. See Oracle Connection Manager.

Names

See Oracle Names.

Network Services MIB

A public MIB (RFC 1565) that contains generic variables designed to apply to all types of network service applications. Oracle has implemented those variables of

this MIB that are relevant to the Oracle Server, the Oracle Connection Manager, and the Oracle Net Services products.

object identifier

A sequence of elements, as specified by the SNMP standard (RFC 1442), that uniquely identifies each object. An object identifier (OID) is a sequence of elements that indicates a hierarchical organization of identifiers.

OID

See object identifier.

OID subtree

The portion of a MIB tree that is specific to a given entity. The subtree for the Oracle enterprise is 1.3.6.1.4.1.111. All of the variables in the Oracle MIBs begin with this OID subtree. Also called root OID.

Oracle Connection Manager

A router through which a client connection request may be sent either to its next hop or directly to the database server. Clients who route their connection requests through an Oracle Connection Manager can then take advantage of the session multiplexing, access control, or protocol conversion features configured on that Oracle Connection Manager.

Oracle Database MIB

This private MIB serves to extend the functionality of the public RDBMS MIB. The Oracle Database MIB contains additional RDBMS statistics that are specific to the Oracle server architecture.

Oracle Names

A product that provides a directory service, by making database address and database link information available to all nodes throughout the network.

Oracle Server

The relational database management systems (RDBMS) developed and sold by Oracle Corporation. These RDBMS includes the database that stores information, as well as the server software that accesses and manipulates that information.

pin

Execution of an item in the library cache.

RDBMS MIB

A proposed standard MIB for relational databases that has been defined by the IETF Working Group. This MIB allows for database discovery, identification of the database, and characterization of database size and activity level.

registration

The method by which a subagent, acting on behalf of a managed object, such as a listener or the Oracle server, notifies a master agent of two things: first, that it will accept requests from the master agent for information, and second, the list of items (the MIB) for which it will provide information.

server

As defined in RFC 1565 (the standard RDBMS MIB) an independent entity that provides access to one or more databases.

SGA

See Shared Global Area.

Shared Global Area

The shared segment containing temporary data caches used by the Oracle server during database operation. The SGA is initialized when the server is started, and unavailable when the server is not running. Also known as System Global Area.

shared pool

The portion of the SGA, created on instance startup, that contains shared memory constructs such as shared SQL areas. A shared SQL area is required to process every unique SQL statement submitted to a database. A single shared SQL area is used by multiple applications that issue the same statement, leaving more shared memory for other uses.

SNMP.ORA

A configuration file for a managed node. SNMP.ORA contains a list of parameters that are read when an Oracle subagent is started.

subagent

A process that receives queries for a particular application from the master agent, and sends the answers back to the master agent.

System Global Area

See Shared Global Area.

V$ table

A generic term for a virtual table which allows the user to access memory structures within the SGA. V$ tables can be used to monitor the performance of processes of an Oracle instance. These tables are also called dynamic performance tables, because they are continuously updated while a database is open and in use. The values of many private Oracle Database MIB variables are retrieved directly from corresponding variables in V$ tables.

V$DATABASE

The dynamic performance table containing database information from the control file.

V$FILESTAT

The dynamic performance table containing file read/write statistics for an Oracle7 database. Some of the variables in the oraDbDataFileTable of the private Oracle Database MIB are retrieved directly from a single column of V$FILESTAT .

V$INSTANCE

The dynamic performance table containing information on the state of the current instance.

V$LIBRARYCACHE

The dynamic performance table containing measures of all library cache activity since the most recent instance startup. Values for each variable in the oraDbLibraryCacheTable of the private Oracle Database MIB are retrieved directly from a corresponding variable in V$LIBRARYCACHE.

V$LICENSE

The dynamic performance table containing information on license limits.

V$ROWCACHE

The dynamic performance table containing measures of all data dictionary activity since the most recent instance startup.

V$SESSTAT

The dynamic performance table containing the current statistics on total memory used for each current session. In the multi-threaded server architecture, Oracle stores session information in the shared pool, rather than in the memory of user processes. While no variables in the private Oracle Database MIB correspond

directly to those in V$SESSTAT, V$SYSSTAT is derived from V$SESSTAT. See also V$SYSSTAT.

V$SGA

The dynamic performance table containing summary information on the System Global Area of an Oracle7 or Oracle**8** database. The values of each variable in the oraDbSGATable of the Oracle Private Database MIB are retrieved directly from a corresponding variable in V$SGA.

V$SGASTAT

The dynamic performance table containing detailed information on the System Global Area of an Oracle7 or Oracle**8** database. Values for each variable in the oraDbSGAStatTable of the private Oracle Database MIB are retrieved directly from a corresponding variable in V$SGASTAT.

V$SYSSTAT

The dynamic performance table containing the current *system-wide* value for each variable in V$SESSTAT. Values for each variable in the oraDbSysTable of the private Oracle Database MIB are retrieved directly from a corresponding variable in V$SYSSTAT.

V$VERSION

The dynamic performance table containing version numbers of core library components in the Oracle Server. See also, library.

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