

Diagnosing and Resolving Performance Problems Using ADDM

[Back to Lesson List](#)

Purpose

This module describes how you can use ADDM to diagnose and resolve performance problems..

Topics

This chapter discusses the following:

- ☒ [Overview](#)
- ☒ [Prerequisites](#)
- ☒ [Creating a Performance Finding](#)
- ☒ [Resolving the Performance Finding using ADDM](#)

Overview

[Back to Topic List](#)

At times database performance problems arise that require your diagnosis and correction. Sometimes problems are brought to your attention by users who complain about slow performance. Other times you might notice performance spikes in the Host CPU chart on the home page.

In all cases, these problems are flagged by the Automatic Database Diagnostics Monitor (ADDM), which does a top-down system analysis every half hour by default and reports its findings on the Oracle Enterprise Manager Home page. ADDM runs automatically every 30 minutes to coincide with the snapshots taken by the Automatic Workload Repository (AWR). Its output consists of a description of each problem it has identified, and a recommended action.

Prerequisites

[Back to Topic List](#)

Before starting this module, you should have:

1. Completed the [Configuring Linux for the Installation of Oracle Database 10g](#) lesson
2. Completed the [Installing the Oracle Database 10g on Linux](#) lesson

Creating a Performance Finding

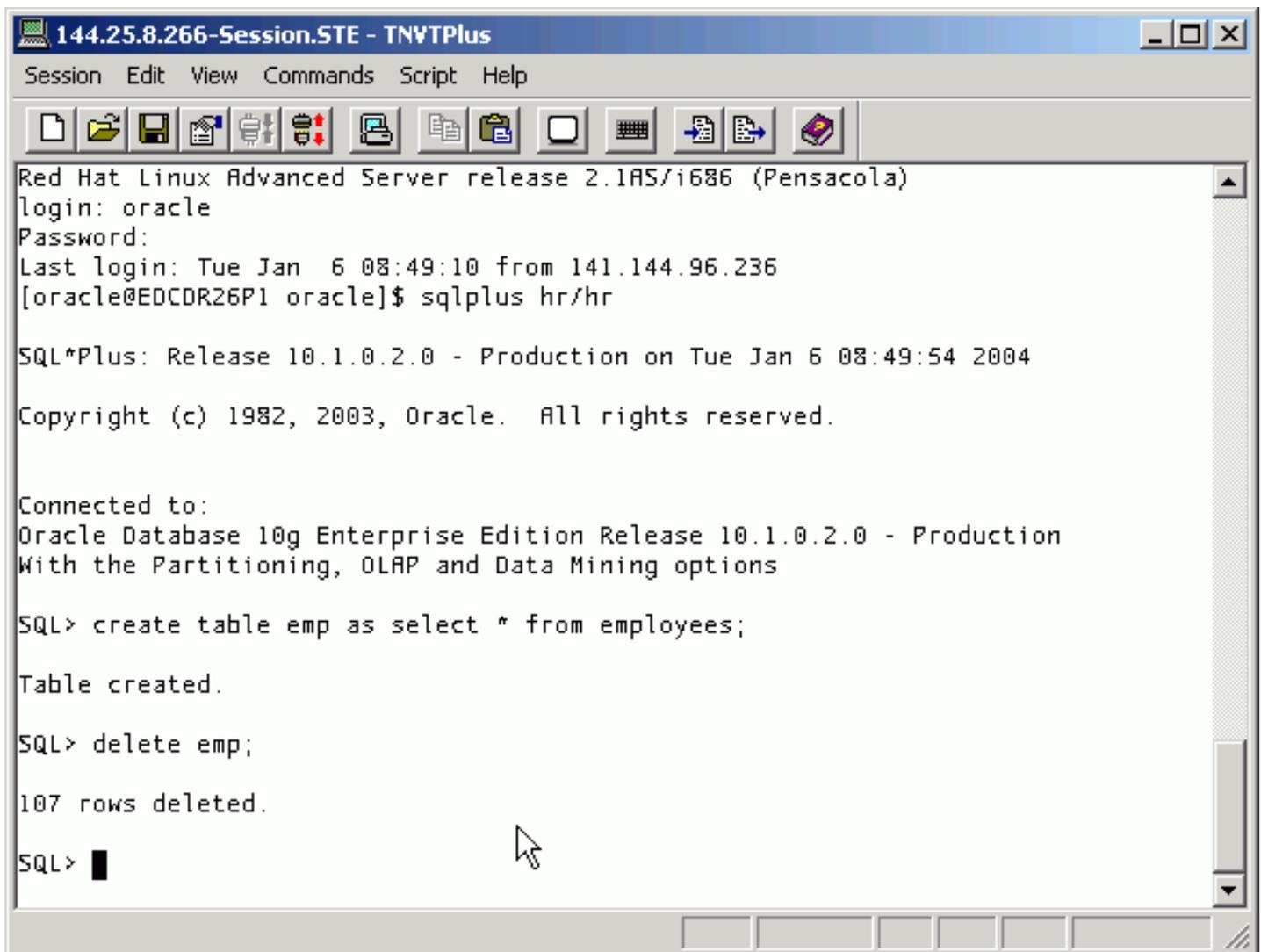
[Back to Topic List](#)

To show how ADDM works, you need to create a performance finding. In this case, you will create a session waiting on a row lock. Perform the following:

1. Open a terminal window and execute the following commands:

```
sqlplus hr/hr
```

```
create table emp as select * from employees;  
delete emp;
```

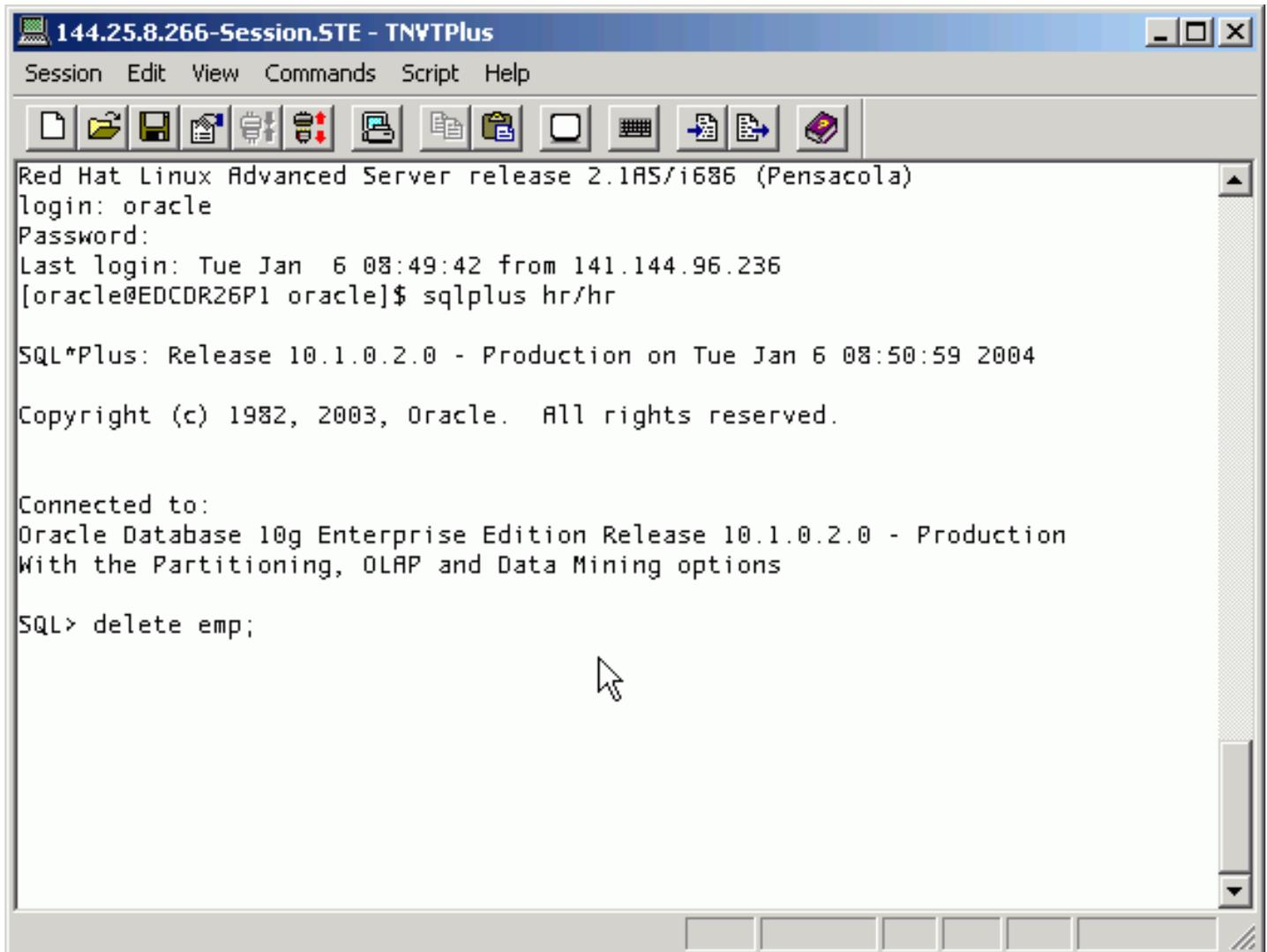
A screenshot of a terminal window titled "144.25.8.266-Session.STE - TNVTPlus". The window has a menu bar with "Session", "Edit", "View", "Commands", "Script", and "Help". Below the menu bar is a toolbar with various icons. The terminal content shows the following text:

```
Red Hat Linux Advanced Server release 2.1AS/i686 (Pensacola)  
login: oracle  
Password:  
Last login: Tue Jan 6 08:49:10 from 141.144.96.236  
[oracle@EDCDR26P1 oracle]$ sqlplus hr/hr  
  
SQL*Plus: Release 10.1.0.2.0 - Production on Tue Jan 6 08:49:54 2004  
  
Copyright (c) 1982, 2003, Oracle. All rights reserved.  
  
Connected to:  
Oracle Database 10g Enterprise Edition Release 10.1.0.2.0 - Production  
With the Partitioning, OLAP and Data Mining options  
  
SQL> create table emp as select * from employees;  
  
Table created.  
  
SQL> delete emp;  
  
107 rows deleted.  
  
SQL> █
```

2. Open another terminal window and execute the following commands to create a row locking conflict:

```
sqlplus hr/hr
```

```
delete emp;
```

A screenshot of a terminal window titled "144.25.8.266-Session.STE - TNVTPlus". The window has a menu bar with "Session", "Edit", "View", "Commands", "Script", and "Help". Below the menu bar is a toolbar with various icons. The terminal text shows the user logging in as "oracle" on a Red Hat Linux Advanced Server release 2.1AS/i686 (Pensacola). The user then runs "sqlplus hr/hr", which connects to an Oracle Database 10g Enterprise Edition Release 10.1.0.2.0 - Production. The user then enters the command "delete emp;" at the SQL prompt.

```
144.25.8.266-Session.STE - TNVTPlus
Session Edit View Commands Script Help
Red Hat Linux Advanced Server release 2.1AS/i686 (Pensacola)
login: oracle
Password:
Last login: Tue Jan  6 08:49:42 from 141.144.96.236
[oracle@EDCDR26P1 oracle]$ sqlplus hr/hr

SQL*Plus: Release 10.1.0.2.0 - Production on Tue Jan 6 08:50:59 2004

Copyright (c) 1982, 2003, Oracle. All rights reserved.

Connected to:
Oracle Database 10g Enterprise Edition Release 10.1.0.2.0 - Production
With the Partitioning, OLAP and Data Mining options

SQL> delete emp;
```

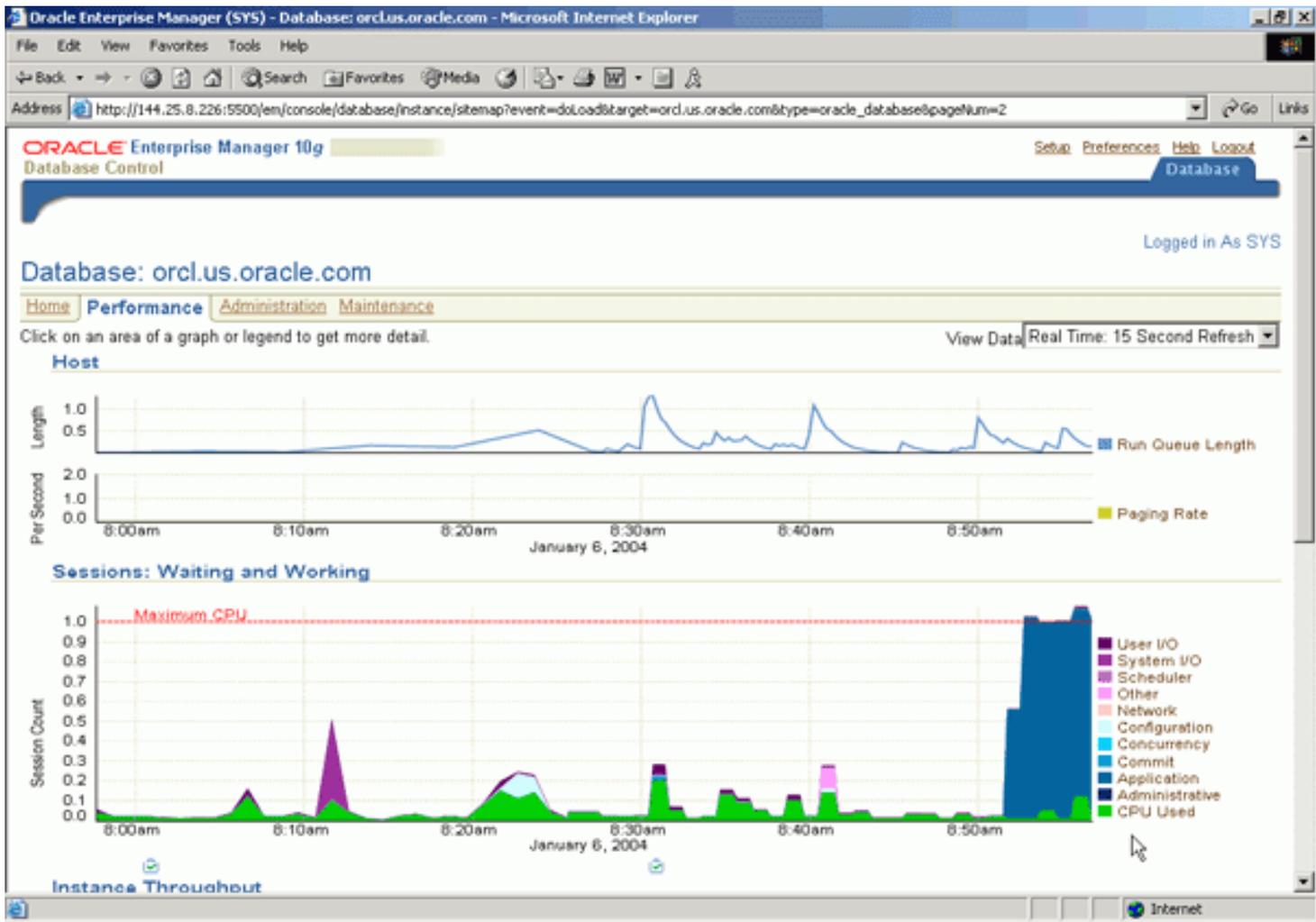
- From your Enterprise Manager browser window, click on the **Performance** tab.

The screenshot shows the Oracle Enterprise Manager 10g Database Control interface in a Microsoft Internet Explorer browser window. The page title is "ORACLE Enterprise Manager 10g Database Control". The user is logged in as "SYS". The main navigation tabs are "Home", "Performance", "Administration", and "Maintenance". The "Performance" tab is selected. The page was refreshed on Jan 6, 2004 at 8:37:45 AM.

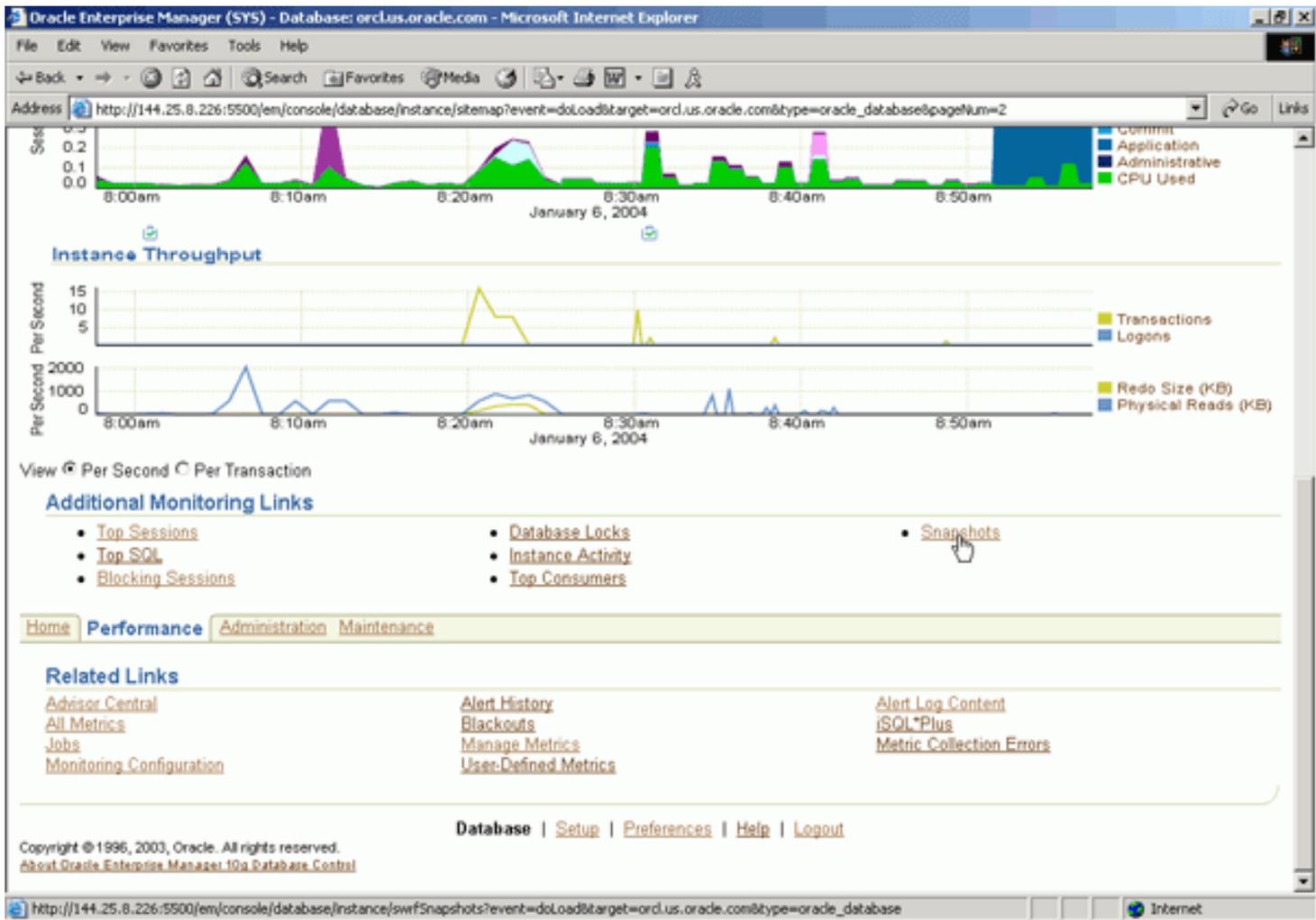
The interface displays several performance metrics:

- General:** Status is Up, Up Since Jan 5, 2004 11:46:30 AM, Time Zone is Unavailable, Availability (%) is 100 (Last 24 hours), Instance Name is orcl, Version is 10.1.0.2.0, Read Only is No, Oracle Home is /u01/app/oracle/product/10.1.0, Listener is LISTENER_EDCDR26P1, and Host is edcdr26p1.us.oracle.com.
- Host CPU:** A bar chart shows CPU usage for "Other" (blue) and "orcl" (green). The Run Queue is 0.2 and Paging (pages per second) is 0.0.
- Active Sessions:** No data is currently available. Active Sessions is Unavailable and SQL Response Time (%) is 93.17 (compared to baseline).
- High Availability:** Instance Recovery Time (seconds) is 11, Last Backup is n/a, Archiving is Disabled, Archive Area Used (%) is n/a, and Flashback Logging is Disabled.
- Space Usage:** Database Size (GB) is 1, Problem Tablespaces is 0, Segment Findings is Not Configured, Policy Violations is 0, and Dump Area Used (%) is Unavailable.
- Diagnostic Summary:** Performance Findings is 0, All Policy Violations is 61, and Alert Log is No ORA- errors.
- Alerts:** Critical alerts are 0.

- You see that the sessions waiting is very high. Wait about 10 minutes and scroll down to the bottom of the window.



5. You want to create a snapshot to capture the performance finding. Click on **Snapshots**.



6. Click **Create** to create a snapshot.

Oracle Enterprise Manager (SYS) - Snapshots - Microsoft Internet Explorer

Database Control

Database: orcl.us.oracle.com > Automatic Workload Repository > Snapshots

Logged in As SYS

Snapshots

A snapshot is a collection of database statistics at a single point in time. You can use the information in snapshots to diagnose database problems.

Page Refreshed Jan 6, 2004 9:00:00 AM

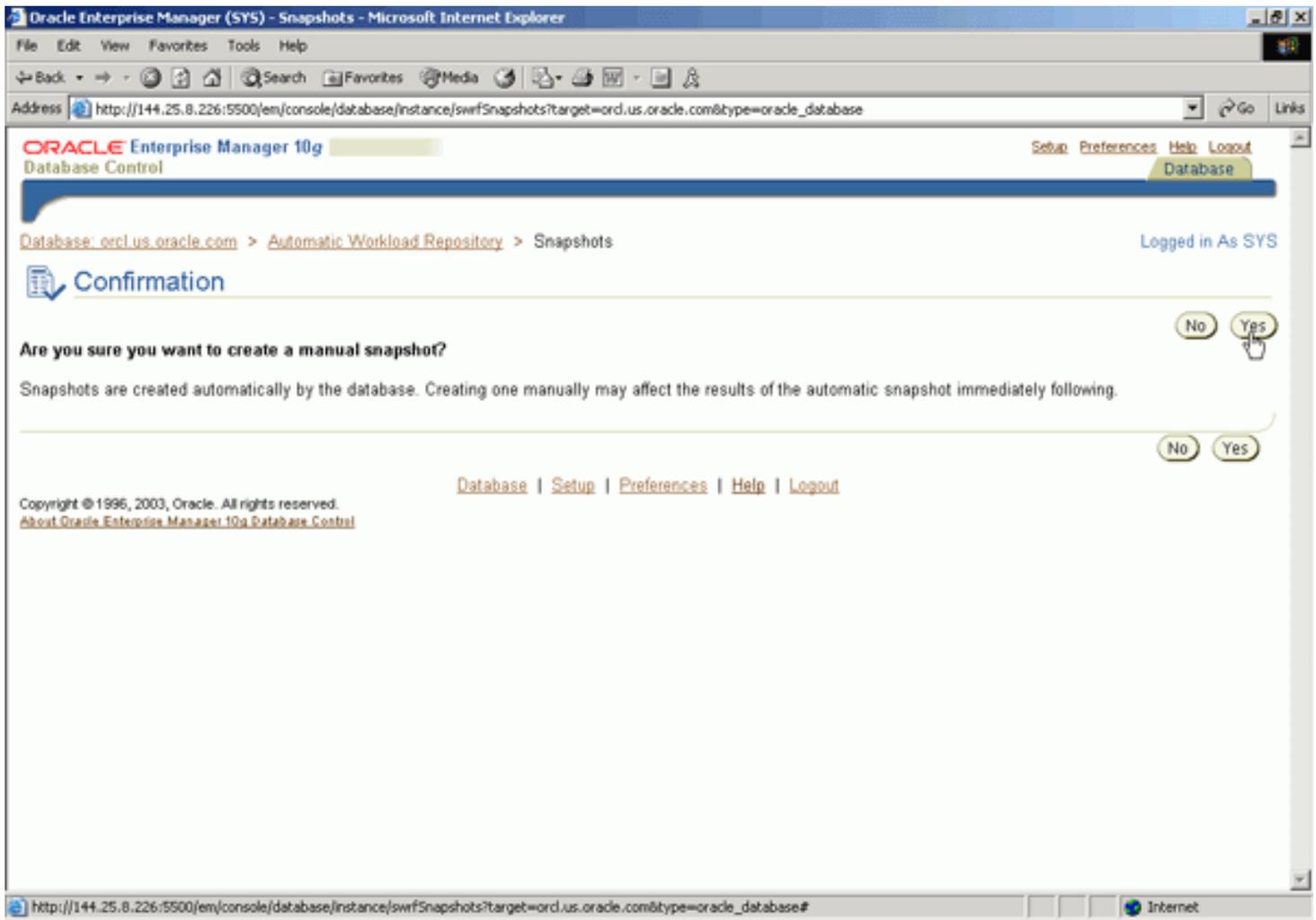
Select Beginning Snapshot

Go To Time:

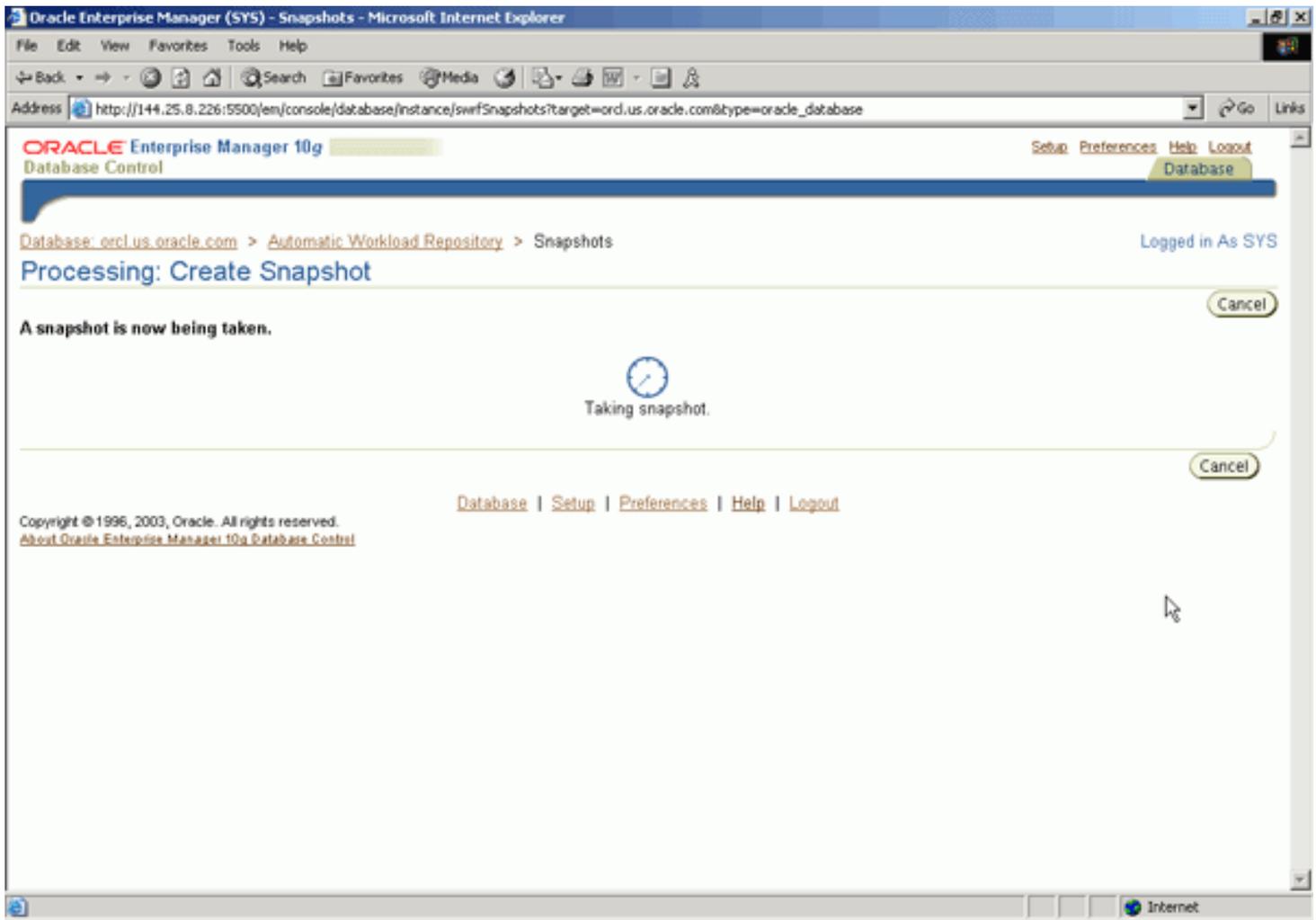
(Example: 12/15/03)

Select	ID	Capture Time ▲	Collection Level	Within A Preserved Snapshot Set
<input checked="" type="radio"/>	26	Jan 6, 2004 12:30:30 AM	TYPICAL	
<input type="radio"/>	27	Jan 6, 2004 1:00:12 AM	TYPICAL	
<input type="radio"/>	28	Jan 6, 2004 1:30:54 AM	TYPICAL	
<input type="radio"/>	29	Jan 6, 2004 2:00:36 AM	TYPICAL	
<input type="radio"/>	30	Jan 6, 2004 2:30:17 AM	TYPICAL	
<input type="radio"/>	31	Jan 6, 2004 3:01:00 AM	TYPICAL	
<input type="radio"/>	32	Jan 6, 2004 3:30:41 AM	TYPICAL	
<input type="radio"/>	33	Jan 6, 2004 4:00:22 AM	TYPICAL	
<input type="radio"/>	34	Jan 6, 2004 4:30:04 AM	TYPICAL	
<input type="radio"/>	35	Jan 6, 2004 5:00:47 AM	TYPICAL	
<input type="radio"/>	36	Jan 6, 2004 5:30:28 AM	TYPICAL	
<input type="radio"/>	37	Jan 6, 2004 6:00:09 AM	TYPICAL	

- Click **Yes** to create a Manual Snapshot.



8. A snapshot is now being taken.



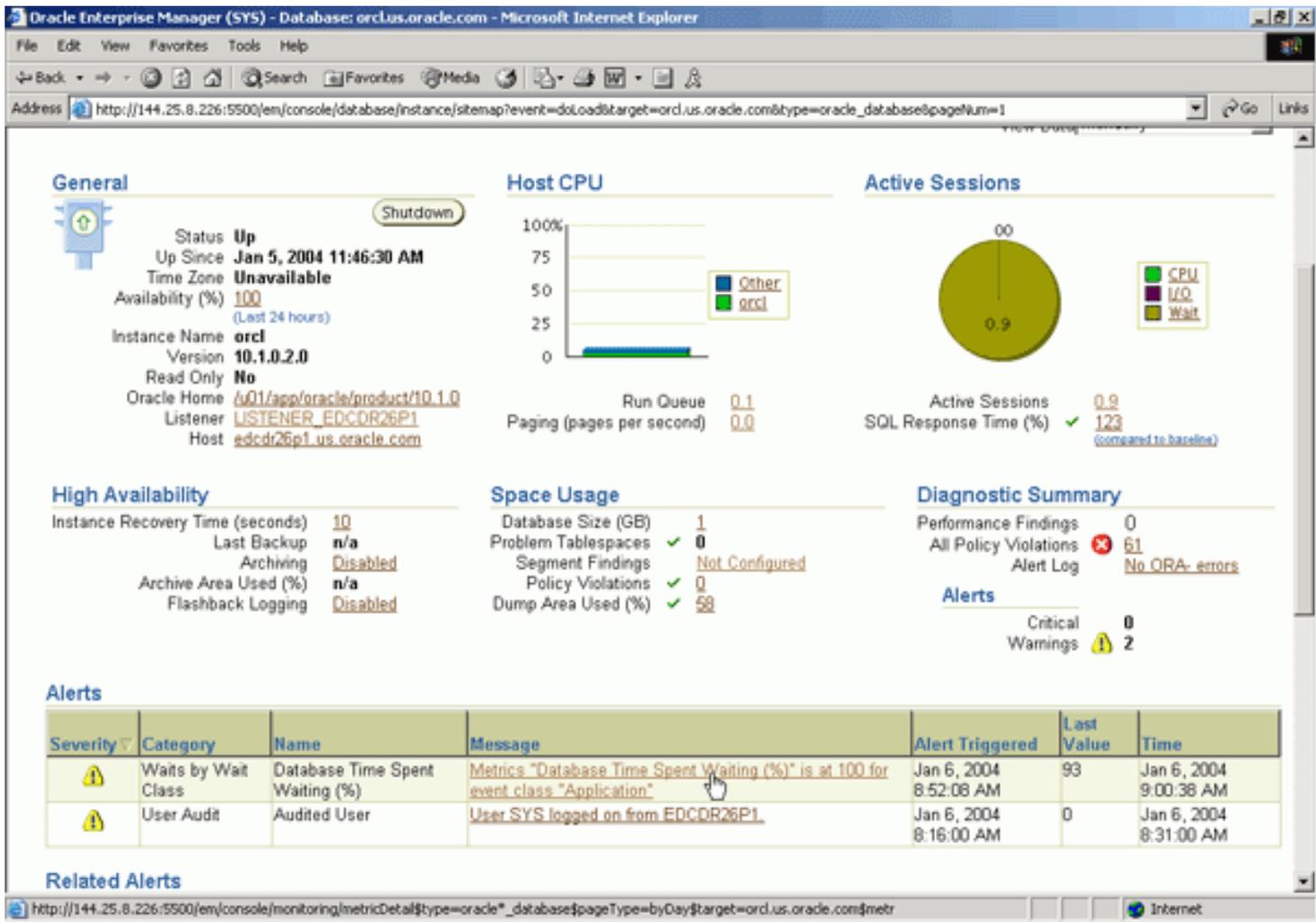
9. Once the snapshot is created, click the **database** breadcrumb then the **home** tab.

The screenshot shows the Oracle Enterprise Manager 10g interface. At the top, there is a navigation breadcrumb: [Database: orcl.us.oracle.com](#) > [Automatic Workload Repository](#) > [Snapshots](#). A confirmation message states: "Confirmation: A snapshot has been created successfully". Below this, the "Snapshots" section explains that a snapshot is a collection of database statistics at a single point in time. The page is refreshed on Jan 6, 2004 9:02:34 AM. A "Select Beginning Snapshot" section allows users to go to a specific time (1/6/04 at 9:00 AM). A table lists the following snapshots:

Select	ID	Capture Time	Collection Level	Within A Preserved Snapshot Set
<input checked="" type="radio"/>	26	Jan 6, 2004 12:30:30 AM	TYPICAL	
<input type="radio"/>	27	Jan 6, 2004 1:00:12 AM	TYPICAL	
<input type="radio"/>	28	Jan 6, 2004 1:30:54 AM	TYPICAL	
<input type="radio"/>	29	Jan 6, 2004 2:00:36 AM	TYPICAL	
<input type="radio"/>	30	Jan 6, 2004 2:30:17 AM	TYPICAL	
<input type="radio"/>	31	Jan 6, 2004 3:01:00 AM	TYPICAL	
<input type="radio"/>	32	Jan 6, 2004 3:30:41 AM	TYPICAL	
<input type="radio"/>	33	Jan 6, 2004 4:00:22 AM	TYPICAL	

A performance finding is now detected through an alert in the Alert section of the Home page.

10.



Resolving the Performance Finding using ADDM

[Back to Topic List](#)

When a performance finding is encountered, you can use ADDM to resolve it. Perform the following:

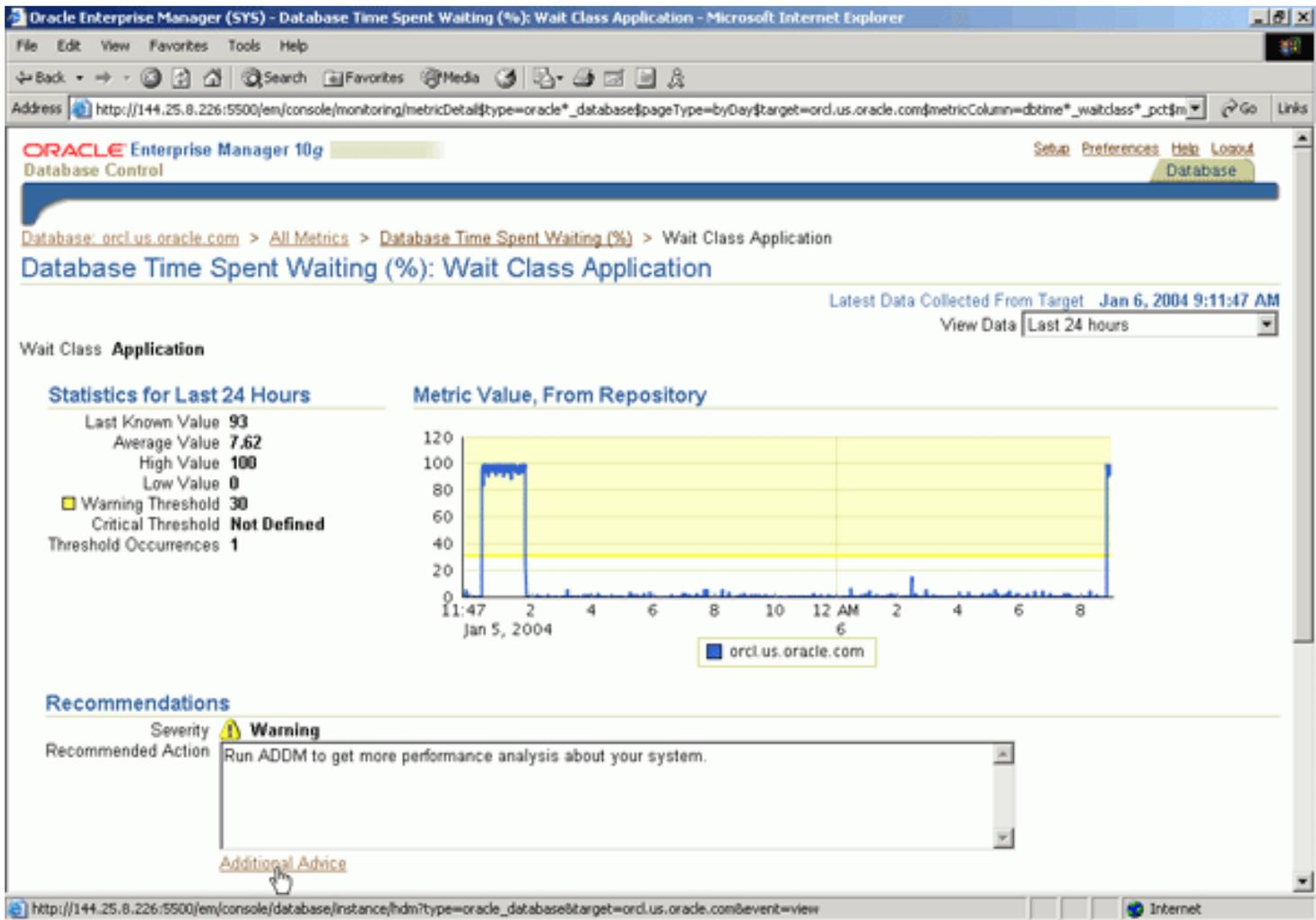
1. Click on the Alert **Database Time Spent Waiting** .

The screenshot displays the Oracle Enterprise Manager (OEM) console for a database instance named 'orcl'. The interface is divided into several sections:

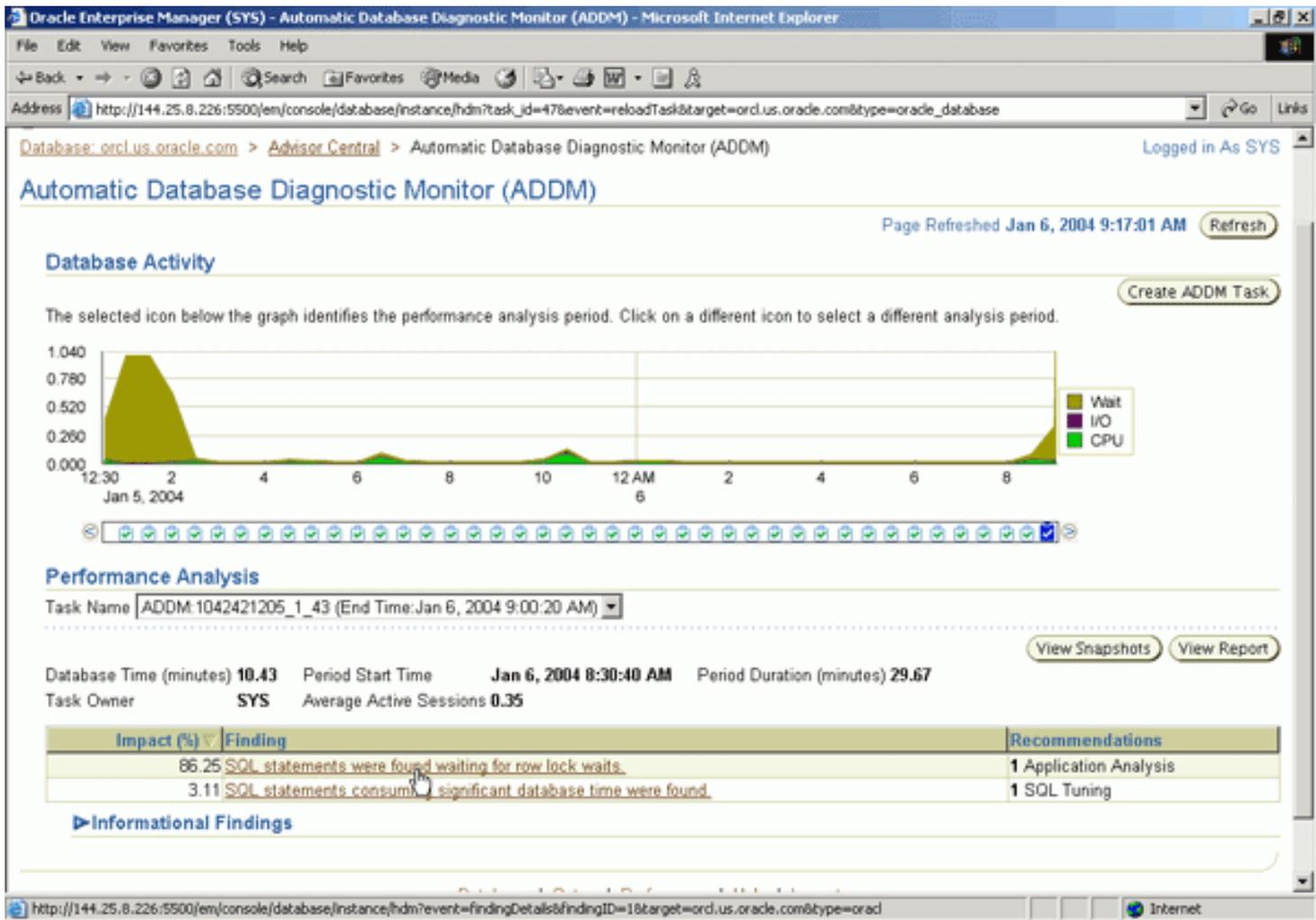
- General:** Shows the database status as 'Up' since Jan 5, 2004 11:46:30 AM. Availability is 100% (Last 24 hours). Instance Name is 'orcl', Version is '10.1.0.2.0'. Oracle Home is 'u01/app/oracle/product/10.1.0'. Listener is 'LISTENER_EDCDR26P1'. Host is 'edcdr26p1.us.oracle.com'.
- Host CPU:** A bar chart showing CPU usage for 'Other' and 'orcl'. The 'orcl' bar is at 0.9%.
- Active Sessions:** A gauge chart showing 0.9 active sessions. SQL Response Time (%) is 123 (compared to baseline).
- High Availability:** Instance Recovery Time is 10 seconds. Last Backup is n/a. Archiving is Disabled. Archive Area Used is n/a. Flashback Logging is Disabled.
- Space Usage:** Database Size is 1 GB. Problem Tablespaces is 0. Segment Findings is Not Configured. Policy Violations is 0. Dump Area Used is 58.
- Diagnostic Summary:** Performance Findings is 0. All Policy Violations is 61. Alert Log is No ORA- errors.
- Alerts:** Critical Warnings is 2.
- Alerts Table:**

Severity	Category	Name	Message	Alert Triggered	Last Value	Time
Warning	Waits by Wait Class	Database Time Spent Waiting (%)	Metrics "Database Time Spent Waiting (%)" is at 100 for event class "Application"	Jan 6, 2004 8:52:08 AM	93	Jan 6, 2004 9:00:38 AM
Warning	User Audit	Audited User	User SYS logged on from EDCDR26P1.	Jan 6, 2004 8:16:00 AM	0	Jan 6, 2004 8:31:00 AM
- Related Alerts:** A section for related alerts.

2. You notice that the recommended action is to run ADDM to get more performance analysis about your system. Click **Additional Advice** .



3. Make sure the snapshot you took is selected from the list. Notice that **SQL statements were found waiting for row lock waits** impacting your system for more than 86% of your database time. Click on this finding in the list.



4. You see the action that needs to be taken to resolve the performance issue. Click on **View Rationale** .

Oracle Enterprise Manager (SYS) - Performance Finding Details - Microsoft Internet Explorer

Address: http://144.25.8.226:5500/em/console/database/instance/hdm?event=findingDetails&findingID=1&target=orcl.us.oracle.com&type=oracle_database&task_id=47

ORACLE Enterprise Manager 10g Database Control

Database: orcl.us.oracle.com > Advisor Central > Automatic Database Diagnostic Monitor (ADDM) > Performance Finding Details

Performance Finding Details

Database Time (minutes) 10.43 Period Start Time Jan 6, 2004 8:30:40 AM Period Duration (minutes) 29.67
 Task Owner SYS Task Name ADDM:1042421205_1_43 Average Active Sessions 0.35

Finding: SQL statements were found waiting for row lock waits.
 Impact (minutes) 8.99
 Impact (%) 86.25

Recommendations

Show All Details | Hide All Details

Details	Category	Benefit (%)
Hide	Application Analysis	86.25

Action: Trace the cause of row contention in the application logic. Use given blocked SQL to identify the database objects involved. Investigate application logic involving DML on these objects.

View Rationale

Findings Path

Expand All | Collapse All

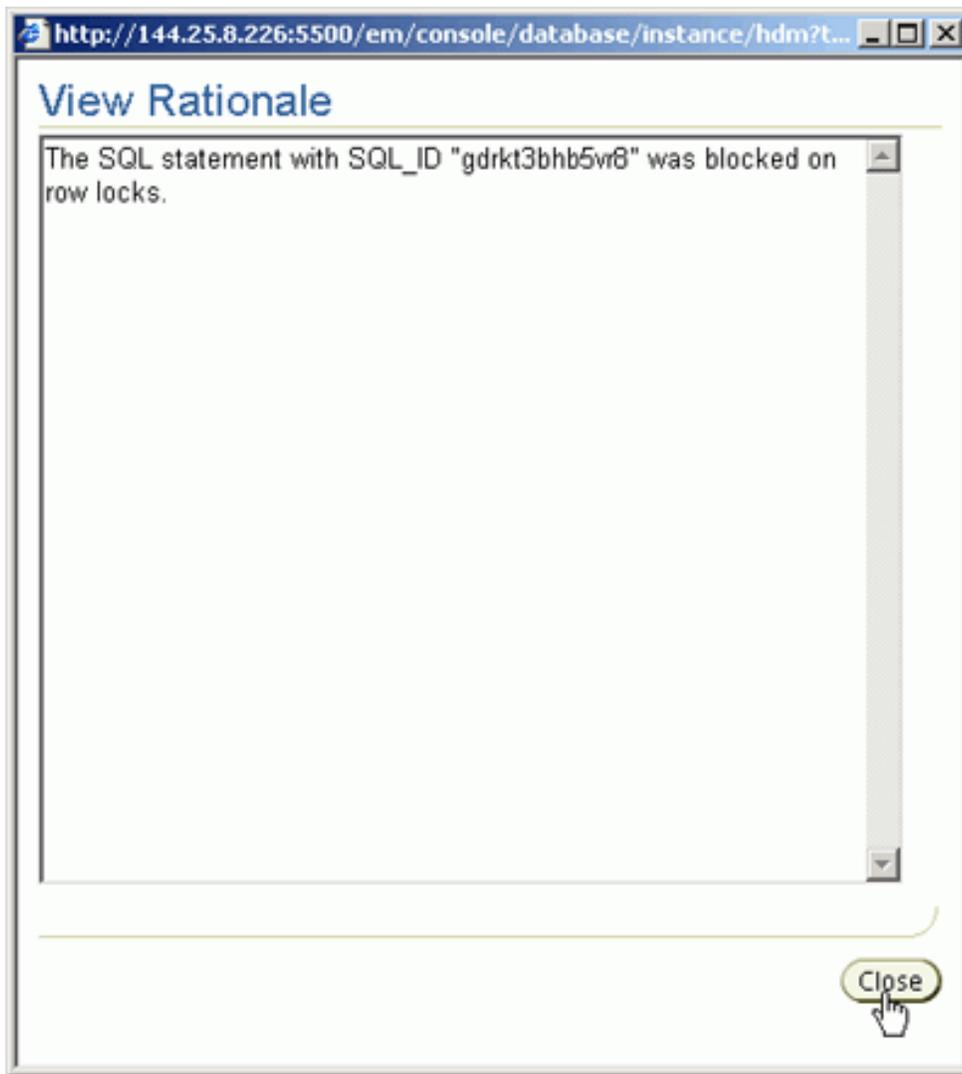
Findings	Impact (%)	Additional Information
SQL statements were found waiting for row lock waits.	86.25	
Wait class "Application" was consuming significant database time.	86.26	

Copyright © 1996, 2003, Oracle. All rights reserved.
 About Oracle Enterprise Manager 10g Database Control

Database | Setup | Preferences | Help | Logout

http://144.25.8.226:5500/em/console/database/instance/hdm?event=findingDetails&findingID=1&target=orcl.us.oracle.com&type=orad Internet

- You see the particular SQL ID that is causing the problem. Click **Close**.



6. To resolve the performance finding, click the **Database** breadcrumb.

Oracle Enterprise Manager (SYS) - Performance Finding Details - Microsoft Internet Explorer

Address: http://144.25.8.226:5500/em/console/database/instance/hdm?event=findingDetails&findingID=1&target=orcl.us.oracle.com&type=oracle_database&task_id=17#

ORACLE Enterprise Manager 10g Database Control

Database: orcl.us.oracle.com > Advisor Central > Automatic Database Diagnostic Monitor (ADDM) > Performance Finding Details

Database Time (minutes) 10.43 Period Start Time Jan 6, 2004 8:30:40 AM Period Duration (minutes) 29.67
 Task Owner SYS Task Name ADDM:1042421205_1_43 Average Active Sessions 0.35

Finding: SQL statements were found waiting for row lock waits.
 Impact (minutes) 8.99
 Impact (%) 86.25

Recommendations

Show All Details | Hide All Details

Details	Category	Benefit (%)
Hide	Application Analysis	86.25

Action: Trace the cause of row contention in the application logic. Use given blocked SQL to identify the database objects involved. Investigate application logic involving DML on these objects.

View Rationale

Findings Path

Expand All | Collapse All

Findings	Impact (%)	Additional Information
SQL statements were found waiting for row lock waits.	86.25	
Wait class "Application" was consuming significant database time.	86.26	

Copyright © 1996, 2003, Oracle. All rights reserved.
 About Oracle Enterprise Manager 10g Database Control

Database | Setup | Preferences | Help | Logout

http://144.25.8.226:5500/em/console/database/instance/sitemap?event=doLoad&target=orcl.us.oracle.com&type=oracle_database&page# Internet

7. Click the **Performance** tab.

The screenshot displays the Oracle Enterprise Manager 10g Database Control interface for the database instance 'orcl.us.oracle.com'. The page is titled 'Database: orcl.us.oracle.com' and shows various performance and configuration metrics.

General Information:

- Status: **Up** (with a Shutdown button)
- Up Since: **Jan 5, 2004 11:46:30 AM**
- Time Zone: **Unavailable**
- Availability (%): **100** (Last 24 hours)
- Instance Name: **orcl**
- Version: **10.1.0.2.0**
- Read Only: **No**
- Oracle Home: [/u01/app/oracle/product/10.1.0](#)
- Listener: [LISTENER_EDCDR26P1](#)
- Host: [edcdr26p1.us.oracle.com](#)

Host CPU:

- Run Queue: **0.0**
- Paging (pages per second): **0.0**

Active Sessions:

- Active Sessions: **0.9**
- SQL Response Time (%): **95.37** (compared to baseline)

High Availability:

- Instance Recovery Time (seconds): **10**
- Last Backup: **n/a**
- Archiving: **Disabled**
- Archive Area Used (%): **n/a**
- Flashback Logging: **Disabled**

Space Usage:

- Database Size (GB): **1**
- Problem Tablespaces: **0**
- Segment Findings: **Not Configured**
- Policy Violations: **0**
- Dump Area Used (%): **58**

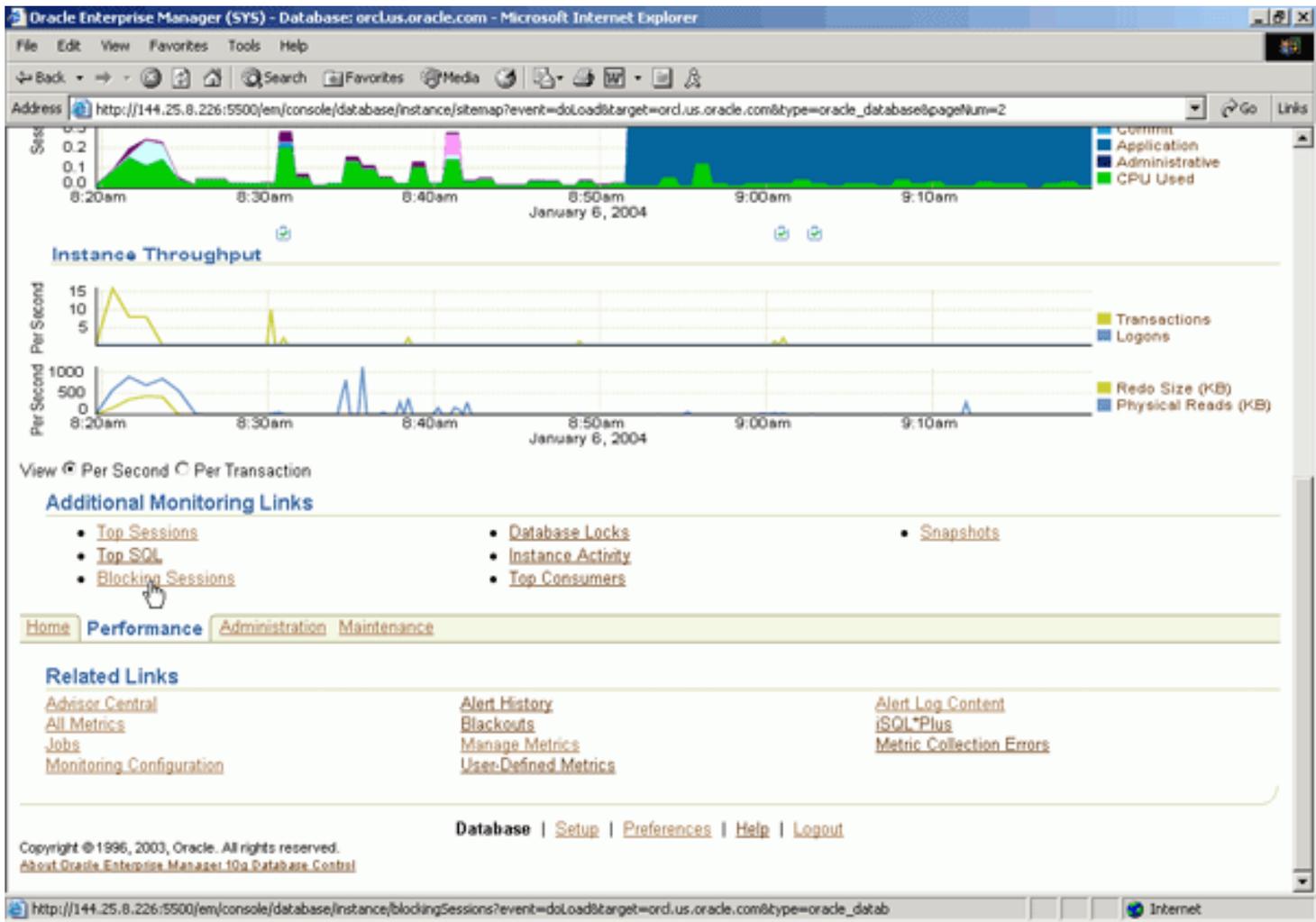
Diagnostic Summary:

- Performance Findings: **0**
- All Policy Violations: **61**
- Alert Log: **No ORA_errors**

Alerts:

- Critical: **0**

8. Scroll down and select **Blocking Sessions** under Additional Monitoring Links.



9. Make sure the highest level HR is selected and click **Kill Session**.

Oracle Enterprise Manager (SYS) - Blocking Sessions - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://144.25.8.226:5500/em/console/database/instance/blockingSessions?event=doLoad&target=orcl.us.oracle.com&type=oracle_database

ORACLE Enterprise Manager 10g Database Control

Setup Preferences Help Logout Database

Database: orcl.us.oracle.com > Blocking Sessions Logged in As SYS

Blocking Sessions

Page Refreshed Jan 6, 2004 9:20:08 AM

View Session Kill Session

Expand All | Collapse All

Select	Username	Sessions Blocked	Session ID	Session Serial Number	SQL Hash Value	Wait Class	Wait Event	P1	P2	P3	Seconds in Wait
<input type="checkbox"/>	Blocking Sessions										
<input checked="" type="checkbox"/>	HR	1	136	4550		Idle	SQL*Net message from client	1650815232	1	0	1788
<input type="checkbox"/>	HR	0	133	6331	gdrk13bht5vr8	Application	eng: TX - row lock contention	1415053318	327727	164	1742

Related Links

[Sessions Waiting](#)
[Database Locks](#)

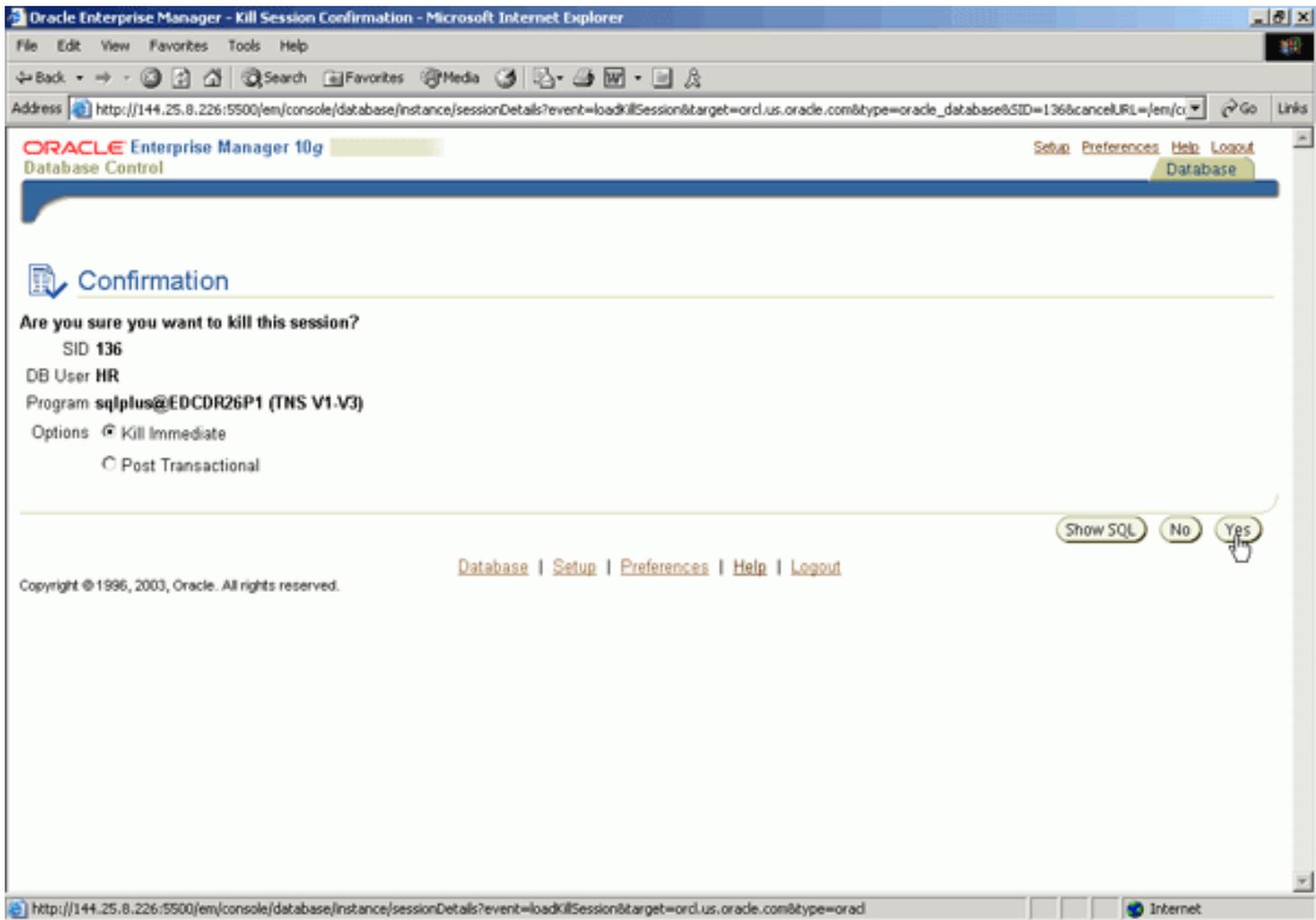
Database | Setup | Preferences | Help | Logout

Copyright © 1996, 2003, Oracle. All rights reserved.
[About Oracle Enterprise Manager 10g Database Control](#)

http://144.25.8.226:5500/em/console/database/instance/blockingSessions?event=doLoad&target=orcl.us.oracle.com&type=oracle_datab Internet

Click **Yes** to kill the session.

10.



The session has been killed. Click the **Database** breadcrumb then click the **Home** tab.

11.

Oracle Enterprise Manager 10g
Database Control

Database: orcl.us.oracle.com > Blocking Sessions Logged in As SYS

Page Refreshed Jan 6, 2004 9:21:24 AM

Select Username	Sessions Blocked	Session ID	Session Serial Number	SQL Hash Value	Wait Class	Wait Event	P1	P2	P3	Seconds in Wait
No sessions found to be currently blocking other sessions.										

Related Links

- [Sessions Waiting](#)
- [Database Locks](#)

[Database](#) | [Setup](#) | [Preferences](#) | [Help](#) | [Logout](#)

Copyright © 1996, 2003, Oracle. All rights reserved.
[About Oracle Enterprise Manager 10g Database Control](#)

Notice the alert has disappeared.

12.

Oracle Enterprise Manager (SYS) - Database: orcl.us.oracle.com - Microsoft Internet Explorer

Address: http://144.25.8.226:5500/em/console/database/instance/sitemap?event=doLoad&target=orcl.us.oracle.com&type=oracle_database&pageNum=1

Page Refreshed Jan 6, 2004 9:20:08 AM [Refresh](#)

View Data:

General

Status Up [Shutdown](#)
Up Since Jan 5, 2004 11:46:30 AM
Time Zone Unavailable
Availability (%) 100 (Last 24 hours)
Instance Name orcl
Version 10.1.0.2.0
Read Only No
Oracle Home [/u01/app/oracle/product/10.1.0](#)
Listener [LISTENER_EDCDR26P1](#)
Host [edcdr26p1.us.oracle.com](#)

Host CPU

Run Queue: 0.4
Paging (pages per second): 0.0

Active Sessions

Active Sessions: 1.0
SQL Response Time (%): ✓ 120.26 (compared to baseline)

High Availability

Instance Recovery Time (seconds): 10
 Last Backup: n/a
 Archiving: Disabled
 Archive Area Used (%): n/a
 Flashback Logging: Disabled

Space Usage

Database Size (GB): 1
 Problem Tablespaces: ✓ 0
 Segment Findings: Not Configured
 Policy Violations: ✓ 0
 Dump Area Used (%): ✓ 58

Diagnostic Summary

Performance Findings: 0
 All Policy Violations: ✗ 61
 Alert Log: No ORA- errors

Alerts

Critical: 0
Warnings: ! 1

Alerts

Severity	Category	Name	Message	Alert Triggered	Last Value	Time
!	User Audit	Audited User	User SYS logged on from EDCDR26P1.	Jan 6, 2004 8:16:00 AM	0	Jan 6, 2004 8:31:00 AM

[Related Alerts](#)